Strategic assessment of service requirements

Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study

March 2025

Queensland Government

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Departmental approvals

Refer to the appropriate Risk Assessment Tool for relevant reviewer and approver

Date	Name	Position	Action required *(Review/endorse/approve)*	Due
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Risk level

☐ GACC major ☐ GACC minor ☐ High risk (but not GACC) ☒ Medium risk

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Document sign off

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Terms and abbreviations

Table 1 Table of Terms and abbreviations

Term	Description
AADT	Annual Average Daily Traffic
AM	Ante meridiem (before noon)
AIMSUN	AIMSUN Next (software for intersection and network analysis)
BC	Business Case
BCAP	Bus Corridor Action Plan
BCC	Brisbane City Council
BSTM-MMv2.4	Brisbane Strategic Transport Model – Multi Modal version 2.4
CBD	Central Business District
CHRA	Cultural Heritage Risk Assessment
DBC	Detailed Business Case
DDA	Disability Discrimination Act
EMP	Environmental Management Plan
EMR	Environmental Management Register
EPBC	Environmental Protection and Biodiversity Conservation
Exit 14	Pacific Motorway northbound off-ramp to Logan Road
FSI	Fatal or Serious Injury
IA	Infrastructure Australia
IPL	Infrastructure Priority List
ILM	Investment Logic Mapping / Map
ISC	Infrastructure Sustainability Council
ITS	Intelligent Transport System
JTV	Journey Time Variability
km	Kilometres
km/h	Kilometres per hour
kV	kilovolt
LOS	Level of Service
NB	northbound
NOF	Network Optimisation Framework
m	metre
M2	Gateway Motorway
M3	Pacific Motorway
MCA	Multi Criteria Analysis
MPPL	Intersection of Logan Sub-Arterial Road / Miles Platting Road / Padstow Road
MSES	Matters of State Environmental Significance
NBN	National Broadband Network
OA	Options Analysis
OnQ	TMR's Project Management Methodology

Term	Description
P90	Cost estimate with a 90 percent confidence level
p.a.	per annum
PAF	Project Assessment Framework
PCNP	Principal Cycle Network Plan
PE	Preliminary Evaluation
PM	Post meridiem (after noon)
PPP	Public Private Partnership
PPR	Project Proposal Report
PRAC	Principal Regional Activity Centre
PUP	Public Utility Plant
QTRIP	Queensland Transport and Roads Investment Program
QTS	Queensland Transport Strategy
REC	Regional Economic Cluster
REF	Review of Environmental Factors
RTP	Regional Transport Plan
s/v	seconds per vehicle
SA2	Statistical Area Level 2
SASR	Strategic Assessment of Service Requirements
SB	southbound
SEQ	South East Queensland
SIS	State Infrastructure Strategy
SME	Subject Matter Expert
SMT	Strategic Merit Test
SRNUIP	State Road Network Upgrade and Improvement Program
TDM	Travel Demand Management
TEPD	Total Excess Passenger Delay
TIPPS	Transport Infrastructure Portfolio Plan and Schedule
TMR	Department of Transport and Main Roads
TMR E&T	Engineering and Technology
TMR PDO	Program Delivery and Operations
TMR PEU	Project Evaluation Unit
TMR PIP	Portfolio Investment Programming
TMR PMO	Portfolio Management Office
TMR SNO	Statewide Network Operations
TMR TSP	Transport Strategy and Planning
vpd	vehicles per day
vph	vehicles per hour
U90	Logan Road
V1	Veloway 1
VHT	vehicle hours travelled
VKT	vehicle kilometres travelled

Executive summary

Introduction

The Department of Transport and Main Roads (TMR) has identified a need to undertake a Planning Study for the future upgrade of the Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road (MPPL) intersection (Study Intersection), in Eight Mile Plains. The Planning Study is being delivered by TMR Metropolitan Region and is funded by the Queensland Transport and Roads Investment Program (QTRIP) (Investment Number 2422929). The Planning Study includes a Strategic Assessment of Service Requirements (SASR) applying the Queensland Government's Project Assurance Framework (PAF) to investigate long term ultimate upgrade options with a capital cost more than $100 million.

Study intersection and broader study area

The broader study area boundary for the MPPL Planning Study was defined based on a review of the existing and emerging transport problems that impact the study intersection, and the associated causal factors.

Figure E1 shows the location of the study intersection and other key elements within the study area.

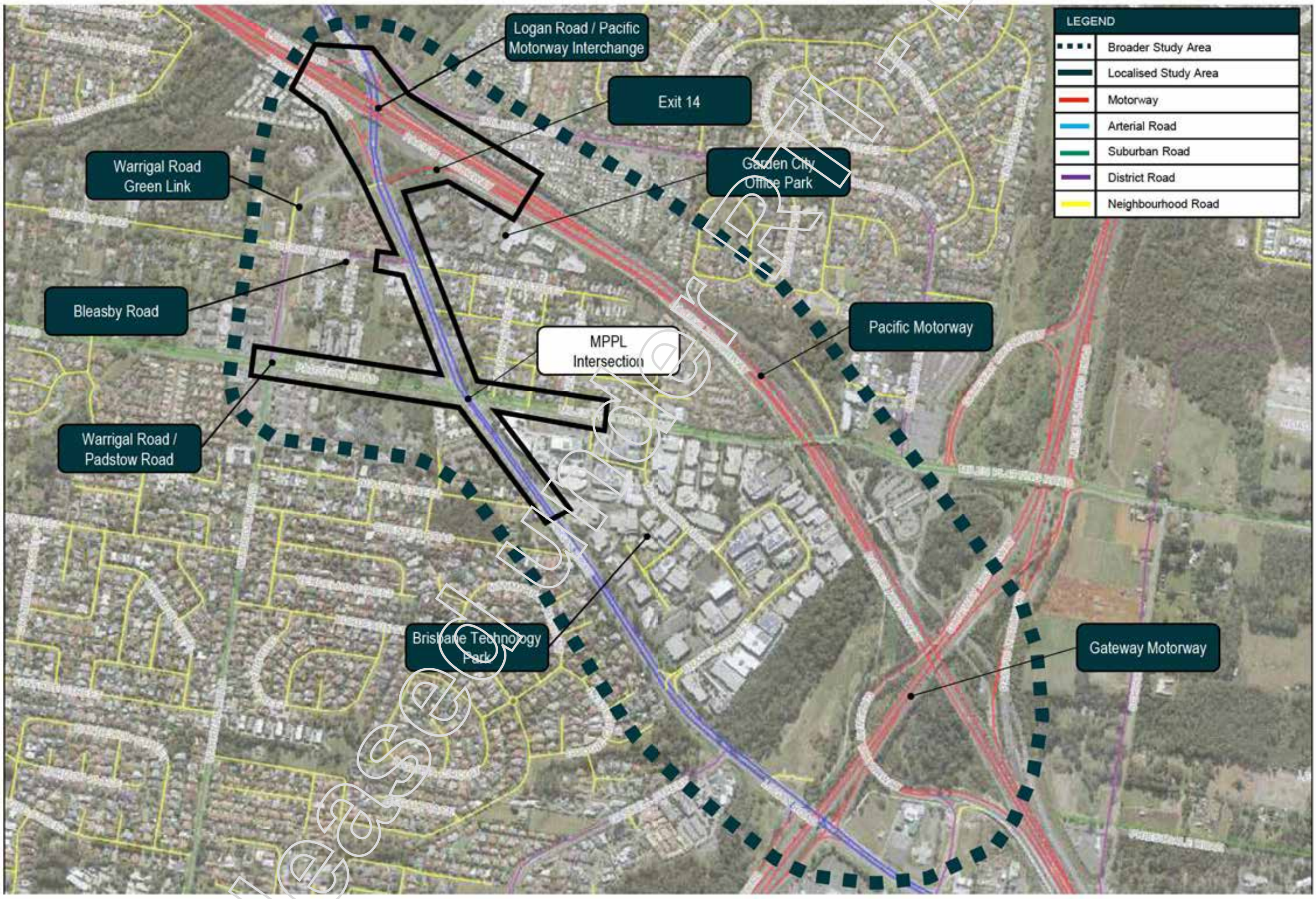


Figure E1 Overview of the study intersection location and key elements within the study area

Logan Road (U90) is a State-controlled arterial road connecting Mount Gravatt Capalaba Road to Underwood Road, with links to the Gateway Motorway (M2) and Pacific Motorways (M3). It has a four-lane median divided carriageway with a 70km/h speed limit. In 2023, the Annual Average Daily Traffic (AADT) was 45,500 vehicles per day (vpd).

The study intersection is an at-grade signalised intersection which forms a major junction of east-west (Miles Platting Road / Padstow Road) and north-south (Logan Road) arterial roads in the southern suburbs of Brisbane. It accommodates all turning movements except the right turn from Logan Road (south) into Miles Platting Road (east).

Problem identification

Table E1 summarises the existing and future transport problems at MPPL and within the broader study area.

Table E1 Summary of existing and future transport problems at MPPL and within the broader study area

Severity of the existing transport problems
Problem Statement #1: Significant congestion at the study intersection during peak periods due to insufficient layout capacity to accommodate increasing demands
• The Logan Road AADT is 45,500vpd (2023) and this is increasing by approximately 1.6% per annum • During typical weekday morning and afternoon peak hour periods, MPPL carries approximately 4,200 and 5,300 vehicles respectively (2022). As a result of these demands, the MPPL intersection currently operates beyond its practical capacity, with excessive vehicle delays and queues, and a Level of Service E (LOS E) • Some motorists use Logan Road to interchange between the M2 and M3 due to the lack of direct connections between the motorways. This results in motorway-to-motorway trips on an arterial road • Some motorists use alternative lower order roads (i.e. Bleasby Road "rat run" and Brisbane Technology Park "rat run") to either avoid congestion at MPPL or due to existing turn restrictions at MPPL
Problem Statement #2: History of casualty crashes within the study area due to significant congestion and queuing on Logan Road and at the study intersection
• 108 casualty crashes were reported within the study area during a 5-year period (July 2018 to June 2023) • The number of reported crashes has been steadily increasing year on year from 16 in 2018 to 25 in 2022 • 68 crashes were categorised as rear end crashes, which is typical for a congested arterial road network • 13 crashes involved pedestrians, cyclists, and motorcyclists, and nine of these resulted in hospitalisation • M3 northbound off-ramp (Exit 14) queues extend back to the M3, increasing the risk of rear-end crashes
Problem Statement #3: Poor travel time reliability for buses within the study area due to the lack of alternative routes and priority infrastructure for public transport
• There is a lack of alternative routes and priority infrastructure for public transport within the study area • Patronage at bus stops within the study area is relatively low. In March 2024, the bus stops on Logan Road and Warrigal Road serviced approximately 50 and 400 boardings / alightings per day respectively • Passengers experience fluctuations in travel time as well as excessive delays within the study area
Problem Statement #4: Lack of active transport infrastructure within the study area reduces safety, attractiveness and reliability for active transport users
• There are significant infrastructure gaps in the active network beyond Veloway 1 (V1) • Whilst V1 provides a high quality dedicated corridor through the study area, connectivity to the V1 is poor • The active transport demands within the study area are low except on the V1. Traffic data (12 hours) from September 2020 and October 2022 recorded less than 10 cyclists riding on-road on Logan Road, Miles Platting Road and Padstow Road compared to 230 cyclists crossing Logan Road along the V1 corridor • 75% of crashes within the study area that involved pedestrians or cyclists resulted in hospitalisation
Potential future transport problems if the Project does not proceed
Problem Statement #1: Significant congestion at the study intersection during peak periods due to insufficient layout capacity to accommodate increasing demands
• Significant population and employment growth is forecast in the suburbs surrounding the study area. This forecast growth will likely result in increased transport demands on Logan Road and associated worsening of congestion at MPPL. It is also likely to hinder economic growth in accordance with ShapingSEQ (2023) • Traffic demands within the study area are forecast to continue to increase by 2-3% per annum to 2041 • Peak hour delays at MPPL are forecast to increase from approximately 60 seconds per vehicle in 2024 to approximately 100-120 seconds per vehicle in 2041. This equates to a LOS F and indicates that the intersection will be operating beyond its practical capacity, resulting in excessive delays and queues
Problem Statement #2: History of casualty crashes within the study area due to significant congestion and queuing on Logan Road and at the study intersection
• Frequency of congestion-related crashes within the study area is expected to continue trending upwards • Frequency and magnitude of the Exit 14 queuing issue is expected to increase
Problem Statement #3: Poor travel time reliability for buses within the study area due to the lack of alternative routes and priority infrastructure for public transport
• Bus travel times are forecast to increase for 6 minutes in 2024 to approximately 10-12 minutes in 2041 • Public transport mode share within the study area is expected to remain relatively low
Problem Statement #4: Lack of active transport infrastructure within the study area reduces safety, attractiveness and reliability for active transport users
• Active transport mode share within the study area is expected to remain relatively low

Investment Logic Map

An Investment Logic Map (ILM) was developed to document the process for identifying the problem definition and corresponding service requirements and project benefits which is undertaken prior to the development and assessment of project options. Figure E2 summarises the endorsed ILM for the Project.

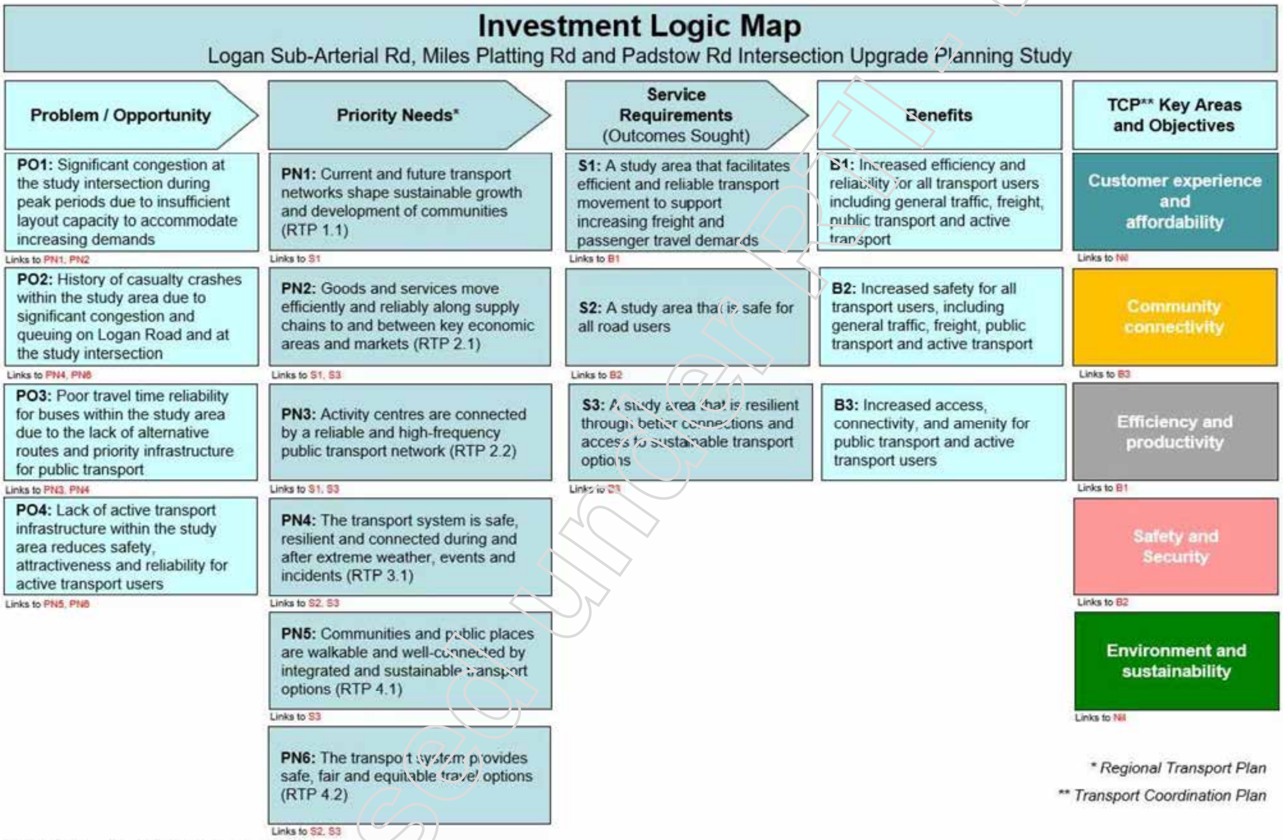


Figure E2 Investment Logic Map

Long list of potential options

Table E2 summarises the long list of potential non-asset, existing asset, and new asset options that were developed in response to the identified problems within the study area and the endorsed outcomes sought by the Project.

Table E2 Summary of potential non-asset, existing asset, and new asset options

		Option	Option Description
Non-Asset Options	1	Signal optimisation	Dynamic traffic signal optimisation and coordination at key intersections along Logan Road to improve the peak hour efficiency of traffic and bus movements
	2	Travel demand management	Travel demand management initiatives (e.g. travel behaviour change, travel information tools, road user pricing etc.) to reduce congestion within the study area
	3	Land use planning changes	Limit the magnitude of population growth and / or redirect the growth to existing areas which are closer to activity centres to reduce congestion within the study area
	4	Reduced / variable speed limits	Reduce the existing posted speed limit on Logan Road and / or install Variable Speed Limits to improve safety for all users including pedestrians and cyclists
Existing Asset Options	5	Logan Road / Warrigal Road intersection upgrade	At-grade intersection upgrade to address safety risks associated with queues on Exit 14 extending back to the M3, and Logan Road queues extending back to MPPL
	6	MPPL at-grade intersection upgrade	At-grade intersection upgrade to increase layout capacity and reduce potential for Logan Road queues to extend back to the Logan Road / Warrigal Road intersection
	7	Bus lanes / queue jumps / signal priority	Bus lanes on Logan Road and / or bus jump lanes and associated traffic signal priority at key intersections to prioritise bus movements through the study area
	8	Warrigal Road general traffic link	Open the Warrigal Road Green Link (a 280m bus only link between Bleasby Road and the Logan Road access road) to general traffic to reduce traffic demands and associated peak hour congestion on Logan Road and at the MPPL intersection
New Asset Options	9	Active transport links	Provide dedicated active transport infrastructure within the study area in accordance with TMR's Principal Cycle Network Plan, and improve connectivity to the V1
	10	M3 to M2 ramps	Provide new northbound and southbound ramp connections between the M2 and M3 to reduce traffic demands on Logan Road and improve performance of MPPL
	11	MPPL partial grade separation	Provide a partial grade separation at MPPL (e.g. southbound right turn from Logan Road into Padstow Road) to reduce traffic demand through the at-grade intersection
	12	MPPL interchange	Upgrade MPPL to a grade separated interchange to provide free-flow conditions on Logan Road and facilitate all other movements via two at-grade intersections

Strategic Merit Test outcomes

A qualitative Strategic Merit Test (SMT) was undertaken to evaluate which options could fulfil the service requirements, and identify a short list of options that warrant further assessment during the Preliminary Evaluation (PE) phase. The options were assessed based on fulfilment of the service requirement, using the following rating system:

- **Low (L):** Poor or non-fulfilment of the service requirement, significant residual issues will remain
- **Medium (M):** Partial fulfilment of the service requirement or adequate fulfilment of a portion of the desired useful life, some residual issues will remain
- **High (H):** Excellent fulfilment of the service requirement with significant improvements in project outcomes.

Table E3 presents the results of the SMT and a brief justification for the scoring against each service requirement.

The SMT results indicate that no option in isolation could achieve excellent fulfilment of all three service requirements.

Table E3 Strategic Merit Test outcomes

Options		Service Requirements						Further Assessment Recommended?
		SR1		SR2		SR3		
Base Case	Business as usual	L	No change to existing situation	L	No change to existing situation	L	No change to existing situation	No
1	Signal optimisation	L	No material change to existing situation	L	No material change to existing situation	L	No material change to existing situation	No
2	Travel demand management	L	No material change to existing situation	L	No material change to existing situation	L	No material change to existing situation	No
3	Land use planning changes	L	No material change to existing situation	L	No material change to existing situation	L	No material change to existing situation	No
4	Reduced / variable speed limits	L	No change to existing road network capacity	M	Improved safety outcomes for all road users	M	Improved safety outcomes for active transport users	Yes – as part of other options
5	Logan Road / Warrigal Road intersection upgrade	H	Significant increase in network capacity on Logan Road and at Exit 14	M	Reduced queuing on Logan Road and Exit 14, but not at MPPL	M	Localised active transport network upgrades and improved bus travel times	Yes
6	MPPL at-grade intersection upgrade	M	Moderate increase in network capacity on Logan Road and at MPPL	M	Improved safety at MPPL but no change to existing situation at Exit 14	M	Localised active transport network upgrades and improved bus travel times	Yes
7	Bus lanes / queue jumps / signal priority	L	No change to existing road network capacity	L	No material change to existing queueing on Logan Road or at Exit 14	M	Localised bus network upgrades and improved bus travel times	No
8	Warrigal Road general traffic link	M	Moderate reduction in traffic demands on Logan Road and at MPPL	L	Reduced safety for users of V1 crossing Warrigal Road (increased traffic demands)	L	Reduced bus priority along the Green Link and reduced bus travel times	No
9	Active transport links	L	No change to existing road network capacity	M	Improved safety outcomes for active transport users	H	Significant active transport network upgrades	Yes – as part of other options
10	M3 to M2 ramps	L	No material change to network capacity on Logan Road or at MPPL	L	No material change to existing queueing on Logan Road or at Exit 14	L	No material change to existing situation	No
11	MPPL partial grade separation	M	Moderate increase in network capacity on Logan Road and at MPPL	M	Improved safety at MPPL but no change to existing situation at Exit 14	M	Localised active transport upgrades and improved bus travel times	Yes
12	MPPL interchange	H	Significant increase in network capacity on Logan Road and at MPPL	M	Improved safety at MPPL but no change to existing situation at Exit 14	M	Localised active transport upgrades and improved bus travel times	Yes

Options rejected in SASR stage

Table E4 lists the options rejected in the SASR stage due to not adequately addressing the service requirements. A summary of the rationale for rejecting these options is provided below and further details are provided in Chapter 6.6.

Table E4 Options rejected in the SASR phase

Options		Reason for Not Proceeding
Base Case		
Base Case	'Do minimum' option	The Base Case is a continuation of the existing problems and does not satisfy the service requirements, as summarised below: • **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**
Non-asset		
1	Signal Optimisation	• **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**
2	Travel Demand Management	• **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**
3	Land Use Planning Changes	• **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**
Existing asset		
7	Bus Lanes / Queue Jumps / Signal Priority	• **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** Localised active transport network upgrades and improved bus travel times may partially contribute to achieving better connections and access to sustainable transport • **Service requirements are not addressed.**
8	Warrigal Road General Traffic Link	• **SR1:** Moderate reduction in traffic demands on Logan Road and at MPPL may partially address the existing transport efficiency and reliability issues within the study area • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**
New asset		
10	M3 to M2 Ramps	• **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**

Options recommended for further analysis in the Preliminary Evaluation (PE) stage

Table E5 summarises the options recommended for further analysis.

Table E5 Options recommended for further analysis in PE phase

Options		Reason for Recommendation
Non-asset		
4	Reduced / Variable Speed Limits	• **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Reduced / variable speed limits are expected to improve safety for all road users • **SR3:** Reduced / variable speed limits are expected to improve safety outcomes for active transport users which may partially contribute to improved connectivity and access to sustainable transport options within the study area • **Service requirements are partially addressed.**
Existing asset		
5	Logan Road / Warrigal Road Intersection Upgrade	• **SR1:** Significant increase in network capacity on Logan Road and at Exit 14 is expected to improve existing transport efficiency and reliability issues, but not at MPPL • **SR2:** Reduced vehicular queueing on Logan Road and Exit 14 is expected to improve existing safety issues within the study area, although not specifically at MPPL • **SR3:** Localised active transport upgrades and improved bus travel times may partially contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**
6	MPPL At-Grade Intersection Upgrade	• **SR1:** Moderate increase in network capacity on Logan Road and at MPPL is expected to improve existing transport efficiency and reliability issues, but not at Exit 14 • **SR2:** Reduced vehicular queueing on Logan Road and at MPPL is expected to improve existing safety issues within the study area, although not specifically at Exit 14 • **SR3:** Localised active transport upgrades and improved bus travel times may partially contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**
New asset		
9	Dedicated Active Transport Links	• **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Significant active transport network upgrades within the study area are expected to improved safety outcomes for active transport users • **SR3:** Significant active transport network upgrades within the study area are expected to contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**
11	MPPL Partial Grade Separation	• **SR1:** Moderate increase in network capacity on Logan Road and at MPPL is expected to improve existing transport efficiency and reliability issues, but not at Exit 14 • **SR2:** Reduced vehicular queueing on Logan Road and at MPPL is expected to improve existing safety issues within the study area, although not specifically at Exit 14 • **SR3:** Localised active transport upgrades and improved bus travel times may partially contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**
12	MPPL Interchange	• **SR1:** Significant increase in network capacity on Logan Road and MPPL is expected to improve existing transport efficiency and reliability issues, but not at Exit 14 • **SR2:** Reduced vehicular queueing on Logan Road and at MPPL is expected to improve existing safety issues within the study area, although not specifically at Exit 14 • **SR3:** Localised active transport upgrades and improved bus travel times may partially contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**

Recommended integration of options for further investigation in PE stage

The SMT results indicate that:

- No option in isolation could achieve excellent fulfilment of all three service requirements
- Infrastructure options (existing and / or new) are required to fully satisfy the service requirements for the Project
- There is an opportunity to investigate integrated options during the PE phase to maximise the potential for the Project to achieve excellent fulfilment of the service requirements. This could include combining non-asset options with existing or new asset options, and / or combining existing and new asset options.

The existing peak hour congestion and associated safety and performance issues at MPPL influences and is heavily influenced by the performance at the Logan Road / Warrigal Road / Exit 14 intersection. It is anticipated that existing and / or new asset options will be required at both intersections to fully satisfy the Project's service requirements.

Table E6 summarises the recommended integration of options for further investigation in the PE phase.

Table E6 Recommended integration of options for further investigation in PE phase

Primary Option ID	Service Requirement 1 (SR1) Focused				SR2 Focused	SR3 Focused
	Logan Road / Warrigal Road	MPPL Intersection				
	Option 5	Option 6	Option 11	Option 12	Option 4	Option 9
5	✓	-	-	-	✓	✓
6	✓	✓	-	-	✓	✓
11	✓	-	✓	-	✓	✓
12	✓	-	-	✓	✓	✓

Key points are summarised below:

- All integrated options should include Option 5 (Logan Road / Warrigal Road Intersection Upgrade), noting the interaction with MPPL and safety concerns associated with the extent and frequency of Exit 14 queuing back to the M3
- The potential scale of infrastructure works at MPPL incrementally increases from no works (i.e. Option 5 as a standalone option), to an at-grade upgrade (Option 6), then a partial grade separation (Option 11), and finally a full grade separation (Option 12)
- All integrated options should include Option 4 (Reduced / Variable Speed Limits) to maximise safety benefits
- All integrated options should include Option 9 (Dedicated Active Transport Links) to maximise access to sustainable transport options within the study area and connectivity to the Veloway 1.

Recommendations

It is recommended that the Investment Decision Making Body:

- **Approve** the Project to proceed from Gate 1 to Gate 2 under the PAF
- **Approve** the following short list of integrated options to proceed to the PE (Gate 2) stage of the PAF process:
  - **Option 5:** Logan Road / Warrigal Road intersection upgrade combined with Option 4 and 9
  - **Option 6:** MPPL at-grade intersection upgrade combined with Option 4, 5 and 9
  - **Option 11:** MPPL partial grade separation combined with Option 4, 5 and 9
  - **Option 12:** MPPL interchange combined with Option 4, 5 and 9
- **Note** that the PE stage of the Project is subject to future funding following Gate 1 submission.

1. Introduction

1.1 Project Assessment Framework

The Queensland Government's Project Assessment Framework (PAF) is used across agencies to ensure a common, rigorous approach to assessing projects at critical stages in their lifecycle, from the initial assessment of the service required, through to delivery. The PAF's application is not limited to infrastructure projects or public private partnership (PPP) projects. At each stage, the project's progress and quality is assessed to ensure that the project (and associated investment) meets strategic objectives and achieves value for money. Once a project 'clears' a particular stage, it can progress to the next. The PAF provides tools and techniques to assess projects throughout the project lifecycle, defined to include eight project stages, as outlined on Figure 1.

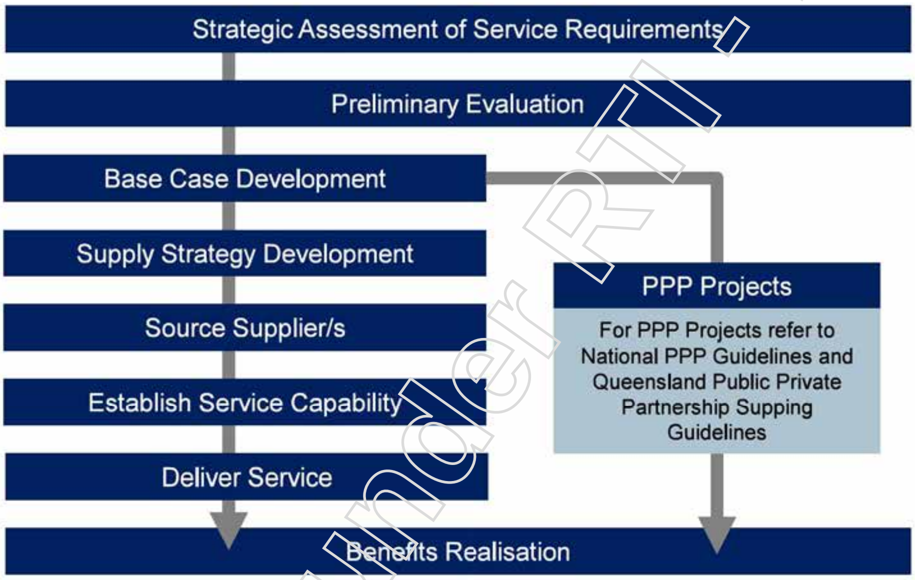


Figure 1 PAF stages

1.2 Purpose of the SASR

The purpose of the Strategic Assessment of Service Requirement (SASR) pre-project stage is to provide information to assist investment decision makers in making an informed decision regarding whether to initiate a project to meet an identified service need. The SASR will clearly articulate the outcome sought to ensure that the response that is developed will be effective and deliver value for money for government.

The key activities undertaken during the SASR pre-project stage are to:

- Provide an overview of the background of the initiative (Chapter 2)
- Confirm the alignment this initiative has with strategic objectives (Chapter 3)
- Identify the problem/s needing to be addressed, or opportunities to be gained (Chapter 4)
- Identify what outcomes are being sought (Chapter 5)
- Identify a range of potential options to achieve the outcomes sought and address the problems (Chapter 6)
- Determine readiness to proceed to the next stage, by detailing a plan and budget (Chapter 7)
- Seek approval to proceed to the next stage (Chapter 8).

1.3 Ownership and governance

Figure 2 illustrates the ownership and governance of the initiative during the SASR stage.

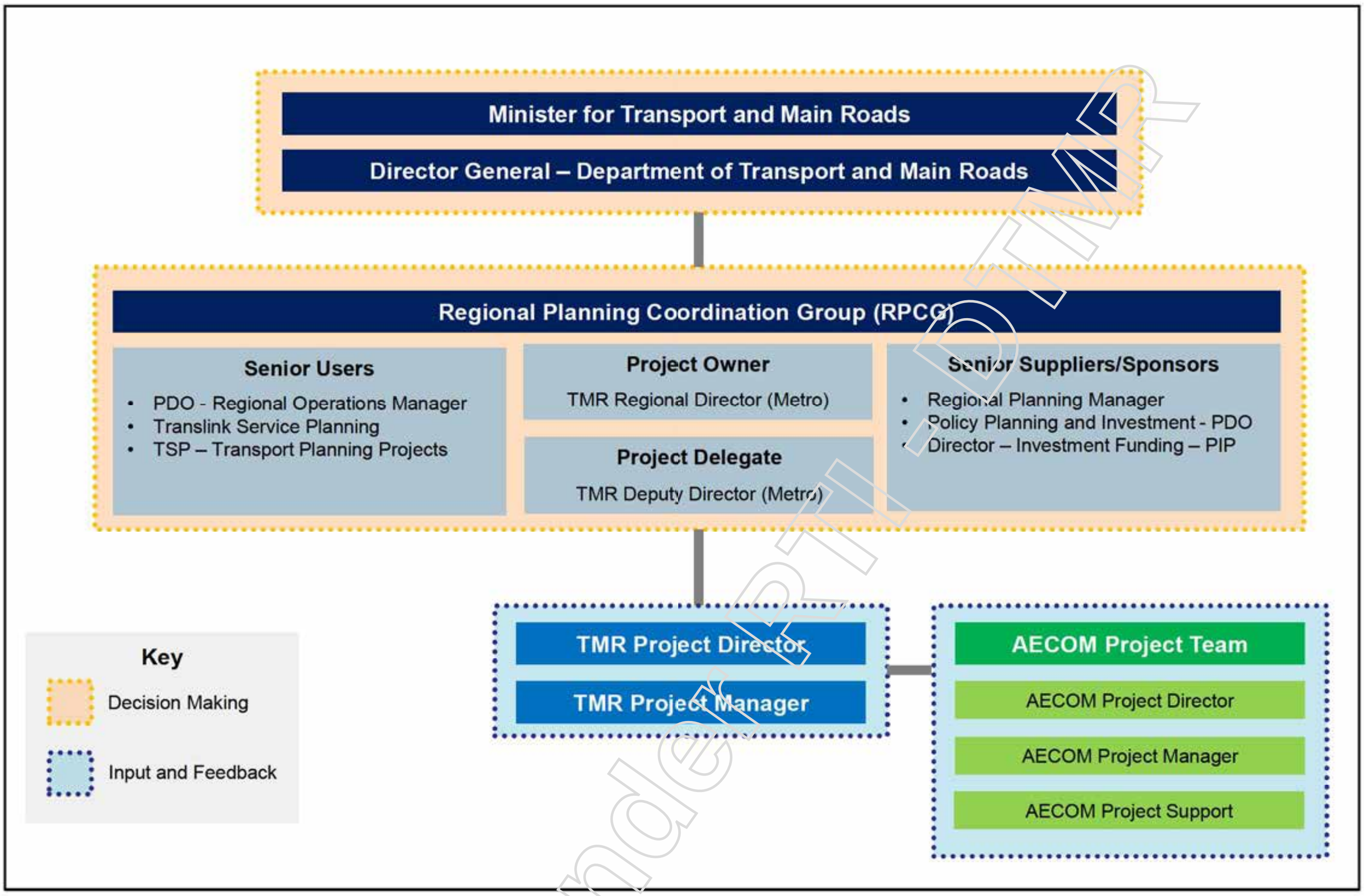


Figure 2 Governance diagram – SASR phase

Specific responsibilities of the key governance roles:

- **Regional Planning Coordination Group:** is the primary leadership and decision-making group for all planning matters in the Metropolitan Region. The RPCG governs all Transport System Planning Program (TSPP) projects in SQR, including those projects contained in, and spanning the applicable region. The RPCG will also assess the progress of the Region's planning program, including status of planning approvals, projects and investment decisions
- **Project Owner:** is the Regional Director for QTRIP projects responsible for seeking changes to investment programs where additional project funding is required for cost overruns
- **TMR Project Director:** is responsible for providing high-level support and advocacy for the Project, ensuring project objectives are met, approving changes to scope, deliverables, and budget
- **TMR Project Manager:** is responsible for achieving the Project objectives within the defined scope and managing all activities required to deliver quality deliverables within time and budget agreed with RPCG, as well as oversight of consultant team (AECOM)
- **AECOM Project Team:** is responsible for undertaking technical investigations and preparing quality deliverables to support the preparation of the SASR report in partnership with TMR's Project Director and Project Manager.

2. Initiative background

2.1 Study area

The Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road intersection (MPPL / Study Intersection) is located within Eight Mile Plains, approximately 15km south-east of the Brisbane Central Business District (CBD).

Figure 3 illustrates the location of the study intersection within the broader road network.

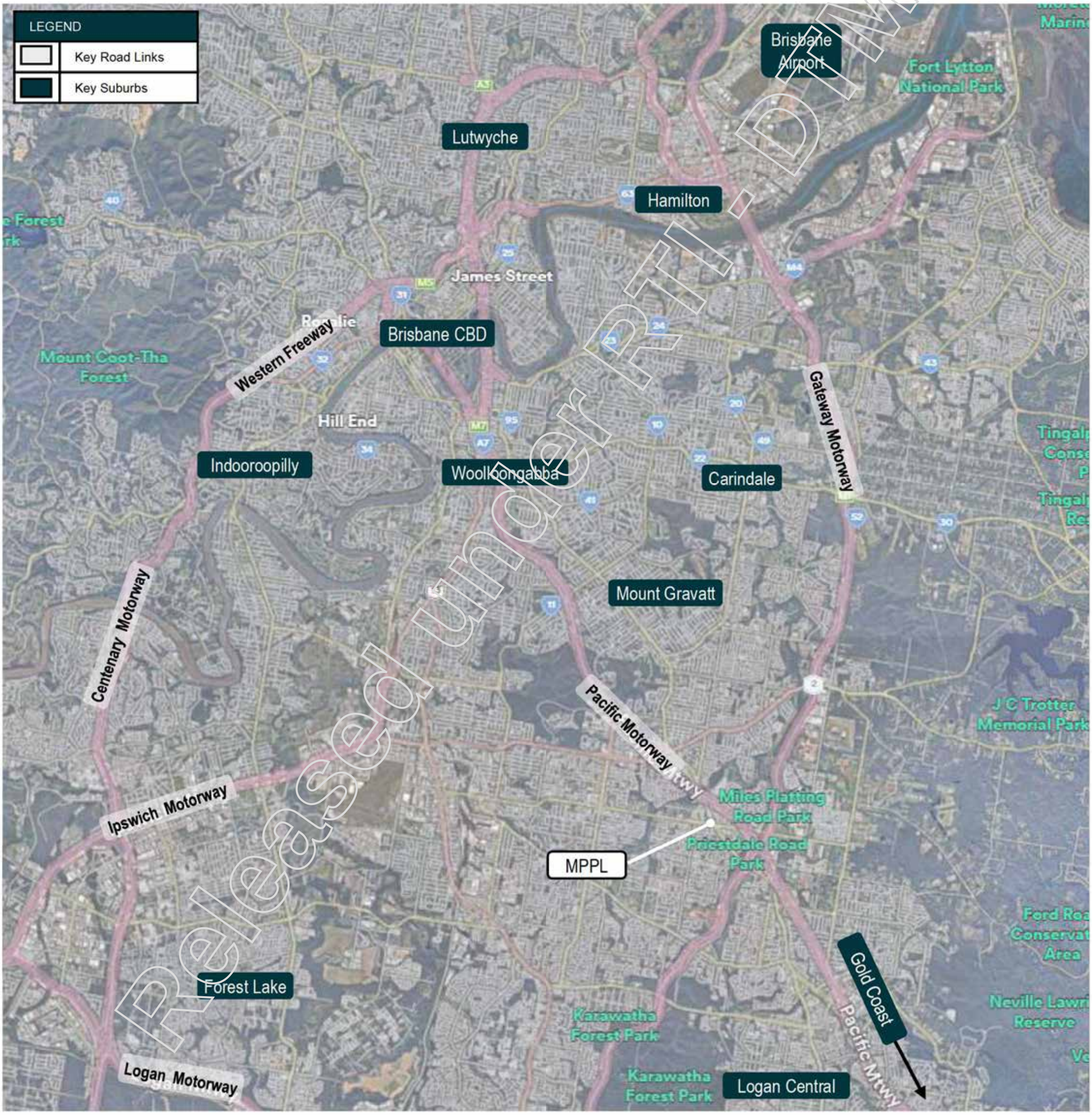


Figure 3 Location of the study intersection within the broader road network

Figure 4 shows the location of the study intersection and other key elements within the study area.

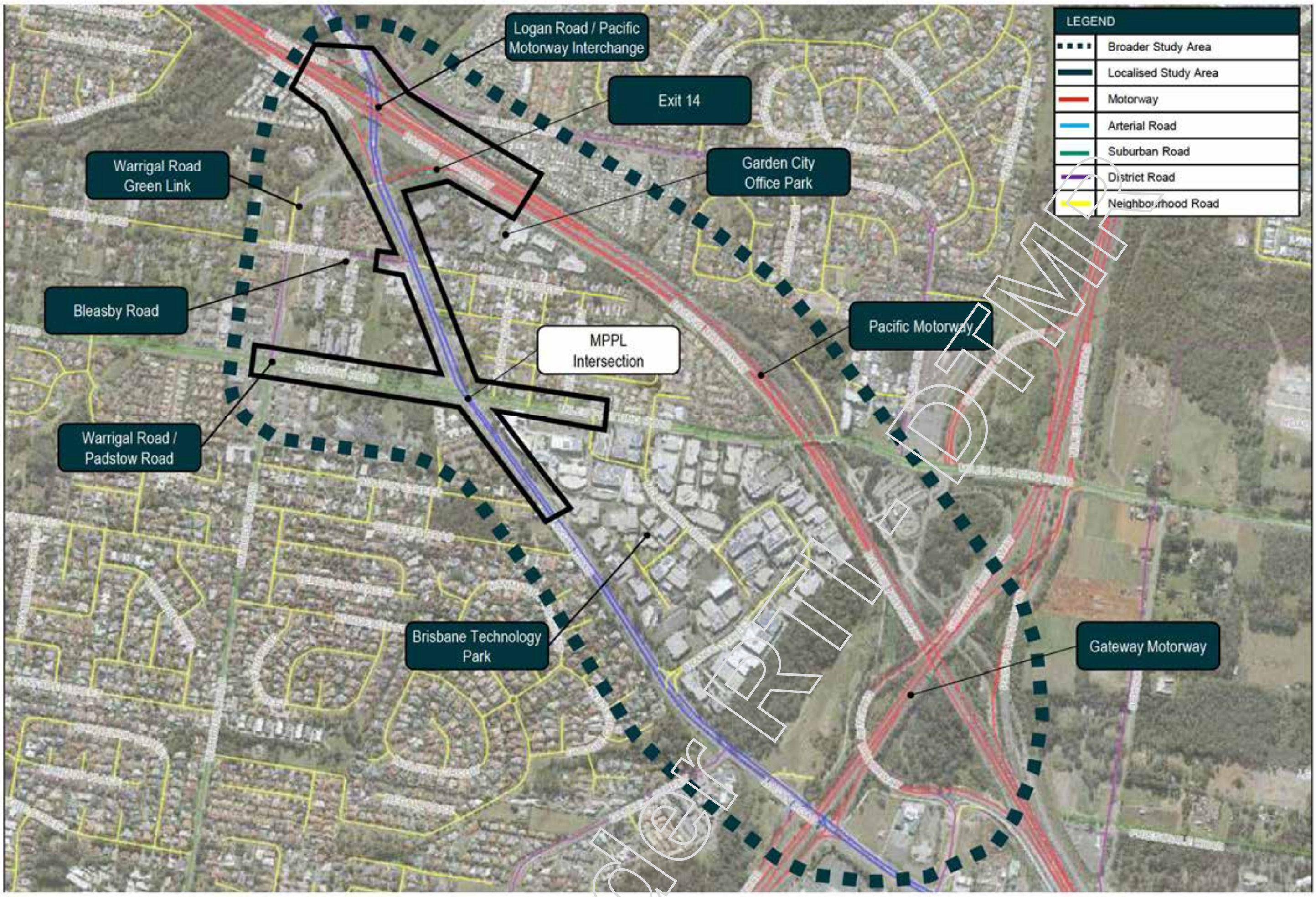


Figure 4 Location of the study intersection and other key elements within the study area

In addition to the MPPL intersection, the broader study area includes the following key elements:

- Logan Road (U90)
- Gateway Motorway (M2) and Pacific Motorway (M3)
- Logan Road / Pacific Motorway interchange and associated on and off ramps (Exit 14)
- Intersections of Warrigal Road / Padstow Road and Logan Road / Bleasby Road
- Warrigal Road Green Link.

Logan Road (U90) is a State-controlled arterial road connecting Mount Gravatt Capalaba Road to Underwood Road, with links to the M2 and the M3. It has a four-lane median divided carriageway with a posted speed limit of 70km/h. In 2023, the Annual Average Daily Traffic (AADT) volume on Logan Road north of MPPL was 45,500 vehicles per day (vpd).

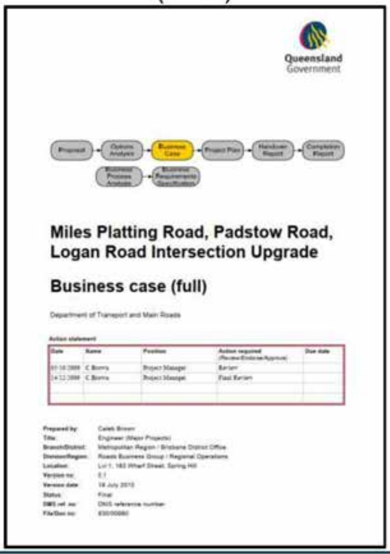
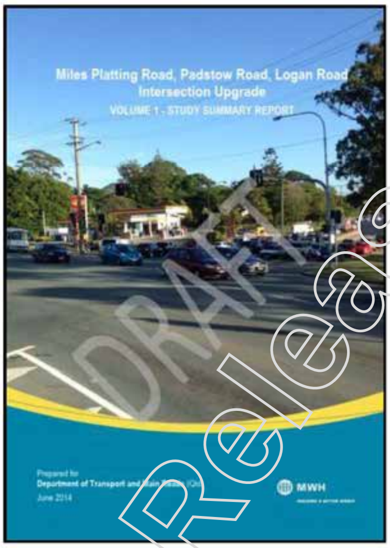
The signalised at-grade study intersection forms a major junction of east-west (Miles Platting Road / Padstow Road) and north-south (Logan Road) arterial roads in the southern suburbs of Brisbane. In 2022, the study intersection was used by approximately 4,200 and 5,300 vehicles in the AM and PM peak hours respectively, which resulted in extensive delays and queues, and had a significant influence on the performance of the surrounding road network.

The broader study area was defined based on a review of the existing and emerging transport issues that impact the study intersection. For example, traffic investigations revealed that some motorists use Logan Road through the MPPL intersection to interchange between the M2 and M3, which is located approximately 1.2km south-east of MPPL, due to the lack of direct links between the motorways. However, a smaller localised study area boundary was adopted to inform the problem identification and the service requirements for the SASR, noting that the Planning Study is for the future upgrade localised at the MPPL intersection. The broader study area was not deemed suitable for this purpose.

2.2 Previous strategic or detailed planning studies

Table 2 summarises previous transport planning studies within the study area. It is noted that there are no previous non transport planning studies that have been undertaken by other government agencies that would influence this project.

Table 2 Previous studies

Study title	Key points relevant to SASR study area
Miles Platting Road, Padstow Road, Logan Road Intersection Upgrade – Business Case (2010) 	In 2010, TMR completed a Planning Study and Business Case for MPPL which identified a preferred ultimate upgrade solution (Option MT1), as well as the following additional works: • The Warrigal Road Green Link (this has been constructed) • An upgrade of the Logan Road / Warrigal Road intersection with an additional right-turn lane on the M3 exit ramp approach • A new U-turn facility and signalised pedestrian crossing on Logan Road near Bleasby Road and London Street • Signalisation of the Miles Platting Road / Buckingham Place intersection (this has been constructed) • Extension of Manchester Street to Buckingham Place through Buckingham Place Park for local residential access. The P90 risk-adjusted cost estimate for Option MT1 was approximately $133M ($2011) excluding escalation allowance. The preferred option was not funded for construction due to high project estimated costs. **Note:** the 2010 BC option is assessed in Chapter 6 of this SASR report via a Strategic Merit Test (SMT) against the endorsed project service requirements.
Miles Platting Road, Padstow Road, Logan Road Intersection Upgrade – Planning Review (2014) 	In 2014, TMR completed a Planning Review of the 2010 BC with the intent to identify a more cost-effective solution. The review confirmed that there are constraints which limit the ability to develop cost-effective options, including: • Established properties (e.g. petrol station and sub-station) • Recent upgrades (e.g. at the Warrigal Road / Padstow Road and Buckingham Place / Miles Platting Road intersections) • Future committed and planned TMR projects (e.g. Logan Road Improvement Works and Warrigal Road Green Link, which were both subsequently delivered in 2015) The review confirmed the issues identified in the 2010 Business Case were still valid but suggested that Option MT1 provided more infrastructure than required in the 2031 design horizon. Consequently, the review recommended a revised ultimate upgrade solution with a reduced footprint, referred to as Option 4. The review noted that Option 4 required a similar number of property resumptions to the 2010 Business Case Option MT1 but reduced the extent of construction and pavement requirements. The P90 risk-adjusted cost estimate for Preferred Option 4 was approximately $97M ($2011) excluding escalation allowance. An interim stage of Option 4 was constructed in 2015. This included an extension of the Logan Road southbound right turn lane and the provision of a new southbound on-road cycle lane. **Note:** the 2014 planning review option is assessed in Chapter 6 of this SASR report via a SMT against the endorsed project service requirements.

<table>
<tr><th>Study title</th><th>Key points relevant to SASR study area</th></tr>
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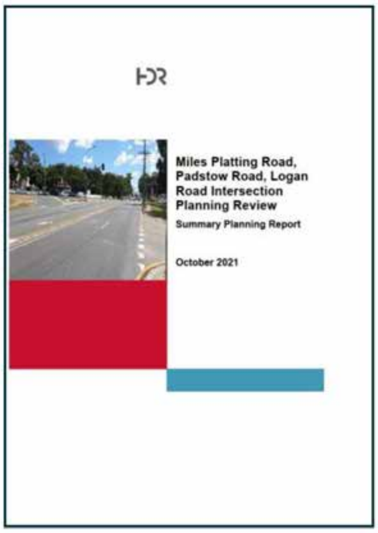
Miles Platting Road, Padstow Road, Logan Road Intersection Planning Review and Options Analysis (2021)



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In 2021, TMR completed another review of Option MT1 as well as an Options Analysis for the following alternative upgrades:

- **Option RI1:** Traditional signals
- **Option RI2:** Right-turn flyover
- **Option RI3:** Northbound flyover
- **Option RI4:** Displaced right-turn
- **Option RI5:** Median U-turn
- **Option RI5A:** Single median U-turn
- **Option RI6:** Alternative right turn routes.

A detailed multi-criteria assessment (MCA) identified Option RI5A as the preferred as it "*balances traffic performance with property impacts and improves flexibility to manage traffic demand increases and traffic pattern changes*".

Key features for Ultimate Option RI5A include:

- Three through lanes on Logan Road in both directions
- Removal of all left turn slip lanes at the MPPL intersection
- Removal of the southbound right-turn lanes on Logan Road
- New two-lane midblock U-turn south of the intersection
- Closure of Liverpool Street and Meadow Street
- Limiting Fraser Street to Left-in / Left-out.

The P90 risk-adjusted cost estimate for Option RI5A was approximately $138M ($2021) excluding escalation allowance.

Note: the 2021 ultimate OA option is assessed in Chapter 6 of this SASR report via a SMT against the endorsed project service requirements.

In additional to a potential ultimate solution, the 2021 OA also identified a series of low-cost (LC) options that could be potentially implemented in the short-term without land acquisitions or the need for major infrastructure works, including:

- **Option LC1:** Northbound M3 ramp left-turn reconfiguration
- **Option LC2:** M3 entry ramp storage increase
- **Option LC3:** Southbound Logan right-turn reconfiguration
- **Option LC4:** Westbound Padstow left-turn reconfiguration
- **Option LC5:** Southbound Logan left-turn extension
- **Option LC6:** Northbound Logan left-turn extension

Whilst LC5 (Southbound Left Turn lane) required an extension of an existing drainage structure and extending the road pavement into the verge, all other options only required line marking modifications and other minor works.

The LC option from the 2021 OA formed the basis of the 2025 OnQ BC.

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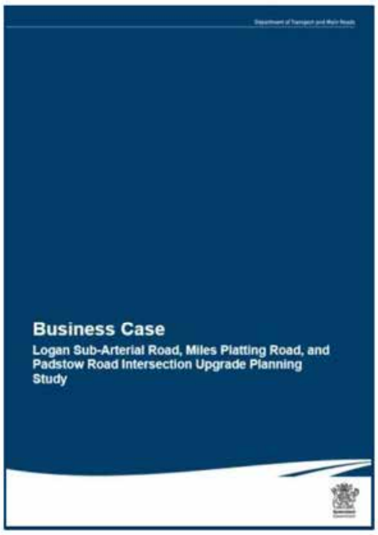
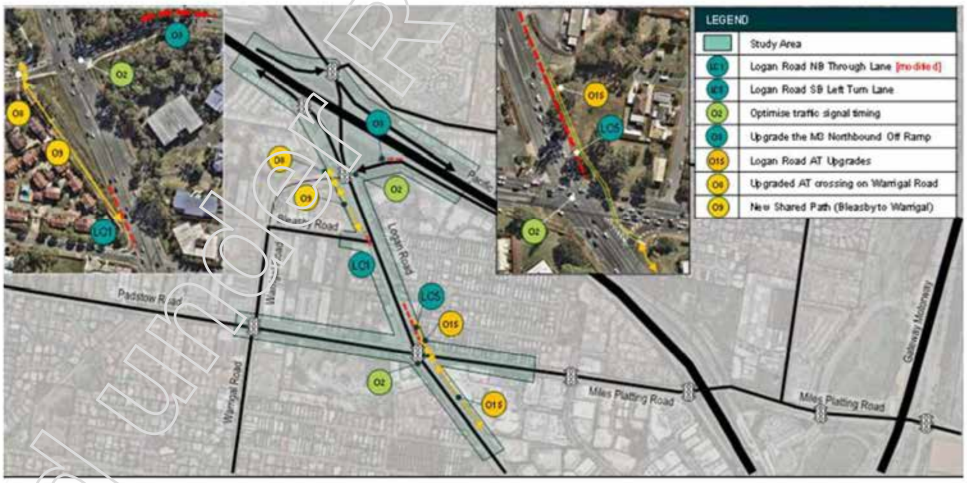
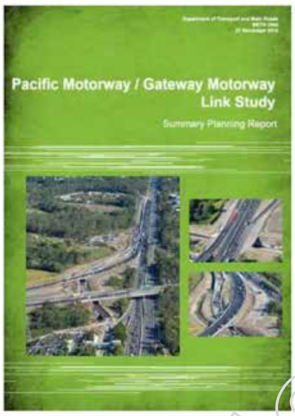
Study title	Key points relevant to SASR study area
Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study (2025) 	In 2024/25, TMR prepared an OnQ BC for a low-cost interim upgrade solution (capital cost less than $50 million) for the MPPL intersection, which built upon an Options Analysis (OA) completed in 2021. Delivery of this project is not funded. The preferred option includes the following elements: • **LC1 (Modified):** Installing give-way control on Bleasby Road and converting the continuous lane at this location into an added lane for Logan Road • **LC5:** Installing a new southbound left turn lane on approach to MPPL • **O3:** Extending the right turn lane storage length on Exit 14 • **O8:** Installing a raised pedestrian crossing on Warrigal Road • **O9:** Installing a Shared Use Path (SUP) on Logan Road northbound between Bleasby Road and Warrigal Road adjacent to the property boundary • **O15:** Installing a separated facility on Logan Road southbound prior to MPPL for cyclists and pedestrians, and then a 3m SUP southbound after MPPL • **O2:** reviewing / optimising traffic signal timing and coordination at MPPL and the intersection of Logan Road / Warrigal Road / Exit 14, noting the abovementioned network changes (e.g. LC1 Modified, O3, and LC5). Given the low cost interim nature of the OnQ BC, these works, when delivered, are not expected to materially impact future stages of the Planning Study. 

2.3 Related projects

Table 3 summarises related projects that may influence or have a material impact on the requirements for this Project:

Table 3 Related projects

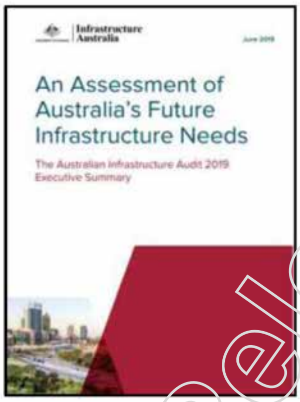
Related project	Description
Brisbane South Area Study (BSAS) (2013) 	The BSAS was prepared in 2013 to provide a baseline analysis of characteristics of Brisbane South residents, as well as an overview of travel behaviour, road use and accessibility. The study area for the Project falls within the study area for the BSAS. Key findings from the BSAS are summarised below: • Brisbane South will continue to be a major residential and employment area in SEQ • Residents and workers are primarily dependant on private vehicles when travelling • Several key freight routes pass through the study area • Strong population and jobs growth coupled with increased freight movements and continued dependence on private vehicles have implications on the road network • Improved public transport services and encouragement of active transport should ease dependency on private vehicle use, however the sheer magnitude of the expected growth means that some car dependency and congestion will be unavoidable • Congestion is expected to worsen as traffic increases. Rising heavy vehicle volumes in residential areas may heighten road demands, safety concerns, and liveability issues • It is essential that the needs of existing and future residents, workers and industry are considered and planned for appropriately in order to sustain future population, jobs and traffic growth. Future planning should limit congestion on the road network and capitalise on the potential to increase public and active transport mode shares without compromising residents' amenity or the ability of industry to function as required.
Pacific Motorway / Gateway Motorway Link Study (2015) 	The M3 / M2 Link Study considered options to provide future connections between the M3 and M2, located to the south-east of MPPL. The intent of this link was to improve traffic flows between Logan's southern growth areas and the Brisbane CBD, reducing reliance on the M1 south of Eight Mile Plains. However, the study was not supported to progress further due to traffic modelling results indicating potential changes in trip generation into other areas which would have a follow on impact without further network upgrades.

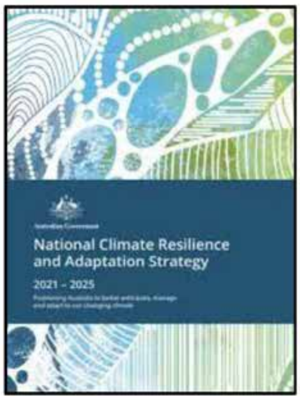
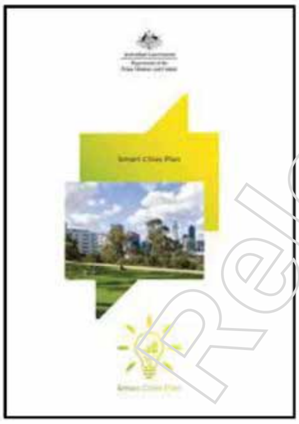
3. Strategic alignment with government objectives

3.1 Australian Government strategies / plans

Table 4 highlights how this project aligns with Australian Government strategic objectives.

Table 4 Strategic alignment with Australian Government priorities

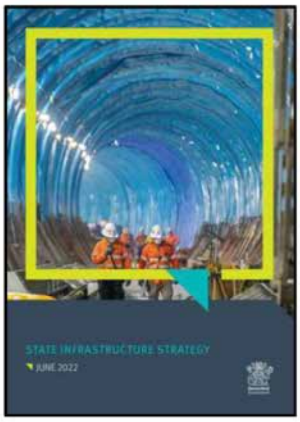
Document	Purpose and Key Objectives / Goals	Relevance to the initiative / study area
Australian Infrastructure Plan 2021 and Infrastructure Priority List (Annual) 	The **Australian Infrastructure Plan 2021** outlines strategic priorities for the country's infrastructure development, focusing on improving economic productivity, liveability, and sustainability. It highlights the need for investment in key sectors such as transport, water, energy, and digital infrastructure to support Australia's growing population and economic needs. The plan emphasises resilience, innovation, and adaptability, urging the integration of smart technologies and sustainable practices. It also advocates for better collaboration between governments, the private sector, and communities, ensuring that infrastructure is future-ready, efficient, and capable of addressing both current and future challenges	The plan emphasises improving transport networks to support growing populations and economic demands, which is relevant to the study area. The plan also encourages the integration of smart technologies, efficient systems, and climate-resilient designs, ensuring transport projects are adaptable to future challenges. By aligning with the plan's goals, and delivering transport network upgrades, the Project can enhance connectivity, reduce congestion, and contribute to long-term sustainability, while addressing emerging needs and future growth within the catchment.
Australian Infrastructure Audit (2019) 	The **Australian Infrastructure Audit (2019)**, conducted by Infrastructure Australia, is a comprehensive assessment of the nation's infrastructure needs and challenges. It identifies key gaps and highlights areas for improvement across sectors including transport, water, energy, and communications. The audit examines the impacts of population growth, urbanisation, and climate change on infrastructure demand, emphasising the need for more resilient, efficient, and future-ready systems. It provides recommendations for investment priorities and long-term planning to ensure Australia's infrastructure can meet both current and future needs.	Significant population growth is forecast within and surrounding the study area. This will likely result in increased traffic demands, worsening congestion, and an increase in congestion-related crashes in the study area. By referencing the audit's findings, and delivering transport network upgrades, the Project can seek to address current deficiencies within the study area, improve connectivity, and ensure that the transport network is future-proofed, sustainable, and adaptable to evolving demands and climate impacts. This alignment helps ensure that the project meets long-term needs and contributes to overall infrastructure resilience.

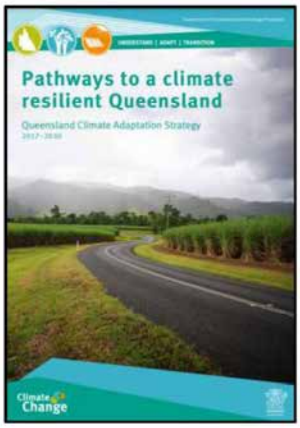
Document	Purpose and Key Objectives / Goals	Relevance to the initiative / study area
National Road Safety Strategy 2021-2030 (2021)  	The **National Road Safety Strategy 2021-2030** aims to reduce road fatalities and serious injuries (FSI) by 50% by 2030, with a long-term vision of zero deaths by 2050. It adopts a Safe System approach, focusing on safer roads, vehicles, road users, and post-crash care. The strategy emphasises data-driven decision-making, collaboration across all levels of government, and partnerships with industry and communities. Key priorities include speed management, impaired driving prevention, reducing distractions, and enhancing safety for vulnerable road users. The strategy aims to create a more resilient, safer road transport system for all Australians.	To align with the aim of the strategy, and noting the increasing crash rate within the study area, the following safety specific service requirement was adopted for the Project: "*a study area that is safe for all road users*". This service requirement was informed by a detailed review of reported crash data and associated crash trends. Furthermore, a Safe Systems Assessment (SSA) will be completed during the next stage of the project (PE phase).
National Climate Resilience and Adaptation Strategy 2021-2025 (2021)  	The **National Climate Resilience and Adaptation Strategy 2021-2025** focuses on enhancing Australia's ability to adapt to climate change impacts. It prioritises sectors most vulnerable to climate risks, such as agriculture, infrastructure, and coastal communities. The strategy emphasises collaboration between governments, businesses, and communities, with a focus on research, data, and early warning systems to support informed adaptation. It also aims to build climate-resilient communities by empowering local areas and improving public awareness. The strategy sets a framework for long-term resilience, ensuring Australia is better prepared for future climate challenges.	The strategy emphasises building infrastructure that is resilient to climate change. Upgrades to the existing stormwater network within the study area may be required to cater for the effects of climate change and will need to be considered in future phases of the project.
Smart Cities Plan 2016 	The **Smart Cities Plan 2016** is a strategic framework developed by the Australian Government to guide the creation of smart, connected, and sustainable urban environments across the country. The plan focuses on leveraging technology, data, and innovation to improve the quality of life, enhance economic opportunities, and address urban challenges such as congestion, sustainability, and service delivery. It emphasises the importance of collaboration between governments, businesses, and communities to integrate smart technologies into city infrastructure. Key initiatives include the use of data analytics for better decision-making, improving transportation systems, enhancing energy efficiency, and fostering digital connectivity to create cities that are more liveable, productive, and resilient to future challenges.	The plan encourages the integration of smart technologies and data-driven solutions into infrastructure upgrades. In relation to the MPPL, the plan supports the use of intelligent transport systems (ITS), which can enhance traffic management, reduce congestion, and improve road safety. This could be considered as a potential non-asset option.

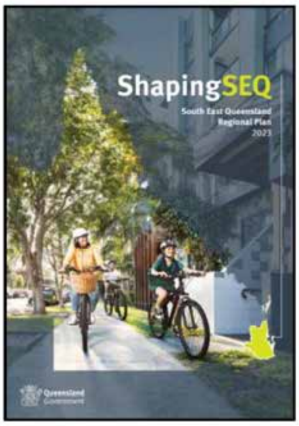
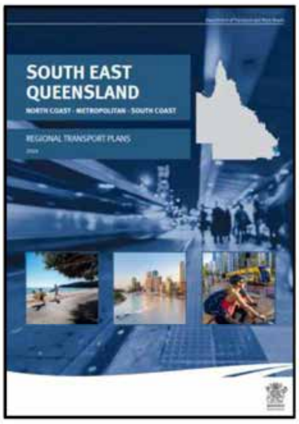
3.2 Queensland Government strategies / plans

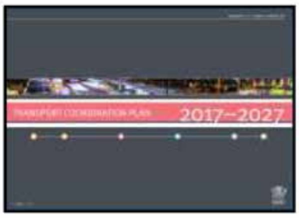
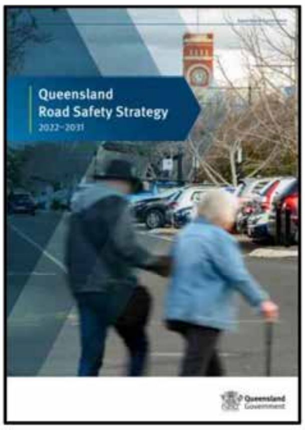
Table 5 highlights how this project aligns with State Government strategic objectives.

Table 5 Strategic alignment with Queensland Government priorities

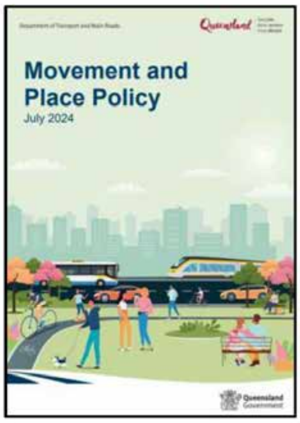
Document	Purpose and Key Objectives / Goals	Relevance to the initiative / study area
Statewide Strategies / Plans		
The Queensland Plan 2014 	The **Queensland Plan 2014** is a long-term strategic vision for the State's development, aiming to shape Queensland's future over the next 30 years. It outlines goals across key areas such as economic growth, sustainability, education, infrastructure, and community well-being. The plan emphasises collaboration between government, businesses, and communities to create a prosperous, resilient, and inclusive state. It encourages innovation, workforce development, and environmental stewardship, while focusing on improving the quality of life for all Queenslanders, ensuring the state remains competitive and adaptable to future challenges.	The Project will assist with the plan's long term goals for sustainable growth, economic development, and improving infrastructure by providing transport network upgrades within the study area. These future upgrades will also align with the plan's focus on connectivity, enhancing mobility, and creating safe, accessible transport networks.
State Infrastructure Strategy, 2022 	The **State Infrastructure Strategy 2022** (SIS) is a comprehensive framework that guides infrastructure investment and development across Queensland. It outlines priority areas for growth, focusing on transport, energy, water, and digital infrastructure to support the state's long-term economic, social, and environmental goals. The strategy aims to enhance connectivity, improve resilience, and foster sustainable development, ensuring that infrastructure investments align with future needs and challenges. It also emphasizes collaboration between government, industry, and communities to build a robust, efficient, and adaptable infrastructure network that supports Queensland's ongoing development and quality of life	The Project aligns with the strategy's focus of enhancing road infrastructure to ultimately improve safety, reduce congestion, and accommodate future population growth by providing transport network upgrades within the study area. The Project will also seek to deliver sustainable and resilient infrastructure, ensuring that it align with the strategy's long-term goals for economic development, environmental sustainability, and community well-being.
Queensland Transport Strategy, 2020 	The **Queensland Transport Strategy 2020** (QTS) sets a comprehensive vision for the state's transport system, aiming to create a safe, efficient, and sustainable framework that supports economic growth and enhances the overall quality of life for residents. Central to the strategy is the integration of various transport modes, such as public transit, cycling, and walking, while addressing issues of congestion and accessibility. The plan outlines key priorities, including improving infrastructure, ensuring reliable transport services, and fostering an environment that promotes the use of public and active transport options.	The Project will seek to address the key objectives of the Queensland Transport Strategy by upgrading the transport infrastructure within the study area to ultimately provide more convenient, reliable and safer journeys for people and goods within the study area, resulting in more liveable communities.

Document	Purpose and Key Objectives / Goals	Relevance to the initiative / study area
Pathways to a Climate Resilient Queensland: Queensland Climate Adaptation Strategy  	The **Pathways to a Climate Resilient Queensland: Queensland Climate Adaptation Strategy** outlines the state's approach to adapting to climate change impacts. It focuses on strengthening resilience across key sectors, including transport, infrastructure, and communities. The strategy identifies actions to reduce climate risks, enhance adaptive capacity, and protect vital assets. It promotes collaboration between government, businesses, and communities to implement adaptive measures, ensuring a sustainable future. The strategy aims to safeguard Queensland's economy, ecosystems, and quality of life by addressing the challenges posed by climate change and fostering long-term resilience.	The Project will take into consideration climate risks such as flooding, extreme weather events, and rising temperatures. Upgrades to the existing stormwater network within the study area may be required to cater for the effects of climate change and will need to be considered in future phases of the project.
Our Future State, 2018  	The **Our Future State – Advancing Queensland's Priorities** document outlines the government's vision for Queensland's growth and development. It focuses on six key priorities: building a strong economy, creating jobs, improving education and health, enhancing infrastructure, ensuring safe and vibrant communities, and protecting the environment. The strategy emphasises innovation, collaboration, and resilience to meet future challenges. It aims to guide government actions and investments, ensuring Queensland remains competitive, sustainable, and inclusive, with a focus on improving the quality of life for all residents across the state.	The Project aims to create jobs during the construction phase, boost economic effectiveness through better transport connections to key activity centres, promote healthy lifestyles by upgrading the active transport network, and improve safety for all users within the study area.
State Planning Policy 2017  	The **State Planning Policy 2017** (SPP) outlines the Queensland Government's approach to land-use planning and development. It sets clear expectations for state and local government planning decisions, focusing on matters of state interest such as economic growth, environmental sustainability, infrastructure, and community well-being. The policy provides a framework for integrating land-use planning with transport, housing, and environmental considerations, ensuring development aligns with long-term state objectives. The SPP aims to foster sustainable, resilient communities and manage growth effectively while addressing key state issues, such as climate change and resource management.	The SPP is relevant to intersection upgrade projects by aligning with state priorities such as connectivity, safety, and sustainability. These priorities help identify service requirements for the Project. The SPP guides improvements in transport efficiency, pedestrian and cyclist access, and reducing environmental impact. Adhering to the SPP ensures the MPPL project contributes to a sustainable transport network supporting long-term economic and community development.

Document	Purpose and Key Objectives / Goals	Relevance to the initiative / study area
Regional and Sector-Specific Plans		
Shaping SEQ 2023 	**Shaping SEQ 2023** is a strategic plan focused on the future growth and development of SEQ. It outlines land-use, transport, and infrastructure priorities to support sustainable, well-connected communities. The plan aims to guide growth while preserving natural areas, improving mobility, and enhancing liveability. It emphasizes integrated planning across housing, transport, and employment to address challenges like population growth, climate change, and economic development. Shaping SEQ provides a framework for coordinated efforts between governments, industry, and communities to ensure the region's long-term prosperity and resilience.	The Project aligns with the plans focus on enhancing transport connectivity, reducing congestion, and supporting sustainable development, by providing transport network upgrades within the study area. The plan also emphasises safety and accessibility, both of these elements have informed the service requirements for the Project during the SASR stage.
SEQ Regional Transport Plan (RTP) 2021 	The **South East Queensland Regional Transport Plan 2021** outlines strategies to improve transport connectivity and efficiency across the region. It focuses on integrating transport modes, enhancing mobility, and reducing congestion while promoting sustainable, low-emission travel options. The plan addresses current and future transport challenges, including population growth, climate resilience, and economic development. Key priorities include expanding public transport, upgrading infrastructure, improving active transport networks, and creating safer, more accessible transport options. **A3.28** sets out a short term action to undertake planning to inform options to upgrade intersections across the Metropolitan region to reduce congestion and improve safety, including along **Logan Road**. **A3.38** sets out a short term action to undertake corridor planning for urban arterial roads in the Metropolitan region, including **Logan Road**.	The project will seek to address the following transport challenges outlined in the SEQ RTP: • Travel preferences and mode competitiveness • Road congestion • Resilience of the road network • Barriers to active transport • Bus congestion The project will also seek to progress short term actions **A3.28** and **A3.38** set out in the RTP.
South East Queensland Principal Cycle Network Plan (SEQ PCNP) 2016 	The **South East Queensland Principal Cycle Network Plan 2016** outlines a vision for an integrated, safe, and accessible cycling network across the region. The plan aims to expand and connect cycling infrastructure, including dedicated bike lanes and shared paths, to enhance connectivity between urban centres and key destinations. It prioritizes safety, accessibility, and the promotion of cycling as a sustainable and active transport mode. The plan also supports reducing congestion, improving health outcomes, and creating a more cyclist-friendly environment, contributing to a greener, more connected South East Queensland.	The SEQ PCNP outlines the development of a connected, safe, and accessible cycling network across the region. All key roads within the study area for part of the Principal Cycle Network, including all approaches to the MPPL intersection. The Project will seek to deliver elements of the PCNP within the study area, potentially via dedicated off-road facilities.

Document	Purpose and Key Objectives / Goals	Relevance to the initiative / study area
Transport and Mobility Focused Policies		
Transport Coordination Plan 2017-2027 	The **Transport Coordination Plan 2017-2027** outlines strategies to improve transport efficiency and integration across Queensland. It focuses on coordinating different modes of transport, including road, rail, air, and sea, to enhance connectivity and reduce congestion. The plan aims to support economic growth, improve accessibility, and foster sustainable transport practices. It emphasizes collaboration between government, industries, and communities to optimize the transport network, improve safety, and ensure future resilience. The plan also addresses emerging challenges, such as population growth and climate change, while promoting efficient and equitable transport solutions	The Plan focuses on enhancing transport efficiency and connectivity across Queensland. To comply with the Plan, the Project will consider and coordinate the requirements of different transport modes, including road, active and public transport, to improve overall network performance. This is particularly relevant at the intersection of Logan Road / Warrigal Road and Exit 14, which accommodates all three modes.
Queensland Road Safety Strategy 2022-2031 	The **Queensland Road Safety Strategy 2022-2031** aims to reduce road fatalities and serious injuries across the state by focusing on safer roads, safer vehicles, and safer road users. The strategy outlines initiatives to improve infrastructure, enhance driver education, and promote safer driving behaviours. It emphasizes a collaborative approach involving government, communities, and stakeholders to implement evidence-based policies and interventions. The strategy also targets high-risk groups and areas, with a commitment to improving road safety through technology, infrastructure upgrades, and public awareness campaigns, ultimately striving for zero road deaths and serious injuries by 2050.	To align with the aim of the strategy and noting the increasing crash rate within the study area, the following safety specific service requirement was adopted for the project: "*a study area that is safe for all road users*". This service requirement was informed by a detailed review of reported crash data and associated crash trends. Furthermore, a Safe Systems Assessment (SSA) will be completed during the next stage of the project (PE phase).
Queensland's Disability Plan 2022-2027 	The **Queensland's Disability Plan** aims to create an inclusive and supportive environment for individuals with disabilities, promoting their rights, participation, and well-being across all aspects of life. The plan focuses on improving accessibility in public services, transport, and community spaces, ensuring that people with disabilities have equal opportunities to engage in education, employment, and social activities. It emphasises collaboration with stakeholders, including individuals with disabilities and advocacy groups, to identify barriers and implement effective solutions. By fostering a culture of inclusion and respect, the plan seeks to empower people with disabilities and enhance their quality of life throughout the state	The MPPL project will seek to enhance accessibility within the study area, particularly in relation to footpath design and grades. Accessibility requirements will be investigated further during the next stage of the Project.

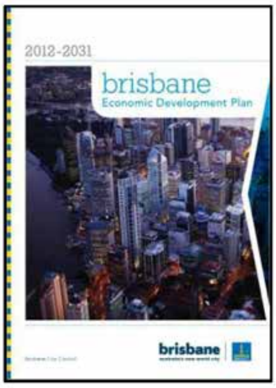
Document	Purpose and Key Objectives / Goals	Relevance to the initiative / study area
Queensland Walking Strategy 2019-2029 	The **Queensland Walking Strategy 2019-2029** promotes walking as a key transport mode, enhances pedestrian safety, and improves walkability across the state. It focuses on creating safer, accessible walking infrastructure, such as footpaths, crossings, and facilities. The strategy supports active transport, health, and sustainability, reducing congestion and emissions. It also emphasizes collaboration with local governments and communities to integrate walking into urban planning, making Queensland more pedestrian-friendly and fostering healthier lifestyles.	The Strategy focuses on improving pedestrian infrastructure and promoting walking as a primary mode of transport. To comply with the Strategy, the Project will seek to incorporate better footpaths, safe pedestrian crossings, and seamless connections to public transport including the Warrigal Road Green Link.
Action Plan for Walking 2022-2024 	The **Action Plan for Walking 2022-2024** aims to improve walking infrastructure and promote walking as a key transport mode. It focuses on enhancing pedestrian safety, accessibility, and connectivity. Key initiatives include upgrading footpaths, safer crossings, and integrating walking with other transport modes. The plan promotes health, reduces congestion and emissions, and emphasizes collaboration with local governments to create walkable, inclusive environments, supporting sustainable urban mobility and quality of life.	The Action Plan emphasises creating safer, more accessible walking infrastructure. To comply with the Action Plan, the Project will seek to incorporate dedicated pedestrian facilities such as wider footpaths, improved crossings and connections to public transport.
Queensland Cycle Strategy 2017-2027 	The **Queensland Cycle Strategy 2017-2027** outlines the state's vision to enhance cycling infrastructure, safety, and accessibility over a 10-year period. The strategy focuses on increasing cycling participation by creating a connected network of safe cycling routes, promoting active transport, and encouraging a shift toward sustainable travel options. It includes initiatives for improving bike facilities, integrating cycling with public transport, and engaging communities in cycling programs. The strategy aims to create a more cyclist-friendly environment, supporting health, sustainability, and the reduction of traffic congestion across Queensland.	The Strategy prioritises the integration of cycling infrastructure to enhance accessibility and safety for cyclists. To comply with the Strategy, the Project will investigate the inclusion of dedicated cycle infrastructure, safe and prioritised crossings, and the seamless connections and integration with existing cycling networks – including Veloway 1.
Queensland Cycling Action Plan 2023-2025 	The **Queensland Cycling Action Plan 2023-2025** outlines key initiatives to enhance cycling infrastructure and promote cycling as a sustainable transport mode. The plan focuses on expanding and upgrading cycling networks, improving safety, and integrating cycling with public transport systems. It aims to increase cycling participation, support active transport, and reduce congestion and emissions. The action plan includes community engagement, development of cycling-friendly policies, and the promotion of cycling as a viable option for everyday travel, contributing to a healthier, more sustainable, and well-connected Queensland.	The Project aligns with Action 1.2: "*Invest in the planning, design and promotion of fit-for-purpose infrastructure on State-controlled portions of the PCN through the TMR investment programs, including where active transport is delivered as part of other TMR projects.*"

Document	Purpose and Key Objectives / Goals	Relevance to the initiative / study area
Strategic Plan 2023 – 2027 (revised 2024 – 2025) 	The **Strategic Plan 2023-2027** outlines the goals and priorities for a specific department or organization over the next five years. It focuses on achieving measurable outcomes related to key areas such as operational efficiency, stakeholder engagement, service delivery, and growth. The plan sets a clear roadmap for addressing current challenges and seizing opportunities, ensuring long-term sustainability, and enhancing the organization's overall performance. It emphasizes innovation, collaboration, and continuous improvement, aligning with broader state or national objectives to drive positive change and meet evolving community needs.	The MPPL Project will seek to address the objectives of the Strategic Plan by upgrading a key connector to the Brisbane CBD. This would contribute to the provision of a safe and secure transport system that offers active and shared transport modes, creating an accessible and integrated transport network.
Movement and Place Policy, July 2024 	The **Movement and Place Policy** sets the objectives, definitions, scope and applicability of movement and place. The policy seeks to deliver vibrant and successful places; happy and healthy people; natural, sustainable, and resilient communities; and connected, accessible and convenient 'movement' for people and goods. Movement and place is a best practice planning methodology which can guide the way our transport networks and the places they interact with, are planned, designed and operated. Movement and place seeks to balance the transport network's role in the movement of people and goods with the role of transport corridors, nodes and precincts, as places that are essential to live, shop, work, carry out business and socialise.	Given the road hierarchy, traffic volumes, and adjacent land use, all major roads within the study area provide a higher movement function. However, during future PAF stages of the project, there would be opportunity to develop a vision for the study area in context with the Movement and Place Policy, with an focus on sustainable transport outcomes.

3.3 Local Government strategies / plans

Table 6 highlights how this project aligns with Local Government strategic objectives.

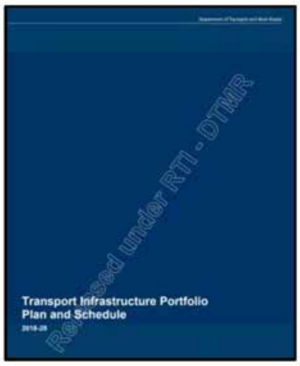
Table 6 Strategic alignment with Local Government priorities

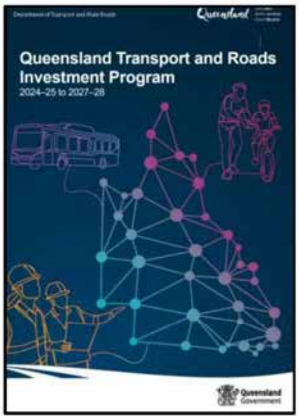
Document	Purpose and Key Objectives / Goals	Relevance to the initiative / study area
Transport Plan for Brisbane – 2018 	The **Transport Plan for Brisbane 2018** outlines strategies to create a sustainable, efficient, and accessible transport system. It focuses on reducing congestion, improving public transport, and enhancing active transport options like cycling and walking. The plan prioritises integrating new technologies, expanding transport infrastructure, and improving road networks, aiming to provide safe, reliable, and connected travel experiences while supporting Brisbane's growth and reducing environmental impacts.	This plan is relevant to the MPPL project as it guides the development of a sustainable, efficient transport network. The Project aligns with the plan's goals, such as reducing congestion, improving connectivity, and supporting public transport and active transport. By integrating new technologies and enhancing the transport network, the Project could contribute to a more accessible, safe, and environmentally friendly transportation system, supporting the city's growth and development.
Brisbane Economic Development 2012-2031 	The **Brisbane Economic Development 2012-2031** outlines strategies to drive sustainable economic growth and enhance the city's global competitiveness. It focuses on diversifying the economy, investing in infrastructure, and fostering innovation in key sectors like knowledge industries, tourism, and advanced manufacturing. The plan aims to create job opportunities, attract investment, and improve the quality of life for residents, while ensuring the city adapts to changing economic conditions and remains a vibrant, thriving hub for business and tourism.	This plan is relevant to the MPPL project as it emphasises the need for infrastructure that supports economic growth and connectivity. Road and intersection upgrades are crucial to enhancing transport efficiency, accessibility, and mobility, which directly impacts business operations, tourism, and workforce productivity. By aligning the Project with the city's economic goals, it could contribute to improved logistics, reduced congestion, and better connections to key economic hubs, ultimately fostering a more competitive and sustainable economy
Brisbane City Plan 2014 	The **Brisbane City Plan 2014** is the primary planning document for Brisbane, outlining the rules, policies, and guidelines for land use and development within the city. It aims to guide the city's growth in a sustainable and structured way, balancing urban development with the preservation of the city's natural and cultural heritage. The Plan provides a framework for zoning, development assessment, and infrastructure planning to ensure Brisbane evolves as a vibrant, sustainable, and liveable city.	Future transport demands within the study area are linked to the planned land use and urban development growth set out in the Brisbane City Plan 2014. This will need to be taken into consideration when undertaking transport modelling during subsequent stages of the Project.

3.4 TMR Transport Infrastructure Portfolio

Table 7 highlights how this project aligns with TMR's Transport Infrastructure Portfolio priorities.

Table 7 Alignment with TMR Transport Infrastructure Portfolio

TMR Portfolio Strategy / Plan	Key Strategies and Goals	Project Alignment Description
Transport Infrastructure Portfolio Plan and Schedule (TIPPS) 	The **Transport Infrastructure Portfolio Plan and Schedule (TIPPS)** is a strategic framework used by TMR to plan, prioritise, and schedule transport infrastructure projects. It ensures efficient allocation of resources, aligning investments with long-term transport goals, and addresses the maintenance and development needs of the transport network. It is the key source of direction for the development of the **Queensland Transport and Roads Investment Plan (QTRIP)**. The **State Road Network Upgrade and Improvement Program (SRNUIP)** is an investment program within the TIPPS. SRNUIP focuses on enhancing the state-controlled road network in Queensland. The program aims to improve road safety, reduce congestion, and support economic growth by upgrading infrastructure, expanding capacity, and addressing maintenance needs. It ensures efficient transport connections, facilitates better freight movement, and enhances accessibility for communities, contributing to a safer, more reliable system.	The Project aligns with the following investment categories in TIPPS: • Transport planning and policy studies with significant cost and asset implications • Initiatives relevant to the management of existing and future transport corridors. The Project is expected to contribute to the realisation of the SRNUIP program benefits, as outlined below: • **Improved Safety:** enhanced safety outcomes for all road users / modes • **Reduced Congestion:** reduced delays and improved travel times at MPPL and along Logan Road • **Economic Growth:** increased efficiency moving goods and people through MPPL and the study area • **Enhanced Connectivity:** improved links between ken activity centres • **Increased Capacity:** Additional layout capacity at MPPL and Logan Road to accommodate traffic growth • **Sustainability:** providing better connections and access to sustainable transport modes • **Long-term Resilience:** consideration of future transport demand scenarios and potential climate change requirements.

TMR Portfolio Strategy / Plan	Key Strategies and Goals	Project Alignment Description
Queensland Transport and Roads Investment Program (QTRIP) 	The **Queensland Transport and Roads Investment Plan (QTRIP)** (2024-25 to 2027-28) outlines the current and planned investment in road and transport infrastructure for delivery over the 4-year period. Publishing QTRIP also ensures that the department meets its legislative requirements under the Transport Infrastructure Act 1994. QTRIP is developed in accordance with funding allocation identified by the Australian and Queensland governments in their annual budgets. The strategic intent of QTRIP is guided and shaped by federal and state government policy objectives and agendas.	The priority for the MPPL project is confirmed in QTRIP, which includes $1.25 million for the "Logan Sub-Arterial Road (Miles Platting Road) and Padstow Road, upgrade intersection, planning". Investment ID: 2422929. Future stages of the project are currently unfunded.

3.5 TMR Operational Policies

Table 8 highlights how this project aligns with TMR's operational policies.

Table 8 TMR Operational Policy compliance

Operational Policy	Policy description	Required [Y/N]	Initiative compliance
Active Transport Policy	The **Active Transport Policy** promotes safe, accessible, and sustainable transportation options by encouraging walking, cycling, and other forms of active transport. It focuses on enhancing infrastructure, improving safety, and integrating active transport into planning for healthier communities and reduced environmental impact.	Yes	The Project seeks to deliver improvements to the existing active transport network within the study area to maximise the potential benefits of the Project, and comply with the Active Transport Policy.
Arterial Operations Policy	The **Arterial Operations Policy** aims to optimise the performance and efficiency of arterial road networks. It focuses on managing traffic flow, improving safety, reducing congestion, and enhancing connectivity, ensuring a reliable and effective transportation system for all users across Queensland's arterial roads.	Yes	The Project seeks to optimise the performance and efficiency of Logan Road and MPPL via potential non-asset, existing asset, and / or new assess options, and comply with the Arterial Operations Policy.
Network Optimisation Framework	The **Network Optimisation Framework Policy** focuses on optimising the operation of the transport network. It ensures efficient, safe, and sustainable movement of people and goods, emphasising data-driven decision-making, performance monitoring, and integrated planning to improve network reliability and functionality.	Yes	The Project seeks to optimise the management and operation of the transport network within the study area for all modes via potential non-asset, existing asset, and / or new assess options, and comply with the Network Optimisation Framework.
Cycling Infrastructure Policy	The **Cycling Infrastructure Policy** states that "*TMR funded projects on principal cycle routes will explicitly provide cycling infrastructure within the project's scope*", and that accessible and inclusive transport is "*critical to allow everyone to move easily and provide the opportunity to participate in our community and access employment, health, education, recreation and culture.*"	Yes	The study area and its surrounds are identified as PCR. Improvements of existing cycling infrastructure is being planned for the study area to widen the benefits of the project, improve connectivity with V1 and comply with the Cycling Infrastructure Policy
Smart Motorway Policy	The **Smart Motorway Policy** focus is optimising the safety, reliability, and productivity of the motorway network by progressively implementing a managed motorway standard across all State-controlled and franchised motorway standard roads in Queensland.	No	This Policy is not considered relevant for the study area (subject to confirmation from the SME for Smart Motorway Policy at the PE stage) for the following reasons: • MPPL does not form part of the motorway network. • The project interfaces with the M3 Pacific Motorway which is already controlled via managed motorways.

Operational Policy	Policy description	Required [Y/N]	Initiative compliance
Road Safety Policy	The **Road Safety Policy** seeks to implement Safe System principles, processes and practices that will deliver reductions in the number of fatal and serious injury crashes. This will contribute to moving towards the Queensland government's vision of zero road deaths and serious injuries and achieving the objective of building safe, caring, and connected communities.	Yes	The project seeks to align with the objectives of the Road Safety Policy by addressing existing and emerging road safety risks within the study area. Furthermore, a Safe Systems Assessment will be undertaken during future PAF stages.
Accessibility and Inclusion Strategy	The **Accessibility and Inclusion Strategy** outlines how the department will 'lead the delivery of accessible and inclusive transport products, services, information and infrastructure, and TMR workplaces and work practices.'	Yes	The project will seek to adhere to relevant legislation, standards and guidelines in relation to accessibility and inclusion. This would include consideration of pathway widths and grades, lighting and wayfinding.
Sustainability and Climate Change	The **Sustainability and Climate Change Policy** focuses on reducing environmental impacts by promoting sustainable transport solutions. It emphasises minimising carbon emissions, improving resource efficiency, and adapting to climate change through resilient infrastructure, while fostering innovation and integrating sustainability in transport planning and operations across Queensland.	Yes	The project seeks to deliver a study area that is resilient through better connections and access to sustainable transport modes. Furthermore, a sustainability assessment will be undertaken during subsequent stages of the Project to identify an Infrastructure Sustainability rating and guide the sustainability process for the project.
Movement and Place Policy	The **Movement and Place Policy** sets the objectives, definitions, scope and applicability of movement and place. The policy seeks to deliver vibrant and successful places; happy and healthy people; natural, sustainable, and resilient communities; and connected, accessible and convenient 'movement' for people and goods	No	The SASR commenced before this Policy was published. The SASR analyses land uses within the study area and provides a high-level understanding of place in proximity to the potential upgrade options. Movement and Place will be considered during the confirmation of the problem statement and ILM at the beginning of the PE. A formal assessment (i.e. using the urban classification matrix) has not been undertaken in the SASR but will be developed during the PE stage with SME engagement and sign-off.

4. Problem identification and assessment

4.1 Background information

4.1.1 Land use

4.1.1.1 ShapingSEQ 2023

ShapingSEQ 2023 is the Queensland Government's long-term vision for added growth in the SEQ region.

Figure 5 is an extract from the Metro sub-region map (Map 22) within ShapingSEQ 2023.

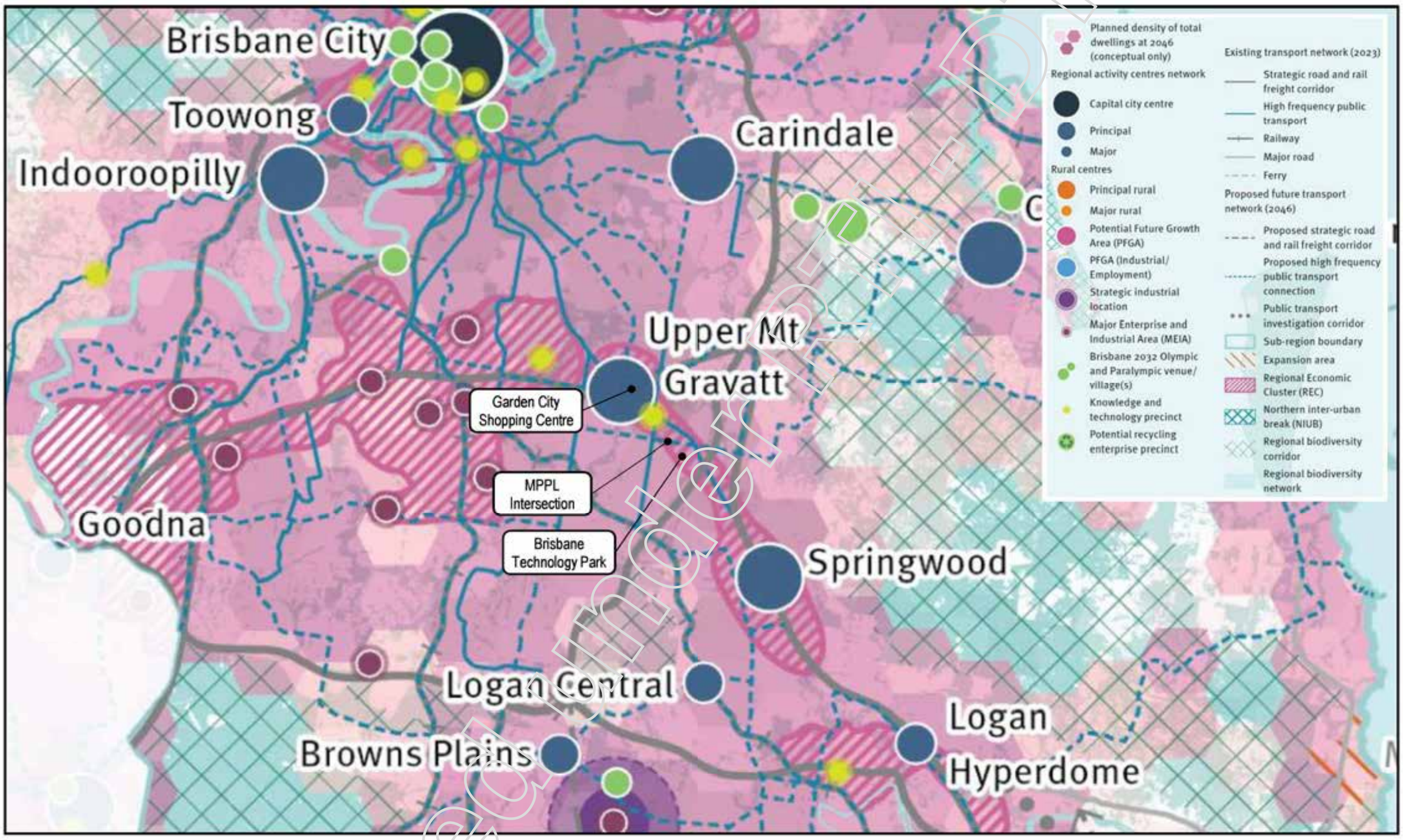


Figure 5 ShapingSEQ (2023) – Map 22 Metro Sub-region

It is noted that MPPL is located:

- Between the Upper Mt Gravatt and Springwood Principal Regional Activity Centres (PRAC). These areas are key focus points for employment and services outside the capital city centre and are major trip generators
- Adjacent to the Eight Mile Plains knowledge and technology precinct (Brisbane Technology Park and Garden City Shopping Centre). These precincts are areas that contain a core high-level health, education, research or similar facility that provides opportunities for complementary and supporting activities
- Within the Pacific Motorway Regional Economic Cluster (REC). This REC includes the Upper Mt Gravatt and Springwood PRACs, the Eight Mile Plains knowledge and technology precinct, as well as the Pacific Motorway and South East Busway. Upgrades within the study area will help further facilitate the growth of this REC.

4.1.1.2 Brisbane City Plan 2014

Figure 6 illustrates the current land use zoning surrounding the study intersection as well as key land uses.

Figure 6 Land use zoning

Table 9 summarises relevant details for the key land uses surrounding the study intersection.

Table 9 Key land uses

ID	Key Land Use	Location
1	Hughesville House	Southwest corner of MPPL
2	Puma Petrol Station	Northwest corner of MPPL
3	Charles Fraser Park	Northeast corner of MPPL
4	Brisbane Technology Park	Southeast corner of MPPL
5	Energex Substation	Miles Platting Road approximately 100m east of MPPL
6	Umart Eight Mile Plains	Logan Road approximately 120m north of MPPL
7	7-Eleven Eight Mile Plains	Logan Road approximately 250m north of MPPL
8	Garden City Office Park	Logan Road approximately 400m north of MPPL
9	Multicap Disability Services	Padstow Road approximately 300m west of MPPL
10	Garden City Shopping Centre	Logan Road approximately 1.5km north of MPPL

Key points to note are summarised below:

- There are key land uses located on each corner of the MPPL intersection including Hughesville House (heritage listed), a petrol station (contaminated land) and Charles Fraser Park (local park)
- There are key employment hubs within and adjacent the study area (e.g. Office / Technology Park, Garden City)
- There is a pocket of low density residential on the eastern side of Logan Road
- There is a pocket of emerging community zoned land on the western side of Logan Road. This area appears to be the only "under developed" land supply within or immediately adjacent to study area
- Multicap Disability Services gains vehicular and pedestrian access via Padstow Road.

Figure 7 illustrates the extents of the Eight Mile Plains Gateway Neighbourhood Plan area in proximity to the study intersection as well as the Emerging Community zoned land adjacent to Logan Road. It is noted that the Rochedale Urban Community Neighbourhood Plan area is located to the immediate east of the Gateway Motorway.

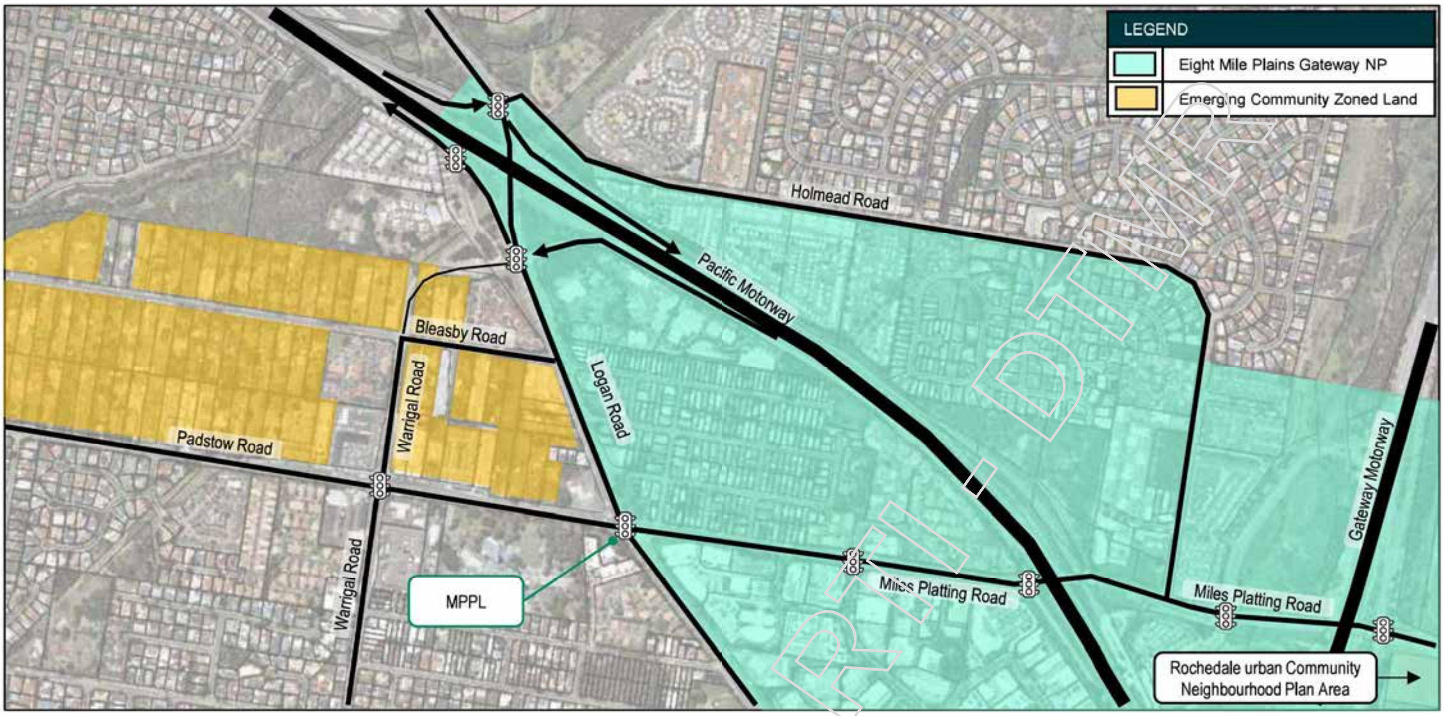


Figure 7 Local development and land use pressure

Table 10 summarises relevant details of the development and land use pressures in proximity to the study intersection.

Table 10 Local development and land use pressure

Plan	Relevant Comments
Eight Mile Plains Gateway Neighbourhood Plan	• Key economic growth area for BCC • One of BCC's key employment hubs with advanced manufacturing and technology parks that contribute to economic growth • Provides the southern gateway to Brisbane and is well connected to the region by the Gateway and Pacific Motorways and Logan Road • The neighbourhood plan for this area was created to plan for the changing needs of the community for the next 10 years and beyond • The plan responds to opportunities associated with significant transport infrastructure investment, including the future Brisbane Metro station.
Rochedale Urban Community Neighbourhood Plan	• Key residential growth area for BCC • Integrated and master-planned urban community with a mix of users including residential, commercial, industrial, and educational uses • High development has occurred within the Rochedale Urban Community Neighbourhood Plan area, however additional growth is planned • Miles Platting Road, the MPPL intersection, and Logan Road provides an important function for Rochedale residents travelling to / from Brisbane.
Emerging Community Zoned Land	• City Plan 2014 states the purpose of the "emerging community" zone is to: "*identify land that is intended for an urban purpose in the future; protect land that is identified for an urban purpose in the future from incompatible uses; and provide for the timely conversion of non-urban land for urban purposes*" • Emerging community areas typically do not have the required infrastructure to support urban development, and is generally considered to be a lower priority for development compared to other land within the urban footprint • This land is not expected to development within the foreseeable future.

4.1.2 Transport network

4.1.2.1 Road network

4.1.2.1.1 Key roads

Figure 8 illustrates the existing road network hierarchy surrounding the study intersection.

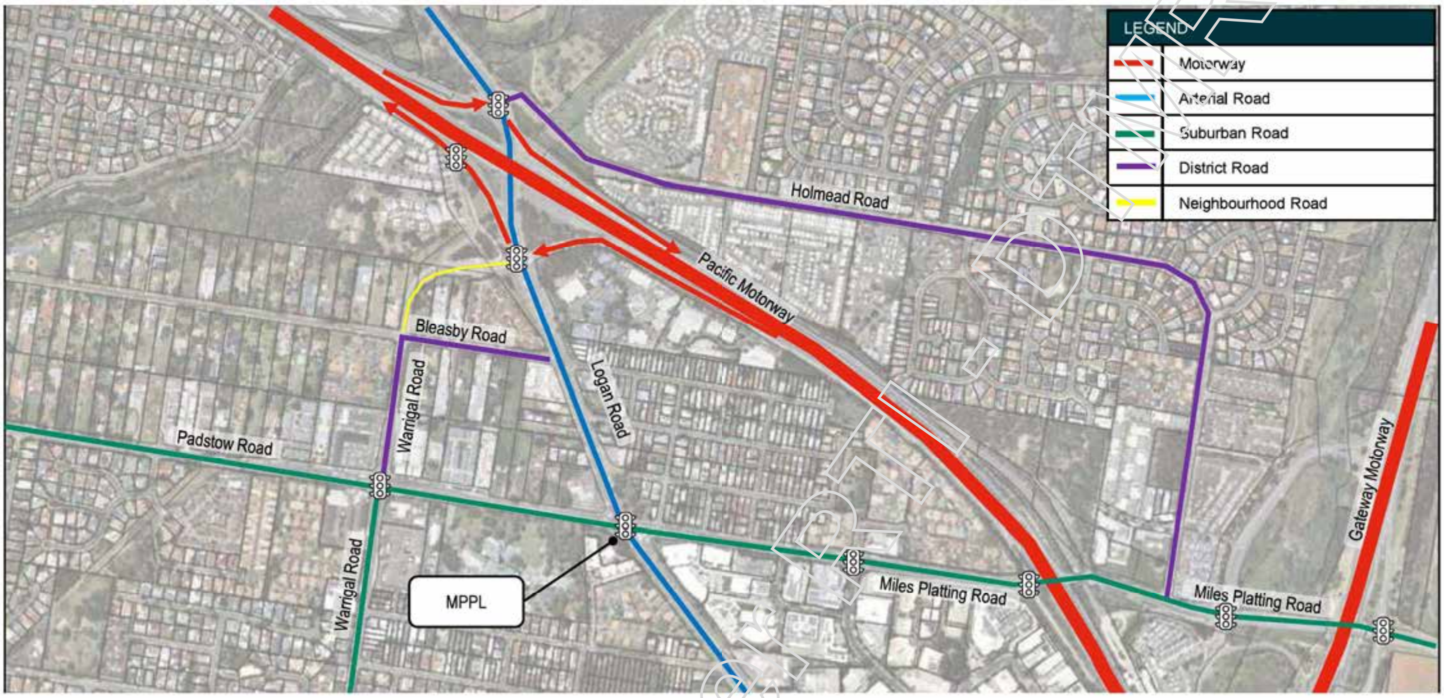


Figure 8 Road network: road hierarchy and key intersections

Table 11 summarises key characteristics of the road network surrounding the study intersection.

Table 11 Road network: road hierarchy

Name	Hierarchy	Jurisdiction	Typical Cross-Section	Speed Limit (km/h)
Pacific Motorway	Motorway	TMR	8 lanes divided	100
Logan Road	Arterial	TMR	4 lanes divided	70-80
Miles Platting Road	Suburban	BCC	4 lanes divided	60
Padstow Road	Suburban	BCC	4 lanes divided	60
Bleasby Road	District	BCC	2 lanes undivided	60
Warrigal Road (south of Padstow Road)	Suburban	BCC	4 lanes divided / 2 lanes undivided	60
Warrigal Road (Padstow Road to Bleasby Road)	District	BCC	4 lanes divided / 2 lanes undivided	60
Warrigal Road (north of Bleasby Road)	Neighbourhood	BCC	2 lanes undivided	50

Key points to note are summarised below:

- Logan Road provides a north-south arterial function between the M3 (north) and M2 (south)
- The Miles Platting Road / Padstow Road corridor provides an east-west sub-arterial function between Rochedale and the M2 (east), as well as Mains Road and Beaudesert Road (west)
- Warrigal Road is classified as a Suburban Road to the south of Padstow Road and a District Road to the north
- Warrigal Road includes a "Green Link" between Bleasby Road and the Logan Road access road for bus and active transport modes only (i.e. general traffic is prohibited from using this section of the Warrigal Road corridor).

4.1.2.1.2 Key intersections

Figure 9 illustrates key intersections within the local road network near the study intersection.

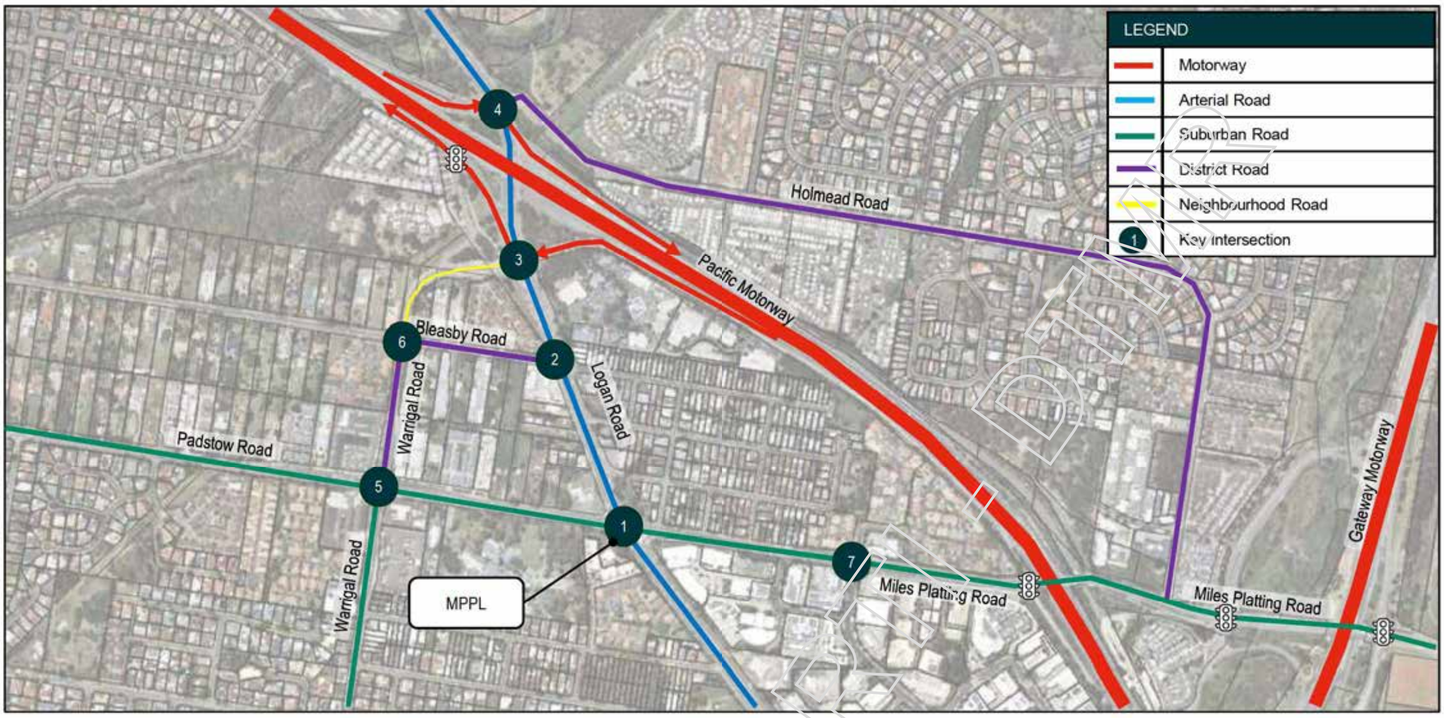


Figure 9 Road network: key intersections

Table 12 summarises relevant characteristics of the nominated key intersections.

Table 12 Road network: key intersections

ID	Name	Jurisdiction	Control
1	Miles Platting Road / Padstow Road / Logan Road	TMR	Traffic Signals
2	Miles Platting Road / Bleasby Road / London Street	TMR	Left-in / Left-out
3	Logan Road / Warrigal Road / M3 Ramps	TMR	Traffic Signals
4	Logan Road / Holmead Road / M3 Ramps	TMR	Traffic Signals
5	Warrigal Road / Padstow Road	BCC	Traffic Signals
6	Warrigal Road / Bleasby Road	BCC	Priority Controlled
7	Miles Platting Road / Buckingham Place	BCC	Traffic Signals

Key points to note are summarised below:

- **Intersection 1:** The right turn from Logan Road (south) into Miles Platting Road (east) is prohibited (refer Section 4.2.2.6). The U-turn on Logan Road (north) is permitted. There is no pedestrian crossing on the southern approach
- **Intersection 2:** There is a continuous left turn lane from Bleasby Road (west) into Logan Road (north) which attracts significant northbound demands (on a lower order district road) and is used as a “rat run” to “bypass” MPPL
- **Intersection 3:** Forms part of the M3 / Logan Road interchange. U-turn movements are permitted on Logan Road (north and south). Veloway 1 (V1) crosses Logan Road on the southern approach
- **Intersection 4:** Forms part of the M3 / Logan Road interchange
- **Intersection 5:** Upgraded by BCC in 2011 from a roundabout to traffic signals
- **Intersection 6:** Priority-controlled four-way intersection. The northern fourth leg was constructed in 2015 as part of the Warrigal Road Green Link project and is restricted to buses only
- **Intersection 7:** Upgraded by BCC in 2012 from a priority controlled intersection to traffic signals.

4.1.2.1.3 Freight routes

Figure 10 illustrates approved freight routes (i.e. B-Doubles and Higher Mass Limits) adjacent to the study intersection.

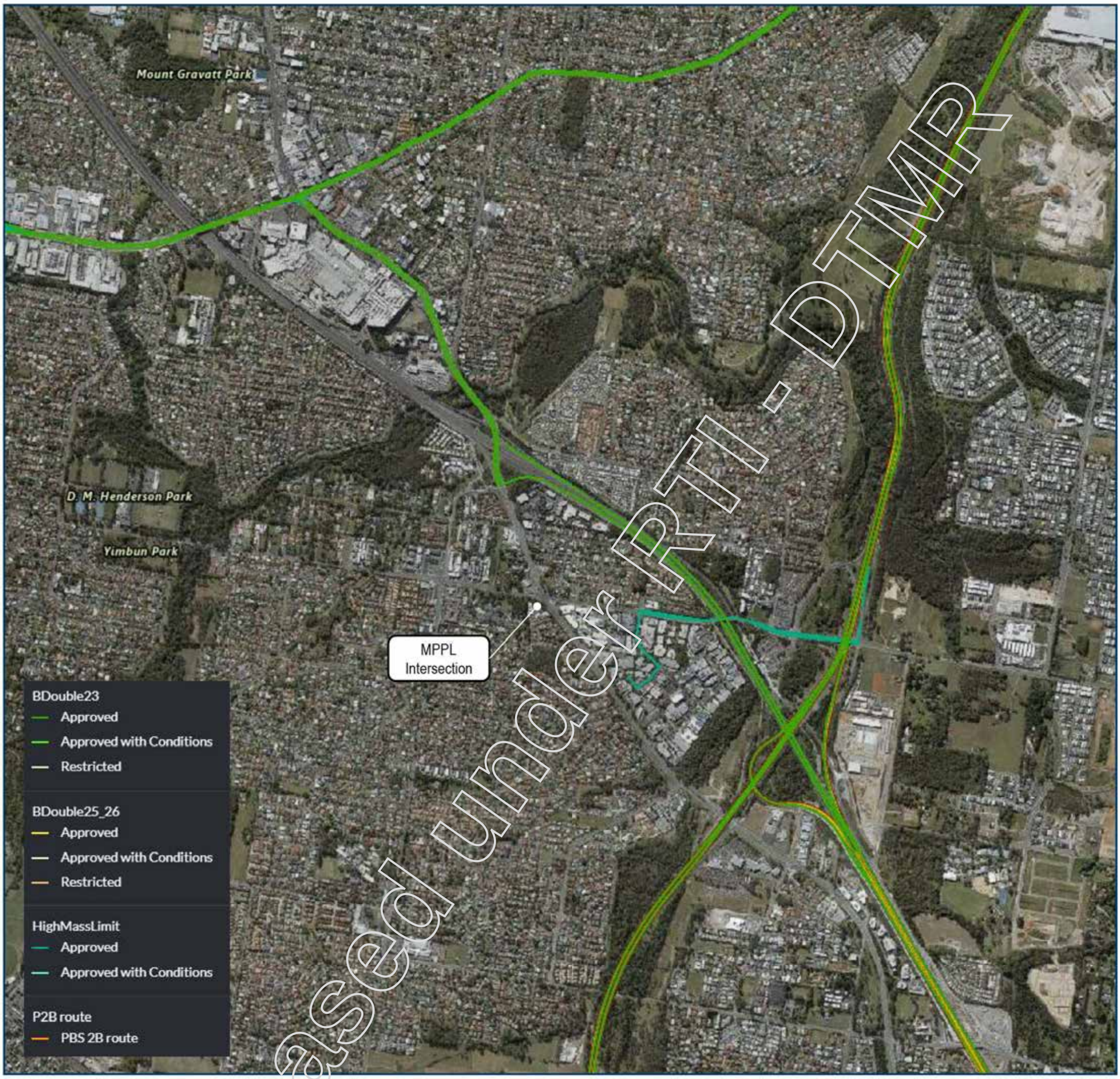


Figure 10 Road network: freight routes

Key points to note are summarised below:

- There are no approved freight routes through the MPPL intersection (e.g. B-Doubles and Higher Mass Limits)
- B Doubles are permitted to use Logan Road north of Warrigal Road
- Higher Mass Limits are permitted to access the Brisbane Technology Park via Miles Platting Road
- Semi-trailers and smaller trucks are permitted to travel through the study area “as of right”.

4.1.2.2 Public transport network

4.1.2.2.1 Bus stops

Figure 11 illustrates the location of public transport infrastructure in proximity to the study intersection.

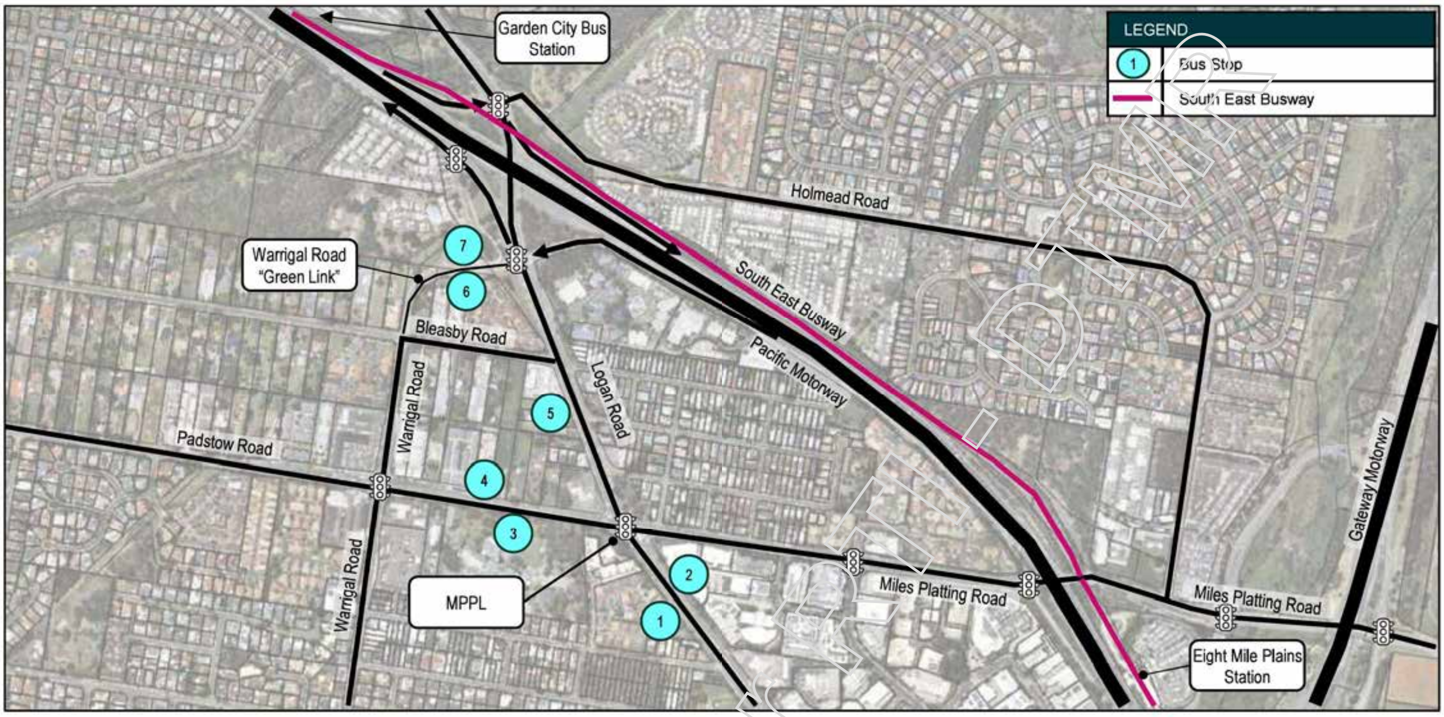


Figure 11 Public transport network: bus stops

Table 13 summarises characteristics of the nominated public transport infrastructure (bus stops).

Table 13 Public transport network: bus stops

ID	Stop ID	Stop Name	Bus Routes
1	005768	Logan Rd at Miles Platting Road Stop 82	152, 545
2	010871	Logan Rd at Miles Platting Road, Stop 82	152, 299, 545
3	006493	Padstow Rd near Logan Road	6038, 8024, 8026, 8033
4	006494	Padstow Rd near Logan Road	8024, 8026, 8033
5	010873	Logan Rd near Liverpool St, Stop 81	152, 545
6	002063	Warrigal Road Green Link	150, 156, N154, P157
7	002062	Warrigal Road Green Link	150, 156, P157

Key points to note are summarised below:

- Three (3) bus stops on Logan Road which are all indented bus bays
- Two (2) bus stops on Padstow Road which are used by school buses
- Warrigal Road Green Link provides indented bus bays in both directions
- The South East Busway is located adjacent to the Pacific Motorway to the north of MPPL
- Garden City Bus Station and Eight Mile Plains Bus Station are located close to the study intersection.

4.1.2.2.2 Bus routes

Figure 12 illustrates existing bus routes which travel through the study intersection and / or surrounding road network.

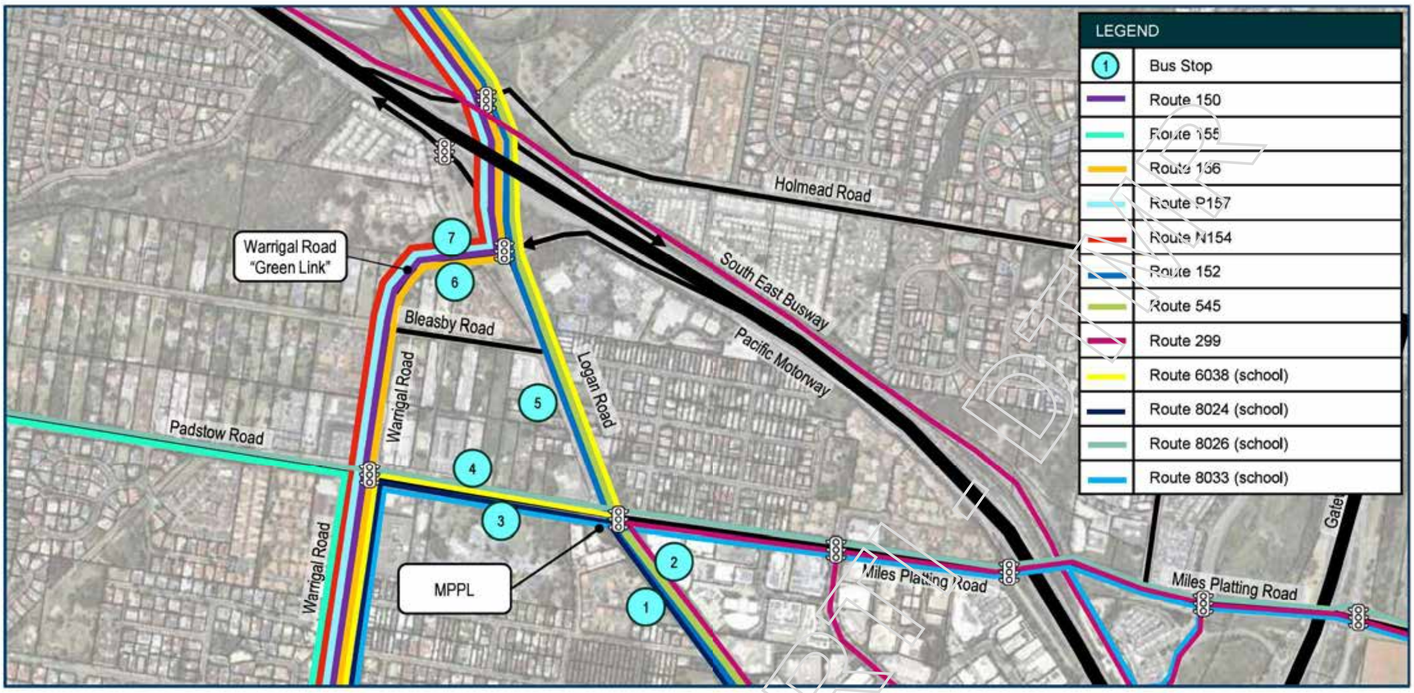


Figure 12 Public transport network: bus routes

Table 14 summarises relevant details of the nominated bus routes.

Table 14 Public transport network: bus routes

ID	Bus Routes	Details
150	Browns Plains to City	Browns Plains, Calamvale, Runcorn, Eight Mile Plains, Garden City, Griffith University, City
152	Garden City Interchange	Stretton, Runcorn, Sunnybank Hills, Eight Mile Plains, Garden City
N154	City to Browns Plains	City, Fortitude Valley, Kangaroo Point, Griffith University, Eight Mile Plains, Runcorn, Calamvale, Browns Plains
155	Calamvale to City	Calamvale, Runcorn, Eight Mile Plains, Griffith University, City
156	Stretton to City	Stretton, Runcorn, Eight Mile Plains, Garden City, City
P157	Runcorn to City	Runcorn, City
299	Brisbane City	Rochedale, Eight Mile Plains, Brisbane Technology Park, Griffith University, Holland Park West, Greenslopes, Buranda, Brisbane City
545	Garden City	Garden City, Eight Mile Plains, Underwood, Woodridge, Logan Central, Kingston, Marsden, Heritage Park, Browns Plains
6038	School Bus Route	Macgregor, Eight Mile Plains, Runcorn, Sunnybank Hills, Browns Plains
8024	School Bus Route	Kuraby, Eight Mile Plains, Underwood, Rochedale South, Springwood, Daisy Hill
8026	School Bus Route	Rochedale, Eight Mile Plains, Sunnybank, Runcorn, Kuraby, Underwood, Daisy Hill
8033	School Bus Route	Rochedale, Eight Mile Plains, Runcorn, Kuraby, Underwood

Key points to note are summarised below:

- Translink and school bus routes travel through the local area including high-frequency services (e.g. P157)
- Most of the bus routes use the Warrigal Road Green Link.

4.1.2.3 Active transport network

Figure 13 and Figure 14 reproduce TMR's PCNP and BCC's Bicycle Network Overlay for the local area.

Figure 13 Active transport network: TMR Principal Network Plan

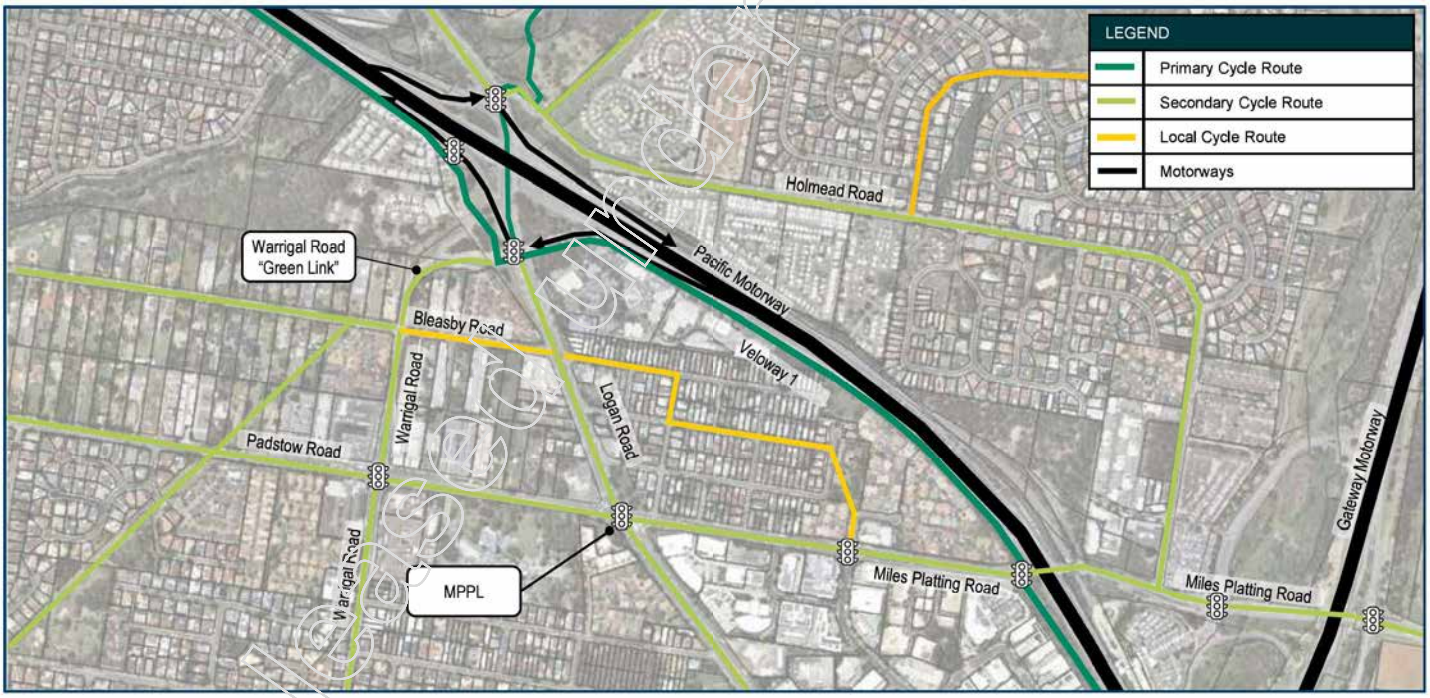


Figure 14 Active transport network: BCC bicycle network overlay

Logan Road, Padstow Road, and Miles Platting Road all form part of TMR's PCNP and are classified as Secondary Cycle Routes within BCC's Bicycle Network Overlay. BCC's City Plan 2014 defines a Secondary Cycle Route as "*A cycle route that provides linkages between residential areas and primary routes or between suburban destinations such as schools, suburban centres, cultural activity areas and recreational facilities*". Nevertheless, the primary cycle infrastructure which currently services the study area is the V1 (cycleway), which runs along the western side of the Pacific Motorway.

4.2 Existing situation (define the current problem/s)

4.2.1 Overview

The primary transport problems that were identified for the study area are summarised below:

- **PO1:** Significant congestion at the study intersection during peak periods due to insufficient layout capacity to accommodate increasing demands
- **PO2:** History of casualty crashes within the study area due to significant congestion and queuing on Logan Road and at the study intersection
- **PO3:** Poor travel time reliability for buses within the study area due to the lack of alternative routes and priority infrastructure for public transport
- **PO4:** Lack of active transport infrastructure within the study area reduces safety, attractiveness and reliability for active transport users

A copy of the Transport Analysis Report is included at **Appendix D**.

4.2.2 Significant congestion at the study intersection during peak periods due to insufficient layout capacity to accommodate increasing demands

4.2.2.1 Significant traffic volumes on Logan Road

Figure 15 and Figure 16 compare historical hourly traffic demands and AADT on Logan Road between Miles Platting Road and Bleasby Road, based on data from the Queensland Government Open Data Portal (Site 135689). It is noted that AADT is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

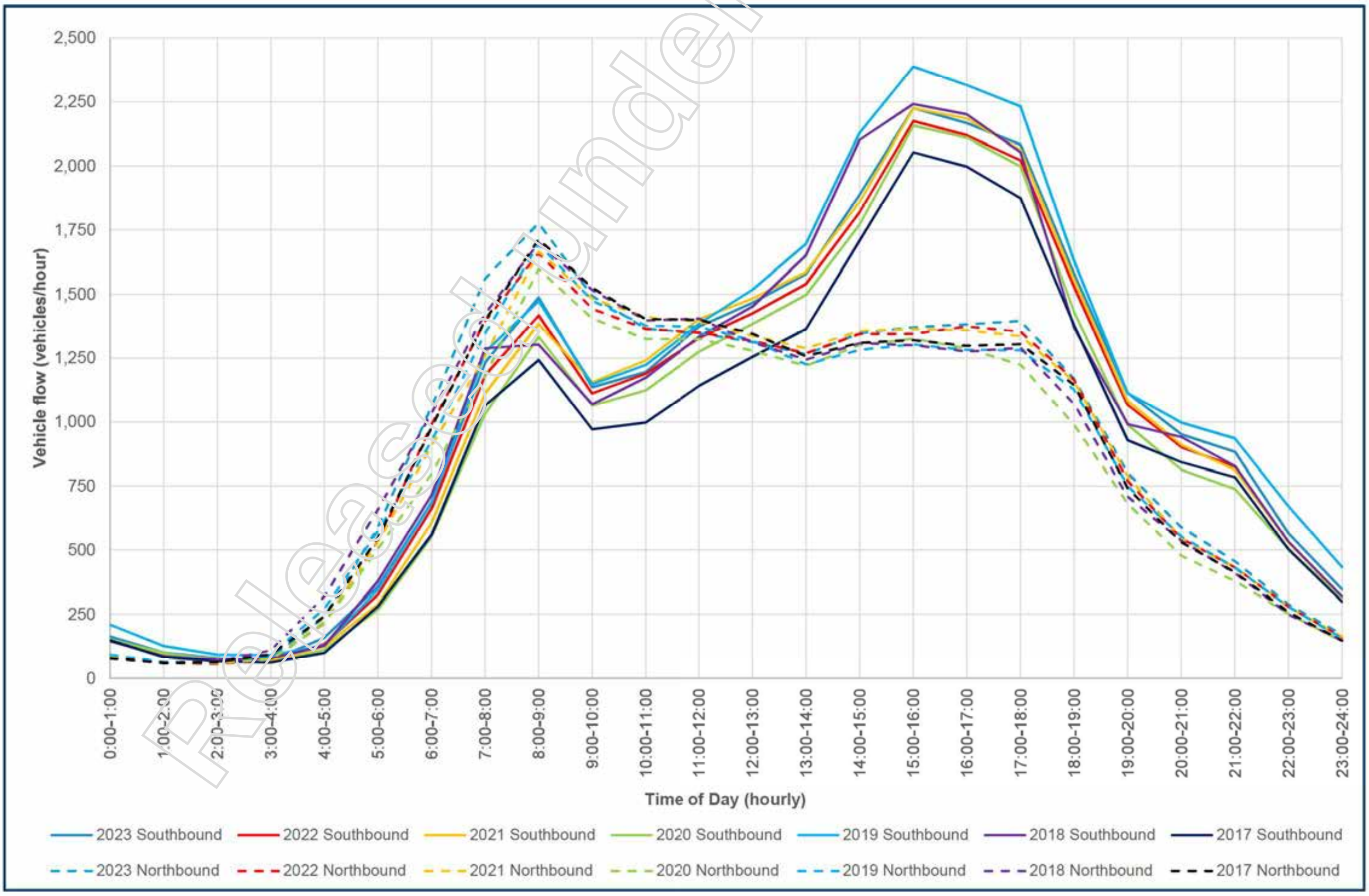


Figure 15 Logan Road: hourly traffic demand profile north of MPPL (2017 to 2023)

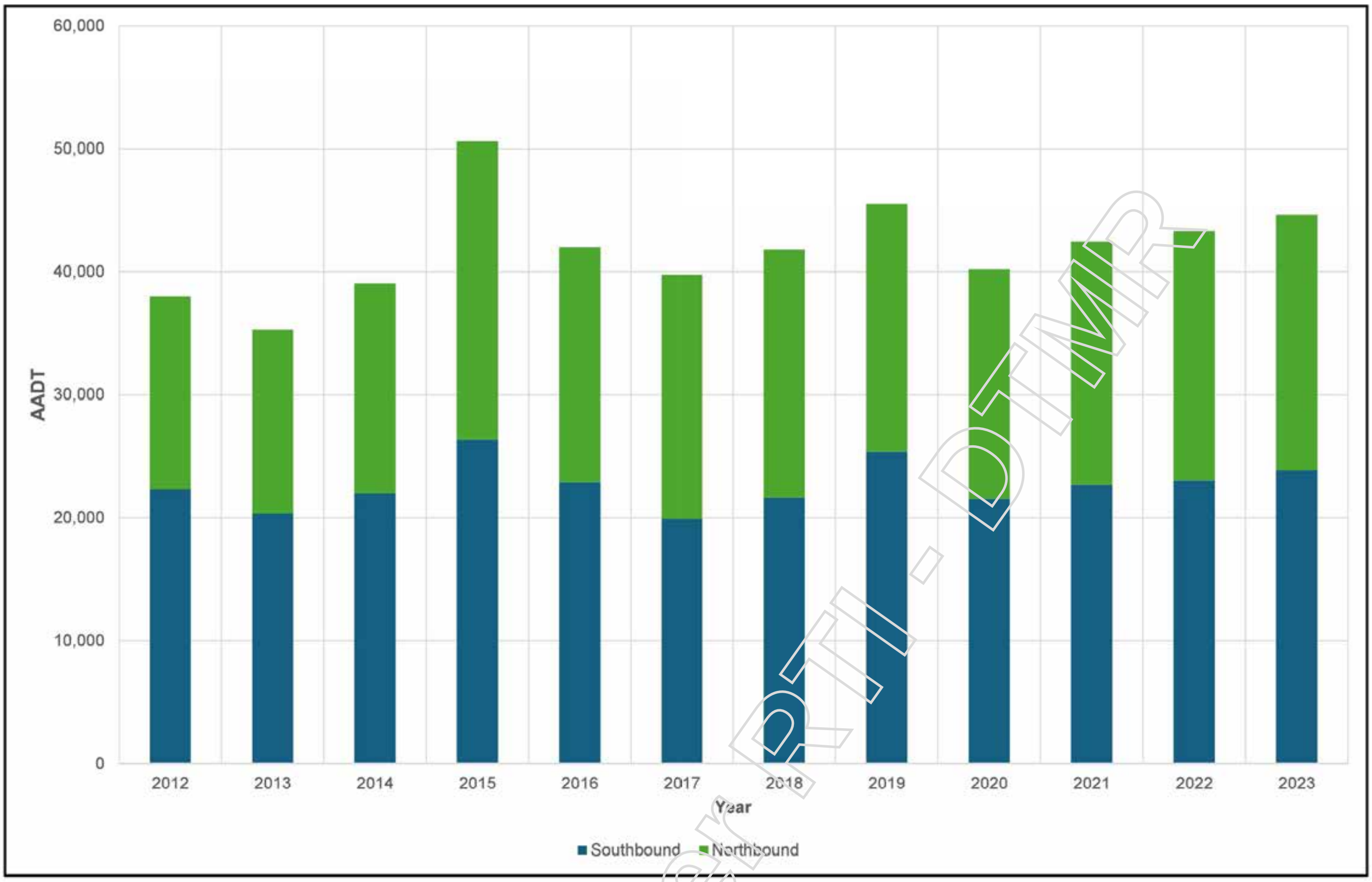


Figure 16 Logan Road: annual average daily traffic (AADT) demands (2012 to 2023)

Table 15 compares historical daily traffic demands at the same location on Logan Road (Site 135689).

Table 15 Logan Road: annual average daily traffic (AADT) demands (2012 to 2023)

Year	Southbound	Northbound	Combined	Directional Split
2012	22,310	15,707	38,017	59% (SB) / 41% (NB)
2013	20,322	14,967	35,289	58% (SB) / 42% (NB)
2014	21,978	17,079	39,057	56% (SB) / 44% (NB)
2015	26,365	24,208	50,573	52% (SB) / 48% (NB)
2016	22,880	19,082	41,962	55% (SB) / 45% (NB)
2017	19,902	19,886	39,788	50% (SB) / 50% (NB)
2018	21,638	20,119	41,757	52% (SB) / 48% (NB)
2019	25,397	20,126	45,523	56% (SB) / 44% (NB)
2020	21,546	18,631	40,177	54% (SB) / 46% (NB)
2021	22,674	19,732	42,406	53% (SB) / 47% (NB)
2022	23,041	20,232	43,273	53% (SB) / 47% (NB)
2023	23,834	20,755	44,589	53% (SB) / 47% (NB)

Key points to note are summarised below:

- **AADT:** Logan Road north of MPPL carried 45,500 vpd in 2023. It is noted that the AADT increased in 2015 to approximately 50,500 vpd. Whilst there is no evidence to confirm, this may be due to roadworks on adjacent roads
- **Growth:** The AADT increased between 2012 and 2023 by 17.3% at a rate of approximately 1.6% per annum (p.a.)
- **Directionality:** The southbound demand (53%) is typically higher than the northbound demand (47%)
- **Profile:** The typical weekday PM peak period is greater and over a longer period compared to the AM peak period.

4.2.2.2 Significant traffic volumes at the study intersection

Figure 17 and Figure 18 reproduce surveyed traffic demands at the MPPL intersection from 12 October 2022.

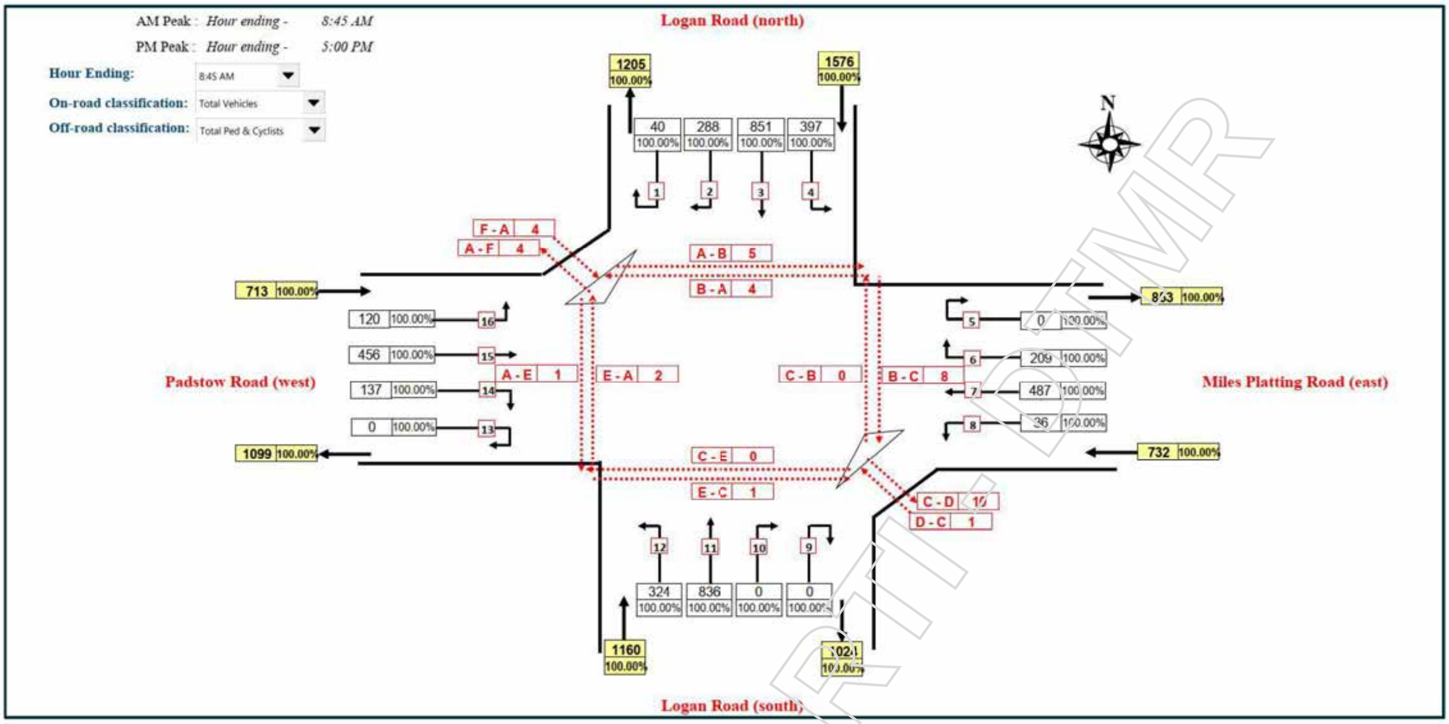


Figure 17 MPPL intersection: peak hour traffic volumes – 2022 AM Peak

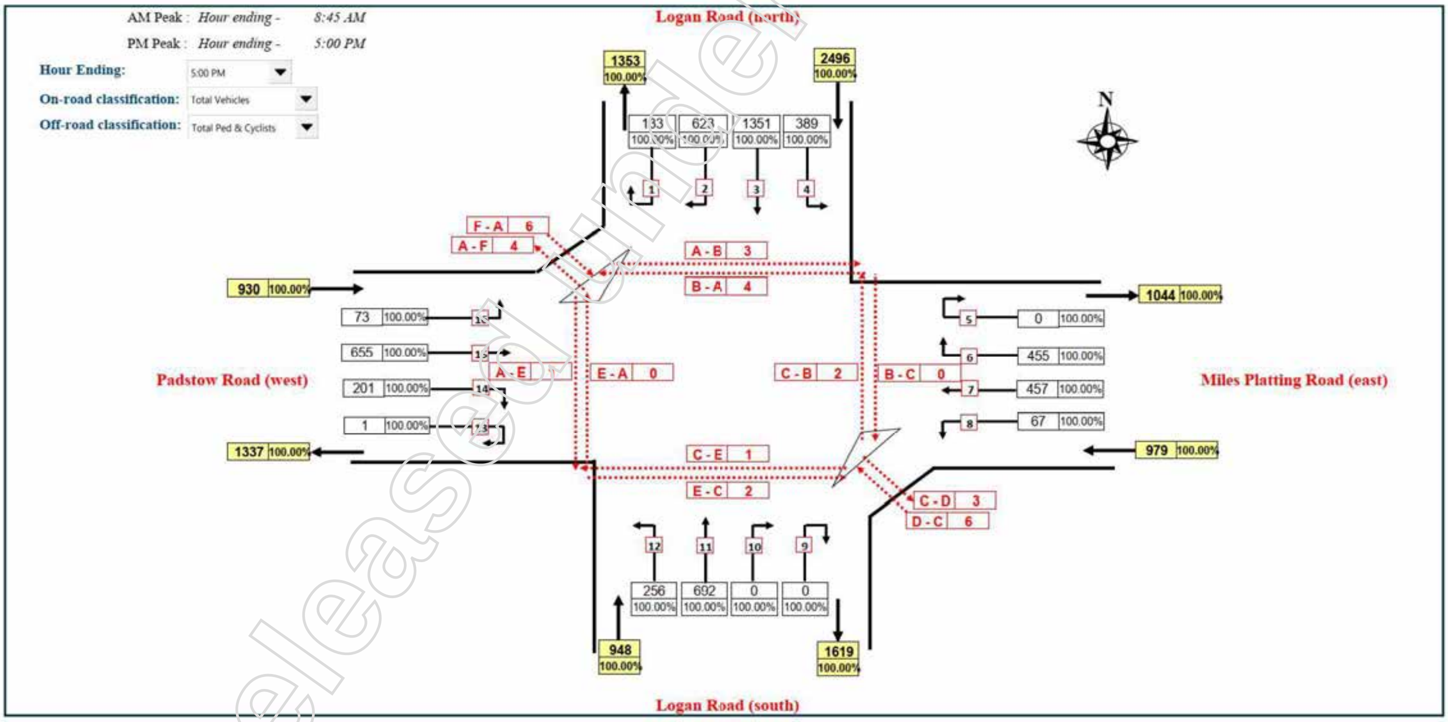


Figure 18 MPPL intersection: peak hour traffic volumes – 2022 PM Peak

Key points to note are summarised below:

- Significant peak hour traffic demands at the intersection (4,200 in the AM and 5,300 in the PM)
- Southbound demand is significantly higher in the PM peak (1,500 in the AM vs. 2,500 in the PM)
- Moderate pedestrian demands at the intersection (40 movements in the AM and 32 in the PM)
- Limited cyclist demands at the intersection (2 movements in the AM and 0 in the PM).

4.2.2.3 Extensive queues and delays during peak periods

Figure 19 and Figure 20 compares "Google Traffic" and simulated density plots for the study area extracted from the AIMSUN model for the 2024 AM and PM peak hours respective. The density plots represent the number of vehicles per lane within road sections and provides an indication of typical vehicle queue formation or slow-movement traffic. Google Traffic conditions reflect speed of traffic relative to the speed limit, and while not an exact comparison, it is still useful.

Figure 19 Google traffic compared to AIMSUN simulated density – 2024 AM Peak

Figure 20 Google traffic compared to AIMSUN simulated density – 2024 PM Peak

These comparisons show a reasonable level of consistent traffic congestion pattern formation between the model and observed, in particular the northbound queues on Logan Road in the AM peak extending back from the Logan Road / Warrigal Road intersection through the MPPL intersection and the southbound queues at MPPL in the PM peak.

Figure 21 illustrates observed vehicle queues on Logan Road from a site inspection on Friday 17 May 2024 from 8:00am to 9:30am. These queues are consistent with Google Traffic and the simulated density plots outlined previously.

Figure 21 Site observations - 2024 AM Peak

4.2.2.4 MPPL is currently operating at capacity during peak periods

Table 16 summarises the intersection performance results for the 2024 AM and PM peak base year scenarios extracted from the AIMSUN model, including average delay per vehicle (seconds per vehicle) and Level of Service (LOS). It is noted that an average delay of 55 seconds per vehicle is typically adopted as the threshold between LOS D and E at signalised intersection. When delays exceed this threshold, the intersection may be operating at practical capacity.

Table 16 AIMSUN simulated intersection performance – 2024 AM and PM Peaks

Intersection	AM Peak				PM Peak			
	7-8am		8-9am		4-5pm		5-6pm	
	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS
Logan Rd / Miles Platting Rd / Padstow Rd	58	E	33	C	51	D	57	E
Logan Rd / Warrigal Rd / NB Ramps	28	C	32	C	21	C	22	C
Logan Rd / Holmead Rd / SB Ramps	29	C	25	C	33	C	33	C
Padstow Rd / Warrigal Rd	38	D	39	D	31	C	32	C

The results indicate that MPPL is operating at or near capacity between 7-8AM (LOS E) and 5-6PM (LOS E), and that it is operating close to capacity between 4-5PM (LOS D). Based on the modelling results, "Google Traffic", and site observations, it is evident that northbound queues on Logan Road at the Logan Road / Warrigal Road intersection restrict capacity at MPPL in the AM peak (i.e. queues extend back through the MPPL intersection) whereas in the PM peak, the performance issues at MPPL are attributed to the significant southbound through and right turn demand on Logan Road.

4.2.2.5 Motorists use Logan Road to interchange between the M2 and M3

Figure 22 and Figure 23 illustrate that some motorists use this section of Logan Road to "interchange" between the M2 and M3 due to the absence of direct links between the motorways. According to data from the Brisbane Strategic Transport Model (BSTM-MMv2.4)(March 2024), this "interchange" movement makes up around 4-7% of the traffic on Logan Road, which is significant given that the road carried approximately 43,000 vehicles per day in 2023.

The lack of a direct connection between the M2 and M3 results in motorway traffic using the arterial road network (i.e. non motorway network), which contributes to the level of peak hour congestion on Logan Road and at the MPPL intersection.

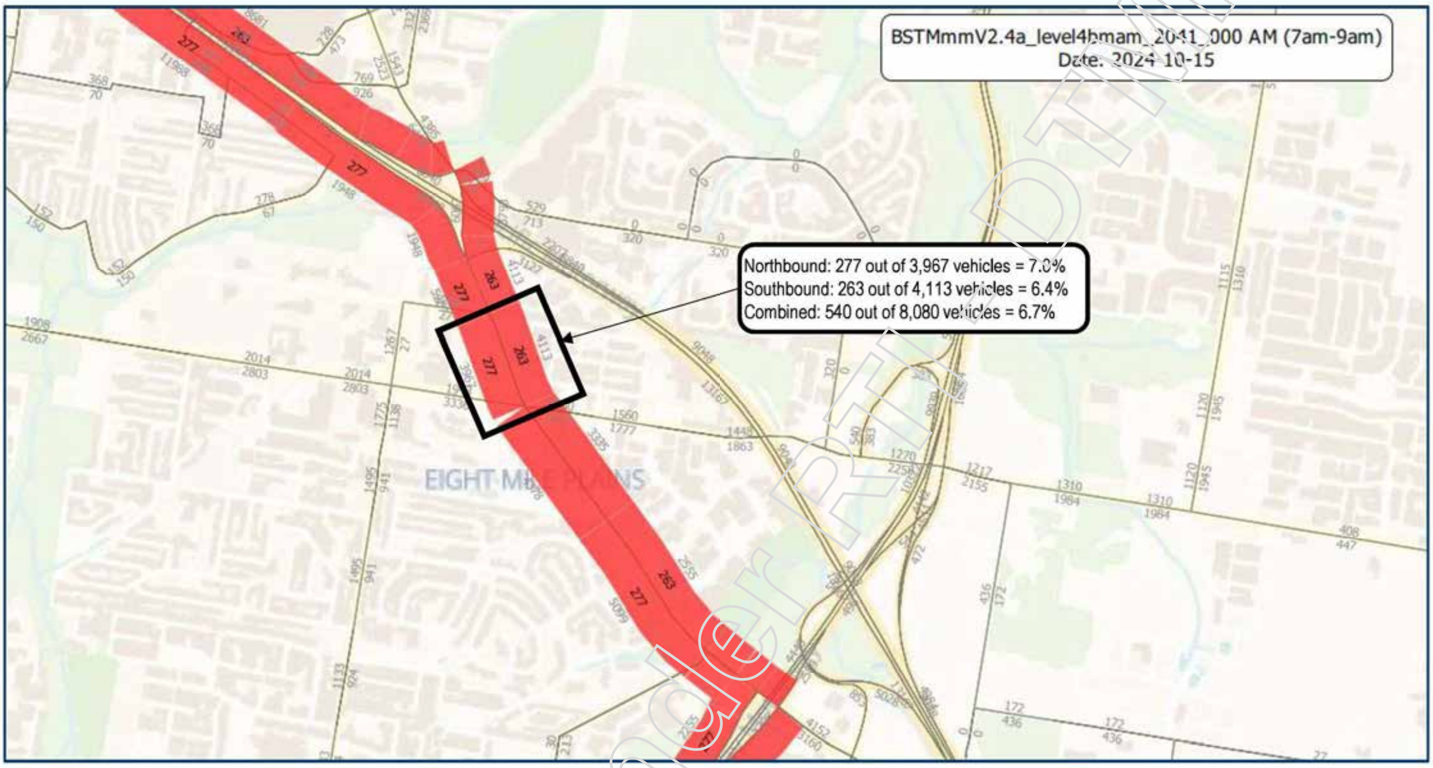


Figure 22 Motorists use Logan Road to interchange between M2 and M3 (BSTM) – 2041 AM Peak Period

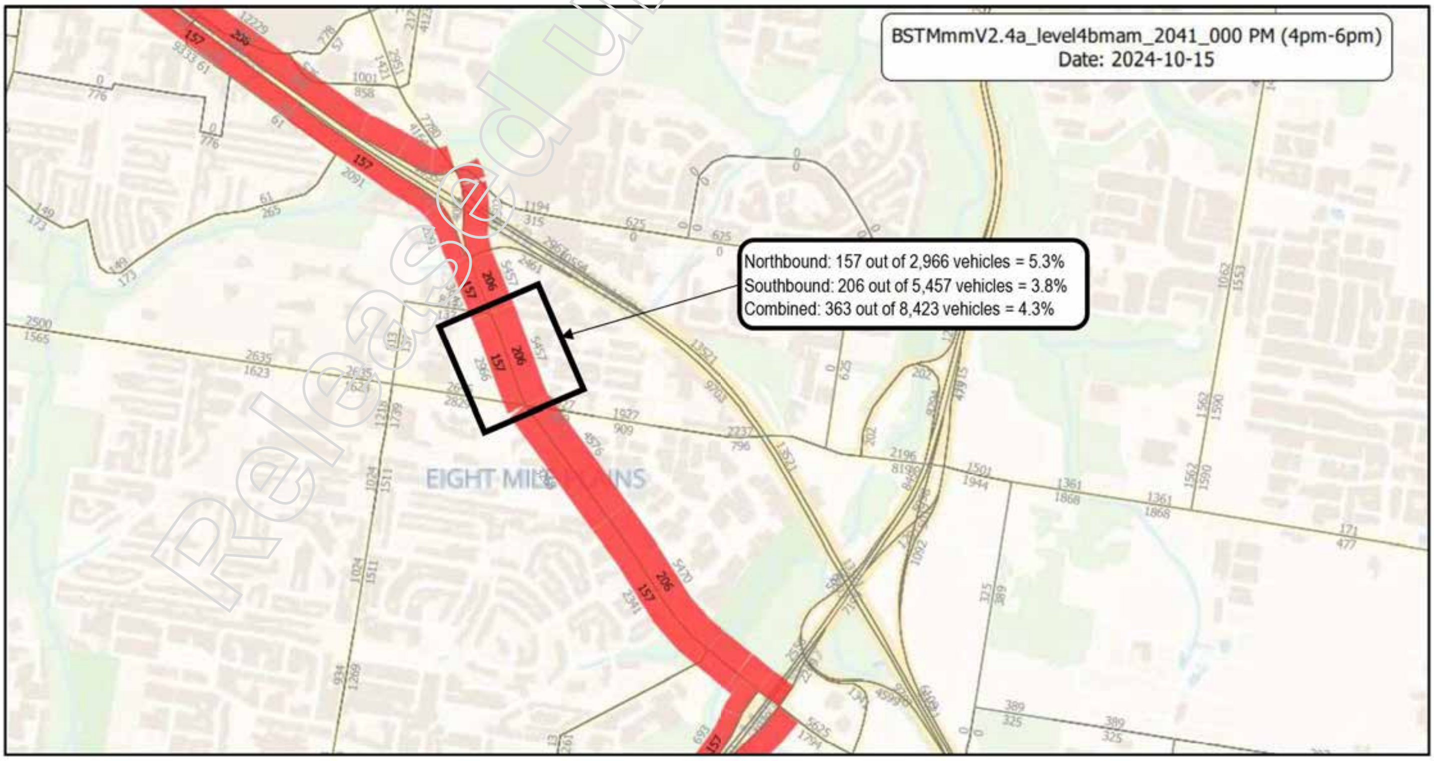


Figure 23 Motorists use Logan Road to interchange between M2 and M3 (BSTM) – 2041 PM Peak Period

4.2.2.6 Motorists travel through Brisbane Technology Park due to right turn ban at MPPL

The right turn movement from Logan Road (south) to Miles Platting Road (east) is prohibited at MPPL. This is an important connection in the arterial /sub-arterial road network for movements from Logan Road to the Eight Mile Plains bus station (i.e. South East Busway), Rochedale and Gateway Motorway (M1). The turn restriction at MPPL results in motorists 'rat-running' through Brisbane Technology Park (via Brandl Street and McKechnie Drive) or using the M1 / Levington Rd northbound on-ramp for short-distance local trips on the M1 (which exacerbates congestion at this location).

Figure 24 indicatively illustrates the route used motorists travelling through Brisbane Technology Park.

Figure 24 Motorists travel through Brisbane Technology Park to access the Park n Ride

The following key points are noted in relation to the road network within the Brisbane Technology Park:

- Road Hierarchy: neighbourhood roads (not traffic carrying roads)
- Cross Section: two lanes undivided with kerbside parking
- Alignment: circuitous (not direct)
- Speed Limit: 50km/h

In summary, the Brisbane Technology Park internal road network has been designed for local trips to or from the precinct.

4.2.2.7 Motorists use local road network to avoid MPPL

Figure 25 illustrates how some motorists use the local road network as a 'rat run' to avoid congestion at MPPL.

Figure 25 Motorists use Warrigal Road and Bleasby Road to avoid MPPL

Traffic survey data obtained at the Logan Road / Bleasby Road intersection on 6 June 2018, indicates approximately 500 vehicles turn left from Bleasby Road into the continuous lane on Logan Road in both the morning and afternoon peak hour. Based on the surrounding catchment (emerging community), road hierarchy (district road), limited left turn demand from Padstow Road into Logan Road (approximately 100 vehicles in both peaks), and recent site observations, it is evident the left turn demand out of Bleasby Road is associated with northbound motorists avoiding the MPPL intersection. The continuous left turn lane out of Bleasby Road allows motorists to "bypass" 700m of congested road network.

4.2.2.8 Summary

In summary:

- Logan Road carries in the order of 45,500vpd (2023) with traffic volumes increasing at approximately 1.6% p.a.
- MPPL carries approximately 4,200 vehicles in the AM peak hour and 5,300 vehicles in the PM Peak hour (2022)
- The significant peak hour traffic volumes on Logan Road and at MPPL result in excessive queues and delays
- The MPPL intersection is currently operating at capacity during peak periods. In the AM peak, northbound queues on Logan Road at the Logan Road / Warrigal Road intersection restrict capacity at MPPL. In the PM peak, the significant southbound through and right turn demands on Logan Road adversely impact the performance of the intersection
- Motorists use Logan Road to interchange between the M2 and M3, which contributes to the peak hour congestion
- To avoid congestion at MPPL and on Logan Road, some motorists use the local road network (e.g. Bleasby Road)
- Due to turn restrictions at MPPL, some northbound motorists on Logan Road travel through the Brisbane Technology Park to access the Eight Mile Plains park 'n' ride facility off Miles Platting Road.

4.2.3 History of casualty crashes within the study area due to significant congestion and queuing on Logan Road and at the study intersection

4.2.3.1 Increasing rate of reported crashes within the study area

Figure 26 and Figure 27 illustrate the location of reported crashes in proximity to the study intersection by "crash severity" and "crash type". The data was sourced from TMR's Data Portal for the 5-year period from 1 July 2018 to 30 June 2023. It is noted that a smaller footprint was selected for the crash data analysis to identify localised crash trends and safety risks in proximity to MPPL and along Logan Road, away from the broader motorway network (e.g. M2 and M3 ramps). The broader study area reflects the vehicle movements which contribute to the congestion at MPPL, however is not deemed suitable for crash data analysis when identifying service requirements for an intersection upgrade localised at MPPL.

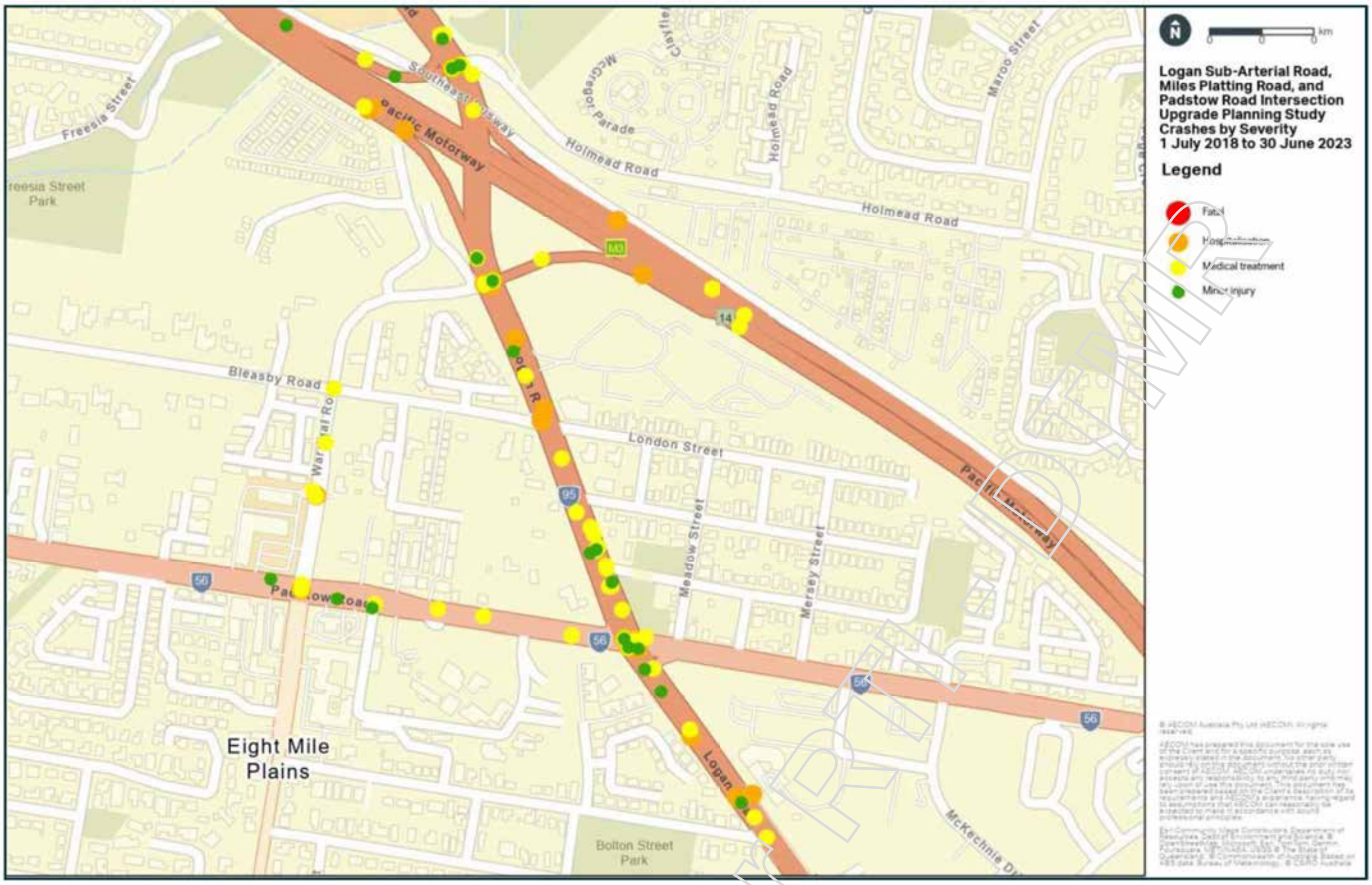


Figure 26   Reported crashes – study area: by crash severity

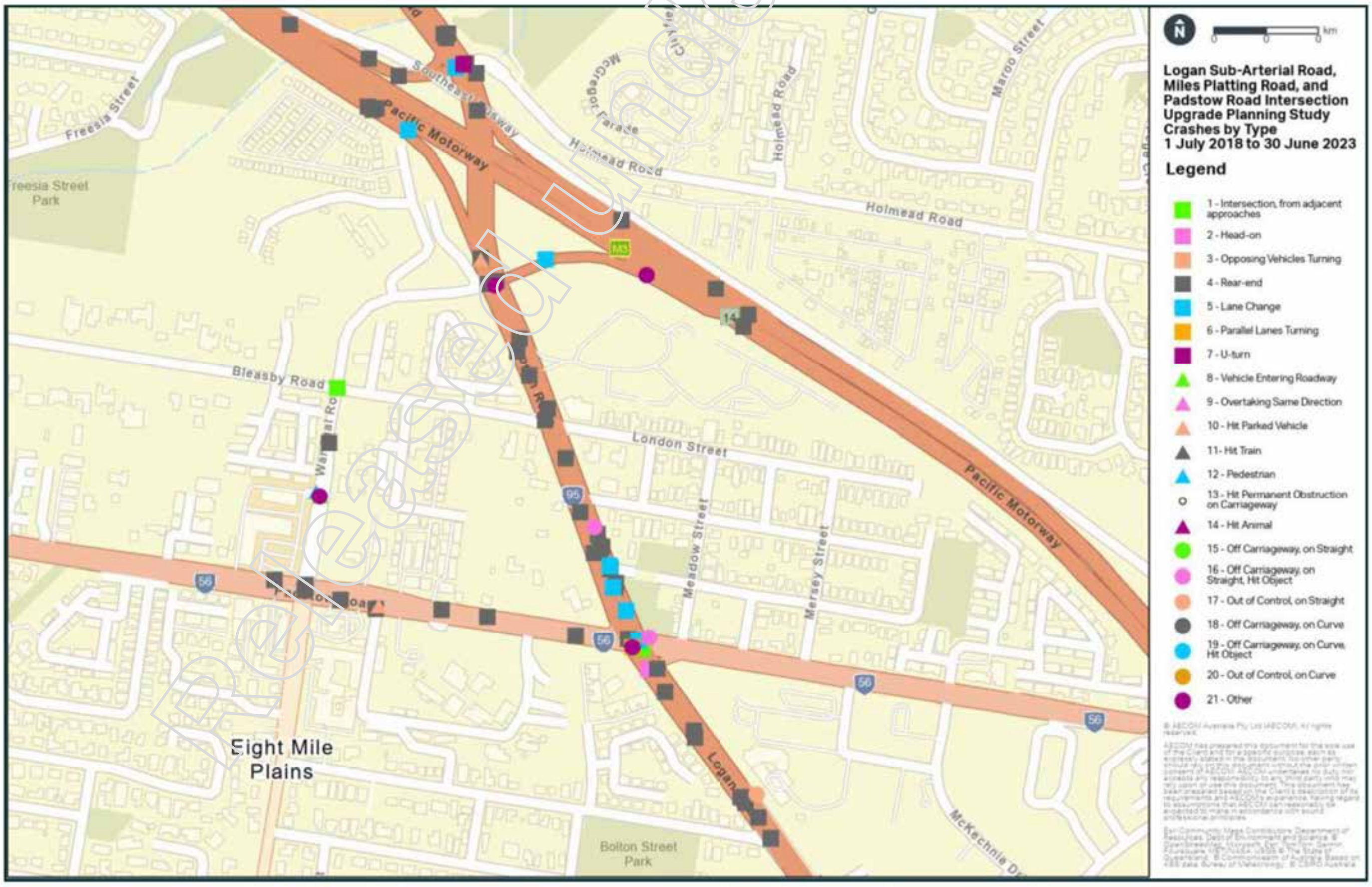


Figure 27   Reported crashes – study area: by crash type

Figure 28 summarises relevant factors attributed to the reported crashes within the study area, to understand if there are any relevant underlying temporal and environmental trends with the dataset.

Figure 28 Reported crashes – study area: temporal and environmental analysis

Table 17 and Table 18 summarise the crashes by “crash severity” and “crash type” respectively.

Table 17 Reported crashes – study area: by crash severity

Crash Severity	Number of Reported Crashes
Fatal	0 (0%)
Hospitalisation	28 (26%)
Medical treatment	58 (54%)
Minor injury	22 (20%)
Total	**108**

Table 18 Reported crashes – study area: by crash type

Crash Type	Number of Reported Crashes						
	2018	2019	2020	2021	2022	2023	TOTAL
1 - From adjacent approaches	3	3	2	3	2	2	15 (14%)
2 - Head on	0	0	0	1	0	0	1 (1%)
3 - Opposing vehicle turning	0	0	0	1	0	0	1 (1%)
4 - Rear end	10	10	12	14	16	6	68 (63%)
5 - Lane change	2	0	1	1	3	0	7 (6%)
6 - Parallel lanes, turning	0	2	0	0	0	0	2 (2%)
7 - U-turn	0	0	0	0	1	0	1 (1%)
8 - Entering roadway	0	0	0	1	0	0	1 (1%)
10 – Hit parked vehicle	0	0	1	0	1	0	2 (2%)
12 - Pedestrian	1	0	0	0	0	0	1 (1%)
16 - Off carriageway on straight, hit object	0	0	1	0	2	0	3 (3%)
17 – Out of control on straight	0	0	1	0	0	0	1 (1%)
21 - Exceptions	0	3	1	1	0	0	5 (5%)
Total	**16**	**18**	**19**	**22**	**25**	**8**	**108**

Note: The crash data was sourced from TMR’s Data Portal for the 5-year period from 1 July 2018 to 30 June 2023

Key points to note are summarised below:

- There were 108 casualty crashes reported within the study area for the 5-year period. The number of reported crashes has been steadily increasing year on year, which appears to be directly related to the increase in “rear end” crashes
- 28 (26%) crashes were categorised as “Fatal or Serious Injury” (FSI) type crashes, however no fatal crashes were reported (i.e. all FSI crashes resulted in hospitalisation)
- The highest crash risk recorded were “Rear End” crashes at 63% (68 crashes) which is typical for a congested network. Most of these crashes occurred “mid-block” rather than at the intersections
- Two (2) crashes involved pedestrians and another two (2) involved cyclists. One (1) of the cyclist crashes was at the Logan Road / Warrigal Road / M3 Ramps intersection (i.e. where V1 crosses Logan Road). The other crashes were at the Neighbourhood Centre driveway on Warrigal Road
- Nine (9) crashes involving motorcyclists, including two (2) at the MPPL intersection
- A high proportion of the reported crashes occurred in the AM Peak between 7:00 and 9:00am (29 crashes or 27%), and in the PM Peak between 17:00 and 19:00pm (23 crashes or 21%)
- Most crashes occurred during daylight hours (79%), on dry pavement (89%), and on sections of the road network that are straight horizontally (82%) and level vertically (77%).

4.2.3.2 High proportion of crashes result in fatal or serious injury

Figure 29 illustrate the location of reported FSI crashes within the study area.

Figure 29 Reported crashes – study area: FSI crashes

Key points to note are summarised below:

- A total of 28 FSI crashes were reported within the study area, all categorised as hospitalisation
- Five (5) FSI crashes occurred at the Logan Road / Holmead Road / M3 Ramps intersection
- Four (4) FSI crashes occurred on the Pacific Motorway
- One (1) FSI crash occurred on Exit 14
- Five (5) FSI crashes occurred at the MPPL intersection
- Five (5) FSI crashes occurred at the Logan Road / Warrigal Road intersection
- Six (6) FSI crashes occurred mid-block on Logan Road
- One (1) FSI crash occurred at the Warrigal Road / Padstow Road intersection
- One (1) FSI crash occurred on Warrigal Road at the local centre driveway.

4.2.3.3 High proportion of vulnerable user crashes result in hospitalisation

Figure 30 illustrate the location of reported pedestrian crashes within the study area.

Figure 30 Reported crashes – study area: pedestrian crashes by crash severity

Figure 31 illustrate the location of reported cyclist crashes within the study area.

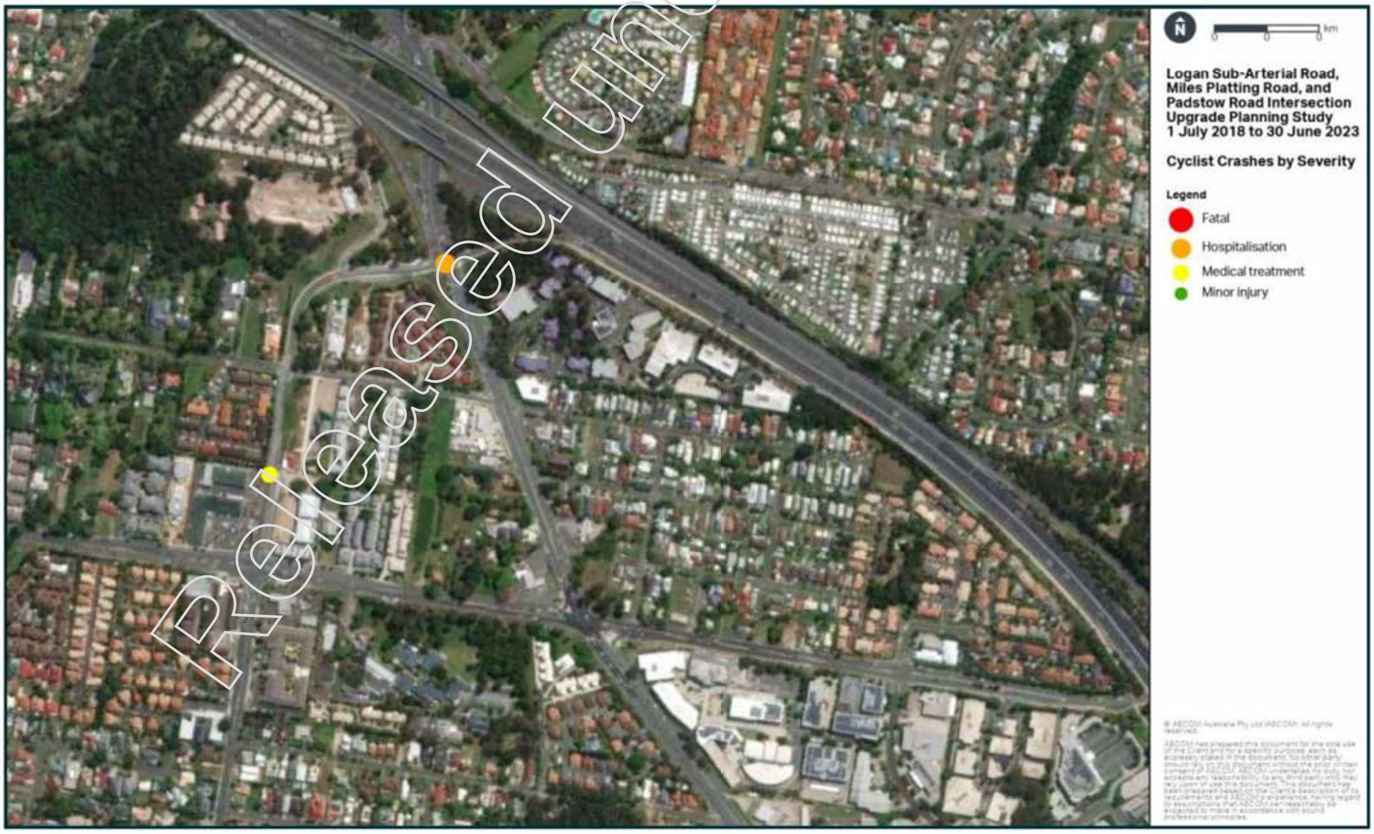


Figure 31 Reported crashes – study area: cyclist crashes by crash severity

Figure 32 illustrate the location of reported motorcyclist crashes within the study area.

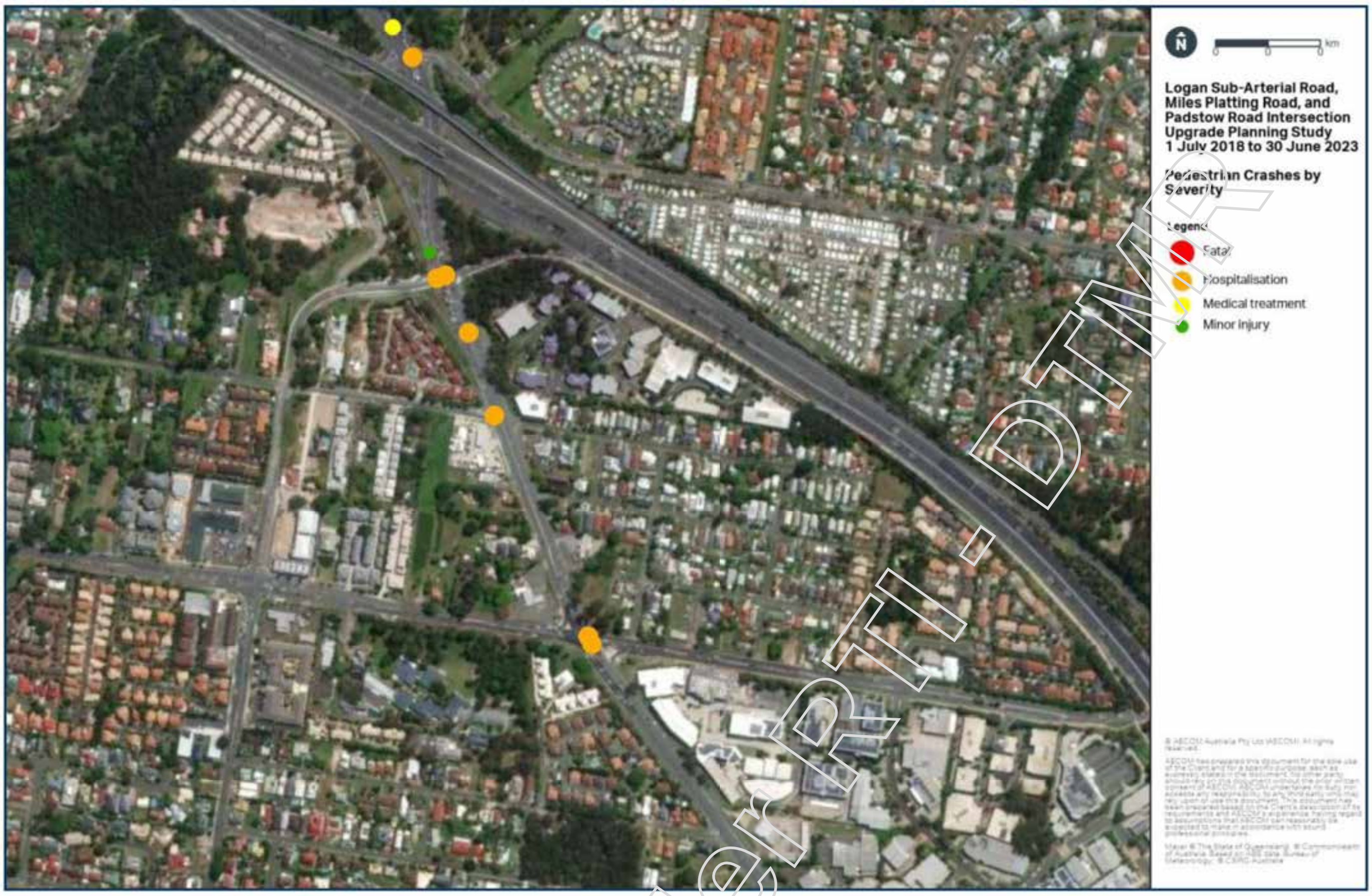


Figure 32 Reported crashes – study area: motorcyclist crashes by crash severity

Key points to note are summarised below:

- **Pedestrian Crashes:** Two (2) reported crashes occurred on Warrigal Road in proximity to the Neighbourhood Centre driveway. One (1) of these resulted in hospitalisation (i.e. FSI crash)
- **Cyclist Crashes:** Two (2) reported crashes occurred within the study area. One (1) was at the Logan Road / Warrigal Road / M3 Ramps intersection where V1 crosses Logan Road. This was a FSI crash. The other reported crash was at the Neighbourhood Centre driveway on Warrigal Road
- **Motorcyclist Crashes:** Nine (9) reported crashes occurred within the study area. Seven (7) of these resulted in hospitalisation (i.e. FSI crash). The crashes occurred at the following locations:
  - Two (2) at the MPPL intersection
  - One (1) at the Bleasby Road intersection
  - Four (4) in proximity to the Logan Road / Warrigal Road / M3 Ramps intersection
  - Two (2) in proximity to the Logan Road / Holmead Road / M3 Ramps intersection

4.2.3.4 Queues on Exit 14 extend back to the Pacific Motorway

Exit 14 experiences significant traffic volumes during typical morning weekday peak hour periods. Traffic survey data obtained on Wednesday 12th October 2022, recorded approximately 1,200 vehicles using the off-ramp during the AM Peak (7:45 to 8:45AM) compared to approximately 700 vehicles in the PM Peak (4:45 to 5:45PM).

Figure 33 illustrates the abovementioned traffic survey data for Exit 14 in 15 minute increments between 6AM and 6PM. It highlights a significant "spike" in the morning with relatively constant flows throughout the rest of the survey period.

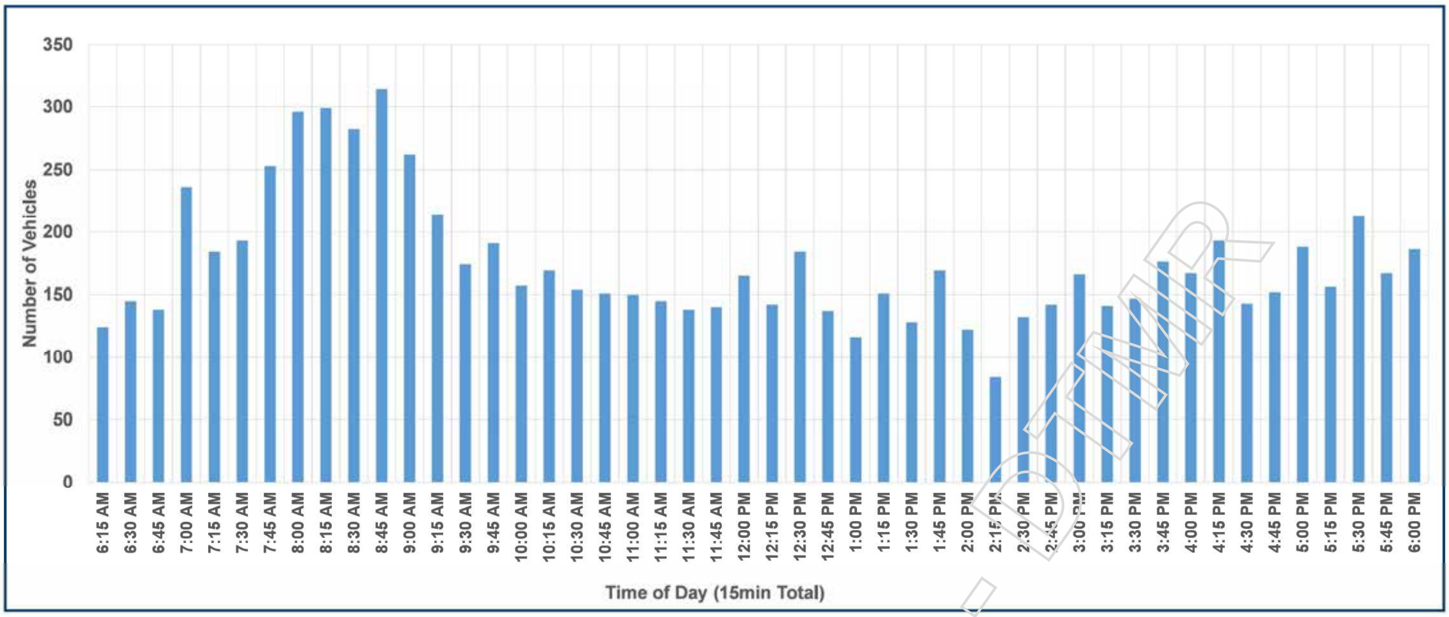


Figure 33 Exit 14: surveyed traffic volumes (12/10/2022)

Due to the considerable increase in traffic demand at Exit 14 during the morning peak, vehicle queues frequently extend over 500m back to the Pacific Motorway, with motorists often waiting on the road shoulder, as shown in **Figure 34**.

Figure 34 Exit 14: queues extend back to the motorway during morning peak period (07/08/24 at 7:45AM)

To help alleviate the queuing at Exit 14, TMR extended the cycle time at the Logan Road / Warrigal Road / M3 Off-Ramp intersection during the morning peak from 140 to 170 seconds, allowing for more "green time" for the off-ramp.

While there is no history of reported crashes at this location, the high-speed environment on the motorway (i.e. 100km/h) make stationary vehicles queued in the shoulder a major safety risk for the study area.

4.2.3.5 Summary

In summary:

- There were 108 casualty crashes reported within the study area for the 5-year period of data including 28 (26%) FSI crashes. The number of reported crashes has been steadily increasing year on year from 16 in 2018 to 25 in 2022
- 68 crashes (63%) were categorised as "rear end" crashes, which is typical for a congested network
- 13 crashes (12%) involved vulnerable users and nine (9) of these (69%) resulted in hospitalisation (FSI)
- Morning peak hour queues on Exit 14 extending back to the Pacific Motorway is a major safety risk for the study area.

4.2.4 Poor travel time reliability for buses within the study area due to the lack of alternative routes and priority infrastructure for public transport

4.2.4.1 Lack of alternative routes and priority infrastructure for public transport

Figure 35 illustrates bus routes in proximity to the study area. It is noted that the M3 and Bulimba Creek create physical barriers for the road network within Eight Mile Plains. As a result, all north-south bus routes through Eight Mile Plains use the Logan Road / Pacific Motorway interchange, and the majority of these use the Warrigal Road Green Link.

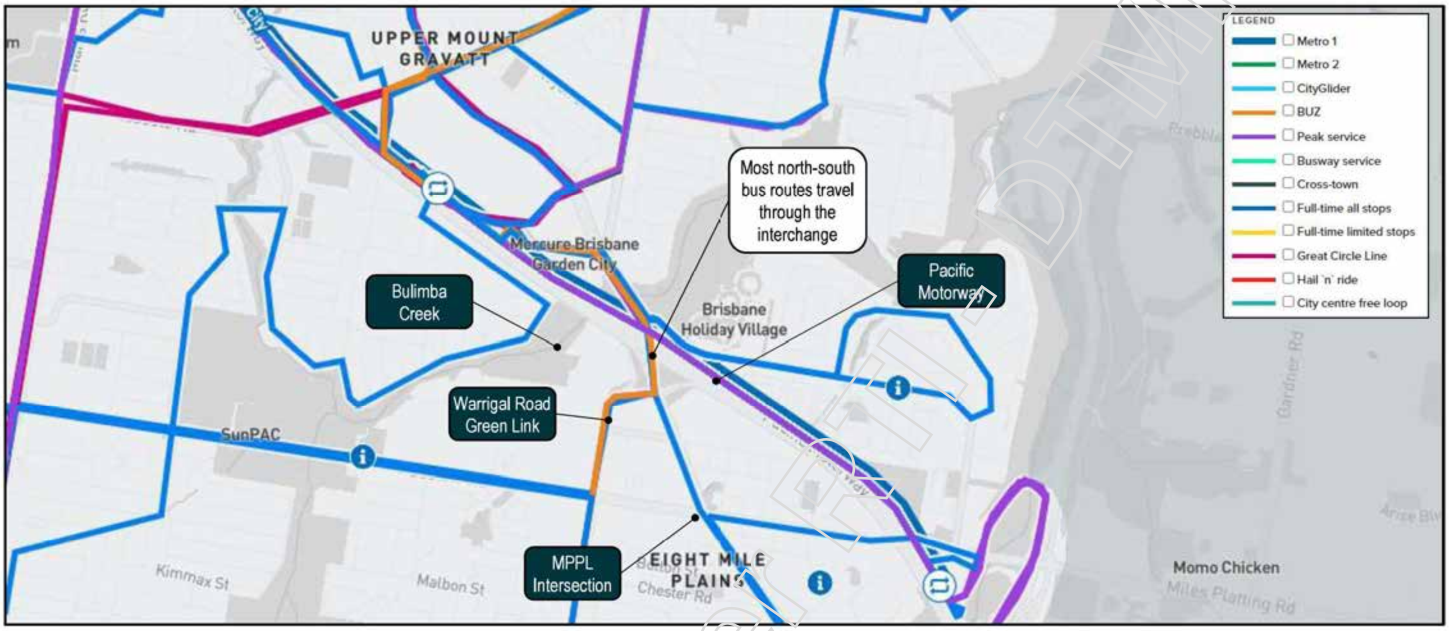


Figure 35 Lack of alternative north-south bus routes through Eight Mile Plains

Figure 36 illustrates the Warrigal Road Green Link between Bleasby Road and the Logan Road access road. This link was constructed in 2015 and is restricted to buses, cyclists, and pedestrians only. This is the only priority infrastructure for public transport within study area (i.e. there are no bus lanes, queue jumps at intersections, or traffic signal priority).

Figure 36 Lack of priority infrastructure for public transport within the study area

4.2.4.2 Relatively low bus patronage demands particularly on logan road

Table 19 summarises the average weekday and weekend boardings and alighting at each bus stop within the study intersection, based on data provided by Translink between 26 February 2024 to 31 March 2024 (5 weeks).

Table 19 Bus patronage data: study area

Stop	Measure	Average Weekday Patronage	Average Weekend Patronage
Bus Stop #1 – Logan Road near Miles Platting Road (northbound)	Boarding	7	1
	Alighting	4	2
	Total	11	3
Bus Stop #2 – Logan Road near Miles Platting Road (southbound)	Boarding	11	2
	Alighting	15	3
	Total	26	5
Bus Stop #5 – Logan Road near Liverpool Street (northbound)	Boarding	4	1
	Alighting	3	2
	Total	7	3
Bus Stop #6 – Warrigal Road Green Link (westbound)	Boarding	20	9
	Alighting	163	85
	Total	182	94
Bus Stop #7 – Warrigal Road Green Link (eastbound)	Boarding	186	86
	Alighting	31	10
	Total	217	96

Key points to note are summarised below:

- The bus stops on Logan Road service a relatively small catchment (50 boardings / alighting per day)
- The bus stops on Warrigal Road service a relatively large catchment (400 boardings / alighting per day)
- Limited routes service the bus stops on Logan Road (152, 299, 545) which may contribute to the limited demands
- Notwithstanding the above, the recorded bus patronage at bus stops within the study area is relatively low.

4.2.4.3 Journey time variability and excess passenger delay within the study area

Table 20 summarises key reliability parameters extracted from TMR's Bus Corridor Action Plan (BCAP) dashboard.

Table 20 Bus network reliability parameters

Measure	Journey Time Variability (JTV)	Total Excess Passenger Delay (TEPD)
Definition	JTV measures the fluctuations in travel time on a given road section at the same time of day, caused by non-recurring factors that make the travel time differ from one day to the next	TEPD quantifies the excessive delays experienced by passengers on a specific road segment due to non-recurring congestion, which increases the unpredictability of travel times for users
Calculation	JTV = (standard deviation of travel time in the time period / mean of travel times in the time period)	TEPD (passenger minutes / km / day) = (95th percentile travel time in the time period – mean travel time in the time period) x Number of passengers / segment length (km) / Number of weekdays in data period
Application	When and where are the most unreliable locations on the network	When and where on the network are customers most impacted by poor reliability

Figure 37 illustrates the recorded JTV on Logan Road and the Warrigal Road Green Link during March 2024.

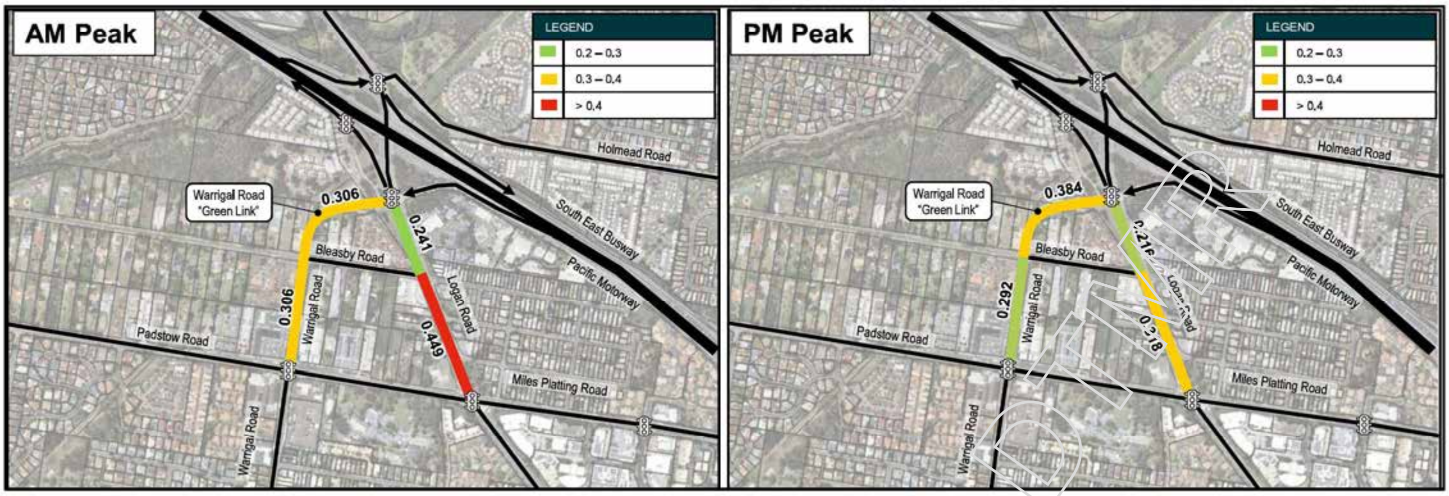


Figure 37 Public transport network: Journey Time Variability

JTV measures the fluctuations in travel time on a given road section at the same time of day, caused by non-recurring factors that make the travel time differ from one day to the next. The above results highlight that Logan Road between MPPL and Bleasby Road recorded the highest JTV during the morning peak in March 2024. All other segments recorded low to moderate variability, with limited difference between the AM and PM peak hour periods. This indicates that the extensive northbound queueing on Logan Road in the AM peak impacts bus journey time reliability.

Figure 38 illustrates the EPD recorded on Logan Road and the Warrigal Road Green Link during March 2024.

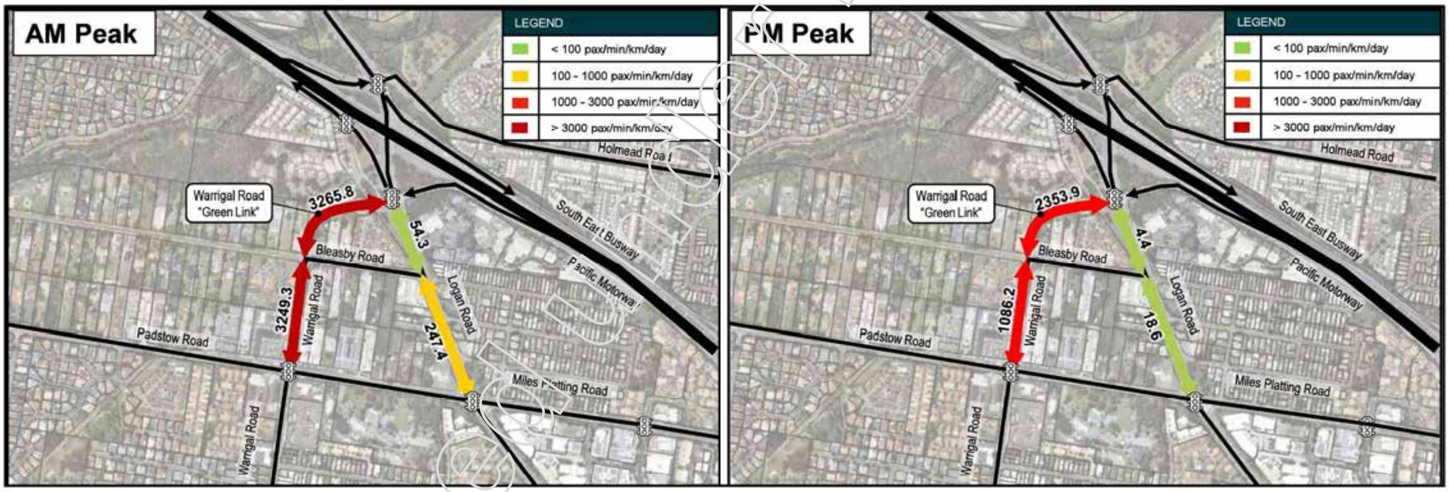


Figure 38 Public transport network: Total Excess Passenger Delay

TEPD quantifies the excessive delays experienced by passengers on a specific road segment due to non-recurring congestion, which increases the unpredictability of travel times for users. The above results highlight that the Warrigal Road Green Link recorded the greatest TEPD in both peaks. Whilst this appears to be counter-intuitive, noting the bus priority on the Green Link, it is influenced by the significantly higher number of patrons that use the Green Link (approximately 2,500 passengers per day) compared to Logan Road (approximately 80 passengers per day). It is also influenced by the limited green time provided to Warrigal Road at the Logan Road / Warrigal Road / Exit 14 intersection.

4.2.4.4 Summary

There is a lack of alternative routes and / or priority infrastructure for public transport (buses) within the study area. All north-south bus routes through Eight Mile Plains use the Logan Road / Pacific Motorway interchange, and the majority of these use the Warrigal Road Green Link. Passengers experience poor reliability and travel time unpredictability within the study area during weekday peak hour periods, due to a combination of excessive vehicle queueing on Logan Road and the limited green time provided to the Warrigal Road approach at the Logan Road / Warrigal Road / Exit 14 intersection. It is anticipated that the JTV and TEPD contributes to the relatively low public transport mode share within the study area.

4.2.5 Lack of active transport infrastructure within the study area reduces safety, attractiveness and reliability for active transport users

4.2.5.1 Gaps in the network and lack of connectivity to Veloway 1

Figure 39 indicatively illustrates the gaps (i.e. missing links) in the active transport network within the study area.

Figure 39 Active transport network: existing infrastructure – network overview

Figure 40 illustrates specific examples of the existing active transport infrastructure and gaps in the network.

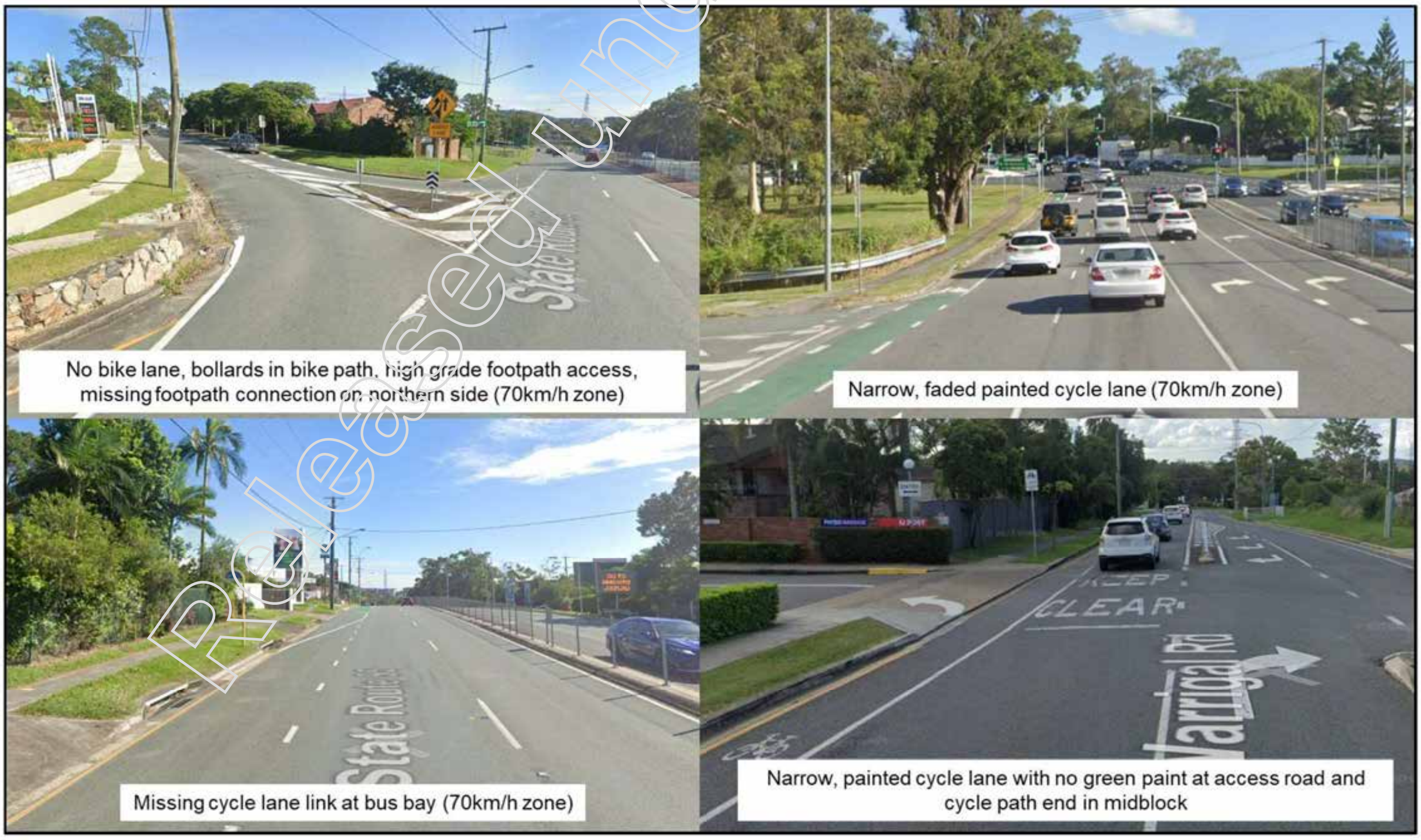


Figure 40 Active transport network: existing infrastructure – specific examples

Key points to note are summarised below:

- The primary active transport infrastructure within the study area is the V1 which runs along the western side of the Pacific Motorway and provides a connection from the City to Underwood
- The off-road cycle network is incomplete within the study area (i.e. there are limited shared paths)
- The on-road cycle network is incomplete within the study area. It is noted that on-road cycle lanes have been retrofitted on Logan Road, Miles Platting Road, Warrigal Road, and Padstow Road over the last 15 years as part of TMR and BCC infrastructure projects as well as land development
- The pathway network along Logan Road is relatively narrow (i.e. 1.2m or less) and undulating
- On-demand traffic signals were installed on the left turn slip lanes at MPPL in 2022
- There is no pedestrian crossing on the southern approach to the MPPL
- There is no pedestrian crossing on Bleasby Road. There are also retaining walls, steep grades, and associated Disability Discrimination Act (DDA) challenges at this location
- There is a staged pedestrian crossing facility on Logan Road (south) for users of the V1 at the intersection of Logan Road / Warrigal Road / M3 Ramps. Users than cross Warrigal Road via a pedestrian refuge located to the west
- There are staged pedestrian crossings on the Padstow Road approaches to the intersection of Padstow Road / Warrigal Road. This intersection was upgraded by BCC in 2011
- The Warrigal Road Green Link project delivered 250m of off-road cycle network (2.5m shared path) on the northern side of Warrigal Road from Logan Road to Bleasby Road. This links into the V1 as well as the off-road network under the Logan Road / M3 interchange and through Holmead Road Park.

4.2.5.2 Low active transport demands except along Veloway 1

Figure 41 summarises on and off-road cyclists demands at key intersections within the study area based on 12 hours of survey data collected on 15 September 2020 (Padstow Road / Warrigal Road) and 12 October 2022 (other intersections).

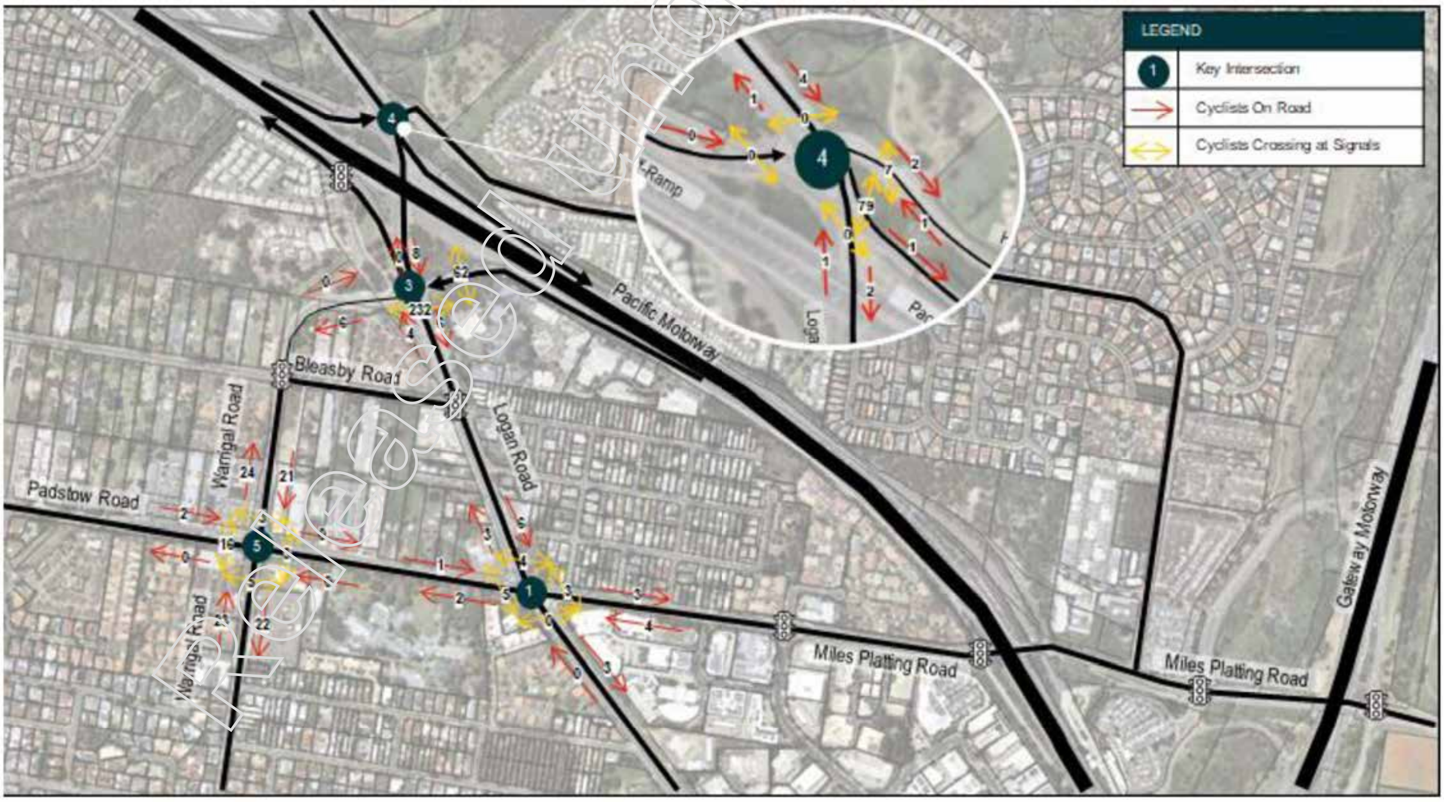


Figure 41 Active transport demands within the study area – cyclists

Figure 42 summarises on and pedestrian demands at key intersections within the study area based on the same dataset.

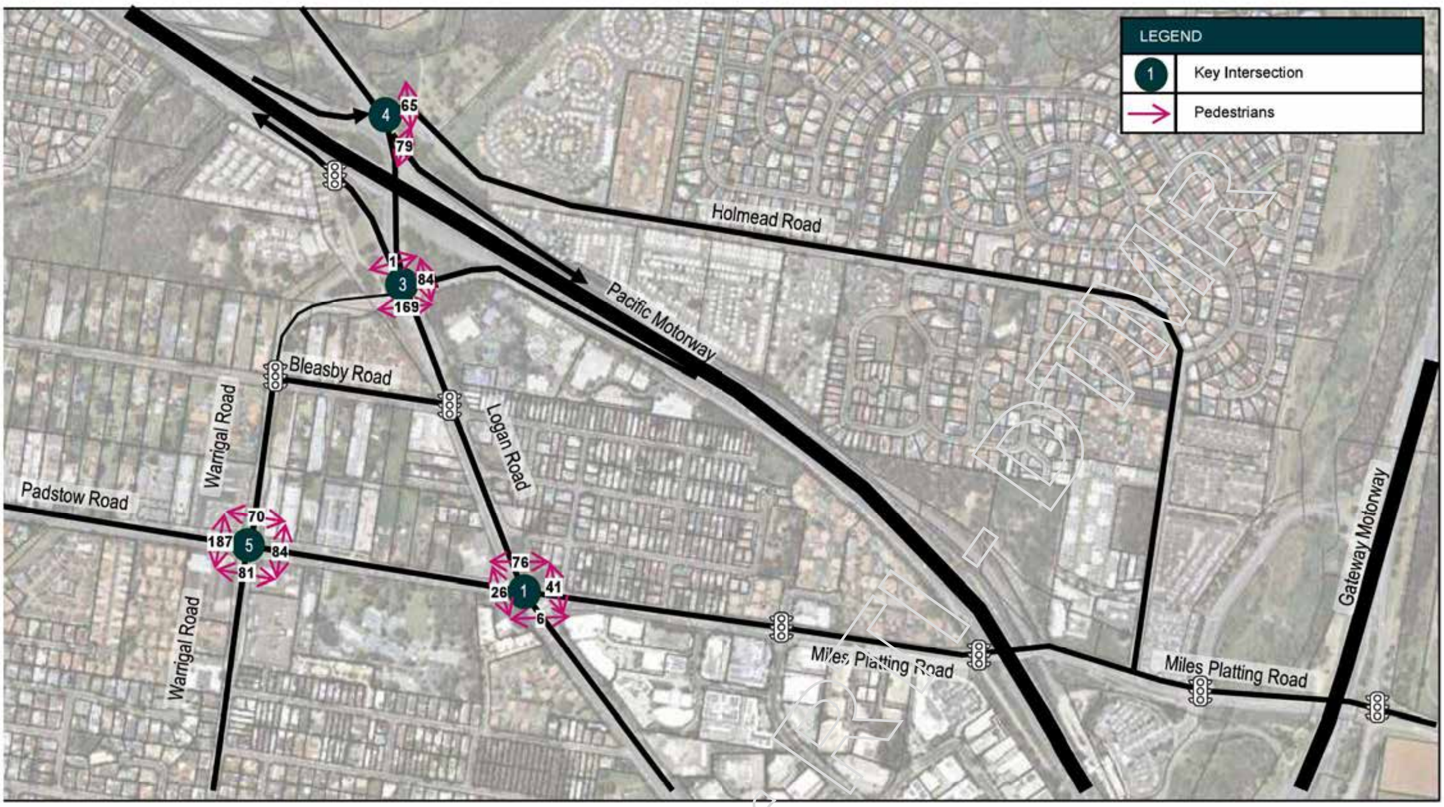


Figure 42 Active transport demands within the study area – pedestrians

Key points to note are summarised below:

- Very few on-road cyclists were recorded on Logan Road, Miles Platting Road and Padstow Road through the study area (i.e. <10 cyclists recorded on each segment over the 12-hour period)
- Most on-road cyclists within the study area used Warrigal Road (45 on each segment), potentially to access the V1
- Approximately 300 cyclists were recorded at the Logan Road / Warrigal Road / M3 Ramps intersection including 230 crossing Logan Road (continue on V1) and 60 crossing Exit 14 (towards Bulimba Bikeway)
- Pedestrian demands at MPPL are relatively low, particularly compared to the recorded demands at the Warrigal Road / Padstow Road intersection and the V1 crossing of Logan Road.

The above observations reinforce the problem statement that the "lack of active transport infrastructure within the study area reduces safety, attractiveness and reliability for active transport users".

4.2.5.3 Pedestrians and cyclists involved in reported crashes are seriously injured

As outlined in Section 4.2.3.3, there has been a total of four (4) reported crashes within the study area involving either pedestrians or cyclists, including three (3) on Warrigal Road in proximity to the Neighbourhood Centre driveway and one (1) at the Logan Road / Warrigal Road / M3 intersection where V1 crosses Logan Road. Whilst this represents a relatively small proportion of the total reported casualty crashes (108 in total), 75% have resulted in hospitalisation.

4.2.5.4 Summary

In summary:

- Despite all key roads within the study area forming part of TMR's PCNP, there are significant "gaps" in the network
- Whilst V1 provides a high quality dedicated corridor through the study area, connectivity to the V1 is poor
- The recorded active transport demands within the study area are very low except along the V1
- Whilst "only" four (4) crashes within the study area involved pedestrians and cyclist, 75% resulted hospitalisation.

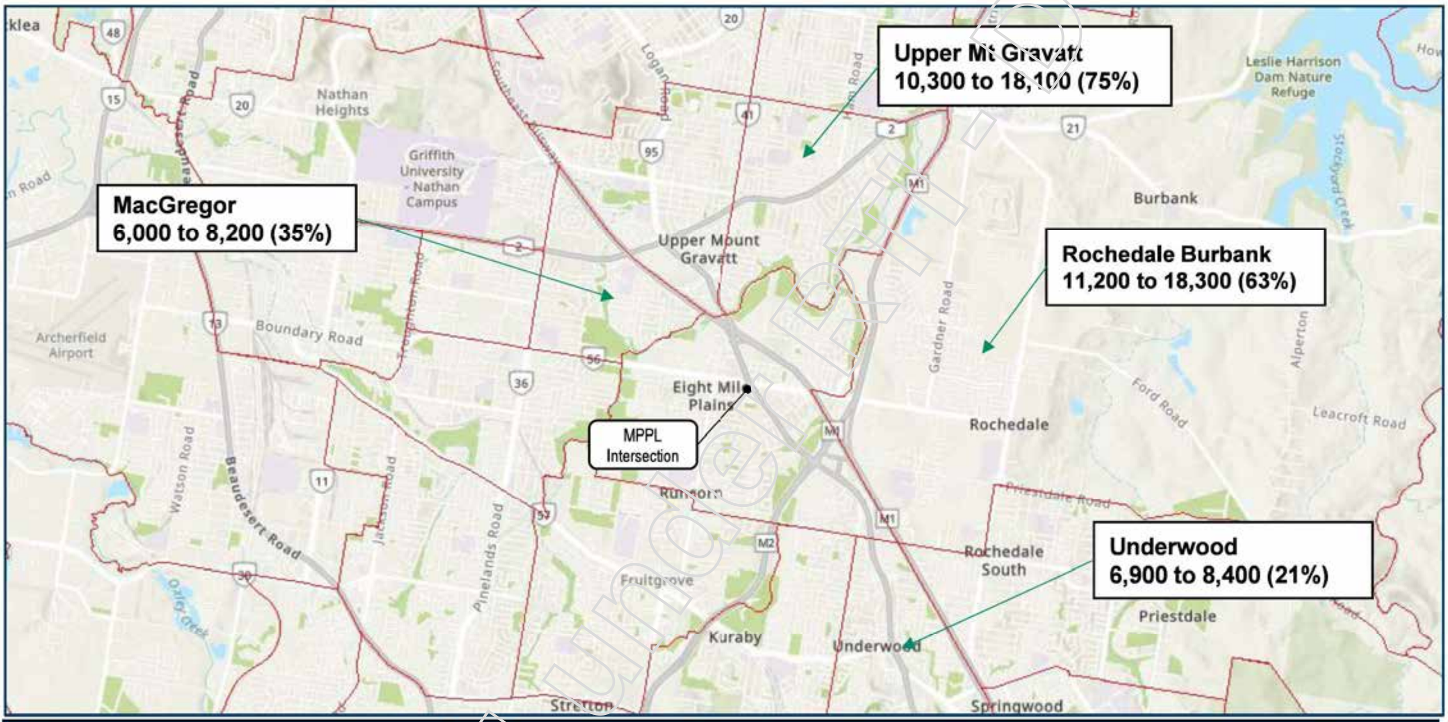
4.3 Future situation (define the future problem/s without any intervention)

4.3.1 Significant congestion at the study intersection during peak periods due to insufficient layout capacity to accommodate increasing demands

4.3.1.1 Population growth will increase pressure on the transport network

4.3.1.1.1 Forecast population growth surrounding MPPL

Figure 43 summarises the forecast population growth in the suburbs surrounding the study area. This information has been extracted from the BSTM-MMv2.4 (March 2024) by Statistical Area Level 2 (SA2).



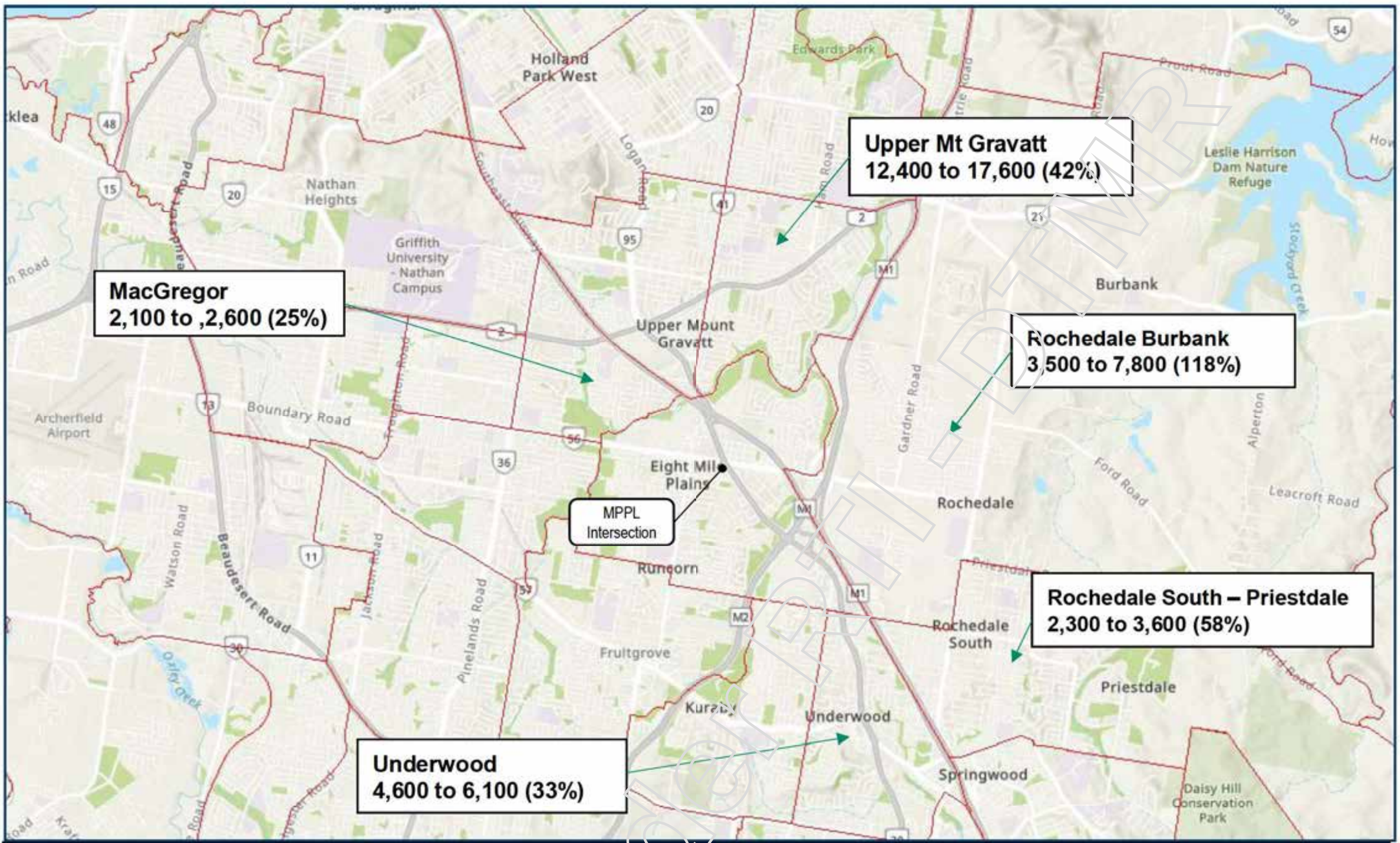
SA2	2021 Population	2041 Population	Growth (Total %)	Growth (%p.a.)
Wishart	11,468	11,675	2%	0.1%
Upper Mount Gravatt	10,342	18,116	75%	3.8%
Rochedale – Burbank	11,201	18,281	63%	3.2%
Sunnybank	9,205	10,109	10%	0.5%
Sunnybank Hills	18,022	18,369	2%	0.1%
Runcorn	14,694	16,253	11%	0.5%
Kuraby	8,644	8,839	2%	0.1%
Underwood	6,912	8,383	21%	1.1%
Rochedale South – Priestdale	15,949	16,323	2%	0.1%
Macgregor (Qld)	6,075	8,203	35%	1.8%

Figure 43 Forecast population growth by SA2 (BSTM) – 2021 to 2041

As outlined above, significant population growth is forecast to the north (Upper Mt Gravatt and MacGregor) and east (Rochedale Burbank) of MPPL with moderately high population growth forecast to the south (Underwood). This forecast increase in population will likely result in increased traffic demands, worsening congestion, and an increase in congestion-related crashes in the study area. It is also likely to hinder economic growth in accordance with ShapingSEQ (2023).

4.3.1.1.2 Forecast employment growth surrounding MPPL

Figure 44 summarises the forecast employment growth in the suburbs surrounding the study area. This information has been extracted from the BSTM-MMv2.4 (March 2024) by SA2.



SA2	2021 Employment	2041 Employment	Growth (Total %)	Growth (%p.a.)
Wishart	1,900	2,529	33%	1.7%
Upper Mount Gravatt	12,390	17,621	42%	2.1%
Rochedale - Burbank	3,581	7,805	118%	5.9%
Sunnybank	2,971	3,800	28%	1.4%
Sunnybank Hills	4,262	5,230	23%	1.1%
Runcorn	2,232	2,796	25%	1.3%
Kuraby	947	1,129	19%	1.0%
Underwood	4,564	6,070	33%	1.6%
Rochedale South - Priestdale	2,292	3,611	58%	2.9%
Macgregor (Qld)	2,053	2,563	25%	1.2%

Figure 44 Forecast employment growth by SA2 (BSTM) – 2021 to 2041

As outlined above, significant employment growth is forecast to the north (Upper Mt Gravatt and MacGregor) east (Rochedale Burbank) and south (Underwood and Rochedale South - Priestdale) of MPPL. This forecast increase in employment will likely result in increased traffic demands, worsening congestion, and an increase in congestion-related crashes in the study area. It is also likely to hinder economic growth in accordance with ShapingSEQ (2023).

4.3.1.2 Transport network operational performance will continue to deteriorate

4.3.1.2.1 Forecast increase in traffic demands

Table 21 summarises forecast future traffic demands within the study area derived from the BSTM-MMv2.4.

Table 21 Forecast future traffic demands within the study area

Model Period	Total Vehicles				
	2024	2031	Growth (2024-2031)	2041	Growth (2024-2041)
AM Peak (6-10am)	26,985	30,713	14% (2.0%p.a.)	36,316	35% (2.0%p.a.)
PM Peak (2-6pm)	37,850	46,205	22% (3.2% p.a.)	55,508	47% (2.7% p.a.)

In summary, traffic demands within the study area are forecast to increase by:

- 35% in the AM peak period (6-10am) between 2024 and 2041 which equates to a rate of approximately 2% p.a.
- 47% in the PM peak period (2-6pm) between 2024 and 2041 which equates to a rate of approximately 3% p.a.

Figure 45 and Figure 46 illustrate the forecast growth in traffic demands on each link within the study area during the AM (7-9AM) and PM (4-6PM) peak periods respectively, extracted from the BSTM-MMv2.4.

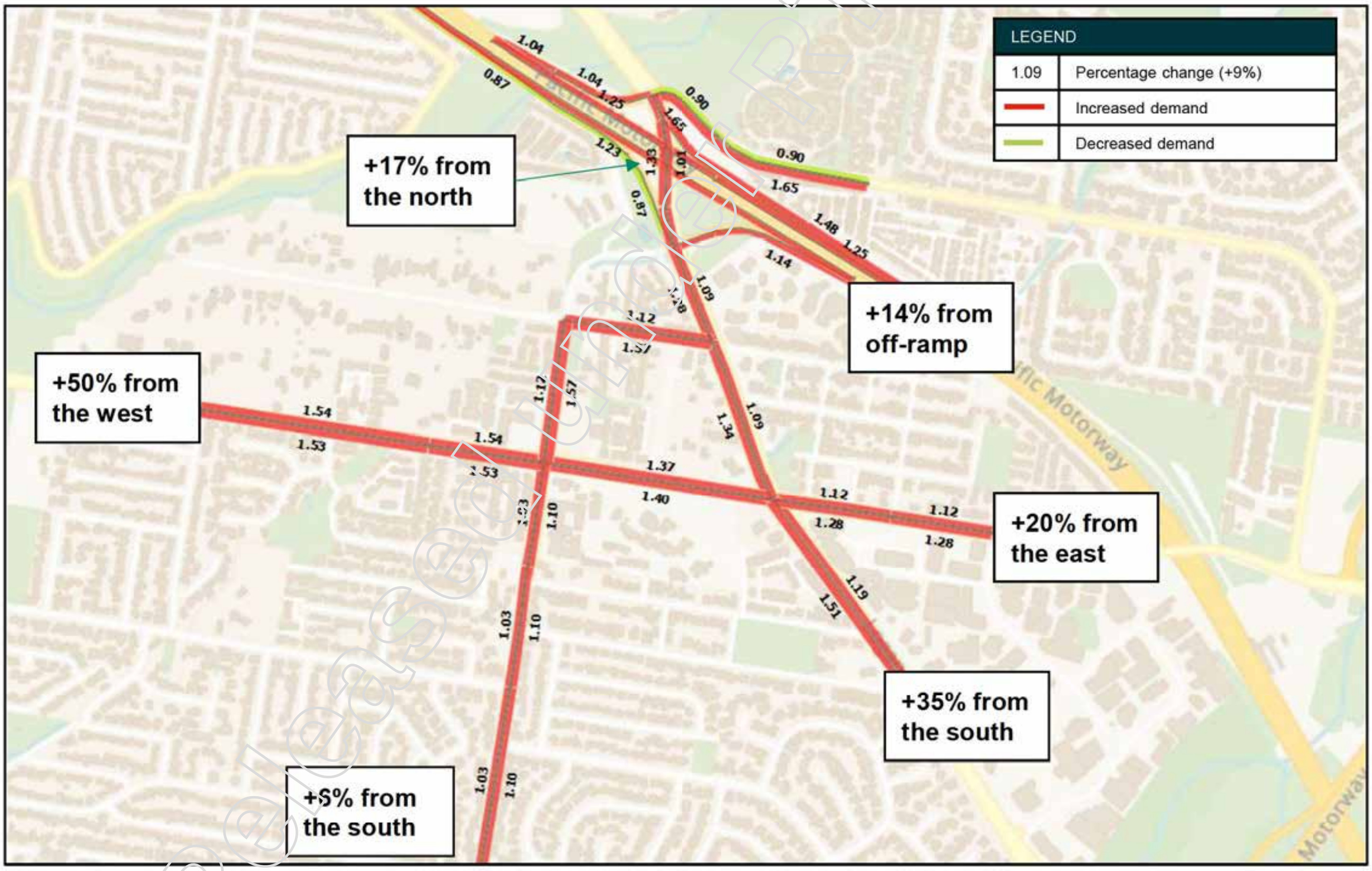


Figure 45 Forecast traffic growth by link (BSTM) – 2021 to 2041 (7-9AM)

Key observations for the AM period (7-9AM) are summarised below:

- All approaches to the MPPL intersection are expected to experience increased traffic demands
- Significant traffic growth is expected from the east (20%), south (35%) and west (50%) of the MPPL intersection
- Exit 14 traffic demands are forecast to increase by 14% between 2021 and 2041.

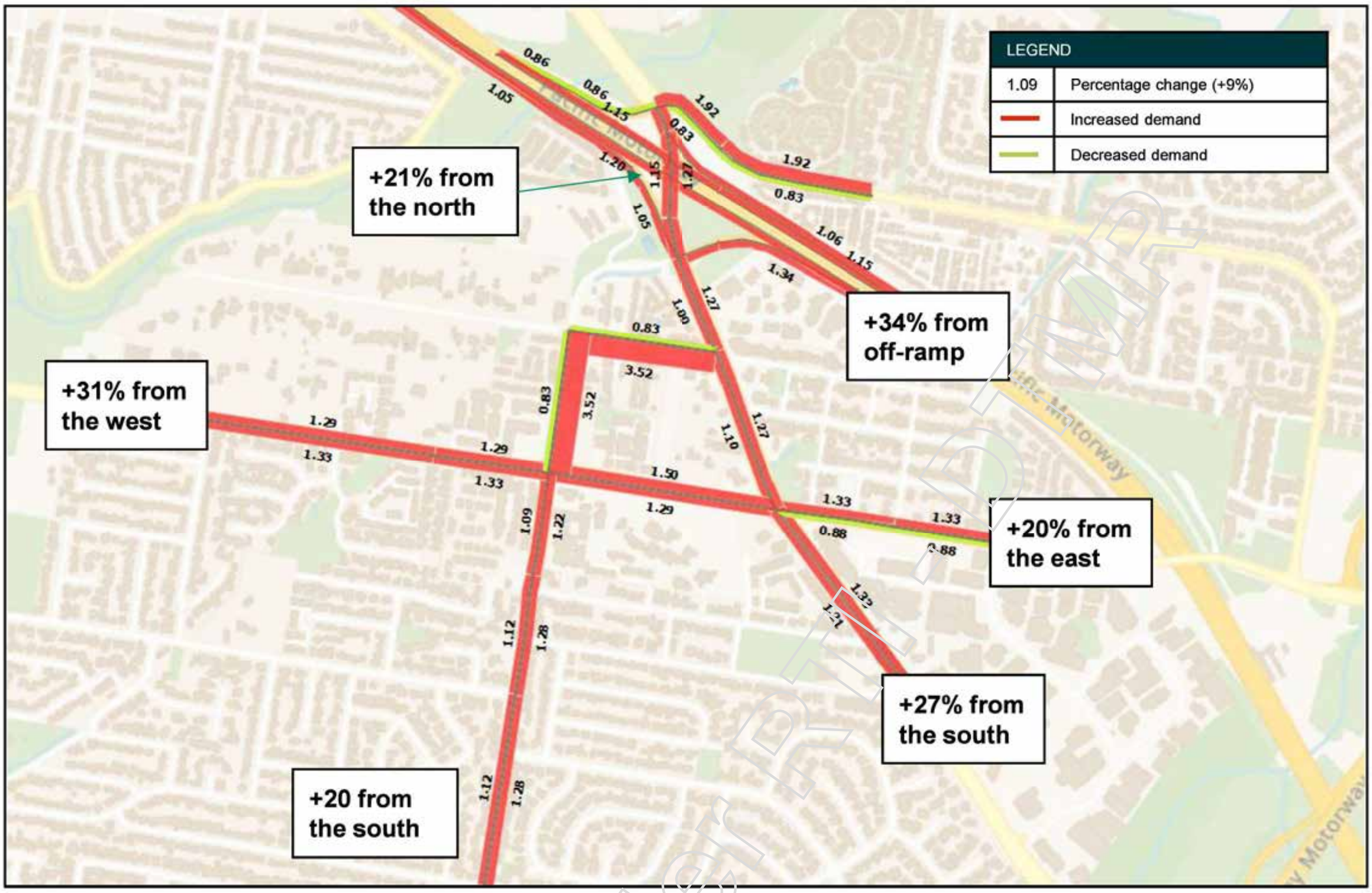


Figure 46 Forecast traffic growth by link (BSTM) – 2021 to 2041 (4-6PM)

Key observations for the PM period (4-6PM) are summarised below:

- All approaches to the MPPL intersection are expected to experience increased traffic demands
- Significant growth is expected from the east (20%), south (30%), west (50%) and north (20%) of the MPPL intersection
- Exit 14 traffic demands are forecast to increase by 34% between 2021 and 2041.

4.3.1.2.2 Forecast worsening of traffic congestion

Figure 47 illustrates the simulated density plots for the study area extracted from the AIMSUN model for the 2024, 2031 and 2041 AM peak hours, respectively. As noted previously, the density plots represent the number of vehicles per lane within road sections and provides an indication of typical vehicle queue formation or slow-movement traffic.

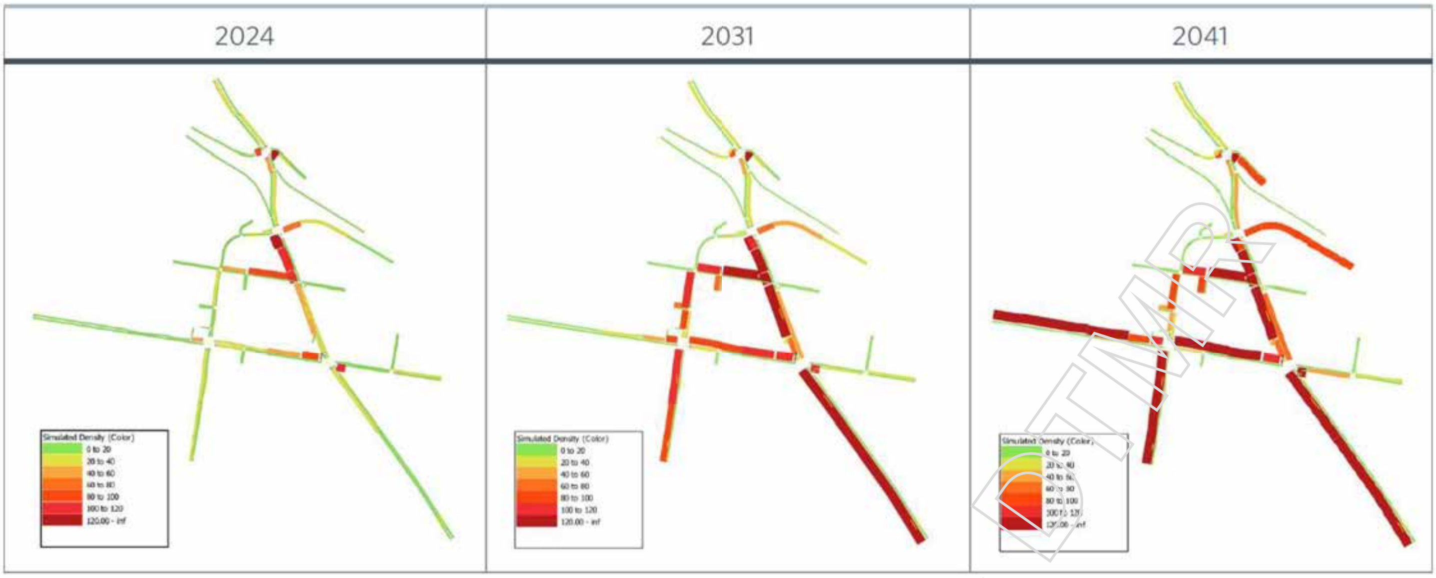


Figure 47 AIMSUN future base network density plots – AM Peak (8-9AM)

Key observations are summarised below:

- The northbound carriageway of Logan Road is forecast to experience significant congestion. This congestion remains at similar levels between 2031 and 2041, indicating that the corridor will likely reach practical capacity by 2031
- The eastbound carriageway of Padstow Road is forecast to experience increasing traffic congestion between 2024 and 2031, with conditions expected to significantly worsen by 2041
- The study area more broadly is expected to experience notable traffic congestion in the 2041AM future base scenario, particularly on Warrigal Road, Bleasby Road, and Exit 14.

Figure 48 illustrates the simulated density plots for the study area extracted from the AIMSUN model for the PM peak.

Figure 48 AIMSUN future base network density plots – PM Peak (6-7PM)

Key observations are summarised below:

- In the 2024 PM peak, congestion is lower than during the AM period, which is consistent with site observations. However, due to significant forecast demand growth between 2031 and 2041 extracted from BSTM (refer Table 21), the PM peak in 2031 and 2041 is expected to experience higher levels of traffic congestion than the AM peak
- It appears the study area will likely reach practical capacity by 2031
- The study area more broadly is expected to experience notable traffic congestion in the 2041 PM future base scenario, particularly on Warrigal Road, Bleasby Road, and Miles Platting Road.

4.3.1.2.3 Forecast worsening of network traffic performance

Table 22 and Table 23 summarises the forecast worsening of the overall network traffic performance in the AM and PM peak periods respective based on various performance measures (e.g. Vehicle Hours Travelled (VHT), Vehicle Kilometres Travelled (VKT), average speed / delays / journey times, and latent demands etc.). Latent demand refers to vehicles unable to enter the model network due to excessive congestion.

Table 22 AIMSUN future base network traffic performance – AM Peak (7-9AM)

Network Measure	7-8am			8-9am		
	2024	2031	2041	2024	2031	2041
VHT (hours)	507	814	1,080	519	996	1,349
VKT (km)	9,689	10,339	10,651	11,172	11,551	12,151
Average Speed (km/h)	26.3	23.3	20.4	27.3	21.6	18.2
Average Delay (secs / vehicle)	120	195	277	103	223	314
Average Journey Time (m:s)	04:28	06:43	08:28	03:57	07:15	09:11
Demand (vehicles) [1]	6,811	7,703	9,120	7,788	8,930	10,642
Completed Trips (vehicles) [2]	6,804	7,279	7,651	7,893	8,238	8,812
Latent Demand (vehicles) [2][3]	4	351	1,608	6	1,025	3,602

[1] Demand is an input for AIMSUN
[2] Completed trips and latent demand are outputs from AIMSUN that may include vehicles from preceding time periods
[3] Completed trips plus latent demand does not necessarily equal input demand (due to the above)

Table 23 AIMSUN future base network traffic performance – PM Peak (4-6PM)

Network Measure	4-5pm			5-6pm		
	2024	2031	2041	2024	2031	2041
VHT (hours)	499	1,345	1,704	502	1,507	1,751
VKT (km)	12,178	13,338	13,983	12,157	13,969	13,642
Average Speed (km/h)	27.2	17.0	12.0	27.4	16.4	12.5
Average Delay (secs / vehicle)	87	280	370	88	311	393
Average Journey Time (m:s)	03:40	08:58	10:56	03:39	09:07	11:27
Demand (vehicles) [1]	8,103	9,960	12,065	8,055	9,835	11,851
Completed Trips (vehicles) [2]	8,160	9,009	9,345	8,263	9,567	9,179
Latent Demand (vehicles) [2][3]	1	827	5,167	0	1,426	8,019

[1] Demand is an input for AIMSUN
[2] Completed trips and latent demand are outputs from AIMSUN that may include vehicles from preceding time periods
[3] Completed trips plus latent demand does not necessarily equal input demand (due to the above)

Key observations are summarised below:

- VHT is expected to significantly increase between 2024 and 2041 in both peak periods
- VKT is expected to remain relatively constant between 2024 and 2041 (due to the lack of route choice)
- Average vehicle speeds are expected to significantly reduce between 2024 and 2041 in both peak periods
- Average delay per vehicle is expected to significantly increase between 2024 and 2041 in both peaks
- Average journey times are expected to significantly increase between 2024 and 2041 in both peak periods
- Traffic demand within the study area is expected to significantly increase between 2024 and 2041 in both peak periods
- Completed trips within the study area is expected to remain constant (indicating the network is already at capacity)
- Latent demand is expected to significantly increase between 2024 and 2041 in both peak periods (indicating that the network is already at capacity and that the level of congestion is expected to significantly worsen over time).

4.3.1.2.4 Forecast worsening of intersection performance

Table 24 and Table 25 summarise the forecast worsening of performance at key intersections within the study area during the 2031 and 2041 AM and PM peak periods respectively, extracted from the AIMSUN model.

Table 24 AIMSUN future base network intersection performance – 2031 and 2041 AM Peak

Intersection	2031				2041			
	7-8am		8-9am		7-8am		8-9am	
	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS
Logan Rd / Miles Platting Rd / Padstow Rd	101	F	108	F	118	F	119	F
Logan Rd / Warrigal Rd / NB Ramps	29	C	37	D	31	C	37	D
Logan Rd / Holmead Rd / SB Ramps	29	C	26	C	31	C	28	C
Padstow Rd / Warrigal Rd	55	E	94	F	109	F	123	F

Table 25 AIMSUN future base network intersection performance – 2031 and 2041 PM Peak

Intersection	2031				2041			
	4-5pm		5-6pm		4-5pm		5-6pm	
	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS
Logan Rd / Miles Platting Rd / Padstow Rd	120	F	113	F	117	F	124	F
Logan Rd / Warrigal Rd / NB Ramps	28	C	28	C	43	D	43	D
Logan Rd / Holmead Rd / SB Ramps	38	D	40	D	57	E	56	E
Padstow Rd / Warrigal Rd	106	F	73	F	100	F	133	F

As noted in Section 4.2.2.4, an average delay of 55 seconds per vehicle is typically adopted as the threshold between LOS D and E at signalised intersection. When delays exceed this threshold, the intersection may be operating at practical capacity. The Base Year results indicated that MPPL is operating at or near capacity between 7-8AM (LOS E) and 5-6PM (LOS E), and that it is operating close to capacity between 4-5PM (LOS D). The above results indicate the MPPL is forecast to exceed capacity in 2031 and 2041 (LOS F with average delays in the order of 100-120 seconds per vehicle). Performance issues are also forecast for the Logan Road / Pacific Motorway interchange (LOS E in 2041) and the intersection of Padstow Road / Warrigal Road (LOS F in 2031 and 2041). These results align with the density plots.

4.3.2 History of casualty crashes within the study area due to significant congestion and queuing on Logan Road and at the study intersection

4.3.2.1 Transport network safety performance will continue to deteriorate

4.3.2.1.1 Anticipated increased frequency of reported crashes within the study area

As noted previously, between 1 July 2018 to 30 June 2023, a total of 108 casualty crashes were reported within the study area. Of these, 68 crashes (63%) were rear end collisions, which is often associated with traffic congestion and stop-and-go driving conditions. The number of crashes has increased steadily each year, rising from 16 in 2018 to 25 in 2022, as illustrated on Figure 49. Given the forecast traffic growth out to 2041 and associated congestion within the study area, without intervention, the number of reported crashes in the study area is expected to continue trending upwards.

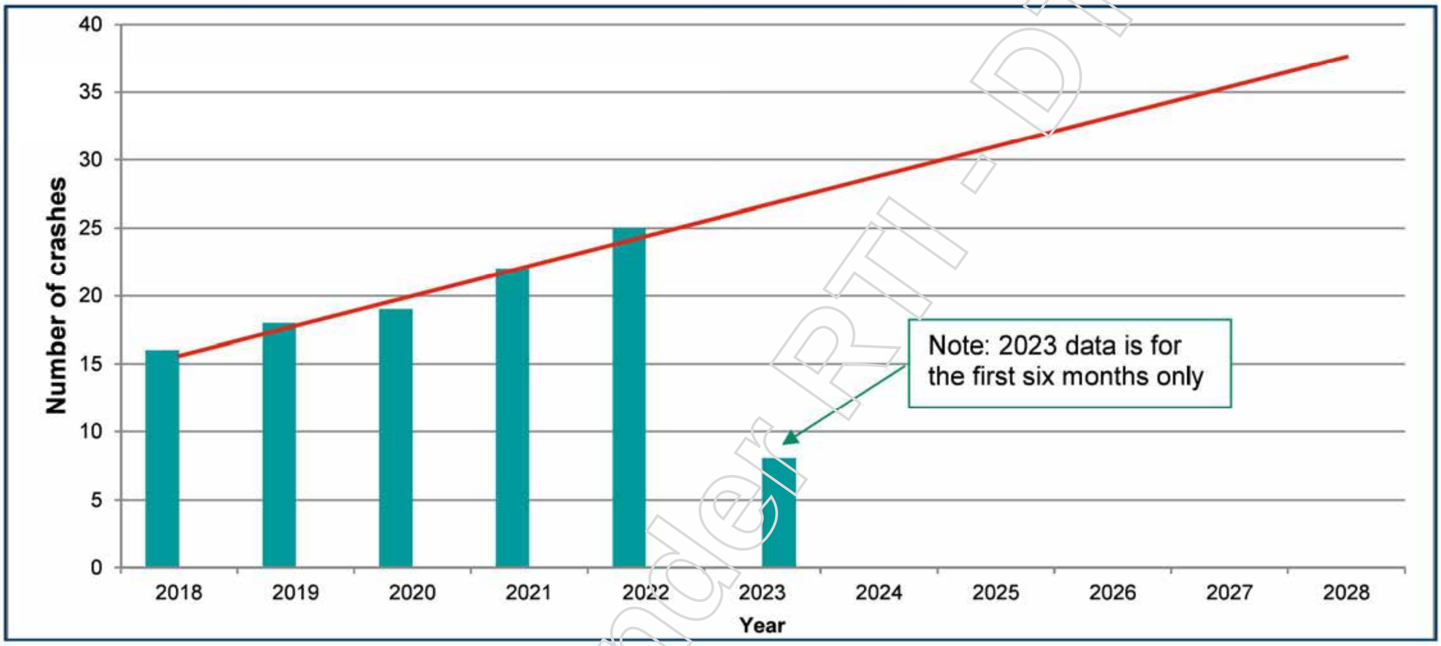


Figure 49 Reported annual crash rate within study area trending upwards

4.3.2.2 Forecast increased extent of Exit 14 queuing back to the pacific motorway

As noted previously, during weekday morning peak hours, vehicle queues on Exit 14 often extend more than 500m back to the M3, with drivers frequently waiting on the road shoulder to avoid queueing in the motorway through lanes. This represents a major safety risk for "rear-end" type crashes occurring, due to the high-speed differential between stopped vehicles (in the shoulder) and high-speed traffic continuing north on the motorway typically travelling at 100km/h.

Table 26 summarises the forecast average delay per vehicle and maximum queue length for Exit 14 during the 2031 and 2041 AM (8-9am) and PM (5-6pm) peak hours respectively, extracted from the AIMSUN model, for a typical weekday.

Table 26 AIMSUN future base network Exit 14 performance – 2031 and 2041 AM and PM Peak

Location	AM Peak (8-9am)				PM Peak (5-6pm)			
	2031		2041		2031		2041	
	Delay (s/v)	Max Queue (m)	Delay (s/v)	Max Queue (m)	Delay (s/v)	Max Queue (m)	Delay (s/v)	Max Queue (m)
Exit 14	41	595	45	1,775	49	180	45	200

Given the forecast traffic growth out to 2041 and associated congestion within the study area, without intervention, the frequency of queues extending back to the M3 and the overall length of the queue is expected to increase, which in turn increases the risk of rear-end crashes occurring. This is supported by the AIMSUN model results which indicates a maximum queue length of 600m and 1800m in the 2031 AM and 2041 AM peak hours respectively. This problem is not expected to eventuate in the PM peak (as Exit 14 traffic demands are lower during this peak period).

4.3.3 Poor travel time reliability for buses within the study area due to the lack of alternative routes and priority infrastructure for public transport

4.3.3.1 Forecast worsening of bus travel times

Table 27 summarises the forecast worsening of bus travel times (i.e. average speed, delays, and journey times) within the study area during the 2031 and 2041 AM and PM peak periods respectively, extracted from the AIMSUN model.

Table 27 AIMSUN future base network traffic performance – public transport

Network Measure	7-8am			5-6pm		
	2024	2031	2041	2024	2031	2041
Average Speed (km/h)	18.1	14.6	12.9	18.1	14.4	9.7
Average Delay (secs / vehicle)	120	222	224	144	214	352
Average Journey Time (m:s)	06:18	09:17	09:20	06:01	07:52	12:55

The above results indicate a significant worsening of bus travel times within the study area in 2031 and 2041, particularly in the PM peak. It is anticipated this would impact Journey Time Variability (JTV) and Total Excess Passenger Delay (TEPD) and continue to reduce the attractiveness of public transport mode share (compared to private vehicle travel).

4.3.3.2 Anticipated low public transport demands within the study area

As noted previously, Logan Road and the Warrigal Road Green Link collectively currently service approximately 110 buses with 2,600 passengers per weekday (TMR BCAP from March 2024), compared to approximately 45,500vpd on Logan Road north of MPPL (2023 Site 135689). Furthermore, the bus stops on Logan Road and the Warrigal Road Green Link currently service approximately 450 boardings / alightings per weekday (March 2024). The proportion of transport users within the study area using public transport is relatively low.

Given the forecast traffic growth out to 2041 and associated impacts on bus travel times within the study area (Table 27), without intervention, it is expected that the public transport mode share will continue to be relatively low.

4.3.4 Lack of active transport infrastructure within the study area reduces safety, attractiveness and reliability for active transport users

As noted previously, there are significant "gaps" in the active transport network within the study area and poor connectivity to V1. As a result, the recorded active transport demands are very low except along the V1 itself.

The lack of active transport infrastructure within the study area is predominately due to a lack of investment. Without intervention (funding), active transport demands within the study area are expected to remain relatively low.

4.4 Causal factors (root cause of the problem/s)

Table 28 summarises the root cause of the identified problems within the study area.

Table 28 Causal factors underpinning transport network problems / opportunities

Problem	Causal Factors
PO1: Significant congestion at the study intersection during peak periods due to insufficient layout capacity to accommodate increasing demands	MPPL is currently operating at or near capacity during weekday peak hours. The congestion at MPPL is primarily due to high and competing traffic volumes, including: • Logan Road: Approximately 45,500 vpd north of MPPL (2023). • MPPL: Approximately 4,200 vph in the AM peak and 5,300vph in the PM peak (2022). Traffic modelling, "Google Traffic" data, and site observations indicate that in the AM peak, northbound queues on Logan Road at the upstream intersection of Logan Road / Warrigal Road / Exit 14 extend through the MPPL intersection, restricting its capacity. In the PM peak, performance issues at MPPL are mainly driven by high southbound demand on Logan Road, reaching in the order of 2,500 vph. Traffic volumes on Logan Road have been increasing at an average rate of 1.6% per year from 2012 to 2023. Traffic demand in the study area is expected to grow as follows: • 35% in the AM peak period (6-10am) between 2024 and 2041 (about 2% per year). • 47% in the PM peak period (2-6pm) between 2024 and 2041 (about 3% per year). The growth in traffic demands is tied to forecast population and employment growth in the region. Without intervention, the performance of MPPL is expected to decline significantly.
PO2: History of casualty crashes within the study area due to significant congestion and queuing on Logan Road and at the study intersection	Between 1 July 2018 and 30 June 2023, a total of 108 casualty crashes were reported within the study area, including 28 (26%) fatal or serious injuries (FSI) crashes. The number of reported crashes has been rising steadily each year, from 16 in 2018 to 25 in 2022. Of these, 68 crashes (63%) were classified as "rear-end" collisions, which are linked to the congested road network and stop-and-go driving conditions. Most of the rear-end crashes occurred "mid-block," rather than at intersections. In the absence of intervention, the number of reported crashes within the study area is expected to continue increasing.
PO3: Poor travel time reliability for buses within the study area due to the lack of alternative routes and priority infrastructure for public transport	All north-south bus routes through Eight Mile Plains use the Logan Road/Pacific Motorway interchange, as there are no alternative routes due to the proximity of Bulimba Creek and Pacific Motorway. Furthermore, there is a lack of dedicated public transport infrastructure, apart from the Warrigal Road Green Link. As a result, bus travel times are influenced by peak-hour congestion in the study area, leading to issues such as "Journey Time Variability" (JTV) and "Total Excess Passenger Delay" (TEPD), along with relatively low levels of patronage. Without intervention, bus travel time reliability is expected to deteriorate further.
PO4: Lack of active transport infrastructure within the study area reduces safety, attractiveness and reliability for active transport users	Despite all key roads within the study area forming part of TMR's PCNP, there are significant "gaps" in the existing active transport network. There is also a lack of connectivity to V1, which is a high quality dedicated active transport corridor that travels through the study area along the western side of the Pacific Motorway. The lack of active transport infrastructure within the study area is predominately due to a lack of investment. Without intervention, active transport demands within the study area are expected to remain low.

4.5 Monetised cost of the problem / value of the opportunity

A monetised cost of the problem exercise was not completed as the project is not seeking to be listed on the Infrastructure Priority List (IPL) or greater than $250 million in Australian Government funding.

The project will be fully funded by the Queensland Government (if funding is approved).

5. Outcomes sought

5.1 Desired future situation

The desired future situation for the study area aligns with the 30-year vision of TMR's Queensland Transport Strategy to provide more convenient, reliable and safer journeys for people and goods, resulting in a more liveable community.

Noting the above, the designed future situation for the Project is to:

- Increase efficiency, reliability, and resilience of the transport network
  - MPPL and the Logan Road / Warrigal Road intersection operate at a LOS D or better during peak periods
  - Exit 14 queues do not extend back to the Pacific Motorway during typical weekday peak hour periods
  - Southbound queues on Logan Road do not extend back from MPPL to the Logan Road / Warrigal Road intersection during typical weekday afternoon peak hour periods
  - Northbound queues on Logan Road do not extend back from the Logan Road / Warrigal Road intersection to MPPL during typical weekday morning peak hour periods
  - Non local private vehicle traffic travelling through the study area utilise the higher order road network
- Increase safety and reduce transport related fatalities and injuries
  - 50% reduction in FSI crashes by 2030 and zero deaths by 2050
  - Exit 14 queues do not extend back to the Pacific Motorway during typical weekday peak hour periods
- Increase connectivity and accessibility of the transport network
  - The active transport network is upgraded within the study area in accordance with the PCNP
  - Dedicated high quality active transport infrastructure is provided within the study area
  - Improved connectivity with Veloway 1 is provided within the study area
- Increase uptake of active and public transport modes.
  - Increase the mode share of active transport
  - Increase the mode share of public transport
  - Reduce the mode share of private vehicles.

5.2 Assumptions

The following assumptions were made in developing the options for the SASR:

- There are no committed or funded transport infrastructure projects within the study area
- Demographic and employment growth will reflect forecasts within the BSTM-MMv2.4 (which utilises demographics and land use projections from the Queensland Government Statistician's Office (QGSO) 2023 edition)
- Land use patterns will be as anticipated in the Brisbane City Plan 2014
- There are no major changes to the existing public transport network and services within the study area
- Hydraulic, environmental, cultural heritage, PUP, geotechnical and traffic management impacts of the proposed options can be managed and will not preclude any of the options
- Detailed cost estimation and financial, economic, transport modelling will be developed and addressed in the PE.

The validity of these assumptions will be tested during future stages of the project.

5.3 Constraints

5.3.1 Policy and legislative issues

It appears there are no government policies that may impede the Project meeting the identified service requirements. However, a detailed legislative and regulatory review will be undertaken as part of the PE stage to confirm.

5.3.2 Natural environment issues

Figure 50 illustrates the natural environmental constraints within the study area.

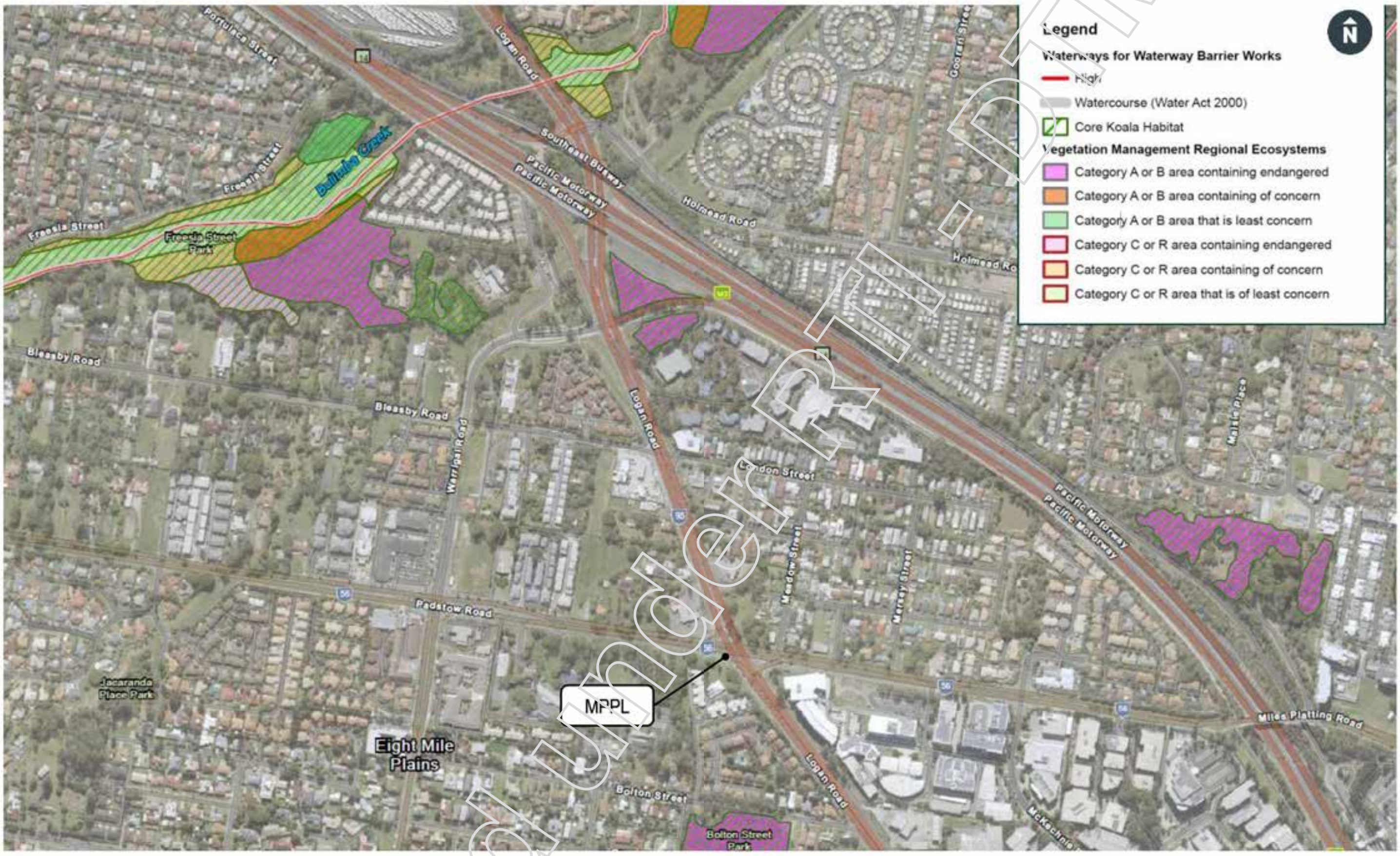


Figure 50 Constraints: natural environmental constraints

Key points to note are summarised below:

- The study intersection is located in a highly urbanised area, adjacent to noise, air, and vibration-sensitive receptors, including residential, recreational, medical, commercial, and educational zones
- The biodiversity within the area is notable, particularly around Bulimba Creek
- Vegetation surrounding Bulimba Creek and in nearby parkland areas, such as Freesia Street Park and Bolton Street Park, supports core koala habitats and other environmental values
- The presence of essential habitats, Matters of State Environmental Significance (MSES), and regulated vegetation further complicates development. Moreover, Bulimba Creek is identified as a fisheries waterway of high significance
- The Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) lists several threatened species and ecological communities that may be present in the area, necessitating further assessment

To address the environmental concerns, a Review of Environmental Factors (REF) and an Environmental Management Plan (Planning) (EMP(P)) is recommended during subsequent stages of the Project. These documents will further assess the potential impacts of the Project on environmental factors, establish mitigation and management measures, and identify necessary environmental approvals.

5.3.3 Built environment issues

The study area is located adjacent to the Pacific Motorway and Gateway Motorway which should provide convenient access for construction workers and the supply of materials to site. As illustrated on Figure 51, there is land within the State-controlled road reserve that could potentially be used for work sites and stockpiling of materials during construction.

Construction of the project could be disruptive to the overall transport network, noting the significant transport demands within the study area and the highly urbanised environment. Impacts to the transport network from upgrading key intersections, for example MPPL and / or the Logan Road / Warrigal Roads / Exit 14 intersection, could potentially be managed via night works, however this could have community and project cost impacts. The PE phase will consider the construction impacts specific to options that are progressed and how these impacts could be managed.

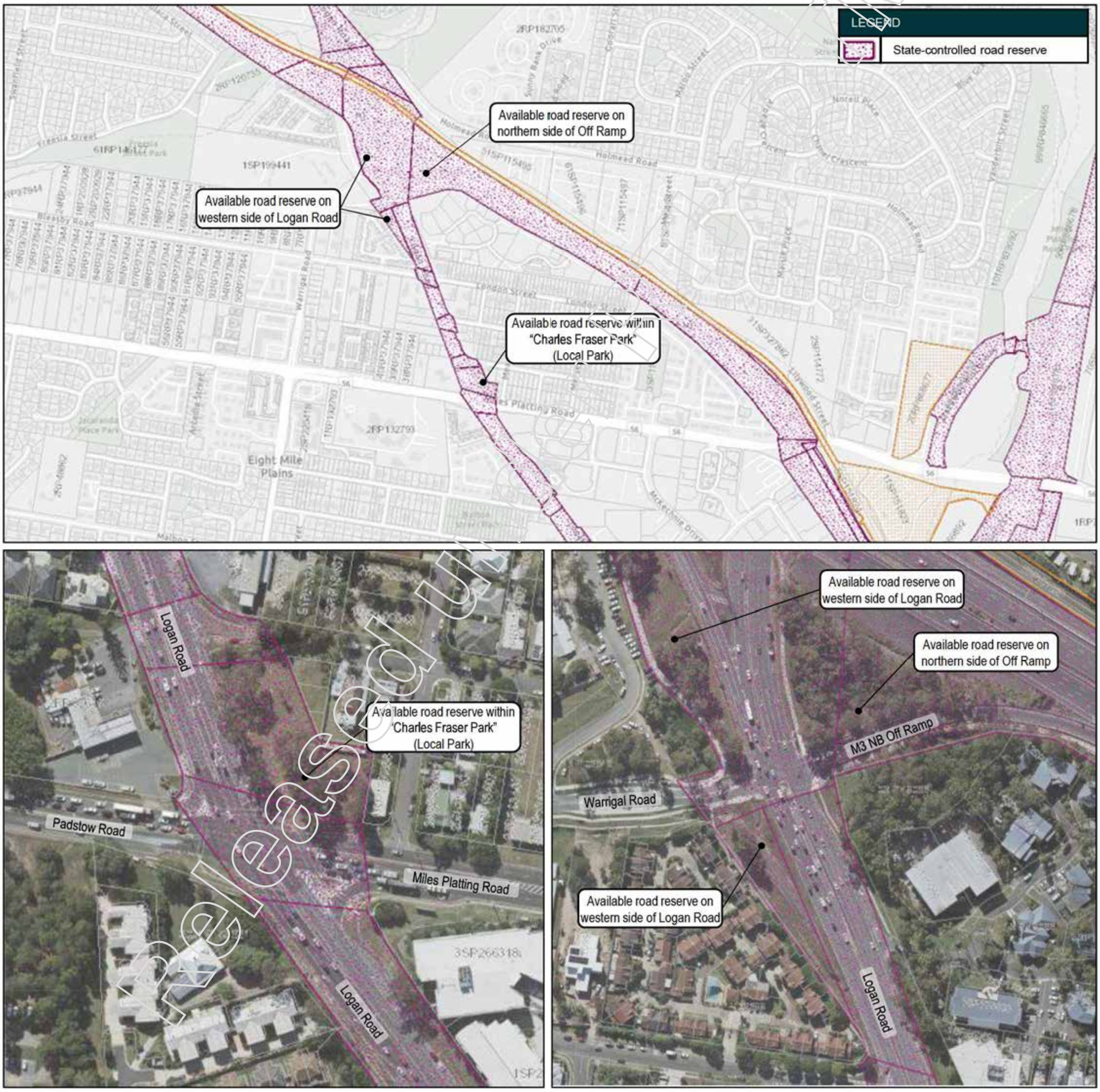


Figure 51 Constraints: available land for work sites and stockpiling material

5.3.4 Public utility plant issues

Figure 52 illustrates key public utility plant (PUP) assets in proximity to study intersection.

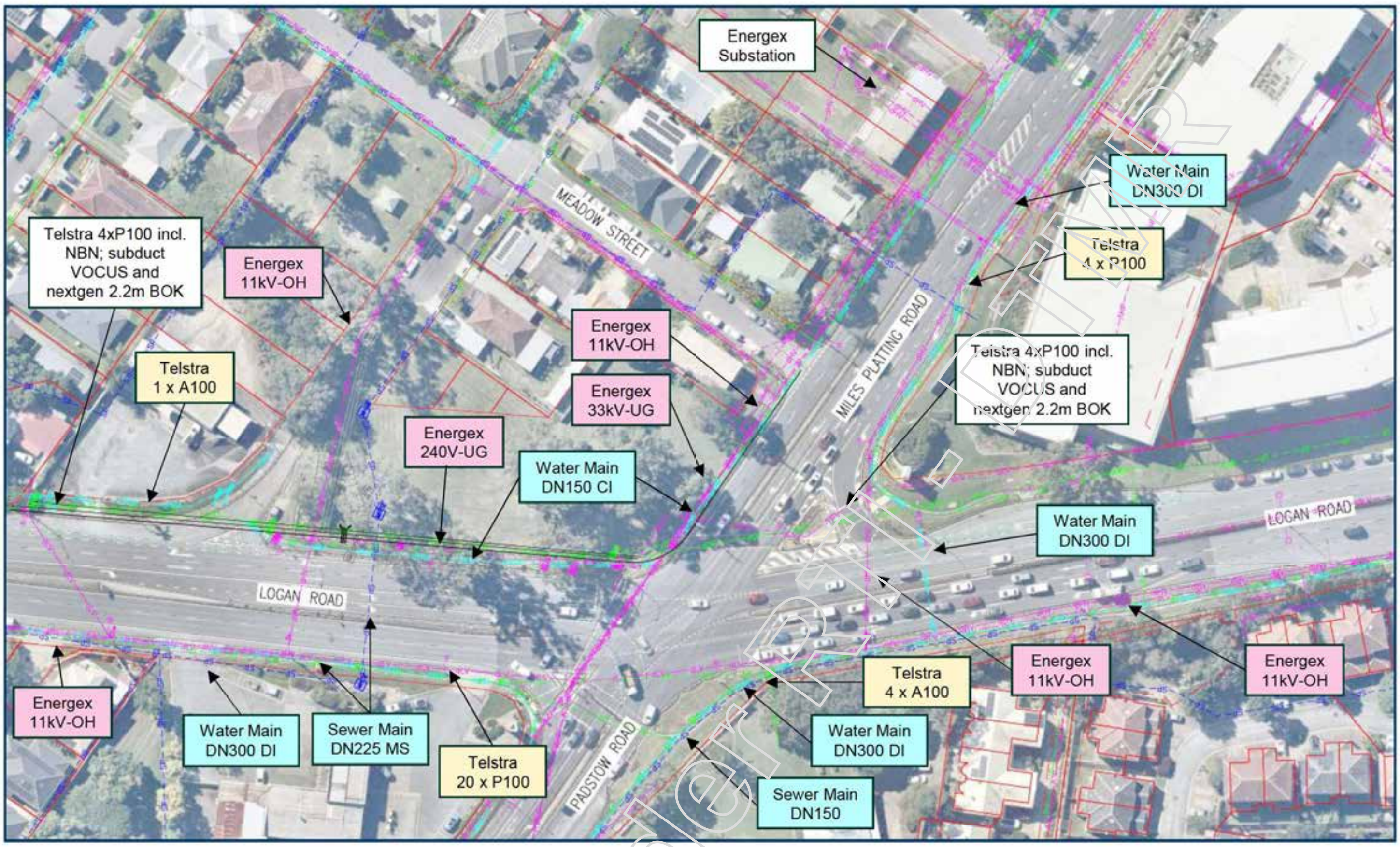


Figure 52 Constraints: public utility constraints

Table 29 summarises relevant details of the key PUP assets in proximity to the study intersection.

Table 29 Constraints: public utility constraints

Type	Description
Substation	Substation located at 24-26 Miles Platting Road
Communications	Fibre optics and NBN in underground conduits within the eastern verge along Logan Road
Electricity	33kV underground electrical crossing Logan Road in northern verge of Miles Platting Road
Electricity	11kV overhead electrical crossing Logan Road north and south of MPPL
Water	Water Mains on all approaches to MPPL including under Logan Road (south)
Sewer	Sewer Mains on Logan Road and Padstow Road including under Logan Road (north)
Stormwater	Various diameter pipes, manholes, pits, inlets, and outlets on all approaches to MPPL
ITS	Various street lights and traffic signals and associated pits and poles

Based on the above, the high risk PUP assets at the SASR stage of the project are considered to be:

- The Energex substation
- The fibre optic backbone within the eastern verge along Logan Road
- The high voltage overhead and underground electrical assets in proximity to MPPL.

5.3.5 Cultural heritage issues

Figure 53 illustrates the cultural heritage constraints within the study area.

Figure 53 Constraints: cultural heritage constraints

The Project area lies within the traditional lands of the Turrbal People and the Jagera People. The Cultural Heritage Risk Assessment (CHRA) provided an analysis of the cultural heritage risks associated with the Project, addressing both Historical and Indigenous heritage requirements. The CHRA identified a high risk to cultural heritage in certain locations within the Project area, particularly due to the proximity to recorded and registered heritage sites and the presence of areas with potentially undisturbed vegetation. The CHRA also updated a previous desktop review conducted by TMR, which had initially classified the Project as low risk for impacting cultural heritage sites and values. However, the updated CHRA expanded the Project area to include previously excluded locations, such as Bulimba Creek and other areas with undisturbed vegetation, and considered a 100-meter buffer zone. It also noted that any work affecting historically listed heritage sites would require consultation with relevant regulators or stakeholders.

In summary, the Project faces a significant historical heritage issue due to its location within a Queensland Heritage Register (QHR) site, specifically the historical house 'Hughesville' situated within the Project area

5.3.6 Funding issues

There is no funding allocated for future PAF stages or delivery of this project. Future project stages will confirm the expected cost of the preferred solution and act as the mechanism to have the project included in QTRIP.

Pending approval from the Investment Decision Making Body to proceed from Gate 1 to Gate 2 under the PAF, the project team will seek further funding through SRNUIP.

Consideration of potential private sector involvement and / or investment will be undertaken in future PAF stages.

5.3.7 Hydrologic and hydraulic issues

Figure 54 and Table 30 summarises the hydrologic and hydraulic constraints within the study area.

Figure 54 Constraints: hydrologic and hydraulic constraints

Table 30 Constraints: hydrologic and hydraulic constraints

ID	Location	Infrastructure	Risk
1	Pacific Motorway near Logan Road	1200mm RCP	**High:** Flooded in 1% AEP event by overland flooding. Further assessment / modelling required
2	Logan Road, North of Padstow Road	2x1350mm and 2x900mm cross-drainage	**High:** Insufficient capacity to convey the 2% AEP flow. Further assessment and modelling required.
3	Exit 14	1500mm RCP	**Medium:** Ponding upstream of culvert. Any increase in impervious area may impact flood levels
4	Holmead Road	2x1500mm RCP	**Low:** Road upgrades in this location may trigger extension of current drainage structures
5	Warrigal Road near Logan Road	750 (H) x 900 (W) RCBC	**Medium:** Potential ponding for the 1% AEP event.
6	Pacific Motorway near Freesia Street	3000 (H) x 3320 (W) RCBC, 3200 (H) x 3040 (W) RCBC, 3x3215 (H) x 3300 (W) RCBC	**High:** adequacy of cross-drainage needs to be assessed following changes to road configuration
7	Pacific Motorway north of Miles Platting Road	Culvert crossing size unknown	**High:** MPPL upgrades may cause increase stormwater runoff and surcharge the drainage system downstream. Further assessment required.
8	M3 Northbound On-Ramp	open channel	**High:** Road widening may impact properties along Bulimba Creek Bikeway and reduce flood storage.

A copy of the Hydraulic Analysis Technical Note is included at **Appendix E**.

5.4 Priority needs

Figure 55 maps the identified problems alongside the priority needs for the study area. It is noted the priority needs were chosen based on the transport objectives outlined in the SEQ Regional Transport Plan, as detailed in Figure 56.

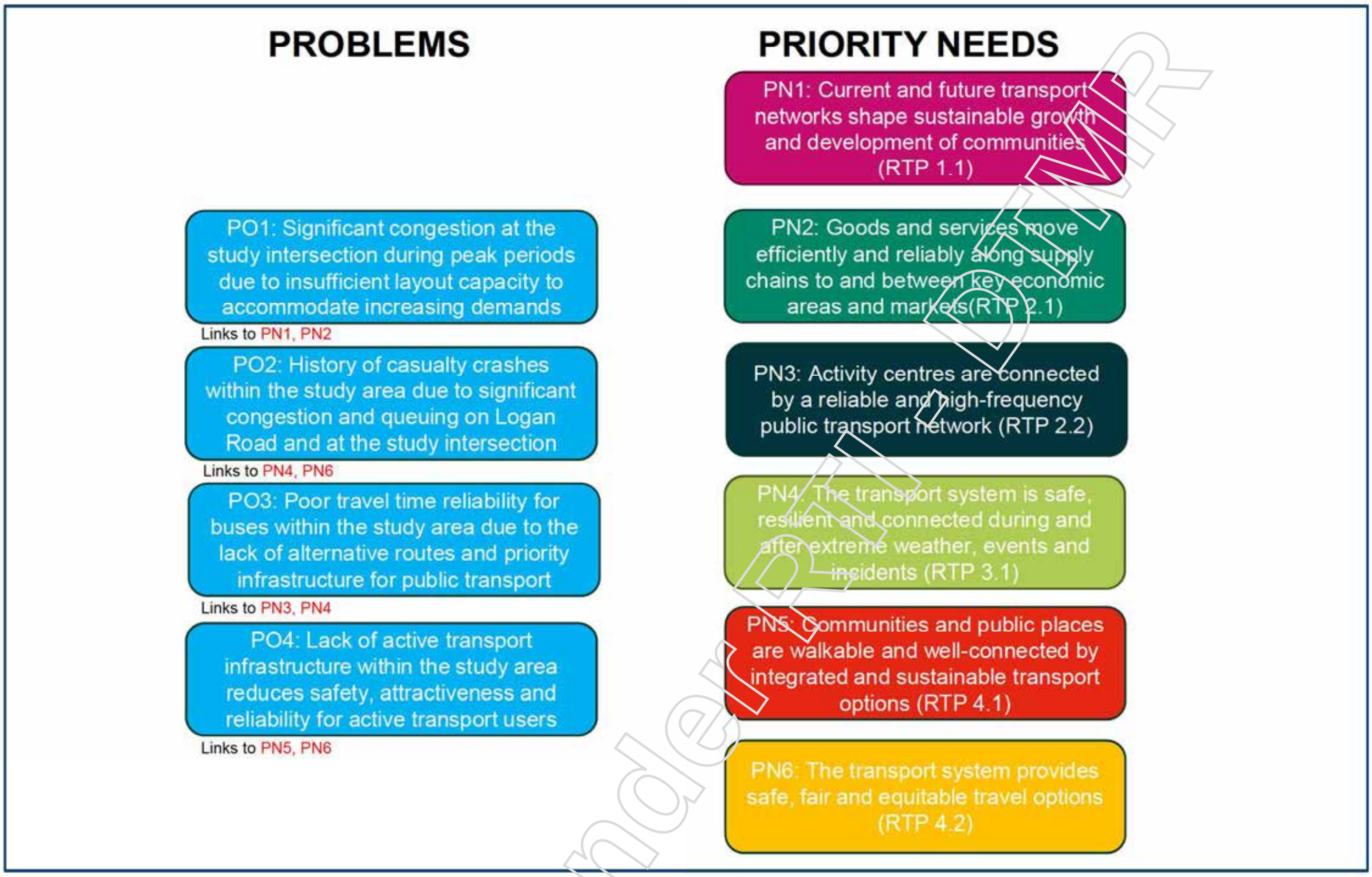


Figure 55 Issues and priority needs

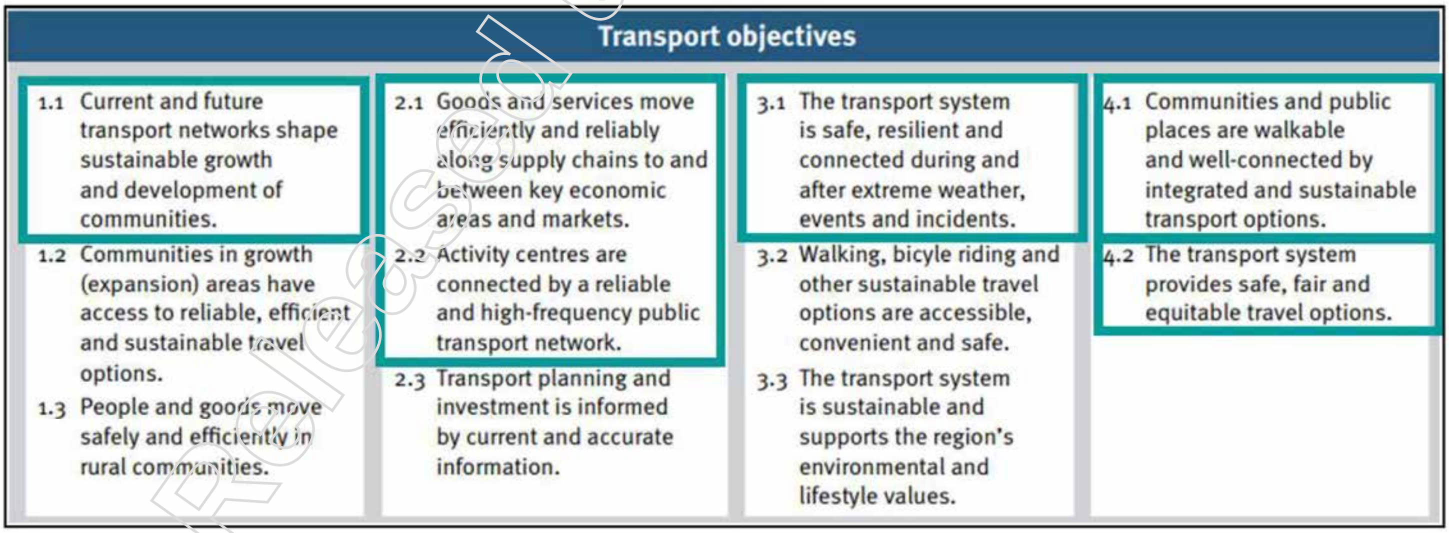


Figure 56 SEQ Regional Transport Plans – transport objectives

5.5 Service requirements to address the problems

The service requirements for the Project are outlined below:

- **S1:** A study area that facilitates efficiency and reliable transport movement to support increasing freight and passenger travel demands
- **S2:** A study area that is safe for all road users
- **S3:** A study area that is resilient through better connections and access to sustainable transport options.

Figure 57 maps the abovementioned service requirements with the identified priority needs for the study area.

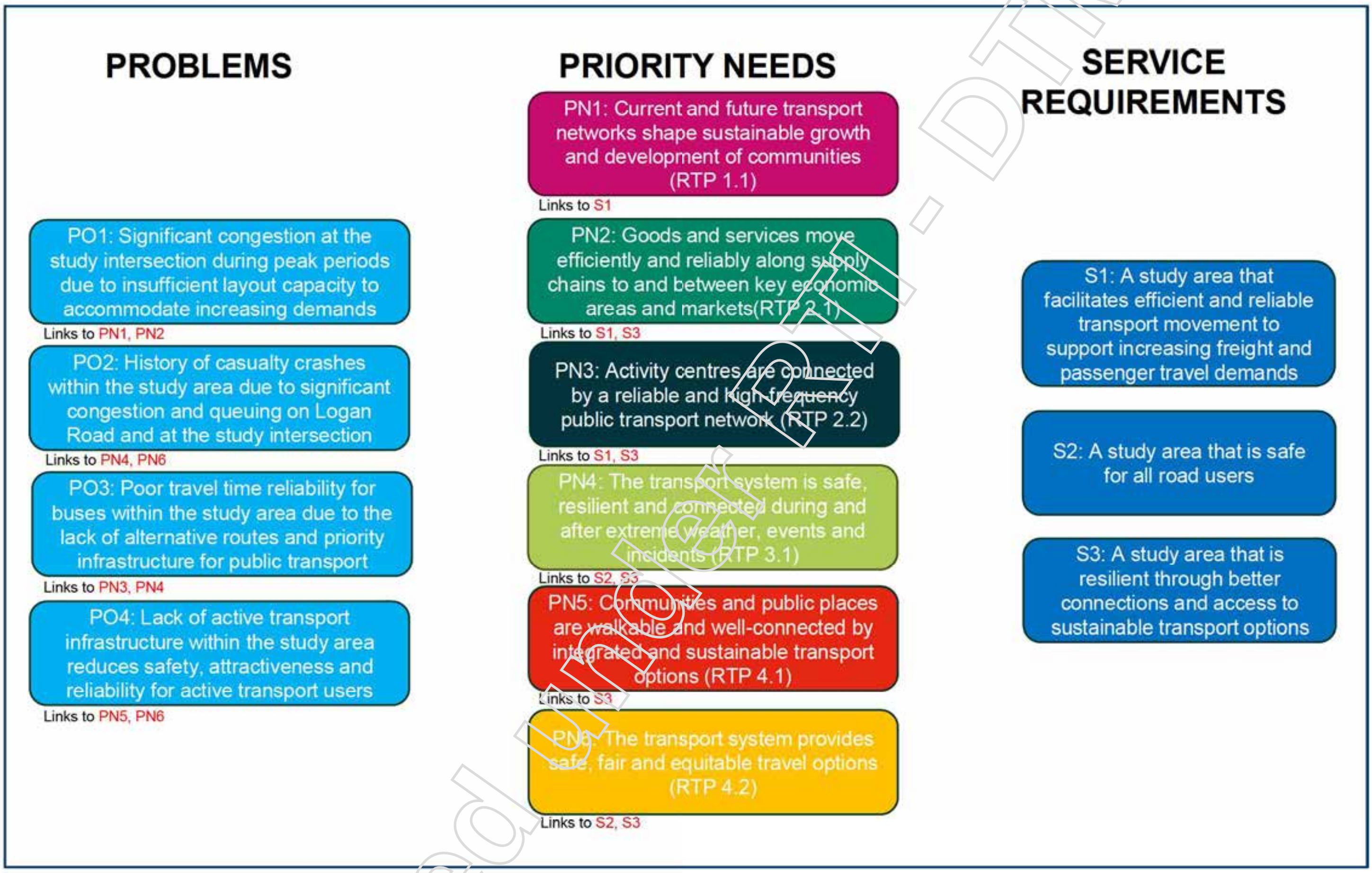


Figure 57 Identified priority needs and related service requirements

5.6 Benefits sought from service requirements

The benefits sought from the service requirements are outlined below:

- **B1:** Increased efficiency and reliability for all transport users including general traffic, freight, public transport and active transport
- **B2:** Increased safety for all transport users, including general traffic, freight, public transport and active transport
- **B3:** Increased access, connectivity, and amenity for public transport and active transport users

The benefits sought align with TMR's vision for the transport network, as detailed in the TMR Strategic Plan 2023-2027 (revised 2024-2025). Table 31 maps the project benefits to TMR's Strategic Plan objectives and performance indicators.

Table 31 Alignment of the project benefits against TMR Strategic Plan objectives

Benefits	Service Requirements	Accessible	Safety	Responsive	Efficient	Sustainable
		A transport system that is accessible and connects customers and communities	A transport system that is safe and secure for customers and goods	A transport system that is responsive and resilient to the changing environment	A transport system that is a key enabler of economic activity	A transport system that contributes to environmental, economic and social sustainability
B1: Increased efficiency and reliability for all transport users including general traffic, freight, public transport and active transport	**S1:** A study area that facilitates efficient and reliable transport movement to support increasing freight and passenger travel demands			✓	✓	
B2: Increased safety for all transport users, including general traffic, freight, public transport and active transport	**S2:** A study area that is safe for all road users		✓			
B3: Increased access, connectivity, and amenity for public transport and active transport users	**S3:** A study area that is resilient through better connections and access to sustainable transport options	✓	✓	✓	✓	✓

5.7 Investment Logic Map

An ILM process was undertaken to support the SASR development. ILM is a technique that develops and documents the underpinning logic for potential investment decisions, prior to identifying specific solutions and making a decision.

An ILM workshop was held on 18 October 2024 with representatives from:

- TMR Program Delivery and Operations (PDO)
- TMR Project Evaluation Unit (PEU)
- TMR Portfolio Management Office (PMO)
- TMR Statewide Network Operations (SNO)
- TMR Engineering and Technology (E&T) – Safer Roads
- TMR Transport Strategy and Planning (TSP)
- TMR Translink
- BCC

The ILM was updated based on feedback from the workshop and subsequent discussions with PEU.

Figure 58 illustrates the endorsed ILM for the SASR stage of the project.

Investment Logic Map

Logan Sub-Arterial Rd, Miles Platting Rd and Padstow Rd Intersection Upgrade Planning Study

Problem / Opportunity	Priority Needs*	Service Requirements (Outcomes Sought)	Benefits	TCP** Key Areas and Objectives
PO1: Significant congestion at the study intersection during peak periods due to insufficient layout capacity to accommodate increasing demands Links to PN1, PN2	**PN1:** Current and future transport networks shape sustainable growth and development of communities (RTP 1.1) Links to S1	**S1:** A study area that facilitates efficient and reliable transport movement to support increasing freight and passenger travel demands Links to B1	**B1:** Increased efficiency and reliability for all transport users including general traffic, freight, public transport and active transport	Customer experience and affordability Links to Nil
PO2: History of casualty crashes within the study area due to significant congestion and queuing on Logan Road and at the study intersection Links to PN4, PN6	**PN2:** Goods and services move efficiently and reliably along supply chains to and between key economic areas and markets (RTP 2.1) Links to S1, S3	**S2:** A study area that is safe for all road users Links to B2	**B2:** Increased safety for all transport users, including general traffic, freight, public transport and active transport	Community connectivity Links to B3
PO3: Poor travel time reliability for buses within the study area due to the lack of alternative routes and priority infrastructure for public transport Links to PN3, PN4	**PN3:** Activity centres are connected by a reliable and high-frequency public transport network (RTP 2.2) Links to S1, S3	**S3:** A study area that is resilient through better connections and access to sustainable transport options Links to B3	**B3:** Increased access, connectivity, and amenity for public transport and active transport users	Efficiency and productivity Links to B1
PO4: Lack of active transport infrastructure within the study area reduces safety, attractiveness and reliability for active transport users Links to PN5, PN6	**PN4:** The transport system is safe, resilient and connected during and after extreme weather, events and incidents (RTP 3.1) Links to S2, S3			Safety and Security Links to B2
	PN5: Communities and public places are walkable and well-connected by integrated and sustainable transport options (RTP 4.1) Links to S3			Environment and sustainability Links to Nil
	PN6: The transport system provides safe, fair and equitable travel options (RTP 4.2) Links to S2, S3			

** Regional Transport Plan*

*** Transport Coordination Plan*

Figure 58 Endorsed Investment Logic Map

5.8 Stakeholders' needs and expectations

Table 32 summarises the various stakeholders which may have an interest in the project and their anticipated level of involvement. It is important to note that not all the stakeholders are key to the project, and their importance will depend upon the stage of the planning or delivery of the projects, or parts of the project.

Table 32 Stakeholders' needs and expectations

Stakeholder	Interest in potential project	Involvement
Australian Government	Understanding of need for and options for potential project	Properly developed analysis which allows prioritisation of funding for works
State Government	Understanding of need for and options for potential project	Properly developed analysis which allows prioritisation of funding for works as part of overall transport program
Brisbane City Council (BCC)	Understanding of potential impacts on local government area and opportunities to contribute to economic and social development within area	Consultation and ability to input into planning and design
Private vehicle users	Impact on road use in terms of safety, time, cost, and efficiency of movement	Consultation and ability to input into planning and design
Freight carriers	Impact on road use in terms of safety, time, cost, and efficiency of movement	Consultation and ability to input into planning and design
Public transport users	Impact on public transport services in terms of level of service including reliability, cost, timeliness, comfort, and safety	Consultation and ability to input into planning and design
Property owners and lessees	Understanding of potential impacts on properties including possibility of acquisition	Equitable treatment where properties are to be impacted or acquired
Property developers	Understanding of potential impacts on proposed property developments and access thereto including opportunities for development	Consultation and ability to input into study
Business groups	Information concerning potential impacts on access to businesses and opportunities for increased commercial development	Consultation and ability to input into study
Community groups	Information concerning study so that they can understand impacts on broader community	Consultation and ability to input into study
Local community	Information concerning study and specifically in relation to local impacts	Consultation and ability to input into study
Indigenous groups	Information concerning potential impacts on items and areas of indigenous cultural significance	Consultation and ability to input into study including Cultural Heritage Impact Management Plan (if required)
Environmental groups	Information concerning impacts on environment including flora and fauna	Consultation and ability to input into planning and design
Educational institutions	Information concerning access to institutions including public transport and active transport options	Consultation and ability to input into study
Service/utility authorities	Knowledge concerning implications for existing and future service locations	Consultation and ability to input into planning and design

Cultural Heritage groups	Information concerning potential impacts on items and areas of cultural significance	Consultation and ability to input into study including Cultural Heritage Impact Management Plan (if required)
Emergency services	Information concerning options being analysed and potential implications for access	Consultation and ability to input into planning and design
Cycle groups	Information concerning study and specifically opportunities for cycle paths and network	Consultation and ability to input into planning and design
Disability Sector	Confirming compliance with Accessibility requirements and applicable guidelines.	Consultation and ability to input into planning and design

5.9 Alignment with stakeholder needs

Table 33 summarises how the service requirements are aligned with the needs of the various stakeholders.

Table 33 Alignment of service requirements to stakeholder needs

Stakeholder	Alignment with stakeholder needs		
	S1: A study area that facilitates efficient and reliable transport movement to support increasing freight and passenger travel demands	**S2:** A study area that is safe for all road users	**S3:** A study area that is resilient through better connections and access to sustainable transport options
Australian Government	✓	✓	✓
State Government	✓	✓	✓
Brisbane City Council (BCC)	✓	✓	✓
Private vehicle users	✓	✓	
Freight carriers	✓	✓	
Public transport users	✓	✓	✓
Property owners and lessees	✓	✓	✓
Property developers	✓	✓	✓
Business groups	✓	✓	✓
Community groups	✓	✓	✓
Local community	✓	✓	✓
Indigenous groups	✓	✓	✓
Environmental groups			✓
Educational institutions	✓	✓	✓
Service/utility authorities		✓	✓
Cultural Heritage groups		✓	✓
Emergency services	✓	✓	✓
Cycle groups	✓	✓	✓
Disability Sector	✓	✓	✓

6. Potential options to achieve the outcome sought

6.1 Methodology

The *Australian Infrastructure Plan* and the *State Infrastructure Plan* provide strategic guidance on how government investment should be prioritised. Both plans emphasise that non-infrastructure solutions and / or making the best use of existing assets should be the preferred response, if they are effective in addressing the identified problem/s and satisfying the service requirements.

TMR's *Network Optimisation Framework* (NOF) has been developed to support this approach by prioritising consideration of low-cost and non-infrastructure solutions, or network optimisation solutions, within its planning and investment processes. This includes consideration of network optimisation solutions which may address part of the service requirements and / or delay the need for more costly infrastructure solutions.

Figure 59 illustrates the strategic direction of Government investment policy as outlined in TMR's NOF.

Figure 59 Strategic direction of Government investment policy (TMR NOF Framework)

The adopted option identification and assessment methodology is outlined below:

- **Step 1:** Define the Future Base Case for the study area to understand what may happen without any intervention
- **Step 2:** Develop a "long list" of potential "non-asset", "existing asset", and "new asset" options based on the problems defined in Chapter 4 and the outcomes sought in Chapter 5
- **Step 3:** Undertake a Strategic Merit Test (SMT) to rank the ability of each option to achieve the service requirements
- **Step 4:** Rule out options that fail to meet the identified outcomes sought and service requirements
- **Step 5:** Recommend a "short list" of options for further analysis in the PE phase
- **Step 6:** Facilitate a NOF Workshop with the TWG to present the above and seek feedback.

A NOF Workshop was held on 3 December 2024 to present the long list of potential non-asset, existing asset and new asset options, and identify a short list of options for progression to the PE. The outcomes of the NOF Workshop are discussed in the following sections, and a copy of the workshop presentation slides is included at **Appendix C**.

6.2 Base case

The Base Case reflects the continued operation of the network under good management practices. It assumes that general operating, routine and periodic maintenance costs will continue to occur, plus a minimum level of capital expenditure to maintain services at their current level (e.g. maintaining access or reliability) without significant deterioration. This may include asset renewals and replacement of life-ending components on a like-for-like basis, as well as committed and funded projects and smaller scale changes required to sustain viable operations under the base case.

Relevant details in relation to the Base Case for the Project are summarised below:

- **Timeframe:**
  - 30 years post construction of project options
- **Maintenance works required in absence of the project:**
  - Routine maintenance (e.g. surface inspections, cleaning, drainage maintenance, signs and line markings etc.)
  - Preventive maintenance (e.g. crack sealing, surface treatments, pothole report, resurfacing etc.)
  - Major maintenance and rehabilitation (e.g. full resurfacing, subgrade and base repairs, reinforcement of pavement structure, shoulder maintenance etc.).
- **Funded / committed projects that inform the Base Case:**
  - nil.
- **Implications from not implementing the Project:**
  - Significant worsening in delays, queues and travel times for cars, trucks and buses within the study area
  - Peak hour delays at MPPL are forecast to increase from approximately 60 seconds per vehicle in 2024 to approximately 100-120 seconds per vehicle in 2041. This equates to a LOS F
  - Frequency of congestion-related crashes within the study area is expected to continue trending upwards
  - Frequency and magnitude of the Exit 14 queuing issue is expected to increase
  - Public transport mode share within the study area is expected to remain relatively low
  - Active transport mode share within the study area is expected to remain relatively low.

6.3 Non-Asset Options

6.3.1 Overview

Figure 60 illustrates potential network optimisation solutions outlined in TMR's *Smarter Solutions Reference Guide*.

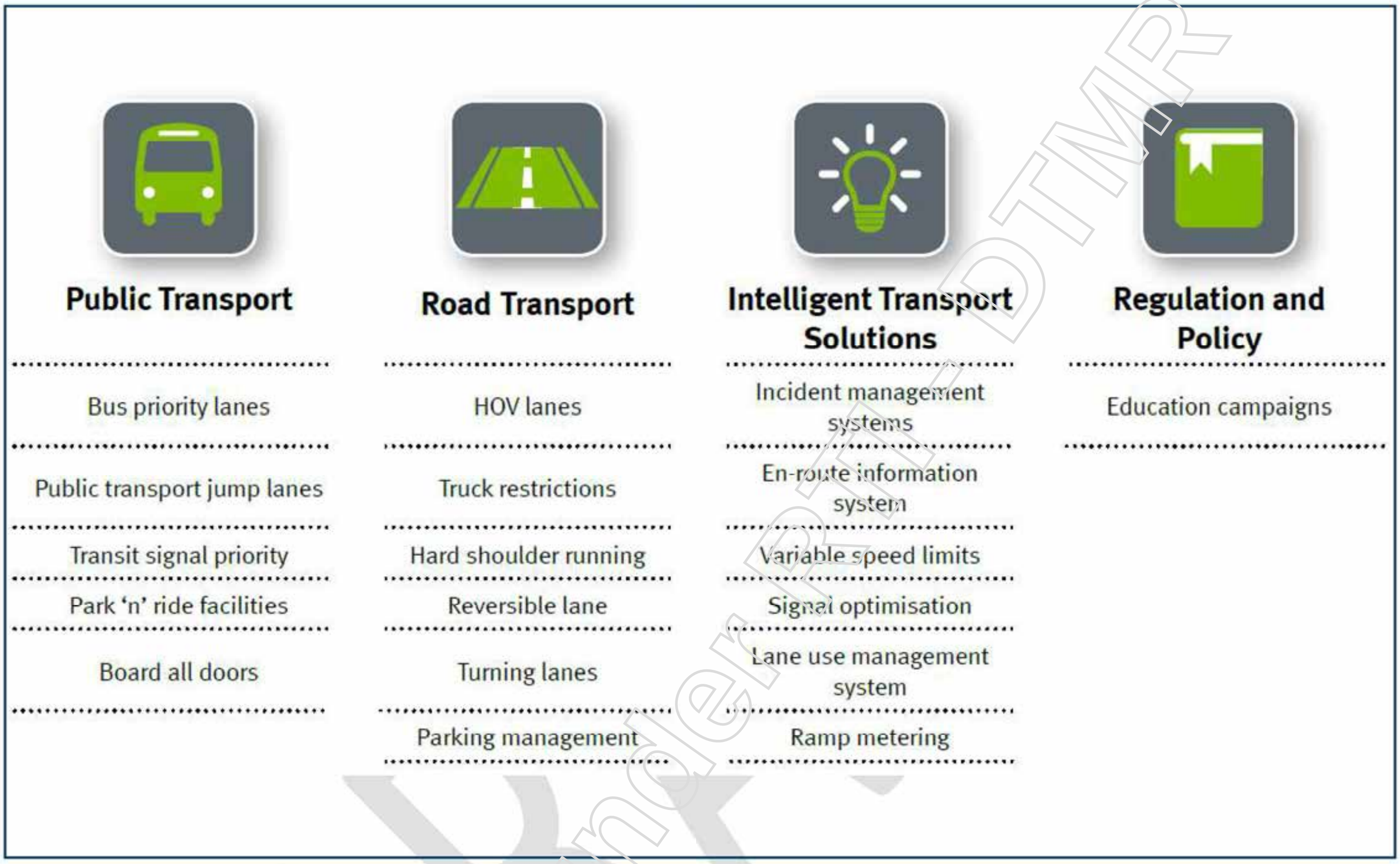


Figure 60 Network optimisation solutions (TMR Smarter Solutions Reference Guide)

TMR's *Smarter Solutions Reference Guide* states:

- Network optimisation solutions are initiatives that improve the functioning of the existing transport network, without delivering new infrastructure. These solutions improve performance by increasing the capacity of, or demand for, elements of the current transport network. The solutions outlined in Figure 60 are not exhaustive
- There are potential significant benefits to be gained through the implementation of network optimisation solutions as they allow for large-scale capital expenditure to be deferred, while improving the performance of the existing network.

The most suitable non-asset options for the project include:

- **Option 1:** Signal optimisation
- **Option 2:** Travel demand management
- **Option 3:** Land use planning changes
- **Option 4:** Reduced / variable speed limits.

Further details in relation to each non-asset option is provided below.

6.3.2 Option 1: signal optimisation

Dynamic traffic signal optimisation and coordination could improve the efficiency of traffic and bus movements through the study area, by adapting to changing traffic circumstances. Various detectors (e.g. in-pavement / loop detectors, video image processing detectors and demand button detectors) provide feedback to the signal control system, altering the lights as required. Signal optimisation ensures that intersection traffic signal phasing and timing reflects current traffic conditions to optimise movements and increase the overall peak hour efficiency within the study area.

NOF Solution	Target outcome areas	Indicative asset life	Benefits
Signal optimisation		< 5 years	• Reduced average travel delay by 20% • Reduced emissions by 1–3%

6.3.3 Option 2: travel demand management

Travel demand management (TDM) initiatives could potentially contribute to reduced congestion within the study area, which may improve road safety and provide benefits to public and active transport users. TDM initiatives could take the form of travel behaviour change, active transport management, travel information tools, and / or road user pricing.

NOF Solution	Target outcome areas	Indicative asset life	Benefits
Education campaigns		< 5 years	• Reduction in single occupancy by 14%

6.3.4 Option 3: land use planning changes

Land use and new development could be limited in the suburbs surrounding the study area to reduce and redirect forecast future growth. By limiting the magnitude of this growth and / or redirecting it to existing areas which are closer to activity centres may reduce the extent of congestion forecast within the study area during the future design horizons.

NOF Solution	Target outcome areas	Indicative asset life	Benefits
Education campaigns		< 5 years	• Reduction in single occupancy by 14%

6.3.5 Option 4: reduced / variable speed limits

Logan Road is governed by a posted speed limit of 70km/h. There may be an opportunity to permanently reduce the speed limit and / or install Variable Speed Limits (VSL) to improve safety for all users, including pedestrians and cyclists.

VSL's are enforced through dynamic speed indicators that adjust to weather and traffic conditions, reducing the speed limit for areas of congestion, accidents or for special events. VSL are designed to avoid or delay the onset of demand driven congestion and reduce supply driven congestion by controlling speed for incident management and flow homogenisation.

As noted in Section 4.2.3, a high proportion (63%) of the 108 reported casualty crashes within the study area have been rear-end type crashes, which is typically attributed to a congested urban road network. A reduced (or variable) speed limit may reduce the frequency and severity of crashes within the study area and increase travel time reliability.

NOF Solution	Target outcome areas	Indicative asset life	Benefits
Variable speed limits		5–10 years	• Increased travel time reliability by 22% • Reduction in overall crashes by between 20% to 57%

6.4 Existing Asset Options

6.4.1 Overview

Potential existing asset options that have been considered as part of the SASR include:

- **Option 5:** Logan Road / Warrigal Road intersection upgrade
- **Option 6:** MPPL at-grade intersection upgrade
- **Option 7:** Bus lanes / queue jump lanes / signal priority
- **Option 8:** Warrigal Road general traffic link.

6.4.2 Option 5: Logan Road / Warrigal Road intersection upgrade

It is recommended upgrade options are investigated for the Logan Road / Warrigal Road intersection to address safety concerns associated with Exit 14 queues extending back to the motorway, and to reduce the potential for northbound queues on Logan Road in the AM peak extending back to MPPL. Delivering a solution similar to the 2010 BC at this location, with separated northbound on and off ramps, is expected to fulfil the service requirements of the project.

Key features of the 2010 BC solution at the Logan Road / Warrigal Road intersection are summarised below:

- Widening Exit 14 to provide an additional right turn lane (three right turn lanes in total)
- Reconstructing the M3 northbound on-ramp within the road reserve to the west of the existing Logan Road carriageway, to allow the M3 northbound on and off ramp movements to occur during the same traffic signal phase
- Upgrading Logan Road to provide six through lanes (three in both directions) through the intersection.

Figure 61 indicatively illustrates the intent and geographical extents of Option 5.

This option provides an opportunity to upgrade the active transport infrastructure at this location, potentially via new off-road shared paths and a signalised pedestrian crossing on the Warrigal Road approach to the intersection. It is anticipated this option would also improve public transport travel times and reliability through the intersection.

Figure 61 Fat pen sketch of Option 5: Logan Road / Warrigal Road intersection upgrade (2010 BC example)

Note: The 2010 BC solution has been presented to help explain the concept. There may be alternative intersection layout options at this location to fulfil the service requirements and this would need to be investigated further in the PE phase.

6.4.3 Option 6: MPPL at-grade intersection upgrade

Additional layout capacity is required to meet both current and projected future traffic demands at MPPL. As noted previously, at-grade upgrade solutions were proposed for MPPL in the 2010 BC, 2014 Planning Review, and 2021 OA, and these options could be reassessed during the PE phase. While the previously recommended solutions varied in their spatial requirements and associated land and utility impacts, all of them aimed to enhance layout capacity and included additional dedicated active transport infrastructure. Therefore, implementing an at-grade solution similar to those previously recommended is expected to partially address the service requirements of the project.

Figure 62 provides an overview of the 2010 BC ultimate solution.

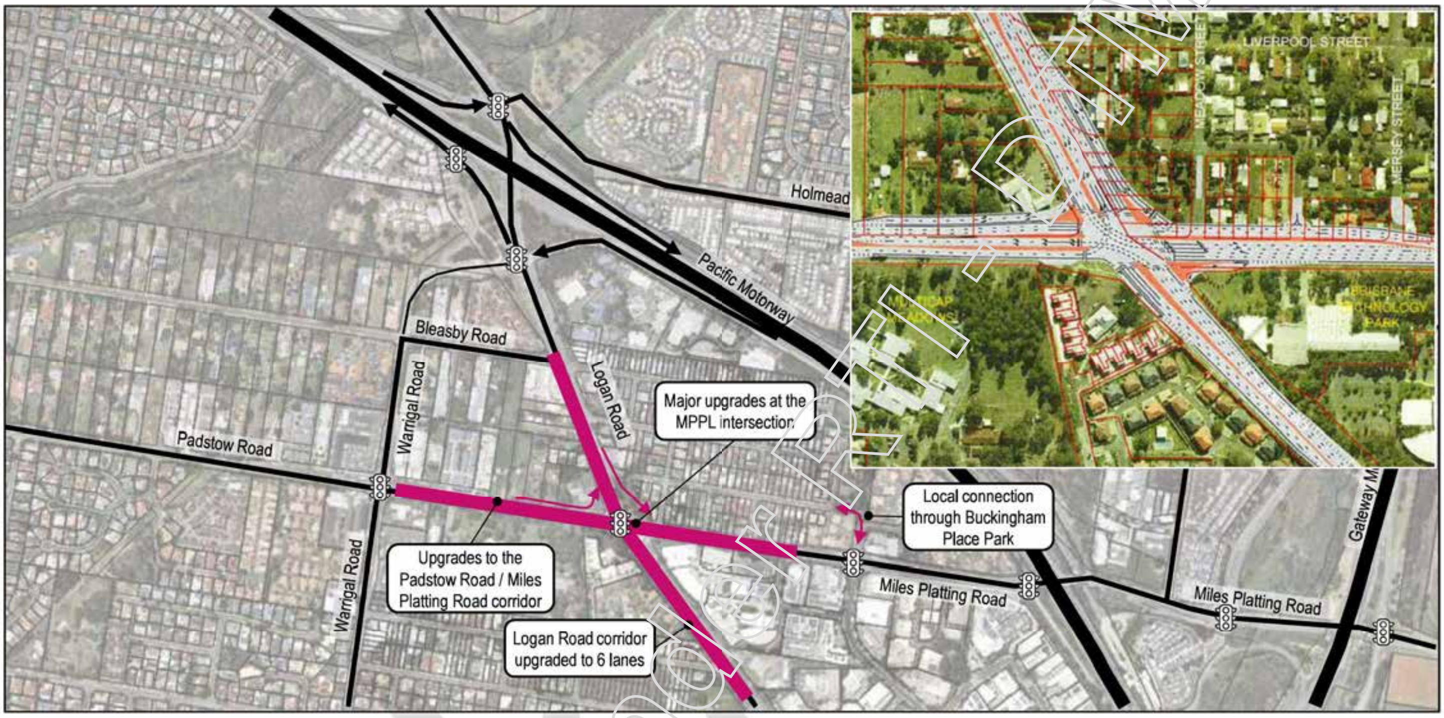


Figure 62 Fat pen sketch of Option 6: MPPL at-grade intersection upgrade (2010 Business Case example)

Figure 63 provides an overview of the 2014 Planning Review ultimate solution.

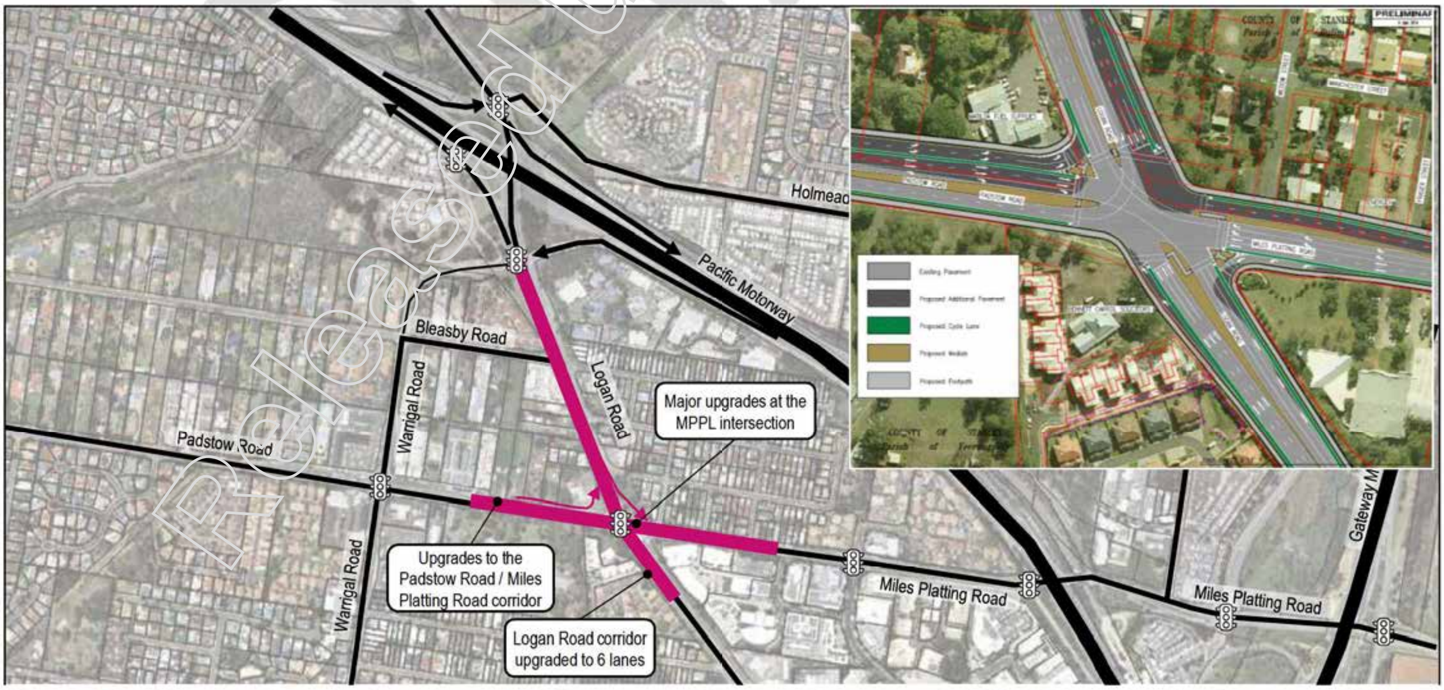


Figure 63 Fat pen sketch of Option 6: MPPL at-grade intersection upgrade (2014 Planning Review example)

Figure 64 provides an overview of the 2021 OA ultimate solution.

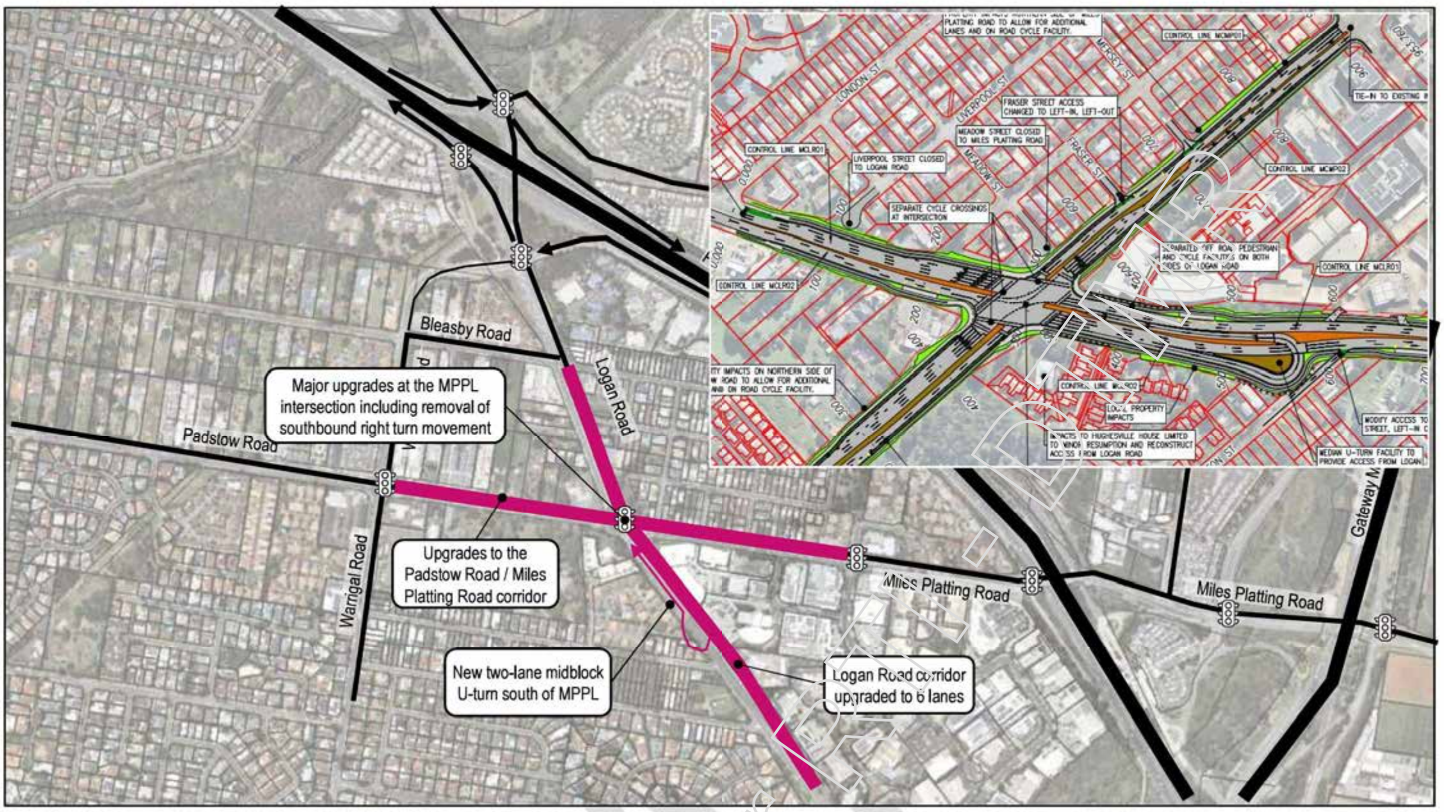


Figure 64 Fat pen sketch of Option 6: MPPL at-grade intersection upgrade (2021 OA example)

This option provides an opportunity to upgrade the active transport infrastructure at this location, potentially via new off-road shared paths on Logan Road and a new signalised pedestrian crossing on the southern approach to the intersection. This option may also improve public transport travel times and reliability through the intersection.

Note: The recommended solutions from the 2010 BC, 2014 Planning Review, and 2021 OA are provided to illustrate the intent of this option. However, there may be alternative intersection configurations that could meet the service requirements of the project, and these would need to be explored further during the PE phase.

Note: The design traffic volumes used to inform the 2010 BC and 2014 Planning Review appear to be conservative compared to existing (2022) surveyed traffic demands, as outlined in Table 34. Whilst subject to detailed traffic modelling, this observation highlights that there may be an opportunity to optimised footprints and reduced land impacts.

Table 34 MPPL design traffic volume comparison

Source	AM Peak Hour	PM Peak Hour
2022 Traffic Surveys	4,200 vehicles (2022)	5,300 vehicles (2022)
2010 Business Case	7,800 vehicles (2026)	9,200 vehicles (2026)
2014 Planning Review	6,200 vehicles (2031)	6,700 vehicles (2031)
2021 Options Analysis	5,200 vehicles (2031)	5,300 vehicles (2031)
2024 OnQ BC	5,200 vehicles (2031)	6,200 vehicles (2031)
2024 OnQ BC	6,500 vehicles (2041)	7,700 vehicles (2041)

Key points to note in relation to the estimated design traffic volumes from the 2024 Business case:

- Peak hours:
  - AM peak: 7:45am to 8:45am
  - PM peak: 4:45pm to 5:45pm
- Static assignment runs have been used, representing an estimated demand for the intersection rather than throughput from the dynamic scenarios.

6.4.4 Option 7: Bus lanes / queue jump lanes / signal priority

The intent of Option 7 is to prioritise bus movements through the study area. This may include dedicated bus lanes on Logan Road and / or bus queue jump lanes and associated traffic signal priority at key intersections along Logan Road. Under this option, Logan Road would be upgraded to six lanes (i.e. 4 general traffic lanes and 2 bus lanes), and there may be an opportunity to upgrade the active transport infrastructure via new off-road shared paths along Logan Road.

Figure 65 indicatively illustrates the intent and geographical extents of Option 7.

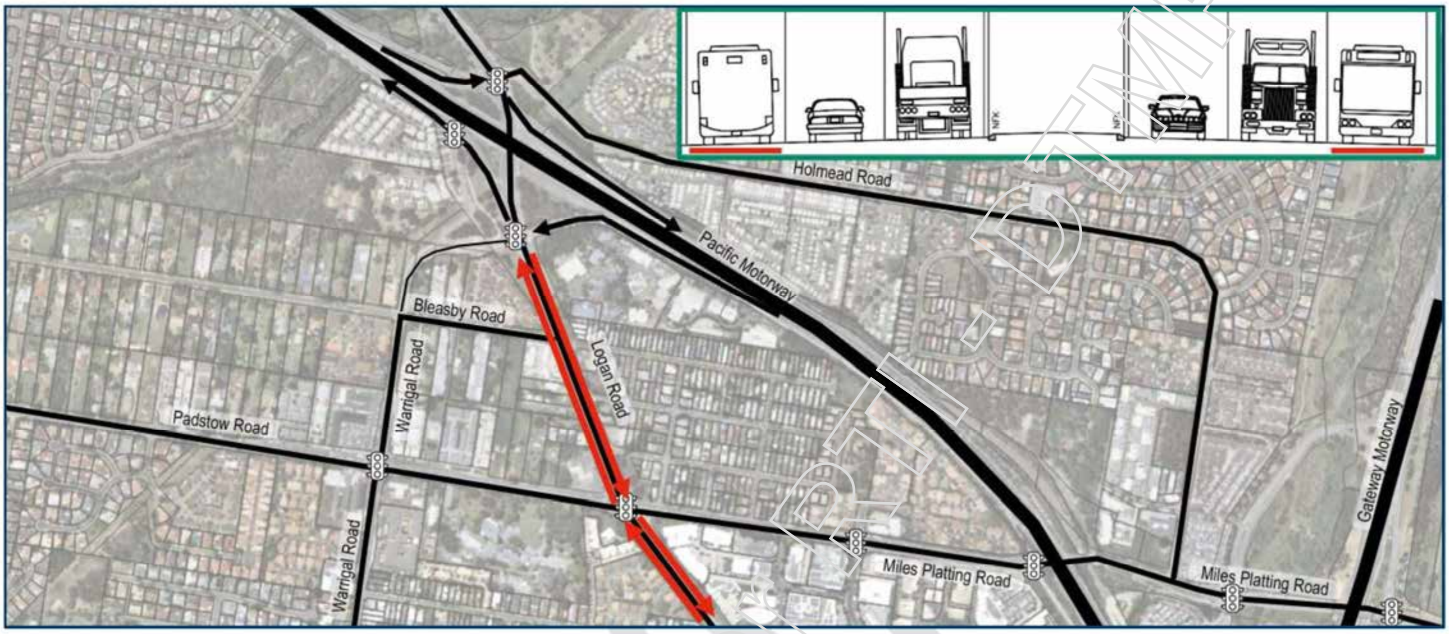


Figure 65 Fat pen sketch of Option 7: bus lanes / queue jump lanes / signal priority

6.4.5 Option 8: Warrigal Road general traffic link

Option 8 includes upgrading the Warrigal Road Green Link to accommodate general traffic as well as public transport. This may include providing a four lane cross-section with two general traffic lanes and two dedicated bus lanes.

This option would not deliver active transport upgrades at the study intersection or materially improve bus travel times.

Figure 66 indicatively illustrates the intent and geographical extents of Option 8.

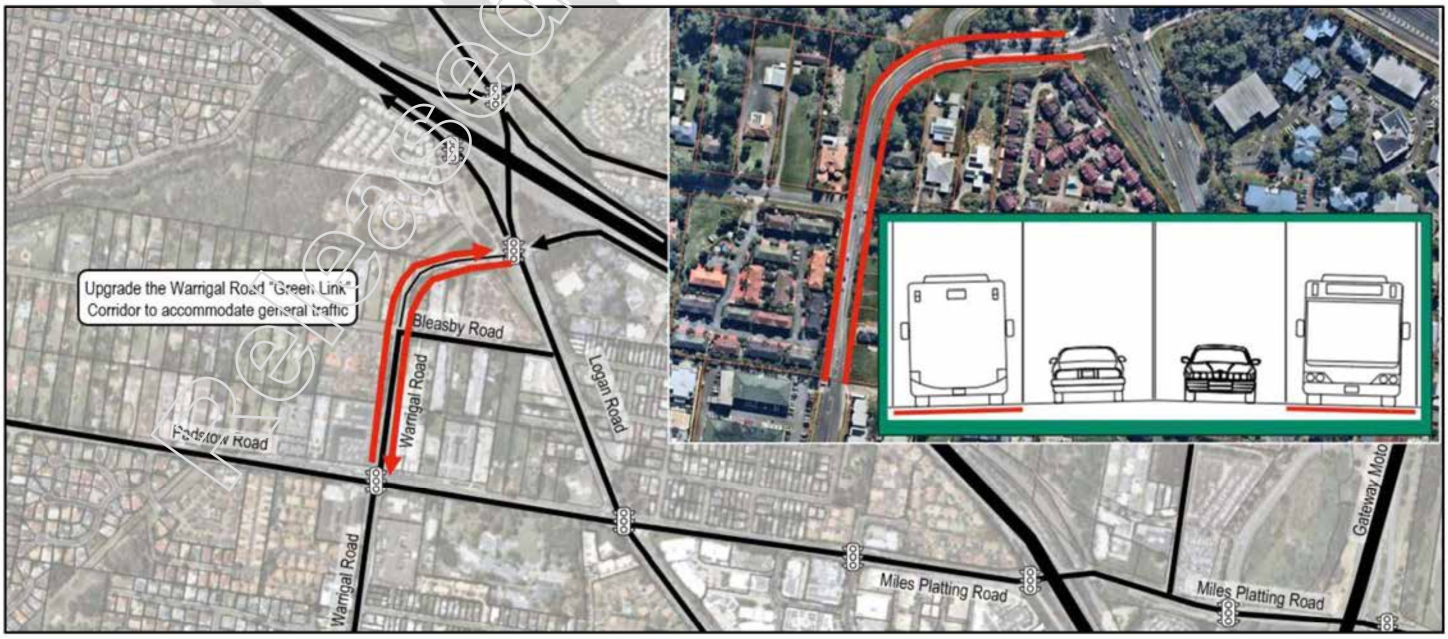


Figure 66 Fat pen sketch of Option 8: Warrigal Road general traffic link

6.5 New Asset Options

6.5.1 Overview

Potential new asset options that have been considered as part of the SASR include:

- Option 9: active transport links
- Option 10: M3 to M2 ramps
- Option 11: MPPL partial grade separation
- Option 12: MPPL interchange.

6.5.2 Option 9: active transport links

As outlined in Section 4.2.5.1, all key roads within the study area form part of TMR's PCNP and the V1 travels through the study area on the western side of the Pacific Motorway. However, there are significant infrastructure gaps in the active transport network and poor connectivity to the V1, resulting in low active transport demands within the study area.

Option 9 includes providing dedicated high quality active transport infrastructure within the study area along Logan Road, Warrigal Road, Padstow Road and Miles Platting Road in accordance with TMR's PCNP. It may also include upgrading V1 to provide an overpass structure to allow users to bypass the at-grade crossing on Logan Road.

Figure 67 indicatively illustrates the intent and geographical extents of Option 9.

Figure 67 Fat pen sketch of Option 9: active transport links

6.5.3 Option 10: M3 to M2 ramps

As outlined in Section 4.2.2.5, some motorists use Logan Road through the study area to interchange between the M2 and M3 due to the lack of direct links between the motorways. Option 10 includes provision for new ramp connections between the M2 and M3 to reduce traffic demands on Logan Road and improve performance at MPPL.

This option would not deliver active transport upgrades at the study intersection or materially improve bus travel times.

Figure 68 indicatively illustrates the intent and geographical extents of Option 10.

Figure 68 Fat pen sketch of Option 10: M3 to M2 ramps

6.5.4 Option 11: MPPL partial grade separation

This option seeks to remove traffic from the at-grade intersection via a partial grade separation.

As outlined in Section 4.2.2.2, there is a significant southbound traffic demand on Logan Road at the MPPL intersection. Traffic survey data from 12 October 2022, recorded 2,500 vehicles travelling southbound on Logan Road at this location in the PM peak (i.e. U-turn = 130, Right Turn = 620, Through = 1,350, and Left Turn = 400). The lack of alternative right turn options for southbound motorists on Logan Road results in concentrated demand at this location. Over the 12 hour survey period, a total of 5,270 motorists turned right into Padstow Road, which equates to 10.6% of the total demands recorded at the intersection (i.e. 49,738 vehicles). It was also ranked the fourth busiest movement at MPPL.

If, for example, the southbound right turn from Logan Road into Padstow Road was grade separated, it would reduce traffic demands at MPPL by approximately 10%. This reduction may facilitate further traffic signal phasing and timing optimisation (refer Phase D) with the intent to provide additional capacity for all other movements at the intersection. This example is similar to the intersection of Hooker Boulevard / Sunshine Boulevard, Broadbeach Waters (Figure 69).

Based on the forecast traffic demands, it is anticipated a 6 lane upgrade of the corridor would also be required.

This option provides an opportunity to upgrade the active transport infrastructure at this location, potentially via new off-road shared paths along Logan Road. This option may also improve public transport travel times through the intersection.

Figure 70 indicatively illustrates the intent and geographical extents of Option 11.

Figure 69 Example of a partial grade separation – Sunshine Boulevard Broadbeach Waters

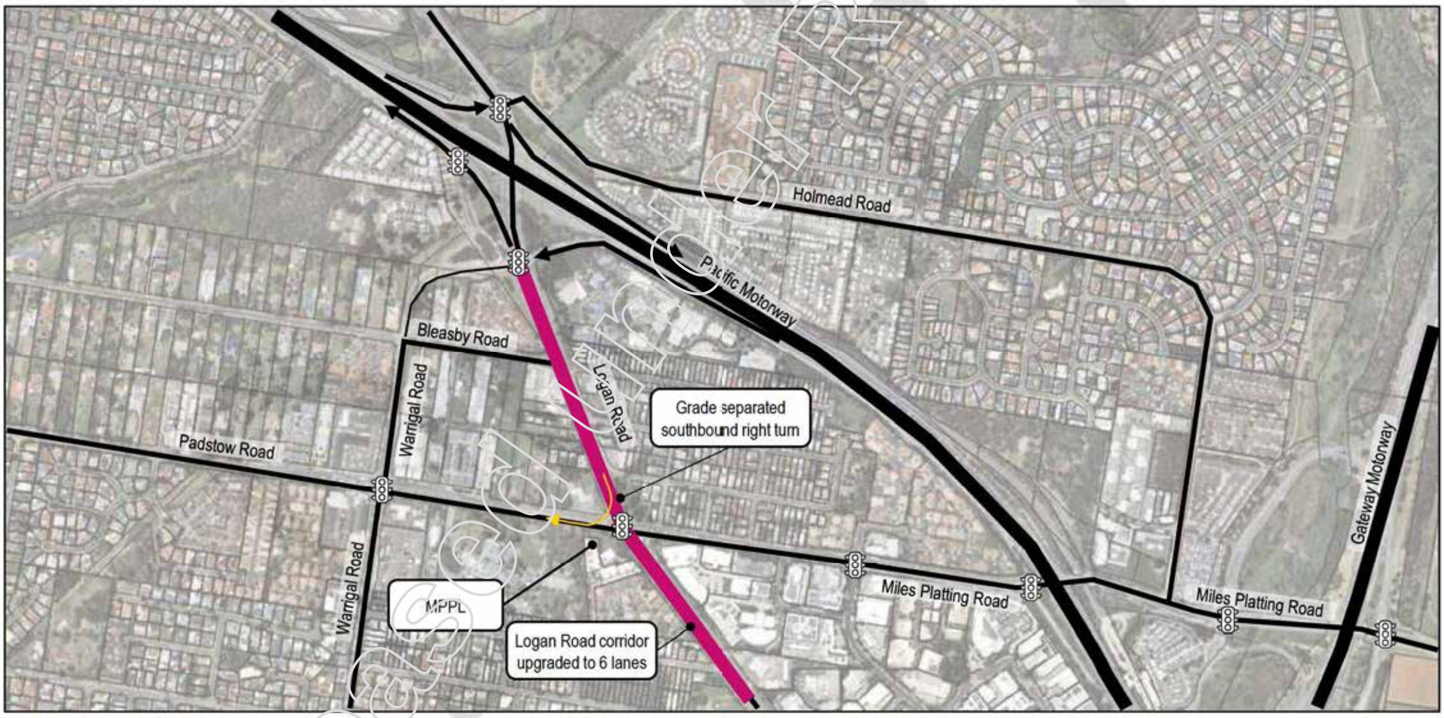


Figure 70 Fat pen sketch of Option 11: MPPL partial grade separation

Note: the southbound right turn movement has been selected to help explain the concept. There may be opportunities to grade separate other movements at the intersection and this would need to be investigated further during the PE phase.

6.5.5 Option 12: MPPL interchange

As outlined in Section 4.2.2.2, there are significant peak hour traffic demands at the MPPL intersection (i.e. approximately 4,200 vehicles in the AM peak and 5,300 vehicles in the PM peak in 2022). Based on the forecast population and employment growth within the study area, and noting the lack of alternative routes, the existing traffic demands are expected to continue to increase at a rate of 2-3% p.a. As a result, achieving an acceptable level of service at the MPPL intersection in 2041 would be challenging with an "at-grade" solution. This conclusion is backed by the preferred solutions from the 2010 BC, 2014 Planning Review, and 2021 OA, all of which proposed a large footprint for the MPPL intersection featuring numerous of approach and departure lanes and substantial land impacts.

Option 12 includes upgrading MPPL to a grade separated interchange. The intent is to provide free-flow conditions on Logan Road, the higher order State-controlled arterial road, and facilitate all other movements via two (2) at-grade signalised intersections either side of the overpass. It is noted a similar solution was investigated as part of the 2010 BC.

Key features of the 2010 option include:

- Grade separation of the MPPL intersection
- Free-flow traffic conditions on Logan Road while overpassing Padstow Road and Miles Platting Road
- A new signalised intersection on Padstow Road (western intersection)
- A new signalised intersection on Miles Platting Road (eastern intersection).

This option provides an opportunity to upgrade the active transport infrastructure at this location, potentially via new off-road shared paths along Logan Road and new signalised pedestrian crossings at the new intersections on Padstow Road and Miles Platting Road. This option may also improve public transport travel times and reliability through the intersection.

Figure 71 indicatively illustrates the intent and geographical extents of Option 12.

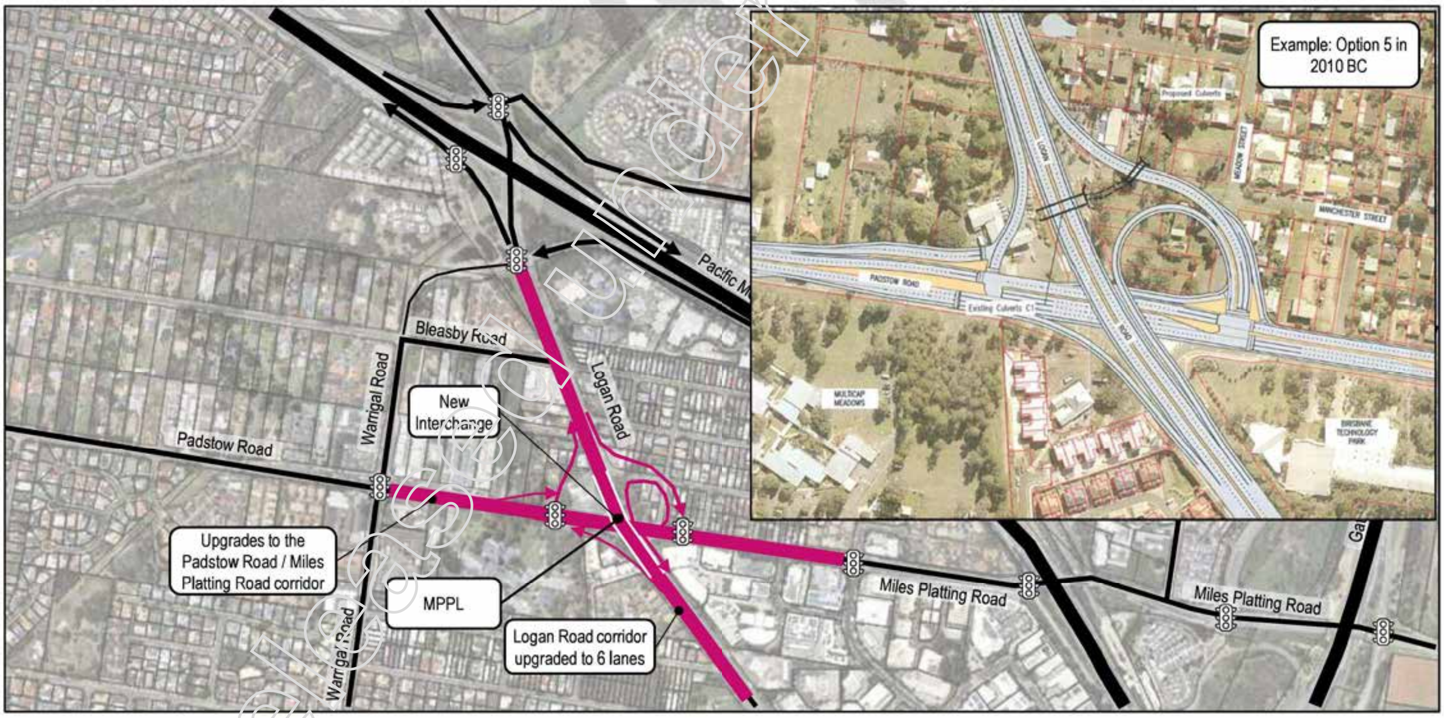


Figure 71 Fat pen sketch of Option 12: MPPL interchange

Note: The 2010 BC option has been presented to help explain the concept. There may be alternative upgrade options at this location to fulfil the service requirements and this would need to be investigated further in the PE phase.

6.6 Options analysis

6.6.1 Strategic Merit Test

A qualitative Strategic Merit Test (SMT) of the long list of options was undertaken to evaluate which options could potentially achieve the service requirements, which are reproduced below for ease of reference:

- **S1:** A study area that facilitates efficiency and reliable transport movement to support increasing freight and passenger travel demands
- **S2:** A study area that is safe for all road users
- **S3:** A study area that is resilient through better connections and access to sustainable transport options.

The options were assessed based on fulfilment of the service requirement, using the following rating system:

- **Low (L):** Poor or non-fulfilment of the service requirement, significant residual issues will remain
- **Medium (M):** Partial fulfilment of the service requirement or adequate fulfilment of a portion of the desired useful life, some residual issues will remain
- **High (H):** Excellent fulfilment of the service requirement with significant improvements in project outcomes.

Table 35 summaries the SMT outcomes and recommends options for further assessment.

The SMT results indicate that no option in isolation could achieve excellent fulfilment of all three service requirements.

Table 35 Strategic Merit Test outcomes

Options		Service Requirements						Further Assessment Recommended?
		SR1		SR2		SR3		
Base Case	Business as usual	L	No change to existing situation	L	No change to existing situation	L	No change to existing situation	No
1	Signal optimisation	L	No material change to existing situation	L	No material change to existing situation	L	No material change to existing situation	No
2	Travel demand management	L	No material change to existing situation	L	No material change to existing situation	L	No material change to existing situation	No
3	Land use planning changes	L	No material change to existing situation	L	No material change to existing situation	L	No material change to existing situation	No
4	Reduced / variable speed limits	L	No change to existing road network capacity	M	Improved safety outcomes for all road users	M	Improved safety outcomes for active transport users	Yes – as part of other options
5	Logan Road / Warrigal Road intersection upgrade	H	Significant increase in network capacity on Logan Road and at Exit 14	M	Reduced queuing on Logan Road and Exit 14, but not at MPPL	M	Localised active transport network upgrades and improved bus travel times	Yes
6	MPPL at-grade intersection upgrade	M	Moderate increase in network capacity on Logan Road and at MPPL	M	Improved safety at MPPL but no change to existing situation at Exit 14	M	Localised active transport network upgrades and improved bus travel times	Yes
7	Bus lanes / queue jumps / signal priority	L	No change to existing road network capacity	L	No material change to existing queueing on Logan Road or at Exit 14	M	Localised active transport network upgrades and improved bus travel times	No
8	Warrigal Road general traffic link	M	Moderate reduction in traffic demands on Logan Road and at MPPL	L	Reduced safety for users of V1 crossing Warrigal Road (increased traffic demands)	L	Reduced bus priority along the Green Link and reduced bus travel times	No
9	Active transport links	L	No change to existing road network capacity	M	Improved safety outcomes for active transport users	H	Significant active transport network upgrades	Yes – as part of other options
10	M3 to M2 ramps	L	No material change to network capacity on Logan Road or at MPPL	L	No material change to existing queueing on Logan Road or at Exit 14	L	No material change to existing situation	No
11	MPPL partial grade separation	M	Moderate increase in network capacity on Logan Road and at MPPL	M	Improved safety at MPPL but no change to existing situation at Exit 14	M	Localised active transport upgrades and improved bus travel times	Yes
12	MPPL interchange	H	Significant increase in network capacity on Logan Road and at MPPL	M	Improved safety at MPPL but no change to existing situation at Exit 14	M	Localised active transport upgrades and improved bus travel times	Yes

6.6.2 Options rejected in SASR stage

Table 36 lists the options rejected in the SASR stage due to not adequately addressing the service requirements.

Table 36 Options rejected in the SASR phase

Options	Description	Reason for Not Proceeding
Base Case		
Base Case	'Do minimum' option	The Base Case is considered an unacceptable situation, although it will progress for analysis purposes into future PAF stages. This scenario provides no reasonable capacity to fulfil the service requirements identified in the study area, resulting in excessive traffic congestion, unacceptable road safety risks, poor bus travel time reliability and limited connectivity and access to sustainable transport options. Key reasons for not proceeding with this option: • **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**
Non-asset		
Option 1	Signal Optimisation	Given the existing road network congestion and forecast population growth in proximity to the study intersection and within the broader study area, signal optimisation is not expected to fulfil the service requirements or materially improve road network capacity. Key reasons for not proceeding with this option: • **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**
Option 2	Travel Demand Management	TMR's *Smarter Solutions Reference Guide* indicates the "education campaigns" could potentially reduce single occupancy trips by approximately 14%. Given the existing and forecast traffic demands at the study intersection and within the study area more broadly, this modest change in behaviour is not expected to fulfil the service requirements. Key reasons for not proceeding with this option: • **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**
Option 3	Land Use Planning Changes	The strategic long-term and citywide nature of this option means that it is unlikely to deliver transport performance improvements and benefits in the short to medium term. Furthermore, limiting development will not provide an appropriate solution to the broad range of service requirements across the study area, nor is it desirable in terms of increasing housing supply and improving affordability. Key reasons for not proceeding with this option: • **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**

Options	Description	Reason for Not Proceeding
Existing asset		
Option 7	Bus Lanes / Queue Jumps / Signal Priority	Most buses that travel through the study area use the Warrigal Road Green Link. Translink data indicates that approximately 80 buses per day use the Logan Road corridor including approximately eight (8) in the peak hours. The provision of dedicated bus lanes / queue jumps / signal priority on Logan Road for a relatively small bus demand is not expected to fulfil the service requirements. Key reasons for not proceeding with this option: • **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** Localised active transport network upgrades and improved bus travel times may partially contribute to achieving better connections and access to sustainable transport • **Service requirements are not addressed.**
Option 8	Warrigal Road General Traffic Link	Whilst opening the Warrigal Road Green Link to general traffic may assist with reducing traffic demands on Logan Road and at the MPPL intersection, it may also adversely impact public and active transport users within the study area. As such, this option is not expected to fulfil the service requirements for the project. There is also a lack of support from Translink and BCC for this option. Key reasons for not proceeding with this option: • **SR1:** Moderate reduction in traffic demands on Logan Road and at MPPL may partially address the existing transport efficiency and reliability issues within the study area • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**
New asset		
Option 10	M3 to M2 Ramps	According to data from the BSTM-MMv2.4, this “interchange” movement may make up around 4-7% of the peak hour traffic on Logan Road in 2041. This equates to approximately 550 vehicles in the AM period (7-9AM) and 350 vehicles in the PM period (4-6PM). Whilst providing the new M3 to M2 ramps may reduce traffic demands on Logan Road by approximately 4-7%, it is not expected to significantly improve peak hour operations on Logan Road or at MPPL and is not expected to fulfil the service requirements for the project. Key reasons for not proceeding with this option: • **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Existing safety issues within the study area will remain • **SR3:** The lack of connectivity and access to sustainable transport options will remain • **Service requirements are not addressed.**

6.6.3 Options recommended for further analysis in PE stage

Table 37 summaries the options recommended for further analysis.

Table 37 Options recommended for further analysis in PE phase

Options	Description	Reason for Recommendation
Non-asset		
Option 4	Reduced / Variable Speed Limits	Whilst this option in isolation is not expected to fulfil the service requirements, it is a valid non-asset solution that could improve other options ability to fulfil Service Requirement 2 and 3. Consequently, it is recommended Option 4 is integrated as part of all other options that are investigated further during the PE phase Key reasons for recommending this option for further analysis: • **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Reduced / variable speed limits are expected to improve safety for all road users • **SR3:** Reduced / variable speed limits are expected to improve safety outcomes for active transport users which may partially contribute to improved connectivity and access to sustainable transport options within the study area • **Service requirements are partially addressed.**
Existing asset		
Option 5	Logan Road / Warrigal Road Intersection Upgrade	It is recommended upgrade options are investigated for the Logan Road / Warrigal Road intersection to address safety concerns associated with Exit 14 queues extending back to the Pacific Motorway, and to reduce the potential for northbound queues on Logan Road in the AM peak extending back to the MPPL intersection. Delivering a solution similar to the 2010 BC at this location, with separated on and off ramps, is expected to fulfil the service requirements of the project, although layout configuration should be explored. Key reasons for recommending this option for further analysis: • **SR1:** Significant increase in network capacity on Logan Road and at Exit 14 is expected to improve existing transport efficiency and reliability issues, but not at MPPL • **SR2:** Reduced vehicular queueing on Logan Road and Exit 14 is expected to improve existing safety issues within the study area, although not specifically at MPPL • **SR3:** Localised active transport upgrades and improved bus travel times may partially contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**
Option 6	MPPL At-Grade Intersection Upgrade	Additional layout capacity is required at MPPL to accommodate existing and forecast traffic demands. At-grade upgrade solutions were recommended at MPPL as part of the 2010 BC, 2014 Planning Review and the 2021 OA, all with different intersection footprints and associated property impacts. With the inclusion of upgrade works at the Logan Road / Warrigal Road intersection (Option 5), this option is expected to fulfil the service requirements for the project. Key reasons for recommending this option for further analysis: • **SR1:** Moderate increase in network capacity on Logan Road and at MPPL is expected to improve existing transport efficiency and reliability issues, but not at Exit 14 • **SR2:** Reduced vehicular queueing on Logan Road and at MPPL is expected to improve existing safety issues within the study area, although not specifically at Exit 14 • **SR3:** Localised active transport upgrades and improved bus travel times may partially contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**

Options	Description	Reason for Recommendation
New asset		
Option 9	Dedicated Active Transport Links	Whilst this option in isolation is not expected to fulfil the service requirements of the project, given the significance of the study area to the active transport network (all key roads form part of the PCN), elements of this option should be incorporated into all other options that are investigated during the PE phase. Key reasons for recommending this option for further analysis: • **SR1:** Existing transport efficiency and reliability issues within the study area will remain • **SR2:** Significant active transport network upgrades within the study area are expected to improved safety outcomes for active transport users • **SR3:** Significant active transport network upgrades within the study area are expected to contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**
Option 11	MPPL Partial Grade Separation	This option seeks to remove traffic from the at-grade intersection via a partial grade separation. If, for example, the southbound right turn from Logan Road into Padstow Road was grade separated, it would reduce traffic demands at MPPL by approximately 10%. This reduction may facilitate further traffic signal phasing and timing optimisation with the intent to provide additional capacity for all other movements at the intersection. With the inclusion of upgrade works at the Logan Road / Warrigal Road intersection (Option 5), this option is expected to fulfil the service requirements for the project. Key reasons for recommending this option for further analysis: • **SR1:** Moderate increase in network capacity on Logan Road and at MPPL is expected to improve existing transport efficiency and reliability issues, but not at Exit 14 • **SR2:** Reduced vehicular queueing on Logan Road and at MPPL is expected to improve existing safety issues within the study area, although not specifically at Exit 14 • **SR3:** Localised active transport upgrades and improved bus travel times may partially contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**
Option 12	MPPL Interchange	The intent of this option is to provide free-flow conditions on Logan Road, the higher order State-controlled arterial road, and facilitate all other movements via two (2) at-grade signalised intersections either side of the overpass. This option is a significant infrastructure upgrade, and with the inclusion of upgrade works at the Logan Road / Warrigal Road intersection (Option 5), it is expected to fulfil the service requirements for the project. Key reasons for recommending this option for further analysis: • **SR1:** Significant increase in network capacity on Logan Road and MPPL is expected to improve existing transport efficiency and reliability issues, but not at Exit 14 • **SR2:** Reduced vehicular queueing on Logan Road and at MPPL is expected to improve existing safety issues within the study area, although not specifically at Exit 14 • **SR3:** Localised active transport upgrades and improved bus travel times may partially contribute to improved connectivity and access to sustainable transport options • **Service requirements are partially addressed.**

6.6.4 Recommended integration of options for further analysis in PE stage

The SMT results indicate that:

- No option in isolation could achieve excellent fulfilment of all three service requirements
- Infrastructure options (existing and / or new) are required to fully satisfy the service requirements for the Project
- There is an opportunity to investigate integrated options during the PE phase, to maximise the potential for the project to achieve excellent fulfilment of the service requirements for the Project. This could include combining non-asset options with existing or new asset options, and / or combining existing and new asset options.

The existing peak hour congestion and associated safety and performance issues at MPPL influences and is heavily influenced by the performance at the Logan Road / Warrigal Road / Exit 14 intersection. It is anticipated that existing and / or new asset options will be required at both intersections to fully satisfy the service requirements of the Project.

Table 38 summarises the recommended integration of options for further investigation in the PE phase.

Table 38 Recommended integration of options for further investigation in PE phase

Primary Option ID	Service Requirement 1 (SR1) Focused				SR2 Focused	SR3 Focused
	Logan Road / Warrigal Road	MPPL Intersection				
	Option 5	Option 6	Option 11	Option 12	Option 4	Option 9
5	✓	-	-	-	✓	✓
6	✓	✓	-	-	✓	✓
11	✓	-	✓	-	✓	✓
12	✓	-	-	✓	✓	✓

Key points are summarised below:

- All integrated options should include Option 5 (Logan Road / Warrigal Road Intersection Upgrade), noting the interaction with MPPL and safety concerns associated with the extent and frequency of Exit 14 queuing back to the M3
- The potential scale of infrastructure works at MPPL incrementally increases from no works (i.e. Option 5 as a standalone option), to an at-grade upgrade (Option 6), then a partial grade separation (Option 11), and finally a full grade separation (Option 12)
- All integrated options should include Option 4 (Reduced / Variable Speed Limits) to maximise safety benefits
- All integrated options should include Option 9 (Dedicated Active Transport Links) to maximise access to sustainable transport options within the study area and connectivity to the Veloway 1.

7. Readiness to proceed to the next stage

7.1 Purpose

The next project phase under the PAF process is the PE. There is currently no funding commitment or approval to undertake the PE and this section presents a potential project plan, indicative budget and resource plan for undertaking the PE to inform the investment decision. This is subject to approval for the MPPL project to proceed from SASR (Gate 1) to PE (Gate 2). The PE will identify preferred solutions to be progressed to a BC (Gate 3) assessment, with a view to securing committed funding for delivery.

7.2 Key tasks

Consistent with the PAF, the key activities which will be undertaken during the PE stage will be:

a) confirm the outcome(s) sought which were identified in the SASR stage

b) further develop and assess the options to arrive at a short list of viable options

c) evaluate the viable options to determine priority and staging

d) conduct a preliminary assessment of project costs, risks and benefits associated with the identified project options including risk analysis and estimate of costs at a P50 confidence level

e) conduct a rigorous evaluation of procurement options to determine whether the project should be progressed through traditional delivery mechanisms, or as a potential PPP project

f) assess affordability of the options

g) develop a detailed plan and budget for progressing to the next stage in the project lifecycle [Business Case Development] including project organisation and governance arrangements

h) prepare a PE Report for the consideration of decision makers

i) prepare a submission seeking approval to proceed through Gate 2 to the Business Case Development stage.

7.3 Project plan and budget

7.3.1 Resource requirements

Table 39 summaries indicative resource requirements for the PE phase.

Table 39 Resource requirements

Expertise	Potential Source
Preliminary Evaluation Management and Coordination	TMR (preferred)
Engineering, Design and Planning	Consultant / Contractor / TMR SME's
Cost Estimation and Risk	Consultant / Contractor / TMR SME's
Transport / Operational Modelling	Consultant / Contractor / TMR SME's
Financial / Commercial / Economic (including financial and economic analysis, and options analysis)	Consultant / Contractor / TMR SME's
Value-for-money assessment, Market Sounding, and Delivery Options Assessment	Consultant / Contractor / TMR SME's
Communications / Stakeholder Engagement / Social Impact Assessments (including disability access engagement)	Consultant / Contractor / TMR SME's
Probity	Consultant / Contractor / TMR SME's
Environmental, Cultural Heritage and Sustainability	Consultant / Contractor / TMR SME's

7.3.2 Timetable

Table 40 provides an indicative time for the next key activities / milestones for the Project. It is noted that the timetable for undertaking the PE is subject to obtaining approval for the SASR and funding for the PE stage.

Table 40 Project timetable

Activity/Milestone	Estimated Timing
Seek approval of SASR by investment decision making body	April 2025
Seek funding for PE stage of the project	Late 2025
Procurement for consultant	Early 2026
Engage consultant and commence PE	Mid 2026
Complete Project Assurance	Mid 2027
TMR PAF Gate 2 Review	Late 2027

7.3.3 Estimated cost

Table 41 provides an indicative cost estimate for the PE phase, based on the project timeline outlined in Section 7.3.2. Any changes to the schedule for seeking funding or alternative procurement strategies will likely impact the cost.

Table 41 Estimated cost of Preliminary Evaluation

Preliminary Evaluation Tasks	Estimated Cost
Internal TMR Costs	
Project Management	NR
Internal Review, Assurance and Approvals	
Communications and Public Engagement	
Property	
Probity and Legal Services	
External (Managed by the Project Owner)	
Technical, Design, Planning and Project Management	NR
Site Investigations (PUP, Survey, Geotechnical and Pavement)	
Environmental, Cultural Heritage and Native Title	
Cost estimator	
Transport modelling	
Financial/Commercial	
Economics	
Subtotal	
Contingency (15%)	
Total	

7.4 Project ownership and governance

Figure 72 provides an indicative ownership and governance framework for the PE phase. This should be reviewed and updated during later stages of the Planning Study, to reflect the requirements of the PAF and Steering Committee.

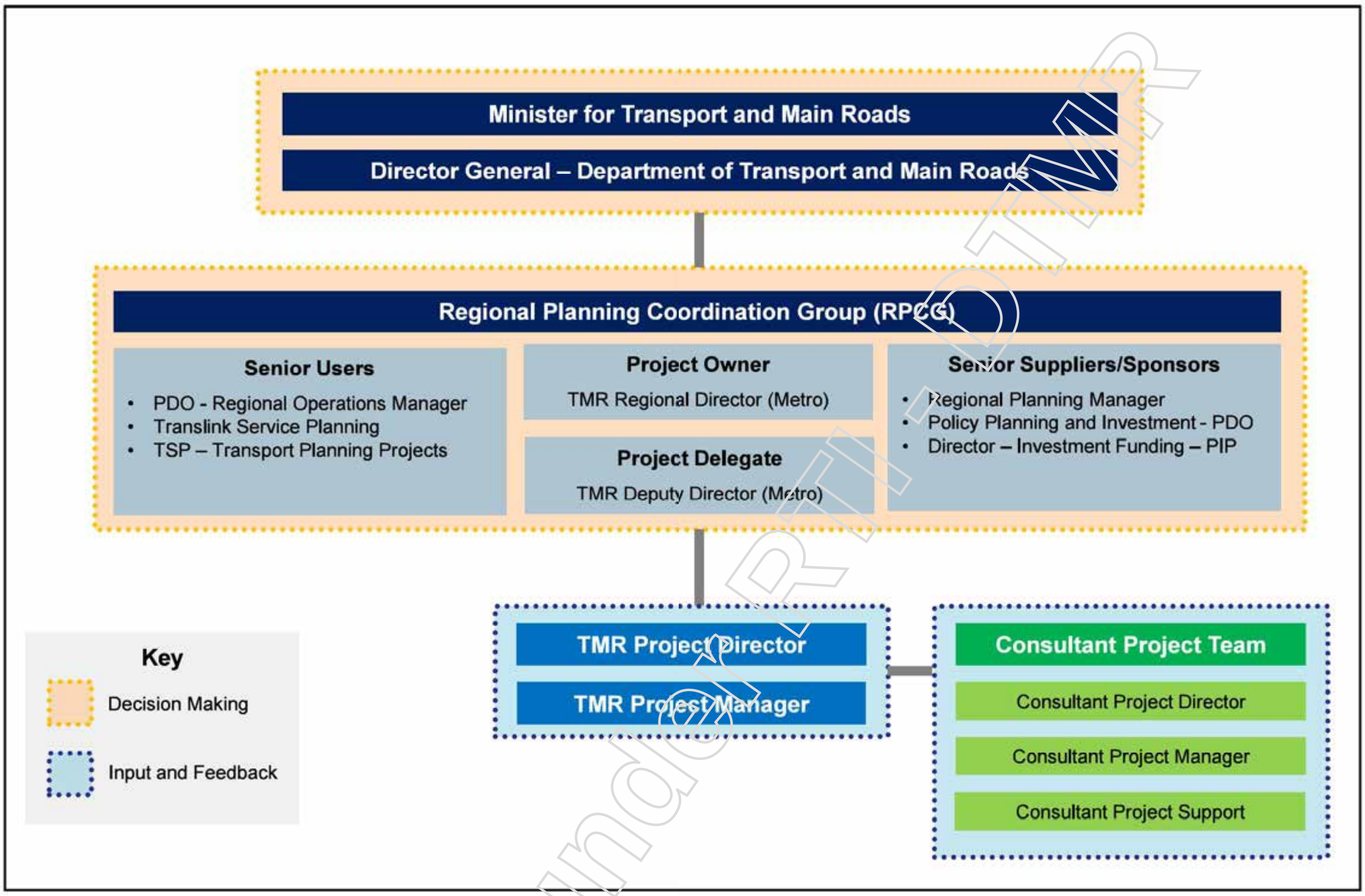


Figure 72 Governance diagram – PE phase (indicative)

Specific responsibilities of the key governance roles:

- **Regional Planning Coordination Group:** is the primary leadership and decision-making group for all planning matters in the Metropolitan Region. The RPCG governs all Transport System Planning Program (TSPP) projects in SQR, including those projects contained in, and spanning the applicable region. The RPCG will also assess the progress of the Region's planning program, including status of planning approvals, projects and investment decisions
- **Project Owner:** is the Regional Director for QTRIP projects responsible for seeking changes to investment programs where additional project funding is required for cost overruns
- **TMR Project Director:** is responsible for providing high-level support and advocacy for the Project, ensuring project objectives are met, approving changes to scope, deliverables, and budget
- **TMR Project Manager:** is responsible for achieving the Project objectives within the defined scope and managing all activities required to deliver quality deliverables within time and budget agreed with RPCG, as well as oversight of consultant team
- **Consultant Project Team:** is responsible for undertaking technical investigations and preparing quality deliverables to support the preparation of the PE report in partnership with TMR's Project Director and Project Manager.

8. Conclusions and Recommendations

8.1 Conclusions

This SASR provides a review of the current and future problems and opportunities at the MPPL intersection and identifies the need for improvements to address significant traffic congestion, safety issues, poor travel time reliability and lack of active transport infrastructure which reduces the safety, attractiveness and reliability for users. It confirms that upgrades to the MPPL and Logan Road / Warrigal Road intersections are required to address the identified problems and satisfy the service requirements.

The MPPL intersection currently experiences significant congestion during peak periods and is operating beyond its practical capacity (LOS E), resulting in excessive delays and queues which are forecast to worsen in the future in response to significant forecast population and employment growth in the study area. Similarly, the Logan Road / Warrigal Road also experiences significant congestion which results in excessive delays and poor travel reliability for buses, and extensive queueing on the M3 / Exit 14 off-ramp which heavily influences performance at the MPPL intersection. Congestion in the study area is a contributing factor to the history of casualty crashes which has been steadily increasing since 2018. In addition, there is a lack of active transport infrastructure within the study area which reduces safety, attractiveness and reliability for this mode.

The SASR confirms that intervention is necessary to provide more convenient, reliable and safer journeys for people and goods within the study area, and contribute to a more liveable community. A summary of the existing and future problems within the broader study area, and associated priority needs and service requirements is provided in Table 42.

Table 42 Summary of problems and services requirements

Problems	Service Requirements
PO1: Significant congestion at the study intersection during peak periods due to insufficient layout capacity to accommodate increasing demands	**SR1:** A study area that facilitates efficiency and reliable transport movement to support increasing freight and passenger travel demands
PO2: History of casualty crashes within the study area due to significant congestion and queuing on Logan Road and at the study intersection	**SR2:** A study area that is safe for all road users
PO3: Poor travel time reliability for buses within the study area due to the lack of alternative routes and priority infrastructure for public transport	**SR3:** A study area that is resilient through better connections and access to sustainable transport options.
PO4: Lack of active transport infrastructure within the study area reduces safety, attractiveness and reliability for active transport users	

A long list of options was identified to address the identified service requirements and assessed using a SMT. The potential options included consideration of the Base Case, which reflects the continued operation of the network under good management practices, and various non-asset (e.g. signal optimisation, travel demand management, land use planning changes, and reduced / variable speed limits etc.), existing asset and new asset options.

The SMT demonstrated that the Base Case and non-asset options would not address the identified service requirements, except reduced / variable speed limits which may partially contribute to improved safety outcomes for all users within the study area.

Options that did not significantly contribute to the outcome sought for the service requirements, provided negligible benefits, or were not applicable to the study area were eliminated from further consideration. Several existing and new asset options were recommended for further consideration and align with some or all of the service requirements and will contribute to addressing the identified problems.

Table 43 summarises the options considered during the SASR phase of the project.

Table 43 Summary of options considered

Options rejected at Strategic Merit Test	Options recommended for further consideration
• Base Case	• Option 4: Reduced / Variable Speed Limits
• Option 1: Signal Optimisation	• Option 5: Logan Road / Warrigal Road Intersection Upgrade
• Option 2: Travel Demand Management	• Option 6: MPPL At-Grade Intersection Upgrade
• Option 3: Land Use Planning Changes	• Option 9: Dedicated Active Transport Links
• Option 7: Bus Lanes / Queue Jumps / Priority	• Option 11: MPPL Partial Grade Separation
• Option 8: Warrigal Road General Traffic Link	• Option 12: MPPL Interchange
• Option 10: M3 to M2 Ramps	

This SASR identified an opportunity to investigate integrated options during the PE phase, to maximise the potential for the project to achieve excellent fulfilment of the service requirements for the Project. This could include combining non-asset options with existing or new asset options, and / or combining existing and new asset options.

The existing peak hour congestion and associated safety and performance issues at MPPL influences and is heavily influenced by the performance at the Logan Road / Warrigal Road / Exit 14 intersection. It is anticipated that existing and / or new asset options will be required at both intersections to satisfy the service requirements of the Project.

Table 44 summarises the recommended integration of options for further analysis in the PE phase.

Table 44 Recommended integration of options for further analysis in PE phase

Primary Option ID	Service Requirement 1 (SR1) Focused				SR2 Focused	SR3 Focused
	Logan Road / Warrigal Road		MPPL Intersection			
	Option 5	Option 6	Option 11	Option 12	Option 4	Option 9
5	✓	-	-	-	✓	✓
6	✓	✓	-	-	✓	✓
11	✓	-	✓	-	✓	✓
12	✓	-	-	✓	✓	✓

Key points are summarised below:

- All integrated options include Option 5 (Logan Road / Warrigal Road Intersection Upgrade), noting the interaction with MPPL and existing safety concerns associated with the extent and frequency of Exit 14 queuing back to the M3
- The potential scale of infrastructure works at MPPL incrementally increases from no works (Option 5), to an at-grade upgrade (Option 6), then a partial grade separation (Option 11), and finally a full grade separation (Option 12)
- All integrated options include Option 4 (Reduced / Variable Speed Limits) to maximise the safety benefits for all users
- All integrated options include Option 9 (Dedicated Active Transport Links) to maximise access to sustainable transport options within the study intersection and connectivity to the Veloway 1.

The recommended integrated options are expected to align with some or all of the service requirements, to varying degrees and contribute to the following benefits:

- **B1:** Increased efficiency and reliability for all transport users including general traffic, freight, public transport and active transport
- **B2:** Increased safety for all transport users, including general traffic, freight, public transport and active transport
- **B3:** Increased access, connectivity, and amenity for public transport and active transport users.

8.2 Recommendations

It is recommended that the Investment Decision Making Body:

- **Approve** the Project proceed from Gate 1 to Gate 2 under the PAF
- **Approve** The following short list of integrated options to proceed to the PE (Gate 2) stage of the PAF process:
  - **Option 5:** Logan Road / Warrigal Road intersection upgrade combined with Option 4 and 9
  - **Option 6:** MPPL at-grade intersection upgrade combined with Option 4, 5 and 9
  - **Option 11:** MPPL partial grade separation combined with Option 4, 5 and 9
  - **Option 12:** MPPL interchange combined with Option 4, 5 and 9
- **Note** that the PE stage of the Project is subject to future funding following Gate 1 submission.

Appendix A: SASR Checklist

Have the following products been completed in accordance with quality standards as agreed via relevant (internal agency) assurance processes?	Guideline Reference	Yes	No
The outcome sought defined in clear and measurable items	2.1 2.2	✓	☐
A description of the potentially viable solutions to achieve the outcome	2.3	✓	☐
A description of the benefits of each potential option	2.3	✓	☐
A detailed plan and budget for conducting a Preliminary Evaluation of project options	2.4	✓	☐
A submission to the appropriate decision maker and their decision	2.5	✓	☐

Source: https://s3.treasury.qld.gov.au/files/paf-strategic-assessment-service-requirement.pdf

Appendix B: SME Endorsement Requirements

Table B.1 summarises the SME endorsement requirements and approach for the SASR phase of the Project.

Table B.1 SME Endorsement Requirements

TMR Operational Policy, Analysis or other requirements	Subject Matter Expert (SME)	Approach	Comment
Network Optimisation Framework	Jay Pigot, Manager (Network Evaluation & Insights)	Seek endorsement	NOF and SMT documented in Chapter 6. NOF Workshop facilitated on 3/12/2024. **Endorsement obtained via email on 13/01/2025.**
Movement and Place Policy	Myles Fairbairn, Executive Director (Statewide Transport Planning Management)	Seek endorsement	The SASR commenced before this Policy was published. The SASR analyses land uses within the study area and provides a high-level understanding of place in proximity to the potential upgrade options. Movement and Place will be considered during the confirmation of the problem statement and ILM at the beginning of the PE. A formal assessment (i.e. using the urban classification matrix) has not been undertaken in the SASR but will be developed during the PE stage with SME engagement and sign-off. **Endorsement obtained via email on 20/01/2025.**
Economics / Cost-Benefit Analysis / Monetisation – Cost of the Problem	Kieron Dauth, Manager - Economics (Project Evaluation)	Seek exemption	Monetisation – cost of the problem not required during SASR stage. **Exemption obtained via email on 8/07/2024.**
Investment Logic Mapping - Project Benefits / Benefits Realisation Plan	Catherine Wilkie, Manager – Benefits (Portfolio Management Office)	Seek endorsement	ILM documented in Chapter 5. ILM Workshop facilitated on 18/10/2024. **Endorsement obtained via email on 19/12/2024.**
Project Proposal Report (PPR)	Richard Adebiyi, Acting Director – State Network Programs	Seek exemption	The Project is not seeking funding from the Australian Government as it is not a national route. Thus, this measure is not applicable. If Australian Government funding becomes available or is likely to be sought, then the Project Team is required to prepare a relevant phase PPR in consultation with either PIP State Network Programs or PIP National Network Programs. **Exemption obtained via email on 19/02/2025.**
Corridor Planning	Chris Howarth-Crewdson, Director (Corridor Planning & Passenger Transport)	Seek endorsement	The SASR documents a strategic assessment of wider, multi-model corridor and network outcomes being sought within strategic planning and policy. **Endorsement obtained via email on 6/3/2025.**
Value Creation and Capture	Josh Adams, Manager – Economics (Economic Research and Analysis)	Not applicable at the SASR stage	The Value Creation and Capture Guidelines state that the PE stage is the suitable point at which to establish whether detailed value capture assessment is required. SME advice confirmed that, other than for major programs and precincts, the Guidelines do not require action at the SASR stage. As a result, a value capture assessment has not been undertaken. **Endorsement obtained via email on 25/02/2025.**

Appendix C: NOF Workshop Slides

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Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study

SASR – Network Optimisation Framework (NOF) Workshop

NR

3 December 2024

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Acknowledgement of Country

AECOM acknowledges the Traditional Custodians of country throughout Australia. We pay respects to Elders both past and present and to emerging community leaders. We recognise and celebrate the diversity of Aboriginal and Torres Strait Islander people and their ongoing cultures and connections to the lands and waters.

Note on Terminology

AECOM acknowledges the diversity of Aboriginal and Torres Strait Islander people, their communities and cultures. Throughout this document we refer to the Aboriginal and Torres Strait Islander Community as inclusive of the many different First Nations Peoples in Australia, including Aboriginal and Torres Strait Islander communities. The words Indigenous, First Nations and Aboriginal and Torres Strait Islander people are used interchangeably throughout this document.

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Agenda

1. Introductions
2. Safety Moment
3. Project Update
4. Purpose of the Workshop
5. Potential Options
   - Non-Asset
   - Existing Asset
   - New Asset
6. Strategic Merit Test Results
7. Closing & Next Steps

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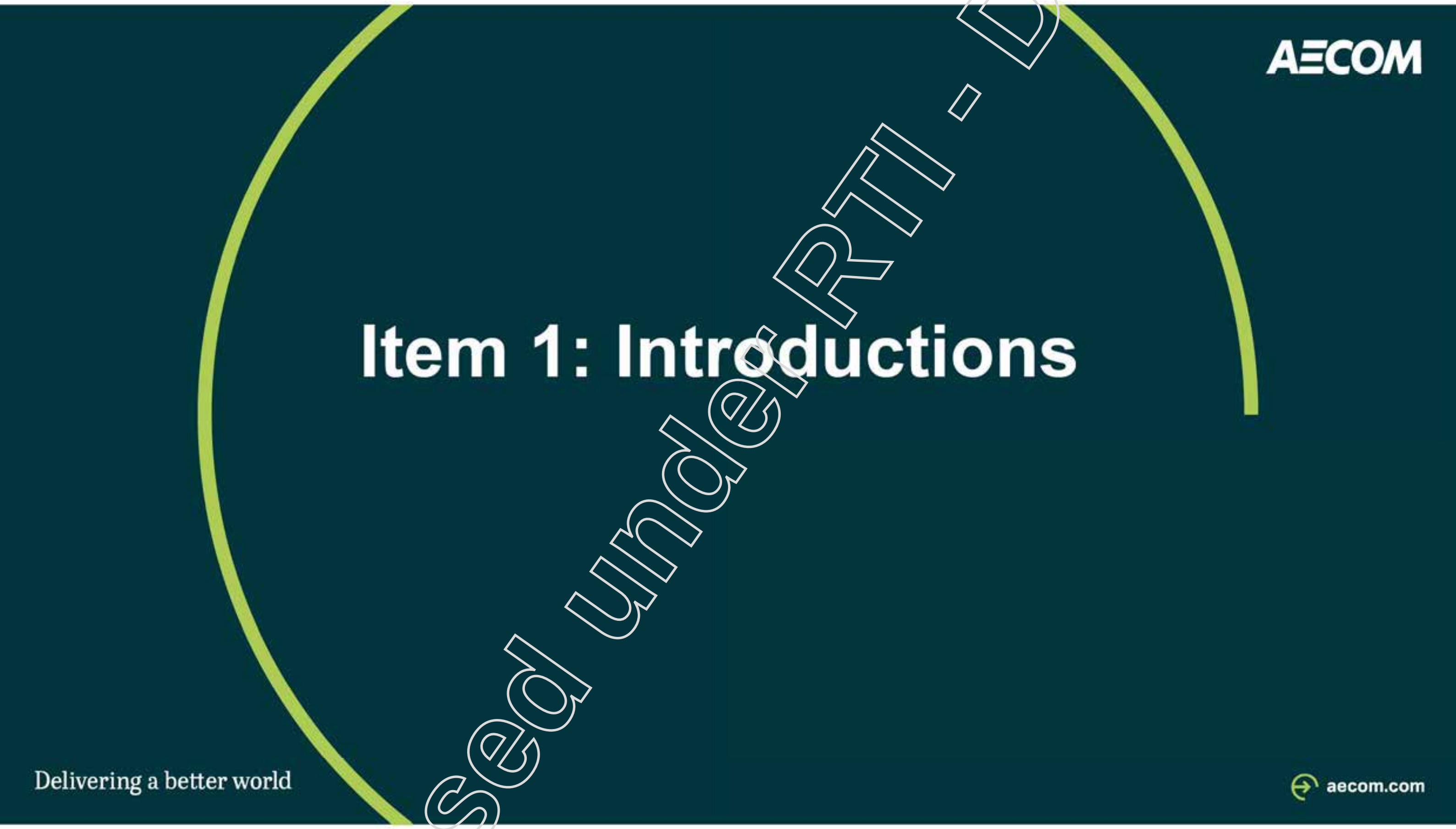
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Item 1: Introductions
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Item 1: Introductions

Name	Organisation	Role on Project
Nizam Abbany	Department of Transport and Main Roads	TMR Project Director [apologies]
Nabhan Rahman	Department of Transport and Main Roads	TMR Project Manager
Matthew Sahota	Department of Transport and Main Roads	TMR Project Evaluation Unit
Amir Khoei	Department of Transport and Main Roads	Principal Engineer (Safer Roads)
Manu Hingorani	Department of Transport and Main Roads	Principal Engineer (ITS)
Matthew Richters	Department of Transport and Main Roads	Planning (Infrastructure Planning)
Rachel Smith	Department of Transport and Main Roads	TWG Member [apologies]
Jay Pigot	Department of Transport and Main Roads	TWG Member / NOF SME [apologies]
Myles Fairbairn	Department of Transport and Main Roads	TWG Member [apologies]
Geoff Ahmet	Department of Transport and Main Roads	Representing Myles Fairbairn
NR [redacted]	Brisbane City Council	TWG Member
	AECOM Australia Pty Ltd	AECOM Project Manager
	AECOM Australia Pty Ltd	AECOM Deputy Project Manager
	AECOM Australia Pty Ltd	AECOM Transport Planning Lead [apologies]
	AECOM Australia Pty Ltd	AECOM Transport Planner

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Item 2: Safety Moment

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Item 2: Safety Moment – Driving Safely during the Holiday Period

During the 2022-2023 Christmas/New Year period, there were **10 lives lost** and **228 hospitalisations** from road crashes in **12 days** across QLD. (TMR)

Here's five simple things you can do to keep you and your family safe:

1. Slow down, stay safe, and drive to the conditions.
2. Take a break every two hours.
3. Make sure you always buckle up and check your passengers.
4. Don't drink and drive, save the drinks for when you get there.
5. Keep your eyes on the road, not your phone. You can find out how to set your phone to **'Do not disturb'**

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Item 3: Project Update

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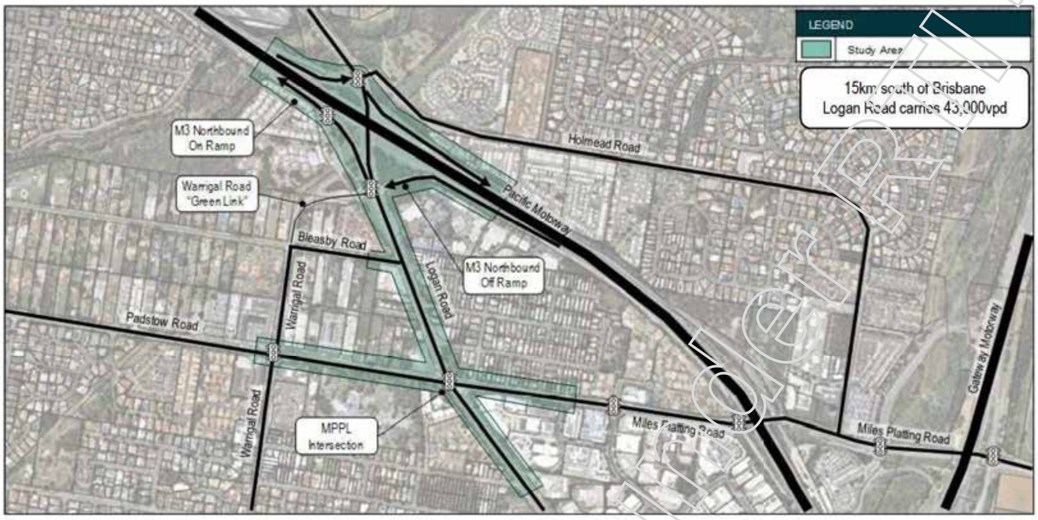
Item 3: Project Update - Study Area



The study area includes:

- The MPPL intersection
- The M3 / Logan Road interchange and associated on and off ramps
- The intersection of Warrigal Road / Padstow Road
- The intersection of Logan road / Bleasby Road

Item 3: Project Update - Planning Study Delivery Structure

The Planning Study will be delivered in two (2) work packages:

1. Business Case (BC): applying TMR's OnQ Project Management Framework for a low-cost interim upgrade solution (<$50m), which builds upon an Option Analysis (OA) completed in 2021	**2. Strategic Assessment of Service Requirements (SASR):** applying Queensland Government's Project Assurance Framework (PAF) to investigate long term ultimate upgrade solutions (>$100m). **[we are here]**

SASR objectives:

- Produce a Strategic Assessment of Service Requirements (SASR) Report that gains acceptance by TMR's Infrastructure Investment Committee (ICC)
- Produce a presentation to TMR's IIC Committee that recommends project progression through Gate 1 of the Project Assurance Framework (PAF) Process

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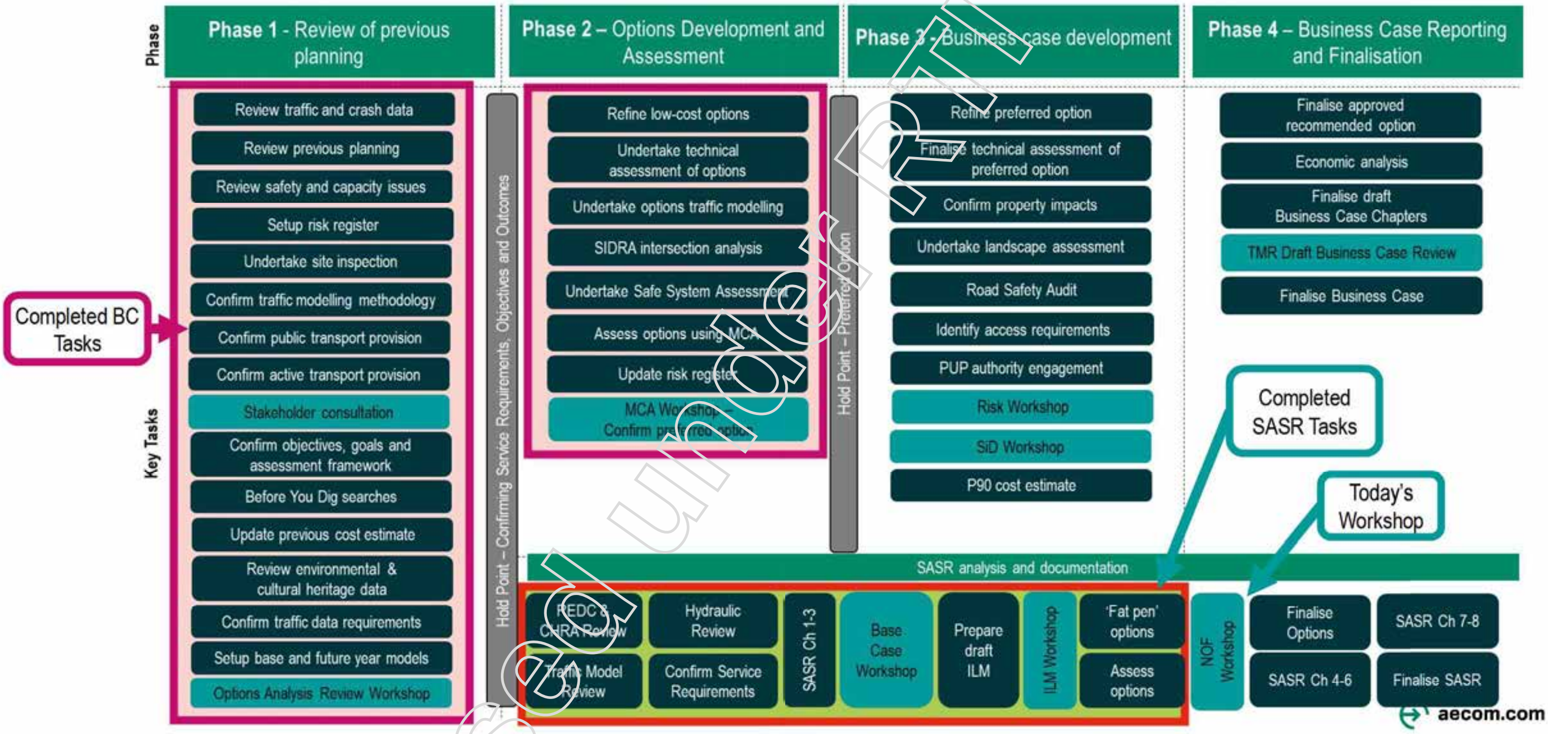
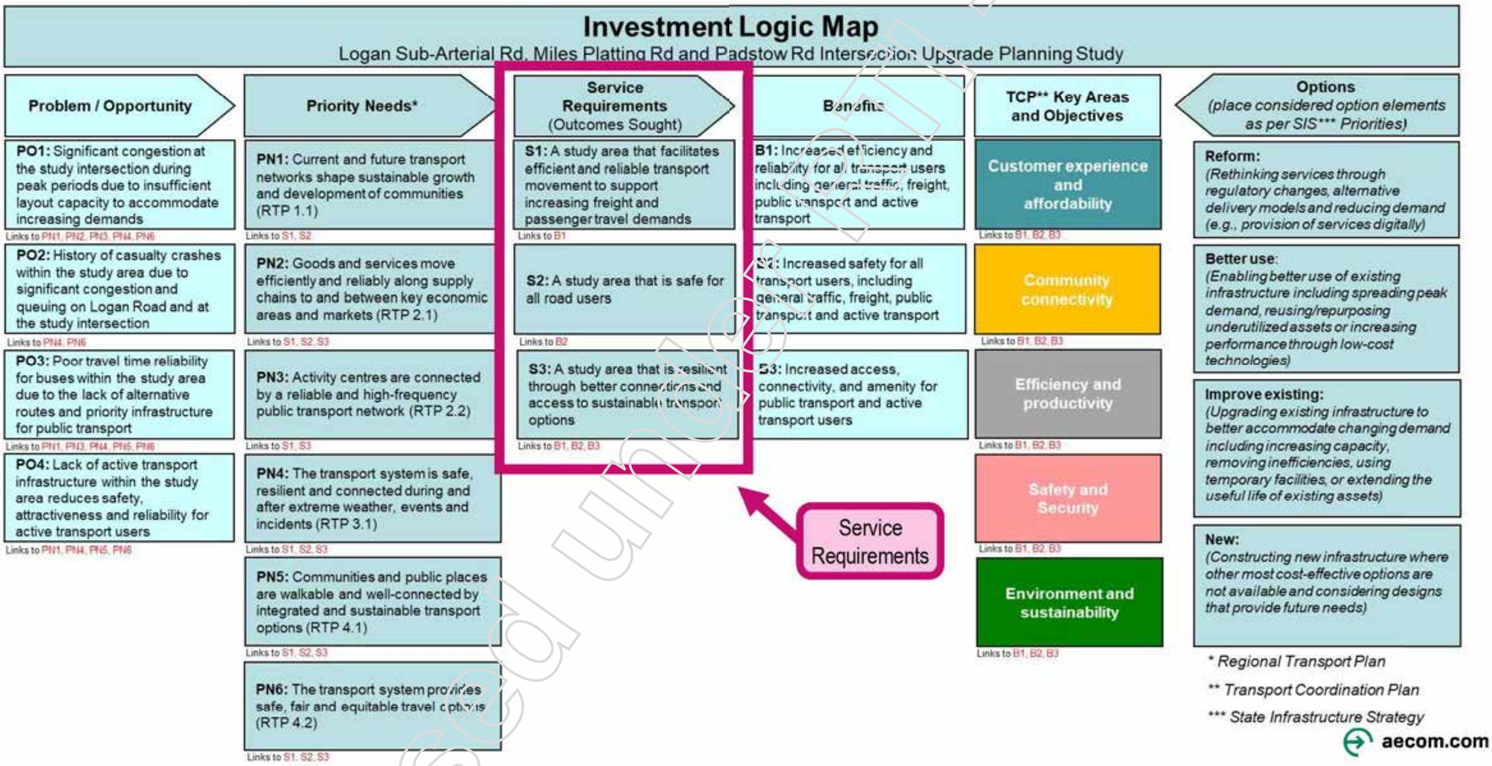
Item 3: Project Update - Planning Study Delivery Structure



Item 3: Project Update - Recap on ILM



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Item 4: Purpose of the Workshop

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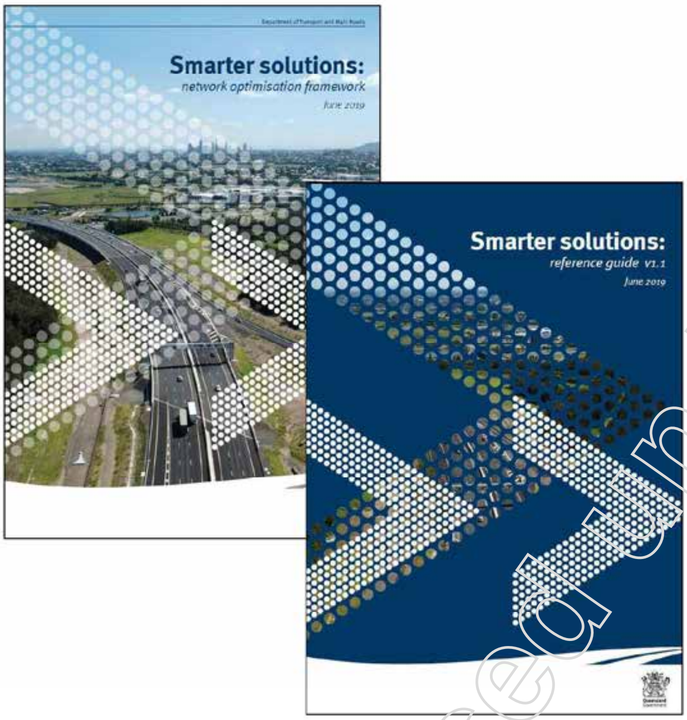
Item 4: Purpose of NOF Workshop



- TMR developed the Network Optimisation Framework (NOF) to prioritise consideration of low and non-infrastructure solutions within the planning and investment process.

- Network optimisation solutions are initiatives that can improve the function of the existing transport network, without delivering new infrastructure.

- **The purpose of the NOF is to:**
  - ✓ discuss non-asset options
  - ✓ discuss existing asset and new asset options
  - ✓ review and discuss the desktop assessment of these solutions (Strategic Merit Test)

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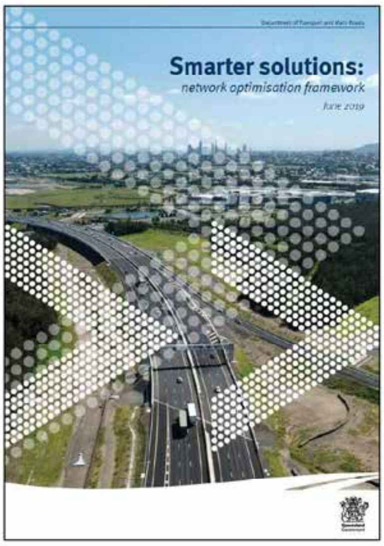
Item 4: Strategic Direction of Government Investment Policy



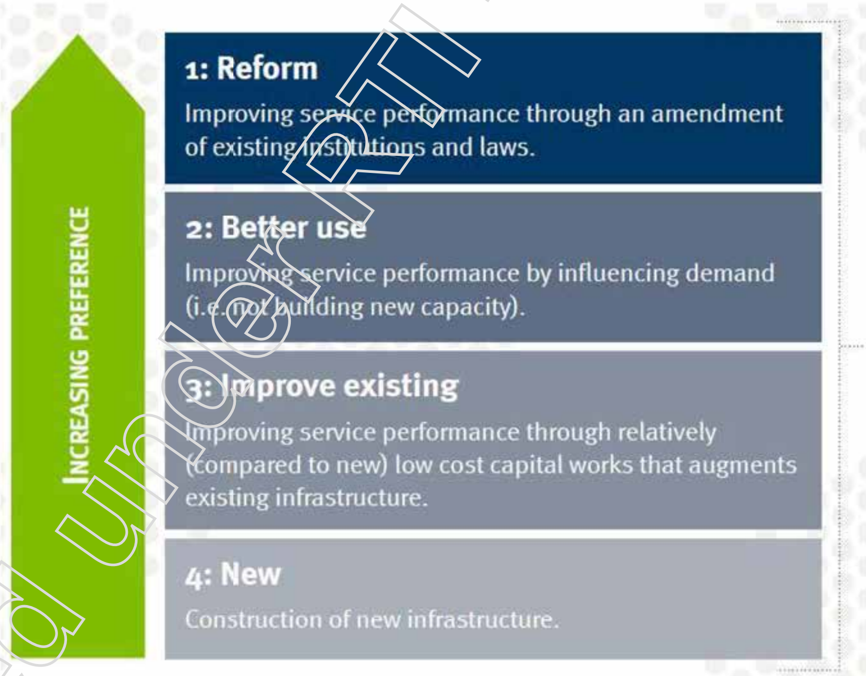


Figure 1 – Strategic direction of government investment policy

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Item 5: Potential Options

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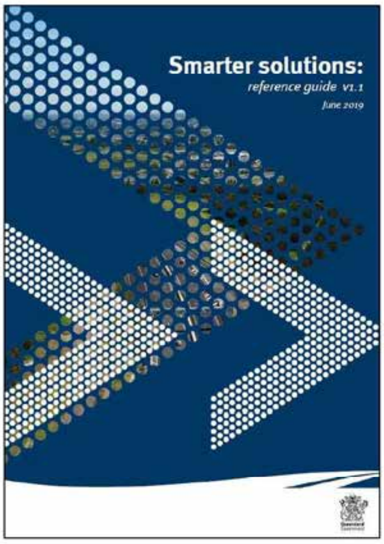
Item 5: Potential Options – Non Asset

Network optimisation solutions are initiatives that improve the functioning of the existing transport network, without delivering new infrastructure.



Public Transport	Road Transport	Intelligent Transport Solutions	Regulation and Policy
Bus priority lanes	HOV lanes	Incident management systems	Education campaigns
Public transport jump lanes	Truck restrictions	En-route information system	
Transit signal priority	Hard shoulder running	Variable speed limits	
Park 'n' ride facilities	Reversible lane	Signal optimisation	
Board all doors	Turning lanes	Lane use management system	
	Parking management	Ramp metering	

Potential Network Optimisation Solutions

tive list)

S1: A study area that facilitates efficiency and reliable transport movement to support increasing freight and passenger travel demands

S2: A study area that is safe for all road users

S3: A study area that is resilient through better connections and access to sustainable transport options

Service Requirements

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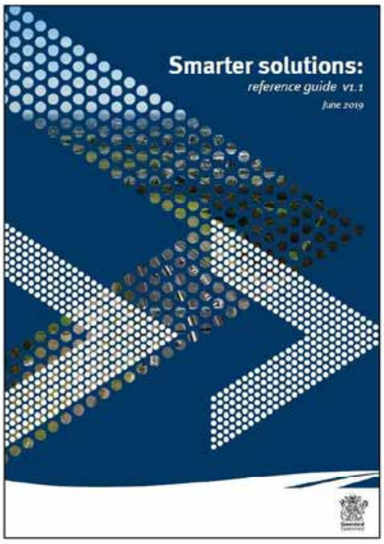
Item 5: Potential Options – Non Asset



Network optimisation solutions are initiatives that improve the functioning of the existing transport network, without delivering new infrastructure.

Public Transport
- Bus priority lanes
- Public transport jump lanes
- Transit signal priority

Road Transport

Intelligent Transport Solutions
- Variable speed limits
- Signal optimisation
- Lane use management system

Regulation and Policy
- Education campaigns

Potential Network Optimisation Solutions

tive list)

S1: A study area that facilitates efficiency and reliable transport movement to support increasing freight and passenger travel demands

S2: A study area that is safe for all road users

S3: A study area that is resilient through better connections and access to sustainable transport options

Service Requirements

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Item 5: Potential Options – Non Asset

The most suitable non-asset options for the project include:

- **Option 1**: signal optimisation
- **Option 2**: travel demand management
- **Option 3**: land use planning changes
- **Option 4**: reduced speed / variable speed limits

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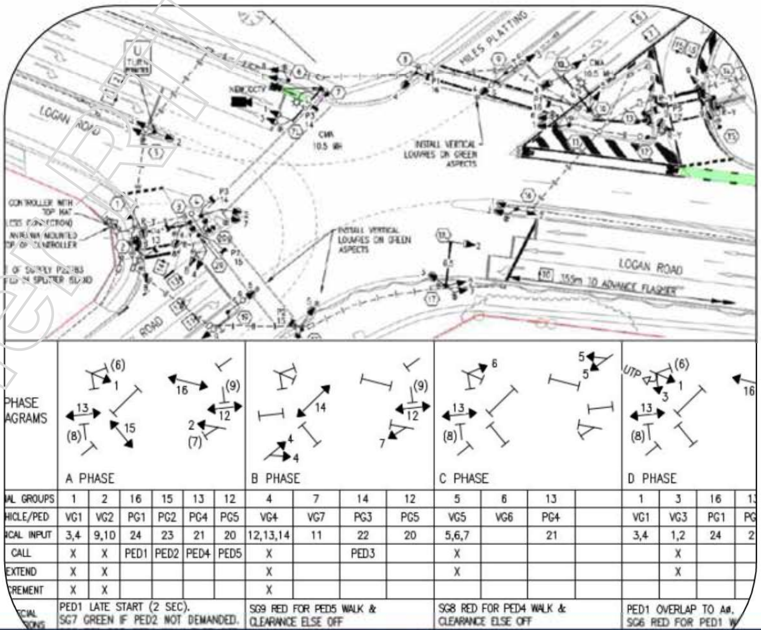
Item 5: Non Asset – Option 1 signal optimisation

Option 1: signal optimisation

- Dynamic traffic signal optimisation and coordination could potentially improve the efficiency of traffic and bus movements through the study area, by adapting to changing operating circumstances.
- Signal optimisation ensures that intersection traffic signal phasing and timing reflects current traffic conditions to optimise movements and increase the overall peak hour efficiency within the study area.
- Logan Road carries 45,500vpd (2023)
- MPPL carries 4,200 (AM) to 5,300vph (PM) (2022)
- Whilst in isolation this option is not expected to fulfil the service requirements, it is a valid non-asset solutions that should be investigated as part of all other options during the PE phase



NOF Solution	Target outcome areas	Indicative asset life	Benefits
Signal optimisation		< 5 years	• Reduced average travel delay by 20% • Reduced emissions by 1–3%

Item 5: Non Asset – Option 2 travel demand management

Option 2: travel demand management

- Travel demand management (TDM) initiatives could potentially contribute to reduced congestion within the study area, which may improve road safety and provide benefits to public and active transport users. TDM initiatives could take the form of travel behaviour change, active transport management, travel information tools, and / or road user pricing.
- TMR's Smarter Solutions Reference Guide indicates the "education campaigns" could potentially reduce single occupancy by approximately 14%.
- Given the significant existing and forecast future traffic demands at the study intersection and within the study area more broadly, this potential modest change peak hour travel demand is not expected to fulfil the service requirements.

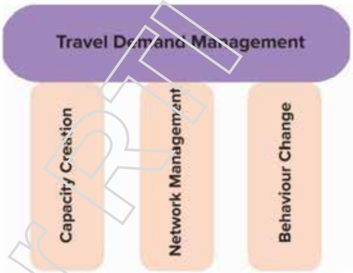


Figure 8 - The Three Pillars of Travel Demand Management: Capacity Creation, Network Management and Behaviour Change

Travel Demand Management Toolkit Managing Network Demand – March 2021 (Department of Transport) - link

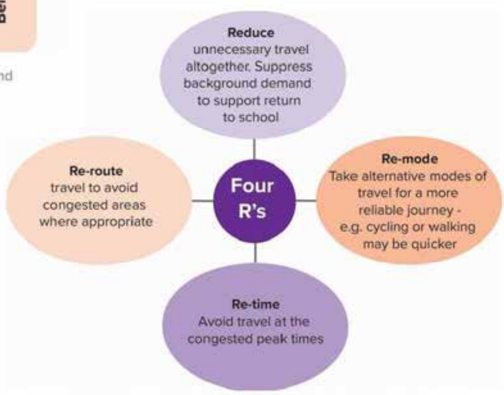


Figure 9 - The Four R's, these are; Reduce, Re-mode, Re-time and Re-route.

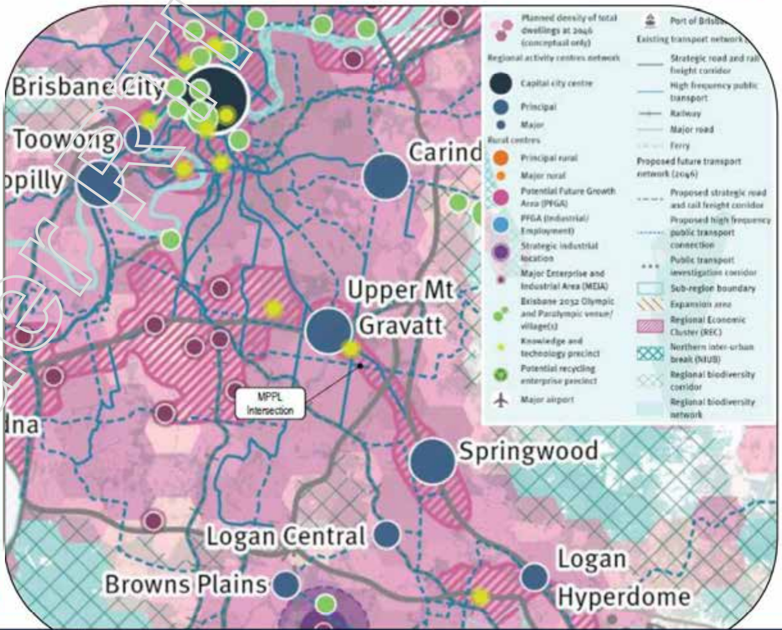
NOF Solution	Target outcome areas	Indicative asset life	Benefits
Education campaigns		‹ 5 years	• Reduction in single occupancy by 14%

Item 5: Non Asset – Option 3 land use planning changes

Shaping SEQ Principal Regional Activity Centres
Eight Mile Plains knowledge and technology precinct
Pacific Motorway Regional Economic Cluster

Option 3: land use planning changes

- Land use and new development could be limited in the suburbs surrounding the study area to reduce and redirect forecast future growth. By limiting the magnitude of this growth and / or redirecting it to existing areas which are closer to activity centres may reduce the extent of congestion forecast within the study area during the future design horizons.
- The strategic long-term and citywide nature of this option means that it is unlikely to deliver transport performance improvements and benefits in the short to medium term.
- Limiting development will not provide an appropriate solution to service requirements across for the project, nor is it desirable in terms of increasing housing supply and improving affordability.



NOF Solution	Target outcome areas	Indicative asset life	Benefits
Education campaigns		‹ 5 years	• Reduction in single occupancy by 14%

Item 5: Non Asset – Option 4 reduced / variable speed limits

Option 4: reduced / variable speed limits

- Logan Road is governed by a speed limit of 70km/h. There may be an opportunity to permanently reduce the speed limit and / or install Variable Speed Limits (VSL) to improve safety for all users
- A high proportion (63%) of the 108 reported casualty crashes within the study area have been rear-end type crashes, which is typically attributed to a congested urban road network.
- A reduced (or variable) speed limit may reduce the frequency and severity of crashes within the study area and increase travel time reliability.
- Whilst in isolation this option is not expected to fulfil the service requirements, it is a valid non-asset solutions that should be investigated as part other options during the PE phase

NOF Solution	Target outcome areas	Indicative asset life	Benefits
Variable speed limits		5–10 years	• Increased travel time reliability by 22% • Reduction in overall crashes by between 20% to 57%

Any questions / feedback on the non asset options?

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Item 5: Potential Options – Existing Asset

Potential existing asset options that have been considered as part of the SASR include:

- **Option 5**: Logan Road / Warrigal road intersection upgrade
- **Option 6**: MPPL at-grade intersection upgrade
- **Option 7**: Bus lanes / queue jump lanes / signal priority
- **Option 8**: Warrigal Road general traffic link

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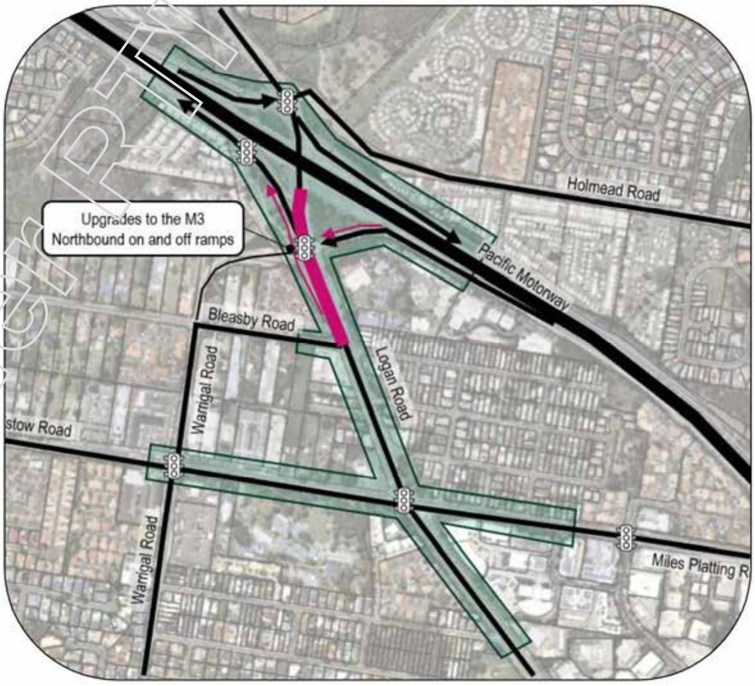
Item 5: Existing Asset – Option 5 Logan Road / Warrigal Road Intersection Upgrade

Option 5: Logan Road / Warrigal Road Upgrade

- It is recommended upgrade options are investigated for the Logan Road / Warrigal Road intersection to address safety concerns associated with Exit 14 queues extending back to the motorway, and to reduce the potential for northbound queues on Logan Road extending back to MPPL.
- Delivering a solution similar to the 2010 BC, with separated northbound on and off ramps, is expected to fulfil the service requirements of the project.
- There may be alternative intersection layout options to fulfil the service requirements and this would need to be investigated further in the PE phase.



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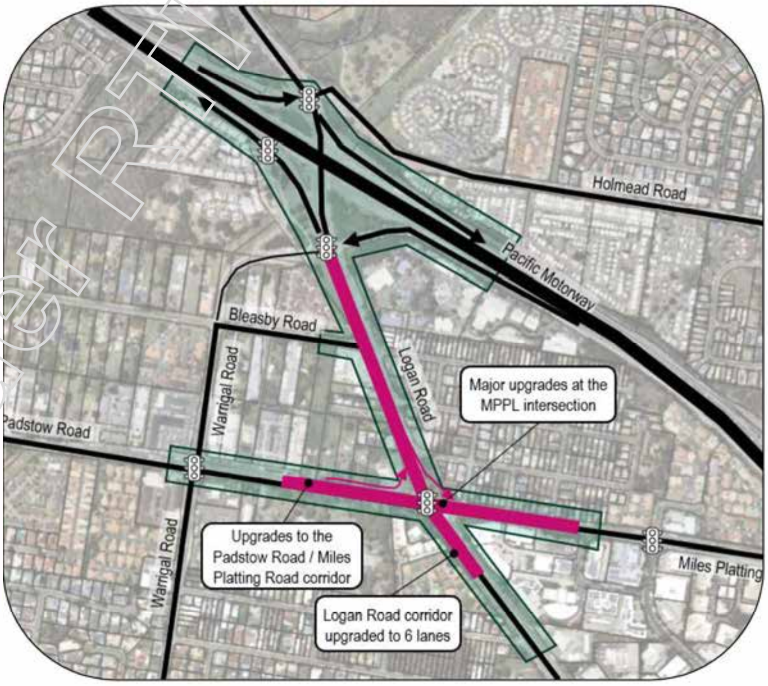
Item 5: Existing Asset – Option 6 MPPL At-Grade Intersection Upgrade

Option 6: MPPL At-Grade Intersection Upgrade

- Additional capacity is required to meet both current and projected future traffic demands at MPPL.
- At-grade solutions were proposed in the 2010 BC, 2014 Planning Review, and 2021 OA.
- While previous solutions varied in their spatial requirements and associated land impacts, all of them aimed to enhance layout capacity and included additional dedicated active transport infrastructure.
- Implementing an at-grade solution similar to those previously recommended is expected to partially address the service requirements of the project.
- There may be alternative intersection layout options to fulfil the service requirements and this would need to be investigated further in the PE phase.



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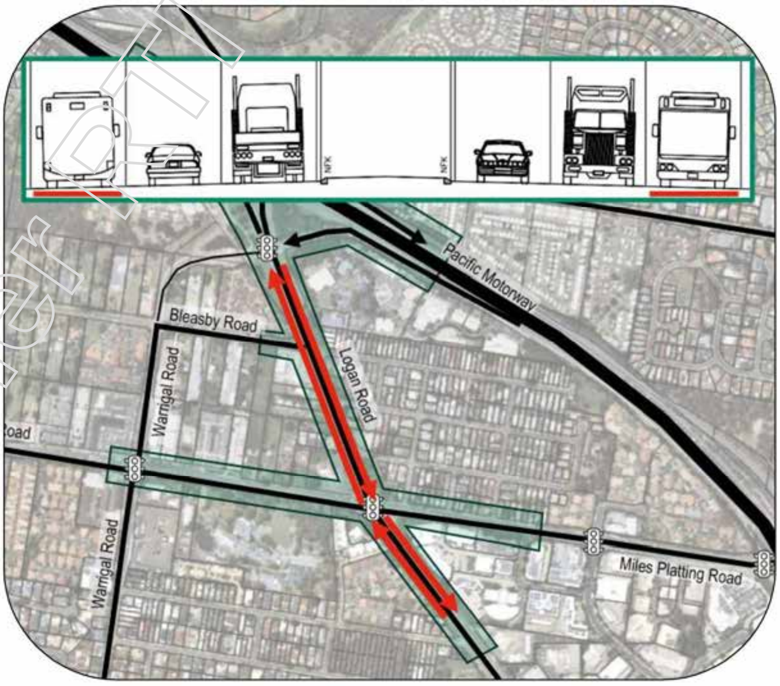
Item 5: Existing Asset – Option 7 Bus lanes / queue jump lanes / signal priority

Option 8: Warrigal Road general traffic link

- The intent of this option is to prioritise bus movements through the study area. This may include dedicated bus lanes on Logan Road and / or bus queue jump lanes and associated signal priority at key intersections along Logan Road. Under this option, Logan Road would be upgraded to six lanes (i.e. 4 general traffic lanes and 2 bus lanes).
- Most buses that travel through the study area use the Warrigal Road "Green Link". Translink data indicates that approximately 80 buses per day use the Logan Road corridor including approximately eight (8) in the peak hours. The provision of dedicated bus lanes / queue jumps / signal priority on Logan Road for a limited bus demand is not expected to fulfil the service requirements.



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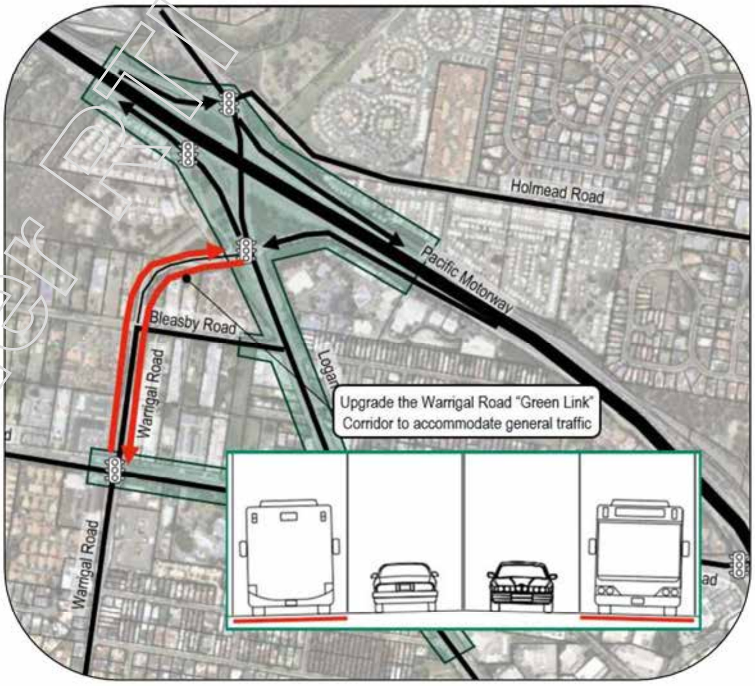
Item 5: Existing Asset – Option 8 Warrigal Road general traffic link

Option 8: Warrigal Road general traffic link

- This option includes upgrading the Warrigal Road "Green Link" to accommodate general traffic as well as public transport. This may include providing a four lane cross-section with two general traffic lanes and two dedicated bus lanes.
- Whilst this may assist with reducing traffic demands on Logan Road and at the MPPL intersection, it may also adversely impact public and active transport users within the study area. As such, this option is not expected to fulfil the service requirements for the project. There is also a lack of support from Translink and BCC for this option.



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Any questions / feedback on the **existing** asset options?

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Item 5: Potential Options – New Asset

Potential new asset options that have been considered as part of the SASR include:

- **Option 9:** active transport links
- **Option 10:** M3 to M2 ramps
- **Option 11:** MPPL grade separation
- **Option 12:** MPPL interchange

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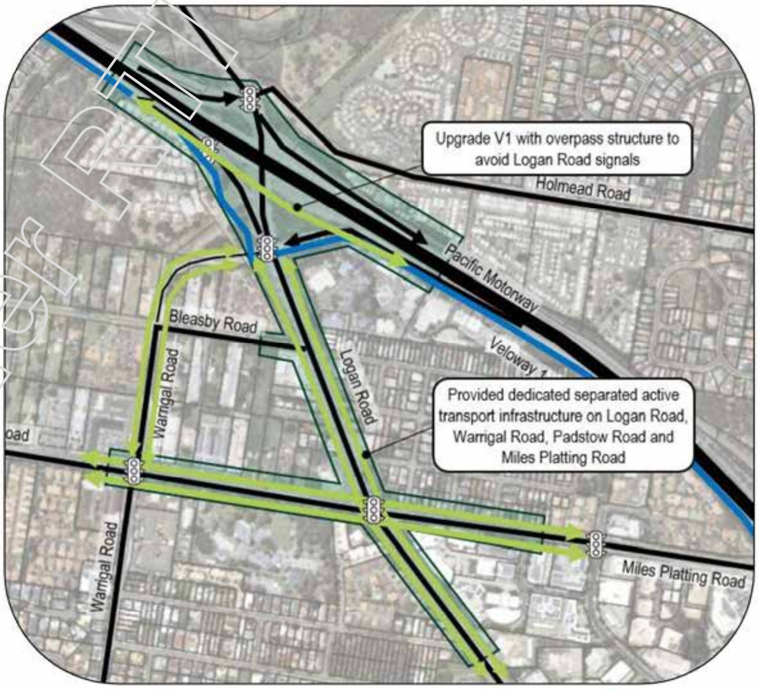
Item 5: New Asset – Option 9 Active Transport Links

Option 9: Active transport links

- This option includes providing dedicated high quality AT infrastructure within the study area along Logan Road, Warrigal Road, Padstow Road and Miles Platting Road in accordance with TMR's PCNP.
- It may also include upgrading Veloway 1 (V1) to provide an overpass structure to allow users to bypass the at-grade crossing on Logan Road.
- This option in isolation is not expected to fulfil the service requirements of the project
- Given the significance of the study area to the AT network (PCNP), elements of this option should be incorporated into all other options that are investigated during the PE phase.



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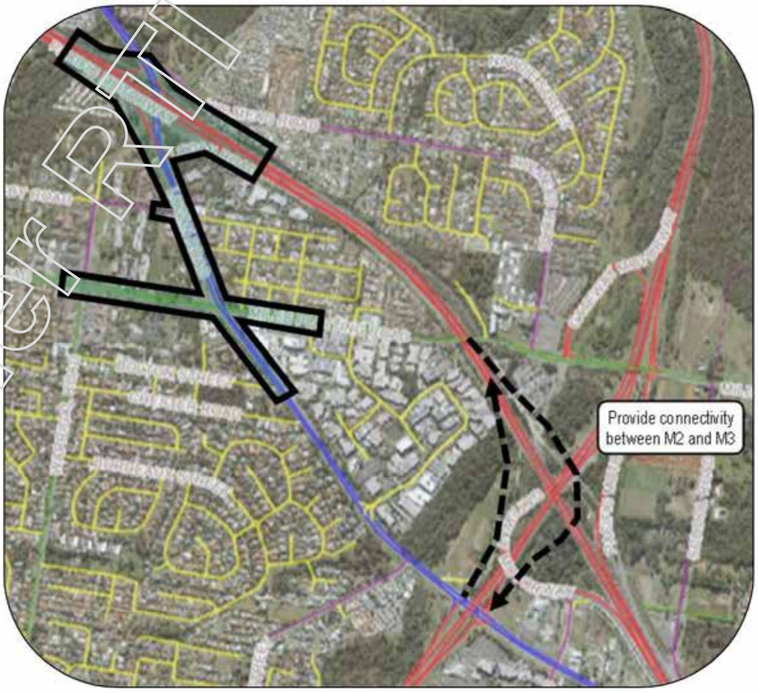
Item 5: New Asset – Option 10 M3 to M2 Ramps

Option 10: M3 to M2 ramps

- This option includes new ramp connections between the M2 and M3 to reduce traffic on Logan Road
- According to BSTM-MMv2.4, this "interchange" movement may make up around 4-7% of the peak hour traffic on Logan Road in 2041. This equates to approximately 550 vehicles in the AM period (7-9AM) and 350 vehicles in the PM period (4-6PM).
- Whilst providing the new M3 to M2 ramps may reduce traffic demands on Logan Road by approx. 4-7%, it is not expected to significantly improve peak hour operations at MPPL and is not expected to fulfil the service requirements for the project.



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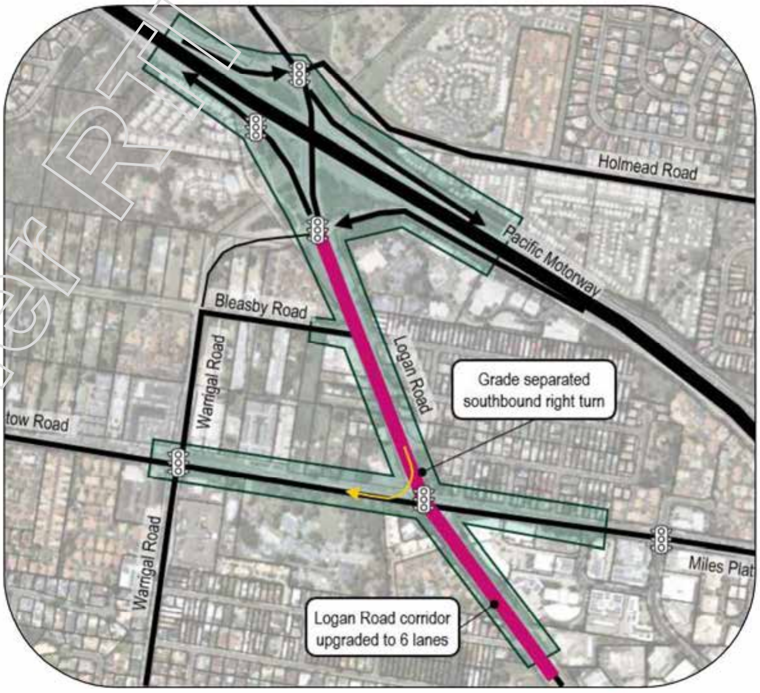
Item 5: New Asset – Option 11 MPPL grade separation

Option 11: MPPL partial grade separation

- This option seeks to remove traffic from the at-grade intersection via a partial grade separation.
- If, for example, the southbound right turn from Logan Road into Padstow Road was grade separated, it would reduce traffic demands at MPPL by approximately 10%. This reduction may facilitate further traffic signal phasing and timing optimisation with the intent to provide additional capacity for all other movements at the intersection.
- Whilst the right turn movement has been selected to help explain the concept, there may be opportunities to grade separate other movements, and this would need to be investigated further during the PE phase
- This option is expected to partially fulfil the SR's



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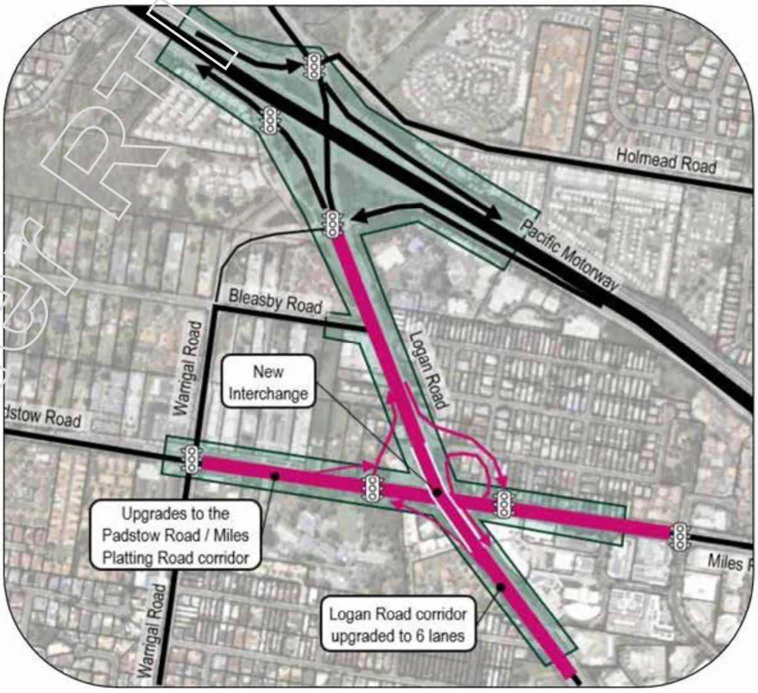
Item 5: New Asset – Option 12 MPPL interchange

Option 12: MPPL interchange

- The intent of this option is to provide free-flow conditions on Logan Road, the higher order State-controlled arterial road, and facilitate all other movements via two (2) at-grade signalised intersections either side of the overpass.

- Logan Road carries 45,500vpd (2023)
- MPPL carries 4,200 (AM) to 5,300vph (PM) (2022)

- This option is a significant upgrade, and with the inclusion of upgrade works at the Logan Road / Warrigal Road intersection (Option 5), it is expected to fulfil the service requirements for the project.



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Any questions / feedback on the new asset options?

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Item 6: Strategic Merit Test Results
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Item 6: Strategic Merit Test Results

A qualitative Strategic Merit Test of the long list of options was undertaken to determine which options could potentially achieve the project service requirements, which are reproduced below for ease of reference:

S1: A study area that facilitates efficiency and reliable transport movement to support increasing freight and passenger travel demands

S2: A study area that is safe for all road users

S3: A study area that is resilient through better connections and access to sustainable transport options

The options were assessed based on fulfilment of the service requirement, using the following rating system:

Low	Poor or non-fulfilment of the service requirement
Medium	Partial fulfilment of the service requirement or adequate fulfilment of a portion of the desired useful life
High	Excellent fulfilment of the service requirement

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Item 6: Strategic Merit Test Results

Options	Option Description	Service Requirements			Further Assessment Recommended?
		S1	S2	S3	
Base Case					
Base Case	"Business as Usual"	Low	Low	Low	No
Non-asset					
Option 1	Signal Optimisation	Low	Low	Low	No
Option 2	Travel Demand Management	Low	Low	Low	No
Option 3	Land Use Planning Changes	Low	Low	Low	No
Option 4	Reduced / Variable Speed Limits	Low	Medium	Medium	Yes – as part of other options
Existing asset					
Option 5	Logan Road / Warrigal Road Intersection Upgrade	High	Medium	Medium	Yes
Option 6	MPPL At-Grade Intersection Upgrade	Medium	Medium	Medium	Yes
Option 7	Bus Lanes / Queue Jumps / Signal Priority	Low	Low	Medium	No
Option 8	Warrigal Road General Traffic Link	Medium	Low	Low	No - due to stakeholder feedback
New asset					
Option 9	Active Transport Links	Low	Medium	High	Yes – as part of other options
Option 10	M3 to M2 Ramps	Low	Low	Low	No
Option 11	MPPL Grade Separation	Medium	Medium	Medium	Yes
Option 12	MPPL Interchange	High	Medium	Medium	Yes

S1: A study area that facilitates efficiency and reliable transport movement to support increasing freight and passenger travel demands	
S2: A study area that is safe for all road users	
S3: A study area that is resilient through better connections and access to sustainable transport options	

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Item 6: Strategic Merit Test Results

Options	Option Description	Service Requirements			Further Assessment Recommended?
		S1	S2	S3	
Non-asset					
Option 4	Reduced / Variable Speed Limits	Low	Medium	Medium	Yes – as part of other options
Existing asset					
Option 5	Logan Road / Warrigal Road Intersection Upgrade	High	Medium	Medium	Yes
Option 6	MPPL At-Grade Intersection Upgrade	Medium	Medium	Medium	Yes
New asset					
Option 9	Active Transport Links	Low	Medium	High	Yes – as part of other options
Option 11	MPPL Grade Separation	Medium	Medium	Medium	Yes
Option 12	MPPL Interchange	High	Medium	Medium	Yes

Based on the SMT, infrastructure options (existing or new) are required to satisfy all service requirements. These options can be integrated with NOF solutions. The following short list of options are recommended for further investigation:

- Option 5: Logan Road / Warrigal Road intersection upgrade combined with Option 4 and 9
- Option 6: MPPL at-grade intersection upgrade combined with Option 4, 5 and 9
- Option 11: MPPL partial grade separation combined with Option 4, 5 and 9
- Option 12: MPPL interchange combined with Option 4, 5 and 9.

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Item 7: Closing & Next Steps

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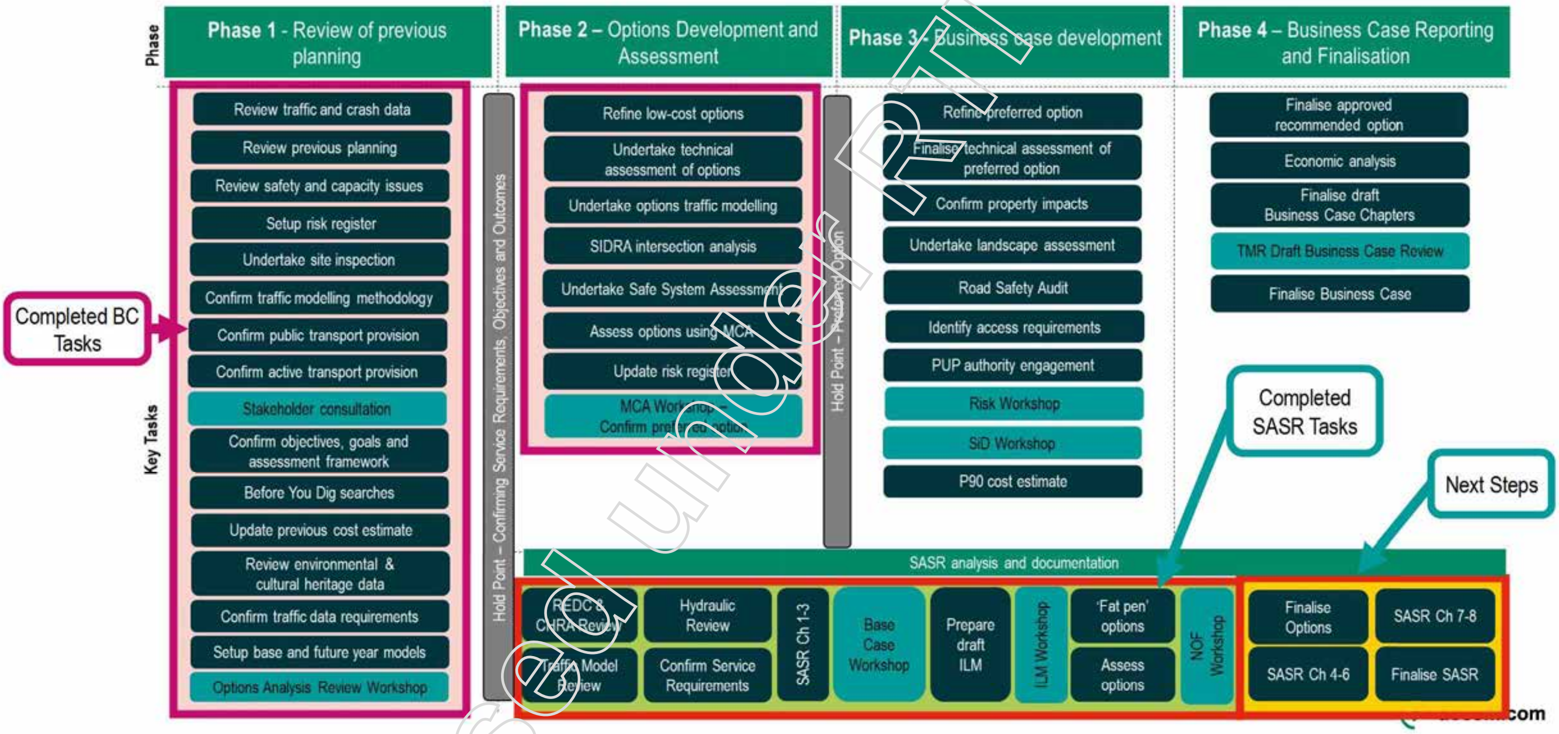
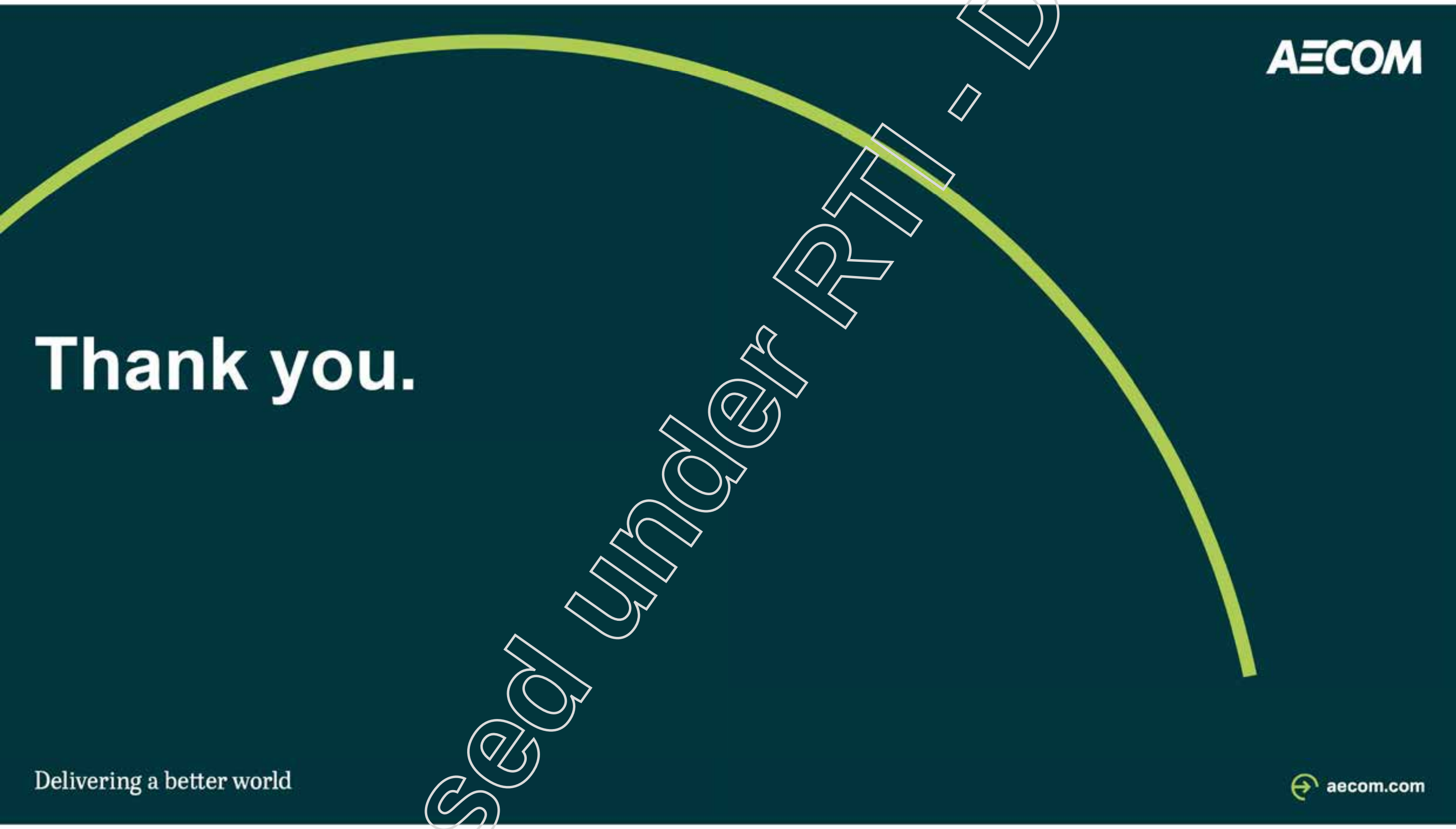
Item 6: Next Steps

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Appendix D: Transport Analysis Report

Prepared for
Department of Transport and Main Roads
ABN: 39 407 690 291

AECOM

Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study

SASR Transport Analysis Report

10-Mar-2025

Art by
NR

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Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study

SASR Transport Analysis Report

Client: Department of Transport and Main Roads

ABN: 39 407 690 291

Prepared by

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10-Mar-2025

Job No.: 60731166

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

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Date	10-Mar-2025
Originator	NR [redacted]
Checker/s	
Verifier/s	

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Rev	Revision Date	Details	Approved	
			Name/Position	Signature
A	21-Feb-2025	Draft for client review	NR [redacted]	
B	10-Mar-2025	Final report		

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1.0 Introduction

1.1 Background

The Department of Transport and Main Roads (TMR) has identified a need to undertake a Planning Study for the future upgrade of the Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road (MPPL) intersection (Study Intersection), in Eight Mile Plains. The Planning Study is being delivered by TMR Metropolitan Region and is funded by the Queensland Transport and Roads Investment Program (QTRIP) (Investment Number 2422929). The Planning Study includes a Strategic Assessment of Service Requirements (SASR) applying the Queensland Government's Project Assurance Framework (PAF) to investigate long term ultimate upgrade options with a capital cost more than $100 million.

1.2 Planning Study Overview

The Planning Study was delivered in two (2) work packages as outlined below:

- **Business Case (BC):** applying TMR's OnQ Project Management Framework for a low-cost interim upgrade solution (<$50m), which builds upon an Option Analysis (OA) completed in 2021
- **Strategic Assessment of Service Requirements (SASR):** applying Queensland Government's Project Assurance Framework (PAF) to investigate long term ultimate upgrade solutions (>$100m).

Figure 1 provides an overview of the adopted staged delivery and key tasks for the Planning Study.

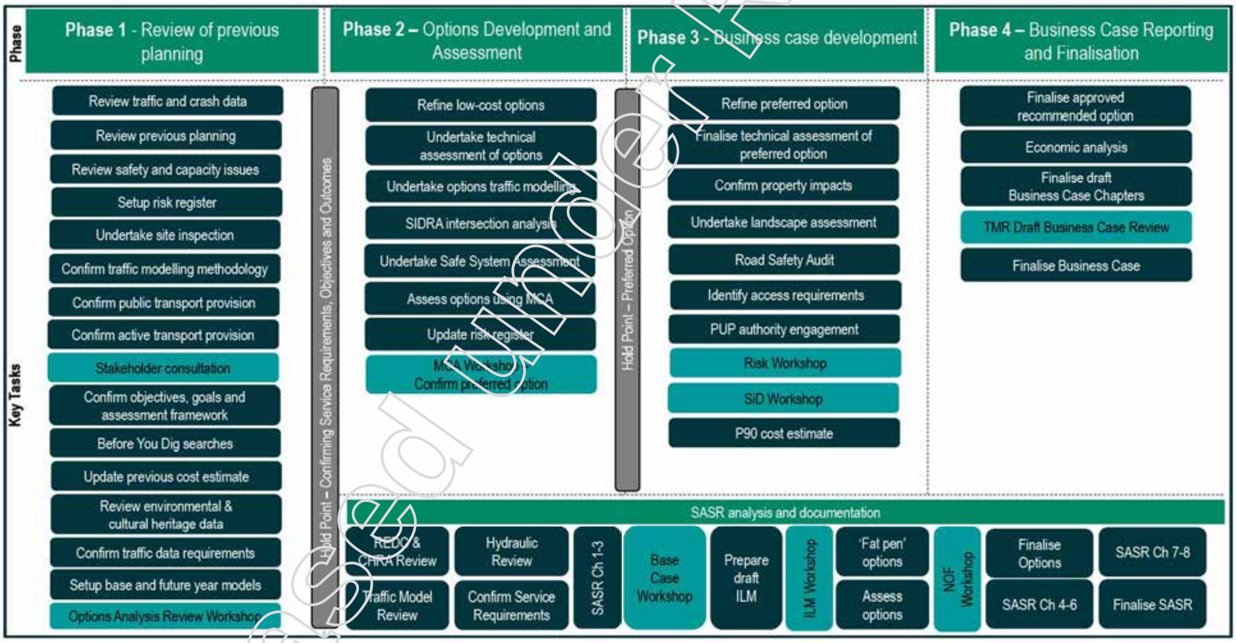


Figure 1 **Planning Study Overview**

This report has been prepared to summarise key findings from the traffic engineering and transport planning tasks completed for the SASR, and should be read in conjunction with the following reports:

- 60731166-REP-0001-TN#1: Existing Traffic Models Review & Data Gap Analysis
- 60731166-REP-0004-TN#2: Existing Situation & Low-Cost Solution Review
- 60731166-REP-0002-Modelling Methodology Report
- 60731166-REP-0003-Base Year Model Development Report
- 60731166-REP-0014-Options Modelling Report.

It is noted that most of the content in this report is also included in the abovementioned deliverables.

1.3 Study Area Overview

Figure 2 illustrates the location of the study intersection and other key elements within the study area. It is noted that the broader study area boundary was defined based on a review of the existing and emerging transport problems that impact the study intersection, and the associated causal factors.

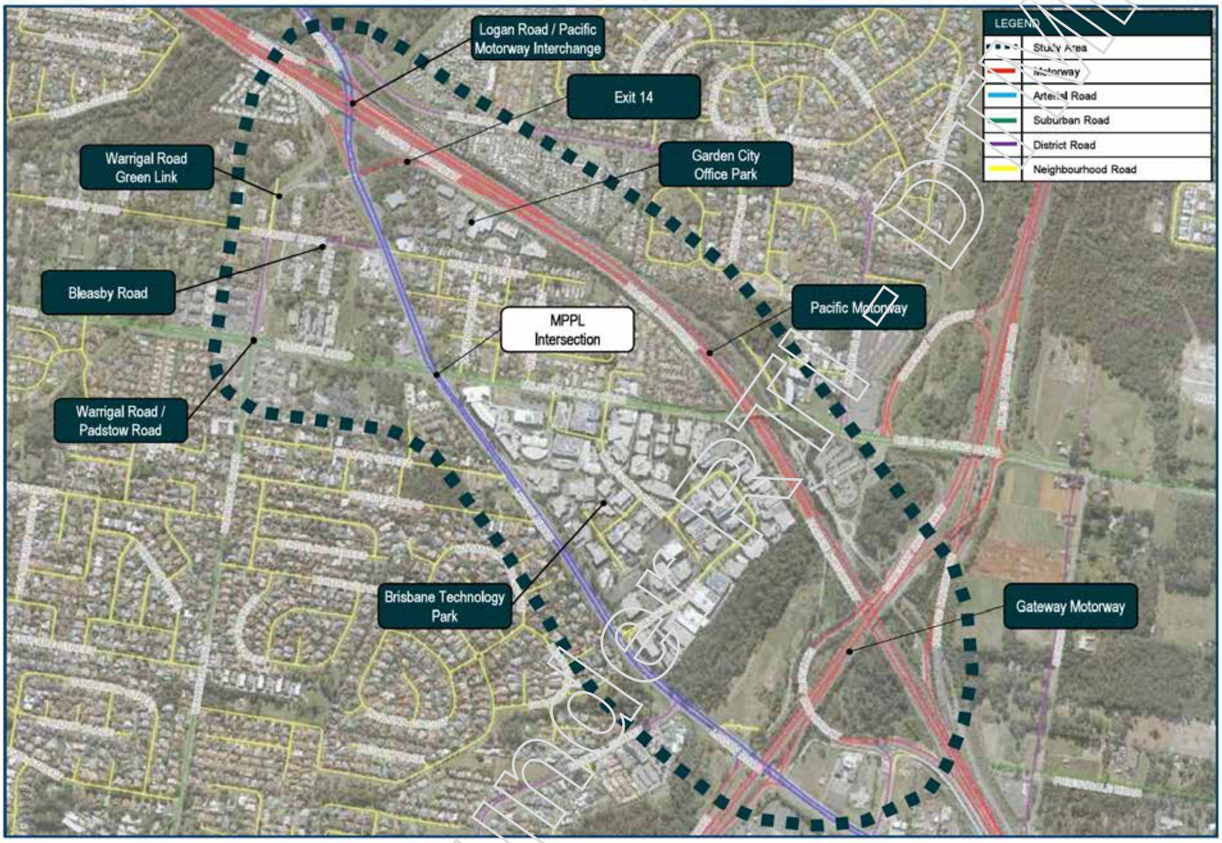


Figure 2 Study Area Overview

Logan Road (U90) is a State-controlled arterial road linking Woolloongabba to Loganlea, with connections to the Gateway Motorway (M2) and the Pacific Motorway (M1 / M3). In proximity to MPPL, Logan Road typically has a four-lane median divided carriageway with a speed limit of 70km/h. In 2023, the Annual Average Daily Traffic (AADT) volume was 44,500 vehicles per day (vpd).

The study intersection is an at-grade signalised intersection which forms a major junction of east-west (Miles Platting Road / Padstow Road) and north-south (Logan Road) arterial roads in the southern suburbs of Brisbane. It accommodates all turning movements except the right turn from Logan Road (south) into Miles Platting Road (east).

The M2 and M1 Motorways are under concession to Transurban. There are currently no committed upgrades are proposed on these corridors which may alter the future operations of Logan Road and the MPPL intersection. As a result, this Planning Study assumes that the existing infrastructure on the M2 and M1 will remain unchanged.

1.4 Scope of Works

The following tasks were completed during the preparation of this report:

- **Chapter 2:** Review the existing transport networks within the study area
- **Chapter 3:** Review previous planning undertaken at the study intersection
- **Chapter 4:** Summarise the transport modelling undertaken to support the SASR Report
- **Chapter 5:** Identify the existing and potential future transport problems within the study area
- **Chapter 6:** Present high level options existing and new asset options to address the problems.

2.0 Existing Conditions

2.1 Land Use

2.1.1 ShapingSEQ 2023

Figure 3 is an extract from the Metro sub-region map (Map 22) within ShapingSEQ 2023. It is noted that ShapingSEQ 2023 is the Queensland Government's long-term vision for growth in the SEQ region.

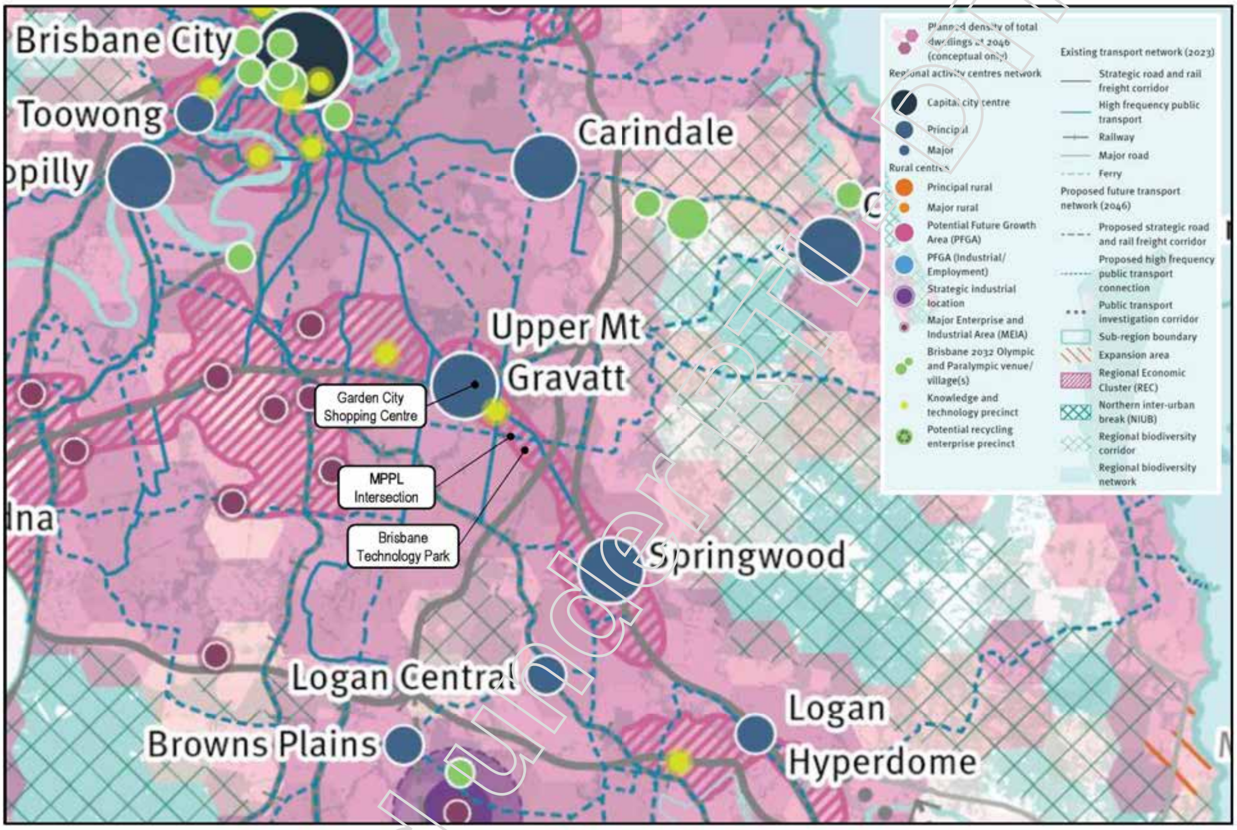


Figure 3 **ShapingSEQ (2023) – Map 22 Metro Sub-region**

It is noted that MPPL is located:

- Between the Upper Mt Gravatt and Springwood Principal Regional Activity Centres (PRAC). These areas are key focus points for employment and services outside the capital city centre and are major trip generators
- Adjacent to the Eight Mile Plains knowledge and technology precinct (Brisbane Technology Park and Garden City Shopping Centre). These precincts are areas that contain a core high-level health, education, research or similar facility that provides opportunities for complementary and supporting activities
- Within the Pacific Motorway Regional Economic Cluster (REC). This REC includes the Upper Mt Gravatt and Springwood PRACs, the Eight Mile Plains knowledge and technology precinct, as well as the Pacific Motorway and South East Busway. Upgrades within the study area will help further facilitate the growth of this REC.

2.1.2 Brisbane City Plan 2014

Figure 4 illustrates the current land use zoning within the study area as well as key land uses.

Figure 4 Brisbane City Plan 2014 - Land Use Zoning

Table 1 summarises relevant details for the key land uses within the study area.

Table 1 Key Land Uses

ID	Key Land Use	Location
1	Hughesville House	Southwest corner of MPPL
2	Puma Petrol Station	Northwest corner of MPPL
3	Charles Fraser Park	Northeast corner of MPPL
4	Brisbane Technology Park	Southeast corner of MPPL
5	Energex Substation	Miles Platting Road approximately 100m east of MPPL
6	Umart Eight Mile Plains	Logan Road approximately 120m north of MPPL
7	7-Eleven Eight Mile Plains	Logan Road approximately 250m north of MPPL
8	Garden City Office Park	Logan Road approximately 400m north of MPPL
9	Multicap Disability Services	Padstow Road approximately 300m west of MPPL
10	Garden City Shopping Centre	Logan Road approximately 1.5km north of MPPL

Key points to note are summarised below:

- There are key land uses located on each corner of the MPPL intersection including Hughesville House (heritage listed), a petrol station (contaminated land) and Charles Fraser Park (local park)
- There are key employment hubs within the study area (e.g. Office Park and Technology Park)
- There is a pocket of low density residential on the eastern side of Logan Road
- There is a pocket of emerging community zoned land on the western side of Logan Road. This area appears to be the only "under developed" land supply within the study area
- Multicap Disability Services gains vehicular and pedestrian access via Padstow Road.

2.1.3 Development and Land Use Pressures

Figure 5 illustrates the extents of the Eight Mile Plains Gateway Neighbourhood Plan area in proximity to the study area, the Emerging Community zoned land adjacent to the study area, and the 7-Eleven Eight Mile Plains Service Centre located at 2433 Logan Road. It is noted that the Rochedale Urban Community Neighbourhood Plan area is located to the immediate east of the Gateway Motorway.

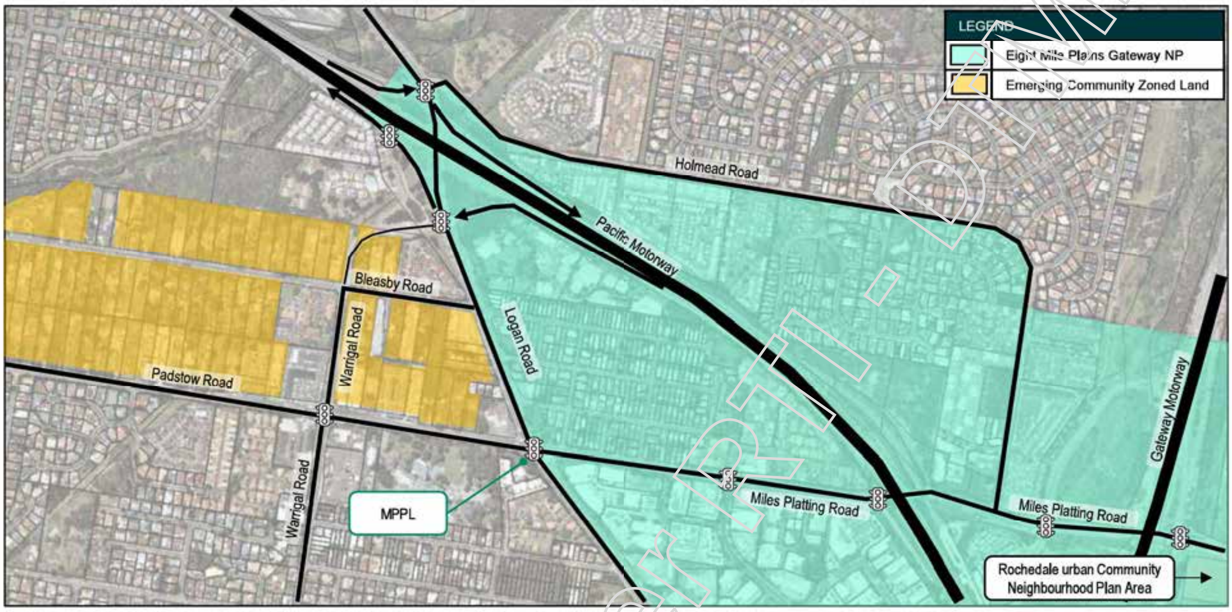


Figure 5 Development and Land Use Pressures

Table 2 summarises relevant details of the development and land use pressures for the study area.

Table 2 Development and Land Use Pressures

Plan	Relevant Comments
Eight Mile Plains Gateway Neighbourhood Plan	• Key economic growth area for BCC • One of BCC's key employment hubs with advanced manufacturing and technology parks that contribute to economic growth • Provides the southern gateway to Brisbane and is well connected to the region by the Gateway and Pacific Motorways and Logan Road • The neighbourhood plan for this area was created to plan for the changing needs of the community for the next 10 years and beyond • The plan responds to opportunities associated with significant transport infrastructure investment, including the future Brisbane Metro station.
Rochedale Urban Community Neighbourhood Plan	• Key residential growth area for BCC • Integrated and master-planned urban community with a mix of users including residential, commercial, industrial, and educational uses • High development has occurred within the Rochedale Urban Community Neighbourhood Plan area, however additional growth is planned • Miles Platting Road, the MPPL intersection, and Logan Road provides an important function for Rochedale residents travelling to / from Brisbane.
Emerging Community Zoned Land	• City Plan 2014 states the purpose of the "emerging community" zone is to: "*identify land that is intended for an urban purpose in the future; protect land that is identified for an urban purpose in the future from incompatible uses; and provide for the timely conversion of non-urban land for urban purposes*" • Emerging community areas typically do not have the required infrastructure to support urban development, and is generally considered to be a lower priority for development compared to other land within the urban footprint • This land is not expected to development within the foreseeable future.

2.2 Road Network

2.2.1 Key Roads

Figure 6 illustrates the existing road network hierarchy within the study area.

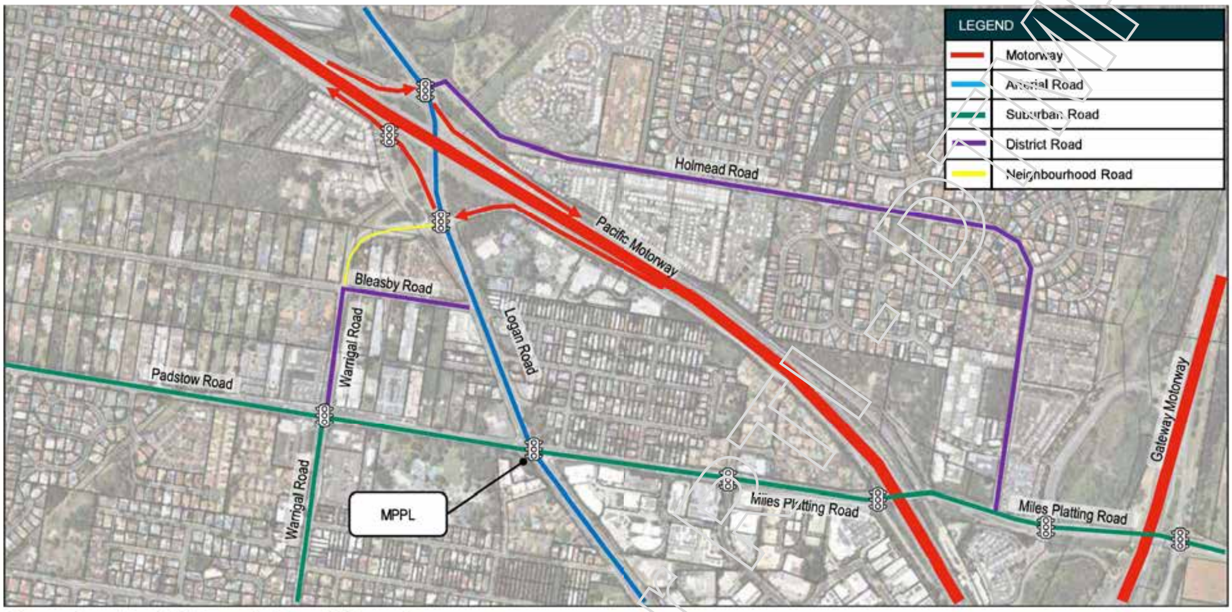


Figure 6 Road Network: Road Hierarchy

Table 3 summarises key characteristics of the road network within the study area.

Table 3 Road Network: Road Hierarchy

Name	Hierarchy	Jurisdiction	Typical Cross-Section	Speed Limit (km/h)
Pacific Motorway	Motorway	TMR	8 lanes divided	100
Logan Road	Arterial	TMR	4 lanes divided	70-80
Miles Platting Road	Suburban	BCC	4 lanes divided	60
Padstow Road	Suburban	BCC	4 lanes divided	60
Bleasby Road	District	BCC	2 land undivided	60
Warrigal Road (south of Padstow Road)	Suburban	BCC	4 lanes divided / 2 lanes undivided	60
Warrigal Road (Padstow Road to Bleasby Road)	District	BCC	4 lanes divided / 2 lanes undivided	60
Warrigal Road (north of Bleasby Road)	Neighbourhood	BCC	2 land undivided	50

Key points to note are summarised below:

- Logan Road provides a north-south arterial function between the M3 (north) and M2 (south)
- The Miles Platting Road / Padstow Road corridor provides an east-west sub-arterial function between Rochedale and the M2 (east), as well as Mains Road and Beaudesert Road (west)
- Warrigal Road is a Suburban Road to the south of Padstow Road and a District Road to the north
- The Warrigal Road / Bleasby Road corridor provides an opportunity for northbound motorists travelling from the south (Warrigal Road) or west (Padstow Road) to bypass the MPPL intersection
- Warrigal Road is a “Green Link” between Bleasby Road and the Logan Road access road. This was constructed in 2015 and is currently limited to buses, cyclists, and pedestrians only.

2.2.2 Key Intersections

Figure 7 illustrates key intersections located within and near the study area.

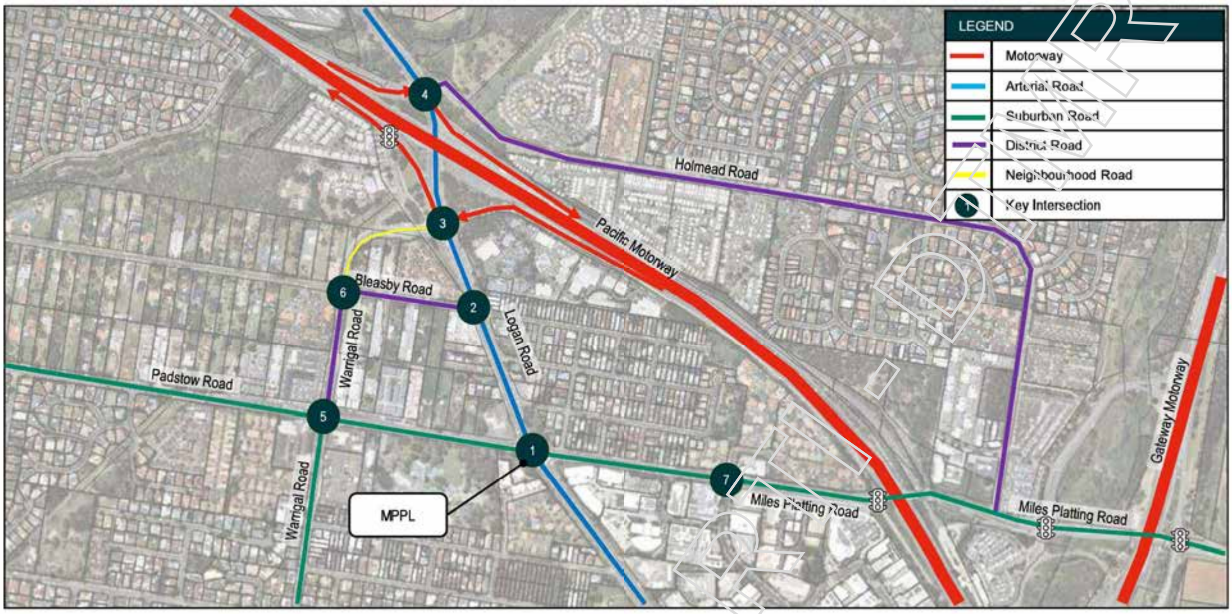


Figure 7 Road Network: Key Intersections

Table 4 summarises relevant characteristics of the nominated key intersections.

Table 4 Road Network: Key Intersections

ID	Name	Jurisdiction	Control
1	Miles Platting Road / Padstow Road / Logan Road	TMR	Traffic Signals
2	Miles Platting Road / Bleasby Road / London Street	TMR	Left-in / Left-out
3	Logan Road / Warrigal Road / M3 Ramps	TMR	Traffic Signals
4	Logan Road / Holmead Road / M3 Ramps	TMR	Traffic Signals
5	Warrigal Road / Padstow Road	BCC	Traffic Signals
6	Warrigal Road / Bleasby Road	BCC	Priority Controlled
7	Miles Platting Road / Buckingham Place	BCC	Traffic Signals

Key points to note are summarised below:

- **Intersection 1:** The right turn from Logan Road (south) into Miles Platting Road (east) is prohibited. The U-turn on Logan Road (north) is permitted. There is no pedestrian crossing on the southern approach. Both left turn slip lanes have on-demand pedestrian crossing facilities
- **Intersection 2:** There is a continuous left turn lane from Bleasby Road (west) into Logan Road (north) which attracts significant northbound demands “bypassing” the MPPL intersection
- **Intersection 3:** Forms part of the M3 / Logan Road interchange. U-turn movements are permitted on Logan Road (north and south). Veloway 1 (V1) crosses Logan Road on the southern approach
- **Intersection 4:** Forms part of the M3 / Logan Road interchange
- **Intersection 5:** Upgraded by BCC in 2011 from a roundabout to traffic signals
- **Intersection 6:** Priority-controlled four-way intersection. The northern fourth leg was constructed in 2015 as part of the Warrigal Road “Green Link” project and is restricted to buses only
- **Intersection 7:** Upgraded by BCC in 2012 from a priority controlled intersection to traffic signals.

2.2.3 Freight Routes

Figure 8 illustrates approved freight routes (i.e. B-Doubles and Higher Mass Limits) adjacent to the study intersection.

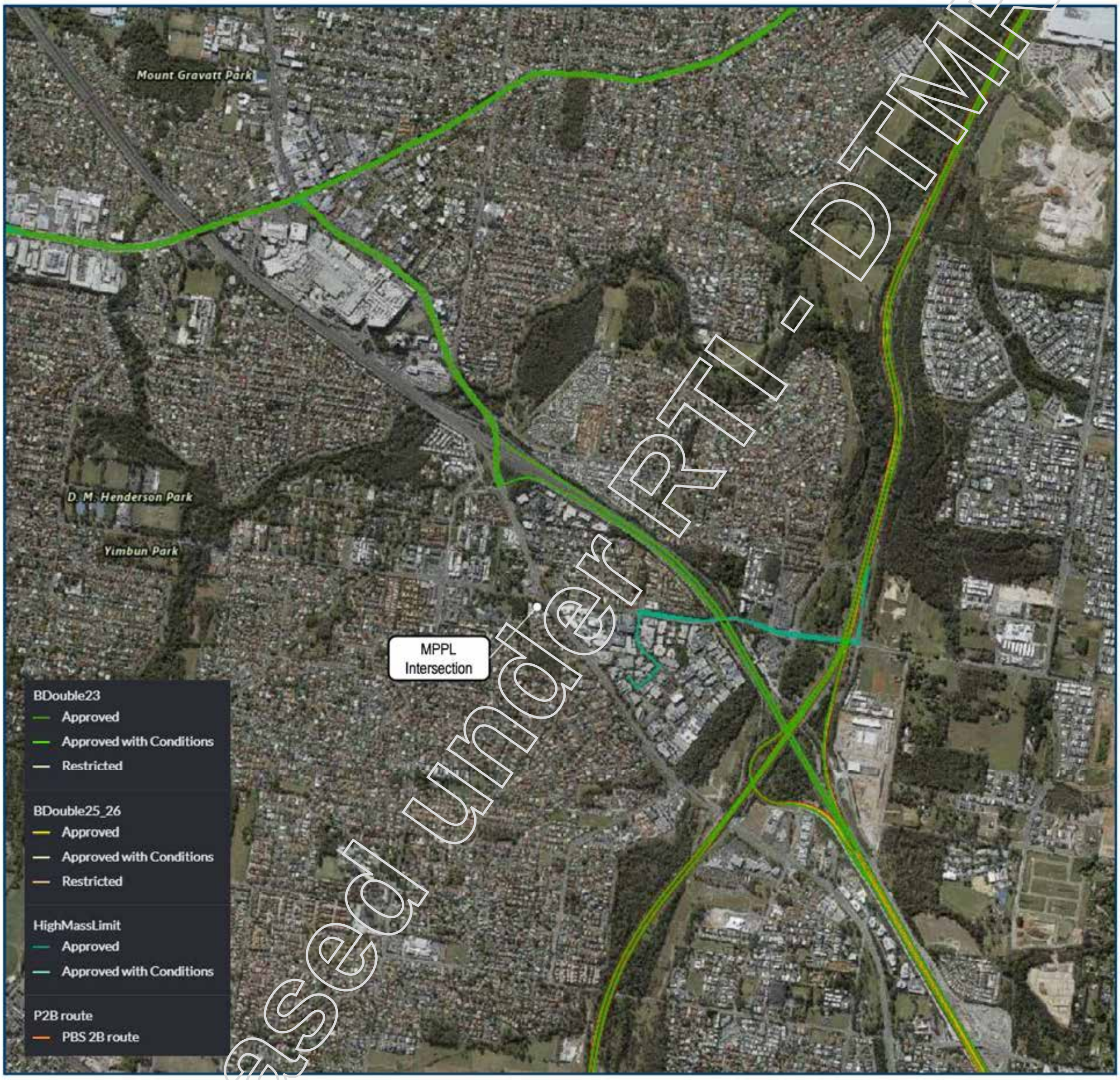


Figure 8 Road Network: Freight Routes

Key points to note are summarised below:

- There are no approved freight routes through the MPPL intersection (e.g. B-Doubles and Higher Mass Limits)
- B Doubles are permitted to use Logan Road north of Warrigal Road
- Higher Mass Limits are permitted to access the Brisbane Technology Park via Miles Platting Road
- Semi-trailers and smaller trucks are permitted to travel through the study area "as of right".

2.2.4 Recent Projects Near Study Area

Figure 9 illustrates the location of recent transport projects within and close to the study area.

Figure 9 Recent Transport Projects

Table 5 summarises relevant details for the transport projects within and close to the study area.

Table 5 Recent Transport Projects

ID	Name	Year	Description
1	Padstow Road / Warrigal Road Intersection Upgrade	2011	BCC upgraded this intersection from a roundabout to traffic signals in 2011
2	Miles Platting Road / Buckingham Place Intersection Upgrade	2012	BCC upgraded this intersection from a priority-controlled intersection to traffic signals in 2012
3	Warrigal Road "Green Link"	2015	TMR constructed a bus link between the intersections of Logan Road / Warrigal Road / M3 Ramps and Warrigal Road / Bleasby Road in 2015
4	MPPL Minor Works	2015	TMR extended the Logan Road southbound right turn lanes on approach to the MPPL intersection and provided an on-road cycle lane on Logan Road
5	MPPL Minor Works	2022	The zebra crossing on the left turn slip lane from Padstow Road into Logan Road was removed. On-demand signalised pedestrian crossings were installed on the left turn slip lanes from Padstow Road (west) and Miles Platting Road (east) into Logan Road.

Key points to note are summarised below:

- The intersection of Padstow Road / Warrigal Road and Miles Platting Road / Buckingham Place were both upgraded by BCC within the last 15 years, potentially to their "ultimate" state
- TMR has implemented relatively minor works at the MPPL intersection within the last 10 years to both add additional southbound capacity on Logan Road (right turn extension) and comply with the Road Safety Policy (on-demand signalised pedestrian crossing facilities)
- The Warrigal Road "Green Link" has been operating for approximately 10 years.

2.3 Public Transport Network

2.3.1 Existing Infrastructure

Figure 10 illustrates the location of public transport infrastructure within and near the study area.

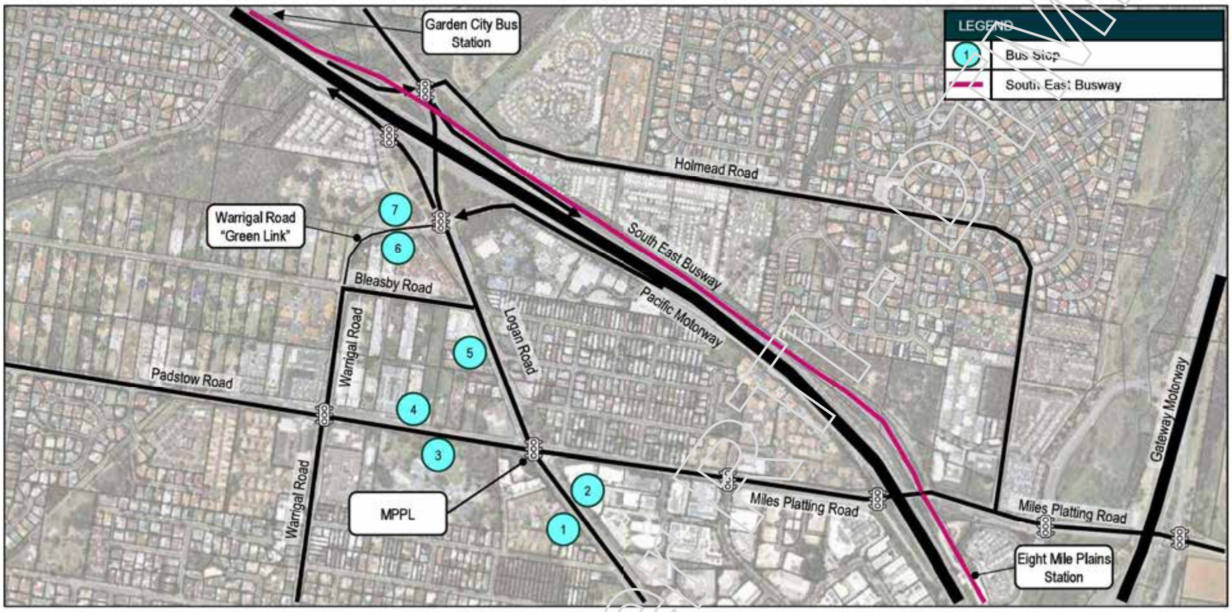


Figure 10 Public Transport Network: Bus Stops

Table 6 summarises characteristics of public transport infrastructure (bus stops) within the study area.

Table 6 Public Transport Network: Bus Stops

ID	Stop ID	Stop Name	Bus Routes	Stop Type
1	005768	Logan Rd at Miles Platting Road Stop 82	152, 545	Bus Bay
2	010871	Logan Rd at Miles Platting Road, Stop 82	152, 299, 545	Bus Bay
3	006493	Padstow Rd near Logan Road	6038, 8024, 8026, 8033	Inline
4	006494	Padstow Rd near Logan Road	8024, 8026, 8033	Bus Bay
5	010873	Logan Rd near Liverpool St, Stop 81	152, 545	Bus Bay
6	002063	Warrigal Road Green Link	150, 156, N154, P157	Bus Bay
7	002062	Warrigal Road Green Link	150, 156, P157	Bus Bay

Key points to note are summarised below:

- Three (3) bus stops on Logan Road within the study area which are all indented bus bays
- Two (2) bus stops on Padstow Road within the study area which are used by school buses
- Warrigal Road "Green Link" provides indented bus bays in both directions
- The South East Busway is located at the northern extents of the study area
- Garden City Bus Station and Eight Mile Plains Bus Station are located close to the study area.

2.3.2 Existing Bus Routes

Figure 11 illustrates existing bus routes which travel through the study area.

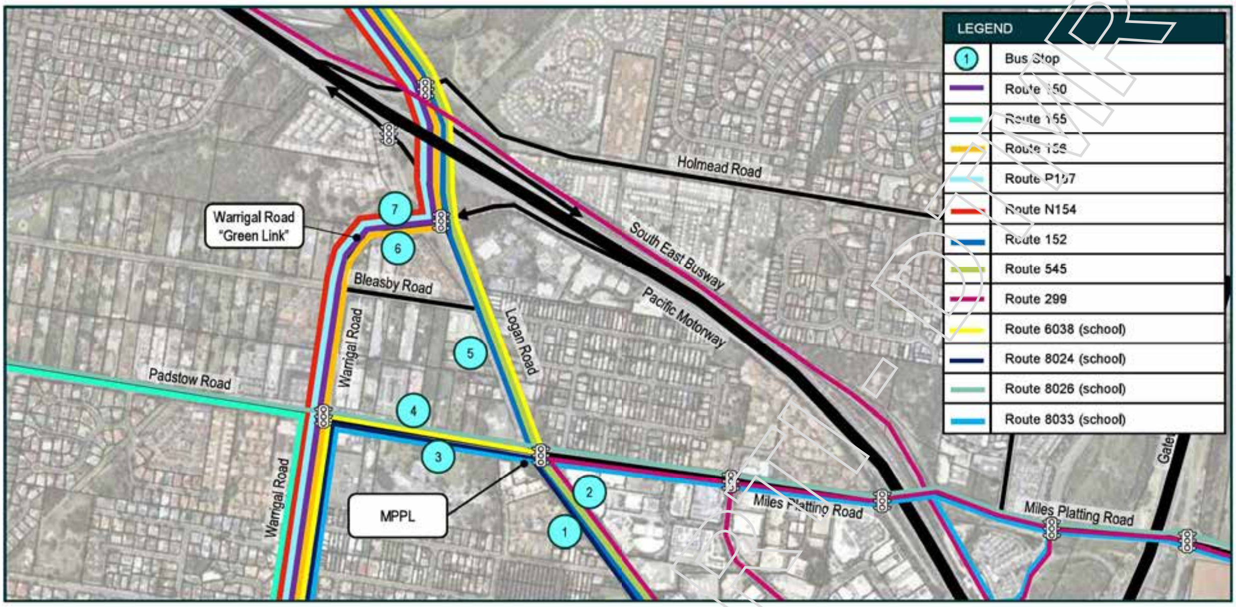


Figure 11 Public Transport Network: Existing Bus Routes

Table 7 summarises relevant details of the bus routes that currently service the study area.

Table 7 Public Transport Network: Existing Bus Routes

Route	Description	Servicing
150	Browns Plains to City	Browns Plains, Calamvale, Runcorn, Eight Mile Plains, Garden City, Griffith University, City
152	Garden City Interchange	Stretton, Runcorn, Sunnybank Hills, Eight Mile Plains, Garden City
N154	City to Browns Plains	City, Fortitude Valley, Kangaroo Point, Griffith University, Eight Mile Plains, Runcorn, Calamvale, Browns Plains
155	Calamvale to City	Calamvale, Runcorn, Eight Mile Plains, Griffith University, City
156	Stretton to City	Stretton, Runcorn, Eight Mile Plains, Garden City, City
P157	Runcorn to City	Runcorn, City
299	Brisbane City	Rochedale, Eight Mile Plains, Brisbane Technology Park, Griffith University, Holland Park West, Greenslopes, Buranda, Brisbane City
545	Garden City	Garden City, Eight Mile Plains, Underwood, Woodridge, Logan Central, Kingston, Marsden, Heritage Park, Browns Plains
6038	School Bus Route	Macgregor, Eight Mile Plains, Runcorn, Sunnybank Hills, Browns Plains
8024	School Bus Route	Kuraby, Eight Mile Plains, Underwood, Rochedale South, Springwood, Daisy Hill
8026	School Bus Route	Rochedale, Eight Mile Plains, Sunnybank, Runcorn, Kuraby, Underwood, Daisy Hill
8033	School Bus Route	Rochedale, Eight Mile Plains, Runcorn, Kuraby, Underwood

Key points to note are summarised below:

- Translink bus routes and school bus routes both travel through the study area
- Most of the bus routes that travel through the study area use the Warrigal Road "Green Link".

2.3.3 Future Bus Routes

In June 2023, BCC released the "Brisbane's New Bus Network" which outlines proposed changes to bus routes within the Brisbane Local Government Area (LGA) due to the Brisbane Metro and Cross River Rail projects. The Community Consultation Report (June 2023) states the following:

"*Brisbane's New Bus Network will:*

- *Introduce two new Brisbane Metro lines, unlocking capacity to get more people to where they want to go, at the times they want to travel.*
- *Reduce bottlenecks and congestion by better utilising our busways and simplifying where services enter and exit the CBD, to deliver greater service reliability.*
- *Increase connections with other public transport modes, including Cross River Rail, to create more interchange opportunities and travel options.*"

Table 8 summarises the proposed bus route changes within the study area.

Table 8 Public Transport Network: Future Bus Routes

Route	Description	Proposed Changes
132	Parkinson to Upper Mt Gravatt Station	Route change to now travel through the study area via the Warrigal Road "Green Link" (currently via Mains Road)
150	Browns Plains to City	No proposed changes
152	Garden City Interchange	No proposed changes
N154	City to Browns Plains	Not stated (assume no change)
155	Calamvale to City	Route change to include Eight Mile Plains Station resulting in an additional left turn from Miles Platting Road into Logan Road
156	Stretton to City (Rocket)	Combined with 157 (no change through study area)
P157	Runcorn to City	Combined with 156 (no change through study area)
299	Brisbane City	Not stated (assume no change)
545	Garden City	Not stated (assume no change)

Figure 12 illustrates the proposed bus route changes within the study area.

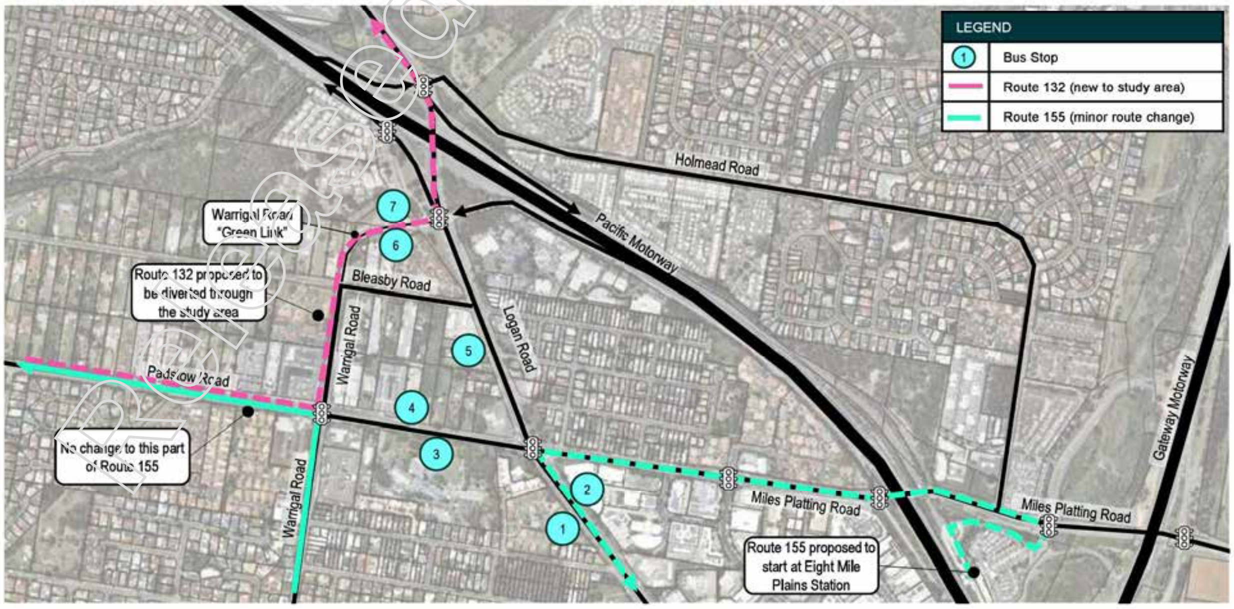


Figure 12 Public Transport Network: Proposed Changes to Bus Routes

2.4 Active Transport Network

Figure 13 reproduces TMR's Principal Cycle Network Plan (PCNP) within the study area.

Figure 13 Active Transport Network: TMR Principal Cycle Network Plan

Figure 14 reproduces BCC's Bicycle Network Overlay within the study area.

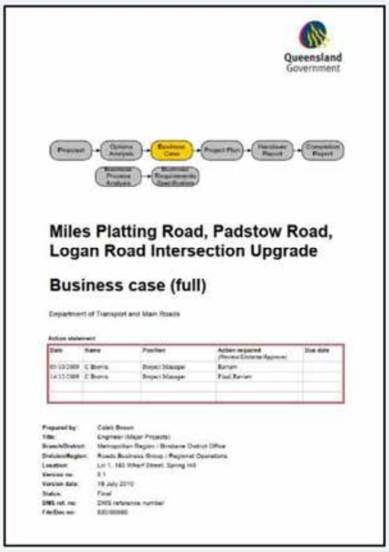
Figure 14 Active Transport Network: BCC Bicycle Network Overlay

Key points to note are summarised below:

- Logan Road, Padstow Road, and Miles Platting Road all form part of TMR's PCNP (Priority C) and are classified as Secondary Cycle Routes within BCC's Bicycle Network Overlay
- BCC's City Plan 2014 defines a Secondary Cycle Route as "*A cycle route that provides linkages between residential areas and primary routes or between suburban destinations such as schools, suburban centres, cultural activity areas and recreational facilities*"
- Notwithstanding the above, the primary cycle infrastructure which currently services the study area is the V1 (dedicated cycleway), which runs along the western side of the Pacific Motorway.

3.0 Previous Planning

3.1 2010 Business Case


Queensland Government

Miles Platting Road, Padstow Road, Logan Road Intersection Upgrade

Business case (full)

Department of Transport and Main Roads

In 2010, TMR completed a Planning Study and Business Case for MPPL which identified a preferred ultimate upgrade solution (**Option MT1**), as well as the following additional works:

- The Warrigal Road "Green Link" (this has been constructed)
- An upgrade of the Logan Road / Warrigal Road intersection with an additional right-turn lane on the M3 exit ramp approach
- A new U-turn facility and signalised pedestrian crossing on Logan Road near Bleasby Road and London Street
- Signalisation of the Miles Platting Road / Buckingham Place intersection (this has been constructed)
- Extension of Manchester Street to Buckingham Place through Buckingham Place Park for local access.

The P90 risk-adjusted cost estimate for Option MT1 was approximately $133M ($2011) excluding escalation allowance.

The preferred option in the 2010 BC was not funded for construction due to high project estimated costs.

Figure 15 illustrates the preferred ultimate upgrade option from the 2010 Business Case (**Option MT1**).

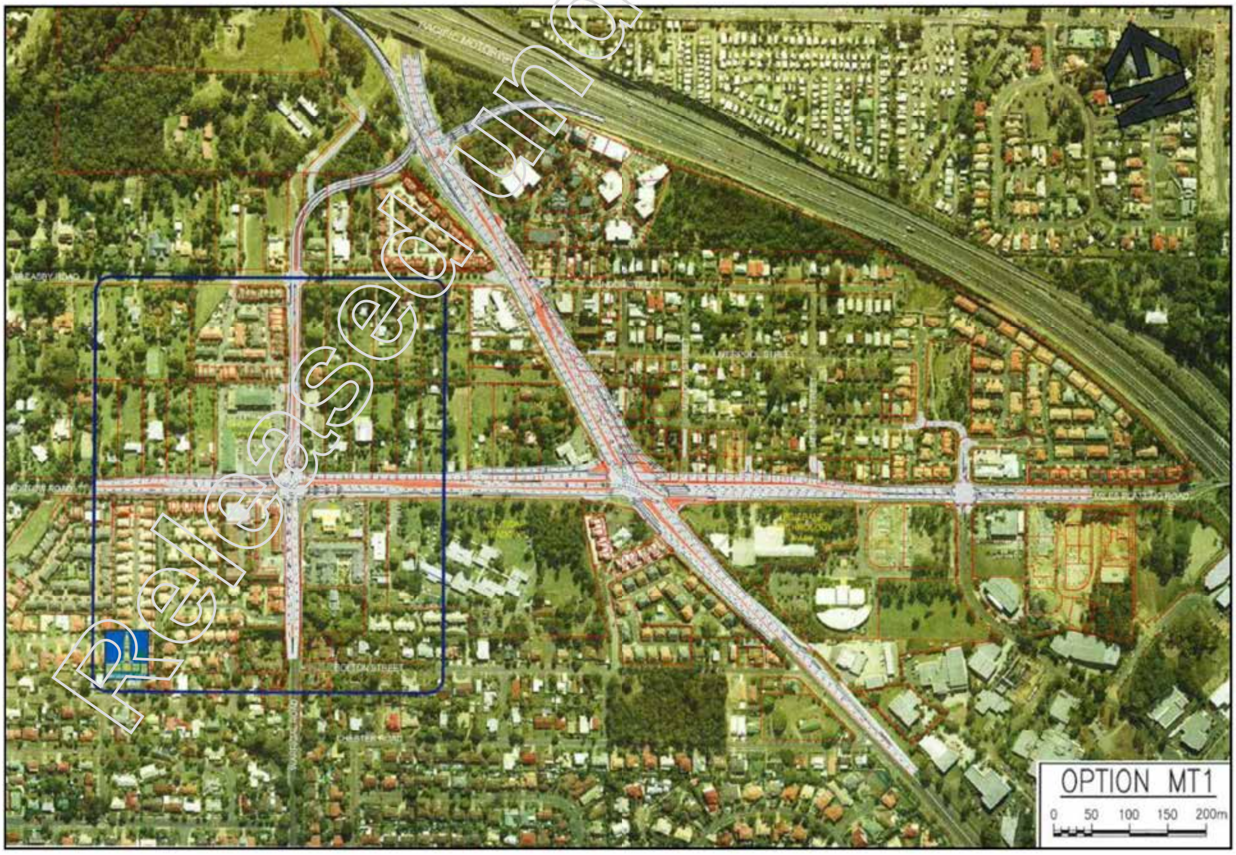
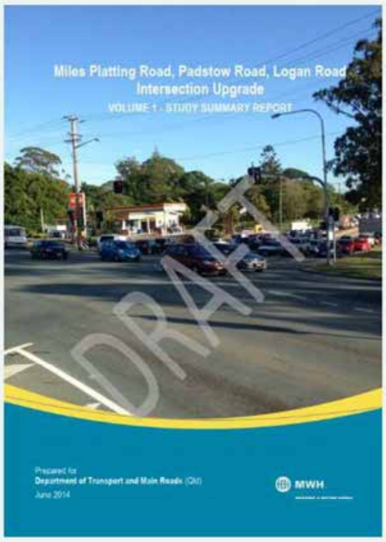


Figure 15 2010 Business Case – Preferred Option MT1

3.2 2014 Planning Review



In 2014, TMR completed a Planning Review of the 2010 Business Case with the intent to identify a more cost-effective solution. The review confirmed that there are significant constraints which limit the ability to develop cost-effective options, including:

- Established properties (e.g. petrol station and sub-station)
- Recent upgrades (e.g. at the Warrigal Road / Padstow Road and Buckingham Place / Miles Platting Road intersections)
- Future committed and planned TMR projects (e.g. Logan Road Improvement Works and Warrigal Road “Green Link”, which were both subsequently delivered in 2015)

The review confirmed the issues identified in the 2010 Business Case were still valid but suggested that **Option MT1** provided more infrastructure than required in the 2031 design horizon. Consequently, the review recommended a revised ultimate upgrade solution with a reduced footprint, referred to as **Option 4**.

The review noted that Option 4 required a similar number of property resumptions to the 2010 Business Case Option MT1 but reduced the extent of construction and pavement requirements.

The P90 risk-adjusted cost estimate for Preferred Option 4 was approximately $97M ($2011) excluding escalation allowance.

An interim stage of Option 4 was constructed in 2015. This included an extension of the Logan Road southbound right turn lane and the provision of a new southbound on-road cycle lane.

Figure 16 illustrates the preferred ultimate upgrade option from the 2014 Planning Review (**Option 4**).

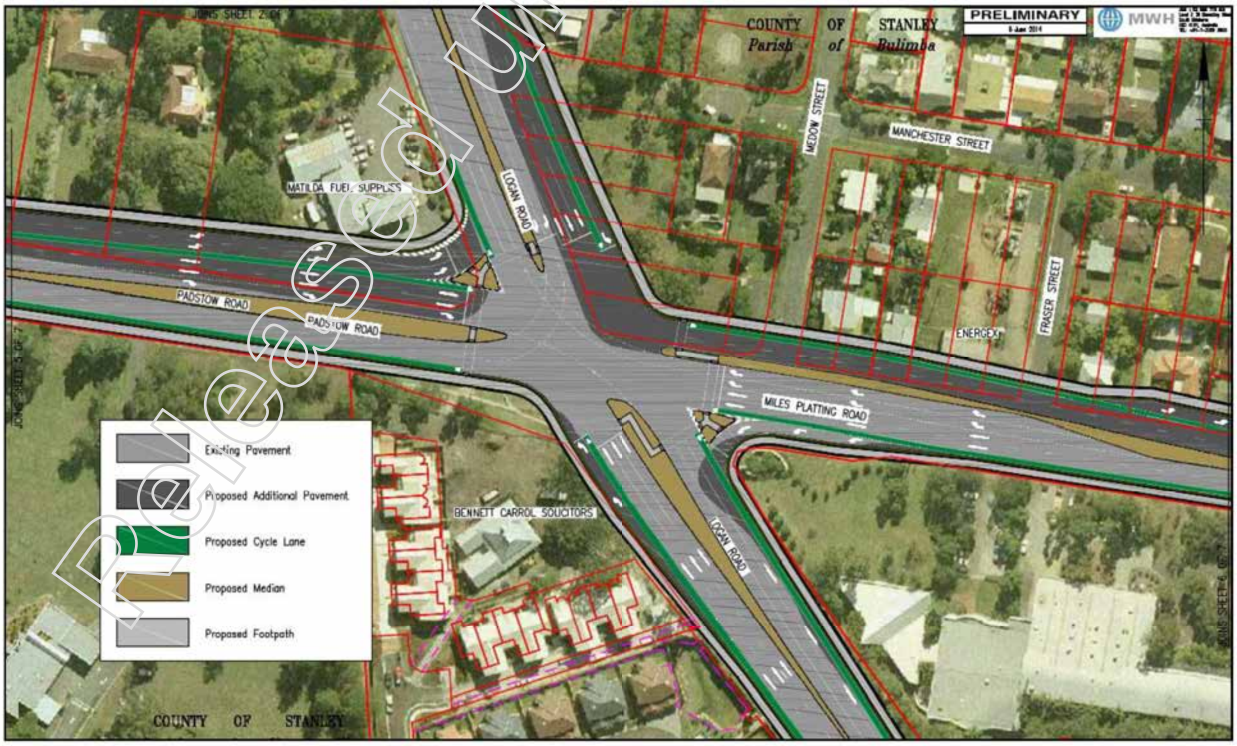
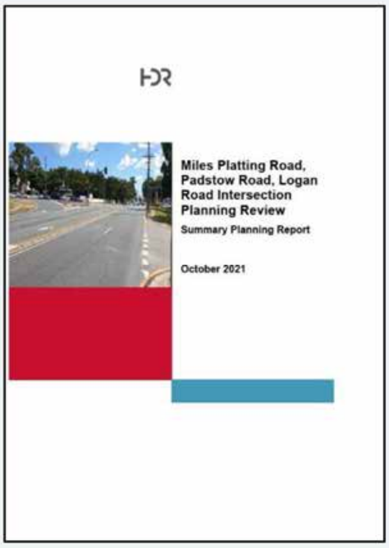


Figure 16 2014 Planning Review – Preferred Option 4

3.3 2021 Planning Study and Options Analysis

3.3.1 Ultimate Option


HDR

Miles Platting Road, Padstow Road, Logan Road Intersection Planning Review

Summary Planning Report

October 2021

In 2021, TMR completed another review of **Option MT1** as well as an Options Analysis for the following alternative upgrades:

- **Option RI1:** Traditional signals
- **Option RI2:** Right-turn flyover
- **Option RI3:** Northbound flyover
- **Option RI4:** Displaced right-turn
- **Option RI5:** Median U-turn
- **Option RI5A:** Single median U-turn
- **Option RI6:** Alternative right turn routes.

A detailed multi-criteria assessment (MCA) identified **Option RI5A** as the preferred as it "*balances traffic performance with property impacts and improves flexibility to manage traffic demand increases and traffic pattern changes*".

Key features for **Ultimate Option RI5A** include:

- Three through lanes on Logan Road in both directions
- Removal of all left turn slip lanes at the MPPL intersection
- Removal of the southbound right-turn lanes on Logan Road
- New two-lane midblock U-turn south of the intersection
- Closure of Liverpool Street and Meadow Street
- Limiting Fraser Street to Left-in / Left-out.

The P90 risk-adjusted cost estimate for Option RI5A was approximately $138M ($2021) excluding escalation allowance.

Figure 17 illustrates the preferred ultimate upgrade option from the 2021 OA (**Option R15A**).

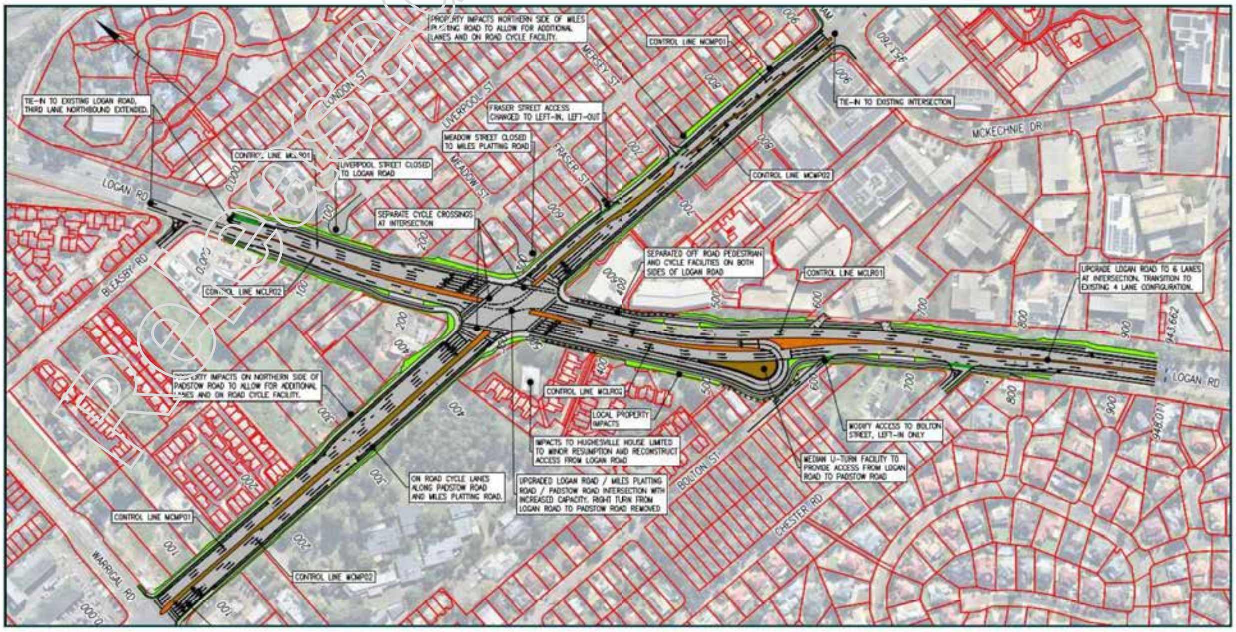
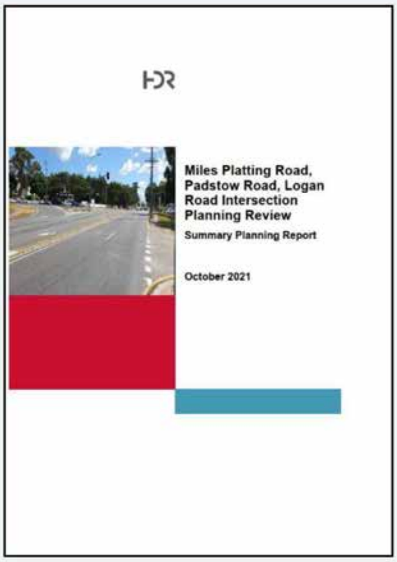


Figure 17 2021 Options Analysis – Ultimate Option R15A

3.3.2 Low-Cost Options


HDR

Miles Platting Road, Padstow Road, Logan Road Intersection Planning Review

Summary Planning Report

October 2021

The 2021 OA also identified a series of low-cost (LC) options that could be potentially implemented in the short-term without land acquisitions or the need for major infrastructure works, including:

- **Option LC1:** Northbound M3 ramp left-turn reconfiguration
- **Option LC2:** M3 entry ramp storage increase
- **Option LC3:** Southbound Logan right-turn reconfiguration
- **Option LC4:** Westbound Padstow left-turn reconfiguration
- **Option LC5:** Southbound Logan left-turn extension
- **Option LC6:** Northbound Logan left-turn extension

Whilst LC5 (Southbound Left Turn lane) required an extension of an existing drainage structure and extending the road pavement into Charles Fraser Park, all other options generally only required line marking modifications and other minor works.

The 2021 OA concluded that the low-cost scheme:

- Would reduce average 2019 morning and afternoon peak period intersection delays by approximately 33% (from 286 to 193 seconds per vehicle) and approximately 28% (from 173 to 124 seconds per vehicle) compared to the Base Case
- Would not have any property impacts, with most of it able to be implemented within the existing carriageway.

All LC options except LC2 form part of the subject BC.

Figure 18 illustrates the five (5) low-cost options from the 2021 Planning Study and Options Analysis.

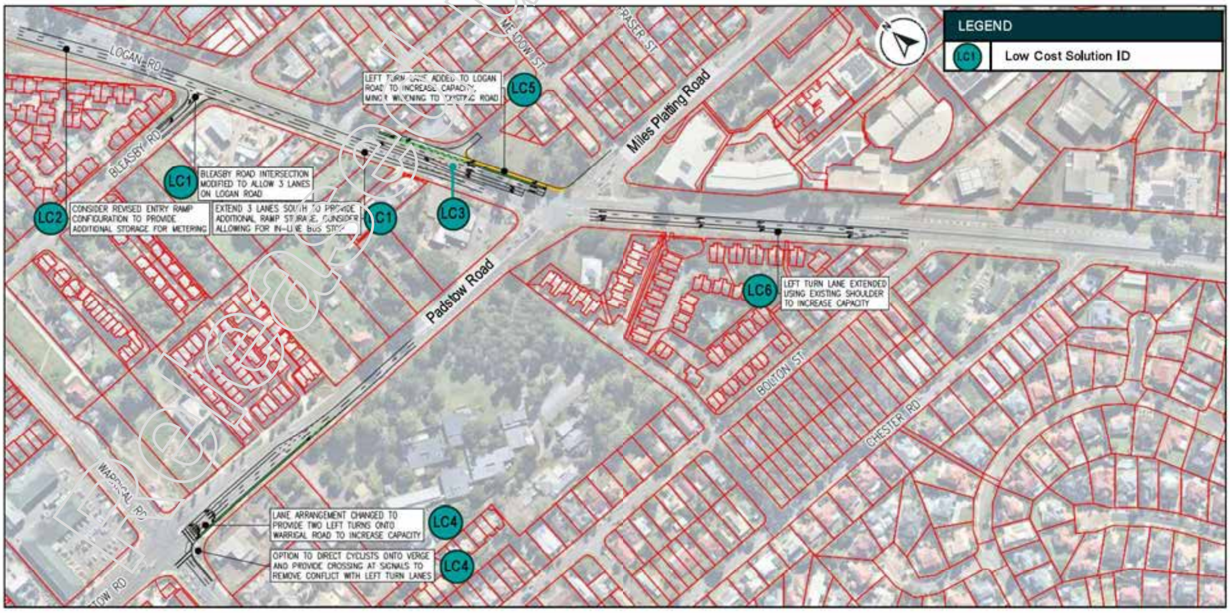


Figure 18 2021 Options Analysis - Low-Cost Options

4.0 Transport Modelling

4.1 Overview

Dykman Consulting was engaged by AECOM to provide traffic modelling services for the MPPL Planning Study. During their engagement, Dykman Consulting prepared the following deliverables:

- **Appendix A:** 60731166-REP-0001-TN#1: Existing Traffic Models Review & Data Gap Analysis
- **Appendix B:** 60731166-REP-0002-Modelling Methodology Report
- **Appendix C:** 60731166-REP-0003-Base Year Model Development Report
- **Appendix D:** 60731166-REP-0014-Options Modelling Report

A copy of each deliverable is attached to this report. Key findings are summarised below.

4.2 Technical Note #1: Existing Traffic Model & Data Gap Analysis

4.2.1 Existing Strategic Models

TMR's Transport Analysis Unit (TAU) maintains two (2) strategic models that cover the study area, including:

- South East Queensland Strategic Transport Model – Multi Modal (SEQSTM-MM)
- Brisbane Strategic Transport Model – Multi Modal, BSTM-MMv2.4 (BSTM-MM)

For the MPPL Planning Study, TAU recommended the use of BSTM-MM to provide the traffic demand matrices for a cordon (subarea) for input into the AIMSUN microsimulation traffic model.

Technical Note #1 concluded that the BSTM-MM is well calibrated and validated to existing conditions in 2016, and as such it is appropriate for use in the MPPL Planning Study for providing the traffic demands for the base and future years as inputs for the operational model (i.e. seed matrices).

4.2.2 Existing Operational Models

In 2017, TMR developed the Brisbane Mesoscopic AIMSUN Model (BMAMv2.3).

Technical Note #1 noted the observed traffic count data set for calibrating the BMAM includes data sourced from different time periods and collection methods, which contributes to the calibration results within the study area not complying with industry guidelines.

TMR TAU advised the project team that the BMAM was being further refined in terms of general updates for 2021 data and network arrangements, including the model being calibrated and validated to these base conditions. Given this is not included in release version 2.3, the BMAM was used for the MPPL Planning Study to inform the general network arrangements and data review only (i.e. it was not used for demand development purposes).

4.2.3 Data Gap Analysis

TMR provided traffic survey counts, travel time data, and signalised intersection data for the study area. After reviewing the supplied dataset, Dykman Consulting made the following conclusions:

- **Traffic survey counts:** the traffic survey counts provided for this analysis are considered appropriate for use as a calibration dataset in the base year model development phase of the project.
- **Travel time data:** the travel time data provided for this study is considered appropriate for use as a validation dataset in the base year model development phase of the project. This is on the basis of segment links with no supplied data are supplemented by travel time data from another time period
- **STREAMS Signal Data:** the signal data provided includes enough detail to efficiently model actuated signal control settings in the base year AIMSUN microsimulation traffic model.

4.3 Modelling Methodology Report

The Modelling Methodology Report was developed in consultation with TAU to ensure the adopted transport modelling methodology was appropriate to support the transport modelling assessment needs for both the SASR and BC phase of the project, including identifying the problem for the SASR.

The adopted model framework includes the use of TMR's BSTM-MM and BMAM along with observed traffic data of existing conditions to develop a microsimulation traffic model. The flow chart of TMR model inputs for the development of the microsimulation traffic model is presented in **Figure 19**.

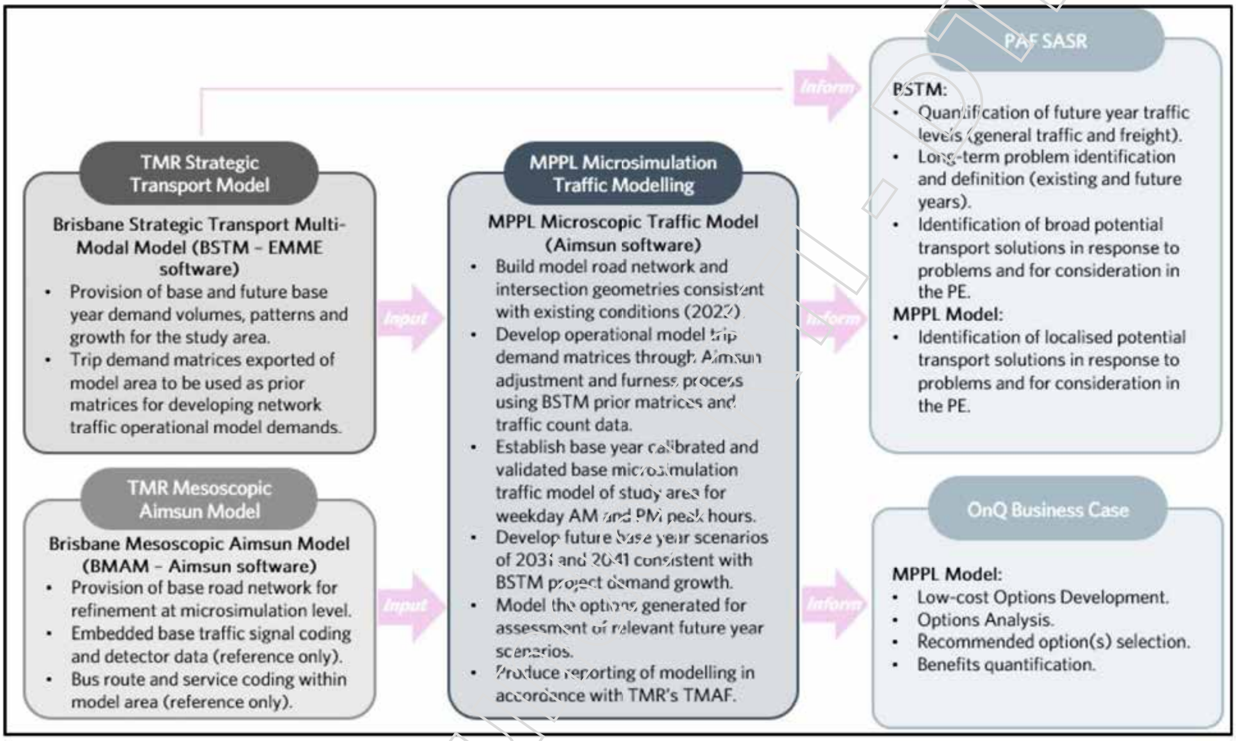


Figure 19 Endorsed Traffic Model Framework

4.4 Base Year Model Development Report

The Base Year Model Development Report outlines the development of the AIMSUN microsimulation model which was used for the transport modelling assessment needs of both the SASR and BC phases of the MPPL project. The results presented in the report indicate that the base year model appropriately simulates traffic volumes and travel times consistent with the observed existing traffic conditions and is generally within industry guidelines for base year model calibration and validation requirements.

4.5 Options Modelling Report

The Options Modelling Report discusses the AIMSUN microsimulation results for the future base case model as well as various project options models for the BC phase of the project. Whilst the options models are not directly relevant for the SASR, the future base model provides valuable insights into the problem definition. Key observations in relation to the 2031 and 2041 future base case models include:

- There are no road network upgrades within the model area with committed funding
- Future public transport routes and schedules were maintained as per the existing conditions
- Actuated signal control was maintained as per the base year model signal settings given that a number of these settings have recently been specifically implemented to manage congestion and queue lengths on the M3 Pacific Motorway northbound off-ramp to Logan Road (Exit 14)
- Travel demands have been factored up based on relative growth within the BSTM-MMv2.4.

The results from the future base model indicate that without intervention, average vehicle speeds and average journey times within the study area will continue to significantly deteriorate in 2031 and 2041.

5.0 Problem Identification

5.1 Existing Situation

5.1.1 Overview

The primary transport problems that were identified for the study area are summarised below:

- Peak-hour congestion resulting from high traffic volumes on Logan Road and at MPPL
- History of casualty crashes with a high proportion classified as rear-end crashes
- Poor travel time reliability for buses on Logan Road and the Warrigal Road Green Link
- Insufficient dedicated active transport infrastructure and limited connectivity.

5.1.2 Peak Hour Traffic Congestion

5.1.2.1 Significant Traffic Volume on Logan Road

Figure 20 and **Figure 21** compares historical AADT on Logan Road north of Miles Platting Road, based on data from the Queensland Government Open Data Portal (Site 135689). It is noted that AADT is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

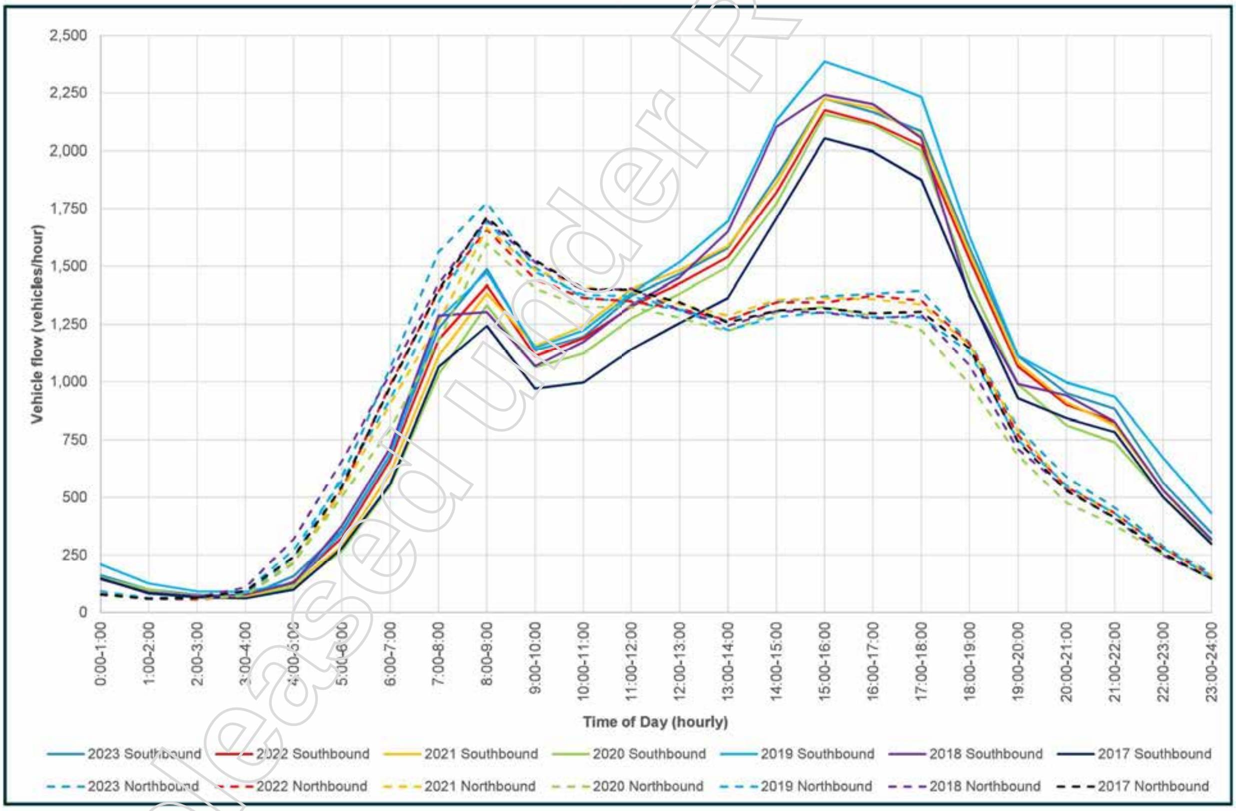


Figure 20 Logan Road – Hourly Traffic Demand Profile North of MPPL (2017 to 2023)

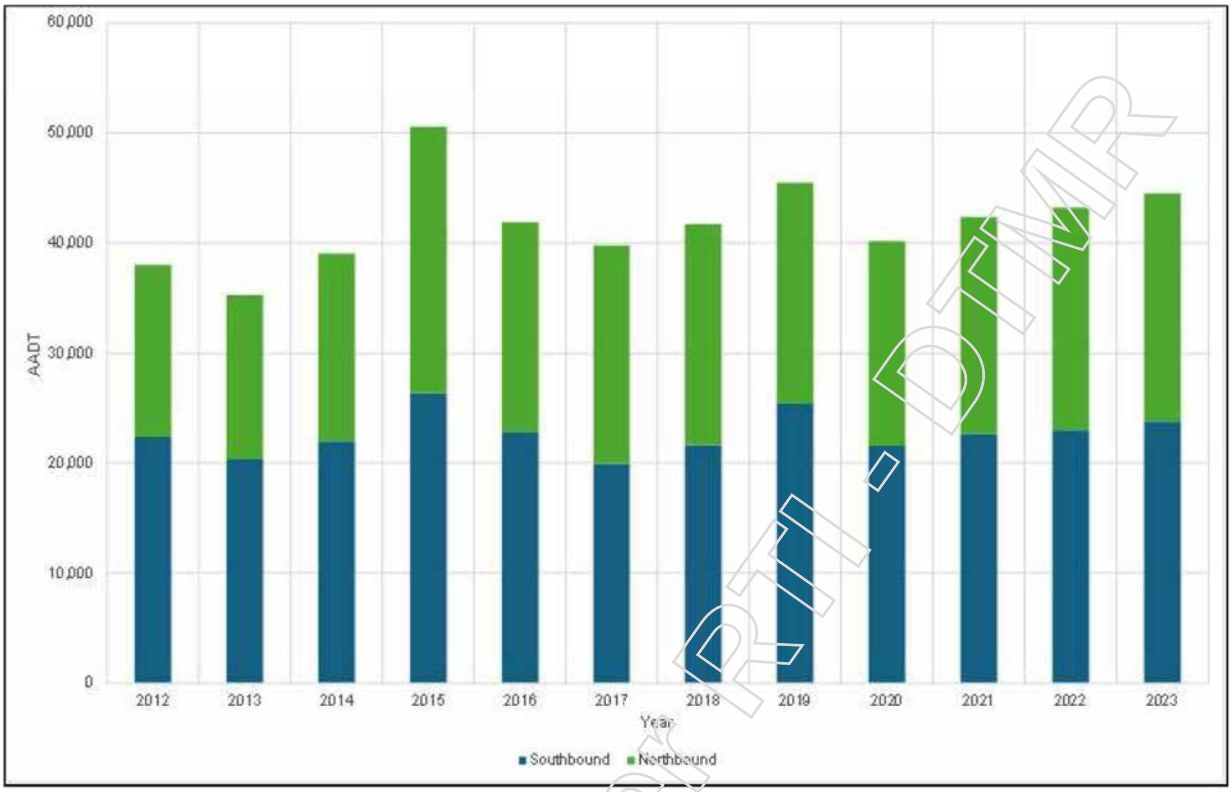


Figure 21 Logan Road – Annual Average Daily Traffic (AADT) Demands (2012 to 2023)

Table 9 compares historical daily traffic demands at the same location on Logan Road (Site 135689).

Table 9 Logan Road – Annual Average Daily Traffic (AADT) Demands (2012 to 2023)

Year	Southbound	Northbound	Combined	Directional Split
2012	22,310	15,707	38,017	59% (SB) / 41% (NB)
2013	20,322	14,967	35,289	58% (SB) / 42% (NB)
2014	21,978	17,079	39,057	56% (SB) / 44% (NB)
2015	26,365	24,208	50,573	52% (SB) / 48% (NB)
2016	22,880	19,082	41,962	55% (SB) / 45% (NB)
2017	19,902	19,886	39,788	50% (SB) / 50% (NB)
2018	21,638	20,119	41,757	52% (SB) / 48% (NB)
2019	25,397	20,126	45,523	56% (SB) / 44% (NB)
2020	21,546	18,631	40,177	54% (SB) / 46% (NB)
2021	22,674	19,732	42,406	53% (SB) / 47% (NB)
2022	23,041	20,232	43,273	53% (SB) / 47% (NB)
2023	23,834	20,755	44,589	53% (SB) / 47% (NB)

Key points to note are summarised below:

- **AADT:** Logan Road north of MPPL carried in the order of 45,500 vpd in 2023
- **Growth:** The AADT increased between 2012 and 2023 at a rate of approximately 1.6% p.a.
- **Directionality:** The southbound demand (53%) is higher than the northbound demand (47%)
- **Profile:** The PM peak period is greater and over a longer period compared to the AM peak period.

5.1.2.2 Significant Traffic Volumes at the Study Intersection

Figure 22 and **Figure 23** reproduce surveyed traffic demands at Intersection 1 from 12 October 2022.

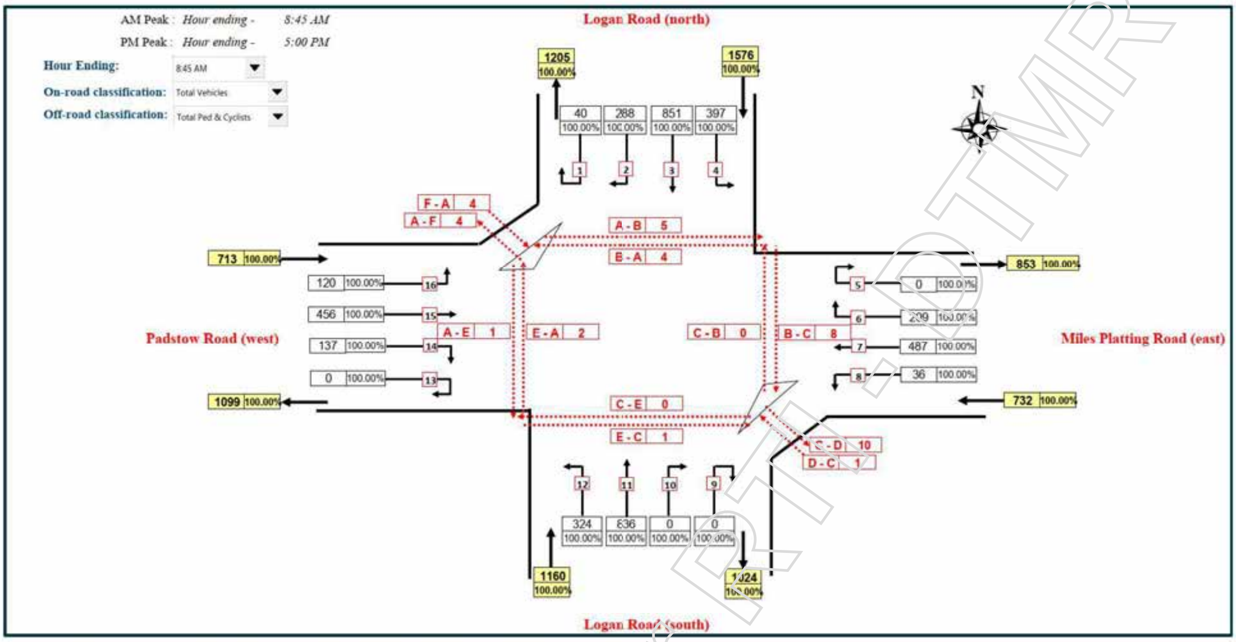


Figure 22 Intersection 1: 2022 AM Peak Hour Traffic Demands

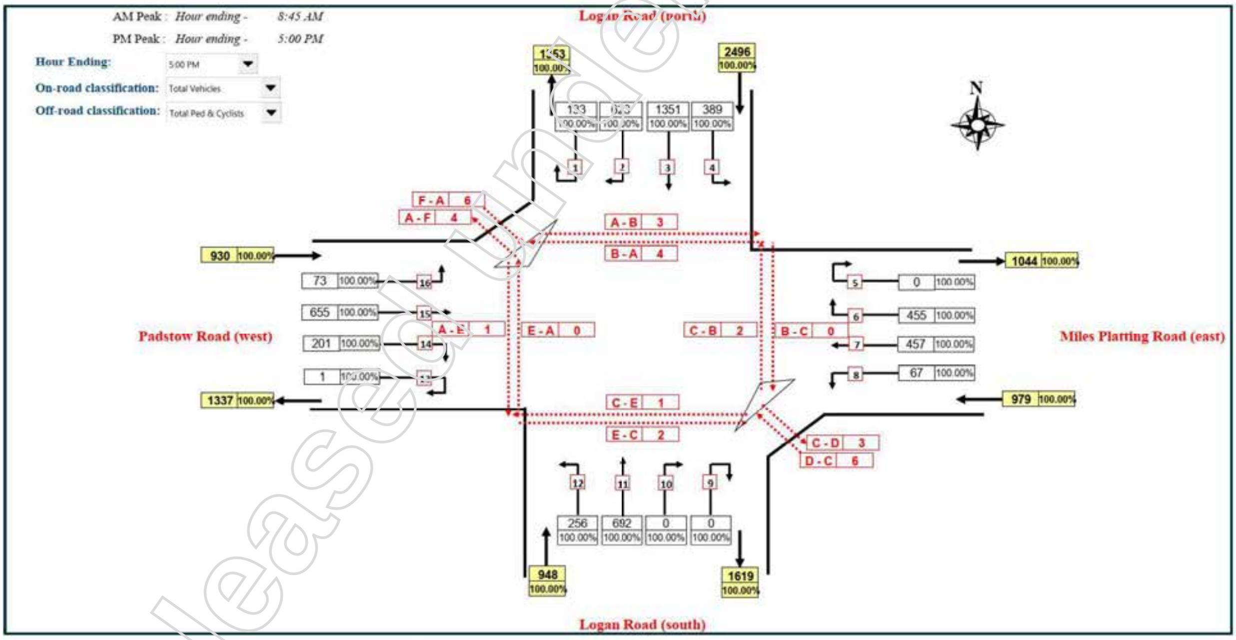


Figure 23 Intersection 1: 2022 PM Peak Hour Traffic Demands

Key points to note are summarised below:

- Significant peak hour traffic demands at the intersection (4,200 in the AM and 5,300 in the PM)
- Southbound demand is significantly higher in the PM peak (1,500 in the AM vs. 2,500 in the PM)
- Moderate pedestrian demands at the intersection (40 movements in the AM and 32 in the PM)
- Limited cyclist demands at the intersection (2 movements in the AM and 0 in the PM).

5.1.2.3 Extensive Queues and Delays During Peak Periods

Figure 24 and **Figure 25** compares "Google Traffic" and simulated density plots for the study area extracted from the AIMSUN model for the 2024 AM and PM peak hours respective. The density plots represent the number of vehicles per lane within road sections and provides an indication of typical vehicle queue formation or slow-movement traffic. Google Traffic conditions reflect speed of traffic relative to the speed limit, and while not an exact comparison, it is still useful.

Figure 24 Google Traffic Compared to AIMSUN Simulated Density – 2024 AM Peak

Figure 25 Google Traffic Compared to AIMSUN Simulated Density – 2024 PM Peak

These comparisons show a reasonable level of consistent traffic congestion pattern formation between the model and observed, in particular the northbound queues on Logan Road in the AM peak extending back from the Logan Road / Warrigal Road intersection through the MPPL intersection and the southbound queues at MPPL in the PM peak.

Figure 26 illustrates observed vehicle queues on Logan Road from a site inspection on Friday 17 May 2024 from 8:00am to 9:30am. These queues are consistent with Google Traffic and the simulated density plots from the AIMSUN model outlined previously.

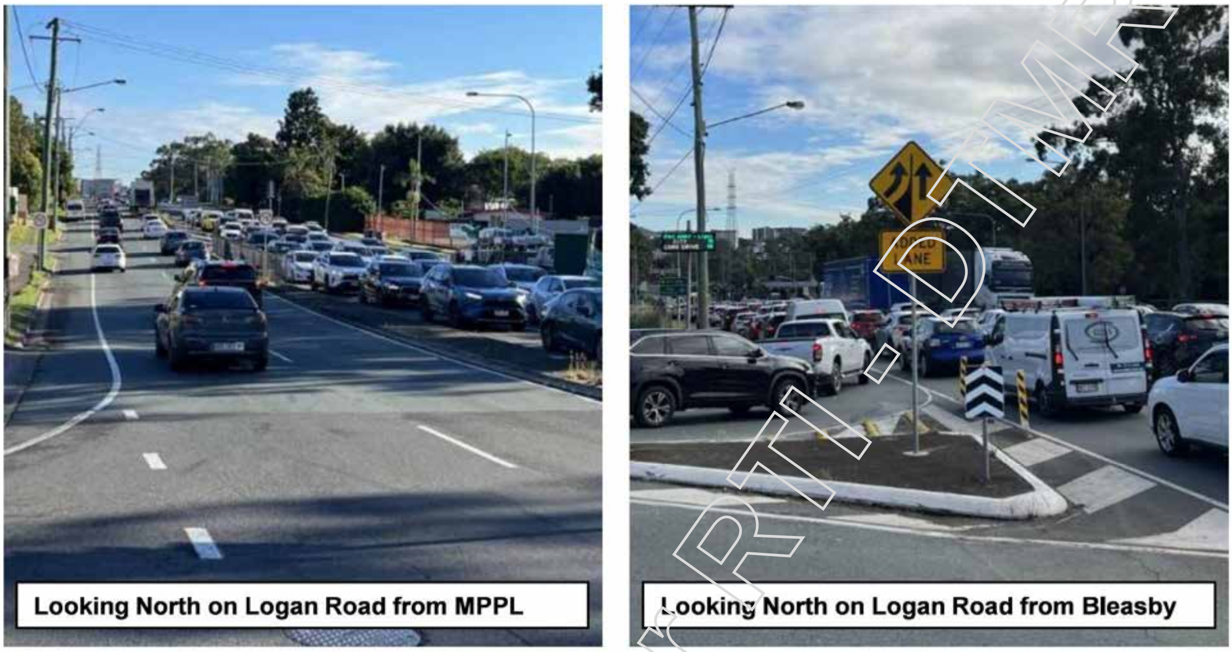


Figure 26 Site Observations – 2024 AM Peak

5.1.2.4 MPPL is Currently Operating at Capacity During Peak Periods

Table 10 summarises the intersection performance results for the 2024 AM and PM peak base year scenarios extracted from the AIMSUN model, including average delay per vehicle (seconds per vehicle) and Level of Service (LOS). It is noted that an average delay of 55 seconds per vehicle is typically adopted as the threshold between LOS D and E at signalised intersection. When delays exceed this threshold, the intersection may be operating at practical capacity

Table 10 AIMSUN simulated intersection performance – 2024 AM and PM Peaks

Intersection	AM Peak				PM Peak			
	7-8AM		8-9AM		4-5PM		5-6PM	
	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS
Logan Rd / Miles Platting Rd / Padstow Rd	58	E	33	C	51	D	57	E
Logan Rd / Warrigal Rd / NB Ramps	28	C	32	C	21	C	22	C
Logan Rd / Holmead Rd / SB Ramps	29	C	25	C	33	C	33	C
Padstow Rd / Warrigal Rd	38	D	39	D	31	C	32	C

The results indicate that MPPL is operating at or near capacity between 7-8AM (LOS E) and 5-6PM (LOS E), and that it is operating close to capacity between 4-5PM (LOS D). Based on the modelling results, Google Traffic, and site observations, it is evident that northbound queues on Logan Road at the Logan Road / Warrigal Road intersection restrict capacity at MPPL in the AM peak (i.e. queues extend back through the MPPL intersection) whereas in the PM peak, the performance issues at MPPL are attributed to the significant southbound through and right turn demand on Logan Road.

5.1.2.5 Motorists use Logan Road to Interchange Between the M2 and M3

Figure 27 and **Figure 28** illustrate that some motorists use this section of Logan Road to “interchange” between the M2 and M3 due to the absence of direct links between the motorways. According to data from the BSTM-MMv2.4, this “interchange” movement makes up around 4-7% of the traffic on Logan Road, which is significant given that the road carried approximately 43,000 vehicles per day in 2023.

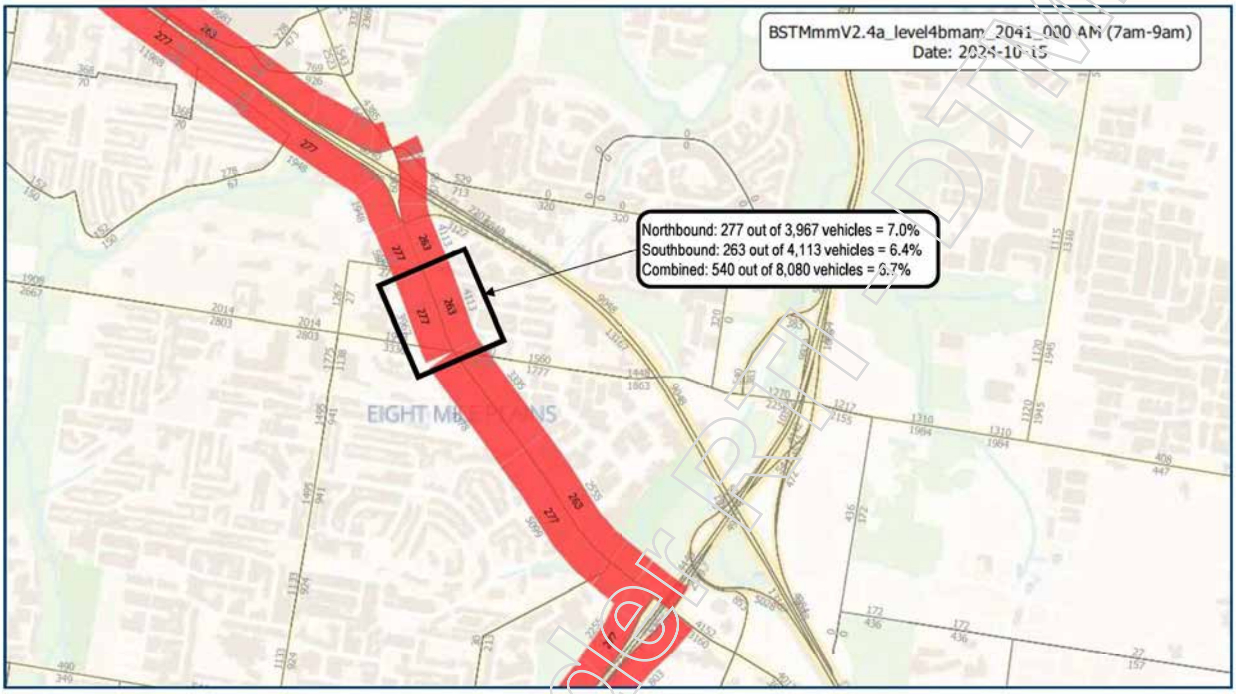


Figure 27 Motorists Interchange Between M2 and M3 (BSTM) – 2041 AM Peak Period

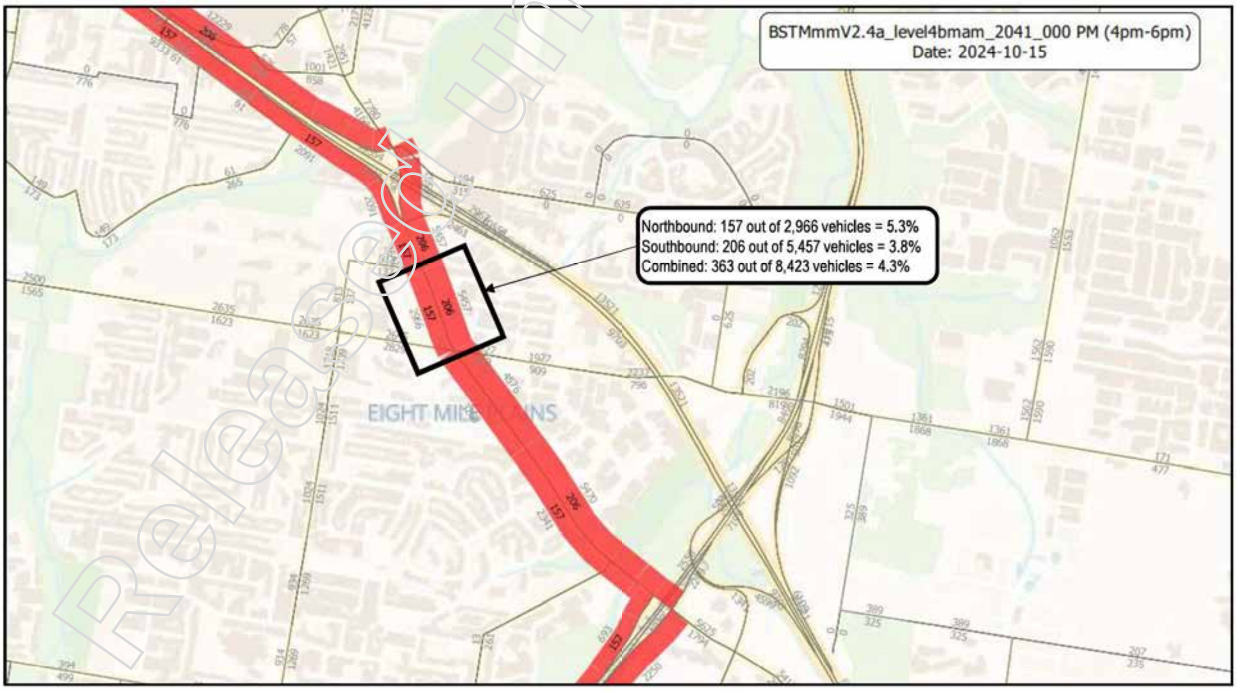


Figure 28 Motorists Interchange Between M2 and M3 (BSTM) – 2041 PM Peak Period

5.1.2.6 Motorists travel through Brisbane Technology Park to access the Park n Ride

The right turn movement from Logan Road (south) to Miles Platting Road (east) is prohibited at the MPPL intersection. As a result, it has been observed that some northbound motorists on Logan Road travel through the Brisbane Technology Park to access the Eight Mile Plains Park 'n' Ride facility by travelling along Brandl Street and McKechnie Drive.

Figure 29 indicatively illustrates the route used by these motorists.

Figure 29 Motorists Travel Through Brisbane Technology Park to Access the Park n Ride

The following key points are noted in relation to the road network within the Brisbane Technology Park:

- Road Hierarchy: neighbourhood roads (not traffic carrying roads)
- Cross Section: two lanes undivided with kerbside parking
- Alignment: circuitous (not direct)
- Speed Limit: 50km/h

In summary, the Brisbane Technology Park internal road network has been designed for local trips to or from the precinct, not "through" trips with destinations outside of the precinct.

5.1.2.7 Motorists use local road network to avoid MPPL

Figure 30 illustrates that some motorists use the local road network to avoid congestion at MPPL.

Figure 30 Motorists use Warrigal Road and Bleasby Road to Avoid MPPL

Traffic survey data obtained at the Logan Road / Bleasby Road intersection on 6 June 2018, indicates approximately 500 vehicles turn left from Bleasby Road into the continuous lane on Logan Road in both the morning and afternoon peak hour. Based on the surrounding catchment (emerging community), road hierarchy (district road), limited left turn demand from Padstow Road into Logan Road (approximately 100 vehicles in both peaks), and recent site observations, it is evident the left turn demand out of Bleasby Road is associated with northbound motorists avoiding the MPPL intersection. The continuous left turn lane out of Bleasby Road allows motorists to bypass a congested road network.

5.1.2.8 Summary

In summary:

- Logan Road carries 45,500vpd (2023) with traffic volumes increasing at approximately 1.6% p.a.
- MPPL carries 4,200 vehicles in the AM peak hour and 5,300 vehicles in the PM Peak hour (2022)
- The peak hour traffic volumes on Logan Road and at MPPL result in excessive queues and delays
- The MPPL intersection is currently operating at capacity during peak periods. In the AM peak, northbound queues on Logan Road at the Logan Road / Warrigal Road intersection restrict capacity at MPPL. In the PM peak, the significant southbound through and right turn demands on Logan Road adversely impact the performance of the intersection
- Motorists using Logan Road to interchange between the M2 and M3, which adds to the congestion
- To avoid congestion at MPPL, some motorists use the local road network (e.g. Bleasby Road)
- Due to turn restrictions at MPPL, northbound motorists on Logan Road travel through the Brisbane Technology Park to access the Eight Mile Plains park 'n' ride facility off Miles Platting Road.

5.1.3 History of Casualty Crashes

5.1.3.1 Increasing Rate of Reported Crashes within the Study Area

Figure 31 and **Figure 32** illustrate the location of reported crashes within the study area by "crash severity" and "crash type" respectively. The crash data was sourced from TMR's Data Portal for the 5-year period from 1 July 2018 to 30 June 2023 (i.e. the most recent 5-year period of available data).

It is noted that a smaller footprint was selected for the crash data analysis to identify localised crash trends and safety risks in proximity to MPPL and along Logan Road, away from the broader motorway network (e.g. M2 and M3 ramps). The broader study area reflects the vehicle movements which contribute to the congestion at MPPL, however is not deemed suitable for crash data analysis when identifying service requirements for an intersection upgrade localised at MPPL.

Figure 31 Reported Crashes – Study Area: by Crash Severity

Figure 32 Reported Crashes – Study Area: by Crash Type

Figure 33 summarises relevant factors attributed to the reported crashes within the study area, to understand if there are any relevant underlying temporal and environmental trends with the dataset.

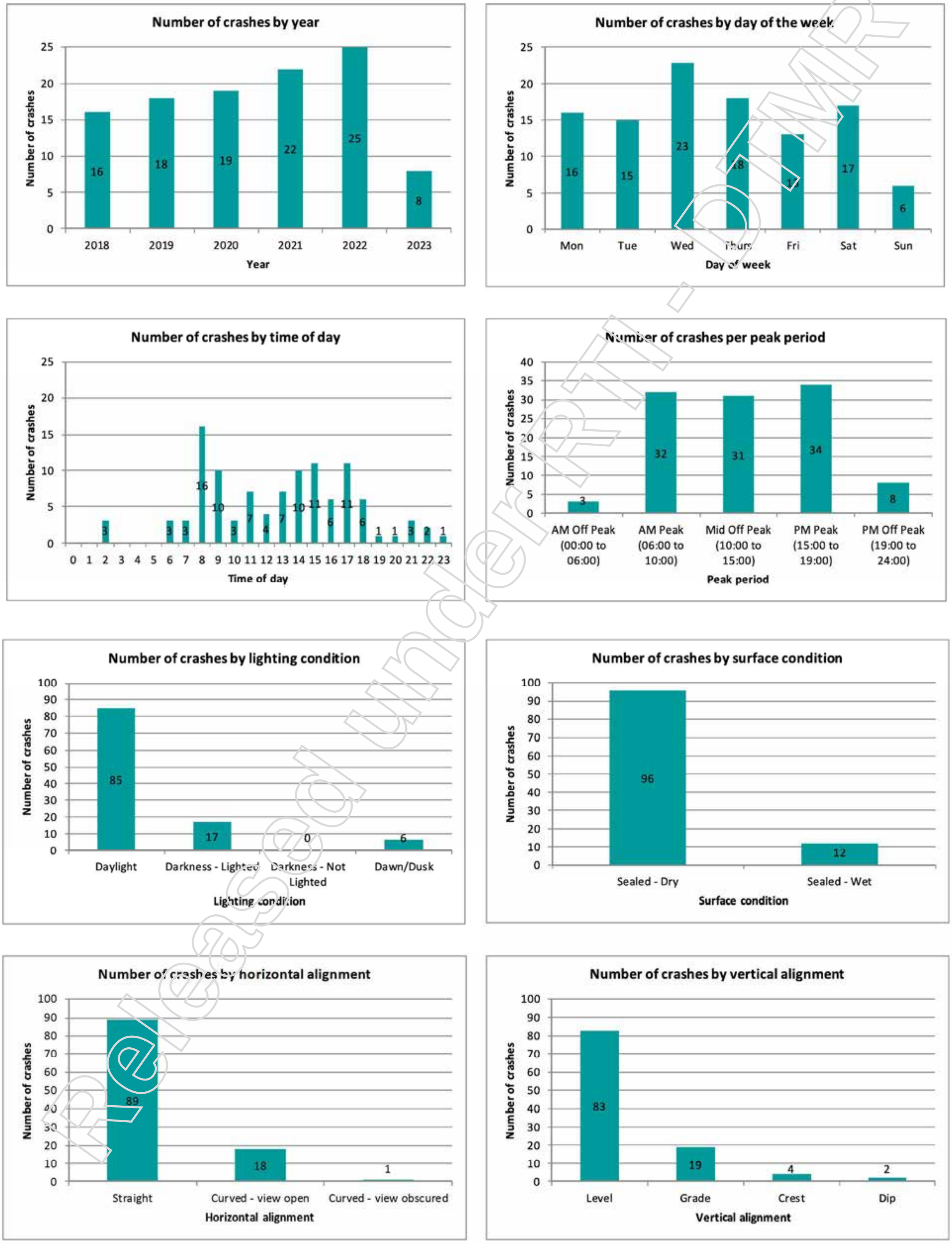


Figure 33 Reported Crashes – Study Area: Temporal and Environmental Analysis

Table 11 and **Table 12** summarise the crashes by "crash severity" and "crash type" respectively.

Table 11 Reported Crashes – Study Area: by Crash Severity

Crash Severity	Number of Reported Crashes
Fatal	0 (0%)
Hospitalisation	28 (26%)
Medical treatment	58 (54%)
Minor injury	22 (20%)
Total	**108**

Table 12 Reported Crashes – Study Area: by Crash Type

Crash Type	Number of Reported Crashes
1 - From adjacent approaches	15 (14%)
2 - Head on	1 (1%)
3 - Opposing vehicle turning	1 (1%)
4 - Rear end	68 (63%)
5 - Lane change	7 (6%)
6 - Parallel lanes, turning	2 (2%)
7 - U-turn	1 (1%)
8 - Entering roadway	1 (1%)
10 – Hit parked vehicle	2 (2%)
12 - Pedestrian	1 (1%)
16 - Off carriageway on straight, hit object	3 (3%)
17 – Out of control on straight	1 (1%)
21 - Exceptions	5 (5%)
Total	**108**

Key points to note are summarised below:

- 108 casualty crashes were reported within study area for the 5-year period
- The crash rate has been steadily increasing each year (noting 2023 represents 6 months of data)
- 28 (26%) crashes were categorised as "Fatal or Serious Injury" (FSI) type crashes, however no fatal crashes were reported (i.e. all FSI crashes resulted in hospitalisation)
- 68 (63%) of the crashes were "Rear End" type crashes which is typical for a congested network
- Most of the crashes occurred "mid-block" rather than at intersections
- Two (2) crashes involved pedestrians and another two (2) involved cyclists. One (1) of the cyclist crashes was at the Logan Road / Warrigal Road / M3 Ramps intersection (i.e. where V1 crosses Logan Road). The other crashes were at the Neighbourhood Centre driveway on Warrigal Road
- Nine (9) crashes involving motorcyclists, including two (2) at the MPPL intersection
- A high proportion of the reported crashes occurred in the AM Peak between 7:00 and 9:00am (29 crashes or 27%), and in the PM Peak between 17:00 and 19:00pm (23 crashes or 21%)
- Most crashes occurred during daylight hours (79%), on dry pavement (89%), and on sections of the road network that are straight horizontally (82%) and level vertically (77%).

5.1.3.2 High Proportion of Crashes Result in Fatal or Serious Injury

Figure 34 illustrate the location of reported FSI crashes within the study area.

Figure 34 Reported Crashes – Study Area: FSI Crashes

Key points to note are summarised below:

- A total of 28 FSI crashes were reported within the study area, all categorised as hospitalisation
- Five (5) FSI crashes occurred at the Logan Road / Holmead Road / M3 Ramps intersection
- Four (4) FSI crashes occurred on the Pacific Motorway
- One (1) FSI crash occurred on the M3 Northbound Off-Ramp
- Five (5) FSI crashes occurred at the MPPL intersection
- Five (5) FSI crashes occurred at the Logan Road / Warrigal Road intersection
- Six (6) FSI crashes occurred mid-block on Logan Road including:
  - Two (2) Northbound on approach to the MPPL intersection
  - One (1) Southbound after the MPPL intersection
  - One (1) Northbound at Bleasby Road
  - Two (2) Southbound between Warrigal Road and Bleasby Road
- One (1) FSI crash occurred at the Warrigal Road / Padstow Road intersection
- One (1) FSI crash occurred on Warrigal Road at the local centre driveway.

5.1.3.3 High Proportion of Vulnerable User Crashes Result in Hospitalisation

Figure 35 illustrate the location of reported pedestrian crashes within the study area.

Figure 35 Reported Crashes – Study Area: Pedestrian Crashes by Crash Severity

Figure 36 illustrate the location of reported cyclist crashes within the study area.

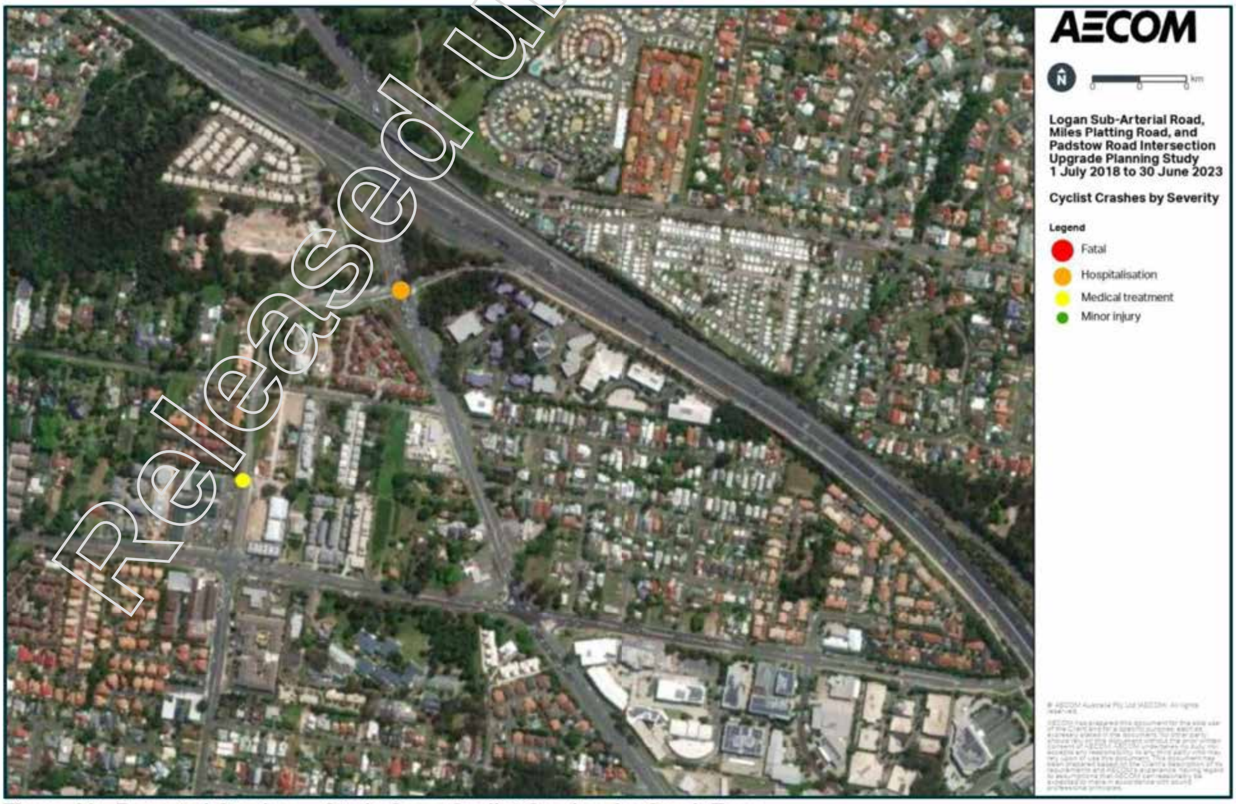


Figure 36 Reported Crashes – Study Area: Cyclist Crashes by Crash Type

Figure 37 illustrate the location of reported motorcyclist crashes within the study area.

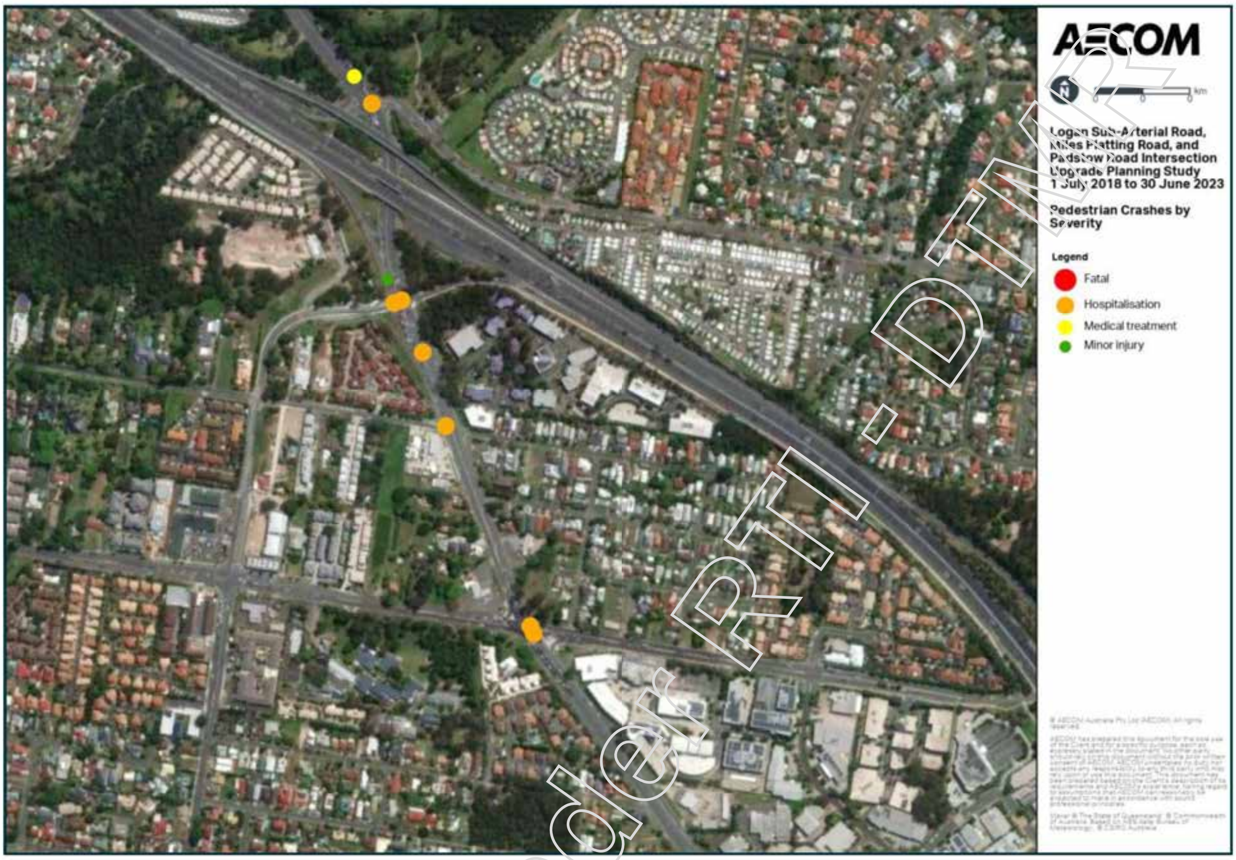


Figure 37 Reported Crashes – Study Area: Motorcyclist Crashes by Crash Type

Key points to note are summarised below:

- **Pedestrian Crashes:** Two (2) reported crashes occurred on Warrigal Road in proximity to the Neighbourhood Centre driveway. One (1) of these resulted in hospitalisation (i.e. FSI crash)
- **Cyclist Crashes:** Two (2) reported crashes occurred within the study area. One (1) was at the Logan Road / Warrigal Road / M3 Ramps intersection where V1 crosses Logan Road. This was a FSI crash. The other reported crash was at the Neighbourhood Centre driveway on Warrigal Road
- **Motorcyclist Crashes:** Nine (9) reported crashes occurred within the study area. Seven (7) of these resulted in hospitalisation (i.e. FSI crash). The crashes occurred at the following locations:
  - Two (2) at the MPPL intersection
  - One (1) at the Bleasby Road intersection
  - Four (4) in proximity to the Logan Road / Warrigal Road / M3 Ramps intersection
  - Two (2) in proximity to the Logan Road / Holmead Road / M3 Ramps intersection

5.1.3.4 Queues on M3 northbound off-ramp extend back to the Motorway

The M3 Northbound Off-Ramp (Exit 14) experiences significant traffic volumes during typical morning weekday peak hour periods. Traffic survey data obtained on Wednesday 12th October 2022, recorded approximately 1,200 vehicles using the off-ramp during the AM Peak (7:45 to 8:45AM) compared to approximately 700 vehicles in the PM Peak (4:45 to 5:45PM).

Figure 38 illustrates the abovementioned traffic survey data for Exit 14 in 15 minute increments between 6AM and 6PM. It highlights a significant "spike" in the morning with relatively constant flows throughout the rest of the survey period.

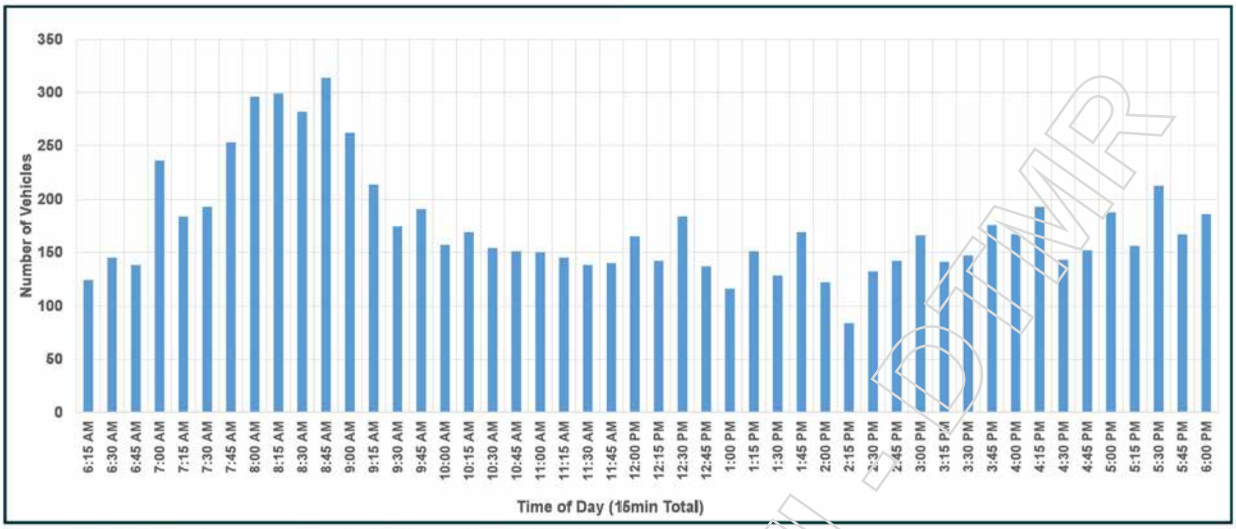


Figure 38 Exit 14: Surveyed Traffic Volumes (12/10/2022)

Due to the considerable increase in traffic demand at Exit 14 during the morning peak, vehicle queues frequently extend over 500m back to the Pacific Motorway, with motorists often waiting on the road shoulder, as shown in **Figure 39**.

Figure 39 Exit 14: Queues Extend Back to the Motorway (07/08/24 at 7:45AM)

To help alleviate the queuing at Exit 14, TMR extended the cycle time at the Logan Road / Warrigal Road / M3 Off-Ramp intersection during the morning peak from 140 to 170 seconds, allowing for more “green time” for the off-ramp.

While there is no history of reported crashes at this location, the high-speed environment on the motorway make stationary vehicles queued in the shoulder a major safety risk for the study area.

5.1.3.5 Summary

In summary:

- There were 108 casualty crashes reported within the study area for the 5-year period of data including 28 (26%) FSI crashes. The number of reported crashes has been steadily increasing year on year from 16 in 2018 to 25 in 2022
- 68 crashes (63%) were categorised as “rear end” crashes, which is typical for a congested network
- 13 crashes (12%) involved vulnerable users and nine (9) of these (69%) resulted in hospitalisation
- Morning peak hour queues on Exit 14 extending back to the Pacific Motorway is a major safety risk for the study area.

5.1.4 Poor Travel Time Reliability for Buses

5.1.4.1 Lack of Alternative Routes and Priority Infrastructure for Public Transport

Figure 40 illustrates bus routes in proximity to the study area. It is noted that the M3 and Bulimba Creek create physical barriers for the road network within Eight Mile Plains. As a result, all north-south bus routes through Eight Mile Plains use the Logan Road / Pacific Motorway interchange, and the majority of these use the Warrigal Road Green Link.

Figure 40 Lack of Alternative North-South Bus Routes through Eight Mile Plains

Figure 41 illustrates the Warrigal Road Green Link between Bleasby Road and the Logan Road access road. This link was constructed in 2015 and is restricted to buses, cyclists, and pedestrians only. This is the only priority infrastructure for public transport within study area (i.e. there are no bus lanes, queue jumps at intersections, or traffic signal priority).

Figure 41 Lack of Priority Infrastructure for Public Transport within the Study Area

5.1.4.2 Relatively Low Bus Patronage Demands Particularly on Logan Road

Table 13 summarises the average weekday and weekend boardings and alighting at key bus stops, based on data provided by Translink between 26 February 2024 to 31 March 2024 (5 weeks).

Table 13 Bus Patronage Data: Study Area

Stop	Measure	Average Weekday Patronage	Average Weekend Patronage
Bus Stop #1 – Logan Road near Miles Platting Road (northbound)	Boarding	7	1
	Alighting	4	2
	Total	11	3
Bus Stop #2 – Logan Road near Miles Platting Road (southbound)	Boarding	11	2
	Alighting	15	3
	Total	26	5
Bus Stop #5 – Logan Road near Liverpool Street (northbound)	Boarding	4	1
	Alighting	3	2
	Total	7	3
Bus Stop #6 – Warrigal Road Green Link (westbound)	Boarding	20	9
	Alighting	163	85
	Total	182	94
Bus Stop #7 – Warrigal Road Green Link (eastbound)	Boarding	186	86
	Alighting	31	10
	Total	217	96

Key points to note are summarised below:

- The bus stops on Logan Road service a small catchment (50 boardings / alighting per day)
- The bus stops on Warrigal Road service a large catchment (400 boardings / alighting per day)
- Limited routes service the bus stops on Logan Road which may contribute to the limited demands.

5.1.4.3 Journey Time Variability and Excess Passenger Delay within the Study Area

Table 14 summarises reliability parameters extracted from TMR's Bus Corridor Action Plan dashboard.

Table 14 Bus Network Reliability Parameters

Measure	Journey Time Variability (JTV)	Total Excess Passenger Delay (TEPD)
Definition	JTV measures the fluctuations in travel time on a given road section at the same time of day, caused by non-recurring factors that make the travel time differ from one day to the next	TEPD quantifies the excessive delays experienced by passengers on a specific road segment due to non-recurring congestion, which increases the unpredictability of travel times for users
Calculation	JTV = (standard deviation of travel time in the time period / mean of travel times in the time period)	TEPD (passenger minutes / km / day) = (95th percentile travel time in the time period – mean travel time in the time period) x Number of passengers / segment length (km) / Number of weekdays in data period
Application	When and where are the most unreliable locations on the network	When and where on the network are customers most impacted by poor reliability

Figure 42 illustrates the recorded JTV on Logan Road and the Green Link during March 2024.

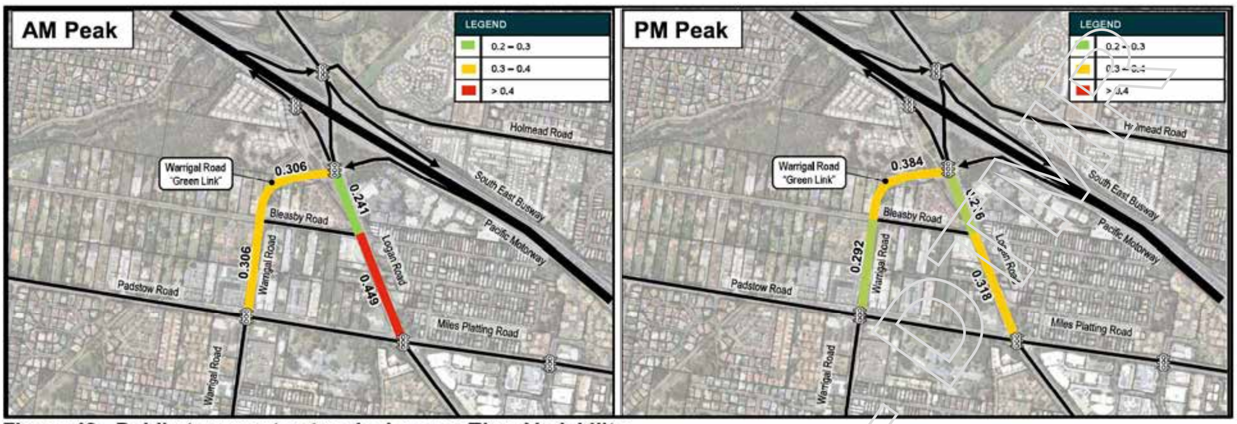


Figure 42 Public transport network: Journey Time Variability

As noted previously, JTV measures the fluctuations in travel time on a given road section at the same time of day, caused by non-recurring factors that make the travel time differ from one day to the next. The above results highlight that Logan Road between MPPL and Bleasby Road recorded the highest JTV during the morning peak in March 2024. All other segments recorded low to moderate variability, with limited difference between the AM and PM peak hour periods. This indicates that the extensive northbound queueing on Logan Road in the AM peak impacts bus journey time reliability.

Figure 43 illustrates the EPD on Logan Road and the Warrigal Road Green Link from March 2024.

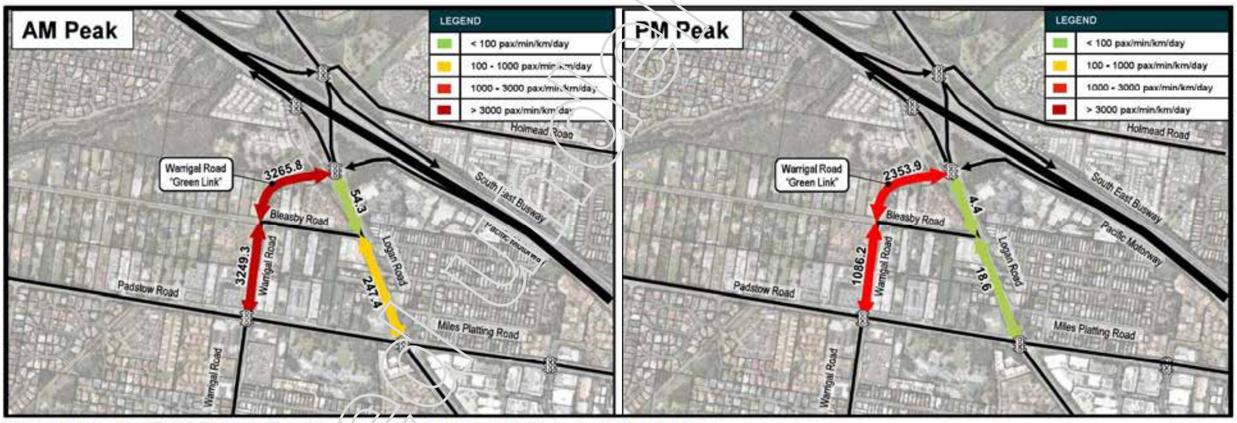


Figure 43 Public transport network: Total Excess Passenger Delay

As noted previously, TEPD quantifies the excessive delays experienced by passengers on a specific road segment due to non-recurring congestion, which increases the unpredictability of travel times for users. The above results highlight that the Warrigal Road Green Link recorded the greatest TEPD in both peaks. Whilst this appears to be counter-intuitive, noting the bus priority on the Green Link, it is influenced by the significantly higher number of patrons that use the Green Link (2,500 passengers per day) compared to Logan Road (80 passengers per day). It is also influenced by the limited green time provided to Warrigal Road at the Logan Road / Warrigal Road intersection.

5.1.4.4 Summary

There is a lack of alternative routes or priority infrastructure for public transport within the study area. All north-south bus routes through Eight Mile Plains use the Logan Road / Pacific Motorway interchange, and the majority of these use the Warrigal Road Green Link. Passengers experience poor reliability and travel time unpredictability within the study area during weekday peak hour periods, due to a combination of excessive vehicle queueing on Logan Road and the limited green time provided to the Warrigal Road approach at the Logan Road / Warrigal Road / Exit 14 intersection. It is anticipated that the JTV and TEPD contributes to the relatively low public transport mode share within the study area.

5.1.5 Lack of Active Transport Infrastructure

5.1.5.1 Gaps in the Network and Lack of Connectivity to Veloway 1

Figure 44 illustrates gaps in the active transport network based on a desktop review.

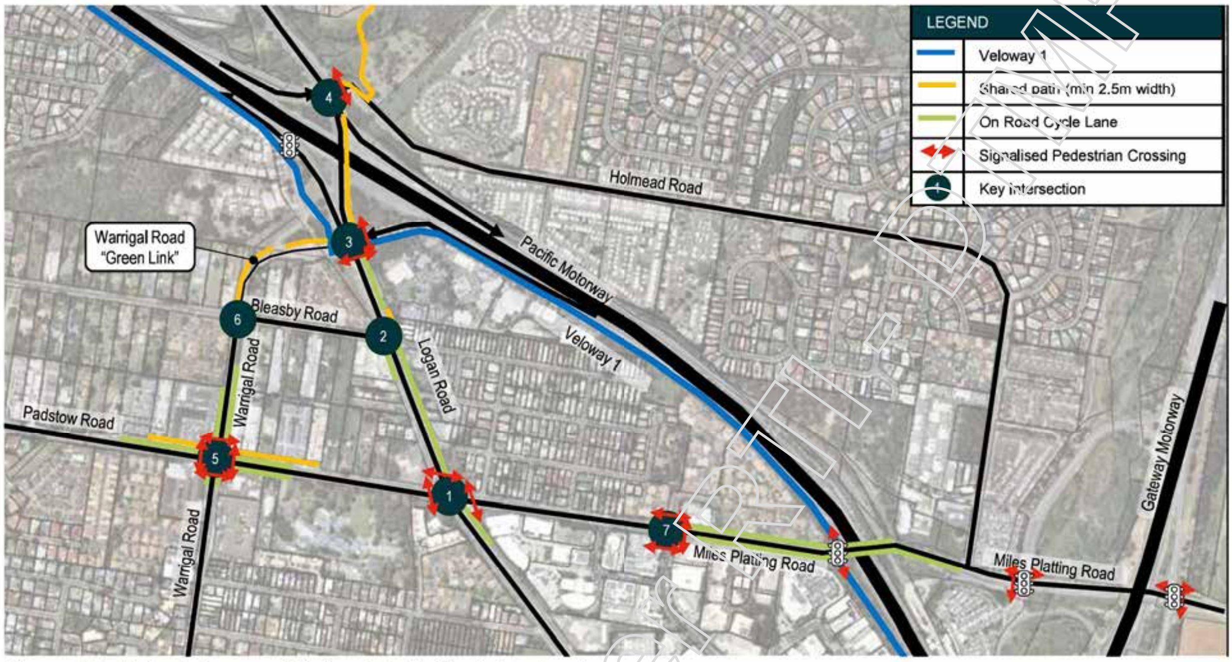


Figure 44 Active Transport Network: Existing Infrastructure

Figure 45 illustrates examples of the existing active transport infrastructure and gaps in the network.

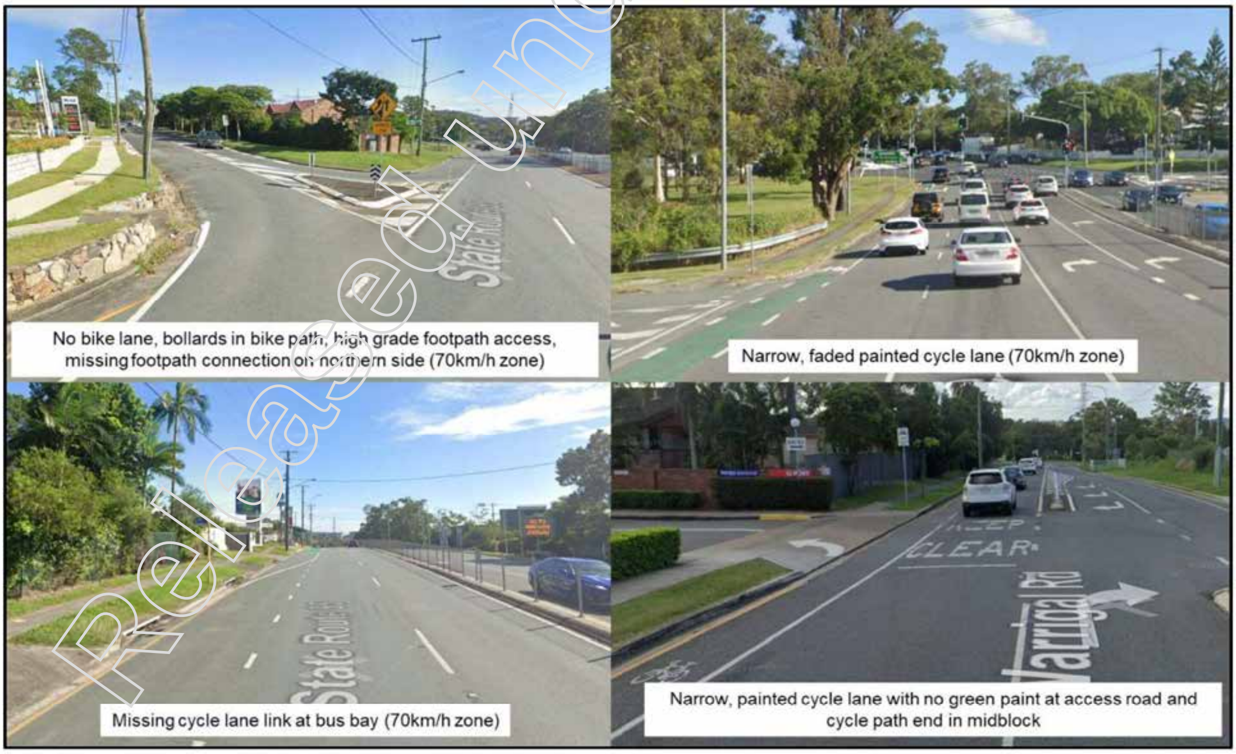


Figure 45 Active Transport Network: Existing Infrastructure

Key points to note are summarised below:

- The primary active transport infrastructure within the study area is the V1 which runs along the western side of the Pacific Motorway and provides a connection from the City to Underwood
- The off-road cycle network is incomplete within the study area (i.e. there are limited shared paths)
- The on-road cycle network is incomplete within the study area. It is noted that on-road cycle lanes have been retrofitted on Logan Road, Miles Platting Road, Warrigal Road, and Padstow Road over the last 15 years as part of TMR and BCC infrastructure projects as well as land development
- The pathway network along Logan Road is relatively narrow (i.e. 1.2m or less) and undulating
- On-demand traffic signals were installed on the left turn slip lanes at MPPL in 2022
- There is no pedestrian crossing on the southern approach to the MPPL
- There is no pedestrian crossing on Bleasby Road. There are also retaining walls, steep grades, and associated Disability Discrimination Act (DDA) challenges at this location
- There is a staged pedestrian crossing facility on Logan Road (south) for users of the V1 at the intersection of Logan Road / Warrigal Road / M3 Ramps. Users than cross Warrigal Road via a pedestrian refuge located to the west
- There are staged pedestrian crossings on the Padstow Road approaches to the intersection of Padstow Road / Warrigal Road. This intersection was upgraded by BCC in 2011
- The Warrigal Road "Green Link" project delivered 250m of off-road cycle network (2.5m shared path) on the northern side of Warrigal Road from Logan Road to Bleasby Road. This links into the V1 as well as the off-road network under the Logan Road / M3 interchange and through Holmead Road Park.

5.1.5.2 Gaps in the Network and Lack of Connectivity to Veloway 1

Figure 46 summarises on and off-road cyclists demands at key intersections within the study area based on 12 hours of survey data collected on 15 September 2020 (Padstow Road / Warrigal Road) and 12 October 2022 (other intersections).

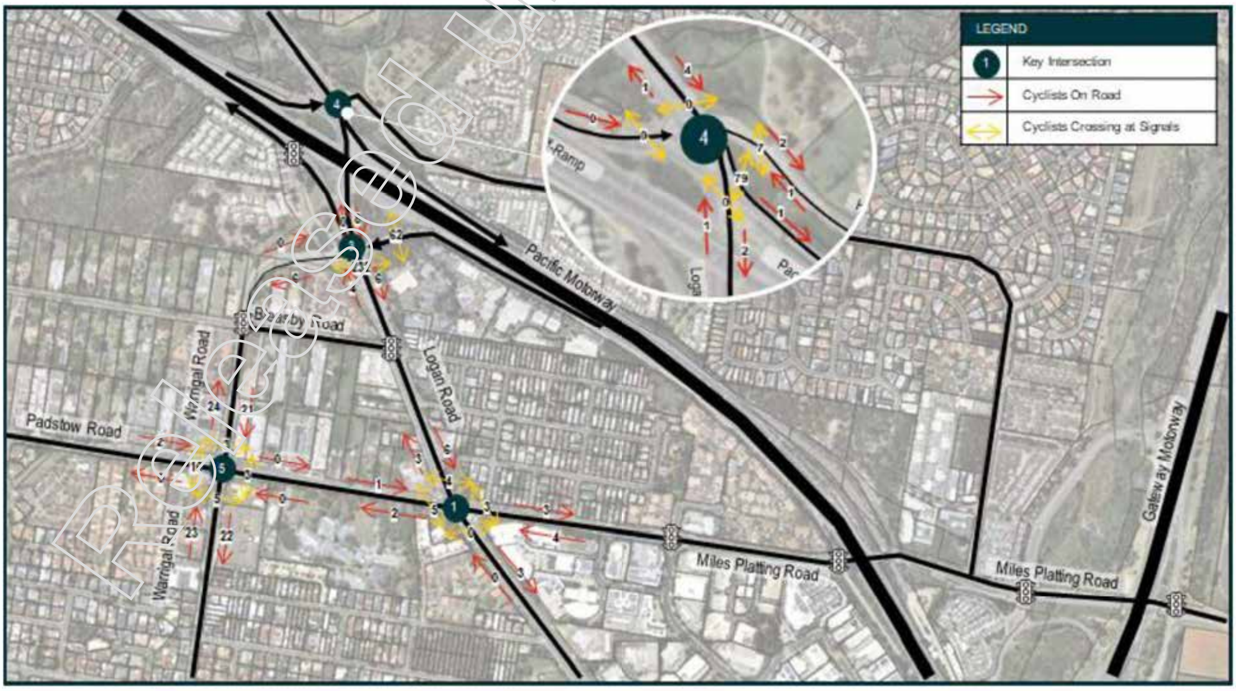


Figure 46 Active Transport Demands within the Study Area – Cyclists

Figure 47 summarises on and pedestrian demands at key intersections within the study area based on the same dataset.

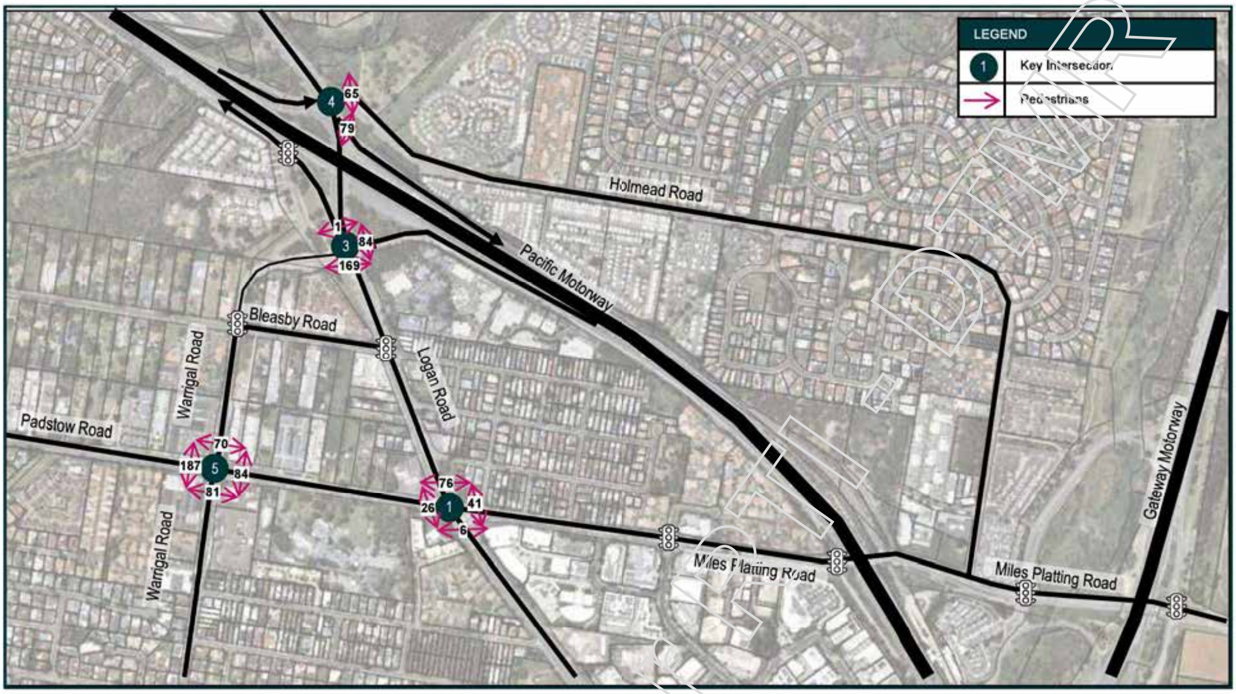


Figure 47 Active Transport Demands within the Study Area – Pedestrian

Key points to note are summarised below:

- Very few on-road cyclists used Logan Road, Miles Platting Road and Padstow Road
- Most on-road cyclists within the study area used Warrigal Road, potentially to access the V1
- Approximately 300 cyclists were recorded at the Logan Road / Warrigal Road / M3 Ramps intersection including 230 crossing Logan Road (continue on V1) and 60 crossing the M3 Northbound Off-Ramp (towards Bulimba Bikeway)
- Pedestrian demands at MPPL are relatively low, particularly compared to the recorded demands at the Warrigal Road / Padstow Road intersection and the V1 crossing of Logan Road

5.1.5.3 Pedestrians and cyclists involved in reported crashes are seriously injured

As outlined in **Section 5.1.3.3**, there has been a total of four (4) reported crashes within the study area involving either pedestrians or cyclists, including three (3) on Warrigal Road in proximity to the Neighbourhood Centre driveway and one (1) at the Logan Road / Warrigal Road / M3 intersection where V1 crosses Logan Road. Whilst this represents a relatively small proportion of the total reported casualty crashes (108 in total), 75% have resulted in hospitalisation.

5.1.5.4 Summary

In summary:

- Despite all key roads within the study area forming part of TMR's PCNP, there are significant "gaps" in the network
- Whilst V1 provides a high quality dedicated corridor through the study area, connectivity to the V1 is poor
- The recorded active transport demands within the study area are very low except along the V1
- Whilst "only" four (4) crashes within the study area involved pedestrians and cyclist, 75% resulted hospitalisation.

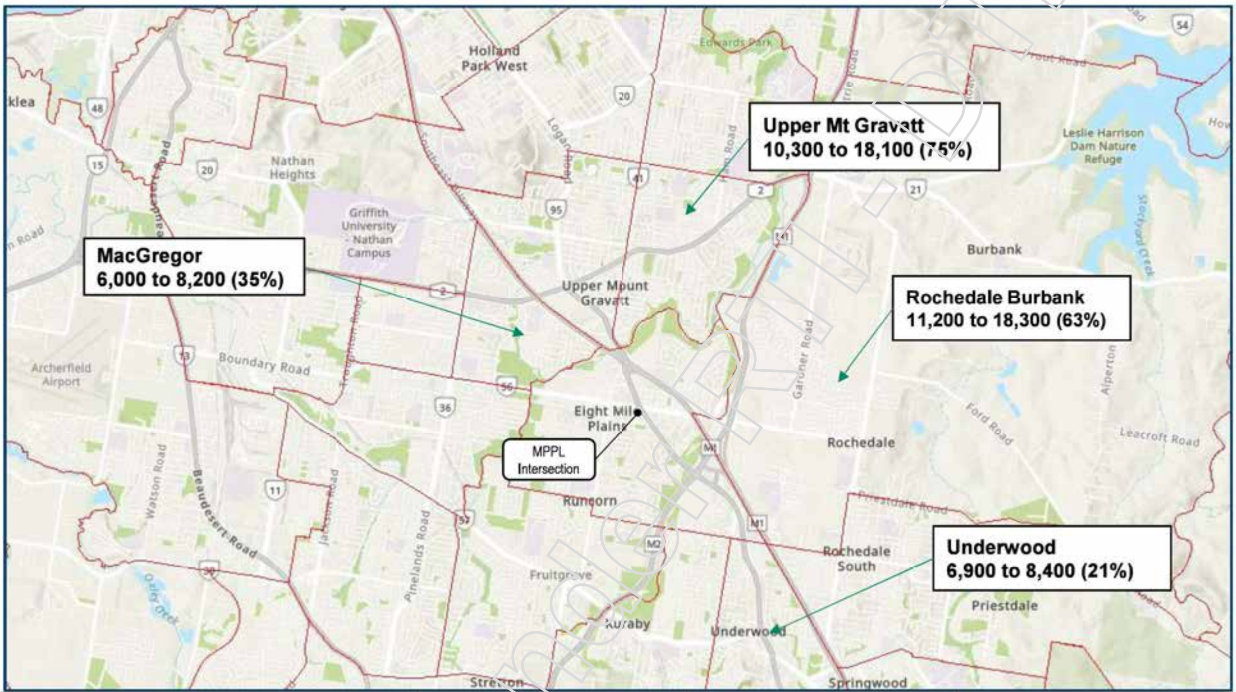
5.2 Future Situation

5.2.1 Peak Hour Traffic Congestion

5.2.1.1 Population Growth will Increase Pressure on the Transport Network

5.2.1.1.1 Forecast Population Growth

Figure 48 summarises forecast population growth surrounding the study area based on data extracted from the Brisbane Strategic Transport Model (BSTM-MMv2.4) by Statistical Area Level 2 (SA2).



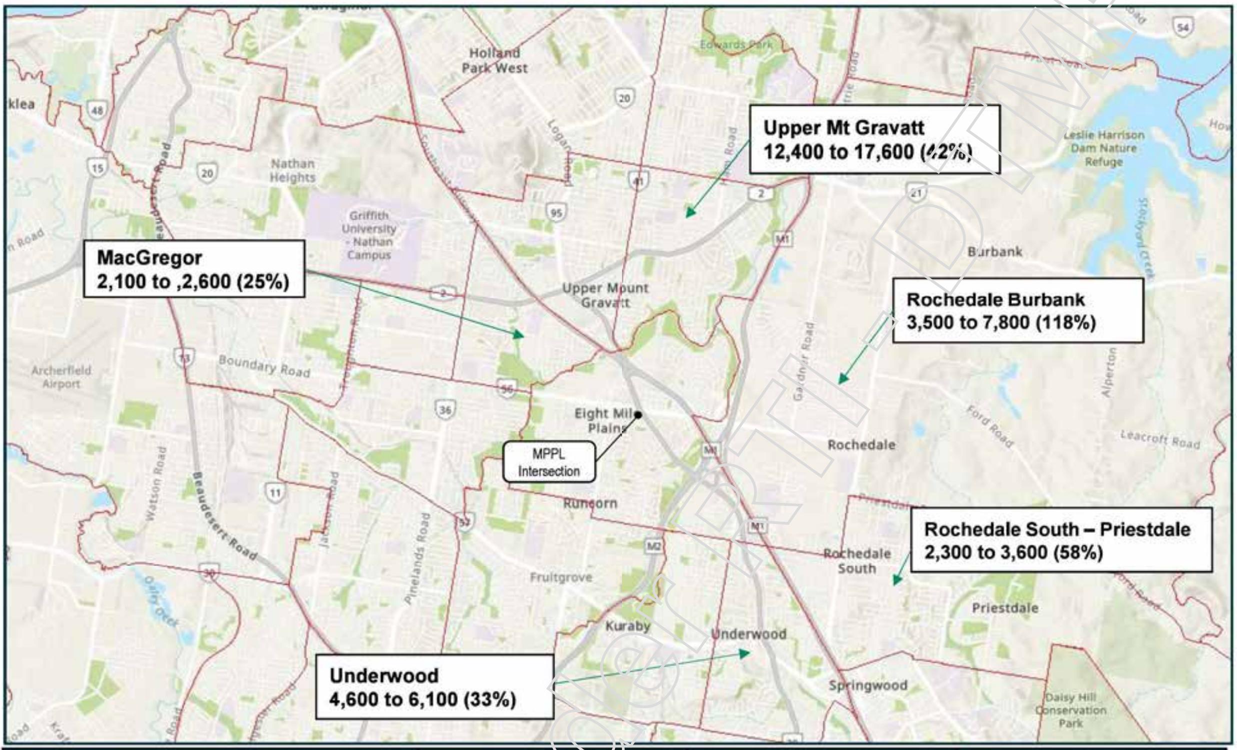
SA2	2021 Population	2041 Population	Growth (%)
Wishart	11,468	11,675	2%
Upper Mount Gravatt	10,342	18,116	75%
Rochedale – Burbank	11,201	18,281	63%
Sunnybank	9,205	10,109	10%
Sunnybank Hills	18,022	18,369	2%
Runcorn	14,694	16,253	11%
Kuraby	8,644	8,839	2%
Underwood	6,912	8,383	21%
Rochedale South – Priestdale	15,949	16,323	2%
Macgregor (Qld)	6,075	8,203	35%

Figure 48 Forecast Population Growth by SA2 (BSTM) – 2021 to 2041

As outlined above, significant population growth is forecast to the north (Upper Mt Gravatt and MacGregor) and east (Rochedale Burbank) of MPPL with moderately high population growth forecast to the south (Underwood). This forecast increase in population will likely result in increased traffic demands, worsening congestion, and an increase in congestion-related crashes in the study area. It is also likely to hinder economic growth in accordance with ShapingSEQ (2023).

5.2.1.1.2 Forecast Employment Growth

Figure 49 summarises the forecast employment growth by SA2.



SA2	2021 Employment	2041 Employment	Growth (%)
Wishart	1,900	2,529	33%
Upper Mount Gravatt	12,390	17,621	42%
Rochedale - Burbank	3,581	7,805	118%
Sunnybank	2,971	3,800	28%
Sunnybank Hills	4,262	5,230	23%
Runcorn	2,232	2,796	25%
Kuraby	947	1,129	19%
Underwood	4,564	6,070	33%
Rochedale South - Priestdale	2,292	3,611	58%
Macgregor (Qld)	2,053	2,563	25%

Figure 49 Forecast Employment Growth by SA2 (BSTM) – 2021 to 2041

As outlined above, significant employment growth is forecast to the north (Upper Mt Gravatt and MacGregor) east (Rochedale Burbank) and south (Underwood and Rochedale South - Priestdale) of MPPL. This forecast increase in employment will likely result in increased traffic demands, worsening congestion, and an increase in congestion-related crashes in the study area. It is also likely to hinder economic growth in accordance with ShapingSEQ (2023).

5.2.1.2 Transport Network Operational Performance Will Deteriorate

5.2.1.2.1 Forecast Increase in Traffic Demands

Table 15 summarises key characteristics of the road network within the study area.

Table 15 Forecast Future Traffic Demands within the Study Area

Model Period	Total Vehicles				
	2024	2031	Growth	2024	2031
AM Peak (6-10am)	26,985	30,713	14% (2.0%p.a.)	36,316	35% (2.0%p.a.)
PM Peak (2-6pm)	37,850	46,205	22% (3.2% p.a.)	55,508	47% (2.7% p.a.)

In summary, traffic demands within the study area are forecast to increase by:

- 35% in the AM peak period between 2024 and 2041 which equates to a rate of 2% p.a.
- 47% in the PM peak period between 2024 and 2041 which equates to a rate of 3% p.a.

Figure 50 and **Figure 51** illustrate the forecast growth in traffic demands on each link within the study area during the AM and PM 2-hour peak periods respectively, extracted from the BSTM-MMv2.4

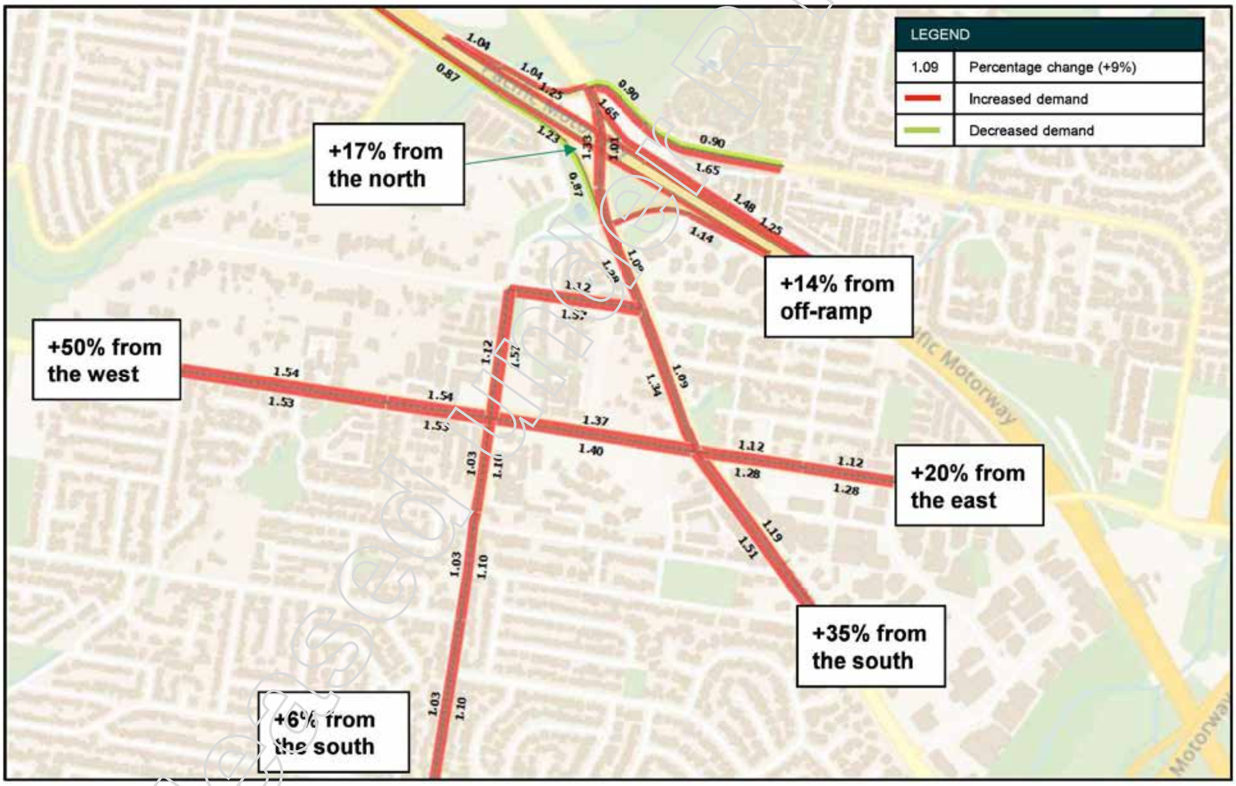


Figure 50 Forecast Traffic Growth by Link (BSTM) – 2021 to 2041 (7-9AM)

Key observations for the AM period (7-9AM) are summarised below:

- All approaches to the MPPL intersection are expected to experience increased traffic demands
- Significant traffic growth is expected from the east (20%), south (35%) and west (50%) of the MPPL intersection
- Exit 14 traffic demands are forecast to increase by 14% between 2021 and 2041.

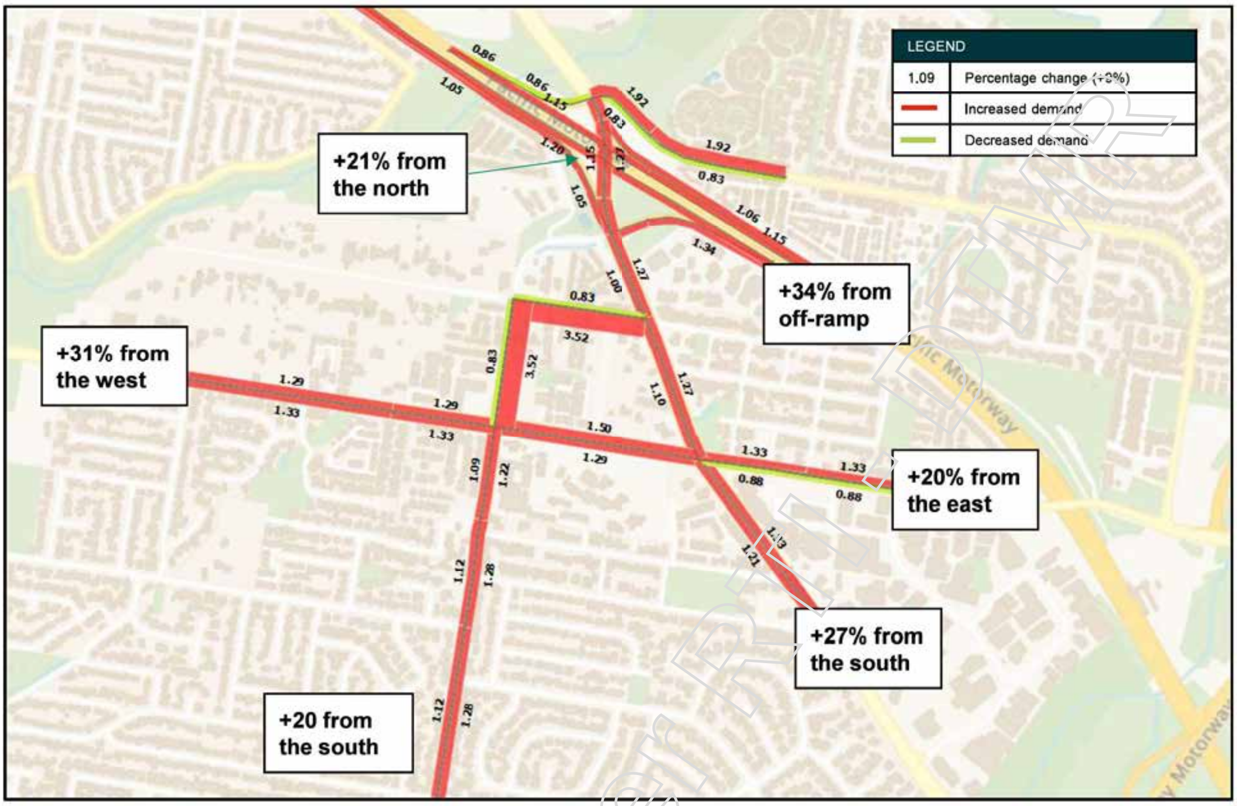


Figure 51 Forecast Traffic Growth by Link (BSTM) – 2021 to 2041 (4-6PM)

Key observations for the PM period (4-6AM) are summarised below:

- All approaches to the MPPL intersection are expected to experience increased traffic demands
- Significant growth is expected from the east (20%), south (30%), west (50%) and north (20%) of the MPPL intersection
- Exit 14 traffic demands are forecast to increase by 34% between 2021 and 2041.

5.2.1.2.2 Forecast Worsening of Traffic Congestion

Figure 52 illustrates the simulated density plots for the study area extracted from the AIMSUN model for the 2024, 2031 and 2041 AM peak hours respective. As noted previously, the density plots represent the number of vehicles per lane within road sections and provides an indication of typical vehicle queue formation or slow-movement traffic.

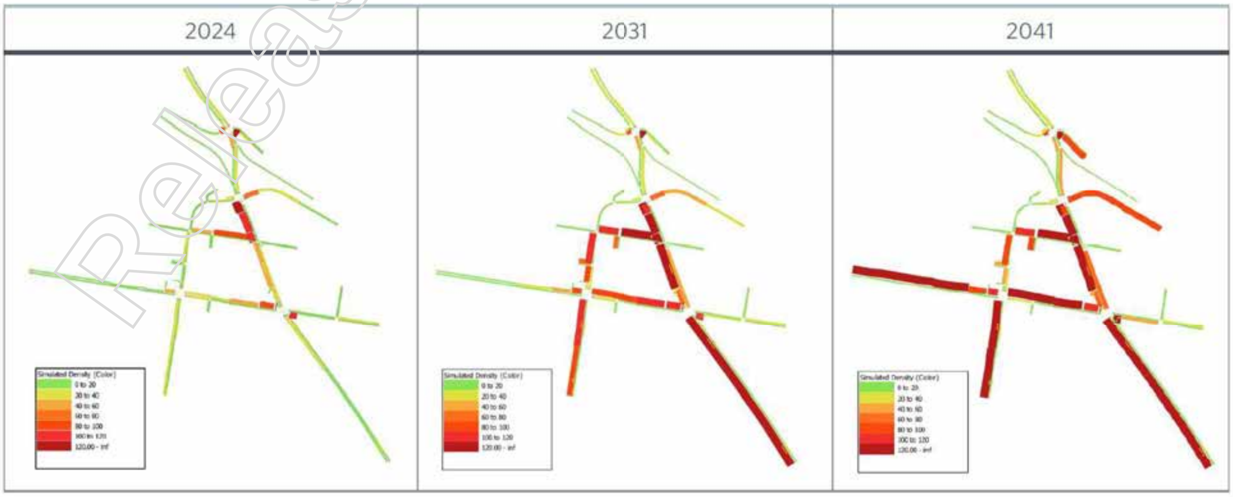


Figure 52 AIMSUN Future Base Network Density Plots – AM Peak (8-9AM)

Key observations are summarised below:

- The northbound carriageway of Logan Road is forecast to experience significant congestion. This congestion remains at similar levels between 2031 and 2041, indicating that the corridor will likely reach practical capacity by 2031
- The eastbound carriageway of Padstow Road is forecast to experience increasing traffic congestion between 2024 and 2031, with conditions expected to significantly worsen by 2041
- The study area more broadly is expected to experience notable traffic congestion in the 2041AM future base scenario, particularly on Warrigal Road, Bleasby Road, and the M3 Northbound Off Ramp (Exit 14).

Figure 53 illustrates the simulated density plots for the study area extracted from the AIMSUN model for the PM peak.

Figure 53 AIMSUN Future Base Network Density Plots – PM Peak (9-7PM)

Key observations are summarised below:

- In the 2024 PM peak, congestion is lower than during the AM period, which is consistent with site observations. However, due to significant forecast demand growth between 2031 and 2041 extracted from BSTM, the PM peak in 2031 and 2041 is expected to experience higher levels of traffic congestion than the AM peak
- It appears the study area will likely reach practical capacity by 2031
- The study area more broadly is expected to experience notable traffic congestion in the 2041 PM future base scenario, particularly on Warrigal Road, Bleasby Road, and Miles Platting Road.

5.2.1.2.3 Forecast Worsening of Network Traffic Performance

Table 16 and **Table 17** summarises the forecast worsening of the network traffic performance in the AM and PM peak periods respective based on various performance measures (e.g. Vehicle Hours Travelled (VHT), Vehicle Kilometres Travelled (VKT), average speed / delays / journey times, and latent demand).

Table 16 AIMSUN Future Base Network Traffic Performance – AM Peak (7-9AM)

Network Measure	7-8AM			8-9AM		
	2024	2031	2041	2024	2031	2041
VHT (hours)	507	814	1,080	519	996	1,349
VKT (km)	9,689	10,339	10,651	11,172	11,551	12,151
Average Speed (km/h)	26.3	23.3	20.4	27.3	21.6	18.2
Average Delay (secs / vehicle)	120	195	277	103	223	314
Average Journey Time (m:s)	04:28	06:43	08:28	03:57	07:15	09:11
Demand (vehicles) [1]	6,811	7,703	9,120	7,788	8,930	10,642
Completed Trips (vehicles) [2]	6,804	7,279	7,651	7,893	8,238	8,812
Latent Demand (vehicles) [2][3]	4	351	1,608	6	1,025	3,602

[1] Demand is an input for AIMSUN
[2] Completed trips and latent demand are outputs from AIMSUN that may include vehicles from preceding time periods
[3] Completed trips plus latent demand does not necessarily equal input demand (due to the above)

Table 17 AIMSUN Future Base Network Traffic Performance – PM Peak (4-6PM)

Network Measure	4-5PM			5-6PM		
	2024	2031	2041	2024	2031	2041
VHT (hours)	499	1,345	1,704	502	1,507	1,751
VKT (km)	12,178	13,338	13,983	12,157	13,969	13,642
Average Speed (km/h)	27.2	17.0	12.0	27.4	16.4	12.5
Average Delay (secs / vehicle)	87	280	370	88	311	393
Average Journey Time (m:s)	03:40	08:58	10:56	03:39	09:07	11:27
Demand (vehicles) [1]	8,103	9,960	12,065	8,055	9,835	11,851
Completed Trips (vehicles) [2]	8,160	9,009	9,345	8,263	9,567	9,179
Latent Demand (vehicles) [2][3]	1	827	5,167	0	1,426	8,019

Key observations are summarised below:

- VHT is expected to significantly increase between 2024 and 2041 in both peak periods
- VKT is expected to remain relatively constant between 2024 and 2041 (due to lack of route choice)
- Average vehicle speeds are expected to significantly reduce between 2024 and 2041
- Average delay per vehicle is expected to significantly increase between 2024 and 2041
- Average journey times are expected to significantly increase between 2024 and 2041
- Traffic demand within the study area is expected to significantly increase between 2024 and 2041
- Completed trips within the study area is expected to remain constant (network already at capacity)
- Latent demand (vehicles unable to enter the network due to congestion) is expected to increase between 2024 and 2041 in both peak periods (indicating the network is already at capacity).

5.2.1.2.4 Forecast Worsening of Intersection Performance

Table 18 and **Table 19** summarise the forecast worsening of performance at key intersections within the study area during the 2031 and 2041 AM and PM peak periods, extracted from the AIMSUN model.

Table 18 AIMSUN Future Base Network Intersection Performance – AM Peak

Intersection	2031				2041			
	7-8AM		8-9AM		7-8AM		8-9AM	
	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS
Logan Rd / Miles Platting Rd / Padstow Rd	101	F	108	F	118	F	119	F
Logan Rd / Warrigal Rd / NB Ramps	29	C	37	D	31	C	37	D
Logan Rd / Holmead Rd / SB Ramps	29	C	26	C	31	C	28	C
Padstow Rd / Warrigal Rd	55	E	94	F	109	F	123	F

Table 19 AIMSUN Future Base Network Intersection Performance – PM Peak

Intersection	2031				2041			
	4-5PM		5-6PM		4-5PM		5-6PM	
	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS	Delay (s/v)	LOS
Logan Rd / Miles Platting Rd / Padstow Rd	120	F	113	F	117	F	124	F
Logan Rd / Warrigal Rd / NB Ramps	28	C	28	C	43	D	43	D
Logan Rd / Holmead Rd / SB Ramps	38	D	40	D	57	E	56	E
Padstow Rd / Warrigal Rd	106	F	73	F	100	F	133	F

As noted in **Section 5.1.2.4**, an average delay of 55 seconds per vehicle is typically adopted as the threshold between LOS D and E at signalised intersection. When delays exceed this threshold, the intersection may be operating at practical capacity. The Base Year results indicated that MPPL is operating at or near capacity between 7-8AM (LOS E) and 5-6PM (LOS E), and that it is operating close to capacity between 4-5PM (LOS D). The above results indicate the MPPL is forecast to exceed capacity in 2031 and 2041 (LOS F with average delays in the order of 100-120 seconds per vehicle). Performance issues are also forecast for the Logan Road / Pacific Motorway interchange (LOS E in 2041) and the intersection of Padstow Road / Warrigal Road (LOS F in 2031 and 2041).

5.2.2 History of Casualty Crashes

5.2.2.1 Transport Network Safety Performance Will Continue to Deteriorate

5.2.2.1.1 Anticipated Increased Frequency of Reported Crashes within the Study Area

As noted previously, between 1 July 2018 to 30 June 2023, a total of 108 casualty crashes were reported within the study area. Of these, 68 crashes (63%) were rear end collisions, which is often associated with traffic congestion and stop-and-go driving conditions. The number of crashes has increased steadily each year, rising from 16 in 2018 to 25 in 2022, as illustrated on **Figure 54**. Given the forecast traffic growth and associated congestion within the study area, without intervention, the number of reported crashes in the study area is expected to continue trending upwards.

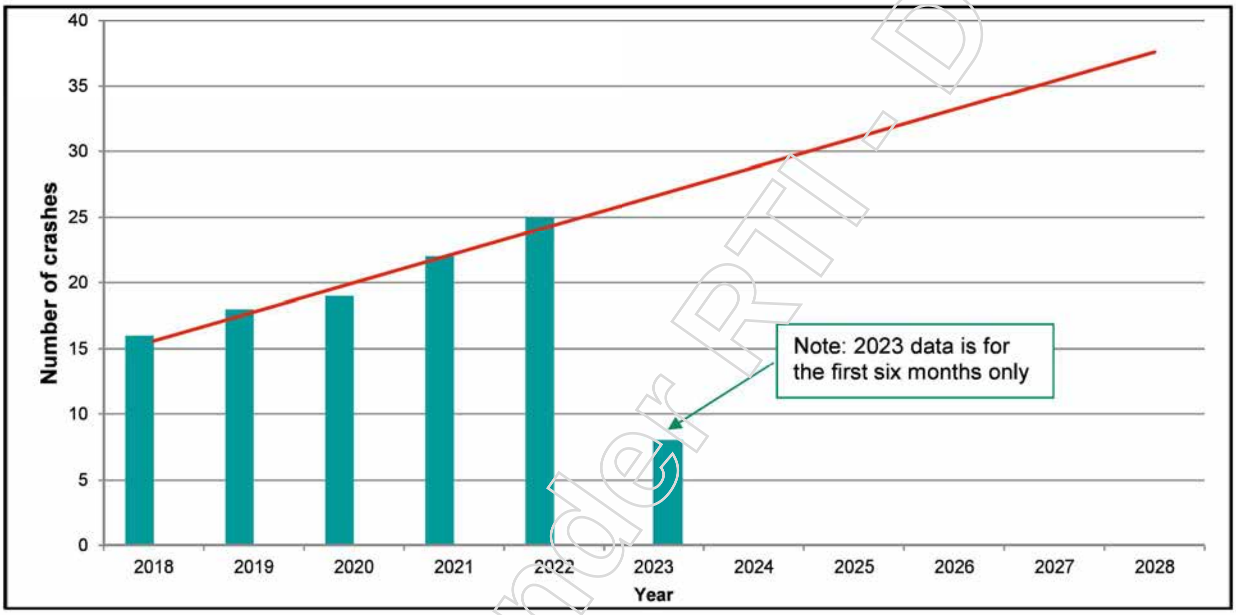


Figure 54 Reported annual crash rate within study area trending upwards

5.2.2.2 Forecast Increased Extent of Exit 14 Queuing Back to the Pacific Motorway

As noted previously, during typical weekday morning peak hours, vehicle queues on Exit 14 often extend more than 500m back to the Pacific Motorway, with drivers frequently waiting on the road shoulder. This represents a major safety risk.

Table 20 summarises forecast average delay per vehicle and maximum queue length for Exit 14 during the 2031 and 2041 AM and PM peak hours respectively, extracted from the AIMSUN model. It is noted that the AIMSUN model represents typical weekday conditions.

Table 20 AIMSUN Future Base Network Exit 14 Performance – 2031 and 2041 AM Peak

Location	AM Peak (8-9am)				PM Peak (5-6pm)			
	2031		2041		2031		2041	
	Delay (s/v)	Max Queue (m)	Delay (s/v)	Max Queue (m)	Delay (s/v)	Max Queue (m)	Delay (s/v)	Max Queue (m)
Exit 14	41	595	45	1,775	49	180	45	200

Given the forecast traffic growth out to 2041 and associated congestion within the study area, without intervention, the frequency of queues extending back to the Pacific Motorway and the overall length of the queue is expected to increase. This is supported by the AIMSUN model results which indicates a maximum queue length of 600m and 1800m in the 2031 AM and 2041 AM peak hours respectively. This problem is not expected to eventuate in the PM peak.

5.2.3 Poor Travel Time Reliability for Buses

5.2.3.1 Forecast Worsening of Bus Travel Times

Table 21 summarises the forecast worsening of bus travel times within the study area during the 2031 and 2041 AM and PM peak periods respectively, extracted from the AIMSUN model.

Table 21 AIMSUN Future Base Network Traffic Performance – Public Transport

Network Measure	4-5PM			5-6PM		
	2024	2031	2041	2024	2031	2041
VHT (hours)	499	1,345	1,704	502	1,507	1,751
VKT (km)	12,178	13,338	13,983	12,157	13,969	13,642
Average Speed (km/h)	27.2	17.0	12.0	27.4	16.4	12.5

The above results indicate a significant worsening of bus travel times within the study area, particularly in the PM peak. It is anticipated this would impact JTV and TEPD.

5.2.3.2 Anticipated Low Public Transport Demands within the Study Area

Logan Road and the Warrigal Road "Green Link" service approximately 110 buses with 2,600 passengers per weekday (TMR BCAP from March 2024), compared to approximately 45,500vpd on Logan Road north of MPPL (2023 Site 135689). Furthermore, the bus stops on Logan Road and the Warrigal Road "Green Link" service approximately 450 boardings / alightings per weekday (March 2024). The proportion of transport users within the study area using public transport is relatively low.

Given the forecast traffic growth out to 2041 and associated impacts on bus travel times within the study area, without intervention, it is expected that the public transport mode share will remain low.

5.2.4 Lack of Active Transport Infrastructure

There are significant "gaps" in the active transport network within the study area and poor connectivity to V1. As a result, the recorded active transport demands are very low except along the V1 itself.

The lack of active transport infrastructure within the study area is predominately due to a lack of investment. Without intervention, active transport demands are expected to remain low.

6.0 Potential Options

6.1 Existing Asset Options

6.1.1 Overview

Potential existing asset options that could be investigated to address the identified problems include:

- Upgrading the Logan Road / Warrigal Road intersection
- Upgrading the MPPL at-grade intersection
- Installing bus lanes / queue jump lanes / signal priority along the Logan Road corridor
- Allowing general traffic to use the Warrigal Road Green Link

6.1.2 Logan Road / Warrigal Road Intersection Upgrade

It is recommended upgrade options are investigated for the Logan Road / Warrigal Road intersection to address safety concerns associated with Exit 14 queues extending back to the motorway, and to reduce the potential for northbound queues on Logan Road in the AM peak extending back to MPPL.

Key features of the 2010 BC solution at the Logan Road / Warrigal Road intersection include:

- Widening the M3 northbound off-ramp to provide an additional right turn lane (three in total)
- Reconstructing the M3 northbound on-ramp within the road reserve to the west of the existing carriageway, to allow the on and off ramp movements to occur during the same traffic signal phase
- Upgrading Logan Road to provide six through lanes through the intersection.

Figure 55 indicatively illustrates the intent and geographical extents of this option.

This option provides an opportunity to upgrade the active transport infrastructure at this location, potentially via new off-road shared paths and a signalised pedestrian crossing on the Warrigal Road approach to the intersection. It is anticipated this option would also improve public transport travel times and reliability through the intersection.

Figure 55 Fat Pen Sketch: Logan Road / Warrigal Road Intersection Upgrade (2010 BC)

Note: The 2010 BC solution has been presented to help explain the concept. There may be alternative intersection layout options at this location to fulfil the service requirements and this would need to be investigated further in the PE phase.

6.1.3 MPPL At-Grade Intersection Upgrade

Additional layout capacity is required to meet both current and projected future traffic demands at MPPL. As noted previously, at-grade upgrade solutions were proposed for MPPL in the 2010 BC, 2014 Planning Review, and 2021 OA, and these options could be reassessed during the PE phase. While the previously recommended solutions varied in their spatial requirements and associated land and utility impacts, all of them aimed to enhance layout capacity and included additional dedicated active transport infrastructure. Therefore, implementing an at-grade solution similar to those previously recommended is expected to partially address the service requirements of the project.

Figure 56 provides an overview of the 2010 BC ultimate solution.

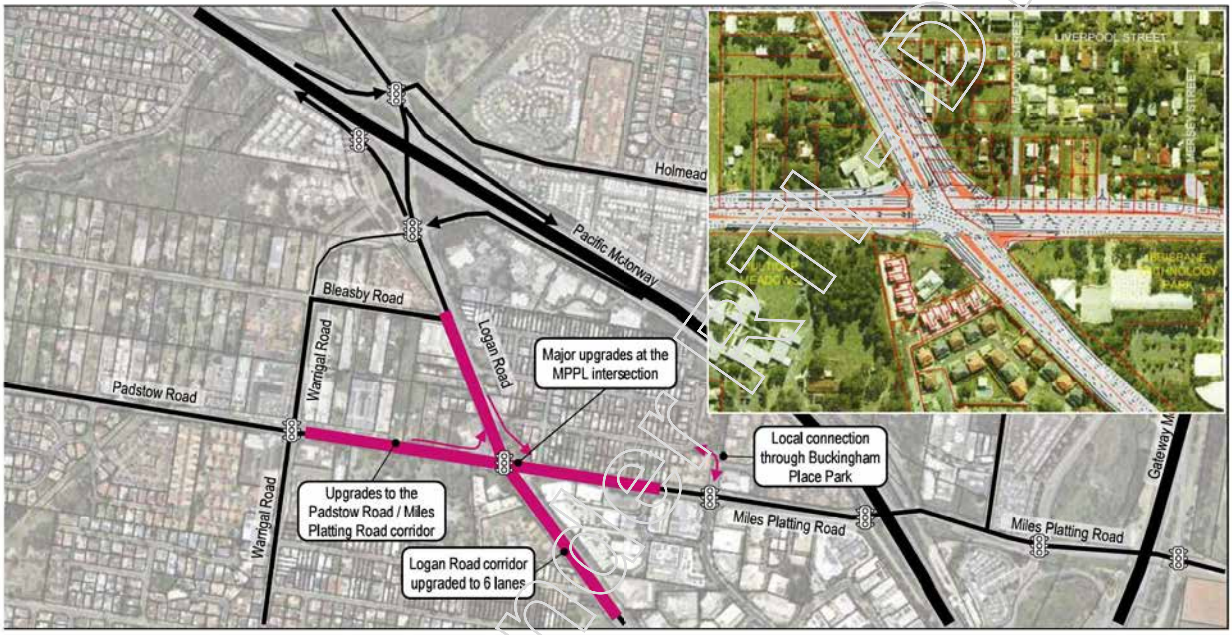


Figure 56 Fat Pen Sketch: MPPL At-Grade Intersection Upgrade (2010 Business Case)

Figure 57 provides an overview of the 2014 Planning Review ultimate solution.

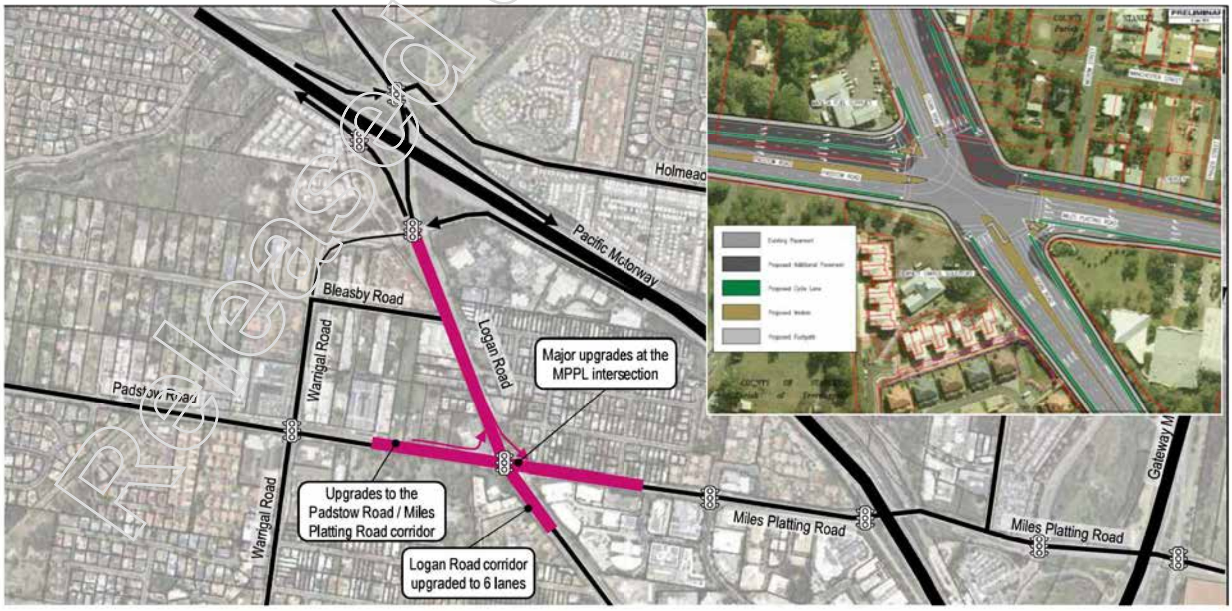


Figure 57 Fat Pen Sketch: MPPL At-Grade Intersection Upgrade (2014 Planning Review)

Figure 58 provides an overview of the 2021 OA ultimate solution.

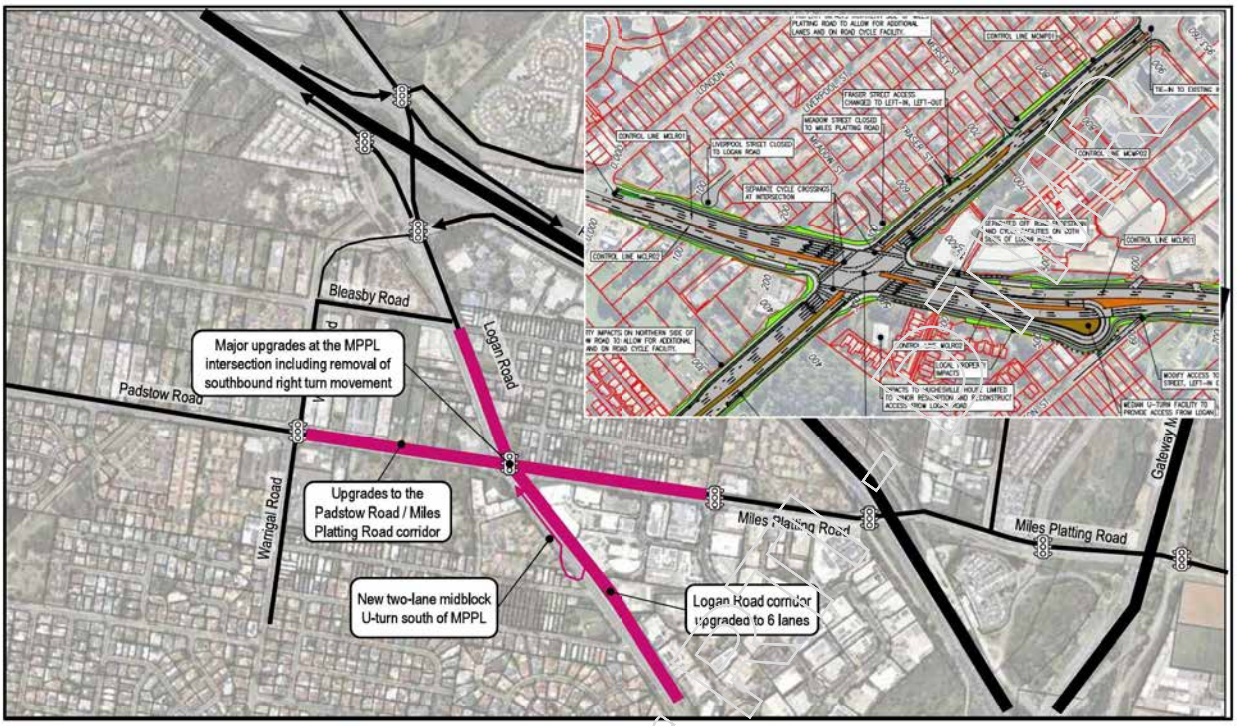


Figure 58 Fat Pen Sketch: MPPL At-Grade Intersection Upgrade (2021 OA)

This option provides an opportunity to upgrade the active transport infrastructure at this location, potentially via new off-road shared paths on Logan Road and a new signalised pedestrian crossing on the southern approach to the intersection. This option may also improve public transport travel times and reliability through the intersection.

Note: The recommended solutions from the 2010 BC, 2014 Planning Review, and 2021 OA are provided to illustrate the intent of this option. However, there may be alternative intersection configurations that could meet the service requirements of the project, and these would need to be explored further during the PE phase.

Note: The design traffic volumes used to inform the 2010 BC and 2014 Planning Review appear to be conservative compared to existing (2022) surveyed traffic demands, as outlined in **Table 22**. Whilst subject to detailed traffic modelling, this observation highlights that there may be an opportunity to optimised footprints and reduced land impacts.

Table 22 MMPL Design Traffic Volume Comparison

Source	AM Peak Hour	PM Peak Hour
2022 Traffic Surveys	4,200 vehicles (2022)	5,300 vehicles (2022)
2010 Business Case	7,800 vehicles (2026)	9,200 vehicles (2026)
2014 Planning Review	6,200 vehicles (2031)	6,700 vehicles (2031)
2021 Options Analysis	5,200 vehicles (2031)	5,300 vehicles (2031)
2024 Business Case	5,200 vehicles (2031)	6,200 vehicles (2031)
2024 Business Case	6,500 vehicles (2041)	7,700 vehicles (2041)

Key points to note in relation to the estimated design traffic volumes from the 2024 Business case:

- Peak hours:
  - AM peak: 7:45am to 8:45am
  - PM peak: 4:45pm to 5:45pm
- Static assignment runs have been used, representing an estimated demand for the intersection rather than throughput from the dynamic scenarios.

6.1.4 Bus Lanes / Queue Jump Lanes / Signal Priority

The intent of this potential option is to prioritise bus movements through the study area. This may include dedicated bus lanes on Logan Road and / or bus queue jump lanes and associated traffic signal priority at key intersections along Logan Road. Under this option, Logan Road would be upgraded to six lanes (i.e. 4 general traffic lanes and 2 bus lanes), and there may be an opportunity to upgrade the active transport infrastructure via new off-road shared paths along Logan Road.

Figure 59 indicatively illustrates the intent and geographical extents of this option.

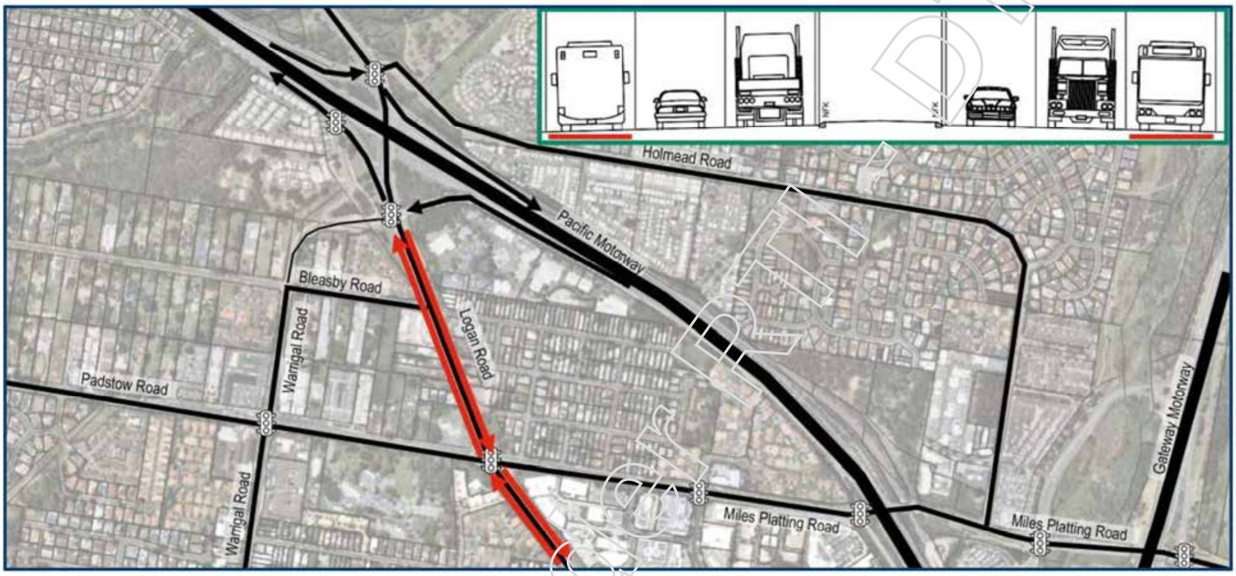


Figure 59 Fat Pen Sketch: Bus Lanes / Queue Jump Lanes / Signal Priority

6.1.5 Warrigal Road General Traffic Link

This potential option includes upgrading the Warrigal Road "Green Link" to accommodate general traffic as well as public transport. This may include providing a four lane cross-section with two general traffic lanes and two dedicated bus lanes. This option would not deliver active transport upgrades at the study intersection or materially improve bus travel times.

Figure 60 indicatively illustrates the intent and geographical extents of this option.

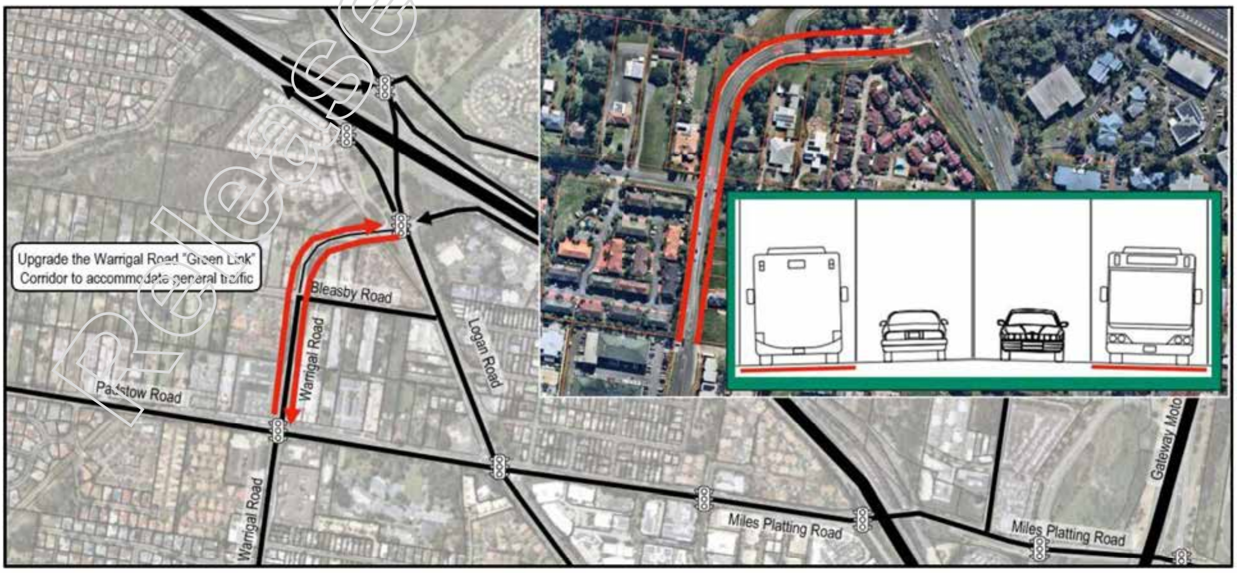


Figure 60 Fat Pen Sketch: Warrigal Road General Traffic Link

6.2 New Asset Options

6.2.1 Overview

Potential new asset options that could be investigated to address the identified problems include:

- Providing high quality dedicated active transport infrastructure within the study area
- Providing new ramp connections between the M3 and M2
- Upgrading the MPPL intersection with a partial grade separation
- Upgrading the MPPL intersection to an interchange.

6.2.2 Active Transport Links

All key roads within the study area form part of TMR's PCNP and the V1 travels through the study area on the western side of the M3. However, there are significant infrastructure gaps in the active transport network and poor connectivity to the V1, resulting in low active transport demands within the study area.

This potential option includes providing dedicated high quality active transport infrastructure within the study area along Logan Road, Warrigal Road, Padstow Road and Miles Platting Road in accordance with TMR's PCNP. It may also include upgrading V1 to provide an overpass structure to allow users to bypass the at-grade crossing on Logan Road.

Figure 61 indicatively illustrates the intent and geographical extents of this option.

Figure 61 Fat Pen Sketch: Active Transport Links

6.2.3 M3 to M2 Ramps

Some motorists use Logan Road through the study area to interchange between the M2 and M3 due to the lack of direct links between the motorways. This option includes provision for new ramp connections between the M2 and M3 to reduce traffic demands on Logan Road and improve performance at MPPL.

This option would not deliver active transport upgrades at the study intersection or materially improve bus travel times.

Figure 62 indicatively illustrates the intent and geographical extents of this option.

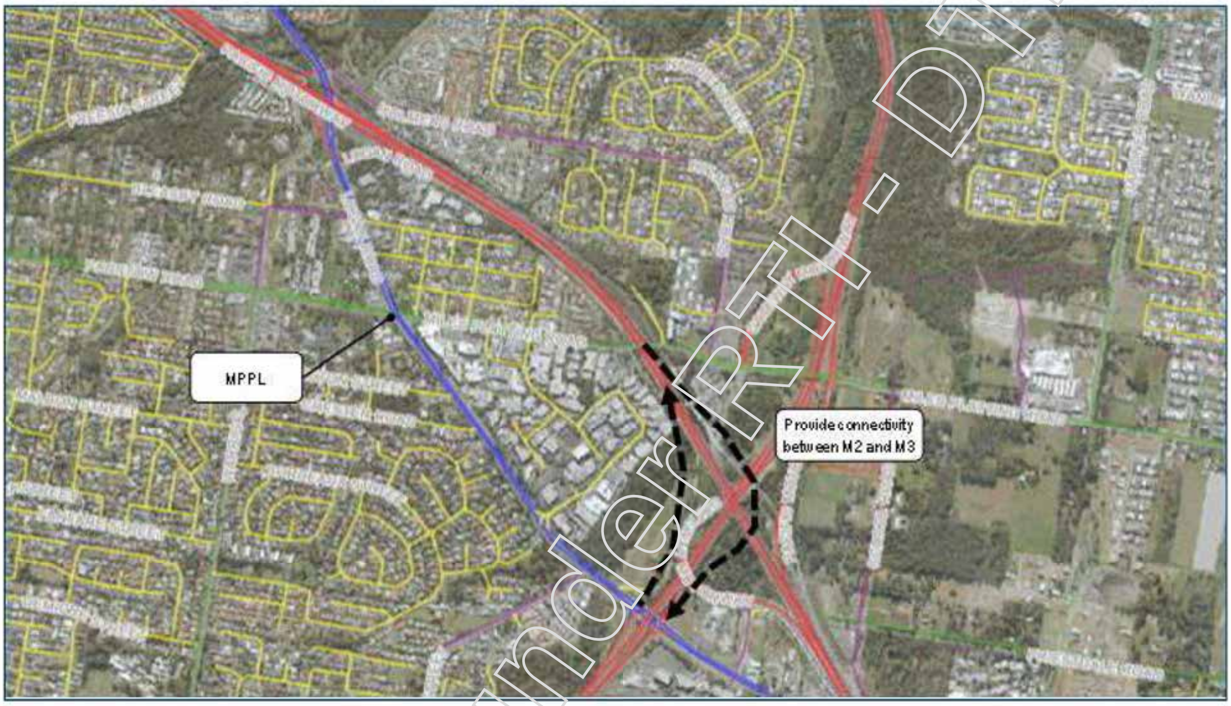


Figure 62 Fat Pen Sketch: M3 to M2 Ramps

6.2.4 MPPL Patial Grade Separation

This option seeks to remove traffic from the at-grade intersection via a partial grade separation.

There is a significant southbound traffic demand on Logan Road at the MPPL intersection. Traffic survey data from 12 October 2022, recorded 2,500 vehicles travelling southbound on Logan Road at this location in the PM peak (i.e. U-turn = 130, Right Turn = 620, Through = 1,350, and Left Turn = 400). The lack of alternative right turn options for southbound motorists on Logan Road results in concentrated demand at this location. Over the 12 hour survey period, a total of 5,270 motorists turned right into Padstow Road, which equates to 10.6% of the total demands recorded at the intersection (i.e. 49,738 vehicles). It was also ranked the fourth busiest movement at MPPL.

If, for example, the southbound right turn from Logan Road into Padstow Road was grade separated, it would reduce traffic demands at MPPL by approximately 10%. This reduction may facilitate further traffic signal phasing and timing optimisation (refer Phase D) with the intent to provide additional capacity for all other movements at the intersection. This example is similar to the intersection of Hooker Boulevard / Sunshine Boulevard, Broadbeach Waters (**Figure 63**).

Based on the forecast traffic demands, it is anticipated a 6 lane upgrade would also be required.

This option provides an opportunity to upgrade the active transport infrastructure at this location, potentially via new off-road shared paths along Logan Road. This option may also improve public transport travel times through the intersection.

Figure 64 indicatively illustrates the intent and geographical extents of this option.

Figure 63 Example of a Partial Grade Separation – Sunshine Boulevard

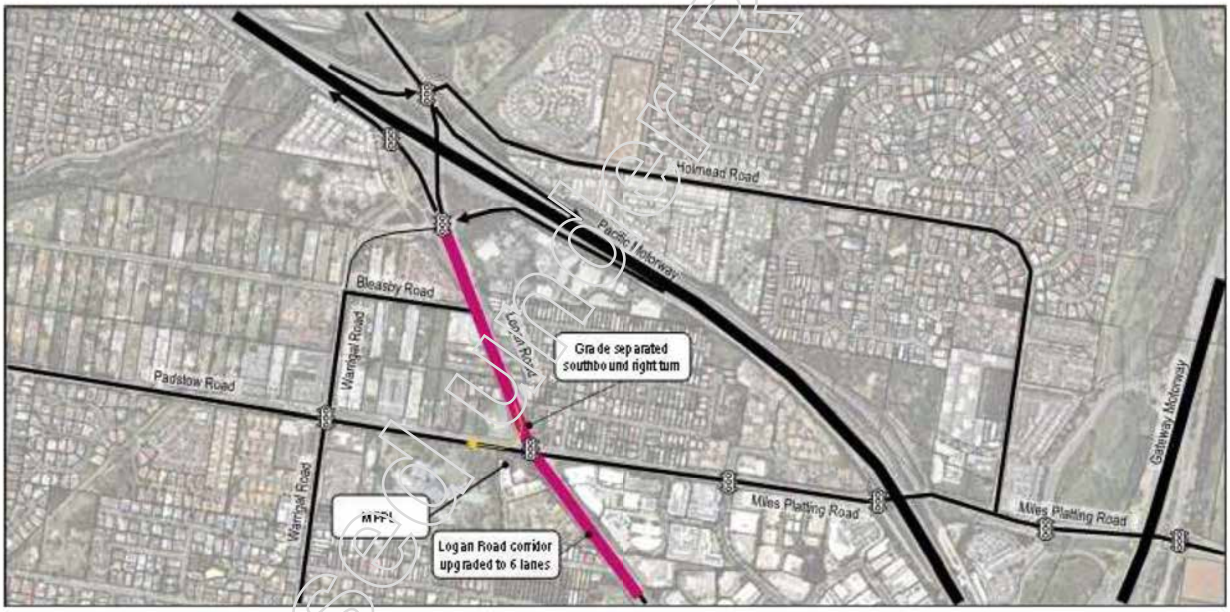


Figure 64 Fat Pen Sketch: MPPL Partial Grade Separation

Note: the southbound right turn movement has been selected to help explain the concept. There may be opportunities to grade separate other movements at the intersection and this would need to be investigated further during the PE phase.

6.2.5 MPPL Interchange

As outlined in Section 4.1.2.2, there are significant peak hour traffic demands at the MPPL intersection (i.e. approximately 4,200 vehicles in the AM peak and 5,300 vehicles in the PM peak in 2022). Based on the forecast population and employment growth within the study area, and noting the lack of alternative routes, the existing traffic demands are expected to continue to increase at a rate of 2-3% p.a. As a result, achieving an acceptable level of service at the MPPL intersection in 2041 would be challenging with an "at-grade" solution. This conclusion is backed by the preferred solutions from the 2010 BC, 2014 Planning Review, and 2021 OA, all of which proposed a large footprint for the MPPL intersection featuring numerous of approach and departure lanes and substantial land impacts.

Option 12 includes upgrading MPPL to a grade separated interchange. The intent is to provide free-flow conditions on Logan Road, the higher order State-controlled arterial road, and facilitate all other movements via two (2) at-grade signalised intersections either side of the overpass. It is noted a similar solution was investigated as part of the 2010 BC.

Key features of the 2010 option include:

- Grade separation of the MPPL intersection
- Free-flow traffic conditions on Logan Road while overpassing Padstow and Miles Platting Road
- A new signalised intersection on Padstow Road (western intersection)
- A new signalised intersection on Miles Platting Road (eastern intersection).

This option provides an opportunity to upgrade the active transport infrastructure at this location, potentially via new off-road shared paths along Logan Road and new signalised pedestrian crossings at the new intersections on Padstow Road and Miles Platting Road. This option may also improve public transport travel times and reliability through the intersection

Figure 65 indicatively illustrates the intent and geographical extents of this option.

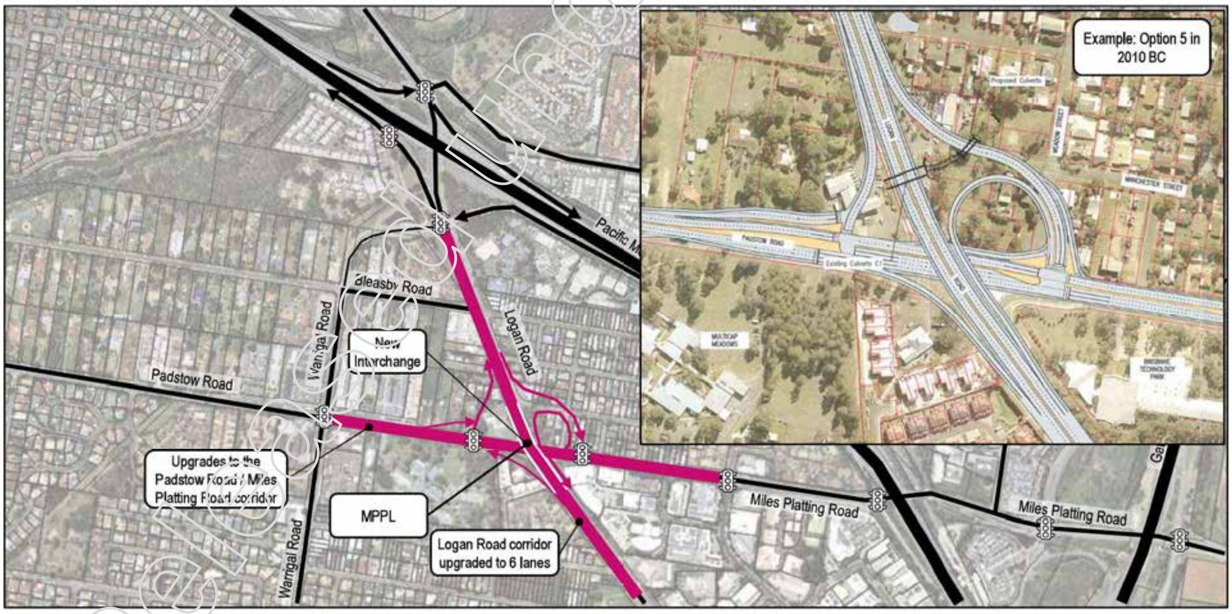


Figure 65 Fat Pen Sketch: MPPL Interchange

Note: The 2010 BC option has been presented to help explain the concept. There may be alternative upgrade options at this location to fulfil the service requirements and this would need to be investigated further in the PE phase.

7.0 Summary

The **existing transport problems** at MPPL and within the broader study area are summarised below:

- Peak-hour congestion resulting from high traffic volumes on Logan Road and at MPPL
  - AADT on Logan Road is 45,500 (2023) with traffic volumes increasing at 1.6% per annum
  - MPPL carries 4,200 and 5,300 vehicles in the AM and PM Peak hour (2022) respectively
  - The peak hour traffic volumes on Logan Road and at MPPL result in queues and delays
  - The MPPL intersection is operating beyond its practical capacity during peak periods (LOS E)
- History of casualty crashes with a high proportion classified as rear-end crashes
  - 108 casualty crashes were reported within the study area from July 2018 to June 2023
  - The number of reported crashes has been steadily increasing year on year
  - 68 crashes were categorised as "rear end", which is typical for a congested road network
  - 13 crashes involved vulnerable users, and nine of these resulted in hospitalisation
  - Vehicle queues on the M3 northbound off-ramp extend back to the M3 during peak periods
- Poor travel time reliability for buses on Logan Road and the Warrigal Road Green Link
  - There are significant infrastructure gaps in the active network beyond Veloway 1 (V1)
  - There is poor connectivity to the V1 within the study area
  - The active transport demands within the study area are low except on the V1.
  - Whilst only four crashes within the study involved pedestrians and cyclists, 75% resulted hospitalisation.
- Insufficient dedicated active transport infrastructure and limited connectivity
  - There is a lack of alternative routes and priority infrastructure for buses within the study area
  - Patronage at bus stops within the study area is relatively low.
  - Passengers experience travel time variability as well as delays within the study area.

The **potential future transport problems** at MPPL and within the study area are summarised below:

- Worsening in delays, queues and travel times for cars, trucks and buses within the study area
- Peak hour delays at MPPL are forecast to increase from approximately 60 seconds per vehicle in 2024 to approximately 100-120 seconds per vehicle in 2041. This equates to a LOS F
- Frequency of congestion-related crashes is expected to continue trending upwards
- Frequency and magnitude of the M3 northbound off-ramp queuing issue is expected to increase
- Public transport mode share within the study area is expected to remain relatively low
- Active transport mode share within the study area is expected to remain relatively low.

Potential **existing asset options** that could be investigated to address the identified problems include:

- Upgrading the Logan Road / Warrigal Road intersection
- Upgrading the MPPL at-grade intersection
- Installing bus lanes / queue jump lanes / signal priority along the Logan Road corridor
- Allowing general traffic to use the Warrigal Road Green Link

Potential **new asset options** that could be investigated to address the identified problems include:

- Providing high quality dedicated active transport infrastructure within the study area
- Providing new ramp connections between the M3 and M2
- Upgrading the MPPL intersection with a partial grade separation
- Upgrading the MPPL intersection to an interchange.

Appendix A

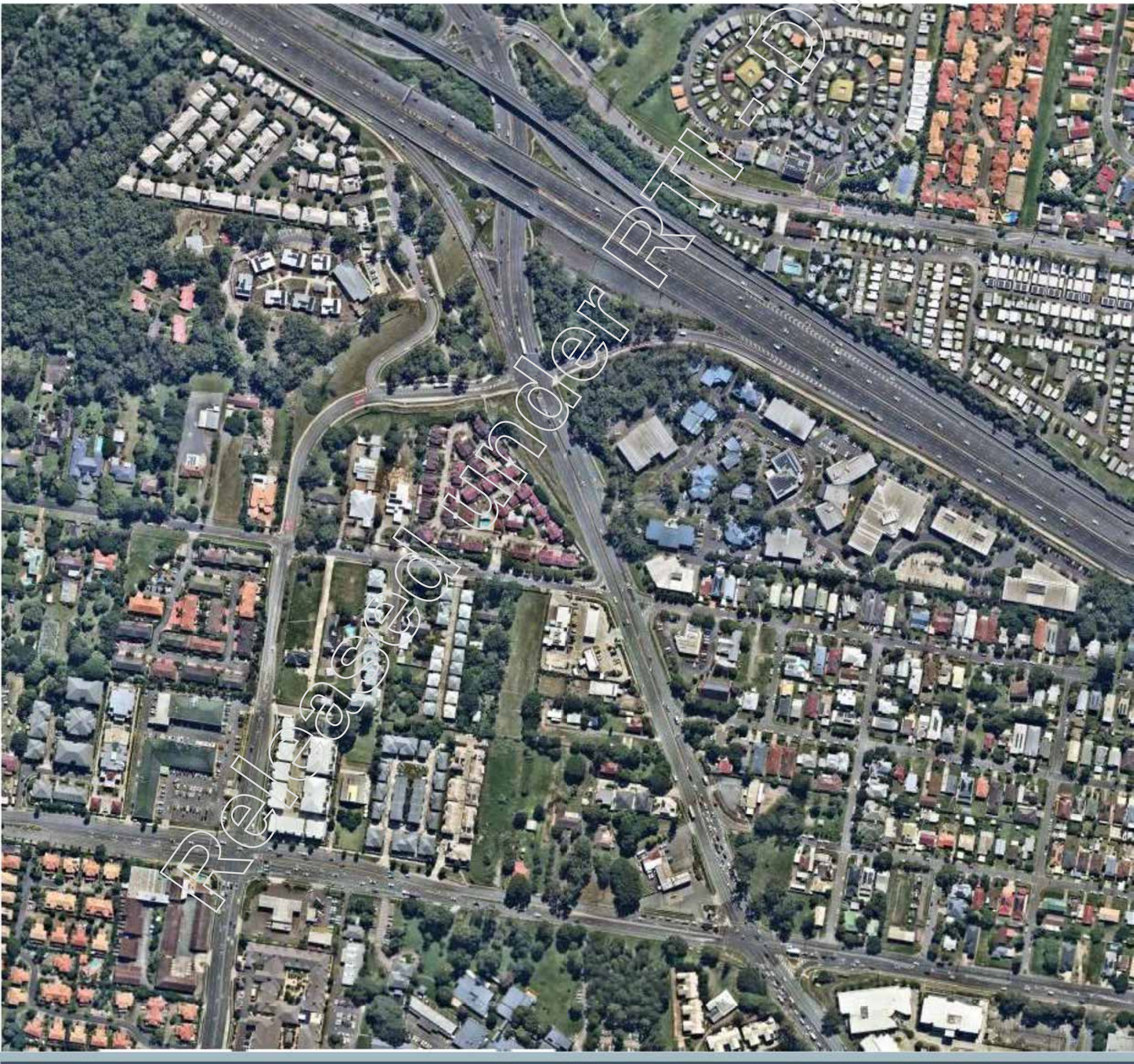
TN#1: Existing Traffic Models Review & Data Gap Analysis

DYKMAN CONSULTING

EXISTING TRAFFIC MODEL REVIEW & DATA GAP ANALYSIS

LOGAN SUB-ARTERIAL ROAD / MILES PLATTING ROAD / PADSTOW ROAD INTERSECTION UPGRADE PLANNING STUDY

JOB NO. 2420 | 2ND JULY 2024



DYKMAN CONSULTING

Document Control

Project Name	MPPL Upgrade Planning Study	Date of Issue	02/07/2024
Document No.	2420-REP-MPPL Existing Traffic Model Review & Data Gap Analysis-FINAL	Discipline	Traffic Modelling
Subject	Existing Conditions Report	Project No.	2420
Author/s	NR [redacted]	Reviewed by	NR [redacted]
Prepared for	TMR	Attention to	[redacted]

Revision	Revision Date	Details	Authorised by
A	25 June 2024	Draft Report	NR [redacted]
B	2 July 2024	Final Report	[redacted]

Contents

Tables

Figures

1 Introduction

Dykman Consulting has been engaged by AECOM to provide traffic modelling services for the Department of Transport and Main Road's (TMR) Logan Sub-Arterial Road / Miles Platting Road / Padstow Road Intersection Upgrade (MPPL) Planning Study project (CN-22628).

1.1 Subject Site

The study area location as well as the associated Aimsun microsimulation traffic model cordon area is presented in Figure 1.1. The proposed microsimulation model

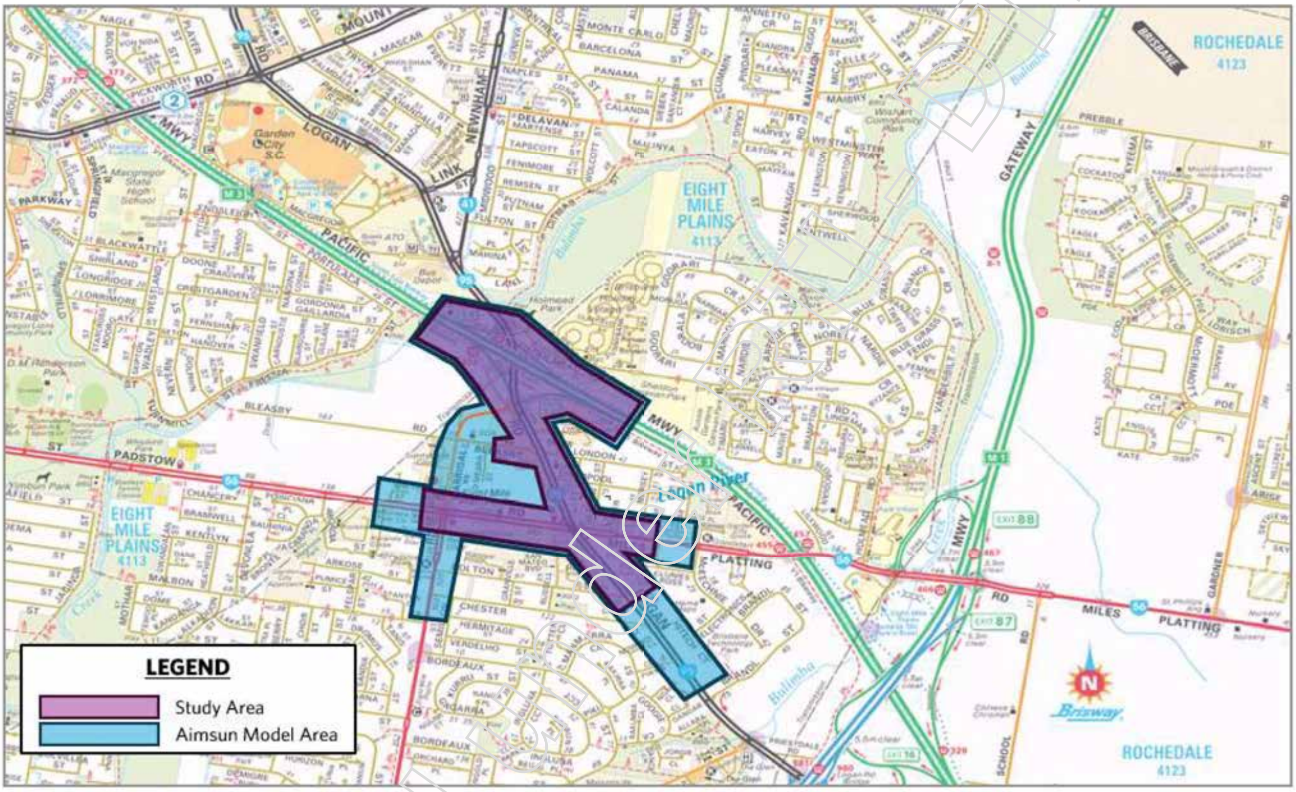


Figure 1 – MPPL Microsimulation Traffic Model and Project Study Areas (Source: Street-Directory)

1.2 Report Outline

This report outlines a review of the existing traffic models and a data gap analysis with respect to providing a holistic understanding of the existing conditions and the operation of the transport network within the study area:

- Inputs summary
- Existing traffic models review
- Data gap analysis
- Conclusions and Recommendations

2 Inputs Summary

2.1 Overview

The input data to be included for the development of the base microsimulation models includes a combination of the latest transport models from TMR, traffic count data, signal data and travel times. A summary of the models and datasets relevant for use in the base model development are outlined below in Table 1.

Table 1: Traffic data summary

Data Type	Source	Survey Date(s)	Survey Time(s)	Location(s)
Brisbane Mesoscopic Aimsun Model (BMAM) v2.3	TMR	N/A	N/A	Greater Brisbane region
BSTM-MMv2.4	TMR	N/A	N/A	Greater Brisbane region
Traffic Counts	Austraffic	Wednesday 12 October 2022	6am-6pm	• Logan Rd / Holmead Rd • Logan Rd / Padstow Rd / Miles Platting Rd • Logan Rd / Warrigal Rd / M1 Off-ramp
Travel Times	HERE (TMR)	10/10/2022 – 14/10/2022	24-hour (15-minute intervals)	• Logan Rd (northbound / southbound) • Padstow Rd (eastbound/westbound)
STREAMS Signal Data	TMR	30/05/2024	6:00am – 6:00pm	• Logan Rd / Holmead Rd (M1418) • Logan Rd / Padstow Rd / Miles Platting Rd (M1420) • Logan Rd / Warrigal Rd / M1 Off-ramp (M1419)
SCATS Signal Data	BCC	To be confirmed with TMR and BCC teams.		• Padstow Rd / Warrigal Rd (B0900)

3 Existing Traffic Models Review

This section provides a high-level review of the available transport models to be adopted of the development of the MPPL study area Aimsun microsimulation traffic modelling for this project.

3.1 Existing Strategic Model(s)

TMR TAU develops and maintains two (2) strategic models that cover this study are, that have been developed to support transport planning and road infrastructure and policy testing by the department:

- Southeast Queensland Strategic Transport Model (SEQSTM).
- Brisbane Strategic Transport Model, BSTM-MMv2.4 (BSTM).

For the MPPL Planning Study, TAU has recommended the use of BSTM to provide the traffic cordon demands for the Aimsun microsimulation traffic model. BSTM is a robust four-step strategic transport model providing travel demand forecasts for Brisbane and adjacent Local Government Areas (LGAs). The model incorporates both highway and public transport assignments.

The following model scenarios, design years and time periods are included and will be considered within this project:

- Model scenarios:
  - Base Case: 2021, 2026, 2031, 2036 and 2041.
  - Reference Case: 2026, 2031 and 2036.
- Time periods:
  - AM peak: 7:00am – 9:00am.
  - PM peak: 4:00pm – 6:00pm.

The key difference between the Base and Reference Case scenarios is in their network assumptions, as stated in the BSTM TMAF documentation:

- Base Case: primarily committed and funded projects.
- Reference Case: constitutes network assumptions at various planning stages that would likely be included.

Due to possible impacts of the COVID-19 pandemic across the years 2020-2022, the re-calibration and rebase to 2021 may have significantly impacted travel demand and trip patters, creating an unwanted impact on the future transport trend in the study area.

Strategic Model – BSTM is considered well calibrated and validated to existing conditions in 2016, and as such is considered appropriate for use in the MPPL Planning Study for providing the traffic demands for the base and future years as inputs for the operational model (seed matrices).

3.2 Existing Operational Model(s)

The Brisbane Mesoscopic Aimsun Model – BMAMv2.3 – (BMAM) was developed in 2017 and has been through continued development phases since. Since the Stage 1 creation of the model, it has been provided by TMR for various planning studies and model development projects in the Brisbane metropolitan region.

A brief snapshot of the modelled network relevant to the MPPL study area and the current calibration results of traffic counts for 1-hour of the AM and PM peak periods is depicted in Figure 2.

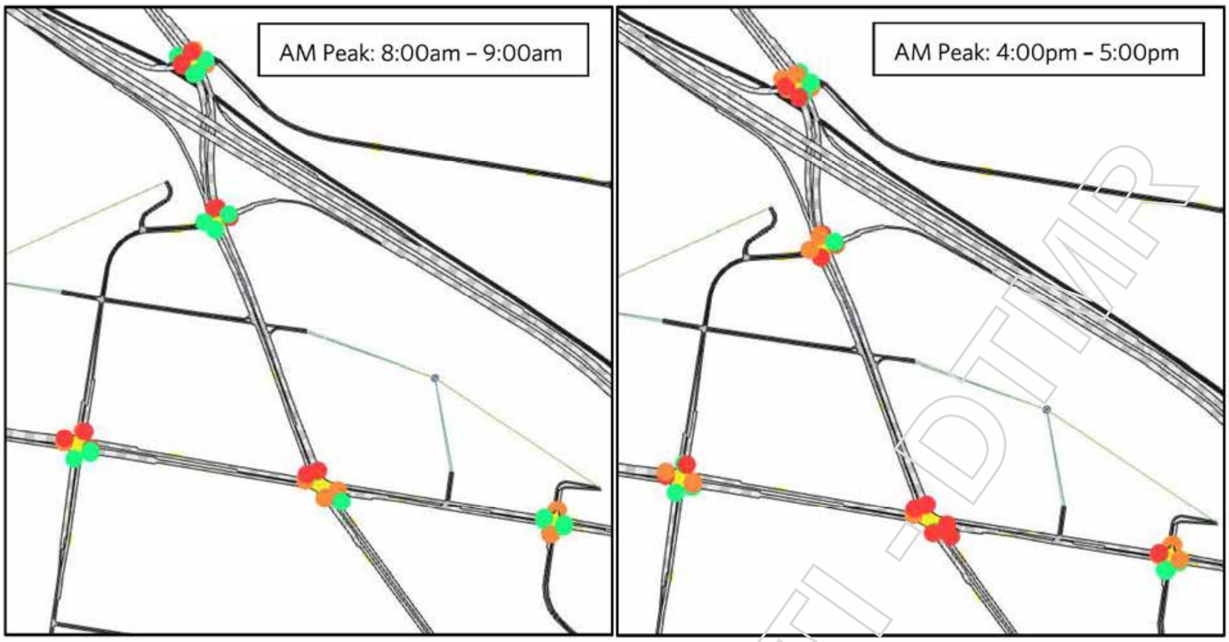


Figure 2: BMAM 2016 Calibration, MPPL Study Area

The observed traffic count data set for calibrating BMAM includes data sourced from different time periods and collection methods (i.e. both manual intersection surveys and loop detector counts). This contributes to the current base model calibration results of the latest version of BMAM within the MPPL study area not meeting industry guidelines. TMR TAU advised the project team that the BMAM is currently being further developed in terms of general updates for 2021 data and network arrangements, including the model being calibrated and validated to these base conditions. Given this is not included in release version 2.3, the BMAM will be applied in this project for general network arrangements and data review only (i.e. will not be used for demand development).

Operational Model – The BMAM will only be considered for use in this project for general network coding and data inputs.

4 Data Gap Analysis

4.1 Overview

This section summarises the data provided for the purposes of the MPPL Planning Study, specific to the development of the Aimsun microsimulation traffic model, as well as a high-level summary of the corresponding existing traffic operational conditions. The following traffic data has been included in this review:

- Traffic survey counts
- Travel time data
- Signalised intersection data

4.2 Traffic Counts

Traffic survey counts were provided by TMR in the form of traffic surveys undertaken by Austraffic on Wednesday 12th October 2022. The following intersections were surveyed:

- Logan Road / Holmead Road (Site ID 12281)
- Logan Road / Padstow Road / Miles Platting Road (Site ID 13170)
- Logan Road / Warrigal Road (Site ID 15347)

Traffic counts were collected across a 12-hour period (6:00am - 6:00pm) for vehicle types: 'light vehicles', 'heavy vehicles', 'cyclists' and 'pedestrians'.

Active travel users for the corridor are at a relative low volume level compared to road-based vehicle traffic volumes. The only intersection signalised crossing with more than 50 active travel users across the 12-hour period was observed at the Pacific Motorway northbound off-ramp crossing along the Principal Cycle Network. This location counted 25 pedestrians and 35 cyclists in the AM peak hour and 36 pedestrians and 35 cyclists in the PM peak hour.

Traffic flow profiles for each of the key intersections are relatively consistent at a daily level. The AM peak has a more pronounced peak hour compared to the PM peak which observes a notably higher volume and longer duration. The PM traffic volume levels and peak duration is likely due to a greater number of trip purposes being combined within the period, including school pick-up; work trip commuting, evening retail trips and recreation trips. The combined intersection daily traffic flow profiles are presented in Figure 3.

Figure 3: Traffic count profiles across each intersection (Wednesday 12th October 2022, Austraffic Survey)

With regard to heavy vehicle traffic volumes, the AM peak observes a higher heavy vehicle percentage than the PM peak, with the peak 1-hour time period (based on traffic counts) observed as follows:

- AM Peak: 7:45am – 8:45am
- PM Peak: 4:45pm – 5:45pm

The above is highlighted graphically in Figure 4 for traffic counts recorded across all sites for the 12-hour period.

Figure 4: Peak hour review

The Aimsun base model is to incorporate a 2-hour AM peak period and 3-hour PM peak period. For this purpose, the following time periods have been chosen:

- AM Peak: 7:00am – 9:00am
- PM Peak: 3:00pm – 6:00pm

In addition to the above, analysis of data extracted from the QLD Government Data Portal has been extracted for Site ID 135689, Logan Road, North of Miles Platting Road. This sites locality is shown below in Figure 5.

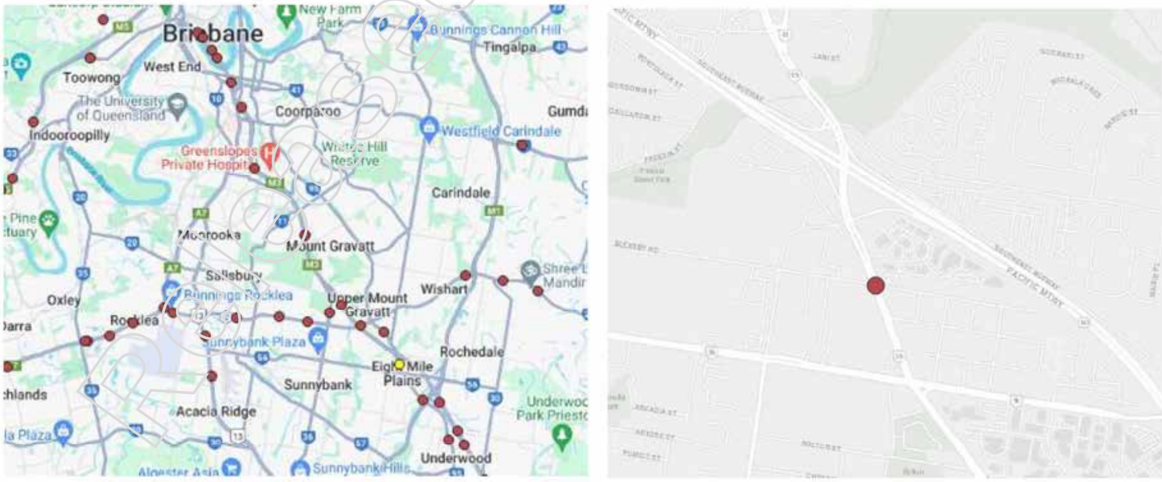


Figure 5: TMR Count Site Location – ID 135689 (QLD Government Data Portal)

Data for this location has been extracted and analysed across the available years, 2012 – 2022, with a summary of the data shown in Figure 6 and Figure 7.

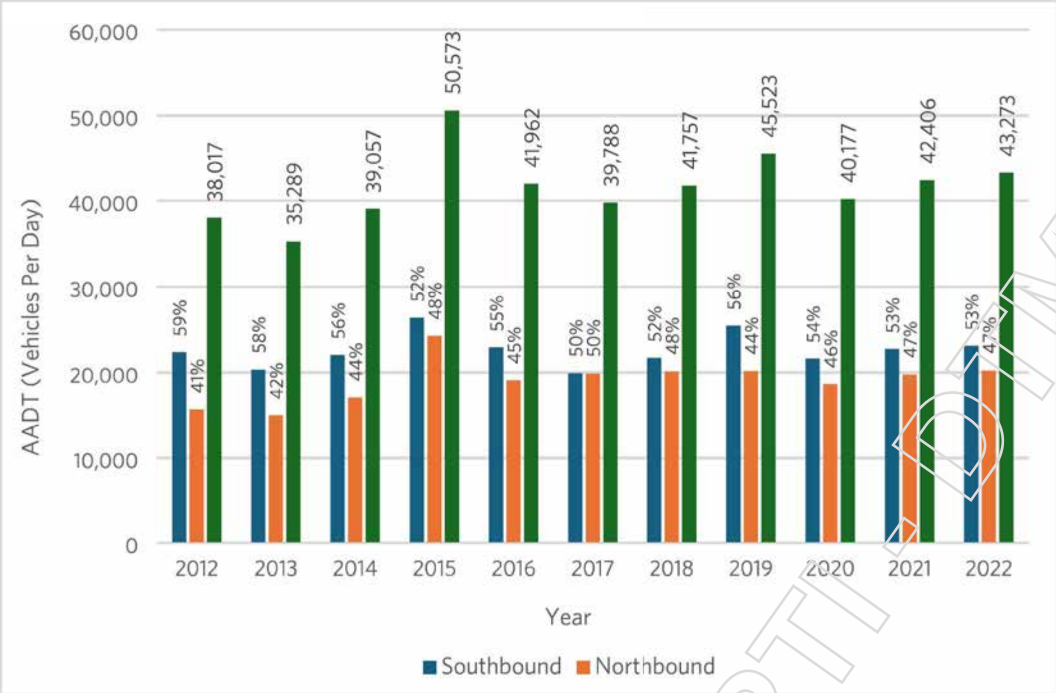


Figure 6: AADT Traffic Counts, 2012 – 2022 (TMR Site ID 135689)

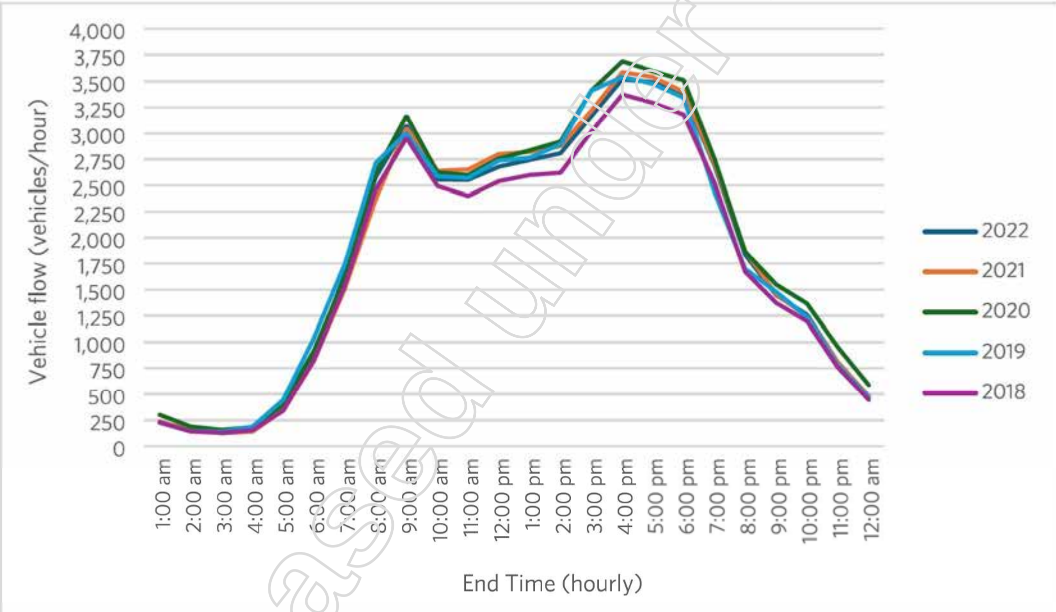


Figure 7: AADT Traffic Count Profiles, 2018-2022 (TMR Site ID 135689)

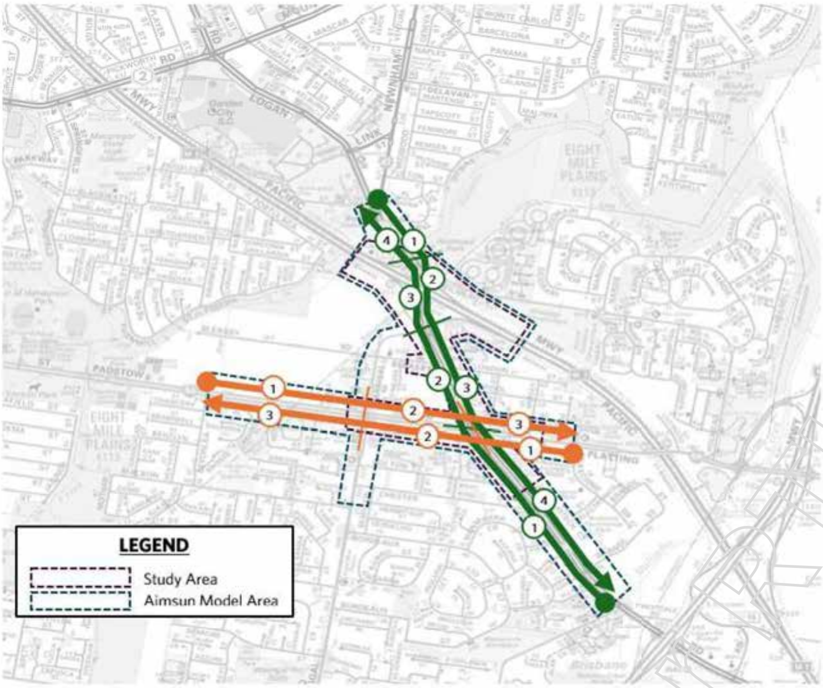
The following key findings are noted in review of the TMR AADT counts on Logan Road:

- AADT over the years 2012-2022 shows a peak in 2015 of around 50,500 vehicles.
- AADT in the years 2020, 2021 and 2022 are lower than that observed in 2019, believed to be a result of the daily travel pattern and volume impacts of the COVID-19 pandemic.
- Southbound traffic (54%) is generally higher than northbound traffic (46%).

Traffic Counts – Based on the review undertaken above, the traffic survey counts provided for this analysis are considered appropriate for use as a calibration dataset in the base model development phase of the project.

4.3 Travel Time Data

The base microsimulation traffic model for the MPPL study is planned to be validated with travel time data. TMR provided travel time data extracted from HERE for the primary traffic routes and segments as presented in Figure 8.



Logan Rd Northbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	Gaskell St	Padstow Rd	1.05km
2	Padstow Rd	Warrigal Rd	0.50km
3	Warrigal Rd	Holmead Rd	0.30km
4	Holmead Rd	MacGregor St	0.35km

Logan Rd Southbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	MacGregor St	Holmead Rd	0.35km
2	Holmead Rd	Warrigal Rd	0.30km
3	Warrigal Rd	Padstow Rd	0.50km
4	Padstow Rd	Gaskell St	1.05km

Padstow Rd Eastbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	Devonlea St	Warrigal Rd	0.65km
2	Warrigal Rd	Logan Rd	0.45km
3	Logan Rd	McKechnie Rd	0.45km

Padstow Rd Westbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	McKechnie Rd	Logan Rd	0.45km
2	Logan Rd	Warrigal Rd	0.45km
3	Warrigal Rd	Devonlea St	0.65km

Figure 8 - MPPL Microsimulation Traffic Model Travel Time Validation Routes and Segments (Source: Street-Directory)

The segmented HERE travel time has been extracted for the week of 10/10/2022 - 14/10/2022 across 24-hours for each day in 15-minute intervals. The provided data includes details on both speed and travel time data specifications. Given the small segmentation of HERE data, these were aggregated to the route segmentations outlined above to a level appropriate for model validation.

The analysis of average travel times for full routes, averaged across each 15-minute period and compared for each day of the week, are provided for all four travel routes in Figure 9 to Figure 12.

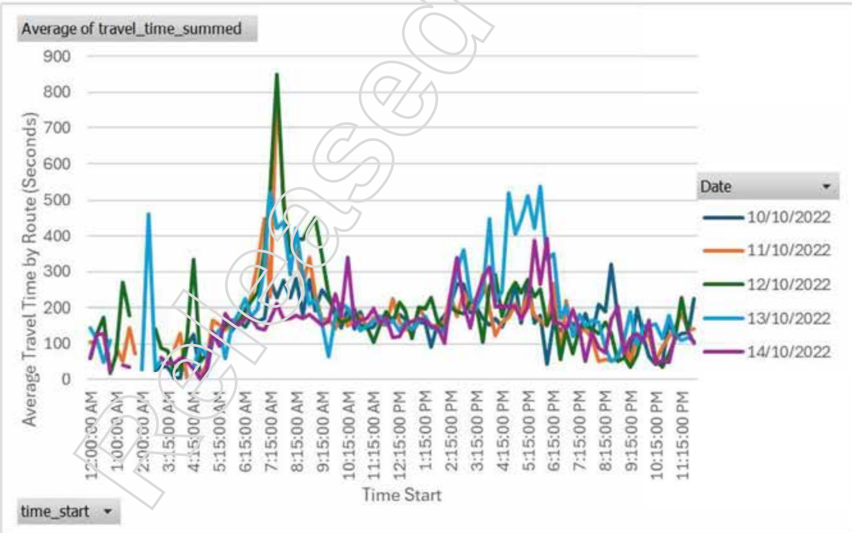


Figure 9: Average HERE Travel Times – Logan Road, Northbound (10/10/22 - 14/10/22)

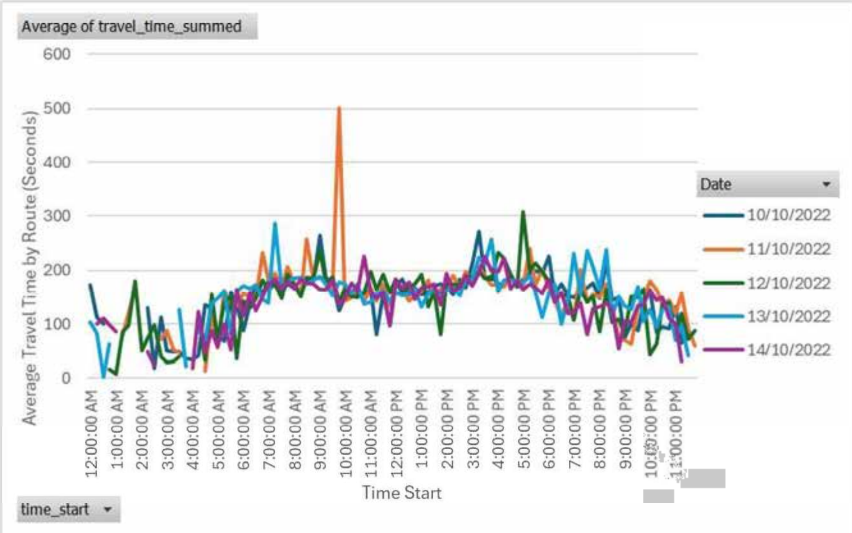


Figure 10: Average HERE Travel Times – Logan Road, Southbound (10/10/22 – 14/10/22)

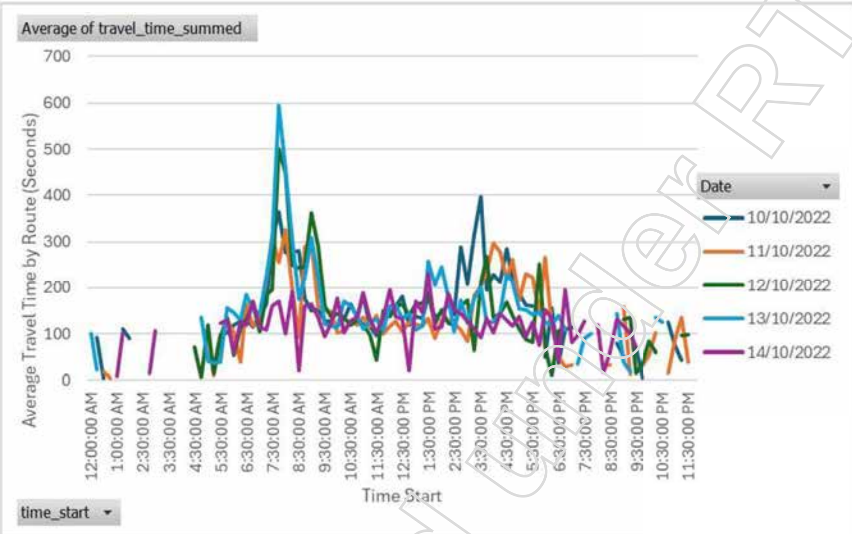


Figure 11: Average HERE Travel Times – Padstow Road, Eastbound (10/10/22 – 14/10/22)

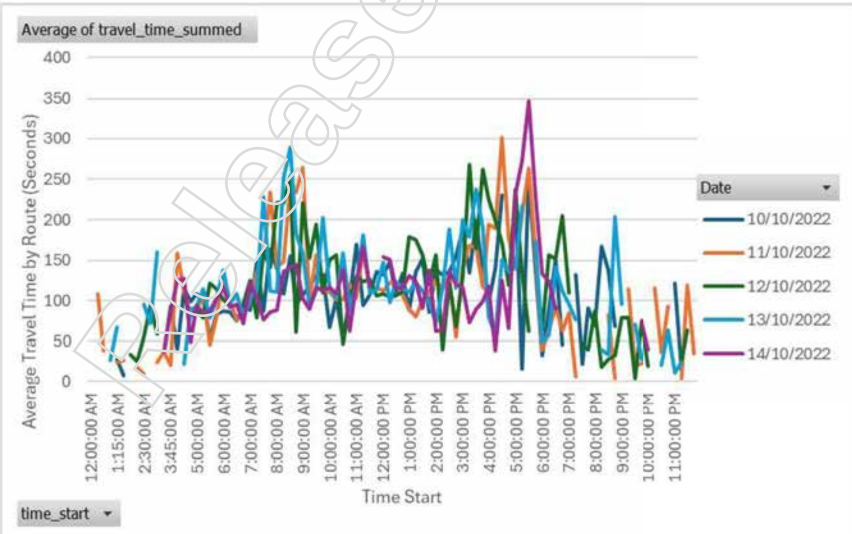


Figure 12: Average HERE Travel Times – Padstow Road, Westbound (10/10/22 – 14/10/22)

The primary existing travel time performance findings for each route are as follows:

- The longest travel times occur in the AM peak for Logan Road northbound and Padstow Road eastbound.
- Traffic congestion is observed for PM peaks Logan Road northbound and Padstow Road westbound at lower levels compared to the AM peak.
- The traffic survey dates produce travel times that reflect relative overall travel times for the network, with the peak directional AM travel time northbound on Logan Road reaching a range near observed maximum travel times for the date 12/10/22.
- Gaps in data were identified through various individual link segments at various times within the daily samples, mostly for the eastbound and westbound routes on Padstow Road. Consequently, average travel times from other dates will be applied to supplement missing data for the validation data set through the week of 10/12/22 - 14/10/22 where required. A summary of links with no supplied data is outlined in Table 2.
- Acknowledging some minor links are missing data (per Table 2), a desktop review indicates the overall routes are relatively consistent to estimates observed from Google Traffic data.

Table 2: Missing Here Data Links

Link Id's	Segment	Road Name
1347494221	1_NB_2_2	LOGAN RD
1347494222	1_NB_2_3	LOGAN RD
1347494219	1_NB_2_4	LOGAN RD
923511712	1_SB_3_6	LOGAN RD
1329801917	2_EB_1_11	PADSTOW RD
1329801916	2_EB_1_12	PADSTOW RD
1201466261	2_EB_1_2	PADSTOW RD
1192230659	2_EB_1_3	PADSTOW RD
848019233	2_EB_1_4	PADSTOW RD
848019232	2_EB_1_5	PADSTOW RD
1329473301	2_EB_1_6	PADSTOW RD
1329473300	2_EB_1_7	PADSTOW RD
1329801921	2_WB_3_3	PADSTOW RD
1329801922	2_WB_3_4	PADSTOW RD
1195765978	2_WB_3_6	PADSTOW RD
1192230656	2_WB_3_7	PADSTOW RD
1192230657	2_WB_3_8	PADSTOW RD
846903571	2_WB_3_9	PADSTOW RD

Further to the above, analysis of individual link segments' average speeds in comparison to Google Traffic to establish enhanced appreciation of and confidence in representing traffic congestion patterns for the base traffic modelling. This analysis of AM and PM peak periods are presented in Figure 13 and Figure 14 respectively.

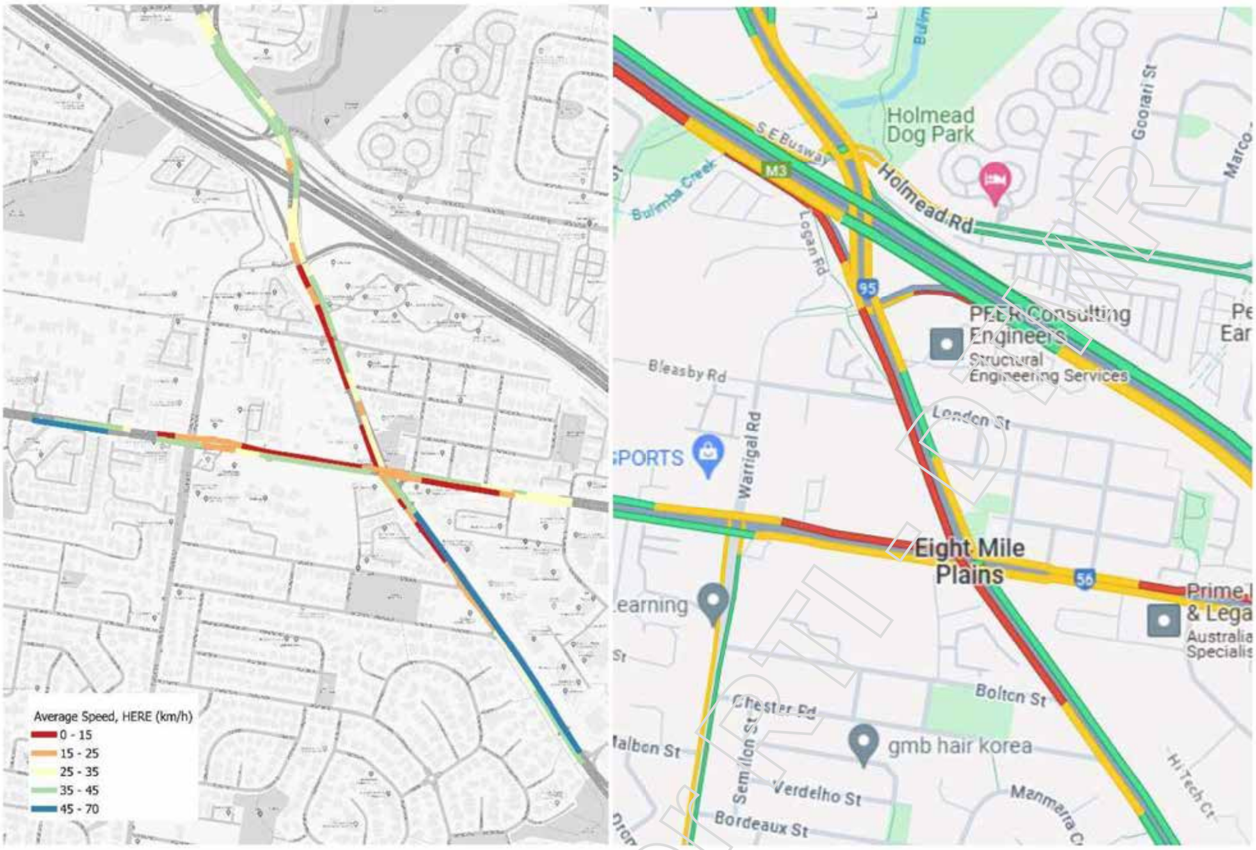


Figure 13: Average Speed (HERE) vs Google Traffic Congestion (AM Peak, 7:45am – 8:45am)

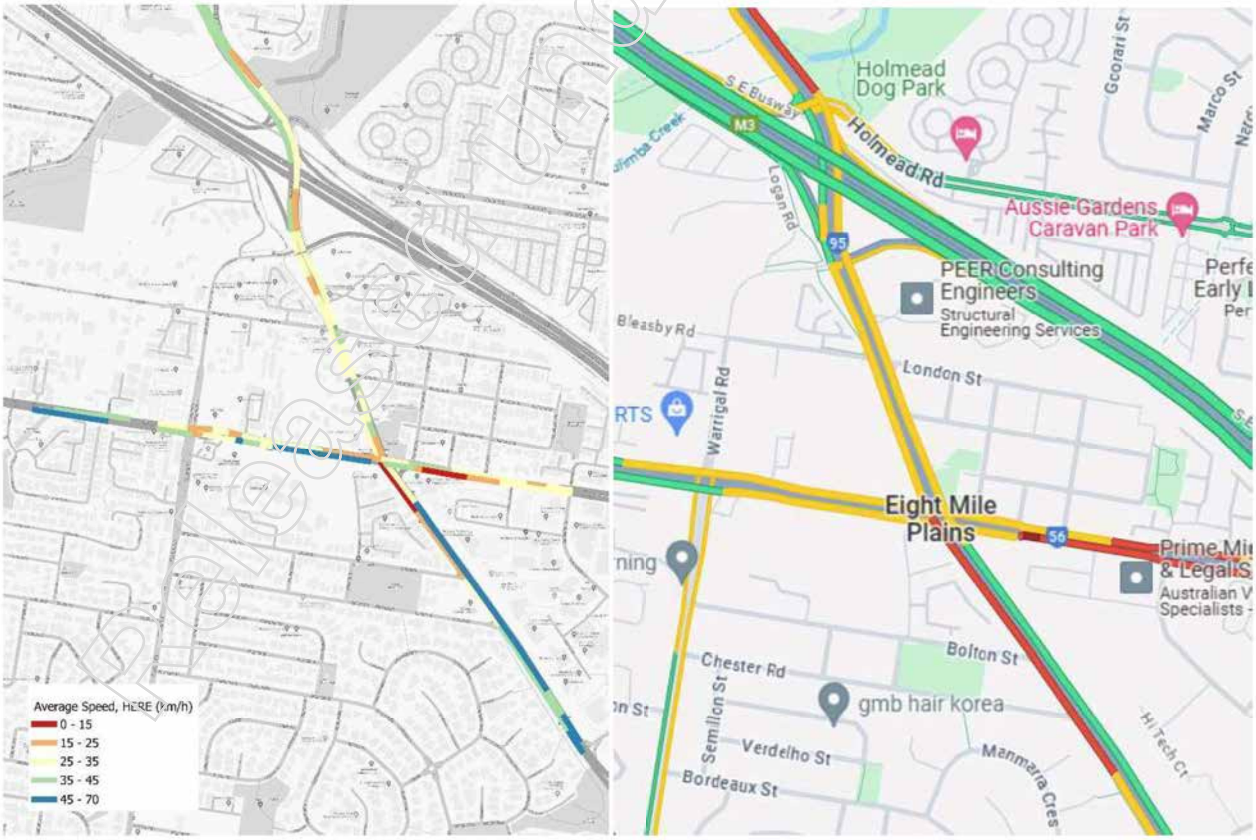


Figure 14: Average Speed (HERE) vs Google Traffic Congestion (PM Peak, 4:45pm – 5:45pm)

Travel Times – Based on the review of available base model validation traffic data, the HERE travel time data provided for this study is considered appropriate for use as a validation dataset in the base model development phase of the project. This is on the basis of segment links with no supplied data are supplemented by travel time data from another time period.

4.4 Signalised Intersection Data

The study area includes three (3) STREAMS signalised intersections and one (1) SCATS signalised intersection:

- Logan Rd / Holmead Rd (M1418)
- Logan Rd / Padstow Rd / Miles Platting Rd (M1420)
- Logan Rd / Warrigal Rd / M1 Off-ramp (M1419)
- Padstow Rd / Warrigal Rd (B0900)

4.4.1 STREAMS Signal Data

Relevant signal plans, plan information and signal timing outputs (ICA data) have been provided by TMR for the STREAMS intersections for the date 30 May 2024 across a 12-hour period (6:00am – 6:00pm).

The provided signal data was reviewed in terms of consistency and completeness to confirm appropriateness for use in the base model development. The following key findings and recommendations are noted:

- No missing recordings or errors in recordings across key peak period times.
- Consistency in actual cycle times and phase times deployed, particularly in the AM peak period for all intersections.
- Offsets to be reviewed and run accordingly to match observed conditions and recorded plan details.

Recorded cycle times across the day have been shown graphically across the day for each of the three (3) STREAMS intersections below.

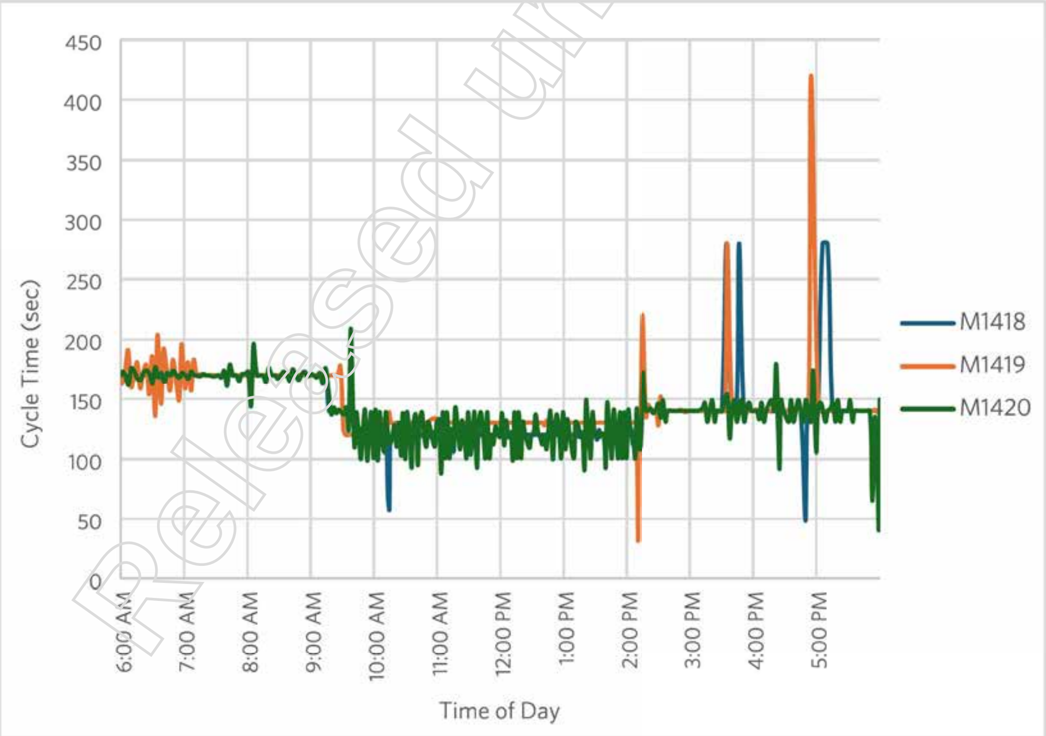


Figure 15: Intersection Cycle Times (6:00am – 6:00pm)

With the exception of double-cycling, the cycle times are relatively consistent across peak and off-peak periods, both for the particular and across each intersection. The following average cycle times for the peak periods are as follows:

- Average cycle times (excluding outliers) were consistent for all three (3) intersections:
  - AM Peak: 170 seconds
  - PM Peak: 140 seconds

STREAMS Signal Data – The signal data provided will include enough detail to efficiently model actuated signal control settings in the base Aimsun microsimulation traffic model; however, further STREAMS signal timing outputs from additional dates should be provided to confirm appropriateness of the selected date.

4.4.2 SCATS Signal Data

SCATS Signal Data – No SCATS data has been provided to date. Ideally, SCATS signal plans, plan information and history data will be provided to assist this task. Further to this, SCATS detector counts for the intersection B0900 would assist in model demand development of traffic movements and patterns (not to be used for formal calibration), ideally one week of data can be presented as this would provide a more robust appreciation of the traffic count surveys provided.

5 Conclusions and Recommendations

Table 3 outlines the conclusions and recommendations made in relation to the available transport model use and traffic data inputs (and gaps) provided by TMR for the development of the MPPL Aimsun traffic microsimulation modelling.

Table 3: Conclusions and Recommendations on Model(s) and Input Data

Input	Review and Recommendations	Action(s)
BSTM (strategic model)	• Considered appropriate for use in developing cordon demands (seed matrices for Aimsun).	• None
BMAM (operational model)	• Considered appropriate for use in assisting the development of the network and for review of background data and inputs.	• None
Signal Data	• All STREAMS signal data inputs have been provided and are acceptable for use in the base model development. • No SCATS signal data inputs have been provided.	• Additional date(s) of STREAMS signal timing outputs to be provided. • TMR/BCC to provide SCATS data inputs for base model development (SCATS ID B0900).
Intersection Traffic Counts (Survey)	• Intersection traffic counts surveyed on 12/10/2022 to be used for the base model calibration.	• None
Travel Times (HERE)	• HERE travel times extracted for 12/10/2022 to be used for base model validation and supplemented by appropriate data recorded across week 10/12/2022 - 14/10/2022 where required.	• Additional HERE travel time data required for another week to supplement missing data across all supplied dates.

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Appendix B

Modelling Methodology Report

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MODEL METHODOLOGY REPORT

LOGAN SUB-ARTERIAL ROAD / MILES PLATTING ROAD / PADSTOW ROAD INTERSECTION UPGRADE PLANNING STUDY

JOB NO. 2420 | 17TH JULY 2024

DYKMAN CONSULTING

Document Control

Project Name	MPPL Intersection Upgrade Planning Study	Date of Issue	17/07/2024
Document No.	2420-REP-Model Methodology-MPPL-FINAL	Discipline	Traffic Modelling
Subject	Model Methodology Report	Project No.	2420
Author/s	NR [redacted]	Reviewed by	NR [redacted]
Prepared for	TMR	Attention to	[redacted]

Revision	Revision Date	Details	Authorised by
A	12 June 2024	Draft Report	NR [redacted]
B	17 July 2024	Final Report	[redacted]

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Contents

Tables

Figures

1 Introduction

Dykman Consulting has been engaged by AECOM to provide traffic modelling services for the Department of Transport and Main Road's (TMR) Logan Sub-Arterial Road / Miles Platting Road / Padstow Road Intersection Upgrade (MPPL) Planning Study project (CN-22628).

1.1 Background

The MPPL intersection is located to the west of the Pacific and Gateway Motorways and has a primary function of connecting vehicle movements to and from the surrounding motorway network as well as locally based vehicle trips.

The key roads within the study area include Logan Road (U90) is a State-controlled Road with sub-arterial classification. In 2022 the AADT of Logan Road was approximately 43,300 vehicles per day which is an increase of approximately 8.8% compared to the 39,800 vehicles AADT five years prior (2017) including, 4.75% heavy vehicles. Logan Road forms a signalised, at-grade intersection with Miles Platting Road (eastern approach) and Padstow Road (western approach).

Over the past decade, the MPPL intersection and surrounding road network has experienced traffic congestion during the AM and PM peak periods. In particular, the vehicle queuing formation at the MPPL intersection limits the traffic operational capacity of the surrounding intersections of Warrigal Road / Padstow Road and the Logan Road / M3 interchange. Without intervention, these traffic operational performance levels are expected to deteriorate in the future given the planned population growth for the region.

With regard to road safety, 155 crashes were recorded by TMR between 2010 and 2020 within the study area. Approximately 67% of these incidents were located on Logan Road between the MPPL intersection and the M3 Pacific Motorway interchange. It is suspected there is a strong correlation between the number of road incidents within this corridor with the high level of traffic volumes and congestion formation.

Several planning studies delivered since 2010 to address the traffic congestion of the surrounding MPPL road network which include:

- **2010 Business Case –** preferred option to upgrade the MPPL intersection was not funded due to high project estimated costs.
- **2014 Planning Review –** the recommended intersection upgrade options were not progressed to development phase, however an interim stage of the option was constructed in 2015.
- **2021 Planning Study and Options Analysis (OA) –** revisited an option of the 2010 Business Case with further investigations, analysis and options developed. This project established a preferred option and five low-cost interim options.

These studies will be reviewed and considered within this MPPL Planning Study project.

1.2 Subject Site

The study area location as well as the associated Aimsun microsimulation traffic model cordon area is presented in Figure 1.1.

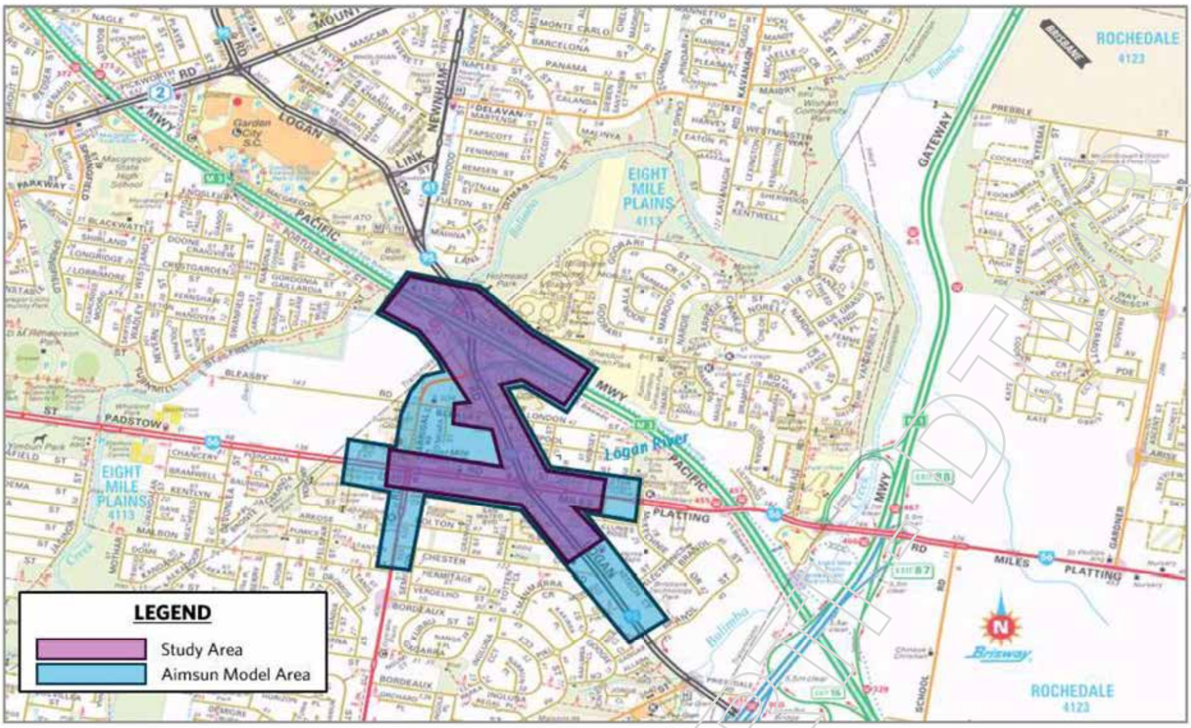


Figure 1 – MPPL Microsimulation Traffic Model and Project Study Areas (Source: Street-Directory)

1.3 Project Objectives

This project will be delivered in two phases with each phase having specific objectives which are as follows:

1. Business Case objectives:
    a. Conduct an extensive review of 2021 low-cost options analysis.
    b. With updated traffic data, re-establish low-cost designs to improve capacity and safety at the MPPL intersection.
    c. Propose a recommended upgrade option(s) that has a cost of no greater than $50m.
    d. Produce an OnQ Type 4in1 format Business Case of the recommended upgrade design.
2. Strategic Assessment of Service Requirements (SASR) objectives:
    a. Produce project recommended upgrades that progress through Gate 1 of the Project Assurance Framework process with a presentation to TMR's IIC Committee.
    b. Produce a SASR report that is accepted by TMR's Infrastructure Investment Committee.

This modelling methodology report has been developed to ensure it is appropriate to support the transport modelling assessment needs for both the SASR and BC phases of the project, including identifying the problem for the SASR.

1.4 Scope of Work

The scope of transport modelling work for the MPPL Planning Study is to comply with TMR's Transport Modelling Assessment Framework (TMAF) and includes:

- Prepare a 2022 base calibrated and validated base microsimulation traffic model of study area, including the weekday AM and PM peak periods.
- Establish equivalent future base year scenario models including 2031 and 2041.
- Deliver microsimulation traffic models of options generated for the 2031 and 2041 future year scenarios.
- Produce traffic modelling reports in accordance with the TMAF process.

1.5 Report Outline

This report outlines the proposed methodology across all stages of modelling, including the following:

- Model framework
- Input data and assumptions
- Base model calibration and validation
- Future base model development
- Options modelling

1.6 Limitations and Assumptions

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

- Microsimulation demands will be based on inputs and assumptions of the relevant strategic model outputs.
- Assessment is limited to impacts within the study area.
- Base model calibration and validation is limited to the appropriateness of the input traffic counts and HERE data travel times.

2 Model Development Approach

2.1 Model Framework Overview

The model framework to be adopted for the MPPL Planning Study include the use of TMR's BSTM and BMAM along with observed traffic data of existing conditions to develop a microsimulation traffic model. The flow chart of TMR model inputs for the development of the microsimulation traffic model is presented in Figure 2.

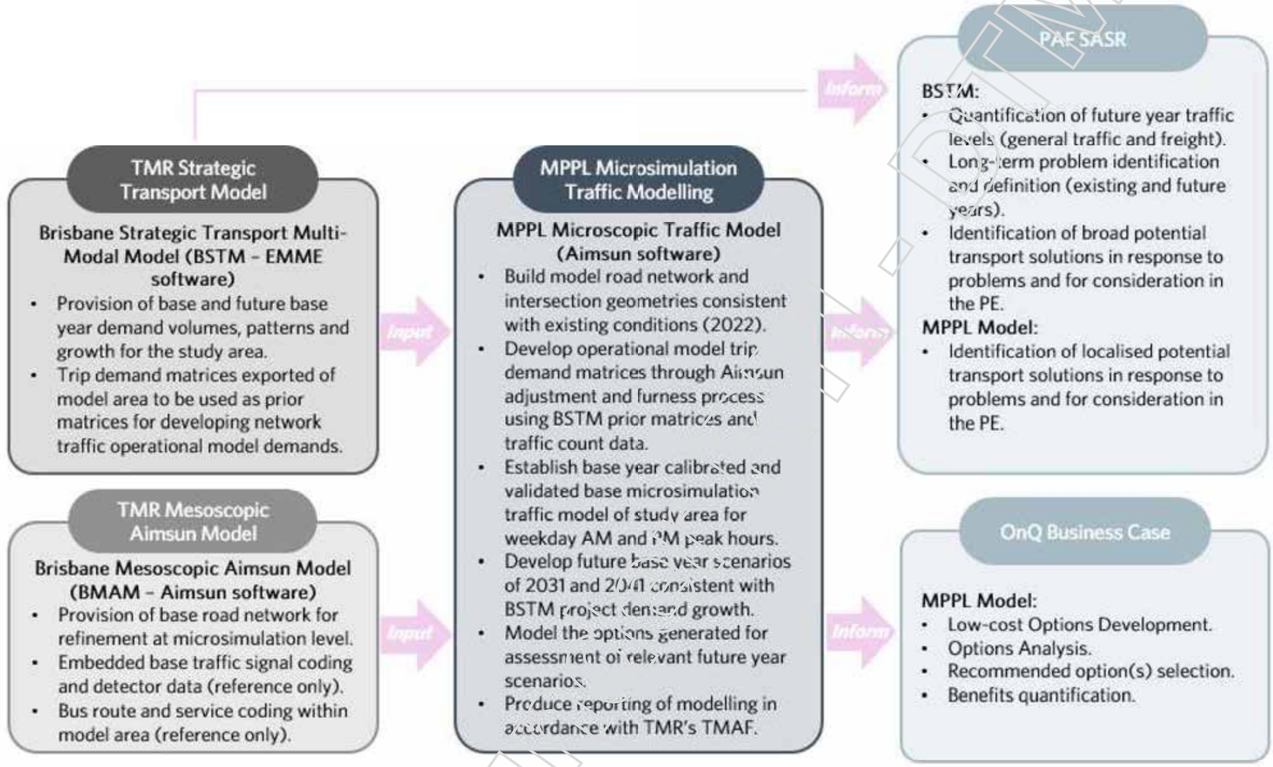


Figure 2 – MPPL Microsimulation Traffic Model Framework Overview

It is common practice to use the BSTM to identify the problem during the SASR phase, and then develop a detailed operational model (e.g. Aimsun) during the BC phase. However, in this instance, the OnQ BC and PAF SASR are being delivered in parallel, which provides an opportunity to use the operational traffic model for both phases of the project (as outlined in Figure 2).

For the SASR, the BSTM will be used to understand future transport network demands and travel patterns, and the proposed model methodology. Given the BSTM does not allow for a detailed representation of the impact of intersections, queues and weaving, the MPPL model, which will be calibrated and validated to local conditions within the study area, will provide further details on localised issues at the MPPL intersection and used for defining the problem for the study area of the SASR.

2.2 Data Summary

2.2.1 Overview

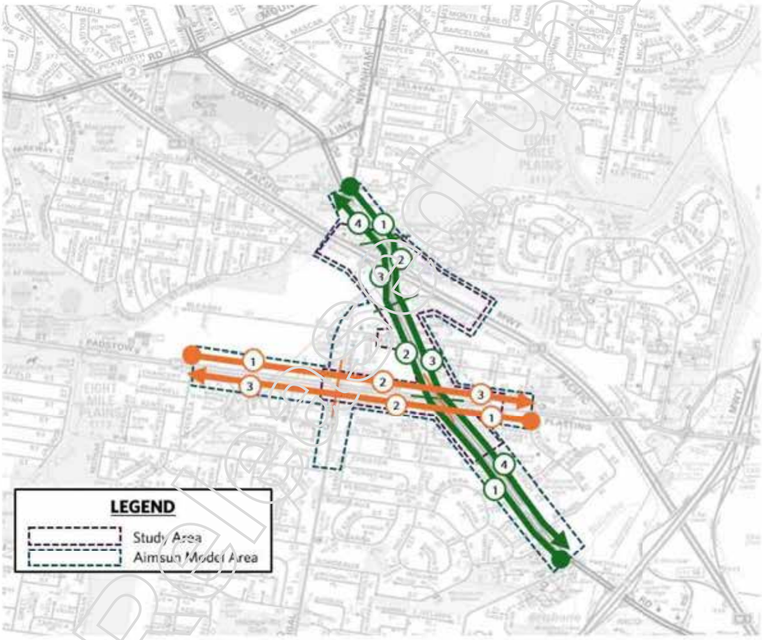
The input data to be included for the development of the base microsimulation model includes a combination of the latest transport models from TMR, traffic count data, signal data and travel times. A summary of the datasets and inputs proposed for use in the base model development are outlined below in Table 1.

Table 1: Traffic Data Summary

Data Type	Source	Survey Date(s)	Survey Time(s)	Location(s)
Brisbane Mesoscopic Aimsun Model (BMAM) v2.3	TMR	N/A	N/A	Greater Brisbane region
BSTM v2.4	TMR	N/A	N/A	Greater Brisbane region
Traffic Counts	Austraffic	Wednesday 12 October 2022	6am-6pm	• Logan Rd / Holmead Rd • Logan Rd / Padstow Rd / Miles Platting Rd • Logan Rd / Warrigal Rd / M1 Off-ramp
Travel Times	HERE (TMR)	10/10/2022 – 14/10/2022	24-hour (15-minute intervals)	• Logan Rd (northbound / southbound) • Padstow Rd (eastbound/westbound)
STREAMS Signal Data	TMR	30/05/2024	6:00am – 6:00pm	• Logan Rd / Holmead Rd (M1418) • Logan Rd / Padstow Rd / Miles Platting Rd (M1420) • Logan Rd / Warrigal Rd / M1 Off-ramp (M1419)
SCATS Signal Data	BCC	To be confirmed with TMR and BCC teams.		• Padstow Rd / Warrigal Rd (B0900)

2.2.2 Calibration and Validation Data

The base microsimulation traffic model for the MPPL will be calibrated to intersection traffic counts and validated to travel time survey data. The intersection traffic count data supplied by TMR per Table 1 will be adopted in the calibration process. The travel time data extracted from HERE by TMR will include the road network routes and segments as presented in Figure 3.



Logan Rd Northbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	Gaskell St	Padstow Rd	1.05km
2	Padstow Rd	Warrigal Rd	0.50km
3	Warrigal Rd	Holmead Rd	0.30km
4	Holmead Rd	MacGregor St	0.35km

Logan Rd Southbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	MacGregor St	Holmead Rd	0.35km
2	Holmead Rd	Warrigal Rd	0.30km
3	Warrigal Rd	Padstow Rd	0.50km
4	Padstow Rd	Gaskell St	1.05km

Padstow Rd Eastbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	Devonlea St	Warrigal Rd	0.65km
2	Warrigal Rd	Logan Rd	0.45km
3	Logan Rd	McKechnie Rd	0.45km

Padstow Rd Westbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	McKechnie Rd	Logan Rd	0.45km
2	Logan Rd	Warrigal Rd	0.45km
3	Warrigal Rd	Devonlea St	0.65km

Figure 3 – MPPL Microsimulation Traffic Model Travel Time Validation Routes and Segments (Source: Street-Directory)

2.2.3 Models

This section defines the models provided to inform this study.

2.2.3.1 Existing Strategic Model(s)

TMR TAU develops and maintains two (2) strategic models that cover this study are, that have been developed to support transport planning and road infrastructure and policy testing by the department:

- Southeast Queensland Strategic Transport Model (SEQSTM).
- Brisbane Strategic Transport Model, BSTM-MMv2.4 (BSTM).

For the MPPL Planning Study, TAU has recommended the use of BSTM to provide the traffic cordon demands for the Aimsun microsimulation traffic model.

The BSTM is a robust four-step strategic transport model providing travel demand forecasts for Brisbane and adjacent Local Government Areas (LGAs). The model incorporates both highway and public transport assignments.

The following model scenarios, design years and time periods are included and will be considered within this project:

- Model scenarios:
  - Base Case: 2021, 2026, 2031, 2036 and 2041.
  - Reference Case: 2026, 2031 and 2036.
- Time periods:
  - AM peak: 7:00am – 9:00am.
  - PM peak: 4:00pm – 6:00pm.

The BSTM was calibrated and validated in 2016 (by others) to observed data that provides a snapshot of travel patterns at the point in time, subject to seasonality and variations as the result of weather, accidents and local road works. It is considered appropriate for use in the MPPL Planning Study to provide the traffic demands for the operational model (seed matrices). It is noted that due to possible impacts of the COVID-19 pandemic across the years 2020-2022, the re-calibration and rebase to 2021 may have significantly impacted travel demand and trip patters, creating an unwanted impact on the future transport trend in the study area.

The key difference between the Base and Reference Case scenarios is in their network assumptions, as stated in the BSTM TMAF documentation:

- Base Case: primarily committed and funded projects.
- Reference Case: constitutes network assumptions at various planning stages that would likely be included.

To capture the future year growth from the BSTM, AECOM performed the subarea analysis based on the operational model boundary in both Base Case and Reference Case (where applicable) in the following model years: 2021, 2026, 2031, 2036 and 2041, for both the AM and PM peak periods.

The demand matrices by vehicle classification were extracted from the BSTM as the seed demand matrices for the operational model for the three vehicle classifications:

- Private vehicle.
- Medium commercial vehicle, MCV (class 3-4 by Austroads Classification).
- Heavy commercial vehicle, HCV (class 5 upward by Austroads Classification).

The demand matrices were output in PCU units and then to vehicle unit by dividing the matrices by the PCU factors of 2 for MCV and by 3 for HCV.

For the OnQ Business Case, the BSTM will be used to provide the base and future year demand volumes, patterns and growth for the study area. For the SASR, the BSTM will be used to identify the existing and future year problems on the network. No scenarios are proposed to be coded or tested in the BSTM. The model does not allow for a detailed representation of the impact of intersections, queues and weaving. Therefore, in understanding the localised impacts at the MPPL intersect, the MPPL model will be used.

2.2.3.2 Existing Operational Model(s)

The Brisbane Mesoscopic Aimsun Model (BMAM) was developed in 2017 and has been through continued development phases since. This model has been provided by TMR to be used as a reference for the development of the MPPL base model.

2.3 MPPL Operational Model Development

The following sections outline the proposed assumptions and methodology for the following:

- Base model calibration and validation.
- Future base and Options model development.

2.3.1 Base Model Calibration and Validation

2.3.1.1 Software

The latest version of Aimsun next (Version 23.0.1) will be used for this assessment.

2.3.1.2 Network

The base network will be developed utilising Nearmap, Google Street view and observed existing conditions (2024) on site. This will include operational nuances specific to the congested network operational in this study area (i.e. use of paved road network outside of line-markings). Road types and observed speeds will be matched to existing road hierarchy and structure with reference made to the provided strategic model and as shown in the 'Street Directory' (Australia Map, Street Smart – street-directory.com.au).

2.3.1.3 Model Extents

The model will include appropriate network links and connections within the study area extents outlined in Figure 1.

2.3.1.4 Time Periods

The modelled peak periods will be determined during the initial assessment of provided traffic count data. The Aimsun model will consist of a two-hour AM peak period and three-hour PM peak period. Further to this, a 15-minute warm-up and 15-minute cool-down will be included at a minimum, to ensure appropriate congestion build-up and dispersion.

2.3.1.5 Vehicle Types

Two vehicle types will be adopted: light vehicles (LV) and heavy vehicles (HV). Matrices for both vehicle types will be developed and calibrated separately. Vehicle type characteristics will be reviewed and updated as required during the base model development and calibration and validation stages.

2.3.1.6 Public Transport

All public transport stops, lines and schedules will be coded as fixed routes as per the latest timetables available on the TransLink website and GTFS data.

2.3.1.7 Traffic Signals

Traffic signal characteristics for the base year models will be derived from an extensive analysis of STREAMS and SCATS outputs. All intersections will be developed with actuated control, with signal groups, associated detector functionalities and phasing specifications determined from analysis of the provided signal control plans, plan details and historic signal data (ICA data). Relevant actuated control inputs (i.e. minimum/maximum green times) will be calculated from the relevant signal timing data outputs provided by TMR.

2.3.1.8 Topography

If data is available for import, altitude slopes will be modelled for links within the network to ensure appropriate delays are created on slopes for heavy vehicles.

2.3.1.9 Active Travel

Given the low volumes of pedestrians and cyclists within the study area, these users will not be explicitly modelled. At locations where pedestrian movements may impose delays on vehicles, these will be incorporated into traffic signals as late starts.

2.3.1.10 Demand Development

Demands will be developed using cordon demand outputs from BSTM. The following steps will be used in the base model demand development process:

1. **Cordon Matrices from BSTM –** cordon matrices will be extracted from BSTM for the specified subarea. Theses matrices will provide the initial OD structure at the travel zone level.
2. **Zone aggregation and disaggregation –** given the finer details required in the microsimulation model subarea, there may be a requirement to disaggregate certain zones from the BSTM cordon outputs into the more refined network of the Aimsun model. Any assumptions made through this process will be outlined in the final modelling report.
3. **Matrix finessing –** the survey data will be analysed to determine known origin and destination totals and the known OD pair totals. The matrices developed in step 2 will be refined (finessed) hourly by vehicle type to match these totals while maintaining the structure of the matrix.
4. **Static adjustment –** the matrices from step 3 will be imported into Aimsun where the static adjustment tool will be used to further refine the matrices to better represent observed data.
5. **Departure adjustment –** static departure adjustment scenarios will be undertaken within Aimsun to determine appropriate 15-minute demand profiles from the matrices developed in step 4. Given the scale of the model, there will likely not be any need to further adjust these to account for length of trips.
6. **Manual adjustments –** it is unlikely any final manual adjustments will be required; however, if they are made in the final step, clear details and explanations behind these will be provided in the final modelling report.

2.3.1.11 Assignment Type

All Aimsun models will be developed as microsimulation scenarios, with the following steps taken:

1. **Static Assignment –** to create initial static paths for the network.
2. **Microsimulation Dynamic User Equilibrium (DUE) –** using the static assignment path outputs from step 1, dynamic paths will be determined across equilibrium to use as an input into the output scenarios (step 3).
3. **Microsimulation Stochastic Route Choice (SRC) –** paths created in the DUE will be input to the SRC, with a minimum of five (5) random seed runs undertaken for each scenario and results reported on as the average across each.

2.3.1.12 Calibration and Validation Criteria

The base model will be calibrated and validated in accordance with NZTA – Transport Modelling Guidelines, 2019 (Type E – Small Area / Corridor), as outlined below in Table 2.

Table 2: Adopted Calibration and Validation Criteria (NZTA, 2019)

Criteria	Item	Criteria
Calibration Criteria	Turning Volumes	Tolerance limits for turn volumes: • GEH <= 5 for at least 85% of turn/link flows. • GEH <= 7.5 for at least 90% of turn/link flows. • GEH <= 10 for at least 95% of turn/link flows.

		• R^2 value for observed vs modelled plots to be > 0.95. • Line of best fit: y=0.95x – 1.05x. • RMSE < 15%.
Validation Criteria	Travel Time Average	• At least 90% of average modelled journey time to be within 15% or one minute (whichever is greater) of average observed journey time for full length of route. • At least 95% of average modelled journey time to be within 25% or 1.5 minutes (whichever is greater) of average observed journey time for full length of route.
	Model Stability	• Model convergence to be achieved, and stability of the various random seed runs (SRC scenarios) will be compared and within acceptable variance limits.

2.3.2 Future Base Model Development

2.3.2.1 Assumptions

- All model parameters will be maintained as per the existing base model development.
- Future public transport lines and schedules will be confirmed with TMR and updated as required.
- Changes will be made to actuated signal control settings for changes in demand distribution where appropriate.
- Future demands will be developed through analysis of BSTM cordon demands.

2.3.2.2 Future Demand Development

Future demands will be developed through analysis of BSTM future demand cordon outputs. Demands for the Aimsun microsimulation model will be developed with appropriate growth applied specifically to origin-destination pairs layered onto the final calibrated demand sets. An appropriated process for applying this growth (percentage growth or absolute growth) will be determined after initial review of the cordon outputs.

2.3.2.3 Model Outputs

To understand baseline performance between existing year and future year scenarios, the following performance metrics will be provided (at a minimum):

- Network wide statistics (VHT, VKT, average speed, average delay, average journey time, completed trips, unreleased trips).
- Local statistics (key intersection LOS, average delays, maximum queue lengths).
- Road network plots:
  - Volume plots.
  - Simulated density plots
  - LOS for urban street speeds
- Travel time routes (as per base model validation).

2.3.3 Options Modelling

Options modelling will maintain methodology as applied through the base and future base model development, with specifics to be confirmed with the project team through the next phases of the project.

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Appendix C

Base Year Model Development Report

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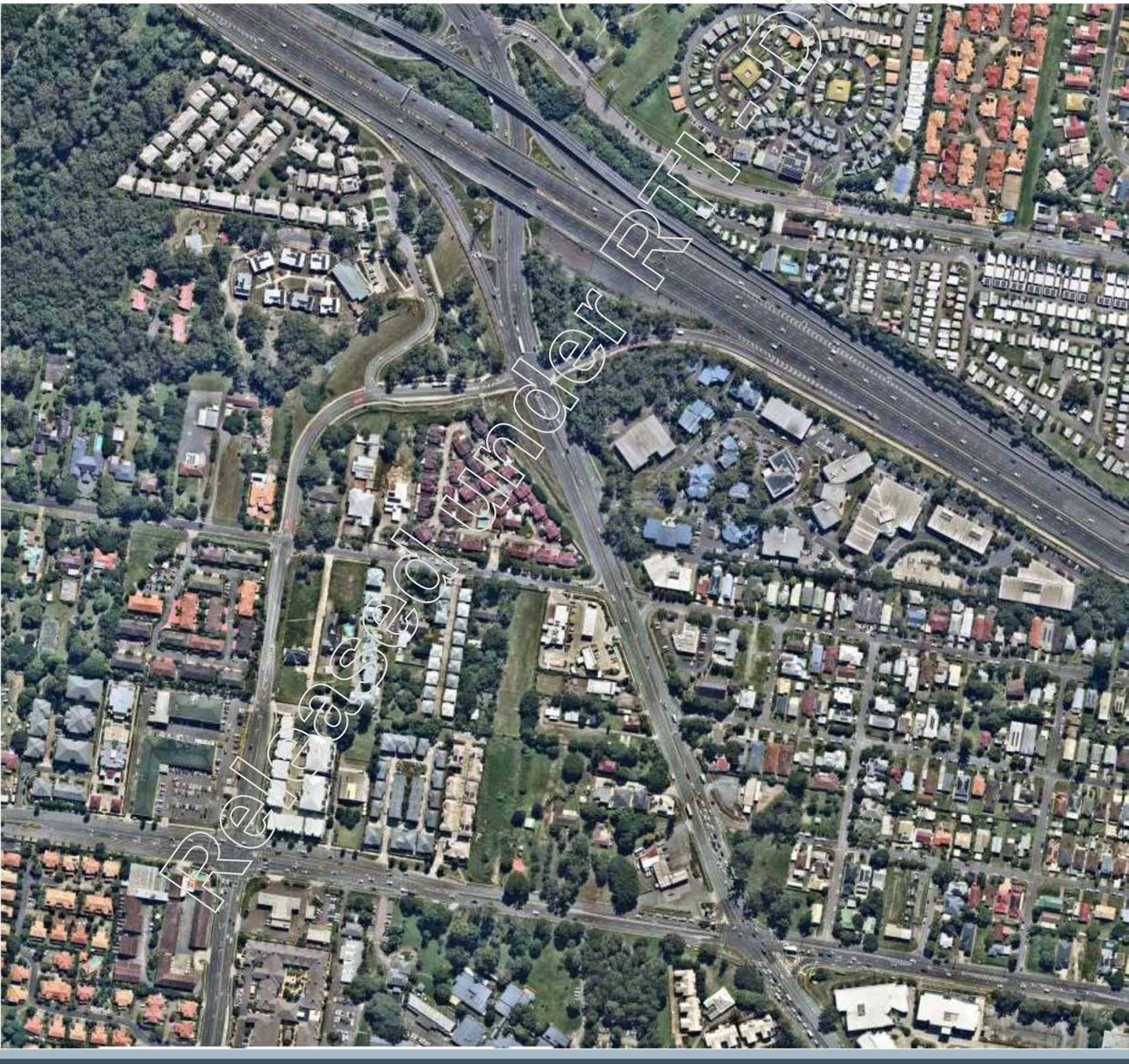
BASE MODEL DEVELOPMENT REPORT

LOGAN SUB-ARTERIAL ROAD / MILES PLATTING ROAD / PADSTOW ROAD INTERSECTION UPGRADE PLANNING STUDY

JOB NO. 2420 | 29TH JULY 2024



Document Control

Project Name	MPPL Intersection Upgrade Planning Study	Date of Issue	29/07/2024
Document No.	2420-REP-MPPL-Base Model Development-DRAFT	Discipline	Traffic Modelling
Subject	Base Model Development Report	Project No.	2420
Author/s	NR [redacted]	Reviewed by	NR [redacted]
Prepared for	TMR	Attention to	[redacted]

Revision	Revision Date	Details	Authorised by
0	29 July 2024	Draft Report	NR [redacted]

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Contents

Tables

Figures

1 Introduction

Dykman Consulting has been engaged by AECOM to provide traffic modelling services for the Department of Transport and Main Road's (TMR) Logan Sub-Arterial Road / Miles Platting Road / Padstow Road Intersection Upgrade (MPPL) Planning Study project (CN-22628).

1.1 Background

The MPPL intersection is located to the west of the Pacific and Gateway Motorways and has a primary function of connecting vehicle movements to and from the surrounding motorway network as well as locally based vehicle trips.

The key roads within the study area include Logan Road (U90) is a State-controlled Road with sub-arterial classification. In 2022 the AADT of Logan Road was approximately 43,300 vehicles per day which is an increase of approximately 8.8% compared to the 39,800 vehicles AADT five years prior (2017) including, 4.75% heavy vehicles. Logan Road forms a signalised, at-grade intersection with Miles Platting Road (eastern approach) and Padstow Road (western approach).

Over the past decade, the MPPL intersection and surrounding road network has experienced traffic congestion during the AM and PM peak periods. In particular, the vehicle queuing formation at the MPPL intersection limits the traffic operational capacity of the surrounding intersections of Warrigal Road / Padstow Road and the Logan Road / M3 interchange. Without intervention, these traffic operational performance levels are expected to deteriorate in the future given the planned population growth for the region.

With regard to road safety, 155 crashes were recorded by TMR between 2010 and 2020 within the study area. Approximately 67% of these incidents were located on Logan Road between the MPPL intersection and the M3 Pacific Motorway interchange. It is suspected there is a strong correlation between the number of road incidents within this corridor with the high level of traffic volumes and congestion formation.

Several planning studies have been delivered since 2010 to address the traffic congestion of the surrounding MPPL road network, including:

- **2010 Business Case –** preferred option to upgrade the MPPL intersection was not funded due to high project estimated costs.
- **2014 Planning Review –** the recommended intersection upgrade options were not progressed to development phase; however, an interim stage of the option was constructed in 2015.
- **2021 Planning Study and Options Analysis (OA) –** revisited an option of the 2010 Business Case with further investigations, analysis and options developed. This project established a preferred option and five low-cost interim options.

These studies have been reviewed and considered within this MPPL Planning Study project.

1.2 Subject Site

The study area location as well as the associated Aimsun microsimulation traffic model cordon area is presented in Figure 1.

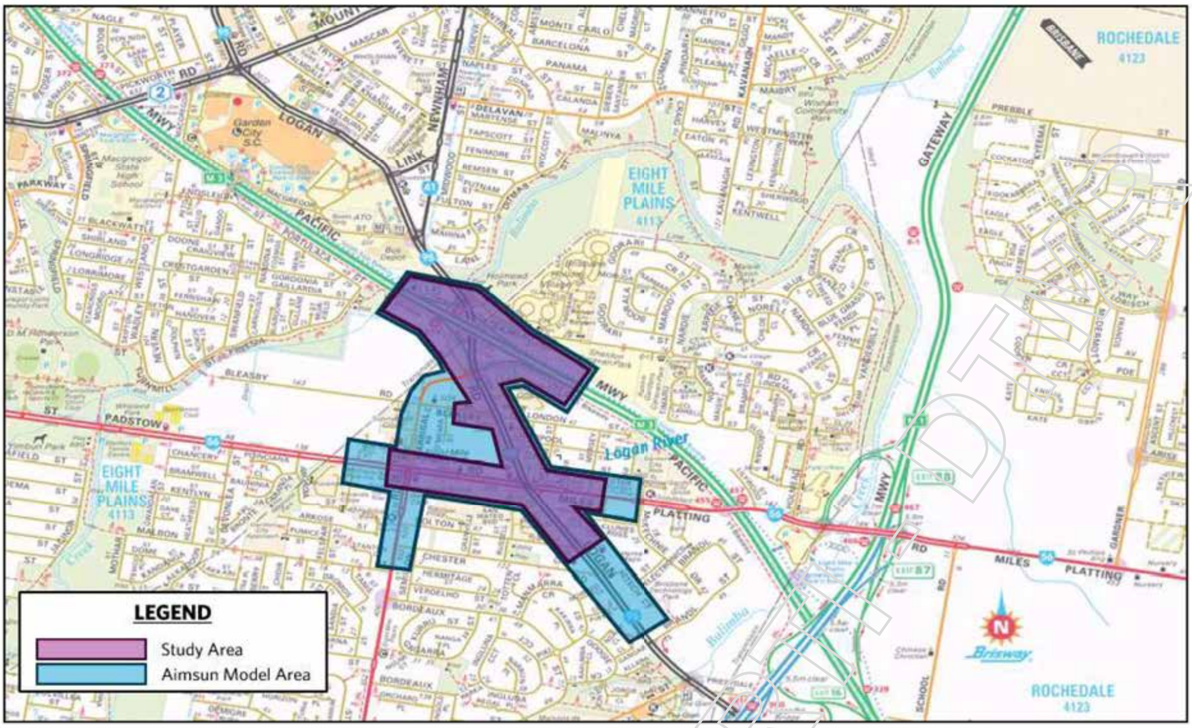


Figure 1 – MPPL Microsimulation Traffic Model and Project Study Areas (Source: Street-Directory)

1.3 Project Objectives

This project will be delivered in two phases with each phase having specific objectives which are as follows:

1. Business Case objectives:
    a. Conduct an extensive review of 2021 low-cost options analysis.
    b. With updated traffic data, re-establish low-cost designs to improve capacity and safety at the MPPL intersection.
    c. Propose a recommended upgrade option(s) that has a cost of no greater than $50m.
    d. Produce an OnQ Type 4in1 format Business Case of the recommended upgrade design.
2. Strategic Assessment of Service Requirements (SASR) objectives:
    a. Produce project recommended upgrades that progress through Gate 1 of the Project Assurance Framework process with a presentation to TMR's IIC Committee.
    b. Produce a SASR report that is accepted by TMR's Infrastructure Investment Committee.

This base model report outlines the development of the Aimsun microsimulation to be used as required for the transport modelling assessment needs of both the SASR and BC phases of the project.

1.4 Scope of Work

The scope of transport modelling work for the MPPL Planning Study is to comply with TMR's Transport Modelling Assessment Framework (TMAF) and includes:

- Prepare a 2024 calibrated and validated base microsimulation traffic model of study area, including the weekday AM and PM peak periods.
- Establish equivalent future base year scenario models including 2031 and 2041.
- Deliver microsimulation traffic models of options generated for the 2031 and 2041 future year scenarios.
- Produce traffic modelling reports in accordance with the TMAF process.

1.5 Report Outline

This report outlines all details relevant to the development, calibration and validation of the Aimsun base microsimulation model, including the following:

- Model Development Approach
- Inputs Summary
- Existing Traffic Models Review
- Existing Conditions Assessment
- Base Model
- Conclusion

2 Model Development Approach

2.1 Model Framework Overview

The model framework adopted for the MPPL Planning Study includes the use of TMR's BSTM and BMAM along with observed traffic data of existing conditions to develop a microsimulation traffic model. The flow chart of TMR model inputs for the development of the microsimulation traffic model is presented in Figure 2.

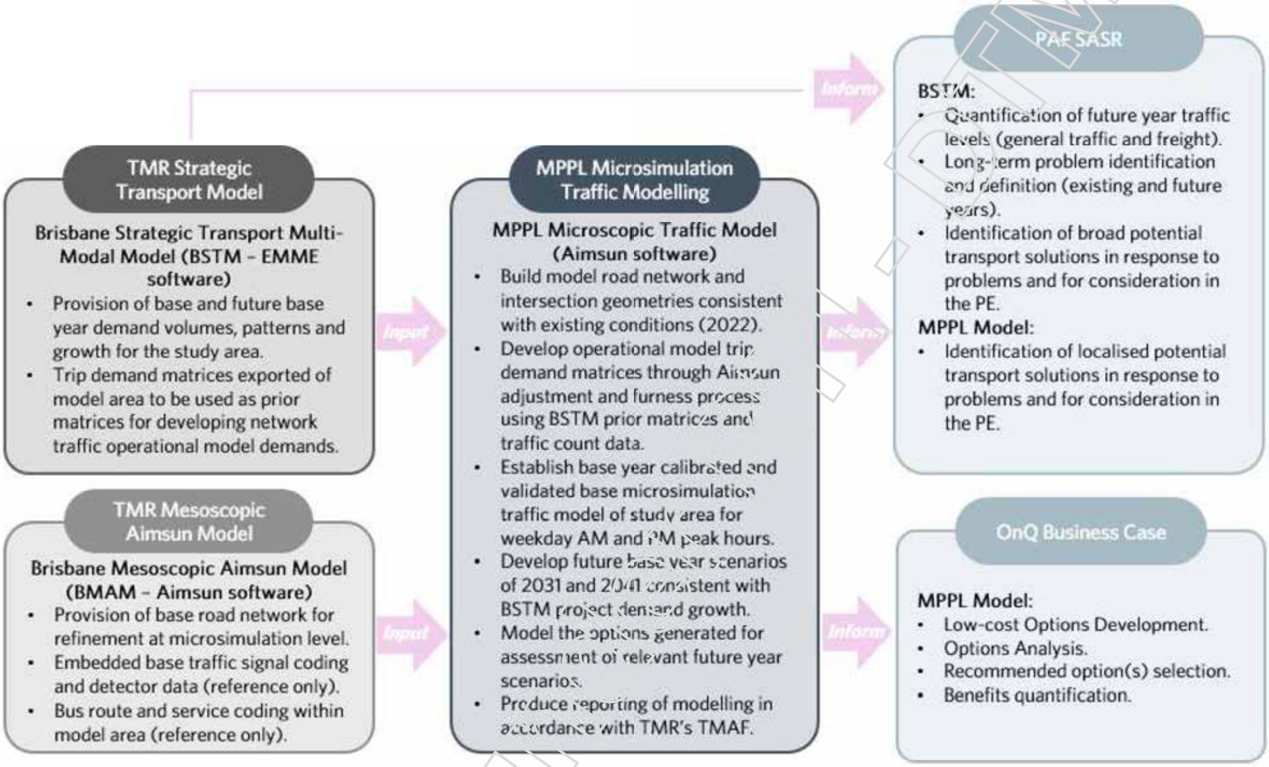


Figure 2 – MPPL Microsimulation Traffic Model Framework Overview

It is common practice to use the BSTM to identify the problem during the SASR phase, and then develop a detailed operational model (e.g. Aimsun) during the BC phase. However, in this instance, the OnQ BC and PAF SASR are being delivered in parallel, which provides an opportunity to use the operational traffic model for both phases of the project (as outlined in Figure 2).

For the SASR, the BSTM will be used to understand future transport network demands and travel patterns, and the proposed model methodology. Given the BSTM does not allow for a detailed representation of the impact of intersections, queues and weaving, the MPPL model, which will be calibrated and validated to local conditions within the study area, will provide further details on localised issues at the MPPL intersection and used for defining the problem for the study area of the SASR.

3 Inputs Summary

3.1 Overview

The inputs included for the development of the MPPL base model includes a combination of the latest transport models from TMR, traffic count data, signal data and travel times. A summary of the models, datasets and inputs used for this project are outlined in Table 1.

Table 1: Modelling Inputs Summary

Data Type	Source	Survey Date(s)	Survey Time(s)	Location(s)
Brisbane Mesoscopic Aimsun Model (BMAM) v2.3	TMR	N/A	N/A	Greater Brisbane region
BSTM-MMv2.4	TMR	N/A	N/A	Greater Brisbane region
Traffic Counts	Austraffic	Wednesday 12 October 2022	6am-6pm	• Logan Rd / Holmead Rd • Logan Rd / Padstow Rd / Miles Platting Rd • Logan Rd / Warrigal Rd / M1 Off-ramp
Travel Times	HERE (TMR)	October 2022	24-hour (15-minute intervals)	• Logan Rd (northbound / southbound) • Padstow Rd (eastbound/westbound)
STREAMS Signal Data	TMR	9/10/2023 – 15/10/2023, 13/05/2024 – 19/05/2024, 30/05/2024	6:00am – 6:00pm	• Logan Rd / Holmead Rd (M1418) • Logan Rd / Padstow Rd / Miles Platting Rd (M1420) • Logan Rd / Warrigal Rd / M1 Off-ramp (M1419)
SCATS Signal Data	BCC	Signal data reviewed and adopted from BMAM.		• Padstow Rd / Warrigal Rd (B0900)
DEM data	QLD Opensource Data	N/A		Greater Brisbane Region
GTFS data				

Further details on how the models and data inputs have been applied are provided in the following sections.

4 Existing Traffic Models Review

This section provides a high-level review of the available transport models adopted to support the development of the Aimsun microsimulation traffic model for this project.

4.1 Existing Strategic Transport Model(s)

TMR's TAU develops and maintains two (2) strategic transport models that cover the MPPL study area. The primary purposes of these models are to support transport planning and road infrastructure and policy testing by the department. TMR's two (2) strategic transport models relevant to this project are as follows:

- Southeast Queensland Strategic Transport Model (SEQSTM).
- Brisbane Strategic Transport Model, BSTM-MMv2.4 (BSTM).

For the MPPL Planning Study, TAU recommended the use of BSTM to provide baseline trip demands for the Aimsun microsimulation traffic model cordon area. BSTM is a robust four-step strategic transport model providing travel demand forecasts for Brisbane and adjacent Local Government Areas (LGAs). It is a multi-modal transport model that incorporates both highway and public transport assignments.

The following BSTM scenarios, design years and time periods have been provided by TMR and will be considered within this project:

- Model scenarios:
  - Base Case: 2021, 2026, 2031, 2036 and 2041.
  - Reference Case: 2026, 2031 and 2036.
- Time periods:
  - AM peak: 7:00am – 9:00am.
  - PM peak: 4:00pm – 6:00pm.

The key difference between the Base and Reference Case scenarios is their respective network assumptions, as stated in the BSTM TMAF documentation:

- Base Case: primarily committed and funded projects.
- Reference Case: constitutes network assumptions at various planning stages that would likely be included.

Due to possible impacts of the COVID-19 pandemic across the years 2020-2022, the re-calibration and rebase to 2021 may have significantly impacted travel demand and trip patterns, creating an unwanted impact on the future transport trend in the study area.

Strategic Model – BSTM is considered well calibrated and validated to existing conditions in 2016, and as such is considered appropriate for use in the MPPL Planning Study for providing the traffic demands for the base and future years as inputs for the operational model (seed matrices).

4.2 Existing Traffic Operational Model(s)

The Brisbane Mesoscopic Aimsun Model – BMAMv2.3 – (BMAM) was developed in 2017 and has been through continued development phases since. Since the Stage 1 development of the model, TMR has made it available to industry for various planning studies and model development projects in the Brisbane metropolitan region.

For the MPPL model area, a summary and illustration of the relevant BMAM network coding and current base model calibration results of traffic counts for the AM and PM peak hours is depicted in Figure 3.

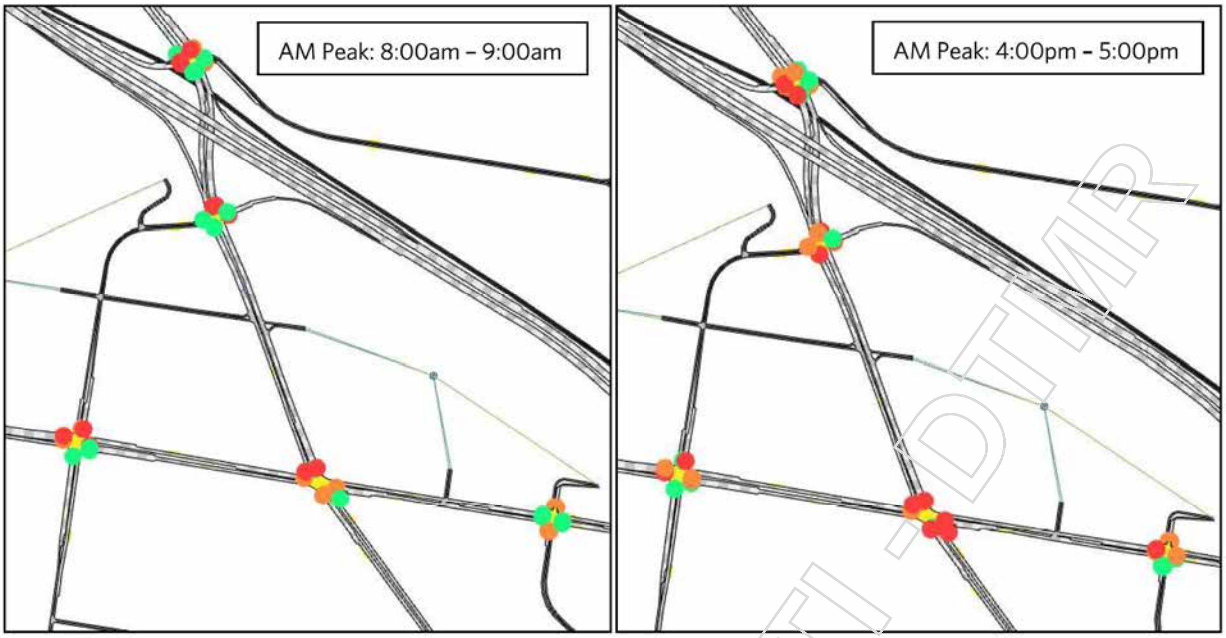


Figure 3: BMAM 2016 Calibration, MPPL Study Area

The observed traffic count data set for calibrating BMAM includes data sourced from different time periods and collection methods (i.e. both manual intersection surveys and loop detector counts). This contributes to the current base model calibration results of the latest version of BMAM within the MPPL study area not meeting industry guidelines, particularly with respect to GEH statistical criteria for intersection turn volumes. TAU advised the project team that the BMAM is currently being further developed in terms of general updates for 2021 data and network arrangements, including the model being calibrated and validated to these base traffic operational conditions. Given this is not included in release version 2.3, the BMAM will be applied in this project for general network arrangements and data review only (i.e. BMAM will not be used for demand development purposes).

Operational Model – The BMAM will only be considered for use in this project for general network coding and relevant traffic data inputs.

5 Existing Conditions Assessment

5.1 Overview

This section summarises the data provided to support the MPPL Planning Study, with the specific purpose in the development of the Aimsun microsimulation traffic model. The data also provides a high-level indication of the existing traffic operational performance of the study area. The following traffic data has been included in this review:

- Traffic survey counts
- Travel time data
- Signalised intersection data

5.2 Traffic Counts

Traffic survey counts were provided by TMR in the form of traffic surveys undertaken by Austraffic on Wednesday 12th October 2022. The following intersections were surveyed:

- Logan Road / Holmead Road (Site ID 12281)
- Logan Road / Padstow Road / Miles Platting Road (Site ID 13170)
- Logan Road / Warrigal Road (Site ID 15347)

Traffic counts were collected across a 12-hour period (6:00am - 6:00pm) for vehicle types: 'light vehicles', 'heavy vehicles', 'cyclists' and 'pedestrians'.

Active travel volumes within the Logan Road corridor, including both cyclists and pedestrians, are at a relatively low level compared to vehicle traffic volumes. The only intersection signalised crossing with more than 50 active travel users across the 12-hour period was observed at the Pacific Motorway northbound off-ramp crossing along the Principal Cycle Network's Veloway 1: Pacific Motorway. This location counted 25 pedestrian movements and 35 cyclist movements in the AM peak hour, while in the PM peak hour 36 pedestrian movements and 35 cyclist movements were recorded.

Traffic flow profiles for each of the key intersections are relatively consistent at a daily level. The AM peak has a more pronounced peak hour compared to the PM peak which observes a notably higher volume over a longer duration. The PM traffic volume levels and peak duration is likely due to a greater number of trip purposes being combined within the period, including school pick-up, work trip commuting, evening retail trips and recreation trips. The combined intersection daily traffic flow profiles are presented in Figure 4.

Figure 4: Traffic Count Profiles Across each Intersection (Wednesday 12th October 2022, Austraffic Survey)

With regard to heavy vehicle traffic volumes, the AM peak observes a higher heavy vehicle percentage than the PM peak, with the peak 1-hour time period (based on traffic counts) observed as follows:

- AM Peak: 7:45am – 8:45am.
- PM Peak: 4:45pm – 5:45pm.

The above is charted in Figure 5 for traffic counts recorded across all sites for the 12-hour period.

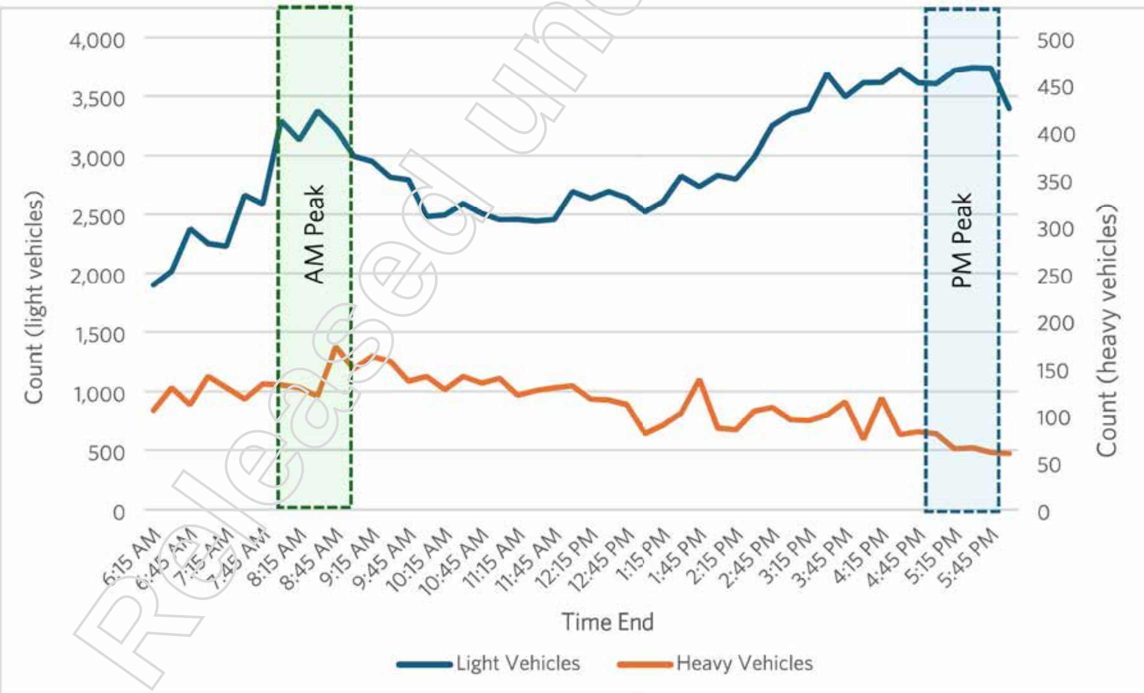


Figure 5: Peak Hour Review

The Aimsun base model is to incorporate a 2-hour AM peak period and 3-hour PM peak period. For this purpose, the following time periods have been chosen:

- AM Peak: 7:00am – 9:00am
- PM Peak: 3:00pm – 6:00pm

In addition to the above, analysis of data extracted from the QLD Government Data Portal has been undertaken for Site ID 135689, Logan Road, North of Miles Platting Road. The locality of this site is presented in Figure 6.

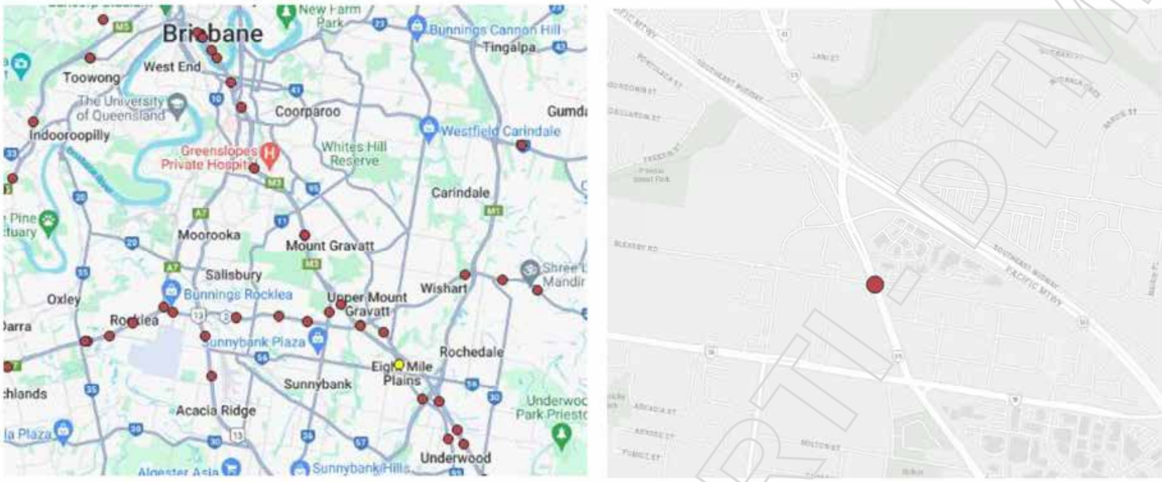


Figure 6: TMR Count Site Location – ID 135689 (QLD Government Data Portal)

Data for this station has been extracted and analysed across the available years, 2012 – 2022, with a summary of the data presented in Figure 7 and Figure 8.

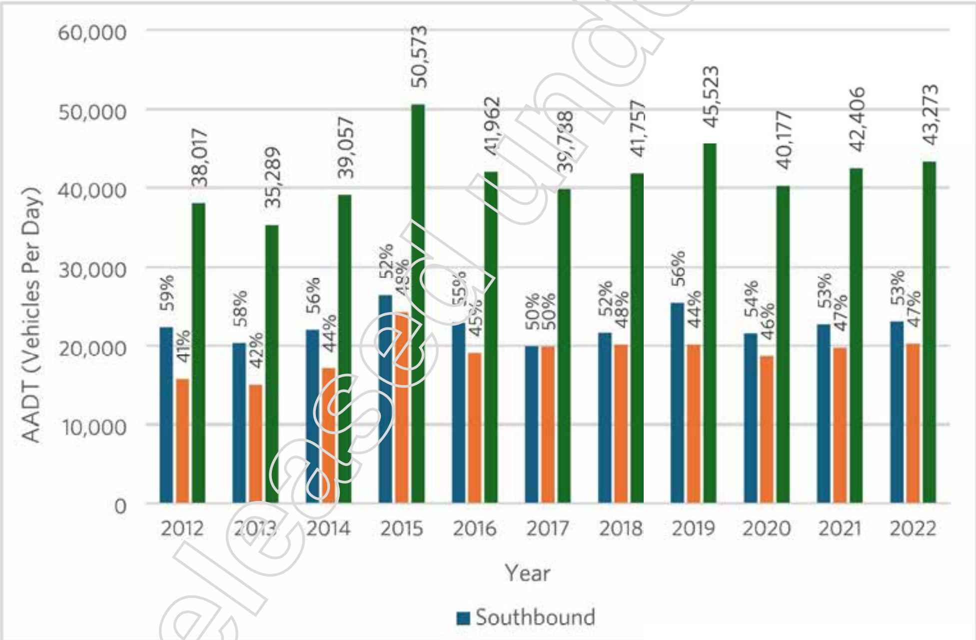


Figure 7: AADT Traffic Counts, 2012 – 2022 (TMR Site ID 135689)

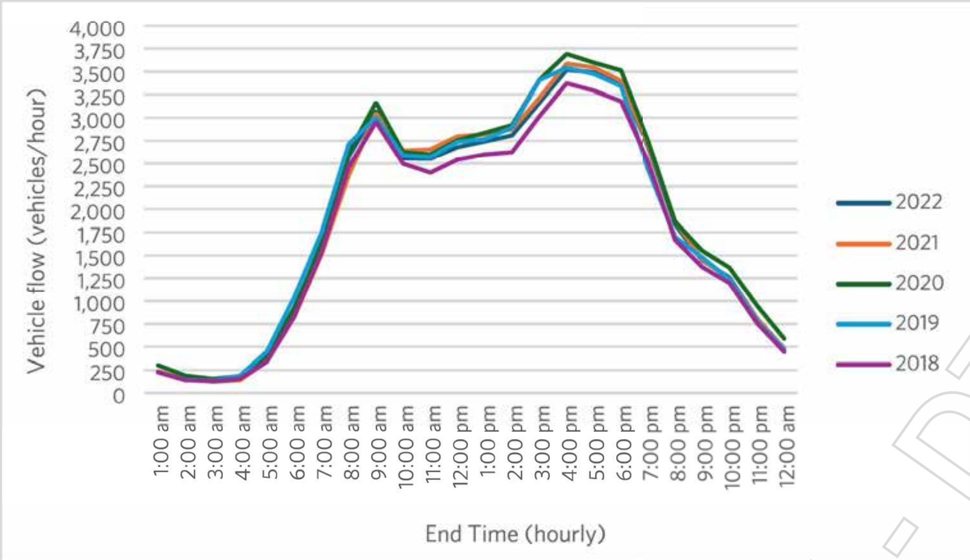


Figure 8: AADT Traffic Count Profiles, 2018-2022 (TMR Site ID 135689)

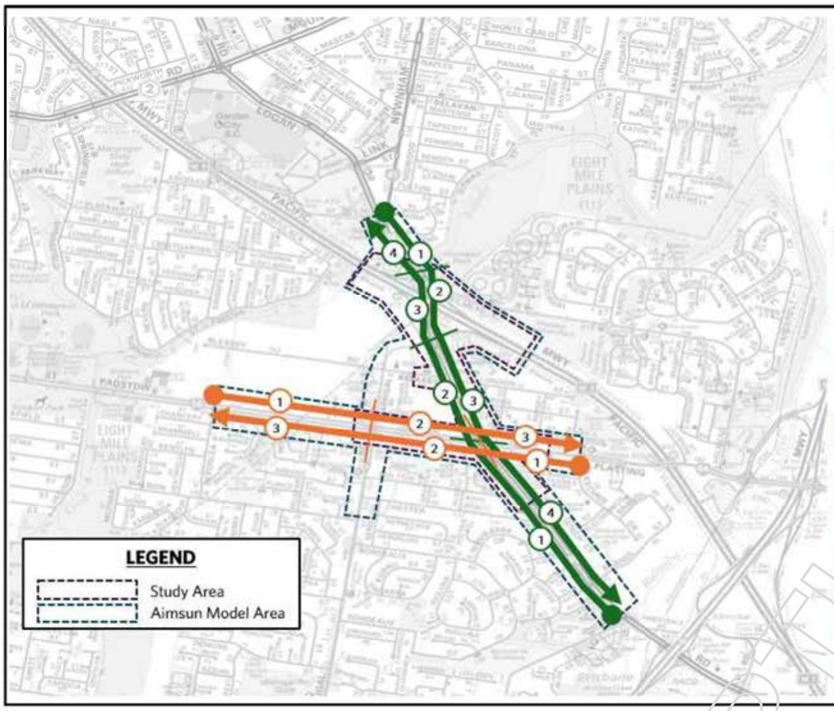
The following key findings are noted in review of the available historical TMR AADT counts on Logan Road:

- AADT between 2012-2022 recorded a peak in 2015 of approximately 50,500 vehicles.
- AADT for the years of 2020, 2021 and 2022 were lower than that observed in 2019, believed to be a result of the daily travel pattern and volume impacts of the COVID-19 pandemic.
- Southbound traffic (54%) is generally higher than northbound traffic (46%).

Traffic Counts – Based on the review undertaken above, the traffic survey counts provided for this analysis are considered appropriate for use as a calibration dataset in the base model development phase of the project.

5.3 Travel Time data

The base microsimulation traffic model for the MPPL Planning Study is to be validated with observed travel time data. TMR provided travel time data extracted from HERE for the primary traffic routes and segments as presented in Figure 9.



Logan Rd Northbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	Gaskell St	Padstow Rd	1.05km
2	Padstow Rd	Warrigal Rd	0.50km
3	Warrigal Rd	Holmead Rd	0.30km
4	Holmead Rd	MacGregor St	0.35km

Logan Rd Southbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	MacGregor St	Holmead Rd	0.35km
2	Holmead Rd	Warrigal Rd	0.30km
3	Warrigal Rd	Padstow Rd	0.50km
4	Padstow Rd	Gaskell St	1.05km

Padstow Rd Eastbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	Devonlea St	Warrigal Rd	0.65km
2	Warrigal Rd	Logan Rd	0.45km
3	Logan Rd	McKechnie Rd	0.45km

Padstow Rd Westbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	McKechnie Rd	Logan Rd	0.45km
2	Logan Rd	Warrigal Rd	0.45km
3	Warrigal Rd	Devonlea St	0.65km

Figure 9: MPPL Microsimulation Traffic Model Travel Time Validation Routes and Segments (Source: Street-Directory)

The segmented HERE travel time was originally extracted for the week of 10/10/2022 – 14/10/2022 across 24-hours for each day in 15-minute intervals. The provided data includes details on both speed and travel time data specifications. Given the small segmentation of HERE data, these were aggregated to the route segmentations outlined above to a level appropriate for model validation.

The analysis of average travel times for full routes, averaged across each 15-minute period and compared for each day of the week, are provided for all four travel routes in Figure 10 to Figure 13.

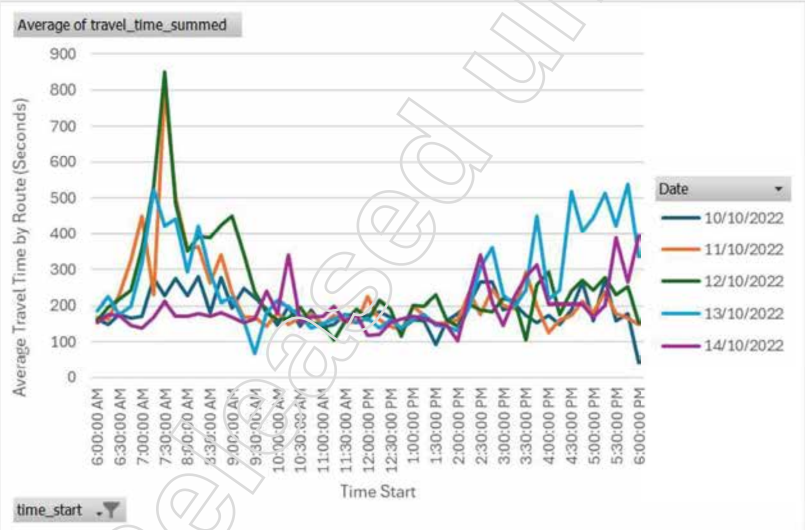


Figure 10: Average HERE Travel Times – Logan Road, Northbound (10/10/22 – 14/10/22)

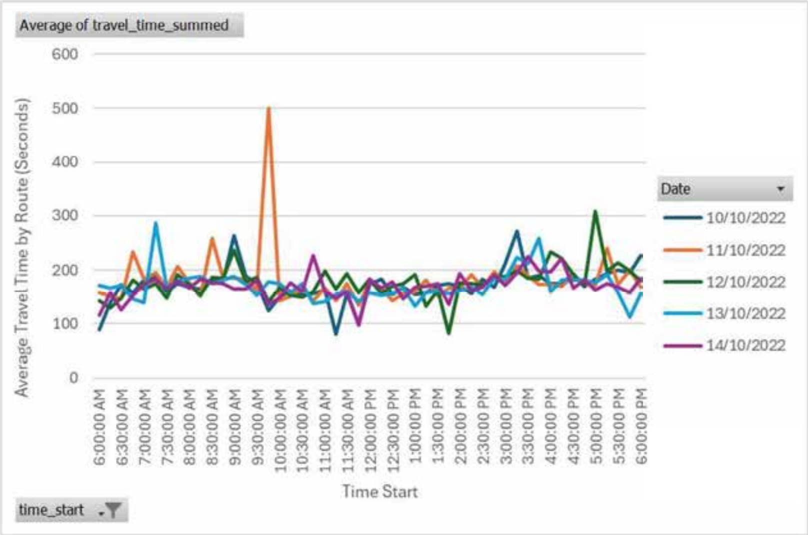


Figure 11: Average HERE Travel Times – Logan Road, Southbound (10/10/22 – 14/10/22)

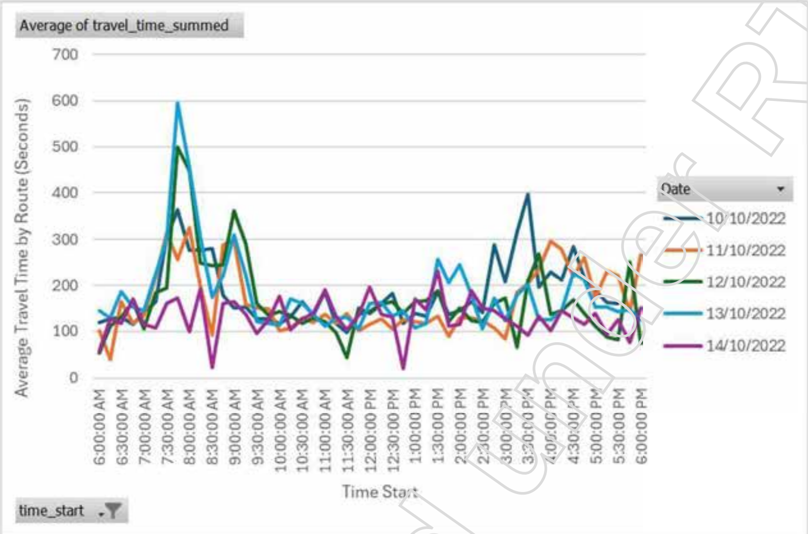


Figure 12: Average HERE Travel Times – Padstow Road, Eastbound (10/10/22 – 14/10/22)

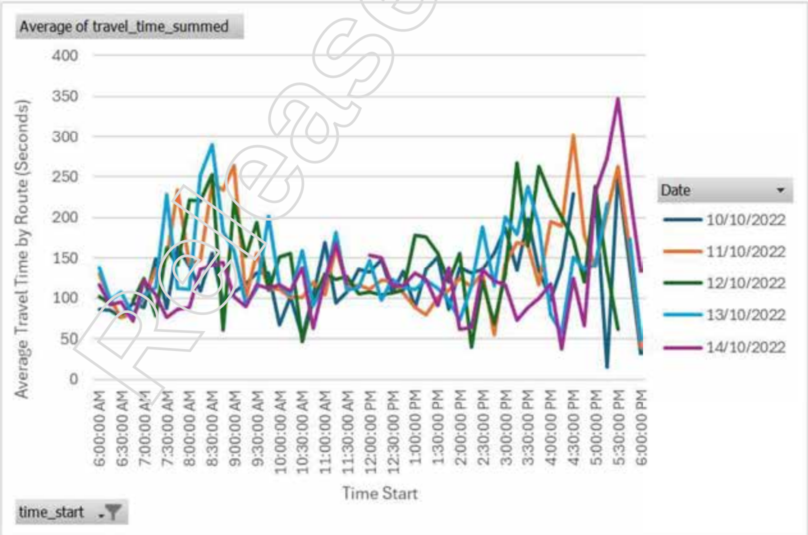


Figure 13: Average HERE Travel Times – Padstow Road, Westbound (10/10/22 – 14/10/22)

The primary existing travel time performance findings for each route are as follows:

- The longest travel times occur in the AM peak for Logan Road northbound and Padstow Road eastbound.
- Traffic congestion is observed during the PM peaks for Logan Road northbound and Padstow Road westbound routes at lower levels compared to the AM peak.
- The survey dates produce travel times that reflect relative overall traffic counts for the network, with the peak directional AM travel time northbound on Logan Road reaching a range near observed maximum travel times for the date 12/10/22.
- The days of week with the greatest travel time (typical congested scenario) are considered Tuesday to Thursday, with Mondays and Fridays indicating a likely higher work from home scenario (resulting in a less congested network).

It was identified that gaps in data existed for various individual link segments for the week of provided sample data, most prominently for the eastbound and westbound routes on Padstow Road. Consequently, average travel times for the entire month of October 2022 were supplied. The same analysis was undertaken across all 'average' days of the supplied data including appropriate Tuesdays – Thursdays of each week.

The data was grouped to relevant segments as defined in Figure 9, with the exception of segments west of Warrigal Road which were still unable to be sourced. This was not deemed critical for the development of the base model.

HERE travel times were grouped by segment across each peak hour (AM and PM peaks), with average travel times summed, as well as minimum and maximum for each 15-minute average taken across all average days. This array of data enabled the summary of average travel times by segment and by peak period, as well as minimum, maximum and +/- 15% results for comparison in the validation of the base model.

A summary of average travel times for each key route by peak hour for model validation is highlighted in Table 2.

Table 2: Observed Travel Times (HERE Data)

Peak	Time	Route	Direction	Travel Times (m:ss)		
				Average	Minimum	Maximum
AM Peak	7am – 8am	Logan Rd	Northbound	8:13	3:10	24:10
			Southbound	3:04	2:03	6:30
		Padstow Rd / Miles Platting Rd	Eastbound	4:05	1:11	11:38
			Westbound	2:05	1:02	6:10
	8am - 9am	Logan Rd	Northbound	5:49	2:55	13:17
			Southbound	3:07	2:14	5:47
		Padstow Rd / Miles Platting Rd	Eastbound	4:12	1:28	10:01
			Westbound	3:13	1:21	8:07
PM Peak	3pm – 4pm	Logan Rd	Northbound	4:46	2:15	15:25
			Southbound	3:24	2:20	5:54
		Padstow Rd / Miles Platting Rd	Eastbound	2:42	1:13	7:45
			Westbound	2:37	1:06	6:43
	4pm – 5pm	Logan Rd	Northbound	4:56	2:15	14:25
			Southbound	3:12	2:16	5:46
		Padstow Rd / Miles Platting Rd	Eastbound	3:21	1:39	7:08
			Westbound	3:05	1:19	8:01
	5pm – 6pm	Logan Rd	Northbound	5:49	2:10	19:05
			Southbound	3:20	2:13	6:46
		Padstow Rd / Miles Platting Rd	Eastbound	2:38	1:19	5:44
			Westbound	3:27	1:14	9:17

The relevant insights from the analysis of travel time data include the following:

- Northbound route along Logan Road is the most congested route across all peak periods.
- The maximum segment-based travel time totals show significant variance from the minimum and average travel times.
- The eastbound route, particularly on the approach to the MPPL intersection has significant variation in observed travel times.

Further to the above, analysis of individual link segments' average speeds in comparison to Google Traffic were established to enhance appreciation of and confidence in the data representing congestion patterns to be used for base traffic modelling. The analysis of AM and PM peak periods is represented in Figure 14 and Figure 15.

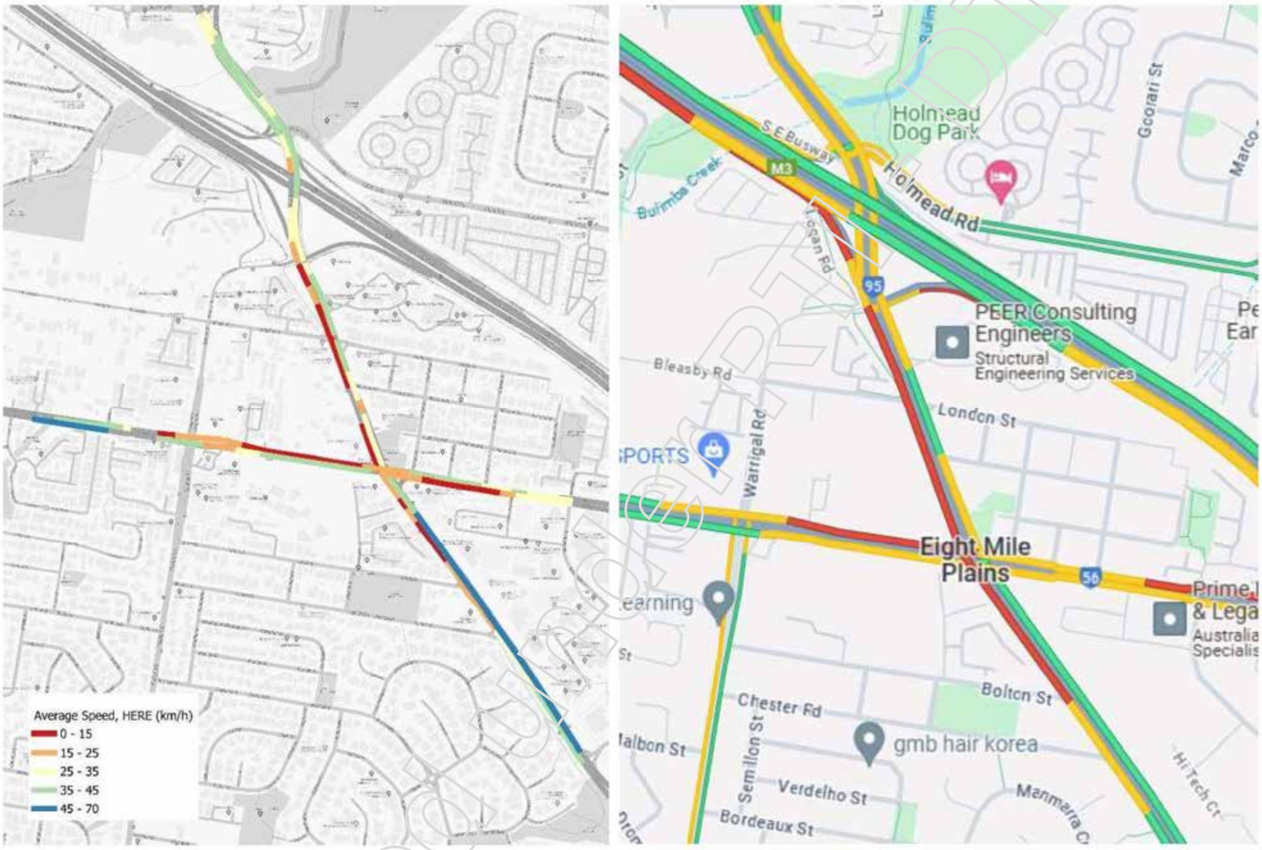


Figure 14: Average Speed (HERE) vs Google Traffic Congestion (AM Peak, 7:45am – 8:45am)

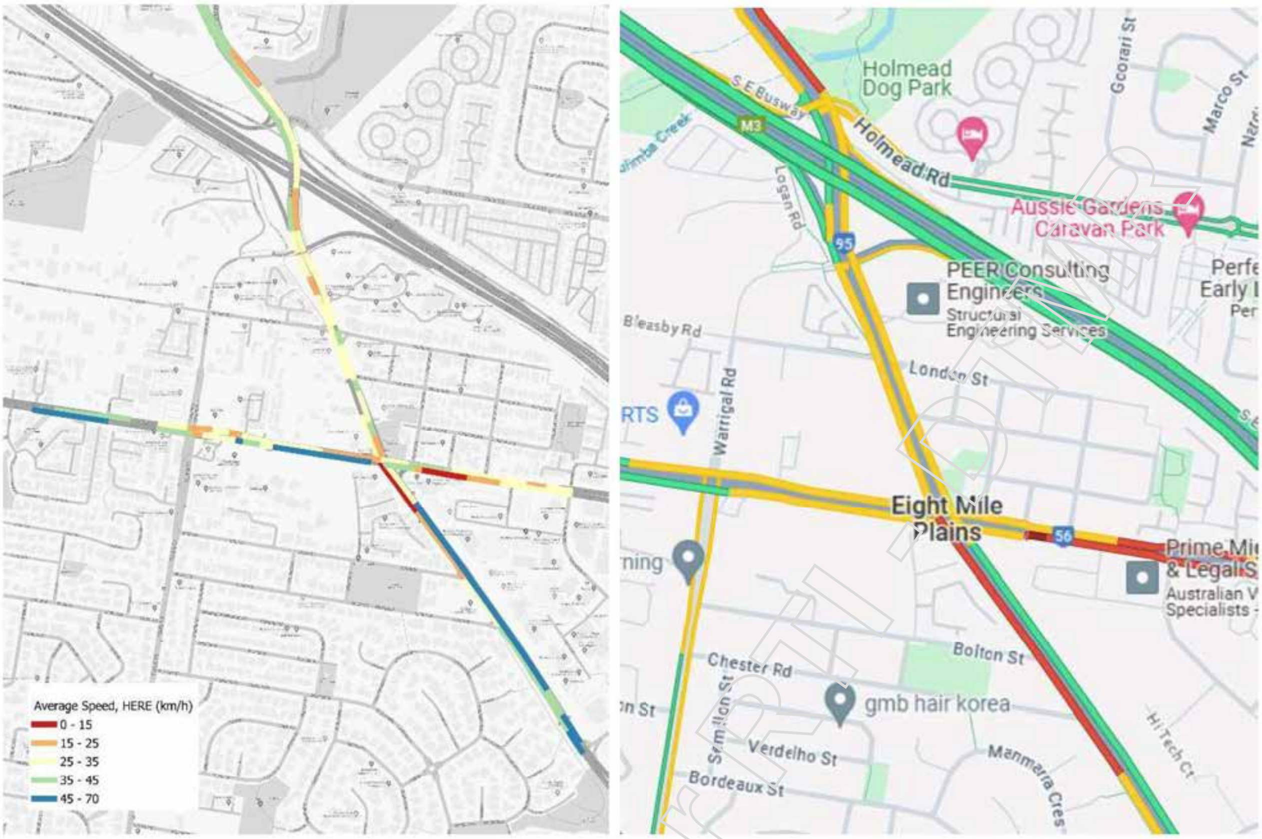


Figure 15: Average Speed (HERE) vs Google Traffic Congestion (PM Peak, 4:45pm – 5:45pm)

The average speeds for the road network from HERE appear to be relatively consistent with estimated Google Traffic maps for the region in both peak periods.

Travel Times – Based on the review of available base model validation traffic data, the HERE travel time data provided for this study is considered appropriate for use as a validation dataset in the base model development phase of the project.

5.4 Signalised Intersection Data

The study area includes three (3) STREAMS signalised intersections and one (1) SCATS signalised intersection:

- Logan Rd / Holmead Rd (M1418)
- Logan Rd / Padstow Rd / Miles Platting Rd (M1420)
- Logan Rd / Warrigal Rd / M1 Off-ramp (M1419)
- Padstow Rd / Warrigal Rd (B0900)

5.4.1 STREAMS Signal Data

Relevant signal plan information and signal timing outputs, Intersection Cycle Analyser (ICA) data, have been provided by TMR for the STREAMS intersections across a 12-hour period (6:00am – 6:00pm), for the following dates:

- 9/10/2023 – 15/10/2023
- 13/05/2024 – 19/05/2024
- 30/05/2025

The provided signal data was reviewed in terms of consistency and appropriateness for use in the base model development. The following key findings and recommendations are noted:

- No missing recordings or errors in recordings across key peak period times.
- Consistency in actual cycle times and phase times deployed within each day and peak period, particularly in the AM peak period for all intersections.
- Offsets to be reviewed and run accordingly to match observed conditions and recorded plan details.

Recorded cycle times presented in the charts of Figure 16 (2024) and Figure 17 (2023) depict each of the three (3) STREAMS intersections for the dates 30/05/2024 and 10/10/2023. These charts highlight the variation in cycle times over time for both respective days.

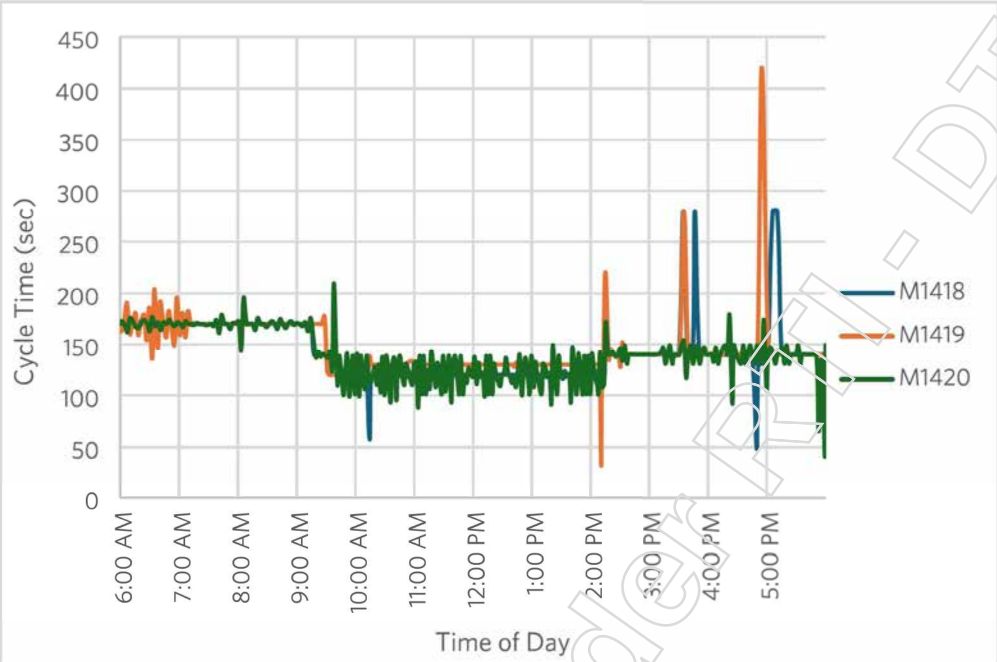


Figure 16: Intersection Cycle Times (6:00am – 6:00pm, 30 May 2024)

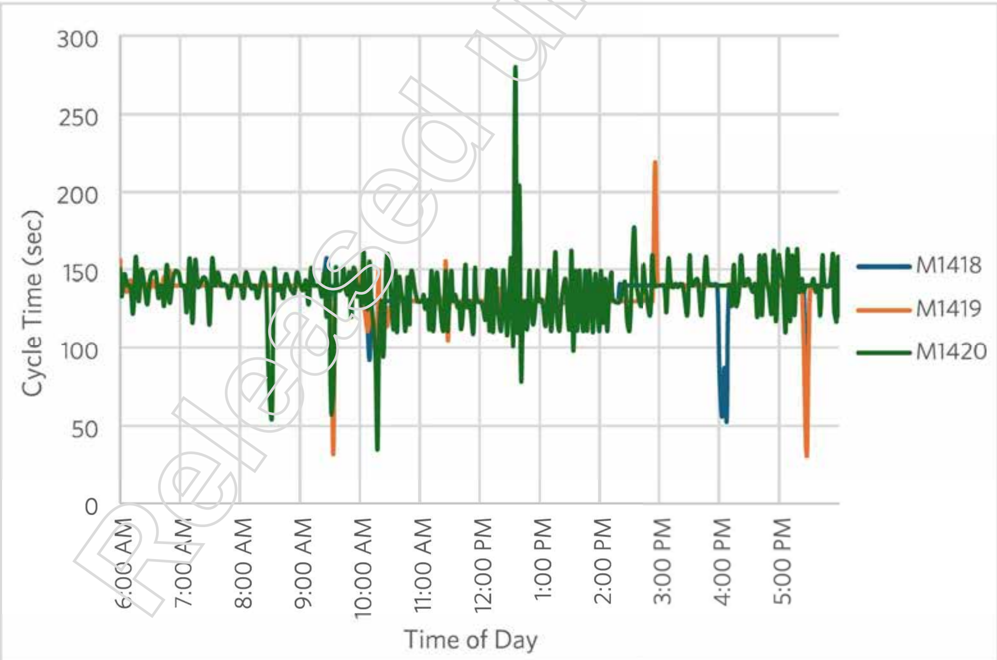


Figure 17: Intersection Cycle Times (6:00am – 6:00pm, 10 October 2023)

The key item to note in this review, is that the AM peak cycle times change between 2023 (140 seconds) and 2024 (170 seconds). This was confirmed with TMR as a direct requirement for servicing the motorway northbound off-ramp demand. Although the data for model calibration and validation has been taken from 2022, where presumably the cycle times were 140 seconds, the cycle times have been implemented as the observed existing traffic signal settings (2024). It is acknowledged this poses a potential challenge in the calibration and validation process, however it is considered to be a higher priority to replicate the latest observed cycle times given this change was specific in purpose to accommodate motorway ramp traffic demands.

The average cycle times (excluding outliers and double cycling) were relatively consistent in 2024, with all three (3) intersections comprising the following arrangements:

- AM Peak: 170 seconds
- PM Peak: 140 seconds

5.4.1.1 Ramp Metering

Ramp metering data was supplied by TMR. This data indicated that ramp metering operated for the northbound on-ramp from 7:20am – 8:20am. Further assessment of ramp-metering was observed on site to confirm appropriate implementation within the base model.

STREAMS Signal Data – The signal data provided will include enough detail to efficiently model actuated signal control settings in the base Aimsun microsimulation traffic model.

5.4.2 SCATS Signal Data

SCATS signal timing data was not provided for use in the base model development. Given the one (1) SCATS intersection is located external to the MPPL study area, it was deemed not critical for model development. Signal plans and timings provided as part of the BMAM were reviewed and used as appropriate for the development of fixed signal timings in the MPPL base model.

SCATS Signal Data – No SCATS data was provided; however, appropriate SCATS signal timing data was extracted from the BMAM and used as appropriate for the MPPL base model development.

5.5 Site Inspection

To ensure a well-rounded understanding of existing conditions operation relevant to this study, two (2) site inspections were undertaken on the following dates:

- Friday 17 May 2024
- Tuesday 9 July 2024

The following key traffic operational performance observations relevant to base model development are as follows:

- AM Peak:
    - Ramp metering operated as recorded in the provided dataset, activated from approximately 7:20am – 8:20am. This ran with 6 seconds red time, and 2-4 vehicles (across 2 lanes) entering within the green allocation. There was significant vehicle queueing on the downstream motorway mainline itself during ramp metering activation, however there was no instance where the vehicle queue lengths from the northbound on-ramp extended back to Logan Road.
    - The MPPL intersection experienced significant variations in queue lengths for each approach:
        - Minor southbound vehicle queueing observed, with most vehicle queuing occuring for vehicles turning left (ineffective in lane utilisation).
        - No vehicle queues observed on the west approach, with vehicles clearing every cycle (unutilised green time observed).

        - Eastbound vehicle queue has a high degree of fluctuation in length, but extends more than halfway towards the Warrigal Road intersection.
        - Extensive northbound vehicle queuing observed, extending beyond visible line of sight from the MPPL intersection.
    - Observations at the MPPL intersection also indicated the following:
        - Sub-optimal coordination northbound during AM peak, with green-time assigned when downstream intersection red (i.e. does not permit movement of vehicles ahead).
        - Eastbound vehicles through movements were blocked in some instances by vehicles not adhering to the road rule of entering a signalised intersection area when the driver can pass through entirely without stopping.
        - Pedestrian signal crossings for each slip lane were off unless activated by pedestrian movement. No pedestrian movements were observed during either site visit.
        - Eastbound left-turn movement vehicles observed to use service station as rat-run during congested periods. Indicatively up to approximately 50 vehicles per hour could elect to rat-run through the service station.
    - Warrigal Road, Logan Road and motorway off-ramp observations:
        - Green time allocation for motorway off-exceeded traffic flow demand.
        - The largest volume of pedestrian and cyclist movements were observed within the study area on the south approach (east-west). The phase for this movement was called every cycle, either by pedestrians or for the northbound U-turn facility.
    - Bleasby Road traffic operations:
        - Approximately 150 vehicles / 15-minutes during AM peak (i.e. up to approximately 600 vehicles per hour). Significant vehicle queuing at this location, even with a dedicated continuous lane into Logan Road northbound carriageway. The lane utilisation was inefficient due to weaving with Logan Road northbound traffic movements. A number of vehicles were observed entering with desired through or right turn lanes (moving out of left turn continuous lane). Irrespective of downstream destination beyond the motorway interchange, a number of drivers did not treat it as a continuous lane, rather a give-way control, stopping until the driver identified an appropriate gap in traffic flow to enter Logan Road.
- PM Peak:
    - Less traffic congestion across study area than observed during AM peak.
    - More consistent congestion across the network by approach and along each corridor.
    - Observations at MPPL intersection:
        - Significant southbound congestion, particularly for right-turn lanes (one full lane). Considered a long look-ahead distance, with vehicles making this lane decision early. Although this approach is congested, most vehicles cleared through each cycle.
        - Minor northbound and eastbound traffic except on approach to the MPPL intersection.
        - High degree of fluctuation of westbound vehicle queue lengths, with the most traffic congestion across cycles resulting in queues extending to upstream signalised intersections. Non-adherence to line marking observed, with some vehicles queueing for right turn through median and previous right turn pocket.

Most site observations were consistent through both peak periods and across both site visit dates. Observations are also consistent with general interpretation of supplied traffic data.

6 Base Model

6.1 Introduction

The following section of the report outlines the following:

- Strategic transport model assessment.
- Base model development (including adopted inputs, assumptions and methodology).
- Base model calibration and validation results.

6.2 Strategic Transport Model Assessment (BSTM)

Further to the initial summary in Section 4.1, the following details the assessment undertaken of the base model BSTM scenarios, including:

- Subarea analysis performed based on the operational model boundary for the Base Case 2016 AM and PM scenarios.
- The demand matrices by vehicle classification were extracted from the BSTM to be used as the seed demand matrices for the operational model of the three recorded vehicle classifications.
    - Private vehicle.
    - Medium commercial vehicle, MCV (class 3-4 by Austroads Classification).
    - Heavy commercial vehicle, HCV (class 5 upward by Austroads Classification).
- The demand matrices were output in PCU units and then to vehicle unit by dividing the matrices by the PCU factors of 2 for MCV and by 3 for HCV. Given the traffic counts were supplied only for light vehicles (cars) and heavy vehicles (trucks), the MCV and HCV matrices were grouped and developed as single heavy vehicle matrices, with the final operational vehicle type representing heavy vehicle specifications observed on site.

The cordon area analysed from BSTM including the associated travel zone system is presented in Figure 18.

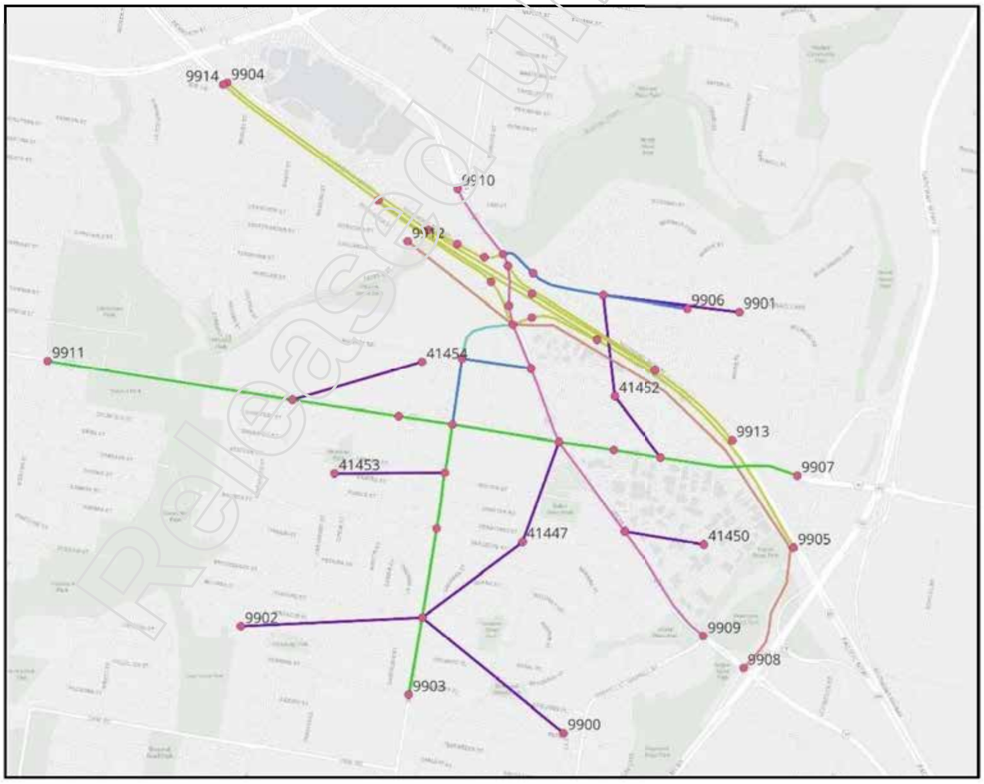


Figure 18: BSTM Cordon and Travel Zone System

6.3 MPPL Aimsun Base Model

6.3.1 Base Model Development

6.3.1.1 Software

The latest version of Aimsun next (Version 23.0.1) was used for this assessment.

6.3.1.2 Network

The base network was developed utilising Nearmap, Google StreetView and observed existing conditions (2024) on site. This included operational nuances specific to the congested network operation in this study area (i.e. use of paved road carriageway beyond traffic lane line-markings). Road types and observed speeds were matched to existing road hierarchy and structure with reference made to the provided strategic model and as shown in the 'Street Directory' (Australia Map, Street Smart – street-directory.com.au).

6.3.1.3 Topography

Section elevations have been coded within the model to ensure appropriate delays have been incorporated to reflect the vertical geometry of the road network within the study area. The following steps were followed:

- Digital Elevation Data (DEM) downloaded from Queensland opensource datasets.
- DEM (.tif) file was then imported using the 'Apply Elevation Using DEM' tool within Aimsun.
- Elevations were reviewed within a 3D view of the network and updated as required with reference to BCC opensource contour maps.

6.3.1.4 Model Extents

The model includes all appropriate road network links and connections within the study area. The modelled network and road hierarchy is shown below in Figure 19.

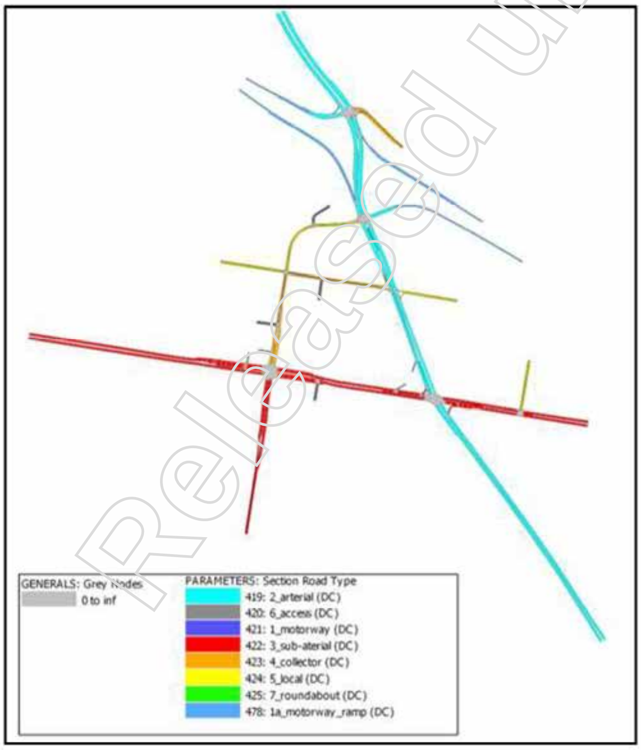


Figure 19: Model Road Network

6.3.1.5 Time Periods

The modelled peak periods consist of a 2-hour AM peak period and 3-hour PM peak period, determined in the initial analysis of the surveyed intersection traffic counts. Further to this, a 1-hour warm-up and 1-hour cool-down have been applied to both peak periods. A summary of the specific warm-up, cool-down and peak hour periods are outlined in Table 3.

Table 3: Model Peak Periods

Peak Period	Warm-up	Peak Period	Cool-down
AM Peak	6:00am – 7:00am	7:00am – 9:00am	9:00am – 10:00am
PM Peak	2:00pm – 3:00pm	3:00pm – 6:00pm	6:00pm – 7:00pm

6.3.1.6 Vehicle Types

Two vehicle types were adopted for the base model development: light vehicles (LV) and heavy vehicles (HV). Matrices for both vehicle types were developed and calibrated separately. A summary of specific vehicle type characteristics is included below in Table 4, which adopt appropriate industry standards as well as vehicle classification behaviours observed on site.

Table 4: Vehicle Type Characteristics

Aimsun Parameter		Light Vehicle (LV)	Heavy Vehicle (HV)
Length	Mean (m)	4	12
	Minimum (m)	3.5	10
	Maximum (m)	4.5	25
	Deviation (m)	0.5	2
Speed Limit Acceptance	Mean	0.9	0.9
	Minimum	0.8	0.8
	Maximum	1.05	1.05
	Deviation	0.1	0.1
Max Acceleration	Mean (m/s)	3	1.5
	Minimum (m/s)	2.6	1.2
	Maximum (m/s)	3.4	1.8
	Deviation (m/s)	0.2	0.15

6.3.1.7 Public Transport

All public transport stops, lines and schedules have been coded as fixed routes as per the latest timetable available on TransLink website and within the GTFS datasets. The Aimsun GTFS import tool was used, with all imported lines reviewed after the initial import.

The bus service lines imported to the base model included150, 152,155, 156, 299, 545, and P157.

6.3.1.8 Active Transport

Given the low volumes of both pedestrians and cyclists within the study area, these user classes were not explicitly modelled. At locations where pedestrian movements were considered to impose influential delays on vehicles, these were incorporated into the traffic signals as a late start. The following specific inclusions are noted:

- Late starts applied during the AM peak at the MPPL intersection.
- Significant active travel demand seen at the Warrigal Road traffic signals; however, the pedestrian phase east-west is called at the same time as the northbound U-turn from Logan Road – as such no additional changes were required at this location.

6.3.1.9 Traffic Signals

6.3.1.9.1 STREAMS

STREAMS traffic signal characteristics for the base year models have been derived from an extensive analysis of outputs provided by TMR. All intersections have been developed with actuated control, with signal groups, associated detector functionalities and phasing specifications determined from analysis of the provided signal control plans, plan details and historic signal data (ICA data). Relevant actuated control inputs (i.e. minimum/maximum green times, detector actuation, coordinated phases) have been calculated from the relevant signal timing data outputs for the date of 30 May 2024, with reference made to previous data outputs where applicable, particularly in response to the changes in cycle times during the AM peak.

6.3.1.9.2 SCATS

Data outputs have been extracted from BMAM for the Warrigal Road / Padstow Road signalised intersection. Minor adjustments were made where applicable, given the timings have been calculated previously as fixed timings.

Given the limited pedestrian activity in the study area, late starts for pedestrian activated crossings were only included where required to appropriately influence vehicle delays and route choice. This was most noticeable at the Warrigal Road / Padstow Road signalised intersection. An example of pedestrian activation and the modelled late start is presented in Figure 20.

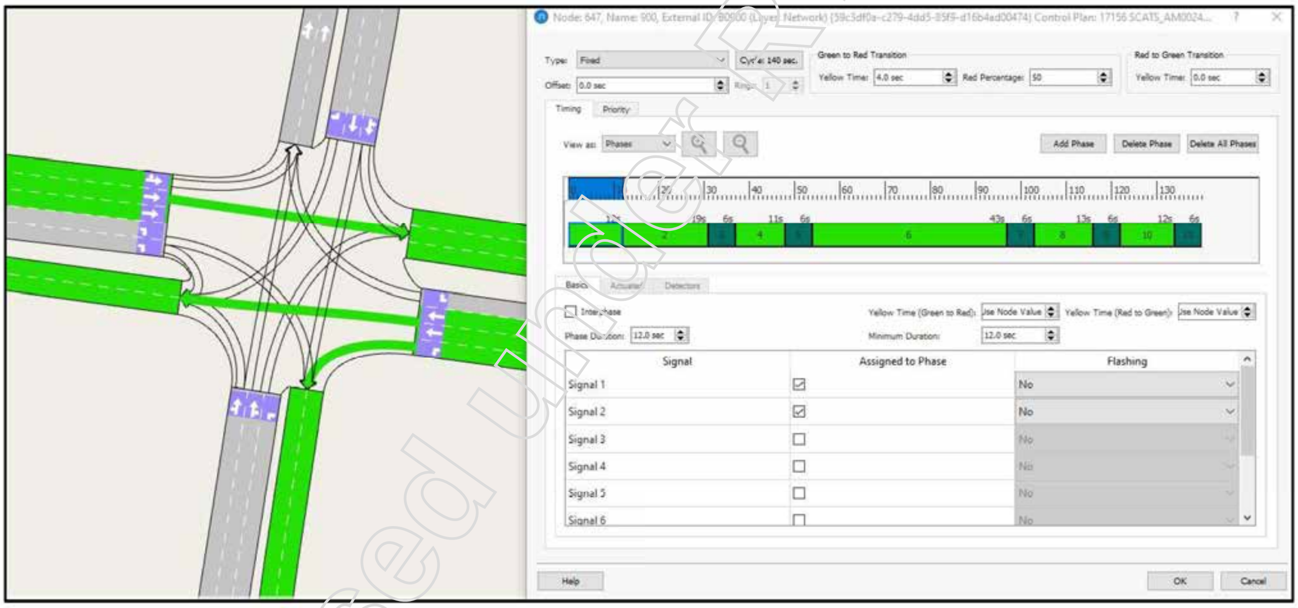


Figure 20: Pedestrian Late Start Phase for B0900 (AM Peak)

6.3.1.9.3 Ramp Metering

Ramp metering was implemented on the northbound Pacific Motorway on-ramp, with signal timing settings set to replicate observed conditions, noting the vehicle queue formation was never observed to have impacted traffic flow for the mainline on Logan Road.

6.3.1.9.4 End Constraints

Traffic congestion was observed (on site, in Google Traffic and based on HERE travel time data) for the locations exiting the model towards signalised intersections. Although these were not deemed critical for model operation, simple end constraints have been applied to represent metering green times, with cycle times and appropriate green proportions applied based on outputs from the BMAM.

6.3.1.10 Traffic Management

No specific traffic management settings were implemented in the model, with the only global network settings altered at the Bleasby Road continuous lane entry to the northbound Logan Road carriageway. On-site observations indicated inefficient merging in this location, with vehicles observed to delay their entry to Logan Road, treating the intersection as a Give Way control, rather than a continuous lane. To simulate this observed driver behaviour and replicate associated increased delay times, section parameters were updated with an additional one second reaction time at stop and acceleration factor set to 'Decrease (x0.5)'.

6.3.1.11 Traffic Zones

The model zoning system comprises of 15 travel zones, as shown in Figure 21.

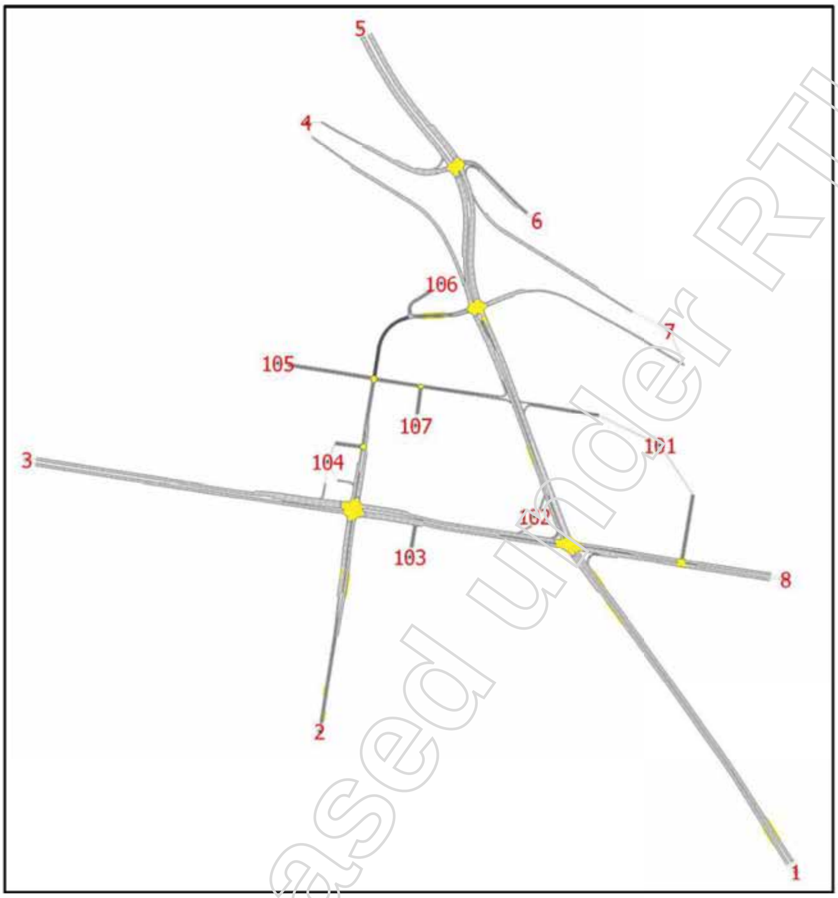


Figure 21: Aimsun Model Zones

6.3.1.12 Demand Development

Demands have been developed using cordon demand outputs from BSTM. The following steps were then used in the base model demand development process:

1. Cordon Matrices from BSTM – cordon matrices were extracted from BSTM for the specified subarea. These matrices provided the initial OD structure at the travel zone level. Demands were kept separate for light vehicles; however, MCV and HCV demands were grouped as a single 'heavy vehicle' type.
2. Zone aggregation and disaggregation – given the finer detailed required in the microsimulation model subarea, internal zones were disaggregated from the BSTM cordon outputs to match the refined Aimsun model area.

3. Matrix finessing – survey data was analysed to determine known origin and destination totals and known origin-destination pair totals. The matrices developed in step 2 were then refined (finessed) based on the known totals, while maintaining the overall structure of the matrices.
4. Static adjustments – the matrices from step 3 were then imported into Aimsun where the static adjustment tool was used to further refine the matrices to better represent known demands within the Real Data Set (RDS).
5. Departure Adjustment – static departure adjustment scenarios were then used within Aimsun to determine appropriate 15-minute demand profiles from the matrices refined in step 4.
6. Manual adjustments – given the unknown demand splits at the Warrigal Road / Padstow Road intersection, some minor adjustments had to be made in terms of the split to/from these locations (zones 2 and 3). Further to this, given the congested nature of the model, additional minor changes had to be made to the profiling to ensure appropriate build-up of traffic.

The resulting demand profiles for the average weekday AM and PM peak periods, inclusive of warm-up and cool-down are shown below in Figure 22 to Figure 25.

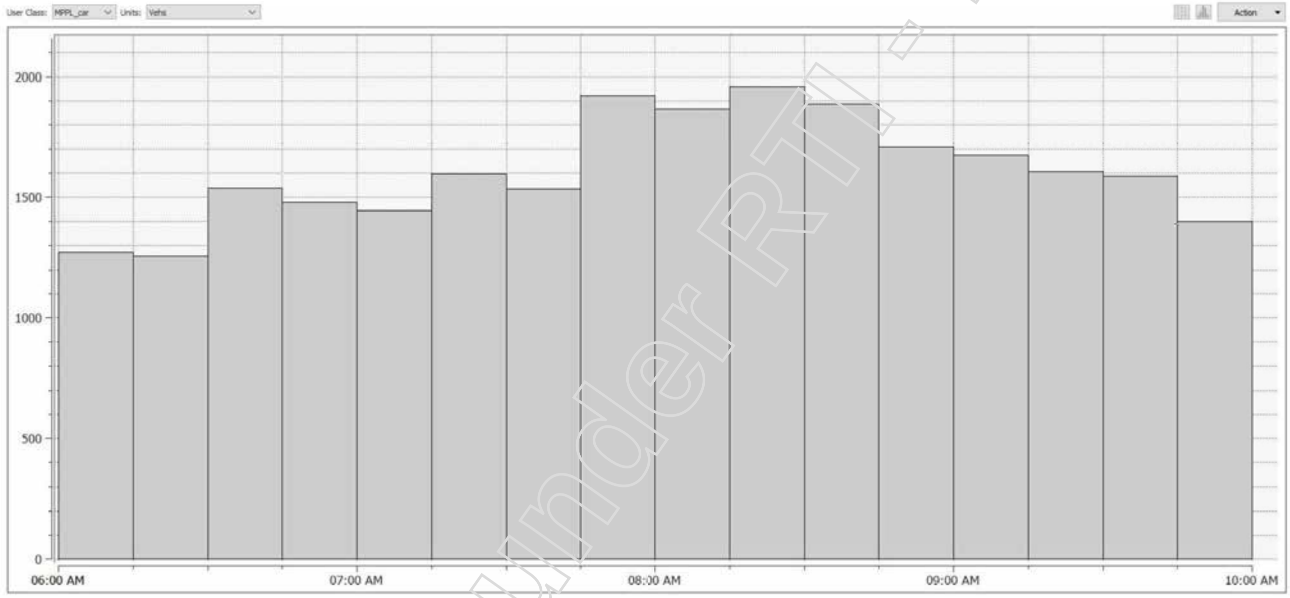


Figure 22: Traffic Demand Profile, AM Peak (6am – 10am) – Light Vehicles

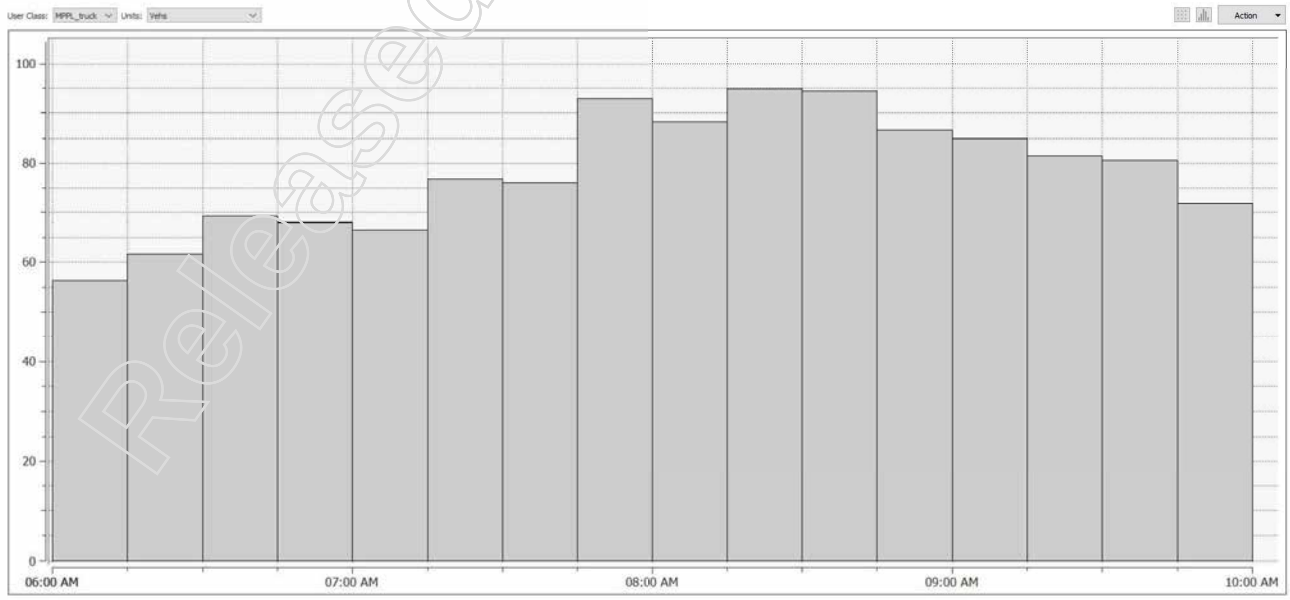


Figure 23: Traffic Demand Profile, AM Peak (6am – 10am) – Heavy Vehicles

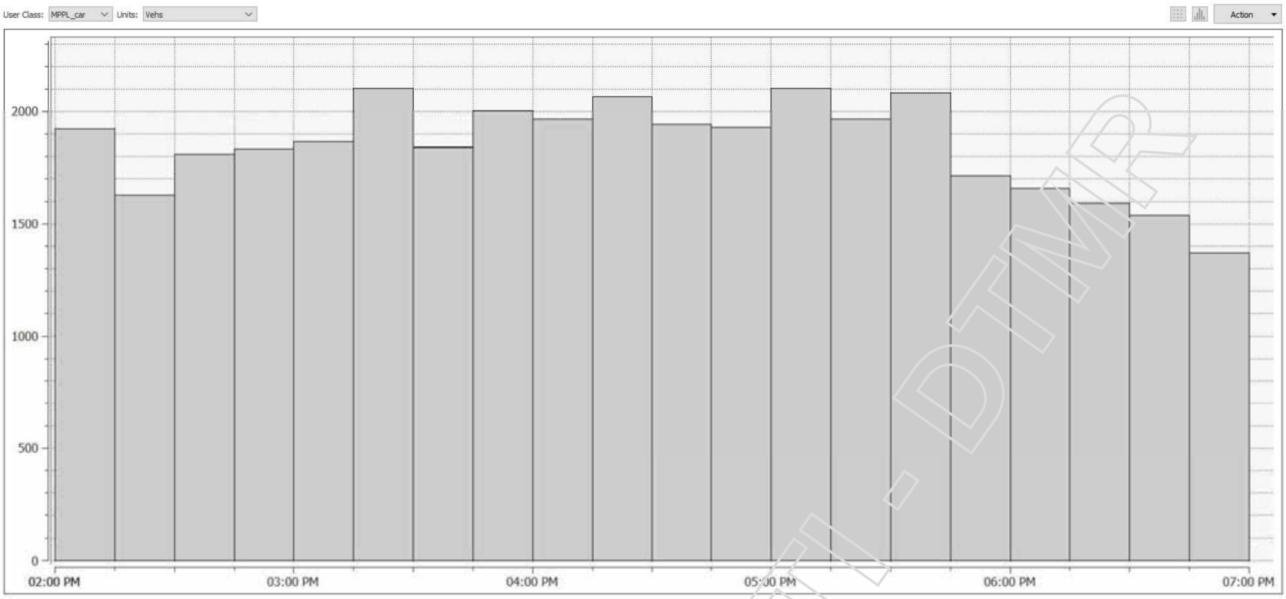


Figure 24: Traffic Demand Profile, PM Peak (2pm – 7pm) – Light Vehicles

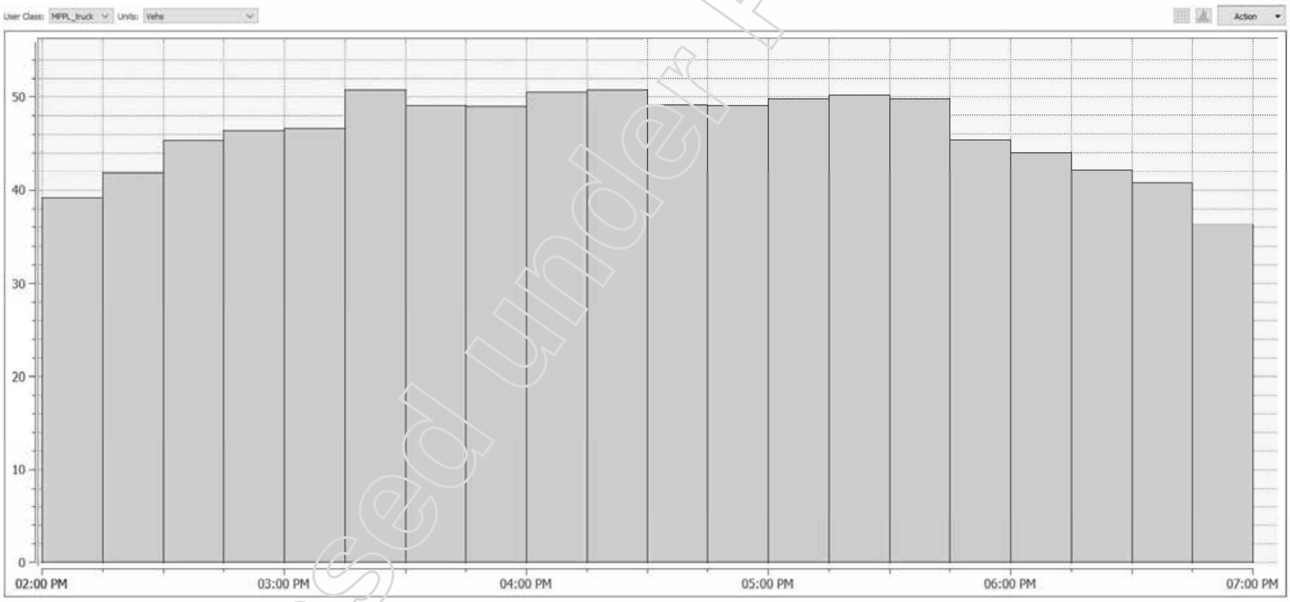


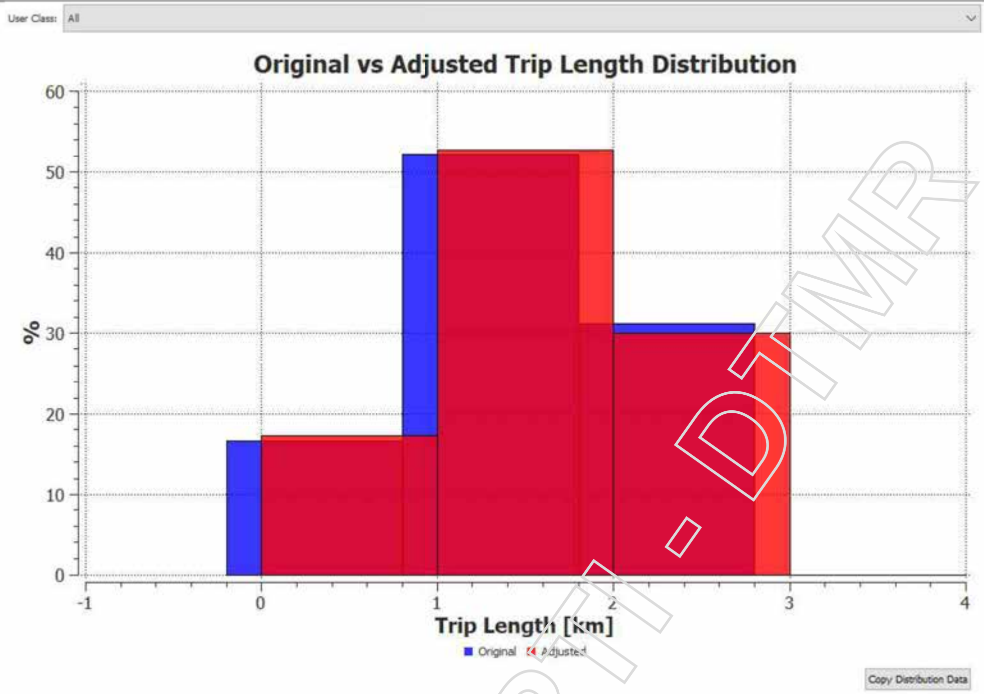
Figure 25: Traffic Demand Profile, PM Peak (2pm – 7pm) – Heavy Vehicles

Further to this, the comparison of trip length distribution between the original and adjusted trip matrices by time period are presented in Figure 26.

Peak Period	Trip Length Distribution (Aimsun Output)
AM Peak (7am – 8am)	
AM Peak (8am – 9am)	

PM Peak

(3pm – 4pm)



Original Mean Distance	Adjusted Mean Distance	Relative Difference	Original Std Dev.	Adjusted Std Dev.	Relative Difference
1.64	1.63	-0.543 %	0.54	0.541	0.0727 %

PM Peak

(4pm – 5pm)

Original Mean Distance	Adjusted Mean Distance	Relative Difference	Original Std Dev.	Adjusted Std Dev.	Relative Difference
1.63	1.62	-0.424 %	0.537	0.534	-0.597 %

PM Peak

(5pm – 6pm)

Figure 26: Trip Length Distribution Comparisons (prior and adjusted Aimsun output)

Trip length distribution changes across all time periods show a strong correlation to the prior matrices, which is expected for a model of this size.

6.3.1.13 Assignment Type

All Aimsun models have been developed as microsimulation scenarios, with the following steps taken to produce required outputs:

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

The five seed values processed for both the AM and PM peak base models are listed in Table 5.

Table 5: Model Seed Values (as per TfNSW Modelling Guidelines)

Seed Number	Seed Value
1	560
2	28
3	7771
4	86524
5	2849

6.3.2 Base Model Calibration and Validation

6.3.2.1 Calibration and Validation Criteria

The base model will be calibrated and validated in accordance with NZTA – Transport Modelling Guidelines, 2019 (Type E – Small Area / Corridor), as outlined below in Table 6.

Table 6: Adopted Calibration and Validation Criteria (NZTA, 2019)

Criteria	Item	Criteria
Calibration Criteria	Turning Volumes	Tolerance limits for turn volumes: • GEH <= 5 for at least 85% of turn/link flows. • GEH <= 7.5 for at least 90% of turn/link flows. • GEH <= 10 for at least 95% of turn/link flows. • R^2 value for observed vs modelled plots to be > 0.95. • Line of best fit: y=0.95x – 1.05x. • RMSE < 15%.
Validation Criteria	Travel Time Average	• At least 90% of average modelled journey time to be within 15% or one minute (whichever is greater) of average observed journey time for full length of route. • At least 95% of average modelled journey time to be within 25% or 1.5 minutes (whichever is greater) of average observed journey time for full length of route.
	Model Stability	• Model convergence to be achieved, and stability of the various random seed runs (SRC scenarios) will be compared and within acceptable variance limits.

6.3.2.2 Convergence & Model Stability

The Relative Gap (RGap) is a comparison of the actual travel time to the travel time when all vehicles use the shortest path. The smaller the RGap the better the convergence. For the purpose of this assessment, the RGap was set at the default target of <0.5%. The model shows an acceptable level of convergence in both peak periods, as shown in Figure 27 and Figure 28.

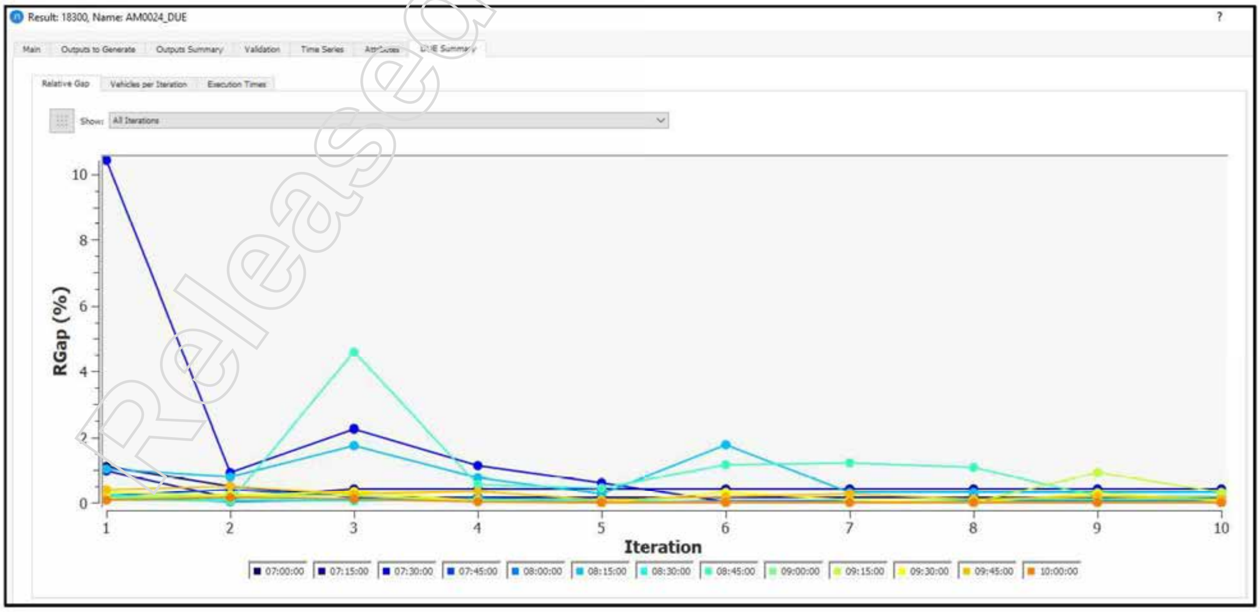


Figure 27: Base Model DUE Convergence – AM Peak

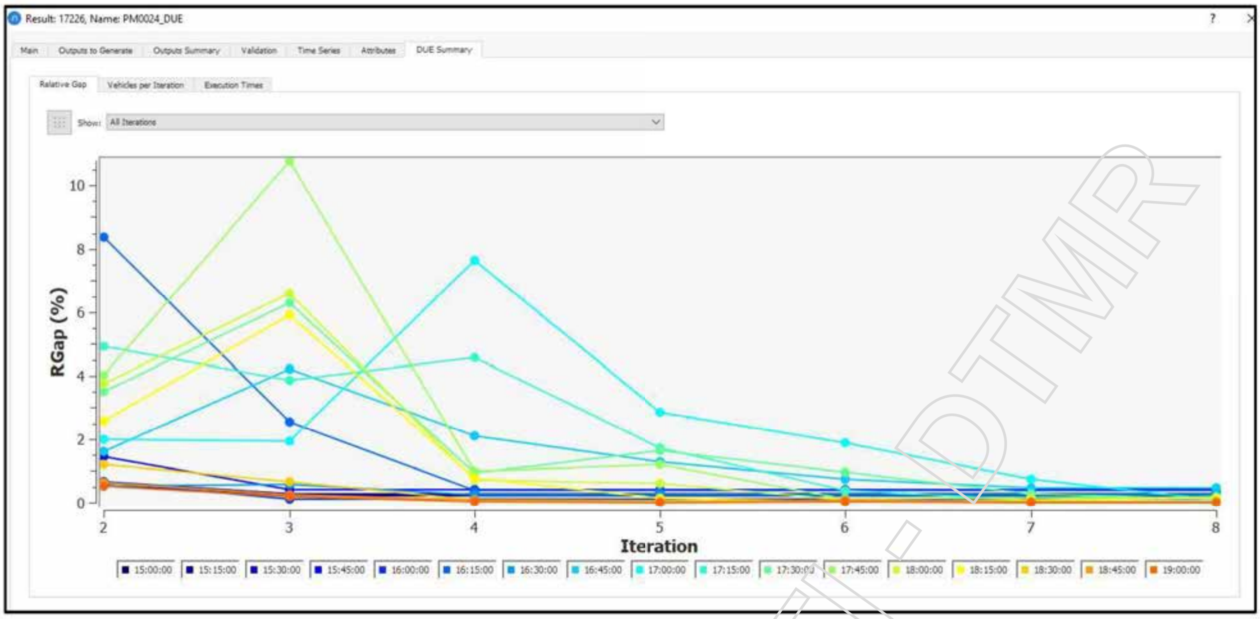


Figure 28: Base Model DUE Convergence – PM Peak

Further to the RGap convergence assessment, model stability was assessed in terms of overall vehicle delay (s/km) and total travel time (vehicle hours) by microsimulation replication. The results are presented in Figure 29 to Figure 32.

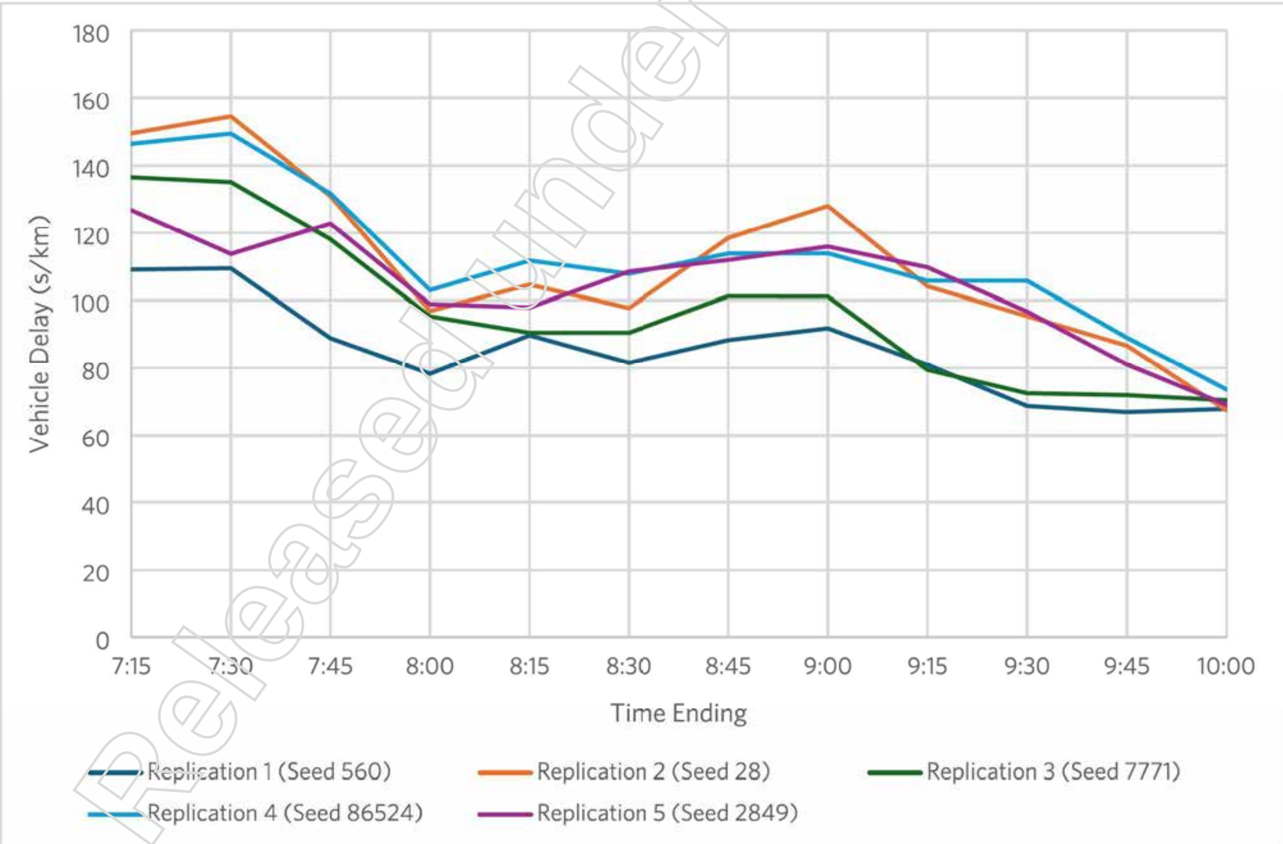


Figure 29: Comparison of Vehicle Delay by Microsimulation Replication – AM Peak (7am – 10am)

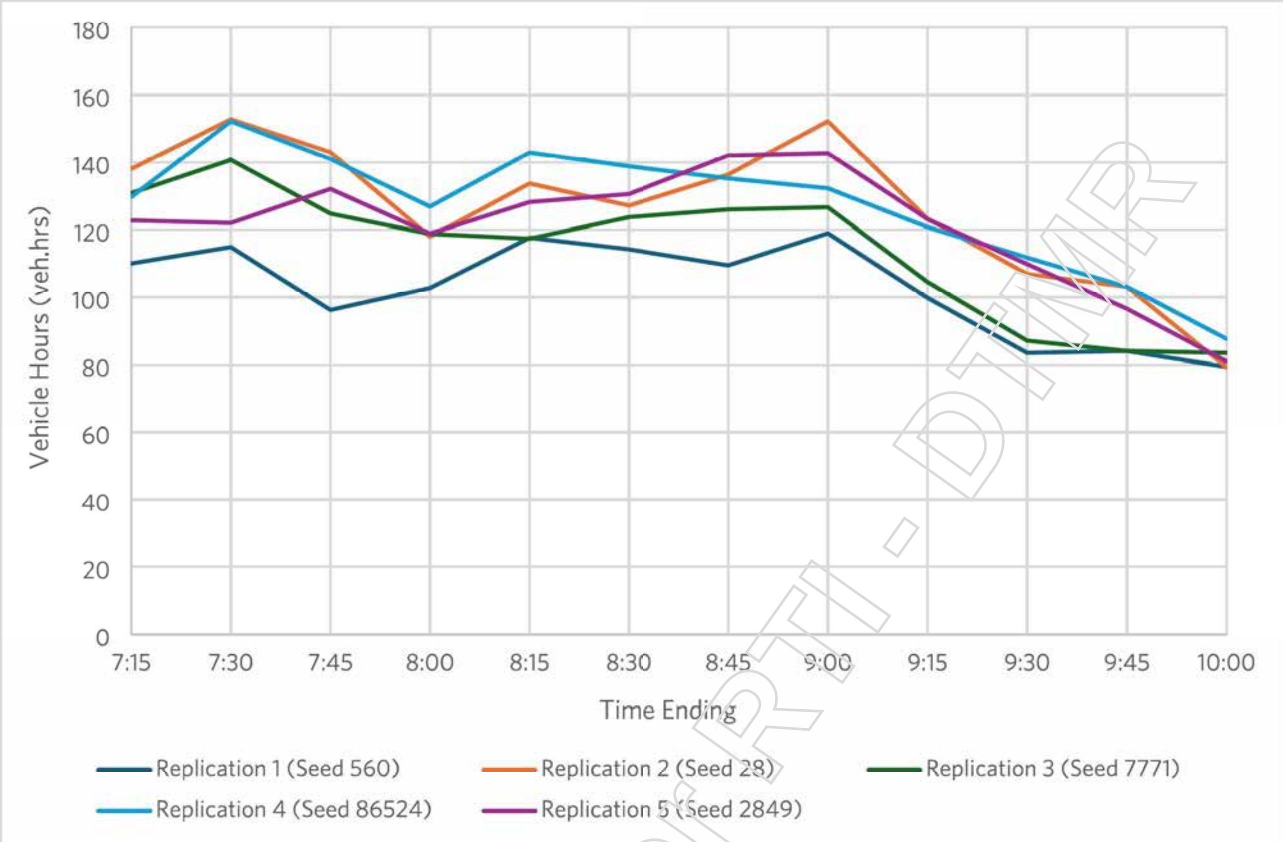


Figure 30: Comparison of Vehicle Hours Travelled by Microsimulation Replication – AM Peak (7am – 10am)

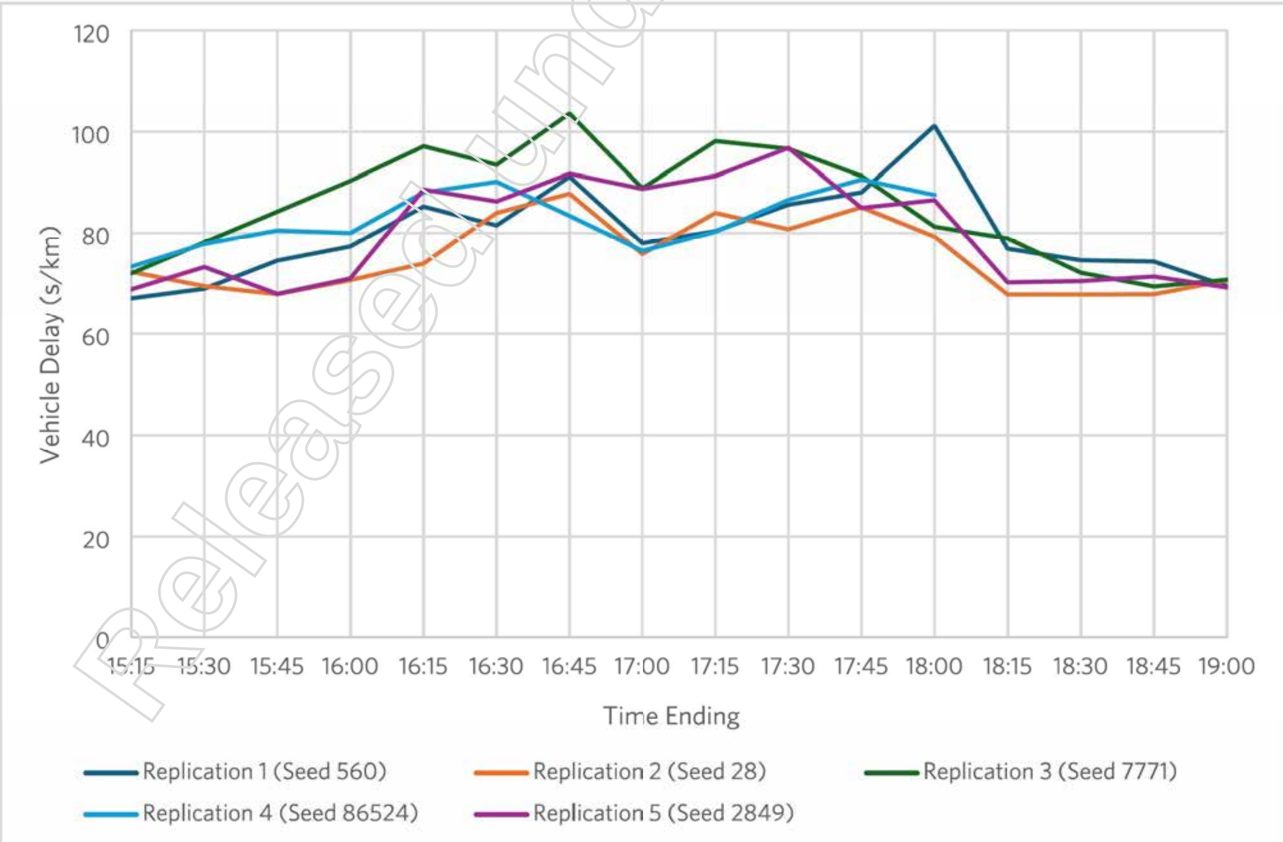


Figure 31: Comparison of Vehicle Delay by Microsimulation Replication – PM Peak (3pm – 6pm)

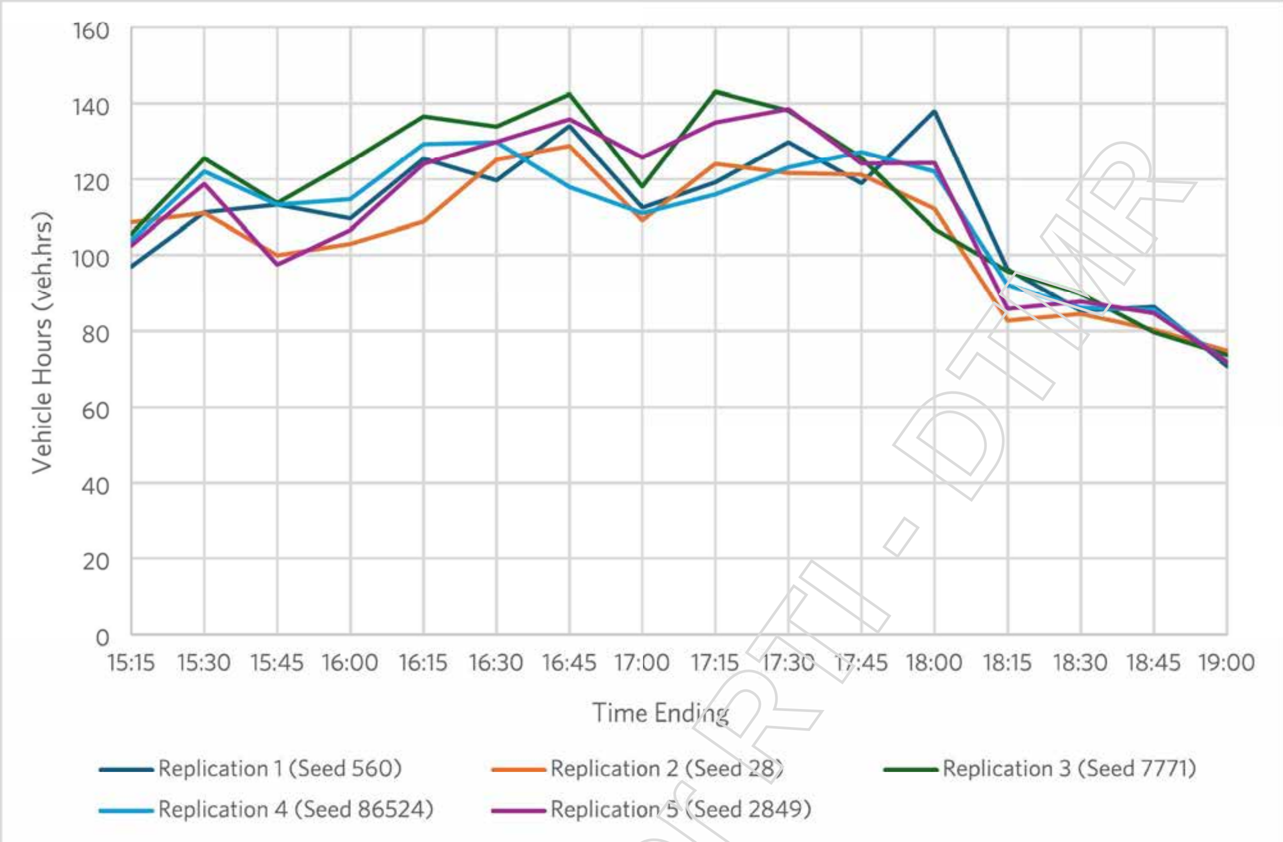


Figure 32: Comparison of Vehicle Hours Travelled by Microsimulation Replication – PM Peak (3pm – 6pm)

The PM peak outputs show a relatively consistent level of vehicle delay and total travel time across the five (5) microsimulation replications.

The AM peak model scenario shows a greater level of variability in model seed runs for both the vehicle delay and total travel time, particularly in the first hour of the modelled time period. In review of the microsimulation scenarios, this variance is primarily a result of the following:

- Significant throughput northbound on Logan Road in the final half an hour of the warm-up period and the associated vehicle queuing generated across the MPPL intersection.
- This type of congestion formation results in a higher variation in route choice for vehicles travelling north from the south-west of Logan Road, which in turn influences the level of congestion on Logan Road northbound and Padstow Road eastbound. An example of dynamic route choice response in this area is presented in Figure 33.

Figure 33: Bleasby Road and Padstow Road Congestion Formation Changes at 8:10am & 8:15am (25/07/2024)

Based on this assessment, the level of variation in base model travel times by replication is a primarily a result of the following two components in combination:

1. Degree of variation in northbound traffic flows.
2. Dynamic route choice of northbound drivers selecting either Bleasby Road or Padstow Road, dependent on the level of downstream traffic congestion in real-time.

These base modelled traffic operational performance conditions of the study area are considered an appropriate representation of observed existing traffic conditions and network operation.

6.3.2.3 Calibration Results

A total of 41 turn/trajectory count locations were included for the AM and PM peak calibration results. Table 7 and Table 8 summarise the overall calibration results, observed compared to modelled, across each hour of the peak periods.

Table 7: AM Peak Calibration Results

Parameter	Target	7:00am - 8:00am			8:00am - 9:00am		
		Car	Truck	Total	Car	Truck	Total
GEH <= 5	85%	90%	98%	90%	90%	98%	90%
GEH <= 7.5	90%	98%	100%	95%	98%	100%	95%
GEH <= 10	95%	100%	100%	100%	100%	100%	100%

Table 8: PM Peak Calibration Results

Parameter	Target	3:00pm - 4:00pm			4:00pm - 5:00pm			5:00pm - 6:00pm		
		Car	Truck	Total	Car	Truck	Total	Car	Truck	Total
GEH <= 5	85%	98%	100%	98%	98%	100%	98%	90%	100%	88%
GEH <= 7.5	90%	100%	100%	100%	98%	100%	98%	100%	100%	100%
GEH <= 10	95%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The following key takeaways are noted regarding the calibration results:

- A high-level of overall calibration is achieved for both cars and trucks across all peak hour periods.
- All calibration criteria is met, with no counts > GEH 10 in any peak period.

A detailed summary of all turn GEH calibration results has been included in Appendix A.

In addition to the above, a modelled versus observed traffic volume (turns) comparison has been undertaken in the form of an R^2 and regression plot analysis for each of the peak hours. It is typically recommended that an R^2 value greater than 0.95 be achieved for appropriate calibration. The AM and PM base model regression plots for all vehicles are presented in Figure 34 to Figure 38.

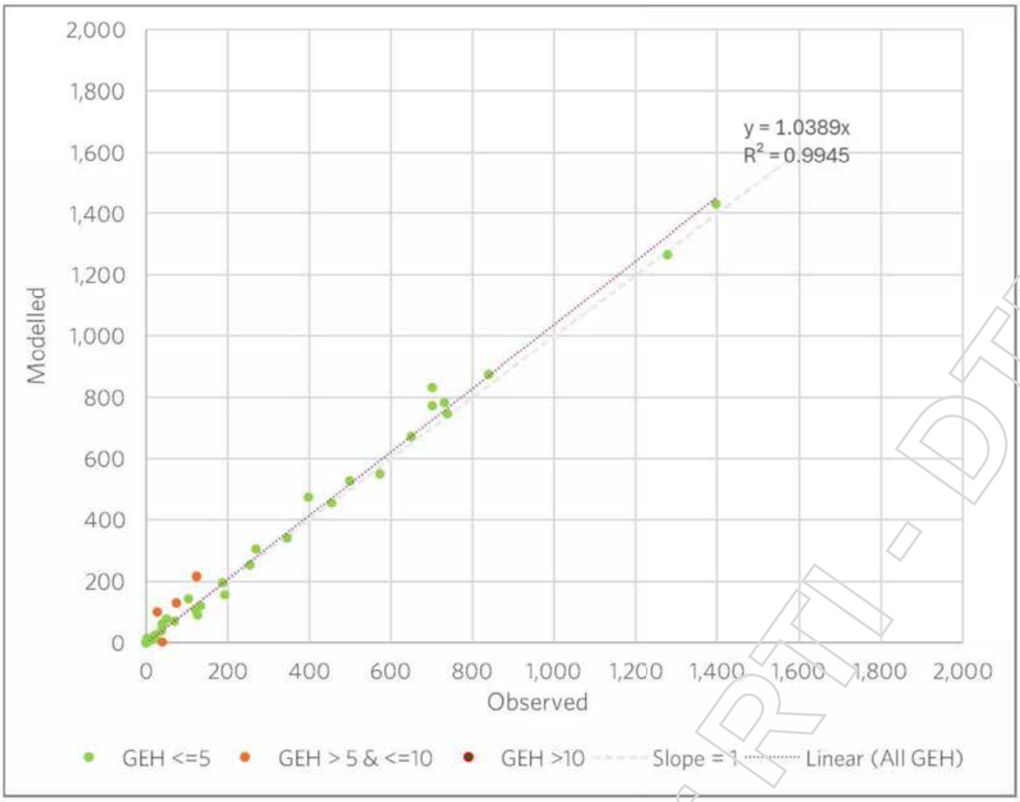


Figure 34: Turn Flow Regression Plot (All Vehicles) – 7:00am – 8:00am

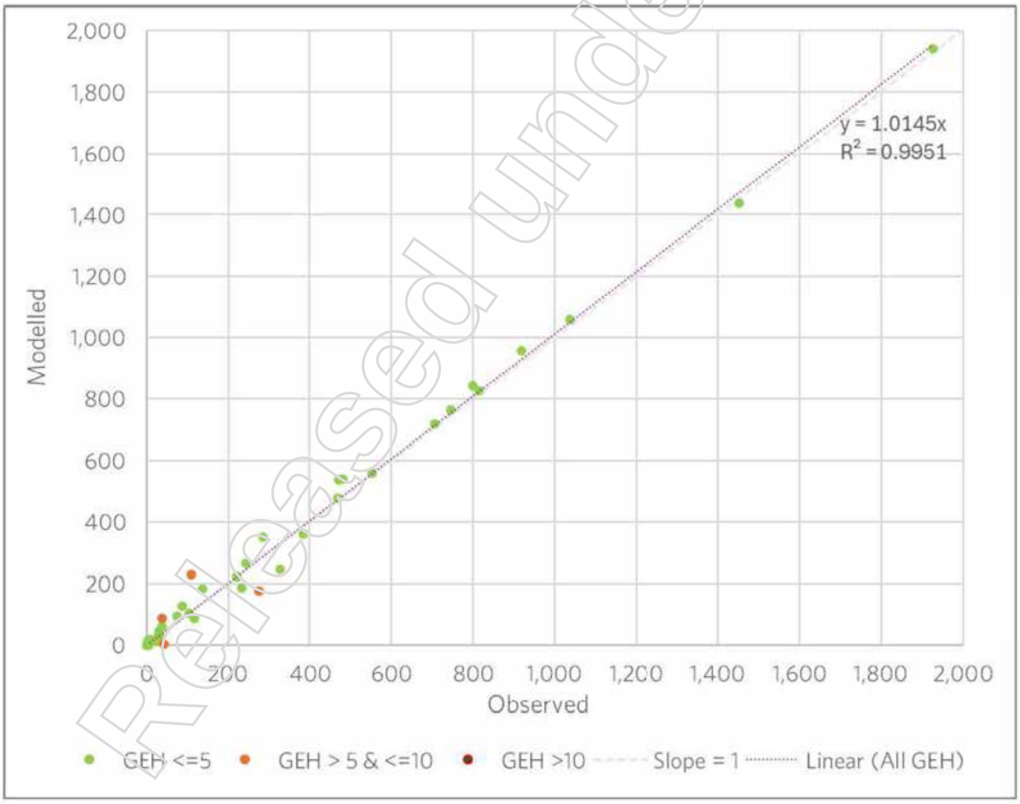


Figure 35: Turn Flow Regression Plot (All Vehicles) – 8:00am – 9:00am

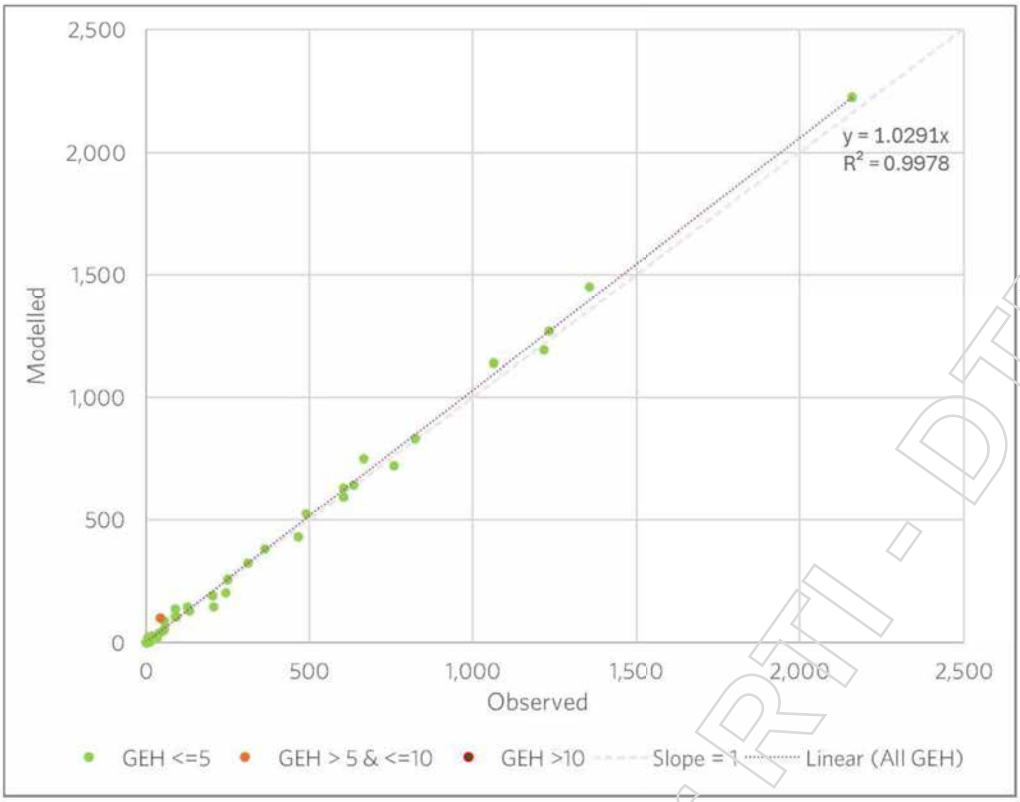


Figure 36: Turn Flow Regression Plot (All Vehicles) – 3:00pm – 4:00pm

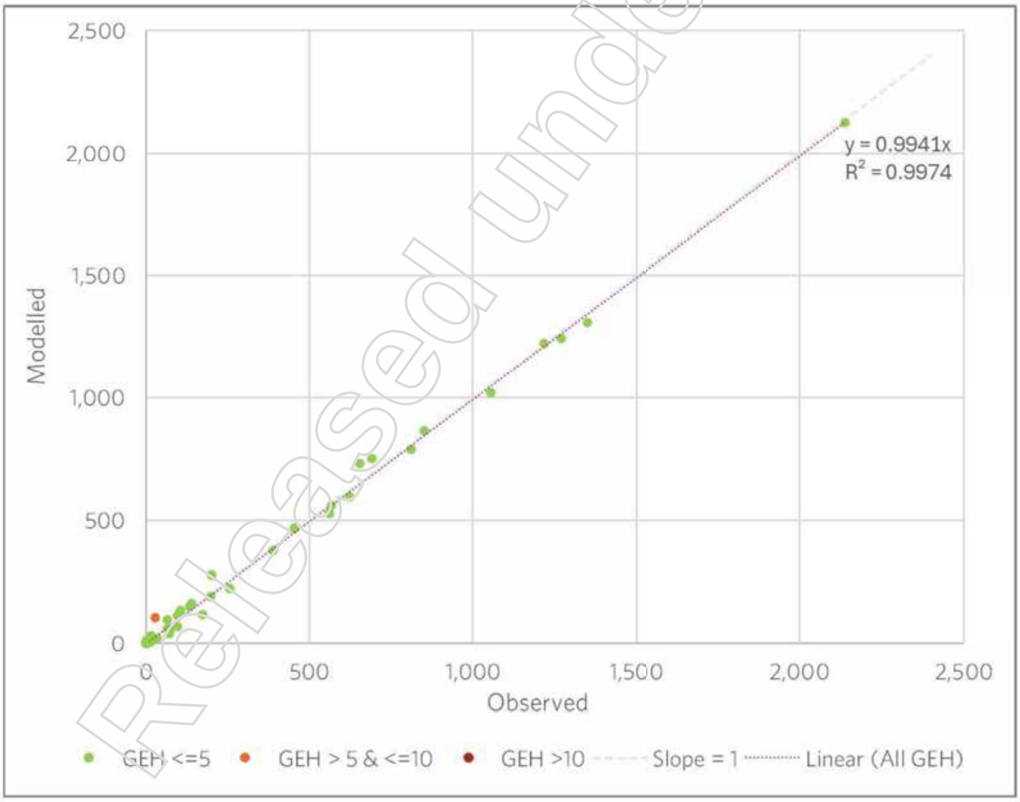


Figure 37: Turn Flow Regression Plot (All Vehicles) – 4:00pm – 5:00pm

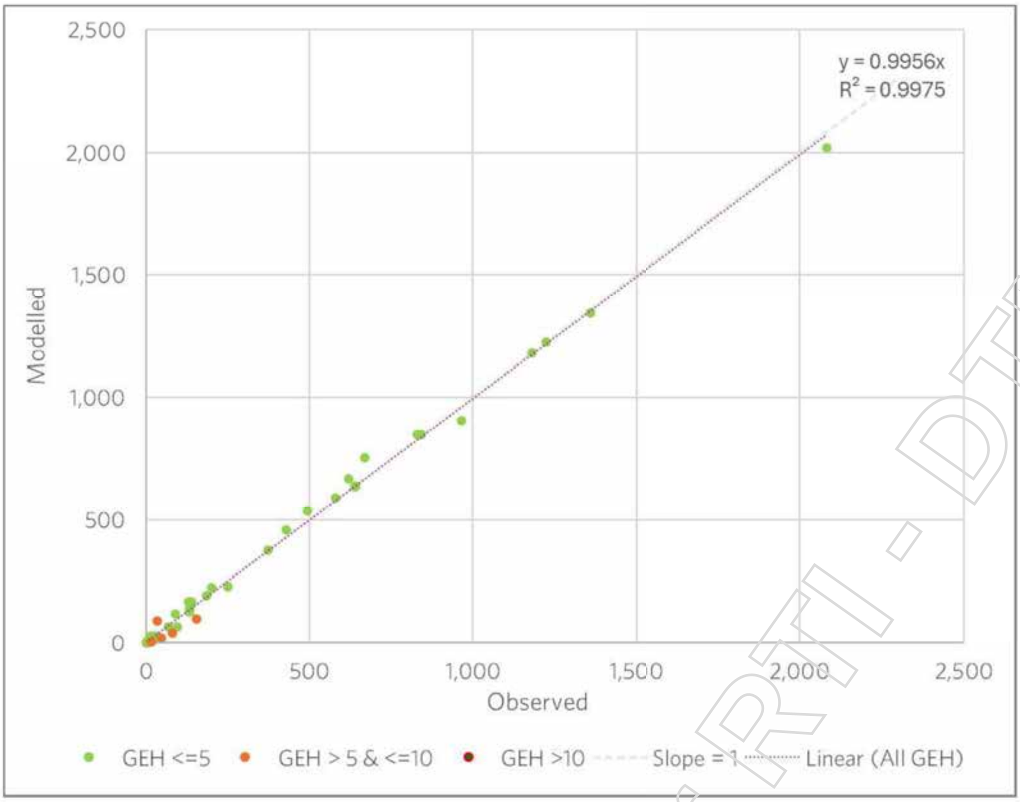


Figure 38: Turn Flow Regression Plot (All Vehicles) – 5:00pm – 6:00pm

All regression plots show a good fit between observed and modelled turn volumes. The outputs also highlight that all GEH values > 5 are for relatively minor traffic volume locations, which are considered less critical for the overall study area calibration.

6.3.2.4 Validation Results

Validation results compare observed travel times to modelled travel times, with travel time criteria requiring that at least 90% of average modelled journey time be within 15% of one minute (whichever is greater) for the full length of defined routes.

Travel time validation results are summarised for the AM and PM peaks in Table 9 and Table 10 respectively.

Table 9: Travel Time Validation Results – AM Peak

Peak Hour	Route	Direction	Average observed Travel Time (m:ss)	Average Model Travel Time (m:ss)	Difference		Meets Criteria
					Relative (m:ss)	%	
7am – 8am	Logan Rd	Northbound	8:13	9:17	1:04	13%	Yes
		Southbound	3:04	3:21	0:17	9%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	4:05	3:18	-0:47	-19%	Yes
		Westbound	2:05	2:18	0:14	11%	Yes
8am – 9am	Logan Rd	Northbound	5:49	6:29	0:39	11%	Yes
		Southbound	3:07	3:32	0:25	13%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	4:12	3:47	-0:25	-10%	Yes
		Westbound	3:13	2:32	-0:42	-22%	Yes

Table 10: Travel Time Validation Results – PM Peak

Peak Hour	Route	Direction	Average observed Travel Time (m:ss)	Average Model Travel Time (m:ss)	Difference		Meets Criteria
					Relative (m:ss)	%	
3pm – 4pm	Logan Rd	Northbound	4:46	5:33	0:46	16%	Yes
		Southbound	3:24	3:43	0:19	9%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	2:42	2:23	-0:19	-12%	Yes
		Westbound	2:37	2:16	-0:21	-13%	Yes
4pm – 5pm	Logan Rd	Northbound	4:56	5:49	0:54	18%	Yes
		Southbound	3:12	4:01	0:49	25%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	3:21	3:10	-0:12	-6%	Yes
		Westbound	3:05	2:51	-0:14	-8%	Yes
5pm – 6pm	Logan Rd	Northbound	5:49	6:03	0:14	4%	Yes
		Southbound	3:20	3:44	0:24	12%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	2:38	3:17	0:39	25%	Yes
		Westbound	3:27	3:01	-0:26	-12%	Yes

The summary of travel time validation shows that all routes meet criteria across the full length of defined travel time routes. At a segment level, all model travel times show a close match to observed travel times, with general patterns in congestion matched. It is noted that one (1) individual segment during the AM peak is higher than observed by greater than 1 minute. This occurs northbound on Logan Road on the approach to Warrigal Rd / northbound off-ramp signalised intersection. Average modelled travel times during the 7am – 8am peak period for this segment are 4 minutes and 18 seconds, compared to an observed average of 2 minutes and 41 seconds. It is noted that the average model travel times are well within the maximum observed travel times for links within this segment which are up to 7 minutes and 25 seconds. Consequently, we are of the opinion this is still an appropriate representation within this travel time route. These travel time differences between observed and modelled are illustrated in Figure 39.

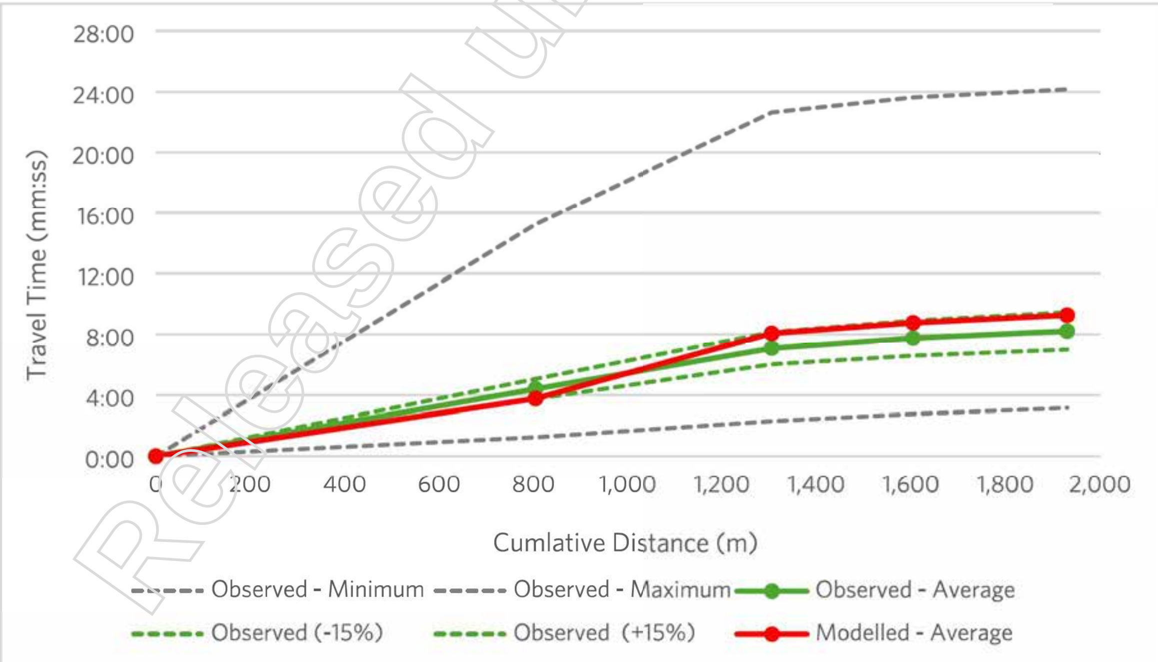


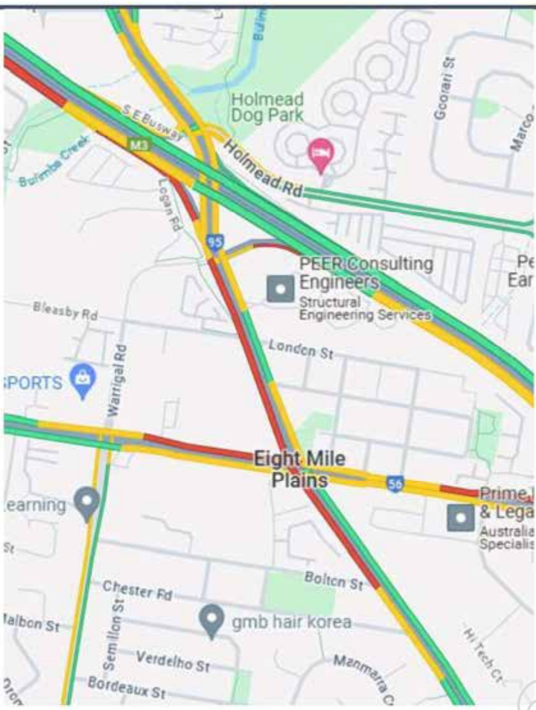
Figure 39: Logan Road Northbound Travel Time Validation, AM Peak (7:00am – 8:00am)

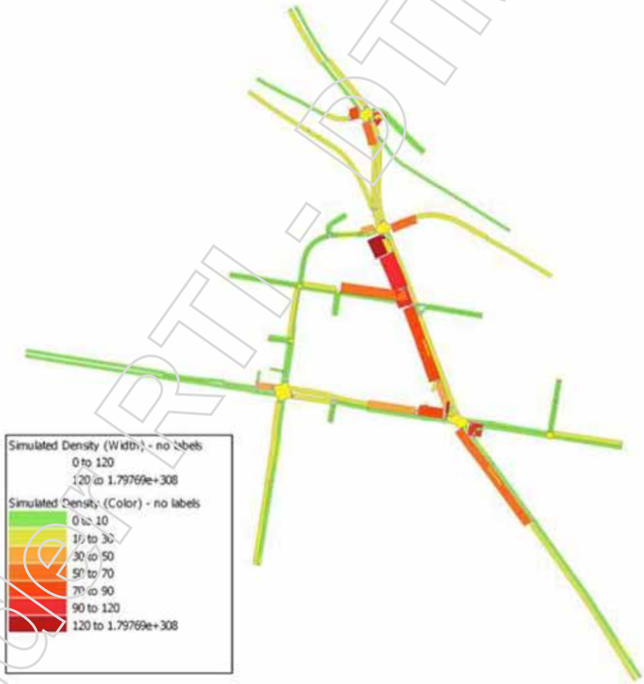
A full summary of segment-based travel time validation for all routes and peak periods is included in Appendix B.

6.3.2.5 Congestion

A comparison between Google traffic maps and simulated density plots for the study area is included below in Figure 40 and Figure 41.

Aimsun network density results represent number of vehicles per lane within road sections and provides an indication of typical vehicle queue formation or slow-moving traffic. Google traffic conditions reflect speed of traffic relative to speed limit, while not an exact comparison there is a relationship to density as it is derived from traffic speed and flow.

<table>
<tr><th>Google Traffic</th><th>Aimsun Simulated Density</th></tr>
<tr><td>


</td><td>


</td></tr>
</table>

Figure 40: Google Traffic Compared to Aimsun Simulated Density – AM Peak

Figure 41: Google Traffic Compared to Aimsun Simulated Density – PM Peak

These comparisons show a reasonable level of consistent traffic congestion pattern formation between the model and observed, in particular formation of vehicle queues at the MPPL intersection.

The main point of difference is in the AM peak modelled congestion for the Pacific Motorway northbound on-ramp being lighter than what is suggested by Google Traffic. It is noted that the observed Google Traffic for this location varies significantly across days and the on-site observations across multiple dates showed no impact to the mainline (Logan Road northbound) from the ramp metering at this location.

6.3.2.6 Limitations

The model provides an acceptable level of calibration and validation to observed traffic data, as well as overall representation observed traffic congestion formation and patterns at the most critical locations within the study area. However, it is recognised that there are limitations to the model remain, which include the following:

- Base model demands are based on inputs and assumptions of the relevant strategic model outputs.
- Assessment is limited to impacts within the study area for the peak hours calibrated and validated.
- Base model calibration and validation is limited to the appropriateness of the input traffic counts., HERE data travel times and SCATS and STREAMS signal data.
- Traffic operations at Bleasby Road have been modelled as deemed appropriate; however, the ability to replicate a certain number of vehicles using this merge as a give-way is limited, particularly with no formal observed traffic data provided.
- The model is not able to replicate rat-running of vehicles east-to-north through the petrol station during the AM peak period.
- No formal calibration data for the Warrigal Road / Padstow Road intersection was provided. Demand inputs at this location reference provided demands from BSTM and BMAM.

7 Conclusion

This report has presented the calibration and validation results of the Aimsun microsimulation scenarios of the MPPL 2024 Base Model. The results indicate that the base model is able to appropriately simulate traffic volumes and travel times consistent with the observed existing traffic conditions and is generally within industry guidelines for base model calibration and validation requirements.

It is our view that the model is calibrated and validated at a suitable level for application with the intended purposes of analysis and advising on proposed road and intersection network change options to support the 'MPPL Intersection Upgrade Planning Study'.

APPENDIX A – Calibration Results

Calibration – GEH Results

Turn Calibration Results, AM Peak, 7am-8am

External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	40	61	21	3.0	0	1	1	1.5	40	63	23	3.2
1_2	700	259	299	40	2.4	10	6	-4	1.4	269	305	36	2.1
1_3	698	627	648	21	0.8	23	26	3	0.5	650	673	23	0.9
1_4	699	335	330	-5	0.3	12	9	-3	1.0	347	339	-8	0.4
1_6	693	252	242	-10	0.6	4	8	4	1.6	256	250	-6	0.4
1_7	694	410	408	-2	0.1	44	47	3	0.4	454	454	0	0.0
1_8	704	22	13	-9	2.1	2	1	-1	1.0	24	14	-10	2.3
1_11	696	670	792	122	4.5	31	40	9	1.5	701	833	132	4.8
1_12	697	98	133	35	3.3	7	9	2	0.6	105	142	37	3.3
1_14	701	71	126	55	5.5	5	4	-1	0.3	76	130	54	5.3
1_15	702	356	424	68	3.4	43	50	7	1.0	399	474	75	3.6
1_16	705	121	212	91	7.0	2	2	0	0.3	123	214	91	7.0
2_1	1086	2	0	-2	2.0	0	0	0	0.9	2	0	-2	1.5
2_2	1085	132	118	-14	1.3	2	3	1	0.4	134	120	-14	1.2
2_3	1083	8	9	1	0.4	4	0	-4	2.8	12	9	-3	0.9
2_4	1084	1240	1231	-9	0.3	38	37	-1	0.2	1278	1267	-11	0.3
2_7	1082	700	744	44	1.6	30	39	9	1.5	730	783	53	1.9
2_8	1081	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
2_9	1079	2	0	-2	1.5	0	0	0	0.0	2	0	-2	1.5
2_10	1080	185	155	-30	2.3	9	1	-8	3.3	194	156	-38	2.9
2_11	1088	50	77	27	3.4	0	2	2	2.0	50	79	29	3.6
2_13	1078	674	742	68	2.6	27	33	6	1.1	701	775	74	2.7
2_14	1077	824	850	26	0.9	15	25	10	2.2	839	875	36	1.2
2_15	1075	4	15	11	3.6	0	0	0	0.6	4	15	11	3.7
2_17	1072	10	9	-1	0.5	0	1	1	1.4	10	10	0	0.1
2_19	1074	19	1	-18	5.9	21	1	-20	6.1	40	1	-39	8.5
2_20	1073	17	15	-2	0.6	1	0	-1	1.4	18	15	-3	0.8
3_3	1048	543	529	-14	0.6	30	23	-7	1.4	573	552	-21	0.9
3_4	1049	462	495	33	1.5	36	33	-3	0.5	498	528	30	1.3
3_5	1045	65	65	0	0.0	4	6	2	1.0	69	72	3	0.3
3_7	1051	183	193	10	0.7	5	3	-2	1.0	188	196	8	0.6
3_9	1068	121	106	-15	1.4	1	1	0	0.4	122	107	-15	1.4
3_10	1069	23	26	3	0.6	1	0	-1	1.4	24	26	2	0.4
3_11	1058	2	2	0	0.0	1	1	0	0.2	3	3	0	0.1
3_12	1059	20	20	0	0.1	0	1	1	1.1	20	21	1	0.2
3_13	1055	28	99	71	8.9	1	0	-1	1.4	29	99	70	8.8
3_14	1056	1318	1361	43	1.2	79	71	-8	0.9	1397	1432	35	0.9
3_17	1063	727	733	6	0.2	12	16	4	1.1	739	749	10	0.4
3_18	1064	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
3_19	1060	35	38	3	0.5	3	1	-2	1.1	38	39	1	0.2
3_20	1062	118	83	-35	3.4	8	7	-1	0.5	126	90	-36	3.5

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Turn Calibration Results, AM Peak, 8am-9am

External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	38	87	49	6.2	0	1	1	1.7	38	89	51	6.4
1_2	700	280	340	60	3.4	6	11	5	1.8	286	351	65	3.7
1_3	698	776	793	17	0.6	38	33	-5	0.8	814	826	12	0.4
1_4	699	366	349	-17	0.9	17	11	-6	1.6	383	360	-23	1.2
1_6	693	221	212	-9	0.6	1	10	9	3.9	222	223	1	0.0
1_7	694	421	429	8	0.4	48	48	0	0.0	469	477	8	0.4
1_8	704	28	17	-11	2.3	5	0	-5	2.8	33	17	-16	3.1
1_11	696	766	799	33	1.2	34	44	10	1.6	800	843	43	1.5
1_12	697	310	240	-70	4.2	17	6	-11	3.4	327	246	-81	4.8
1_14	701	135	177	42	3.4	2	5	3	1.4	137	182	45	3.6
1_15	702	424	480	56	2.6	47	59	12	1.7	471	539	68	3.0
1_16	705	108	222	114	8.9	2	7	5	2.2	110	228	118	9.1
2_1	1086	3	0	-3	2.4	0	1	1	1.3	3	1	-2	1.6
2_2	1085	88	122	34	3.4	0	4	4	2.8	88	126	38	3.7
2_3	1083	15	15	0	0.1	4	0	-4	2.8	19	15	-4	1.0
2_4	1084	1405	1388	-17	0.5	48	49	1	0.1	1453	1437	-16	0.4
2_7	1082	885	913	28	0.9	34	44	10	1.6	919	956	37	1.2
2_8	1081	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
2_9	1079	5	0	-5	3.2	0	0	0	0.0	5	0	-5	3.2
2_10	1080	222	181	-41	2.9	11	3	-8	3.0	233	184	-49	3.4
2_11	1088	76	91	15	1.7	0	3	3	2.4	76	94	18	2.0
2_13	1078	1018	1027	9	0.3	18	34	16	3.1	1036	1061	25	0.8
2_14	1077	532	531	-1	0.0	21	29	8	1.7	553	560	7	0.3
2_15	1075	9	17	8	2.3	0	1	1	1.3	9	18	9	2.5
2_17	1072	26	10	-16	3.7	2	0	-2	1.7	28	10	-18	4.0
2_19	1074	18	1	-17	5.6	26	1	-25	6.6	44	2	-42	8.7
2_20	1073	4	15	11	3.6	0	0	0	0.0	4	15	11	3.6
3_3	1048	680	686	6	0.2	26	31	5	1.0	706	718	12	0.4
3_4	1049	451	501	50	2.3	30	40	10	1.7	481	541	60	2.7
3_5	1045	116	86	-30	3.0	2	2	0	0.3	118	88	-30	3.0
3_7	1051	241	258	17	1.1	3	6	3	1.5	244	264	20	1.3
3_9	1068	102	103	1	0.1	2	0	-2	1.5	104	103	-1	0.1
3_10	1069	28	30	2	0.3	0	0	0	0.0	28	30	2	0.3
3_11	1058	3	4	1	0.7	0	1	1	1.1	3	5	2	1.0
3_12	1059	33	23	-10	1.8	0	1	1	1.1	33	24	-9	1.7
3_13	1055	37	62	25	3.5	1	0	-1	1.4	38	62	24	3.4
3_14	1056	1852	1861	9	0.2	74	79	5	0.6	1926	1940	14	0.3
3_17	1063	719	742	23	0.9	26	21	-5	0.9	745	764	19	0.7
3_18	1064	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
3_19	1060	30	44	14	2.2	0	2	2	1.9	30	45	15	2.5
3_20	1062	250	168	-82	5.7	25	9	-16	3.9	275	177	-98	6.5

Turn Calibration Results, PM Peak, 3pm-4pm

External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	91	139	48	4.5	0	0	0	0.6	91	139	48	4.5
1_2	700	596	627	31	1.3	7	5	-2	1.0	603	632	29	1.2
1_3	698	1325	1412	87	2.3	32	39	7	1.1	1357	1450	93	2.5
1_4	699	308	320	12	0.7	4	3	-1	0.8	312	323	11	0.6
1_6	693	359	373	14	0.7	6	9	3	1.1	365	382	17	0.9
1_7	694	427	404	-23	1.1	39	26	-13	2.3	466	429	-37	1.7
1_8	704	36	39	3	0.5	6	1	-5	2.5	42	40	-2	0.2
1_11	696	650	734	84	3.2	16	16	0	0.1	666	751	85	3.2
1_12	697	237	202	-35	2.4	8	2	-6	2.5	245	204	-41	2.7
1_14	701	247	249	2	0.2	4	6	2	0.8	251	255	4	0.3
1_15	702	617	622	5	0.2	19	23	4	1.0	636	645	9	0.4
1_16	705	90	103	13	1.3	1	0	-1	1.0	91	103	12	1.3
2_1	1086	3	0	-3	2.4	0	0	0	0.9	3	0	-3	2.0
2_2	1085	127	143	16	1.4	0	2	2	2.1	127	145	18	1.6
2_3	1083	16	5	-11	3.2	20	12	-8	2.0	36	17	-19	3.6
2_4	1084	2122	2183	61	1.3	38	43	5	0.7	2160	2226	66	1.4
2_7	1082	471	509	38	1.7	20	16	-4	0.9	491	525	34	1.5
2_8	1081	3	0	-3	2.4	0	0	0	0.0	3	0	-3	2.4
2_9	1079	5	1	-4	2.3	0	0	0	0.0	5	1	-4	2.3
2_10	1080	127	129	2	0.1	5	1	-4	2.3	132	130	-2	0.2
2_11	1088	45	99	54	6.4	0	2	2	2.0	45	101	56	6.6
2_13	1078	809	817	8	0.3	14	14	0	0.1	823	831	8	0.3
2_14	1077	741	707	-34	1.2	17	14	-3	0.7	758	722	-36	1.3
2_15	1075	14	10	-4	1.0	0	0	0	0.0	14	10	-4	1.0
2_17	1072	8	22	14	3.7	0	0	0	0.0	8	22	14	3.7
2_19	1074	9	1	-8	3.5	5	0	-5	3.2	14	1	-13	4.6
2_20	1073	7	3	-4	1.9	1	0	-1	1.4	8	3	-5	2.2
3_3	1048	1178	1164	-14	0.4	38	30	-8	1.4	1216	1194	-22	0.6
3_4	1049	588	578	-10	0.4	16	17	1	0.2	604	595	-9	0.4
3_5	1045	199	189	-10	0.7	5	2	-3	1.5	204	191	-13	0.9
3_7	1051	90	104	14	1.4	2	4	2	1.0	92	107	15	1.5
3_9	1068	51	49	-2	0.3	3	1	-2	1.8	54	49	-5	0.7
3_10	1069	15	14	-1	0.2	0	0	0	0.0	15	14	-1	0.2
3_11	1058	2	3	1	0.7	0	1	1	1.4	2	4	2	1.2
3_12	1059	20	26	6	1.3	0	1	1	1.3	20	27	7	1.5
3_13	1055	53	56	3	0.4	2	0	-2	1.5	55	56	1	0.2
3_14	1056	1197	1245	48	1.4	37	28	-9	1.6	1234	1273	39	1.1
3_17	1063	1047	1113	66	2.0	15	25	10	2.2	1062	1138	76	2.3
3_18	1064	1	0	-1	1.4	0	0	0	0.0	1	0	-1	1.4
3_19	1060	55	87	32	3.8	0	0	0	0.6	55	87	32	3.8
3_20	1062	204	145	-59	4.4	2	1	-1	1.0	206	146	-60	4.5

Turn Calibration Results, PM Peak, 4pm-5pm

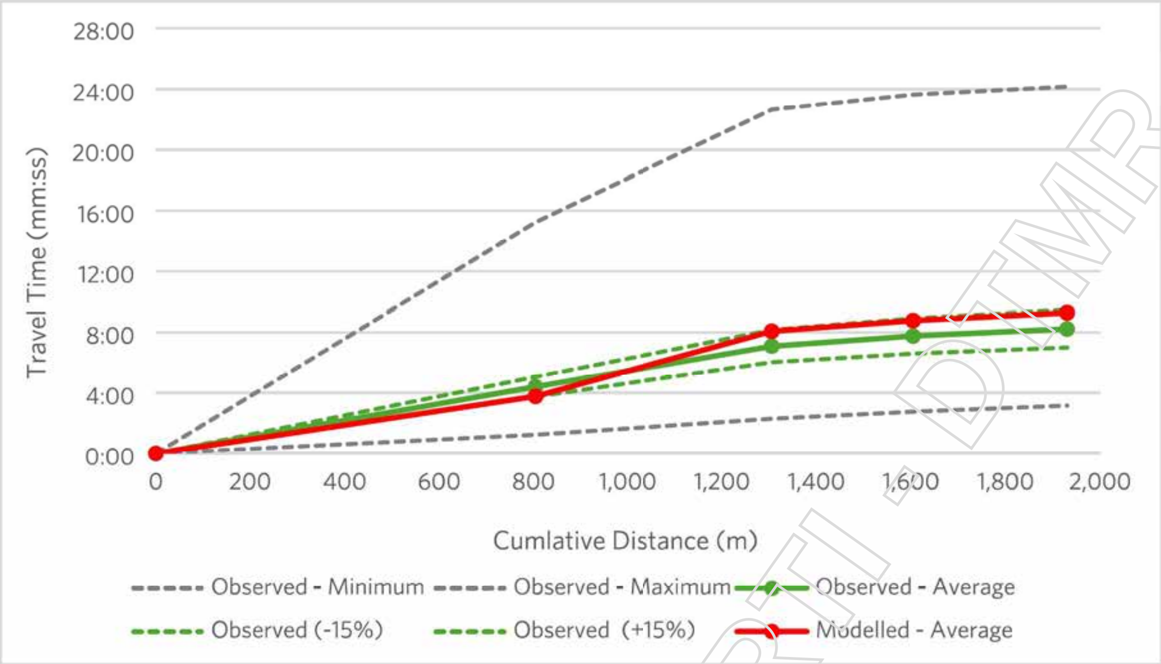
External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	133	149	16	1.3	0	1	1	1.1	133	149	16	1.4
1_2	700	619	591	-28	1.1	4	6	2	0.9	623	597	-26	1.0
1_3	698	1312	1271	-41	1.1	39	37	-2	0.4	1351	1307	-44	1.2
1_4	699	387	372	-15	0.7	2	3	1	0.5	389	375	-14	0.7
1_6	693	452	456	4	0.2	3	9	6	2.5	455	465	10	0.5
1_7	694	430	447	17	0.8	27	25	-2	0.5	457	472	15	0.7
1_8	704	62	61	-1	0.1	5	0	-5	3.0	67	61	-6	0.7
1_11	696	675	740	65	2.4	17	16	-1	0.3	692	756	64	2.4
1_12	697	250	218	-32	2.1	6	5	-1	0.6	256	222	-34	2.2
1_14	701	197	268	71	4.7	4	8	4	1.5	201	276	75	4.8
1_15	702	632	710	78	3.0	23	23	0	0.1	655	733	78	3.0
1_16	705	71	39	-32	4.3	2	1	-1	0.5	73	40	-33	4.4
2_1	1086	4	0	-4	2.8	0	0	0	0.9	4	0	-4	2.4
2_2	1085	141	162	21	1.7	0	1	1	1.5	141	164	23	1.8
2_3	1083	19	7	-12	3.5	15	12	-3	0.9	34	18	-16	3.1
2_4	1084	2094	2084	-10	0.2	44	43	-1	0.2	2138	2127	-11	0.2
2_7	1082	550	538	-12	0.5	18	21	3	0.6	568	559	-9	0.4
2_8	1081	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
2_9	1079	2	0	-2	2.0	0	0	0	0.0	2	0	-2	2.0
2_10	1080	104	132	28	2.6	2	1	-1	1.0	106	133	27	2.4
2_11	1088	30	103	73	9.0	0	3	3	2.3	30	106	76	9.2
2_13	1078	801	776	-25	0.9	11	14	3	0.8	812	790	-22	0.8
2_14	1077	839	851	12	0.4	11	15	4	1.1	850	866	16	0.5
2_15	1075	14	10	-4	1.3	0	0	0	0.9	14	10	-4	1.2
2_17	1072	21	27	6	1.2	0	0	0	0.0	21	27	6	1.2
2_19	1074	8	2	-6	2.7	6	0	-6	3.5	14	2	-12	4.2
2_20	1073	6	1	-5	2.5	1	0	-1	1.4	7	1	-6	2.9
3_3	1048	1182	1185	3	0.1	35	36	1	0.1	1217	1220	3	0.1
3_4	1049	545	512	-33	1.4	15	15	0	0.0	560	527	-33	1.4
3_5	1045	193	187	-6	0.5	6	5	-1	0.3	199	192	-7	0.5
3_7	1051	94	109	15	1.5	2	3	1	0.4	96	112	16	1.6
3_9	1068	74	58	-16	2.0	0	0	0	0.0	74	58	-16	2.0
3_10	1069	11	18	7	1.8	0	0	0	0.0	11	18	7	1.8
3_11	1058	0	11	11	4.7	0	0	0	0.9	0	11	11	4.8
3_12	1059	16	30	14	2.8	0	0	0	0.9	16	30	14	2.9
3_13	1055	95	68	-27	3.0	1	0	-1	1.0	96	68	-28	3.0
3_14	1056	1235	1209	-26	0.7	34	34	0	0.0	1269	1243	-26	0.7
3_17	1063	1027	999	-28	0.9	26	21	-5	1.0	1053	1020	-33	1.0
3_18	1064	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
3_19	1060	67	97	30	3.3	0	1	1	1.1	67	97	30	3.3
3_20	1062	175	118	-57	4.7	0	0	0	0.9	175	118	-57	4.7

Turn Calibration Results, PM Peak, 5pm-6pm

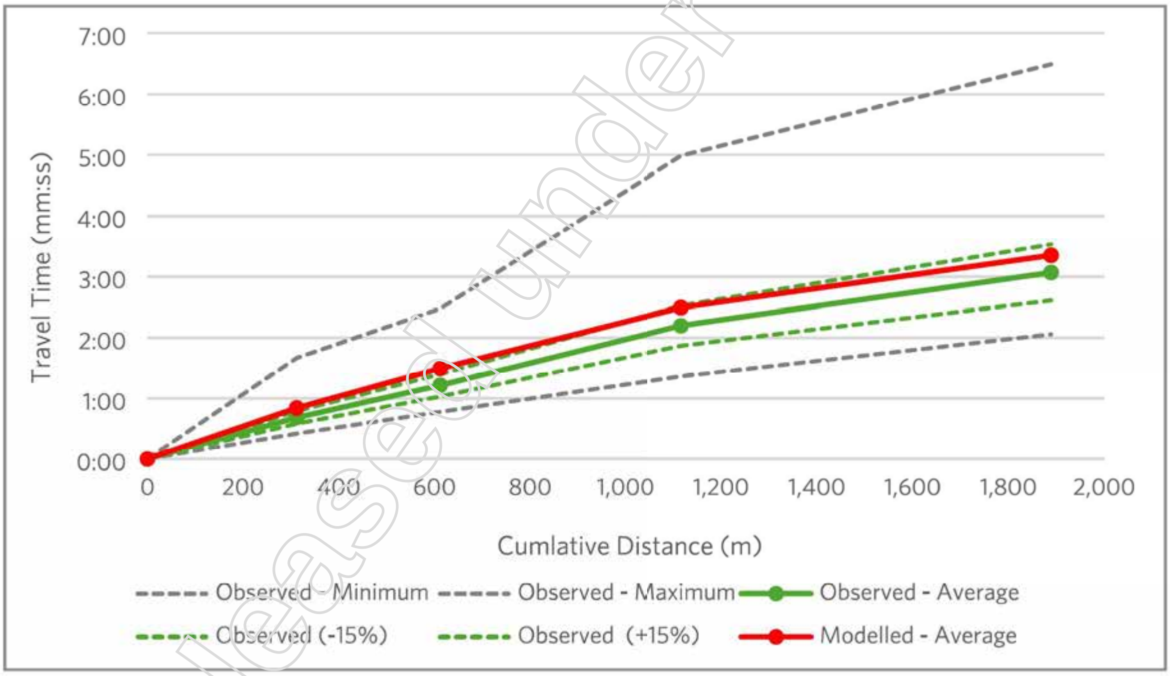
External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	131	164	33	2.7	0	1	1	1.3	131	165	34	2.8
1_2	700	635	633	-2	0.1	6	5	-1	0.3	641	638	-3	0.1
1_3	698	1154	1150	-4	0.1	26	32	6	1.1	1180	1183	3	0.1
1_4	699	375	374	-1	0.0	0	3	3	2.6	375	378	3	0.1
1_6	693	428	448	20	1.0	2	9	7	3.0	430	458	28	1.3
1_7	694	481	509	28	1.3	12	29	17	3.8	493	538	45	2.0
1_8	704	30	25	-5	0.9	1	1	0	0.0	31	26	-5	0.9
1_11	696	661	740	79	3.0	8	16	8	2.2	669	756	87	3.2
1_12	697	250	225	-25	1.6	2	2	0	0.0	252	227	-25	1.6
1_14	701	195	216	21	1.4	5	9	4	1.4	200	224	24	1.7
1_15	702	607	641	34	1.4	13	26	13	3.0	620	667	47	1.9
1_16	705	81	39	-42	5.4	1	1	0	0.4	82	40	-42	5.3
2_1	1086	10	0	-10	4.5	1	1	0	0.4	11	1	-10	4.3
2_2	1085	141	162	21	1.7	0	4	4	2.8	141	165	24	2.0
2_3	1083	28	5	-23	5.6	18	12	-6	1.5	46	17	-29	5.1
2_4	1084	2056	1982	-74	1.7	27	37	10	1.8	2083	2019	-64	1.4
2_7	1082	565	573	8	0.3	15	19	4	0.9	580	591	11	0.5
2_8	1081	3	0	-3	2.4	0	0	0	0.0	3	0	-3	2.4
2_9	1079	7	0	-7	3.6	0	0	0	0.0	7	0	-7	3.6
2_10	1080	129	138	9	0.8	3	1	-2	1.2	132	139	7	0.6
2_11	1088	35	87	52	6.7	0	3	3	2.4	35	90	55	7.0
2_13	1078	819	833	14	0.5	10	15	5	1.3	829	848	19	0.7
2_14	1077	836	835	-1	0.0	6	12	6	2.1	842	847	5	0.2
2_15	1075	25	10	-15	3.6	1	0	-1	1.0	26	10	-16	3.7
2_17	1072	19	29	10	2.0	0	0	0	0.6	19	29	10	2.0
2_19	1074	13	1	-12	4.4	3	0	-3	2.4	16	1	-15	5.0
2_20	1073	5	2	-3	1.4	0	0	0	0.0	5	2	-3	1.4
3_3	1048	1190	1195	5	0.1	32	30	-2	0.3	1222	1225	3	0.1
3_4	1049	630	619	-11	0.4	9	16	7	2.0	639	635	-4	0.2
3_5	1045	184	189	5	0.4	2	4	2	1.0	186	193	7	0.5
3_7	1051	131	125	-6	0.5	3	2	-1	0.5	134	128	-6	0.6
3_9	1068	96	65	-31	3.5	0	1	1	1.1	96	65	-31	3.4
3_10	1069	28	20	-8	1.6	0	0	0	0.0	28	20	-8	1.6
3_11	1058	3	6	3	1.3	0	0	0	0.9	3	6	3	1.5
3_12	1059	14	27	13	2.9	0	0	0	0.6	14	27	13	2.9
3_13	1055	69	62	-7	0.9	1	0	-1	0.7	70	62	-8	1.0
3_14	1056	1335	1314	-21	0.6	25	33	8	1.5	1360	1346	-14	0.4
3_17	1063	950	884	-66	2.2	14	21	7	1.7	964	905	-59	1.9
3_18	1064	1	0	-1	1.4	0	0	0	0.0	1	0	-1	1.4
3_19	1060	90	114	24	2.4	1	3	2	1.4	91	117	26	2.6
3_20	1062	154	96	-58	5.1	1	2	1	0.8	155	98	-57	5.0

APPENDIX B –Validation Results

Validation – Travel Time Charts



Logan Road – Northbound, AM Peak (7:00am – 8:00am)



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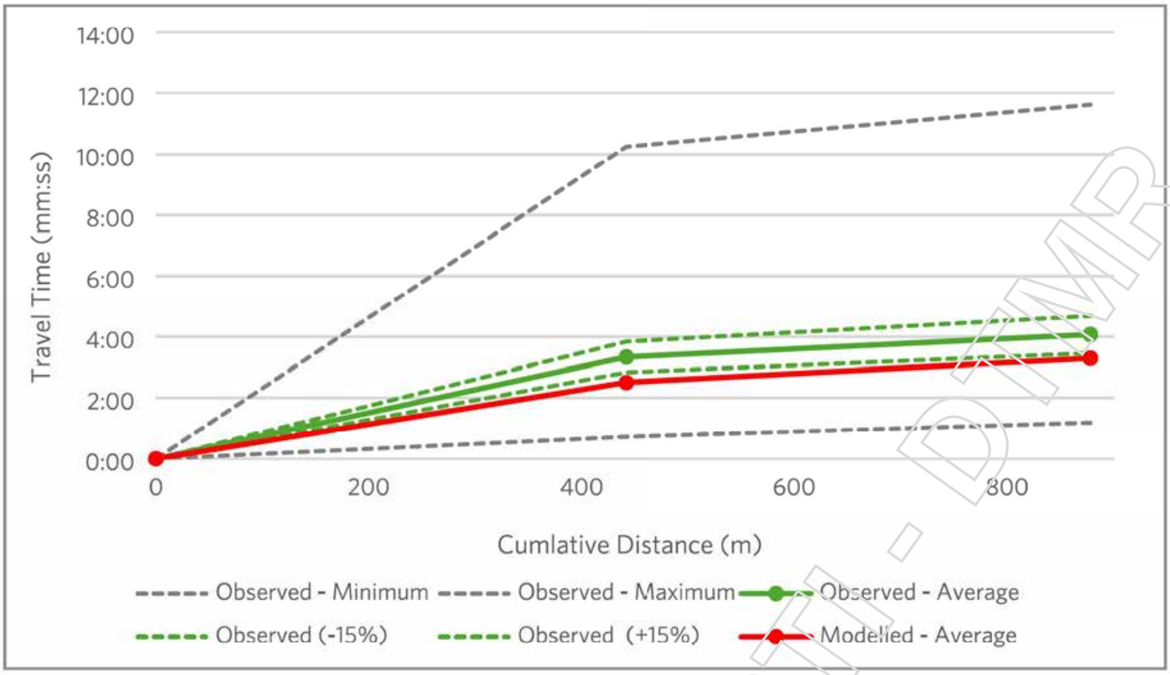
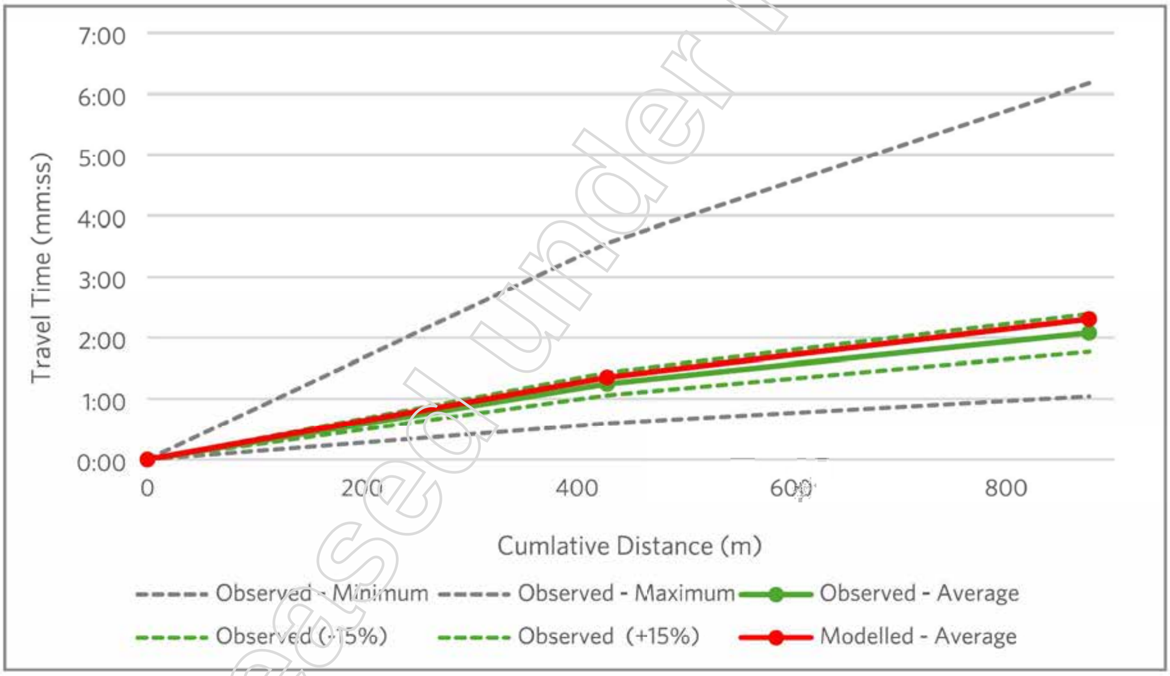


Padstow Rd / Miles Platting Road – Eastbound, AM Peak (7:00am – 8:00am)



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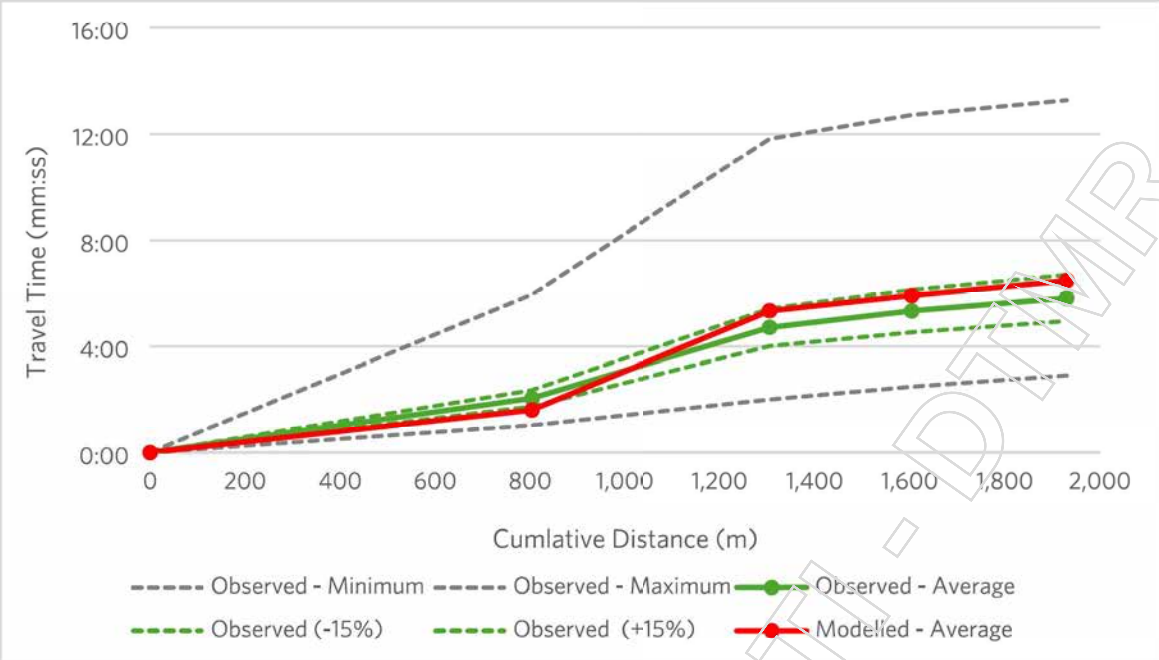
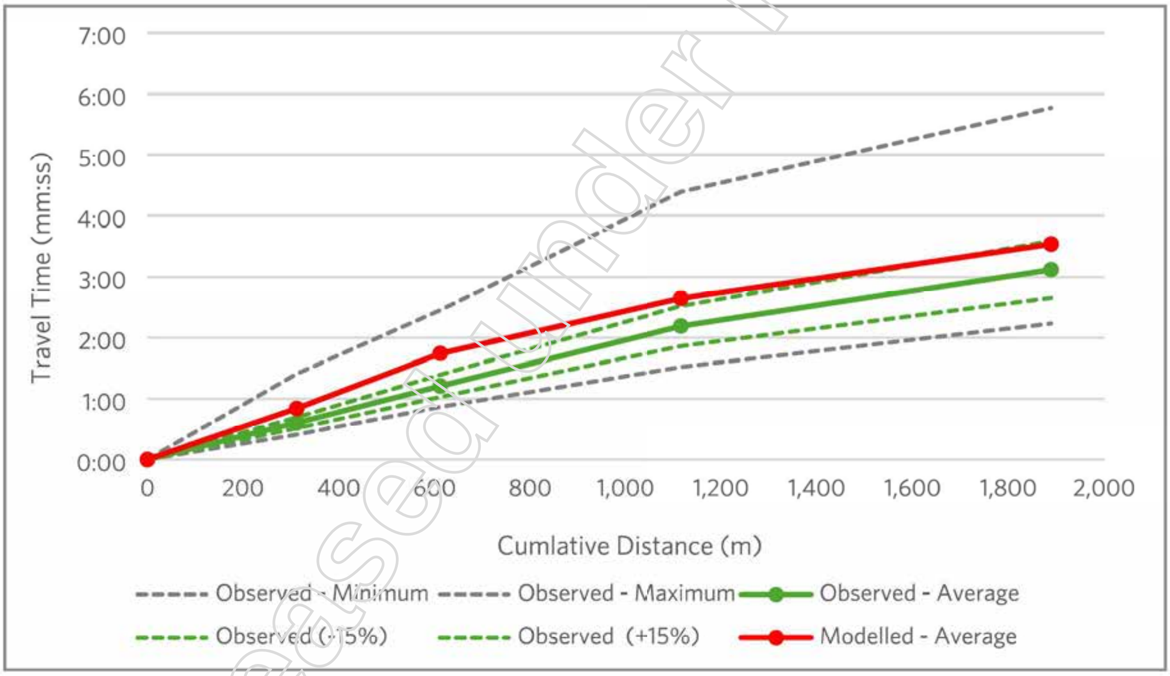
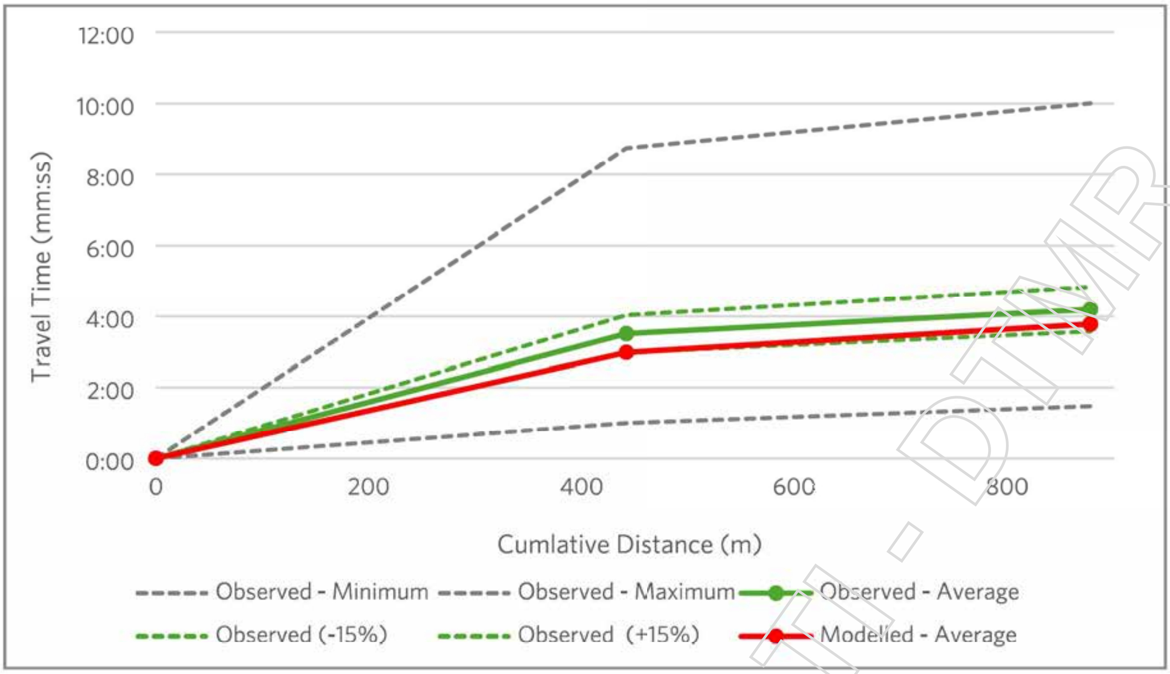


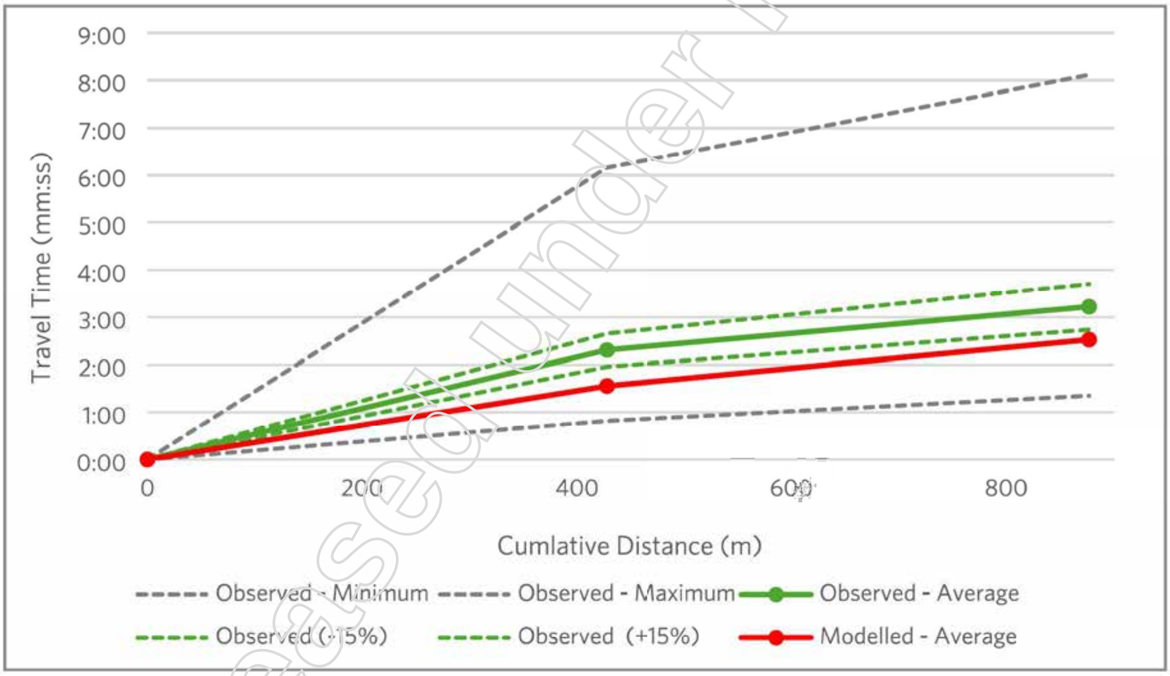
Logan Road – Northbound, AM Peak (8:00am – 9:00am)



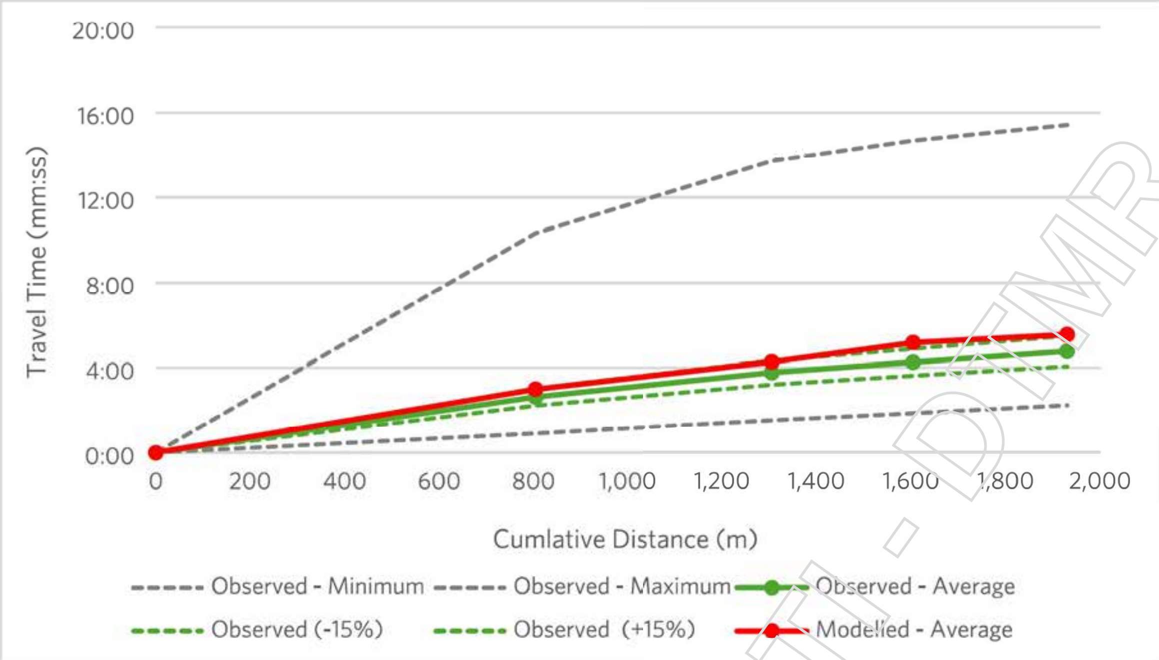
Logan Road – Southbound, AM Peak (8:00am – 9:00am)



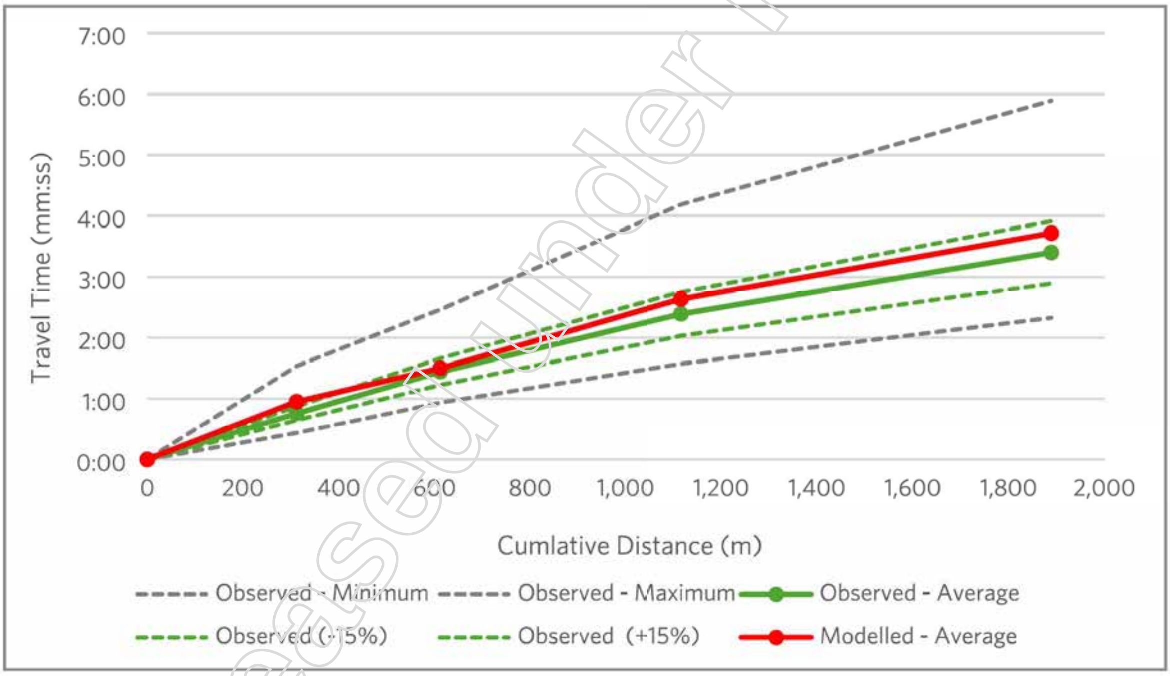
Padstow Rd / Miles Platting Road – Eastbound, AM Peak (8:00am – 9:00am)



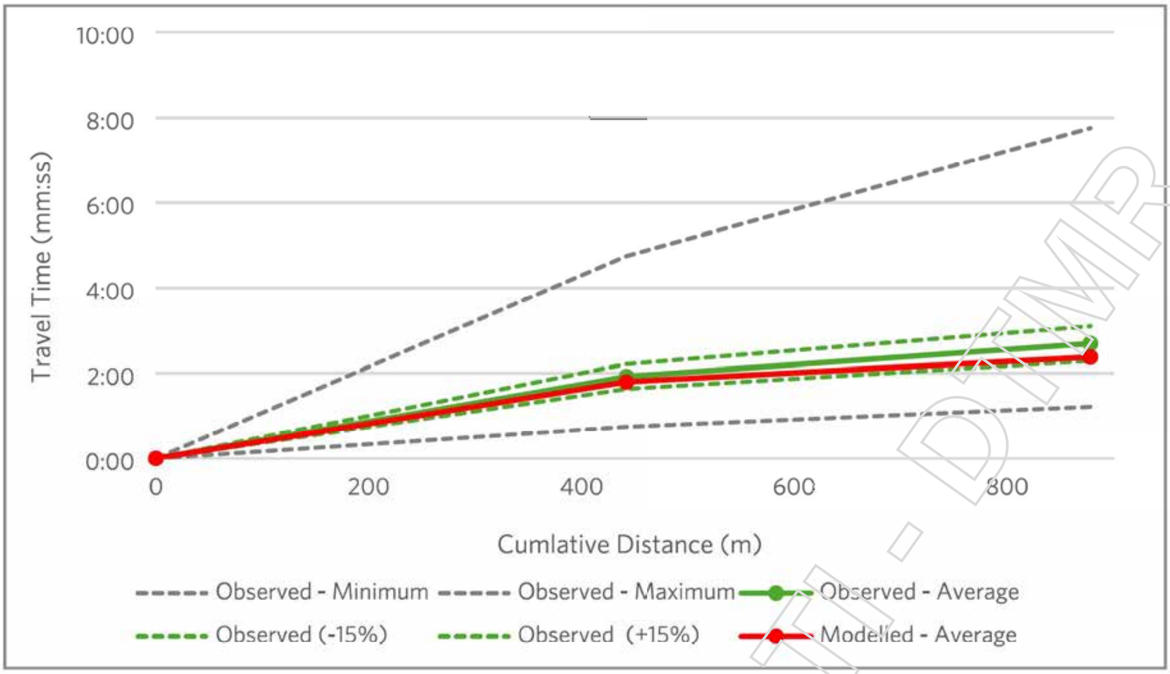
Padstow Rd / Miles Platting Road – Westbound, AM Peak (8:00am – 9:00am)



Logan Road – Northbound, AM Peak (3:00pm – 4:00pm)



Logan Road – Southbound, AM Peak (3:00pm – 4:00pm)



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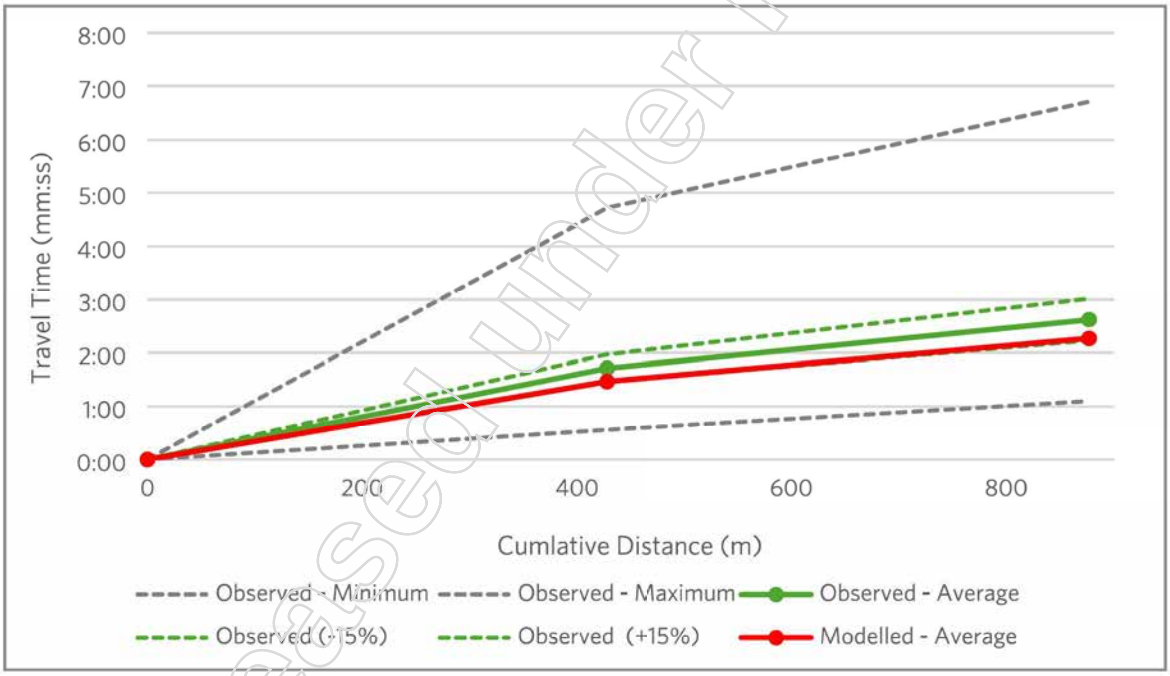

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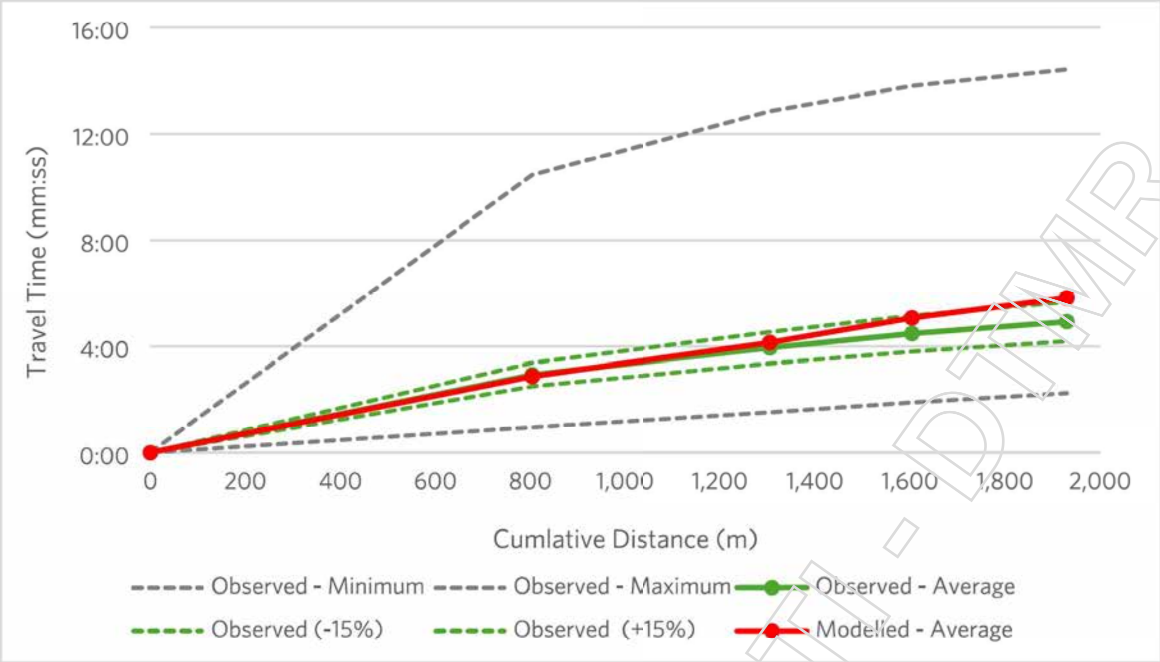
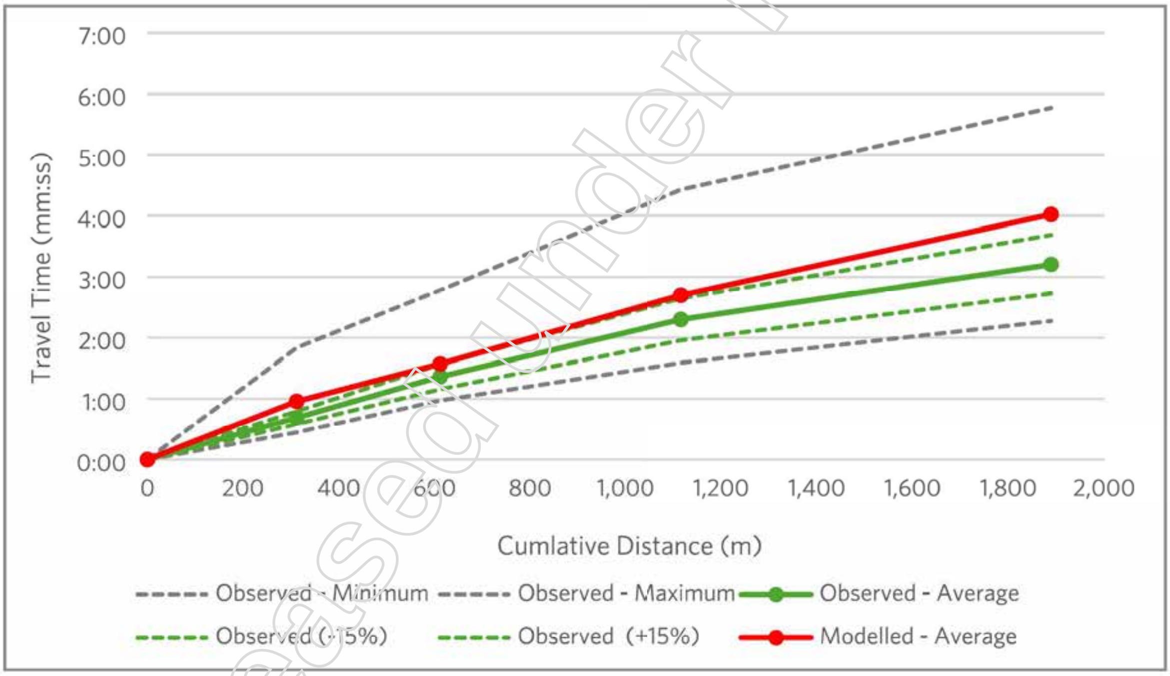


Logan Road – Northbound, AM Peak (4:00pm – 5:00pm)



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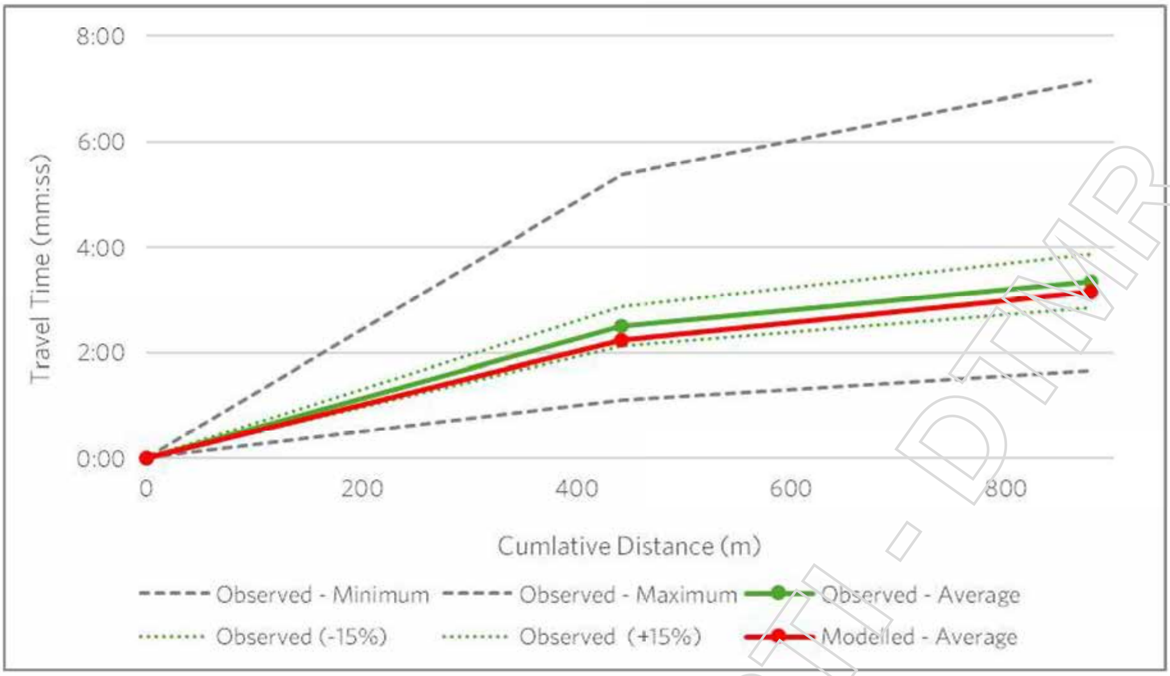
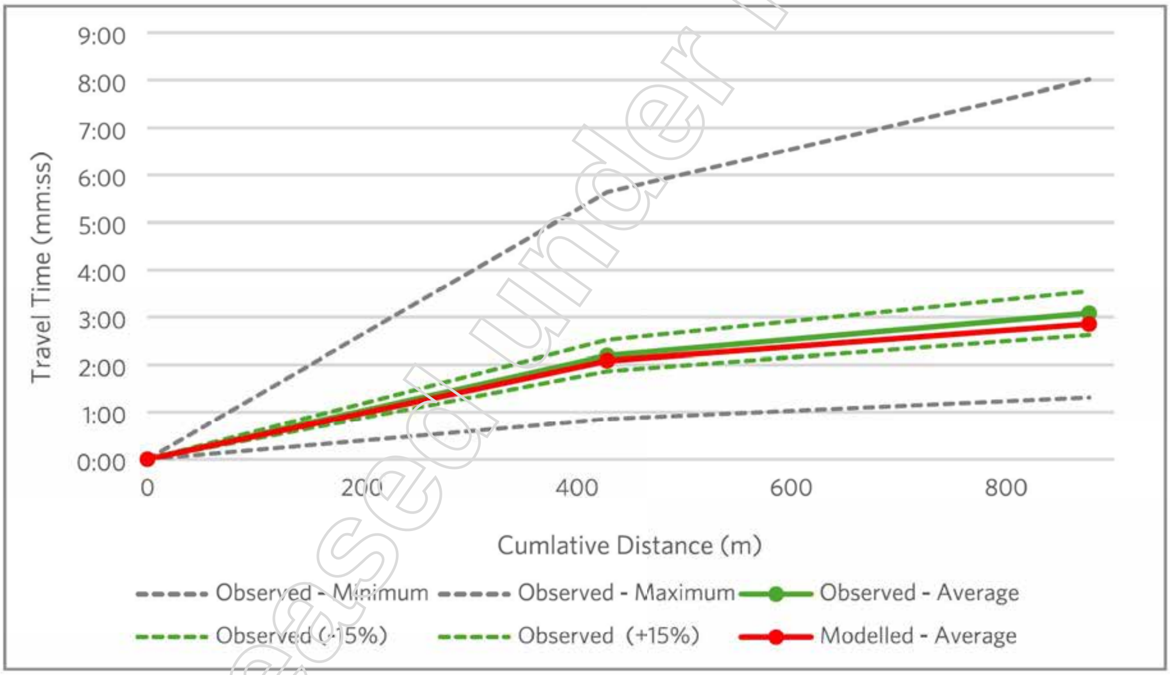


Padstow Rd / Miles Platting Road – Eastbound, AM Peak (4:00pm – 5:00pm)



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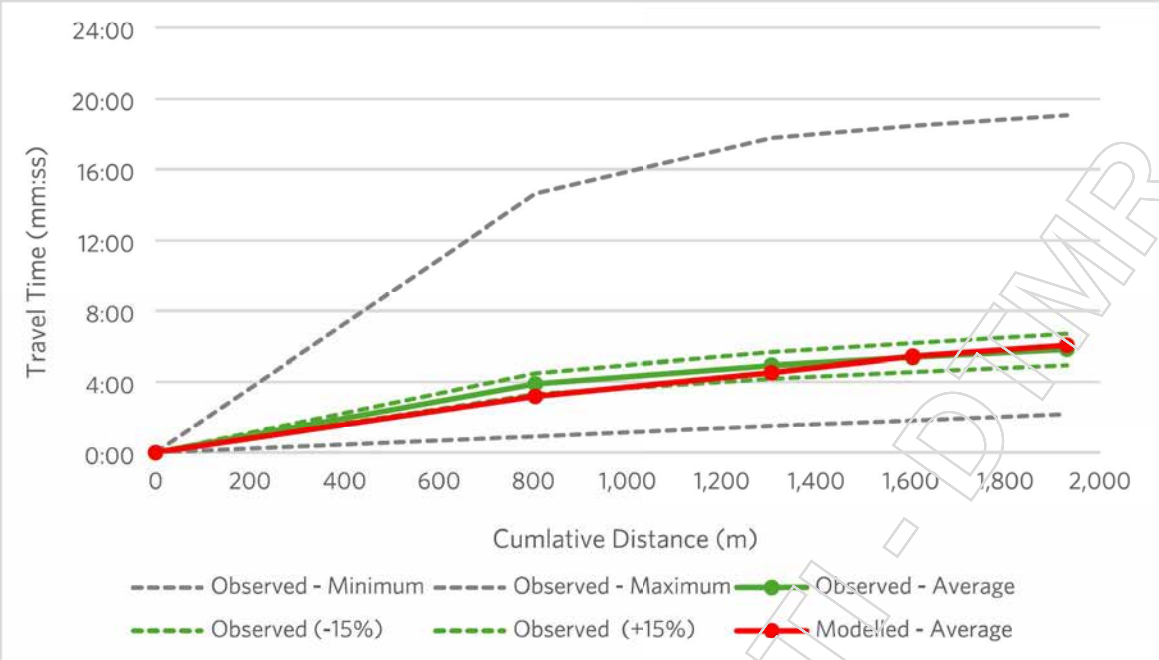
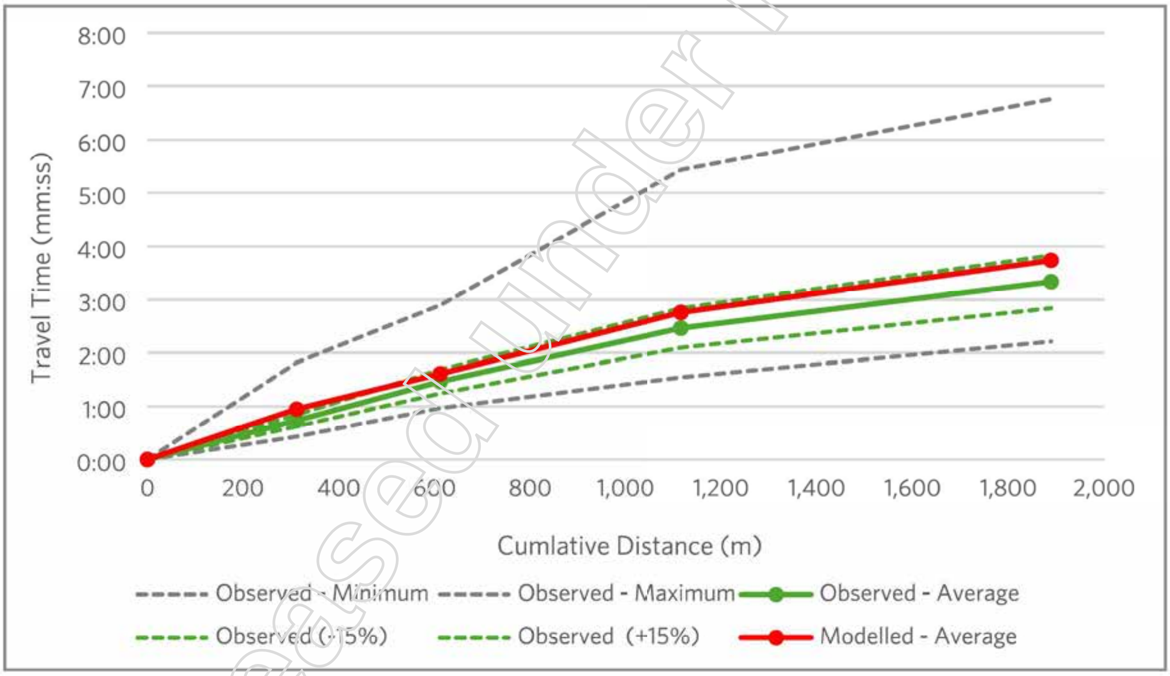
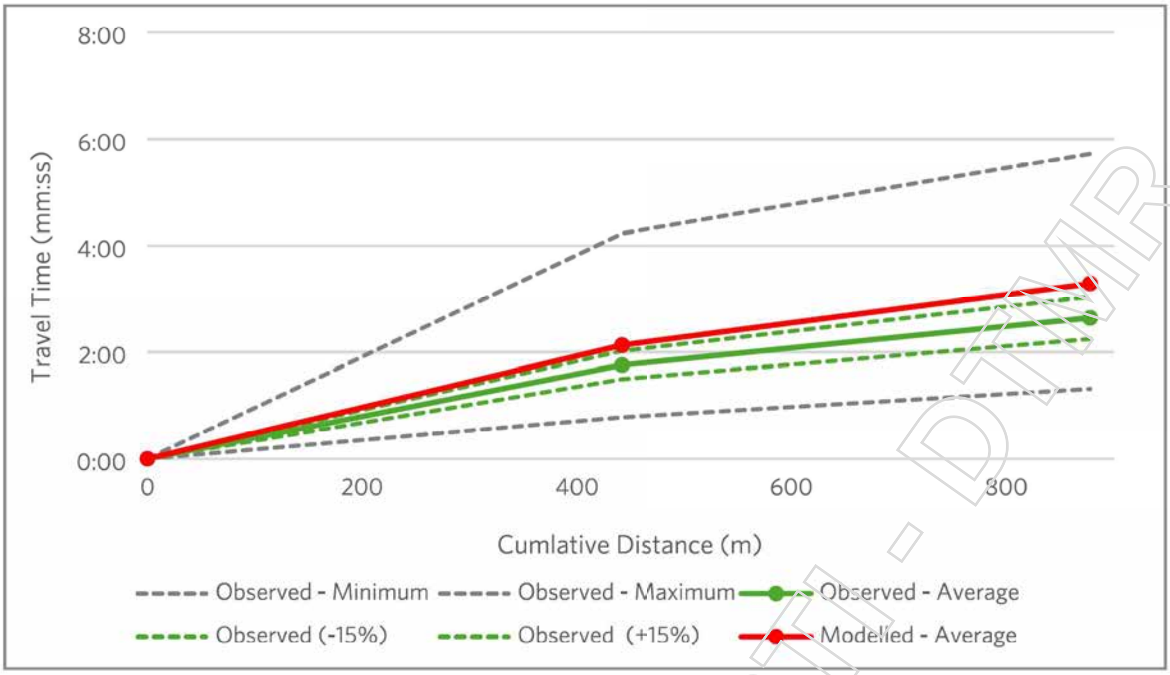


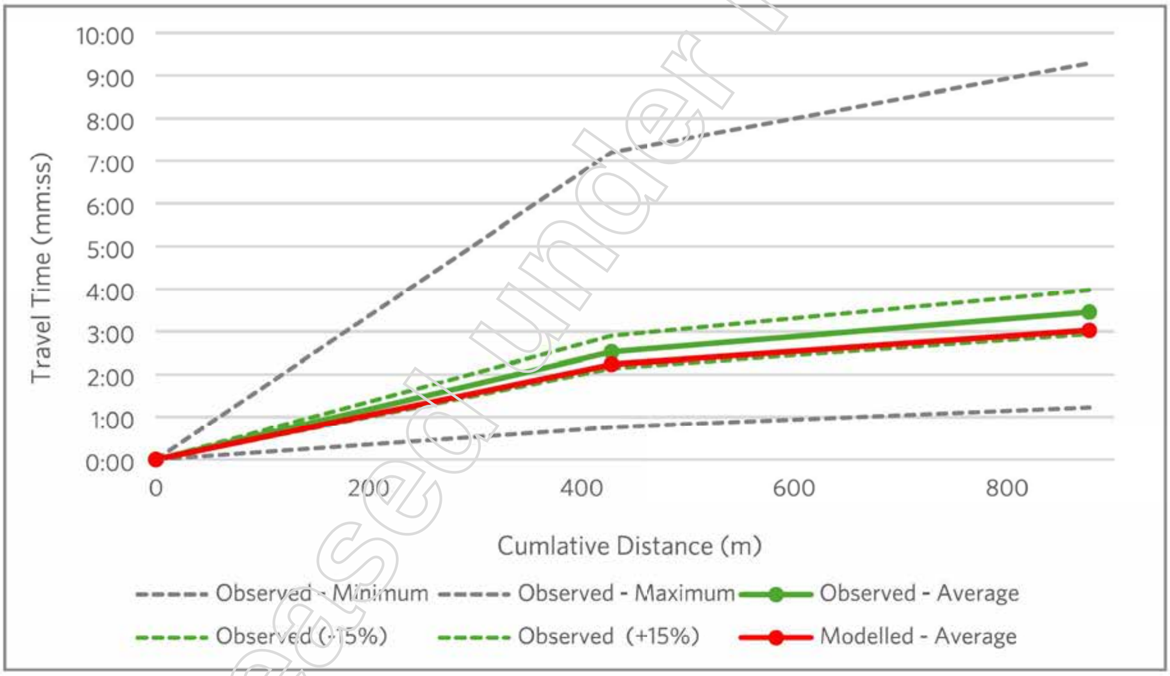
Logan Road – Northbound, AM Peak (5:00pm – 6:00pm)



Logan Road – Southbound, AM Peak (5:00pm – 6:00pm)



Padstow Rd / Miles Platting Road – Eastbound, AM Peak (5:00pm – 6:00pm)



Padstow Rd / Miles Platting Road – Westbound, AM Peak (5:00pm – 6:00pm)

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We are **DYKMAN Consulting.**

Appendix D

Options Modelling Report

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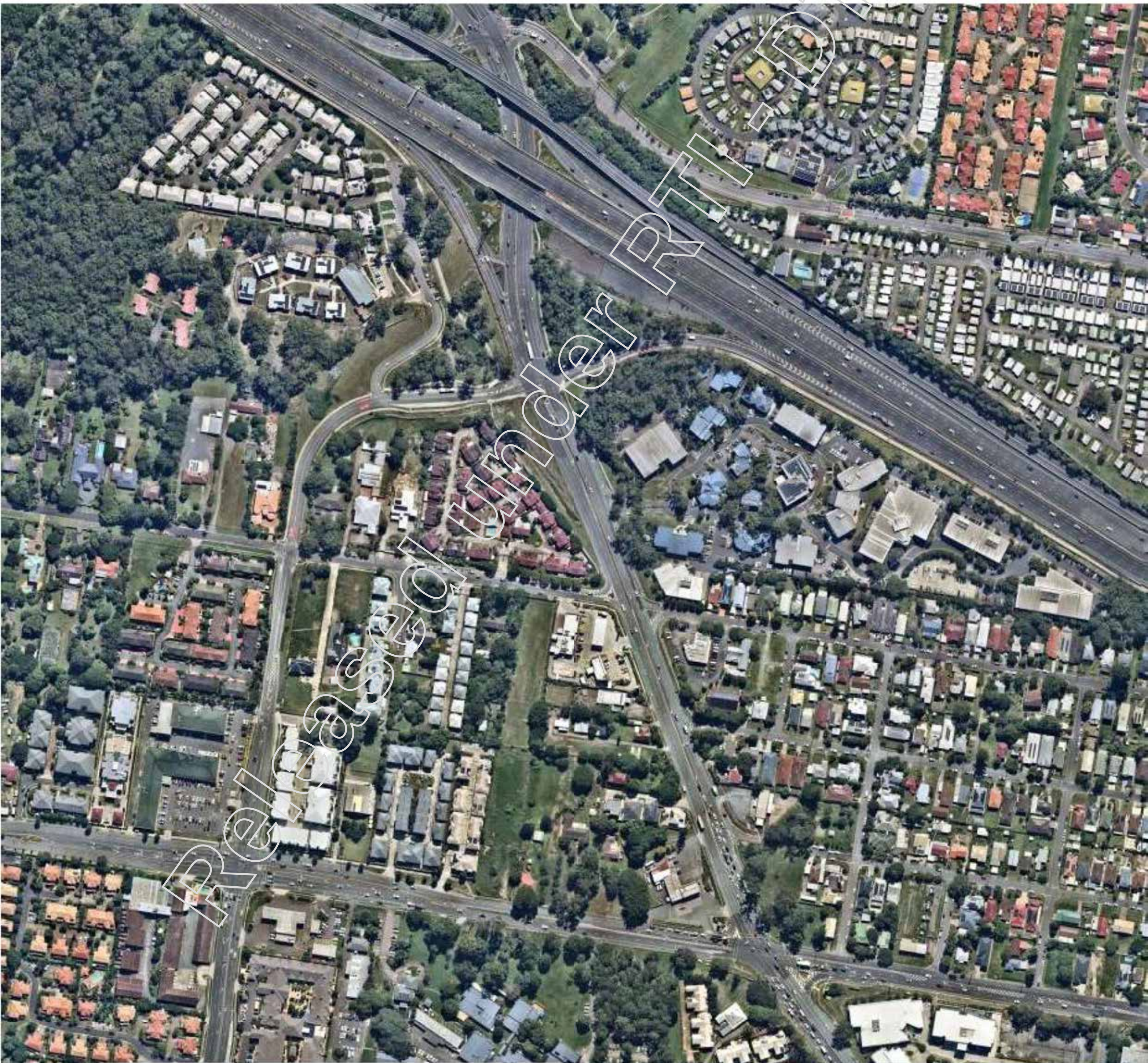
OPTIONS MODELLING REPORT

LOGAN SUB-ARTERIAL ROAD / MILES PLATTING ROAD / PADSTOW ROAD INTERSECTION UPGRADE PLANNING STUDY

JOB NO. 2420 | 5TH DECEMBER 2024



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Document Control

Project Name	MPPL Intersection Upgrade Planning Study	**Date of Issue**	05/12/2024
Document No.	2420-REP-MPPL-Options Model-FINAL	**Discipline**	Traffic Modelling
Subject	Options Model Development Report	**Project No.**	2420
Author/s	[redacted]	**Reviewed by**	[redacted]
Prepared for	TMR	**Attention to**	

Revision	Revision Date	Details	Authorised by
A	10 October 2025	Draft	[redacted]
B	5 December 2024	Final	

DYKMAN CONSULTING

Contents

Tables

Figures

1 Introduction

Dykman Consulting has been engaged by AECOM to provide traffic modelling services for the Department of Transport and Main Road's (TMR) Logan Sub-Arterial Road / Miles Platting Road / Padstow Road Intersection Upgrade (MPPL) Planning Study project (CN-22628).

1.1 Background

The MPPL intersection is located to the west of the Pacific and Gateway Motorways and has a primary function of connecting vehicle movements to and from the surrounding motorway network as well as locally based vehicle trips.

The key roads within the study area include Logan Road (U90) is a State-controlled Road with sub-arterial classification. In 2022 the AADT of Logan Road was approximately 43,300 vehicles per day which is an increase of approximately 8.8% compared to the 39,800 vehicles AADT five years prior (2017) including, 4.75% heavy vehicles. Logan Road forms a signalised, at-grade intersection with Miles Platting Road (eastern approach) and Padstow Road (western approach).

Over the past decade, the MPPL intersection and surrounding road network has experienced traffic congestion during the AM and PM peak periods. In particular, the vehicle queuing formation at the MPPL intersection limits the traffic operational capacity of the surrounding intersections of Warrigal Road / Padstow Road and the Logan Road / M3 interchange. Without intervention, these traffic operational performance levels are expected to deteriorate in the future given the planned population growth for the region.

With regard to road safety, 155 crashes were recorded by TMR between 2010 and 2020 within the study area. Approximately 67% of these incidents were located on Logan Road between the MPPL intersection and the M3 Pacific Motorway interchange. It is suspected there is a strong correlation between the number of road incidents within this corridor with the high level of traffic volumes and congestion formation.

Several planning studies have been delivered since 2010 to address the traffic congestion of the surrounding MPPL road network, including:

- **2010 Business Case –** preferred option to upgrade the MPPL intersection was not funded due to high project estimated costs.
- **2014 Planning Review –** the recommended intersection upgrade options were not progressed to development phase; however, an interim stage of the option was constructed in 2015.
- **2021 Planning Study and Options Analysis (OA) –** revisited an option of the 2010 Business Case with further investigations, analysis and options developed. This project established a preferred option and five low-cost interim options.

These studies have been reviewed and considered within this MPPL Planning Study project.

1.2 Subject Site

The study area location as well as the associated Aimsun microsimulation traffic model cordon area is presented in Figure 1.

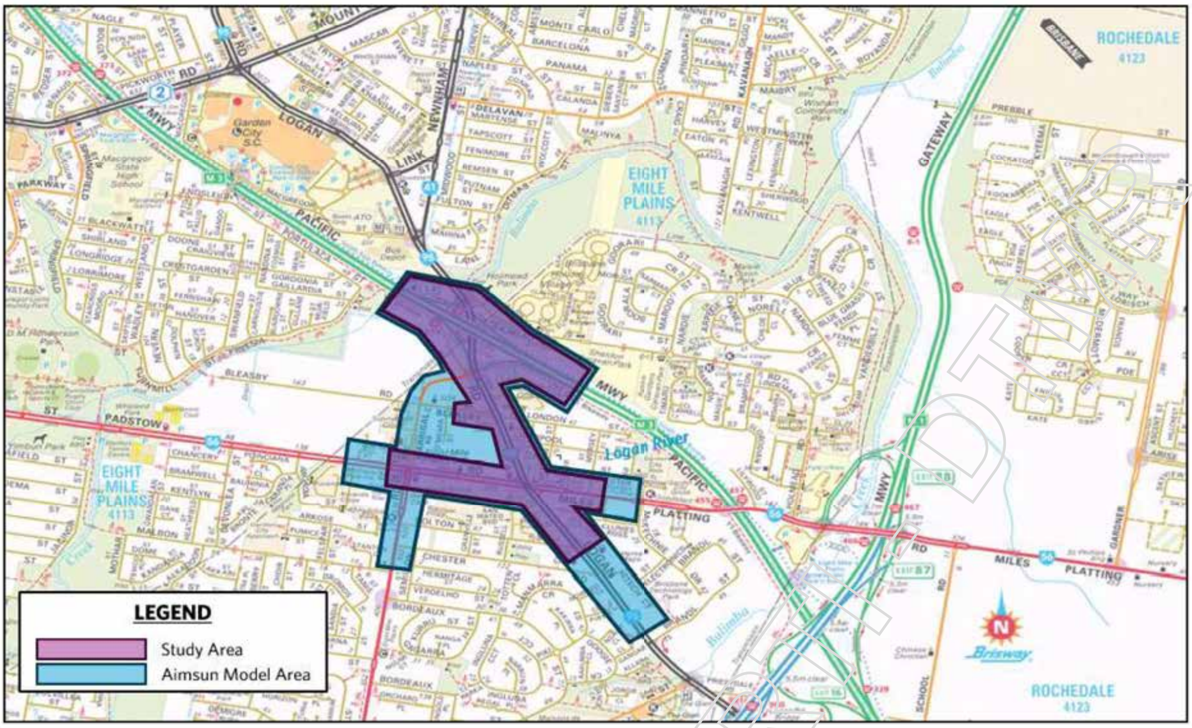


Figure 1: MPPL Microsimulation Traffic Model and Project Study Areas (Source: Street-Directory)

1.3 Project Objectives

This project will be delivered in two phases with each phase having specific objectives which are as follows:

1. Business Case objectives:
    a. Conduct an extensive review of 2021 low-cost options analysis.
    b. With updated traffic data, re-establish low-cost designs to improve capacity and safety at the MPPL intersection.
    c. Propose a recommended upgrade option(s) that has a cost of no greater than $50m.
    d. Produce an OnQ Type 4in1 format Business Case of the recommended upgrade design.
2. Strategic Assessment of Service Requirements (SASR) objectives:
    a. Produce project recommended upgrades that progress through Gate 1 of the Project Assurance Framework process with a presentation to TMR's IIC Committee.
    b. Produce a SASR report that is accepted by TMR's Infrastructure Investment Committee.

This base model report outlines the development of the Aimsun microsimulation to be used as required for the transport modelling assessment needs of both the SASR and BC phases of the project.

1.4 Scope of Work

The scope of transport modelling work for the MPPL Planning Study is to comply with TMR's Transport Modelling Assessment Framework (TMAF) and includes:

- Prepare a 2024 calibrated and validated base microsimulation traffic model of study area, including the weekday AM and PM peak periods.
- Establish equivalent future base year scenario models including 2031 and 2041.
- Deliver microsimulation traffic models of options generated for the 2031 and 2041 future year scenarios.
- Produce traffic modelling reports in accordance with the TMAF process.

1.5 Report Outline

This report outlines all details relevant to the development and outcomes of the future base and project scenarios of the Aimsun options microsimulation modelling, including the following:

- Model Development Approach
- Inputs Summary
- Future Base Model Development
- Option Scenario Definition
- Options Modelling Results
- Conclusion

2 Model Development Approach

2.1 Model Framework Overview

The model framework adopted for the MPPL Planning Study includes the use of TMR's BSTM and BMAM along with observed traffic data of existing conditions to develop a microsimulation traffic model. The flow chart of TMR model inputs for the development of the microsimulation traffic model is presented in Figure 2.

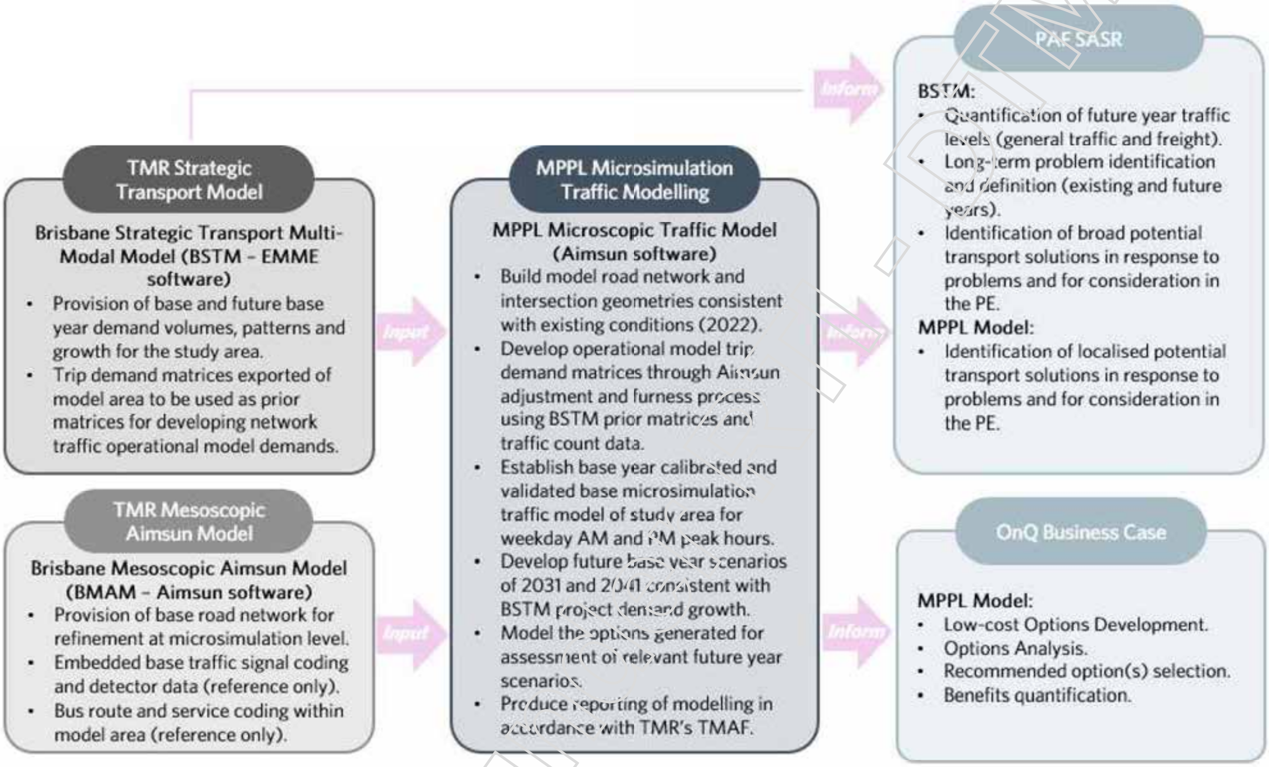


Figure 2: MPPL Microsimulation Traffic Model Framework Overview

It is common practice to use the BSTM to identify the problem during the SASR phase, and then develop a detailed operational model (e.g. Aimsun) during the BC phase. However, in this instance, the OnQ BC and PAF SASR are being delivered in parallel, which provides an opportunity to use the operational traffic model for both phases of the project (as outlined in Figure 2).

For the SASR, the BSTM will be used to understand future transport network demands and travel patterns, and the proposed model methodology. Given the BSTM does not allow for a detailed representation of the impact of intersections, queues and weaving, the MPPL model, which will be calibrated and validated to local conditions within the study area, will provide further details on localised issues at the MPPL intersection and used for defining the problem for the study area of the SASR.

3 Future Base Model Development

3.1 Overview

This section provides a high-level summary of the following aspects of the future base model scenarios established for the MPPL Planning Study:

- Future base model assumptions:
  - Transport network supply
  - Travel demands
- Future base modelling results and outputs

3.2 Future Base Model Assumptions

3.2.1 Transport network supply

Our assessment of the BSTM road network schemes for the 2031 and 2041 scenarios, along with TMR consultation, identified no road network upgrades within the model area with committed funding. Consequently, it is assumed no road network upgrades will be made to the existing road network within the study area for the purpose of future base scenarios of 2031 and 2041.

In terms of other microsimulation traffic model parameters, the following assumptions have been made for the future base model scenarios:

- All model parameters have been maintained as per the existing base model with the exception of the DUE relative gap, which was increased from 0.5% to 2.0%. Given the highly congested network, this change is considered within an acceptable range for appropriately determining route choice.
- No changes have been made to the existing road network configuration.
- Future public transport lines and schedule have been maintained as per the existing conditions.
- Actuated signal control has been maintained as per the base model signal settings given that a number of these settings have recently been specifically implemented.

3.2.2 Travel Demands

In the initial project review phases of existing transport models, it was determined that the Brisbane Strategic Transport Model, BSTM-MMv2.4 (BSTM) would be used for the development of future base demands for the operational model, with 2031 and 2041 'Base' scenarios used. A summary of this review is included in Appendix C.

The total travel demands for the future base scenarios have been developed adopting the following process:

1. Process future base cordon demands in same nature as undertaken for the MPPL base year model.
2. Determine specific origin-destination absolute differences between each corresponding scenario (i.e. 2031 Base AM Peak – 2021 Base AM Peak).
3. Calculate delta (% difference) for each origin-destination pair.
4. Apply this % difference to the calibrated and validated base year demand set, by vehicle type and by time segment. It is assumed the same profile will be maintained.
5. In instances where an O-D trip was estimated to reduce in 2031 or 2041 compared to the 2021 scenario, a 1% linear growth has been applied to take a conservative approach to the demand for the study area.

The total trip demands of each future base scenario for the AM and PM peak model periods by vehicle type (car and truck) is presented in Table 1.

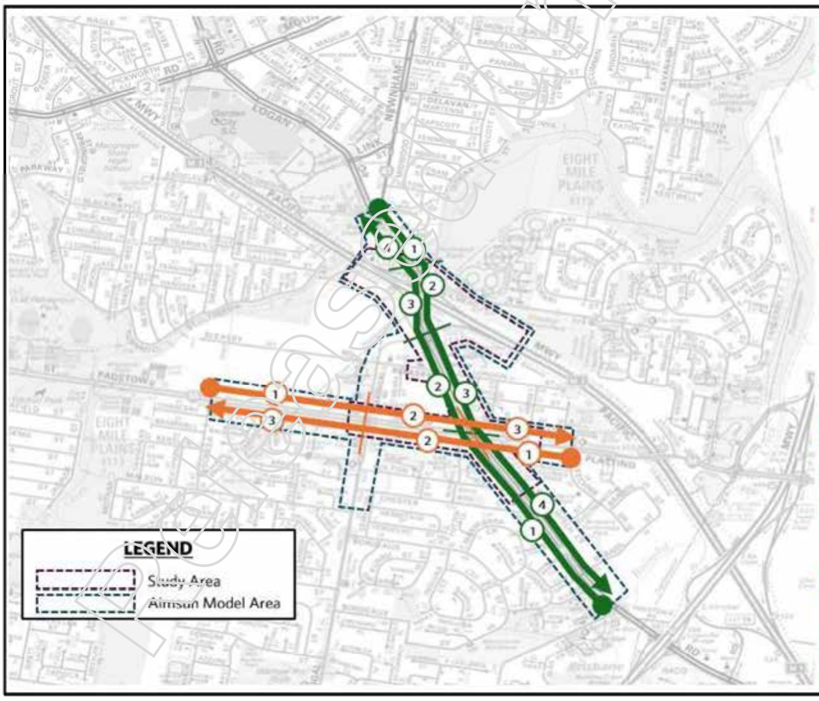
Table 1: Estimated MPPL Future Base Model Demand Totals by Time Period and Vehicle Type

Model Period	Cars					Trucks				
	2024	2031	Growth	2041	Growth	2024	2031	Growth	2041	Growth
AM Peak (6-10am)	25,735	28,991	13%	34,126	33%	1,250	1,722	38%	2,190	75%
PM Peak (2-6pm)	36,924	44,836	21%	53,059	44%	926	1,369	48%	2,449	164%

3.3 Future Base Model Results and Outputs

The future base model results include the provision of the following road network performance metrics:

- Network statistics
- Vehicles Hours Travelled, VHT (hr)
- Vehicle Kilometres Travelled, VKT (km)
- Average Speed (km/h)
- Average Delay (s/km)
- Average Journey Time (mm:ss)
- Completed Trips (veh)
- Latent Demand – unreleased trips within the model time period due to congestion (veh)
- Localised intersection traffic performance measures including:
- Average vehicle delay by intersection (seconds)
    - Level of Service by intersection
- Road corridor travel times for routes presented in Figure 3
- Road network level congestion maps (density plots)



Logan Rd Northbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	Gaskell St	Padstow Rd	1.05km
2	Padstow Rd	Warrigal Rd	0.50km
3	Warrigal Rd	Holmead Rd	0.30km
4	Holmead Rd	MacGregor St	0.35km

Logan Rd Southbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	MacGregor St	Holmead Rd	0.35km
2	Holmead Rd	Warrigal Rd	0.30km
3	Warrigal Rd	Padstow Rd	0.50km
4	Padstow Rd	Gaskell St	1.05km

Padstow Rd Eastbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	Devonlea St	Warrigal Rd	0.65km
2	Warrigal Rd	Logan Rd	0.45km
3	Logan Rd	McKechnie Rd	0.45km

Padstow Rd Westbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	McKechnie Rd	Logan Rd	0.45km
2	Logan Rd	Warrigal Rd	0.45km
3	Warrigal Rd	Devonlea St	0.65km

Figure 3: MPPL Microsimulation Traffic Model Travel Time Validation Routes and Segments (Source: Street-Directory)

3.3.1 Network Statistics

The AM peak results of the future base scenario modelling at the road network level are presented in Table 2.

Table 2: MPPL Future Base Model Scenario Network Level Results – AM Peak

Network Measure	7-8am					8-9am				
	2024	2031	% Diff	2041	% Diff	2024	2031	% Diff	2041	% Diff
VHT (h)	507	814	61%	1,080	113%	519	996	92%	1,349	160%
VKT (km)	9,689	10,339	7%	10,651	10%	11,172	11,551	3%	12,151	9%
Average Speed (km/h)	26.3	23.3	-12%	20.4	-23%	27.3	21.6	-21%	18.2	-33%
Average Delay (s)	120	195	63%	277	131%	103	223	116%	314	204%
Average Journey Time (m:s)	04:28	06:43	50%	08:28	89%	03:57	07:15	84%	09:11	133%
Demand (veh)	6,811	7,703	13%	9,120	34%	7,788	8,930	15%	10,642	37%
Completed Trips (veh)	6,804	7,279	7%	77,651	12%	7,893	82,38	4%	8,812	12%
Latent Demand (veh)	4	351	+347	1,608	+1605	6	1,025	+1,019	3,602	+3,596

The modelling results of the future base scenarios for the AM peak period indicate the following:

- Average vehicle speeds are expected to reduce from approximately 27km/h in 2024 to approximately 22km/h in 2031 (~16% reduction) and 19km/h in 2041 (~28% reduction)
- Average journey times within the modelled road network are expected to increase from approximately 4.5 minutes in 2024 to over 7 minutes in 2031 and approximately 9 minutes in 2041
- Latent traffic demand emanating from extensive traffic congestion formation in both 2031 and 2041 future base scenarios resulted in approximately 3,600 vehicles waiting to enter the network at the end of the AM peak period simulation

The PM Peak results of the future base scenario modelling at the road network level are presented in Table 3.

Table 3: MPPL Future Base Model Scenario Network Level Results – PM Peak

Network Measure	4-5pm					5-6pm				
	2024	2031	% Diff	2041	% Diff	2024	2031	% Diff	2041	% Diff
VHT (h)	499	1,345	169%	1,704	241%	502	1,507	200%	1,751	249%
VKT (km)	12,178	13,338	10%	13,983	14%	12,157	13,969	15%	13,642	12%
Average Speed (km/h)	27.2	17.0	-38%	12.0	-56%	27.4	16.4	-40%	12.5	-54%
Average Delay (s)	87	280	223%	370	327%	88	311	254%	393	347%
Average Journey Time (m:s)	03:40	08:58	144%	10:56	198%	03:39	09:27	159%	11:27	214%
Demand (veh)	8103	9,960	23%	12,065	49%	8,055	9,835	22%	11,851	47%
Completed Trips (veh)	8160	9,009	10%	9,345	15%	8,263	9,567	16%	9,179	11%
Latent Demand (veh)	1	827	+826	5,167	+5,166	0	1,426	+1,426	8,019	+8,019

The results of the future base scenario modelling for the PM peak period indicate a significant deterioration in traffic operational performance the study area through to 2041 that is disproportionate to planned future traffic demand growth levels. A summary of key performance indicates for the future base scenarios are as follows:

- Average vehicle speeds are expected to reduce from approximately 28km/h in 2024 to approximately 18km/h in 2031 (~36% reduction) and 13km/h in 2041 (~54% reduction)
- Average journey times within the modelled road network are expected to increase from approximately 3.5 minutes in 2024 to 9.5 minutes in 2031 and approximately 11.5 minutes in 2041
- Latent traffic demand emanating from extensive traffic congestion formation in both 2031 and 2041 future base scenarios resulted in approximately 8,000 vehicles waiting to enter the network at the end of the PM peak period simulation

3.3.2 Localised Intersection Performance Results

The intersection performance results of the AM and PM peak future base scenarios from an average vehicle delay perspective are presented in Table 4 and Table 5 respectively.

Table 4: MPPL Future Base Model Scenario Intersection Average Delay Results – AM Peak

Intersection	7-8am Average Delay (s)					8-9am Average Delay (s)				
	2024	2031	% Diff	2041	% Diff	2024	2031	% Diff	2041	% Diff
Logan Rd / Miles Platting Rd / Padstow Rd	58	101	76%	118	105%	33	108	222%	119	255%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	28	29	2%	31	9%	32	37	17%	37	18%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	29	29	0%	31	7%	25	26	5%	28	14%
Padstow Rd / Warrigal Rd	38	55	46%	109	186%	39	94	142%	123	214%

Table 5: MPPL Future Base Model Scenario Intersection Average Delay Results – PM Peak

Intersection	4-5pm Average Delay (s)					5-6pm Average Delay (s)				
	2024	2031	% Diff	2041	% Diff	2024	2031	% Diff	2041	% Diff
Logan Rd / Miles Platting Rd / Padstow Rd	51	120	134%	117	127%	57	113	99%	124	118%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	21	28	33%	43	107%	22	28	27%	43	95%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	33	38	16%	57	74%	33	40	21%	56	69%
Padstow Rd / Warrigal Rd	31	106	239%	100	219%	32	73	130%	133	317%

The equivalent intersection Level of Service performance results of the AM and PM peak future base scenarios are presented in Table 6 and Table 7 respectively.

Table 6: MPPL Future Base Model Scenario Intersection Level of Service Results – AM Peak

Intersection	7-8am Level of Service			8-9am Level of Service		
	2024	2031	2041	2024	2031	2041
Logan Rd / Miles Platting Rd / Padstow Rd	E	F	F	C	F	F
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	C	C	C	C	D	D
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	C	C	C	C	C	C
Padstow Rd / Warrigal Rd	D	E	F	D	F	F

Table 7: MPPL Future Base Model Scenario Intersection Level of Service Results – PM Peak

Intersection	4-5pm Level of Service			5-6pm Level of Service		
	2024	2031	2041	2024	2031	2041
Logan Rd / Miles Platting Rd / Padstow Rd	D	F	F	E	F	F
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	C	C	D	C	C	D
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	C	D	E	C	D	E
Padstow Rd / Warrigal Rd	C	F	F	C	E	F

The intersection average vehicle delay results indicate that the Logan Road / Miles Platting Road / Padstow Road intersection is expected to operate beyond acceptable performance parameters (i.e. LOS F) in 2031 and 2041 during both the AM and PM peak periods without intervention.

3.3.3 Road Corridor Travel Time Results

The future base scenario modelled travel time results for the Logan Road and Padstow Road routes are presented in Figure 4 for the AM peak period and Figure 5 for the PM peak period.

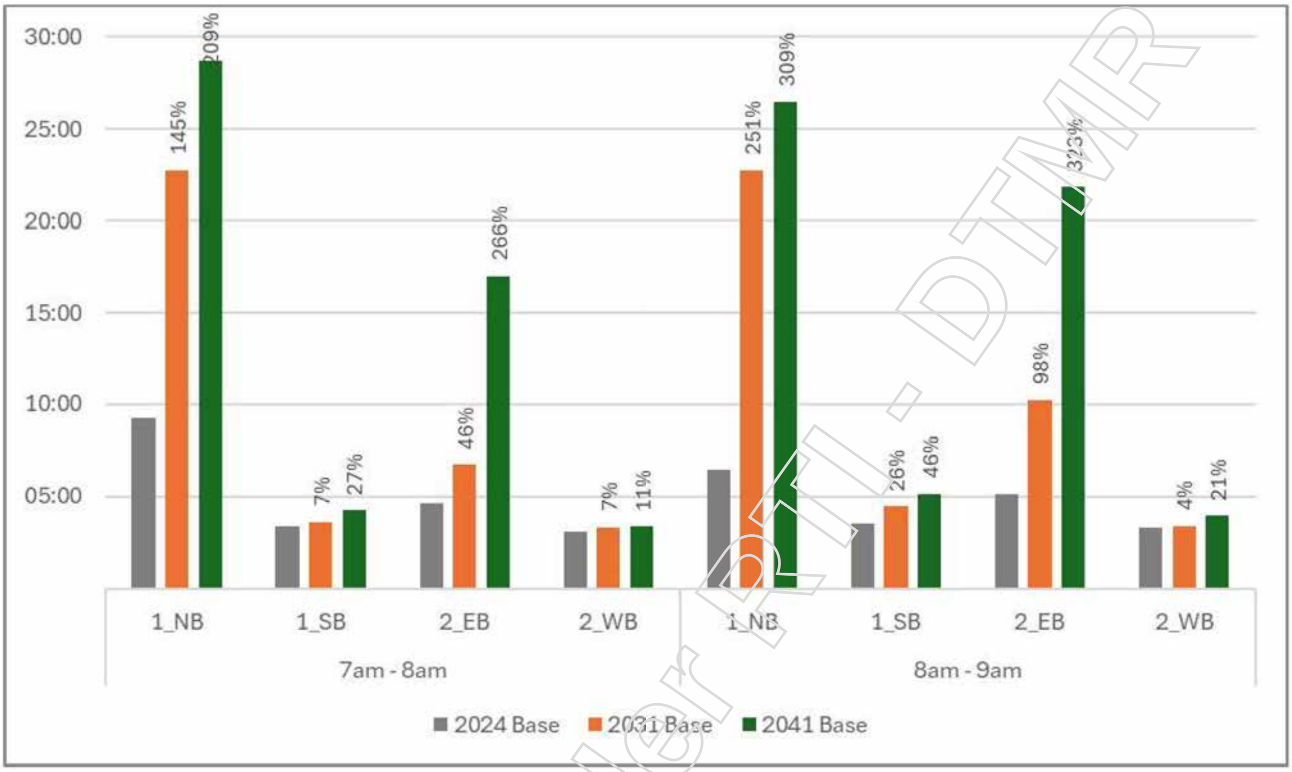


Figure 4: MPPL Microsimulation Traffic Model Future Base Travel Time Results – AM Peak

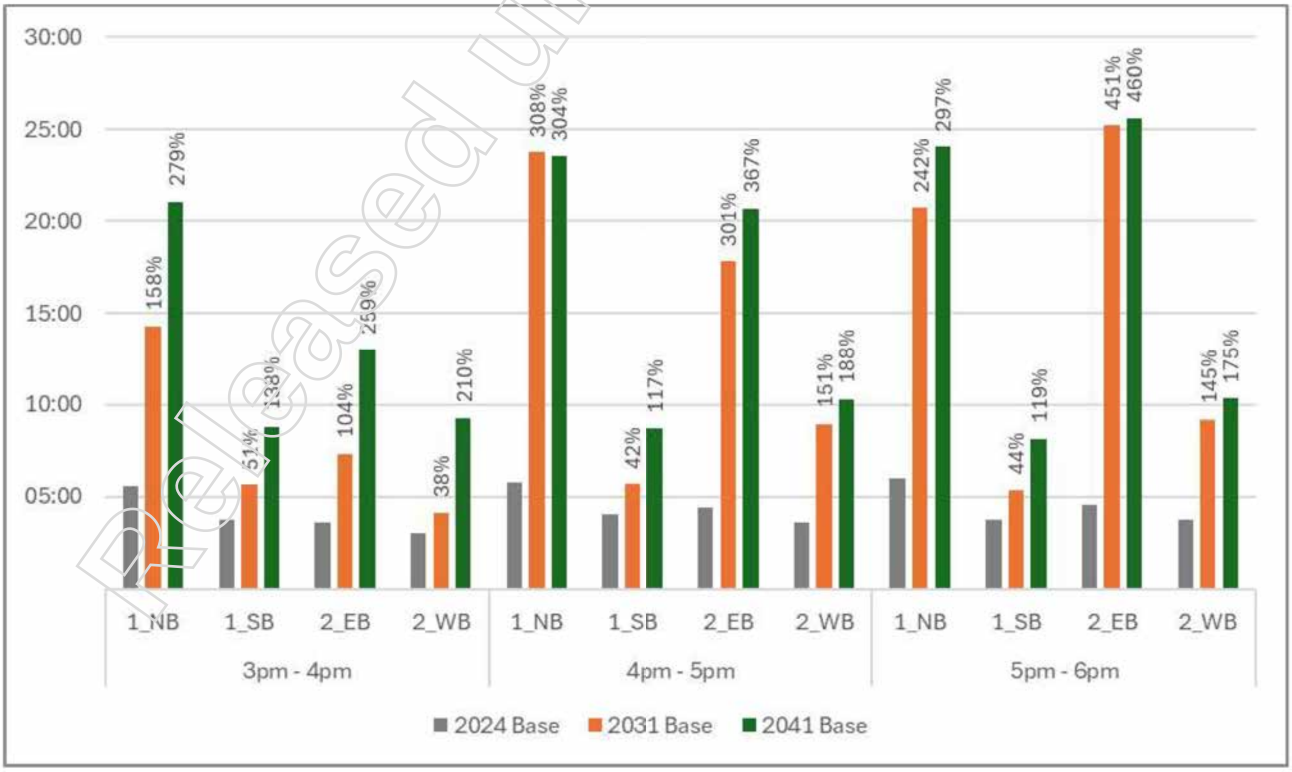


Figure 5: MPPL Microsimulation Traffic Model Future Base Travel Time Results – PM Peak

The modelled travel time results indicate the following expected outcomes for the peak directional movements:

- AM peak period:
  - Northbound travel times on Logan Road are expected to increase from approximately 9 minutes in 2024 to approximately 23 minutes in 2031 and 29 minutes in 2041 during the 7-8am period
  - Padstow Road eastbound travel times are expected to increase from approximately 5 minutes in 2024 to 10 minutes in 2031 and 22 minutes in 2041 during the 8-9am period
- PM peak period:
  - Logan Road northbound travel times are expected to increase from approximately 6 minutes in 2024 to approximately 21 minutes in 2031 and 24 minutes in 2041 during the 5-6pm period
  - Padstow Road eastbound travel times are expected to increase from approximately 4 minutes in 2024 to 25 minutes in 2031 and 26 minutes in 2041 during the 5-6pm period

3.3.4 Road Network Congestion Formation Plots

The network density model outputs from the Aimsun microsimulation traffic model are a measure of traffic congestion formation on the road network. This measures the number of vehicles per kilometre on each road network section with typically 120 vehicles per kilometre representing a congested traffic condition.

The AM peak future base scenario modelled road network density plots are presented in Figure 6.

Figure 6: MPPL Microsimulation Traffic Model Future Base Network Density Results – AM Peak (8am – 9am)

The network density plots of the AM peak period future base scenario indicates that there is significant traffic congestion formation for the Logan Road northbound carriageway from the Pacific Motorway to the south. This is maintained at similar congestion levels between 2031 and 2041 indicating the corridor is at capacity by 2031.

The Padstow Road eastbound carriageway is also expected to experience increasing traffic congestion formation between 2024 and 2031, that is further exacerbated by 2041.

The study area is also expected to experience significant traffic congestion for the 2041 AM future base scenario on Warrigal Road, Bleasby Road and the Pacific Motorway Northbound Off Ramp.

The PM peak future base scenario modelled road network density plots are presented in Figure 7.

Figure 7: MPPL Microsimulation Traffic Model Future Base Network Density Results – PM Peak (6pm – 7pm)

The network density plots of the PM peak period future base scenario indicate the PM peak is expected to produce similar significant traffic congestion pattern formation within the study area as per the AM peak period. The 2024 PM peak base scenario experiences less traffic congestion than the AM period, however due to a larger demand growth in 2031- 2041 it is expected that the PM peak will experience higher levels of traffic congestion compared to the AM peak.

4 Options Modelling

4.1 Options Development

The following sections summarise the process and key inputs in the development of the options scenarios in the microsimulation model.

4.1.1 Scenario Development

The shortlisted options to be modelled to inform the Multi Criteria Assessment are outlined in Table 8.

Table 8: Options Scenario Descriptions

Scenario	Details	Scenario Changes
Option 2	Low-cost solutions (previous studies)	• Network geometry changes • Minor signal updates at the MPPL intersection due to route choice changes from Bleasby Rd change
Option 3	Low-cost solutions (updated)	• Network geometry changes • Signal cycle times reduced from 170s to 140s in the AM peak periods • Signal optimisation across the network for AM peak and PM peak scenarios
Option 4	Option 3 changes + additional storage capacity on the M3 northbound off-ramp	• M3 northbound off-ramp lane extension • Signal timings mostly maintained as per Option 3, with the main change at the Logan Rd / Warrigal Rd / M3 off-ramp intersection, where a proportion of green time was moved from the off-ramp to the Logan Road through movement phase
Option 5	Option 3 changes + full upgrade of the Logan Rd / Warrigal Rd / M3 northbound off-ramp intersection	• Logan Rd / Warrigal Rd / M3 northbound off-ramp intersection upgrade • Signal timing optimisation

The specific network changes included across scenarios are further broken down below in Table 9.

Table 9: Option Network Change Configurations

Changes		Scenario				
ID	Road Upgrade Details	Base	Option 2	Option 3	Option 4	Option 5
LC1	Bleasby Rd / continuous road update		✓			
LC1_a	LC1 modified (reduced length of impact)			✓	✓	✓
LC3	Logan Rd southbound right turn at MPPL		✓			
LC5	Logan Rd southbound left turn at MPPL		✓	✓	✓	✓
LC4	Padstow Rd westbound left turn at Warrigal Rd		✓			
O2*	Signal optimisation (where relevant and able)		✓	✓	✓	✓
O14	Logan Rd additional southbound through lane at MPPL			✓	✓	✓
LC6	Logan Rd northbound left turn at MPPL		✓			
O3_a	M3 northbound off-ramp additional storage				✓	
O3_b	M3 off-ramp additional lane					✓
O4	M3 on-ramp upgrades (intersection upgrade)					✓

Detailed layout plan outputs from the microsimulation for each option network are included in Appendix A.

4.1.2 SIDRA Modelling for Traffic Signal Timing Development

Within the process of options model development, SIDRA was used to analyse network configurations and assist in the optimisation of signal timings, particularly with respect to the changes for the AM peak signal cycle times reducing from 170s to 140s.

Given the limited data available for validating the M3 northbound off-ramp queueing during the base model development phase of the project, it was decided with TMR that any changes to network or signal timings at this location should have no material impact on the performance of the Pacific Motorway off-ramps. Average delays for this approach as well as maximum queue lengths were reviewed to mitigate impacts across the option scenarios.

4.2 Options Model Results and Outputs

4.2.1 Network Statistics (Vehicles)

The AM peak results of the future option scenario modelling at the road network level for 2031 and 2041 are presented in Table 10 and Table 11 respectively.

Table 10: MPPL Future Options Model Scenario Network Level Results – All Vehicles – 2031 AM Peak Hour (8-9am)

Network Measure	2024	2031								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
VHT (h)	507	996	858	-14%	892	-10%	751	-25%	753	-24%
VKT (km)	9,689	11,551	11,804	2%	11,951	3%	12,402	7%	12,500	8%
Average Speed (km/h)	26.3	21.6	23.2	7%	20.4	-6%	22.5	4%	23.1	7%
Average Delay (s)	120	223	191	-14%	195	-13%	150	-33%	149	-33%
Average Journey Time (m:s)	04:28	07:15	06:16	-14%	06:25	-12%	05:12	-28%	05:10	-29%
Demand (veh)	6,811	8,930	8,930	0%	8,930	0%	8,930	0%	8,930	0%
Completed Trips (veh)	6,804	8,238	8,223	0%	8,352	1%	8,668	5%	8,747	6%
Latent Demand (veh)	4	1,025	1,082	6%	311	-70%	46	-95%	169	-84%

Table 11: MPPL Future Options Model Scenario Network Level Results – All Vehicles – 2041 AM Peak Hour (8-9am)

Network Measure	2024	2041								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
VHT (h)	507	1,349	1,303	-3%	1,249	-7%	1,225	-9%	993	-26%
VKT (km)	9,639	12,151	11,299	-7%	12,510	3%	12,819	5%	13,491	11%
Average Speed (km/h)	26.3	18.2	15.8	-13%	17.9	-1%	17.0	-6%	20.4	12%
Average Delay (s)	120	314	329	5%	287	-9%	277	-12%	201	-36%
Average Journey Time (m:s)	04:28	09:11	09:46	6%	08:34	-7%	08:06	-12%	06:13	-32%
Demand (veh)	6,811	10,642	10,642	0%	10,642	0%	10,642	0%	10,642	0%
Completed Trips (veh)	6,804	8,812	8,004	-9%	8,739	-1%	9,067	3%	9,577	9%
Latent Demand (veh)	4	3,602	3,768	5%	3,099	-14%	2,158	-40%	1,849	-49%

The modelling results of the future base scenarios for the AM peak hour of 8-9am indicate the following:

- Average vehicle speeds
  - 2031 model results range from 20km/h (Option 3) to 23km/h (Options 2, 4 and 5) compared to the 22km/h for the base scenario (equating to a 7% increase for Options 2 and 5)

  - In 2041 only Option 5 (at 20km/h) is expected to improve average travel speeds compared to the base scenario of 18km/h (equating to a 12% increase)
- Average journey times
  - All four options are expected to improve average journey times compared to the base scenario of 7.25 minutes, with Options 4 and 5 providing the most improvement at approximately 30% (i.e. 5.15 minute average journey times)
  - Option 5 upgrades are expected to produce the best average journey times for the network in 2041 at approximately 6.25 minutes (32% improvement on base scenario), while Options 3 and 4 model results indicate a more modest improvement in the range of 7-12%
- Network traffic operational capacity
  - 2031 completed trips are modelled to be in the order of 8,240 vehicles for the AM peak hour base scenario. In comparison, Options 2 and 3 expected to provide limited increases compared to Options 4 and 5 providing capacity to achieve up to 8,750 completed trips (5-6% increase on base scenario)
  - In 2041, Option 5 is expected to have the ability to ensure up to 9,575 vehicle trips are completed between 8-9am. This is greater than the other options and approximately 9% more than the base scenario of 8,810 completed vehicle trips.

At the road network level, the microsimulation traffic modelling indicates the Option 5 upgrades will consistently provide the most traffic operational performance benefits compared to the base scenario during the AM peak hour.

The 2031 and 2041 PM peak hour (5-6pm) results of the future base scenario modelling at the road network level are presented in Table 12 and Table 13.

Table 12: MPPL Future Options Model Scenario Network Level Results – All Vehicles – 2031 PM Peak Hour (5-6pm)

Network Measure	2024	2031								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
VHT (h)	507	1,507	1,226	-19%	876	-42%	884	-41%	990	-34%
VKT (km)	9,689	13,969	13,957	0%	14,242	2%	14,331	3%	14,210	2%
Average Speed (km/h)	26.3	16.4	18.1	11%	23.1	41%	22.7	39%	21.8	33%
Average Delay (s)	120	311	247	-21%	150	-52%	150	-52%	177	-43%
Average Journey Time (m:s)	04:28	09:27	07:43	-18%	05:25	-43%	05:26	-42%	06:08	-35%
Demand (veh)	6,811	9,835	9,835	0%	9,835	0%	9,835	0%	9,835	0%
Completed Trips (veh)	6,804	9,567	9,540	0%	9,708	1%	9,764	2%	9,691	1%
Latent Demand (veh)	4	1,426	748	-48%	104	-93%	90	-94%	267	-81%

Table 13: MPPL Future Options Model Scenario Network Level Results – All Vehicles – 2041 PM Peak Hour (5-6pm)

Network Measure	2024	2041								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
VHT (h)	507	1,751	1,577	-10%	1,321	-25%	1,346	-23%	1,215	-31%
VKT (km)	9,689	13,642	14,479	6%	13,683	0%	14,342	5%	15,731	15%
Average Speed (km/h)	26.3	12.5	14.0	12%	14.9	19%	15.7	26%	18.1	44%
Average Delay (s)	120	393	329	-16%	289	-26%	278	-29%	218	-45%
Average Journey Time (m:s)	04:28	11:27	09:41	-15%	08:26	-26%	08:08	-29%	06:38	-42%
Demand (veh)	6,811	11,851	11,851	0%	11,851	0%	11,851	0%	11,851	0%
Completed Trips (veh)	6,804	9,179	9,778	7%	9,401	2%	9,934	8%	10,984	20%
Latent Demand (veh)	4	8,019	6,775	-16%	5,274	-34%	4,540	-43%	3,624	-55%

The modelling results of the future base scenarios for the PM peak hour of 5-6pm indicate the following:

- Average vehicle speeds
    - 2031 PM model results range from 18km/h (Option 2) to 23km/h (Option 3 and 4) compared to the 16km/h for the base scenario (equating to a 40% increase for Options 3 and 4)
    - In 2041 all four options are expected to improve average vehicle speeds by 10-45% compared to the base scenario of 13km/h. The Option 5 upgrades are expected to provide the most improvement of the options, with average speeds modelled to increase to 22km/h
- Average journey times
    - All four options are expected to improve average journey times compared to the base scenario of 9.5 minutes, with Options 3 and 4 model results reducing average journey times to approximately 5.5 minutes (43% reduction)
    - The improvements across all four upgrade options are expected to also be achieved in the 2041 PM peak hour. Option 5 upgrades are expected to produce the best average journey times for the network in 2041 at approximately 6.65 minutes (42% improvement on base scenario), while Options 2, 3 and 4 model results indicate improvements will be in the order of 15-30%
- Network traffic operational capacity
    - 2031 completed trips are modelled to be in the order of 9,570 vehicles for the PM peak hour base scenario. The option upgrades are expected to increase the amount of vehicles to complete trips through the network are by up to 2%, with Option 4 achieving the most at approximately 9,770 vehicles.
    - In 2041, as per the AM Option 5 is expected to have the ability to ensure up to 10,985 vehicle trips are completed in the PM peak hour. This represents a 20% increase on the base scenario and is more than any other option.

At the road network level, the microsimulation traffic modelling indicates all four upgrade options will provide traffic operational performance benefits compared to the base scenario during the PM peak hour. While extent of benefits varies between each option across the 2031 and 2041 PM future scenarios, Option 5 provides the most traffic operational benefits through to 2041 in the PM peak hour.

4.2.2 Network Statistics (Public Transport)

The AM peak results of the future option scenario modelling at the road network level for 2031 and 2041 are presented in Table 14 and Table 15respectively.

Table 14: MPPL Future Options Model Scenario Network Level Results – Public Transport – 2031 AM Peak Hour (8-9am)

Network Measure	2024	2031								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
VHT (h)	4	5	9	85%	5	8%	3	-28%	3	-46%
VKT (km)	54	48	34	-29%	41	-15%	53	9%	51	7%
Average Speed (km/h)	18.1	14.6	14.9	2%	15.6	7%	17.3	19%	24.0	65%
Average Delay (s)	120	222	528	138%	324	46%	137	-38%	112	-50%
Average Journey Time (m:s)	06:18	09:17	24:11	161%	12:07	31%	06:18	-32%	04:48	-48%
Completed Trips (veh)	33	30	21	-29%	25	-17%	32	7%	32	5%
Latent Demand (veh)	1	11	16	55%	4	-60%	2	-83%	3	-74%

Table 15: MPPL Future Options Model Scenario Network Level Results – Public Transport – 2041 AM Peak Hour (8-9am)

Network Measure	2024	2041								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
VHT (h)	4	4	5	4%	9	94%	3	-29%	2	-46%
VKT (km)	54	46	21	-55%	34	-26%	39	-14%	48	4%
Average Speed (km/h)	18.1	12.9	11.4	-12%	11.7	-10%	14.9	15%	22.2	71%
Average Delay (s)	120	224	541	141%	692	209%	184	-18%	127	-43%
Average Journey Time (m:s)	06:18	09:20	21:18	128%	23:57	157%	07:42	-17%	04:50	-48%
Completed Trips (veh)	33	29	13	-55%	22	-24%	25	-14%	30	5%
Latent Demand (veh)	1	16	34	114%	32	103%	17	5%	10	-40%

The public transport modelling results of the future base scenarios for the AM peak hour of 8-9am indicate the following:

- Average bus speeds
    - 2031 model results range from 15-17km/h (Options 2, 3 and 4) to 24km/h (Option 5) compared to the 15km/h for the base scenario (equating to a 65% increase for Option 5)
    - In 2041 only Options 4 and 5 (at 15km/h and 22km/h) are expected to improve average travel speeds compared to the base scenario of 13km/h (equating to a 15% and 71% respective increase)
- Average bus journey times
    - Only two options are expected to improve 2031 average journey times compared to the base scenario of 9.3 minutes, with Options 4 and 5 providing the most improvement at approximately 30-50% (i.e. 4.8 minute average journey times). Option 2 is expected to create significant impact to bus journey times due to increased congestion at Warrigal Road and Bleasby Road resulting from the proposed upgrades at Logan Road.
    - Option 5 upgrades are expected to produce the best average journey times for the network in 2041 at approximately 4.85 minutes (48% improvement on base scenario), while Options 2 and 3 model results indicate a significant performance reduction impact in the range of 130-160%
- Operational capacity of bus services
    - 2031 completed trips are modelled to be in the order of 30 buses for the AM peak hour base scenario. In comparison, Options 2 and 3 expected to result in significant reductions in service

capacity compared to Options 4 and 5 providing bus service capacity of 32 completed trips (7% increase on base scenario)

- In 2041, Option 5 is expected to have the ability to ensure up to 30 bus service trips are completed between 8-9am. This is greater than the other options and approximately 5% more than the base scenario of 29 completed vehicle trips.

At the road network level, the microsimulation traffic modelling indicates the Option 5 upgrades will consistently provide the most traffic operational performance benefits compared to the base scenario during the AM peak hour.

The 2031 and 2041 PM peak hour (5-6pm) results of the future base scenario modelling at the road network level are presented in Table 16 and Table 17.

Table 16: MPPL Future Options Model Scenario Network Level Results – Public Transport – 2031 PM Peak Hour (5-6pm)

Network Measure	2024	2031								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
VHT (h)	3	4	4	9%	3	-10%	3	-27%	2	-43%
VKT (km)	48	45	48	6%	38	-17%	40	-12%	38	-17%
Average Speed (km/h)	18.1	14.4	13.3	-7%	18.4	28%	19.0	32%	21.4	49%
Average Delay (s)	144	214	217	2%	209	-2%	157	-27%	137	-36%
Average Journey Time (m:s)	06:01	07:52	08:12	4%	08:36	9%	06:38	-16%	05:30	-30%
Completed Trips (veh)	29	28	29	4%	23	-18%	24	-13%	23	-18%
Latent Demand (veh)	0	5	0	-96%	2	-64%	1	-72%	4	-16%

Table 17: MPPL Future Options Model Scenario Network Level Results – Public Transport – 2041 PM Peak Hour (5-6pm)

Network Measure	2024	2041								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
VHT (h)	3	5	4	-20%	5	-4%	9	91%	3	-41%
VKT (km)	48	36	38	5%	30	-18%	38	4%	44	22%
Average Speed (km/h)	18.1	9.7	10.8	11%	10.4	7%	8.0	-18%	17.2	77%
Average Delay (s)	144	352	268	-24%	450	28%	756	115%	169	-52%
Average Journey Time (m:s)	06:01	12:55	09:55	-23%	14:46	14%	23:03	79%	06:12	-52%
Completed Trips (veh)	29	22	23	4%	19	-16%	24	7%	27	23%
Latent Demand (veh)	0	20	14	-27%	12	-39%	11	-42%	9	-53%

The bus service modelling results of the future base scenarios for the PM peak hour of 5-6pm indicate the following:

- Average bus speeds
  - 2031 PM model results range from 18-19km/h (Options 3 and 4) to 21km/h (Option 5) compared to the 14km/h for the base scenario (equating to a 50% increase for Option 5)
  - In 2041 Option 5 is expected to improve average vehicle speeds the most, by 77% at 17km/h compared to the base scenario of 10km/h.
- Average bus journey times
  - Only Options 4 and 5 are expected to improve average bus journey times compared to the base scenario of 7.9 minutes, with results reducing average journey times to approximately 5.5 minutes for Option 5 (30% reduction)
  - The improvements are expected to be achieved for Options 2 and 5 in the 2041 PM peak hour. Option 5 upgrades are expected to produce the best average bus journey times for the network in

2041 at approximately 6.2 minutes (52% improvement on base scenario), while Option 2model results indicate the improvement will be in the order of 23%. Option 4 is expected to experience significant bus journey time deterioration, with journey times increasing by approximately 80%.

- Network traffic operational capacity
  - 2031 completed trips are modelled to be in the order of 28 buses for the PM peak hour base scenario. Only Option 2 is expected to maintain and improve bus service capacity while Options 3-5 are expected to reduce bus completed trips by 13-18%.
  - In 2041, Option 5 is expected to have the ability to ensure up to 27 buses vehicle trips are completed in the PM peak hour. This represents a 23% increase on the base scenario and is more than any other option.

At the road network level, the microsimulation traffic modelling indicates all four upgrade options will provide traffic operational performance benefits compared to the base scenario during the PM peak hour. While extent of benefits varies between each option across the 2031 and 2041 PM future scenarios, Option 5 provides the most traffic operational benefits through to 2041 in the PM peak hour.

4.2.3 Localised Intersection Performance Results

The intersection performance results of the 2031 and 2041 AM peak future base scenarios from an average vehicle delay perspective are presented in Table 18 and Table 19, and the results for 2031 and 2041 PM peak future base scenarios included in Table 20 and Table 21.

Table 18: MPPL Future Options Model Scenario Intersection Average Delay Results – 2031 AM Peak Hour (8-9am)

Network Measure	2024	2031								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
Logan Rd / Miles Platting Rd / Padstow Rd	33	108	74	-31%	90	-16%	84	-22%	91	-16%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	32	37	36	-2%	27	-27%	26	-28%	26	-30%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	25	26	26	-1%	26	-1%	26	-1%	27	4%
Padstow Rd / Warrigal Rd	88	94	124	32%	101	7%	71	-25%	45	-53%

Table 19: MPPL Future Options Model Scenario Intersection Average Delay Results – 2041 AM Peak Hour (8-9am)

Network Measure	2024	2041								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
Logan Rd / Miles Platting Rd / Padstow Rd	33	119	103	-13%	97	-18%	93	-22%	97	-19%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	32	37	43	15%	28	-25%	30	-19%	29	-22%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	25	28	31	9%	26	-6%	26	-8%	27	-4%
Padstow Rd / Warrigal Rd	88	123	153	25%	159	30%	125	2%	53	-57%

Table 20: MPPL Future Options Model Scenario Intersection Average Delay Results – 2031 PM Peak Hour (5-6pm)

Network Measure	2024	2031								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
Logan Rd / Miles Platting Rd / Padstow Rd	57	113	82	-28%	92	-19%	92	-19%	93	-18%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	22	28	29	5%	29	4%	27	-3%	25	-9%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	33	40	41	2%	32	-20%	31	-22%	31	-23%
Padstow Rd / Warrigal Rd	32	73	73	0%	93	26%	54	-27%	91	24%

Table 21: MPPL Future Options Model Scenario Intersection Average Delay Results – 2041 PM Peak Hour (5-6pm)

Network Measure	2024	2041								
		Base	Opt 2	% Diff	Opt 3	% Diff	Opt 4	% Diff	Opt 5	% Diff
Logan Rd / Miles Platting Rd / Padstow Rd	57	124	86	-31%	104	-16%	102	-18%	90	-28%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	22	43	41	-5%	51	20%	45	5%	34	-20%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	33	56	51	-9%	55	0%	46	-17%	33	-41%
Padstow Rd / Warrigal Rd	32	133	78	-41%	100	-25%	126	-5%	62	-53%

The average delays are expected to improve with Option 2 upgrades at all intersection during the PM peak periods of both 2031 and 2041 scenarios. However, the AM peak periods are only expected to improve operational performance at the Logan Road / Miles Platting Road intersection, with the Padstow Road / Warrigal Road expected to have significant increases in average delay as a result of the upgrades of Option 2.

The equivalent intersection Level of Service performance results of the 2031 and 2041 AM peak future base scenarios are presented in Table 22 and Table 23 respectively.

Table 22: MPPL Future Options Model Scenario Intersection Level of Service Results – 2031 AM Peak Hour (8-9am)

Network Measure	2024	2031				
		Base	Option 2	Option 3	Option 4	Option 5
Logan Rd / Miles Platting Rd / Padstow Rd	C	F	E	F	F	F
Logan Rd / Warrigal Rd / Pacific Mwy NB Off-ramp	C	D	D	C	C	C
Logan Rd / Holmead Rd / Pacific Mwy SB Off-ramp	C	C	C	C	C	C
Padstow Rd / Warrigal Rd	D	F	F	F	E	D

Table 23: MPPL Future Options Model Scenario Intersection Level of Service Results – 2041 AM Peak Hour (8-9am)

Network Measure	2024	2041				
		Base	Option 2	Option 3	Option 4	Option 5
Logan Rd / Miles Platting Rd / Padstow Rd	C	F	F	F	F	F
Logan Rd / Warrigal Rd / Pacific Mwy NB Off-ramp	C	D	D	C	C	C
Logan Rd / Holmead Rd / Pacific Mwy SB Off-ramp	C	C	C	C	C	C
Padstow Rd / Warrigal Rd	D	F	F	F	F	D

The intersection average vehicle delay results indicate that the Logan Road / Miles Platting Road / Padstow Road intersection is expected to operate beyond acceptable performance parameters (i.e. LOS F) in 2031 and 2041 during AM peak periods without intervention. Option 2 upgrades are expected to improve the intersection performance to a LOS E in 2031 before returning to LOS F in 2041.

Across the four intersections in 2041, Option 5 upgrades are expected to produce the overall best LOS results, achieving LOS C at the two Pacific Mwy intersections and LOS D at the Padstow Road / Warrigal Road intersection.

The equivalent intersection Level of Service performance results of the 2031 and 2041 PM peak hour future base scenarios are presented in Table 24 and Table 25respectively.

Table 24: MPPL Future Options Model Scenario Intersection Level of Service Results – 2031 PM Peak Hour (5-6pm)

Network Measure	2024	2031				
		Base	Option 2	Option 3	Option 4	Option 5
Logan Rd / Miles Platting Rd / Padstow Rd	D	F	F	F	F	F
Logan Rd / Warrigal Rd / Pacific Mwy NB Off-ramp	C	C	C	C	C	C
Logan Rd / Holmead Rd / Pacific Mwy SB Off-ramp	C	D	D	C	C	C
Padstow Rd / Warrigal Rd	C	E	E	F	D	F

Table 25: MPPL Future Options Model Scenario Intersection Level of Service Results – 2041 PM Peak Hour (5-6pm)

Network Measure	2024	2041				
		Base	Option 2	Option 3	Option 4	Option 5
Logan Rd / Miles Platting Rd / Padstow Rd	D	F	F	F	F	F
Logan Rd / Warrigal Rd / Pacific Mwy NB Off-ramp	C	D	D	D	D	C
Logan Rd / Holmead Rd / Pacific Mwy SB Off-ramp	C	E	D	E	D	C
Padstow Rd / Warrigal Rd	C	F	E	F	F	E

The intersection average vehicle delay results indicate that the Logan Road / Miles Platting Road / Padstow Road intersection is expected to operate beyond acceptable performance parameters (i.e. LOS F) in 2031 and 2041 during AM peak periods with and without intervention.

Overall, for the four intersections during the 2041 PM peak hour, the Option 5 upgrades are expected to produce the overall best LOS results of the four options, achieving LOS C at the two Pacific Mwy intersections and LOS E at the Padstow Road / Warrigal Road intersection.

4.2.4 Road Corridor Travel Time Results

The future option scenario modelled travel time results for the Logan Road (NB and SB) and Padstow Road (EB and WB) routes are presented in Figure 8 for the 2031 AM peak period and Figure 9 for the 2041 AM peak hour period.

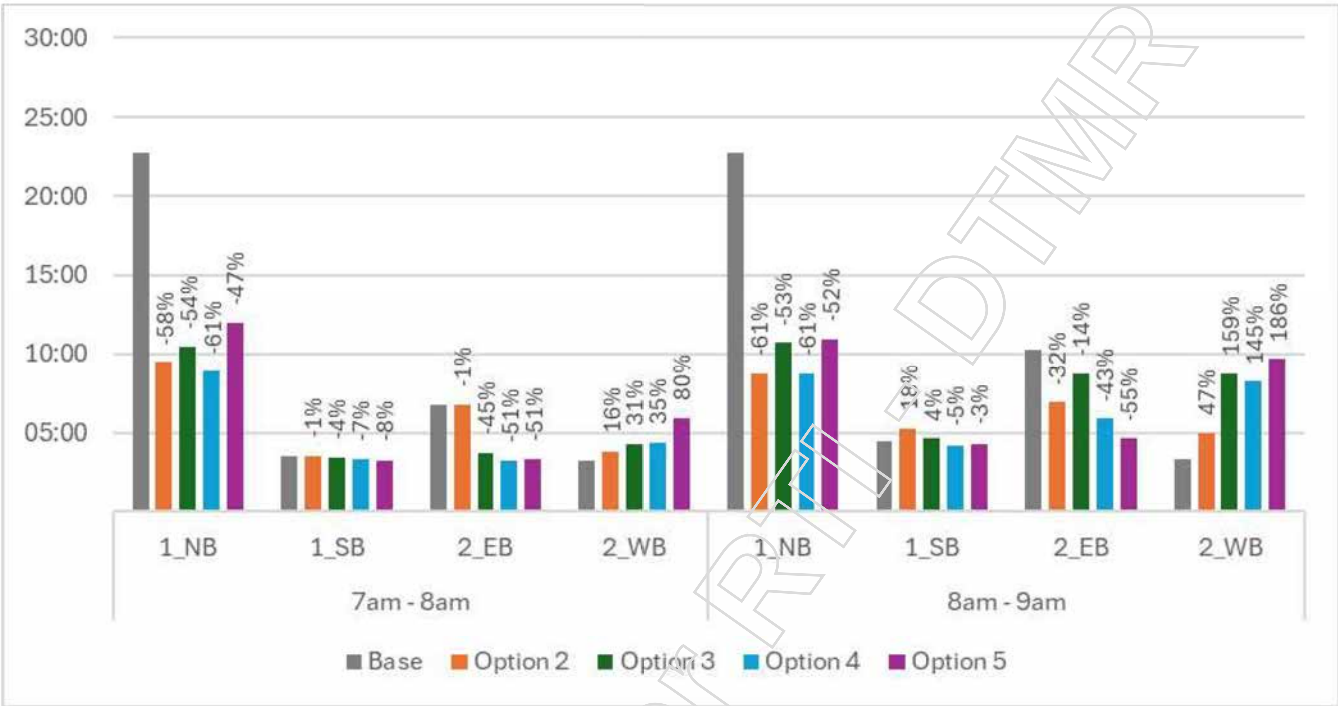


Figure 8: MPPL Microsimulation Traffic Model Future Options Travel Time Results – 2031 AM Peak

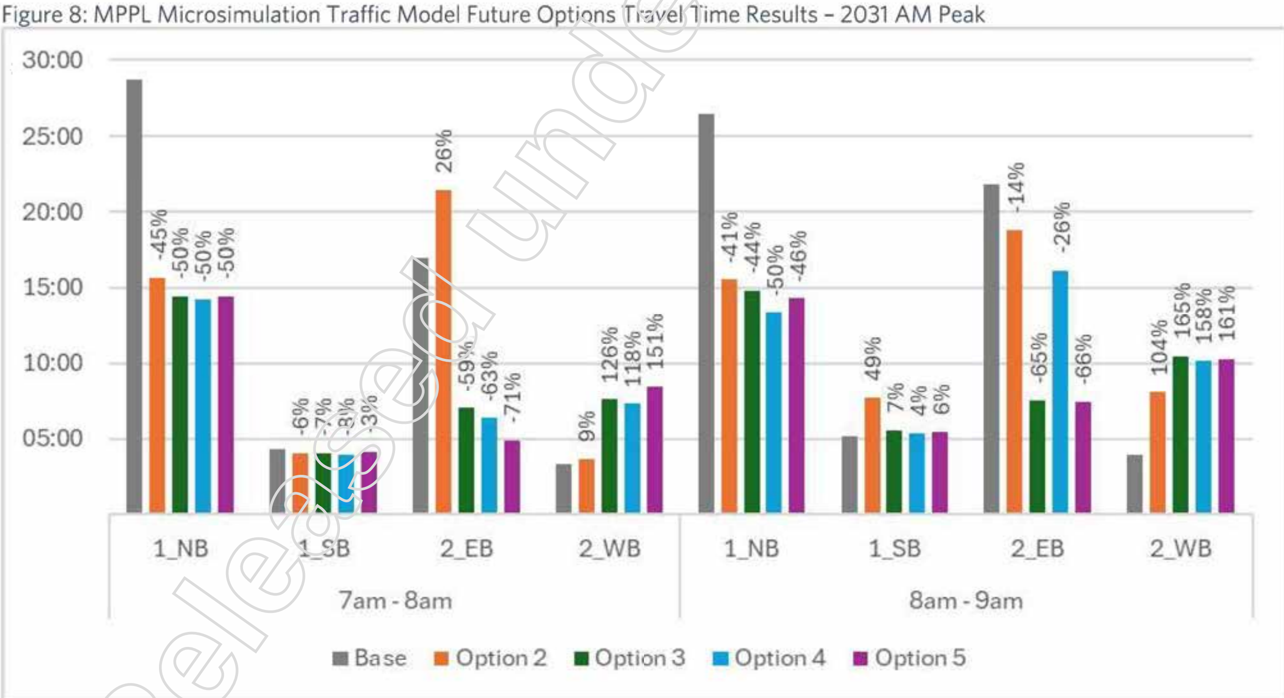


Figure 9: MPPL Microsimulation Traffic Model Future Options Travel Time Results – 2041 AM Peak

The modelled travel time results indicate the following expected outcomes for the peak directional movements:

- Logan Road northbound peak direction travel times
  - 2031 northbound travel times on Logan Road are expected to reduce from approximately 23 minutes in the base scenario to approximately 9 minutes with the upgrades of Options 2 and 4 (equates to a 60% reduction)

- In 2041 the AM peak modelling results indicate a reduction from approximately 29 minutes in the base scenario to approximately 14 minutes for Options 3, 4 and 5

- Padstow Road eastbound peak direction travel times
  - 2031 AM travel times are expected to experience the most improvement with Option 5 upgrades, reducing from 10.5 minutes in the base scenario to 4.5 minutes with the intervention (55% reduction)
  - In the 2041 AM peak period both Option 3 and 5 upgrades are expected to improve travel times compared to the base scenario by approximately 65%
- Miles Platting Road westbound peak direction travel times
  - Westbound travel times in 2031 are expected to be impacted across all four upgrade option scenarios with travel times increasing from 3 minutes in the base scenario to up to 10 minutes for Option 5
  - In 2041 travel times are expected to increase from approximately 4 minutes in the base scenario to 10 minutes for upgrade Options 3, 4 and 5
  - The modelled impacts as a result of the option upgrades to westbound travel times on Miles Platting Road are in part caused by overall network improvements that provide greater priority to Logan Road northbound and Padstow Road eastbound traffic movements

The future option scenario modelled travel time results for the Logan Road (NB and SB) and Padstow Road (EB and WB) routes are presented in Figure 10 for the 2031 PM peak period and Figure 11 for the 2041 PM peak period.

Figure 10: MPPL Microsimulation Traffic Model Future Options Travel Time Results – 2031 PM Peak

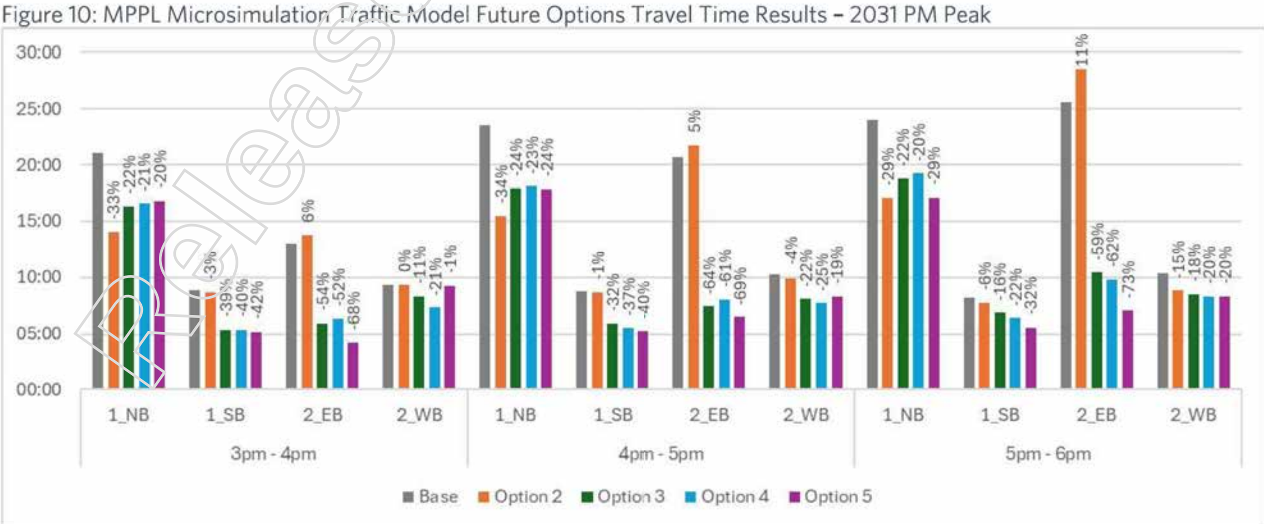


Figure 11: MPPL Microsimulation Traffic Model Future Options Travel Time Results – 2041 PM Peak

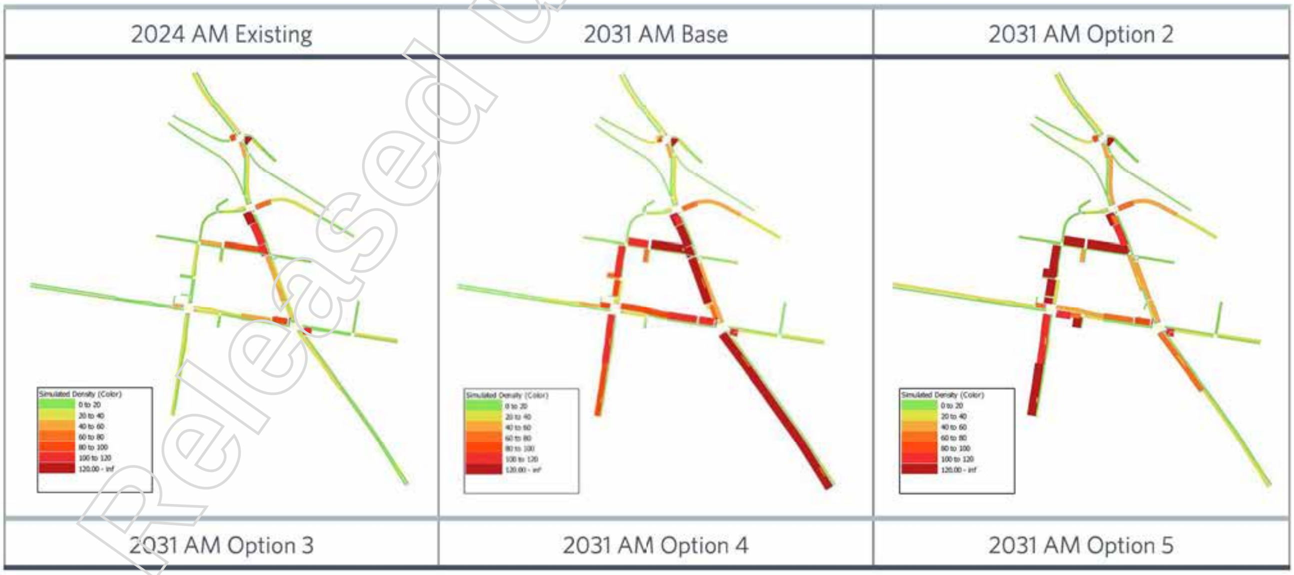
The modelled travel time results indicate the following expected outcomes for the peak directional movements:

- Logan Road southbound peak direction travel times
    - Up to a 10% reduction in travel times are expected for southbound traffic as a result of the upgrade options compared to the base scenario 5-minute travel times in 2031
    - The travel time reductions are expected to be up to 40%, achieved by Option 5, for southbound traffic in 2041 compared to the base scenario 8-minute average travel times
- Logan Road northbound travel times
    - All upgrades are expected to reduce average 2031 northbound travel times from approximately 24 minutes in the base scenario to approximately 10 minutes with the upgrades of Option 2 (equates to a 67% reduction)
    - In 2041 the PM peak modelling results indicate a reduction from approximately 24 minutes to approximately 16 minutes for Options 2 and 5 (approximate reduction of 30%)
- Padstow Road eastbound peak direction travel times
    - 2031 PM travel times are expected to experience limited improvement with Option 2 upgrades, while Options 3, 4 and 5 model results indicate a reduction in the order of 65-75% from the base scenario of 25 minutes with Option 4 producing the fastest travel times
    - In the 2041 AM peak period Option 2 upgrades are expected to increase travel times by 11% compared to the base scenario of 25 minutes, while Options 3-5 are modelled to improve travel times by 60-75% with Option 5 producing the fastest travel times

The consistent travel time improvements for Options 3-5 are a result of the additional (third) Logan Road southbound lane at the MPPL intersection. This increased traffic lane capacity also enabled a wider benefit via a proportional reduction in green time allocation within the traffic signal settings that was reallocated the Logan Road northbound and Padstow Road approaches to reduce their respective traffic congestion formation.

4.2.5 Road Network Congestion Formation Plots

The AM peak future base scenario modelled road network density plots for 2031 and 2041 are presented in Figure 12 Figure 13 respectively.



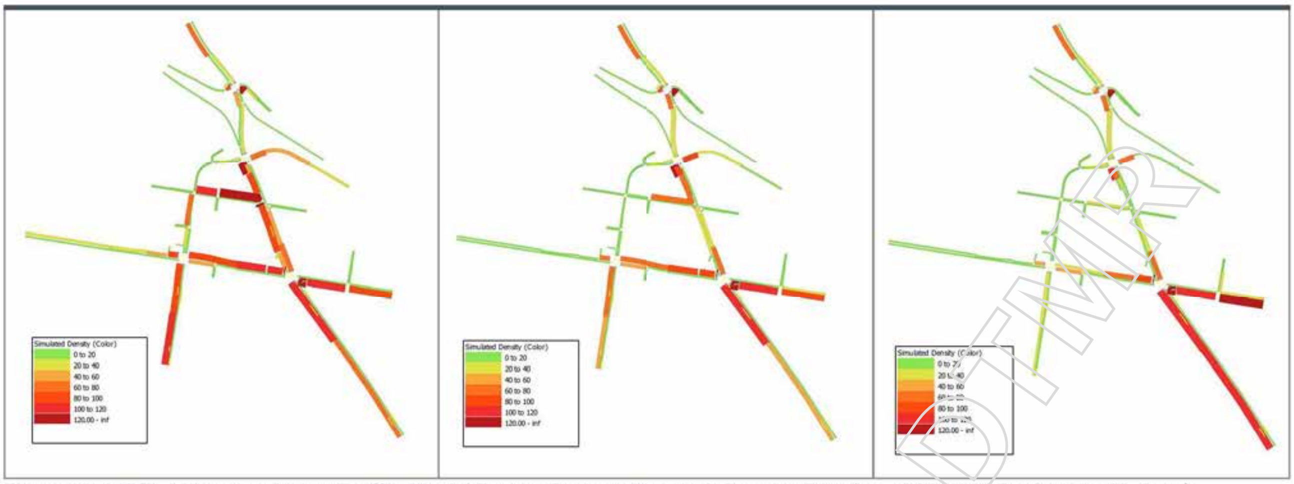


Figure 12: MPPL Microsimulation Traffic Model Future Options Network Density Results – 2031 AM Peak Hour (8-9am)

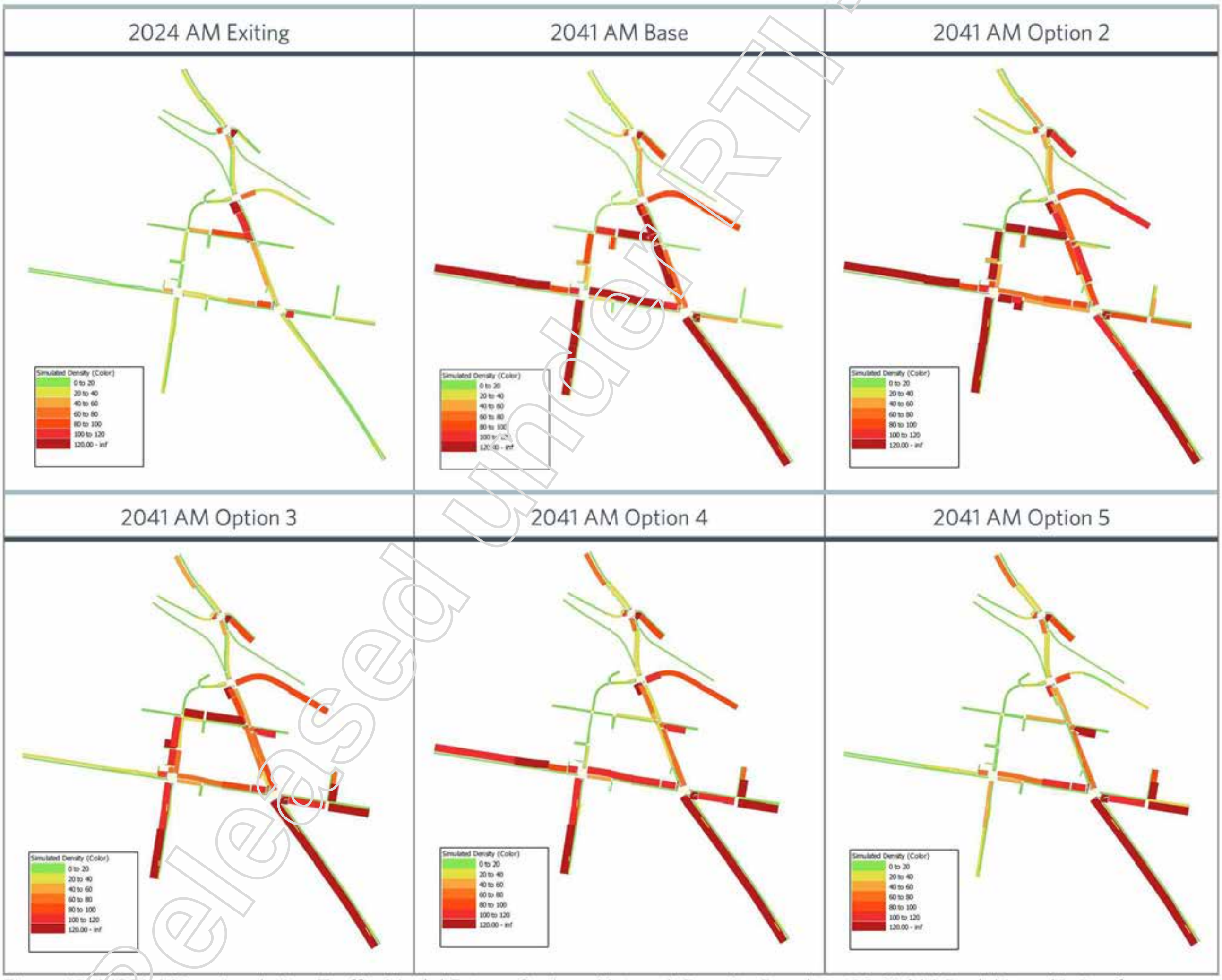


Figure 13: MPPL Microsimulation Traffic Model Future Options Network Density Results – 2041 AM Peak Hour (8-9am)

The network density plots of the AM peak period future base scenario indicates that there is significant traffic congestion formation for the Logan Road northbound carriageway from the Pacific Motorway to the south in the base scenario. Each upgrade option provides reductions in network traffic congestion to varying degrees. Option 5 upgrades produce the most improvements in reducing traffic congestion within the study area, including Padstow Road, Logan Road, Warrigal Road and Bleasby Road.

The Padstow Road eastbound carriageway is also expected to experience increasing traffic congestion formation through to the 2041 base scenario without intervention, with Option 3 and 5 upgrades indicating an ability to reduce congestion the most out of all options for the corridor in 2041 in comparison.

With regard to the Pacific Motorway northbound off ramp, consistent levels of traffic congestion is expected for the base scenario and Options 2-4, with Option 5 upgrades expected to provide significant vehicle queuing reductions. Given the level of improved performance of the off ramp for Option 5, this presents an opportunity to further optimise the traffic signal timings at the intersection via allocating more green time to competing movements with the view to provide wider network benefits without compromising the safety and efficiency of the Pacific Motorway.

The PM peak future base scenario modelled road network density plots for 2031 and 2041 are presented in Figure 14 and Figure 15 respectively.

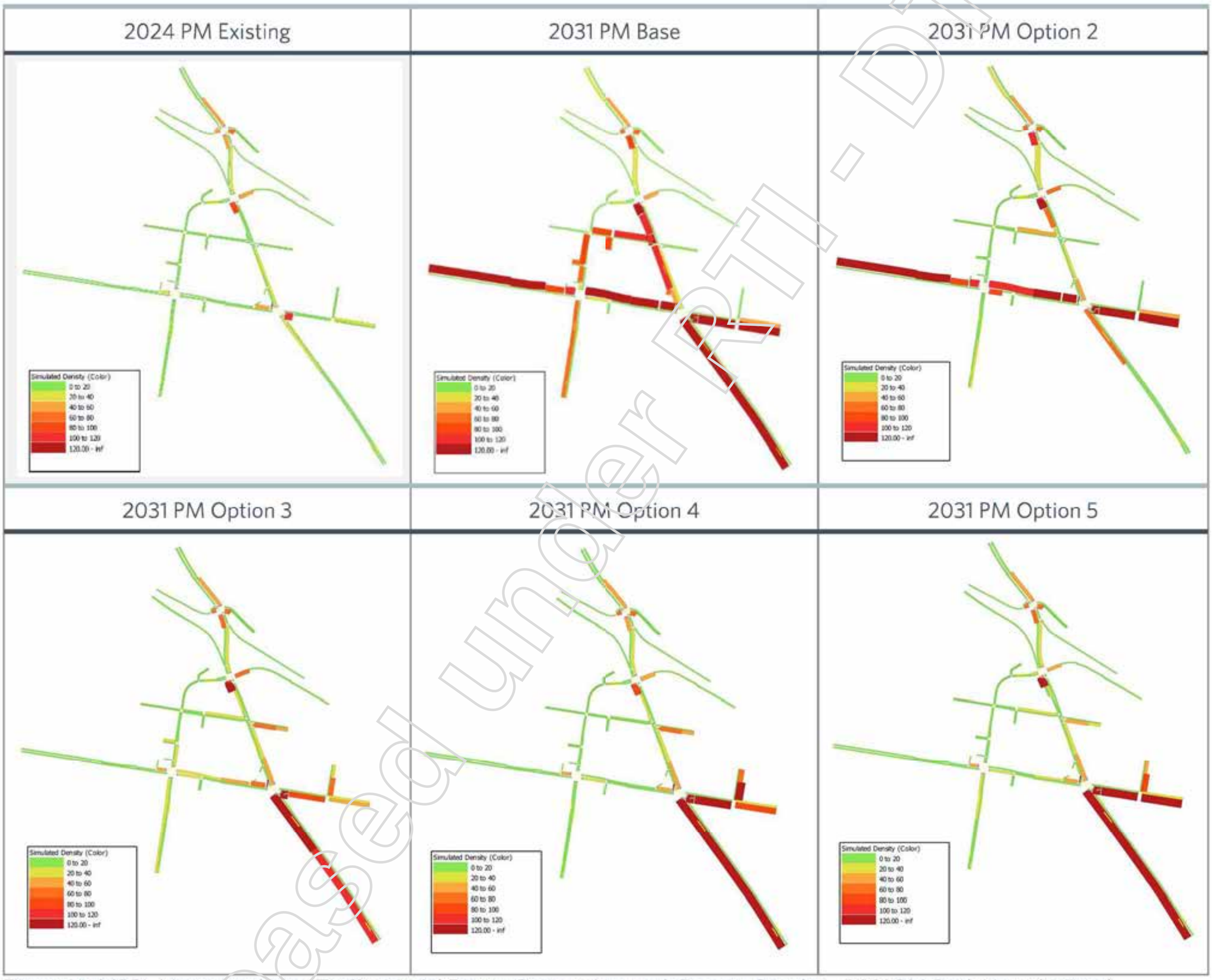


Figure 14: MPPL Microsimulation Traffic Model Future Options Network Density Results – 2031 PM Peak Hour (6-7pm)

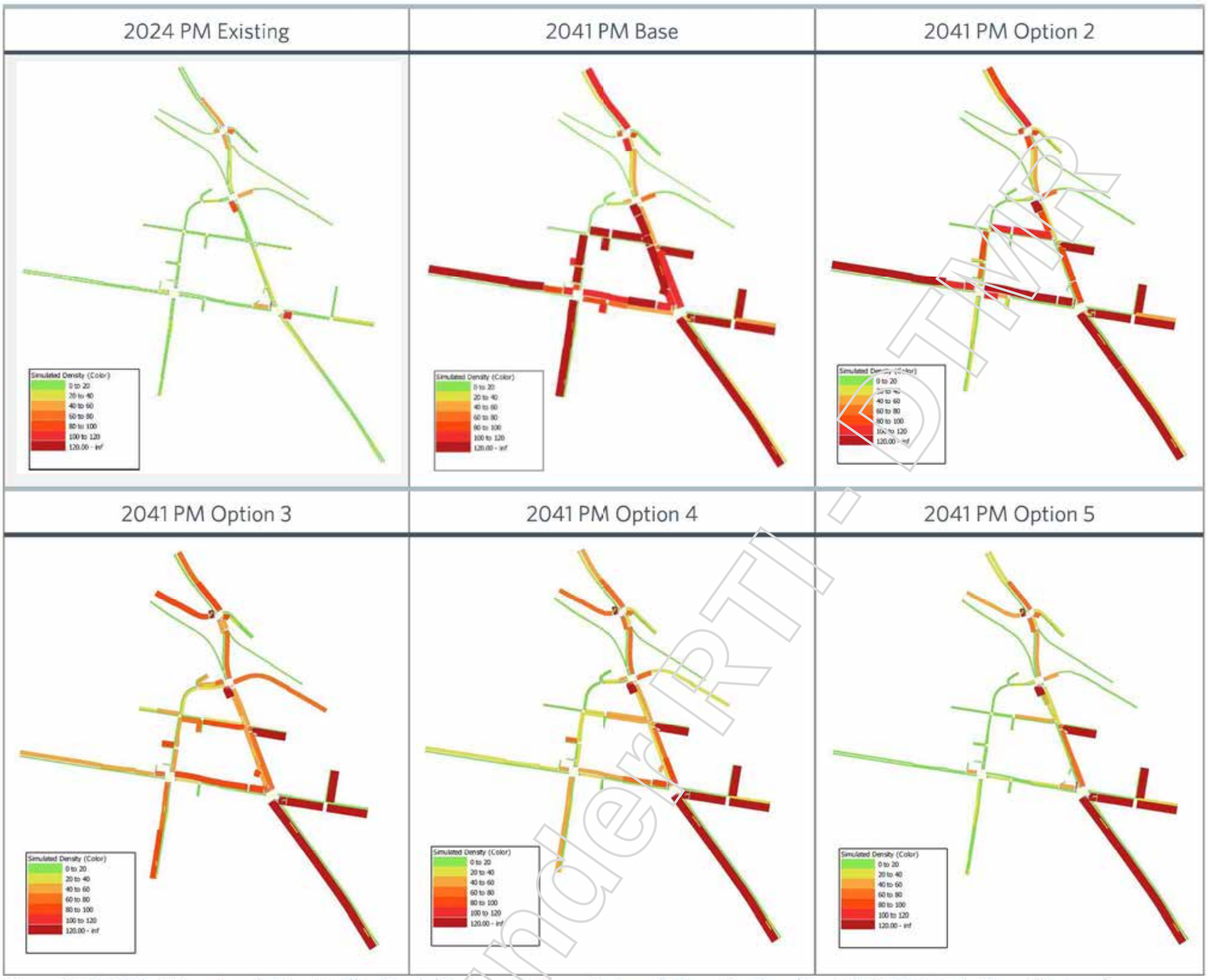


Figure 15: MPPL Microsimulation Traffic Model Future Options Network Density Results – 2041 PM Peak Hour (4-5pm)

The network density plots of the PM peak period future base scenario is expected to produce similar significant traffic congestion pattern formation within the study area as per the AM peak period in the base scenario. The upgrades associated with Options 3-5 demonstrate similar levels of improvement to congestion in 2031 on Logan Road, Padstow Road, Warrigal Road and Bleasby Road. The Option 2 upgrades however are limited to achieving improvements to Logan Road and Warrigal Road with Padstow Road and Bleasby Road expected to continue experiencing congestion in 2031.

Levels of traffic congestion are expected to deteriorate in 2041 with similar pattern formations within the study area. Options 3-5 are expected to provide similar levels of congestion reduction across the network relative to the model results in the 2031 PM peak period. While Option 2 modelling results indicate improvements will be achieved in the study area, Padstow Road and Bleasby Road are expected to experience similar levels of congestion as per the base scenario.

4.2.6 Pacific Motorway Northbound Off Ramp Traffic Performance Results

The average vehicle delay and maximum vehicle queue length results for the Pacific Motorway northbound off ramp are presented in Table 26 and Table 27 respectively.

For context in terms of comparative purposes, the maximum vehicle queue lengths have been calculated from the model outputs as the average of the five seed model runs. Further the outputs have been converted to a proxy maximum vehicle length by adding the 'maximum queue length' and 'maximum virtual queue length' in vehicle units for each model road section output and multiplying the total number of vehicles by 7 meters to determine the length.

Table 26: Pacific Motorway northbound off ramp average vehicle delays

Time Period	Year	Average delay (seconds)				
		Base	Option 2	Option 3	Option 4	Option 5
AM Peak (8-9am)	2031	41	40	41	42	45
	2041	45	46	45	55	60
PM Peak (5-6pm)	2031	49	48	48	49	48
	2041	45	45	46	48	49

Table 27: Pacific Motorway northbound off ramp maximum vehicle queue lengths

Time Period	Year	Maximum vehicle queue lengths (m)				
		Base	Option 2	Option 3	Option 4	Option 5
AM Peak (8-9am)	2031	595	590	530	245	145
	2041	1,775	1,940	1,690	1,100	225
PM Peak (5-6pm)	2031	180	175	170	140	90
	2041	200	210	1,675*	685*	110

The average vehicle delays are expected to be relatively consistent across the four upgrade options compared to the base scenario. The AM peak direction movement in 2041 is modelled to experience impacts for Options 4 and 5, with average vehicle delays increasing from 45 seconds in the base scenario to 55-60 seconds.

In contrast to the average vehicle delays, the maximum vehicle queue length results presented in Table 27 indicate that Option 5 ensures the Pacific Motorway northbound off ramp will improve the traffic operational performance level compared to the base scenario. Maximum vehicle queue lengths with Option 5 are expected to be at least half the length estimated for the base scenario.

Modelling for Options 2, 3 and 4 indicate the potential for the Pacific Motorway northbound off ramp to experience vehicle queue length impacts with reduced reliability and increased variability. However, these impacts in part are a result of congestion in other areas of the network as opposed to an impact of upgrades provided at the off-ramp intersection. It is recommended wider network traffic signal refinements are implemented as part of these options if they progress to ensure safe and efficient arrangements are made for the Pacific Motorway.

Regarding model stability for the Pacific Motorway northbound off ramp results, there were two scenarios (Options 3 and 4 for 2041 PM) where the vehicle queue length recorded was a result of a relatively 'unstable' model assignment of the five-model seed runs whereby only one replication of the five recorded vehicle queue lengths of that magnitude.

5 Conclusion

This options modelling report for the MPPL intersection upgrade planning study summarises the results of the future base scenario compared to the four (4) upgrade options at the wider network and localised level to determine the effectiveness of each option. A detailed summary of the outcomes across the options is included below in Table 28.

Table 28: Options Modelling Summary

Scenario	AM Peak	PM Peak	Overall
Future Base	• Network performance is expected to experience increased traffic congestion through to 2041 at levels disproportionately higher than estimated traffic demand growth of approximately 35% • MPPL intersection is expected to perform at LOS F in 2041 • Logan Road northbound average travel times forecast increase from 9 minutes in 2024 to 29 minutes in 2041	• Network performance is expected to experience significant increased traffic congestion through to 2041 at levels disproportionately higher than estimated traffic demand growth of approximately 50% • MPPL intersection is expected to perform at LOS F in 2041 • Logan Road northbound average travel times forecast increase from 6 minutes in 2024 to 24 minutes in 2041	Without intervention the MPPL intersection and surrounding road network will operate beyond acceptable traffic operational performance parameters. The deterioration of traffic operational performance is disproportionately greater than the forecast traffic growth demand levels.
Option 2	• 6% worsening to average network journey times in 2041 compared to base scenario • LOS F intersection performance expected for MPPL in 2041 • 41% improvement to Logan Road northbound travel times in 2041 compared to base scenario	• 15% improvement to average network journey times in 2041 compared to base scenario • LOS F intersection performance expected for MPPL in 2041 • 29% improvement to Logan Road northbound travel times in 2041 compared to base scenario	Option 2 road upgrades provide localised traffic operational improvements that are primarily limited to enhancements on Logan Road and Padstow Road with wider network traffic congestion remaining.
Option 3	• 7% improvement to average network journey times in 2041 compared to base scenario • LOS F intersection performance expected for MPPL in 2041 • 44% improvement to Logan Road northbound travel times in 2041 compared to base scenario	• 26% improvement to average network journey times in 2041 compared to base scenario • LOS F intersection performance expected for MPPL in 2041 • 22% improvement to Logan Road northbound travel times in 2041 compared to base scenario	Option 3 road upgrades provide significant traffic operational improvements at the local and wider network level. The network is expected to respond well to the modified traffic signal cycle settings and optimised phase times.
Option 4	• 12% improvement to average network journey times in 2041 compared to base scenario • LOS F intersection performance expected for MPPL in 2041 • 50% improvement to Logan Road northbound travel times in 2041 compared to base scenario	• 29% improvement to average network journey times in 2041 compared to base scenario • LOS F intersection performance expected for MPPL in 2041 • 20% improvement to Logan Road northbound travel times in 2041 compared to base scenario	Option 4 road upgrades provide significant local and network level traffic operational improvements. The improvements are marginally greater than Option 3 due to the increased capacity at the Pacific Motorway off ramp.
Option 5	• 32% improvement to average network journey times in 2041 compared to base scenario • LOS F intersection performance expected for MPPL in 2041 • 46% improvement to Logan Road northbound travel times in 2041 compared to base scenario	• 42% improvement to average network journey times in 2041 compared to base scenario • LOS F intersection performance expected for MPPL in 2041 • 29% improvement to Logan Road northbound travel times in 2041 compared to base scenario	Option 5 consistently provides the greatest amount of traffic operational improvements at the network and localised levels compared to the other options. This is due to the relative increase in road network capacity of the option.

APPENDIX A – Option Layouts

Base

Option 2

Option 3

Option 4

Option 5

APPENDIX B – Option Model Results

Network Statistics - AM Peak

AM Peak - 2031 — 7am - 8am (1)

Paramter	Base AM0031	Option 2 AM0231	Option 2 % diff	Option 3 AM0331	Option 3 % diff	Option 4 AM0431	Option 4 % diff	Option 5 AM0531	Option 5 % diff
VHT (h)	814	731	-10%	595	-27%	527	-35%	587	-28%
VKT (km)	10339	10564	2%	10874	5%	11022	7%	10962	6%
Average Speed (km/h)	23.3	24.1	3%	24.8	7%	26.4	13%	25.5	9%
Average Delay (s)	195	176	-10%	127	-35%	107	-45%	125	-36%
Average Journey Time (m:s)	06:43	06:00	-11%	04:44	-29%	04:08	-38%	04:38	-31%
Demand (veh)	7703	7703		7703		7703		7703	
Completed Trips (veh)	7279	7306	0%	7539	4%	7644	5%	7608	5%
Latent Demand (veh)	351	257	-27%	2	-99%	2	-99%	8	-98%

AM Peak - 2031 — 8am - 9am (2)

Paramter	Base AM0031	Option 2 AM0231	Option 2 % diff	Option 3 AM0331	Option 3 % diff	Option 4 AM0431	Option 4 % diff	Option 5 AM0531	Option 5 % diff
VHT (h)	996	858	-14%	892	-10%	751	-25%	753	-24%
VKT (km)	11551	11804	2%	11951	3%	12402	7%	12500	8%
Average Speed (km/h)	21.6	23.2	7%	20.4	-6%	22.5	4%	23.1	7%
Average Delay (s)	223	191	-14%	195	-13%	150	-33%	149	-33%
Average Journey Time (m:s)	07:15	06:16	-14%	06:25	-12%	05:12	-28%	05:10	-29%
Demand (veh)	8930	8930		8930		8930		8930	
Completed Trips (veh)	8238	8223	0%	8352	1%	8668	5%	8747	6%
Latent Demand (veh)	1025	1082	6%	311	-70%	46	-95%	169	-84%

AM Peak - 2041 — 7am - 8am (1)

Paramter	Base AM0041	Option 2 AM0241	Option 2 % diff	Option 3 AM0341	Option 3 % diff	Option 4 AM0441	Option 4 % diff	Option 5 AM0541	Option 5 % diff
VHT (h)	1080	1056	-2%	891	-17%	848	-21%	798	-26%
VKT (km)	10651	11065	4%	11267	6%	11851	11%	12092	14%
Average Speed (km/h)	20.4	20.3	0%	20.4	0%	21.4	5%	22.3	10%
Average Delay (s)	277	265	-4%	211	-24%	184	-33%	167	-40%
Average Journey Time (m:s)	08:28	08:08	-4%	06:46	-20%	06:06	-28%	05:38	-34%
Demand (veh)	9120	9120		9120		9120		9120	
Completed Trips (veh)	7651	7786	2%	7889	3%	8344	9%	8507	11%
Latent Demand (veh)	1608	1265	-21%	1121	-30%	614	-62%	687	-57%

AM Peak - 2041 — 8am - 9am (2)

Paramter	Base AM0041	Option 2 AM0241	Option 2 % diff	Option 3 AM0341	Option 3 % diff	Option 4 AM0441	Option 4 % diff	Option 5 AM0541	Option 5 % diff
VHT (h)	1349	1303	-3%	1249	-7%	1225	-9%	993	-26%
VKT (km)	12151	11299	-7%	12510	3%	12819	5%	13491	11%
Average Speed (km/h)	18.2	15.8	-13%	17.9	-1%	17.0	-6%	20.4	12%
Average Delay (s)	314	329	5%	287	-9%	277	-12%	201	-36%
Average Journey Time (m:s)	09:11	09:46	6%	08:34	-7%	08:06	-12%	06:13	-32%
Demand (veh)	10642	10642		10642		10642		10642	
Completed Trips (veh)	8812	8004	-9%	8739	-1%	9067	3%	9577	9%
Latent Demand (veh)	3602	3768	5%	3099	-14%	2158	-40%	1849	-49%

Network Statistics - PM Peak

Paramter	PM Peak - 2031								
	3pm - 4pm								
	1								
	Base	Option 2		Option 3		Option 4		Option 5	
	PM0031	PM0231	% diff	PM0331	% diff	PM0431	% diff	PM0531	% diff
VHT (h)	888	813	-8%	649	-27%	683	-23%	759	-15%
VKT (km)	13640	13997	3%	13964	2%	13986	3%	13750	1%
Average Speed (km/h)	20.2	21.6	7%	26.7	32%	25.7	27%	24.7	22%
Average Delay (s)	163	142	-13%	102	-38%	109	-33%	128	-21%
Average Journey Time (m:s)	05:45	05:09	-11%	04:05	-29%	04:18	-25%	04:49	-16%
Demand (veh)	9805	9805		9805		9805		9805	
Completed Trips (veh)	9255	9485	2%	9538	3%	9527	3%	9436	2%
Latent Demand (veh)	53	4	-92%	22	-59%	24	-55%	84	58%

Paramter	PM Peak - 2031								
	4pm - 5pm								
	2								
	Base	Option 2		Option 3		Option 4		Option 5	
	PM0031	PM0231	% diff	PM0331	% diff	PM0431	% diff	PM0531	% diff
VHT (h)	1345	1071	-20%	876	-35%	884	-34%	990	-26%
VKT (km)	13338	14240	7%	14242	7%	14331	7%	14210	7%
Average Speed (km/h)	17.0	19.5	15%	23.1	36%	22.7	34%	21.8	29%
Average Delay (s)	280	199	-29%	150	-46%	150	-46%	177	-37%
Average Journey Time (m:s)	08:58	06:41	-25%	05:25	-40%	05:26	-39%	06:08	[illegible]
Demand (veh)	9960	9960		9960		9960		9960	
Completed Trips (veh)	9009	9620	7%	9708	8%	9764	8%	9691	[illegible]
Latent Demand (veh)	827	252	-70%	104	-87%	90	-89%	267	-68%

Paramter	PM Peak - 2031								
	5pm - 6pm								
	3								
	Base	Option 2		Option 3		Option 4		Option 5	
	PM0031	PM0231	% diff	PM0331	% diff	PM0431	% diff	PM0531	% diff
VHT (h)	[illegible]	[illegible]	-19%	876	-42%	884	-41%	990	-34%
VKT (km)	13969	13957	0%	14242	2%	14331	3%	14210	2%
Average Speed (km/h)	16.4	18.1	11%	23.1	41%	22.7	39%	21.8	33%
Average Delay (s)	311	247	-21%	150	-52%	150	-52%	177	-43%
Average Journey Time (m:s)	09:27	07:43	-18%	05:25	-43%	05:26	-42%	06:08	-35%
Demand (veh)	9835	9835		9835		9835		9835	
Completed Trips (veh)	9567	9540	0%	9708	1%	9764	2%	9691	1%
Latent Demand (veh)	1426	748	-48%	104	-93%	90	-94%	267	-81%

Paramter	PM Peak - 2041								
	3pm - 4pm								
	1								
	Base	Option 2		Option 3		Option 4		Option 5	
	PM0041	PM0241	% diff	PM0341	% diff	PM0441	% diff	PM0541	% diff
VHT (h)	1335	1293	-3%	1084	-19%	1079	-19%	1040	-22%
VKT (km)	13807	14553	5%	15163	10%	15244	10%	15169	10%
Average Speed (km/h)	14.0	14.6	4%	19.1	36%	18.9	35%	20.6	47%
Average Delay (s)	278	257	-7%	191	-31%	185	-33%	184	-34%
Average Journey Time (m:s)	08:43	08:05	-7%	06:12	-29%	06:09	-30%	05:56	-32%
Demand (veh)	11776	11776		11776		11776		11776	
Completed Trips (veh)	9188	9604	5%	10502	14%	10540	15%	10526	15%
Latent Demand (veh)	2439	2104	-14%	1100	-55%	1074	-56%	1311	-46%

Paramter	PM Peak - 2041								
	4pm - 5pm								
	2								
	Base	Option 2		Option 3		Option 4		Option 5	
	PM0041	PM0241	% diff	PM0341	% diff	PM0441	% diff	PM0541	% diff
VHT (h)	1704	1565	-8%	1208	-29%	1239	-27%	1139	-33%
VKT (km)	13983	14794	6%	14943	7%	15261	9%	15451	10%
Average Speed (km/h)	12.0	13.2	10%	17.1	42%	17.4	45%	19.1	59%
Average Delay (s)	370	318	-14%	229	[illegible]	[illegible]	-38%	204	-45%
Average Journey Time (m:s)	10:56	09:36	-12%	07:00	-36%	07:02	[illegible]	06:19	-42%
Demand (veh)	12065	12065		12065		[illegible]		12065	
Completed Trips (veh)	9345	9789	5%	10344	11%	10578	13%	10804	16%
Latent Demand (veh)	5167	4435	-14%	2692	[illegible]	2473	-52%	2539	-51%

Paramter	PM Peak - 2041								
	5pm - 6pm								
	3								
	Base	Option 2		Option 3		Option 4		Option 5	
	PM0041	PM0241	% diff	PM0341	% diff	PM0441	% diff	PM0541	% diff
VHT (h)	1751	1577	-10%	1321	-25%	1346	-23%	1215	-31%
VKT (km)	13642	14479	6%	13683	0%	14342	5%	15731	15%
Average Speed (km/h)	12.5	14.0	12%	14.9	19%	15.7	26%	18.1	44%
Average Delay (s)	393	329	-16%	289	-26%	278	-29%	218	-45%
Average Journey Time (m:s)	11:27	09:41	-15%	08:26	-26%	08:08	-29%	06:38	-42%
Demand (veh)	11851	11851		11851		11851		11851	
Completed Trips (veh)	9179	9778	7%	9401	2%	9934	8%	10984	20%
Latent Demand (veh)	8019	6775	-16%	5274	-34%	4540	-43%	3624	-55%

Intersection Statistics - AM Peak

2031 - AM Peak										
	7am - 8am					8am - 9am				
	1	1	1	1	1	2	2	2	2	2
Name	AM0031	AM0231	AM0331	AM0431	AM0531	AM0031	AM0231	AM0331	AM0431	AM0531
Logan Rd / Miles Platting Rd / Padstow Rd	101	60	74	69	85	108	74	90	84	91
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	29	28	25	24	21	37	36	27	26	26
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	29	29	28	29	32	26	26	26	26	27
Padstow Rd / Warrigal Rd	55	106	43	42	42	94	124	101	71	45
Logan Rd / Miles Platting Rd / Padstow Rd		-40%	-27%	-32%	-16%		-31%	-16%	-22%	-16%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp		-3%	-13%	-18%	-27%		-2%	-27%	-28%	-30%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp		1%	-2%	1%	9%		-1%	-1%	-1%	4%
Padstow Rd / Warrigal Rd		92%	-23%	-24%	-25%		32%	7%	-25%	-53%
Logan Rd / Miles Platting Rd / Padstow Rd	F	E	E	E	F	F	E	F	F	F
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	C	C	C	C	C	D	D	C	C	C
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	C	C	C	C	C	C	C	C	C	C
Padstow Rd / Warrigal Rd	E	F	D	D	D	F	F	F	E	D

2041 - AM Peak										
	7am - 8am					8am - 9am				
	1	1	1	1	1	2	2	2	2	2
Name	AM0041	AM0241	AM0341	AM0441	AM0541	AM0041	AM0241	AM0341	AM0441	AM0541
Logan Rd / Miles Platting Rd / Padstow Rd	118	84	93	91	96	119	103	97	93	97
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	31	27	25	24	27	37	43	28	30	29
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	31	30	27	27	28	28	31	26	26	27
Padstow Rd / Warrigal Rd	109	142	108	73	45	123	153	159	125	53
Logan Rd / Miles Platting Rd / Padstow Rd		-29%	-21%	-22%	-19%		-13%	-18%	-22%	-19%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp		-11%	-18%	-21%	-13%		15%	-25%	-19%	-22%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp		-4%	-13%	-14%	-10%		9%	-6%	-8%	-4%
Padstow Rd / Warrigal Rd		31%	0%	-33%	-59%		25%	30%	2%	-57%
Logan Rd / Miles Platting Rd / Padstow Rd	F	F	F	F	F	F	F	F	F	F
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	C	C	C	C	C	D	D	C	C	C
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	C	C	C	C	C	C	C	C	C	C
Padstow Rd / Warrigal Rd	F	F	F	E	D	F	F	F	F	D

Intersection Statistics - PM Peak

2031 - PM Peak															
	3pm - 4pm					4pm - 5pm					5pm - 6pm				
	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3
Name	PM0031	PM0231	PM0331	PM0431	PM0531	PM0031	PM0231	PM0331	PM0431	PM0531	PM0031	PM0231	PM0331	PM0431	PM0531
Logan Rd / Miles Platting Rd / Padstow Rd	108	75	83	85	92	120	77	88	89	90	113	82	92	92	93
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	24	24	23	23	20	28	27	25	24	23	28	29	29	27	25
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	43	40	29	30	29	38	37	31	31	31	40	41	32	31	31
Padstow Rd / Warrigal Rd	52	49	28	29	30	106	58	66	55	68	73	73	93	54	91
Logan Rd / Miles Platting Rd / Padstow Rd		-31%	-23%	-22%	-15%		-36%	-26%	-26%	-25%		-28%	-19%	-19%	-18%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp		1%	-7%	-7%	-18%		-3%	-10%	-13%	-18%		5%	4%	-3%	-9%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp		-6%	-32%	-30%	-32%		-5%	-20%	-18%	-20%		2%	-20%	-22%	-23%
Padstow Rd / Warrigal Rd		-5%	-46%	-45%	-43%		-45%	-38%	-50%	-36%		0%	26%	-27%	24%
Logan Rd / Miles Platting Rd / Padstow Rd	F	E	F	F	F	F	E	F	F	F	F	F	F	F	F
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	C	C	C	C	B	C	C	C	C	C	C	C	C	C	C
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	D	D	C	C	C	D	D	C	C	C	D	D	C	C	C
Padstow Rd / Warrigal Rd	D	D	C	C	C	F	E	E	D	E	E	E	F	D	F

2041 - PM Peak															
	3pm - 4pm					4pm - 5pm					5pm - 6pm				
	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3
Name	PM0041	PM0241	PM0341	PM0441	PM0541	PM0041	PM0241	PM0341	PM0441	PM0541	PM0041	PM0241	PM0341	PM0441	PM0541
Logan Rd / Miles Platting Rd / Padstow Rd	119	88	89	89	91	117	86	89	87	89	124	86	104	102	90
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	44	40	31	30	25	43	41	40	34	29	43	41	51	45	34
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	58	55	30	31	29	57	55	36	34	30	56	51	55	46	33
Padstow Rd / Warrigal Rd	56	59	37	38	30	100	67	76	82	50	133	78	100	126	62
Logan Rd / Miles Platting Rd / Padstow Rd		-26%	-25%	-25%	-24%		-26%	-24%	-25%	-24%		-31%	-16%	-18%	-28%
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp		-9%	-30%	-33%	-42%		-5%	-8%	-20%	-32%		-5%	20%	5%	-20%
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp		-5%	-48%	-46%	-49%		-3%	-36%	-42%	-48%		-9%	0%	-17%	-41%
Padstow Rd / Warrigal Rd		4%	-35%	-33%	-46%		-33%	-24%	-17%	-50%		-41%	-25%	-5%	-53%
Logan Rd / Miles Platting Rd / Padstow Rd	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
Logan Rd / Warrigal Rd / Pacific Motorway NB Off-ramp	D	D	C	C	C	D	D	D	C	C	D	D	D	D	C
Logan Rd / Holmead Rd / Pacific Motorway SB Off-ramp	E	E	C	C	C	E	E	D	C	C	E	D	E	D	C
Padstow Rd / Warrigal Rd	E	E	D	D	C	F	E	E	F	D	F	E	F	F	E

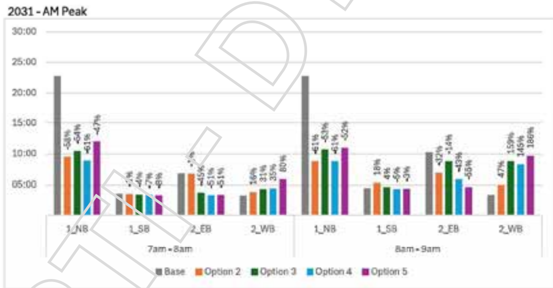
Travel Times - AM Peak 2031

AM Peak - 2031									
		7am - 8am				8am - 9am			
		1	1	1	1	2	2	2	2
ID	Scenario	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB
AM0031	Base	1365	214	406	196	1365	268	614	203
AM0231	Option_2	569	213	403	227	527	316	415	298
AM0331	Option_3	627	206	224	256	642	278	527	527
AM0431	Option_4	534	200	197	264	527	255	352	497
AM0531	Option_5	718	198	201	353	657	260	278	581

		7am - 8am				8am - 9am			
ID	Scenario	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB
Base	Base	22:45	03:34	06:46	03:16	22:45	04:28	10:14	03:23
Option 2	Option_2	09:29	03:33	06:43	03:47	08:47	05:16	06:55	04:58
Option 3	Option_3	10:27	03:26	03:44	04:16	10:42	04:38	08:47	08:47
Option 4	Option_4	08:54	03:20	03:17	04:24	08:47	04:15	05:52	08:17
Option 5	Option_5	11:58	03:18	03:21	05:53	10:57	04:20	04:38	09:41

Travel Time Difference (mm:ss)									
Base	Base								
Option 2	Option_2	-13:16	-00:02	-00:02	00:31	-13:58	00:48	-03:19	01:35
Option 3	Option_3	-12:18	-00:09	-03:02	01:00	-12:04	00:10	-01:27	05:24
Option 4	Option_4	-13:51	-00:15	-03:29	01:08	-13:58	-00:14	-04:22	04:54
Option 5	Option_5	-10:47	-00:17	-03:25	02:37	-11:49	-00:08	-05:36	06:18

Travel Time Difference (%)									
Base	Base								
Option 2	Option_2	-58%	-1%	-1%	16%	-61%	18%	-32%	47%
Option 3	Option_3	-54%	-4%	-45%	31%	-53%	4%	-14%	155%
Option 4	Option_4	-61%	-7%	-51%	35%	-61%	-5%	-43%	145%
Option 5	Option_5	-47%	-8%	-51%	80%	-52%	-3%	-55%	186%



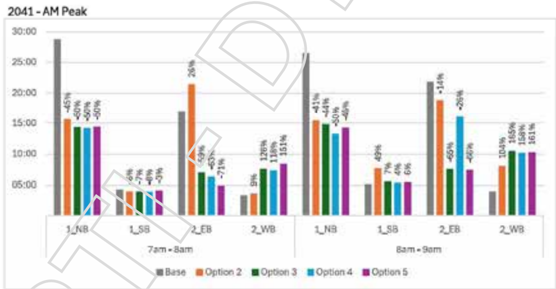
Travel Times - AM Peak 2041

AM Peak - 2041									
		7am - 8am				8am - 9am			
		1	1	1	1	2	2	2	2
ID	Scenario	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB
AM0041	Base	1722	256	1019	202	1588	309	1310	237
AM0241	Option_2	942	240	1285	221	932	460	1129	483
AM0341	Option_3	865	239	421	457	890	331	453	629
AM0441	Option_4	855	236	380	440	800	320	968	611
AM0541	Option_5	866	249	293	506	859	327	446	618

		7am - 8am				8am - 9am			
ID	Scenario	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB
Base	Base	28:42	04:16	16:59	03:22	26:28	05:09	21:50	03:57
Option 2	Option_2	15:42	04:00	21:25	03:41	15:32	07:40	18:49	08:03
Option 3	Option_3	14:25	03:59	07:01	07:37	14:50	05:31	07:33	10:29
Option 4	Option_4	14:15	03:56	06:20	07:20	13:20	05:20	16:08	10:11
Option 5	Option_5	14:26	04:09	04:53	08:26	14:19	05:27	07:26	10:18

Travel Time Difference (mm:ss)									
Base	Base								
Option 2	Option_2	-13:00	-00:15	04:26	00:19	-10:57	02:31	-03:00	04:06
Option 3	Option_3	-14:16	-00:17	-09:58	04:14	-11:38	00:21	-14:17	06:32
Option 4	Option_4	-14:27	-00:19	-10:39	03:58	-13:08	00:11	-05:42	06:14
Option 5	Option_5	-14:16	-00:07	-12:06	05:04	-12:10	00:17	-14:23	06:21

Travel Time Difference (%)									
Base	Base								
Option 2	Option_2	-45%	-6%	26%	9%	-41%	49%	-14%	104%
Option 3	Option_3	-50%	-7%	-59%	126%	-44%	7%	-65%	165%
Option 4	Option_4	-50%	-8%	-63%	118%	-50%	4%	-26%	158%
Option 5	Option_5	-50%	-3%	-71%	151%	-46%	6%	-66%	161%



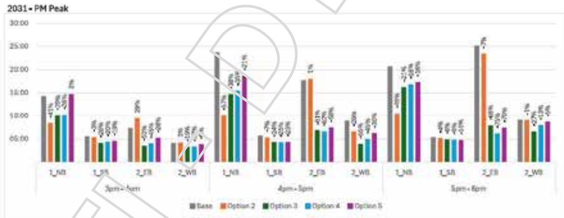
Travel Times - PM Peak 2031

PM Peak - 2031													
		3pm - 4pm				4pm - 5pm				5pm - 6pm			
		1	1	1	1	2	2	2	2	3	3	3	3
ID	Scenario	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB
PM0031	Base	857	337	442	247	1424	343	1066	539	1243	322	1512	561
PM0231	Option_2	508	327	571	255	609	320	1080	399	633	310	1406	546
PM0331	Option_3	611	251	211	201	883	262	415	240	977	295	478	401
PM0431	Option_4	617	268	245	204	929	257	401	299	1014	293	373	479
PM0531	Option_5	882	273	318	232	1125	265	453	378	1043	290	448	504

		3pm - 4pm				4pm - 5pm				5pm - 6pm			
ID	Scenario	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB
Base	Base	14:17	05:37	07:22	04:07	23:44	05:43	17:46	08:59	20:43	05:22	25:12	09:11
Option 2	Option_2	08:28	05:27	09:31	04:15	10:09	05:20	18:00	06:39	10:33	05:10	23:26	09:06
Option 3	Option_3	10:11	04:11	03:31	03:21	14:43	04:22	06:55	04:00	16:17	04:55	07:58	06:41
Option 4	Option_4	10:17	04:28	04:05	03:24	15:29	04:17	06:41	04:59	16:54	04:53	06:13	07:59
Option 5	Option_5	14:42	04:33	05:18	03:52	18:45	04:25	07:33	06:18	17:23	04:50	07:28	08:44

Travel Time Difference (mm:ss)													
Base	Base												
Option 2	Option_2	-05:50	-00:11	02:09	00:07	-13:35	-00:23	00:14	-02:19	-10:09	-00:12	-01:46	-00:05
Option 3	Option_3	-04:07	-01:26	-03:51	-00:46	-09:01	-01:22	-10:51	-04:59	-04:26	-00:27	-17:13	-02:30
Option 4	Option_4	-04:00	-01:09	-03:17	-00:43	-08:16	-01:27	-11:05	-04:00	-03:49	-00:29	-18:58	-01:12
Option 5	Option_5	00:24	-01:04	-02:04	-00:16	-04:59	-01:18	-10:13	-02:41	-03:20	-00:32	-17:44	-00:27

Travel Time Difference (%)													
Base	Base												
Option 2	Option_2	-41%	-3%	29%	3%	-57%	-7%	1%	-26%	-49%	-4%	-7%	-1%
Option 3	Option_3	-29%	-26%	-52%	-19%	-38%	-24%	-61%	-55%	-21%	-8%	-68%	-27%
Option 4	Option_4	-28%	-20%	-45%	-17%	-35%	-25%	-62%	-45%	-18%	-9%	-75%	-13%
Option 5	Option_5	3%	-19%	-28%	-6%	-21%	-23%	-58%	-30%	-16%	-10%	-70%	-5%



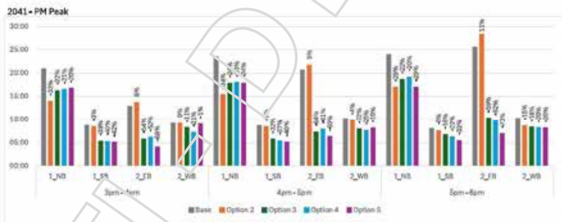
Travel Times - PM Peak 2041

PM Peak - 2041													
		3pm - 4pm				4pm - 5pm				5pm - 6pm			
		1	1	1	1	2	2	2	2	3	3	3	3
ID	Scenario	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB
PM0041	Base	1262	531	779	557	1411	523	1242	617	1441	491	1536	620
PM0241	Option_2	843	517	828	557	928	516	1305	594	1023	460	1710	528
PM0341	Option_3	980	322	355	499	1074	353	444	484	1124	410	625	508
PM0441	Option_4	994	321	378	438	1084	330	482	462	1153	381	589	498
PM0541	Option_5	1009	310	252	552	1071	314	387	497	1026	332	421	497

		3pm - 4pm				4pm - 5pm				5pm - 6pm			
ID	Scenario	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB	1_NB	1_SB	2_EB	2_WB
Base	Base	21:02	08:51	12:59	09:17	23:31	08:43	20:42	10:17	24:01	08:11	25:36	10:20
Option 2	Option_2	14:03	08:37	13:48	09:17	15:28	08:36	21:45	09:54	17:03	07:40	28:30	08:48
Option 3	Option_3	16:20	05:22	05:55	08:19	17:54	05:53	07:24	08:04	18:44	06:50	10:25	08:28
Option 4	Option_4	16:34	05:21	06:18	07:18	18:04	05:30	08:02	07:42	19:13	06:21	09:49	08:18
Option 5	Option_5	16:49	05:10	04:12	09:12	17:51	05:14	06:27	08:17	17:06	05:32	07:01	08:17

Travel Time Difference (mm:ss)													
Base	Base												
Option 2	Option_2	-06:59	-00:14	00:48	00:00	-08:03	-00:07	01:03	-00:23	-06:58	-00:31	02:54	-01:32
Option 3	Option_3	-04:42	-03:29	-07:04	-00:59	-05:37	-02:50	-13:18	-02:13	-05:17	-01:21	-15:11	-01:51
Option 4	Option_4	-04:27	-03:30	-06:41	-01:59	-05:27	-03:13	-12:40	-02:35	-04:48	-01:50	-15:47	-02:02
Option 5	Option_5	-04:12	-03:41	-08:47	-00:05	-05:40	-03:29	-14:15	-02:00	-06:55	-02:39	-18:35	-02:03

Travel Time Difference (%)													
Base	Base												
Option 2	Option_2	-33%	-3%	6%	0%	-34%	-1%	5%	-4%	-29%	-6%	11%	-15%
Option 3	Option_3	-22%	-39%	-54%	-11%	-24%	-32%	-64%	-22%	-22%	-16%	-59%	-18%
Option 4	Option_4	-21%	-40%	-52%	-21%	-23%	-37%	-61%	-25%	-20%	-22%	-62%	-20%
Option 5	Option_5	-20%	-42%	-68%	-1%	-24%	-40%	-69%	-19%	-29%	-32%	-73%	-20%



APPENDIX C – Future Base Demand Development Details

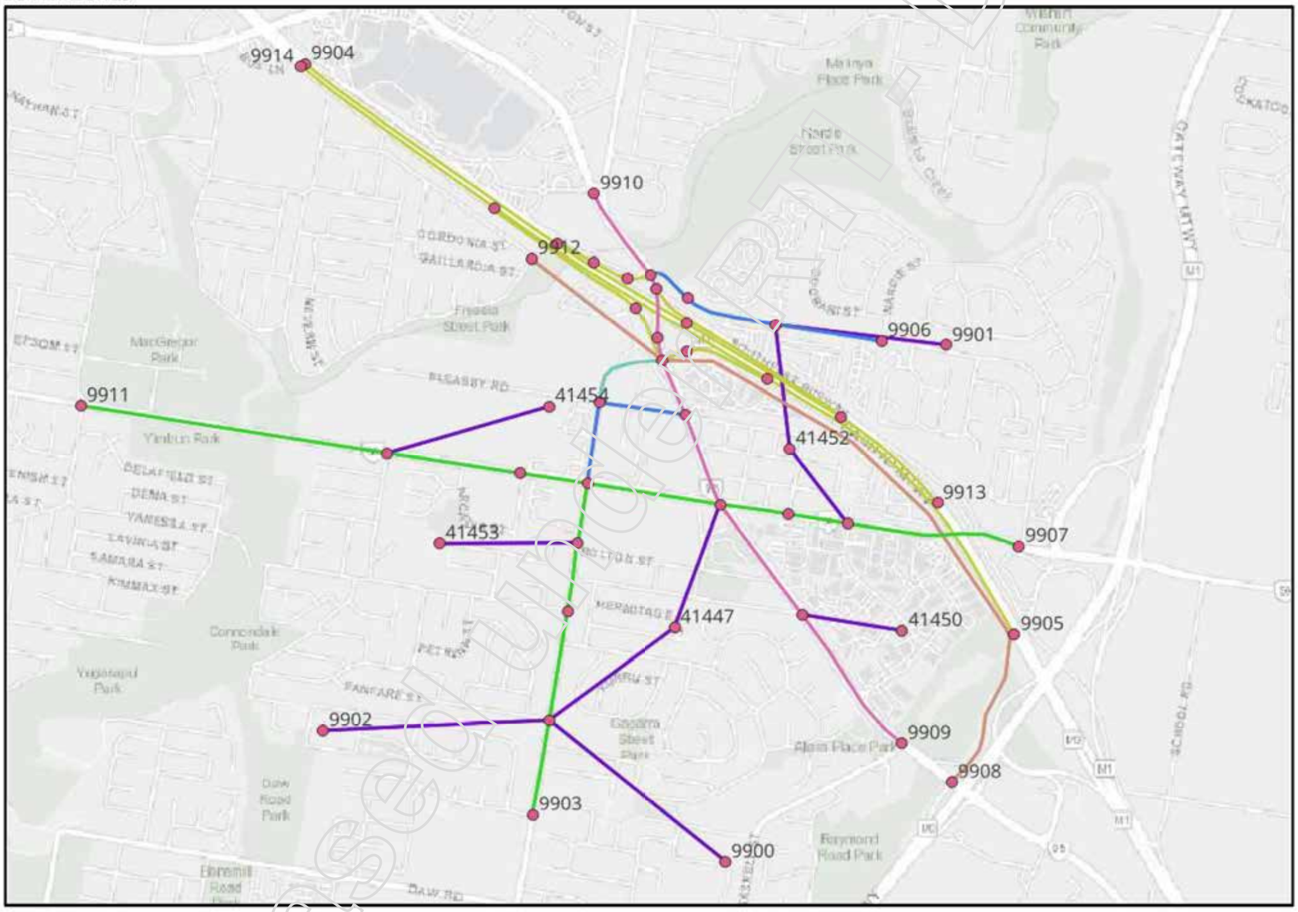
Future Base Demand Growth Assumptions

The demand development process followed a comprehensive assessment of the BSTM cordon outputs. Following discussions and input from all stakeholders (including TAU), the cordon demands were finalised for use in the Aimsun operational models.

In review of the BSTM cordon outputs, it was observed that several specific routes and ODs experienced minor drops in demand (negative growth). Given the uncertain nature of this assessment, an understanding of the location and that the total decrease in demands were minor in the overall assessment, it was decided that a nominal growth rate of 1% pa would be applied to these ODs. This was considered to be an acceptable and conservative approach for the study area assessment.

The following section details the strategic model OD differences across each scenario, showing locations that observed a negative growth that were updated when included in the Aimsun model.

BSTM Zones



BSTM OD Absolute Differences – AM Peak (2021 – 2031)

OD	9901	9903	9904	9905	9907	9908	9909	9910	9911	9912	41447	41452	41454
9901	0	-16	-11	0	0	0	-16	20	-26	0	-2	0	-2
9903	-14	17	-33	32	24	0	8	1	73	0	3	1	1
9904	4	10	0	931	-23	0	72	22	0	0	6	-3	3
9905	-4	-2	1329	0	0	0	57	145	193	0	5	-13	2
9907	0	19	27	0	0	0	16	12	399	0	10	16	6
9908	0	0	0	0	0	0	0	0	0	0	0	0	0
9909	14	3	28	0	11	0	-13	787	257	0	22	20	13
9910	5	13	-70	179	-57	0	-45	0	13	0	-10	2	-1
9911	-20	32	0	85	222	0	270	12	0	0	19	4	10
9912	0	0	0	0	0	0	0	0	0	0	0	0	0
41447	-2	2	-5	2	1	0	10	1	11	0	0	0	0
41452	0	1	-5	0	17	0	-7	10	3	0	0	0	0
41454	-1	1	-3	7	-2	0	5	0	9	0	0	0	0

BSTM OD Absolute Differences – AM Peak (2031 – 2041)

OD	9901	9903	9904	9905	9907	9908	9909	9910	9911	9912	41447	41452	41454
9901	0	0	-9	0	0	0	0	294	0	0	0	0	0
9903	2	96	-54	-25	-44	0	2	101	7	0	6	2	2
9904	2	-5	0	851	23	0	-49	22	0	0	-3	-1	-1
9905	-20	5	808	0	6	0	73	-29	34	0	2	3	3
9907	0	20	-27	0	0	0	42	-172	81	0	2	21	5
9908	0	0	0	0	0	0	0	0	0	0	0	0	0
9909	-12	2	-321	0	8	0	-139	694	5	0	5	-2	9
9910	15	39	-18	413	23	0	168	0	5	0	4	-7	10
9911	3	16	1	-16	72	0	133	19	0	0	12	34	16
9912	0	0	0	0	0	0	0	0	0	0	0	0	0
41447	0	1	-8	1	-3	0	2	6	3	0	0	0	0
41452	0	1	-5	6	-9	0	5	16	3	0	0	0	0
41454	0	2	0	-1	4	0	6	6	19	0	0	0	0

BSTM OD Absolute Differences – PM Peak (2021 – 2031)

OD	9901	9903	9904	9905	9907	9908	9909	9910	9911	9912	41447	41452	41454
9901	0	0	7	6	0	0	0	2	0	0	0	0	0
9903	-9	42	27	-41	77	0	-1	23	29	0	2	0	1
9904	-54	-24	0	707	-1	0	-59	-42	0	0	-9	-4	-3
9905	-31	-10	986	0	0	0	19	374	56	0	0	0	-1
9907	0	12	-14	0	0	0	4	-35	76	0	1	15	0
9908	0	0	0	0	0	0	0	0	0	0	0	0	0
9909	-2	32	75	15	58	0	-96	26	307	0	8	-3	5
9910	584	73	-32	406	71	0	1007	0	6	0	4	-2	-10
9911	-14	118	2	-128	616	0	131	36	0	0	10	12	23
9912	0	0	0	0	0	0	0	0	0	0	0	0	0
41447	-3	9	7	-17	33	0	16	-8	20	0	0	0	0
41452	0	3	-2	6	63	0	-43	-6	7	0	0	0	0
41454	-1	5	3	-17	24	0	5	1	10	0	0	0	0

BSTM OD Absolute Differences – PM Peak (2031 – 2041)

OD	9901	9903	9904	9905	9907	9908	9909	9910	9911	9912	41447	41452	41454
9901	0	0	0	7	0	0	0	11	0	0	0	0	0
9903	0	72	-2	-1	-5	0	2	25	9	0	1	1	1
9904	41	-58	0	-114	-43	0	-340	-9	0	0	-7	-4	-6
9905	-4	-20	291	0	0	0	-2	191	-56	0	-2	-5	-1
9907	0	66	27	0	0	0	33	21	-8	0	1	2	2
9908	0	0	0	0	0	0	0	0	0	0	0	0	0
9909	-5	16	-140	49	25	0	-343	65	124	0	0	-2	6
9910	245	59	-53	-168	-14	0	437	0	10	0	1	0	10
9911	0	25	-1	24	-55	0	-19	30	0	0	1	10	17
9912	0	0	0	0	0	0	0	0	0	0	0	0	0
41447	0	19	-2	1	-8	0	0	4	11	0	0	0	0
41452	0	5	-5	9	-34	0	34	6	21	0	0	0	0
41454	0	5	2	3	-2	0	11	7	19	0	0	0	0

APPENDIX D – Base Model Development Report

DYKMAN CONSULTING

BASE MODEL DEVELOPMENT REPORT

LOGAN SUB-ARTERIAL ROAD / MILES PLATTING ROAD / PADSTOW ROAD INTERSECTION UPGRADE PLANNING STUDY

JOB NO. 2420 | 19TH SEPTEMBER 2024

Document Control

Project Name	MPPL Intersection Upgrade Planning Study	Date of Issue	19/09/2024
Document No.	2420-REP-MPPL-Base Model Development-FINAL	Discipline	Traffic Modelling
Subject	Base Model Development Report	Project No.	2420
Author/s	NR [redacted]	Reviewed by	NR [redacted]
Prepared for	TMR	Attention to	[redacted]

Revision	Revision Date	Details	Authorised by
A	29 July 2024	Draft Report	NR [redacted]
B	19 September 2024	Final Report	[redacted]

Contents

Tables

Figures

1 Introduction

Dykman Consulting has been engaged by AECOM to provide traffic modelling services for the Department of Transport and Main Road's (TMR) Logan Sub-Arterial Road / Miles Platting Road / Padstow Road Intersection Upgrade (MPPL) Planning Study project (CN-22628).

1.1 Background

The MPPL intersection is located to the west of the Pacific and Gateway Motorways and has a primary function of connecting vehicle movements to and from the surrounding motorway network as well as locally based vehicle trips.

The key roads within the study area include Logan Road (U90) is a State-controlled Road with sub-arterial classification. In 2022 the AADT of Logan Road was approximately 43,300 vehicles per day which is an increase of approximately 8.8% compared to the 39,800 vehicles AADT five years prior (2017) including, 4.75% heavy vehicles. Logan Road forms a signalised, at-grade intersection with Miles Platting Road (eastern approach) and Padstow Road (western approach).

Over the past decade, the MPPL intersection and surrounding road network has experienced traffic congestion during the AM and PM peak periods. In particular, the vehicle queuing formation at the MPPL intersection limits the traffic operational capacity of the surrounding intersections of Warrigal Road / Padstow Road and the Logan Road / M3 interchange. Without intervention, these traffic operational performance levels are expected to deteriorate in the future given the planned population growth for the region.

With regard to road safety, 155 crashes were recorded by TMR between 2010 and 2020 within the study area. Approximately 67% of these incidents were located on Logan Road between the MPPL intersection and the M3 Pacific Motorway interchange. It is suspected there is a strong correlation between the number of road incidents within this corridor with the high level of traffic volumes and congestion formation.

Several planning studies have been delivered since 2010 to address the traffic congestion of the surrounding MPPL road network, including:

- **2010 Business Case –** preferred option to upgrade the MPPL intersection was not funded due to high project estimated costs.
- **2014 Planning Review –** the recommended intersection upgrade options were not progressed to development phase; however, an interim stage of the option was constructed in 2015.
- **2021 Planning Study and Options Analysis (OA) –** revisited an option of the 2010 Business Case with further investigations, analysis and options developed. This project established a preferred option and five low-cost interim options.

These studies have been reviewed and considered within this MPPL Planning Study project.

1.2 Subject Site

The study area location as well as the associated Aimsun microsimulation traffic model cordon area is presented in Figure 1.

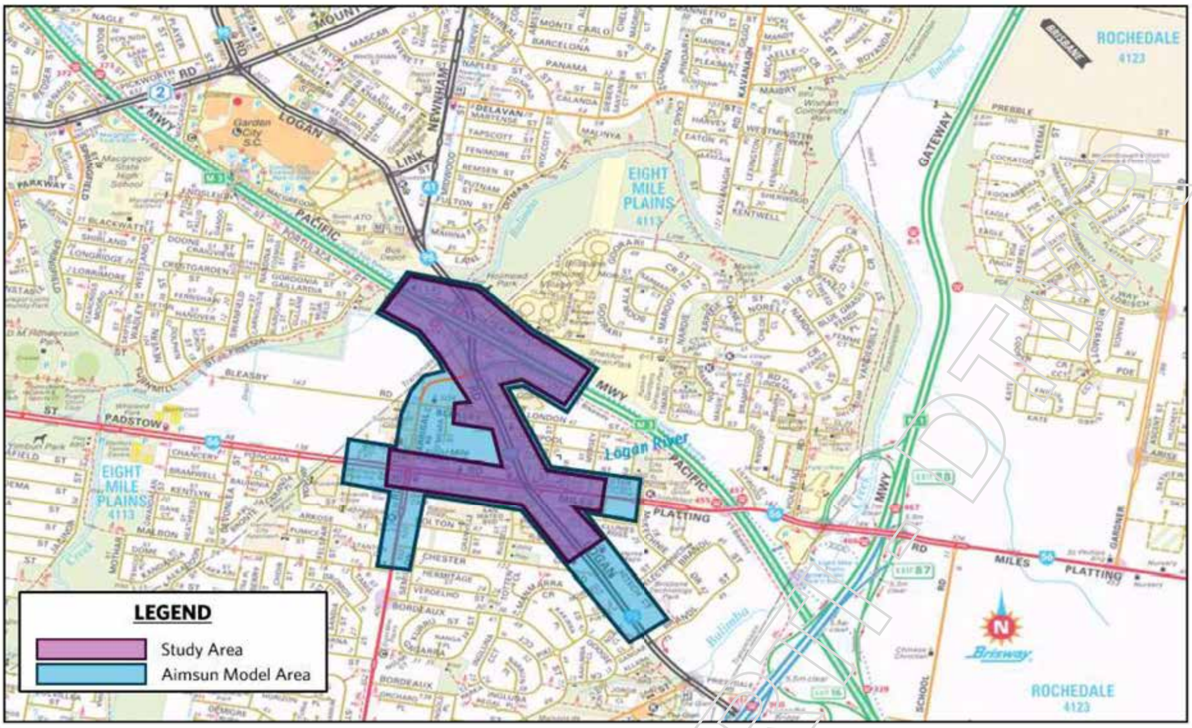


Figure 1 – MPPL Microsimulation Traffic Model and Project Study Areas (Source: Street-Directory)

1.3 Project Objectives

This project will be delivered in two phases with each phase having specific objectives which are as follows:

1. Business Case objectives:
    a. Conduct an extensive review of 2021 low-cost options analysis.
    b. With updated traffic data, re-establish low-cost designs to improve capacity and safety at the MPPL intersection.
    c. Propose a recommended upgrade option(s) that has a cost of no greater than $50m.
    d. Produce an OnQ Type 4in1 format Business Case of the recommended upgrade design.
2. Strategic Assessment of Service Requirements (SASR) objectives:
    a. Produce project recommended upgrades that progress through Gate 1 of the Project Assurance Framework process with a presentation to TMR's IIC Committee.
    b. Produce a SASR report that is accepted by TMR's Infrastructure Investment Committee.

This base model report outlines the development of the Aimsun microsimulation to be used as required for the transport modelling assessment needs of both the SASR and BC phases of the project.

1.4 Scope of Work

The scope of transport modelling work for the MPPL Planning Study is to comply with TMR's Transport Modelling Assessment Framework (TMAF) and includes:

- Prepare a 2024 calibrated and validated base microsimulation traffic model of study area, including the weekday AM and PM peak periods.
- Establish equivalent future base year scenario models including 2031 and 2041.
- Deliver microsimulation traffic models of options generated for the 2031 and 2041 future year scenarios.
- Produce traffic modelling reports in accordance with the TMAF process.

1.5 Report Outline

This report outlines all details relevant to the development, calibration and validation of the Aimsun base microsimulation model, including the following:

- Model Development Approach
- Inputs Summary
- Existing Traffic Models Review
- Existing Conditions Assessment
- Base Model
- Conclusion

2 Model Development Approach

2.1 Model Framework Overview

The model framework adopted for the MPPL Planning Study includes the use of TMR's BSTM and BMAM along with observed traffic data of existing conditions to develop a microsimulation traffic model. The flow chart of TMR model inputs for the development of the microsimulation traffic model is presented in Figure 2.

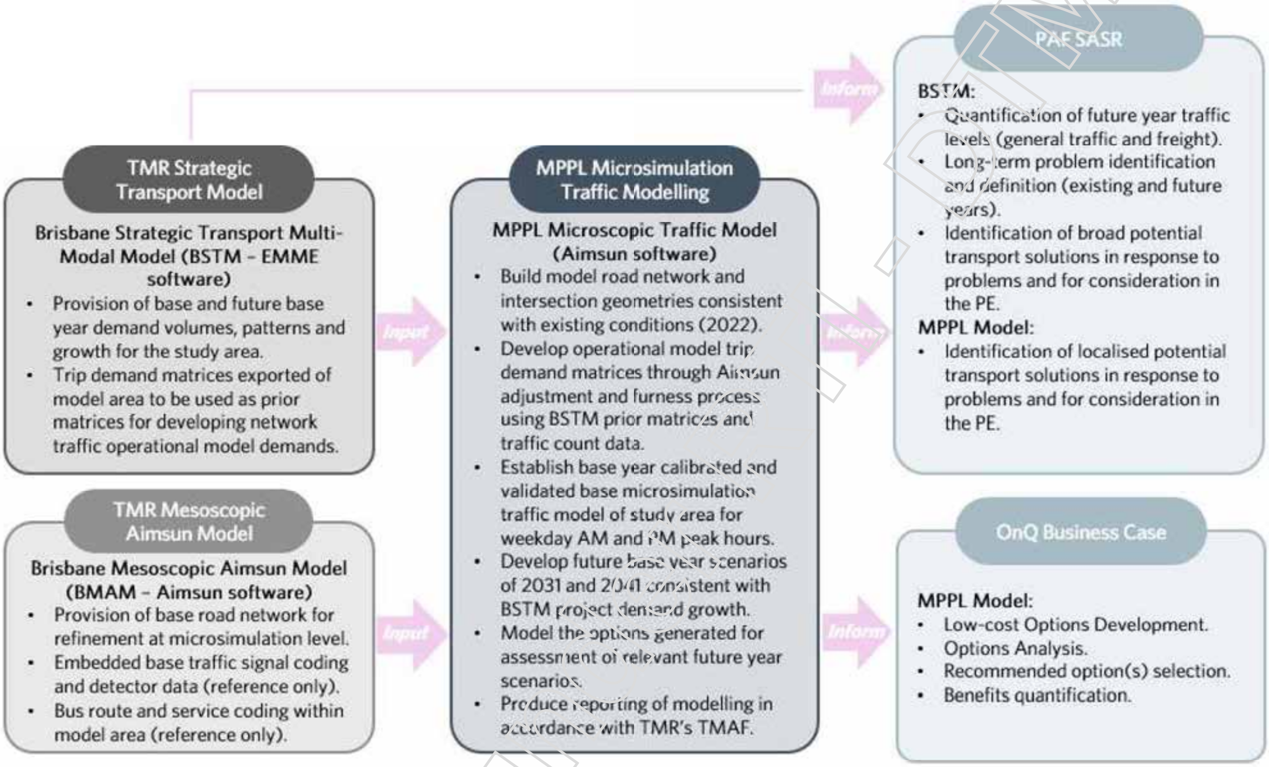


Figure 2 – MPPL Microsimulation Traffic Model Framework Overview

It is common practice to use the BSTM to identify the problem during the SASR phase, and then develop a detailed operational model (e.g. Aimsun) during the BC phase. However, in this instance, the OnQ BC and PAF SASR are being delivered in parallel, which provides an opportunity to use the operational traffic model for both phases of the project (as outlined in Figure 2).

For the SASR, the BSTM will be used to understand future transport network demands and travel patterns, and the proposed model methodology. Given the BSTM does not allow for a detailed representation of the impact of intersections, queues and weaving, the MPPL model, which will be calibrated and validated to local conditions within the study area, will provide further details on localised issues at the MPPL intersection and used for defining the problem for the study area of the SASR.

3 Inputs Summary

3.1 Overview

The inputs included for the development of the MPPL base model includes a combination of the latest transport models from TMR, traffic count data, signal data and travel times. A summary of the models, datasets and inputs used for this project are outlined in Table 1.

Table 1: Modelling Inputs Summary

Data Type	Source	Survey Date(s)	Survey Time(s)	Location(s)
Brisbane Mesoscopic Aimsun Model (BMAM) v2.3	TMR	N/A	N/A	Greater Brisbane region
BSTM-MMv2.4	TMR	N/A	N/A	Greater Brisbane region
Traffic Counts	Austraffic	Wednesday 12 October 2022	6am-6pm	• Logan Rd / Holmead Rd • Logan Rd / Padstow Rd / Miles Platting Rd • Logan Rd / Warrigal Rd / M1 Off-ramp
Travel Times	HERE (TMR)	October 2022	24-hour (15-minute intervals)	• Logan Rd (northbound / southbound) • Padstow Rd (eastbound/westbound)
STREAMS Signal Data	TMR	9/10/2023 – 15/10/2023, 13/05/2024 – 19/05/2024, 30/05/2024	6:00am – 6:00pm	• Logan Rd / Holmead Rd (M1418) • Logan Rd / Padstow Rd / Miles Platting Rd (M1420) • Logan Rd / Warrigal Rd / M1 Off-ramp (M1419)
SCATS Signal Data	BCC	Signal data reviewed and adopted from BMAM.		• Padstow Rd / Warrigal Rd (B0900)
DEM data	QLD Opensource Data	N/A		Greater Brisbane Region
GTFS data				

Further details on how the models and data inputs have been applied are provided in the following sections.

4 Existing Traffic Models Review

This section provides a high-level review of the available transport models adopted to support the development of the Aimsun microsimulation traffic model for this project.

4.1 Existing Strategic Transport Model(s)

TMR's TAU develops and maintains two (2) strategic transport models that cover the MPPL study area. The primary purposes of these models are to support transport planning and road infrastructure and policy testing by the department. TMR's two (2) strategic transport models relevant to this project are as follows:

- Southeast Queensland Strategic Transport Model (SEQSTM).
- Brisbane Strategic Transport Model, BSTM-MMv2.4 (BSTM).

For the MPPL Planning Study, TAU recommended the use of BSTM to provide baseline trip demands for the Aimsun microsimulation traffic model cordon area. BSTM is a robust four-step strategic transport model providing travel demand forecasts for Brisbane and adjacent Local Government Areas (LGAs). It is a multi-modal transport model that incorporates both highway and public transport assignments.

The following BSTM scenarios, design years and time periods have been provided by TMR and will be considered within this project:

- Model scenarios:
  - Base Case: 2021, 2026, 2031, 2036 and 2041.
  - Reference Case: 2026, 2031 and 2036.
- Time periods:
  - AM peak: 7:00am – 9:00am.
  - PM peak: 4:00pm – 6:00pm.

The key difference between the Base and Reference Case scenarios is their respective network assumptions, as stated in the BSTM TMAF documentation:

- Base Case: primarily committed and funded projects.
- Reference Case: constitutes network assumptions at various planning stages that would likely be included.

Due to possible impacts of the COVID-19 pandemic across the years 2020-2022, the re-calibration and rebase to 2021 may have significantly impacted travel demand and trip patterns, creating an unwanted impact on the future transport trend in the study area.

Strategic Model – BSTM is considered well calibrated and validated to existing conditions in 2016, and as such is considered appropriate for use in the MPPL Planning Study for providing the traffic demands for the base and future years as inputs for the operational model (seed matrices).

4.2 Existing Traffic Operational Model(s)

The Brisbane Mesoscopic Aimsun Model – BMAMv2.3 – (BMAM) was developed in 2017 and has been through continued development phases since. Since the Stage 1 development of the model, TMR has made it available to industry for various planning studies and model development projects in the Brisbane metropolitan region.

For the MPPL model area, a summary and illustration of the relevant BMAM network coding and current base model calibration results of traffic counts for the AM and PM peak hours is depicted in Figure 3.

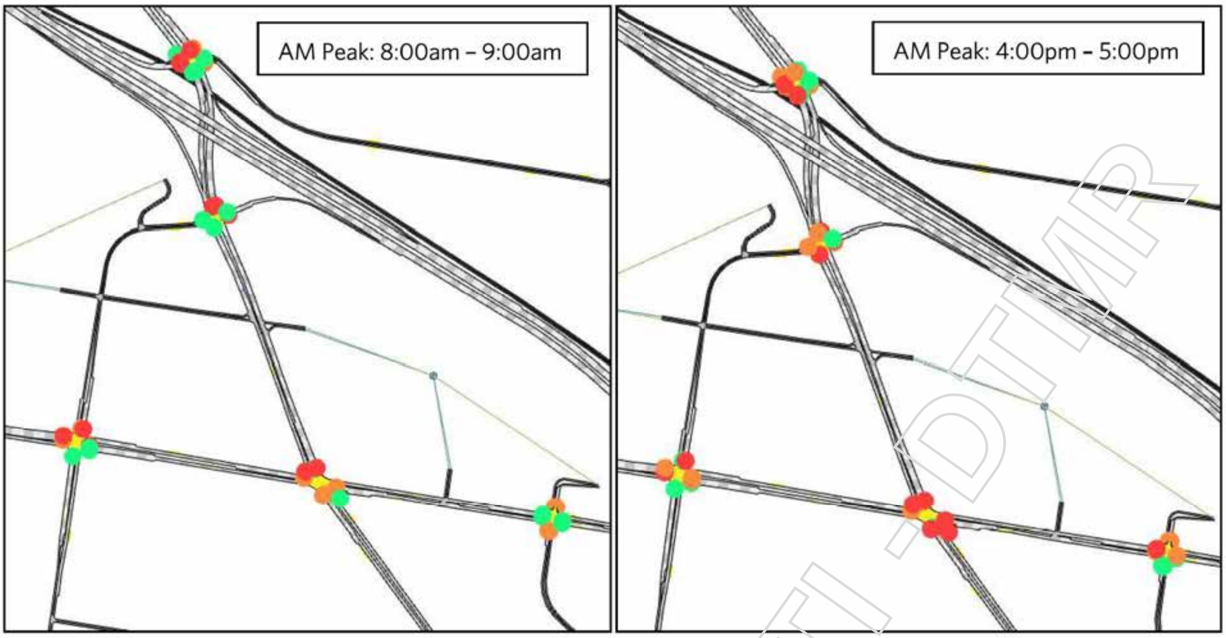


Figure 3: BMAM 2016 Calibration, MPPL Study Area

The observed traffic count data set for calibrating BMAM includes data sourced from different time periods and collection methods (i.e. both manual intersection surveys and loop detector counts). This contributes to the current base model calibration results of the latest version of BMAM within the MPPL study area not meeting industry guidelines, particularly with respect to GEH statistical criteria for intersection turn volumes. TAU advised the project team that the BMAM is currently being further developed in terms of general updates for 2021 data and network arrangements, including the model being calibrated and validated to these base traffic operational conditions. Given this is not included in release version 2.3, the BMAM will be applied in this project for general network arrangements and data review only (i.e. BMAM will not be used for demand development purposes).

Operational Model – The BMAM will only be considered for use in this project for general network coding and relevant traffic data inputs.

5 Existing Conditions Assessment

5.1 Overview

This section summarises the data provided to support the MPPL Planning Study, with the specific purpose in the development of the Aimsun microsimulation traffic model. The data also provides a high-level indication of the existing traffic operational performance of the study area. The following traffic data has been included in this review:

- Traffic survey counts
- Travel time data
- Signalised intersection data

5.2 Traffic Counts

Traffic survey counts were provided by TMR in the form of traffic surveys undertaken by Austraffic on Wednesday 12th October 2022. The following intersections were surveyed:

- Logan Road / Holmead Road (Site ID 12281)
- Logan Road / Padstow Road / Miles Platting Road (Site ID 13170)
- Logan Road / Warrigal Road (Site ID 15347)

Traffic counts were collected across a 12-hour period (6:00am - 6:00pm) for vehicle types: 'light vehicles', 'heavy vehicles', 'cyclists' and 'pedestrians'.

Active travel volumes within the Logan Road corridor, including both cyclists and pedestrians, are at a relatively low level compared to vehicle traffic volumes. The only intersection signalised crossing with more than 50 active travel users across the 12-hour period was observed at the Pacific Motorway northbound off-ramp crossing along the Principal Cycle Network's Veloway 1: Pacific Motorway. This location counted 25 pedestrian movements and 35 cyclist movements in the AM peak hour, while in the PM peak hour 36 pedestrian movements and 35 cyclist movements were recorded.

Traffic flow profiles for each of the key intersections are relatively consistent at a daily level. The AM peak has a more pronounced peak hour compared to the PM peak which observes a notably higher volume over a longer duration. The PM traffic volume levels and peak duration is likely due to a greater number of trip purposes being combined within the period, including school pick-up, work trip commuting, evening retail trips and recreation trips. The combined intersection daily traffic flow profiles are presented in Figure 4.

Figure 4: Traffic Count Profiles Across each Intersection (Wednesday 12th October 2022, Austraffic Survey)

With regard to heavy vehicle traffic volumes, the AM peak observes a higher heavy vehicle percentage than the PM peak, with the peak 1-hour time period (based on traffic counts) observed as follows:

- AM Peak: 7:45am – 8:45am.
- PM Peak: 4:45pm – 5:45pm.

The above is charted in Figure 5 for traffic counts recorded across all sites for the 12-hour period.

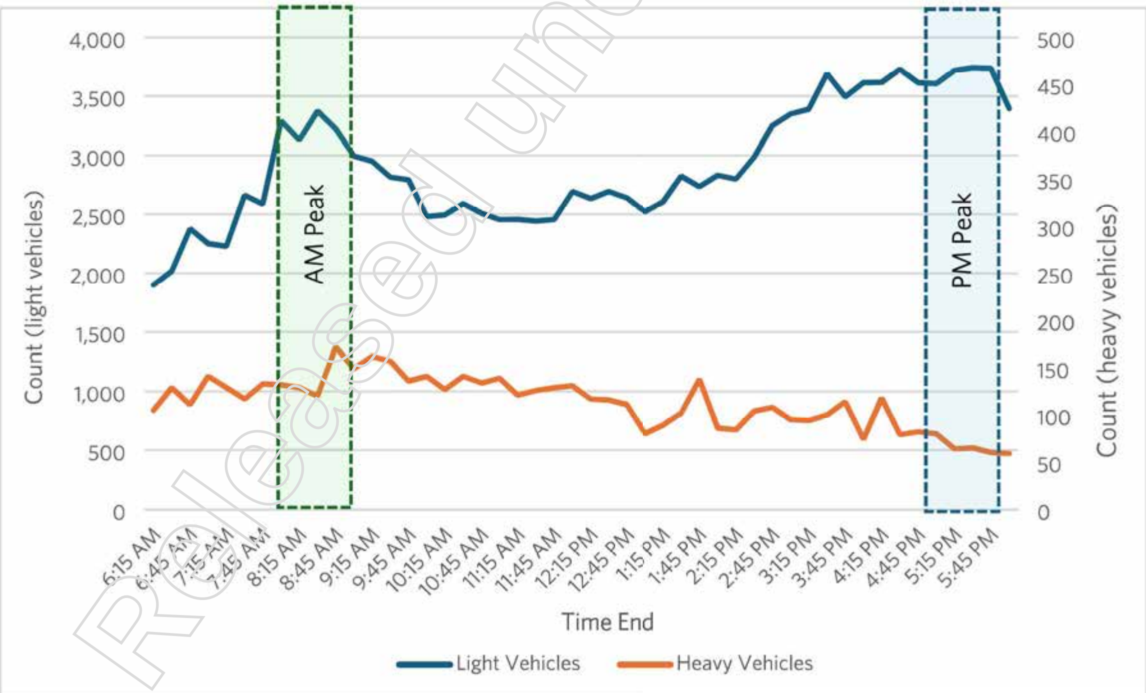


Figure 5: Peak Hour Review

The Aimsun base model is to incorporate a 2-hour AM peak period and 3-hour PM peak period. For this purpose, the following time periods have been chosen:

- AM Peak: 7:00am – 9:00am
- PM Peak: 3:00pm – 6:00pm

In addition to the above, analysis of data extracted from the QLD Government Data Portal has been undertaken for Site ID 135689, Logan Road, North of Miles Platting Road. The locality of this site is presented in Figure 6.

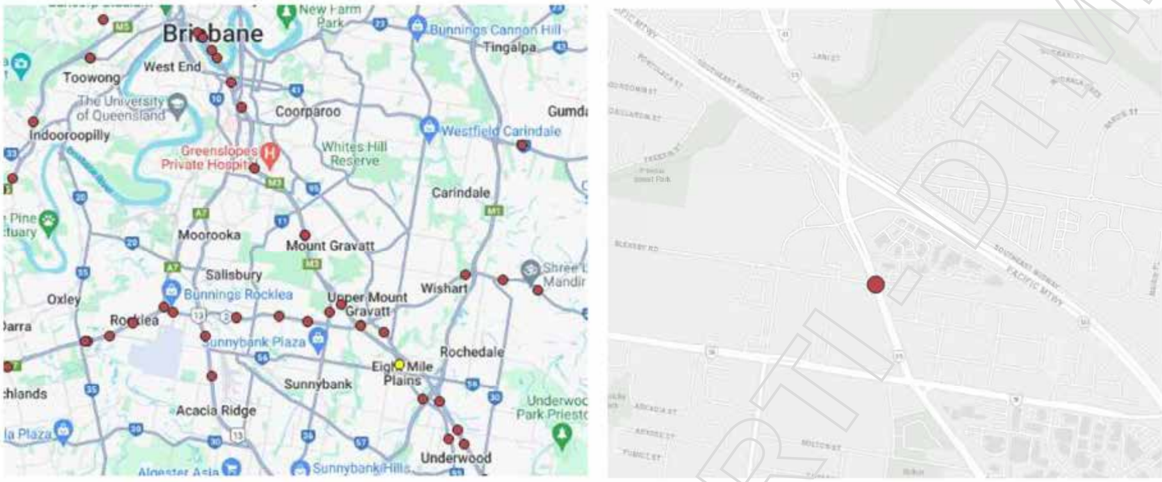


Figure 6: TMR Count Site Location – ID 135689 (QLD Government Data Portal)

Data for this station has been extracted and analysed across the available years, 2012 – 2022, with a summary of the data presented in Figure 7 and Figure 8.

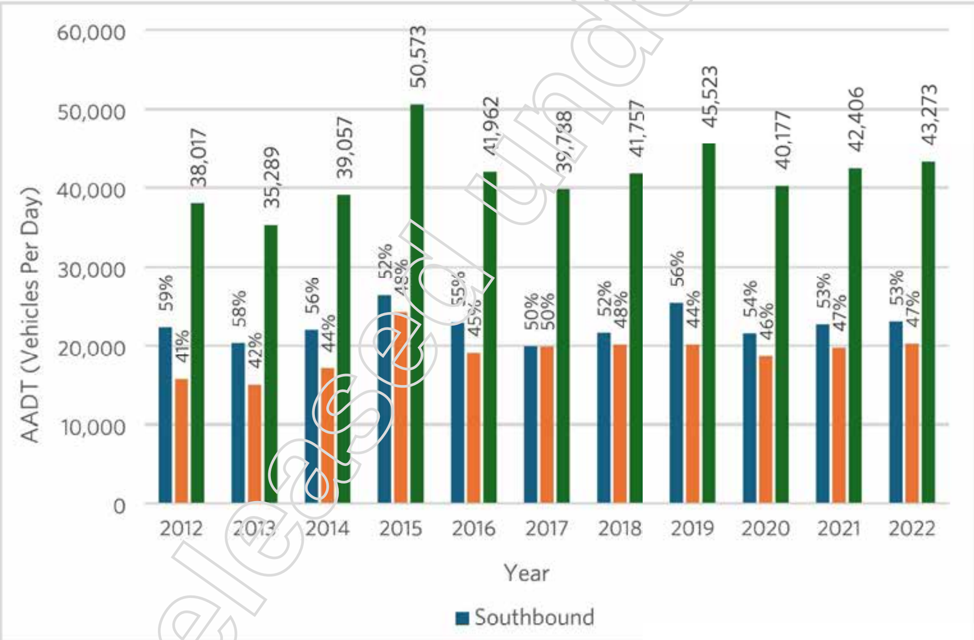


Figure 7: AADT Traffic Counts, 2012 – 2022 (TMR Site ID 135689)

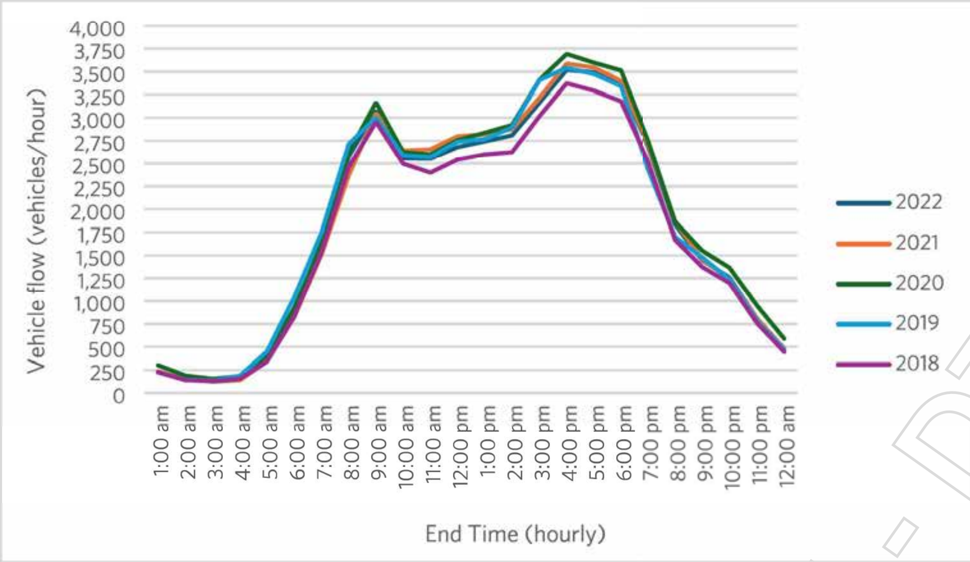


Figure 8: AADT Traffic Count Profiles, 2018-2022 (TMR Site ID 135689)

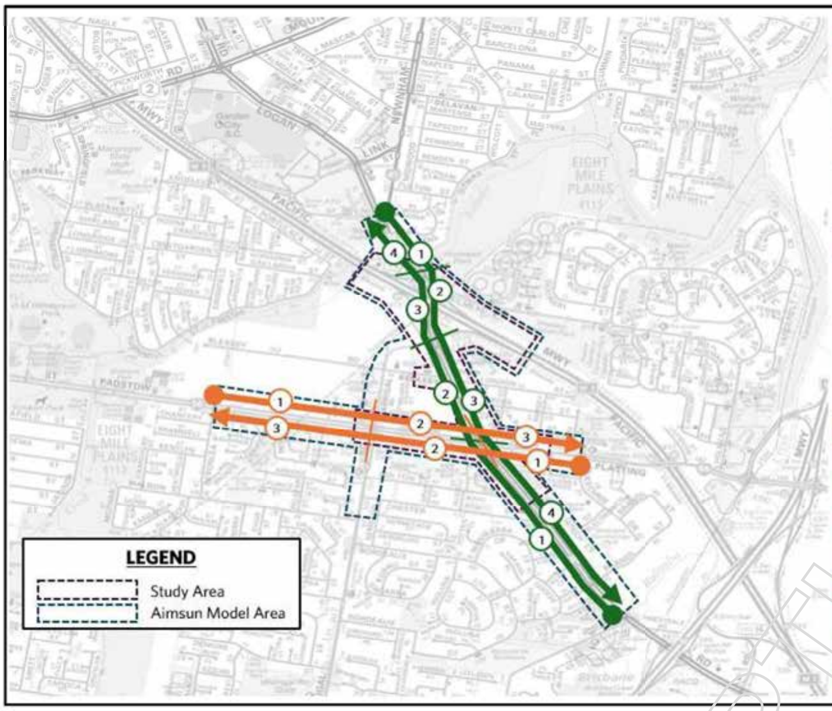
The following key findings are noted in review of the available historical TMR AADT counts on Logan Road:

- AADT between 2012-2022 recorded a peak in 2015 of approximately 50,500 vehicles.
- AADT for the years of 2020, 2021 and 2022 were lower than that observed in 2019, believed to be a result of the daily travel pattern and volume impacts of the COVID-19 pandemic.
- Southbound traffic (54%) is generally higher than northbound traffic (46%).

Traffic Counts – Based on the review undertaken above, the traffic survey counts provided for this analysis are considered appropriate for use as a calibration dataset in the base model development phase of the project.

5.3 Travel Time data

The base microsimulation traffic model for the MPPL Planning Study is to be validated with observed travel time data. TMR provided travel time data extracted from HERE for the primary traffic routes and segments as presented in Figure 9.



Logan Rd Northbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	Gaskell St	Padstow Rd	1.05km
2	Padstow Rd	Warrigal Rd	0.50km
3	Warrigal Rd	Holmead Rd	0.30km
4	Holmead Rd	MacGregor St	0.35km

Logan Rd Southbound TT Route Segments (2.2km)

Segment	From	To	Distance
1	MacGregor St	Holmead Rd	0.35km
2	Holmead Rd	Warrigal Rd	0.30km
3	Warrigal Rd	Padstow Rd	0.50km
4	Padstow Rd	Gaskell St	1.05km

Padstow Rd Eastbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	Devonlea St	Warrigal Rd	0.65km
2	Warrigal Rd	Logan Rd	0.45km
3	Logan Rd	McKechnie Rd	0.45km

Padstow Rd Westbound TT Route Segments (1.5km)

Segment	From	To	Distance
1	McKechnie Rd	Logan Rd	0.45km
2	Logan Rd	Warrigal Rd	0.45km
3	Warrigal Rd	Devonlea St	0.65km

Figure 9: MPPL Microsimulation Traffic Model Travel Time Validation Routes and Segments (Source: Street-Directory)

The segmented HERE travel time was originally extracted for the week of 10/10/2022 – 14/10/2022 across 24-hours for each day in 15-minute intervals. The provided data includes details on both speed and travel time data specifications. Given the small segmentation of HERE data, these were aggregated to the route segmentations outlined above to a level appropriate for model validation.

The analysis of average travel times for full routes, averaged across each 15-minute period and compared for each day of the week, are provided for all four travel routes in Figure 10 to Figure 13.

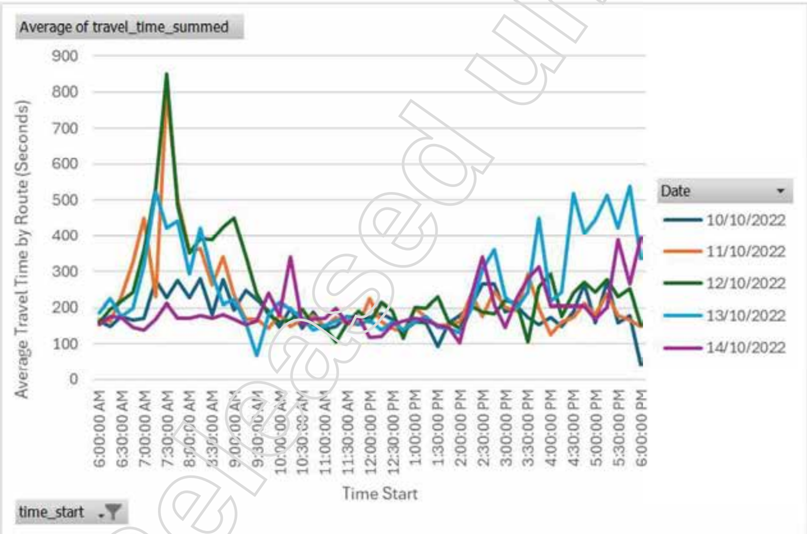


Figure 10: Average HERE Travel Times – Logan Road, Northbound (10/10/22 – 14/10/22)

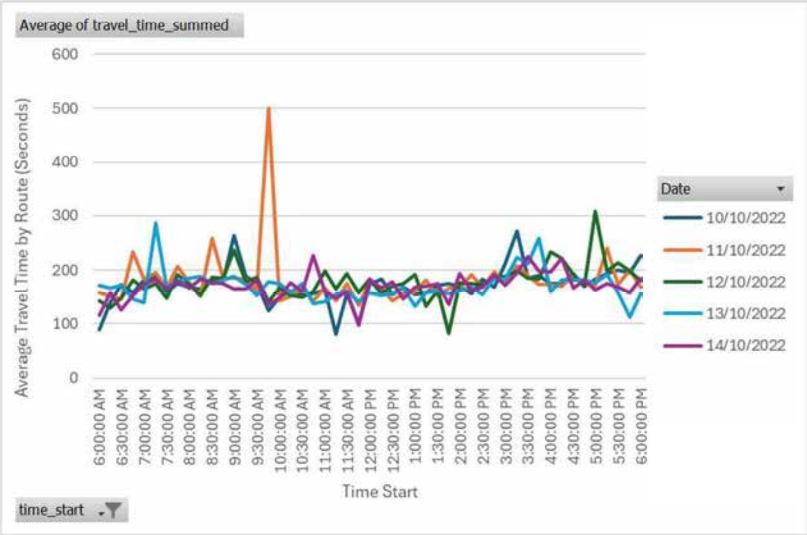


Figure 11: Average HERE Travel Times – Logan Road, Southbound (10/10/22 – 14/10/22)

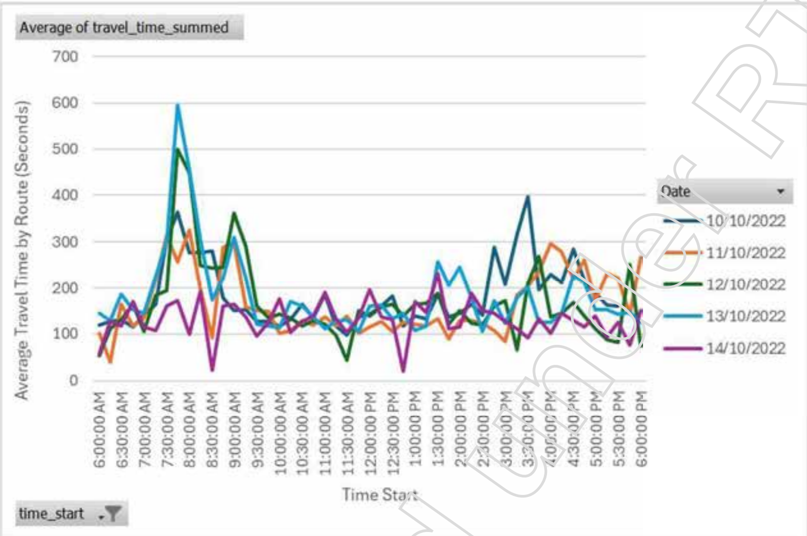


Figure 12: Average HERE Travel Times – Padstow Road, Eastbound (10/10/22 – 14/10/22)

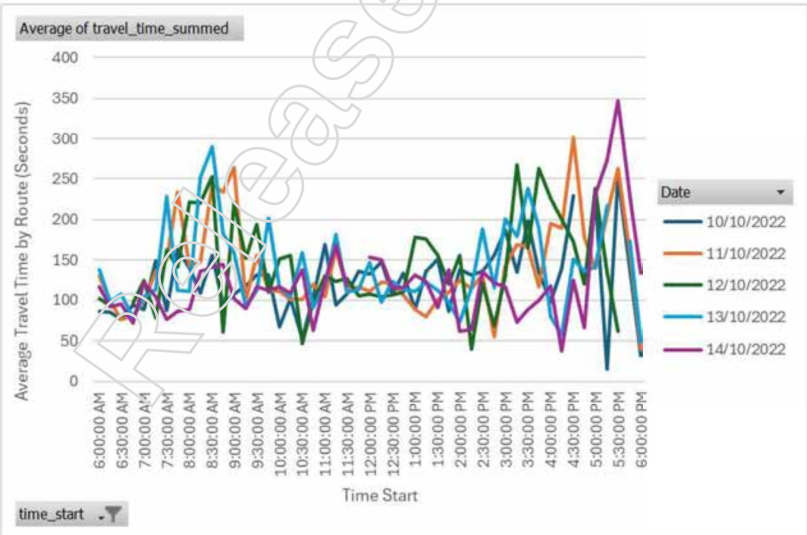


Figure 13: Average HERE Travel Times – Padstow Road, Westbound (10/10/22 – 14/10/22)

The primary existing travel time performance findings for each route are as follows:

- The longest travel times occur in the AM peak for Logan Road northbound and Padstow Road eastbound.
- Traffic congestion is observed during the PM peaks for Logan Road northbound and Padstow Road westbound routes at lower levels compared to the AM peak.
- The survey dates produce travel times that reflect relative overall traffic counts for the network, with the peak directional AM travel time northbound on Logan Road reaching a range near observed maximum travel times for the date 12/10/22.
- The days of week with the greatest travel time (typical congested scenario) are considered Tuesday to Thursday, with Mondays and Fridays indicating a likely higher work from home scenario (resulting in a less congested network).

It was identified that gaps in data existed for various individual link segments for the week of provided sample data, most prominently for the eastbound and westbound routes on Padstow Road. Consequently, average travel times for the entire month of October 2022 were supplied. The same analysis was undertaken across all 'average' days of the supplied data including appropriate Tuesdays – Thursdays of each week.

The data was grouped to relevant segments as defined in Figure 9, with the exception of segments west of Warrigal Road which were still unable to be sourced. This was not deemed critical for the development of the base model.

HERE travel times were grouped by segment across each peak hour (AM and PM peaks), with average travel times summed, as well as minimum and maximum for each 15-minute average taken across all average days. This array of data enabled the summary of average travel times by segment and by peak period, as well as minimum, maximum and +/- 15% results for comparison in the validation of the base model.

A summary of average travel times for each key route by peak hour for model validation is highlighted in Table 2.

Table 2: Observed Travel Times (HERE Data)

Peak	Time	Route	Direction	Travel Times (m:ss)		
				Average	Minimum	Maximum
AM Peak	7am – 8am	Logan Rd	Northbound	8:13	3:10	24:10
			Southbound	3:04	2:03	6:30
		Padstow Rd / Miles Platting Rd	Eastbound	4:05	1:11	11:38
			Westbound	2:05	1:02	6:10
	8am - 9am	Logan Rd	Northbound	5:49	2:55	13:17
			Southbound	3:07	2:14	5:47
		Padstow Rd / Miles Platting Rd	Eastbound	4:12	1:28	10:01
			Westbound	3:13	1:21	8:07
PM Peak	3pm – 4pm	Logan Rd	Northbound	4:46	2:15	15:25
			Southbound	3:24	2:20	5:54
		Padstow Rd / Miles Platting Rd	Eastbound	2:42	1:13	7:45
			Westbound	2:37	1:06	6:43
	4pm – 5pm	Logan Rd	Northbound	4:56	2:15	14:25
			Southbound	3:12	2:16	5:46
		Padstow Rd / Miles Platting Rd	Eastbound	3:21	1:39	7:08
			Westbound	3:05	1:19	8:01
	5pm – 6pm	Logan Rd	Northbound	5:49	2:10	19:05
			Southbound	3:20	2:13	6:46
		Padstow Rd / Miles Platting Rd	Eastbound	2:38	1:19	5:44
			Westbound	3:27	1:14	9:17

The relevant insights from the analysis of travel time data include the following:

- Northbound route along Logan Road is the most congested route across all peak periods.
- The maximum segment-based travel time totals show significant variance from the minimum and average travel times.
- The eastbound route, particularly on the approach to the MPPL intersection has significant variation in observed travel times.

Further to the above, analysis of individual link segments' average speeds in comparison to Google Traffic were established to enhance appreciation of and confidence in the data representing congestion patterns to be used for base traffic modelling. The analysis of AM and PM peak periods is represented in Figure 14 and Figure 15.

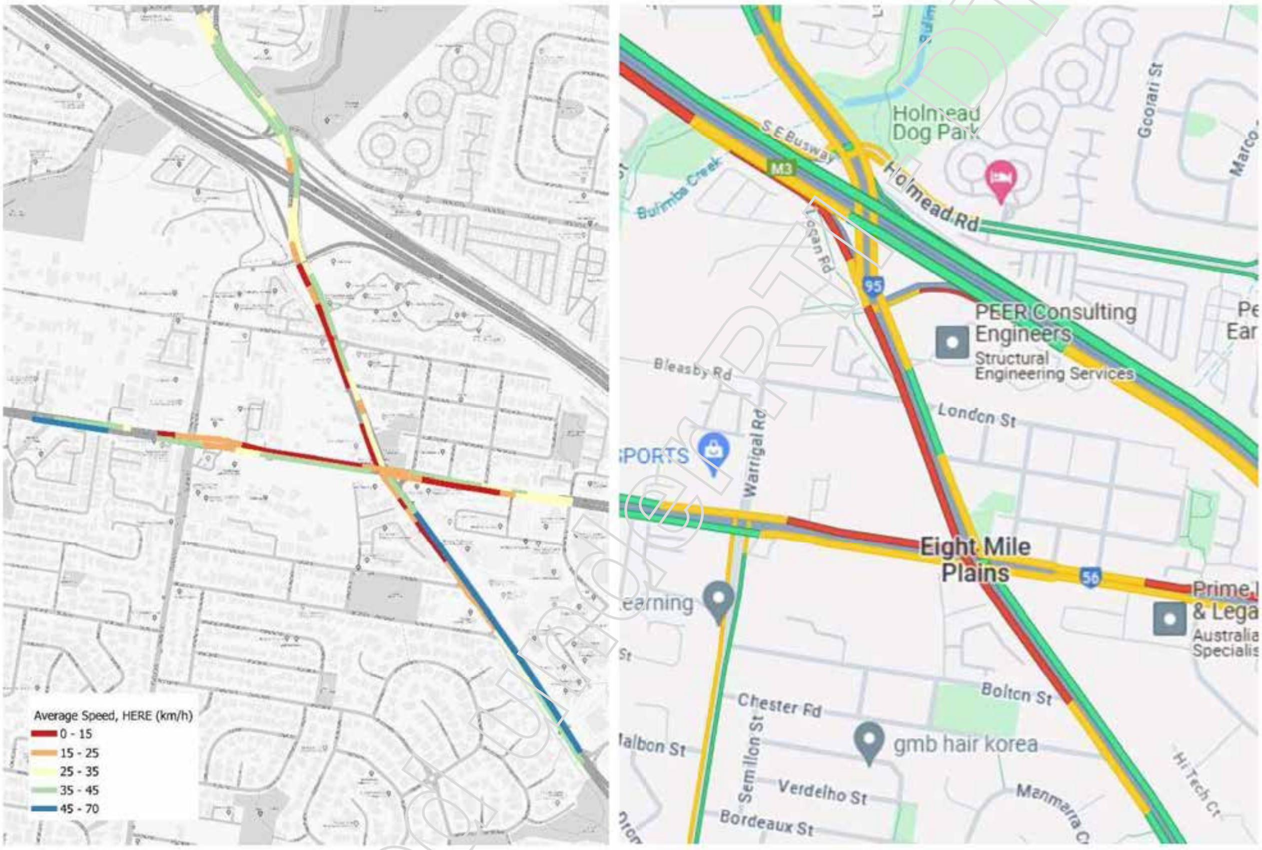


Figure 14: Average Speed (HERE) vs Google Traffic Congestion (AM Peak, 7:45am – 8:45am)

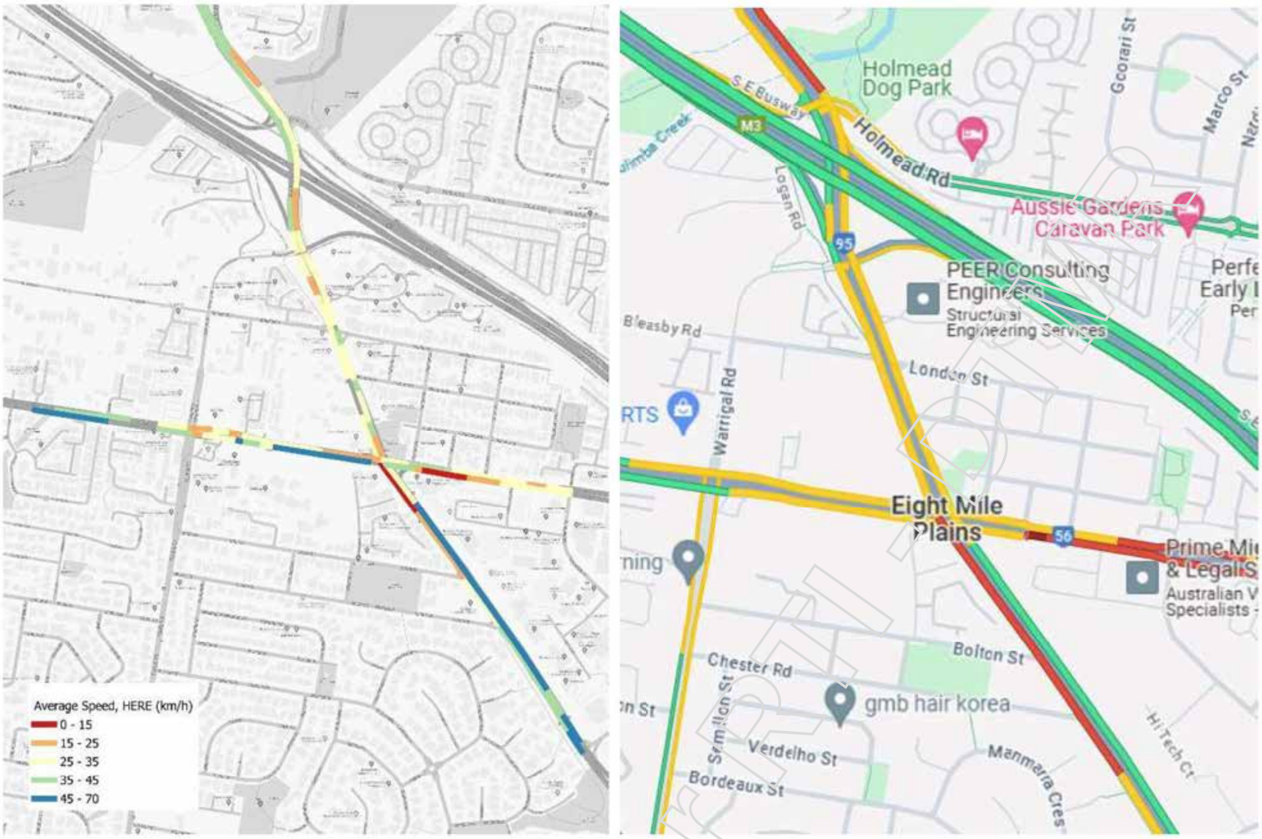


Figure 15: Average Speed (HERE) vs Google Traffic Congestion (PM Peak, 4:45pm – 5:45pm)

The average speeds for the road network from HERE appear to be relatively consistent with estimated Google Traffic maps for the region in both peak periods.

Travel Times – Based on the review of available base model validation traffic data, the HERE travel time data provided for this study is considered appropriate for use as a validation dataset in the base model development phase of the project.

5.4 Signalised Intersection Data

The study area includes three (3) STREAMS signalised intersections and one (1) SCATS signalised intersection:

- Logan Rd / Holmead Rd (M1418)
- Logan Rd / Padstow Rd / Miles Platting Rd (M1420)
- Logan Rd / Warrigal Rd / M1 Off-ramp (M1419)
- Padstow Rd / Warrigal Rd (B0900)

5.4.1 STREAMS Signal Data

Relevant signal plan information and signal timing outputs, Intersection Cycle Analyser (ICA) data, have been provided by TMR for the STREAMS intersections across a 12-hour period (6:00am – 6:00pm), for the following dates:

- 9/10/2023 – 15/10/2023
- 13/05/2024 – 19/05/2024
- 30/05/2025

The provided signal data was reviewed in terms of consistency and appropriateness for use in the base model development. The following key findings and recommendations are noted:

- No missing recordings or errors in recordings across key peak period times.
- Consistency in actual cycle times and phase times deployed within each day and peak period, particularly in the AM peak period for all intersections.
- Offsets to be reviewed and run accordingly to match observed conditions and recorded plan details.

Recorded cycle times presented in the charts of Figure 16 (2024) and Figure 17 (2023) depict each of the three (3) STREAMS intersections for the dates 30/05/2024 and 10/10/2023. These charts highlight the variation in cycle times over time for both respective days.

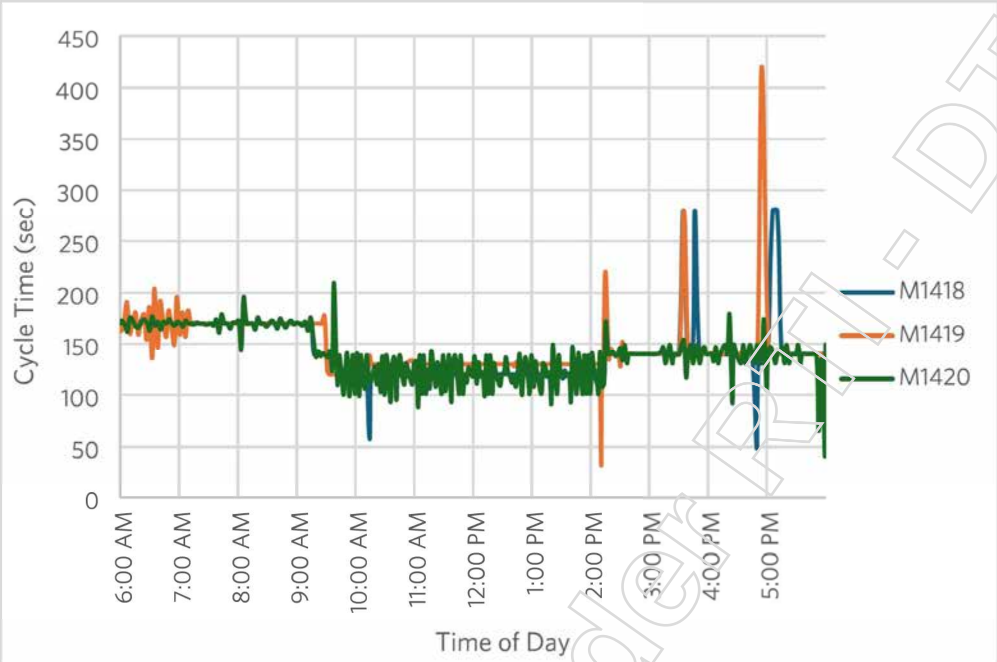


Figure 16: Intersection Cycle Times (6:00am – 6:00pm, 30 May 2024)

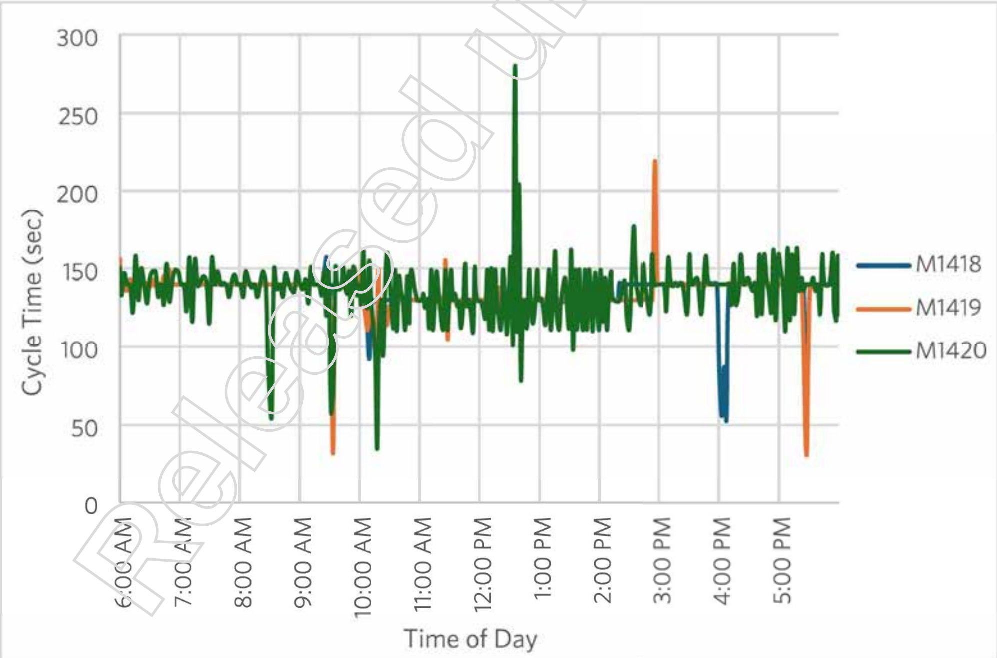


Figure 17: Intersection Cycle Times (6:00am – 6:00pm, 10 October 2023)

The key item to note in this review, is that the AM peak cycle times change between 2023 (140 seconds) and 2024 (170 seconds). This was confirmed with TMR as a direct requirement for servicing the motorway northbound off-ramp demand. Although the data for model calibration and validation has been taken from 2022, where presumably the cycle times were 140 seconds, the cycle times have been implemented as the observed existing traffic signal settings (2024). It is acknowledged this poses a potential challenge in the calibration and validation process, however it is considered to be a higher priority to replicate the latest observed cycle times given this change was specific in purpose to accommodate motorway ramp traffic demands.

The average cycle times (excluding outliers and double cycling) were relatively consistent in 2024, with all three (3) intersections comprising the following arrangements:

- AM Peak: 170 seconds
- PM Peak: 140 seconds

5.4.1.1 Ramp Metering

Ramp metering data was supplied by TMR. This data indicated that ramp metering operated for the northbound on-ramp from 7:20am – 8:20am. Further assessment of ramp-metering was observed on site to confirm appropriate implementation within the base model.

STREAMS Signal Data – The signal data provided will include enough detail to efficiently model actuated signal control settings in the base Aimsun microsimulation traffic model.

5.4.2 SCATS Signal Data

SCATS signal timing data was not provided for use in the base model development. Given the one (1) SCATS intersection is located external to the MPPL study area, it was deemed not critical for model development. Signal plans and timings provided as part of the BMAM were reviewed and used as appropriate for the development of fixed signal timings in the MPPL base model.

SCATS Signal Data – No SCATS data was provided; however, appropriate SCATS signal timing data was extracted from the BMAM and used as appropriate for the MPPL base model development.

5.5 Site Inspection

To ensure a well-rounded understanding of existing conditions operation relevant to this study, two (2) site inspections were undertaken on the following dates:

- Friday 17 May 2024
- Tuesday 9 July 2024

The following key traffic operational performance observations relevant to base model development are as follows:

- AM Peak:
    - Ramp metering operated as recorded in the provided dataset, activated from approximately 7:20am – 8:20am. This ran with 6 seconds red time, and 2-4 vehicles (across 2 lanes) entering within the green allocation. There was significant vehicle queueing on the downstream motorway mainline itself during ramp metering activation, however there was no instance where the vehicle queue lengths from the northbound on-ramp extended back to Logan Road.
    - The MPPL intersection experienced significant variations in queue lengths for each approach:
        - Minor southbound vehicle queueing observed, with most vehicle queuing occuring for vehicles turning left (ineffective in lane utilisation).
        - No vehicle queues observed on the west approach, with vehicles clearing every cycle (unutilised green time observed).

- Eastbound vehicle queue has a high degree of fluctuation in length, but extends more than halfway towards the Warrigal Road intersection.
- Extensive northbound vehicle queuing observed, extending beyond visible line of sight from the MPPL intersection.

  - Observations at the MPPL intersection also indicated the following:
    - Sub-optimal coordination northbound during AM peak, with green-time assigned when downstream intersection red (i.e. does not permit movement of vehicles ahead).
    - Eastbound vehicles through movements were blocked in some instances by vehicles not adhering to the road rule of entering a signalised intersection area when the driver can pass through entirely without stopping.
    - Pedestrian signal crossings for each slip lane were off unless activated by pedestrian movement. No pedestrian movements were observed during either site visit.
    - Eastbound left-turn movement vehicles observed to use service station as rat-run during congested periods. Indicatively up to approximately 50 vehicles per hour could elect to rat-run through the service station.
  - Warrigal Road, Logan Road and motorway off-ramp observations:
    - Green time allocation for motorway off-exceeded traffic flow demand.
    - The largest volume of pedestrian and cyclist movements were observed within the study area on the south approach (east-west). The phase for this movement was called every cycle, either by pedestrians or for the northbound U-turn facility.
  - Bleasby Road traffic operations:
    - Approximately 150 vehicles / 15-minutes during AM peak (i.e. up to approximately 600 vehicles per hour). Significant vehicle queuing at this location, even with a dedicated continuous lane into Logan Road northbound carriageway. The lane utilisation was inefficient due to weaving with Logan Road northbound traffic movements. A number of vehicles were observed entering with desired through or right turn lanes (moving out of left turn continuous lane). Irrespective of downstream destination beyond the motorway interchange, a number of drivers did not treat it as a continuous lane, rather a give-way control, stopping until the driver identified an appropriate gap in traffic flow to enter Logan Road.

- PM Peak:
  - Less traffic congestion across study area than observed during AM peak.
  - More consistent congestion across the network by approach and along each corridor.
  - Observations at MPPL intersection:
    - Significant southbound congestion, particularly for right-turn lanes (one full lane). Considered a long look-ahead distance, with vehicles making this lane decision early. Although this approach is congested, most vehicles cleared through each cycle.
    - Minor northbound and eastbound traffic except on approach to the MPPL intersection.
    - High degree of fluctuation of westbound vehicle queue lengths, with the most traffic congestion across cycles resulting in queues extending to upstream signalised intersections. Non-adherence to line marking observed, with some vehicles queueing for right turn through median and previous right turn pocket.

Most site observations were consistent through both peak periods and across both site visit dates. Observations are also consistent with general interpretation of supplied traffic data.

6 Base Model

6.1 Introduction

The following section of the report outlines the following:

- Strategic transport model assessment.
- Base model development (including adopted inputs, assumptions and methodology).
- Base model calibration and validation results.

6.2 Strategic Transport Model Assessment (BSTM)

Further to the initial summary in Section 4.1, the following details the assessment undertaken of the base model BSTM scenarios, including:

- Subarea analysis performed based on the operational model boundary for the Base Case 2016 AM and PM scenarios.
- The demand matrices by vehicle classification were extracted from the BSTM to be used as the seed demand matrices for the operational model of the three recorded vehicle classifications.
    - Private vehicle.
    - Medium commercial vehicle, MCV (class 3-4 by Austroads Classification).
    - Heavy commercial vehicle, HCV (class 5 upward by Austroads Classification).
- The demand matrices were output in PCU units and then to vehicle unit by dividing the matrices by the PCU factors of 2 for MCV and by 3 for HCV. Given the traffic counts were supplied only for light vehicles (cars) and heavy vehicles (trucks), the MCV and HCV matrices were grouped and developed as single heavy vehicle matrices, with the final operational vehicle type representing heavy vehicle specifications observed on site.

The cordon area analysed from BSTM including the associated travel zone system is presented in Figure 18.

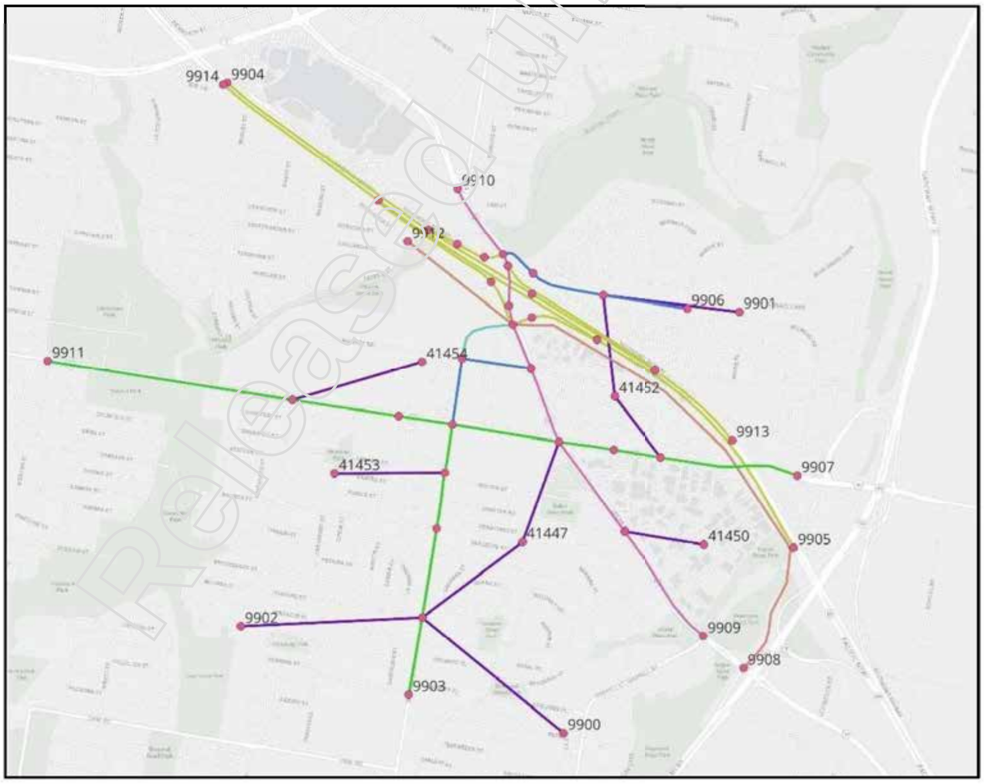


Figure 18: BSTM Cordon and Travel Zone System

6.3 MPPL Aimsun Base Model

6.3.1 Base Model Development

6.3.1.1 Software

The latest version of Aimsun next (Version 23.0.1) was used for this assessment.

6.3.1.2 Network

The base network was developed utilising Nearmap, Google StreetView and observed existing conditions (2024) on site. This included operational nuances specific to the congested network operation in this study area (i.e. use of paved road carriageway beyond traffic lane line-markings). Road types and observed speeds were matched to existing road hierarchy and structure with reference made to the provided strategic model and as shown in the 'Street Directory' (Australia Map, Street Smart – street-directory.com.au).

6.3.1.3 Topography

Section elevations have been coded within the model to ensure appropriate delays have been incorporated to reflect the vertical geometry of the road network within the study area. The following steps were followed:

- Digital Elevation Data (DEM) downloaded from Queensland opensource datasets.
- DEM (.tif) file was then imported using the 'Apply Elevation Using DEM' tool within Aimsun.
- Elevations were reviewed within a 3D view of the network and updated as required with reference to BCC opensource contour maps.

6.3.1.4 Model Extents

The model includes all appropriate road network links and connections within the study area. The modelled network and road hierarchy is shown below in Figure 19.

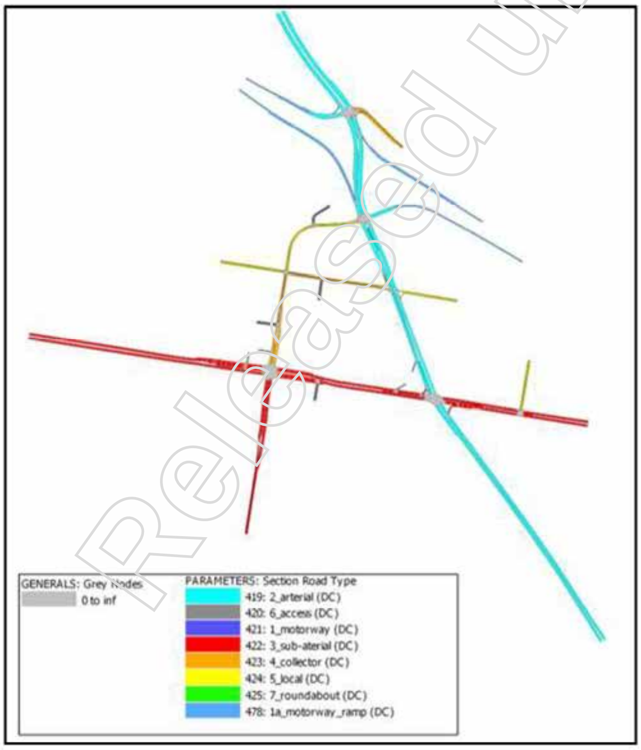


Figure 19: Model Road Network

6.3.1.5 Time Periods

The modelled peak periods consist of a 2-hour AM peak period and 3-hour PM peak period, determined in the initial analysis of the surveyed intersection traffic counts. Further to this, a 1-hour warm-up and 1-hour cool-down have been applied to both peak periods. A summary of the specific warm-up, cool-down and peak hour periods are outlined in Table 3.

Table 3: Model Peak Periods

Peak Period	Warm-up	Peak Period	Cool-down
AM Peak	6:00am – 7:00am	7:00am – 9:00am	9:00am – 10:00am
PM Peak	2:00pm – 3:00pm	3:00pm – 6:00pm	6:00pm – 7:00pm

6.3.1.6 Vehicle Types

Two vehicle types were adopted for the base model development: light vehicles (LV) and heavy vehicles (HV). Matrices for both vehicle types were developed and calibrated separately. A summary of specific vehicle type characteristics is included below in Table 4, which adopt appropriate industry standards as well as vehicle classification behaviours observed on site.

Table 4: Vehicle Type Characteristics

Aimsun Parameter		Light Vehicle (LV)	Heavy Vehicle (HV)
Length	Mean (m)	4	12
	Minimum (m)	3.5	10
	Maximum (m)	4.5	25
	Deviation (m)	0.5	2
Speed Limit Acceptance	Mean	0.9	0.9
	Minimum	0.8	0.8
	Maximum	1.05	1.05
	Deviation	0.1	0.1
Max Acceleration	Mean (m/s)	3	1.5
	Minimum (m/s)	2.6	1.2
	Maximum (m/s)	3.4	1.8
	Deviation (m/s)	0.2	0.15

6.3.1.7 Public Transport

All public transport stops, lines and schedules have been coded as fixed routes as per the latest timetable available on TransLink website and within the GTFS datasets. The Aimsun GTFS import tool was used, with all imported lines reviewed after the initial import.

The bus service lines imported to the base model included150, 152,155, 156, 299, 545, and P157.

6.3.1.8 Active Transport

Given the low volumes of both pedestrians and cyclists within the study area, these user classes were not explicitly modelled. At locations where pedestrian movements were considered to impose influential delays on vehicles, these were incorporated into the traffic signals as a late start. The following specific inclusions are noted:

- Late starts applied during the AM peak at the MPPL intersection.
- Significant active travel demand seen at the Warrigal Road traffic signals; however, the pedestrian phase east-west is called at the same time as the northbound U-turn from Logan Road – as such no additional changes were required at this location.

6.3.1.9 Traffic Signals

6.3.1.9.1 STREAMS

STREAMS traffic signal characteristics for the base year models have been derived from an extensive analysis of outputs provided by TMR. All intersections have been developed with actuated control, with signal groups, associated detector functionalities and phasing specifications determined from analysis of the provided signal control plans, plan details and historic signal data (ICA data). Relevant actuated control inputs (i.e. minimum/maximum green times, detector actuation, coordinated phases) have been calculated from the relevant signal timing data outputs for the date of 30 May 2024, with reference made to previous data outputs where applicable, particularly in response to the changes in cycle times during the AM peak.

6.3.1.9.2 SCATS

Data outputs have been extracted from BMAM for the Warrigal Road / Padstow Road signalised intersection. Minor adjustments were made where applicable, given the timings have been calculated previously as fixed timings.

Given the limited pedestrian activity in the study area, late starts for pedestrian activated crossings were only included where required to appropriately influence vehicle delays and route choice. This was most noticeable at the Warrigal Road / Padstow Road signalised intersection. An example of pedestrian activation and the modelled late start is presented in Figure 20.

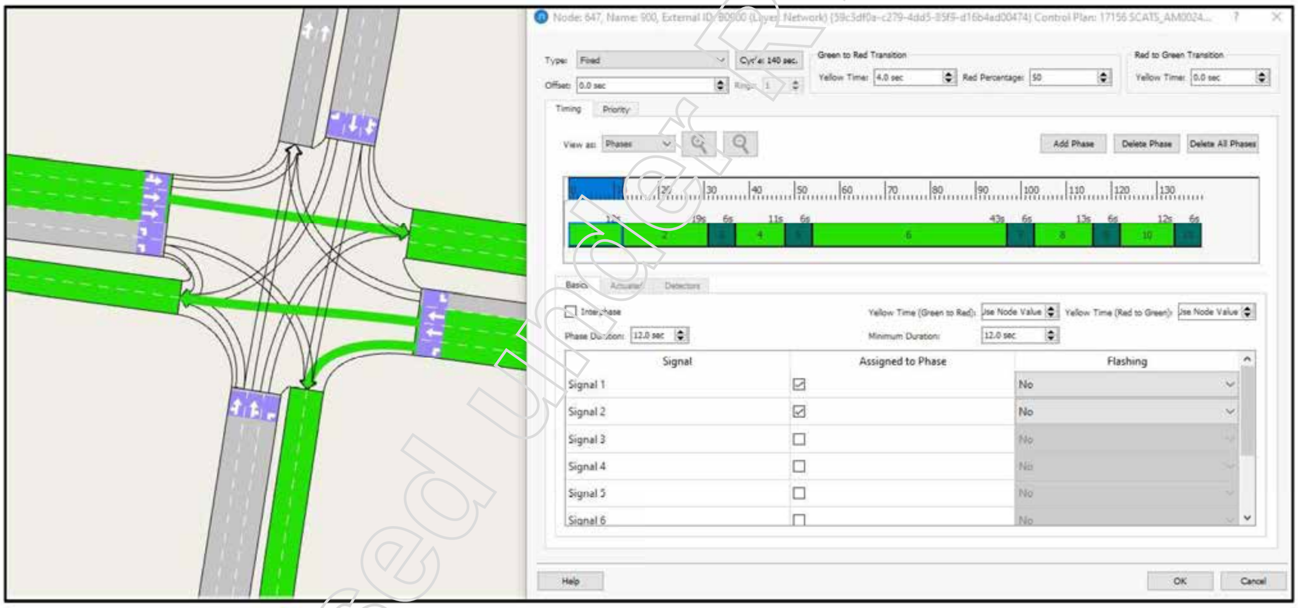


Figure 20: Pedestrian Late Start Phase for B0900 (AM Peak)

6.3.1.9.3 Ramp Metering

Ramp metering was implemented on the northbound Pacific Motorway on-ramp, with signal timing settings set to replicate observed conditions, noting the vehicle queue formation was never observed to have impacted traffic flow for the mainline on Logan Road.

6.3.1.9.4 End Constraints

Traffic congestion was observed (on site, in Google Traffic and based on HERE travel time data) for the locations exiting the model towards signalised intersections. Although these were not deemed critical for model operation, simple end constraints have been applied to represent metering green times, with cycle times and appropriate green proportions applied based on outputs from the BMAM.

6.3.1.10 Traffic Management

No specific traffic management settings were implemented in the model, with the only global network settings altered at the Bleasby Road continuous lane entry to the northbound Logan Road carriageway. On-site observations indicated inefficient merging in this location, with vehicles observed to delay their entry to Logan Road, treating the intersection as a Give Way control, rather than a continuous lane. To simulate this observed driver behaviour and replicate associated increased delay times, section parameters were updated with an additional one second reaction time at stop and acceleration factor set to 'Decrease (x0.5)'.

6.3.1.11 Traffic Zones

The model zoning system comprises of 15 travel zones, as shown in Figure 21.

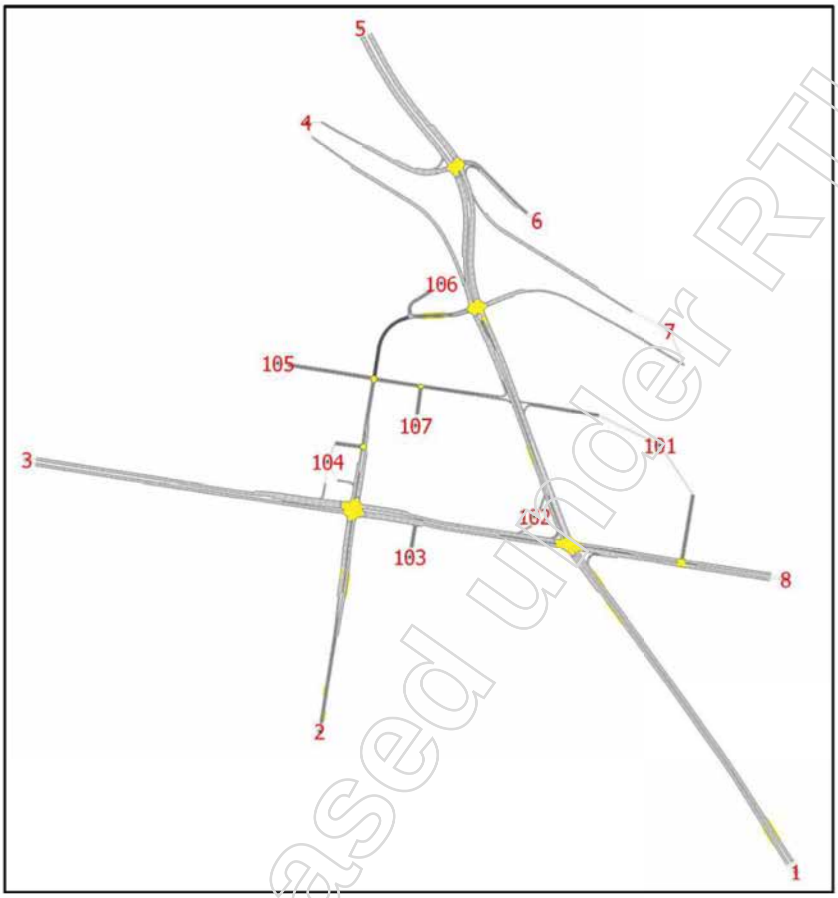


Figure 21: Aimsun Model Zones

6.3.1.12 Demand Development

Demands have been developed using cordon demand outputs from BSTM. The following steps were then used in the base model demand development process:

1. Cordon Matrices from BSTM – cordon matrices were extracted from BSTM for the specified subarea. These matrices provided the initial OD structure at the travel zone level. Demands were kept separate for light vehicles; however, MCV and HCV demands were grouped as a single 'heavy vehicle' type.
2. Zone aggregation and disaggregation – given the finer detailed required in the microsimulation model subarea, internal zones were disaggregated from the BSTM cordon outputs to match the refined Aimsun model area.

3. Matrix finessing – survey data was analysed to determine known origin and destination totals and known origin-destination pair totals. The matrices developed in step 2 were then refined (finessed) based on the known totals, while maintaining the overall structure of the matrices.
4. Static adjustments – the matrices from step 3 were then imported into Aimsun where the static adjustment tool was used to further refine the matrices to better represent known demands within the Real Data Set (RDS).
5. Departure Adjustment – static departure adjustment scenarios were then used within Aimsun to determine appropriate 15-minute demand profiles from the matrices refined in step 4.
6. Manual adjustments – given the unknown demand splits at the Warrigal Road / Padstow Road intersection, some minor adjustments had to be made in terms of the split to/from these locations (zones 2 and 3). Further to this, given the congested nature of the model, additional minor changes had to be made to the profiling to ensure appropriate build-up of traffic.

The resulting demand profiles for the average weekday AM and PM peak periods, inclusive of warm-up and cool-down are shown below in Figure 22 to Figure 25.

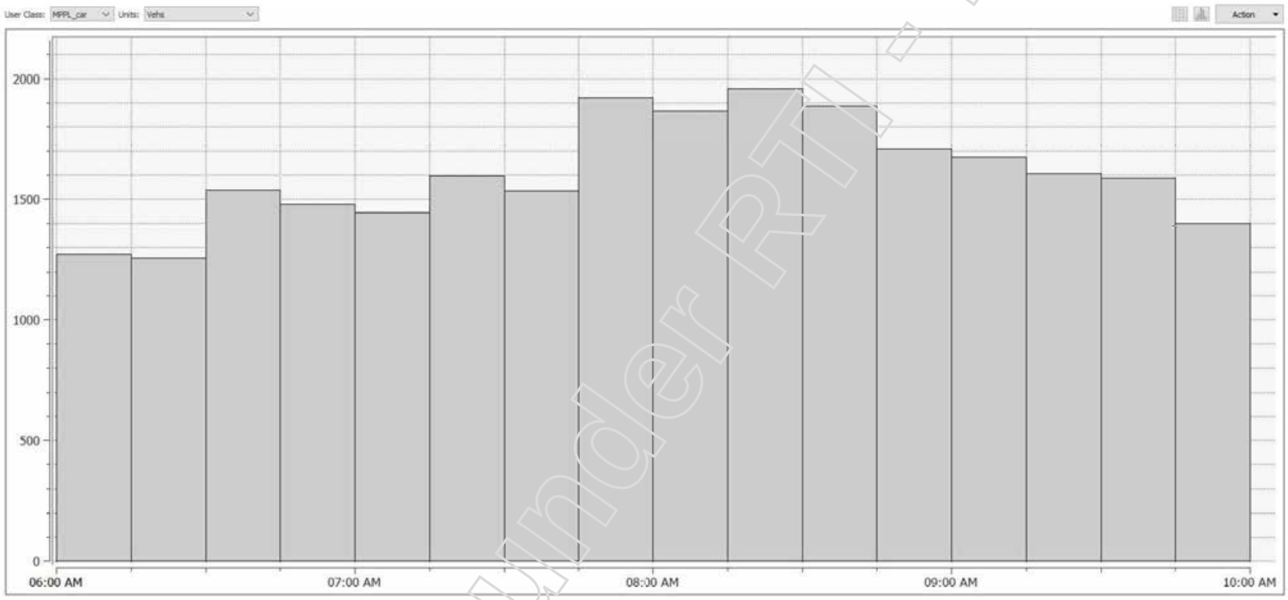


Figure 22: Traffic Demand Profile, AM Peak (6am – 10am) – Light Vehicles

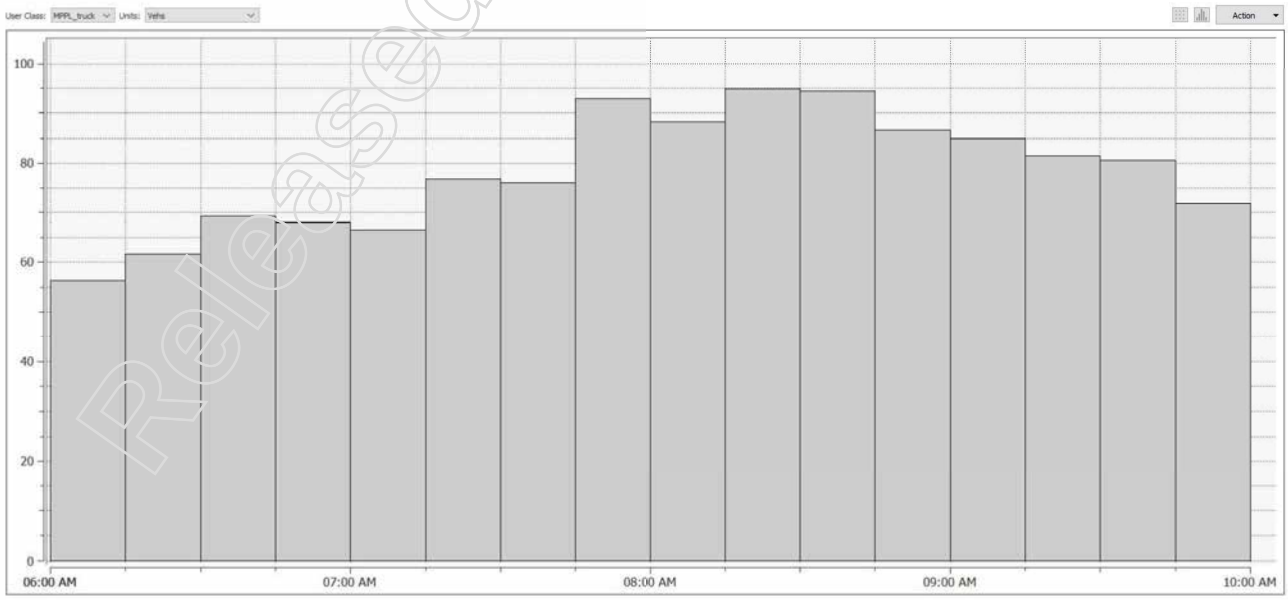


Figure 23: Traffic Demand Profile, AM Peak (6am – 10am) – Heavy Vehicles

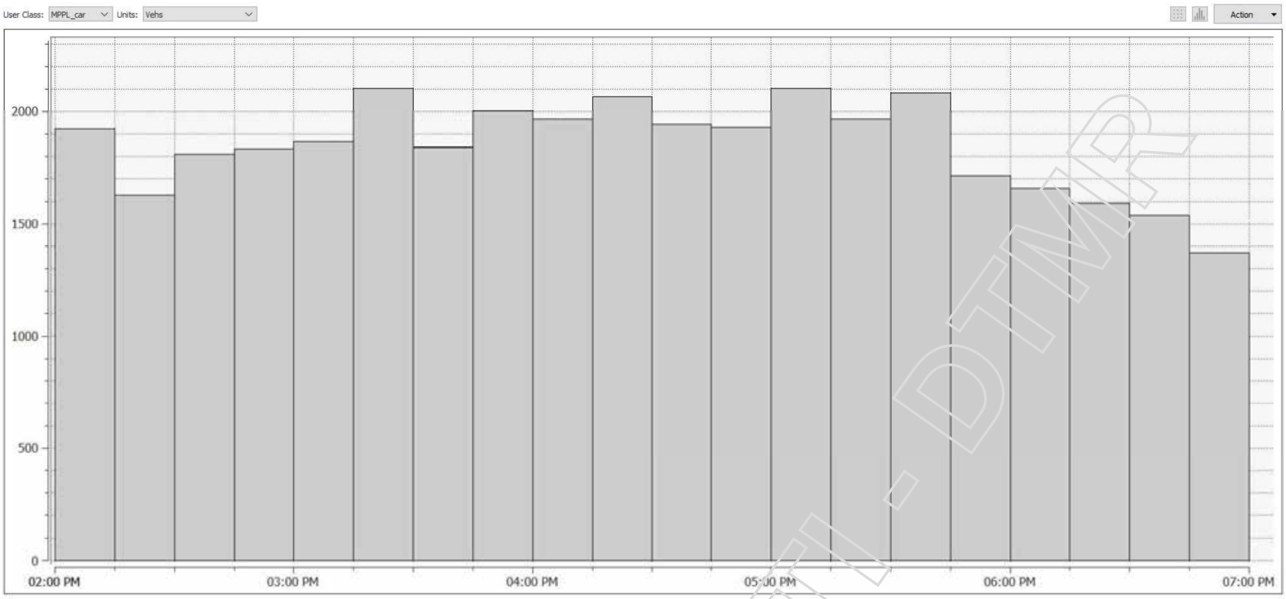


Figure 24: Traffic Demand Profile, PM Peak (2pm – 7pm) – Light Vehicles

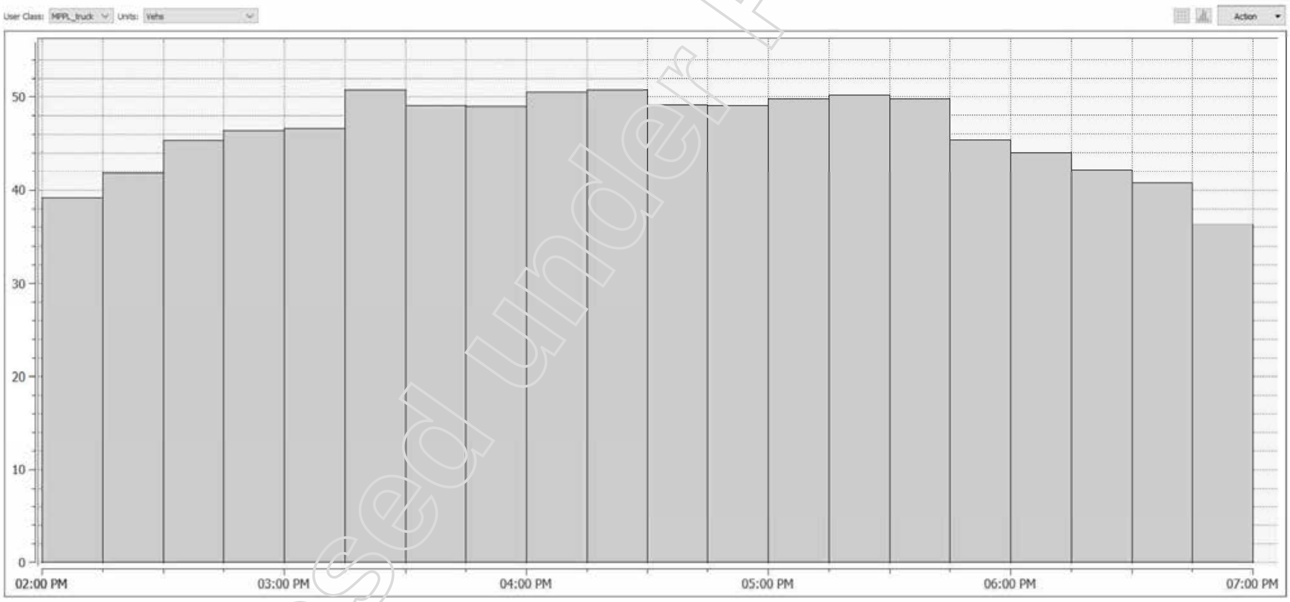


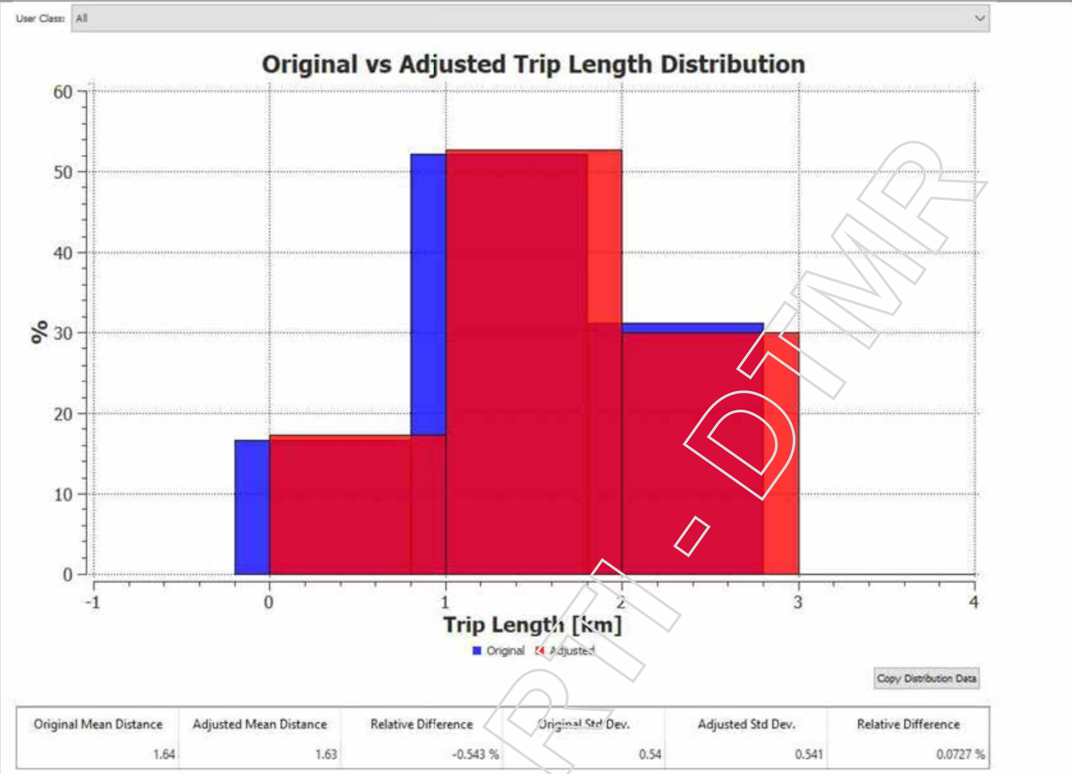
Figure 25: Traffic Demand Profile, PM Peak (2pm – 7pm) – Heavy Vehicles

Further to this, the comparison of trip length distribution between the original and adjusted trip matrices by time period are presented in Figure 26.

<table>
<tr><th>Peak Period</th><th>Trip Length Distribution (Aimsun Output)</th></tr>
<tr><td>AM Peak
(7am – 8am)</td><td>
</td></tr>
<tr><td>AM Peak
(8am – 9am)</td><td>
</td></tr>
</table>

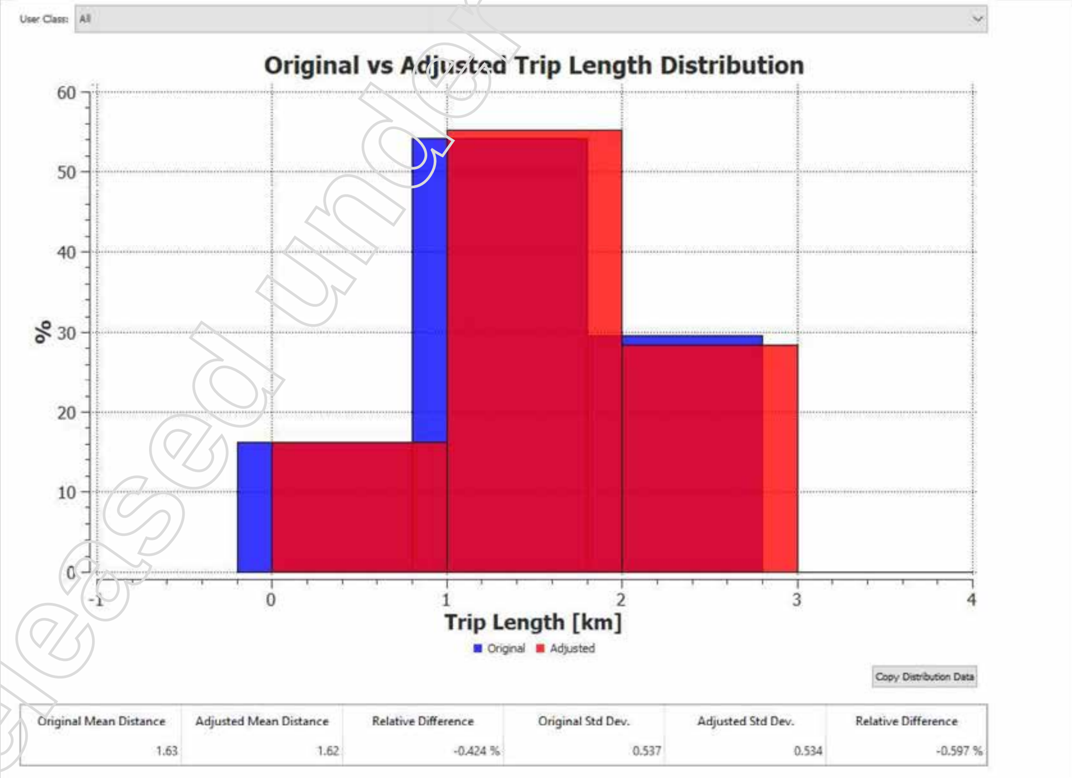
PM Peak

(3pm – 4pm)



PM Peak

(4pm – 5pm)



PM Peak

(5pm – 6pm)

Figure 26: Trip Length Distribution Comparisons (prior and adjusted Aimsun output)

Trip length distribution changes across all time periods show a strong correlation to the prior matrices, which is expected for a model of this size.

6.3.1.13 Assignment Type

All Aimsun models have been developed as microsimulation scenarios, with the following steps taken to produce required outputs:

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

The five seed values processed for both the AM and PM peak base models are listed in Table 5.

Table 5: Model Seed Values (as per TfNSW Modelling Guidelines)

Seed Number	Seed Value
1	560
2	28
3	7771
4	86524
5	2849

6.3.2 Base Model Calibration and Validation

6.3.2.1 Calibration and Validation Criteria

The base model will be calibrated and validated in accordance with NZTA – Transport Modelling Guidelines, 2019 (Type E – Small Area / Corridor), as outlined below in Table 6.

Table 6: Adopted Calibration and Validation Criteria (NZTA, 2019)

Criteria	Item	Criteria
Calibration Criteria	Turning Volumes	Tolerance limits for turn volumes: • GEH <= 5 for at least 85% of turn/link flows. • GEH <= 7.5 for at least 90% of turn/link flows. • GEH <= 10 for at least 95% of turn/link flows. • R^2 value for observed vs modelled plots to be > 0.95. • Line of best fit: y=0.95x – 1.05x. • RMSE < 15%.
Validation Criteria	Travel Time Average	• At least 90% of average modelled journey time to be within 15% or one minute (whichever is greater) of average observed journey time for full length of route. • At least 95% of average modelled journey time to be within 25% or 1.5 minutes (whichever is greater) of average observed journey time for full length of route.
	Model Stability	• Model convergence to be achieved, and stability of the various random seed runs (SRC scenarios) will be compared and within acceptable variance limits.

6.3.2.2 Convergence & Model Stability

The Relative Gap (RGap) is a comparison of the actual travel time to the travel time when all vehicles use the shortest path. The smaller the RGap the better the convergence. For the purpose of this assessment, the RGap was set at the default target of <0.5%. The model shows an acceptable level of convergence in both peak periods, as shown in Figure 27 and Figure 28.

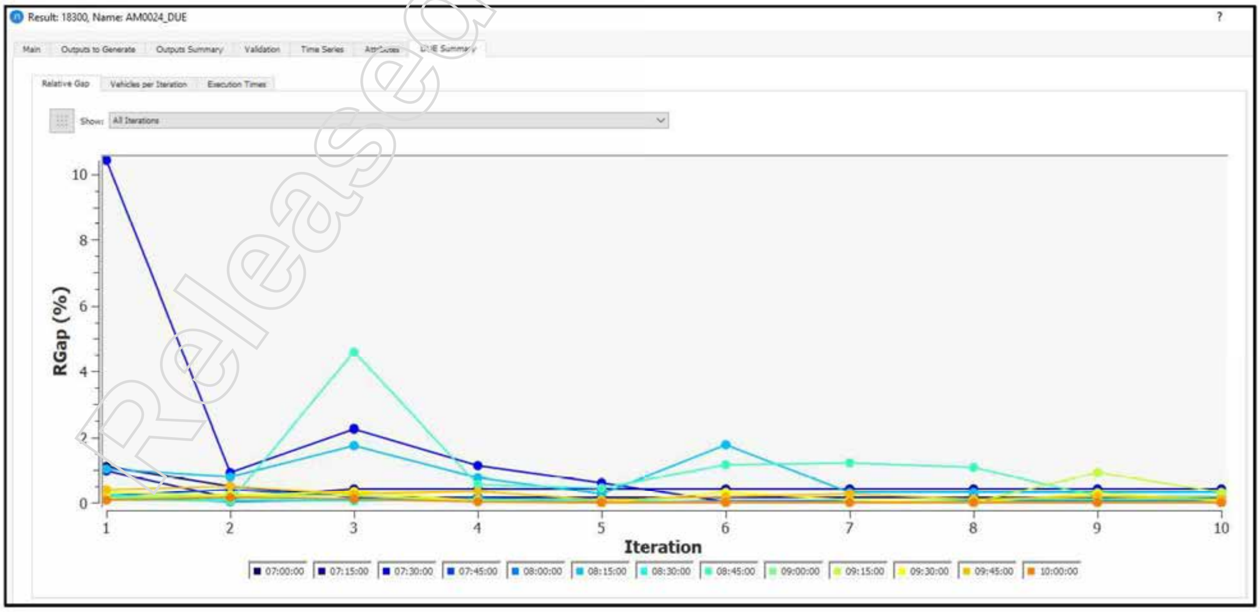


Figure 27: Base Model DUE Convergence – AM Peak

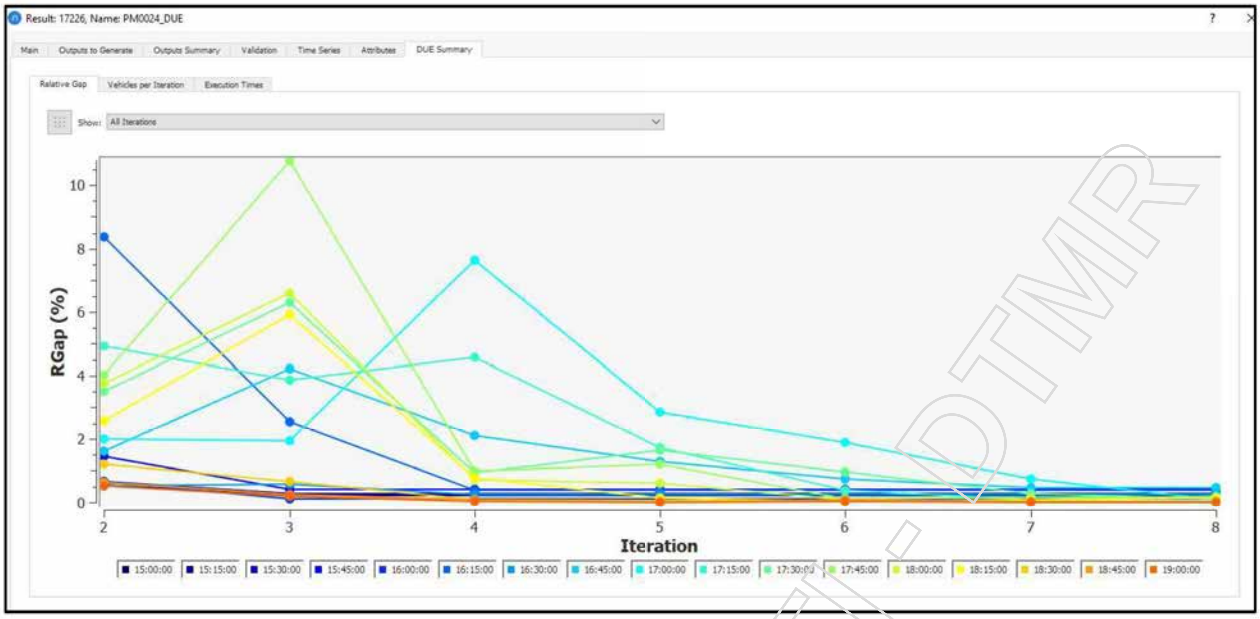


Figure 28: Base Model DUE Convergence – PM Peak

Further to the RGap convergence assessment, model stability was assessed in terms of overall vehicle delay (s/km) and total travel time (vehicle hours) by microsimulation replication. The results are presented in Figure 29 to Figure 32.

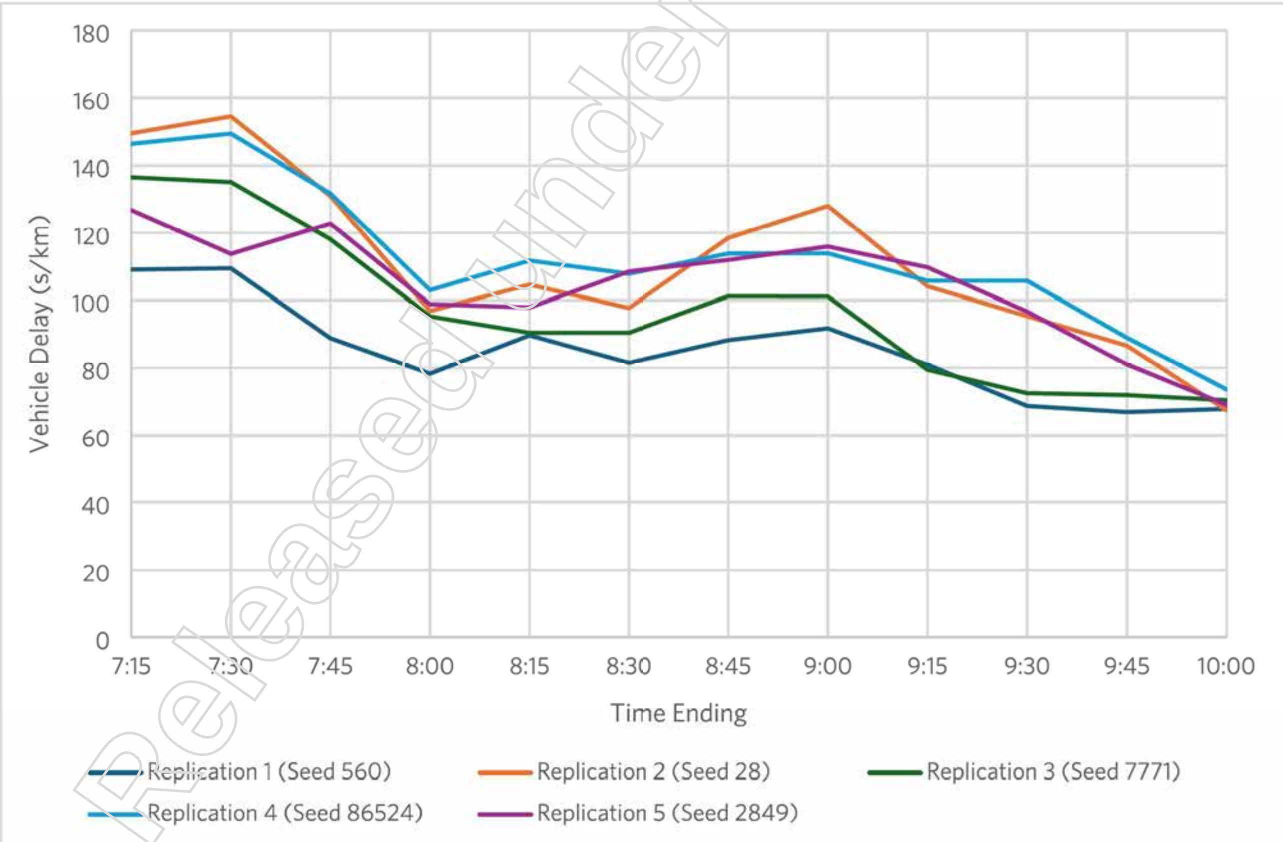


Figure 29: Comparison of Vehicle Delay by Microsimulation Replication – AM Peak (7am – 10am)

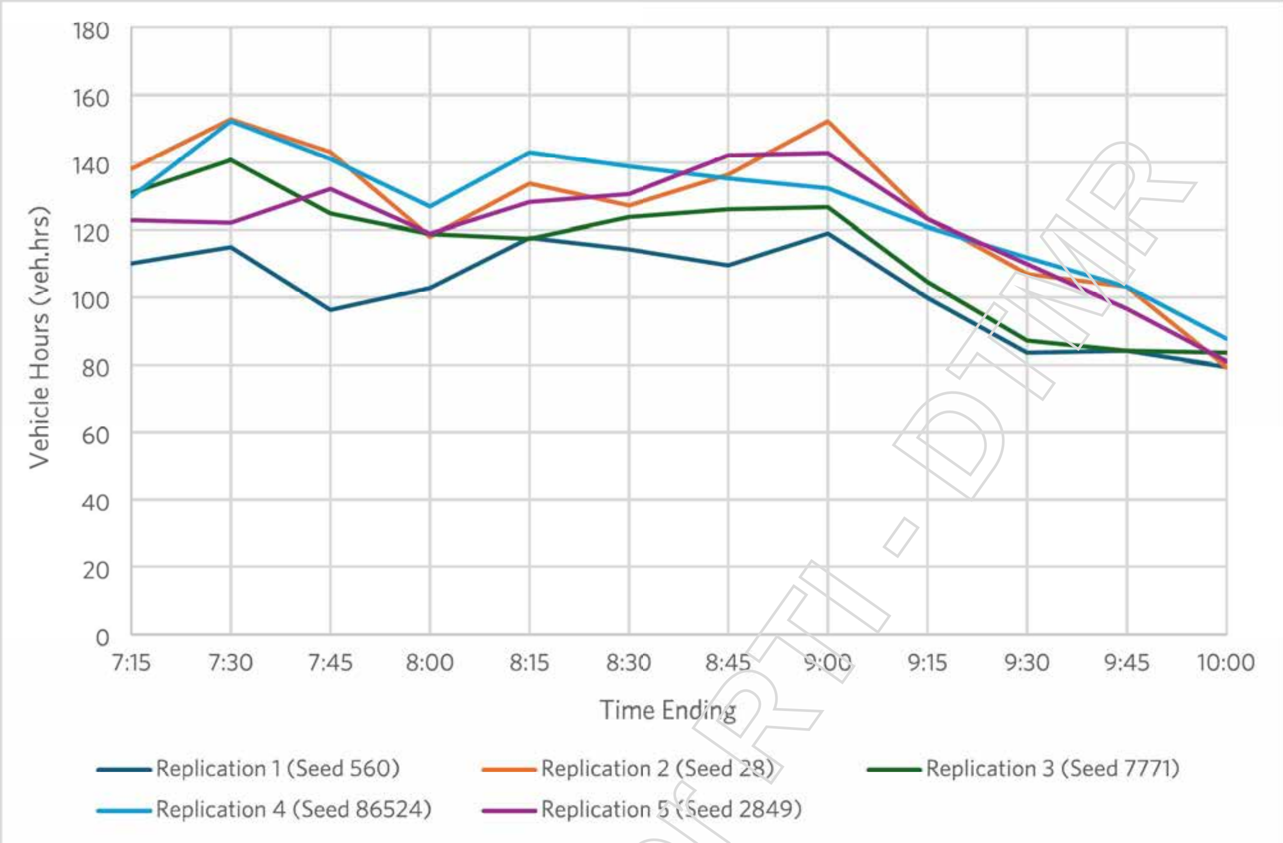


Figure 30: Comparison of Vehicle Hours Travelled by Microsimulation Replication – AM Peak (7am – 10am)

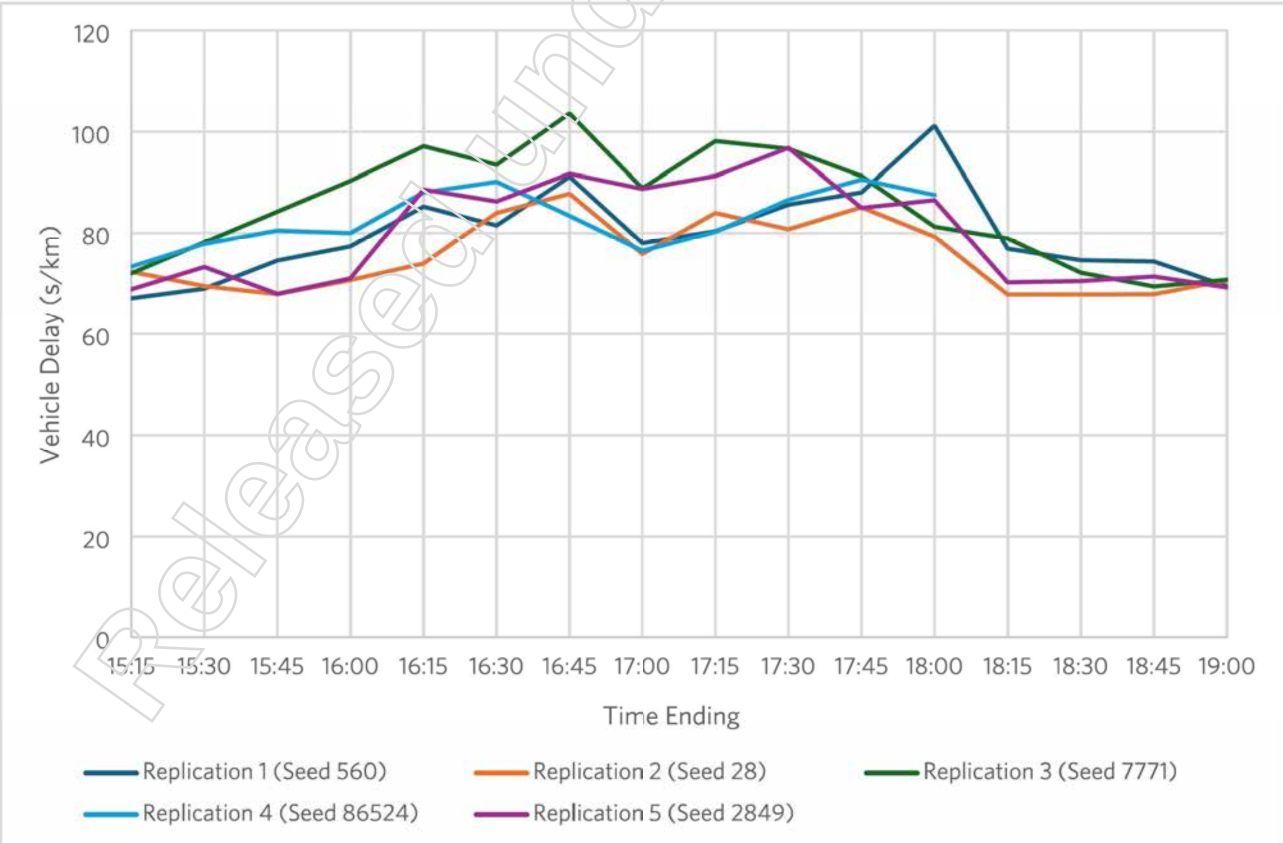


Figure 31: Comparison of Vehicle Delay by Microsimulation Replication – PM Peak (3pm – 6pm)

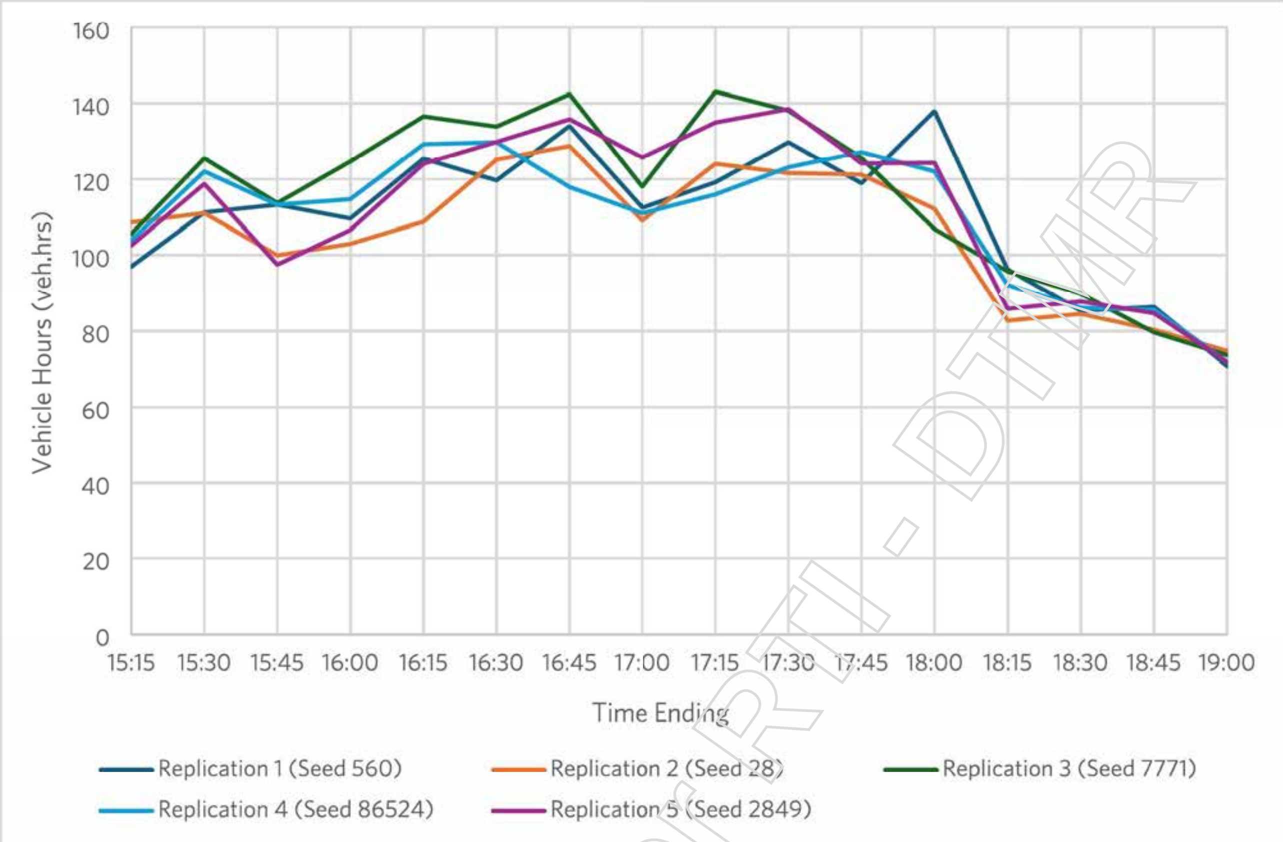


Figure 32: Comparison of Vehicle Hours Travelled by Microsimulation Replication – PM Peak (3pm – 6pm)

The PM peak outputs show a relatively consistent level of vehicle delay and total travel time across the five (5) microsimulation replications.

The AM peak model scenario shows a greater level of variability in model seed runs for both the vehicle delay and total travel time, particularly in the first hour of the modelled time period. In review of the microsimulation scenarios, this variance is primarily a result of the following:

- Significant throughput northbound on Logan Road in the final half an hour of the warm-up period and the associated vehicle queuing generated across the MPPL intersection.
- This type of congestion formation results in a higher variation in route choice for vehicles travelling north from the south-west of Logan Road, which in turn influences the level of congestion on Logan Road northbound and Padstow Road eastbound. An example of dynamic route choice response in this area is presented in Figure 33.

Figure 33: Bleasby Road and Padstow Road Congestion Formation Changes at 8:10am & 8:15am (25/07/2024)

Based on this assessment, the level of variation in base model travel times by replication is a primarily a result of the following two components in combination:

1. Degree of variation in northbound traffic flows.
2. Dynamic route choice of northbound drivers selecting either Bleasby Road or Padstow Road, dependent on the level of downstream traffic congestion in real-time.

These base modelled traffic operational performance conditions of the study area are considered an appropriate representation of observed existing traffic conditions and network operation.

6.3.2.3 Calibration Results

A total of 41 turn/trajectory count locations were included for the AM and PM peak calibration results. Table 7 and Table 8 summarise the overall calibration results, observed compared to modelled, across each hour of the peak periods.

Table 7: AM Peak Calibration Results

Parameter	Target	7:00am - 8:00am			8:00am - 9:00am		
		Car	Truck	Total	Car	Truck	Total
GEH <= 5	85%	90%	98%	90%	90%	98%	90%
GEH <= 7.5	90%	98%	100%	95%	98%	100%	95%
GEH <= 10	95%	100%	100%	100%	100%	100%	100%

Table 8: PM Peak Calibration Results

Parameter	Target	3:00pm - 4:00pm			4:00pm - 5:00pm			5:00pm - 6:00pm		
		Car	Truck	Total	Car	Truck	Total	Car	Truck	Total
GEH <= 5	85%	98%	100%	98%	98%	100%	98%	90%	100%	88%
GEH <= 7.5	90%	100%	100%	100%	98%	100%	98%	100%	100%	100%
GEH <= 10	95%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The following key takeaways are noted regarding the calibration results:

- A high-level of overall calibration is achieved for both cars and trucks across all peak hour periods.
- All calibration criteria is met, with no counts > GEH 10 in any peak period.

A detailed summary of all turn GEH calibration results has been included in Appendix A.

In addition to the above, a modelled versus observed traffic volume (turns) comparison has been undertaken in the form of an R^2 and regression plot analysis for each of the peak hours. It is typically recommended that an R^2 value greater than 0.95 be achieved for appropriate calibration. The AM and PM base model regression plots for all vehicles are presented in Figure 34 to Figure 38.

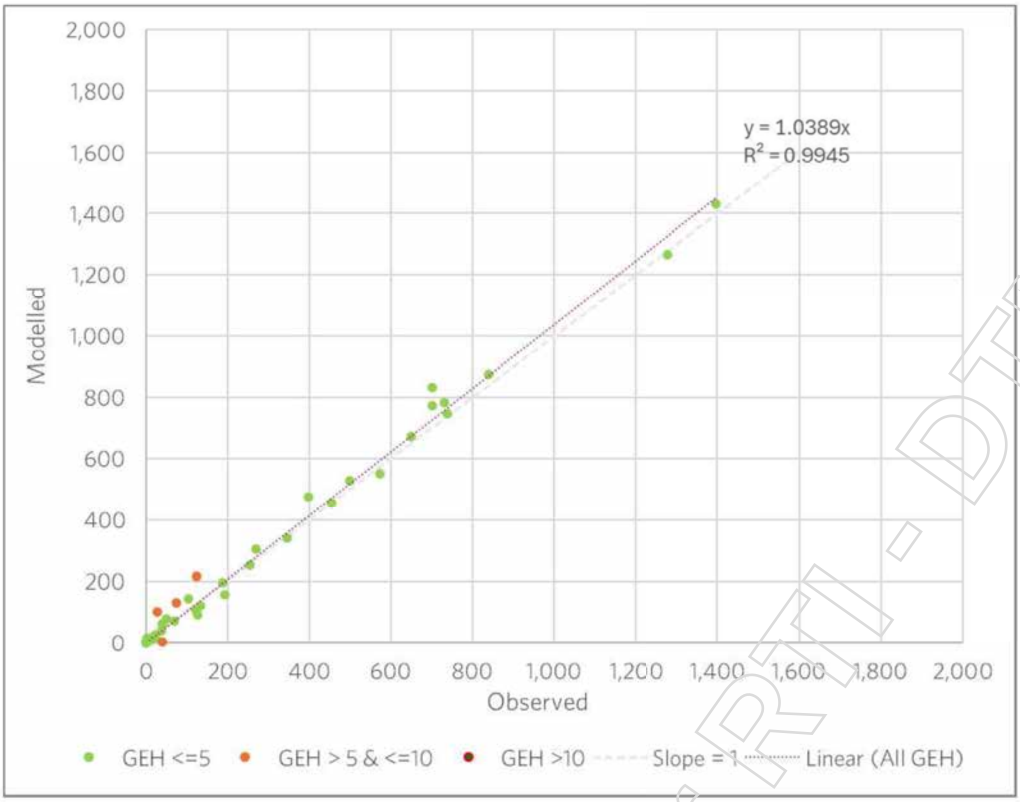


Figure 34: Turn Flow Regression Plot (All Vehicles) – 7:00am – 8:00am

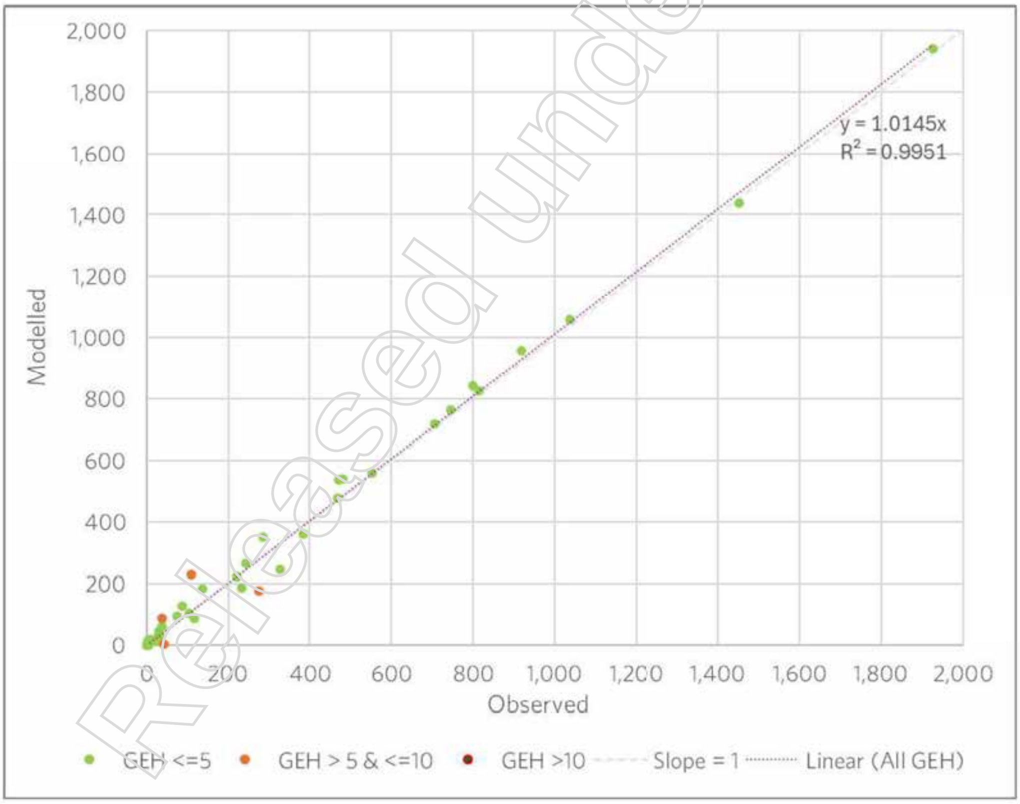


Figure 35: Turn Flow Regression Plot (All Vehicles) – 8:00am – 9:00am

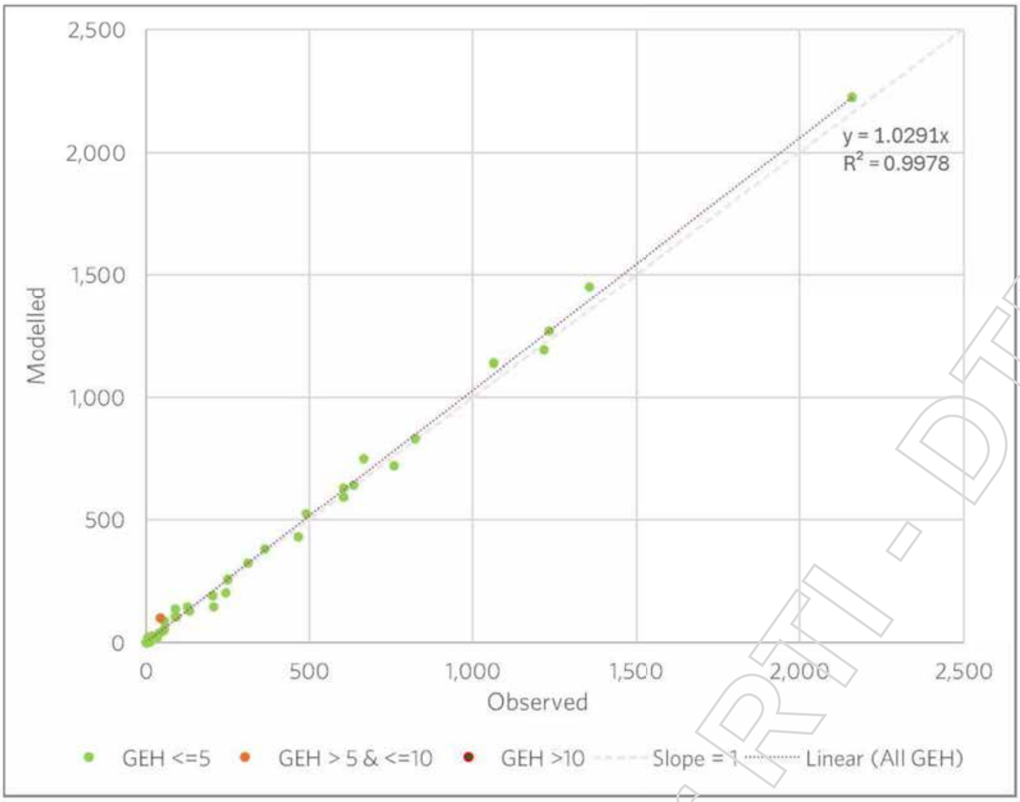


Figure 36: Turn Flow Regression Plot (All Vehicles) – 3:00pm – 4:00pm

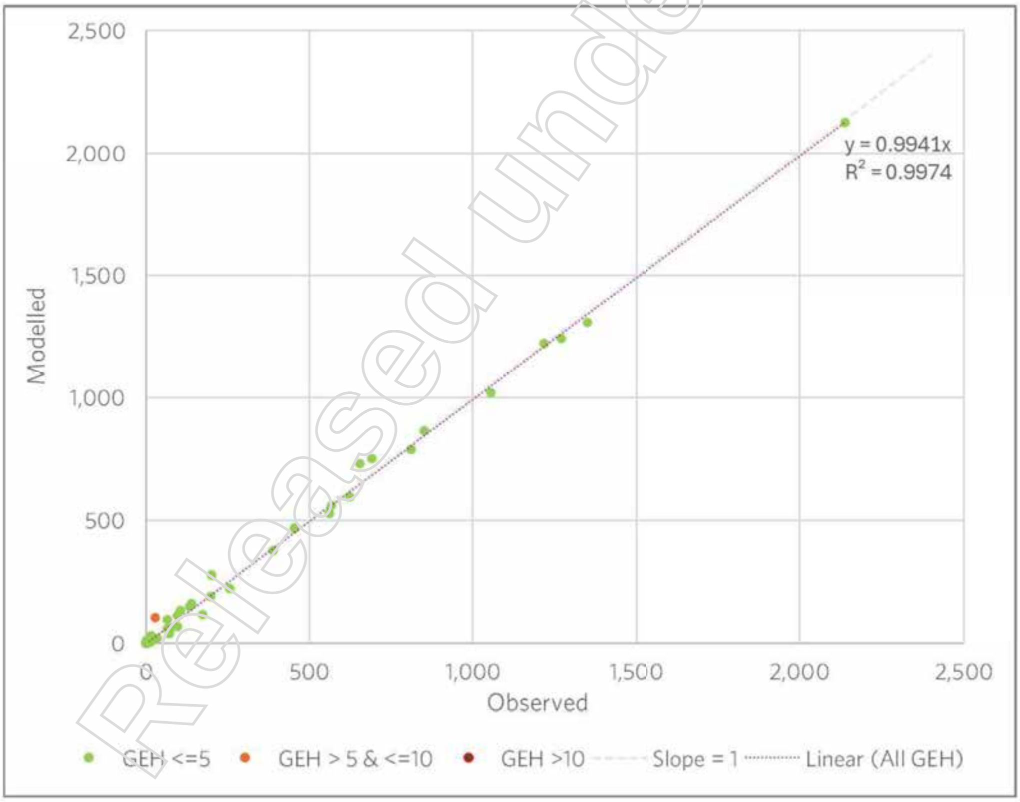


Figure 37: Turn Flow Regression Plot (All Vehicles) – 4:00pm – 5:00pm

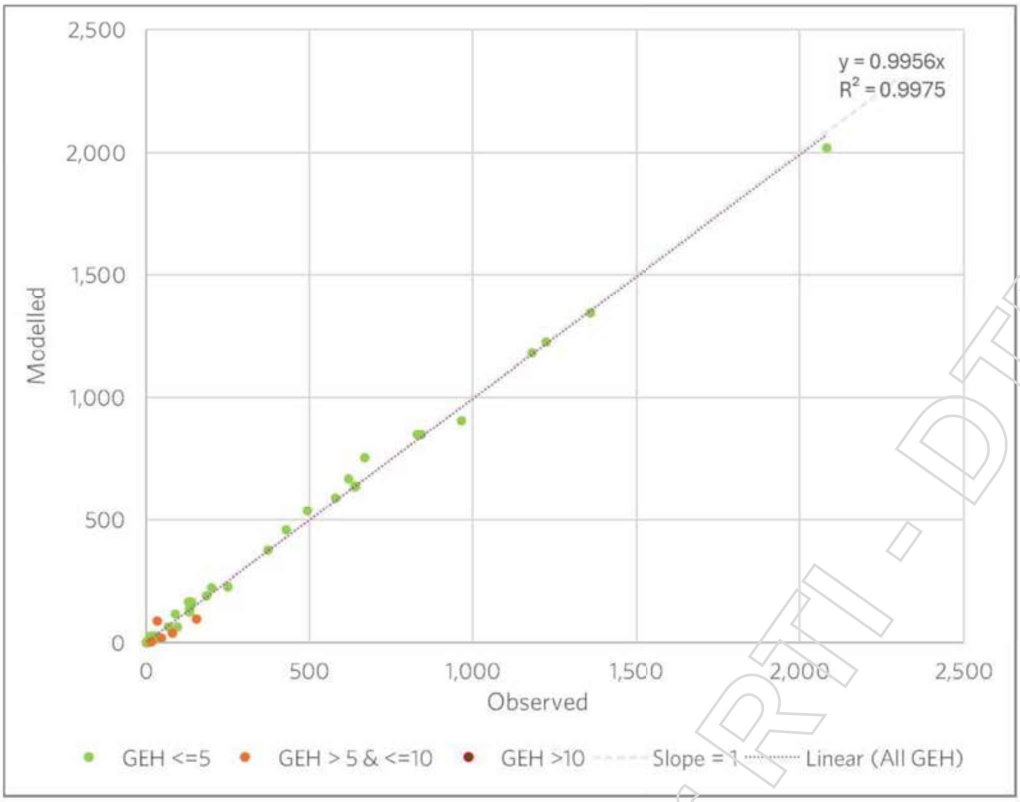


Figure 38: Turn Flow Regression Plot (All Vehicles) – 5:00pm – 6:00pm

All regression plots show a good fit between observed and modelled turn volumes. The outputs also highlight that all GEH values > 5 are for relatively minor traffic volume locations, which are considered less critical for the overall study area calibration.

6.3.2.4 Validation Results

Validation results compare observed travel times to modelled travel times, with travel time criteria requiring that at least 90% of average modelled journey time be within 15% of one minute (whichever is greater) for the full length of defined routes.

Travel time validation results are summarised for the AM and PM peaks in Table 9 and Table 10 respectively.

Table 9: Travel Time Validation Results – AM Peak

Peak Hour	Route	Direction	Average observed Travel Time (m:ss)	Average Model Travel Time (m:ss)	Difference		Meets Criteria
					Relative (m:ss)	%	
7am – 8am	Logan Rd	Northbound	8:13	9:17	1:04	13%	Yes
		Southbound	3:04	3:21	0:17	9%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	4:05	3:18	-0:47	-19%	Yes
		Westbound	2:05	2:18	0:14	11%	Yes
8am – 9am	Logan Rd	Northbound	5:49	6:29	0:39	11%	Yes
		Southbound	3:07	3:32	0:25	13%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	4:12	3:47	-0:25	-10%	Yes
		Westbound	3:13	2:32	-0:42	-22%	Yes

Table 10: Travel Time Validation Results – PM Peak

Peak Hour	Route	Direction	Average observed Travel Time (m:ss)	Average Model Travel Time (m:ss)	Difference		Meets Criteria
					Relative (m:ss)	%	
3pm – 4pm	Logan Rd	Northbound	4:46	5:33	0:46	16%	Yes
		Southbound	3:24	3:43	0:19	9%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	2:42	2:23	-0:19	-12%	Yes
		Westbound	2:37	2:16	-0:21	-13%	Yes
4pm – 5pm	Logan Rd	Northbound	4:56	5:49	0:54	18%	Yes
		Southbound	3:12	4:01	0:49	25%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	3:21	3:10	-0:12	-6%	Yes
		Westbound	3:05	2:51	-0:14	-8%	Yes
5pm – 6pm	Logan Rd	Northbound	5:49	6:03	0:14	4%	Yes
		Southbound	3:20	3:44	0:24	12%	Yes
	Padstow Rd / Miles Platting Rd	Eastbound	2:38	3:17	0:39	25%	Yes
		Westbound	3:27	3:01	-0:26	-12%	Yes

The summary of travel time validation shows that all routes meet criteria across the full length of defined travel time routes. At a segment level, all model travel times show a close match to observed travel times, with general patterns in congestion matched. It is noted that one (1) individual segment during the AM peak is higher than observed by greater than 1 minute. This occurs northbound on Logan Road on the approach to Warrigal Rd / northbound off-ramp signalised intersection. Average modelled travel times during the 7am – 8am peak period for this segment are 4 minutes and 18 seconds, compared to an observed average of 2 minutes and 41 seconds. It is noted that the average model travel times are well within the maximum observed travel times for links within this segment which are up to 7 minutes and 25 seconds. Consequently, we are of the opinion this is still an appropriate representation within this travel time route. These travel time differences between observed and modelled are illustrated in Figure 39.

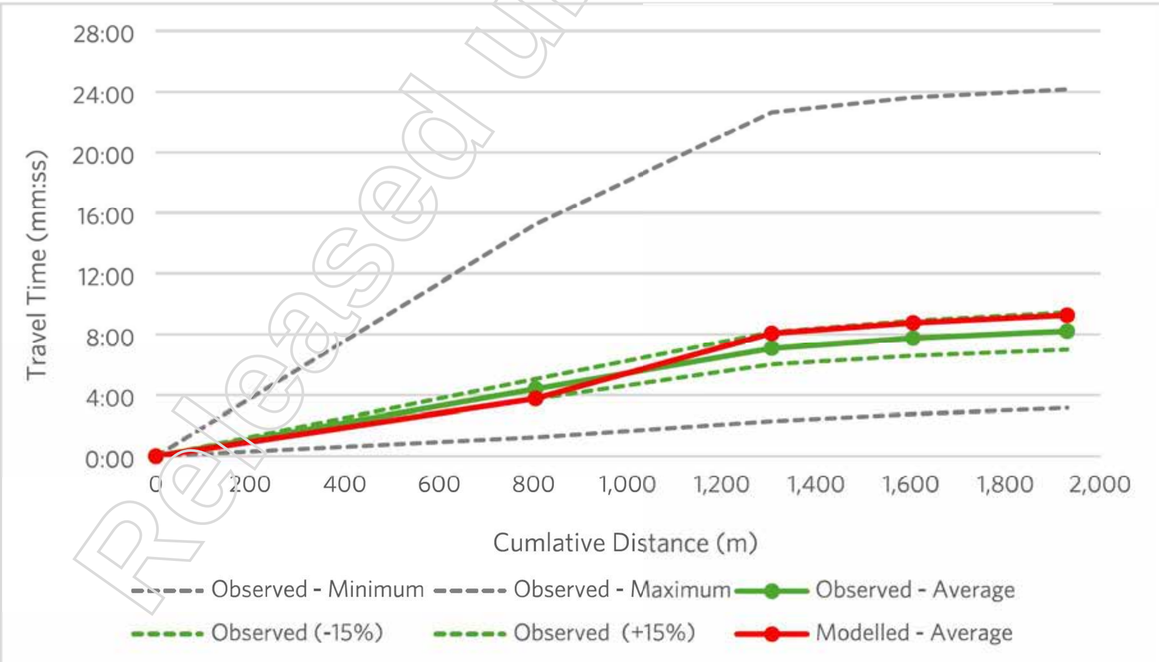


Figure 39: Logan Road Northbound Travel Time Validation, AM Peak (7:00am – 8:00am)

A full summary of segment-based travel time validation for all routes and peak periods is included in Appendix B.

6.3.2.5 Congestion

A comparison between Google traffic maps and simulated density plots for the study area is included below in Figure 40 and Figure 41.

Aimsun network density results represent number of vehicles per lane within road sections and provides an indication of typical vehicle queue formation or slow-moving traffic. Google traffic conditions reflect speed of traffic relative to speed limit, while not an exact comparison there is a relationship to density as it is derived from traffic speed and flow.

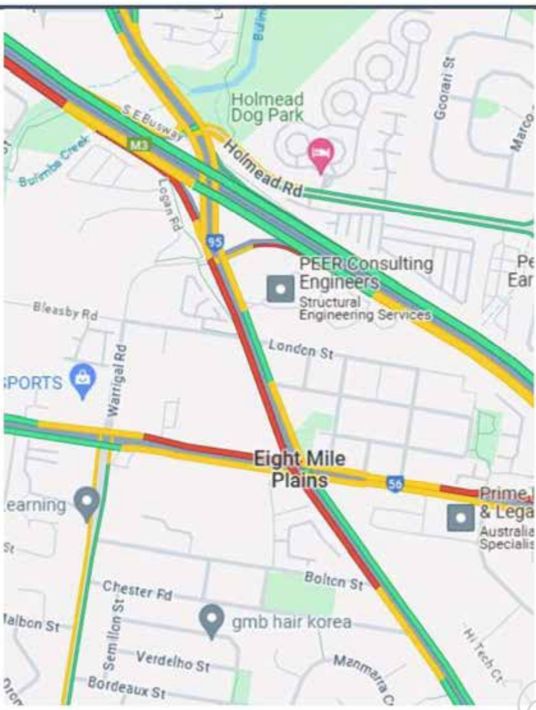
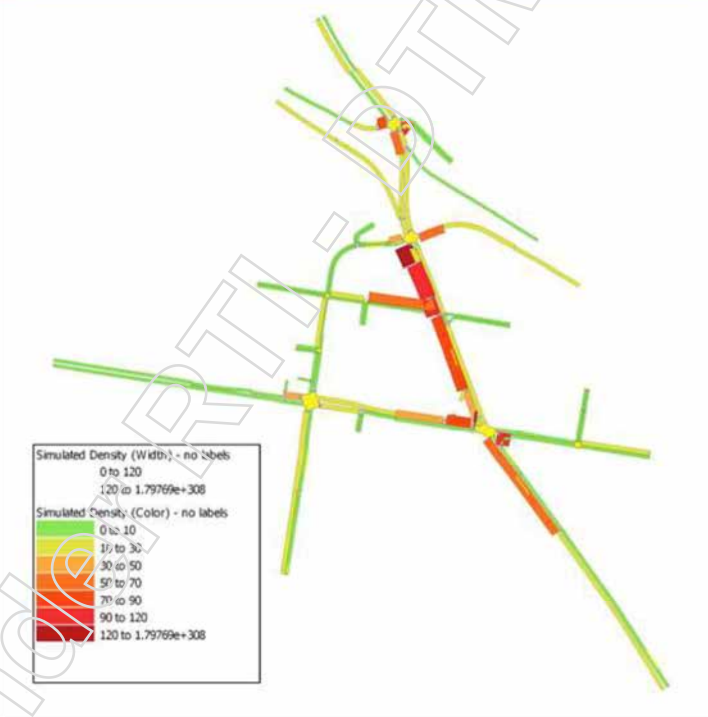
Google Traffic	Aimsun Simulated Density
	

Figure 40: Google Traffic Compared to Aimsun Simulated Density – AM Peak

Google Traffic | Aimsun Simulated Density

Figure 41: Google Traffic Compared to Aimsun Simulated Density – PM Peak

These comparisons show a reasonable level of consistent traffic congestion pattern formation between the model and observed, in particular formation of vehicle queues at the MPPL intersection.

The main point of difference is in the AM peak modelled congestion for the Pacific Motorway northbound on-ramp being lighter than what is suggested by Google Traffic. It is noted that the observed Google Traffic for this location varies significantly across days and the on-site observations across multiple dates showed no impact to the mainline (Logan Road northbound) from the ramp metering at this location.

6.3.2.6 Limitations

The model provides an acceptable level of calibration and validation to observed traffic data, as well as overall representation observed traffic congestion formation and patterns at the most critical locations within the study area. However, it is recognised that there are limitations to the model remain, which include the following:

- Base model demands are based on inputs and assumptions of the relevant strategic model outputs.
- Assessment is limited to impacts within the study area for the peak hours calibrated and validated.
- Base model calibration and validation is limited to the appropriateness of the input traffic counts., HERE data travel times and SCATS and STREAMS signal data.
- Traffic operations at Bleasby Road have been modelled as deemed appropriate; however, the ability to replicate a certain number of vehicles using this merge as a give-way is limited, particularly with no formal observed traffic data provided.
- The model is not able to replicate rat-running of vehicles east-to-north through the petrol station during the AM peak period.
- No formal calibration data for the Warrigal Road / Padstow Road intersection was provided. Demand inputs at this location reference provided demands from BSTM and BMAM.

7 Conclusion

This report has presented the calibration and validation results of the Aimsun microsimulation scenarios of the MPPL 2024 Base Model. The results indicate that the base model is able to appropriately simulate traffic volumes and travel times consistent with the observed existing traffic conditions and is generally within industry guidelines for base model calibration and validation requirements.

It is our view that the model is calibrated and validated at a suitable level for application with the intended purposes of analysis and advising on proposed road and intersection network change options to support the 'MPPL Intersection Upgrade Planning Study'.

APPENDIX A – Calibration Results

Calibration – GEH Results

Turn Calibration Results, AM Peak, 7am-8am

External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	40	61	21	3.0	0	1	1	1.5	40	63	23	3.2
1_2	700	259	299	40	2.4	10	6	-4	1.4	269	305	36	2.1
1_3	698	627	648	21	0.8	23	26	3	0.5	650	673	23	0.9
1_4	699	335	330	-5	0.3	12	9	-3	1.0	347	339	-8	0.4
1_6	693	252	242	-10	0.6	4	8	4	1.6	256	250	-6	0.4
1_7	694	410	408	-2	0.1	44	47	3	0.4	454	454	0	0.0
1_8	704	22	13	-9	2.1	2	1	-1	1.0	24	14	-10	2.3
1_11	696	670	792	122	4.5	31	40	9	1.5	701	833	132	4.8
1_12	697	98	133	35	3.3	7	9	2	0.6	105	142	37	3.3
1_14	701	71	126	55	5.5	5	4	-1	0.3	76	130	54	5.3
1_15	702	356	424	68	3.4	43	50	7	1.0	399	474	75	3.6
1_16	705	121	212	91	7.0	2	2	0	0.3	123	214	91	7.0
2_1	1086	2	0	-2	2.0	0	0	0	0.9	2	0	-2	1.5
2_2	1085	132	118	-14	1.3	2	3	1	0.4	134	120	-14	1.2
2_3	1083	8	9	1	0.4	4	0	-4	2.8	12	9	-3	0.9
2_4	1084	1240	1231	-9	0.3	38	37	-1	0.2	1278	1267	-11	0.3
2_7	1082	700	744	44	1.6	30	39	9	1.5	730	783	53	1.9
2_8	1081	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
2_9	1079	2	0	-2	1.5	0	0	0	0.0	2	0	-2	1.5
2_10	1080	185	155	-30	2.3	9	1	-8	3.3	194	156	-38	2.9
2_11	1088	50	77	27	3.4	0	2	2	2.0	50	79	29	3.6
2_13	1078	674	742	68	2.6	27	33	6	1.1	701	775	74	2.7
2_14	1077	824	850	26	0.9	15	25	10	2.2	839	875	36	1.2
2_15	1075	4	15	11	3.6	0	0	0	0.6	4	15	11	3.7
2_17	1072	10	9	-1	0.5	0	1	1	1.4	10	10	0	0.1
2_19	1074	19	1	-18	5.9	21	1	-20	6.1	40	1	-39	8.5
2_20	1073	17	15	-2	0.6	1	0	-1	1.4	18	15	-3	0.8
3_3	1048	543	529	-14	0.6	30	23	-7	1.4	573	552	-21	0.9
3_4	1049	462	495	33	1.5	36	33	-3	0.5	498	528	30	1.3
3_5	1045	65	65	0	0.0	4	6	2	1.0	69	72	3	0.3
3_7	1051	183	193	10	0.7	5	3	-2	1.0	188	196	8	0.6
3_9	1068	121	106	-15	1.4	1	1	0	0.4	122	107	-15	1.4
3_10	1069	23	26	3	0.6	1	0	-1	1.4	24	26	2	0.4
3_11	1058	2	2	0	0.0	1	1	0	0.2	3	3	0	0.1
3_12	1059	20	20	0	0.1	0	1	1	1.1	20	21	1	0.2
3_13	1055	28	99	71	8.9	1	0	-1	1.4	29	99	70	8.8
3_14	1056	1318	1361	43	1.2	79	71	-8	0.9	1397	1432	35	0.9
3_17	1063	727	733	6	0.2	12	16	4	1.1	739	749	10	0.4
3_18	1064	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
3_19	1060	35	38	3	0.5	3	1	-2	1.1	38	39	1	0.2
3_20	1062	118	83	-35	3.4	8	7	-1	0.5	126	90	-36	3.5

Turn Calibration Results, AM Peak, 8am-9am

External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	38	87	49	6.2	0	1	1	1.7	38	89	51	6.4
1_2	700	280	340	60	3.4	6	11	5	1.8	286	351	65	3.7
1_3	698	776	793	17	0.6	38	33	-5	0.8	814	826	12	0.4
1_4	699	366	349	-17	0.9	17	11	-6	1.6	383	360	-23	1.2
1_6	693	221	212	-9	0.6	1	10	9	3.9	222	223	1	0.0
1_7	694	421	429	8	0.4	48	48	0	0.0	469	477	8	0.4
1_8	704	28	17	-11	2.3	5	0	-5	2.8	33	17	-16	3.1
1_11	696	766	799	33	1.2	34	44	10	1.6	800	843	43	1.5
1_12	697	310	240	-70	4.2	17	6	-11	3.4	327	246	-81	4.8
1_14	701	135	177	42	3.4	2	5	3	1.4	137	182	45	3.6
1_15	702	424	480	56	2.6	47	59	12	1.7	471	539	68	3.0
1_16	705	108	222	114	8.9	2	7	5	2.2	110	228	118	9.1
2_1	1086	3	0	-3	2.4	0	1	1	1.3	3	1	-2	1.6
2_2	1085	88	122	34	3.4	0	4	4	2.8	88	126	38	3.7
2_3	1083	15	15	0	0.1	4	0	-4	2.8	19	15	-4	1.0
2_4	1084	1405	1388	-17	0.5	48	49	1	0.1	1453	1437	-16	0.4
2_7	1082	885	913	28	0.9	34	44	10	1.6	919	956	37	1.2
2_8	1081	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
2_9	1079	5	0	-5	3.2	0	0	0	0.0	5	0	-5	3.2
2_10	1080	222	181	-41	2.9	11	3	-8	3.0	233	184	-49	3.4
2_11	1088	76	91	15	1.7	0	3	3	2.4	76	94	18	2.0
2_13	1078	1018	1027	9	0.3	18	34	16	3.1	1036	1061	25	0.8
2_14	1077	532	531	-1	0.0	21	29	8	1.7	553	560	7	0.3
2_15	1075	9	17	8	2.3	0	1	1	1.3	9	18	9	2.5
2_17	1072	26	10	-16	3.7	2	0	-2	1.7	28	10	-18	4.0
2_19	1074	18	1	-17	5.6	26	1	-25	6.6	44	2	-42	8.7
2_20	1073	4	15	11	3.6	0	0	0	0.0	4	15	11	3.6
3_3	1048	680	686	6	0.2	26	31	5	1.0	706	718	12	0.4
3_4	1049	451	501	50	2.3	30	40	10	1.7	481	541	60	2.7
3_5	1045	116	86	-30	3.0	2	2	0	0.3	118	88	-30	3.0
3_7	1051	241	258	17	1.1	3	6	3	1.5	244	264	20	1.3
3_9	1068	102	103	1	0.1	2	0	-2	1.5	104	103	-1	0.1
3_10	1069	28	30	2	0.3	0	0	0	0.0	28	30	2	0.3
3_11	1058	3	4	1	0.7	0	1	1	1.1	3	5	2	1.0
3_12	1059	33	23	-10	1.8	0	1	1	1.1	33	24	-9	1.7
3_13	1055	37	62	25	3.5	1	0	-1	1.4	38	62	24	3.4
3_14	1056	1852	1861	9	0.2	74	79	5	0.6	1926	1940	14	0.3
3_17	1063	719	742	23	0.9	26	21	-5	0.9	745	764	19	0.7
3_18	1064	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
3_19	1060	30	44	14	2.2	0	2	2	1.9	30	45	15	2.5
3_20	1062	250	168	-82	5.7	25	9	-16	3.9	275	177	-98	6.5

Turn Calibration Results, PM Peak, 3pm-4pm

External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	91	139	48	4.5	0	0	0	0.6	91	139	48	4.5
1_2	700	596	627	31	1.3	7	5	-2	1.0	603	632	29	1.2
1_3	698	1325	1412	87	2.3	32	39	7	1.1	1357	1450	93	2.5
1_4	699	308	320	12	0.7	4	3	-1	0.8	312	323	11	0.6
1_6	693	359	373	14	0.7	6	9	3	1.1	365	382	17	0.9
1_7	694	427	404	-23	1.1	39	26	-13	2.3	466	429	-37	1.7
1_8	704	36	39	3	0.5	6	1	-5	2.5	42	40	-2	0.2
1_11	696	650	734	84	3.2	16	16	0	0.1	666	751	85	3.2
1_12	697	237	202	-35	2.4	8	2	-6	2.5	245	204	-41	2.7
1_14	701	247	249	2	0.2	4	6	2	0.8	251	255	4	0.3
1_15	702	617	622	5	0.2	19	23	4	1.0	636	645	9	0.4
1_16	705	90	103	13	1.3	1	0	-1	1.0	91	103	12	1.3
2_1	1086	3	0	-3	2.4	0	0	0	0.9	3	0	-3	2.0
2_2	1085	127	143	16	1.4	0	2	2	2.1	127	145	18	1.6
2_3	1083	16	5	-11	3.2	20	12	-8	2.0	36	17	-19	3.6
2_4	1084	2122	2183	61	1.3	38	43	5	0.7	2160	2226	66	1.4
2_7	1082	471	509	38	1.7	20	16	-4	0.9	491	525	34	1.5
2_8	1081	3	0	-3	2.4	0	0	0	0.0	3	0	-3	2.4
2_9	1079	5	1	-4	2.3	0	0	0	0.0	5	1	-4	2.3
2_10	1080	127	129	2	0.1	5	1	-4	2.3	132	130	-2	0.2
2_11	1088	45	99	54	6.4	0	2	2	2.0	45	101	56	6.6
2_13	1078	809	817	8	0.3	14	14	0	0.1	823	831	8	0.3
2_14	1077	741	707	-34	1.2	17	14	-3	0.7	758	722	-36	1.3
2_15	1075	14	10	-4	1.0	0	0	0	0.0	14	10	-4	1.0
2_17	1072	8	22	14	3.7	0	0	0	0.0	8	22	14	3.7
2_19	1074	9	1	-8	3.5	5	0	-5	3.2	14	1	-13	4.6
2_20	1073	7	3	-4	1.9	1	0	-1	1.4	8	3	-5	2.2
3_3	1048	1178	1164	-14	0.4	38	30	-8	1.4	1216	1194	-22	0.6
3_4	1049	588	578	-10	0.4	16	17	1	0.2	604	595	-9	0.4
3_5	1045	199	189	-10	0.7	5	2	-3	1.5	204	191	-13	0.9
3_7	1051	90	104	14	1.4	2	4	2	1.0	92	107	15	1.5
3_9	1068	51	49	-2	0.3	3	1	-2	1.8	54	49	-5	0.7
3_10	1069	15	14	-1	0.2	0	0	0	0.0	15	14	-1	0.2
3_11	1058	2	3	1	0.7	0	1	1	1.4	2	4	2	1.2
3_12	1059	20	26	6	1.3	0	1	1	1.3	20	27	7	1.5
3_13	1055	53	56	3	0.4	2	0	-2	1.5	55	56	1	0.2
3_14	1056	1197	1245	48	1.4	37	28	-9	1.6	1234	1273	39	1.1
3_17	1063	1047	1113	66	2.0	15	25	10	2.2	1062	1138	76	2.3
3_18	1064	1	0	-1	1.4	0	0	0	0.0	1	0	-1	1.4
3_19	1060	55	87	32	3.8	0	0	0	0.6	55	87	32	3.8
3_20	1062	204	145	-59	4.4	2	1	-1	1.0	206	146	-60	4.5

Turn Calibration Results, PM Peak, 4pm-5pm

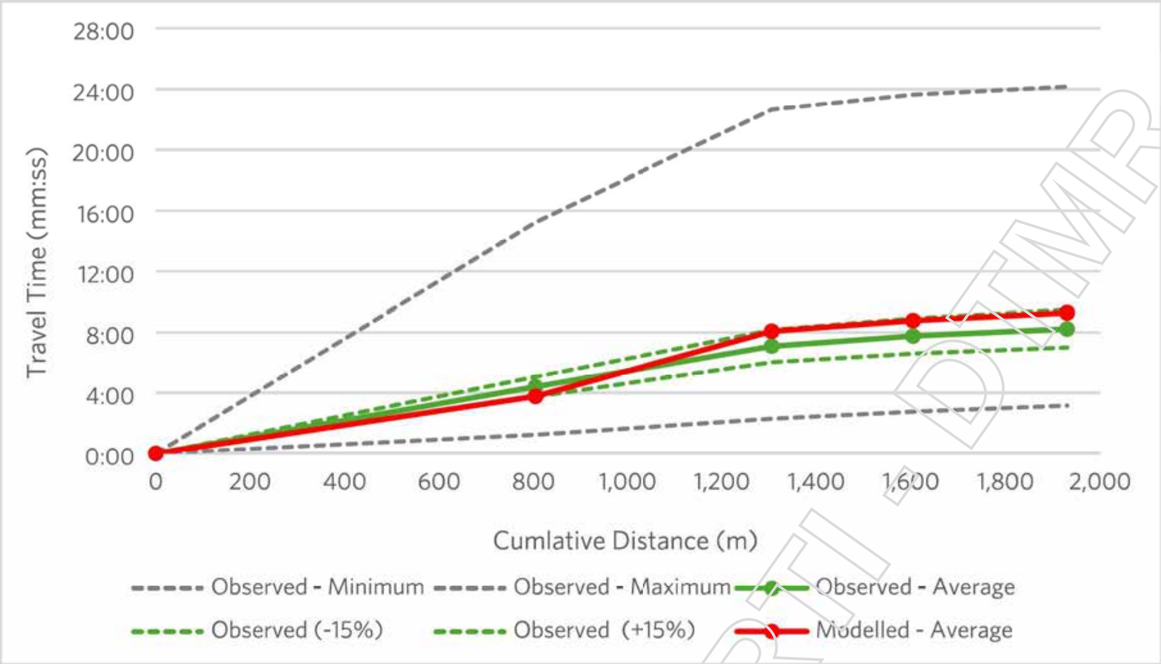
External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	133	149	16	1.3	0	1	1	1.1	133	149	16	1.4
1_2	700	619	591	-28	1.1	4	6	2	0.9	623	597	-26	1.0
1_3	698	1312	1271	-41	1.1	39	37	-2	0.4	1351	1307	-44	1.2
1_4	699	387	372	-15	0.7	2	3	1	0.5	389	375	-14	0.7
1_6	693	452	456	4	0.2	3	9	6	2.5	455	465	10	0.5
1_7	694	430	447	17	0.8	27	25	-2	0.5	457	472	15	0.7
1_8	704	62	61	-1	0.1	5	0	-5	3.0	67	61	-6	0.7
1_11	696	675	740	65	2.4	17	16	-1	0.3	692	756	64	2.4
1_12	697	250	218	-32	2.1	6	5	-1	0.6	256	222	-34	2.2
1_14	701	197	268	71	4.7	4	8	4	1.5	201	276	75	4.8
1_15	702	632	710	78	3.0	23	23	0	0.1	655	733	78	3.0
1_16	705	71	39	-32	4.3	2	1	-1	0.5	73	40	-33	4.4
2_1	1086	4	0	-4	2.8	0	0	0	0.9	4	0	-4	2.4
2_2	1085	141	162	21	1.7	0	1	1	1.5	141	164	23	1.8
2_3	1083	19	7	-12	3.5	15	12	-3	0.9	34	18	-16	3.1
2_4	1084	2094	2084	-10	0.2	44	43	-1	0.2	2138	2127	-11	0.2
2_7	1082	550	538	-12	0.5	18	21	3	0.6	568	559	-9	0.4
2_8	1081	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
2_9	1079	2	0	-2	2.0	0	0	0	0.0	2	0	-2	2.0
2_10	1080	104	132	28	2.6	2	1	-1	1.0	106	133	27	2.4
2_11	1088	30	103	73	9.0	0	3	3	2.3	30	106	76	9.2
2_13	1078	801	776	-25	0.9	11	14	3	0.8	812	790	-22	0.8
2_14	1077	839	851	12	0.4	11	15	4	1.1	850	866	16	0.5
2_15	1075	14	10	-4	1.3	0	0	0	0.9	14	10	-4	1.2
2_17	1072	21	27	6	1.2	0	0	0	0.0	21	27	6	1.2
2_19	1074	8	2	-6	2.7	6	0	-6	3.5	14	2	-12	4.2
2_20	1073	6	1	-5	2.5	1	0	-1	1.4	7	1	-6	2.9
3_3	1048	1182	1185	3	0.1	35	36	1	0.1	1217	1220	3	0.1
3_4	1049	545	512	-33	1.4	15	15	0	0.0	560	527	-33	1.4
3_5	1045	193	187	-6	0.5	6	5	-1	0.3	199	192	-7	0.5
3_7	1051	94	109	15	1.5	2	3	1	0.4	96	112	16	1.6
3_9	1068	74	58	-16	2.0	0	0	0	0.0	74	58	-16	2.0
3_10	1069	11	18	7	1.8	0	0	0	0.0	11	18	7	1.8
3_11	1058	0	11	11	4.7	0	0	0	0.9	0	11	11	4.8
3_12	1059	16	30	14	2.8	0	0	0	0.9	16	30	14	2.9
3_13	1055	95	68	-27	3.0	1	0	-1	1.0	96	68	-28	3.0
3_14	1056	1235	1209	-26	0.7	34	34	0	0.0	1269	1243	-26	0.7
3_17	1063	1027	999	-28	0.9	26	21	-5	1.0	1053	1020	-33	1.0
3_18	1064	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
3_19	1060	67	97	30	3.3	0	1	1	1.1	67	97	30	3.3
3_20	1062	175	118	-57	4.7	0	0	0	0.9	175	118	-57	4.7

Turn Calibration Results, PM Peak, 5pm-6pm

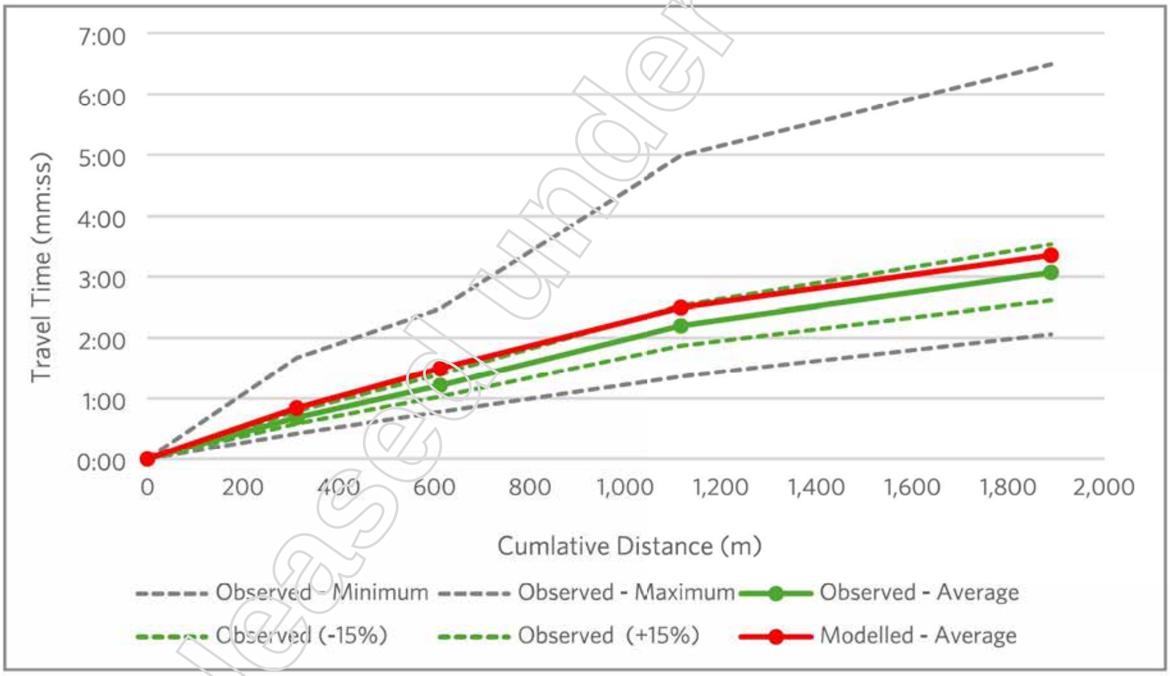
External Id	Id	Light Vehicles				Heavy Vehicles				Total Vehicles			
		Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH	Obs.	Model	Diff.	GEH
1_1	974	131	164	33	2.7	0	1	1	1.3	131	165	34	2.8
1_2	700	635	633	-2	0.1	6	5	-1	0.3	641	638	-3	0.1
1_3	698	1154	1150	-4	0.1	26	32	6	1.1	1180	1183	3	0.1
1_4	699	375	374	-1	0.0	0	3	3	2.6	375	378	3	0.1
1_6	693	428	448	20	1.0	2	9	7	3.0	430	458	28	1.3
1_7	694	481	509	28	1.3	12	29	17	3.8	493	538	45	2.0
1_8	704	30	25	-5	0.9	1	1	0	0.0	31	26	-5	0.9
1_11	696	661	740	79	3.0	8	16	8	2.2	669	756	87	3.2
1_12	697	250	225	-25	1.6	2	2	0	0.0	252	227	-25	1.6
1_14	701	195	216	21	1.4	5	9	4	1.4	200	224	24	1.7
1_15	702	607	641	34	1.4	13	26	13	3.0	620	667	47	1.9
1_16	705	81	39	-42	5.4	1	1	0	0.4	82	40	-42	5.3
2_1	1086	10	0	-10	4.5	1	1	0	0.4	11	1	-10	4.3
2_2	1085	141	162	21	1.7	0	4	4	2.8	141	165	24	2.0
2_3	1083	28	5	-23	5.6	18	12	-6	1.5	46	17	-29	5.1
2_4	1084	2056	1982	-74	1.7	27	37	10	1.8	2083	2019	-64	1.4
2_7	1082	565	573	8	0.3	15	19	4	0.9	580	591	11	0.5
2_8	1081	3	0	-3	2.4	0	0	0	0.0	3	0	-3	2.4
2_9	1079	7	0	-7	3.6	0	0	0	0.0	7	0	-7	3.6
2_10	1080	129	138	9	0.8	3	1	-2	1.2	132	139	7	0.6
2_11	1088	35	87	52	6.7	0	3	3	2.4	35	90	55	7.0
2_13	1078	819	833	14	0.5	10	15	5	1.3	829	848	19	0.7
2_14	1077	836	835	-1	0.0	6	12	6	2.1	842	847	5	0.2
2_15	1075	25	10	-15	3.6	1	0	-1	1.0	26	10	-16	3.7
2_17	1072	19	29	10	2.0	0	0	0	0.6	19	29	10	2.0
2_19	1074	13	1	-12	4.4	3	0	-3	2.4	16	1	-15	5.0
2_20	1073	5	2	-3	1.4	0	0	0	0.0	5	2	-3	1.4
3_3	1048	1190	1195	5	0.1	32	30	-2	0.3	1222	1225	3	0.1
3_4	1049	630	619	-11	0.4	9	16	7	2.0	639	635	-4	0.2
3_5	1045	184	189	5	0.4	2	4	2	1.0	186	193	7	0.5
3_7	1051	131	125	-6	0.5	3	2	-1	0.5	134	128	-6	0.6
3_9	1068	96	65	-31	3.5	0	1	1	1.1	96	65	-31	3.4
3_10	1069	28	20	-8	1.6	0	0	0	0.0	28	20	-8	1.6
3_11	1058	3	6	3	1.3	0	0	0	0.9	3	6	3	1.5
3_12	1059	14	27	13	2.9	0	0	0	0.6	14	27	13	2.9
3_13	1055	69	62	-7	0.9	1	0	-1	0.7	70	62	-8	1.0
3_14	1056	1335	1314	-21	0.6	25	33	8	1.5	1360	1346	-14	0.4
3_17	1063	950	884	-66	2.2	14	21	7	1.7	964	905	-59	1.9
3_18	1064	1	0	-1	1.4	0	0	0	0.0	1	0	-1	1.4
3_19	1060	90	114	24	2.4	1	3	2	1.4	91	117	26	2.6
3_20	1062	154	96	-58	5.1	1	2	1	0.8	155	98	-57	5.0

APPENDIX B –Validation Results

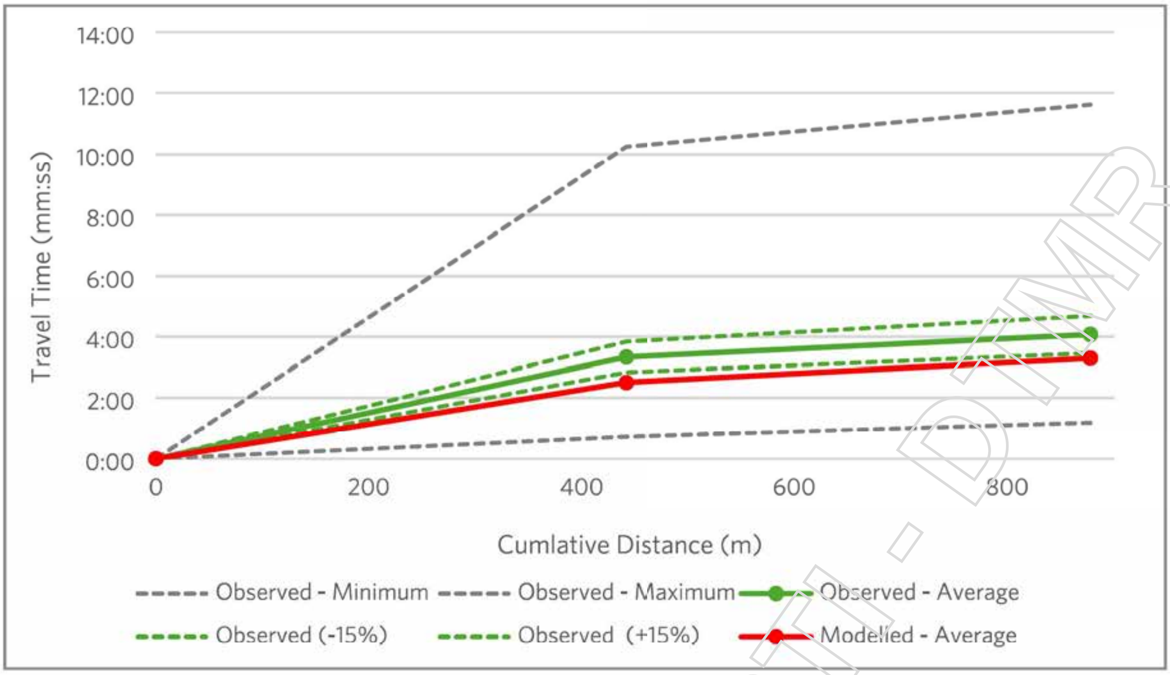
Validation – Travel Time Charts



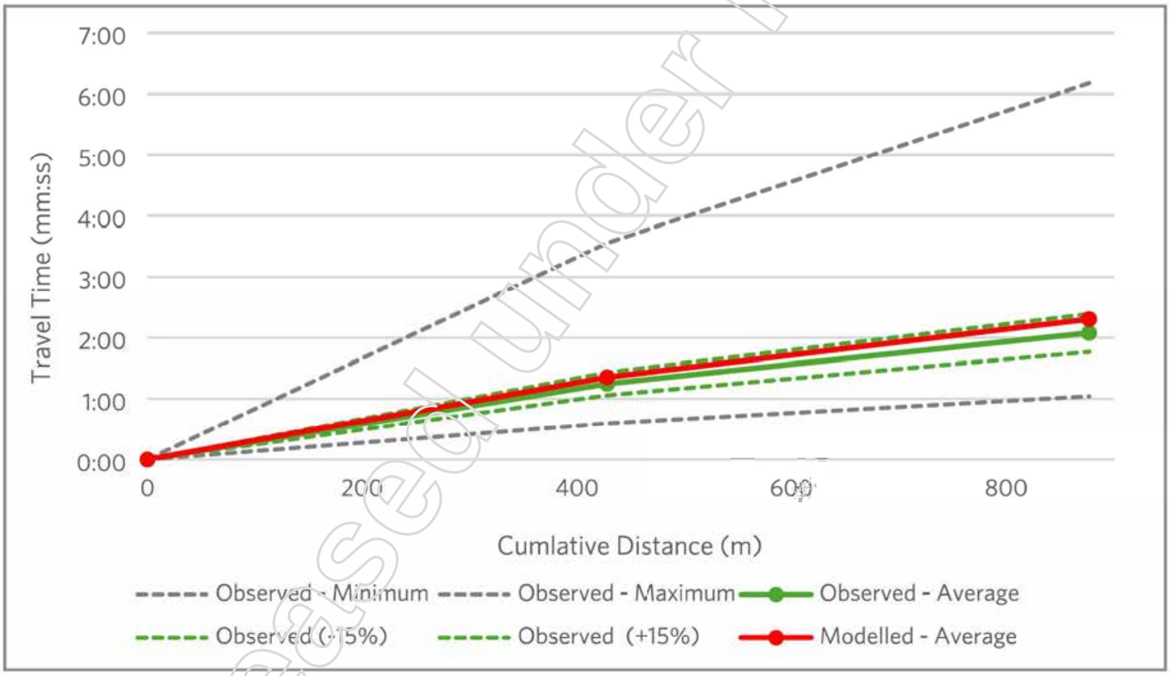
Logan Road – Northbound, AM Peak (7:00am – 8:00am)



Logan Road – Southbound, AM Peak (7:00am – 8:00am)



Padstow Rd / Miles Platting Road – Eastbound, AM Peak (7:00am – 8:00am)



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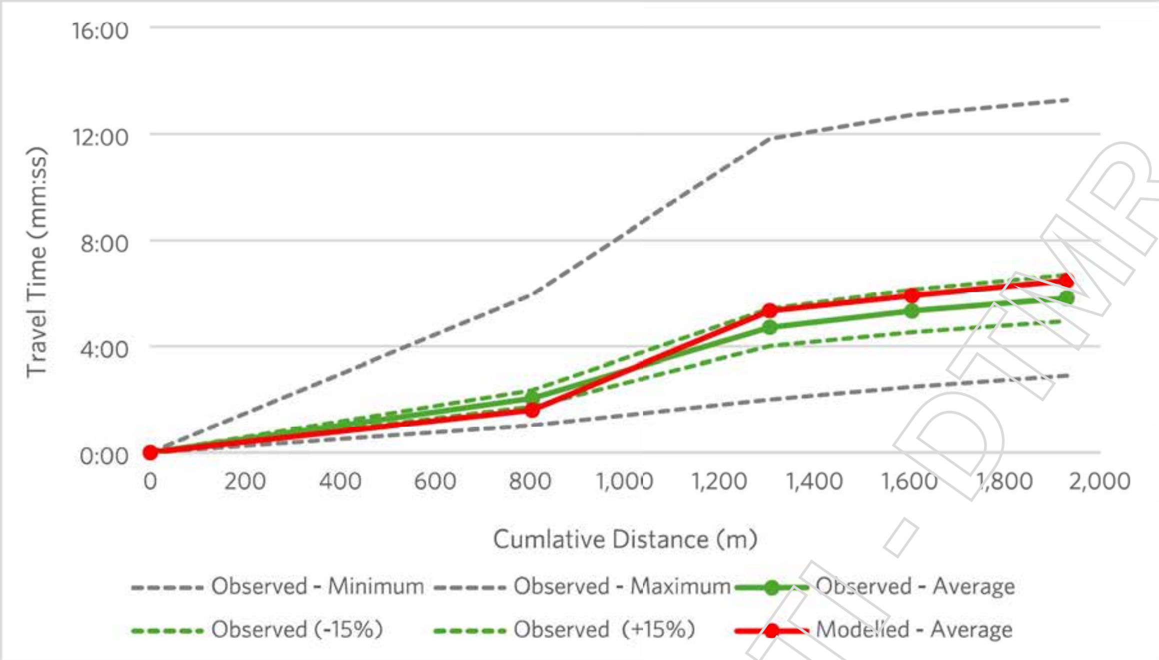

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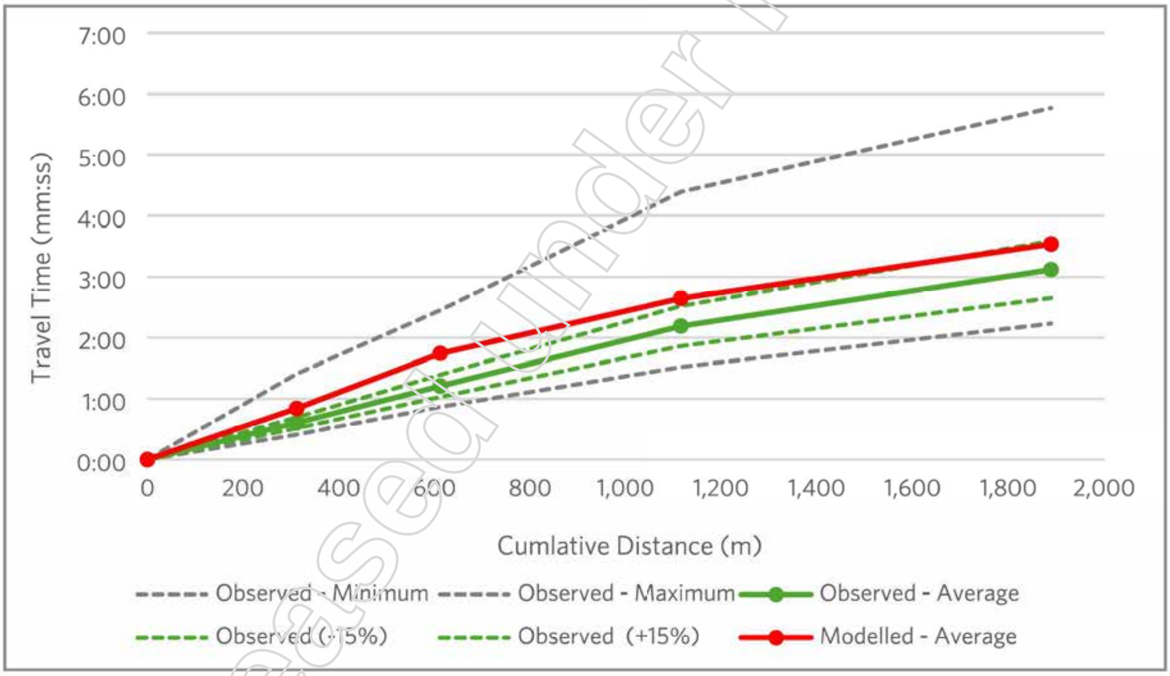

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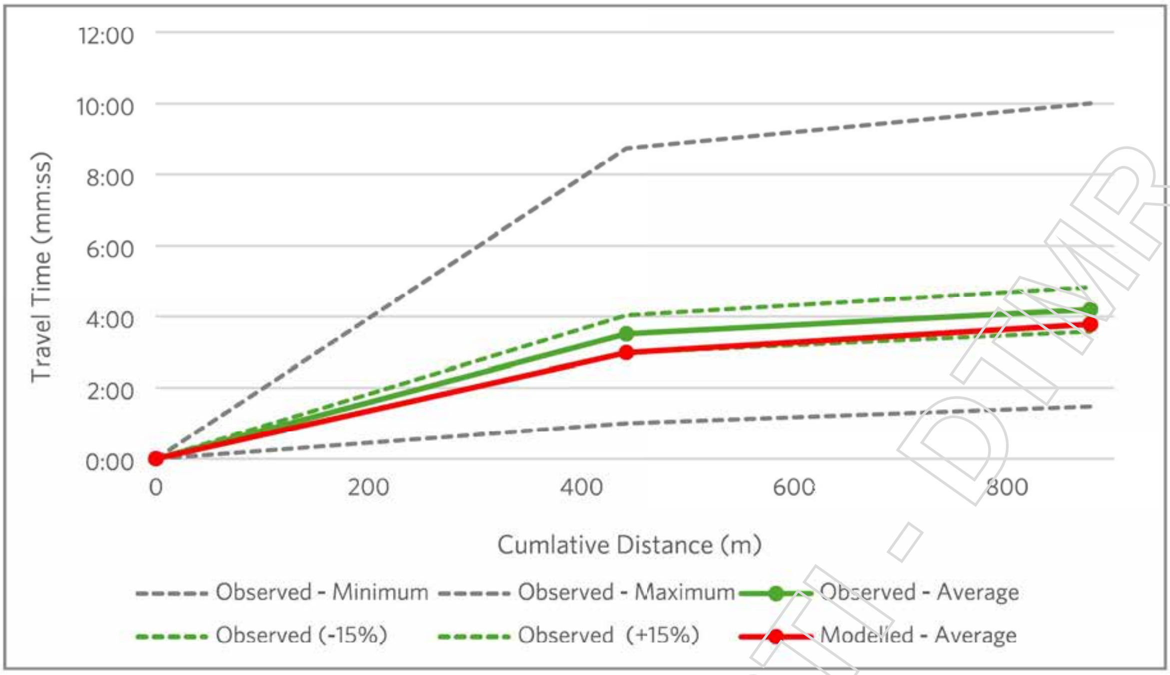

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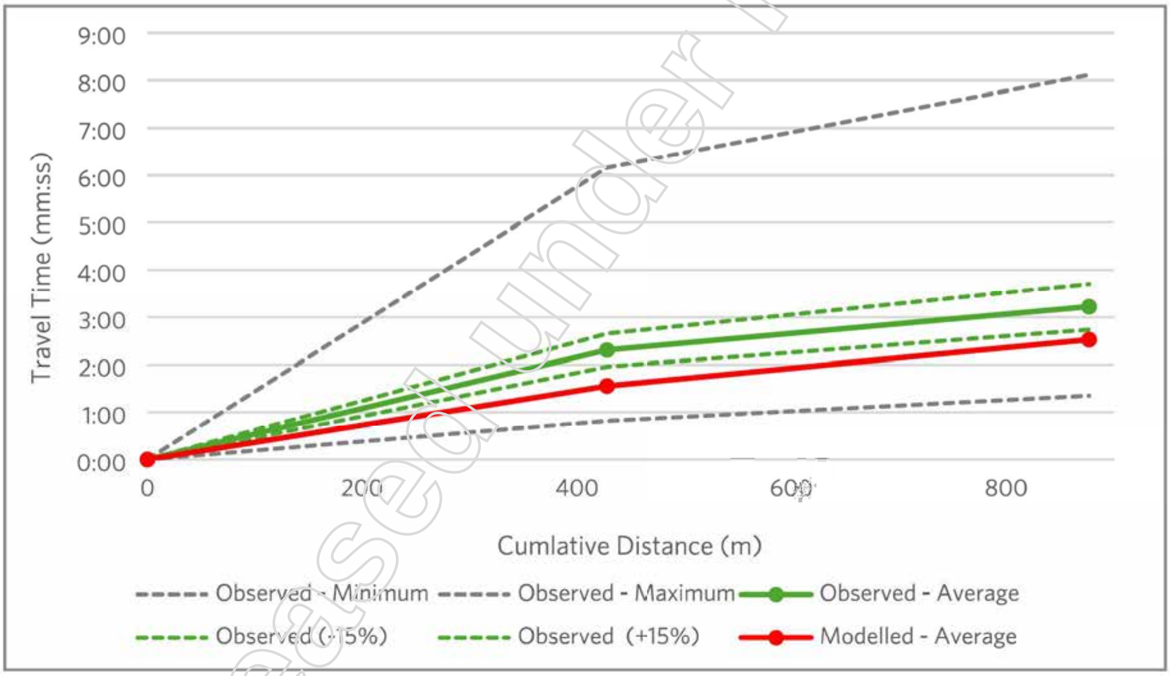

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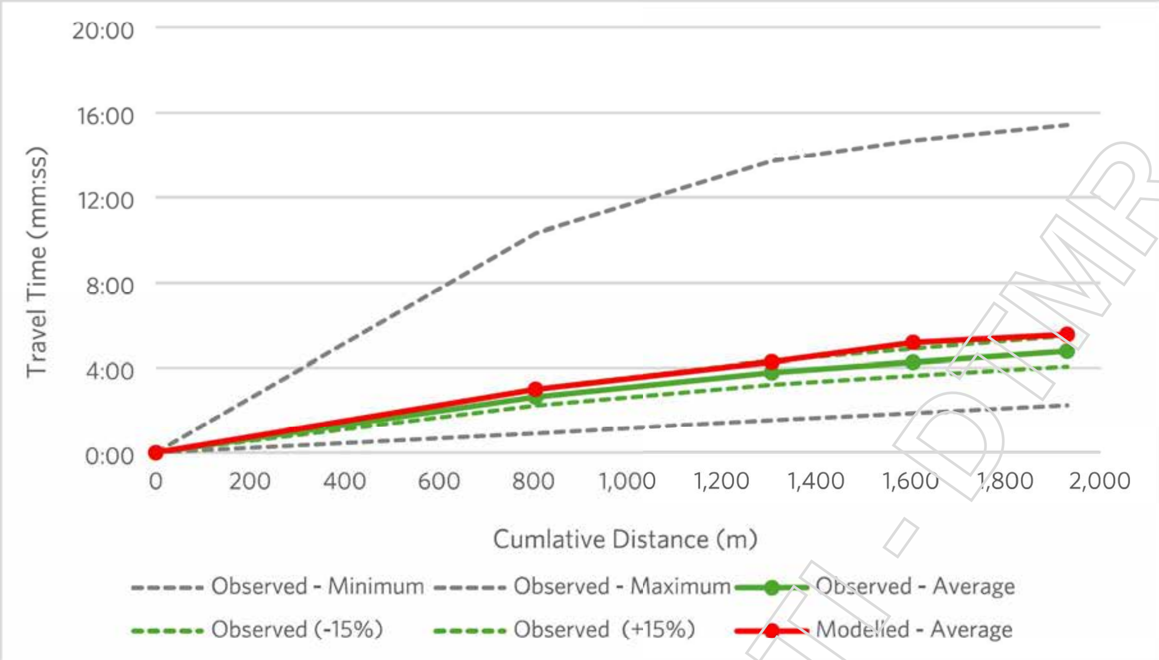

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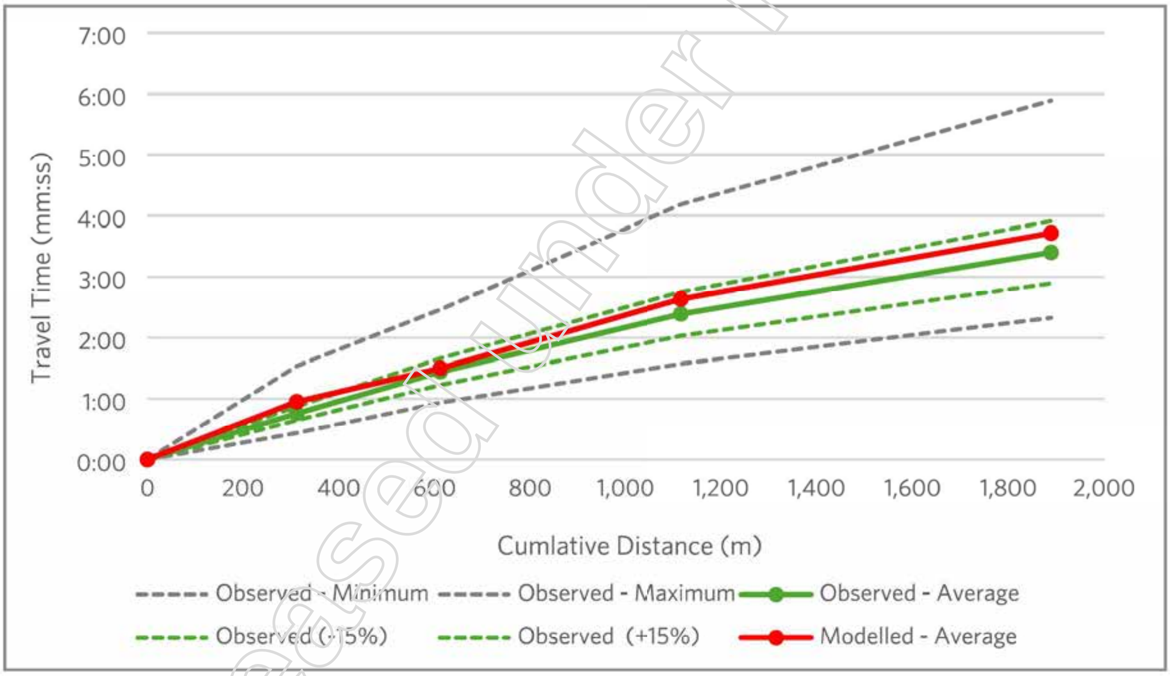

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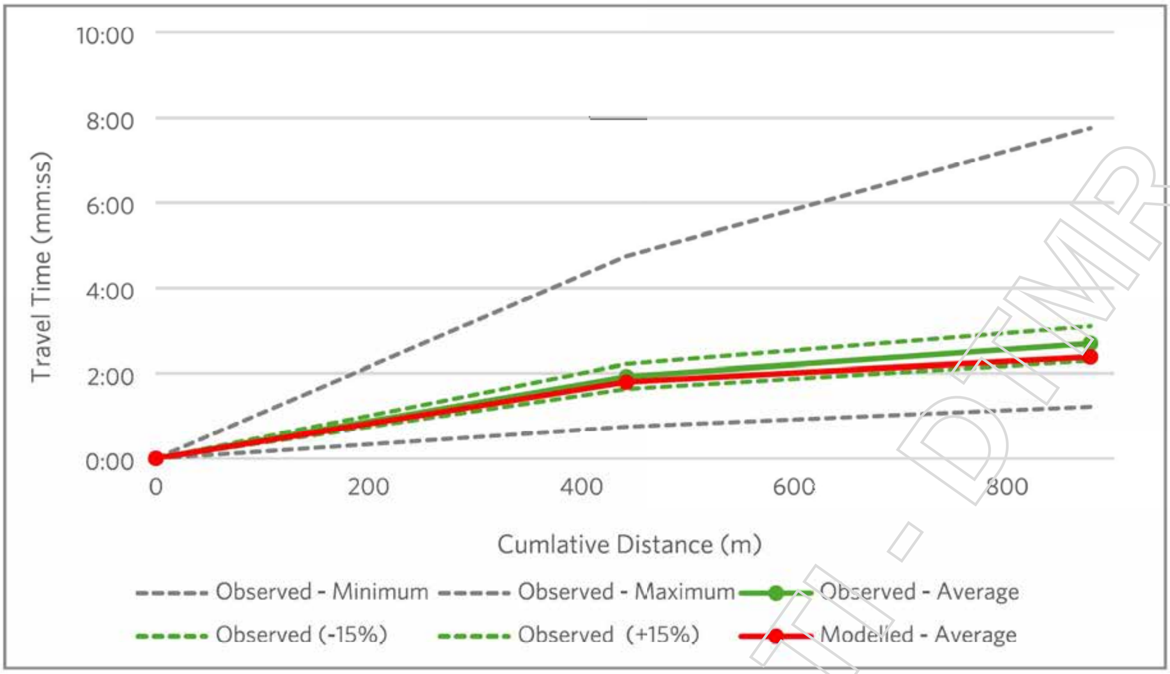

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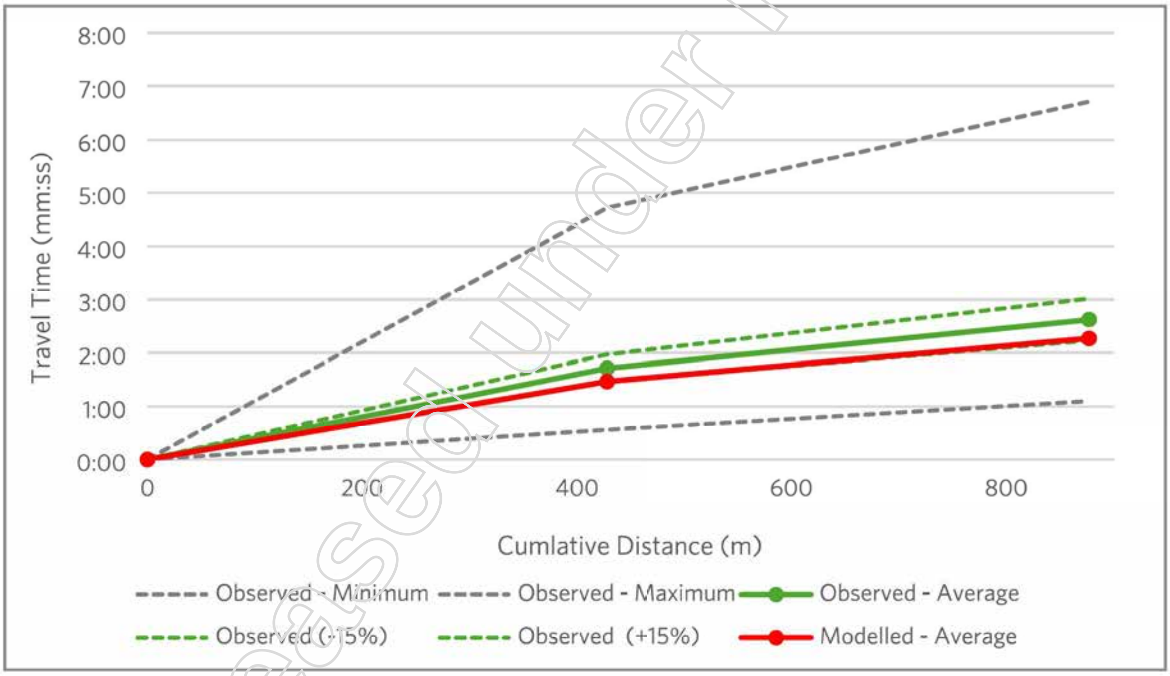

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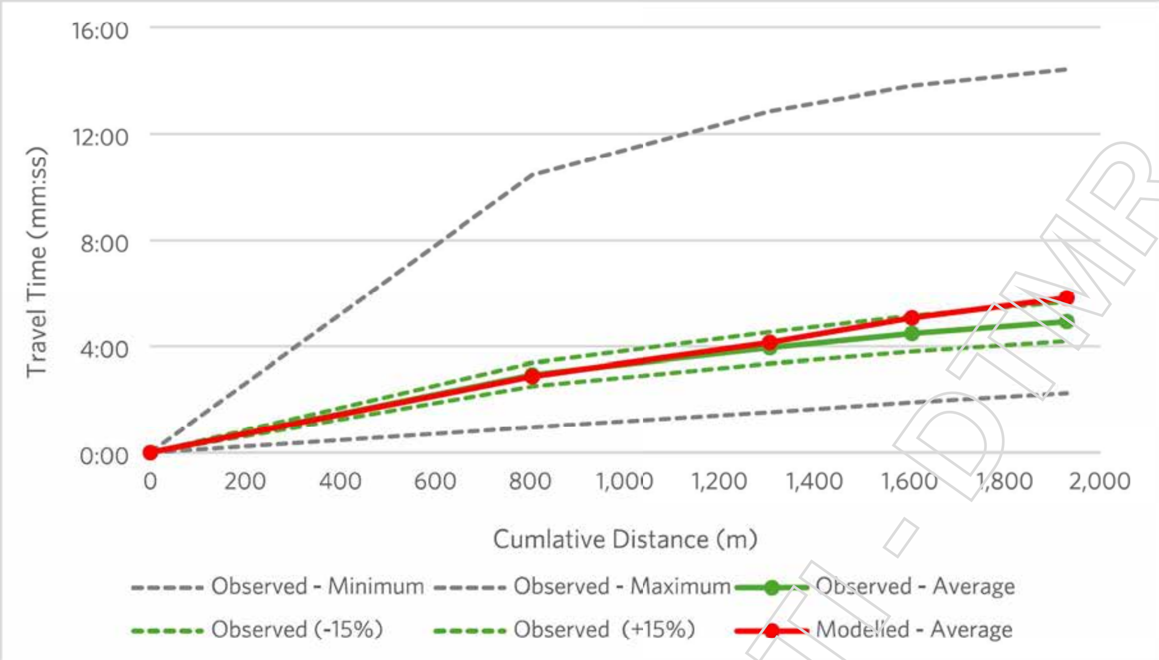

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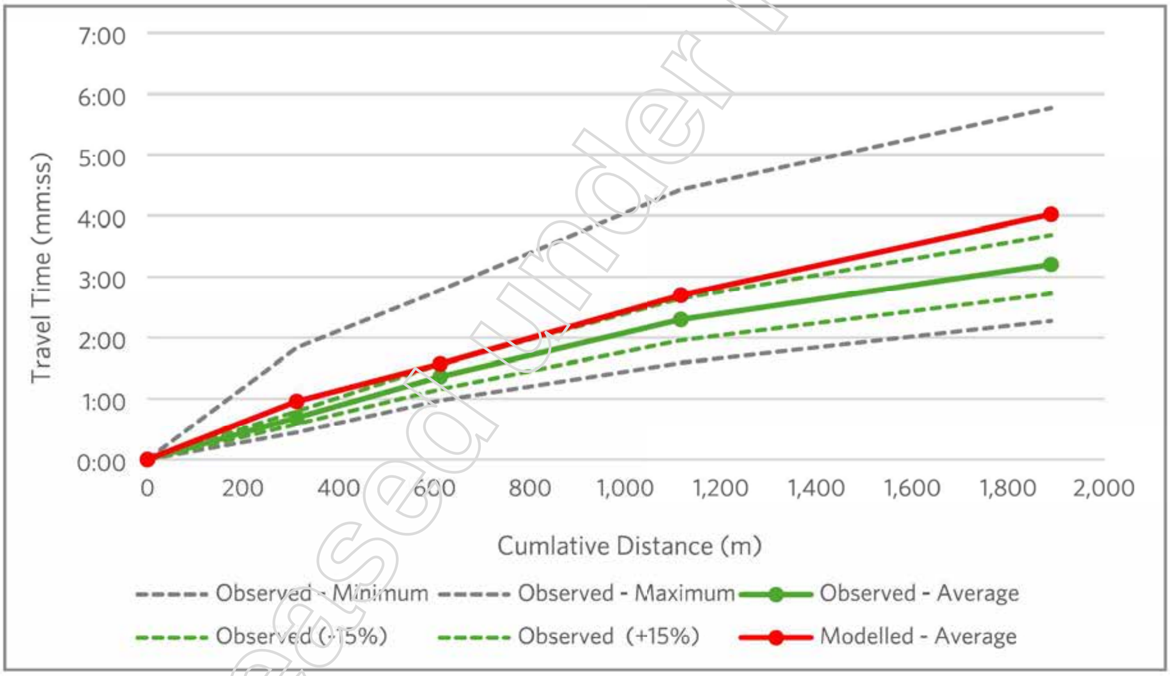

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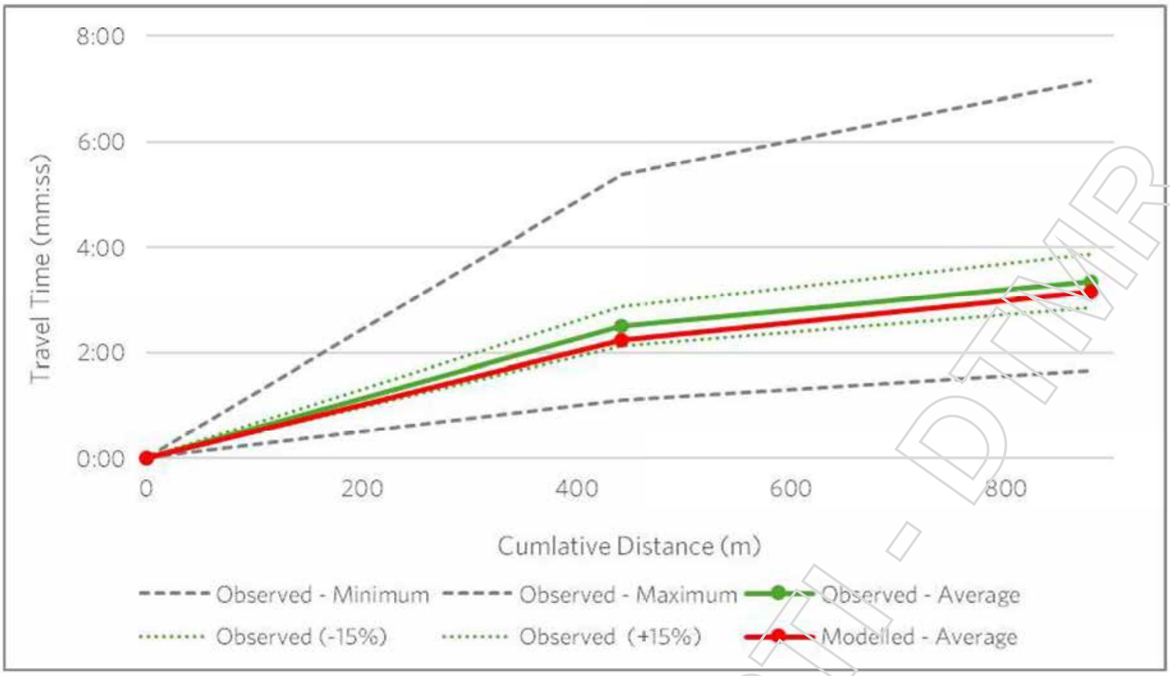

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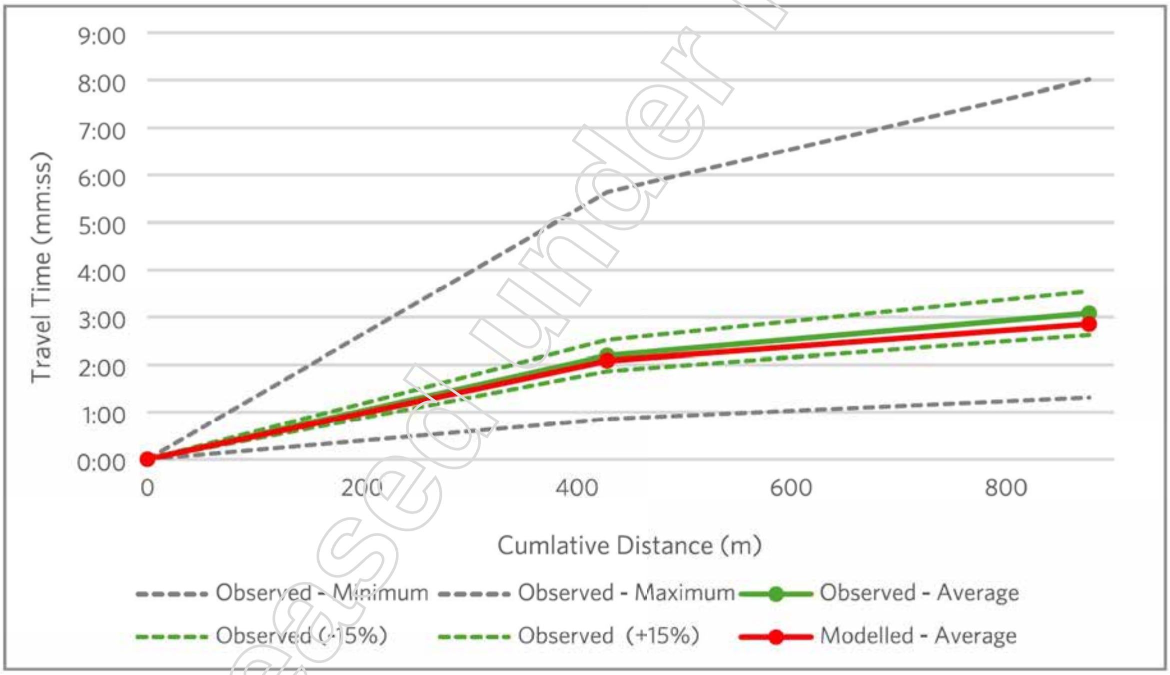

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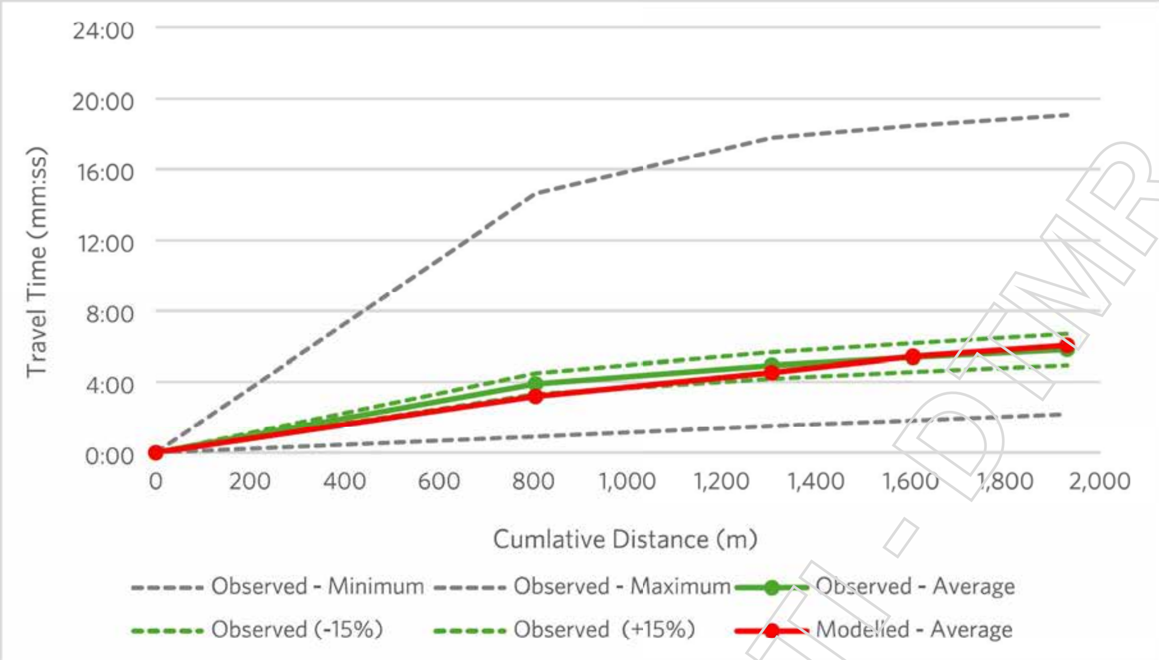

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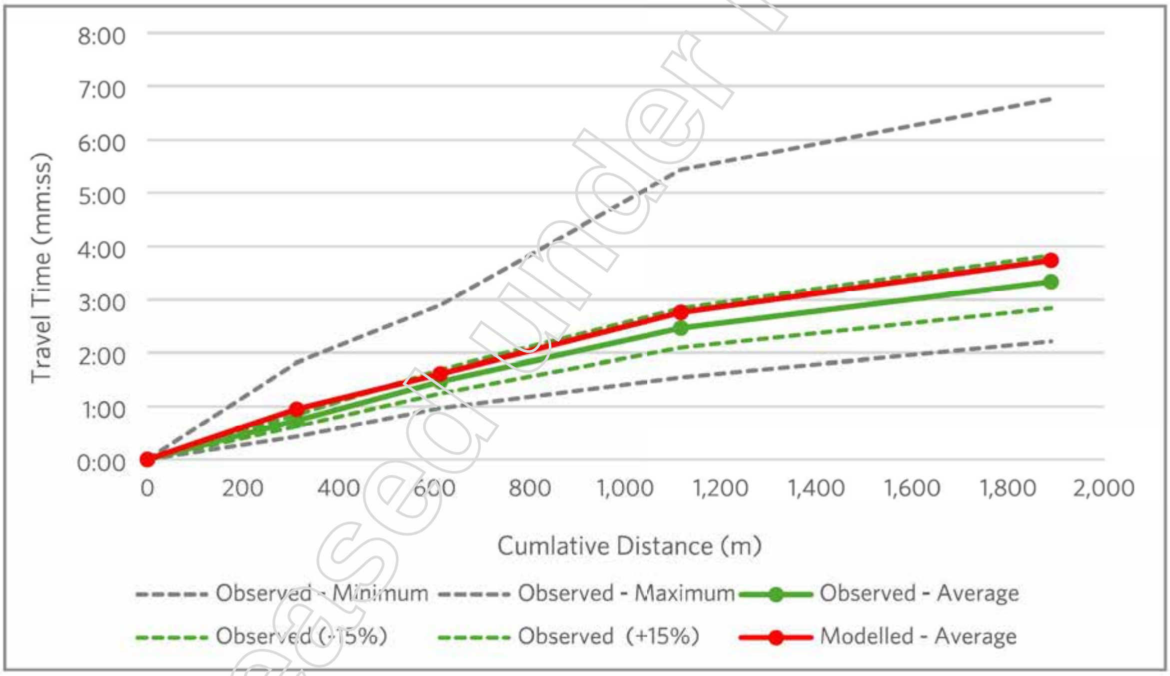

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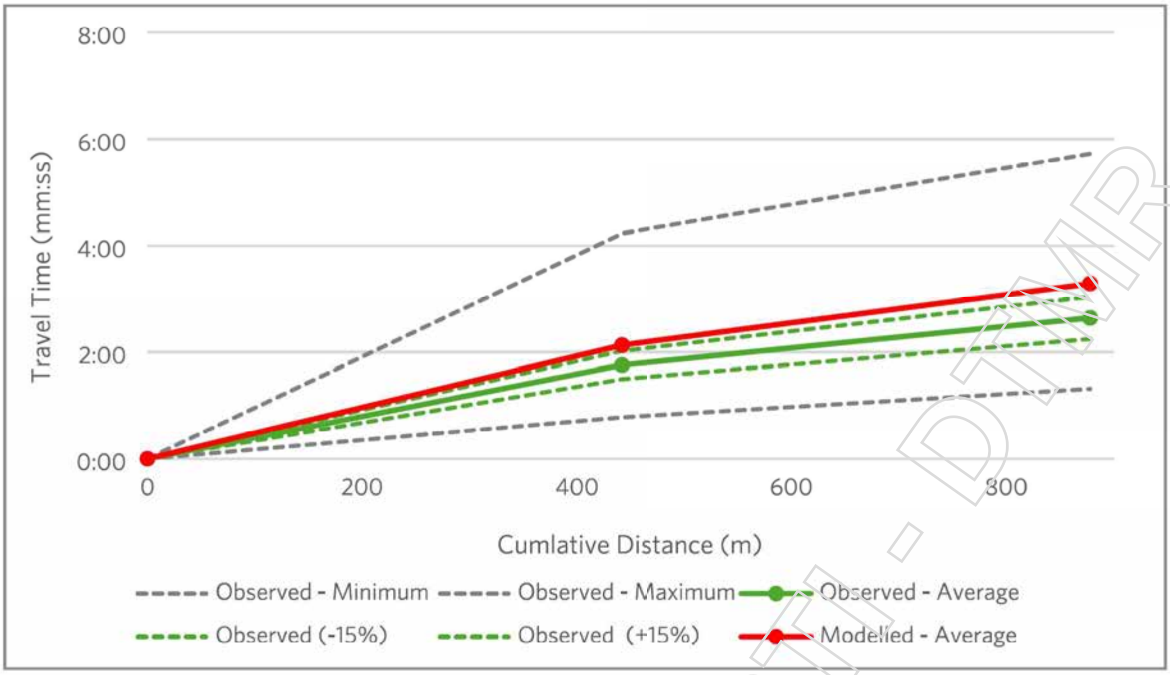

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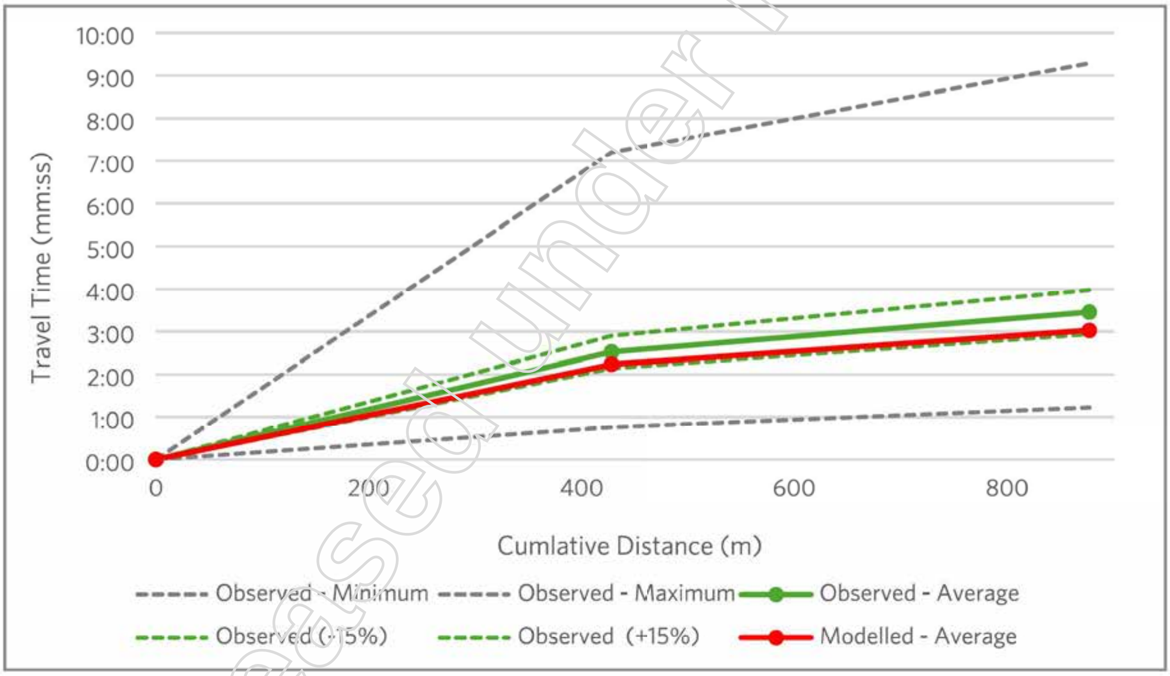

Padstow Rd / Miles Platting Road – Westbound, AM Peak (5:00pm – 6:00pm)

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Appendix E: Hydraulic Analysis Technical Note

Prepared for
Department of Transport and Main Roads
ABN: 39 407 690 291

AECOM

Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study

SASR Hydraulic Analysis Technical Note

10-Dec-2024

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Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study

SASR Hydraulic Analysis Technical Note

Client: Department of Transport and Main Roads

ABN: 39 407 690 291

Prepared by

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10-Dec-2024

Job No.: 60731166

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Quality Information

Document	Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study
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			Name/Position	Signature
A	04-Dec-2024	Draft for client review	NR [redacted] Deputy Project Manager	NR [redacted]
B	10-Dec-2024	Final report	NR [redacted] Deputy Project Manager	

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1.0 Introduction

1.1 Background

AECOM Australia Pty Ltd (AECOM) has been engaged by the Department of Transport and Main Roads (TMR) to undertake a Planning Study for the future upgrade of the Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road (MPPL) intersection (Study Intersection), in Eight Mile Plains.

The Planning Study will be delivered in two (2) work packages as outlined below:

- **Business Case (BC):** applying TMR's OnQ Project Management Framework for a low-cost interim upgrade solution (<$50m), which builds upon an Option Analysis (OA) completed in 2021
- **Strategic Assessment of Service Requirements (SASR):** applying Queensland Government's Project Assurance Framework (PAF) to investigate long term ultimate upgrade solutions (>$100m).

Figure 1 illustrates the nominated study area for the Planning Study.

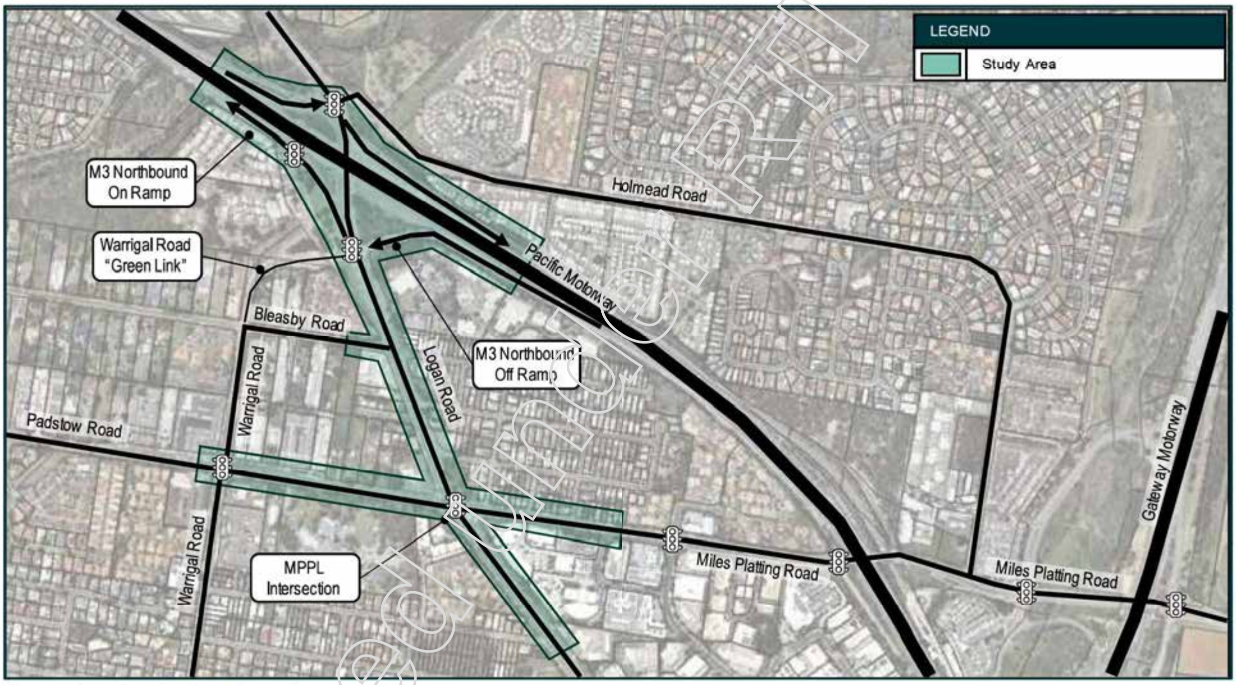


Figure 1 Study Area Overview

1.2 Purpose of Report

This Technical Note has been prepared to document a review of existing hydraulic and hydrology data for the study area to inform the SASR Report. It includes a review of previous planning and identifies key hydraulic and hydrology risks that need to be considered during the Preliminary Evaluation (PE) phase.

1.3 Scope of Works

The following tasks were completed during the preparation of this Technical Note:

- Obtain stormwater infrastructure data and flood information from Brisbane City Council (BCC)
- Undertake a desktop review of relevant previous planning for the MPPL project
- Undertake a desktop review of potential hydraulic issues and risks within the study area
- Identify whether potential flooding issues need to be investigated further during the PE phase.

2.0 Desktop Review

2.1 Reference Documents

2.1.1 Data Collection

The data used to inform this Technical Note has been obtained from the following sources:

1. BCC's stormwater data on Open Data
2. Survey information and as-constructed details of existing drainage system provided by TMR
3. The existing ground levels sourced from QLD government 1m Digital Elevation Model (DEM)
4. The land use type information for the study area
5. Bulimba Creek Flood Study (BCC; 2021)
6. Flood Study Citywide overland flow – Upper-Bulimba sub model (BCC; 2017)
7. Relevant data and studies undertaken by BCC (City Plan 2014).

2.1.2 Previous Project Planning Studies

Apart from the abovementioned data, the following studies were also obtained and reviewed:

1. Planning Study and Business Case for MPPL intersection (2010)
2. Planning Review of the 2010 Business Case (2014)
3. Planning Study and Options Analysis (2021).

2.2 Previous Project Planning Studies

2.2.1 Overview

In 2010, TMR completed a Planning Study and Business Case for MPPL which identified a preferred ultimate upgrade solution with a P90 risk-adjusted cost estimate of $133M. The solution included significant works at MPPL and at the Logan Road / Warrigal Road intersection (refer to **Figure 2**).

The 2014, TMR completed a Planning Review of the 2010 Business Case to identify a more cost-effective solution. The review identified a revised upgrade solution with a P90 risk-adjusted cost estimate of $97M. The solution included a reduced footprint and limited works to the MPPL intersection (refer to **Figure 3**).

In 2021, TMR completed another review of the 2010 Business Case as well as an Options Analysis (OA) for a ultimate upgrade solution. The OA identified an alternative ultimate solution with a P90 risk-adjusted cost estimate of $138M. The solution limited works to the MPPL intersection (refer to **Figure 4**).

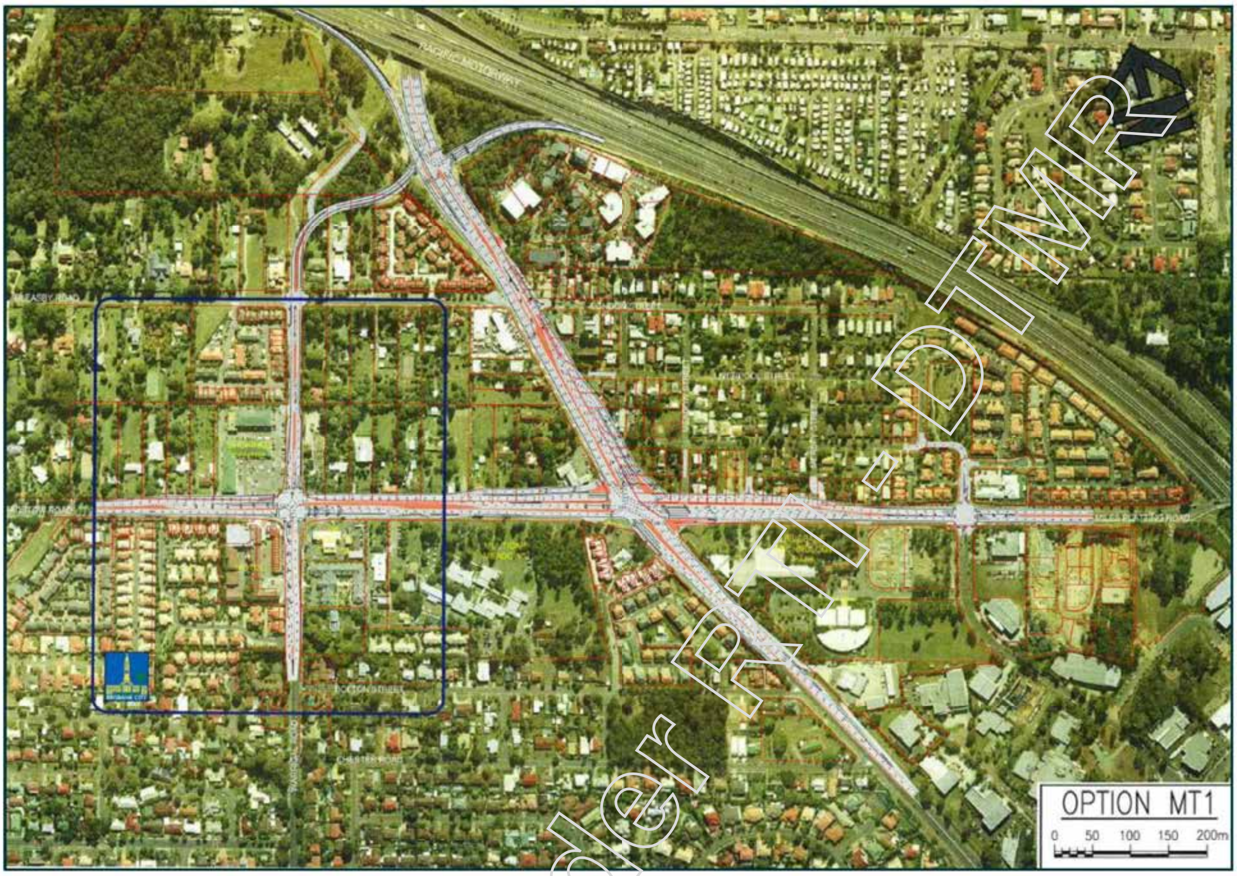


Figure 2 2010 Business Case – Preferred Option MT1

Figure 3 2014 Planning Review – Preferred Option 4

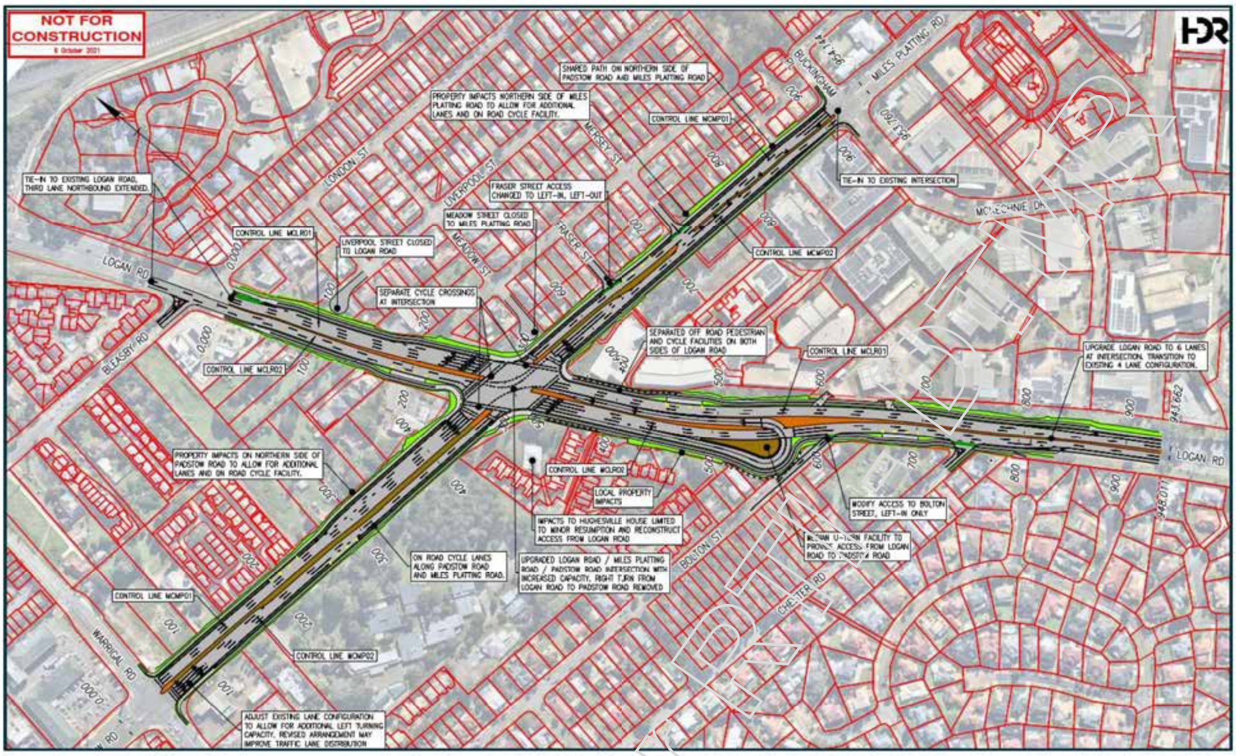


Figure 4 2021 Options Analysis – Ultimate Option R15A

2.2.2 Hydraulic Findings From Previous Planning Studies

The 2010 Business Case highlighted the performance of the existing drainage system. The existing drainage system which included two 1350mm RCP and two 900mm RCPs crossing Logan Road could accommodate a 2% AEP but there was no significant discharge storage upstream of Logan Road crossing under the major flow events (i.e. there is negligible attenuation of the major flows as a result of surface storage upstream of Logan Road). On Miles Platting Road, the single 600mm RCP crossing the road only provided a 10% AEP capacity, necessitating upgrades to meet the 2% AEP requirement.

There was no hydrologic / hydraulic analysis undertaken as part of the 2014 planning review.

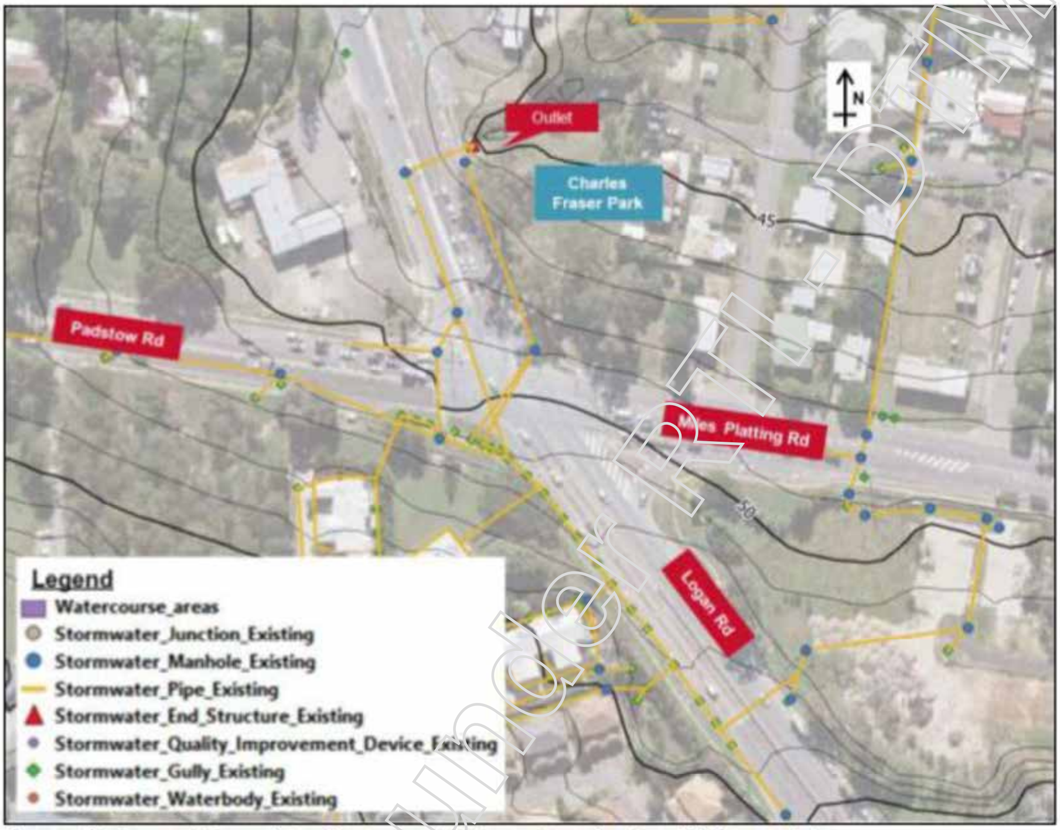
However, the 2021 OA noted that the two existing 900mm RCPs on Logan Road were insufficient to accommodate a 10% AEP event. To address this deficiency, it was recommended that these drains be upgraded to two 1200mm RCPs to enhance capacity and reduce flood risks.

In addition, the 2021 Summary Planning Report identified gaps in knowledge about the existing stormwater network on Logan Road between Liverpool Street and Bolton Street, necessitating assumptions about its adequacy. A detailed topographical survey was recommended for future project stages to verify drainage system details. A concept-level drainage analysis estimated pipe sizes and pit locations for cost estimation purposes was carried out in 2021. The design directing flow to the existing channel in Charles Fraser Park as shown in **Figure 5**. The 2021 Drainage Technical Note included pit spacings based on TMR's Road Drainage Manual to meet flow path width criteria, including 1.0m for on-road cycle lanes in a 50mm/hr event, 500mm for pedestrian crossings in a 63.2% AEP event, and minimum clear widths of 3.5m and 2.5m for single- and multi-lane roads respectively during a 10% AEP event. Major storm conditions were not assessed.

Drainage Infrastructure

Figure 3-22 shows the existing stormwater pits and pipes at and near the MPPL intersection based on BCC's open data.

Figure 3-22. Existing Drainage Stormwater Infrastructure



Source: Background image from Queensland Globe and overlay from BCC open data.

Stormwater runoff along Padstow Road and Logan Road near the MPPL intersection is collected via kerb and channel and captured in a stormwater pipe network which outlets into Charles Fraser Park. The outlet comprises a large headwall which is adjacent to the footpath on the eastern side of Logan Road.

Runoff along Miles Platting Road is captured in a drain which runs north-east of the MPPL intersection.

Figure 5 2021 Options Analysis – Planning Summary Report – Drainage Characteristics

2.3 Existing Flood Condition Review

2.3.1 City Plan 2014 Flood Overlay Maps

The BCC Portal has established a database of Flood Planning Areas (FPA's) guiding future development at risk of flooding within defined flood planning areas. BCC's Flood Overlay Code was used to define flood risks within the study area. This code establishes FPA's based on the likelihood and severity of flooding as depicted in the Flood Overlay Map. These FPA's are designated based on their susceptibility to flooding from riverine (Brisbane River and Creeks) and local overland flow events. Specifically, high-risk areas within the MPPL region may include sections adjacent to Bulimba Creek and its tributaries.

As shown in **Figure 6**, there are small sections within the study area that are impacted by overland flooding (Locations 1, 2, 3 and 4) and a small section of Pacific Highway impacted by creek flooding in a 1% AEP event (Location 5). Further details are provided in the following sections of this Technical Note.

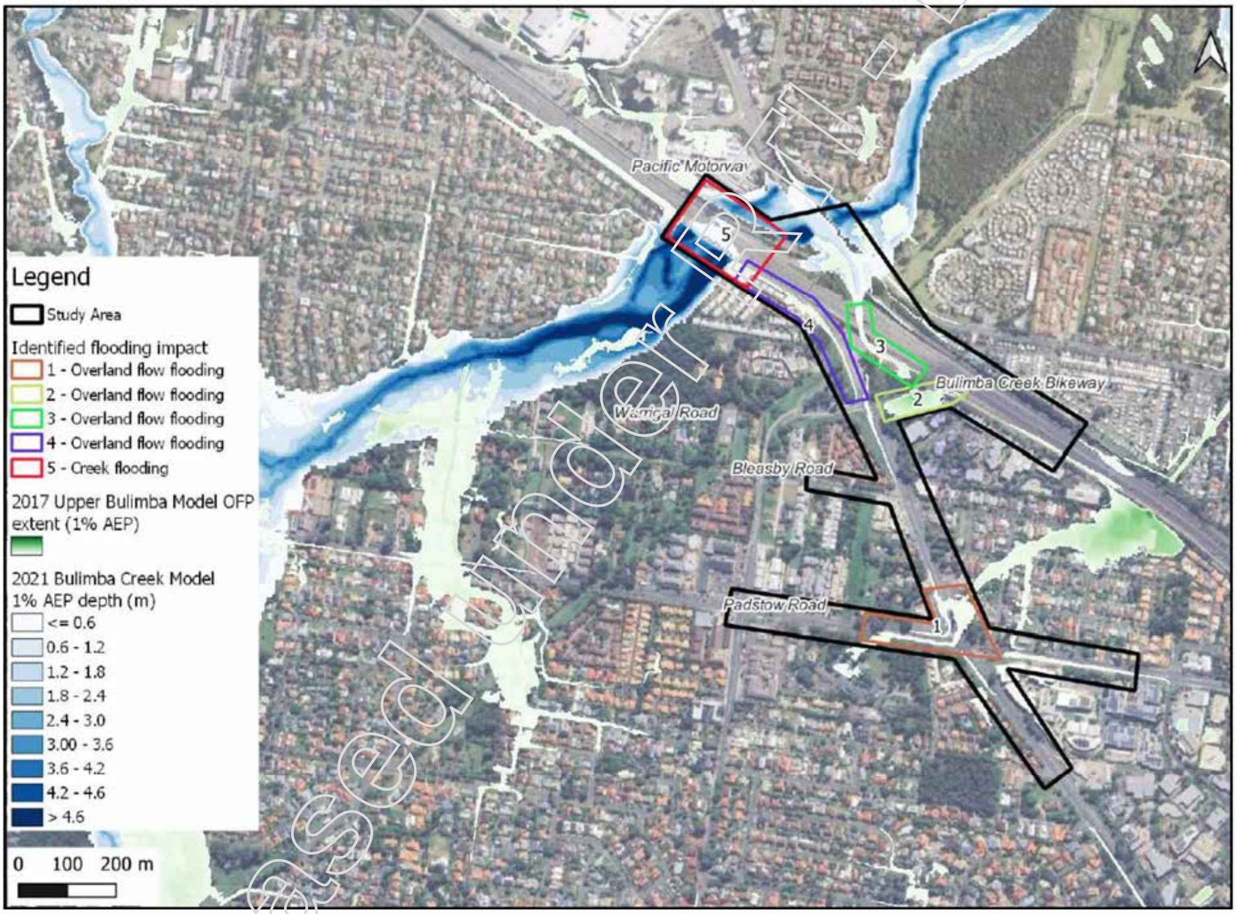


Figure 6 Areas Impacted by Overland Flooding

A copy of the overland flooding map is included at **Appendix A**.

2.3.2 Brisbane River Flood Planning Area

BCC developed Brisbane City Plan 2014 (City Plan) in consultation with the community to support a simple, fast and clear development assessment process. Council developed five FPA's for Brisbane River and creek / waterway flooding to guide future building and development in flood prone areas.

Figure 7 highlights that the study area is not located within the Brisbane River FPA and hence would not be subject to regional flooding from the Brisbane River.

Figure 7 BCC City Plan 2014 – Brisbane River Flood Planning Area

2.3.3 Creek / Waterway Flood Planning Area

Figure 8 indicates that a small section of the study area at north-west near the Pacific Highway is impacted by the Bulimba Creek FPA in 2% and 1% AEP[1] events.

Figure 8 BCC City Plan 2014 – Creek / Waterway Flood Planning Area

A copy of the Bulimba Creek FPA map is included at **Appendix B**.

[1] According to the BCC's City Plan, the flood overlay mapping for the Bulimba Creek catchment was updated on September 1, 2023. Comparing the updated map with the superseded map from 2021 shows minor changes within the study area.

2.3.4 Bulimba Creek Flood Study 2021

In 2014, BCC undertook a flood study of the Bulimba Creek Catchment in 2021. As part of the flood assessment, the main Bulimba catchment was subdivided into three model domains: upper, middle and lower. Hydrologic inputs to the flood models were set up using URBS software and incorporated ARR 2019 guidelines and Brisbane Council IFD data. Outcomes of the study included hydraulic results such as depth, water level and flood hazard for the 50% to 0.05% AEP events.

Updates to the 2014 Bulimba Creek Flood Study were then undertaken in 2021, with the development of a new TUFLOW hydraulic model of the Bulimba creek system and associated tributaries. This was in line with the aim of the update to provide most current flooding conditions and best practice flood modelling techniques for the catchment. Latest topographical data and incorporation of infrastructural updates and the then planning scheme were part of the scope for the 2021 revision. Moreover, calibration and validation of the flood models to recent historical storms and subsequent design event hydrologic and hydraulic assessment for the 50% to 1% AEP events provided confidence to the outcomes of the design flood exercise. Calibration of the URBS and TUFLOW models were undertaken for 2001, 2013 and 2015 historical storm events, with the simulated peak levels within the specified tolerance of 0.3 m.

The upper sub-model comprising of Bulimba Creek headwaters and Bulimba East Creek was relevant for the study area. An outline of the overall Bulimba Creek catchment extent is described in **Figure 9**, noting that the study area is located at the top of the catchment. Given the updates and additional investigations regarding calibration and validation of the modelling undertaken in 2021, it can be inferred that the flood model would provide a good baseline for any potential flood impact assessment as a result of road upgrades for the study area, specifically where Pacific Motorway interacts with Bulimba Creek crossing.

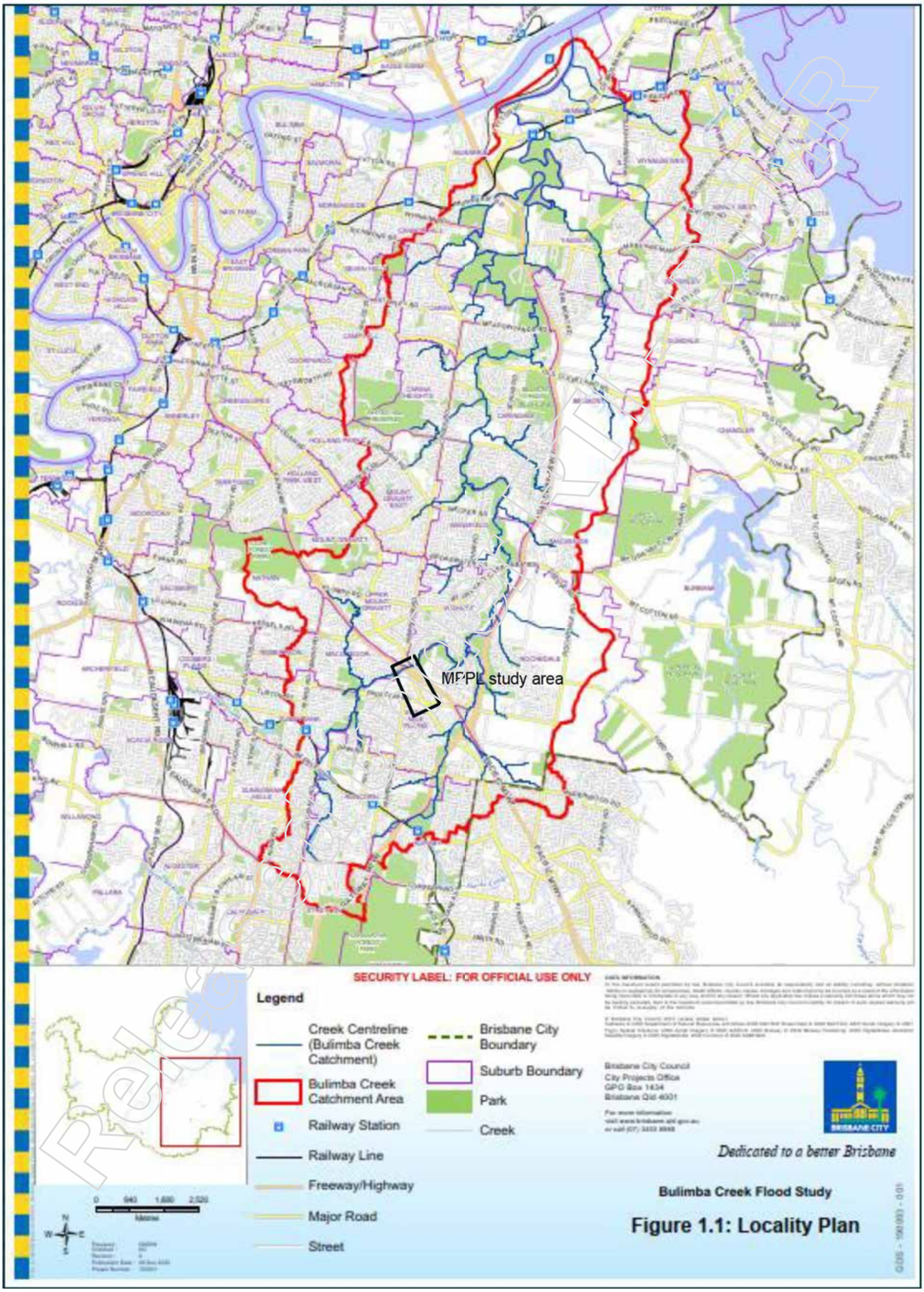


Figure 9 2021 Bulimba Creek Locality Plan (BCC, 2021)

2.3.5 Overland Flow Flood Planning Area

BCC's Overland Flow Overlay Code is designed to identify areas at risk of overland flooding, which occurs when stormwater runoff flows across land before entering a watercourse. The BCC Citywide Overland Flood Study is a comprehensive assessment designed to evaluate and manage the risks associated with overland flow flooding across Brisbane. GHD was engaged by BCC in 2017 to undertake hydrologic and hydraulic modelling of overland flow paths for the Brisbane area. Hydraulic results with respect to extent, depth, velocity, hazard for the 50%, 20%, 10%, 5%, 2%, 1%, 0.2% and 0.05% AEP events were assessed as part of the assessment. The delivery of the study was undertaken in three phases.

The hydraulic models were set up to use a direct rainfall or "rain-on-grid" approach in order to simulate catchment runoff processes for the entire Brisbane area. 27 sub-models were set up so as to limit run.

The methodology involved calibration and validation of the models on small areas (using Norman Creek pilot catchment). Seven locations where there was sufficient historic stream gauge and rainfall data were used for calibration of the hydraulic model in order to give confidence in adopted model parameters.

A filtering approach was adopted in order to produce overland flow path extents. This involved having screening thresholds for hydraulic results such as depths (>0.15m), velocity-depth (0.125 m^2/s), removal of isolated "ponds" of water with no active conveyance (500 m^2 minimum limit). Some sensitivity tests with varying Manning's roughness, losses and blockage of stormwater drainage network were also undertaken to assess changes to the baseline hydraulic results.

The study area is within the Upper-Bulimba sub model.

Figure 10 indicates that there are overland flow paths within the study area.

1% AEP overland flow flood extents of consideration have been illustrated in **Figure 10**. These include:

- Area 1: A portion of the Logan Road just north of the Padstow Road intersection
- Area 2: The area in proximity to Warrigal and Logan Road intersection
- Area 3: A section of Pacific Motorway within the study extent
- Area 4: The length of road from Bulimba Creek to Bleasby Road-Logan Road intersection.

Figure 10 BCC City Plan 2014 – Overland Flow Flood Planning Area

A copy of the Overland Flow FPA map is included at **Appendix C**.

2.4 Existing Stormwater Pipe Network

The latest stormwater pipe networks obtained in BCC's website and TMR's as-constructed drainage details are illustrated in **Figure 11**. Eight drainage infrastructures with hydraulic risk were identified within the study area, which are listed in **Table 1**. Their corresponding risks will be elaborated in **Section 4**.

A copy of the existing stormwater pipe network map is included at **Appendix D**.

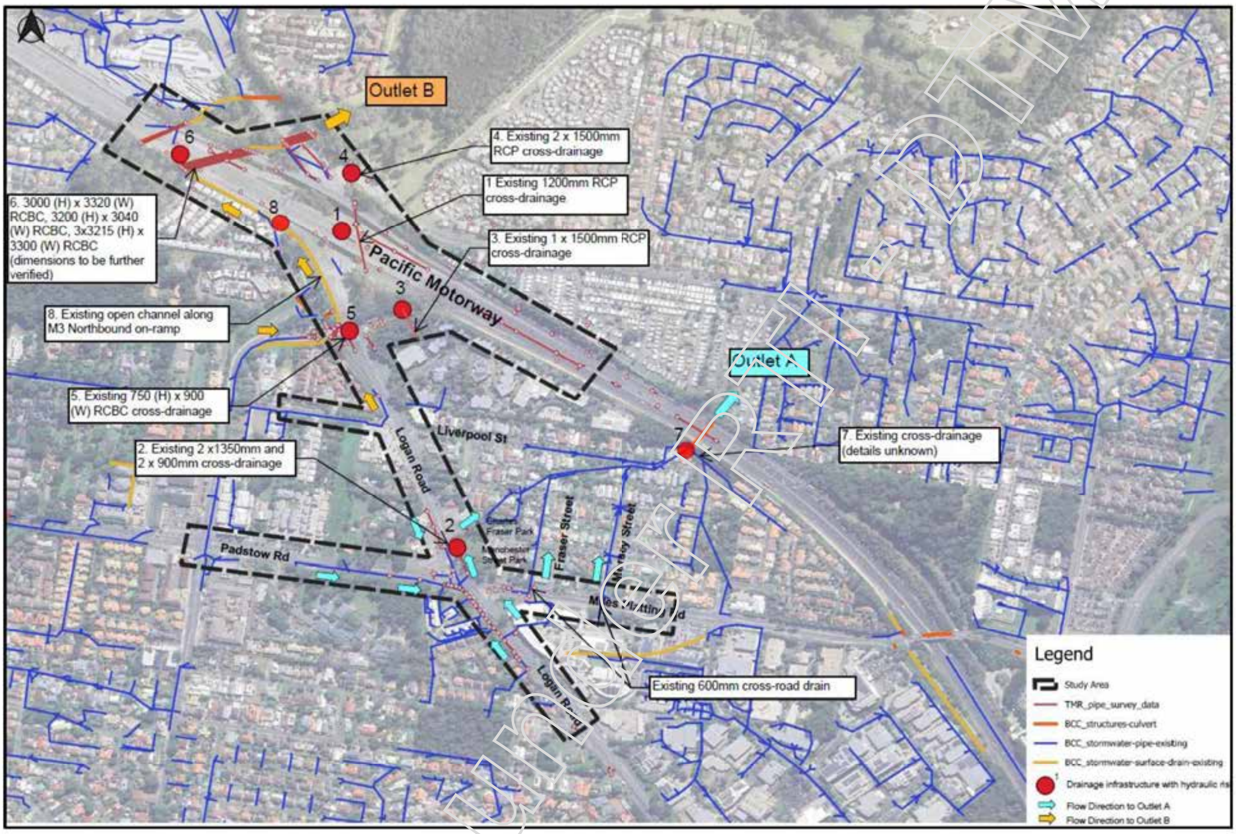


Figure 11 Existing Stormwater Pipe Networks around Study Area

Table 1 Drainage Infrastructure within Study Area

ID	Location	Drainage Infrastructure
1	Pacific Motorway near Logan Road	1200mm RCP
2	Logan Road, North of Padstow Road	2x1350mm and 2x900mm cross-drainage
3	Bulimba Creek Bikeway (M3 Slip Road)	1500mm RCP
4	Holmead Road	2x1500mm RCP
5	Warrigal Road near Logan Road	750 (H) x 900 (W) RCBC
6	Pacific Motorway near Freesia Street	3000 (H) x 3320 (W) RCBC, 3200 (H) x 3040 (W) RCBC, 3x3215 (H) x 3300 (W) RCBC (dimensions to be further verified)
7	Culvert crossing Pacific Motorway at south of Logan Road/Pacific Motorway Intersection	Unknown (to be confirmed at later stage if necessary)
8	North of Warrigal Road/ Logan Road Intersection	Existing open channel along M3 Northbound on-ramp

Key observations from the existing stormwater pipe network are summarised below:

- At the south of Liverpool Road, the runoff from the catchment is predominately conveyed to Outlet A. Within this catchment, two major cross drainages are:
  - **Logan Road Cross-Drainage (Item 2):**
    - 2 x 1350mm and 2 x 900mm cross-drainage are located along Logan Road, directing runoff from Padstow Road and areas south of Logan Road towards existing culverts at Manchester Street Park and Charles Fraser Park. These drains are positioned at the lowest point within the MPPL intersection, with numerous inlet pits managing surface water at this critical location.
  - **Miles Platting Road Cross-Drainage:**
    - Two 600mm cross-road drains are situated near Fraser Street and Mersey Street along Miles Platting Road. These drains primarily handle localized runoff and connect to the downstream stormwater system, ultimately discharging into Bulimba Creek through a culvert beneath the Pacific Motorway.
- At the north of Liverpool Road, the runoff from the catchment is predominately conveyed to Outlet B. Within this catchment, the major drainage infrastructures are:
  - **Open Channel Along M3 Northbound On-Ramp (Item 3):**
    - An open channel runs parallel to the M3 northbound on-ramp, serving as a vital conveyance pathway for runoff from the catchment area north of Padstow Road. This channel plays a key role in managing overland flow and maintaining hydraulic connectivity in the area.
  - **Pacific Motorway Cross-Drainages (Items 1, 6 and 7):**
    - Several cross-drainage culverts are located at Pacific Motorway conveying the runoff from study area to Bulimba Creek.

2.5 Stormwater Infrastructure Immunity Requirement

2.5.1 Austroads Guidance

The Austroads “Guide to Road Design Part 5: Drainage – General and Hydrology Considerations” (AGRD Part 5) outlines minimum flood immunity standards for different hydraulic design elements.

Table 2 and **Table 3** summarise the items relevant to this assessment.

Table 2 Guide for Flood Immunity of Design Elements

Design Element	Austroads Road Classification	Suggested AEP
Cross drainage (culverts & bridges)	Controlled Access Highways Includes: Motorways & Freeways (National/State/Territory)	1%
	Arterial Road Class 3 Includes: State/Territory main roads	2%
	Local Roads Classes 4 & 5	10-5%
Cross drainage (floodways)	Arterial Road Class 3	5%
	Local Road class 4 &5	20-10%
	Urban Local roads	20-10%
Longitudinal open drainage (table drains, diversion drains, catch drains and banks)	All roads	10%
Road surface (network drainage including kerb and channel with inlet pipe and put systems, bridge decks)	All roads other than local roads	10%
	Local roads	20%

Table 3 Flood Immunity for Road Sections within Study Area

Road	Road classification	Suggested Flood Immunity
Pacific Motorway	Motorway	1%
Logan road	Secondary (Sub Arterial)	2%
Padstow Road	Secondary (Sub Arterial)	2%
Bleasby Road	Local	10-5% AEP
Holmead Road	Local	10-5% AEP
Veloway 1	Bikeway	-

2.5.2 Flood Immunity at Cross-Drainage Locations

Upon superposition of the 1% AEP flood extent from the BCC creek and overland flow flood grids, the pre-existing road immunity at the location of these structures were identified as described in **Table 4**.

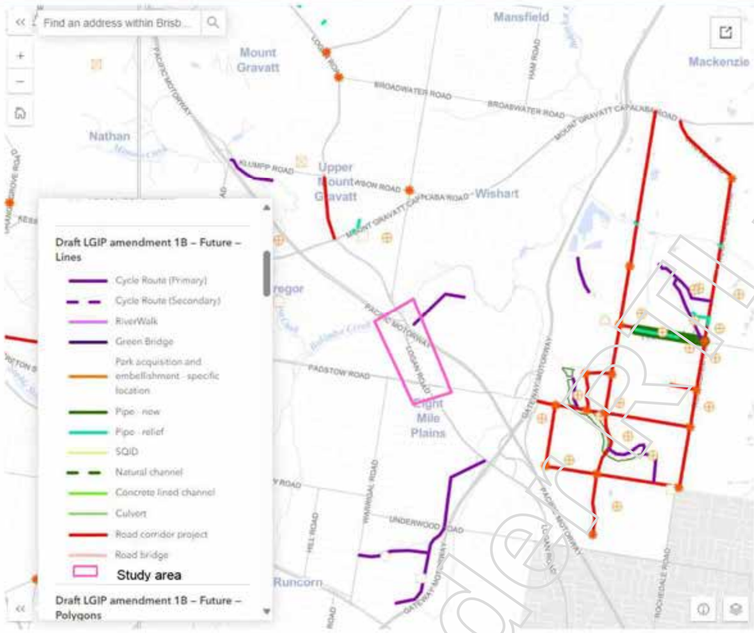
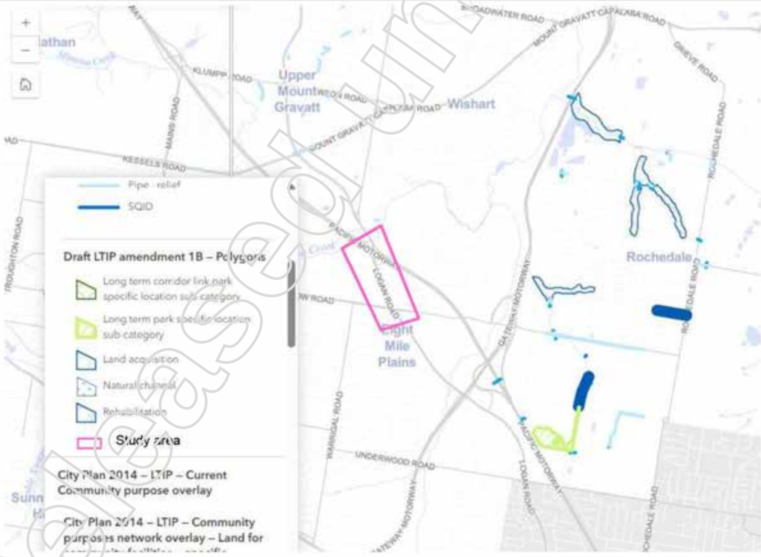
Table 4 Summary of Flood Immunity of Existing Cross-Drainage Structures

Location	Structure	Existing Flood Immunity
Logan road, north of Padstow Road intersection	2 x 900 mm RCP 2 x 1350 mm RCP	Road immunity less than 1% AEP at that location. Both traffic lanes are flooded in the 1% AEP event. The 20% AEP BCC flood grid indicates a flood depth of up to 470 mm in the left lane at the location of crossing.
Bulimba Creek Bikeway (M3 slip road)	1 x 1500 mm RCP	Road is dry at that location for the 1% AEP.
Holmead Road	2 x 1500 mm RCP	Road is dry at that location for the 1% AEP.
Pacific Motorway	Dimensions of culverts from BCC were unknown	Highway section at the location of crossing to Bulimba experiences flood depths of around 500 mm from creek flooding for the 1% AEP event. Localised flooding at Logan Road – Pacific Motorway intersection from the overland flow flood grids.

2.6 Future Infrastructure Plans

BCC's "Local Government Infrastructure Plan" (LGIP) and "Long-Term Infrastructure Plan" (LTIP) Portal outline proposed trunk infrastructure in line with the 2014 City Plan. On assessment of the interactive Portal for the study area, the following in **Table 5** were noted with respect to future infrastructural changes.

Table 5 Future Infrastructure Plans

Type	Map	Review Comments
LGIP		Proposition for cycle corridor next to Bulimba Creek in the LGIP scenario is not expected to affect MPPL road upgrade works.
LTIP		Proposition for long-term park in the LTIP scenario is not expected to majorly affect MPPL road upgrade works.

2.7 Summary of Desktop Review

Key findings are summarised below:

- The study area is not susceptible to flooding associated with Brisbane river or storm tides but is affected by creek flooding from Bulimba Creek and overland flooding
- Overland flooding for the 1% AEP is restricted to the area around the Padstow Road / Logan Road intersection and the road section at Bleasby Road / Logan Road intersection and longitudinally along Bulimba Creek bikeway draining to Bulimba Creek
- Based on the current drainage networks, runoff from MPPL is conveyed to Outlet A, where significant overland flooding has been observed. This overland flooding may be due to the inadequate capacity of the existing culvert at the Pacific Motorway near Outlet A or the upstream drainage network being insufficient to convey runoff downstream. Therefore, if there is any increase in runoff arising from the MPPL project, the downstream drainage system, which lies outside the current study area, may require upgrading. However, as the existing culvert is located on the Pacific Motorway, any upgrade works, including not only the culvert but also the drains between MPPL and the culvert at the Pacific Motorway, could be challenging and costly. Consequently, it is essential to consider providing sufficient storage around MPPL to prevent further strain on the existing drainage system
- Based on the previous survey data and BCC stormwater pipes, some drainage details, including the pipe size and invert levels, are missing from available records. For example, some inlet pits were observed at Logan Road near Liverpool Road from Google map but not shown in official records
- The study area is not expected to be affected by LTIP and LGIP infrastructure plans.

3.0 Key Hydrologic / Hydraulic Risks

3.1 Overview

The level of hydraulic risk at selected locations within the study area have been categorised based on existing flood profile and immunity, potential for ponding within trafficable areas, constraints of existing stormwater conveyance. As inferred from the desktop review and inspection of the LTIP and LGIP layers, there are no future changes to the current stormwater network which would impact the site area.

3.2 Hydraulic Risks and Opportunities

Table 6 outlines the various observations with respect to the hydraulic risks and opportunities at different sections of the study area, with locations annotated in **Figure 12**.

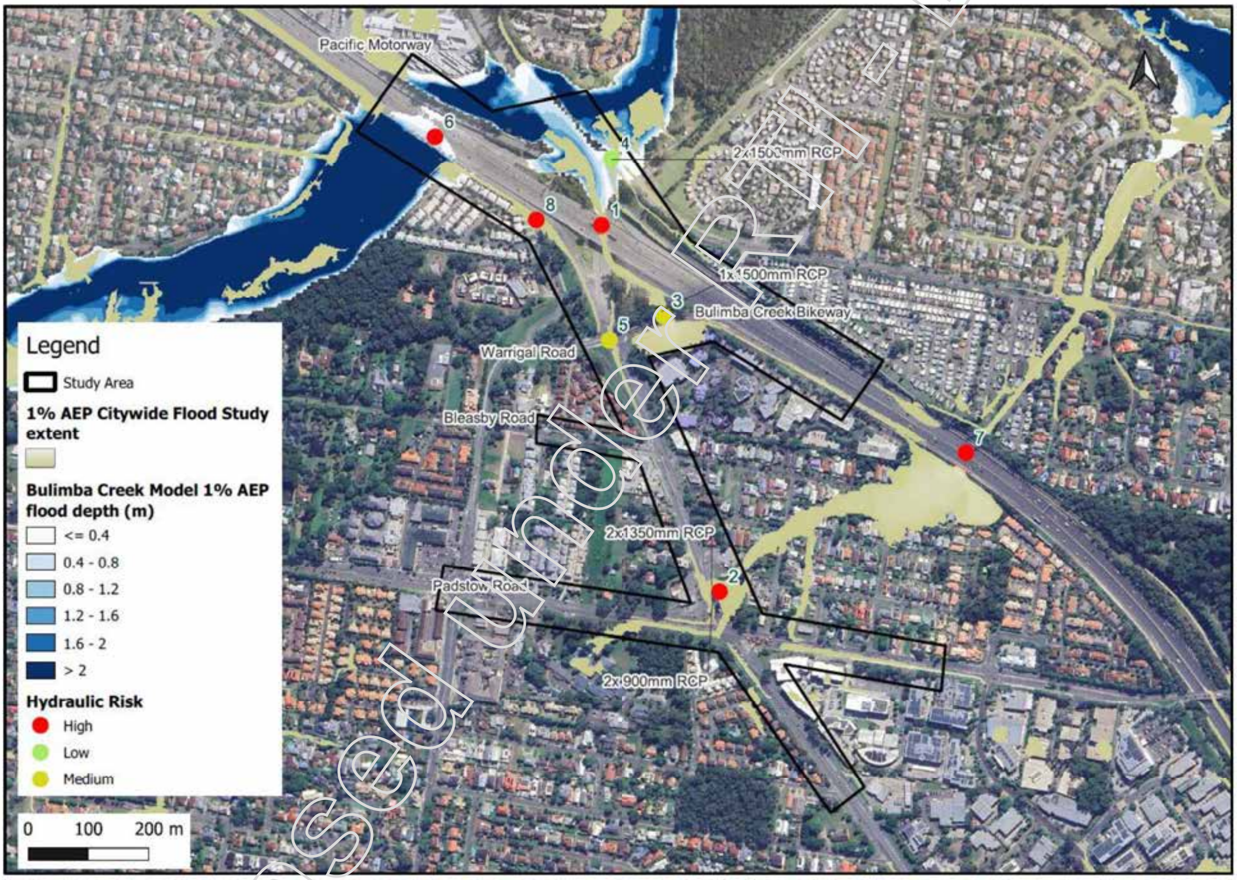


Figure 12 **Locations of Hydraulic Risks and Opportunities**

A copy of the hydraulic risks and opportunities map is included at **Appendix E**.

Table 6 Levels of Risk at Selected Locations Within the Study Area

ID	Location	Infrastructure	Risk	Risk / Opportunity
1	Pacific Motorway near Logan Road	1200mm RCP	High	Highly trafficable area, flooded in the 1% AEP event by overland flooding. Further assessment of local flooding and existing flood model are required to better understand the flood condition in this area. Assessment of afflux (increase/decrease in water levels) and flood immunity following road upgrades need to be undertaken, should works be carried out in that section.
2	Logan Road, North of Padstow Road Intersection	2x1350mm and 2x900mm cross-drainage	High	Highly trafficable area. Existing drainage structure is insufficient to convey the 2% AEP flow for that road classification. The existing road immunity in that location is low. There is potential for upsizing the existing drainage system or maintaining existing flood immunity. Any increase in impervious area in catchments draining to these cross-drainage structure will adversely impact flooding in this area. Further assessment of local flooding and existing flood model are required to better understand the flood condition in this area. Assessment of afflux (increase/decrease in water levels) and flood immunity following road upgrades need to be undertaken, should works be carried out in that section.
3	Bulimba Creek Bikeway (M3 Northbound Off-Ramp)	1500mm RCP	Medium	Location of flow path; there is ponding upstream of the existing culvert. There is no impact on the private properties. Road section is dry in the 1% AEP. Any increase in impervious area in catchments draining to these cross-drainage structure will adversely impact flooding in this area which may impact private properties. Further assessment of local flooding and existing flood model are required to better understand the flood condition in this area. Assessment of afflux (increase/decrease in water levels) and flood immunity following road upgrades need to be undertaken, should works be carried out in that section along with building floor survey investigations.
4	Holmead Road	2x1500mm RCP	Low	Location of flow path but stormwater network discharges into Bulimba Creek Existing flood immunity is high. Potential road upgrades may require extension of current drainage structures.
5	Warrigal Road near Logan Road	750 (H) x 900 (W) RCBC	Medium	Potential ponding for the 1% AEP but not excessive, flood hazard around 0.3 m2/s for the 1% AEP event at that location.
6	Pacific Motorway near Freesia Street	3000 (H) x 3320 (W) RCBC, 3200 (H) x 3040 (W) RCBC, 3x3215 (H) x 3300 (W) RCBC	High	Bulimba Creek Crossing: adequacy of existing cross-drainage needs to be assessed following changes to road configuration. **Note:** infrastructure dimensions to be further verified
7	Culvert crossing Pacific Motorway at south of Logan Road/Pacific Motorway Intersection	Unknown	High	Flooding of properties upstream at drainage location; road upgrades along Padstow/ Logan Road may cause increased stormwater runoff and surcharge the drainage system downstream. Road widening may affect the downstream hydraulic conditions to Bulimba Creek bikeway. **Note:** infrastructure details to be confirmed at later stage if necessary
8	North of Warrigal Road / Logan Road Intersection	Existing open channel along M3 Northbound on-ramp	High	Existing flooding along longitudinal drainage north of Warrigal Road/ Logan Road intersection into Bulimba Creek. Road widening in this area may adversely impact properties along Bulimba Creek Bikeway and reduce flood storage.

3.3 Summary of the Hydrologic / Hydraulic Risks

Table 7 summarises the key hydrologic / hydraulic risks for the project.

Table 7 Key Hydrologic / Hydraulic Risks for the Project

Item	Hydrologic / Hydraulic Risk
Climate Change Impact on Stormwater Networks	The existing stormwater systems may not be able to accommodate increased runoff expected due to the effects of climate change. This could lead to more frequent or severe flooding unless the network is upgraded. Climate change scenarios are to be undertaken in accordance with TMR's RPDM and ARR2019 guidelines, the specifications of which to be established during the PE phase
Cross-drainage capacity	Capacity of cross-drainage structures post development to be assessed at the location north of the Padstow Road – Logan Road intersection. In 2021 OA, these cross-drainage had been identified as undercapacity for the proposed works.
Bulimba Creek Flooding Impacts	If works are contemplated outside the study area, e.g. M2, M3 ramps, these may influence flooding behaviour within the study area and would need to be incorporated in hydraulic modelling scenarios.
Downstream Network Capacity	Existing stormwater network downstream may be at capacity (a number of properties downstream of Logan Road and Miles Platting Road had already experienced overland flooding during major flood events) and any increase in impervious area, contributing to higher discharges to other parts of the stormwater network outside the study area, resulting in pipe upgrades to the outlets.
Out-of-Corridor Hydraulic Offsets	Some drainage improvements necessary to mitigate hydraulic impacts extend beyond the project's corridor, complicating project boundaries and coordination.
Impact on Manchester Street and Charles Fraser Parks	Encroachment into Manchester Street Park and Charles Fraser Park will likely cause a reduction to pervious fraction of the catchment and increased stormwater runoff. The flood storage is also reduced.
Unknown / Non-surveyed Underground Utilities (UU)	The presence of uncharted or non-surveyed utilities could clash with proposed drainage designs. These unknowns may force design revisions, delay timelines, and inflate project costs. The existence of underground utilities also limits the space available for installation of sufficient road gullies for flow capture. As such, a complete survey with accurate UU information will be required in the PE phase.
Road level design	MPPL's upgrading works may involve changes to road levels at the intersection. These adjustments could alter the catchment's flow characteristics, necessitating careful design to prevent unintended flow diversion.
Flood Immunity	Changes to road alignment and vertical elevations at Bulimba Creek Bikeway, Logan Road (north of intersection to Padstow Road) and Holmead Road will require assessment of the flood immunity for the next stage of the study.
Flood Impact Assessment and updating existing flood models	As summarised in **Table 6**, there are few locations impacted by overland flooding. Any increase in impervious area in catchments draining to these cross-drainage structure will adversely impact flooding in these areas. Further assessment of local flooding and existing flood model are required to better understand the flood condition in this area. Assessment of afflux (increase/decrease in water levels) and flood immunity following road upgrades need to be undertaken, should works be carried out in that section. Depending on the proposed upgrade and areas affected, the existing flood models should be updated in accordance with the latest AR&R guideline (IFDs, and Climate Change scenarios) for current condition. This may increase existing flood extent/depth/hazard which will impact the design. A flood impact assessment should be also undertaken.

4.0 Recommendations for Preliminary Evaluation Phase

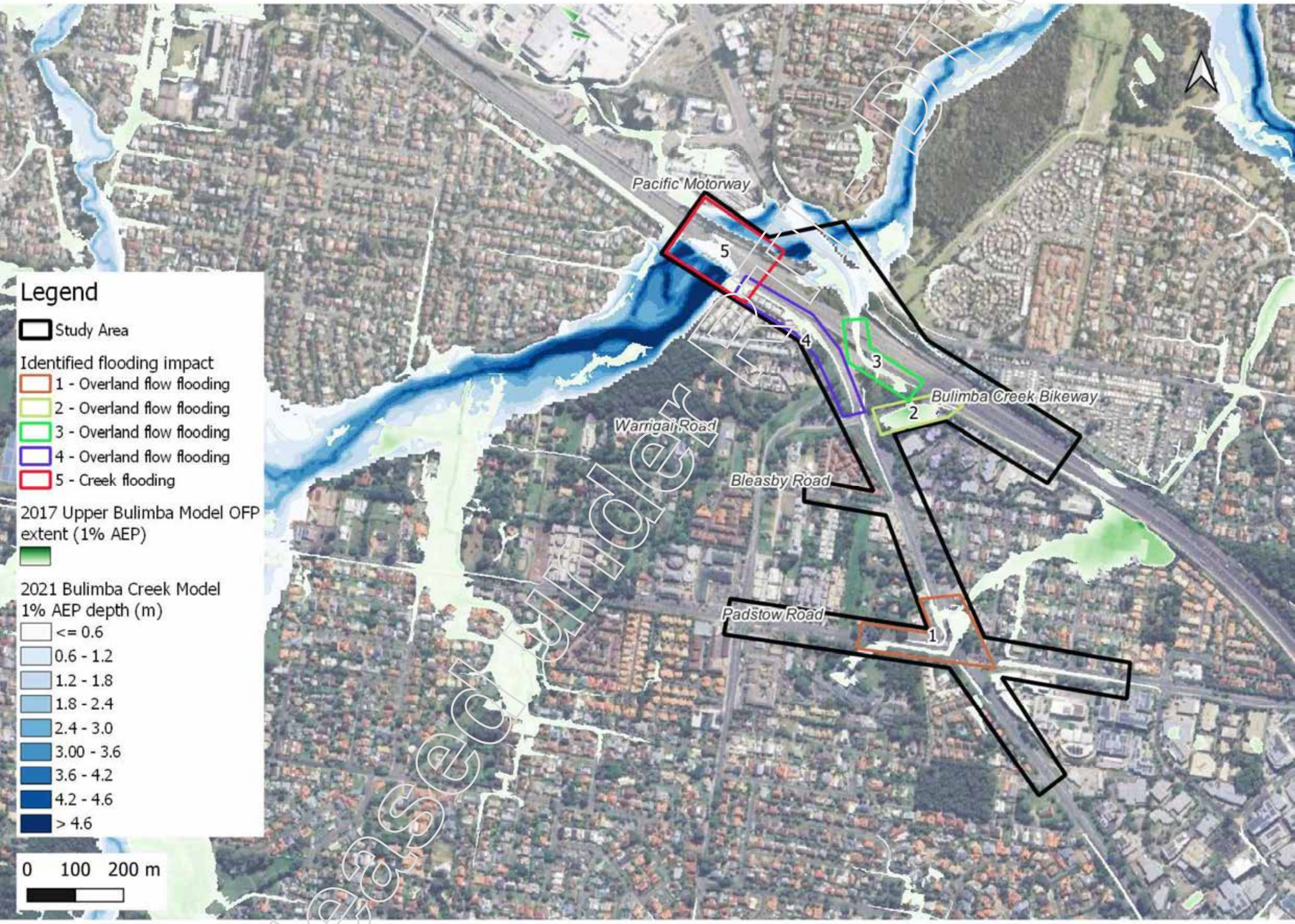
Table 8 outlines recommended hydrologic / hydraulic investigations for the PE phase.

Table 8 Recommendations for Preliminary Evaluation Phase

Item	Recommendation for the PE Phase
Flood Model	The 2017 Citywide Creek and Overland Flow Path Mapping TUFLOW model and the 2021 Bulimba Creek flood model should be requested at future stages of the study and updated in accordance with the latest AR&R guideline (IFDs, and Climate Change scenarios) for current condition. This may increase existing flood extent / depth/hazard which will impact the design. A Flood Impact Assessment should be also undertaken. Capacity of existing cross-drainage structures within the study area are to be assessed in the post-development scenario within the flood model with consideration of impacts to the downstream stormwater network.
Surveys	Additional surveys should be conducted to fill "gaps" in the existing drainage networks. The extent of the survey should also cover some of the downstream networks, particularly the network downstream of the cross-drainage drainage at Logan Road, north of Padstow Road. Also, some inlet pits were observed at Logan Road near Liverpool Road from google map but not shown in the records
Flood mitigation measures	Flood mitigation measures, such as detention basins or swales, can be considered to manage peak flow rates and reduce the burden on downstream systems. These measures are particularly relevant where road widening is proposed, resulting in changes to existing flow conveyance and storage. For example, open channels could be used as detention elements to manage runoff before discharging into the stormwater network. Also, upgrading options that reduce the existing pervious parkland areas should be avoided.
Dedicated overland flow path	Incorporate dedicated overland flow paths into the road design to ensure safe conveyance of excess stormwater. This reduces the risk of roadway flooding and enhances pedestrian safety.
Risk minimisation	**Table 6** outline the risks at locations where drainage structures are located and at other selected locations. Further effort will be worth for shifting the risks from high-risk locations to low-risk ones by proposing drainage options of different scales, depending on the scale of the intersection upgrading works.
Design integration meeting / workshop	Identify the drainage improvements necessary to mitigate hydraulic impacts extend beyond the study area as early as possible and arrange some design integration meetings / workshops to bring elements back into the study area.

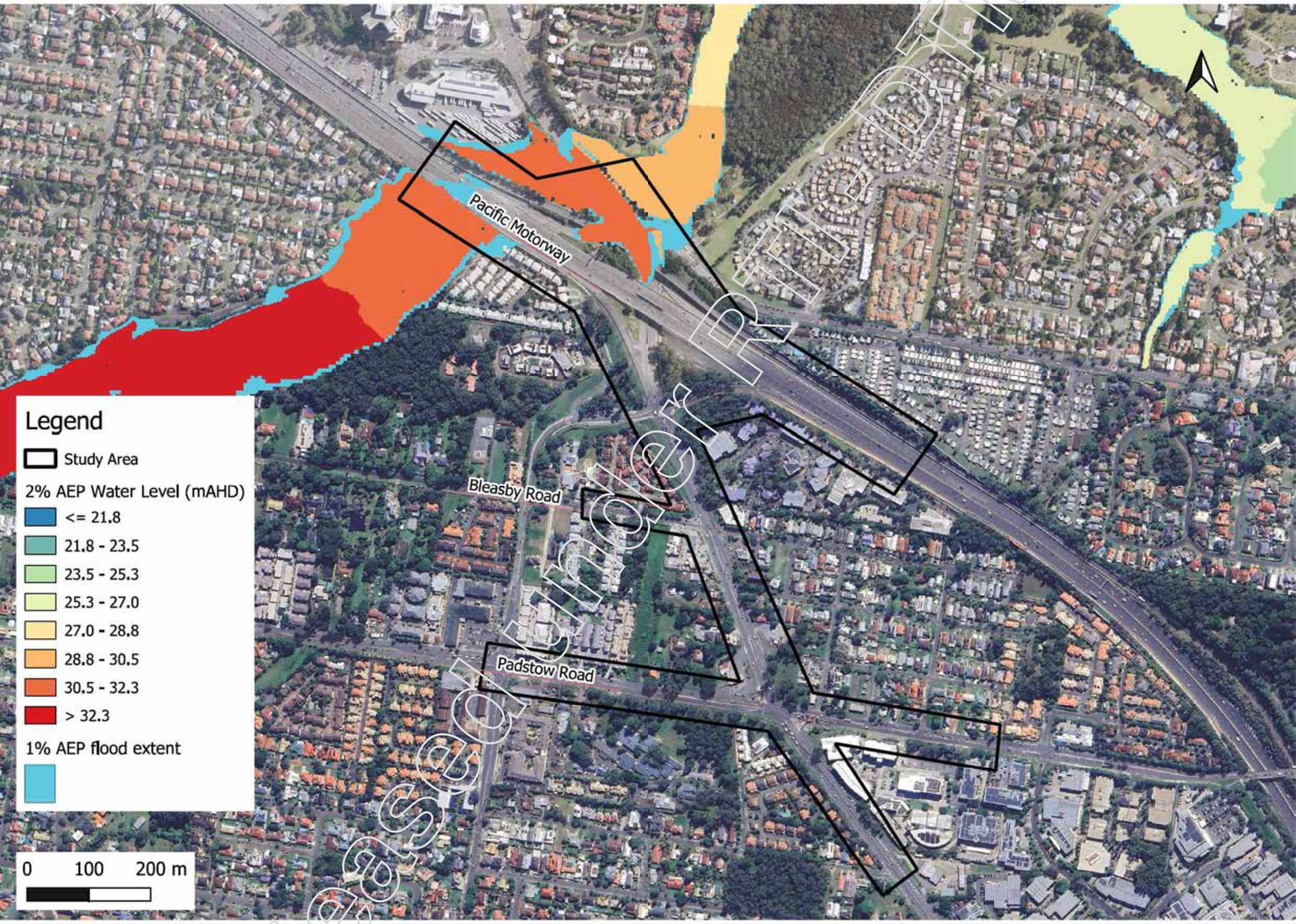
Appendix A

Overland Flooding Map


Pacific Motorway
Bulimba Creek Bikeway
Warrigal Road
Bleasby Road
Padstow Road
5
4
3
2
1
Legend
Study Area
Identified flooding impact
1 - Overland flow flooding
2 - Overland flow flooding
3 - Overland flow flooding
4 - Overland flow flooding
5 - Creek flooding
2017 Upper Bulimba Model OFP extent (1% AEP)
2021 Bulimba Creek Model 1% AEP depth (m)
<= 0.6
0.6 - 1.2
1.2 - 1.8
1.8 - 2.4
2.4 - 3.0
3.00 - 3.6
3.6 - 4.2
4.2 - 4.6
> 4.6
0 100 200 m

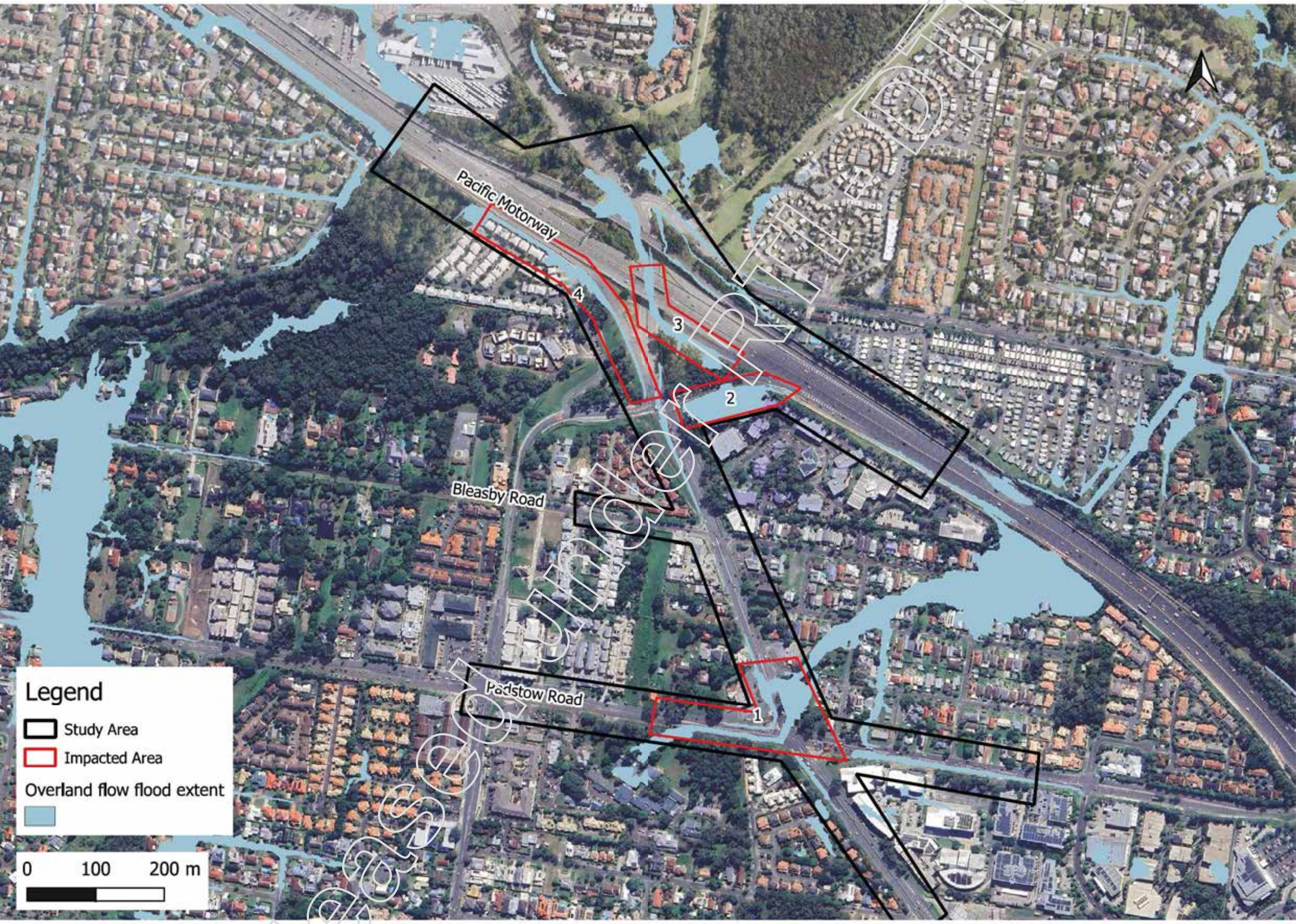
Appendix B

Bulimba Creek Flood Planning Area Map


Pacific Motorway
Bleasby Road
Padstow Road
Legend
Study Area
2% AEP Water Level (mAHD)
<= 21.8
21.8 - 23.5
23.5 - 25.3
25.3 - 27.0
27.0 - 28.8
28.8 - 30.5
30.5 - 32.3
> 32.3
1% AEP flood extent
0
100
200 m

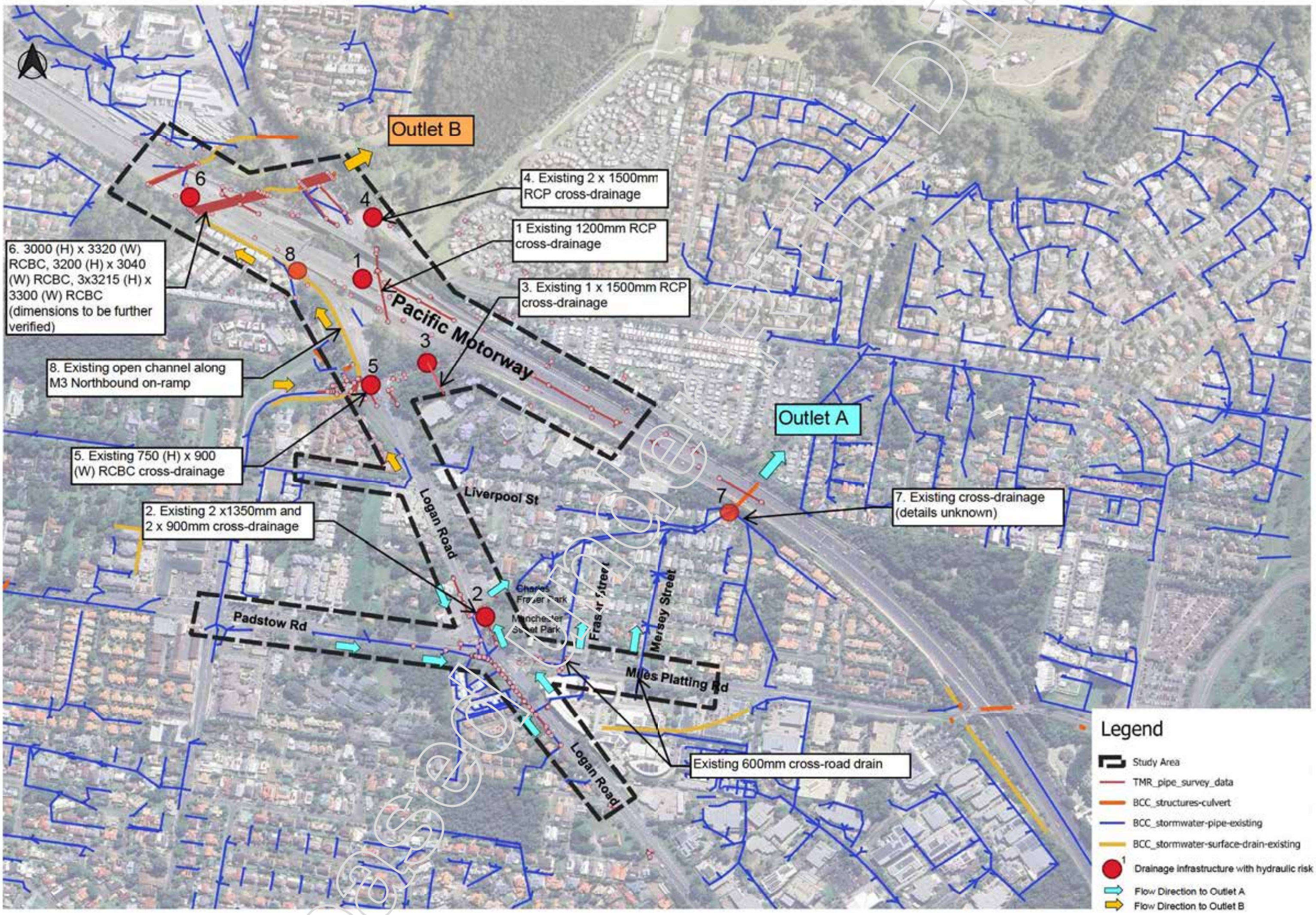
Appendix C

Overland Flow Flood Planning Area Map


Pacific Motorway
Bleasby Road
Padstow Road
1
2
3
4
Legend
Study Area
Impacted Area
Overland flow flood extent
0
100
200 m

Appendix D

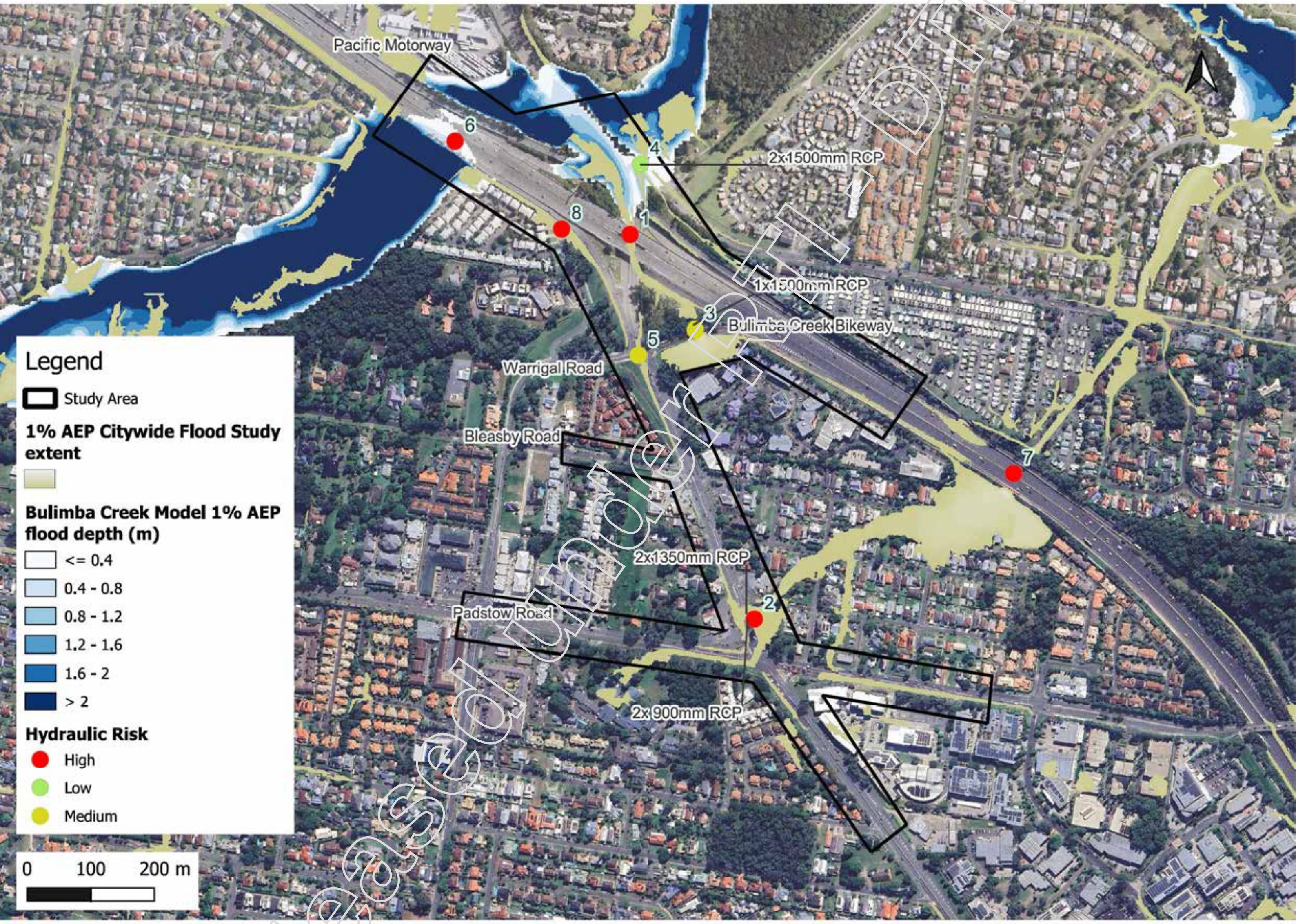
Existing Stormwater Pipe Networks Map



Outlet B
4. Existing 2 x 1500mm RCP cross-drainage
1 Existing 1200mm RCP cross-drainage
3. Existing 1 x 1500mm RCP cross-drainage
6. 3000 (H) x 3320 (W) RCBC, 3200 (H) x 3040 (W) RCBC, 3x3215 (H) x 3300 (W) RCBC (dimensions to be further verified)
8. Existing open channel along M3 Northbound on-ramp
5. Existing 750 (H) x 900 (W) RCBC cross-drainage
2. Existing 2 x1350mm and 2 x 900mm cross-drainage
7. Existing cross-drainage (details unknown)
Existing 600mm cross-road drain
Outlet A
Pacific Motorway
Liverpool St
Logan Road
Padstow Rd
Mersey Street
Miles Platting Rd
Logan Road
Legend
Study Area
TMR_pipe_survey_data
BCC_structures-culvert
BCC_stormwater-pipe-existing
BCC_stormwater-surface-drain-existing
Drainage infrastructure with hydraulic risk
Flow Direction to Outlet A
Flow Direction to Outlet B

Appendix E

Hydraulic Risks and Opportunities Map


Pacific Motorway
2x1500mm RCP
1x1500mm RCP
Bulimba Creek Bikeway
Warrigal Road
Bleasby Road
2x1350mm RCP
Padstow Road
2x 900mm RCP
1
2
3
4
5
6
7
8
Legend
Study Area
1% AEP Citywide Flood Study extent
Bulimba Creek Model 1% AEP flood depth (m)
<= 0.4
0.4 - 0.8
0.8 - 1.2
1.2 - 1.6
1.6 - 2
> 2
Hydraulic Risk
High
Low
Medium
0
100
200 m

Appendix F: Risk Assessment Report

Prepared for
Department of Transport and Main Roads
ABN: 39 407 690 291

AECOM

Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study

SASR Risk Assessment Report

21-Mar-2025

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Delivering a better world

Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study

SASR Risk Assessment Report

Client: Department of Transport and Main Roads

ABN: 39 407 690 291

Prepared by

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21-Mar-2025

Job No.: 60731166

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document	Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road Intersection Upgrade Planning Study
Ref	60731166
	\\na.aecomnet.com\lfs\apac\brisbane-aubne1\secure\projects\607x\60731166_mppl_bc__sasr\400_technical\439_cost_risk\risk\60731166-rep-0031-sasr risk assessment report-20250321.docx
Date	21-Mar-2025
Originator	NR [redacted]
Checker/s	[redacted]
Verifier/s	[redacted]

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
A	4-Mar-2025	Draft report for client review	NR [redacted]	[redacted]
B	21-Mar-2025	Final report	[redacted]	[redacted]

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1.0 Introduction

1.1 Background

AECOM Australia Pty Ltd (AECOM) has been engaged by the Department of Transport and Main Roads (TMR) to undertake a Planning Study for the future upgrade of the Logan Sub-Arterial Road, Miles Platting Road, and Padstow Road (MPPL) intersection (Study Intersection), in Eight Mile Plains. The Planning Study is being delivered by TMR Metropolitan Region and is funded by the Queensland Transport and Roads Investment Program (QTRIP) (Investment Number 2422929).

1.2 Study Overview

The Planning Study will be delivered in two (2) work packages as outlined below:

- **Business Case (BC):** applying TMR's OnQ Project Management Framework for a low-cost (LC) interim upgrade solution (<$50m), which builds upon an Option Analysis (OA) completed in 2021
- **Strategic Assessment of Service Requirements (SASR):** applying Queensland Government's Project Assurance Framework (PAF) to investigate long term ultimate upgrade solutions (>$100m).

Figure 1 provides an overview of the adopted staged delivery and key tasks for the Planning Study.

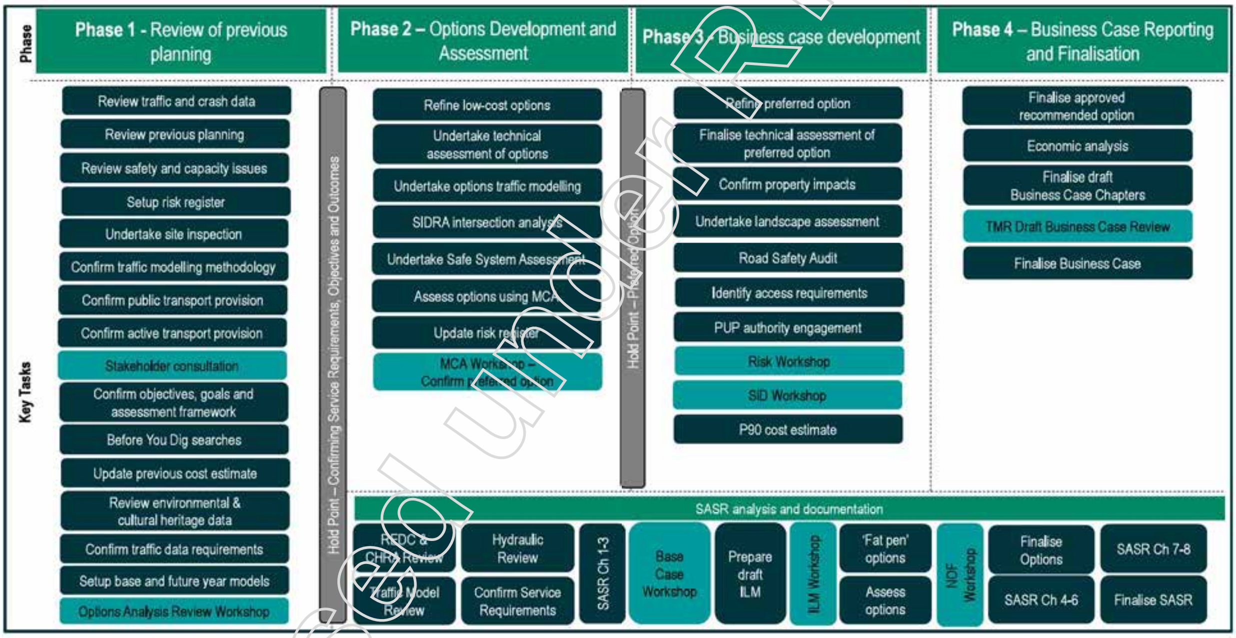

Figure 1 Planning Study: Overview

This Risk Assessment Report has been prepared to document the high level risk analysis undertaken during the SASR phase, to identify potential impediments to meeting desired future outcomes.

1.3 Scope of Works

The following tasks were completed during the preparation of this report:

- Prepare a draft Risk Context Profile (RCP) using TMR's Project Risk Log
- Facilitate a workshop with the project team to discuss, refine, and agree each risk in the draft RCP
- Prepare a risk register to capture the highest active risks in the RCP and identify treatment options
- Prepare a concise report to document the above process and attach the RCP and risk register.

2.0 Risk Assessment

2.1.1 Risk Management Methodology

TMR defines program and project risk as '*the effect of uncertainty on program or project objectives*'. AS/NZS 31000 2018 defines risk management as '*the architecture (principles, framework and processes) for managing risk efficiently*'.

The Project manages risk following the TMR Risk Management Framework and guidance is provided through TMR's Risk Management Practice Guides that are aligned with International Standard AS/NZS ISO 31000:2018, Risk Management – Guidelines (the Standard).

TMR's RCP tool was used following the TMR Engineering Policy (EP) 153 Risk Context Profiles, to identify the main areas of high risk that required further investigations during the subsequent planning and design phases of the Project and management into the future Delivery phase.

Figure 2 illustrates TMR's risk management process.

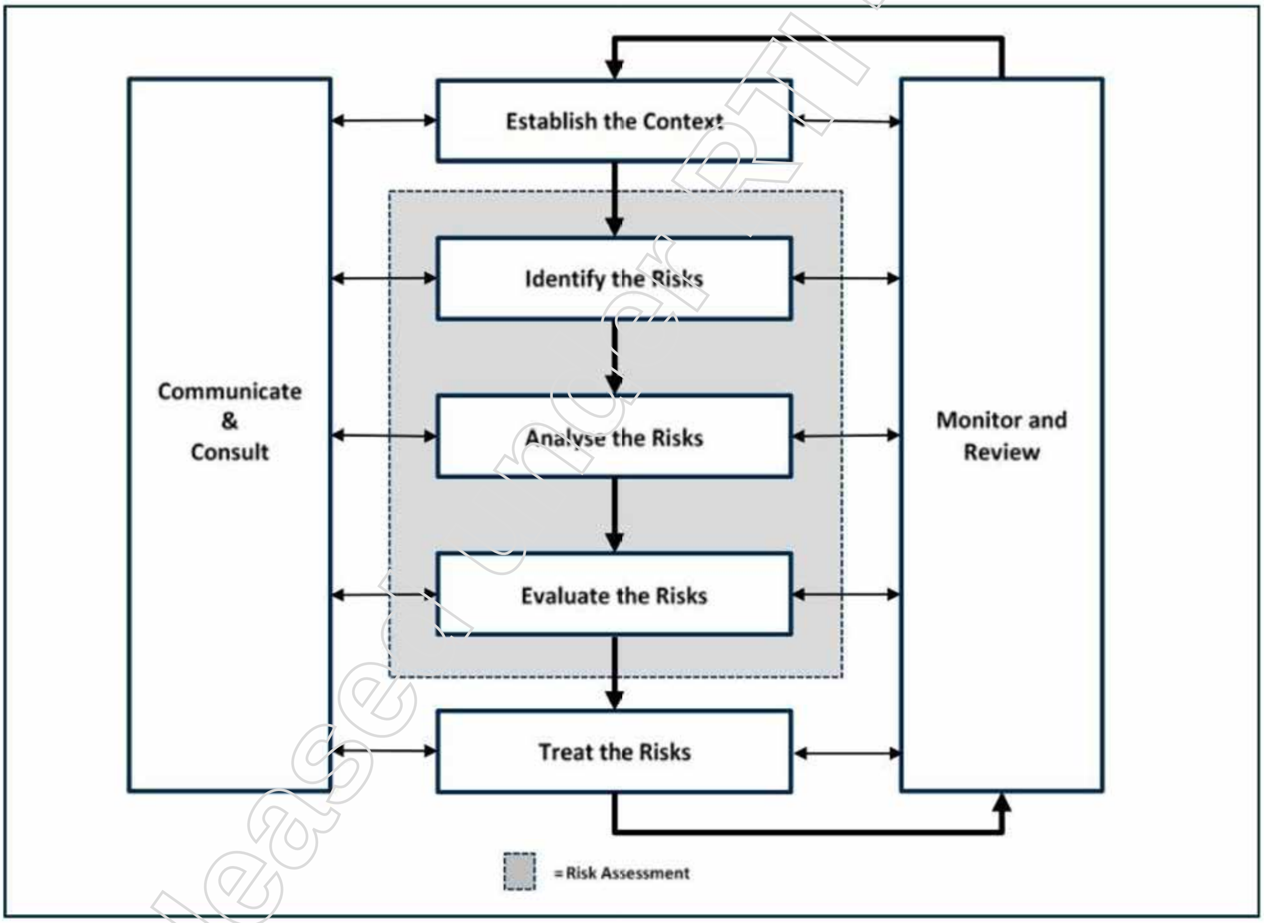

Figure 2 TMR Risk Management Process

2.1.2 Risk Workshop

A risk workshop was held on 4 March 2025 for this stage of the project, which was attended by:

- Nizam Abbany – TMR Project Director
- Nabhan Rahman – TMR Project Manager
- NR [redacted] AECOM Project Manager
- [redacted] AECOM Deputy Project Manager.

A copy of the workshop minutes is included at **Appendix A**.

2.1.3 Risk Analysis and Evaluation

Each identified risk was reviewed to assess its significance to the Project.

The approach is to determine the likelihood of the risk occurring, and the consequence if it does, and then to use those scores to determine an overall rating for the risk. This enables later mitigation attention to be focused on the more significant risks.

Table 1 summarises the adopted likelihood criteria for the risk assessment.

Table 1 Adopted Risk Assessment Criteria: Likelihood

Likelihood	Probability of Occurrence	Qualitative Statement	Likelihood Percentage
Rare	<5%	This event may have happened previously in TMR or "like" organisations. Not expected to occur in TMR in the foreseeable future	2.50%
Unlikely	6%-30%	This event may have occurred previously in TMR or "like" organisations. Occurrence in TMR would be considered highly unusual	12.00%
Possible	31%-60%	This event may have occurred previously in TMR or "like" organisations. The distinct possibility of occurrence	45.00%
Likely	61%-90%	This event has occurred in TMR or "like" organisations regularly. Occurrence within the financial year	75.00%
Almost Certain	>91%	This event occurs frequently within TMR	95.00%

Table 2 summarises the adopted consequence criteria for the risk assessment.

Table 2 Adopted Risk Assessment Criteria: Consequence

Consequence	Probability of Occurrence	Qualitative Statement	Likelihood Percentage
Insignificant	<0.5% base Estimate	A risk event that, if it occurs, will have an insignificant impact, on achieving desired results, to the extent that one or more stated outcome objectives will fall below goals but above minimum acceptable levels.	0.00%
Minor	0.5-1% base Estimate	A risk event that, if it occurs, will have a minor impact, on achieving desired results, to the extent that one or more stated outcome objectives will fall below or well below goals but above minimum acceptable levels.	0.75%
Moderate	1-3% base Estimate	A risk event that, if it occurs, will have a moderate impact, on achieving desired results, to the extent that one or more stated outcome objectives will fall well below goals but above minimum acceptable levels.	2.00%
Major	3-5% base Estimate	A risk event that, if it occurs, will have a major impact, on achieving desired results, to the extent that one or more stated outcome objectives will fall below acceptable levels.	4.00%
Severe	>5% base Estimate	A risk event that, if it occurs, will have a severe impact, on achieving desired results, to the extent that one or more of its critical outcomes objectives will not be achieved.	7.50%

2.1.4 Risk Treatment Options

Table 3 summarises the treatment options considered for each risk.

Table 3 Risk Treatment Options

Treatment Option	Description
Avoiding	This is the process of deciding not to start or continue with the activity that gives rise to the risk.
Taking Opportunity	The realisation of an opportunity ensures that potential improvements to the program are delivered. For example, if there is an opportunity to complete a project task / item early and reduce the headcount, the realisation of the opportunity would be to achieve the reduced costs possible through a lower-than-planned headcount. Exploitation refers to changing the project's scope, supplier or specification to achieve a beneficial outcome without changing the objectives or specification. An example is where a contractor on a fixed-price contract manages to obtain a lower price from an alternative supplier on multiple subcontracts while maintaining the desired specification. Enhancement of an opportunity refers to both the identification and realisation of an opportunity. For example, negotiating a lower rental figure for existing occupied premises and restructuring the organisation to reduce the floor space required. Or it may include achieving financial gain from finishing a project early and gaining additional revenue from deploying the released resources on another project.
Removing	The risk source is removed.
Changing Likelihood	The chance of a risk event happening is changed, whether defined, measured or determined objectively or subjectively, qualitatively or quantitatively and described generally or using mathematic terms such as probability.
Changing Consequence	The outcome of a risk event that affects the project objectives is changed. Please note: ▪ An event can lead to a range of consequences. ▪ A consequence can be certain or uncertain and have positive or negative effects on objectives. ▪ Consequences can be expressed qualitatively or quantitatively. Initial consequences can escalate through cumulative events.
Sharing	Involves sharing the risk with other parties. For example, modern procurement methods commonly entail a form of risk-sharing through the application of a pain/gain formula: both parties share the gain (within pre-agreed limits) if the cost is less than the cost plan, or share the pain (again within pre-agreed limits) if the cost plan is exceeded.
Retaining	A conscious and deliberate informed decision is taken to retain the threat, having discerned that it is more economical to do so than to attempt a risk treatment action. The threat should continue to be monitored to ensure that it remains tolerable.

3.0 Risk Summary

3.1 Risk Context Profile

TMR's Project Risk Log was used to assess the 10 RCP categories. Each category in the Project Risk Log includes Risk Areas and Risk Area Prompts to guide the risk assessment. After assessing the likelihood and consequence of each risk area occurring, a priority rating is assigned. The priority ratings and then combined to identify a RCP score for each of the categories.

Figure 3 summarises the outcome of the RCP, including identification of the higher risk categories.

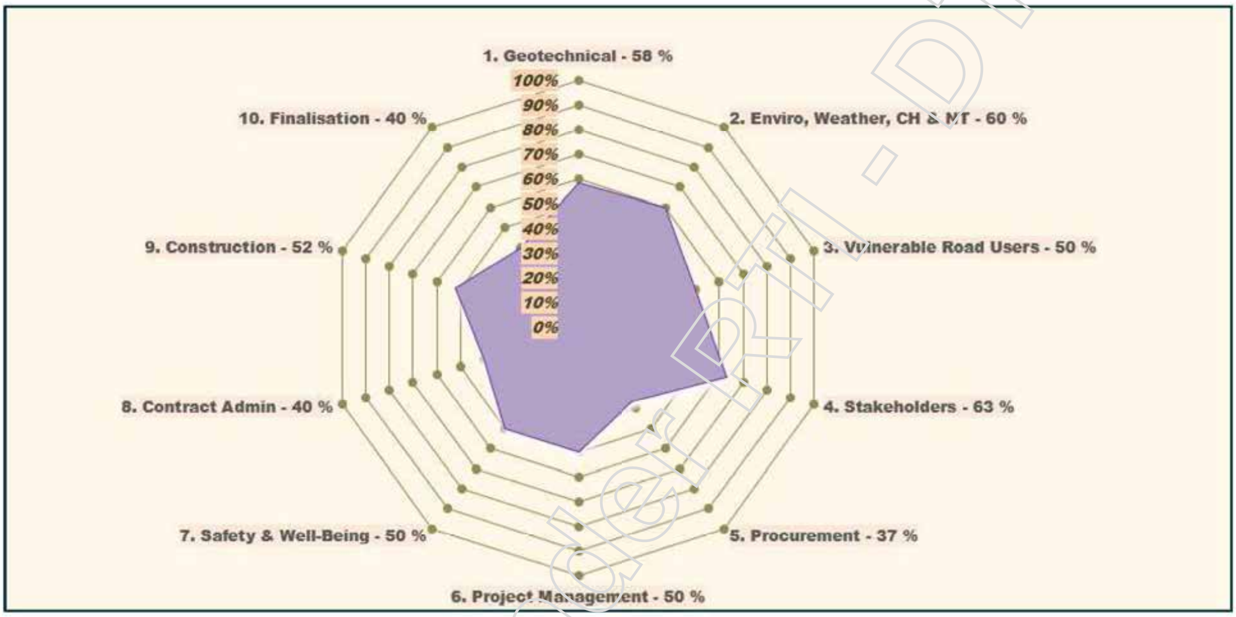

Figure 3 Project Risk Profile

The identified high (>60%), medium (45% to 60%), and low (<45%) risk categories are listed below:

- High Risk Categories (1): Stakeholders
- Medium Risk Categories (5): Geotechnical, Environmental, Weather, Cultural Heritage and Native Title, Vulnerable Road Users, Safety and Well-Being, Construction
- Low Risk Categories (4): Procurement, Project Management, Contract Administration, Finalisation.

A copy of the RCP is included at **Appendix B**.

3.2 Risk Register

All risks areas with a priority rating of 7 or above (i.e. high or extreme) were transferred to the Risk Register (Active) for further consideration and to identify treatment options. A total of 14 risks were added to the risk register including 12 high risks and 2 extreme risks. The extreme risks include:

- **Reference #4.5 - Political Representatives:** The project has interest from the community and local members of parliament. Mitigation: Identify stakeholders and develop an engagement plan
- **Reference #9.5 – Public Utility Plant:** PUP constraints are expected. Option to determine extents. Critical to ensure sufficient funding is available for investigations during the planning stage so that significant risks do not materialise. Optic fibre cables are located within the study area, which should be carefully considered. Mitigation: Careful consideration of cost, timing and safety.

Potential treatment option have been nominated for each of the risk areas included in the risk register.

A copy of the Risk Register is included at **Appendix C**.

Appendix A

Risk Workshop Minutes

AECOM

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Minutes of Meeting

MPPL Intersection Upgrade Planning Study

Subject	SASR Risk Workshop	Page	1
Venue	MS Teams	Time	09:00am to 10:00am
Participants	Nizam Abbany **(NA)**: TMR Project Director Nabhan Rahman **(NR)**: TMR Project Manager [redacted] AECOM Project Manager [redacted] AECOM Deputy Project Manager		
Apologies	Nil		
File/Ref No.	60731166-MIN-0031	Date	04-Mar-2025
Distribution	As above		

No	Item	Action	Date
1.	**Safety Moment** • [redacted] provided a safety moment on Tropical Cyclone Alfred	Nil	N/A
2.	**Project Update** • [redacted] provided an overview of the project delivery structure	Nil	N/A
3.	**Function Specification & Workshop Purpose** • [redacted] noted the Functional Specification states: "*For the purpose of the SASR, risk analysis should be targeted to impediments to meeting desired future outcomes.*", and that the risk assessment has been tailored accordingly • [redacted] noted the intent of the workshop was to review the draft Risk Context Profile and Active Risk Register for the SASR, and to discuss and agree on the risk ratings	Nil	N/A
4.	**Service Requirements** • **RP** noted the agreed service requirements from the ILM	Nil	N/A

5.	**Run Through RCP and Active Risk Register**
	• **Geotechnical**
	  ○ [redacted] noted that it is difficult to specifically identify geotechnical risks at this stage of the project
	  ○ [redacted] noted obtaining comprehensive data to understand ground conditions during the next phase of the project would assist manage the risk
	• **Environment**
	  ○ **NR** mentioned PFAS and the need to consider this prior to construction (e.g. via management plan)
	  ○ For Item 2.3, it was agreed to increase the likelihood of Enviro Approvals / Permits to "likely"
	  ○ For Item 2.6, it was agreed to increase the likelihood of Contaminated Land (CL) to "likely" and therefore add this to the risk register
	  ○ For Item 2.7, it was agreed to increase the likelihood of Cultural Heritage (CH) to "likely" and therefore add this to the risk register
		[redacted] to update RCP and Risk Register as agreed during workshop	05/03/2025

No	Item	Action	Date

	• **Vulnerable Road Users**
	  ○ NR noted all risks areas are considered low risk at this stage. To be considered during PE / BC.
	• **Stakeholders**
	  ○ NR noted for Item 4.3, Transurban Queensland (TQ) are a potential risk to be considered.
	  ○ NR noted for Item 4.5: Political risk could be high for this project, and should be considered.
	• **Procurement**
	  ○ NR noted this is low risk during the SASR phase due to uncertainty in delivering timing
	  ○ **NR** confirmed that timing is uncertain until after the SASR is presented to the IIC
	• **Project Management**
	  ○ **NA** noted TMR Metropolitan Region often cannot deliver some recommended options during SASR phases of projects (e.g. land use changes, PT improvements), and this impacts future delivery
	• **Safety and Well Being**
	  ○ NR noted this category is not relevant at SASR. To be considered during PE / BC
	• **Contract Admin**
	  ○ NR noted this category is not relevant at SASR. To be considered during PE / BC
	• **Construction**
	  ○ For Item 9.3 NR noted investigations have a high impact & cost risk during future stages
	  ○ For Item 9.4, **NR** agreed it is too early to flag risk around land resumptions for this project
	  ○ For Item 9.5, **NR** suggested this risk should be high. **NR** specifically noted the Corridor Planning SME flagged that PUP constraints were not emphasised in the draft SASR, particularly fibre optics [note: SASR report has been updated]
	• **Finalisation**
	  ○ NR noted this category is not relevant at SASR. To be considered during PE / BC
		NR to update RCP and Risk Register as agreed during workshop	05/03/2025

6.	**Any Other Business** • NR asked **NA** and **NR** if the risk register covered what they expected to see for the project at the SASR stage • **NR** confirmed he covered the risks well • NR noted that AECOM were not proposing to consider the financial impacts of each risk item at this stage • **NA** and **NR** agreed this was not needed for MPPL	Nil	N/A

Appendix B

Risk Context Profile (RCP)

RISK CONTEXT PROFILE (RCP)

1. GEOTECHNICAL

Reference Material:

- TMR Geotechnical Design Standard - Minimum Requirements
- TMR Specifications (MRTS03, MRTS04, MRTS06)

Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
1.1	Embankments	• Stability, settlement and erosion issues • Surface water infiltration protection • Availability of suitable material • Excessive unsuitable encountered.	4	3	7	The existing geotechnical investigation lacks comprehensive data for the subsurface conditions within the study area. This creates uncertainty in the ground profile, which may lead to unexpected soil behaviour during construction, potentially impacting the stability and performance of the geotechnical elements.
1.2	Cuttings / Excavations	• Excavatability of the rock • Variability of material at pavement subgrade, subgrade strength, stability of the cut batters, moisture regime, drainage requirement, excavatability of table drains • Assess the effect of excavation on nearby structures / services • Excavation edge protection.	3	3	6	The existing geotechnical investigation lacks comprehensive data for the subsurface conditions within the study area. This creates uncertainty in the ground profile, which may lead to unexpected soil behaviour during construction, potentially impacting the stability and performance of the geotechnical elements.
1.3	Ground conditions	• Identification soft / wet areas and subsoils • Provide working platform if required • Assess ground improvement schemes • Unsuitable materials identified and / or encountered • Identification of expansive soils • Identification and treatment of dispersive soils • Groundwater.	3	3	6	The existing geotechnical investigation lacks comprehensive data for the subsurface conditions within the study area. This creates uncertainty in the ground profile, which may lead to unexpected soil behaviour during construction, potentially impacting the stability and performance of the geotechnical elements.
1.4	Bridge and structure foundations	• Foundation conditions for culverts, bridges, table drains, pipe jacking and so on.	3	3	6	Unknown risk prior to options being selected. However, potential retaining bridge and structure foundations would be required with grade-separated options. The existing geotechnical investigation lacks comprehensive data for the subsurface conditions within the study area.
1.5	Retaining structures	• Retaining walls • Soil nailed walls • RSS walls • Gabion walls, boulder walls.	3	3	6	Unknown risk prior to options being selected. However, potential retaining structures would be required with grade-separated options. The existing geotechnical investigation lacks comprehensive data for the subsurface conditions within the study area.
1.6	Acid sulphate soils	• Identification, testing and treatment of acid sulphate soils.	1	3	4	The existence of Acid Sulfate Soils (ASS) is deemed to have 'Extemely Low Potential' based on QGD, but validation is required through the future investigations
1.7	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		58%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

RISK CONTEXT PROFILE (RCP)
2. ENVIRONMENTAL, WEATHER, CULTURAL HERITAGE AND NATIVE TITLE

Reference Material:

- TMR Environmental Management System
- TMR Indigenous and Historical Cultural Heritage Policy
- TMR Native Title Policy
- TMR Environmental Management Policy
- TMR Environmental Offsets Policy
- TMR Environment Processes Manual
- TMR Specifications (MRTS51, MRTS52)
- EP170 Climate Change Risk Assessment Methodology

Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
2.1	Biodiversity	• Protected Fauna • Protected Flora • Protected Species Habitats and Ecosystems • Habitat management • Weeds and Pest Management.	4	4	8	Areas within the study area are mapped as core koala habitat, koala habitat revegitation areas, and MSES areas on Queensland Globe. Further investigation will be required, including surveys of impacted areas.
2.2	Water Quality	• Watercourses / waterways & scouring water • Groundwater • Marine • Works in coastal areas • Water contamination.	2	3	5	The study area is within the mapped area of Bulimba Creek Fresh Waters. Environmental provision will be required where impacting local waterways.
2.3	Environmental Approvals / Permits	• Delays in obtaining permits / approvals • Novation of permits / approvals • Environmental offsets.	4	4	8	Impacts to environmental areas are likely to require EPBC approval, which can take upwards of 12 months. Offsets are likely to be required to satisfy EPBC approval conditions.
2.4	Noise, Vibration & Air Quality	• Measures to reduce environmental nuisance or harm • Air contamination.	2	3	5	The project is within an urban area with mixed land uses. Undertake a survey to establish current noise levels for benchmarking purposes. Largely limited access roads. Already treatments on M3
2.5	Land Tenure	• State and Commonwealth Land • Forestry • Protected Area - Conservation Areas / GBR / World Heritage Areas / Marine Areas and so on.	1	3	4	Initial review of the available mapping for the study area suggests this is low risk. Further investigation will be required as a part of PE and BC development.
2.6	Contaminated Land	• Identification (for example, PFAS) • Treatment.	4	3	7	Initial review of the available mapping for the study area suggests there is a low risk of ASS or PASS. No contaminated land reviews have been done at this stage, unknown presence of PFAS - which is potential at some local sites. Further investigation will be required as a part of PE and BC development.
2.7	Native Title & Cultural Heritage	• Commonwealth and State native title legislation • State Government Native Title Work Procedures. Legislative requirements • Impacts on Aboriginal and Torres Strait Islander cultural heritage and non-indigenous cultural heritage • Registered Local, State, National and World Heritage lists • Identification of CH sites • Discovery of CH artefacts.	4	3	7	Areas within the study area mapped as High Risk. Further investigation will be required as a part of PE and BC development
2.8	Waste management	• Waste avoidance, waste reuse, waste recycling, waste disposal • Waste Reduction and Recycling Act 2011 • Waste data collection reporting (MRTS51) • Management/Levy costs for Regulated Wastes (PFAS).	2	2	4	Further investigation to reuse existing material will be required as a part of PE and BC development
2.9	Climate Change Risk Assessment	For projects >$100M (also recommended for $50M-$100M) • Risks to final asset associated with projected climate change hazards (EP170) • Project contribution to reduction in greenhouse gas emissions through design • Risks from vulnerable interdependent assets (e.g. local road network, adjacent road sections, electricity).	2	3	5	Likely requirement for CCRA to be undertaken during PE and BC stage.
2.10	Weather	• Cyclone/Storm Events • Excessive Rainfall • Implementation of Erosion and Sediment Control Plan/Audits • Insurance claim costs (PAI deductible) • Extreme temperature & humidity • Bushfire Hazard Area.	1	3	4	Urban Brisbane area with low risk of tropical cyclones. Elevated land will be unaffected by storm surge. Standard risks with high rainfall and surface flooding in urban Brisbane. The project site is not flood prone. Standard urban Brisbane temperature and humidity risks
2.11	Flooding and Drainage	• Increased flooding risk upstream due to afflux • Climate change (sea level rise will result in higher tailwater conditions at stormwater pipe outlets • Existing stormwater network may not meet Client's existing minimum level of service • Council and TMR rainfall design event flow rates and flood models are different	3	3	6	High likelihood flooding (5%) within the study area on sections of Logan Road, and Pacific Motorway and associated active transport infrastructure. Flood modelling required to understand impact to options. There is a risk the existing stormwater
2.12	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		57%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

RISK CONTEXT PROFILE (RCP)

3. Vulnerable Road Users

Reference Material:

- Consultants report on traffic management targeting vulnerable road users (VRU's)
- PIARC Road Network Operations & Intelligent Transport Systems a Guide for Practitioners
- Various traffic management standards

Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

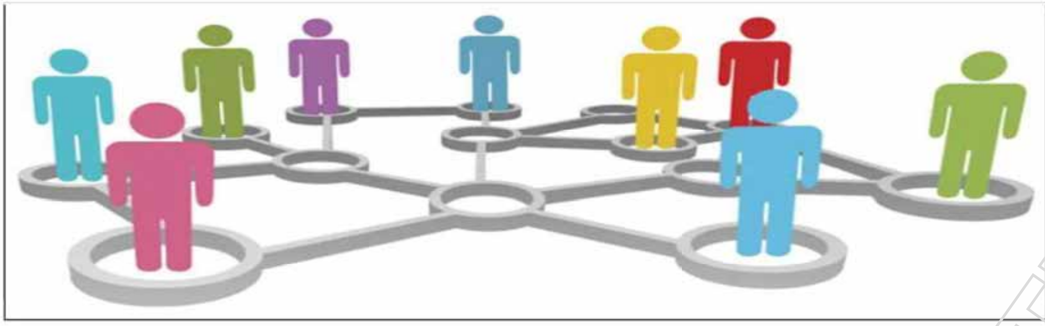
Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
3.1	Cyclists & Motorcyclists	• Traffic Management Plan considers all foreseeable risks and assesses the impact on all VRU's • Positioning of devices should not be a hazard to VRU's • Multi-message sign plates for pedestrians and cyclists • Consider cyclist, vehicular separation and safe passing • Specific issues relating to road surface and sight distancing • Position of signs in shoulders and bicycle lanes causing cyclists to merge with traffic • Sign posts, fencing and barriers not to intrude into bicycle operating space. Consider hazards created by temporary works. • Traffic signals to consider the travel time for Cyclists & Motorcyclists to clear the work area • Travelled surfaces – skid resistance, surface maintenance, and steel road plates • Planned bikeways in conjunction with construction methodologies • Vertical and horizontal geometry impacts • Changes in surface profile (latitudinal and longitudinal) • Impact on visual indicators of user paths (green cycle lanes etc).	3	3	6	Problem identification and options to provide for Cyclists and Motorcyclists.
3.2	Pedestrians	• Provision of suitably constructed and protected temporary footpaths and crossing points or formal pedestrian crossings • Positioning of devices should not be a hazard to pedestrians • Path surfacing • Crossing locations and level of function, including signalization • Positioning of devices should not be a hazard to pedestrians • Plastic mesh fencing may be used for pedestrian containment • Signs and devices for pedestrian control • Multi-message sign plates for pedestrians and cyclists • Lighting.	3	3	6	Problem identification and options to provide for Pedestrians.
3.3	School Zones / Children	• Controlled drop off and pick up • Solar flashing lights for 40Km zone • Controlled short term parking in vicinity of school • Monitoring of unattended children • In-school training regarding road safety • Use of mobile devices • Provision of suitably constructed and protected temporary footpaths and crossing points or formal pedestrian crossings • Non-verbal signage for preschool children • Designated child safety zone • Large group crossing of both controlled and non-controlled crossings	1	4	5	Problem identification and options to consider and provide for School Zones / Children.
3.4	Elderly	• Provision of suitably constructed and protected temporary footpaths and crossing points or formal pedestrian crossings • Large signage • Calculation of pedestrian crossing timing	2	3	5	Problem identification and options to consider and provide for Elderly.
3.5	Disabled	• Provision of suitably constructed and protected temporary footpaths and crossing points or formal pedestrian crossings • Provision for visually impaired • Provision for hearing impaired • Provision for mobility and electric scooters • Temporary immobility due to injuries (crutches) • Installation of kerb ramps for wheel chair access •Signalised intersections might require phasing changes to accommodate pedestrian crossings and longer phases for People With Disabilities (PWD) as well as vibrating buttons and audio tactile surfaces for visually impaired.	3	3	6	Problem identification and options to consider and provide for Disabled access
3.6	Road Workers	• Provision of suitably constructed and protected temporary footpaths and crossing points or formal pedestrian crossings • Information and advance warnings to drivers through dynamic signs about the presence of road workers - including the temporary deployment of portable dynamic signs • Speed management using variable speed limits and camera enforcement. Automatic Number Plate Recognition (ANPR) can be used to support enforcement or to display an offending vehicle's registration number on a dynamic message sign to influence driving behaviour • Traffic management plan and supervision of same • Work, health and safety plan and implementation.	1	3	4	Low risk in SASR phase
3.7	VRU Routing	• Unplanned behavioural tendencies to disregard routing • Treatment to insure compliance with stated route use • Significance of appropriate signage for guidance of VRU's • Appropriate application of road lighting (Not construction lighting) • Installation of traffic slowing devices on the approaches to peds crossings to ensure low speed compliance (e.g. speed bumps, wombat crossings, etc) • Proximity of 'travelled path' to any construction works and traffic, including delineation of lines and associated markings.	1	3	4	Develop a construction management plan during the delivery phase to manage risk. Likely to be a low risk.
3.8	Accessibility	• Smarter Solutions: Network Optimisation Framework and Reference Guide • Road Safety Policy • Cycling Infrastructure Policy • Accessibility Compliance • Walking Infrastructure Policy.	1	3	4	Develop a construction management plan during the delivery phase to manage risk. Likely to be a low risk.
3.9	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		50%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

RISK CONTEXT PROFILE (RCP)

4. STAKEHOLDERS

Reference Material:
• TMR Comms Hub website (via insideTMR)



Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
4.1	Local community	• Road users (including motorists, cyclists, pedestrians, public transport users) • Special interest groups, industry, business • Environmental groups • Property owners & residents.	2	3	5	Unlikely to be a significant issue, during planning. Potential impacts during construction. Identify stakeholders and develop an engagement plan.
4.2	Local Government	• Local councils.	3	3	6	The project impacts on BCC roads and intersections. BCC were consulted during the ONQ BC at Padstow Road and Miles Platting Road undertaken in parallel to the SASR.. Undertake ongoing liaison with BCC through all stages of the project, particularly to integrate planning with BCC route planning.
4.3	Other Organisations	• Private organisations, industry and peak bodies such as: Transurban, RACQ, Queensland Trucking Association, Queensland Taxi Council, Bicycle Queensland etc.	4	3	7	Unlikely to be a significant issue. Identify stakeholders and develop an engagement plan. Requriement to liaise with private road operators if impacging the Logan Motorway or Gateway Motorway operations.
4.4	Government Agencies	• Government departments or government-owned-corporations such as: Tourism Queensland, Queensland Treasury (Building Queensland), Maritime Safety Queensland, Infrastructure, Local Government and Planning, State Development, Natural Resources and Mines, Queensland Rail, Emergency services (Police, Ambulance, Fire) etc.	1	3	4	Unlikely to be a significant issue. Identify stakeholders and develop an engagement plan.
4.5	Political Representatives	• Local • State • Federal.	4	5	9	The project has interest from the community and local members of parliament. Identify stakeholders and develop an engagement plan.
4.6	Media	• Impacts to TMR's reputation • Newspaper, television, radio.	3	5	8	Could react to stakeholder concerns. Identify stakeholders and develop an engagment plan.
4.7	Internal TMR	• Regions / Districts / PMD • TransLink • RoadTek • Engineering & Technology (E&T) • Infrastructure Investment Committee (IIC).	3	4	7	Requirement to engage with all parts of TMR, particularly E&T, AT, and SNO in the development and agreement of options.
4.8	Utilities Services Providers (PUP)	• Telecommunications • Water • Electrical • Gas.	4	3	7	Likely PUP impacts. Unknown at this stage.
4.9	Local Indigenous Groups	• Aboriginal and Torres Strait Islander community groups • Traditional land owners.	1	3	4	Unlikely to be a significant issue. Identify stakeholders and develop an engagement plan.
4.10	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		63%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

RISK CONTEXT PROFILE (RCP)

5. PROCUREMENT

Reference Material:
• TMR Transport Infrastructure Project Delivery System (TIPDS)
• TMR Consultants for Engineering Projects Manual
• TMR Engineering Consultant Scheme (ECS)
• Queensland Procurement Policy
• EP150 Procurement of infrastructure project thresholds
• EP163 Infrastructure Procurement Amendments

Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
5.1	Consultants - Capacity & Capability	• Market conditions • Consultant procurement process • Prequalification • Personnel • Proprietary Systems compatibility.	2	2	4	Consultant capacity / capability low risk
5.2	Construction Contractors - Capacity & Capability	• Market conditions • Construction site location • Contractor procurement process • Prequalification • Personnel • Project Management systems (such as, Quality, Environmental, WH&S, Stakeholder, Traffic).	2	2	4	Low risk at SASR phase. Low risk if delivered post-2032. Potentially higher risk if delivered sooner.
5.3	Project Delivery Method	• Correct project delivery method adopted • Project delivery process adhered to.	2	2	4	TMR PAF planning approach. Delivery model will be dependent on the size and scope of upgrade. Potential for TICCO,ETI or D&C contracts.
5.4	Tendering Process	• Probity • Quality of tenders (conformance, compliance, discrepancies) • Alternative tenders • Evaluation • Tender price • Unusually low tender bid.	1	1	2	Assess delivery strategy during the Business Case. Likely to be low risk.
5.5	Contract Documentation	• Capturing design intent • Errors and / or omissions • Contract documentation ambiguous, interpreted differently • Address risk of Legislation / Standards changing.	2	2	4	Standard provisions apply
5.6	Fraud & Corruption	• The project encounters fraud which is any intentional act or omission designed to deceive the organisation, resulting in that organisation suffering a loss and/or the perpetrator achieving a gain.	2	2	4	Assess delivery strategy during the Business Case. Likely to be low risk.
5.7	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		37%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

RISK CONTEXT PROFILE (RCP)

6. PROJECT MANAGEMENT

Reference Material:
- TMR Contract Administration System (CAS)
- TMR Project Management Policy
- TMR Project Management Practices Guideline
- TMR Project Cost Estimating Manual
- Queensland's Project Assessment Framework (for projects > $100m)
- TMR OnQ Project Management Framework (for projects $50 - $100m)
- Project Management website (via *inside* TMR)

Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
6.1	Funding	• Budget • Approval of funding • Changes to funding arrangements • Insufficient funding • Conditions imposed to obtain funding • Escalation • Market conditions • Cost estimate • Contingency • Unknown cost impacts (for example, BPIC) • Principal Arranged Insurance (PAI) Levy allowance for changes in Contract Value	3	3	6	Future stages of the project are currently unfunded.
6.2	Schedule	• Project deliverables behind schedule • Schedule unreasonable (perhaps driven by political or funding commitments) • Accelerated works delivery • Contractor construction program quality reporting • Delay dispute and Extension of Time (EOT) • Deliverable milestone delays (e.g. end of financial year) • Regularly and timely updates of program and schedule.	2	2	4	Assess delivery strategy during the Business Case and develop schedules. Likely to be low risk.
6.3	Project Scope	• Project objectives unclear • Changes to approved project scope • Scope not clear • Scope does not meet project objectives • Scope integrates with other relevant projects, network planning studies etc.	3	4	7	SASR stage and therefore the scope of the options considered is unclear. PE and BC required to clarify this and ensure integration with other relevant projects. Risk exists that the PAF project results in options inconsistent with the OnQ project delivered and recent OnQ works become redundant. Potential for PE options to not be "deliverable by Metro Region" e.g. Translink PT improvements or Land Use Management
6.4	Project Team Working Relationship & Performance	• Superintendent, Contractor, Independent Verifier / Reviewer, Principal, Administrator, Designer and so on, all working together for a 'best for project' outcome • Poor performance from members of the project team.	2	2	4	Assess delivery strategy during the Business Case. Likely to be low risk.
6.5	Human Resources	• Project team has adequate capacity (level of resources) • Project team has adequate capability (qualifications, experience, skills, etc.) • Impact of existing government policy & commitments.	2	2	4	Assess delivery strategy during the Business Case. Likely to be low risk.
6.6	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		50%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

RISK CONTEXT PROFILE (RCP)

7. Safety & Well-Being

Reference Material:
- IMD Safety Risk Profile-PDO
- TMR Safety Policies and Procedures

Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
7.1	Vehicular	• Vehicle to Vehicle • Vehicle to Object • Vehicle to Person • Vehicle Movements Around a Workplace.	3	3	6	High traffic volumes
7.2	Energised and Exposed Electrical Parts	• Incorrectly Installed Electrical Infrastructure on The Road Network • Damage to Electrical Infrastructure from MoP, Vehicle or Natural Events • Incorrectly Installed or Insufficiently Protected Electrical Equipment in Training, Testing, Or Development Workplaces.	3	3	6	Substation located adjacent to MPPL intersection. Extensive overhead power within study area.
7.3	Biological	• Infection with COVID19 While at Work for a Vulnerable Person (As Defined By QLD Health).	1	4	5	Low risk. Develop a construction management plan during the delivery phase to manage this risk
7.4	Occupational Violence	• Assault by Member of Public (MoP) • Personal security.	1	4	5	Low risk. Develop a construction management plan during the delivery phase to manage this risk
7.5	Hazardous/ Manual Handling Tasks	• Lifting, Lowering, Pushing, Pulling, And Carrying Objects That Require Moderate to High Levels Of Exertion.	1	4	5	Low risk. Develop a construction management plan during the delivery phase to manage this risk
7.6	Psychosocial	• Exposure to Traumatic Events or Information Arising from Road Crashes • Exposure to Extreme Bullying or Harassment • Excessive workloads, unachievable deadlines or expectations, or lack of role clarity • Exposure to vicarious trauma from managing or supporting colleagues or staff that are experiencing personal trauma (e.g. domestic violence).	1	4	5	Low risk. Develop a construction management plan during the delivery phase to manage this risk
7.7	Fall from Height	• Walking Up or Down an embankment, batters or other slopes • Walking up and down stairs in the workplace.	1	4	5	Low risk. Develop a construction management plan during the delivery phase to manage this risk
7.8	Legal & Regulatory	• Compliance with the Work Health and Safety Act 2011 • Compliance with the Electrical Safety Act 2003.	1	3	4	Low risk. Develop a construction management plan during the delivery phase to manage this risk
7.9	Workplace Health & Safety	• Safety, health & wellbeing of personnel on and around construction site (including personnel working onsite, road users, public) • Safety management plan.	1	3	4	Low risk. Develop a construction management plan during the delivery phase to manage this risk
7.10	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		50%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

RISK CONTEXT PROFILE (RCP)

8. CONTRACT ADMINISTRATION

Reference Material:
- TMR Contract Administration System (CAS)

Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
8.1	Contractor	• Reputation / attitude (e.g. contractually aggressive, disregard for contractual obligations, previous major breach of contract) • Attraction and retention of key personnel / staff • Sufficiency, capability & performance of key personnel • Contractor defaults • Contractor change of ownership • Payment of subcontractors • Payment claims (complete, accurate, detailed) • Unidentified unusually low bid.	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.2	Contract Management Plan & Systems (Contractor)	• Construction program (suitability & compliance) • Traffic management (suitability & compliance) • Safety management (suitability & compliance) • Environmental management (suitability & compliance) • Cultural Heritage and Native Title management (suitability & compliance) • Community Engagement Plan • Auditing regimes for management systems • Document control system - sufficiency of use, poor project records • Ability to finalise • Clear communication strategies.	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.3	Contract Administrator	• Reputation • Capability (e.g. experience, qualifications & skills) • Approved Contract Management Plan • Surveillance Plan (suitability & compliance) • CA proprietary system in use • CA reporting requirements to Principal • Auditing Resource and technical support • Performance monitoring and reporting • CA Resource alignment to Contractor working hours, nights, weekends	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.4	Time	• Appropriate contract schedule management for milestone reporting and EOT analysis • Re-baselining, Critical path monitoring • Delays in project commencement or premature start • Principal caused delays • Force Majeure • Assessment of EoTs • Tenderer defaults.	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.5	Cost	• Variation management and reporting to Principal • Contract cost forecasting • Risk and Contingency management • Contract variations - identification, costing • Market forces (interest rates, lack of competition, very competitive market) • Contract estimate inaccurate • Force Majeure • Cashflow management • Earned Value • Latent condition • Tenderer defaults.	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.6	Quality	• Poor quality workmanship / Excessive rework • Surveillance and Lot Management • Quality Record keeping • As-Built information / Daily diaries • Product, material and work testing services / Auditing • Quality management system (ITPs, NCRs, RFIs) inadequate and/or performed poorly • Third party compliance testing.	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.7	Contract	• Contract type (PPP, Alliance, TIC-CO, TIC-DC etc) • Design documentation - if design and then construct (complete, accurate, detailed) • Contract documentation is unambiguous, complete, accurate & detailed (including contract, annexures, specifications) • Address possibility of change of legislation and /or standards.	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.8	Principal	• Principal supplied materials • Timely engagement of CA • Project budget for services required constraints • Possession of Site • Finalisation considerations with customer/ District.	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.9	Leadership Governance and Dispute Resolution	• PLT / PLG formation and effectiveness • Variation & EOT claim resolution and active monitoring • Contractors commercial approach • Contract Administration Reviews - Verify governance and potential dispute.	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.10	Fraud & Corruption	• The project encounters fraud which is any intentional act or omission designed to deceive the organisation, resulting in that organisation suffering a loss and/or the perpetrator achieving a gain.	1	3	4	Assess contract administration requirements during the delivery phase. Likely to be low risk.
8.11	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		40%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

RISK CONTEXT PROFILE (RCP)

9. CONSTRUCTION

Reference Material:

- TMR approved products and registered suppliers list
- TMR Traffic and Road Use Management Manual (TRUM)
- TMR Manual of Uniform Traffic Control Devices (MUTCD)
- TMR Preconstruction Process Manual
- TMR Road Planning and Design Manual
- TMR Design criteria for bridges and other structures
- TMR Cycling Infrastructure Policy
- TMR Road Drainage Manual
- TMR Pavement Design Manual
- EP170 Climate Change Risk Assessment Methodology

Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
9.1	Design	• Constructability • Fit-for-purpose • Value for money • Maintainability • Whole-of-life costs considered • No hinderance to future development • Sustainability.	1	3	4	SASR stage and therefore the scope of the options considered is unclear. PE and BC required to clarify this and ensure constructable,VfM and consistent with future development.
9.2	Early Works / Preconstruction Works	• Completed on time, within budget and fit-for-purpose. For example, ancillary works, survey, drainage, accommodation works (such as fencing), access works and etc. • Consideration of opportunity for early works • Consideration of early work compatibility with main construction design.	1	2	3	To be considered during design development stage.
9.3	Investigations	• Inadequate site investigations • Type of investigations may include: geotechnical, stakeholder, traffic modelling, asset condition, noise, cultural heritage, survey, PUP, network planning, environmental, hydraulics, hydrology, land acquisition • Impact due to proximate construction project works • Investigation of additional environmental liabilities that will cost a project more that may not be on standard EMR / CLR searches (such as PFAS).	3	4	7	Relevant investigations to be undertaken as part of Business Case. Critical to ensure sufficient funding is available for investigations during the planning stage so that significant risks do not materialise.
9.4	Land / Resumptions Acquisition	• Ensuring appropriate resumption requirements • Valuation / Compensation • Compulsory Land Acquisition.	1	3	4	SASR stage and therefore the scope of the options considered is unclear. PE and BC required to clarify land resumption requirements
9.5	PUP	• Relocation and / or installation of PUP • Consideration of early work relocations • Stakeholder identification of PUP works. • PUP damaged during construction • Unknown PUP discovered • Delay to PUP commencement and / or completion.	5	4	9	PUP constraints expected - Option to determine extents. Critical to ensure sufficient funding is available for investigations during the planning stage so that significant risks do not materialise. Optic fibre cables are within the study are which should be carefully considered. Careful consideration of cost, timing and safety.
9.6	Availability of Construction Materials	• Non-standard materials • Access to water for construction • Access and availability to specified materials. Location specific • Lead times for supply • Principal supplied materials and ordering. * Impact of BPIC on materials	2	3	5	Not considered in SASR
9.7	Access to Construction Plant, Equipment and Construction Site	• Plant and equipment necessary for approved construction methodology is not available or is delayed. • Delivery of construction materials to site • Approval of designated haul routes • Consider transport network (including road, rail, load limits) • Appropriate material storage.	2	3	5	Not considered in SASR
9.8	Traffic Management	• Suitability of Traffic Management Plans (TMPs) and compliance validation • Levels of traffic management training competency • Traffic Control contractors.	2	3	5	Standard provisions to apply
9.9	Insurance Deductibles	• Insurance Deductibles and likelihood of insurable events (Refer to Insurance Deductibles - Risk Tab) • Contract Works Policy • Product and Public Liability Policy • Environmental Policy • Professional Indemnity Policy (TMR only)	2	2	4	
9.10	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		51%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

RISK CONTEXT PROFILE (RCP)

10. FINALISATION

Reference Material:

• TMR Asset Information and Finalisation Guideline for Transport Infrastructure Projects

Likelihood Ratings	
Level	Ratings
1	Rare
2	Unlikely
3	Possible
4	Likely
5	Almost Certain

Consequence levels	
Level	Ratings
1	Insignificant
2	Minor
3	Moderate
4	Major
5	Severe

Ref.	Risk Area	Risk Area Prompts	Likelihood	Consequence	Risk Area Priority Rating	Current Risk Considerations
10.1	Maintenance Arrangements	• Agreement and acceptance from asset owner.	2	3	5	Develop a finalisation plan during the delivery phase and update maintenance responsibility plans and TMR / BCC interfaces. Develop an in principle agreement with BCC during the BC.
10.2	Records Management	• Handover information (e.g. design reports, as-constructed drawings, Building Information Model (BIM), warranties, operation & maintenance manuals, contact details, asset registers) captured and provided to asset owners / operators and all other relevant stakeholders (e.g. emergency services, state agencies, regulatory authorities etc.) • Contract documentation to Document Management System (DMS).	1	2	3	Develop a finalisation plan during the delivery phase. Likely to be low risk
10.3	Corporate Asset Management System Requirements	• Need to ensure requirements of corporate Asset Management Systems (such as ARMIS, ROAMS, STREAMS, SIMS) are achieved after project completion to enable effective ongoing maintenance, operations and management of assets.	1	2	3	Develop a finalisation plan during the delivery phase. Likely to be low risk
10.4	Testing, Training & Commissioning	• Ensure handover to asset owner enables effective ongoing maintenance, operations and management of assets.	1	2	3	Develop a finalisation plan during the delivery phase. Likely to be low risk
10.5	Returned works	• Acceptance from asset owner of returned works.	3	2	5	Develop a finalisation plan during the delivery phase and confirm with BCC any asset additions or changes at interface locations. Develop an in principle agreement with BCC during the BC.
10.6	Project Specific	If a relevant project risk area has not already been adequately addressed, capture that risk area here. LIMIT TO ONE ONLY			0	
			RCP Score		38%	
			Key Legend	0 to <=45%	>45 to <=60%	>60 to 100%

Appendix C

Risk Register (Active)

[Enter project name]
Risk Register (Active risks)

Reference Number	Project Objectives: [illegible]	Project Objectives: [illegible]	Project Objectives: [illegible]	RCP Category	RCP Risk Area	Risk Description	Causes/Sources	Impacts	Controls	Control Owner	Stakeholders	Risk Owner	Current Rating: Likelihood	Current Rating: Consequence	Current Rating: Rating	Current Financial Impact ($)	Treatment Option	Treatment(s)	Treatment Owner(s)	Treatment Due Date(s)	Treatment Status	Residual Retained Rating: Likelihood	Residual Retained Rating: Consequence	Residual Retained Rating: Rating	Residual Financial Impact ($)	Net Financial Impact ($): Best Case (Residual Financial Impact $)	Net Financial Impact ($): Most Likely Case (Midpoint $)	Net Financial Impact ($): Worst Case (Current Financial Impact $)	Net Financial Impact ($): Ref. No. (Estimator's Unplanned Risk Register)	Next review date	Comment(s)
	x	x		1. Geotechnical	1.1 Embankments	Worse-than-expected subgrade conditions impacts on embankment and / or pavement construction or causes progressive pavement damage	Planned excavation through the overlying residual soils and extremely weathered extremely low to very low strength. Construction of new road embankments or dewatering may cause adjacent existing roads to settle. This may lead to cracking of pavements, increased risk of aquaplaning, and a loss of serviceability of the road Settlement induced by construction of new road embankments or dewatering may damage existing utilities extremely low probability and very low confidence that acid sulphate soil	Variable subgrade strength and lack of Geotech investigations delays project and or leads to quantity changes which impact cost. Excavated materials may not be reused and may require treatment prior to disposal. Delays to the programme to allow additional investigations, treatment and disposal. Additional costs for investigations / disposal.	Geotechnical Design Standards	Project Manager	- TMR PM Team - Consultant Delivery Team	Twrk	Likely	Moderate	High		Changing the likelihood	1. Undertake sufficient geotechnical testing when option development is undertaken in PE/BC 2. Designer to provide schedule of provisional quantities for earthworks treatments (including soft soil treatments) and pavement subgrade treatment to Estimator (may be based on experiences on similar local projects) 3. * Latent conditions clause under Transport Infrastructure Contract (TIC) contract and assignment of risk to the contractor 4. * Ensure sufficient guidance information provided to tenderers at end of detailed design phase 5.	TMR TMR TMR TMR	PE Phase DD Phase DD Phase DD Phase	On Track On Track On Track On Track			#N/A							
	x	x		1. Geotechnical	1.2 Cuttings / Excavations	Worse-than-expected subgrade conditions impacts on cuttings / excavations	Planned excavation through the overlying residual soils and extremely weathered extremely low to very low strength. Construction of new road embankments or dewatering may cause adjacent existing roads to settle. This may lead to cracking of pavements, increased risk of aquaplaning, and a loss of serviceability of the road Settlement induced by construction of new road embankments or dewatering may damage existing utilities extremely low probability and very low confidence that acid sulphate soil	Variable subgrade strength and lack of Geotech investigations delays project and or leads to quantity changes which impact cost. Excavated materials may not be reused and may require treatment prior to disposal. Delays to the programme to allow additional investigations, treatment and disposal. Additional costs for investigations / disposal.	Geotechnical Design Standards	Project Manager	- TMR PM Team - Consultant Delivery Team	Twrk	Likely	Moderate	High		Changing the likelihood	1. Undertake sufficient geotechnical testing when option development is undertaken in PE/BC 2. Designer to provide schedule of provisional quantities for earthworks treatments (including soft soil treatments) and pavement subgrade treatment to Estimator (may be based on experiences on similar local projects) 3. * Core drilling 4. * The Contractor is to undertake risk assessments of proximity to excavations and RPEQ mitigations 5.	TMR TMR TMR TMR	PE Phase DD Phase DD Phase DD Phase	On Track On Track On Track On Track			#N/A							
	x	x		1. Geotechnical	1.3 Ground Conditions	Worse-than-expected subgrade conditions impacts on the design	* Latent conditions and / or adverse weather * Soft ground conditions * Construction on soft soils	* Construction delays and additional costs * Differential settlement * Reflective settlement of wearing course * Possible lane / road closures * Possible ongoing maintenance * TMR reputation * Delays to construction	Geotechnical Design Standards	Project Manager	- TMR PM Team - Consultant Delivery Team	Twrk	Likely	Moderate	High		Changing the likelihood	1. Undertake sufficient geotechnical testing when option development is undertaken in PE/BC 2. Designer to provide schedule of provisional quantities for earthworks treatments (including soft soil treatments) and pavement subgrade treatment to Estimator (may be based on experiences on similar local projects) 3. 4. 5.	TMR TMR	PE Phase DD Phase	On Track On Track			#N/A							
	x	x		1. Geotechnical	1.4 Bridge and structure foundations	Worse-than-expected subgrade conditions impacts on bridge and structure foundations	Planned excavation through the overlying residual soils and extremely weathered extremely low to very low strength. Construction of new road embankments or dewatering may cause adjacent existing roads to settle. This may lead to cracking of pavements, increased risk of aquaplaning, and a loss of serviceability of the road Settlement induced by construction of new road embankments or dewatering may damage existing utilities	Variable subgrade strength and lack of Geotech investigations delays project and or leads to quantity changes which impact cost. Excavated materials may not be reused and may require treatment prior to disposal. Delays to the programme to allow additional investigations, treatment and disposal. Additional costs for investigations / disposal.	Geotechnical Design Standards	Project Manager	- TMR PM Team - Consultant Delivery Team	Twrk	Likely	Moderate	High		Changing the likelihood	1. Undertake sufficient geotechnical testing when option development is undertaken in PE/BC 2. Designer to provide schedule of provisional quantities for earthworks treatments (including soft soil treatments) and pavement subgrade treatment to Estimator (may be based on experiences on similar local projects) 3. 4.	TMR TMR	PE Phase DD Phase	On Track On Track			#N/A							

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						existing utilities extremely low probability and very low confidence that acid sulphate soil										5.					
x	x		1. Geotechnical	1.5 Retaining Structures	Worse-than-expected subgrade conditions impacts on retaining structures	Construction of new road embankments or dewatering may cause adjacent existing roads to settle. This may lead to cracking of pavements, increased risk of aquaplaning, and a loss of serviceability of the road Settlement induced by construction of new retaining structrues may damage existing utilities Geotechnical investigations have not been undertaken and therefore high risk only due to lack of available subgrade quality information at this stage	Variable subgrade strength and lack of Geotech investigations delays project and or leads to quantity changes which impact cost. Excavated materials may not be reused and may require treatment prior to disposal. Delays to the programme to allow additional investigations, treatment and disposal. Additional costs for investigations / disposal.	Geotechnical Design Standards	Project Manager	- TMR PM Team '- Consultant Delivery Team	TMR	Likely	Moderate	High	Changing the likelihood	1. Undertake sufficient geotechnical testing when option development is undertaken in PE/BC 2. Designer to provide schedule of provisional quantities for earthworks treatments (including soft soil treatments) and pavement subgrade treatment to Estimator (may be based on experiences on similar local projects) 3. 4. 5.	TMR TMR	PE Phase DD Phase	On Track On Track	#N/A
x	x	x	2. Environmental, Weather, CH & NT	2.1 - Biodiversity	project negatively impacts the environmentally sensitive areas	unknown or unidentified environmental areas. There is the potential for protected fauna, flora, species habitats, ecosystems, and matters of national and state significance to occur within the Project area. Further investigations will be required to identify environmental issues, impacts and management responses. The majority of the study area has been mapped as high value koala habitat or high value habitat suitable for rehabilitation Study area is also mapped for MSES	Potential approvals, permits or notifications that may be required as a result of the associated maintenance and works must be identified. Should environmental approvals be triggered, a minimum of 12 months should be given to obtain potential approvals (State and/or Commonwealth). Harm to the environment (e.g. flora/fauna habitat, conservation areas, marine habitat, etc.). There is the potential for matters of state environmental significance (MSES) to occur with the project area, therefore state	TMR Environmental Processes Manual MRTS51 Environmental Management Fauna Sensitive Road Design Manual Environment Protection and Biodiversity Conservation Act 1999 (EPBC)	Project Manager	- TMR PM Team '- Consultant Delivery Team	TMR	Likely	Major	High	Taking opportunity	1. Undertake desktop analysis to identify any potential environmentally sensitive areas 2. Develop Schedule of Environmental permits required during Business case stage 3. Engage with TMR Enviro team early on for Environmental Scoping Report (ESR) to assist in identifying areas that potentially will be sensitive and appropriate mitigations 4. 5.	TMR TMR TMR	BC Phse BC Phse BC Phse	On Track On Track On Track	#N/A
x	x	x	2. Environmental, Weather, CH & NT	2.3 - Environmental Approvals / Permits	Impacts to environmental areas are likely to require EPBC approval, which can take upwards of 12 months. Offsets are likely to be required to satisfy EPBC approval conditions.	unknown or unidentified environmental areas. There is the potential for protected fauna, flora, species habitats, ecosystems, and matters of national and state significance to occur within the Project area. Further investigations will be required to identify environmental issues, impacts and management responses. Study area is also mapped for MSES/MNES	Potential approvals, permits or notifications that may be required as a result of the associated maintenance and works must be identified. Should environmental approvals be triggered, a minimum of 12 months should be given to obtain potential approvals (State and/or Commonwealth). Commonwealth offsets may apply. Trigger for environmental permits/approvals.	TMR Environmental Processes Manual MRTS51 Environmental Management Fauna Sensitive Road Design Manual Environment Protection and Biodiversity Conservation Act 1999 (EPBC)	Project Manager	- TMR PM Team '- Consultant Delivery Team	TMR	Likely	Major	High	Taking opportunity	1. Undertake desktop analysis to identify any potential environmentally sensitive areas 2. Develop Schedule of Environmental permits required during Business case stage 3. Engage with TMR Enviro team early on for Environmental Scoping Report (ESR) to assist in identifying areas that potentially will be sensitive and appropriate mitigations 4. 5.	TMR TMR TMR	BC Phse BC Phse BC Phse	On Track On Track On Track	#N/A
x	x	x	2. Environmental, Weather, CH & NT	2.6 - Contaminated Land	Initial review of the available mapping for the study area suggests there is a low risk of ASS or PASS. No contaminated land reviews have been done at this stage, unknown presence of PFAS - which is potential at some local sites. Further investigation will be required as a part of PE and BC development.	* Existing infrastructure may present contaminated land issues	* Contaminated land required to be treated or removed * Delayed construction and cost implications	TMR Environmental Processes Manual MRTS51 Environmental Management	Project Manager	- TMR PM Team '- Consultant Delivery Team	TMR	Likely	Major	High	Taking opportunity	1. * Undertake contaminated land investigation to identify areas of concern 2. 3. 4. 5.	TMR	BC Phse	On Track	#N/A
			2. Environmental, Weather, CH & NT	2.7 - Native Title & Cultural Heritage	Areas within the study area mapped as High Risk for Cultural Heritage, both indigenous and non-indigenous. Further investigation will be required as a part of PE and BC development	* Inadequate consultation with traditional landowners * Unknown sites of non-Indigenous (historic) cultural heritage significance (incl archaeological places) to exist * Cultural Heritage	* Delays to construction plus costs to address * Possible variations required for additional studies and consultation * Project delays * Additional monitoring required * Principal exposed to additional escalation	* TMR Cultural Heritage Management processes and procedures * Cultural Heritage Risk Assessment * Consultation with Traditional Owners, fieldwork, literature review and database searches * Cultural Heritage	Project Manager	- TMR PM Team '- Consultant Delivery Team					...ity	1. Undertake desktop analysis to identify any potential cultural sensitive areas 2. Engage with local heritage groups	TMR TMR	BC Phse BC Phse	On Track On Track	

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x	x	x				items within the works not always evident prior to construction * Unknown sites of non-Indigenous (historic) cultural heritage significance (incl: archaeological places) to exist * Intangible Cultural Heritage is less easy to define and to provide demarcation on site	costs * Damage to TMR reputation * Delays to Contractor and additional costs * Possible variations required for additional studies and consultation * Project delays * Additional monitoring required * Principal exposed to additional escalation costs	Management Plan to document process for management of risk * TMR will work with TO's and monitors to manage any significant finds in accordance with Cultural Heritage Management Agreement (CHMA) processes * TMR Cultural Heritage Management processes and procedures * Consultation with			Tarift	Likely	Major	High	Taking opportun	3. 4. 5.					#N/A
x	x	x	2. Environmental, Weather, CH & NT	2.11 - Flooding and Drainage	High likelihood flooding (5%) within the study area on sections of Logan Road, and Pacific Motorway and associated active transport infrastructure. Flood modelling required to understand impact to options.	There is a risk the existing stormwater network may not meeting required minimum level of service with overland flow paths through the study area. May need to offset drainage impacts outside the study area.	* Delays to construction plus costs to address * Possible variations required for additional studies and consultation * Project delays * Additional monitoring required * Principal exposed to additional escalation costs	* TMR Cultural Heritage Management processes and procedures * Cultural Heritage Risk Assessment * Consultation with Traditional Owners, fieldwork, literature review and database searches * Cultural Heritage Management Plan to document process for management of risk * TMR will work with TO's and monitors to manage any significant finds in accordance with Cultural Heritage Management Agreement (CHMA) processes * TMR Cultural Heritage Management processes and procedures * Consultation with	Project Manager	- TMR PM Team *- Consultant Delivery Team	Tarift	Likely	Major	High	Taking opportunity	1. 2. 3. 4. 5.	Undertake desktop analysis to identify any potential cultural sensitive areas Engage with local heritage groups	TMR TMR	BC Phse BC Phse	On Track On Track	#N/A
x	x	x	3. Vulnerable Road Users	3.1 Cyclists & Motorcyclists 3.2 Pedestrians	Inadequate provision for vulnerable road users during and post construction resulting in cyclist / pedestrian injuries	* Unsuitable temporary and permanent footpaths and crossing points * Poor signage * Inappropriate separation between VRU's and vehicles (construction vehicles or public) * Inadequate protection between cyclists / pedestrians and vehicles / cyclists / pedestrians	* Negative impact on VRU's * Personal Injury * Negative reputational impact to TMR * Litigation	* Smarter Solutions: Network Optimisation Framework and Reference Guide * Road Safety Policy * Cycling Infrastructure Policy * Accessibility Compliance * Walking Infrastructure Policy * Pedestrian and Cyclist design manuals * Road Safety Audit Process * TTM requirements * RSA to be undertaken which considers VRU's. * Project includes upgrade of active transport infrastructure * Construction management plans including TMP and SMP include provisions for safe	Project Manager	TMR, Transurban	Tarift	Possible	Major	High	Taking opportunity	1. 2. 3. 4. 5.	Consideration of VRU in Design Process	TMR	BC Phse	On Track	#N/A
x	x	x	3. Vulnerable Road Users	3.1 Cyclists & Motorcyclists 3.2 Pedestrians 3.3 School Zones / Children 3.4 Elderly 3.5 Disabled 3.6 Road Workers 3.7 VRU Routing 3.8 Accessibility	Inadequate provision for vulnerable road users during and post construction resulting in Cyclist / pedestrian injuries	• Unsuitable temporary and permanent footpaths and crossing points • Poor signage • Inappropriate separation between VRU's and vehicles (construction vehicles or public) • Inadequate protection between cyclists/pedestrians and vehicles/cyclists/pedestrians	• Personal Injury • Negative reputational impact to TMR • Litigation • Negative media to TMR	• Smarter Solutions: Network Optimisation Framework and Reference Guide • Road Safety Policy • Cycling Infrastructure Policy • Accessibility Compliance • Walking Infrastructure Policy. • Pedestrian and Cyclist design manuals • Road Safety Audit Process • TTM requirements	Project Manager	TMR, Transurban	Tarift	Possible	Major	High	Taking opportunity	1. 2. 3. 4. 5.	Consideration of VRU in Design Process	TMR	BC Phse	On Track	#N/A
x	x	x	4. Stakeholders	4.2 Local Government	Project impacts the operation oflocal road network and Council assets		Lack of engagement. Insufficient analysis of options and impacts		Project Manager	TMR, BCC	Tarift	Possible	Major	High	Taking opportunity	1. 2. 3. 4. 5.	Consult BCC on proposed project and potential land impacts Seek information on BCC internal development plans and traffic generation, forecasts etc. Estimator to include provisional item for design changes required as a result of constraints placed on project by BCC	TMR TMR TMR	PE Phse PE Phse PE Phse	On Track On Track On Track	#N/A

x	x	x	4. Stakeholders	4.3 Other Organisations	Project impacts the operation of toll roads within the study area (i.e. Logan Motorway or Gateway Motorway)		Lack of engagement. Insufficient analysis of options and impacts		Project Manager	TMR, Transurban	TwR	Possible	Major	High	Taking opportunity	1. Consult Transuban on proposed project and potential impacts to their network 2. 3. 4. 5.	TMR	PE Phse	On Track	#N/A
x	x	x	4. Stakeholders	4.5 Political Representatives	Project outcomes do not meet elected officials expectations.	Local, state and federal government may specify upgrades as part of the project Political representatives may object to specific elements of the preferred scheme.	Not achieving acceptable safety on road Not providing appropriate access Reputational damage. Delays to project implementation start date Delays in resumption process redesign works Political intervention	TMR Communication Approval Policy Acquisition of Land Act 1967 (Qld) Approved Communications & Engagement Plan Preconstruction Processes Manual	Project Manager	- TMR PM Team	TwR	Likely	Severe	Extreme	Changing the likelihood & consequence	1. Consult BCC, State and Feds on proposed project and potential land impacts 2. Seek information on BCC, State and Feds internal development plans and traffic generation, forecasts etc. 3. Estimator to include provisional item for design changes required as a result of constraints placed on project by BCC, State and Federal Government 4. Provide project briefing to elected officials on the [illegible] option 5.	TMR TMR TMR TMR	PE Phse PE Phse PE Phse PE Phse	On Track On Track On Track On Track	#N/A
x	x	x	4. Stakeholders	4.6 Media	Stakeholder dissatisfaction with project outcome	* Lack of stakeholder communication regarding project objectives, deliverables and outcomes * Lack of understanding regarding interim and ultimate solution philosophy	* Design does not address stakeholder requirements resulting in delays, rework and increased costs * Active political pressure to resolve issues	* Preconstruction Processes Manual * Community Engagement and Stakeholder Engagement Policies	Project Manager	- TMR PM Team	TwR	Likely	Severe	Extreme	Changing the likelihood & consequence	1. * Community Engagement and Stakeholder Engagement Policies 2. * Use of Communication Plans 3. * Proactively provide media with positive press releases explaining the benefits of the option, conduct preliminary issues identification and monitor emerging issues 4. 5.	TMR TMR TMR	PE Phse PE Phse PE Phse	On Track On Track On Track	#N/A
x	x	x	4. Stakeholders	4.7 Internal TMR	Requirement to engage with all parts of TMR, particularly E&T, AT, and SNO in the development and agreement of options.	Differing priorities and options for the corridor	Delay in schedule. Suboptimal outcome		Project Manager	- TMR PM Team	TwR	Likely	Major	High	Changing the likelihood & consequence	1. Regular consultation with stakeholders through SteerCo and TWG 2. 3. 4. 5.	TMR	PE Phse	On Track	#N/A

x			4. Stakeholders	4.8 Utilities Service Providers (PUP)	Long Lead times on PUP relocations result in project delay • Telecommunications • Water • Electrical • Gas.	Competing demand for PUP Co resources in overheated market Availability and ability of PUP owner to meet timeframes for attending and actioning items	Congested work site with PUP providers working over each other Lack of control and timing over PUP providers		Project Manager	- TMR PM Team *- Consultant Delivery Team	Treat	Likely	Moderate	High	Changing the likelihood & consequence	1.	PUP engagement in accordance with the Functional Specification requirements and CEP	TMR	PE Phase	On Track	#N/A
																2.	Develop schedule of early relocation works in PE Phase and updated in the Business Case phase	TMR	PE Phase	On Track	
																3.					
																4.					
																5.					
x	x	x	6. Project Management	6.1 Funding	The proposed project exceeds funding	TMR don't endorse project. Business Case project estimate is insufficient for final design Changes in design / scope not covered by BC estimate / project funding Increase in qty's from BC estimate to DD estimate Contingency not enough Planning Project is funded. Funding for DD and Construction not committed at this stage.	TMR may require more than one preferred option to be progressed as preferred option not endorsed resulting n additional PE/BC phase costs to address requirements Delays to project delivery Increase in funding or reduction in project scope required.	Project cost estimates are in accordance with departmental requirements (including TMRs PCEM)	Project Manager	- TMR PM Team	Treat	Possible	Major	High	Changing the likelihood	1.	Review and update project cost estimate at completion of PE and BC phase	TMR	PE Phase	On Track	#N/A
																2.	components of work / scope that can be removed to be identified for inclusion in estimate as separable packages / items	TMR	PE Phase	On Track	
																3.					
																4.					
																5.					
x	x	x	6. Project Management	6.3 Project Scope	Risk exists that the PAF project results in options inconsistent with the OnQ project delivered and recent OnQ works become redundant.	Delivery of OnQ Business Case, Detailed Design and Delivery prior to the commencement of the PAF PE phase for significant options	PAF design may be required to incorporate OnQ outcome resulting in a sub-optimal solution. Completed OnQ works may be removed as a part of the PAF design construction.	PAF Framework	Project Manager	- TMR PM Team	Treat	Possible	Major	High	Avoidance	1.	Delivery of works in the OnQ BC and DD which are likely to form part of broader nework solutions	TMR	PE Phase	On Track	#N/A
																2.					
																3.					
																4.					
																5.					
x	x	x	7. Safety & Well-Being	7.1 Vehicular	Vehicle collisions during construction	Insufficient or ineffective TTM	Collisions and Crashes	MRTS02. during consturction	Project Manager	TMR	Treat	Possible	Major	High	Avoidance	1.	Preparation of sufficient TTM during design	TMR	DD Phase	On Track	#N/A
																2.					
																3.					
																4.					
																5.					
x	x	x	7. Safety & Well-Being	7.2 Energised and Exposed Electrical Parts	Safety, health and wellbeing of personnel on and around construction site resulting from substation located adjacent to MPPL intersection. Extensive overhead power within study area.	* Inexperience contractor * Inadequate safety management plan and documentation * Construction near high speed traffic, high heavy vehicle percentage, high traffic volumes, working at heights, working above motorway * Compressed construction timeframe may result in excessive work hours	* Safety, health and wellbeing risk.	* Contractor responsible for managing their resources to meet project deadlines * Contractor to complete detailed safety management plan (including SWMS, risk assessments, inductions, etc) * Contractor to completed detailed Traffic Management Plan	Project Manager	TMR	Treat	Possible	Major	High	Avoidance	1.	Adherent to safe consturction practices during construction	TMR	DD Phase	On Track	#N/A
																2.	SiD workshops during design phase	TMR	PE Phase	On Track	
																3.					

																4.					
																5.					
x	x	x	9. Construction	9.3 Investigations	Inadequate site investigations.	Lack of geotechnical investigations in the planning phases, poor subgrade requiring Subgrade Treatment traffic signal hardware and software is not compatible with the proposed upgrade including the red light camera. Permanent works does not anticipate future traffic demands The existing geometry does not comply with a design speed of 10km/h above the existing posted speeds for either road.	Compromised / failed excavations, embankments, structures. Additional cost. Delay to program. Revision to design during construction leading to delivery delays and increase i n project costs Design assumptions / parameters based on incomplete information leading to increased quantities, cost, reduced asset life, and delay to programme of preconstruction activities and redesign work.	TMR Geotechnical Design Standards and TMR Specifications Preconstruction Processes Manual and design standards Austroads Guide to Road Design Hydrologic and Hydraulic Modelling Guidelines Pavement Rehabilitation Manual Technical design reports identify discipline specific design development issues to be managed through the design process, including treatments and controls	Project Manager	- TMR PM Team - Consultant Delivery Team	TMR	Possible	Major	High	Taking opportunity	1.	Undertake site investigations, including geotechnical investigations, in development phase (Detailed Design)	TMR	DD Phase	On Track	#N/A
																2.	Identify project discipline design risks in design reports, including discipline specific treatments and controls	TMR	DD Phase	On Track	
																3.	Consider SiD in all phases of design, including SiD workshop and documentation of SiD.	TMR	PE Phase	On Track	
																4.					
																5.					
x	x	x	9. Construction	9.4 Land / Resumptions Acquisition	Property Resumptions are greater than expected	Delays and cost impact. Possibility of need to resume additional property. Limited available funding for alternate solutions that meet design criteria. Early works don't resume enough land for project Land required for PUP infrastructure relocation insufficient widening for road footprint impacts existing properties pinch points - widening for shared path impacts on existing retaining structure and shared	Project delays to resolve land resumption process Negative press and public sentiment if early works don't resume enough land to accommodate main works Additional land is required that not accounted for (e.g. PUP switchgear, transformers etc. not currently designed, so locations unknown)	Acquisition of Land Act 1967 (Qld) TMR acquisition policies and procedures Approved Communications & Engagement Plan Preconstruction Processes Manual	Project Manager	- TMR PM Team - Consultant Delivery Team	TMR	Likely	Moderate	High	Changing the likelihood	1.	Review land requirements and develop resumption schedule	TMR	PE Phase	On Track	#N/A
																2.	TMR Property Services personnel price resumption schedule and procurement plan. Estimator to include updated resumption costs in P90 estimate	TMR	PE Phase	On Track	
																3.	Ensure all property access requirements (including maintenance and services) are identified in subsequent phase	TMR	PE Phase	On Track	
																4.	Ensure sufficient provision of land requirement is identified for ancillary works including PUP and structures in land estimate	TMR	PE Phase	On Track	
																5.					
x	x	x	9. Construction	9.5 PUP	PUP or PUP conflicts not identified or identified incorrectly 1. during preconstruction phase. 2. During Delivery Phase	High quantum of existing PUP (incl. water, sewer, drainage, Telstra, NBN and U/G and O/H electrical). Relocations and protection treatments required in several locations. No or inaccurate record of services., unknown services encountered on site, not in DB4UD, or lack of data (no site survey or locating of underground PUP) Service strikes, damaged assets. Relocation of services.	Delayed schedule due to extra works to protect existing services Conflict with design (future constructability issues) Unexpected PUP relocations PUP damage during construction leading to nuisance and loss of productivity, plus expenses associated with rectification of damaged or disturbed PU Variations Delays to construction associated with	Preconstruction Processes Manual TMR Surveying Standards	Project Manager	- TMR PM Team - Consultant Delivery Team	TMR	Almost Certain	Major	Extreme	Changing the likelihood	1.	Undertake DBYD and initial desktop review to identify major existing PUP	TMR	PE Phase	On Track	#N/A
																2.	Undertake detailed site survey and potholing by a suitably qualified contractor to determine extent of conflicts.	TMR	PE Phase	On Track	
																3.	Develop options for PUP relocation early works	TMR	PE Phase	On Track	
																4.	Contractor's SWMS to confirm plant selection does not impact on existing PUP (e.g. vibration causing damage to water main), and procedure in place to minimise risk of service strike in construction.	TMR	DD Phase	On Track	
																5.	Estimator to allow suitable provision for unidentified and unplanned service relocation	TMR	PE Phase	On Track	