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8 May 2023

Project/File: 300303460

Mr Chris Pratt
Vicinity Centres

Dear Chris,

Reference: PLANNING PROPOSAL FOR 'BANKSTOWN CENTRAL SHOPPING CENTRE' – BANKSTOWN LOCAL ENVIRONMENTAL PLAN (BLEP) 2015 – RESPONSE TO TFNSW LETTER DATED 18 MAY 2022 & EMAIL DATED 14 APRIL 2023

Background

In 2019, a Planning Proposal was prepared by Urbis on behalf of Vicinity Centres (the proponent) to initiate an amendment to the Bankstown Local Environmental Plan (BLEP 2015) with respect to the Bankstown Central Shopping Centre site located at 1 North Terrace, Bankstown (the site).

The intended outcome of the Planning Proposal was to establish site-specific height and floor space controls and amend the application of BLEP 2015 Clause 6.9 to northern parts of the site to allow residential uses to occur on the lower two levels of future redevelopment in those locations. To inform the assessment of the Planning Proposal, a concept masterplan was prepared by FJMT which set out a range of potential future uses and building typologies to inform and verify the proposed height and FSR controls. The proposed FSR controls included a relatively minor density increase of approximately 12% from the previously approved FSR of 3.5:1 to a proposed FSR of 3.923:1.

As part of the Planning Proposal submission, a Transport Impact Assessment Report (titled 'Bankstown Central Shopping Centre Planning Proposal', dated 17 July 2020) was prepared by GTA (now Stantec). The report outlined a proposed travel demand management approach for the future development of the site, including supressed car parking provisions to actively minimise traffic impacts, and contained AIMSUN traffic modelling to quantify the anticipated impacts.

The traffic modelling included in the July 2020 Stantec report was completed using the AIMSUN model previously prepared by GTA (now Stantec) for the Complete Streets CBD masterplan that was endorsed by Bankstown-Canterbury Council in late 2019. The modelled scenario assumed the full development of the site as envisaged in the Planning Proposal coupled with Council's endorsed changes to the CBD street network and concluded that the traffic impacts of the indicative development yield as envisaged in the Planning Proposal was expected to be minor and acceptable.

In 2022, the July 2020 Stantec report was reviewed by Transport for New South Wales (TfNSW) who sought an updated TIAR as well as additional information confirming that the AISMUN base model built for Complete Streets and relied upon for the Planning Proposal was suitably validated and calibrated. This letter has been prepared to respond to this TfNSW request for further information and to consolidate all relevant transport reports into one location such that they can be assessed collectively.

It is prudent to note that Bitzios Consulting was engaged by Council in 2020 to undertake a peer review of the July 2020 Report. Whilst this peer review was included as part of the pre-exhibition material for the Planning Proposal, it is unclear whether it was made available to TfNSW to guide their assessment. For

ease of reference, this peer review is appended to this letter, with the key conclusion reproduced as follows:

> *"… we are generally satisfied that the development would likely have manageable road network impacts on the surrounding road network, and that the level of detail required to investigate specific mitigation measures to offset development impacts can and should be undertaken during subsequent application stages."*

With respect to this Bitzios commentary, we confirm our agreement that more detailed traffic modelling will be provided with subsequent development applications at Bankstown Central. In our experience, this approach is common practice, as limited traffic modelling is typically required or thus provided for Planning Proposals (particularly those representing a relatively minor FSR increase as is the case for Bankstown Central (i.e., +12% above current controls)). The requirement for this additional modelling for future development applications has also been accepted in writing by Vicinity Centres and it is understood that this will be specifically required by Council in the approval of subsequent development applications.

Purpose and Structure of this Letter

This letter has been prepared to provide the further information requested by TfNSW in a single document such that the material can be assessed collectively. The letter specifically responds to the following:

- TfNSW letter dated 18 May 2022, including:
    - Attachment A pursuant to the Transport Impact Assessment for the Bankstown Central Planning Proposal, and
    - Attachment B pursuant to the appropriateness of the 2018 Bankstown Traffic Model prepared for Complete Streets and used for an assessment of the land use envisaged in the Bankstown Central Planning Proposal.
- NSW Department of Planning and Environment Gateway Determination Letter dated 28 October 2022, which is understood to have been informed by questions raised in part by TfNSW.
- TfNSW email dated 14 April 2023 from Mr Michael Dixon which provided a response in reply to the previous version of this letter.

Our responses to the items raised in the above documentation and other relevant materials are included in the attachments to this letter as described below:

- **Attachment 1:** Response to Gateway Determination Letter
- **Attachment 2:** An updated TIA report for the Planning Proposal which will include responses to each comment raised by TfNSW in Attachment A of the TfNSW letter dated 18 May 2022.
- **Attachment 3:** An updated Calibration and Validation Report for a revised 2022 Bankstown Traffic Model. This report includes responses to each comment raised by TfNSW in Attachment B of the TfNSW letter dated 18 May 2022.
- **Attachments 4 & 5:** The Bitzios Consulting Peer Review report (Attachment 4) plus a table response from Stantec to the Bitzios recommendations (Attachment 5).
- **Attachment 6:** Stantec response to the TfNSW email dated 14 April 2023.

Reference: TfNSW Comments on Bankstown Complete Street Project – Base Model

Summary

It is our view that the transport related documentation provided in support of the Planning Proposal, including the updated TIA and other material included in this letter, is more than sufficient to enable an assessment of the transport impacts of the future land use changes on the Bankstown Central site.

With respect to traffic modelling, it is recommended that the need, extent, and timing of this modelling is considered in the context of what the Planning Proposal seeks to facilitate. In this instance, we consider it prudent to note the following:

1. The FSR change sought by the Planning Proposal is relatively minor (i.e., +12% above current controls) and there have been numerous recommendations put forward to mitigate associated traffic impacts, including:

   – Improved pedestrian permeability through the site.

   – Enhanced public transport infrastructure including the proposed extension of Jacobs Street for bus movement and stops only.

   – Reduced car parking provision, coupled with greater control and management of the existing retail car parking provision, to proactively reduce off-site traffic impacts.

2. The Planning Proposal itself will not directly allow the construction of additional development on the Bankstown Central site. Rather, such development will be subject to separate Development Applications which will be supported by more detailed traffic modelling. The need for this additional traffic modelling is accepted by the Proponent (Vicinity Centres) and it is understood that Council will include a requirement for this modelling to be completed to support future major development applications on the site.

3. The completion of traffic modelling in the Bankstown CBD is a very complex process. The recent updated modelling completed by Stantec, as outlined in Attachment 3, highlights that the future modelling may need to move away from a "whole of CBD" approach to a more tailored approach which is specific for each land use and/or transport infrastructure project. In our view, it would be unreasonable to require this modelling to be completed for a Planning Proposal.

Overall, we retain the view that the traffic modelling and updated transport impact assessment report submitted for the Planning Proposal are sufficient and indicate that the transport and traffic impacts of the envisaged land use can be suitably accommodated in the surrounding transport network. We note this view is not only stated by Stantec but is also shared by Bitzios Consulting in their peer review for Council. Further discussion regarding the key findings of the Bitzios peer review, including the matters which we agree need to be addressed in further detail for future Development Applications at Bankstown Centre, is included in Attachment 5 of this letter.

In our view, the response from TfNSW in their email dated 14 April 2023 in relation to the Bankstown Central Planning Proposal is positive given it supports its exhibition subject to the preparation of a Travel Demand Management Plan (TDMP) to deal with *"any outstanding traffic and transport issues at the planning proposal stage"*. Vicinity Centres confirms its agreement to the preparation of this TDMP in parallel with the exhibition of the Planning Proposal. As discussed further in Attachment 6 of this letter, it is proposed that this TDMP be informed by the updated TIA included in Attachment 2 but is expanded to address the specific items requested by TfNSW.

Reference: **TfNSW Comments on Bankstown Complete Street Project – Base Model**

We hope the above and attached information is clear. Naturally, should you wish to discuss this matter further and/or organise a time with TfNSW and/or Council to discuss it in person, please do not hesitate to contact me.

Sincerely,

STANTEC AUSTRALIA PTY LTD

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Encl.

Attachment 1 – Response to the Gateway Determination Letter dated 28 October 2022

Attachment 2 – Updated Transport Impact Assessment for the Bankstown Central Planning Proposal

Attachment 3 – Updated Modelling Calibration & Validation Report

Attachment 4 – Bitzios Traffic & Transport Peer Review

Attachment 5 – Response to Bitzios Findings

Attachment 6 – Response to TfNSW email dated 14 April 2023

Attachment 1 – Response to Gateway Determination Letter

The comments outlined in the Gateway Determination letter dated 28 October 2022 have been reproduced below in bold and italics, with our responses thereafter.

The applicant will complete, to the satisfaction of TfNSW all Traffic modelling and transport planning requirements specified by TfNSW as previously and as advised in TfNSW's letter (TfNSW Reference: SYD22/00674/01, Dated 8 September 2022) at Attachment A

Attachment 3 of this letter includes a calibration and validation report for an updated traffic model prepared for the Bankstown CBD.

The model focuses solely on the weekday PM peak hour, as was agreed by TNSW (via email dated 09 December 2022), as being sufficient for the Planning Proposal. The Proponent also accepts that additional traffic modelling will be required to support future major development applications on the site.

We hope that the information provided with respect to traffic modelling is sufficient for TfNSW to allow their assessment of Planning Proposal and clearly shows the Proponent is willing to work with TfNSW to ensure that appropriate traffic modelling is completed in the future.

The planning proposal is to demonstrate the site's development capacity based on transport constraints applying to the subject land and within the wider Bankstown Town Centre Master Plan Area defined by Councils Bankstown Town Centre Master Plan.

Attachment 2 of this letter contains an updated transport impact assessment (TIA), which confirms the transport responses that are to be adopted as part of the Planning Proposal in response to the local traffic and transport conditions.

Specifically, having regard to the site's excellent public transport access (due to existing and planned public transport services) and constrained road network capacity, the Planning Proposal has adopted a travel demand management approach to guide future development. This is an approach which aims to reduce the number of single-occupancy vehicle trips by encouraging alternative modes of transport such as walking, cycling, and public transportation.

In this context, the Planning Proposal includes the following measures and initiatives:

- Provision of new east-west and north-south pedestrian connections throughout the Precinct to improve amenity, safety, permeability, and distances and travel times.
- Generous provision of bicycle parking and associated end of trip facilities reflected the in Complete Streets and the Bankstown City Centre Master Plan.
- Commitment to improvements to the public transport (bus) network by the creation of a new transit street known as the Jacobs Street extension.
- Adoption of progressive car parking rates generally consistent with the rates reflected in the Bankstown City Centre Master Plan.
- Promotion of more people living and working within walking distance of Bankstown Metro and Sydney Train Station.

In our view, it would not be appropriate, or consistent with common or best practice, to determine (or indeed limit) the site's development capacity based on a constraint in road network capacity. Rather, it is considered appropriate for this constraint to simply inform the manner in which the development occurs.

For the Bankstown Central Planning Proposal, this has occurred through the measures and initiatives outlined above which seek to make the most of the available active travel and public transport capacity (now and proposed) and limit the impacts on the constrained road network capacity.

The planning proposal is to provide an evidence base in terms of methodology, assumptions, and calculations for the development potential reflected in proposed height and FSR standards and how these are related to traffic and transport constraints and future requirements.

In relation to the determination of the proposed heights and FSR standards, the following information has been advised by the Proponent's consulting team with respect to the determination of the proposed land use:

"The intended outcome of this planning proposal is to facilitate the redevelopment of the site for a range of uses consistent with the intended future development character of Bankstown CBD as set out in NSW planning policy. To inform the assessment of this planning proposal, a concept masterplan and massing study has been prepared by FJMT. This sets out a range of potential future uses and building typologies to inform and verify the proposed height and FSR controls.

It is noted that this concept masterplan assumes a particular mix of uses and building typologies for the purposes of assessing the merits of the planning proposal. As the development timeline to achieve the quantum of development envisaged by the concept masterplan is long (40+ years), it is recognised that the building typology and use mix may change and evolve over time to respond to market conditions.

Overall, the proposal will enable the redevelopment and renewal of a significant landholding in the centre of Bankstown CBD for a range of uses commensurate with the intended future role of Bankstown as a key Strategic Centre, and a future Health and Education Innovation Precinct.

The proposal is consistent with Government Policy which supports higher density in existing centres with public transport connections. The proposal is also consistent with the Bankstown City Centre Masterplan which was adopted by Council in 2021 and is now progressing as a planning proposal. The planning proposal for, primarily, increased building height will help realise a range of benefits to the Bankstown CBD and local community. These are summarised as follows:

- *Incentivising the redevelopment of this significant landholding in the centre of the Bankstown CBD and attracting investment to the locality.*
- *Encouraging densification of uses, through taller building forms than currently available, in close proximity to the existing Bankstown Railway Station, future Metro station and relocated bus interchange, in a manner that will facilitate patronage of these transport services.*
- *The creation of a true mixed-use precinct, including potential for retail, commercial, short term accommodation, residential, health and student accommodation offerings that will complement the location of the Western Sydney University Campus (Bankstown) and new Bankstown-Lidcombe Public Hospital, both in close proximity to the subject site.*
- *The significant improvement in the public domain in the heart of the CBD, including the provision of significant areas of publicly accessible open spaces, including a 5,000sqm City Park.*

Reference: TfNSW Comments on Bankstown Complete Street Project – Base Model

The Greater Sydney Commission's South District Plan outlines that Bankstown is a Strategic Centre, where high levels of growth, both commercial and residential, along with public transport improvements are to be encouraged and supported. This is reinforced by other significant NSW Government policies to stimulate and encourage urban renewal, additional housing, and employment growth. The Sydney Metro City & Southwest Project will upgrade and convert stations to Metro standards including Bankstown Station, providing improved transport services to Liverpool and the Sydney CBD. Furthermore, the proposal also aligns with the Vision and Directions of the Bankstown City Centre Masterplan.

This broader planning strategy for Bankstown has informed Vicinity's decision to undertake considerable planning, design, and market investigations to explore further opportunities at this key site, Bankstown Central, in order to help deliver on the strategic initiatives for Bankstown CBD. To this end, Vicinity has undertaken a series of discussions with Canterbury-Bankstown Council to discuss various opportunities for future redevelopment on the site."

With respect to the influence of traffic and transport capacity on the determination of the land uses and yields, we reiterate the position outlined above that it would not be appropriate, or consistent with common or best practice, to determine (or indeed limit) the site's development capacity based on a constraint in road network capacity. Rather, it is considered appropriate for this constraint to simply inform the manner in which the development occurs.

It is our view that the travel demand management approach adopted for the Planning Proposal, including the measures and initiatives outlined above, will help to mitigate the development impacts as far as practicable by encouraging active travel and public transport trips, and discouraging and limiting private motor vehicle trips.

Reference: **TfNSW Comments on Bankstown Complete Street Project – Base Model**

Attachment 2 – Updated Transport Impact Assessment for the Bankstown Central Planning Proposal

Bankstown Central Shopping Centre Planning Proposal

North Terrace, Bankstown
Transport Impact Assessment

Prepared by: Stantec for Vicinity Centres PM Pty Ltd

on 27/03/2023

Reference: N186960 / 300303460

Issue #: B

Stantec

Bankstown Central Shopping Centre Planning Proposal

North Terrace, Bankstown
Transport Impact Assessment

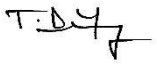
Client: Vicinity Centres PM Pty Ltd

on 27/03/2023

Reference: N186960 / 300303460

Issue #: B

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	17/07/2020	Final	Mitch Henderson	Rhys Hazell	Tim De Young	Tim De Young
B	27/03/2023	Final	Mitch Henderson	Tim De Young	Tim De Young	

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

A Planning Proposal has been prepared by Urbis on behalf of Vicinity Centres (the proponent) to initiate an amendment to the Bankstown Local Environmental Plan (BLEP 2015) with respect to the Bankstown Central Shopping Centre site located at 1 North Terrace, Bankstown (the site).

Concept master planning prepared by FJMT for the Planning Proposal indicates an indicative future yield of approximately 106,131sqm of retail (including 91,090sqm of existing floor area), 119,117sqm of commercial, 1,255 residential apartments, 528 serviced apartment and hotel rooms, 694 student accommodation units, and 891sqm of childcare. (All areas are Gross Floor Area).

The subject site has excellent access to surrounding public transport and walking facilities, noting that public transport services will also improve in the near future with the completion of the Sydney Metro project from Bankstown to Sydney CBD.

This report contains an assessment of the likely transport impacts of the Planning and outlines the key transport responses proposed in the concept masterplan to minimise the impacts or improve existing facilities. A summary of the responses fir each mode is presented in Table ES1.

Table ES1: Key Transport Responses

Mode	Development Response
	• Promotes pedestrian and to/from the Centre and the Bankstown CBD through the provision of public open space and improved pedestrian connections internal and external to the site in all cardinal directions.
	• Promotes cyclist and to/from the Centre and the Bankstown CBD through the provision of public open space and the provision of bicycle parking consistent with other Sydney based developments.
	• Facilitates future enhancements to the bus network in the immediate vicinity of the site via the creation of a new transit street known as the Jacobs Street extension. The proposed arrangement supports a productive CBD, improves bus operating travel times, improves user experience, retains proximity and is consistent with Complete Streets objectives.
	• Envisages loading and logistics activity via existing loading docks or a version of that arrangement to suit future conditions. This loading will principally occur at basement level or away from public realm areas. As land use and loading activity increases, the loading dock will likely become managed to maximise the turnover of loading bays
	• Proactively mitigates traffic impacts via the adoption of progressive car parking rates which are aligned with the nature of the development, the excellent public transport services available and the future of mobility services. • Proposes vehicle access to this car parking largely from North Terrace, Rickard Road, and Stacey Street (in accordance with the intent of Complete Streets), with limited reliance on Jacobs Street and Lady Cutler Drive.

Overall, the assessment detailed within this report indicates that the transport impacts of the indicative development yield envisaged in the Planning Proposal can be accommodated by the adjacent transport system with the completion of the proposed transport responses.

CONTENTS

Appendices

1. INTRODUCTION

01

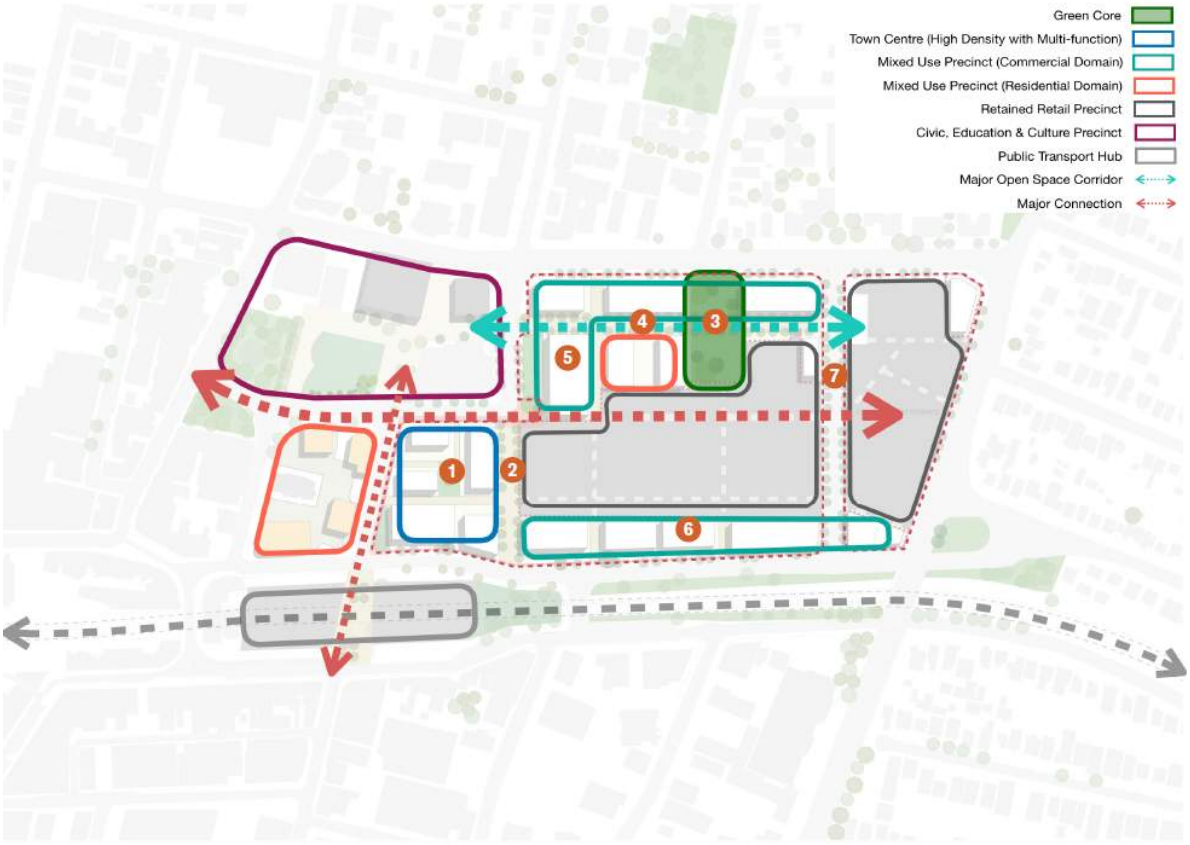
1.1. Background

A Planning Proposal has been prepared by Urbis on behalf of Vicinity Centres (the proponent) to initiate an amendment to the Bankstown Local Environmental Plan (BLEP 2015) with respect to the Bankstown Central Shopping Centre site located at 1 North Terrace, Bankstown (the site).

It is understood that the intended outcome of the Planning Proposal is to establish site-specific height and floor space controls and amend the application of BLEP 2015 Clause 6.9 to northern parts of the site to allow residential uses to occur on the lower two levels of future redevelopment in those locations.

To inform assessment of the Planning Proposal, a concept masterplan was prepared by FJMT which sets out a range of potential future uses and building typologies to inform and verify the proposed height and FSR controls. The FJMT concept masterplan is shown in Figure 1.1 with a summary of the indicative development yields summarised in Table 1.1.

Figure 1.1: FJMT Concept Masterplan



Source: FJMT

Table 1.1: Indicative Land Use Summary[1]

Land Use	Future Yield
Retail	106,131 sqm GFA [1]
Commercial	119,117sqm GFA
Residential	1,255 apartments
Hotel & Serviced Apartment Rooms	528 rooms
Student Accommodation	694 units
Childcare	891 sqm GFA

[1] Includes 91,090 sqm GFA of existing retail floor area. (It is noted that the retail floor areas quoted in this report are Gross Floor Areas. Other transport impact assessment reports recently prepared by Stantec for Development Applications at Bankstown Central quote Gross Leasable Floor Area, which are lower than the Gross Floor Area.)

1.2. Report Purpose

In March 2020, Stantec (then GTA Consultants) was engaged by Vicinity Centres to undertake a transport impact assessment of the Planning Proposal. This was submitted as part of the development applicated (dated July 2020). This report is a subsequent revision for the primary purpose of responding to comments raised by Transport for New South Wales (TfNSW).

This report sets out an assessment of the transport impacts of the Planning Proposal and how those impacts are minimised or managed through the design of the concept masterplan. It considers:

1. The existing transport conditions and policy relating to the site – *refer to Section 2*
2. The expected trip generation of the land uses envisaged in the masterplan – *refer to Section 3*
3. The details of the proposed transport response with respect to each transport mode / consideration, such as:
    - Active Transport – *refer to Section 4*
    - Public Transport – *refer to Section 5*
    - Loading and waste collection – *refer to Section 6*
    - Car parking & traffic impacts – *refer to Section 7.*

1.3. References

In preparing this report, reference has been made to the following:

- Bankstown Complete Streets CBD Transport and Place Plan Detailed Action Plan, dated Oct 2019
- Bankstown Central Shopping Centre Planning Proposal Report prepared by Urbis, dated Dec 2019
- Bankstown Development Control Plan 2015 - Part B5, Parking
- other documents as nominated.

[1] The land uses presented in this Table represent those considered as part of the current pre-exhibited Bankstown Central (May 2022). These land uses include minor variations to those considered in the original transport impact assessment (dated July 2020). In brief, these revisions consider a decrease in the provision of student accommodation rooms and an increase in residential apartments. On balance, the changes are considered minor from a transport point of view. The transport impacts throughout this report have been updated to accord with the pre-exhibited yields.

1.4. Submission History

1.4.1. Initial Submission (July 2020)

This report has been updated with regard to Canterbury Bankstown Council's Request for Further Information (RFI) dated 11 March 2020 (which was prepared after review of a preliminary transport impact assessment prepared by Colston Budd Rogers & Kafes (CBRK) for the Planning Proposal which submitted in December 2019). The RFI sought an updated transport impact assessment report be provided to include more detailed information regarding various transport matters, such as the proposed relocation of the bus interchange, the extension of various abutting streets, public transport service improvements, car parking rates, and traffic impacts at key intersections.

A summary of the comments concerning traffic and transport as presented in Council's RFI are tabulated below with corresponding responses.

Table 1.2: RFI Comments and Stantec Response

RFI Comment	Stantec Response
"There is a lock of detail and inconsistent information regarding the proposed relocation of the bus interchange. Please provide details of the proposed location of the bus interchange and details of discussions with TfNSW."	Detailed discussion of the relocation of the bus interchange is included in Section 5.2 of this report. Further detail regarding liaison with TfNSW has been provided via a separate Development Application.
"The extension of Jacobs Street south to North Terrace is supported, however, further detail is required as to the design and activation of this street which is currently occupied by a loading bay."	Section 5.2 of this report include a concept design showing the potential extension of Jacobs Street. This design is indicative only but provide an overview of the potential arrangement.
"The TIA traffic breakdown differs to that of the planning proposal. Both need to be revised to be consistent and reflect demonstrated demand for floor space / yield."	This report assumes the latest floor areas provided by FJMT for the Planning Proposal.
"The lack of public transport services in a north/south direction from the site is not documented in the TIA. Improved services will be required to move the projected workforce, shoppers, residents etc. to and from the expanded Bankstown Central precinct."	Section 5.2 of this report contains further discussion on public transport services and the means by which north-south movements can be improved (via the extension of Jacobs Street).
"Traffic generation as a result of the adjacent WSU is not adequately addressed."	The traffic analysis contained in this report has been based on projections used in the modelling to support Complete Streets. It includes a high-level estimation of growth in the CBD, which would include the WSU site.
The proposal states that car parking requirements will be addressed during DA stage and provides no indication if it will be sleaved or relocated underground. Car parking rates will need to be resolved as part of the Planning Proposal."	Indicative car parking rates are provided in Section 7.2.4 of this report. Further information regarding the location of car parking should be sourced from the previously lodged Urban Design Report.
"The railway underpass between North and South Terrace is currently a pinch point for traffic. Further traffic modelling needs to be conducted regarding the impact of the development on the functionality of the intersection."	The impacts of traffic in the vicinity of Bankstown Central Shopping Centre including the underpass between North and South Terrace is discussed in Section 7.4 which shows no change in the operation of these intersection.

"The Proponent should continue discussions with TfNSW as they continue to develop concept designs for the Stacey Street upgrade. The TIA notes no setback on Stacey Street and for the cycleway to be provided within the street boundary. The report also notes intersection improvements at Rickard Road / Stacey Street and Wattle Street / Stacey Street which should be considered with the TfNSW design."	Discussions were held with TfNSW regarding the potential upgrades on Stacey Street on 20/4/2020. During that meeting, TfNSW confirmed the upgrade was at a planning phase only but, if completed, would improve the capacity of the road network. There was no discussion at the meeting for a requirement for the Planning Proposal to be amended to suit the potential needs of this project.
"The traffic assessment needs to consider Council's adopted plans for Fetherstone and The Appian Way to become shared zones with little to no volume traffic at peak periods and the extensions of Jacobs Street for bus movements"	The impacts of these road network change are included within the "Future Base with Complete Streets" scenario modelled in AIMSUN as discussed in Section 7.4. The staging of the extension of Jacobs Street also outlines a means by which these projects can be realised by Council.

1.4.2. Subsequent Submission (March 2023)

In a letter dated 18 May 2022, Transport for New South Wales (TfNSW) sought an update to the July 2020 Stantec Transport Impact Assessment report. Their letter included comments contained in Attachment A.

This TIAR has been updated to include specific responses to these comments which are contained in the body of the report.

It is noted that separate materials have been submitted to TfNSW including a recalibrated and revalidated model to respond to TfNSW comments.

2. EXISTING CONDITIONS

02

2.1. Site Context

2.1.1. Location

The subject site is bounded by Stacey Street, Rickard Road, North Terrace and Jacob Street / The Appian Way.

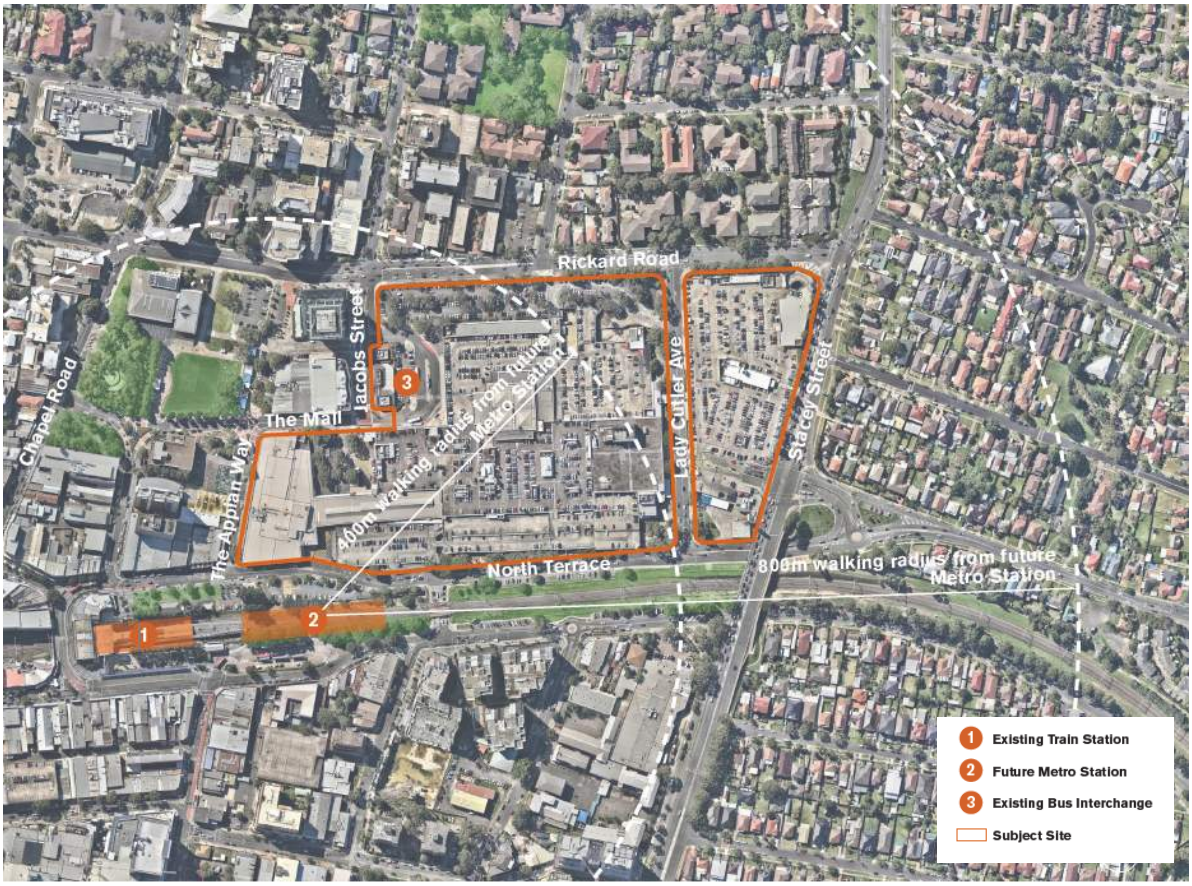
The site is occupied by Bankstown Central Shopping Centre ('the Centre') and has a frontage of approximately 275m to Stacey Street, 425m to Rickard Road, 500m to North Terrace and 250m to Jacob Street and The Appian Way.

It comprises approximately 81,300sqm of retail floor area, including major retailers, specialty stores, restaurants and food court uses. These land uses are supported by approximately 3,300 car spaces, including 1,100 car spaces located east of Lady Cutler Avenue and 2,200 car spaces located within the car park off Rickard Road, the central roof top car park and within the North Terrace multi-deck car parks.

The site is located within the Bankstown Central Business District (CBD), with surrounding properties predominately comprising medium and low density residential and commercial uses. Bankstown Town Hall and other council buildings immediately neighbour the site to the west.

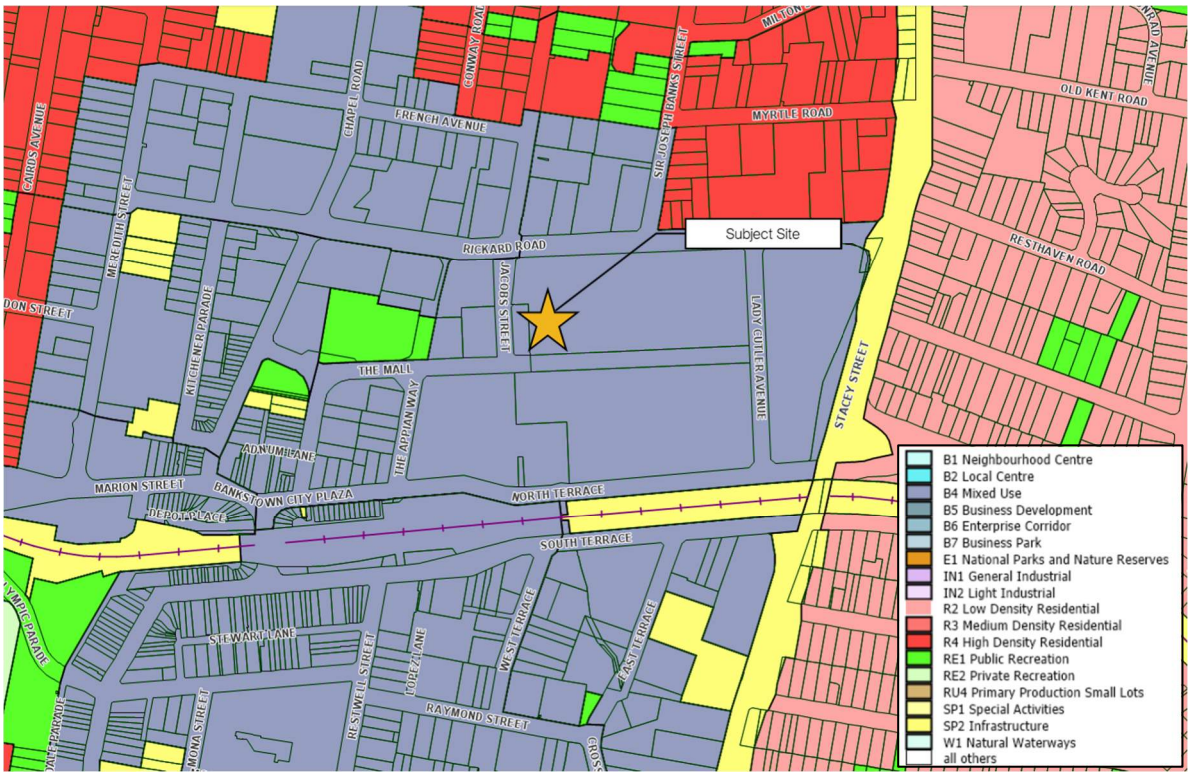
The location of the site and its surroundings environs is shown in Figure 2.1 and Figure 2.2.

Figure 2.1: Subject Site and its Environs



Source: FJMT Urban Design Statement for Planning Proposal

Figure 2.2: Land Zoning Map



(Adapted from Canterbury Bankstown Council, available at http://maps.cbcity.nsw.gov.au/)

2.1.2. Adjacent Road Network

The key roads adjacent to the site are discussed as follows:

Stacey Street

Stacey Street is an arterial controlled road and is aligned in a north-south direction connecting to South Western Motorway to the south and Hume Highway to the north.

It is currently a two-way road generally configured with a 4-lane, 20m wide carriageway, set within a 35m road reserve (approx.). However, it is noted that the NSW Government is preparing a design to upgrade a 2.2km section of Stacey Street including the section adjacent to the site[2]. The proposal is currently in conceptual design phase and includes the widening of Stacey Street to create a divided 6-lane road. That project proposes key intersection upgrades and aims to improve road safety, travel times and reliability, congestion, capacity and pedestrian and cyclist facilities.

Stacey Street is shown in Figure 2.3.

[2] NSW Government, Stacy Street and the Hume Highway, Bankstown Upgrade Project Update August 2019

Rickard Road

Rickard Road functions as a secondary road and is aligned in an east-west direction connecting to Stacey Street to the east and Meredith Street to the west.

It is a two-way road, generally configured with a 4-lane, 17.5m wide carriageway, set within a 25m road reserve (approx.). Kerbside parking is permitted on the northern side of the road between Jacobs Street and Sir Joseph Banks Street subject to time restrictions, otherwise parking is not permitted along its length.

Rickard Road is shown in Figure 2.4.

North Terrace

North Terrace functions as a major local road and is aligned in an east-west direction connecting to Wattle Street in the east and Marion Street in the west.

West of The Appian Way, it operates as a two-way road, generally configured with a 2 to 4-lane, 12.5m wide carriageway, set within a 25m road reserve (approx.). East of the Appian Way, it operates as a one-way westbound road to Fetherstone Road. Kerbside parallel is permitted throughout various segments in the road in addition to kerbside perpendicular commuter car parking.

North Terrace is shown in Figure 2.5.

The Appian Way

The Appian Way functions as a local road and is aligned in a north-south direction connecting North Terrace in the south and The Mall in the north.

It is a one-way road (southbound), configured with a 2-lane, 13.5m carriageway set within a 20m road reserve (approx.) Kerbside parallel parking is permitted along its length, the western side is subject to time restrictions and the eastern side is generally loading / bus zones.

The Appian Way is shown in Figure 2.6.

The Mall

The Mall functions as a local road and is aligned in an east-west direction connecting Chapel Road North in the west to Jacobs Street in the east.

Between Fetherstone Street and The Appian Way the road is a one-way road (eastbound), east of The Appian Way the road operates as a two-way road. Kerbside parking is permitted between Fetherstone Street and The Appian Way. Bus zones are present on both sides of the road east of The Appian Way.

The Mall is shown in Figure 2.7.

Jacobs Street

Jacobs Street functions as a local road and is aligned in a north-south direction connecting The Mall in the south to Rickard Road in the north.

Adjacent to the site, Jacobs Street primarily provides access to the bus interchange and is a two-way road configured generally with a 2-lane, 12m carriageway set within a 15-30m road reserve (approx.). Kerbside parking is not permitted.

Jacobs Street is shown in Figure 2.8.

Lady Cutler Drive

Lady Cutler Drive functions as a local road and is aligned in a north-south direction connecting Rickard Road in the north to North Terrace in the south. It provides access to several of the Centre's car parks.

It is a two-way road, generally configured with 2 lanes in each direction, 12m carriageway set within a 25m road reserve (approx.). Kerbside parking is permitted on sections of the road, generally for pick-up and drop-off type manoeuvres.

Figure 2.3: Stacey Street

Figure 2.4: Rickard Road

Figure 2.5: North Terrace

Figure 2.6: The Appian Way

Figure 2.7: The Mall

Figure 2.8: Jacobs Street

Source: Google Street View

2.2. Pedestrian Network

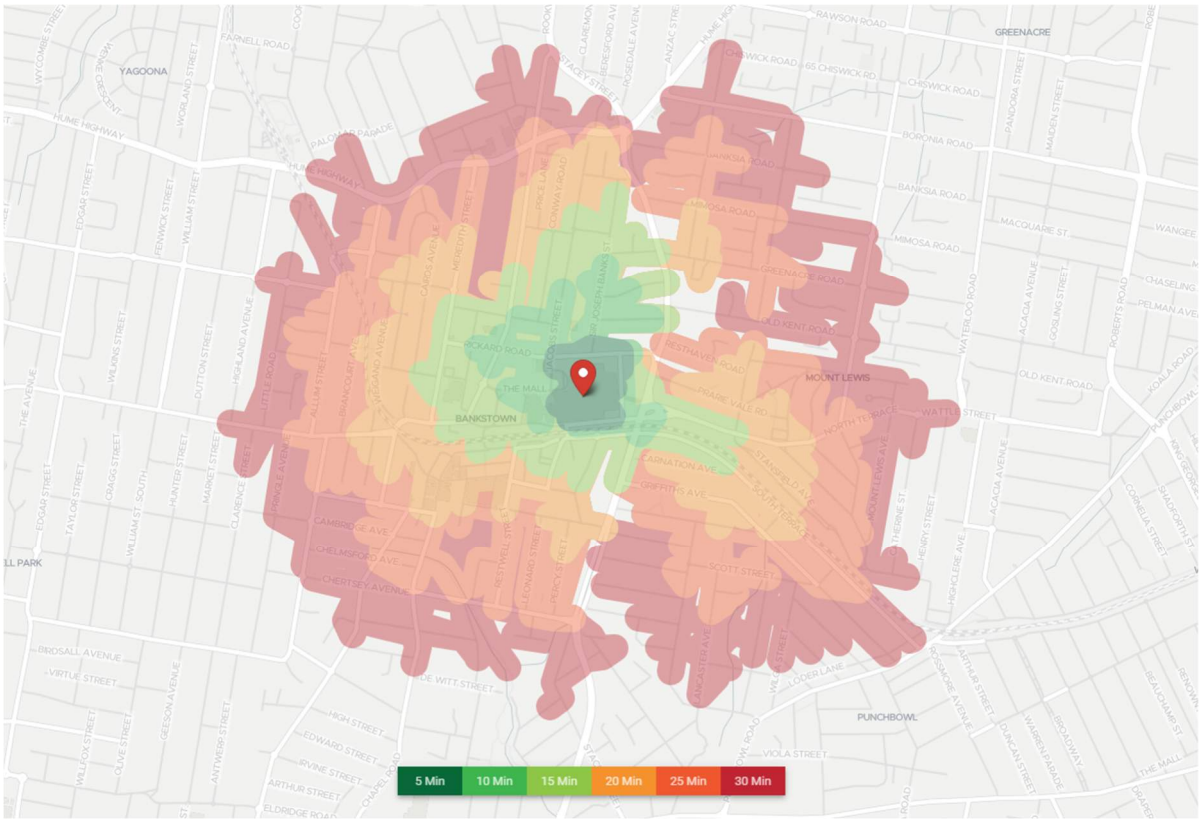
2.2.1. Existing Connectivity

The Bankstown CBD generally enjoys a well-connected pedestrian network, with all streets in the local area having sealed footpaths and street lighting. The network provides good connection through the CBD and to key destinations including Bankstown train station. However, some pedestrian connections have reduced widths and low levels of amenity.

2.2.2. Existing Catchment

The available walking catchment within 30 minutes of the subject site at 5-minute intervals, is provided in Figure 2.9. This indicates that major locations such as the Bankstown Train Station and Bankstown NSW TAFE are within comfortable walking distance.

Figure 2.9: Pedestrian Walking Catchment Area (from Subject Site)



2.2.3. Walk Score

The accessibility of the site via walking can be measured by assessing the "Walk Score" of the suburb or site. The Walk Score is calculated by determining the distance required to walk from an origin to nearby amenities, whilst also assessing block sizes and intersection density to determine the permeability of an area. For the subject site, the walk score is 93 which suggests that the site is complimented by excellent walking facilities including factors such as provision of footpaths, street lighting and surrounding land uses.

2.3. Cycling Network

2.3.1. Existing Connectivity

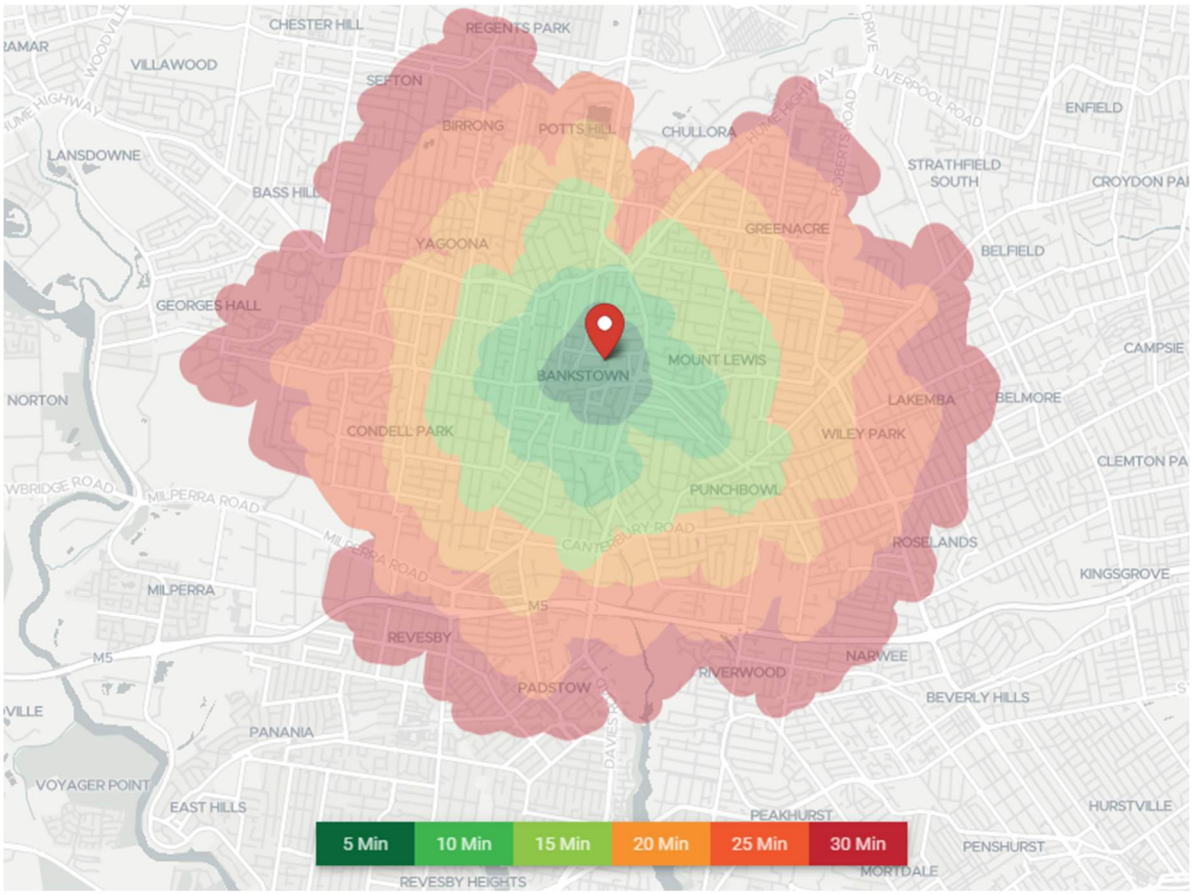
The Bankstown CBD currently lacks dedicated cycling infrastructure, with cyclists on key desire lines (e.g. Olympic Parade, Marion Street, William Street, Greenfield Parade and South Terrace) needing to share road space with vehicles.

It is understood that the Metro project proposes the introduction of a shared bicycle and pedestrian path along the rail corridor between Bankstown and Sydenham and that Council is considering options to extend this connection to other nearby streets.

2.3.2. Existing Catchment

The available cycling catchment within 30 minutes of the subject site at 5-minuite intervals is provided in Figure 2.10. Despite the limited infrastructure provided for cyclists, this figure highlights that cycling permeability through the surrounding areas is relatively high and that cycling should be a realistic travel option for many local trips.

Figure 2.10: Cycling Catchment Area (from Subject Site)



2.4. Public Transport Network

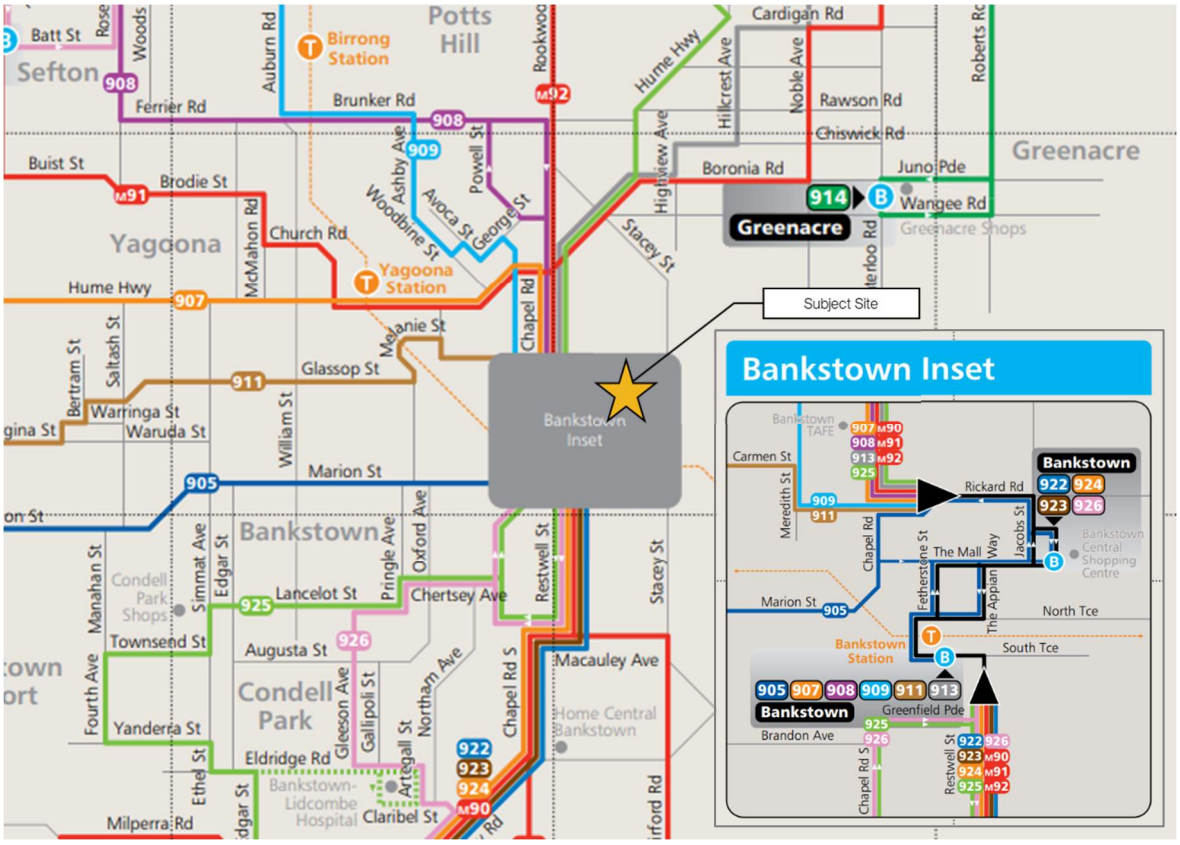
2.4.1. Existing Services / Routes

Bankstown Central has excellent access to and is well serviced by public transport, including nearby services as follows:

- Heavy rail, with trains running to the CBD at a frequency of approx. 15 minutes (with a journey time of approx. 35 minutes) during peak periods.
- Bus services, including 22 bus routes, operating from the Jacobs Street bus interchange or from Bankstown Station.

The bus services are run by three separate operators (TransdevNSW, Punchbowl Bus Co and STA) as a result of Bankstown being on the boundary between bus contract zones.

Figure 2.11: Bus Network Transport Map (Transdev, NSW)

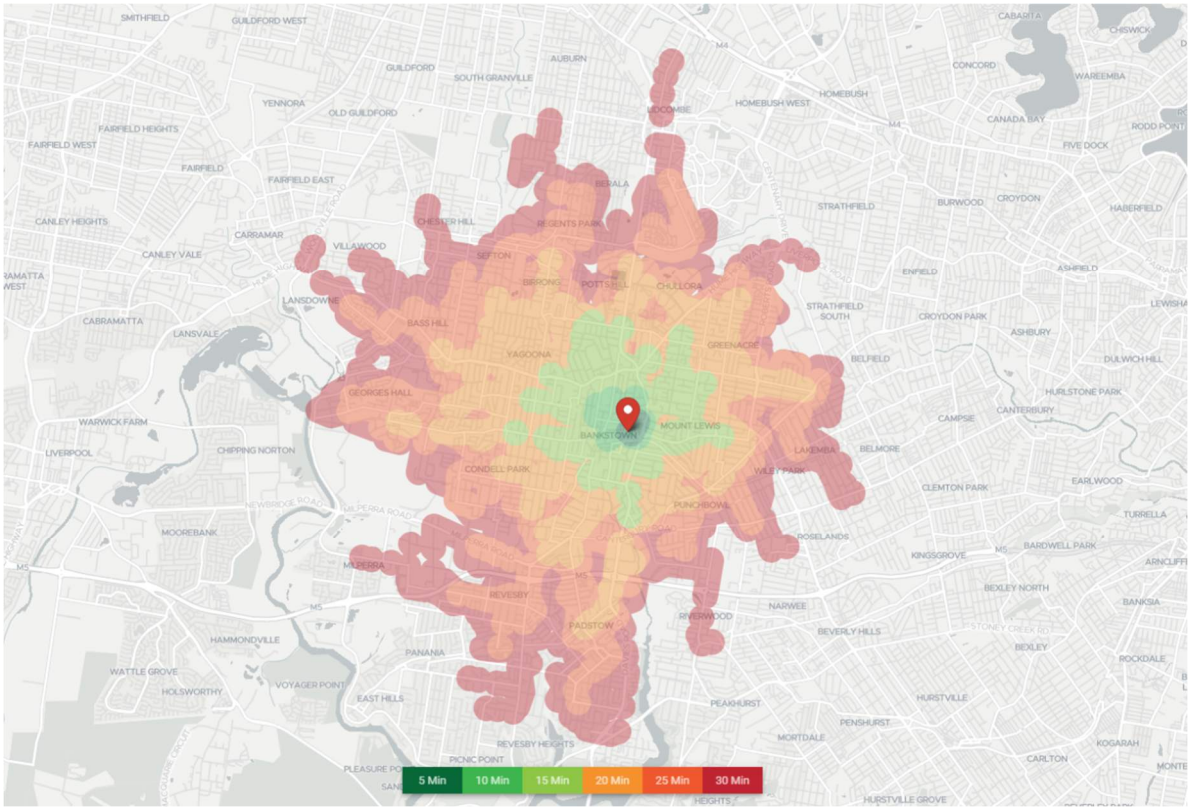


It is noted that the stops located along Jacob Street at Banktown Shopping Centre have been relocated since the time of writing the original report (July 2020). Further information in regarding this change is contained in Section 6.

2.4.2. Existing Catchment

The available public transport catchment withing 30 minutes of The Centre (at 5-minute intervals) is presented in Figure 2.12, indicating that the site is well service by public transport, with a significant population residing within the catchment.

Figure 2.12: Public Transport Catchment Area (from Subject Site)



2.4.3. Transit Score

The accessibility of the site via public transport can be measured by assessing the "Transit Score" of the suburb. The Transit Score of a suburb measures how well a location is served by the public transit based on the distance and type of nearby transit lines.

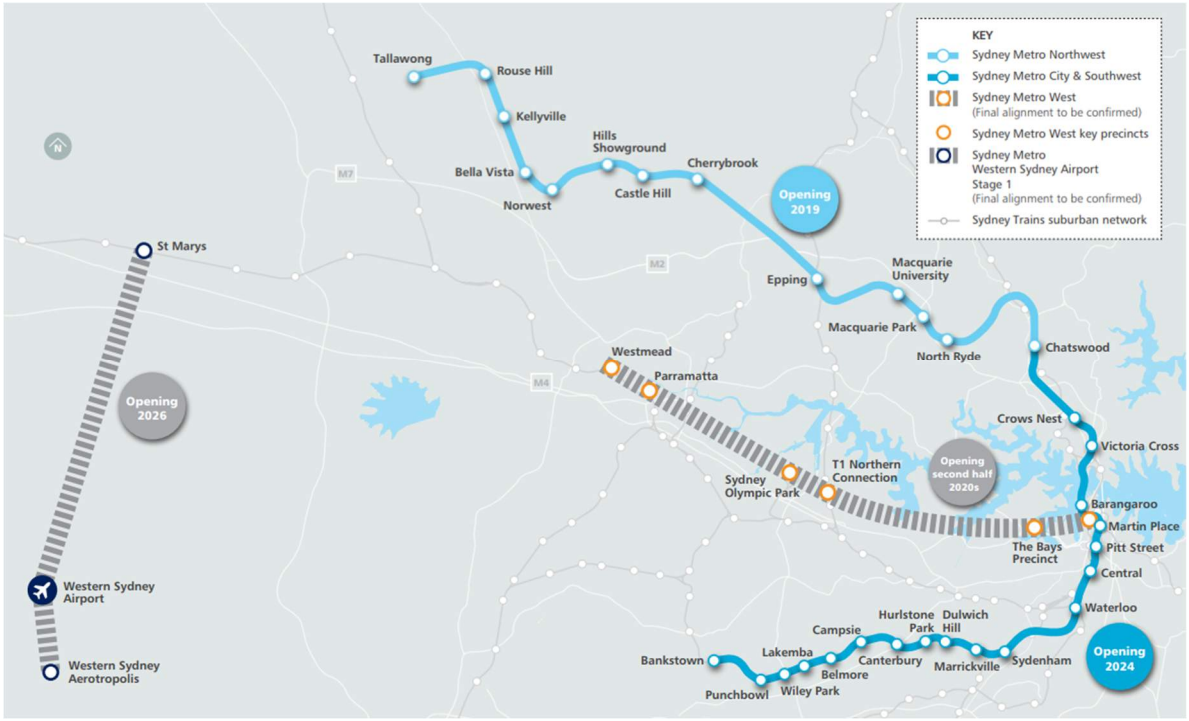
A review of the applicable transit score (hhtps://www.walkscore.com/), which provides transit scores for the United States America, Canada, and Australia, for the subject site indicates a score of 89 or "Excellent Transit'. The scope suggests that 'transit is convenient for most trips.'

2.4.4. Future Transport Network

The Sydney Metro Line Conversion comprises four separate upgrades to the rail service within the Sydney region. The City & Southwest line conversion plans an upgrade of the rail line between Bankstown and the City (see Figure 2.13) and is planned to be delivered in 2024. This upgrade involves converting the Bankstown line to a standalone metro system.

These upgrades are expected to improve the capacity of the services and the frequency of services to every 4 minutes in the peak and every 10 minutes in the off peak with ultimate capacity boasting 2-minute headways. This will greatly improve the accessibility of Bankstown to Sydney and the train stations in between.

Figure 2.13: Sydney Metro Line Conversion Map (adapted from Sydney Metro)



2.5. Car Parking

The Bankstown Shopping Centre currently accommodates 3,283 on-site car spaces located throughout the Centre. This car parking is currently provided in a mixture of at-grade, multideck and basement car parks, as shown in Figure 2.14.

Car parking surveys undertaken on Thursday 7th and Saturday 9th March 2019 indicate that the existing demands for on-site car parking are high, with peak demands recorded just below the available capacity. Specifically, the following peak demands were recorded:

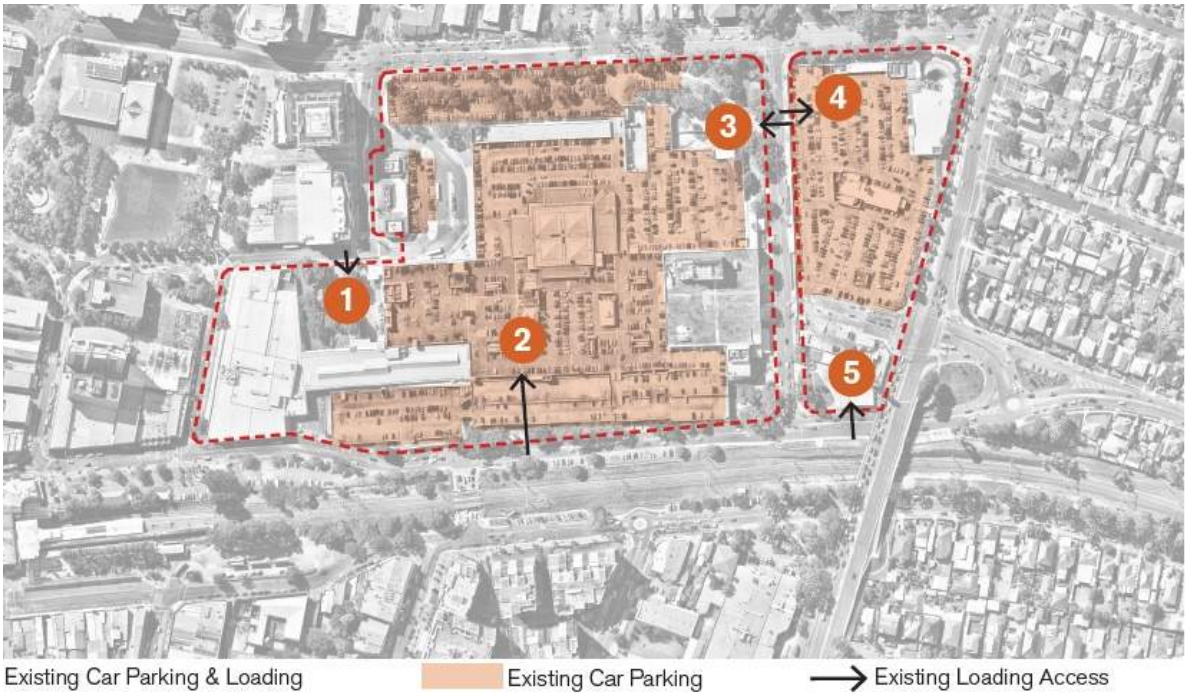
- Thursday: 3,188 occupied car spaces (3.9 car spaces/100sqm)
- Saturday: 3,086 car spaces on a Saturday (3.8 car spaces/100sqm)[3].

For a land use which is comprised principally of retail floor area, the recording of peak parking demands on a Thursday that are higher than those on a Saturday (the typical peak trading day) is highly unusual and suggests that a significant proportion of the available car parking supply is occupied by non-retail customers or associated staff.

Further discussion regarding the existing car parking demands, and how they can be expected to alter in the future, is presented in Section 7 of this report.

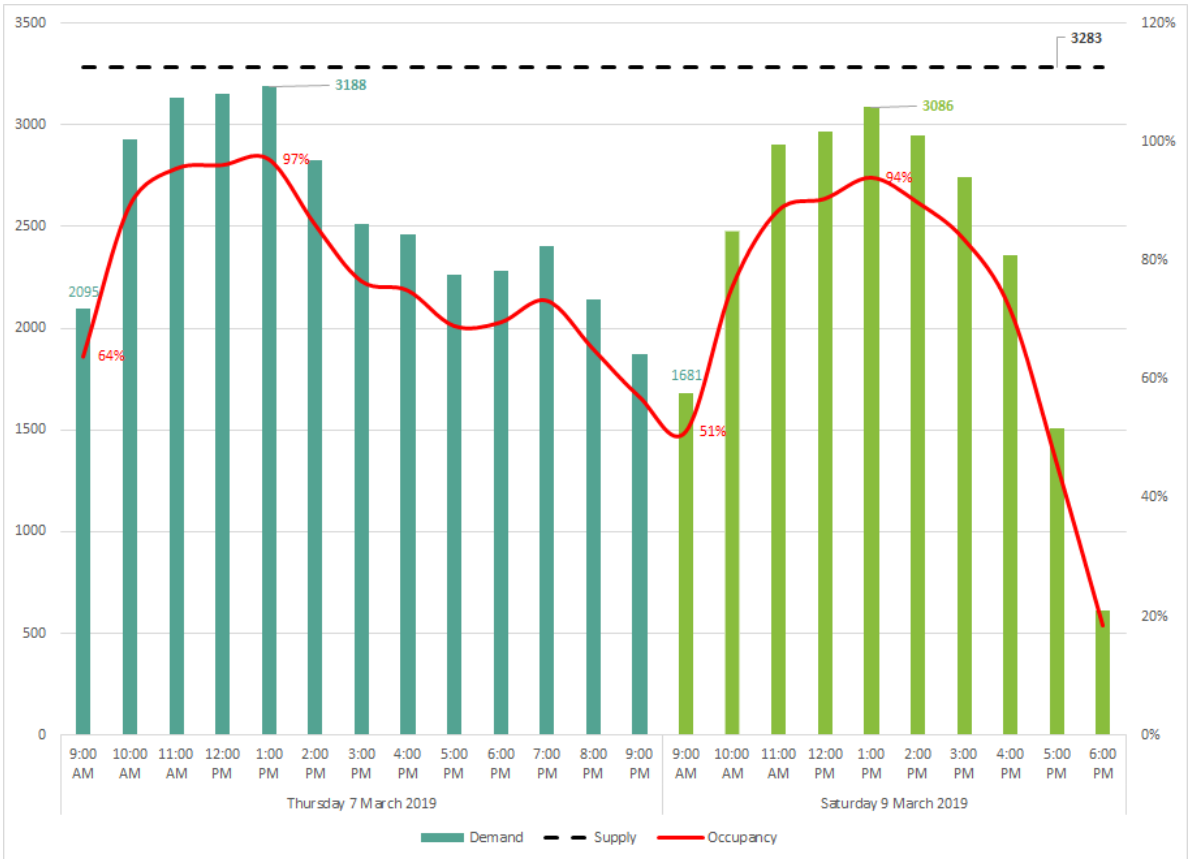
[3] Assuming existing retail floor area of approximately 81,600sqm.

Figure 2.14: Car Parking Supply and Demand (surveyed March 2019)



Source: FJMT Urban Design Statement for Planning Proposal

Figure 2.15: Car Parking Supply and Demand (surveyed March 2019)



2.6. Relevant Documents

2.6.1. Bankstown Complete Streets

In 2019, the Bankstown Complete Streets CBD Transport & Place Plan ('Complete Streets') was adopted by Canterbury Bankstown Council.

It is described as providing *"a holistic city design and transport framework to provide the vision, strategies and concepts for movement systems in the Bankstown CBD"* to *"ensure that as the CBD develops, priority is given towards a more liveable, safer and more attractive public domain that supports all modes of transport"*. It *"provides this vision, supported by a Master Plan with street typologies and concept designs to improve pedestrian safety and amenity."*

Key recommendations of Complete Streets are reproduced in Figure 2.15 and include the prioritisation of pedestrian, improved streetscapes and bus services, the creation of a ring road and the provision of 'smart parking' and not more parking.

It is noted that whilst Complete Streets includes concept designs for the design of CBD streets including those adjacent Bankstown Central, it clarifies that *"these concepts are based on high level base information and are indicative only in their resolution"* and that *"detailed site survey and analysis will be applicable to each to take the concepts to the next level of design.*"

Stantec has been advised that although Complete Streets has been adopted by Council, it does not have the same statutory weight as the Bankstown Local Environmental Plan or the Bankstown Development Control Plan. The document can be used by Council to help guide future aspirations and inform development decisions, including Council's master planning work for the CBD.

However, the document is not founded on formal negotiations with key landowners and private stakeholders in the CBD in terms of land dedication or purchase, which will be needed to realise the ultimate outcomes of the plan. As such, there is a need for flexibility in the application of policies within Complete Streets by Council, during the assessment of future development proposals within Bankstown CBD. It should also be noted that Vicinity Centres formally objected to components of this Plan via submission during its public exhibition.

Despite Vicinity's position, this development proposal has broadly been designed with regard to the Complete Streets Plan and has sought to balance the key themes of the Plan with the commercial realities of future development at the site.

Further detail regarding the recommendations of Complete Streets is included at Appendix A.

Figure 2.16: Key Recommendations of Complete Streets

2.6.2. Sydenham to Bankstown Urban Renewal Corridor Strategy

The Sydenham to Bankstown Urban Renewal Corridor Strategy is a document that seeks to plan and manage the population and employment growth throughout the Sydenham to Bankstown Corridor largely stemming from the Sydney Metro major infrastructure investment.

The strategy revises population, housing and economic forecasts and addresses key infrastructure to implemented to support these forecasts. As it relates to Bankstown the Strategy includes suggestions of improved bus network, relocation of and improvement to the Jacobs Street bus interchange.

2.6.3. Greater Sydney Region Plan – A Metropolis of Three Cities

The Greater Sydney Region Plan – A Metropolis of Three Cities (the Plan) was released by the Greater Sydney Commission in March 2018.

The Plan outlines the *"vision of three cities where most residents live within 30 minutes of their jobs, education and health facilities, services and great places"* and aims to meet the needs of a growing population. The Plan seeks to concentrate the development of Sydney into a metropolis of three distinct and interconnected cities; the 'Western Parkland City', the 'Central River City', the 'Eastern Harbour City'.

Bankstown is situated within the 'Central River City' and is defined as a Strategic Centre within the Plan. Strategic Centres are nominated as places for high levels of private sector investment, increased job growth, accessible by all via public transport, and supported by strong walking and cycling networks.

2.7. Summary

The site, which is comprised of mostly retail land use, is well connected to the wider region through an interconnected road network which also provides excellent walking facilities. The site enjoys proximate, frequent public transport network via both bus from the Jacob's Street Interchange and train from Bankstown Station. Committed and proposed infrastructure projects such as the Sydney Metro and the Stacey Street upgrade respectively will further improve accessibility of the Bankstown CBD.

3. TRIP GENERATION

03

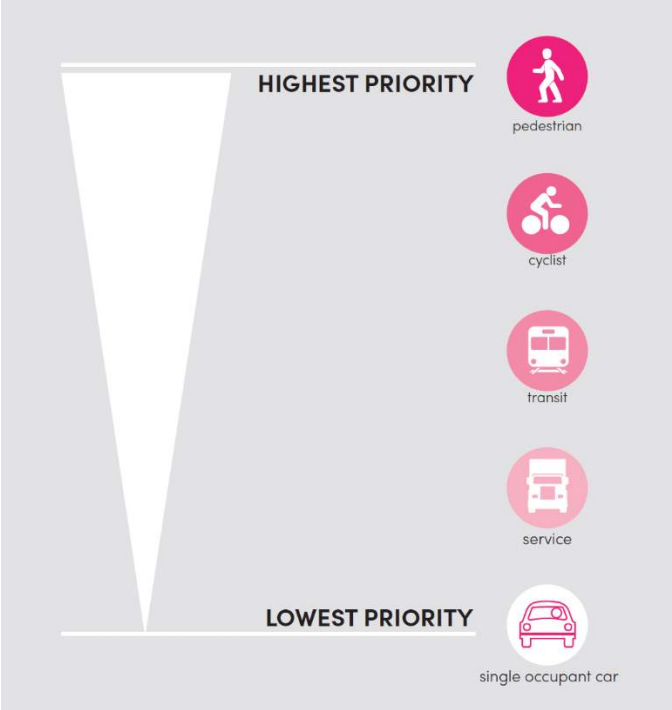
3.1. Preamble

The Planning Proposal / concept masterplan has been designed with regard to a modal hierarchy that:

1. Prioritises walking, cycling and public transport.
2. Recognises the important role that loading plays in facilitating land use (subject to it not compromising the prioritisation of the modes above).
3. Seeks to limit the provision of car parking (as far as commercially practicable) as a proactive means to reduce traffic impacts.

This hierarchy is consistent with the approach adopted in Complete Streets, which references the hierarchy as shown in Figure 3.1. This hierarchy is also used as a structure for this report.

Figure 3.1: Complete Streets Modal Hierarchy



3.2. Assumed Mode Splits

For the purposes of the assessment contained in this report, mode splits for additional trips to/from the proposed commercial, residential and hotel land uses have been assumed.

The target mode splits have been assumed based on our experience on other projects but remain indicative only and for use only to estimate peak hour trips. For the traffic impact assessment presented later in this report, the vehicle trip generation estimate has also been sanity checked using a traditional 'traffic generation approach' (i.e. vehicle movements per car space by land use).

The assumed / target mode splits are shown in Figure 3.2. (The figure excludes targets for retail floor area and the childcare land use for reasons outlined later in this report).

Figure 3.2: Assumed Mode Splits

Clarification to TfNSW comment:

"The report assumes a high proportion of public transport usage for the proposed development. This should be compared with the current mode share data for the area."

ABS 2016 mode split data for Bankstown as both an origin and destination for work-based trips is summarised in Figure 3.3.

This data considers the Bankstown North (SA2) which includes Bankstown Central on its southern boundary and shows a preference for vehicles to travel to work from Bankstown and to get to work in Bankstown. This data shows a preference for the use of car (as driver) for travel to work in Bankstown (77%) as well as from Bankstown to work in other locations (65%).

Additionally, the mode share for all trips originating from households within Bankstown in 2019/2020, as reported by the Household Travel Survey, is shown in Figure 3.4. This shows that 50% of trips are taken by private vehicle, 23% by vehicle as a passenger, 9% by train, 5% by bus and 12% walked only.

The above datasets confirm a heavy reliance on the use of car for travel to/from Bankstown at present and therefore there is no disagreement that the mode share targets set out in the Bankstown Central Planning Proposal TIA will require a significant shift to more sustainable transport modes. However, we consider this significant mode share is appropriate, noting:

1. It is proposed to occur over a very long development duration i.e., 20 to 30 years.

2. It is consistent with State Government and Council objectives for the Bankstown CBD, which seek to reduce car reliance and increase the use of walking, cycling and public transport as the preferred modes of travel to/from the CBD.

3. It aligns with the significant investment that has already occurred and will continue to occur in Bankstown to improve active travel and public transport accessibility. These projects include, but are not limited to, the new Bankstown Metro station and Sydney Metro conversion of the Bankstown Railway line.

Figure 3.3: Journey to Work Mode Share (ABS Census Data, 2016)

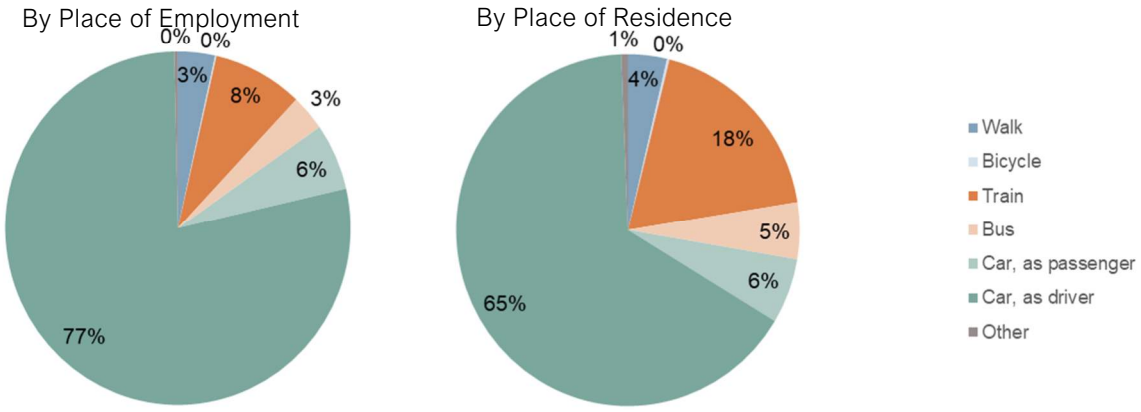
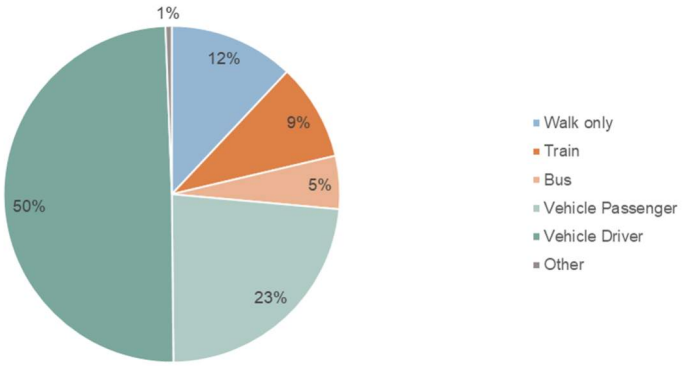


Figure 3.4: Household Mode Share (Household Travel Survey, 2019/2020)



Clarification to TfNSW comment:

"The current capacity of bus and rail services serving Bankstown area should also be analysed to understand if the current public transport has the capacity to accommodate the proposed future public transport usage as indicated in the report. This may require specific measures to improve such public transport usage proposed for the development as well as preparation of a Travel Demand Management Plan and Green Travel Plan."

An assessment of the capacity of the existing and/or future / upgraded public transport network to accommodate the increased patronage from the development of the Bankstown Central site is not considered necessary or reasonable for the following reasons:

1. The Planning Proposal seeks a relatively small change in the existing controls applicable to the site, including an increase in the approved overall FSR on the site from 3.5:1 to 3.92:1. As such, the Planning Proposal does not include a significant intensification of the site over what is permitted under the current controls.

2. The ability for the transport infrastructure currently being planned and constructed in the CBD would have already considered the likely uplift in patronage proposed for site including, but by no means limited to, the Bankstown Central site (particularly given the Planning Proposal only seeks a relatively small change in the approved FSR).

3. The Bankstown Central site represents only one of a number of strategic developments sites in the Bankstown CBD. Other major developments include, but are not limited to, the New Bankstown Hospital proposed by Health Infrastructure NSW. In our view, an assessment of the capacity of public transport system should not be the responsibility of a private development, but rather should be led by the State Government having regard to the full development of the CBD.

4. The Planning Proposal does not seek approval for development. In due course, further analysis and reporting will be provided for each development application lodged on the site. At this time, assessments of public transport can be completed as required. In addition, Green Travel Plans can be provided to further encourage active travel and public transport use.

It is further noted that this adopts a travel demand management approach for the planning of the site including the adoption of progressive car parking rates to actively reduce traffic generation and encourage other modes of transport. This approach is consistent with the Council's newly proposed adoption of maximum car parking rates in the CBD.

3.3. Estimated Trip Generation

The forecast trip generation of the land uses envisaged in the Planning Proposal is detailed in Table 3.1 and summarised in Figure 3.5.

Importantly, it is noted that this trip generation is presented for the weekday PM peak hour only, is based on the sources quoted and assumes a trip reduction factor of 20% to take into account multi-purpose trips (i.e., a residential trip to/from the retail within the site only). Other assumptions include:

- Additional trips to/from the retail floor area increase have been ignored. This approach is consistent with advice provided to Stantec by the proponent that any additional retail floor area will principally be provided to serve the diversification of land use on the site and in the CBD more broadly.
- Trip generation associated with the childcare land use has been ignored as enrolments will likely be comprised of those persons employed or living in Bankstown Central. As such, trips associated with the land uses are likely to be captured through the trip generation of other land uses. (Staff trips are also expected to be negligible in the context of the other land uses).

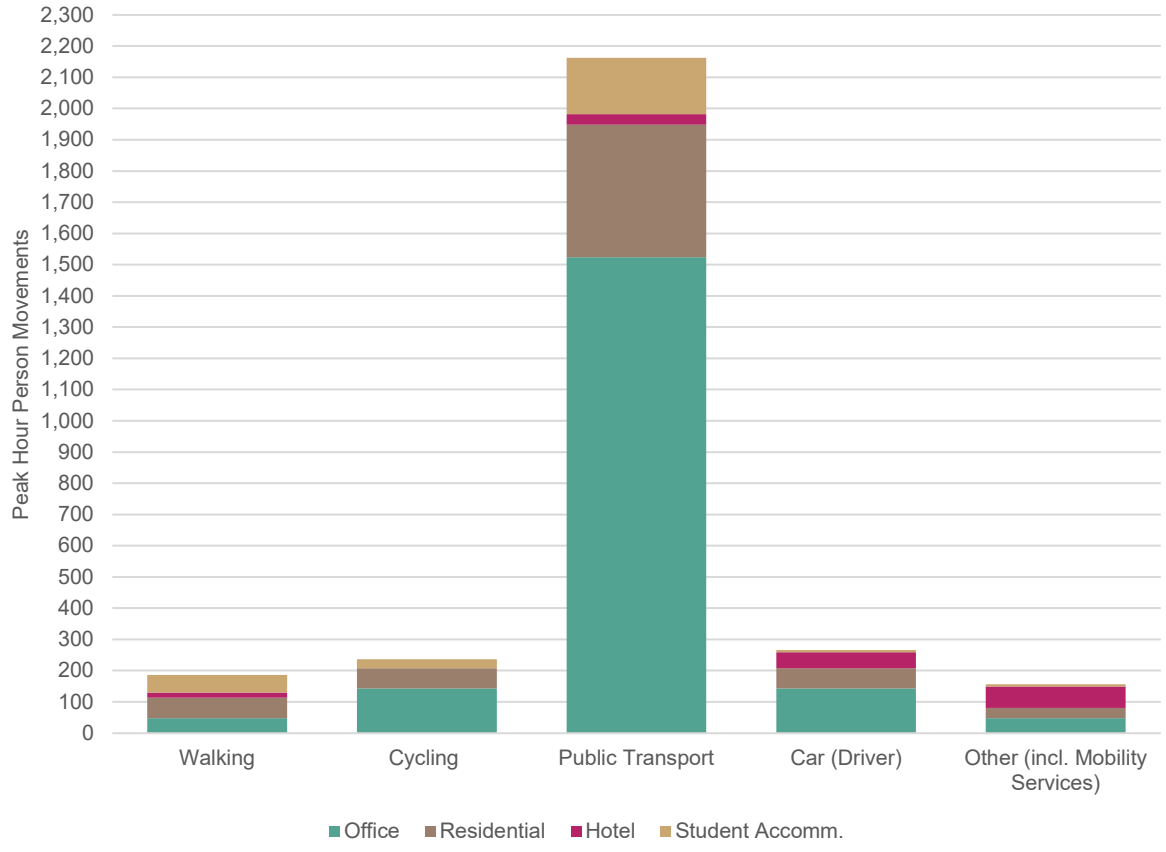
The assessment indicates that the land uses envisaged in the Planning Proposal could be expected to (ultimately) generate up to approximately 3,000 additional external person trips during the weekday PM peak hour, including approximately 2,150 person trips on public transport, 235 person trips by cycling, 185 person trips by walking, 265 person trips by car, and 155 person trips by other modes.

Table 3.1: Estimated Trip Generation during Weekday PM Peak Hour

Land Use	Size	PM Peak Hour Trip Generation Rate	PM Peak Hour Trip Generation Estimate	Including External Trips Reduction Factor (20%)
Commercial	119,117sqm GFA	2.0 trips / 100sqm [1]	2,382 trips	1,906 external trips
Residential	1,255 apartments	0.65 trips / apartment [2]	816 trips	653 external trips
Hotel & Serviced Apartment Rooms	528 rooms	0.40 trips / room [3]	211 trips	169 external trips
Student Accommodation	694 units	0.50 trips / unit [4]	347 trips	278 external trips
Total				3,005 external trips

[1] Average rate for inner metropolitan offices as sourced from RMS Technical Direction (TDT 2013/04a) and rounded up to nearest 0.5.
[2] Sourced from the RMS Technical Direction (August 2013).
[3] Assumed
[4] Assumed equal to 75% of residential rate

Figure 3.5: Estimated Trip Generation during Weekday PM Peak Hour



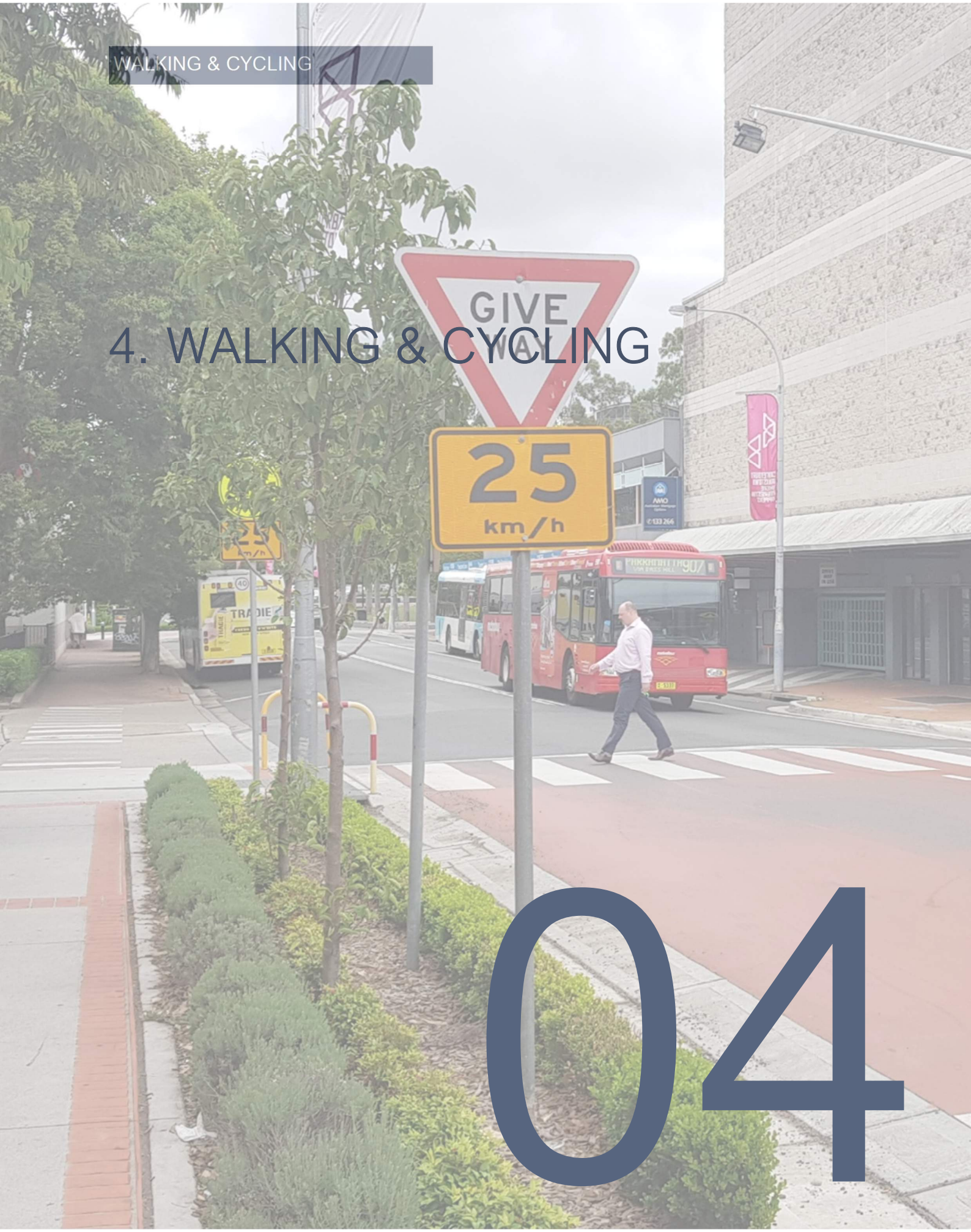
Clarification to TfNSW comment:

"The person-based trip estimation should include estimation of trips for AM peak. The trip generation estimation should include trips generated from all proposed development, including additional retail and childcare facilities."

The PM peak was assessed as it is the period in which the trip generation of the site will be highest. In other peaks, such as the AM peak hour peak or weekend midday peaks, the trip generation is likely to be approx. 80% of the PM peak. This approach has subsequently been supported to TfNSW with respect to the updated traffic modelling sought (i.e., the weekday PM peak hour has been accepted as the most critical period).

As outlined above, trip generation has not included other uses such as retail as they are considered ancillary land uses to the existing and future development of the site. For example, the additional retail is expected to principally draw visitation from people already living or working on the site or in the CBD precinct. If such additional trip generation were assumed, it would be appropriate to adopt a far larger proportion of trip containment within the development. This would offset the increase in trips and is therefore not considered necessary.

4. WALKING & CYCLING



04

4.1. Overview

As detailed in Section 3, the land uses envisaged in the Planning Proposal could be expected to (ultimately) generate up to approximately 2,550 walking trips (including public transport trips) and 260 person trips by cycling during a weekday PM peak hour. Accordingly, the prioritisation of walking and cycling (including to/from public transport services) will be crucial for the Bankstown CBD.

4.2. Connectivity Improvements

The Planning Proposal proposes the creation of new and improved pedestrian connections both internally and to the surrounding network.

This includes the establishment of an internal pedestrian network through the site which will improve pedestrian amenity and safety, improve permeability, and reduce pedestrian travel times and distances between various land uses to key transport destinations (such as Bankstown Station).

The major pedestrian and cycling links imbedded within the Planning Proposal is shown in Figure 4.1 and include:

- East-West connections:
  The Planning Proposal includes two primary east-west connections: a new link along the open space corridor, and one which is a continuation of The Mall running internal to the Centre.
  The two connections will ensure that pedestrians are able to traverse the site and connect easily with the surrounding land uses. These connections are expected to meet the desired intent of the Complete Streets recommendations.
  It is noted that whilst Complete Streets proposes a pedestrian only "open air" connection as the extension of The Mall, it is understood Vicinity Centres has confirmed to Council that in light of commercial realities that this cannot be provided due to the very significant impact to existing structure of the shopping centre as well as major lease holders in the shopping centre.
- North-South connections:
  The Planning Proposal includes the Jacobs Street Extension, which will improve pedestrian amenity, safety, and connectivity in the north-south direction. This will be complimented by the existing pedestrian linkage available along Lady Cutler Drive which the Planning Proposal seeks to enhance via traffic calming initiatives. Other internal connections within the site will also be provided.

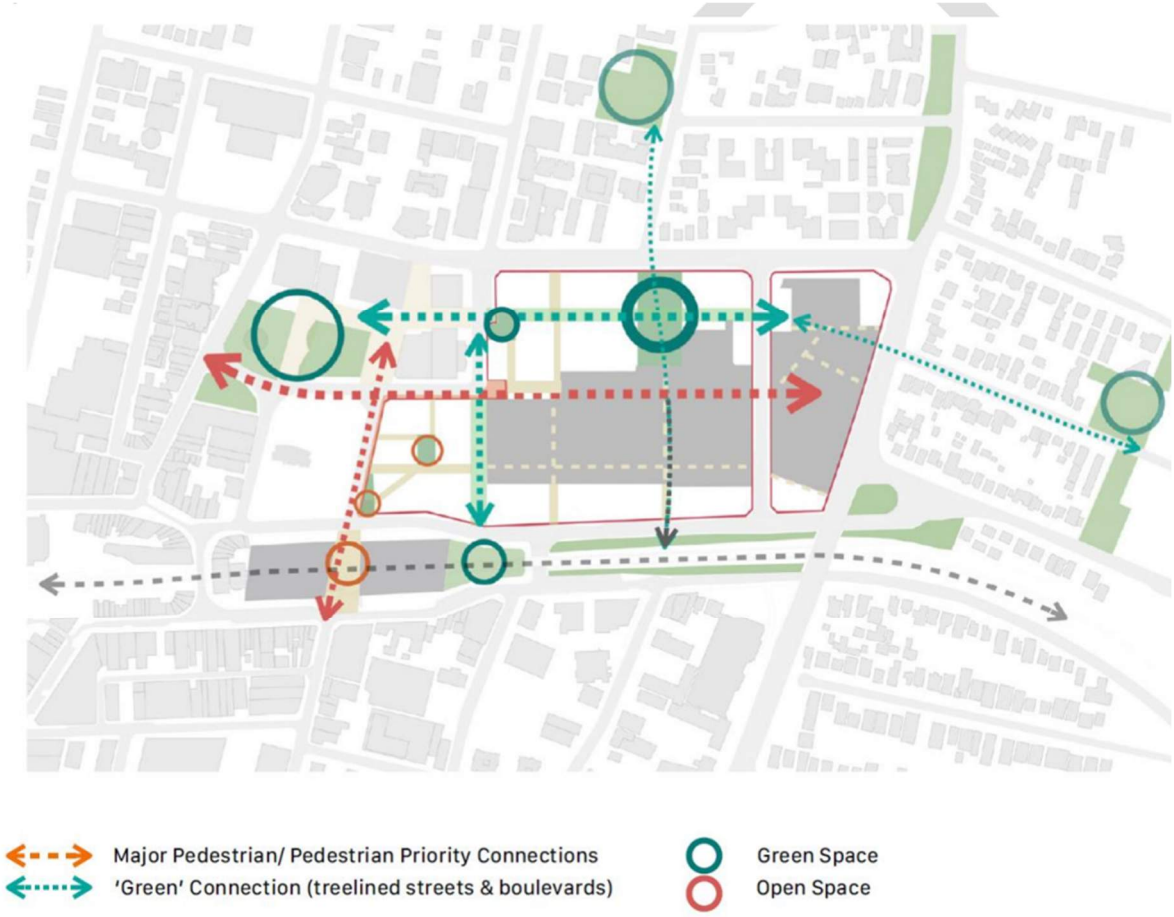
Overall, it is considered that the Planning Proposal has been designed in a manner which will improve pedestrian connectivity through the site in both the east-west and north-south directions. As detailed in the following section, the proposed Jacobs Street extension will also improve pedestrian movement (and public transport use) in the vicinity of the site.

Clarification to TfNSW comment:

"The proposal and associated traffic assessment should include any future proposal of Bankstown Metro Station and proposed active transport linkages specially on the northern side of the proposed metro station."

The consideration of the future Bankstown Metro Station and proposed active transport linkages have been outlined within Complete Streets. The Bankstown Central Planning Proposal has been prepared with regard to Complete Streets and includes (for example) new east-west and north-south active travel connections through the site. In this regard, we consider that the Planning Proposal has already had appropriate regard to the proposed changes in the CBD.

Figure 4.1: Proposed Pedestrian Connections through Site



Source: FJMT

4.3. Bicycle Parking & Associated Facilities

It is proposed that the level of bicycle parking provision will be generally at a high rate to reflect the objectives and aims of Complete Streets and to encourage a mode shift away from private vehicles.

At a minimum, it is expected that bicycle parking facilities should be provide for a 5%-10% target mode share for each land use (other than the hotel which is likely to have low bicycle parking needs) and the subsequent bicycle trip generation rates as specified in Section 3.3.

As a guide, this approach is likely to entail the provision of a minimum of approx. 0.5 bicycle spaces per 100sqm of office, which aligns with guidelines such as the Austroads 'Bicycle Parking Facilities: Updating the Austroads Guide to Traffic Management' and the NSW Government 'Planning Guidelines for Walking and Cycling'.[4]

[4] It is noted that this bicycle parking provision was at a rate of 0.75 bicycle spaces per 100sqm in the Mixed Use Development, this is in excess of the guidance provided here.

4.4. Summary

This proposal seeks to promote pedestrian and cycling modes to/from the Centre and the Bankstown CBD through the provision of public open space, improved pedestrian connections in all directions and the provision of bicycle parking consistent with other Sydney based developments. These improvements will encourage the use of sustainable modes of transport and discourage the reliance on private vehicles.

5. PUBLIC TRANSPORT

05

5.1. Overview

To deliver the land use intensification envisaged in the Planning Proposal (as well as for the broader Bankstown area as proposed by various local and State government policies), a substantial mode shift increase to public transport will be required.

The strategy for bus network improvement in the CBD has been informed by the public transport master planning documented in '*Complete Streets*'. This document outlines the overall objective to ***"simplify bus routes and better integrate station and layover space".*** Complete Streets seeks to improve the current bus layover arrangements to increase the efficiency of space, reduce the number of bus kilometres through the CBD, minimise the number of pedestrian conflicts and the negative affect on pedestrian desire lines.

5.2. Bus Network Improvements

5.2.1. Jacobs Street Extension

The Planning Proposal seeks to improve public transport and land use integration via the creation of a new street through the site as an extension to Jacobs Street (running from The Mall to North Terrace).

This new street is proposed as a 'bus only transit street' which together with other road network changes including the conversion of North Terrace to two-way to the east of Fetherstone Street, allows bus services to be moved off Fetherstone Street, The Appian Way and The Mall and thereby allows public realm improvements on those streets to prioritise pedestrian movements through the CBD.

5.2.2. On-street Bus Stops vs Off-street Bus Station

The configuration of the extension as envisaged under the Planning Proposal is to be designed as a 'bus only transit street' which facilitates through movement of buses.

This arrangement differs from the vision in Complete Streets which identifies a "potential new bus station" on the corner of The Appian Way and North Terrace which is accessed from the Jacob Street extension. It is understood that the rationale for the provision of an off-street bus station within the CBD was driven by two requirements of the existing bus network operating through Bankstown:

1. The need to provide layover bays in the CBD; and
2. The need to turn around terminating bus services within the CBD.

Despite these two requirements being valid at the time of preparing Complete Streets, there have been ongoing discussions between the Proponent (Vicinity Centres) and Transport for NSW (TfNSW) over the past two years to explore other options and locations for bus infrastructure within the Bankstown CBD. These options have included the extension of Jacobs Street and its dedication for bus movements, bus stops, and layovers only in the Jacobs Street extension road reserve. No other use of the Bankstown Central site/land is to be used for bus infrastructure (stops or layover).

In our view, the options proposed by the Proponent and consistent with TfNSW's Guidelines for Planning of Bus Layover Parking (Sept 2018) which states the following regarding the location of layover bays:

"The location of bus layover should support productive places. To this end locating layover outside of centres where compact form and walkability are key features should be considered. Where layover is located within a centre it should be located away from streets with high levels of active frontages and

areas of pedestrian activity. Within centres options to minimise the footprint of the layover should be thoroughly investigated"

In this context and noting that Complete Streets recognises that **"bus layover (is an) inefficient use of land",** the provision of a bus station within the CBD – and more notably on the Bankstown Central site – is considered unnecessary. Rather, the adoption of a more traditional on-street bus stop arrangement is considered preferable for the long-term planning of the CBD given:

1. It supports the provision of a productive CBD by avoiding the inefficient use of land.
2. It improves bus operating travel times by avoiding deviations off the road network.
3. It places bus services in the public domain where buses are visible (not hidden within a station) and therefore promotes public transport use.
4. It improves the experience for users of the buses by allowing customers to wait in weather protected but open-air areas, with high levels of amenity and security provided from adjacent land use. This arrangement will also allow users to disperse and spread out if they have longer wait times for buses, which is expected to be increasingly important for 'social distancing'.
5. It is more consistent with the Complete Streets objective of simplifying bus routes through the CBD (rather than the provision of an off-street bus station) and aligns with the arrangement envisaged within that document for Bankstown Plaza South as shown in Figure 5.1.
6. It retains suitable proximity to other transport services, e.g., Bankstown station.

Figure 5.1: On-street Bus Stops – Example from Complete Streets

Another example of an on-street bus stop arrangement in an activated CBD environment is Lake Street in Cairns. In this example, a single through lane is provided, for all vehicles, with kerbside bus stops on either side of the street. The constructed arrangements and a photomontage of the future development is shown in Figure 5.2.

Figure 5.2: On-street Bus Stops – Lake Street, Cairns

Source: https://www.barkdesign.com.au/public/cairns-cbd/

5.2.3. Conceptual Design

For the purposes of illustrating a potential design for the Jacobs Street extension which includes kerbside bus stops, a concept plan has been prepared by Stantec (then GTA). The concept design (Dwg. No. V186960-02-05 P1) is shown in Figure 5.3.

Importantly, it is noted that the concept plan has been informed by design principles outlined in Complete Streets. These principles are reproduced in Figure 5.4 and include:

- The extension has been designed as a transit street, with threshold treatments at either end.
- The indicative cross-section for the street includes 3m wide bus stops, 3.5m wide through lanes and footpath widths that vary from approximately 5m (narrowest adjacent stops) to 8m (adjacent the threshold treatments and central pedestrian crossing).

The concept allows for eight (8) bus bays (4 in either direction), which accords with advice provided by WSP (as discussed with TfNSW) regarding the long-term needs for the Bankstown CBD. However, the design could also accommodate additional bays if kerbside rather than indented bus bays were adopted.

Figure 5.3: Jacobs Street Extension Concept Design

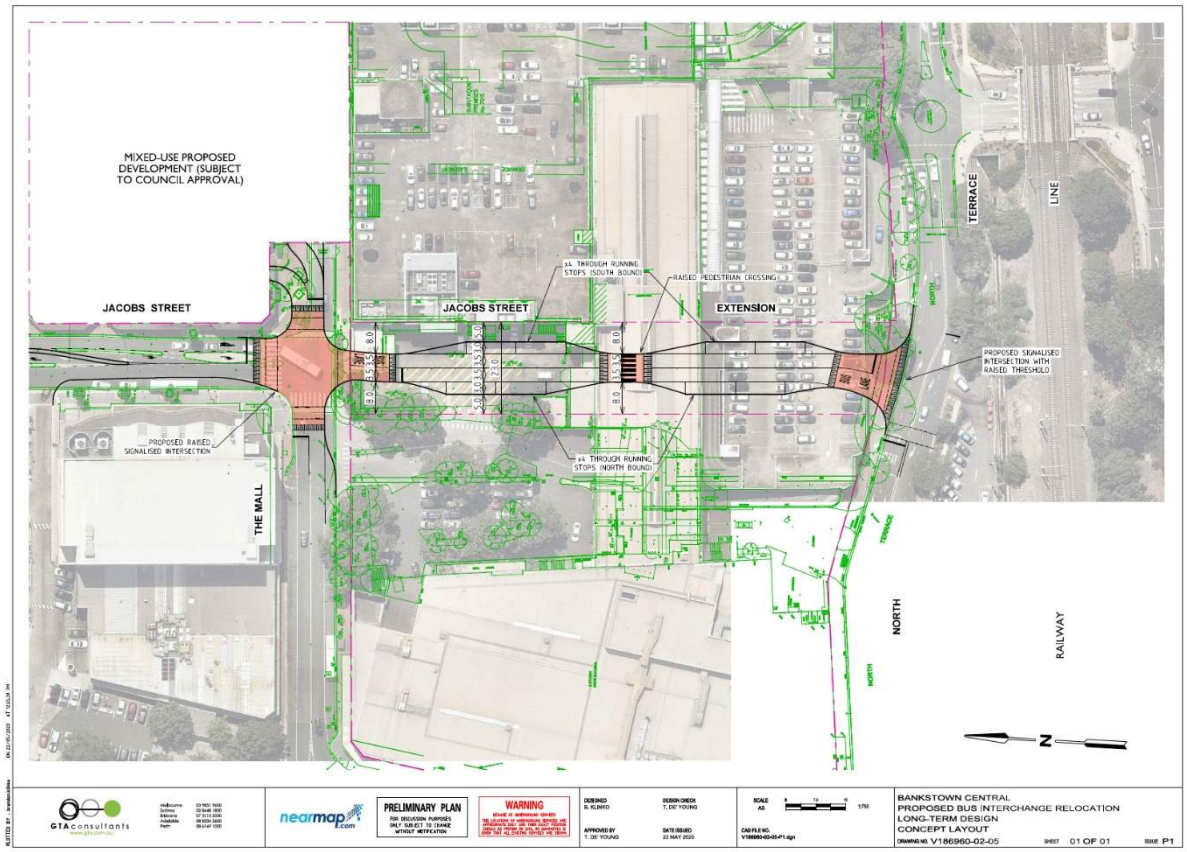
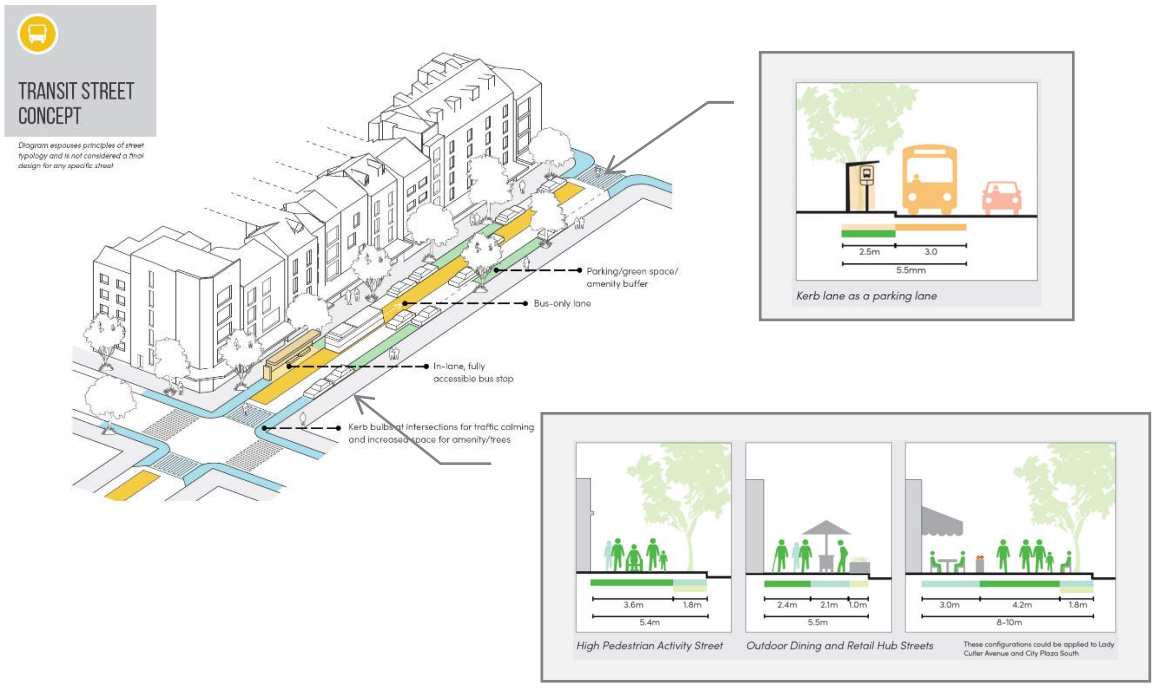


Figure 5.4: Jacobs Street Extension Concept Design – design principles from Complete Streets



5.2.4. Potential Staging of Bus Network Modifications

The construction of the Jacobs Street extension, together with other road network changes including the conversion of North Terrace to two-way to the east of Fetherstone Street, will provide a range of public transport and public realm benefits throughout the CBD. However, advice provided to Stantec by the proponent indicates that the road is not to be delivered in the first stage of the development of Bankstown Central.

To allow the staged development of the site and the realisation of the objectives of Complete Streets (and completion of its key priority projects as soon as possible), it will be necessary to also modify the bus network in a staged approach. This approach has been discussed at length with TfNSW and is supported 'in-principle'. The potential staging of the bus network changes under three stages is outlined in Figure 5.5 to Figure 5.7 and is summarised as follows:

- Stage 1 (in operation as of 2022) – This entailed the creation of a temporary through-site link through the Bankstown Central site, west of the ultimate Jacobs Street extension alignment, and the relocation of the bus stops to either this link (terminating pick-up stops) or The Mall or Jacobs Street (all other stops). Bus layover would also be provided at the top of the through site link, between the drop-off and pick-up stops.
- Stage 2 – This would entail the conversion of Fetherstone Street to two-way, and other related intersection modifications, to move buses off The Appian Way. Bus layover and terminating pick-up stops would remain on the through-site link. The principal benefit of this stage would be the ability to convert The Appian Way to a 'shared zone'.
- Stage 3 – This would entail the construction of the Jacobs Street extension, and other related intersection / road network modifications, as described in previous sections. This stage would be subject to modifications to the bus network to move terminating services. This stage would also enable Fetherstone Street to be converted to a 'shared zone'.

Figure 5.5: Bankstown CBD Bus Network Modifications – Stage 1

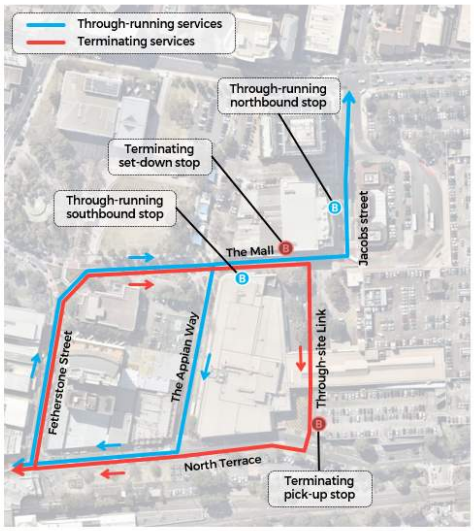
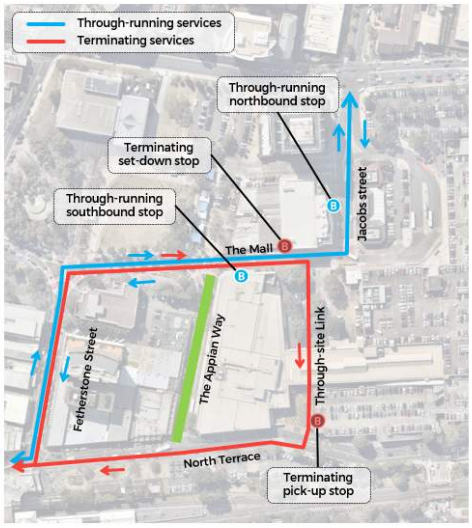


Figure 5.6: Bankstown CBD Bus Network Modifications – Stage 2

Stage 2



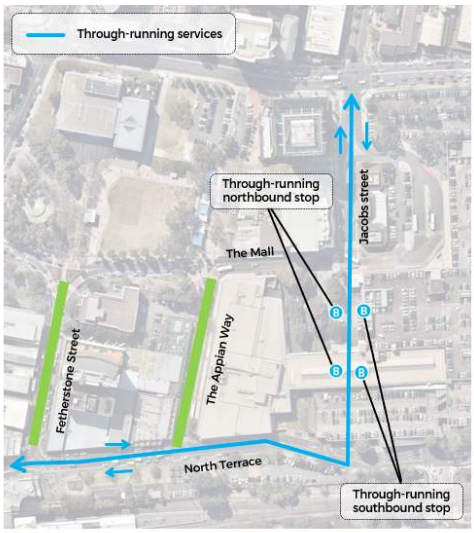
Changes:

1. Conversion of Fetherstone Street to two-way. [1]
2. Alterations to intersections at The Mall and North Terrace to facilitate two-way movements at Fetherstone Street [1]
3. Alteration to The Mall / The Appian Way intersection to allow westbound traffic movements [1]
4. Creation of 'shared zone' on The Appian Way [1]

[1] Consistent with Action Plan of Complete Streets.

Figure 5.7: Bankstown CBD Bus Network Modifications – Stage 3 (Ultimate Conditions)

Stage 3 / Ultimate



Changes:

1. Bus network alterations to remove bus layovers from the CBD and move terminating services north of the CBD
2. Conversion of North Terrace to two-way from The Appian Way and Fetherstone Street [1]
3. Extension of Jacobs Street, including signalisation of intersections of Jacobs Street at The Mall and North Terrace [1]
4. Relocation of all bus stops to Jacobs Street extension.
5. Creation of 'shared zone' on Fetherstone Street [1]

[1] Consistent with Action Plan of Complete Streets.

5.2.5. Timing of Bus Network Modifications

Stage 1 was completed in 2022. It is expected that Stage 2 could be completed by 2024 when the Metro station and new Western Sydney University campus are expected to be completed.

The timing of Stage 3 is likely to be subject to various factors including the timing of the completion of the CBD road network changes to alter bus movements and the development (and associated Council approvals) at Bankstown Central for the land affected by the extension of Jacobs Street.

5.3. Summary

The Planning Proposal will facilitate future enhancements to the bus network in the immediate vicinity of the site via the creation of a new transit street known as the Jacobs Street extension.

The new street will allow for on-street kerbside or indented bus bays with generous footpath widths to encourage public transport access. The proposed arrangement is preferable to an off-street bus station, as is envisaged in Complete Streets, as:

1. It supports the provision of a productive CBD by avoiding the inefficient use of land.
2. It improves bus operating travel times by avoiding deviations off the road network carrying the bus services.
3. It places bus services in the public domain where buses are visible (not hidden within a station) and therefore promotes public transport use.
4. It improves the experience for users of the buses by allowing persons to wait in weather protected but open-air areas, with high levels of amenity and security provided from adjacent land use. This arrangement will also allow users to disperse and spread out if they have longer wait times for buses, which is expected to be increasingly important for 'social distancing'.
5. It is more consistent with the Complete Streets objective of simplifying bus routes through the CBD (than provision of an off-street bus station) and aligns with the arrangement envisaged within that document for Bankstown Plaza South as shown in Figure 5.1.
6. It retains suitable proximity to other transport services e.g., Bankstown station.

The proposed arrangements have been discussed with TfNSW and the relocation of the bus layover and terminating services outside of the CBD is supported "in-principle" given it accords with their own design requirements. As the timing of road and bus network changes required to facilitate the ultimate design outcome cannot be dictated by Vicinity, whilst the extension itself will depend on the staging of development at Bankstown Central, the Planning Proposal envisages a staged approach to the bus network modifications in the CBD. This staging will enable the conversion of The Appian Way to a 'shared zone' prior to 2024 (when the Metro project and Western Sydney University campus are expected to be completed.

6. LOADING & LOGISTICS

06

6.1. Overview

The land use development envisaged within the Planning Proposal will require a loading and logistics strategy that optimises existing provisions, rather than tries to duplicate them. This will be particularly important given the quantum of on-street loading bays in the CBD is likely to reduce in the near future to prioritise walking and cycling.

6.2. Existing Loading Arrangements

Bankstown Central is currently principally serviced by a basement loading dock (referred to as 'the racetrack') which is accessed from North Terrace. This loading dock comprises 10 docks that allows access for vehicles up to 14.6m in length and another 10 parallel parking loading bays along the north and south aisle suitable for small goods vehicles (i.e., vans, utes, SRVs).

6.3. Improved Management Arrangements

The Planning Proposal proposes that most of the loading and logistics activity will continue to occur via the existing loading dock or a version of that arrangement to suit future conditions (i.e., at basement level).

This arrangement is proposed to locate loading activity away from major pedestrian links which ensures safety and amenity is maintained. These benefits are further reinforced through the consolidation of the loading activities in one central location where possible.

It is understood that in the future, as land use and loading activity increases, the loading dock will likely become managed to maximise the turnover of loading bays and minimise the probability of queueing for loading activities on-street. This form of management has been successfully implemented at numerous major Sydney CBD sites such as the Sydney Opera House, Barangaroo, and Westfield Sydney and can be used to also encourage loading activity during periods of low pedestrian demand on the abutting CBD network.

6.4. Summary

The existing loading dock which is comprised of 20 loading bays on the basement level is situated away from current and proposed major pedestrian and cyclist links.

The consolidation, where possible, of future loading activities to this site is considered appropriate to continue to minimise the impacts on other users and the existing loading provision adequately cater for future uses with the support loading dock management.

In addition, the required loading associated with the redevelopment of periphery sites (e.g. the Target site) will likely be provided via its own separate subterranean loading dock designed specifically for the mixed used land uses proposed in those areas.

7. CAR PARKING & TRAFFIC

07

7.1. Overview

The standard approach to car parking provision which involves the setting of minimum car parking rates for land uses has historical origins which follow a *'predict and provide'* approach.

The Austroads 'Guide to Traffic Management Part 11 (2017)' describes this approach as a technique which readily interprets a *'parking problem'* as an issue of *'inadequate supply'*. It goes on to note that this problematic ideology is underlined by the premise that:

- *"More parking is better,*
- *Every destination should satisfy its own parking needs (minimum ratios),*
- *Car parks should never fill,*
- *Parking should always be free or subsidised or incorporated into buildings costs."*

Over the past decade, the *'predict and provide'* approach has been steadily replaced by a range of travel demand management techniques which challenge historical travel behaviours and encourage mode change away (reversing the trend) from private motor vehicle travel, particularly during road network peak hours. This approach is aligned with the sustainable transport policies summarised in Section 2 of this report.

For the future development in Bankstown, it is considered appropriate – and indeed necessary – to adopt a reduced car parking rate approach to maximise travel by sustainable transport modes (walking, cycling and public transport) and minimise, as far as practical, travel by private motor vehicle. This will require a change to the 'status quo' in terms of the supply and management of car parking for both existing and future land uses.

Discussion regarding the recommended car parking provision for the future development anticipated in the Planning Proposal for Bankstown Central, and associated traffic impacts of that provision, is detailed below.

7.2. Car Parking Provision

7.2.1. Existing Conditions

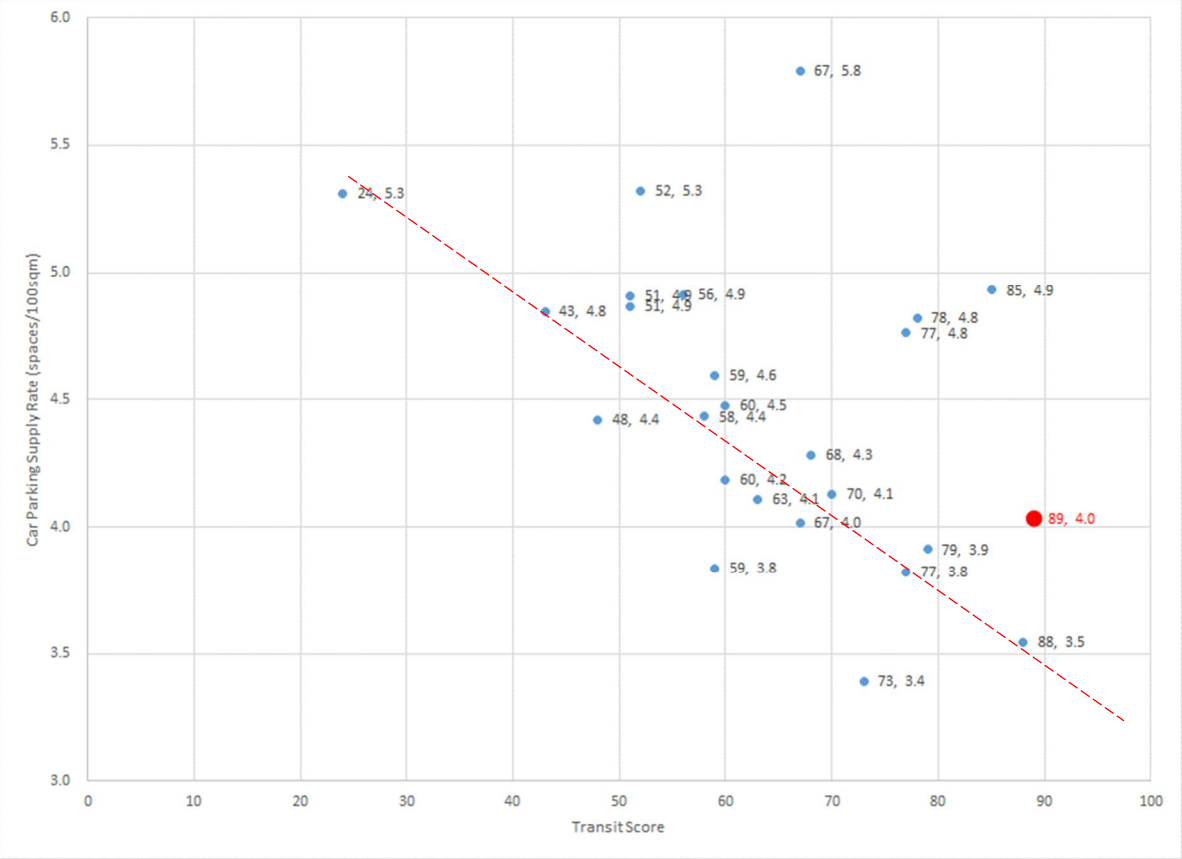
As outlined in Section 2 of this report, Bankstown Central currently provides a total of 3,283 car spaces, with surveys recording peak demands of 3,188 occupied car spaces on a Thursday (3.9 car spaces/100sqm) and 3,086 car spaces on a Saturday (3.8 car spaces/100sqm).

For a land use which is comprised principally of retail floor area, the recording of peak parking demands on a Thursday that are higher than those on a Saturday (the typical peak trading day) is highly unusual and suggests that a significant proportion of the available car parking supply is occupied by non-retail customers or associated staff. For Bankstown Central, this non-retail demand likely includes a significant proportion of commuter car parking and demand from other nearby land uses, as evidenced by:

1. The Saturday on-site parking demand at 9am is 400 car spaces lower than that recorded at the same time on the Thursday.
2. The on-site parking demands at 9am on Thursday and Saturday are 64% and 51% respectively. In comparison, reference to Google data suggests that the shopping centre itself has visitation levels equal to approximately 40% of the peak visitation levels at these times.

From a benchmarking perspective, the recorded parking demands are also higher than would normally be expected at a shopping centre within a CBD location which has excellent proximity to public transport services including train. For reference, the rates of car parking provision at major and super regional shopping centres in NSW, against the transit score for each, is presented in Figure 7.1 *(as sourced from the 2019 Property Council of Australia Shopping Centre Directory)*. In this figure, Bankstown Central is shown as the red dot (4.0 car spaces/100sqm with a transit score of 89), which sits above the trendline of the data. This figure also highlights other notable 'outliers' including Westfield Liverpool (4.9, 85), Erina Fair (4.8, 78), Westfield Hurstville (4.8, 77) and Roselands (5.8, 67).

Figure 7.1: Car Parking Rates vs Transit Score for Major & Super Regional NSW Shopping Centres



7.2.2. Conditions with Controlled Parking

In 2019, DA approval was granted by Council for the introduction of controlled parking at Bankstown Central.

It is understood that this approval was sought by the Centre's co-owners to better manage the car park given the extent of non-retail parking demands at present (discussed above) and the likelihood this would increase after the completion of the Metro project if the car park remained uncontrolled.

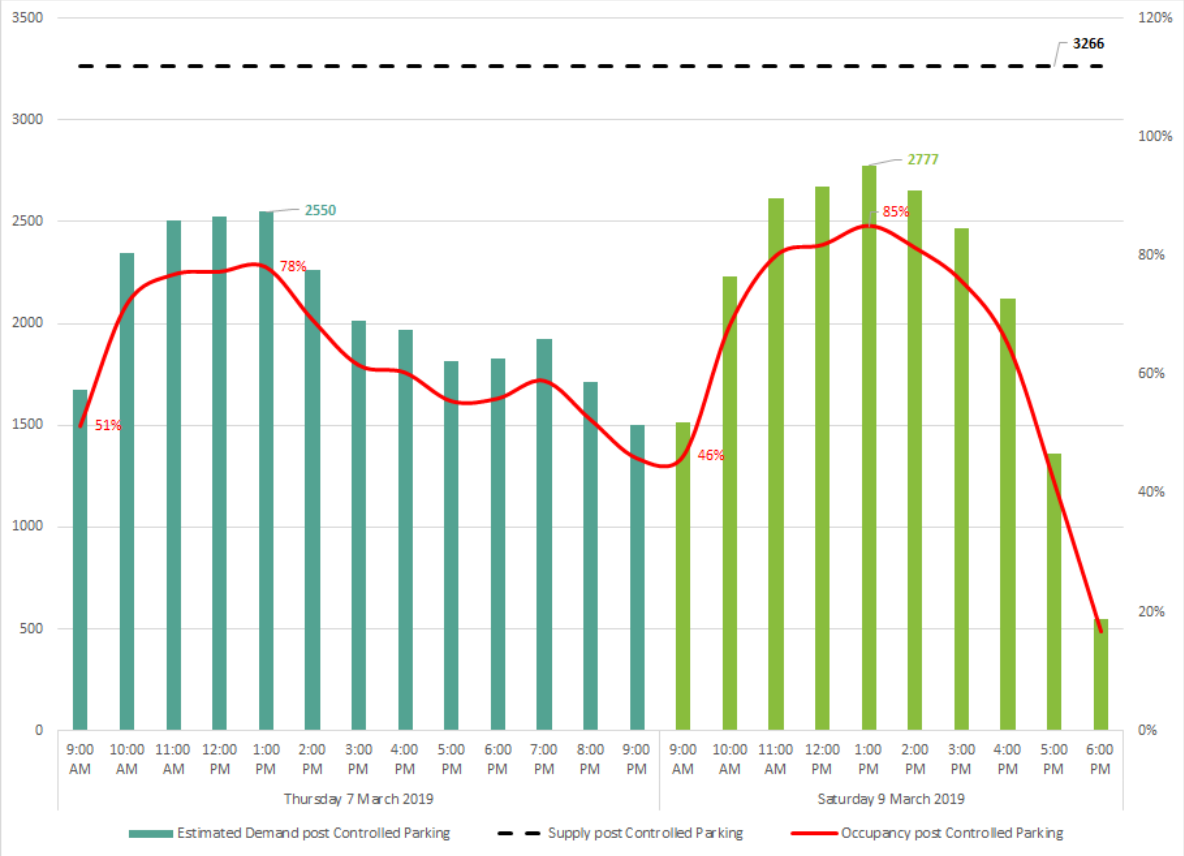
The DA was supported by a transport impact assessment report prepared by Colston Budd Rogers & Kafes (dated March 2019) which assessed the impact of the proposal from a car parking and traffic perspective. The CBRK report outlined that the introduction of controlled parking is likely to result in the loss of 17 car spaces which *"would not be noticeable given the significant benefits of the improvements in car park efficiency and utilisation of parking spaces".*

In our experience, the implementation of controlled parking at retail assets in CBD locations, particularly those near train stations, is likely to have additional benefits to those documented in the CBRK report. Most notably, one of the most important benefits of controlled parking is that it supresses long-term car parking that is not associated with the retail asset[5]. This is achieved through the pricing of the car parking which typically involves charging a high cost of car parking beyond (approximately) 4-hours duration, excluding retail staff parking.

A relevant case study which highlights this benefit is Castle Towers Shopping Centre in Castle Hill. In late 2017, controlled parking was implemented at this shopping centre to better manage the car park supply in advance of the opening of the Castle Hill Metro train station. Car parking demand surveys at the shopping centre prior to and after the introduction of the controlled parking (but prior to the opening of the train station) show that peak car parking demands reduced by approximately 15% i.e. from circa 5,000 occupied car spaces (circa 4.5 spaces/100sqm) to 4,200 car spaces (circa 3.8 spaces/100sqm).

For Bankstown Central, it is expected that the reduction would be higher than the 15% experienced at Castle Towers given the existence of commuter car parking at Bankstown. Assuming 20% and 10% parking demand suppressions on the Thursday and Saturday respectively, the anticipated car parking demands following the implemented of controlled parking at Bankstown Central is shown in Figure 7.2.

Figure 7.2: Anticipated Car Parking Demand at Bankstown Central with Controlled Parking



[5] These demands are typically supressed, not relocated, where surrounding areas are well protected by time restrictions which do not permit car parking overflow into surrounding residential streets or other commercial car parks.

Figure 7.2 indicates:

- The expected peak parking demand are:
  - Thursday: 2,558 occupied car spaces (3.1 car spaces/100sqm)
  - Saturday: 2,777 occupied car spaces (3.4 car spaces/100sqm)[6]
- The occupancy expected at 9am on Thursday and Saturday are 51% and 46% respectively. These occupancies are more consistent with, but still higher than, the Google visitation data for the shopping centre at these times (approximately 40%). This comparison suggests that the assumed 20% and 10% parking demand suppressions are potentially conservatively low and the parking demand anticipated post implementation of controlled parking could be lower than the estimates above.

7.2.3. Other Impacts on Car Parking Provision

It is understood that the full development of the site anticipated in the Planning Proposal is likely to occur over a period of 20-30 years.

Over this timeframe, numerous factors will likely significantly impact current travel patterns and thus the demand for and supply of car parking in the Bankstown CBD. Such factors will include (but undoubtedly not be limited to):

1. The diversification of land use development in the precinct.
2. The upcoming improvements to public transport services in Bankstown.
3. The high likelihood of continued technology disruptions in transport and car parking.
4. The likelihood of change in car parking policy / controls for Bankstown, as set by Council.

The factors are discussed below.

Land Use Diversification

As land use diversification occurs in the CBD, trip containment will increase, with a greater proportion of trips by people living, working and shopping in the area able to be completed by walking and cycling. (This is a key principle of Complete Streets).

In this future, the demand for car parking will also reduce, as has been seen in many other CBD areas of Sydney (and elsewhere) where increasingly progressive car parking rates have been adopted into the relevant planning controls.

For this reason, it is considered appropriate to allow car parking ranges for the land use anticipated in the Planning Proposal given that the demand for such parking is likely to be highest in early stages of development before declining over time.

Public Transport Improvements

As outlined in Section 2 of this report, the completion of the Sydney Metro (expected in 2024) will greatly improve the accessibility of Bankstown by increasing the capacity of the train services and the frequency of those services to every 4 minutes in the peak and every 10 minutes in the off peak.

[6] It is noted that the resultant recording of a higher peak demand on a Saturday would accord with the normal trend for shopping centres.

This improvement can be expected to reduce the need for car parking in the CBD for all land uses.

Technology Disruptions

Future technology disruption has the potential to fundamentally change existing transport systems by a magnitude that far exceeds the change that has been seen over recent decades.

The speed at which these changes are occurring, as well as the uncertainty around when this disruption will cause major shifts in user behaviour, is challenging to predict. Notwithstanding this challenge, the potential impact of the three technology disruptors (autonomous vehicles, zero emission vehicles, and mobility services) are described in Appendix B. This discussion concludes that the disruptors are likely to place downward pressure on long-term parking demands.

Car Parking Controls

As the Bankstown CBD develops, it is likely that the current DCP controls will alter to manage the supply of car parking more proactively. This commonly involves the setting of maximum car parking rates, rather than minimums.

The adoption of maximum car parking rates applies in many areas of metropolitan Sydney (St Leonards, Macquarie Park, Parramatta, etc) and is recommended within Complete Streets. Specifically, Complete Streets notes:

"Parking in the CBD generates traffic and providing more parking spaces in the CBD will result in more trips on the CBD road network. In line with what other city centres are doing, and due to excellent alternative transport services in Bankstown, it is recommended to introduce maximum parking caps for developments within 400m of the station to attract car-free households and/or those who will utilise bus and transport services"

In the event that maximum parking controls were introduced by Council into the DCP, it naturally follows that the supply of car parking would reduce.

7.2.4. Recommended Car Parking Rates

The recommended car parking rate (or range) for each land uses anticipated in the Planning Proposal is discussed below.

Retail

The adoption of a parking rate of **3.0 to 3.5 car spaces/100sqm** is considered appropriate for the retail floor area.

This range would accord with the rate expected following the implementation of the controlled car parking (3.4 car spaces/100sqm) whilst also reflecting that the additional retail floor area anticipated is likely to draw its trade by those persons working or residing in the additional commercial and residential dwellings proposed.

The adoption of a reduced rate for the retail floor area would also be consistent with the travel demand management approach detailed earlier, and the fact that public transport accessibility will improve in 2024 with the completion of the Sydney Metro.

The provision of parking in this range would also provide flexibility in car parks to provide more drop-off / pick-up parking should future technology disruptions (e.g. autonomous vehicles) warrant that increase or require an altered layout.

It is noted that the lower end of the rate range would be achieved not by reducing the existing retail parking provision but rather providing car parking for new retail development at a lower rate (so that the overall weighted average rate declines).

Commercial

The adoption of a parking rate of **0 to 0.5 car spaces/100sqm** is considered appropriate for the commercial floor area.

Stantec has previously assisted in a variety of other commercial developments throughout Sydney and has collated the approved parking rates for commercial use as shown in Table 7.1, these rates have been normalised to a provision per 100sqm of gross floor area for consistency.

Table 7.1: Benchmarking of Commercial / Office Car Parking Rate

Location	Commercial Car Parking Rate
Sydney CBD (based on proposed FSR for the site, calculated rate)	0.083 spaces per 100sqm (max.)
North Sydney CBD	0.25 spaces per 100sqm (max.)
St Leonards (Zone B3 and B4)	0.25 spaces per 100sqm (max.)
Chatswood CBD	0.5 spaces per 100sqm
Ryde (Macquarie Park Corridor)	1 space per 100sqm (max.)
Parramatta CBD – draft LEP	0.083 spaces per 100sqm (max.)

The adoption of car parking at a range from 0 to 0.5 spaces per 100sqm is consistent with the commercial / office land uses in other areas of Sydney and thus appropriate for application here.

Residential

The adoption of a parking rate of **0 to 1.0 car spaces/apartment** is considered appropriate for the residential land use.

The *Car Parking Requirement in SEPP 65* as published by NSW Government of Planning and Environment states that for land zones as B4 Mixed Use that "*the minimum car parking requirement for residents and visitors is set out in the Guide to Traffic Generating Developments, or the car parking requirement prescribed by the relevant council, whichever is less.".* Table 7.2 sets out a comparison between the car parking provision requirements from each policy.

Table 7.2: Comparison of Car Parking Requirements

Number of Bedrooms	DCP 2015 Car Parking Rate [1]		RMS Guide to Traffic Generating Development Rates [2]	
	Resident	Visitor	Resident	Visitor
1 bedroom	1-3 spaces per dwelling	1 space per 5 dwellings	0.4 spaces per dwelling	1 space per 7 dwellings
2 bedrooms			0.7 spaces per dwelling	
3+ bedrooms			1.2 spaces per dwelling	

[1] Rates represent dwellings defined as Residential Flat Building located in Zone B4.
[2] Rates represent dwellings defined as 'high density residential flat buildings' in 'metropolitan regional (CBD) centres
[3] Assuming apartment breakdown of 50% 1-br, 40% 2-br and 10% 3-br.

Table 7.2 shows that the RMS Guide to Traffic Generation Developments prescribes car parking provision at the lesser rate of 0.4 to 1.2 spaces per dwelling for residents. This accords with the adopted rate of 0 to 1.0 car spaces/apartment.

Adoption at a lower car parking rate will be offset by the generous provisions of bicycle parking and access to other modes, such as public transport and rideshare facilities.

Hotel & Serviced Apartment Rooms

It is expected that the hotel land use will provide minimal dedicated car parking and will instead rely on the sharing of car parking provided by other land uses (i.e. it will use retail car parking that is vacant during evening periods). In this context, the adoption of a parking rate of **0 to 0.2 car spaces/room** is considered appropriate for the hotel land use.

Student Accommodation

It is expected that minimal car parking would be required for the student accommodation given the site's proximity to universities (existing and proposed) and proximity to excellent public transport. For this report, a rate of **0.1 car spaces/apartment** is assumed.

Childcare

It is expected that enrolments to the childcare centre will be comprised majorly of people who work in Bankstown Central. As such, there will be negligible demand for parking above that is additional to what is captured by the other land uses. There will be a demand for staff car parking, however, this will also be negligible given the smaller magnitude of the childcare centre.

7.2.5. Anticipated Post-Development Parking Supply (approx.)

Based on the discussions within this chapter, an estimate of the future car parking provision required for the land uses envisaged in the Planning Proposal is outlined in Table 7.3.

This table generally assumes the midpoint of the car parking rate ranges identified above and indicates that approximately 4,790 car spaces would be required for the indicative development yield envisaged in the Planning Proposal. This would represent an increase of approximately 1,490 car spaces over the existing provision.

Table 7.3: Anticipated Post-Development Car Parking Rates and Supply

Land Use	Size	Approx. Rate	Approx. Provision
Retail	106,131 sqm GFA	3.25 spaces per 100sqm	3,449 spaces
Commercial	119,117sqm GFA	0.5 spaces per 100sqm	595 spaces
Residential	1,255 apartments	0.5 spaces per apartment	627 spaces
Hotel & Serviced Apartment Rooms	528 rooms	0.1 spaces per room	52 spaces
Student Accommodation	694 units	0.1 spaces per apartment	69 spaces
Total			*4,792 spaces*

It is noted that the car parking rates identified above are different to those adopted in the site-specific Development Control Plan (DCP) for the site. This is due to a variety of factors, including:

- The DCP rates represent maximum rates of supply, whereas the rates identified above represent the anticipated rates of demand. In reality, development on the site is likely to provide car parking at a rate less than the applicable maximum rates. By way of example, the recently approved Bankstown Exchange office development provided car parking at a rate of 0.75 car spaces per 100sqm, which was less than the maximum rate of 2 car spaces per 100sqm.
- The DCP rates represent the maximum rates applicable to the site for the short-term future (say 5 to potentially 10 years). In contrast, the rates identified above represent the average rates envisaged at the site following its full development over a 20 to 30 year horizon. It is reasonable to expect that car parking rates will significantly reduce over this period for the reasons outlined in Appendix B of this report). That is, it is likely that car parking may be provided at higher rates in early stages of development before reducing substantially in the longer term.

As this report assesses the anticipated transport impacts associated with the full development of the site, with more detailed reports to be provided for individual Development Applications associated with the staged development of the site, the use of the long-term car parking as outlined in this report is considered appropriate. (Notwithstanding this, it is acknowledged and accepted that the reports and likely traffic modelling at will accompany Development Applications will assess the car parking provisions proposed at that time)."

7.3. Vehicle Access Arrangements

The Planning Proposal envisages the provision of car parking to meet the abovementioned predicted demand in multi-deck car parks around the periphery of the site.

The vehicle accesses to this car parking are expected to be largely provided from North Terrace, Rickard Road and Stacey Street (in accordance with the intent of Complete Streets) albeit with some reliance on Jacobs Street, Lady Cutler Drive, and The Mall.

The vehicle access arrangements will be subject to approval at the Development Application stage.

Clarification to TfNSW comment:

The figure shows proposed access from Stacey Street. This access is very close to Stacey Street/Richard Street intersection and is a major safety concern. TfNSW does not agree with this access.

An access is also shown on the North Terrace which is located on the proposed extension of Jacobs Street and appears to be very close to the proposed new intersection at North Terrace/Jacobs Street (Extension).

It also appears from the figure that the west approach of Stacey Street/Wattle Street is not considered. Please clarify if this approach/access will be removed in future.

It is acknowledged that the figure included in the previous version of this report showed a vehicle access from Stacey Street at a location that is too close to the Rickard Road intersection. It is accepted that this vehicle access is unlikely to be feasible and therefore we acknowledge and accept TfNSW's objection to its provision.

The vehicle access shown along North Terrace near the proposed extension of Jacobs Street is an existing car park access point which is currently not proposed to change from its present arrangement. Notwithstanding this, it is accepted that this vehicle access may need to be reviewed, altered and/or closed as part of the Jacobs Street extension project. Further information regarding such changes will

be provided at the time that planning approval for the extension of Jacobs Street is sought. This level of detail is simply not able to be provided for the Planning Proposal.

Finally, it is noted that no change is currently proposed or envisaged at the Stacey Street / Wattle Street vehicle access. If such change is ever proposed as part of a development application on the site, it will be supported by appropriate traffic modelling.

Notwithstanding this, the figure has been removed from this report and a note has been included that confirms that all vehicle access arrangements will be subject to separate approval at the Development Application stage.

7.4. Traffic Assessment

7.4.1. Generation

A summary of the anticipated peak hour and daily traffic generation from the site, based on rates obtained from various sources, is presented in Table 7.4.

It is noted that the traffic generation assessment is based on 'per space' generation rather than a 'per 10sqm/dwelling' metric. This approach has been adopted given a travel demand management approach is to be adopted to limit car parking provision, to minimise traffic generation and encourage other modes of transport.

Table 7.4 indicates that the ultimate development of the Centre as proposed in the Planning Proposal could be expected to generate additional peak hour traffic volumes as follows:

- AM Peak Hour: +355 vehicle movements per hour
- PM Peak Hour: +355 vehicle movements per hour
- Saturday Lunchtime Peak Hour: +177 vehicle movements per hour

Table 7.4: Forecast Development Traffic Generation

Peak Hour	Land Use	Demand for Car Parking Spaces	Traffic Generation Rate	Traffic Generation
AM Peak Hour	Commercial	595	0.40 movements per space	238
	Residential	627	0.15 movements per space	94
	Hotel & Serviced Apartment Rooms	52	0.25 movements per room	13
	Student Accommodation	69	0.15 movements per room	10
	Total Movements			**355 movements**
PM Peak Hour	Commercial	593	0.35 movements per space	207
	Residential	486	0.12 movements per space	58
	Hotel & Serviced Apartment Rooms	66	1.0 movements per room	66
	Student Accommodation	160	0.15 movements per room	24
	Total Movements			**355 movements**

Peak Hour	Land Use	Demand for Car Parking Spaces	Traffic Generation Rate	Traffic Generation
Saturday Peak Hour	Commercial	593	0.0375 movements per space	22
	Residential	486	0.135 movements per space	65
	Hotel & Serviced Apartment Rooms	66	1.0 movements per room	66
	Student Accommodation	160	0.15 movements per room	24
	Total Movements			177 movements

7.4.2. Traffic Distribution

For the purposes of modelling, all additional generated traffic has been distributed in accordance with existing travel patterns observed within the road network.

Clarification to TfNSW comment:

"The trip generation estimation should be based on the trip rates included in RMS Guide to Traffic Generating Developments and Technical Direction Guide to Traffic Generating Developments – Updated Traffic Surveys and should include all proposed developments including retail. The report should also include a figure showing adopted trip distribution percentages for the proposed development."

The traffic generation rates have been based on data from the *RMS Guide to Traffic Generation Developments – Updated Traffic Surveys* and other empirical data that Stantec has collected for similar developments albeit has been modified to represent a "vehicle movements per car space" approach.

The adopted traffic generation rates are considered appropriate particularly given that a travel demand management approach is proposed which will include limitations to car parking provision to reduce car traffic and encourage other transport modes. In our opinion, it would be inappropriate to adopt higher traffic generation rates, which reflect historic conditions often associated with developments with higher car parking provision, less public transport accessibility or development density. Rather, we support the approach adopted, particularly given the development is not expected to be completed in full for another 20-30 years and it can be reasonably expected that reliance on car as a mode of travel will continue to reduce in that period.

If further information on traffic generation and distribution is required by TfNSW, we recommend that it is provided for each development application when detail regarding the location of the development and the provision of car parking is known. This information is not available now as the detailed planning of each development site is yet to be completed.

7.4.3. Traffic Impacts

Against existing volumes in the vicinity of the site, it considered that the additional traffic generated by the development yield envisaged in the Planning Proposal will have a negligible and acceptable impact on the operation and safety of the surrounding road network.

This conclusion aligns with the peer review of the previous version of this report completed by Bitzios Consulting on behalf of Council which concluded the following in their memo dated 20 October 2020: *"…we are generally satisfied that the development would likely have manageable road network impacts*

on the surrounding road network, and that the level of detail required to investigate specific mitigation measures to offset development impacts can and should be undertaken during subsequent application stages."

Notwithstanding this, for the purposes of presenting a robust traffic impact assessment, traffic modelling using the model prepared by GTA (now Stantec) in 2019 for Complete Streets was undertaken to test the additional impact of the added traffic demand of the envisaged land use.

This modelling was conducted within AIMSUN using the future year 2036 with Complete Streets transport infrastructure (referred to as "Future Base with Complete Streets"), with an alternate future year scenario also tested which included the development / traffic uplift of Bankstown Central (referred to a "Post Development with Complete Streets"). As outlined earlier, this future model includes an estimation of growth in the CBD, which would include the WSU site.

It is noted that this modelling was undertaken using the land use yields envisaged within the July 2020 TIA. As the changes in yield considered in 2022 are considered insignificant from a traffic impact point of view (+1 vehicle generated in the PM peak hour), the modelling has not been updated.

Key statistics are summarised as follows:

Network Statistics

General network statistics were extracted from the models and include the following:

- **Total Travelled Distance**: total number of kilometres travelled by all the vehicles that have crossed the network.
- **Total Travel Time**: total travel time experienced by all the vehicles that have crossed the network.
- **Average Speed**: average speed for all vehicles that have left the system. This is calculated using the mean journey speed for each vehicle.
- **Average Delay**: average time at standstill per vehicle per kilometre.
- **Vehicles Waiting to Enter**: number of vehicles that are waiting to enter the network.

The network statistics are aggregated across the entire modelled area for all trips within the model and are shown in Table 7.5 the PM peak period.

Table 7.5: Network Performance Results – PM Peak Volumes

Criteria	Future Base with Complete Streets	Post Development with Complete Streets	Difference
Total Vehicles in the network (2 hour demand) – (veh)	35,927	36,300	+373
Total Travelled Distance (VKT) – km	65,565	65,646	+80
Total Travel Time (VHT) – hours	3,468	3,610	+142
Travel Time (sec/km)	193	202	+8
Average Speed (km/h)	22.3	21.6	-0.68
Average Delay (sec/km)	133	141	+8

Criteria	Future Base with Complete Streets	Post Development with Complete Streets	Difference
Vehicle Waiting to Enter Network (veh)	718	1,028	+310
Vehicle Waiting to Enter Network (veh) – Bankstown Central Zones only	602	787	+185
Vehicle Waiting to Enter Network (veh) – All other zones	116 (0.32% of total vehicles in network)	241 (0.66% of total vehicle in network)	+125 (+0.34 of total vehicles in network)

The results indicate that minor increases are observed across the network statistics, which in consideration of the magnitude of development envisaged – and the timeframe of the assessment - is negligible and acceptable.

It is noted that whilst the modelling shows an increase in the number of vehicles waiting to enter the network (i.e., unreleased vehicles), the quantum for the network, excluding Bankstown Central zones, is very low and not inconsistent with other models for CBD locations.

It is further noted that the presence of vehicles waiting to enter the network is also not a sign of "failure" and would likely be reduced by one of the following:

1. The proposed intersection upgrades being investigated by TfNSW for Stacey Street.
2. The completion of other Bankstown Central vehicle access improvements (e.g., enhanced vehicle access arrangements onto Rickard Road) that would likely be pursued in the future as required for Development Applications.
3. The suppression or spreading of peak hour vehicle activity to/from Bankstown Central.

Intersection Level of Service

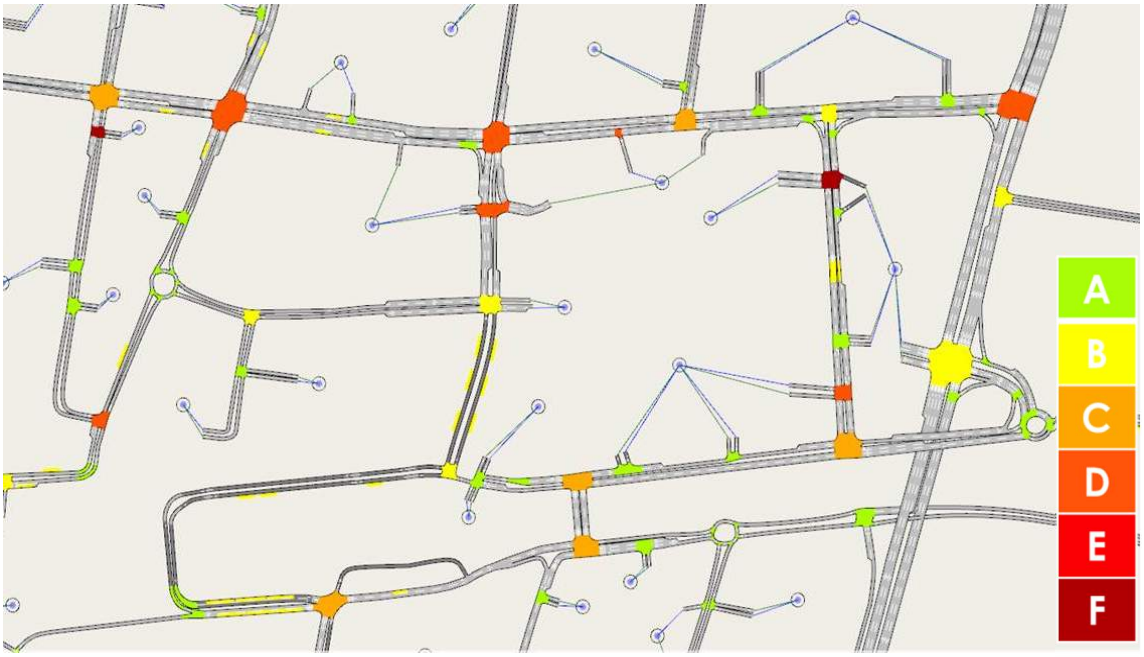
Intersection Level of Service (LOS) is a measure of the weighted average of approach queue delay experienced by vehicles, where a level of A denotes minimal delay and F denotes significant delay.

The results detailed in Figure 7.3 and Figure 7.4 show that the traffic generation associated with the development envisaged in the Planning Proposal will not have any significant impact on the operation of the surrounding road network. This includes intersections along North Terrace adjacent the site and the underpass between North and South Terrace.

Overall, the modelling statistics including the level of service comparisons indicate that the additional traffic generated by the indicative development yield is unlikely to have a notable impact on the operation of the road network. Moreover, it is noted that opportunities exist (e.g. via the potential introduction of broader parking restrictions) for Vicinity Centre, Council and/or TfNSW to improve the operation of the network. This sits outside the scope of this report.

Figure 7.3: Intersection Level of Service, Future Base with Complete Streets

Figure 7.4: Intersection Level of Service, Post Development with Complete Streets



Clarification to TfNSW comment:

It is acknowledged that concern was raised by TfNSW regarding the acceptability of the calibration and validation of the base model prepared for Complete Streets and used for the Planning Proposal in the above assessment.

In this regard, the following is noted:

- The model previously prepared by GTA (now Stantec) for Complete Streets was prepared to support the CBD masterplan which was ultimately endorsed by Council. We retain the view that it was appropriately calibrated and validated and "fit for purpose". Notwithstanding this, Stantec was engaged by Vicinity Centres to update the base model using more recent traffic data. This modelling update will be provided separately to TfNSW and Council.
- The completion of detailed traffic modelling would not normally be undertaken for a Planning Proposal. Rather, it would typically be completed only for Development Applications when more detail is known regarding development yields and timing. The modelling was completed in this instance solely due to the availability of the AIMSUN model and our view that it provides a more robust assessment that the additional traffic generated by the development is likely to be minor and acceptable.
- The acceptability of the traffic impacts associated with the Planning Proposal aligns with views outlined in the peer review of the previous version of this report completed by Bitzios Consulting on behalf of Council. This peer review concluded the following in their memo dated 20 October 2020: *"…we are generally satisfied that the development would likely have manageable road network impacts on the surrounding road network, and that the level of detail required to investigate specific mitigation measures to offset development impacts can and should be undertaken during subsequent application stages."*
- It is agreed that more detailed traffic modelling will need to be provided with subsequent development applications on the Bankstown Central site. In our experience, this approach is common practice, as limited traffic modelling is typically required or thus provided for Planning Proposals (particularly those representing a relatively minor FSR increase as is the case for Bankstown Central). The requirement for this additional modelling for future development applications has also been accepted in writing by Vicinity Centres and it is understood that this will be specifically required by Council in the approval of the Planning Proposal.
- The new traffic modelling currently being completed by Stantec using more recent traffic data shows results for the existing conditions that are very similar to the previous modelling. For example, the more recent modelling still shows there are locations of congestion in the CBD at present. Accordingly, the new modelling will not alter the travel demand management approach documented above that is proposed for the future development on Bankstown Central site. This approach includes the adoption of very low car parking rates for new land use, which also align with Council's rates, to proactively drive down the future traffic generation of the development, minimize traffic congestion and encourage use of public transport and active travel modes. Similarly, the use of the new model to undertake new post-development modelling (using the newly calibrated and validated existing conditions model) will not likely show materially different results than was previously assessed by Stantec using the old model. In our view, the anticipated net traffic generation increase of approximately +350 vehicle movements in the PM peak hour is likely to have a relatively modest impact on the operation of the CBD, irrespective of which model (old or new) is used to assess it.

- Advice provided to Stantec from Vicinity Centres indicates that the proponent is committed to working collaboratively with TfNSW and Council to assist the orderly planning for the CBD. This includes finding a suitable and mutually acceptable solution for the bus infrastructure as well as completing more modelling for subsequent development applications. In our professional view, this post-development modelling is better completed for the development applications (not this Planning Proposal) when development staging, land use intensity, and transport infrastructure is known. If this modelling is completed now, it runs the risk of being outdated very quickly.

Overall, we hold the view that the assessment and determination of the Planning Proposal should not be withheld until the post-development modelling is completed, particularly given this mode detailed traffic modelling will be completed in the future for development applications on the site. (It is again noted that this view is also shared by Bitzios Consulting in their peer review for Council).

7.5. Summary

With the adoption of the progressive car parking rates outlined in this report (as an approximate range), the traffic impacts of the indicative development yield envisaged in the Planning Proposal will be minor and acceptable. There are also opportunities for Vicinity Centres, Council and/or TfNSW to improve the operation of the network. These opportunities will be investigated in future Development Applications or the like.

8. CONCLUSION

08

CONCLUSION

Key conclusions drawn from this report include:

- This Planning Proposal seeks to promote pedestrian and cycling modes to/from the Centre and the Bankstown CBD through the provision of public open space, improved pedestrian connections in all directions and the provision of bicycle parking consistent with other Sydney based developments. These improvements will encourage the use of sustainable modes of transport and discourage the reliance on private vehicles.
- The Planning Proposal will facilitate future enhancements to the bus network in the immediate vicinity of the site via the creation of a new transit street known as the Jacobs Street extension. The new street will allow for on-street kerbside or indented bus bays with generous footpath widths to encourage public transport access. The proposed arrangement is preferable arrangement and supports a productive CBD, improves bus operating travel times, improves user experience, retains proximity and is consistent with Complete Streets objectives.
- The Planning Proposal proposes that most of the loading and logistics activity will continue to occur via the existing loading dock or a version of that arrangement to suit future conditions (i.e. at basement level). As land use and loading activity increases, the loading dock will likely become managed to maximise the turnover of loading bays.
- The proposed car parking provision is considered appropriate and consistent with the objectives of the DCP. This conclusion is based on a detailed assessment of car parking demand under future conditions. Approximately 4,790 car spaces would be required for the indicative development yield envisaged in the Planning Proposal. This would represent an increase of approximately 1,490 car spaces over the existing provision.
- The vehicle accesses to this car parking are expected to be largely provided from North Terrace, Rickard Road and Stacey Street (in accordance with the intent of Complete Streets) albeit with some reliance on Jacobs Street, Lady Cutler Drive and The Mall.
- The traffic modelling presented in this report (AIMSUN modelling) includes level of service results for intersections which indicate that the additional traffic generated by the indicative development yield is unlikely to have a notable impact on the operation of the road network in the future. With the adoption of the progressive car parking rates outlined in this report (as an approximate range), the traffic impacts of the indicative development yield envisaged in the Planning Proposal will be minor and acceptable. There are also opportunities for Vicinity Centres, Council and/or TfNSW to improve the operation of the network. These opportunities will be investigated in future Development Applications or the like.

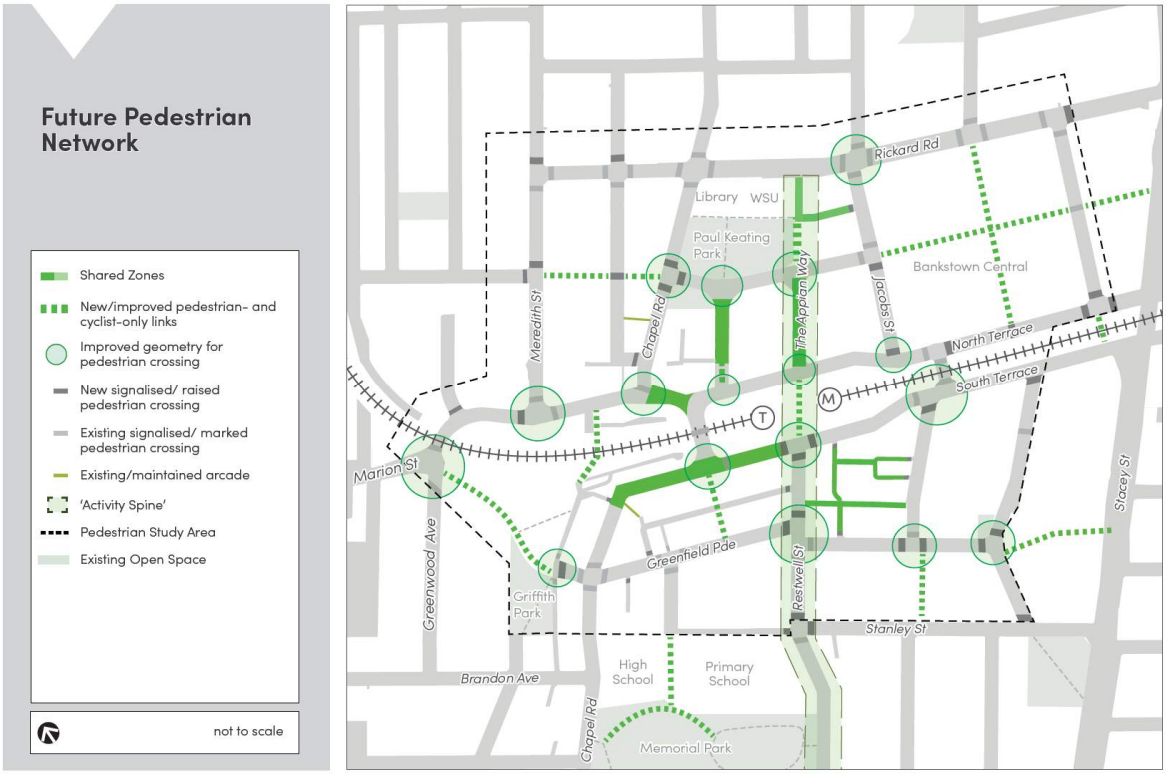
A. RECOMMENDATIONS OF COMPLETE STREETS

A

A.1. Pedestrian Network

Complete Streets proposes improved pedestrian geometry at the intersections of Rickard Road / Jacobs Street and North Terrace / Jacobs Street in the immediate vicinity of the site as well as new pedestrian crossings along North Terrace and Jacobs Street. New or improved pedestrian- and cyclist-only links are proposed internal to the site. Additionally, The Appian Way is proposed to become a shared zone and the priority north-south pedestrian route, as shown in Figure A.1.

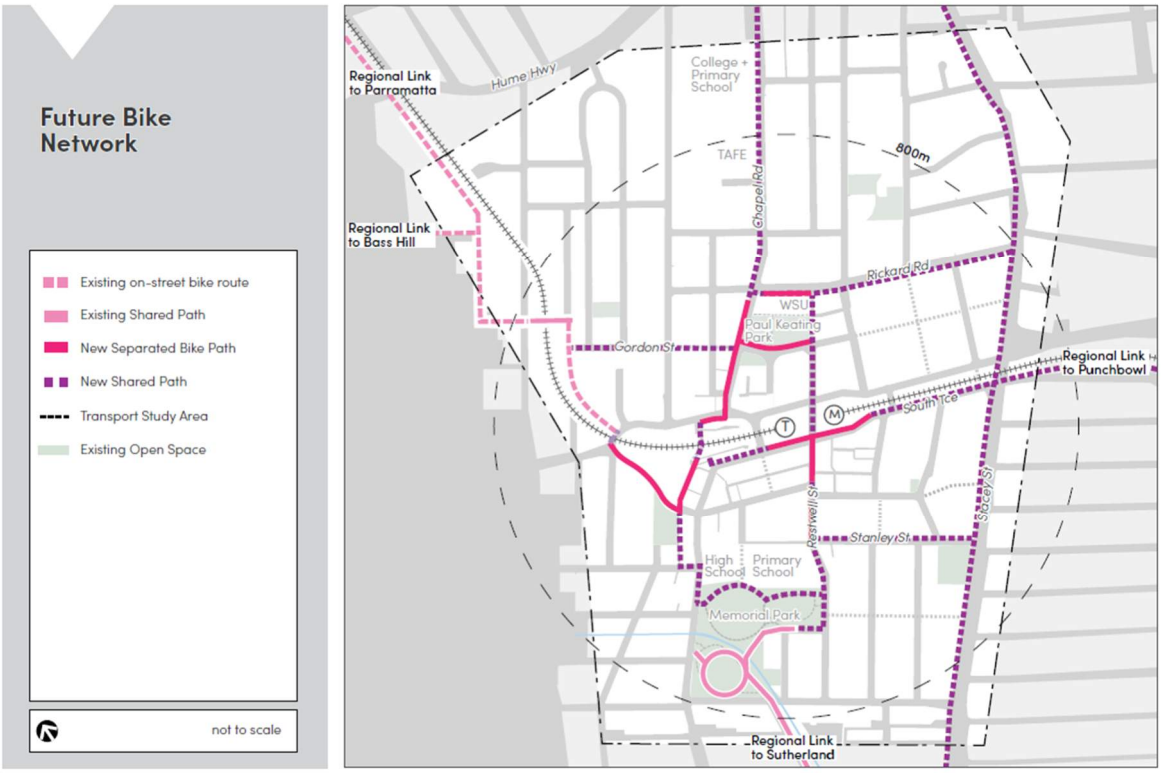
Figure A.1: Future Pedestrian Network



A.2. Cycling Network

Complete Streets proposes shared paths along Rickard Road, South Terrace and The Appian Way as shown in Figure A.2. Notably, wider precinct access will be delivered north-south through a new shared path along Stacey Street and east-west along a Regional Link to Punchbowl.

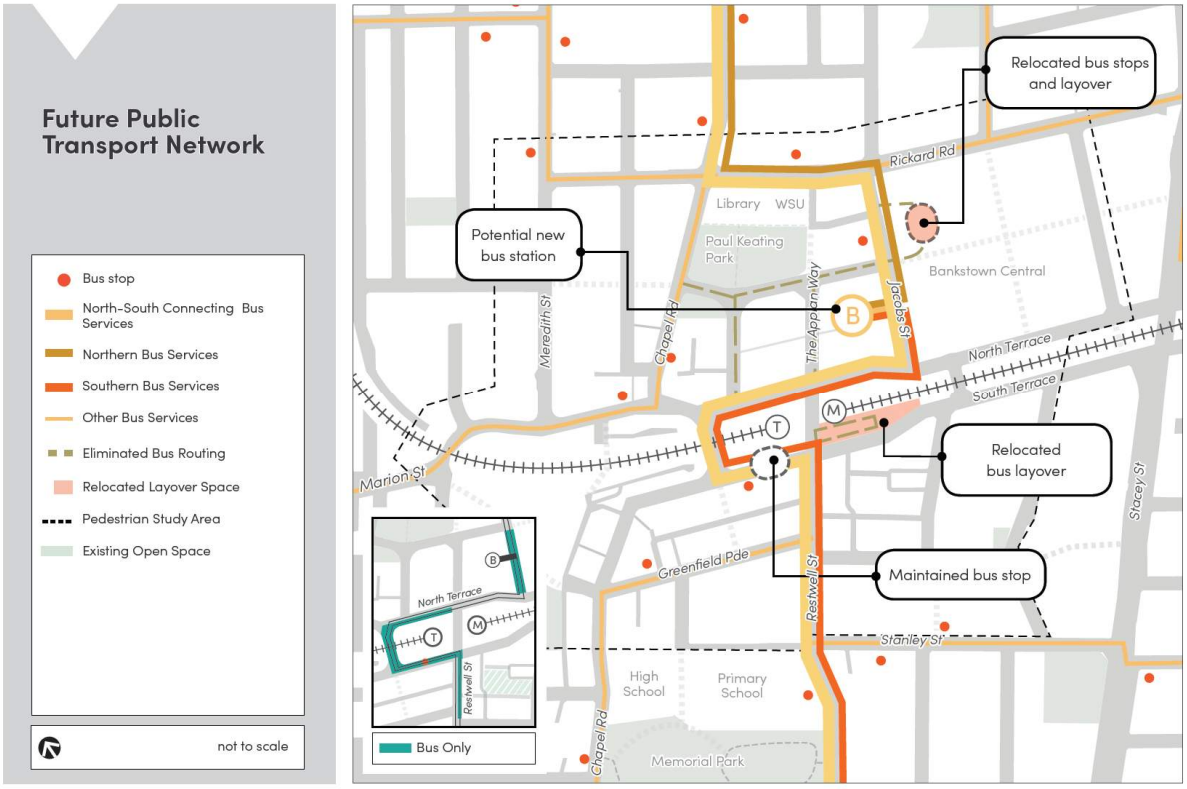
Figure A.2: Future Cycling Network



A.3. Public Transport

Complete Streets proposes that the existing bus stop and layover spaces located off Jacobs Street should be relocated and identifies that a potential new bus station could be located in the south-west corner of Jacobs Street where southern and northern bus routes would terminate. The bus layover is proposed immediately south of the proposed Metro Station as shown in Figure A.3.

Figure A.3: Future Public Transport Network



A.4. Traffic Network

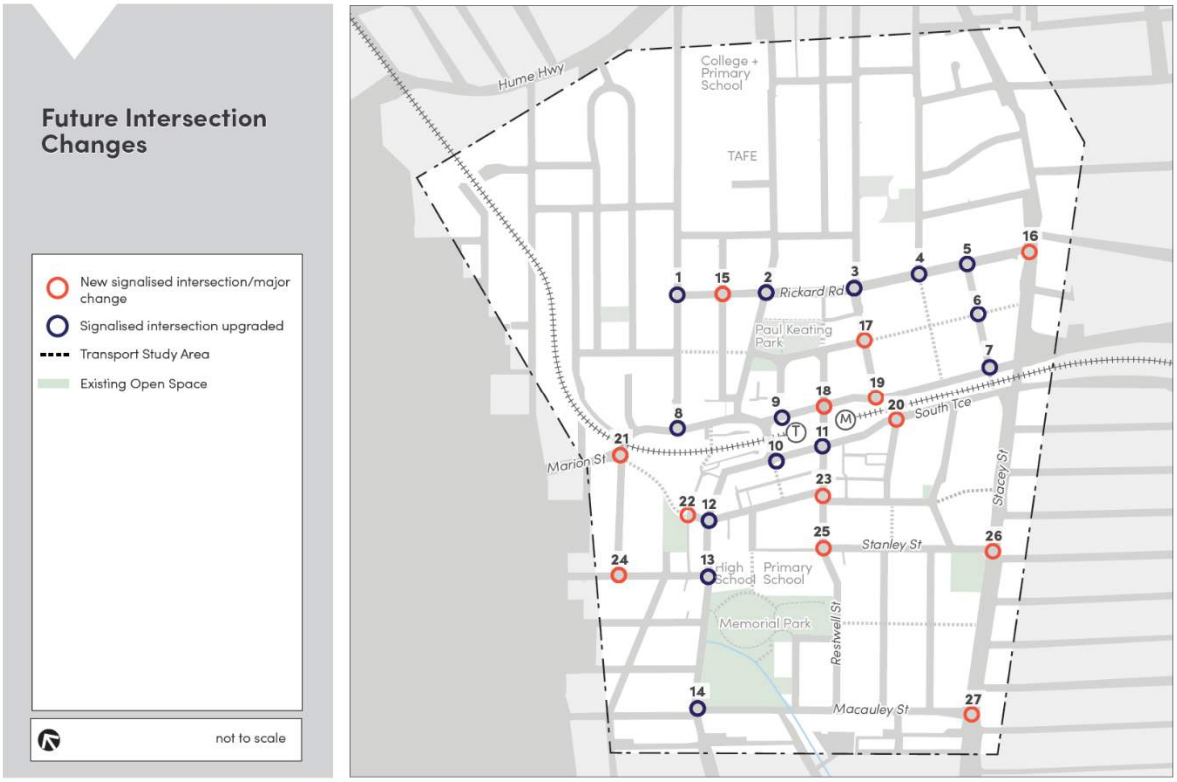
As shown in Figure A.4, Complete Streets proposes both Rickard Road and Stacey Street to be upgraded to form part of the Ring Road. This upgrade will see the traffic capacity on the Ring Road increase with all roads on the Ring Road being increased to have two lanes in each direction except for Stacey Street which will have three lanes in each direction. It proposes the Jacobs Street Extension from The Mall to North Terrace and will restrict private vehicle access. Other roads in the immediate vicinity of the site are proposed to remain unchanged.

Figure A.4: Future Traffic Network Changes

A.5. Intersections

Complete Streets proposes that intersection works will occur on all major intersections within the vicinity of the site. As it relates to this site, the general improvements (as detailed in Figure A.5) involve updates to signal phasing to increase the performance of the Ring Road and the prioritisation of pedestrian on local roads.

Figure A.5: Future Intersection Changes



Key Enhancements

1 • Additional right turn lane from Meredith St northbound into Rickard Rd eastbound to encourage Ring Road use.
• Southbound Meredith St reduced to one lane at signals.
• Signal phasing updated to support Ring Road.

2 • Additional right turn lane from Chapel Rd southbound into Rickard Rd westbound to encourage Ring Road use.
• Southbound Chapel Rd reduced to one lane at signals to discourage through-traffic.
• Signal phasing updated to support Ring Road.

3 • Signal phasing updated to support Ring Road and bus movements.

4 • Potential carpark access consolidation (subject to redevelopment of centre).
• Signal phasing updated to support Ring Road.

5 • Pedestrian crossings added to all sides of intersection.
• Signal phasing updated to support Ring Road.

6 • Pedestrian crossing widened to cater for high volumes.
• Intersection reduced to one traffic lane each direction to discourage through traffic.
• Signal phasing updated to reduce pedestrian wait time.

7 • Pedestrian crossings added to all sides of intersection.

8 • Right turn lane from Marion St westbound into Meredith St northbound removed to discourage through-traffic.
• Signal phasing updated to support Ring Road.

9 • Fetherstone St closed to traffic at North Tce.
• Signals reconfigured as signalised pedestrian crossing.

10 • Reduced to one bus lane each direction.
• Signal phasing updated for reduced pedestrian wait times.

11 • Alignment of lanes reconfigured to suit new Restwell St design.
• Fourth leg to bus terminus removed (subject to relocation of bus terminus)
• Signal phasing updated include phase for bike lane and reduced pedestrian wait times.

12 • Northbound Chapel Rd reduced to one lane.
• Signal phasing updated.

13 • Signal phasing updated to support Ring Road.

14 • Signal phasing updated to support Ring Road.

15 • Kitchener Pde (north) re-opened.
• Signal phasing updated to support Ring Road.

16 • Intersection upgraded as part of Stacey Street widening by RMS.

17 • New signalised intersection to manage bus/ pedestrian conflicts, includes pedestrian crossings on all sides of intersection.

18 • New signalised intersection to manage the forecast increased pedestrian movements associated with the Metro station and new university, includes pedestrian crossings on all sides.

19 • New signalised intersection to manage bus access in and out of Jacobs St extension, includes pedestrian crossings on all sides.

20 • One turn lane removed from South Tce westbound and eastbound into North Tce (via rail underpass) to discourgae through-traffic.
• Pedestrian priority crossing converted to fully signalised pedestrian crossing.

21 • Olympic Pde closed to traffic at Greenwood Ave.
• Signal phasing updated to support Ring Road and increase through capacity with closure of Olympic Pde.

22 • Olympic Pde closed to traffic at Dale Pde and signlas reconfigured.

23 • One turn lane on Raymond St westbound and Restwell St northbound removed to discourage through-traffic.
• Pedestrian priority crossing and slip lane converted to signalised crossing.
• Signal phasing updated to include phase for bike lane.

24 • New signalised intersection to support reliable flow on the Ring Road.

25 • New signalised intersection provided to provide safer pedestrian access to schools and Memorial Park and cater for new bike lane and shared paths on Restwell St and Stanley St.

26 • Intersection upgraded as part of Stacey Street widening by RMS.

27 • Intersection upgraded as part of Stacey Street widening by RMS.

B. TECHNOLOGICAL CONSIDERATIONS FOR THE FUTURE OF CAR PARKING

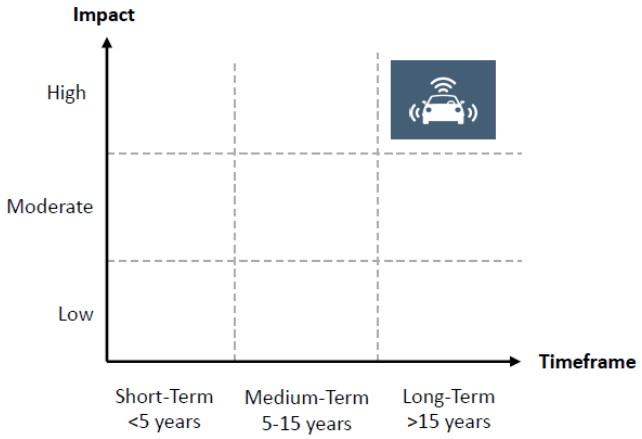
B

APPENDIX: TECHNOLOGICAL CONSIDERATIONS FOR THE FUTURE OF CAR PARKING

B.1. Autonomous Vehicles

Whilst a small level of autonomy already exists as part of our current available vehicle fleet, the greater adoption of high autonomy vehicles (predicted to be available somewhere after 2025 and pervasive in the vehicle fleet somewhere between 2030 and 2040) will be a 'game changer' with respect to the future transport network and car park design response required.

In the context, autonomous vehicles are likely to be a high impact, long-term disruption, as illustrated in the figure below.



The key implications of autonomous vehicles for the planning of the site will likely include:

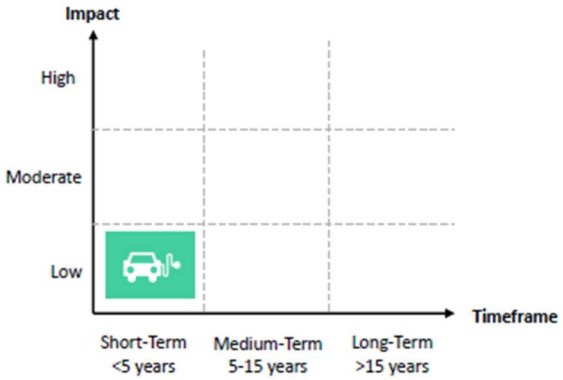
1. The demand for conveniently located pick-up / drop-off zones on abutting streets and/or in car parks will increase.
2. The overall demand for car parking will decrease (as the need for car ownership long-term parking will reduce)
3. The design requirements for car parking areas will change (e.g. car space widths may decrease (as autonomous vehicles are able to park themselves) or increase (as the width of autonomous vehicles may increase).

B.2. Zero Emission Vehicles

Electric vehicles already represent a portion of the Australian market and this portion is only going to increase in the short-term and could include other forms of zero emission vehicles.

The impacts of electric vehicles is already being considered in many developments through the inclusion of car charging parking spaces, however the impact of this change with respect to physical design considerations is low and promotion of zero emission vehicles at the Centre would be driving largely by branding and public relations.

In the context, zero emission vehicles are likely to be a low impact, short term disruption, as illustrated in the figure below.



The key implications of zero emission vehicles for the planning of the site will likely include:

1. The inclusion of car charging car parking spaces within strategic locations around the Centre.
2. The overall demand for zero emission friendly parking (i.e. car charging car parks) is likely to be driven by the market share of zero emission vehicle.

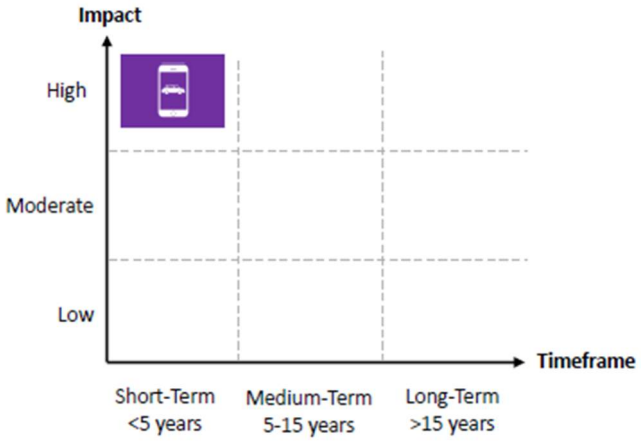
B.3. Mobility Services

Mobility services (or Movement as a Service) models currently exist in the form of ridesharing vehicles. In Australia, there are already many operators, covering private vehicle, bicycle and public transport services, as summarised below:

Source: https://www.austrade.gov.au/future-transport/mobility-as-a-service/

These services will continue to challenge the need to own and park a personal vehicle in the immediate future. The impact to the physical design of car parking areas will be significant when/if MAAS becomes a more predominate mode of travel and will increase the need for pick-up / drop-off facilities. Further, these mobility services will also influence travel needs with delivery services making it easier to have large goods delivered.

In the context, mobility services are likely to be a high impact, short term disruption, as illustrated in the figure below.



The key implications of mobility services for the planning of the site will likely include:

1. The demand for short-stay, pick-up / drop-off type parking in convenient location will increase, but the demand for long-stay parking will decrease.
2. The feasibility for the Centre to run neighbourhood shuttle buses or support on-demand shared mobility (similar to the Inner West on Demand service operating around Burwood, NSW).

w

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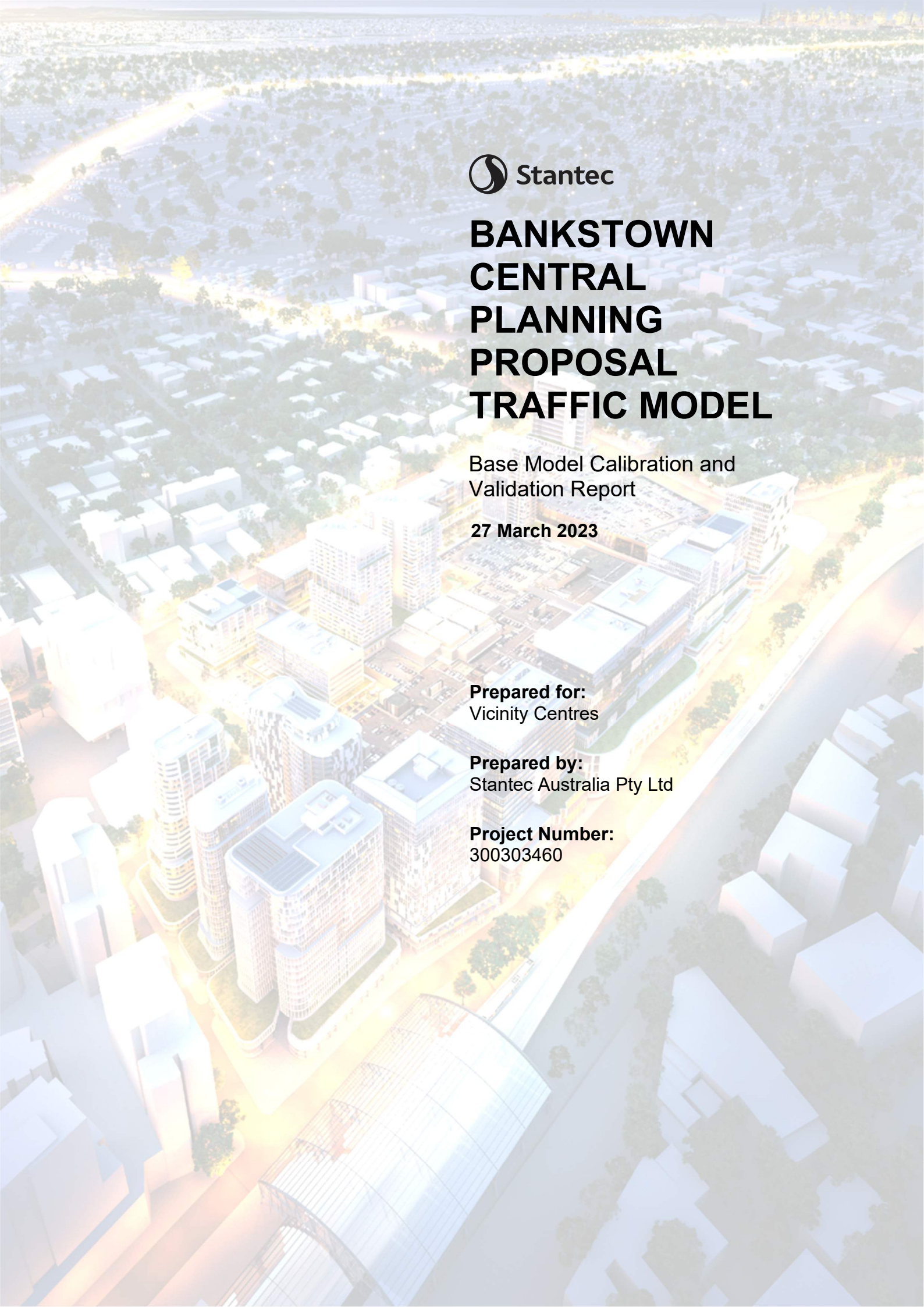
Reference: **TfNSW Comments on Bankstown Complete Street Project – Base Model**

Attachment 3 – Modelling Calibration & Validation Report for Updated Traffic Modelling



BANKSTOWN CENTRAL PLANNING PROPOSAL TRAFFIC MODEL

Base Model Calibration and Validation Report

27 March 2023

Prepared for:
Vicinity Centres

Prepared by:
Stantec Australia Pty Ltd

Project Number:
300303460

Revision	Description	Authors	Reviewer	Approver	Date
A	Final	Radhika Gopalakrishnan Mitch Henderson	Mark Stephens	Robert Dus Robert Dus	27/03/2023

Table of Contents

1 Introduction

1.1 Background

In 2019, a Planning Proposal was prepared by Urbis on behalf of Vicinity Centres (the proponent) to initiate an amendment to the Bankstown Local Environmental Plan (BLEP 2015) with respect to the Bankstown Central Shopping Centre site located at 1 North Terrace, Bankstown (the site).

The intended outcome of the Planning Proposal was to establish site-specific height and floor space controls and amend the application of BLEP 2015 Clause 6.9 to northern parts of the site to allow residential uses to occur on the lower two levels of future redevelopment in those locations. To inform the assessment of the Planning Proposal, a concept masterplan was prepared by FJMT which set out a range of potential future uses and building typologies to inform and verify the proposed height and FSR controls. The proposed FSR controls included a relatively minor density increase of approximately 12% from the previously approved FSR of 3.5 to a proposed FSR of 3.923.

As part of the Planning Proposal submission, a Transport Impact Assessment Report (titled '*Bankstown Central Shopping Centre Planning Proposal'*, dated 17 July 2020) was prepared by GTA (now Stantec). The report outlined a proposed travel demand management approach for the future development of the site, including supressed car parking provisions to actively minimise traffic impacts, and contained AIMSUN traffic modelling to quantify the anticipated impacts.

The traffic modelling included in the July 2020 Stantec report was completed using the AIMSUN model previously prepared by GTA (now Stantec) for the Complete Streets CBD masterplan that was endorsed by Bankstown-Canterbury Council in late 2019. The modelled scenario assumed the full development of the site as envisaged in the Planning Proposal coupled with Council endorsed changes to the CBD street network and concluded that the traffic impacts of the indicative development yield as envisaged in the Planning Proposal was expected to be minor and acceptable.

It is noted that the July 2020 Stantec report was subsequently peer reviewed by Bitzios Consulting on behalf of Canterbury-Bankstown City Council who concluded the following in their memo dated 20 October 2020: *"…we are generally satisfied that the development would likely have manageable road network impacts on the surrounding road network, and that the level of detail required to investigate specific mitigation measures to offset development impacts can and should be undertaken during subsequent application stages."*

With respect to this commentary, Stantec agrees that more detailed traffic modelling will need to be provided with subsequent development applications on the Bankstown Central site. In our experience, this approach is common practice, as limited traffic modelling is typically required or thus provided for Planning Proposals (particularly those representing a relatively minor FSR increase as is the case for Bankstown Central (+12% above current controls)). The requirement for this additional modelling for future development applications has also been accepted in writing by Vicinity Centres and it is understood that this will be specifically required by Council in the approval of the subsequent development applications.

1.2 TfNSW Engagement

In 2022, the July 2020 Stantec report was reviewed by Transport for New South Wales (TfNSW) who sought an updated TIAR as well as additional information confirming that the AISMUN base model built for Complete Streets and relied upon for the Planning Proposal was suitably validated and calibrated.

With respect to this calibration and validation request, the following is noted:

- The base model initially prepared by GTA (now Stantec) for Complete Streets was built to test the anticipated traffic impacts of a range of initiatives proposed to improve the public realm of the Bankstown CBD to create a more people-oriented network and place. It adopted a "vision and validate" approach, acknowledging that an increase in congestion should not represent an unacceptable CBD outcome if the public realm was improved for pedestrian, cyclists, and public transport users.

- The approach adopted with respect to the validation and calibration of the base mode built for Complete Streets, which relied upon mid-block tube count data and other observations, rather than turning movement data at intersections which has subsequently now been sought by TfNSW, was confirmed with Council at the time of the model build in 2019. Stantec retains the view that the model built for Complete Streets is "fit for purpose" for the CBD masterplan and the Bankstown Central Planning Proposal (particularly given that additional traffic modelling will be completed for subsequent development applications). Moreover, Stantec retains the view that the calibration and validation of the Complete Streets model aligns with TfNSW guidelines which outlines that midblock or turning movement data can be utilised for model calibration and validation.

Notwithstanding this, Stantec was engaged by Vicinity Centres in November 2022 to collect new traffic data in the vicinity of the Bankstown Central site and recalibrate and revalidate the base AIMSUN model. This approach was undertaken as it would not have otherwise been possible to confirm the previous model met turning movement volumes calibration requirements given no such data was collected.

For completeness, a copy of the TfNSW comments with respect to the model calibration and validation concerns, along with Stantec's response to closing out each item, has been provided as Appendix A of this report. These responses confirm our view that the model is suitably calibrated and validated to enable an assessment of the Planning Proposal.

1.3 Modelling Purpose

The purpose of this modelling is to assist assessment of the Bankstown Central Planning Proposal.

It has not been prepared to be the "final" model prepared in the CBD or to support major development applications, road network changes, or other major transport infrastructure projects. Indeed, it is accepted by Vicinity Centres (the proponent of the Bankstown Central Planning Proposal) that further modelling would need to be completed for subsequent development applications on the Bankstown Central site.

The appropriateness of the model's calibration and validation should have regard to this purpose and the fact that subsequent modelling revisions can and will be completed in time.

1.4 Modelling Scope

The updated traffic modelling covers the same model network extent as the previous 2018/19 traffic modelling, with the important exception being that the new modelling also includes all existing vehicle accesses to Bankstown Central site.

Further, for the purposes of completing this modelling by March 2023, the model focuses on the update of solely for the Thursday PM peak hour. This approach has been accepted by TfNSW in an email dated 9 December 2022. The assessment of other peak hours is agreed as a requirement for supporting analysis for subsequent development applications on the Bankstown Central site.

1.5 Report Outline

This report sets out an overview of the traffic model development process, calibration and validation outcomes and an assessment of the existing traffic conditions. The report is divided in following sections:

- Chapter 1: Introduction
  - Background information of the project and project study area, and an overview of the modelling scope.
- Chapter 2: Existing Conditions
  - Overview of the existing conditions of the study area and data inputs required to inform the model.
- Chapter 3: Model Assumptions
  - Details the model methodology, specifications and development procedures, calibration and validation targets for the model.
- Chapter 4: Model Calibration and Validation
  - Demonstration of the stability of the model under varying conditions.
  - Outputs and discussion on the ability of the base year models to replicate current traffic conditions.
- Chapter 5: Conclusion
  - Summary of the suitability of the base year model.

2 Existing Conditions

2.1 Traffic Surveys

Comprehensive traffic data was collected to develop and calibrate the existing conditions model. A summary of the data collected is provided in Table 2.1.

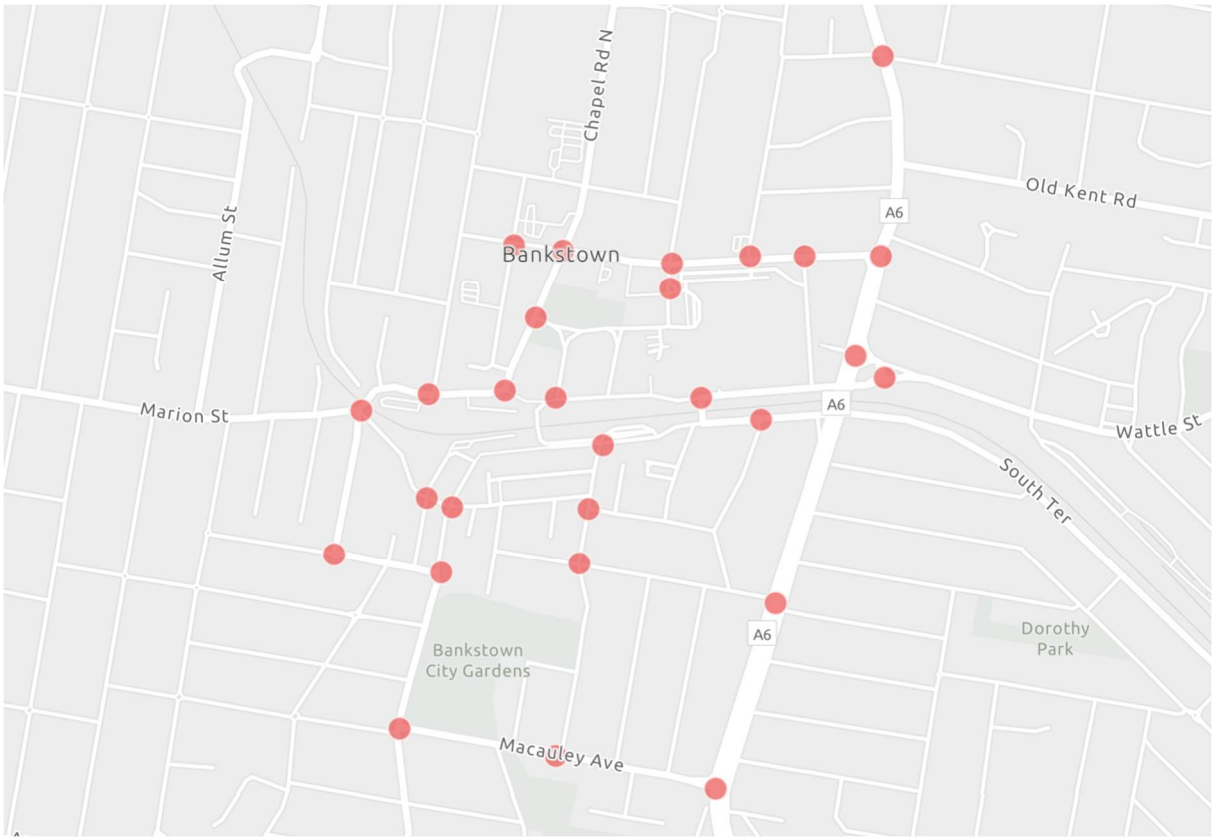
Table 2.1: Data Collection Summary

Item	Data Collection Type	Source	Location	Dates / Times
1	Classified intersection turn counts	Traffic Information Specialist	38 sites	Thursday 8 December 2022 (3pm-6pm)
2	Classified automatic tube counts	Traffic Information Specialist	7 sites	Monday 5 December 2022 to Sunday 11 December 2022 (24/7)
3	Origin-Destination (OD) Data	TomTom	Study Area	Thursday 8 December 2022 February-December 2022 (Weekday Average excl. School Holidays and Public Holidays)
4	Travel Time Data	TomTom	5 bi-directional routes	Thursday 8 December 2022 February-December 2022 (Weekday Average excl. School Holidays and Public Holidays)
5	Junction Data (Queues)	TomTom	5 Sites	Thursday 23 February 2023
6	SCATS Data including: • Signal phase History Data • Signal LX file (to inform signal linking and coordination) • TCS diagrams/SCATS Graphics	TfNSW	All signalised intersections within the Study Area.	Thursday 8 December 2022
7	Public transport information (GTFS)	Open source data	Study Area	Latest available data on the TfNSW Open Data Hub
8	Site inspections	Stantec	Study Area	2 February 2023

2.2 Classified Turning Movement Counts

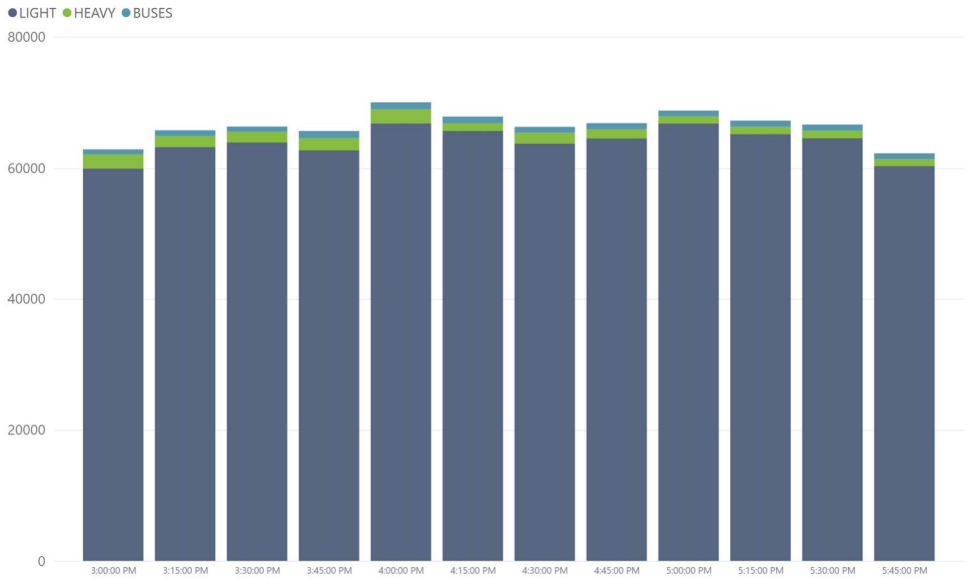
Subconsultants 'Traffic Information Specialist' were engaged to collect classified intersection turn counts at 38 locations throughout the Bankstown area. Data was collected on Thursday 8 December 2022 between 3:00pm and 6:00pm by video survey. The locations where classified intersection counts were performed has been presented in Figure 2.1.

Figure 2.1: Map of TMC Data Collection Locations



The data was processed and interrogated for insights into network flows and to develop the link and turn 'real data sets (RDS's)' for model calibration. Aggregated site flows were also used to confirm the network volume peak for modelling. In this regard, the PM peak has a relatively flat profile and confirms the previously adopted 4:00pm-6:00pm model period still applies. The PM peak volume profile is shown in Figure 2.2.

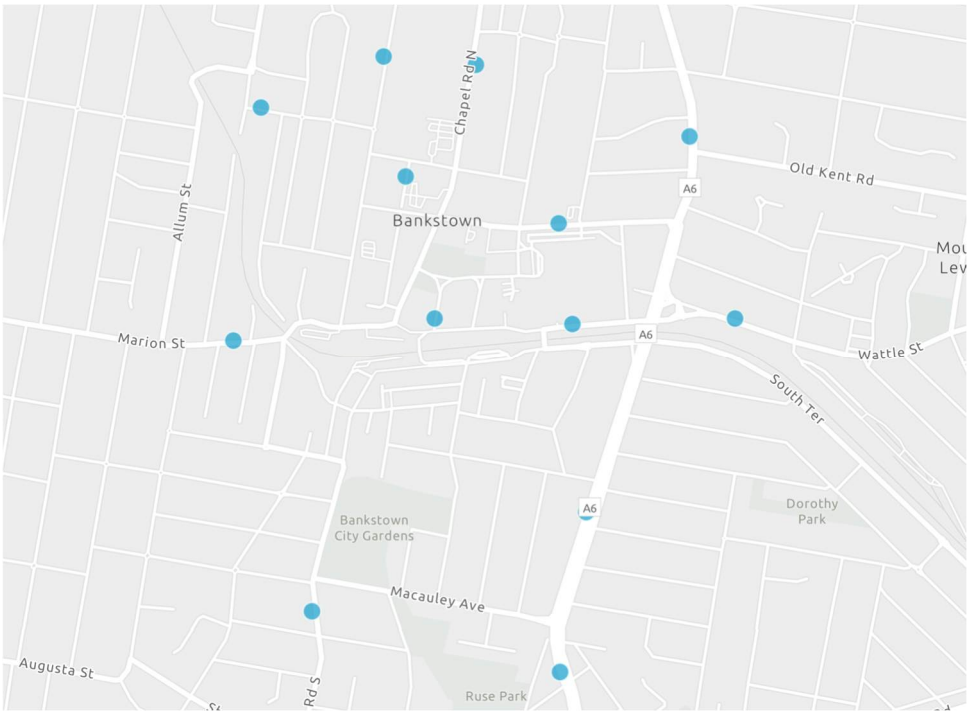
Figure 2.2: PM Peak Volume Profile



2.3 Automated Tube Counts

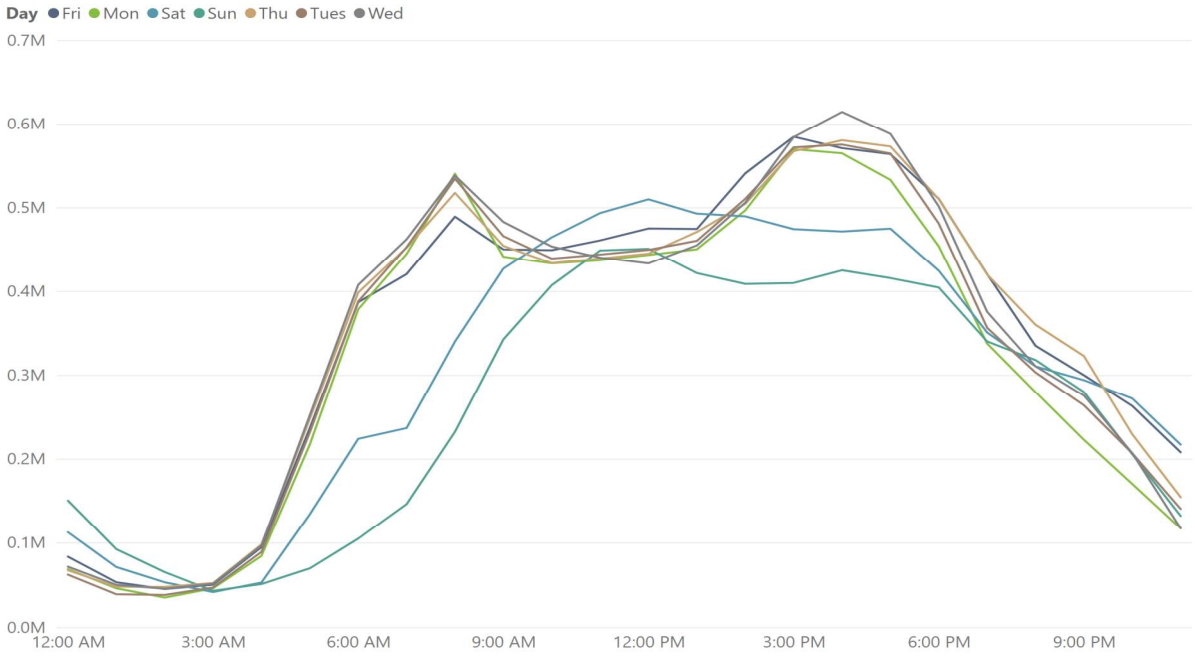
Subconsultants 'Traffic Information Specialist' were also engaged to collect automated tube count data for a 7-day periods from Monday 5 December 2022 – Sunday 11 December 2022. Data was collected at 13 locations throughout the study area, as presented in Figure 2.3.

Figure 2.3: Map of ATC Data Collection Locations



Automated tube data was processed to understand the variability in traffic flows throughout the day over a 24-hour period, and secondly the variability between weekdays. The data was processed and interrogated for insights which confirmed the Weekday PM peak is the critical network peak, and that Thursday's data was typical of the other weekdays. The weekday volume profiles are shown in Figure 2.4. Automated tube data also collects speed information which has been used to aid in the recalibration and validation of model network speeds.

Figure 2.4: Automated Tube Counts - Weekday Volume Profiles



2.4 Origin-Destination (OD) Data

Stantec purchased and collated origin-destination data from TomTom datasets. Accordingly, several OD regions were defined, such that a comprehensive summary of the typical flow OD structure could be understood and validated against the model.

Historic data was collated for the survey date (Thursday 8 December 2022) in addition to an average weekday period between February and December 2022, excluding school holidays and public holidays. The survey days data was defined to provide a comparable dataset to the other datasets collated, whilst the 2022 average was to ensure a sufficient sample size was accounted for noting TomTom data is 'probe' data and only captures a sample of the traffic on the network. Given TomTom OD data is based on probes and not an exact capture of all movement, the data is not expected to perfectly match but provide a relative comparision and help with the development of the model path structure.

The OD regions were chosen based on attempting to capture traffic patterns from all major study area extents, as well as local regions within the study area which correlated with the model zone structure. The OD regions have been presented Figure 2.5.

The survey day OD data was compared to TomTom historic data for each PM peak hour. The OD demand distribution were comparable between historic data and survey day data, suggesting the survey OD data are reliable.

Figure 2.5: Map of data collection locations

The OD data suggested that:

- Approximately 30% of traffic observed within the network area uses Stacey Street.
- Wattle Street, Marion Street and Chapel Road generate about 15% of the network traffic in the PM peak hours.

- Approximately 60% of the demand entering from Stacey Street south and 83% from the Stacey Street north entering the study area via Stacey Street (north or south) are expected to represent through trips along Stacey Street.
- Of those trips that enter the network to Bankstown Central, only 6-8% are expected to travel via the Stacey Street overpass. Accordingly, we can assume those entering from the north to enter Bankstown via Wattle Street or Rickard Road and those entering from the south to travel via Macauley Avenue, Stanley Street or South Terrace.
- Of the motorists entering the study area through Marion Street, up to 55% are reported to stay within the study area, 16% travel north via Meredith Street, and 20% through via South Terrace or Wattle Street.
- Of the motorists entering the study area through Chapel Street, 40% of trips are reported to travel through via the western extents (Marion Street, Chapel Street South and Brandon Avenue), 12% travel through to Stacey Road south, and 10% travel through east to South Terrace or Wattle Street. The remainder stay within the study area.

The survey day OD data was compared to the profiled 2-hr demand matrix. This concluded that modelled demands had comparable OD demand distribution to Survey day OD data.

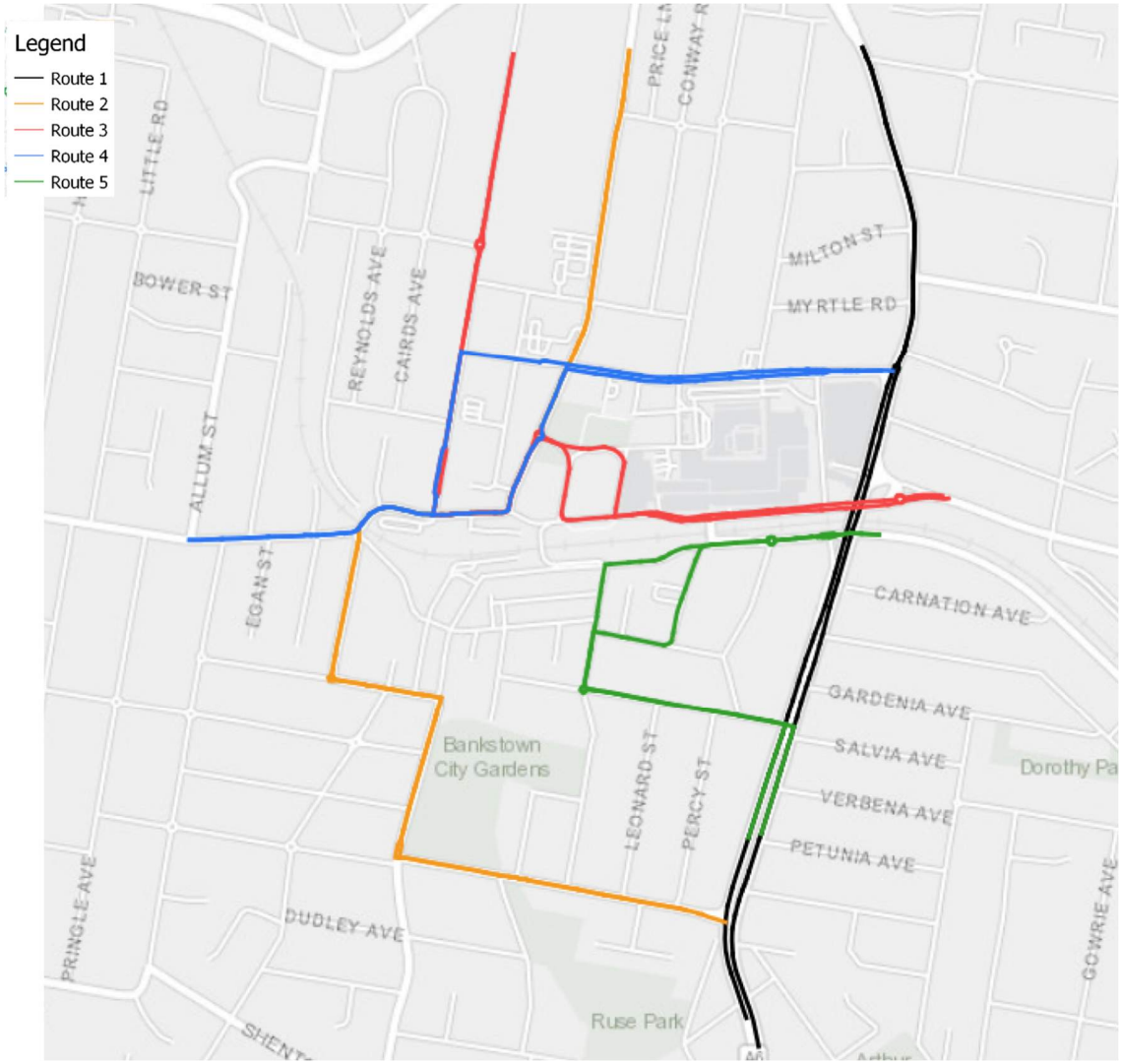
2.5 Travel Time Data

Stantec purchased and collated travel time data from TomTom datasets. Using the data, a number of travel time routes were defined, such that a comprehensive summary of the typical travel time along key corridors could be understood and used in the model validation process. Data for five (5) bi-directional travel time routes has been collated as shown in Figure 2.6. As with the OD data, given TomTom data is probe-dependant and based on the relative percentage of traffic which have TomTom devices; historic data was collated for the survey date (Thursday 8 December 2022) in addition to an average weekday period between February and December 2022, excluding school holidays and public holidays.

To ensure sufficient sample size, the travel time data has been summarised by section. This ensures average travel times capture traffic that traverses any defined road segment whether or not they traverse the entire travel time route. It is noted that the modelling validation adopts a consistent methodology for summarising travel time such that a compatible methodology is being adopted for validation.

A detailed summary of travel times recorded has been presented as part of the travel time validation along with the modelling results.

Figure 2.6: Travel Time Routes



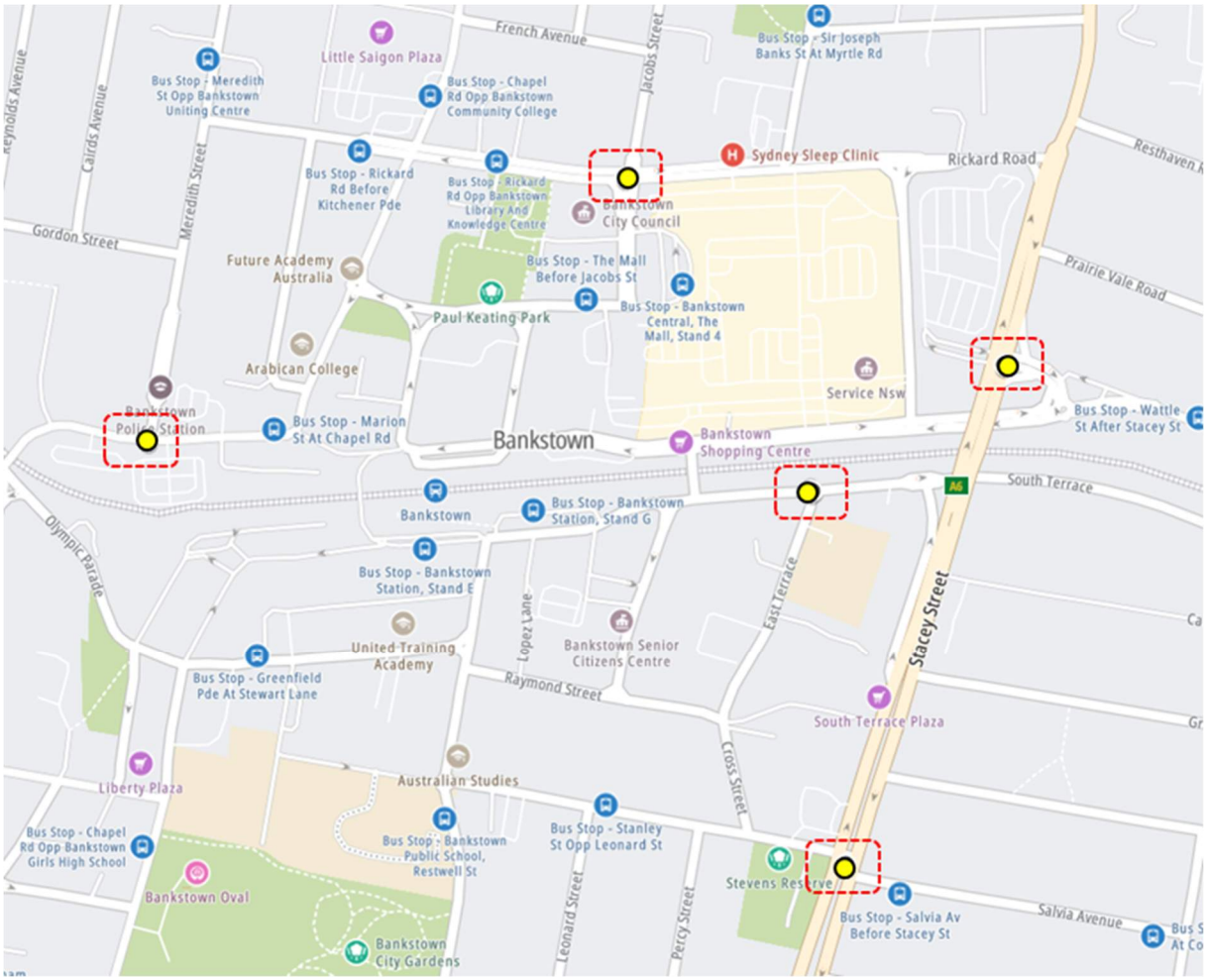
2.6 Junction Data (Queues)

Stantec collated TomTom Junction data, which provides indicative queues for nominated intersections around Bankstown. Five (5) Junctions were selected for analysis including;

- Jacobs Street / Rickard Road
- Stacey Street / Wattle Street
- Stacey Street / Stanley Street / Salvia Avenue
- South Terrace / East Terrace roundabout
- Marion Street / Meredith Street

Junction data was used to review typical network queuing within the model area as a secondary validation tool for the model development. The five (5) junction locations were selected to provide a reasonable network coverage in the core area and are also sites where approaches are significant length to capture meaningful data.

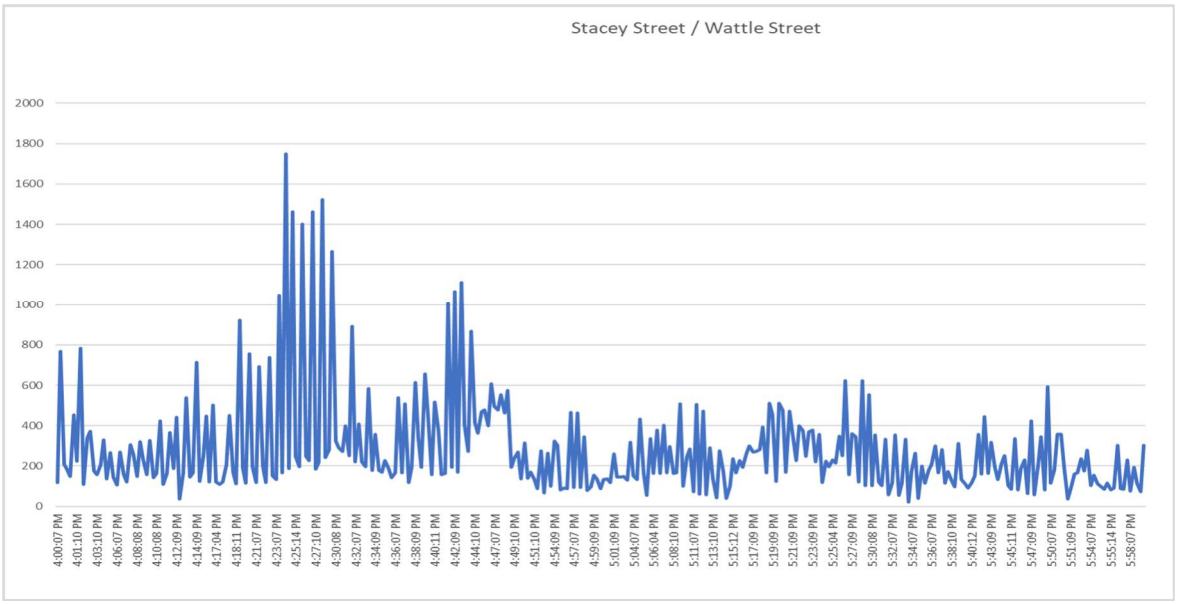
Figure 2.7: Junction Data Collection Sites



This data has been used as additional tool (in addition to travel times and site observations) to evaluate and validate model queueing within the network. It is noted that TomTom junction data is a relatively new feature that has its limitations in accuracy. Accordingly, exact queue lengths are not taken as definitive, but the data is used to derive an understanding of the relative fluctuation in queueing throughout the peak hours (how long they last) and an estimation of queue length. It is also noted that the junction queue lengths varied day-to-day particularly for roads such as Stacey Street again reconfirming the versatility in network operations surrounding shopping centre precincts.

Figure 2.8 shows a preview of the junction queue analysis outputs used.

Figure 2.8: Sample of Junction Queue Analysis – Stacey Street / Wattle Street North Approach



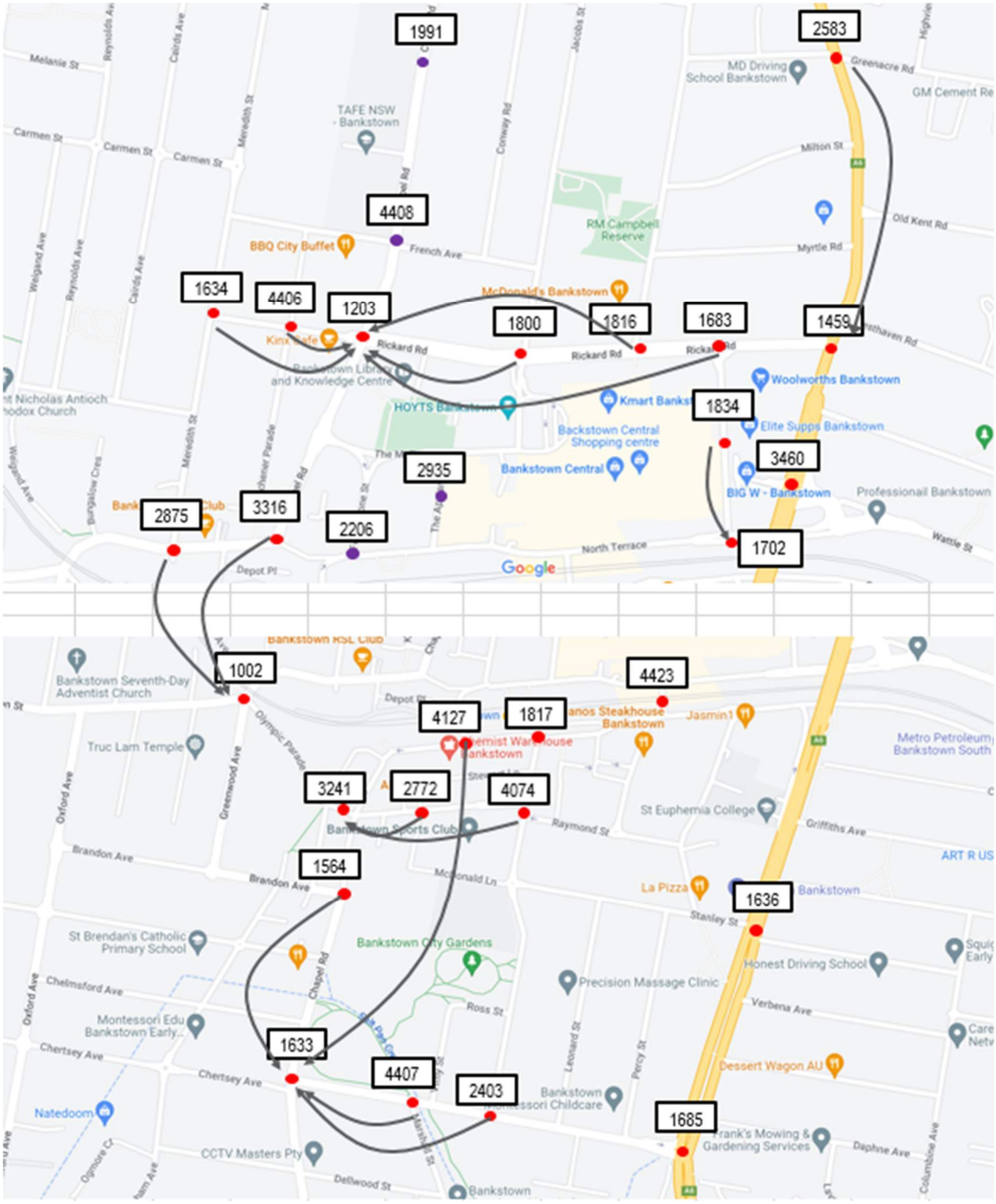
2.7 SCATS Signal Data

Stantec collated SCATS signal phase operation and timing data for the survey day (8 December 2022). Data included phase timing data and signal linking datasets, such that signal operations could be accurately reflected within the modelling environment.

Phase timing data was processed to identify average cycle time and phase green times throughout the peak period at a granularity of 15mins. These averages were then imported into the model to inform the parameters of the actuated signal program.

LX data was reviewed to ensure any signal linking within the model could be replicated in accordance with SCATS settings. Figure 2.9 shows the adopted SCATS linking.

Figure 2.9: SCATS Signal Linking



2.8 Site Visit

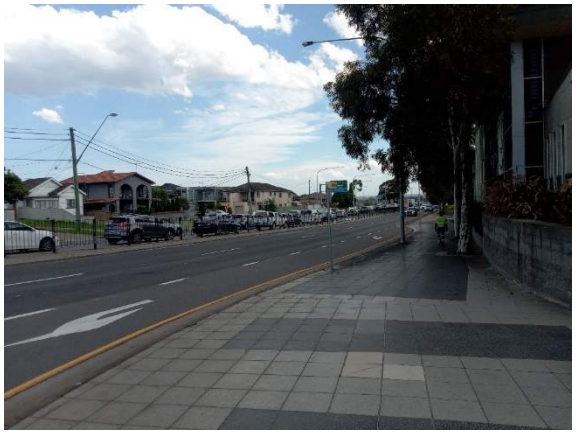
Stantec had multiple staff complete a site visit in February 2023 to confirm network configurations and operations during the PM peak hour. Below is a summary of the key observations made as it relates to network operation.

Rickard Road / Stacey Street

Long queues were observed on southbound direction on Stacey Street. This is attributed to the high southbound movements and operation of Stacey Street/Wattle Street. Queues were observed to propagate back through the Rickard Road / Stacey Street intersection impacting Rickard Road movements. Queuing on the Rickard Road eastbound approach was observed to extend to the interception with Lady Cutler Avenue, whilst queuing was marginal at other intersections along Rickard Road (i.e., intersection was typically cleared within one cycle time). These observations have been captured within Figure 2.10 and Figure 2.11.

Figure 2.10: Congestion on Rickard Road at Stacey Street / Rickard Road intersection

Figure 2.11: Stacey Street Southbound Queuing at Wattle Street



Stacey Street / Wattle Street

The Wattle Street right turn queue extends beyond the available storage capacity at times. However, drivers ensured that where possible they did not interrupt other movements within the roundabout. The Stacey Street south right turn into North Terrace allowed approx. 5 vehicles per cycle, noting this queue often reaches the extent right turn bay (generally contained). The south approach (northbound flow) along Stacey Street experiences some flow breakdown, due to upstream queuing causing issues.

North Terrace

There was some queuing observed along North Terrace, however, queues are kept within the available queuing capacity of each intersection. Queues were not observed causing issues to the function of signalised intersections, however, westbound queues back from North Terrace / West Terrace intersection were observed to extend beyond the driveway access into Bankstown Central car park. Additionally, it was noted that the inner traffic lane usage was higher at the west approach at North Terrace / West Terrace intersection.

Other Observations

- No queues were observed on the northern section of Chapel Road; however, some congestion was observed on the southern section close to Bankstown Station.
- Some queuing was observed on The Appian Way southbound approach due to the downstream The Appian Way/North Terrace signalised intersection. This resulted in some slowing along The Mall eastbound approach.
- No queues were observed on Jacob Street during the site visit. This includes the Jacob Street / Rickard Road intersection where traffic typically clears within a single cycle.
- No queues were observed on Lady Cutler Avenue during the site visit.
- No queues observed on Griffiths Avenue or Gardenia Avenue. Vehicles were observed to be able to exit onto Stacey Street relatively easily.
- The queue capacity is minimal along South Terrace, accordingly this naturally affects operations of downstream intersection.

3 Model Assumptions

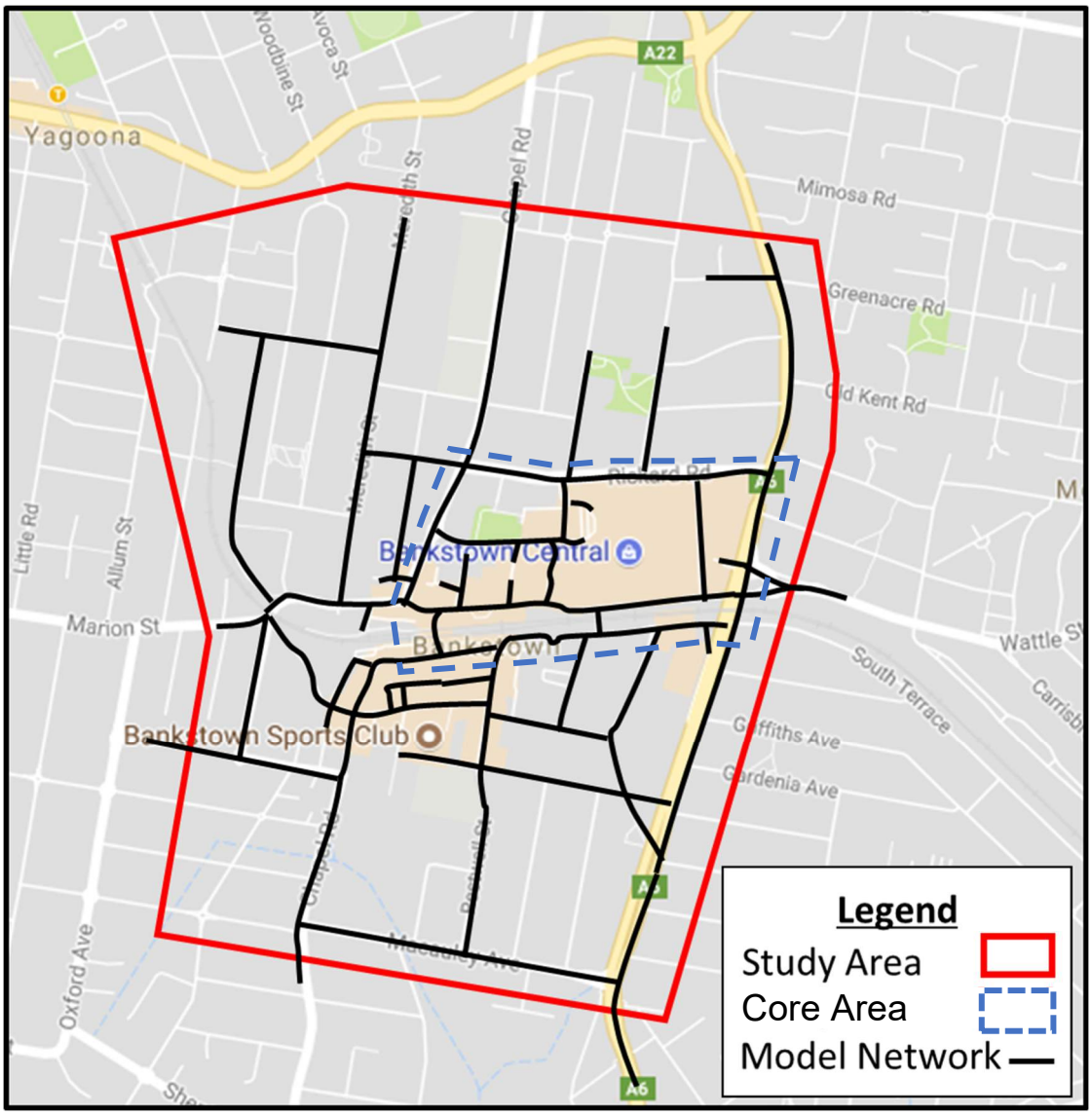
3.1 Modelling Platform

The model has been developed using AIMSUN Next version 22.0.1.

3.2 Model Area

Figure 3.1 details the study area, the extent of modelled network, and the “core area”. The core area has been defined as the road network in the vicinity of Bankstown Central including portions of Rickard Road, Stacey Street, North Terrace, South Terrace, and Chapel Road.

Figure 3.1: Model Area



3.3 Network

The base network adopts the previously developed 2018/2019 base model as a foundation. Amendments to the network geometric configuration have been made where necessary to reflect December 2022 conditions on-site during the survey period.

Amendments from the previous modelling include:

- Bankstown Bus Interchange updated to reflect interim arrangements on The Mall Road and Jacobs Street.
- Intersection upgrades at Stacey Street / Macauley Street and Stacey Street / Stanley Street. Updating Stacey Street to three lanes between Macauley Street and Stanley Street.
- Stanley Street / Restwell Street intersection upgraded to a roundabout.
- Road type and speed limits have been updated to reflect the current conditions on site.

In addition to geometric updates, network parameters and functions have also been refined as part of the recalibration process.

3.4 Time Period

As outlined in the introduction to this report, the current study focuses on the update of a single PM peak period model given time constraints on the project. TfNSW has agreed to this approach, noting that future modelling is expected to evaluate alternate peaks.

A two-hour peak period between 4:00pm and 6:00pm has been modelled as part of this study with a 30-minute warm-up period. This time period is consistent with the previous 2018/2019 modelling and re-confirmed by the December 2022 surveys.

3.5 Vehicle Composition

Three (3) vehicle types were adopted for the purposes of this AIMSUN model:

- Cars
- Heavy vehicles (Trucks)
- Buses on fixed routes.

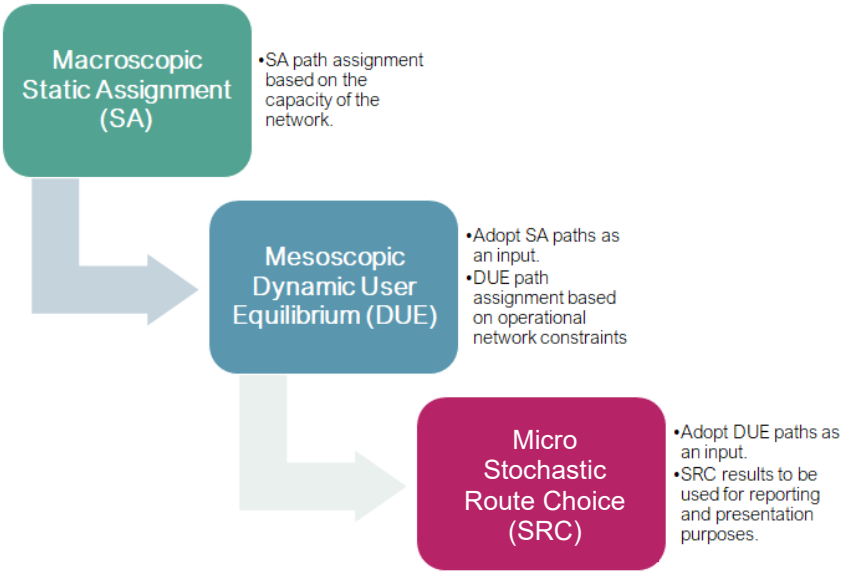
The car and truck volumes used were based on the December survey data, whilst bus volumes were adopted based on bus frequencies from the Transport for NSW's bus timetables.

3.6 Assignment Type

Three assignment types within the AIMSUN software package were adopted to inform and develop the base year model. A macroscopic static assignment for high level demand adjustment and path choice; a mesoscopic dynamic user equilibrium (DUE) for path convergence and finally a microscopic stochastic route choice assignment to visually represent the model operation and for results interrogation.

Figure 3.2 illustrates the traffic assignment process that was adopted for this study.

Figure 3.2: Model traffic assignment process



3.6.1 MACROSCOPIC STATIC ASSIGNMENT

Prior to running the mesoscopic DUE scenarios, a macroscopic static assignment experiment was run to generate an initial path assignment file (APA file). This provided a suitable starting point to determine the available paths from which the vehicles in the dynamic scenarios will follow. An industry accepted check of the paths generated in the static assignment was undertaken by utilising the select link analysis and path assignment tools, pinpointing reasons for the unrealistic paths or bad matches between the survey and the modelled results. To ensure unrealistic paths were eliminated, Volume Delay Functions (VDF) were refined and applied with one set VDF for each road type. The VDF refinements incorporated adjusted factors based on both section speed and section capacity to ensure reasonable level of calibration is reached and realistic paths were assigned between any origin-destination pairs.

3.6.2 MICROSCOPIC DUE ASSIGNMENT

The mesoscopic DUE assignment within the AIMSUN models was used to generate an initial path assignment file (APA file) for the hybrid stochastic route choice (SRC) scenarios. The DUE assignment is an iterative process where vehicles are released into the model network, select a preferred route, and respond to the cost of their route choice (as a function of travel time and delay) as a result of traffic conditions within the model, changing its route if deemed appropriate. This provides a realistic representation of the actual driver behaviour where drivers have their own perception on when to make decisions and change their route to avoid delays.

The mesoscopic DUE assignment runs over a number of iterations (predetermined maximum) until it reaches the maximum, or a state of equilibrium or convergence measured as the relative gap in the path costs for each path assignment cycle (15 minutes). Achieving convergence before the maximum iterations is exhausted indicates that the travel behaviour in the network between the previous and current iteration is able to be closely replicated for the entire simulation period, therefore suggesting the model is in a stable condition and suitable for assessment.

3.6.3 MICROSCOPIC DYNAMIC SRC ASSIGNMENT

The SRC traffic assignment within the AIMSUN models follows the converged DUE assignment paths, whilst being able to visually represent the vehicles, their interactions with each other and network infrastructure such as traffic signals. The reported calibration and validation statistics and outcomes has been based on the median of 5 seed runs of the SRC simulation.

During the model development process, the following process was undertaken to ensure that the demands were suitable for each of peak period simulations:

- Each SRC assignment was assessed in terms of relative gap, regression slope, number of vehicles waiting to enter, number of vehicles in the network and the number of vehicles that went through.
- Validity of the SRC paths were assessed to ensure unrealistic paths were not being assigned between any origin-destination pairs.
- Should the results of the SRC assignment not be satisfactory, a review of some key parameters was undertaken after each run to better calibrate the model. This included local and global parameters such as:
  - Look-ahead distances for turn movements to ensure vehicles remained in the correct lane as observed on-site.
  - Gap acceptance parameters and advanced priority settings for priority controlled intersections to ensure correct behaviour at intersections.
  - Reaction times to better match queuing and throughput observed on-site.

3.7 Demand Development

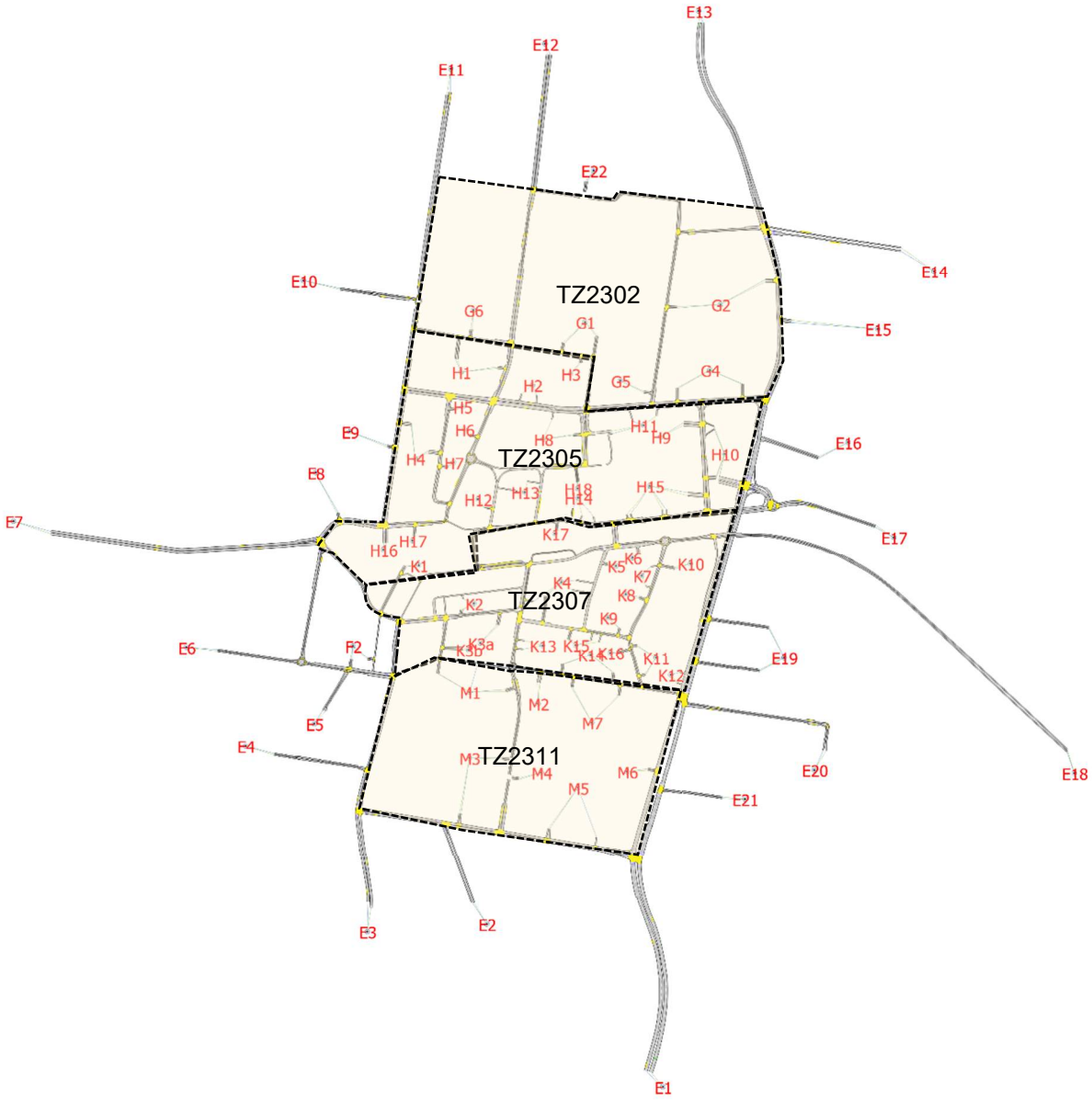
3.7.1 TRAFFIC ZONES/INPUT

The zone system adopted for the modelling is consistent with the previously developed network model. This has generally been based on the Sydney Traffic Model[1] (STM), whereby STM zones were then further disaggregated into several zones to represent detail attraction and egress points (such as car parks) within the model.

Figure 3.3 shows the zoning system implemented within the model.

[1] Sydney Traffic Model is a strategic model built in EMME software. It is developed and maintained by Transport for NSW and includes the future population and employment forecasts.

Figure 3.3: AIMSUN model zones



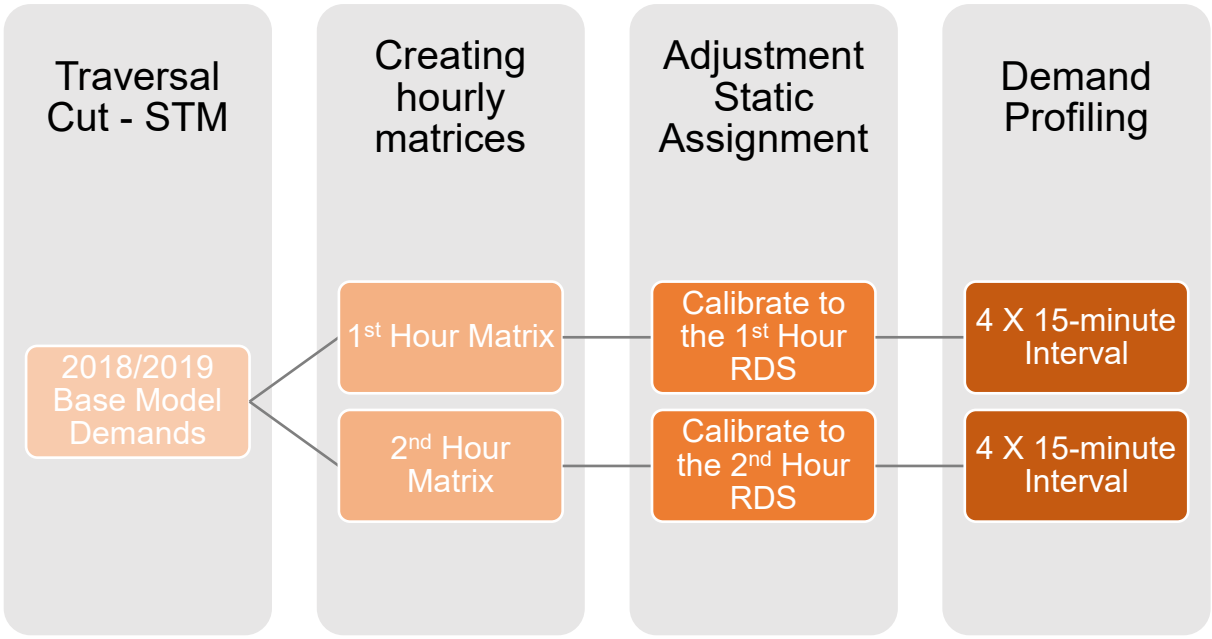
3.7.2 TRAFFIC DEMANDS

Prior demands for the current model utilise the 2018/2019 base model as a foundational demand matrix. These demands were used as an input to the strategic assignment to re-evaluate and refine network parameters and volume delay functions post model amendments.

The internal AIMSUN Static OD adjustment tool was then used to recalculate OD demands at an hourly level towards the updated survey volume targets. Secondly, the departure adjustment tool was then used to reprofile the static demand into 15minute profiled demand matrices which correlate to the recorded survey data.

Once profiled, an iterative adjustment process adopting a combination of parameter and demand refinements was used to reach a desirable level of turn calibration. Results of the calibration and validation are documented within the subsequent chapters to this report.

Figure 3.4: Demand Adjustment Process



3.8 Traffic Signals

Traffic signal characteristics for the base year model were derived from an extensive analysis of SCATS data. In response to TfNSW feedback on the 2018/2019 base model all intersections (with exception of a few pedestrian sites) have been updated for operate with actuated signal control. The signal groups and the associated detector functionalities and phasing specifications were all derived from analysis and interrogation of the sourced SCATS phase history data.

Minimum and maximum green times for each signal phase were input at a granularity of 15-minutes throughout the peak period. Phase sequences, signal offsets and special conditions were incorporated as relevant to existing SCATS operations.

It is noted that some adjustments were made to the signal timing to account for pedestrian movements. As pedestrians were excluded from the model, the green times for pedestrian affected movements were adjusted based on expected delays and approximate call frequency rate of the signalised crossing.

3.9 Public Transport

All public transport lines and schedules are coded as fixed routes as per the latest timetables available from the open-source General Transit Feed Specification (GTFS) data (dated 17/03/2022). No dwell time data was available at the time of model development and as such the following assumptions have been adopted in the model:

- Average dwell time: 15 seconds
- Dwell time standard deviation: 2 seconds

3.10 Dynamic Cost Function

The dynamic cost function for the microsimulation model was adjusted from the default cost function provided within the AIMSUN software. This was undertaken to not only consider travel time as a cost but also distance travelled. A comparison of the two functions is shown below:

Default Cost Function

Dynamic Cost = TT + TT x AW x A + UDCW * UDC

Adjusted Cost Function

Dynamic Cost = TT + TT x AW x A + UDCW x UDC + D x DW

Where:

TT = Estimated Travel Time

A = Attractiveness

AW = Attractiveness Weight

UDC = User Defined Cost

UDCW = User Defined Cost Weight

D = Distance

DW = Distance Weight

Further, the methodology used to calculate the attractiveness weight of each link was adjusted to reflect attractiveness as a function of road type and not overall capacity. This was adjusted as the default methodology applies greater differences to the attractiveness weighting for higher order roads and less of an impact for lower order roads. This does not reflect overall route choice in which vehicles will typically choose higher order roads based on travel time of total journey with local roads used typically used to access the desired destination.

3.11 Behaviour Parameters

Table 3.1 provides a summary of all global model parameters used to simulate the existing conditions and outlines any departures from the default values.

Table 3.1: Global parameters

Parameters	Default Value	Model Value
Driving Behaviour		
Simulation Step	0.80 seconds	
Reaction Time – Micro	0.80	
Reaction Time at Stop – Micro (Car)	1.20	
Reaction Time at Stop – Micro (Truck, Bus)	1.30	
Reaction Time at Traffic Light – Micro (Car)	1.60	
Reaction Time at Traffic Light – Micro (Truck, Bus)	1.70	
Reaction Time – Meso (Car)	1.20	
Reaction Time – Meso (Truck, Bus)	1.20	
Reaction Time at Stop – Meso (Car)	-	
Reaction Time at Stop – Meso (Truck, Bus)	-	
Reaction Time at Traffic Light – Meso (Car)	1.60	
Reaction Time at Traffic Light – Meso (Truck, Bus)	1.60	
Global Dynamic Assignment		
Cycle	15 minutes	
Attractiveness Weight	0.00	2.00
User-Defined Cost Weight	1.00	
Path Cost	-	-
Model	C-Logit	
Maximum Paths per Interval	2	

In addition to the above, local parameter enhancements were applied in the AIMSUN model (microsimulation) to more accurately replicate driver behaviour in the area and simulate the congestion that was observed.

4 Calibration and Validation

The role of the calibration and validation process adopted for the project was to develop a model that is fit for purpose and produces results that can be used for testing various network and planning options.

4.1 Criteria

The base year AIMSUN model was calibrated and validated with regard to the following criteria set out in the Roads and Maritime Services (now TfNSW) Traffic Modelling Guidelines, February 2013.

Table 4.1: Calibration and validation criteria

Item	Criteria
Link or Turn Volumes	***Network wide tolerance limits for turn/link volumes:*** • GEH ≤ 5 for at least 85% of link or turn flows • All Link and turn flows should have GEH ≤ 10 • R^2 value for Observed vs. Modelled plots to be >0.9
Travel Time Average	• Average modelled journey time to be within 15% or one minute (whichever is greater) of average observed journey time for full length of route. • Average modelled journey time to be within 15% of average observed journey time for individual sections.
Visual Checks	• Compare model congestion to observed datasets including TomTom OD surveys, TomTom junction data, Google traffic data and site observations.

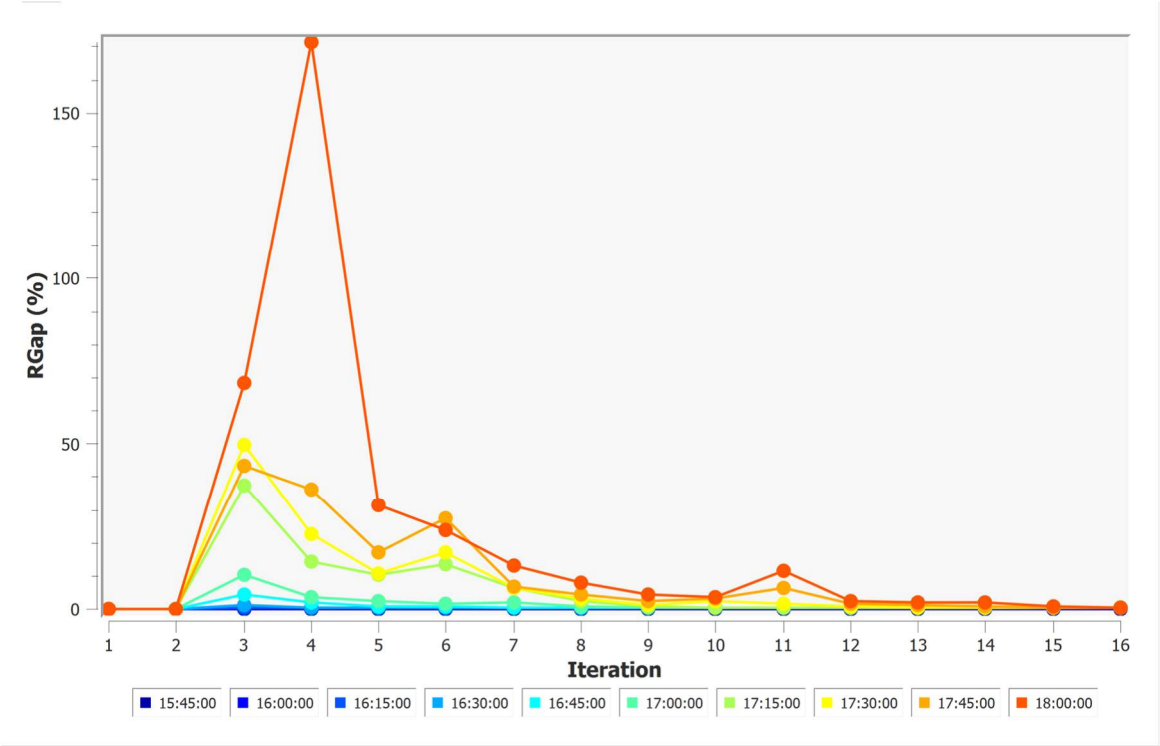
[1] As discussed in Section 5.1.2, core area calibration results for the microsimulation pocket have been used as guidance rather than an 'end criterion' for model calibration.

4.2 Model Stability

As simulation models are stochastic, they can produce different outcomes depending on their starting conditions. Due to this stochastic behaviour, it is necessary to assess how the model behaves under a variety of starting conditions (referred as seeds) using the same input parameters. The ability of a model to produce consistent results for a number of seed values is referred as the model stability, which has been assessed in this section of the report.

For the mesoscopic DUE assignment, the convergence of such models typically provides an indication of model stability. The relative gap (RGap) is a ratio of the actual travel time to the travel time when all vehicles use the shortest paths. The smaller the RGap the better the convergence. For the purposes of this assessment, the RGap being < 0.5% was adopted. Figure 4.1 demonstrates the base model showed a satisfactory level of convergence under the microscopic DUE assignment based on the relative gap of travel times over the multiple iterations.

Figure 4.1: Mesoscopic DUE model convergence



For the microsimulation SRC scenarios, the approach to calibration and validation of the base model is to simulate the models for five seed values. The median seed value from the five seed runs is determined based on the vehicle hours travelled (VHT), or total travel time network statistic from the five seeds and used to present the calibration and validation results in accordance with the TfNSW Traffic Modelling Guidelines.

- Seed Number 1: 28
- Seed Number 2: 2,849
- Seed Number 3: 560
- Seed Number 4: 7,771
- Seed Number 5: 86,524

The results of the stability test for the microsimulation SRC scenarios are provided in Table 4.2.

Table 4.2: PM peak– descriptive statistical results for VHT

Statistic	PM Peak
Number of Runs	5
Mean	2591
Standard Deviation	57
Range	128
Minimum	2505

Statistic	PM Peak
Maximum	2632
95% Confidence Limit	50
Lower Confidence Limit	2540
Upper Confidence Limit	2641
Median	2628

The results of the model stability analysis illustrate minor variations in the VHT results without large shifts in value which is in line with a typical variation in day-to-day traffic volumes. The above results have demonstrated the stable conditions of the model with varying seed runs. The identified median seed number for the hybrid SRC models is **2,849.** The following calibration and validation results have been based on the nominated seed run value for the respective peak and will be taken forward into future year models.

4.3 Core Area Calibration

The core area includes road network adjacent to the Bankstown Shopping Centre whose performance are highly related to the traffic generated by the shopping centre, as defined in Figure 3.1. All the turns within this core area are considered critical for calibration and validation. Conversely, meeting calibration and validation targets for the turns outside of this area are desirable but do not have direct influence on Bankstown Centre.

Having regard to the nature of the study area which services a large number of carparks, on-street parking, a railway station and pedestrian impacts associated with the shopping precinct; the area experiences a high degree of variability in flow operations through the peak hours. Although we can attempt to account for all the various influences on driver behaviour, such as pedestrians or parking cars, operations within shopping precincts such as this are often very difficult to match across a network. The difficulty is further exaggerated by the significant number of path choices between model zones, representative of the many car park entrances and exits. It is also to be noted that 54% of the turn volumes within the core area have less 150veh/hr as illustrated in Table 4.3.

Accordingly, the abovementioned factors all contribute to the achieved level of calibration being marginally under the GEH target criteria. Further refinement is expected to provide diminishing returns and is not expected to materially impact project outcomes. It may also result in the model becoming more rigid and therefore be less responsive to demand and network changes as part of any option testing.

The model calibration results are presented in Table 4.4.

Table 4.3: Observed Turn volume within Bankstown core area.

Observed Turn Volume	Class	PM Peak	
		4:00pm-5:00 pm	5:00pm-6:00pm
Turn Volume < 50	Car	18	19
	Truck	105	105
Turn Volume ≥ 50 and < 150	Car	41	40
	Truck	4	4
Turn Volume ≥ 150	Car	50	50
	Truck	0	0

Table 4.4: Bankstown Core Area Model Calibration Results

Criteria	Target	Class	PM Peak	
			4:00pm-5:00 pm	5:00pm-6:00pm
Individual Turn Counts GEH ≤ 5	>85%	Car	76%	72%
		Truck	96%	95%
Individual Turn Counts GEH ≤ 10	100%	Car	100%	97%
		Truck	100%	100%

Table 4.4 shows that an average turn calibration of 86% GEH < 5 was achieved within the first peak hour and 84% in the second hour. However, individually the calibration of cars, has a lower level of calibration marginally outside target criteria whilst trucks are well within target criteria.

It is noted that there are some locations which report GEH > 10 within the second peak hour (5:00pm-6:00pm). This includes the following;

- Chapel Road left turn into Rickard Road; 153 vehicles low in the 5:00-6:00pm peak hour.
- North Terrace right turn into Featherstone Street; 247 vehicles low in the 5:00-6:00pm peak hour.
- North Terrace through movement in westbound direction; 231 vehicles low in the 5:00-6:00pm peak hour.

The first discrepancy typically relates to balancing traffic to/from Bankstown Central carparks to/from the north via Chapel Street vs Jacobs Street. When demand struggles to exit Chapel Street south approach to Rickard Road alternative routes via Jacobs Street become more attractive.

The second two locations typically associated with balancing the attractiveness of paths north and south of the railway line between Marion Street and Bankstown Central. As North Terrace builds congestion demand tends to enter via South Terrace.

In addition to the above, a modelled versus observed traffic volume comparison has been undertaken in the form of a R^2 and scatter plot analysis for each PM peak hour. It is typically recommended that an R^2 value greater than 0.9 be achieved before a model is calibrated appropriately for the network.

Figure 4.2: Core Area PM peak turn flow comparison (4:00pm - 5:00pm) – Cars

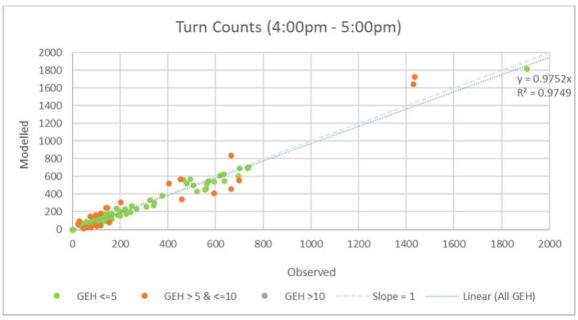


Figure 4.3: Core Area PM peak turn flow comparison (5:00pm - 6:00pm) – Cars

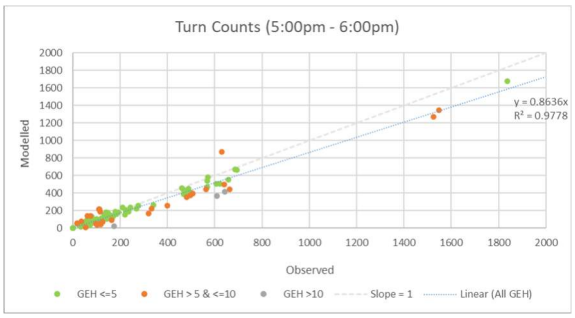


Figure 4.4: Core Area PM peak turn flow comparison (4:00pm – 5:00pm) – Trucks

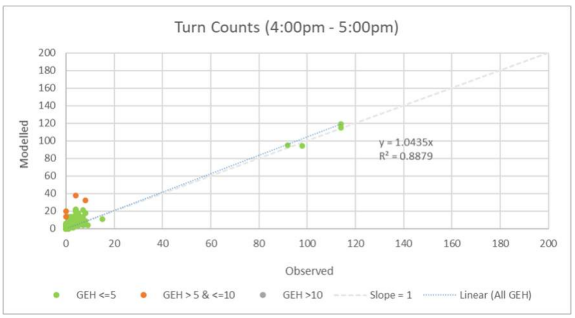
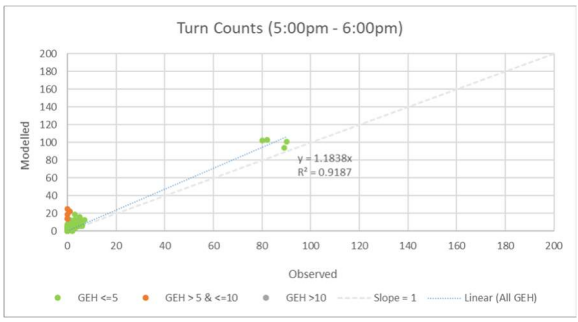


Figure 4.5: Core Area PM peak turn flow comparison (5:00pm – 6:00pm) – Trucks



Given the above, the results of the turn flow calibration meet the network wide calibration R^2 criteria for cars and are slightly 1-2% outside target for the truck flows in the first hour. However, noting the very low truck volumes the achieved R^2 criteria is considered satisfactory.

4.4 Network Wide Traffic Volume Calibration

The network wide traffic volume calibration results presented in this section refers to all turn counts within the model study area. The following table and figures summarise the comparison of the modelled turn flows against the surveyed (observed) counts, and how well they meet the network wide criteria specified in Section 4.1.

Table 4.5: Network Wide Model Calibration Results – All Vehicle Types

Criteria	Target	Class	PM Peak	
			4:00pm-5:00 pm	5:00pm-6:00pm
Individual Turn Counts GEH ≤ 5	>85%	Car	67%	67%
		Truck	96%	97%
Individual Turn Counts GEH ≤ 10	100%	Car	97%	98%
		Truck	100%	100%

The network wide calibration results shown in Table 4.5 indicate that the model achieves a reasonable level of correlation to the observed traffic volumes. As outlined in Section 4.3, given the variety of factors associated with a shopping precinct which impact path choice and influence network operation achieving a perfect match is extremely difficult. The difficultly is further exaggerated by the number of low flow targets. It is noted, 50% of turn targets have flows less than 150veh/hr, as shown in Table 4.6.

Table 4.6: Observed Turn volume within Whole Network

Observed Turn Volume	Class	PM Peak	
		4:00pm-5:00 pm	5:00pm-6:00pm
Turn Volume < 50	Car	37	42
	Truck	192	192
Turn Volume ≥ 50 and ≤ 150	Car	62	60
	Truck	10	10
Turn Volume > 150	Car	103	100
	Truck	0	0

Accordingly, overall performance is unable to achieve the target criteria for cars.

Figure 4.6: 1st hour (4-5pm) – Turns with GEH >10

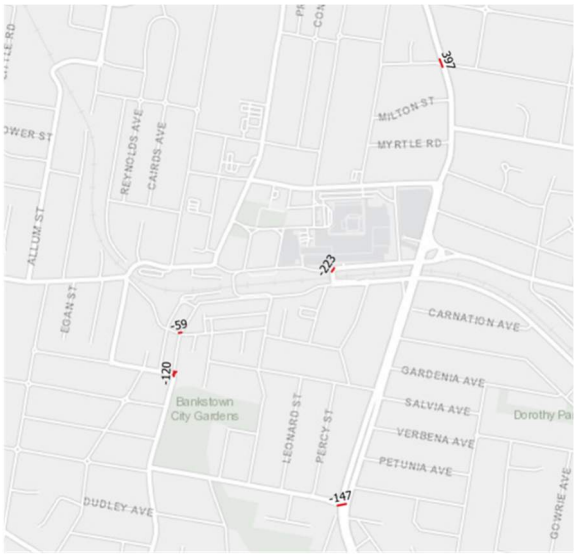


Figure 4.7: 2nd hour (5-6pm) - Turns with GEH>10

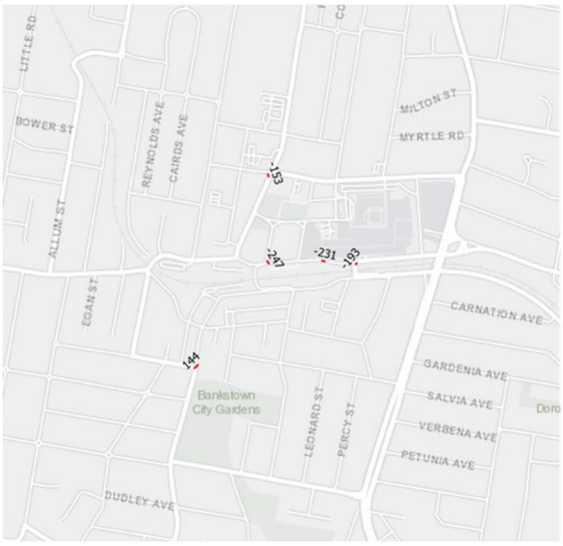


Figure 4.8: 1st hour (4-5pm) – Turns with GEH >5 & <10

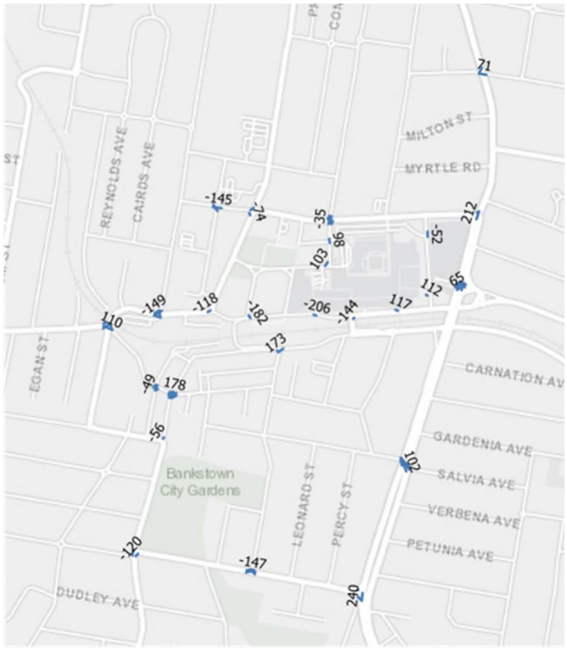
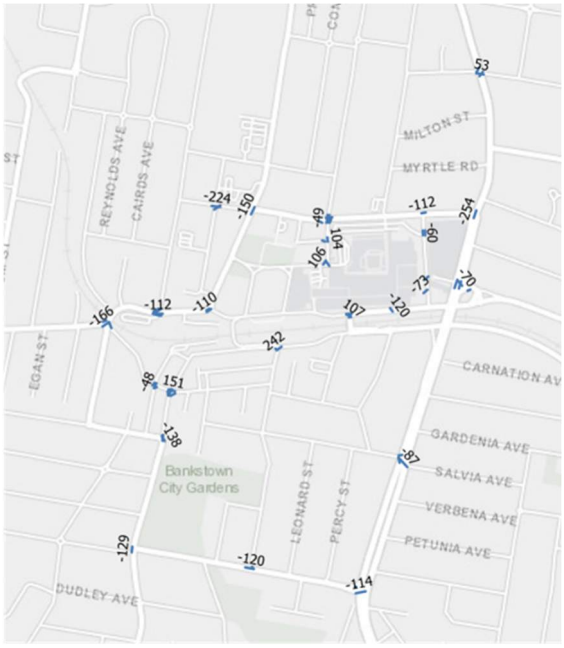


Figure 4.9: 2nd hour (5-6pm) – Turns with GEH >5 & <10



As per the core area outcomes, a modelled versus observed traffic volume comparison has been undertaken in the form of a R^2 and scatter plot analysis for each PM peak hour.

Figure 4.10: Network wide PM peak turn flow comparison (4:00pm – 5:00pm) – Cars

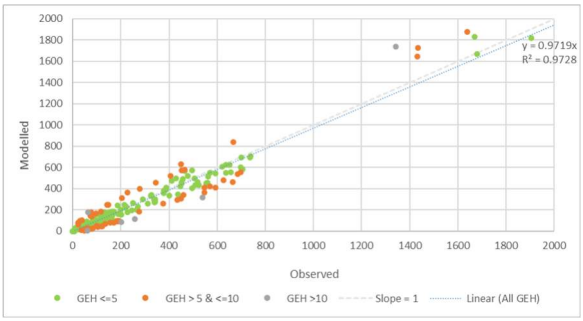


Figure 4.11: Network wide PM peak turn flow comparison (5:00pm – 6:00pm) – Cars

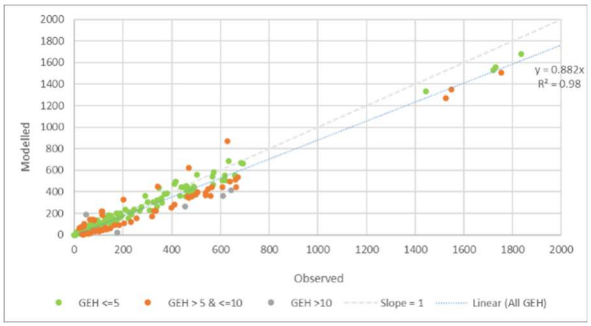


Figure 4.12: Network wide PM peak turn flow comparison (4:00pm – 5:00pm) – Trucks

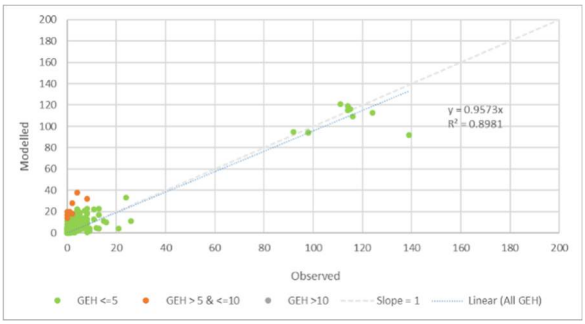
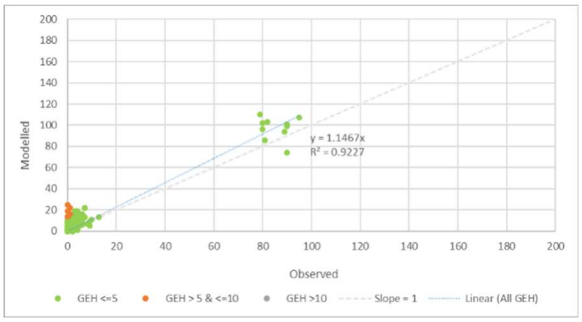


Figure 4.13: Network wide PM peak turn flow comparison (5:00pm – 6:00pm) – Trucks



The results of the turn flow calibration achieve the network wide calibration R^2 criteria for cars with truck flows.

Although turn calibration falls short of the target criteria, we believe that given the versatile operations shopping precincts typically experience and considering the validation criteria outcomes (contained within subsequent sections of this report), the model has achieved a suitable level of calibration for scenario testing.

4.5 Travel Time Validation

Table 4.7 summarises the travel time validation results for PM peak. The following routes have been assessed (refer Figure 2.6 for an illustration of the routes):

- Route 1 – Stacey Street between Mimosa Road and Macauley Avenue
- Route 2 – Between the Chapel Road/ Hume Highway intersection and the Macauley Avenue/ Stacey Street intersection via Chapel Road, Marion Street, Greenwood Avenue, Brandon Avenue, Chapel Road and Macauley Avenue

- Route 3 – Between the Meredith Street/ Hume Highway intersection and the North Terrace/ Wattle Street roundabout via Meredith Street, Marion Street, The Mall, Fetherstone Street/ The Appian Way and North Terrace
- Route 4 – Between the Marion Street/ Oxford Avenue intersection and Rickard Road / Stacey Street intersection via Meredith Street, Chapel Road.
- Route 5 – Between the South Terrace underpass and the Stacey Street/ Stanley Street intersection via South Terrace, East Terrace/Raymond Street/ Restwell Street and Stanley Street.

It is noted that the target travel time criteria requires that average modelled journey time to be within 15% or one minute (whichever is greater) of average observed journey time for the full length of route.

Table 4.7: Travel Time Validation Results – PM Peak

Peak Period	Route	Direction	Average Observed Travel Time (s)	Average Modelled Travel Time (s)	Difference		Meets Criteria?
					Absolute	Relative (s)	
4:00pm–5:00pm	Route 1	Northbound	07:28	07:33	00:05	1%	YES
		Southbound	04:24	04:52	00:28	11%	YES
	Route 2	Northbound	08:37	06:47	-01:50	-21%	NO
		Southbound	08:32	07:04	-01:28	-17%	NO
	Route 3	Eastbound	07:41	05:45	-01:56	-25%	NO
		Westbound	08:21	06:19	-02:02	-24%	NO
	Route 4	Eastbound	06:28	05:42	-00:46	-12%	YES
		Westbound	06:01	03:29	-02:32	-42%	NO
	Route 5	Northbound	06:16	03:09	-03:07	-50%	NO
		Southbound	05:56	04:49	-01:07	-19%	NO
5:00pm–6:00pm	Route 1	Northbound	06:34	06:33	-00:01	0%	YES
		Southbound	04:15	04:02	-00:13	-5%	YES
	Route 2	Northbound	09:08	06:27	-02:41	-29%	NO
		Southbound	08:26	07:25	-01:01	-12%	YES
	Route 3	Eastbound	07:26	05:46	-01:40	-22%	NO
		Westbound	07:50	06:58	-00:52	-11%	YES
	Route 4	Eastbound	06:23	05:00	-01:23	-22%	NO
		Westbound	05:50	03:27	-02:23	-41%	NO
	Route 5	Northbound	06:14	03:02	-03:12	-51%	NO
		Southbound	06:07	04:55	-01:12	-20%	NO

From a point-to-point perspective, the results presented in the table above indicates that the observed travel time on Stacey Street (Route 1) satisfy the travel time validation requirement.

Overall, the model presents travel times that are typically faster than the observed travel time along the other routes which traverse through the shopping precinct.

Having regard to the nature of the study area which services a large number of carparks, on-street parking, a railway station, and pedestrian impacts associated with the shopping precinct, the area experiences high degree of variability. Accounting for all factors which slow drivers within the vicinity of a shopping precinct can be extremely difficult. This includes factors such as; drivers looking for car parks or waiting for other motorists to depart a car park, pedestrian crossings and circulating traffic. Accordingly, modelled travel time presents faster than the observed data especially for the routes via Bankstown CBD.

A cumulative travel time comparison has been undertaken to evaluate the accuracy of the modelled travel time progression and its correlation with observed conditions. The importance of this method is that it identifies whether the model can reflect the level of delays experienced along the travel time route. The figures below represent the observed vs modelled cumulative travel time for each peak hour. The figures suggest that the modelled generally represents the travel time profile on all routes suggesting the model is able to replicate queuing and arrival patterns along each route. However, as previously mentioned typically presents faster travel times compared to the observed datasets.

The observed dataset represents TomTom data. TomTom data is probe data dependant and is based on the relative percentage of traffic which have TomTom devices installed. As such, two time periods of data have been presented within the below figures to show the survey date (represented by orange) and the weekday average February to December excluding holidays (represented by black). This ensures sufficient probe samples were captured and shows how the survey day compares to typical conditions.

Figure 4.14: Travel time comparison (4:00pm – 5:00pm) – Route 1 Northbound

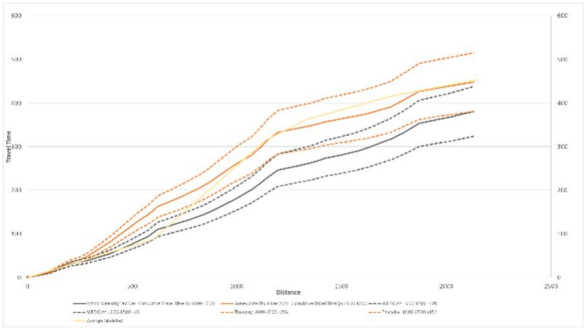


Figure 4.15: Travel time comparison (5:00pm – 6:00pm) – Route 1 Northbound

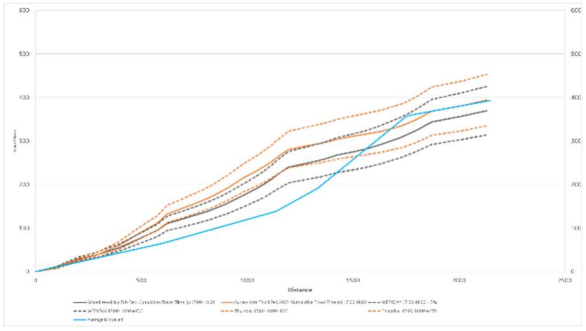


Figure 4.16: Travel time comparison (4:00pm – 5:00pm) – Route 1 Southbound

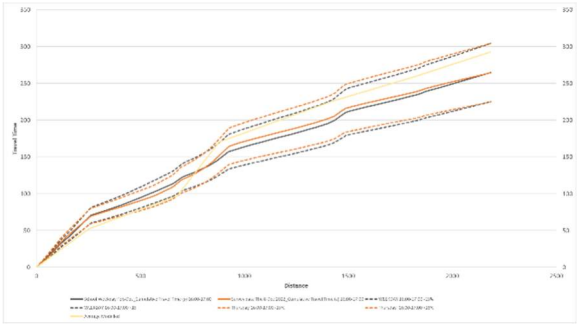


Figure 4.17: Travel time comparison (5:00pm – 6:00pm) – Route 1 Southbound

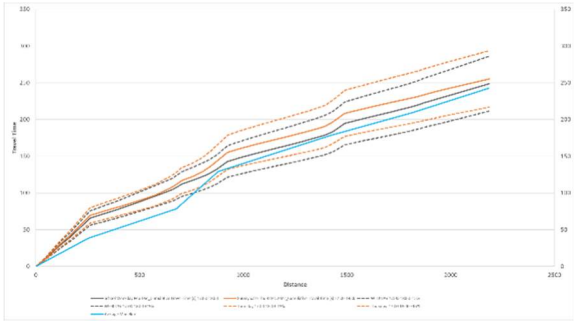


Figure 4.18: Travel time comparison (4:00pm – 5:00pm) – Route 2 Northbound

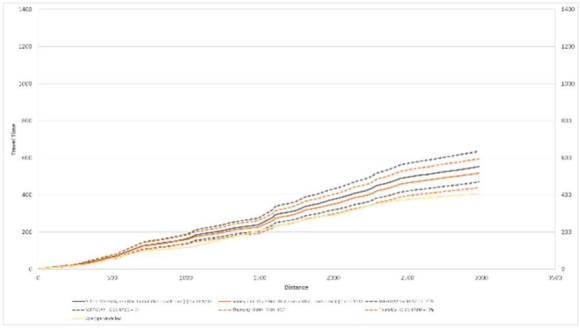


Figure 4.19: Travel time comparison (5:00pm – 6:00pm) – Route 2 Northbound

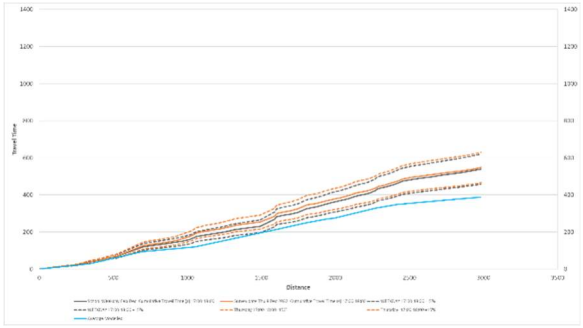


Figure 4.20: Travel time comparison (4:00pm – 5:00pm) – Route 2 Southbound

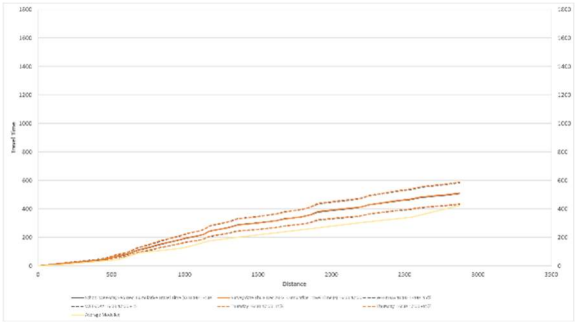


Figure 4.21: Travel time comparison (5:00pm – 6:00pm) – Route 2 Southbound

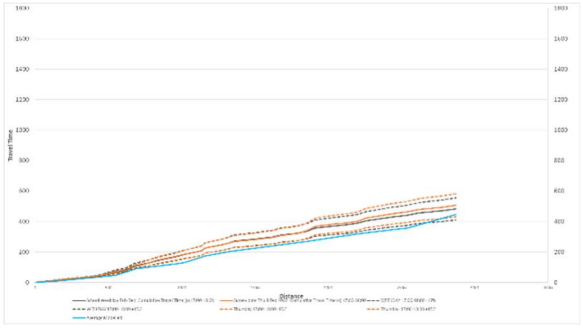


Figure 4.22: Travel time comparison (4:00pm – 5:00pm) – Route 3 Westbound

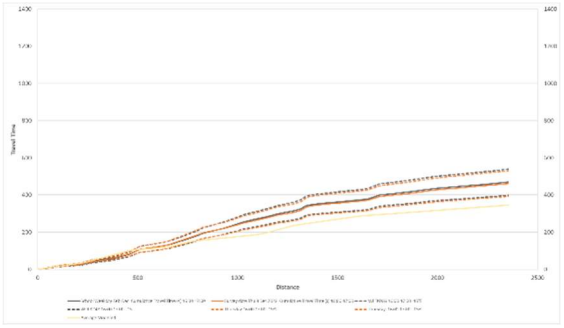


Figure 4.23: Travel time comparison (5:00pm – 6:00pm) – Route 3 Westbound

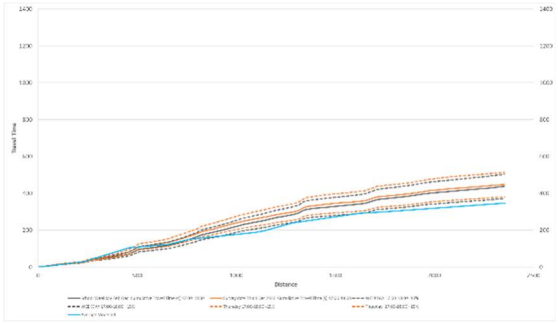


Figure 4.24: Travel time comparison (4:00pm – 5:00pm) – Route 3 Eastbound

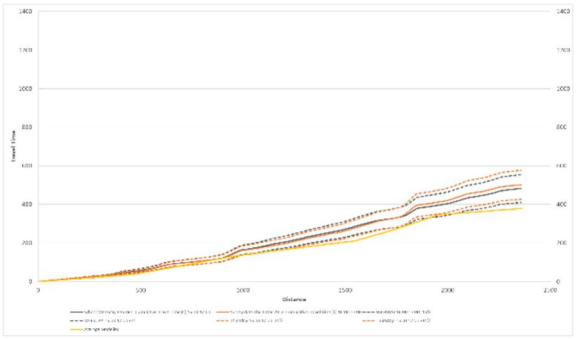


Figure 4.25: Travel time comparison (5:00pm – 6:00pm) – Route 3 Eastbound

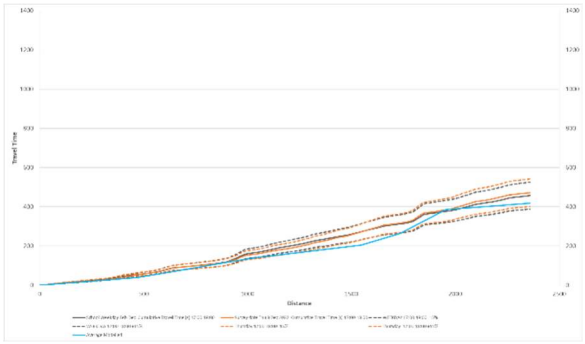


Figure 4.26: Travel time comparison (4:00pm – 5:00pm) – Route 4 Eastbound

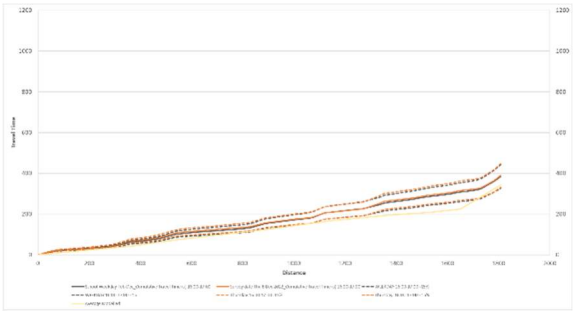


Figure 4.27: Travel time comparison (5:00pm – 6:00pm) – Route 4 Eastbound

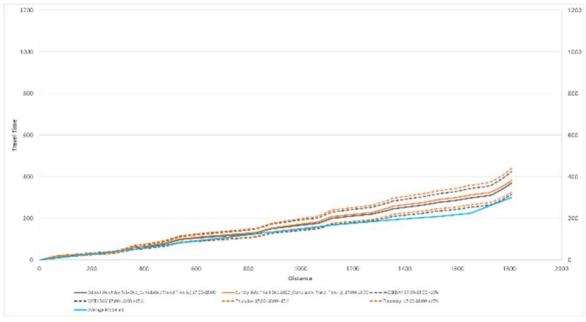


Figure 4.28: Travel time comparison (4:00pm – 5:00pm) – Route 4 Westbound

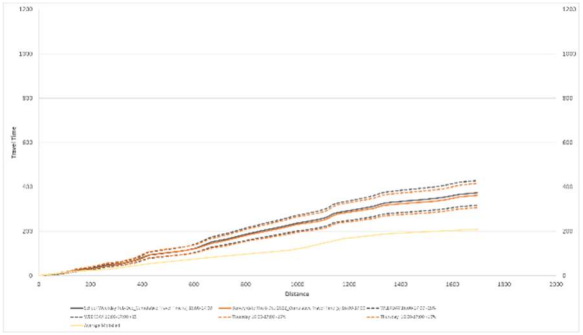


Figure 4.29: Travel time comparison (5:00pm – 6:00pm) – Route 4 Westbound

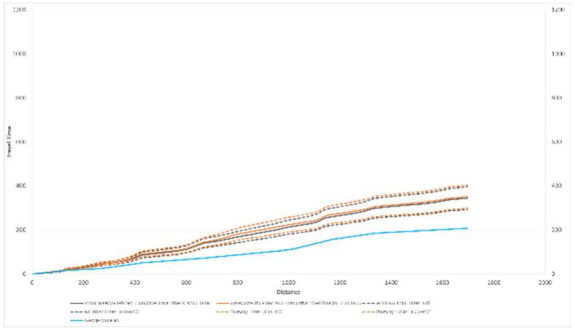


Figure 4.30: Travel time comparison (4:00pm – 5:00pm) – Route 5 Northbound

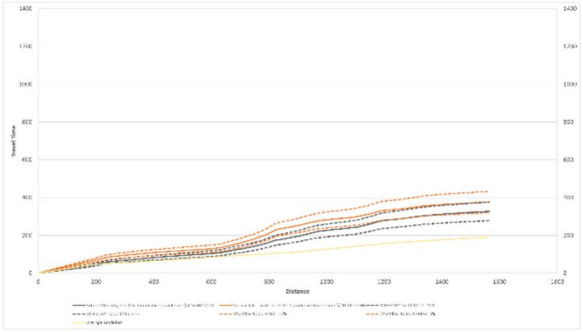


Figure 4.31: Travel time comparison (5:00pm – 6:00pm) – Route 5 Northbound

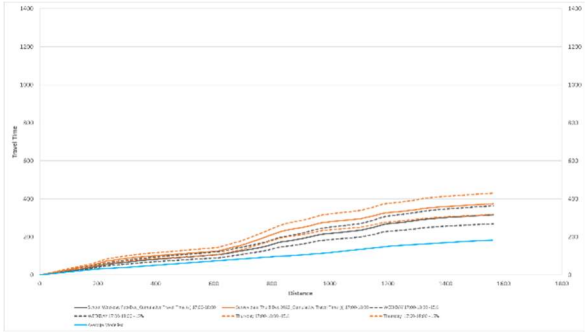


Figure 4.32: Travel time comparison (4:00pm – 5:00pm) – Route 5 Southbound

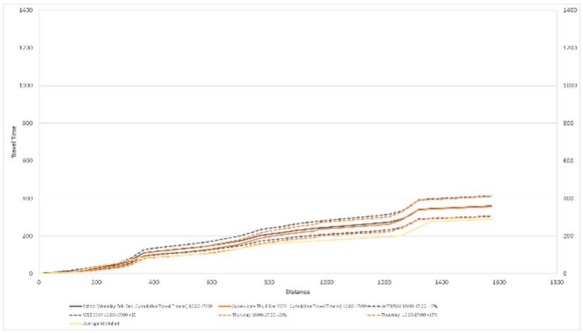
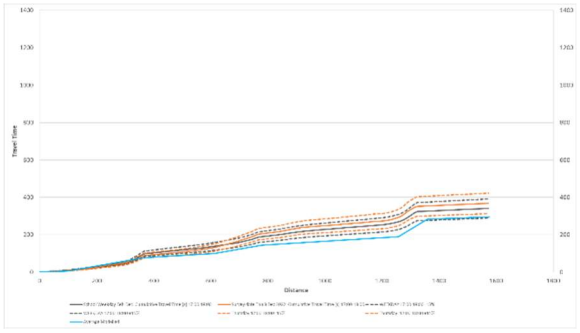


Figure 4.33: Travel time comparison (5:00pm – 6:00pm) – Route 5 Southbound



4.6 Visual Validation

In addition to turn calibration and travel times, the model has been reviewed with regard to visual validation with respect to operational performance and congestion. Site observations and TomTom junction data were the primary validation datasets for visual validation of network congestion.

Figure 4.34 shows the model queues representing the observed conditions along Stacey Street as discussed in Section 2.8. This includes Stacey Street southbound queues extending back to Rickard Road, starting to impact the eastbound approach and Stacey Street northbound flows building back from Wattle Street.

Also observed is some of the congestion surrounding North Terrace along the Bankstown Central frontage and the minor (single cycle) queues which form on Rickard Road intersection approaches. Also noted is the predominant centre lane usage on the North Terrace (east) approach to the intersection with West Terrace. Further, as observed during the site inspection a low level of congestion in other areas of the model.

Figure 4.34: Visual Validation - Queueing

Figure 4.35 shows the periodic build-up of vehicles on The Appian Way and North Terrace.

Figure 4.35: Visual Validation – The Appian Way / North Terrace

5 Conclusion

This report has presented and discussed the model inputs, assumptions and calibration and validation results of the AIMSUN modelling developed to address concerns raised by Transport for New South Wales (TfNSW) relating to the transport model built by GTA (now Stantec) for the Complete Streets transport strategy.

The report outlines the modelling development methodology, inputs, assumptions, and outcomes including:

- Data collection and existing traffic conditions.
- Development of the base model network and demands.
- Model calibration and validation.

Due to the nature of the study area which services a large number of carparks, on-street parking, a railway station, and pedestrian impacts associated with the shopping precinct; the area experiences a high degree of variability in flow operations through the peak hours. It is also noted that the recorded junction data (queue lengths) varied day-to-day reconfirming the variability in network operations surrounding shopping centre precincts. Further, there is a significant number of path choices between model zones, representative of the many car park entrances and exits.

Stantec has sought to replicate onsite conditions to the best of our ability. However, it is very difficult in a precinct such as Bankstown to account for every incident which occurred during the surveys. It is the combined influence that factors such as pedestrian interaction, car parking, and route choice to the various carparks which contribute to the achieved level of calibration being marginally outside guideline targets.

Notwithstanding this, given the core area performance and model validation, the model is considered suitable for the purposes of supporting the traffic analysis for the Bankstown Central Planning Proposal. It is acknowledged that further model refinements to enhance the calibration and validation may be required in the future as part of subsequent development applications. This may entail the creation of smaller models to better assess local conditions in the immediate vicinity of proposed development and/or infrastructure projects.

APPENDIX

Appendix A – Response to TfNSW Comments

Table A-5.1: Response to TfNSW Modelling Comments

Ref.	Details	Stantec Response
Table 2: Summary of review comments – Traffic Modelling Assessment Report		
1	2.1.1 Base Model Development	Noted. No action required.
2	2.1.3 Calibration and Validation Summary	N/A - Calibration and validation has been redone.
3	2.2.1 Future Year Demand	Not relevant to the Base Model Development.
Table 3: Summary of review comments – Base Model Calibration and Validation Report		
1	2.1 Overview of the collected data	Calibration and validation has been redone using new datasets.
2	2.2 Automatic Tube Count	Calibration and validation has been redone using new datasets. The peak focuses on the network peak which will not necessarily be the same at all intersections. Further, the peak chosen aligns with the peak at the Centre (retail peak).
3	3.3.3 Network Assumptions	The modelled traffic signals have been updated to operate with actuated signal control as part of this revision.
4	3.4.1 Zone System	The zone inconsistency has been updated as part of this model revision along with recalibration of base model demands.
5	3.4.2 Traffic	N/A - The current modelling only reports on the PM peak. Further, calibration and validation has being redone using new datasets.
6	4.1 Process	N/A - Calibration and validation has been redone using, link and turn count validation, travel times and visual validation.
7	4.2 Calibration and Validation Criteria	N/A - Calibration and validation has been redone.
8	4.3.2 Model Stability	Alternate representation on model stability has been presented within the latest calibration and validation report.
9	4.4 Model Calibration Results	N/A - Calibration and validation has been redone.
10	4.5 Model Validation Results	N/A - Calibration and validation has been redone.
11	4.5 Model Validation Results	N/A - Calibration and validation has been redone.
12	4.5 Model Validation Results	N/A - Calibration and validation has been redone.
13	4.6 Visual Inspections	Noted. Calibration and validation has been redone. Queue length validation has been addressed through the use of TomTom junction data, site inspections, and google traffic plots.
14	General	The updated calibration and validation included site inspections, as contained in the report.
15	General	N/A - Calibration and validation has been redone to address the listed criteria.
Table 4: Summary of review comments – AIMSUN Base Model		

Ref.	Details	Stantec Response
1	Speed limit – Stacey St	Speed limits were reviewed and updated in the revised modelling.
2	Wattle St – Missing component	This section is intentionally left out to prevent unrealistic rat running in the model, as the missing link just serves as an access to 2 residential properties.
3	Grade separation	This is purely visual and does not impact the results.
4	Path for Micro SRC	N/A - Calibration and validation has been redone and new path files generated.
5	Path available for Model Review	N/A - Calibration and validation has been redone and new path files generated.
6	Reproducing Base Model results	N/A - Calibration and validation has been redone and new path files generated.
7	The Mall	The geometry around The Mall Road, Jacobs Street have been updated to the current conditions in the revised modelling.
8	The Mall	The geometry around The Mall Road, Jacobs Street have been updated to the current conditions in the revised modelling.
9	Marion Street	This represents timed parking restrictions implemented to represent on-site operation.
10	Pedestrian crossing at traffic signal	Signals have been updated as part of the model recalibration. It is noted that pedestrian movements have still not been coded, however minimum phase times have been adjusted to reflect historically recorded scats timings from December 2022 (the survey date).
11	Traffic signal minimum green time	Signals have been updated to an actuated arrangement as part of the model recalibration. Minimum phase times have been adjusted to reflect historically recorded scats timings from December 2022 (the survey date), whilst the actuated nature allows for phase skipping where applicable.
12	Rat running due to Stacey Street congestion	N/A - Paths have been refined as part of the model update and this is no longer observed as an issue.
13	Midblock Pedestrian crossing	Pedestrian inputs were not coded and considered out of scope. The crossings have been coded for visual understanding of crossing locations. Further, the crossings act as a placeholder should pedestrian inputs be required to be added to a future model update.

Reference: **TfNSW Comments on Bankstown Complete Street Project – Base Model**

Attachment 4 – Bitzios Traffic & Transport Peer Review

Issue History

File Name	Prepared by	Reviewed	Issued by	Date	Issued to
P4655.001T Bankstown Central PP Peer Review	A. Lewis & D. Scutt	D. Scutt	J. Yang	1/09/2020	Wesley Folitarik at City of Canterbury Bankstown Council via email at Wesley.folitarik@cbcity.nsw.gov.au
P4655.002T Bankstown Central PP Peer Review	J. Hu & J. Yang	A. Ahmed	J. Yang	23/10/2020	Patrick Lebon at City of Canterbury Bankstown Council via email at Patrick.Lebon@cbcity.nsw.gov.au
P4655.003T Bankstown Central PP Peer Review	J. Yang	A. Ahmed	J. Yang	30/10/2020	Patrick Lebon at City of Canterbury Bankstown Council via email at Patrick.Lebon@cbcity.nsw.gov.au

Bankstown Central Planning Proposal

Traffic & Transport Peer Review Report

1. Background

Relevant background information is summarised below for context:

- On 20th December 2019, a planning proposal was lodged with the City of Canterbury Bankstown Council (Council) by Urbis Pty Ltd (Urbis) on behalf of Vicinity Centres PM Pty Ltd (the proponent) over the Bankstown Central Shopping Centre (subject site)
- The subject site is approximately 11.4ha in size and contains a 91,110m^2 shopping centre over multiple levels with both at-grade and multi-storey car parking facilities
- The planning proposal is for a mixed-use development with a variety of land uses including commercial, residential, student accommodation, serviced apartments, hotel, retail, and child care, with a total Gross Floor Area (GFA) of 395,415m^2
- In July 2020, GTA Consultants prepared a "Transport Impact Assessment" for the proposed development (referred to herein as the "traffic report")
- Council has engaged Bitzios Consulting to peer review the traffic and transport aspects of the planning proposal. The peer review will assess the assumptions, methodology and key recommendations outlined in the traffic report and provide Council advice on whether the study is adequate and can be used to inform strategic land use decisions and / or highlight any shortcomings and gaps.

Table 1.1 summarises the land use and yield changes outlined within the traffic report.

Table 1.1: Summary of Changes

Land Use	Current	Proposed	Increase
Retail	91,090m^2 GFA	106,773m^2 GFA	15,683m^2 GFA
Commercial	-	118,565m^2 GFA	118,565m^2 GFA
Residential	-	972 apartments	972 apartments
Hotel	-	656 rooms	656 rooms
Student Accommodation	-	1,597 units	1,597 units
Child Care	-	891m^2	891m^2

GFA = Gross Floor Area

Table 1.2 lists the documents reviewed as part of this report, noting that this engagement focuses on the traffic and transport aspects of the planning proposal (i.e. the traffic report).

Table 1.2: Reviewed Documents

ID	Title	Author	Date
1	Planning Proposal - Bankstown Central Shopping Centre, Bankstown	Urbis Pty Ltd	20 December 2019
2	Bankstown Central Shopping Centre Planning Proposal Transport Impact Assessment	GTA Consultants	17 July 2020
3	Bankstown Complete Streets Project Traffic Modelling Report	GTA Consultants	18 April 2019

2. Peer Review

2.1 Overview

This peer review has been structured based on the following traffic and transport items:

- Item 1: Walking and Cycling
- Item 2: Public Transport
- Item 3: Loading and Logistics
- Item 4: Car Parking
- Item 5: Traffic Generation and Traffic Impacts.

Key findings from the peer review are summarised below.

2.2 Item 1: Walking and Cycling

The traffic report states the following in relation to walking and cycling:

- The Bankstown Central Business District (CBD) benefits from a well-established urban pedestrian network, with all streets in the local area having sealed paths and lighting. However, some connections have reduced widths and low levels of amenity
- The Bankstown CBD currently lacks dedicated cycling infrastructure on the surrounding network, and cyclists are required to share the road space with vehicles
- The proposal includes additional pedestrian links including two (2) east-west connections and a new north-south connection through the Jacobs Street extension
- The proposal states that (min) 0.5 bicycle spaces per 100m2 of office will be provided.

The traffic report concludes that the proposal: *"seeks to promote pedestrian and cycling modes to/from the CBD through the provision of public open space, improved pedestrian connections in all directions and the provision of bicycle parking consistent with other Sydney based developments. These improvements will encourage the use of sustainable modes of transport and discourage the reliance on private vehicles."*

Notwithstanding the above, further detailed investigations should be undertaken during future development application stages to confirm the following:

- Safe and compliant connectivity to the surrounding network
- Appropriate design of bicycle parking spaces in accordance with AS2890.3
- Appropriate End of Trip Facilities (i.e. lockers, showers, change rooms) that promote the continued use of active transport mode share.

Given that the Planning Proposal's intensification of use is dependent on a shift away from private vehicle trips, it is recommended that a Green Travel Plan (GTP) be prepared and submitted as part of the documentation. The GTP is considered to be a strong planning tool which can support the applicant's statements regarding the anticipated mode share. By implementing specific travel initiatives or measures as a part of the GTP, the proposal can organically encourage a shift towards more sustainable modes of travel.

2.3 Item 2: Public Transport

The traffic report states the following in relation to public transport:

- The site benefits from excellent access to and is well serviced by public transport including the Bankstown railway station (with 15 minute peak hour services to the Sydney CBD) and bus interchange (with 22 bus routes run by three operators)
- The future new metro line, interchange and pedestrian connections between the metro station and CBD will improve the accessibility of the CBD and public transport services

- The proposal seeks to improve the public transport servicing the subject site through the extension of Jacobs Street into a 'bus only transit street' which facilitates bus movements through the site and removing stops from the surrounding road network.

Whilst 'in-principle' support may have been provided by Transport for NSW (TfNSW) for the proposed changes to the bus network and associated staging, further stakeholder engagement will be required during future development application stages to ensure that the outcomes are consistent with the requirements of the subject site and TfNSW.

The following comments are noted in regard to the three Stages of the bus network modifications:

- Stage 1:
  - The creation of the 'through-site link' between The Mall and North Terrace would require a thorough review of manoeuvrability and priority control during design stage, particularly given its close proximity to the Jacob Street intersection. Eastbound buses on The Mall turning right into the 'through-site link' would likely have to give way to oncoming vehicles and pedestrian, which could result in delays and queues on this approach.
  - It is understood that buses currently stopping at the layover east of Jacobs Street would stop at on-street bus stops on Jacobs Street and The Mall during Stages 1 and 2. Increase in bus usage at these stops may lead to queues which could significantly impact the performance of the surrounding road network, as there are only single lanes in each direction.
- Stage 2:
  - The conversion of Fetherstone Street to two-way could result in a loss of pedestrian amenity on the northern end due to required adjustments to the intersection layout to accommodate two-way traffic. To ensure pedestrian safety is not compromised, there may be opportunity to convert the intersection to traffic signal control, with signalised pedestrian crossings.
  - Similarly, the adjustments at the intersection of Fetherstone Street and North Terrace would enable a refresh of the pedestrian crossing arrangements at this location. This would allow clearly marked foot crossings, which could assist with reinforcing pedestrian safety in the highly trafficked location.
  - The alterations at The Mall / The Appian Way to allow for westbound traffic would impact the existing pedestrian zebra crossings. The proposed design should retain measures to accommodate pedestrian safety and amenity at this location. It is noted that if Fetherstone Street is signalised, another set of traffic signals may not be supported at this location due to safety issues raised by close proximity.
- Stage 3:
  - The proposed traffic signals at Jacobs Street extension / North Terrace would be located around 60m west of the North Terrace / South Terrace railway underpass signals. This could compromise traffic safety due to the 'see through' effect (being able to see the traffic lights at a different set of signals). This could also result in a decrease of the road capacity in the area, and vehicles are liable to get caught between the signals.

More details are required regarding the changes in bus stop and layover capacity resulting from the Bankstown CBD Bus Network Modifications.

2.4 Item 3: Loading and Logistics

The traffic report outlines the following in relation to loading and logistics:

- The site is currently serviced by a basement level loading dock which includes:
  - 10 loading bays suitable for vehicles up to a length of 14.6m
  - 10 loading bays suitable for smaller commercial sized vehicles (i.e. 8.8m and below).
- The loading dock is separated from existing / proposed pedestrian and cycling links
- The proposal seeks to adopts a strategy that optimises and manage the existing servicing provisions rather than provide new or additional loading facilities / capacity

Whilst the traffic report sets out a servicing strategy that appears to be appropriate, further detail will be required during the subsequent application stages including, but not limited to:

- The capacity for the existing loading dock to accommodate the servicing demands for the development, both in terms of quantify and size of service vehicles
- The appropriateness of the existing loading dock to safely and efficiently service the entire development, noting the distance between loading dock and new buildings
- A detailed Servicing Management Plan to formally document the servicing arrangements to ensure that queuing or services vehicles, on-street loading does not occur, and safe vehicles movements are undertaken within the existing servicing area.

The Traffic Report notes that the redevelopment of periphery sites will likely include separate underground loading docks designed specifically for the mixed use land uses proposed in those areas. More details are required regarding the proposed locations of the loading docks accesses, in particular for the 'Target site'. Additional heavy vehicle movements may have significant impacts on the road network surrounding the site, as it currently serves a high volume of buses and pedestrian traffic. Delivery trucks may cause friction and delays in the traffic as they look for gaps in the traffic to turn into the loading dock. If accesses are proposed on The Appian Way to the 'Target site', delivery vehicles would be required to detour through Fetherstone Street and The Mall to access the southbound-only road.

Furthermore, it is observed that 'Shared zones' are proposed on Fetherstone Street and The Appian Way as a part of the bus network modification. To ensure that pedestrian safety is not compromised, it is recommended not to have high volumes of heavy vehicles using those roads to access any loading dock entrances.

2.5 Item 4: Car Parking

The traffic report outlines the following in relation to car parking:

- Bankstown Central currently accommodates 3,283 car parking spaces
- Car parking at Bankstown Centre is uncontrolled (i.e. no limits or payment required), and provided in a mixture of at-grade, multideck and basement car parks
- Car parking occupancy surveys from March 2019 recorded a peak demand of:
  - **Thursday Peak:** 3,188 spaces or 97% capacity at a rate of 3.9 spaces / 100m^2
  - **Saturday Peak:** 3,086 spaces or 94% capacity at a rate of 3.8 spaces / 100m^2.
- GTA claim that a portion of the surveyed demand were all day rail commuters
- GTA note that in 2019, Council approved a DA which permitted the introduction of controlled parking (i.e. paid) at Bankstown Centre
- GTA claim that the introduction of paid parking will reduce demands at the subject site by 20% on weekdays and 10% on weekends, by supressing commuter demands. This assertion is supported by a case study at Castle Towers Shopping Centre
- Based on the assumed reduction in parking demands triggered by the introduction of paid parking, GTA nominate the following revised Bankstown Central parking rates:
  - **Thursday Peak:** 2,558 spaces or 78% at a rate of 3.1 spaces per 100m^2

- **Saturday Peak:** 2,777 spaces or 85% at a rate of 3.4 spaces per 100m^2.

- GTA recommend car parking rates for the various proposed uses.

Table 2.1 summarises our review of the nominated parking rates.

Table 2.1: Nominated Parking Rate

Land Use	Proposed	Source	DCP Requirement	Appropriate
Retail	3.0-3.5 spaces / 100m^2 GFA	Modified parking survey data for Bankstown Central	A parking survey should be carried out by the applicant, to assess the appropriate level of parking for developments greater than 4,000m^2 in gross floor area	Yes, however further detail justification is recommended in relation to the commuter demand reductions
Commercial	0 to 0.5 spaces / 100m^2 GFA	Approved parking rates for commercial developments in other LGAs	1 space per 40m^2 of half the GFA of the premises; and a planning agreement is considered on the remaining 50% of parking requirements for the purpose of public parking.	A relaxation of DCP rates is considered appropriate given the site context and recently approved rates in other LGAs. However, further justification is required to justify the minimum rate (no parking)
Residential	0 to 1 space / apartment	Adaptation of RMS Guide to Traffic Generating Development	A minimum of 1 car space and a maximum of 3 car spaces per dwelling; and 1 visitor car space per 5 dwellings.	Yes, however it is recommended that the RMS GTGD per bedroom rates are adopted (i.e. 0.4, 0.7, and 1.2 spaces per 1, 2 and 3+ bedroom dwelling) instead of a blanket per apartment rate
Hotel	0 to 0.2 spaces / room	n/a	1 car space per unit; and 1 car space per 2 employees.	No, further detailed justification is required to support the reduced rate
Student Accommodation	0.1 spaces / apartment	n/a	n/a	No, further detailed justification is required to support the proposed rate
Child Care	No parking	n/a	1 car space per 4 children + 2 additional car spaces for the exclusive use of any associated dwelling.	No, further detailed justification is required to support the reduced rate (no parking).

Based on the above, the traffic report estimates that 4,774 spaces would be required to service the development, which is an increase of 1,491 spaces on the current provision. These are broken down in Table 2.2.

Table 2.2: Car Parking Provision

Land Use	Pre-development Parking Spaces	Post-development Parking Spaces	Change in Parking Spaces
Retail	3,283	3,469	+186
Commercial	-	593	+593
Residential	-	486	+486
Hotel	-	66	+66
Student Accommodation	-	160	+160
Total	**3,283**	**4,774**	**+1,491**

In summary, the traffic report sets out recommended parking rates for the proposal. Whilst the intent to adopt reduce parking rates is sound and can be supported in-principle, further detailed justification will be required during subsequent applications to ensure adequate parking is provided for the various land uses. This should consider all land uses, temporal parking demands, and the cross-utilisation of parking spaces.

Key points from Table 2.1 are reiterated below:

- Further justification is recommended in relation to the commuter demand reductions from the Bankstown Centre car parking survey (and subsequent parking rates)
- Further justification is recommended in relation to the significantly reduced commercial parking rates, particularly the minimum rate (nil) which does not seem appropriate
- Further justification is recommended to support the parking rates for hotel land, student accommodation, and child care land uses, particularly the child care (nil)
    - For hotels: the DCP has nominated a rate of 1 parking space per unit for hotel uses. In our experience, other Local Council DCPs typically allow for a reduced rate to be applied where the proposed development is located in close proximity to the town centre or a public transportation hub, which this development satisfies. The reduction can be around 50% of the ordinary rate, which would entail 0.5 hotel parking spaces / unit. However, there are select case study sites in Parramatta which have been allowed a rate of 0.2 hotel parking spaces / unit, plus spaces for employees. For these reasons, we would advise that a parking rate between **0.2 – 0.5 hotel parking spaces / unit** should be acceptable.
    - For student accommodation: it is acknowledged that student accommodation does not generate the greatest parking demand. The DCP does not differentiate between typical residential accommodation and that for students. Given the expected lower car ownership amongst tertiary students, a reduction in the standard residential parking rate (assuming one-bedroom, 0.4 parking spaces / unit) is acceptable. However, the proposed rate of 0.1 parking spaces / unit is considered to be a significant reduction which should be justified via evidence-based means; this will ensure that any parking impacts due to potential overflow parking have been taken into account. For consideration, we reference the City of Monash Student Accommodation Car Parking Study (July 2009), which recommended a parking rate of **0.3 parking spaces / bed** when within close proximity to tertiary education facilities and/or public transportation.
    - For child care: While it is acknowledged that it is likely that childcare centre patronage will be for parents working in Bankstown Central, the provision of zero parking spaces for the childcare centre is not supported. Parking at childcare centre facilitates the pick-up and drop-off of young children in a safe and isolated environment, while ensuring operational efficiency during the busy before and after work peak periods. An area should be provided with sufficient parking capacity to accommodate these movements independent of other car parking modules, to ensure that queues do not affect general traffic movements. Furthermore, excepting cases where visitors live very close to the site, in our experience, childcare centres patrons are less likely to use active or public modes of travel. For these reasons, the **unreduced rates from the DCP** are recommended to be adopted for the childcare centre.
- It is recommended that the RMS GTGD per bedroom rates are adopted for the residential land uses instead of a blanket per apartment rate.

2.6 Item 5: Traffic Generation

The traffic report notes the following in relation to traffic generation:

- Traffic generation is based on 'per space' basis in lieu of the typical 'per GFA'
- This has been adopted to reflect the Travel Demand Management approach to minimise traffic generation and encourage alternative modes of transport
- The proposed development will have a negligible and acceptable impact on the operation and safety of the surrounding road network.

Table 2.3 summarises our review of the nominated traffic generation rates.

Table 2.3: Adopted Traffic Generation Rates

Land Use	Trips per space			Source	Appropriate
	AM Peak	PM Peak	Saturday		
Retail	None Identified			-	Justification Required
Commercial	0.40	0.35	0.0375	Not Identified	Equates to 0.2 trips / 100m^2 compared to typical RMS rates of 1.2 trips / 100m^2. Whilst it is acknowledged that reduced parking is proposed, this rate seems low. Further justification required
Residential	0.15	0.12	0.135		Yes, however the source of this rate should be referenced
Hotel	0.25	1.00	1.00		Yes, however the source of this rate should be referenced
Student Accommodation	0.15	0.15	0.15		Yes, however the source of this rate should be referenced
Child Care	None Identified			-	Justification Required

The traffic report states that the proposal will increase peak hour traffic demands by:

- **AM Peak Hour:** +351 trips
- **PM Peak Hour:** +356 trips
- **Weekend Peak Hour:** +178 trips.

Key points to note are summarised below:

- The increase of retail GFA (15,683m2) as outlined within the traffic report has not been included within the traffic generation estimates for the proposed expansion
- Whilst it is acknowledged that the proposal includes reduced parking rates, the estimated additional traffic demands equates to a peak hour trip rate of 0.24 trips per additional space (1,491 spaces), which seems low. Further justification is required
- The child care trip generation rate has not been provided, and detailed justification has not been provided detailing the reasoning behind the exclusion
- The trip generation rates for student accommodation, residential and hotel are generally appropriate, however the source of these rates should be referenced.

In summary, the traffic report sets out recommended trip rates for the proposal. Whilst it is acknowledged that adopting reduced parking rates would result in reduced trip rates, further detailed justification will be required during subsequent applications to ensure potential road network impacts are adequately considered and mitigated (if required).

2.7 Item 6: Traffic Impacts

The traffic report notes the following in relation to traffic impacts:

- GTA prepared an AIMSUN traffic model for 'Complete Streets'
- The Complete Street model was used to test the potential impacts of the added development traffic demands on road network surrounding Bankstown Central
- The modelling was conducted using a 2036 design scenario which incorporated the Complete Streets recommendations in addition to the additional development traffic
- Broad network statistics for the PM peak scenario have been reported to demonstrate negligible impacts. The broad network statistics (which are aggregated across the entire modelled area for all trips within the model) include total travelled distance, total travel time, average speed, average delay, and vehicles waiting to enter
- The report concludes '*the additional traffic generated by the indicative development yield is unlikely to have a notable impact on the operation of the road network'*
- The report also concludes that *'there are also opportunities for Vicinity Centres, Council and / or TfNSW to improve the operation of the network. These Opportunities will be investigated in future Development Applications or the like'*.

Key points to note are summarised below:

- The traffic report only outlines the PM peak hour results (i.e. no comment is made on the performance of the AM and Weekend scenarios). Whilst it is acknowledged that the PM peak is typically the busiest, for a development of this scale, at minimum the AM scenario should also be analysed. The difference in traffic directionality (incoming in the morning and outgoing in the afternoon for commercial, vice versa for residential) should result in an appreciable difference between the scenarios
- Whilst the traffic report considers broad network impacts, further detailed intersection based analysis will be required during the subsequent application stage to ensure potential road network impacts are adequately considered and mitigated (if required)
- Whilst the Complete Street model includes infrastructure upgrades, and the traffic report notes that there are opportunities to improve the operation of the network, the timing and responsibility of these potential upgrades have not been investigated. This will need to be undertaken during the subsequent application stage
- The 'Vehicles Waiting to Enter Network' statistic is shown to be around 1,000 vehicles at the end of the PM scenario, with ~75% associated with Bankstown Central. Whilst it is acknowledged that this number may be improved via future intersection upgrades or peak spreading, it should be stated that the release of this volume of vehicles into the network may have consequential downstream effects on the road network. These impacts are being masked behind the 'Vehicles Waiting to Enter Network' statistic
- The traffic report compares the intersection Level of Service (LoS) pre- and post-development across the study area via two figure extracts from AIMSUN software with colour-coded intersection nodes. These figures do not provide a clear understanding of the traffic impacts at each of the intersections, particularly in light of the fact that AIMSUN-calculated intersection delays can misrepresent actual performance due to limitations caused by short sections on approach to an intersection node. Furthermore, these figures are unclear on the adopted LoS thresholds. For these reasons, it is advised that a table of key intersections and their average delay and associated LoS will enable a more quantitative and effective analysis of the traffic impacts.

In summary, the traffic report includes high level network based modelling which appears to demonstrate that the planning proposal (with reduced car parking rates) would have manageable impacts on the surrounding road network. Nevertheless, further justification is required for the adopted parking rates (refer Section 2.5), and further detailed intersection based analysis is required to ensure road network impacts are adequately considered and suitable mitigation measures are identified to offset development impacts.

3. Summary

Key findings from this peer review report are summarised below:

- **Item 1 - Walking and Cycling:** The proposal seeks encourage the use of sustainable modes of transport and discourage the reliance on private vehicles. Whilst this is supported and encouraged given the site context, further detailed investigations should be undertaken during the future development application stages to confirm safe and compliant connectivity to the surrounding network, and adequate internal provisions (i.e. bicycle parking, end of trip facilities etc.). A GTP is recommended to be prepared, as it will be a strong planning tool to create a strategy for more sustainable travel options.
- **Item 2 - Public Transport:** The proposal seeks to improve public transport and land use integration via the creation of a new 'bus only transit street' through the subject site as an extension to Jacobs Street. Whilst this is a significant departure from the new bus station envisaged by Complete Streets, it is understood there has been extensive consultation with and 'in-principle' support provided by TfNSW regarding the 'bus only transit street' concept. Nevertheless, further stakeholder engagement will be required during future development application stages to ensure that the outcomes are consistent with the requirements of the subject site and TfNSW. The proposed Staged upgrade for this transit street is anticipated to have implications for pedestrian safety and amenity which should be addressed.
- **Item 3 – Loading and Logistics:** The proposal seeks to adopt a strategy that optimises and manages the existing servicing provisions rather than provide new or additional loading facilities / capacity. Whilst the strategy appears to be appropriate, a Servicing Management Plan will need to be prepared during subsequent application stages to confirm the capacity of the existing loading dock to accommodate increased servicing demands generated by the proposed development, and the appropriateness of the existing loading dock to safely and efficiently service the entire development. Further clarity is required on the proposed accesses to the separate loading docks, particularly for the 'Target site'. The implications and impacts of heavy vehicle routing and turning movements must be considered.
- **Item 4 – Car Parking:** The proposal seeks to adopt reduced car parking rates to maximise travel by sustainable transport modes and minimise travel by private motor vehicles. Whilst the intent is sound and can be supported in-principle, further detailed justification will be required during subsequent applications to ensure adequate parking is provided for the various uses. This should consider all land uses, temporal parking demands, and the cross-utilisation of parking spaces
- **Item 5 – Traffic Generation:** The traffic report sets out recommended trip rates for the proposal. Whilst it is acknowledged that adopting reduced parking rates would result in reduced trip rates, further justification will be required during subsequent applications to ensure road network impacts are adequately considered and mitigated (if required)
- **Item 6 – Traffic Impacts:** The traffic report includes high level network based modelling which appears to demonstrate that the planning proposal (with reduced car parking rates) would have manageable impacts on the surrounding road network. To ensure that the planning proposal has undertaken a full assessment of the expected traffic impacts, further justification is required for the adopted parking rates, insofar as where they have significant influences on generated trip volumes, and further intersection analysis is required to ensure that the ultimate road network impacts have been adequately considered across all scenarios.

It is noted that the proposal is in the CBD and adjacent to high quality public transport services, and that the applicant will seek to encourage travel modes other than private vehicles. However, the proposal is a significant redevelopment of the site and has the potential to generate significant traffic demands onto the surrounding road network.

Furthermore, the traffic report includes departures from standard practice such as reduced parking rates, and reduced trip generation rates.

Nevertheless, we are generally satisfied that the development would likely have manageable road network impacts on the surrounding road network, and that the level of detail required to investigate specific mitigation measures to offset development impacts can and should be undertaken during subsequent application stages.

Attachment 5 – Response to Bitzios Findings

The key findings of the Bitzios report (refer Attachment 4) have been reproduced below in bold and italics, with our responses thereafter.

Item 1 - Walking and Cycling: ***The proposal seeks encourage the use of sustainable modes of transport and discourage the reliance on private vehicles. Whilst this is supported and encouraged given the site context, further detailed investigations should be undertaken during the future development application stages to confirm safe and compliant connectivity to the surrounding network, and adequate internal provisions (i.e., bicycle parking, end of trip facilities etc.). A GTP is recommended to be prepared, as it will be a strong planning tool to create a strategy for more sustainable travel options.***

Stantec confirms that further detailed investigations will be completed to inform subsequent Development Applications and confirm that safe and compliant walking and cycling connectivity and associated end of trip facilities are provided. Vicinity Centres also confirms that it raises no objection to the preparation of a Green Travel Plan if sought by Council to support the future Development Applications.

Item 2 - Public Transport: ***The proposal seeks to improve public transport and land use integration via the creation of a new 'bus only transit street' through the subject site as an extension to Jacobs Street. Whilst this is a significant departure from the new bus station envisaged by Complete Streets, it is understood there has been extensive consultation with and 'in-principle' support provided by TfNSW regarding the 'bus only transit street' concept. Nevertheless, further stakeholder engagement will be required during future development application stages to ensure that the outcomes are consistent with the requirements of the subject site and TfNSW. The proposed Staged upgrade for this transit street is anticipated to have implications for pedestrian safety and amenity which should be addressed.***

Stantec confirms that discussion and engagement is continuing between TfNSW, Council and Vicinity Centres to advance the 'in principle' agreement reached in relation to the bus infrastructure required in the Bankstown CBD.

Importantly, it is noted that the 'in principle' agreement attained is for a layout generally consistent with the design provided within the updated TIA (refer to Attachment 2). This design includes the extension of Jacobs Street as a bus only transit street, with kerbside bus stops and/or layover bays. The final design of this extension will be subject to the outcomes of ongoing engagement between TfNSW, Council, and Vicinity Centres, but we remain confident that this solution will be found prior to the submission of major Development Applications at Bankstown Central.

Item 3 – Loading and Logistics: ***The proposal seeks to adopt a strategy that optimises and manages the existing servicing provisions rather than provide new or additional loading facilities / capacity. Whilst the strategy appears to be appropriate, a Servicing Management Plan will need to be prepared during subsequent application stages to confirm the capacity of the existing loading dock to accommodate increased servicing demands generated by the proposed development, and the appropriateness of the existing loading dock to safely and efficiently service the entire development. Further clarity is required on the proposed accesses to the separate loading docks, particularly for the 'Target site'. The implications and impacts of heavy vehicle routing and turning movements must be considered.***

Stantec agrees that these matters will need to be resolved as part of the future Development Application processes. Vicinity Centres also raises no objection to the provision of a Servicing Management Plan for these Development Applications assuming it cannot readily be included in other documentation (e.g., TIA reports, etc.).

Item 4 – Car Parking: ***The proposal seeks to adopt reduced car parking rates to maximise travel by sustainable transport modes and minimise travel by private motor vehicles. Whilst the intent is sound and can be supported in-principle, further detailed justification will be required during subsequent applications to ensure adequate parking is provided for the various uses. This should consider all land uses, temporal parking demands, and the cross-utilisation of parking spaces.***

Stantec agrees that the requested further information / detailed justification on car parking will be provided with the future Development Applications. It is expected that this justification will include analysis to be included within the Travel Demand Management Plan requested by TfNSW (refer to further discussion presented in Attachment 6).

Item 5 – Traffic Generation: The traffic report sets out recommended trip rates for the proposal. Whilst it is acknowledged that adopting reduced parking rates would result in reduced trip rates, further justification will be required during subsequent applications to ensure road network impacts are adequately considered and mitigated (if required)

Stantec agrees that the requested further information / justification on traffic generation will be provided with the future Development Applications. It is expected that this justification will include analysis to be included within the Travel Demand Management Plan requested by TfNSW (refer to further discussion presented in Attachment 6).

Item 6 – Traffic Impacts: The traffic report includes high level network based modelling which appears to demonstrate that the planning proposal (with reduced car parking rates) would have manageable impacts on the surrounding road network. To ensure that the planning proposal has undertaken a full assessment of the expected traffic impacts, further justification is required for the adopted parking rates, insofar as where they have significant influences on generated trip volumes, and further intersection analysis is required to ensure that the ultimate road network impacts have been adequately considered across all scenarios.

Stantec (and Vicinity Centres) agrees that further traffic modelling will be provided to accompany future Development Applications.

This traffic modelling will be informed by the analysis to be included within the Travel Demand Management Plan requested by TfNSW (refer to further discussion presented in Attachment 6) which will guide car parking provisions and thus traffic generation.

It is also recommended that this modelling is completed after the final bus infrastructure within the CBD is confirmed through the aforementioned discussion and engagement between TfNSW, Council, and Vicinity Centres.

Reference: **TfNSW Comments on Bankstown Complete Street Project – Base Model**

Attachment 6 – Response to TFNSW email dated 14 April 2023

The comments outlined in the TfNSW email dated 14 April 2023 have been reproduced below in bold and italics, with our responses thereafter.

…we have undertaken a preliminary review and consider that the best approach to dealing with any outstanding traffic and transport issues at the planning proposal stage, given the constrained nature of the existing road network, would be through the development of a Travel Demand Management Plan (TDMP) to minimise the traffic generating impact of the proposal. This TDMP should include, but not be limited to, the following:

- ***Improving pedestrian and active transport connections to the interim bus interchange, future permanent bus interchange, railway station and future metro station, and neighbouring land uses. This should also include interactions between the proposed development and the proposed shared use path on the northern side of North Terrace identified for safeguarding in the Bankstown Station Design & Precinct Plan (September 2021).***

- ***Lower parking rates are supported, however consideration needs to be given to measures that ensure lower parking rates (especially for the commercial and residential land uses) do not simply result in increased parking on neighbouring streets and high parking turnover that increases the availability of parking (resulting from additional timed parking restrictions on-site). This would increase traffic generation, which is undesirable. It is noted that the TIA provides additional retail parking but does not account for the additional retail trips resulting from new retail offerings (floor space). In general, further clarification is required with respect to forecast traffic generation (e.g. Table 7.4 in the updated TIA appears to show inconsistencies in the 'Demand for Car Parking Spaces', number of rooms, parking spaces, and movements per room with the remainder of the report).***

- ***Measures to promote and accommodate increased bus patronage given the large number of additional trips forecast on the public transport system (noting the railway line will not serve all travel movements/directions of travel).***

- ***How loading/unloading and service vehicles will access the site without significant safety and amenity impacts in areas of higher pedestrian/cyclist activity.***

- ***Mechanism to review the TDMP upon construction and occupation of the initial stages of the proposed development to identify whether the objectives are being met and if further measures are required."***

Vicinity Centres confirms its agreement to the preparation of this TDMP in parallel with the exhibition of the Planning Proposal.

In our view, this TDMP should be informed by the updated TIA included in Attachment 2 but be expanded to address the specific items requested by TfNSW. This is considered appropriate given the updated TIA adopts a travel demand management approach for the development of Bankstown Central. Specifically, we note that the Planning Proposal will encompass a range of "development responses" to proactively encourage walking, cycling and public transport use, and discourage private motor vehicle trips. These "development responses" are summarised in the Executive Summary (Table ES1) of the updated TIA (refer Attachment 2 of this letter), as reproduced, with highlighting added, below.

Reference: **TfNSW Comments on Bankstown Complete Street Project – Base Model**

Table ES1: Key Transport Responses

Mode	Development Response
	• Promotes pedestrian and to/from the Centre and the Bankstown CBD through the provision of public open space and improved pedestrian connections internal and external to the site in all cardinal directions.
	• Promotes cyclist and to/from the Centre and the Bankstown CBD through the provision of public open space and the provision of bicycle parking consistent with other Sydney based developments.
	• Facilitates future enhancements to the bus network in the immediate vicinity of the site via the creation of a new transit street known as the Jacobs Street extension. The proposed arrangement supports a productive CBD, improves bus operating travel times, improves user experience, retains proximity and is consistent with Complete Streets objectives.
	• Envisages loading and logistics activity via existing loading docks or a version of that arrangement to suit future conditions. This loading will principally occur at basement level or away from public realm areas. As land use and loading activity increases, the loading dock will likely become managed to maximise the turnover of loading bays
	• Proactively mitigates traffic impacts via the adoption of progressive car parking rates which are aligned with the nature of the development, the excellent public transport services available and the future of mobility services. • Proposes vehicle access to this car parking largely from North Terrace, Rickard Road, and Stacey Street (in accordance with the intent of Complete Streets), with limited reliance on Jacobs Street and Lady Cutler Drive.

In this context, we note our expectation that the TDMP will not fundamentally alter the nature of the Planning Proposal itself or materially impact or change the car parking and traffic impact assessment provided within this letter. Rather, we envisage it will add support to this analysis and documentation, whilst also providing more guidance for the future Development Applications at Bankstown Central. It is for this reason that the preparation of the TDMP in parallel with the exhibition of the Planning Proposal is considered reasonable.

Please note that TfNSW has written to Vicinity Centres to provide conditional support for their bus interchange proposals and will work collaboratively with Council on future bus layover designs that are also sympathetic to place needs.

This comment is noted. Vicinity Centres confirms it will continue to work collaboratively with TfNSW and Council to determine the appropriate bus infrastructure in the Bankstown CBD in the vicinity of Bankstown Central.

Based on time constraints, Stantec has only undertaken traffic modelling for the worst case scenario, which is the weekday PM peak and has advised that traffic modelling will be undertaken for both weekday peaks (AM and PM) as part of any future development application (DA) lodged. TfNSW has accepted this 'in principle' due to time constraints, subject to both the AM and PM peak being undertaken as part of any abovementioned DA provided it is traffic modelling that incorporates the cumulative traffic generation for the entire master planned development.

Stantec confirms that both the weekday AM and PM peak periods will be modelled for future Development Applications at Bankstown Central. The post development scenarios for this modelling will also be confirmed with TfNSW at the time of the Development Application submissions.

Reference: **TfNSW Comments on Bankstown Complete Street Project – Base Model**

Transport for NSW reserves the right to provide further comments during the exhibition of the Planning Proposal for the Bankstown Central site (upon receipt of an updated Planning Proposal and associated documentation including, but not limited to, soft copy modelling files).

This comment is noted. Vicinity Centres also confirms that it will ask Stantec to provide the soft copies of the modelling files to TfNSW upon exhibition of the Planning Proposal.