



Integrated
Transport
Study Report
25/05/2016

CG150966

Knox Central Integrated Transport Study





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Executive Summary

Introduction

Knox City Council is currently preparing a Structure Plan for the Knox Central Activity Centre (Knox Central), with the purpose of updating and building upon recommendations identified in the Knox Central Urban Design Framework 2005 (KCUDF).

The purpose of this Integrated Transport Study (ITS) is to identify deficiencies and areas of opportunity in the Knox Central study area in order to develop a framework for the future investment in transport network improvements, including public transport and active transport, as development increases and the demand across all modes of transport grows.

This ITS identifies existing transport issues and opportunities, and provides recommendations for potential future investment projects in the short term and into the future. These recommendations are intended to provide a transport network that is ‘fit-for-purpose’ as development in the study area places additional pressure on the network.

ITS Development Context

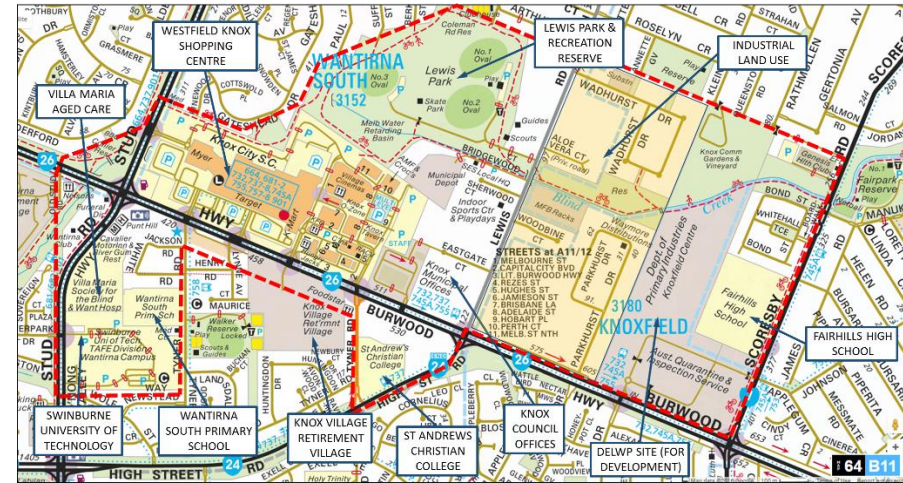
Location & land use

The Knox Central Activity Centre is located approximately 35 kilometres east of the Melbourne CBD and has an area of approximately 200 hectares. It is generally bounded by Scoresby Road to the east, Burwood Highway / Swinburne TAFE / St Andrews College to the south, Stud Road to the west and Westfield Knox / Lewis Park to the north.

The study area comprises a wide range of land uses that result in a cosmopolitan Activity Centre precinct. Notably, Westfield Knox is the key attractor of visitors to the study area, providing a mix of retail and commercial uses. Key land uses within Knox Central include:

- Retail (Primarily Westfield Knox)
- Education (Primary, Secondary, Tertiary, including Private education);
- Aged Care;
- Government (Department of Environment, Land, Water & Planning (DELWP));
- Industrial / Commercial (Warehouse, Manufacturing, and Servicing operations);
- Residential (Low to High Density);
- Civic (Knox Civic Centre – Council Offices and Operations Centre); and
- Open Space / Recreational (Blind Creek Trail, Lewis Park, and sporting facilities).

Knox Central Site Location & Key Land Uses



Planning Context

The recommendations identified in this ITS are intended to support the Knox Central Structure Plan whilst satisfying the key objectives set out in State and Local Government land use, development, and transport policy that include but aren't limited to:

- The **Transport Integration Act (2010)**, which was introduced in 2010 to create a framework for the provision of an integrated and sustainable transport system in Victoria;
- **Plan Melbourne**, which is the current Metropolitan Planning Strategy; an integrated land use and transport plan developed by the State Government and adopted in May 2014;
- **SmartRoads**, a road network management approach developed by VicRoads which recognises the increasing importance of public transport, walking and cycling as transport modes;
- The **Knox Central Urban Design Framework (KCUDF)** was prepared for the Knox Central Precinct and endorsed in 2005 with the key aim of outlining the built form principles required to support a thriving, lively focal point and mixed use activity centre for the outer eastern suburbs.

- Transport strategies outlined in the *Knox City Council Planning Scheme*;
- *The Knox Integrated Transport Plan 2015 – 2025 (ITP)*, which provides a framework for both the development and management of an integrated transport network to service the future needs of the Knox community and local business
- Transport aspirations identified in the *Knox Vision: Our City, Our Future 2013-2017* document, which intends to provide a picture of the future City that will deliver the lifestyle, jobs and industry, health and wellbeing desired by members of the Knox community. The *Knox City Plan 2013-2017* provides transport strategies to support the Knox Vision.

Integrated Transport Study Findings and Recommendations

The following sections outline the existing transport network with issues and opportunities identified for each transport mode. A set of network improvement recommendations for each mode have also been identified and included with an implementation plan.

Road Network Assessment

The observed and future road network issues and requirements were identified, and have helped define a proposed road network through Knox Central. This network was also developed using results from strategic traffic modelling. With this strategic road network identified, sections of the network were refined through the assessment of a number of intersection improvement options.

This section goes on to identify a set of recommendations to be implemented over time in order to provide the road network that will be required to address the current issues and provide for the additional demand as Knox Central continues to develop.

Existing Road Network

Knox Central sits east-west along the Burwood Highway Arterial Route between the north-south Arterial Routes Stud Road to the west and Scoresby Road to the east. The internal study area road network further consists of local Connector and Access Streets that connect the site to the surrounding Arterial Road network. Key road network links are outlined below,

Burwood Highway is an Arterial Road aligned generally in an east-west direction from Monbulk Road in Belgrave to Warrigal Road in Burwood where it continues as Toorak Road to the Melbourne CBD. Within the Knox Central study area, Burwood Highway is currently a

divided carriageway with 3 through traffic lanes in each direction. There are generally auxiliary turning lanes and a landscaped median provided between the intersections within the study area.

Stud Road is an Arterial Road aligned in a north-south direction which runs from Mountain Highway in Bayswater to the north to Clow Street in Dandenong to the south. Stud Road typically provides for three traffic lanes in each direction separated by a landscaped median.

Scoresby Road is an Arterial Road also aligned in a north-south direction which extends from Ferntree Gully Road in the south to Mountain Highway and beyond in the north. Scoresby Road provides an undivided carriageway with two lanes in each direction at Knox Central. Auxiliary turn lanes are provided where appropriate. A signalised pedestrian crossing is provided on Scoresby Road, approximately 300m north of the intersection with Burwood Highway, to facilitate pedestrian movements to and from Fairhills High School.

High Street Road is an arterial road extending west from Burwood Highway to St Kilda Road in Prahran. High Street Road has been upgraded between Stud Road and Burwood highway to provide a two traffic lanes in each direction on a dual carriageway.

Lewis Road is a key local road which provides a north-south connection through Knox Central, extending south from High Street Road at Burwood Highway to Boronia Road.

Tyner Road is a local road essentially comprising a loop road within Burwood Highway, Stud Road and High Street Road, connecting the residential, aged care and educational areas within to Burwood Highway and High Street Road. Tyner Road has a single traffic lane in each direction in addition to a kerbside parking lane on one side only.

Parkhurst Drive is a local road serving an industrial area which is accessed from a Burwood Highway service road and extends north from Burwood Highway then looping back onto itself. Parkhurst Drive is characterised by the industrial land use on both sides.

Signals are provided at the key intersections on Burwood Highway with Stud Road, Tyner Road, High Street Road, Scoresby Road and a number of access points to Westfield Knox.

Road Network Issues & Opportunities

The existing road network issues that have been identified throughout Knox Central are summarised in the table below, and are shown on the following figure.

Existing Road Network Issues

Reference	Road Network Issue
11	The intersections on Burwood Highway within the Knox Central study area all currently operate with very poor levels of service resulting in significant queuing on the approaches during peak periods.
12	The Stud Road / High Street Road intersection to the south of the study area operates above capacity during the peak periods, resulting in long queues on all approaches during the peak times.
13	The Boronia Road / Lewis Road intersection to the north of the study area is significantly over capacity and warrants signalisation in the short term.
14	There is a high concentration of road accidents at intersections along Burwood Highway, including incidents involving pedestrians and cyclists, particularly between High Street Road and Stud Road.
15	The VicRoads SmartRoads Road User Hierarchy for the study area indicates that the Burwood Highway and Stud Road are nominated as a 'Bus Priority Route' through the study area, as well as 'Bicycle Priority Routes' through Knox Central. Burwood Highway between the Tyner Road (loop) intersections is also a nominated 'Pedestrian Priority Route'. It will be necessary to continue to balance the accessibility needs for all modes on the road network through Knox Central, particularly along the Burwood Highway.

These issues have been highlighted on the following Plan

Lewis Road – Boronia Road Intersection - The Lewis Road/Boronia Road intersection to the north of Knox Central is currently operating at capacity under existing traffic conditions. Traffic modelling indicates that signalising the intersection would provide additional capacity at the intersection that would relieve current congestion in the short term and also allow for traffic growth in the longer term.

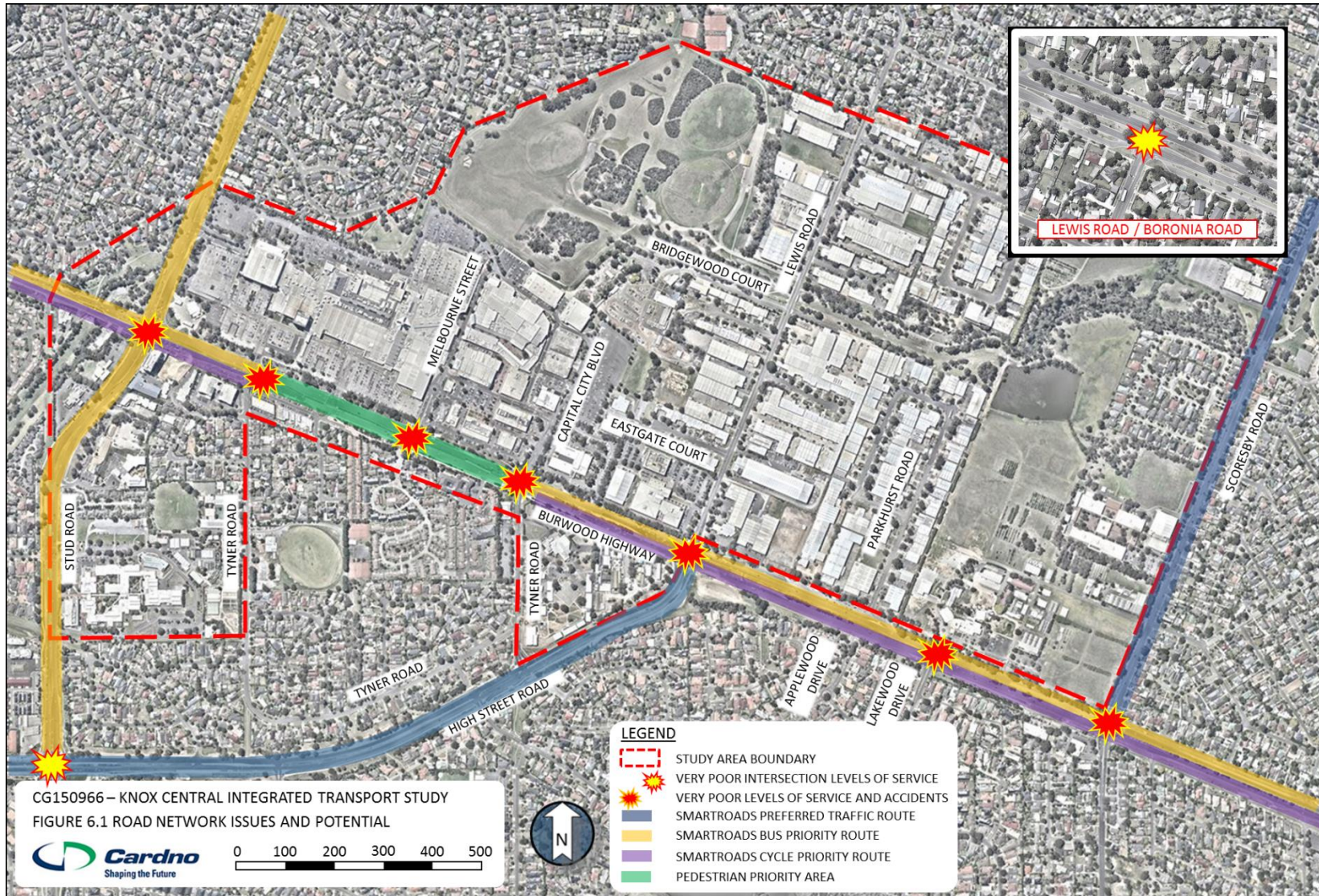
Eastgate Court to Bridgewood Court Link - It is understood that a number of intersections on the road network within Knox Central will require upgrading to allow new road connections and to allow for increased traffic growth at existing connections. Introduction of the north south link between Eastgate Court and Bridgewood Court will change traffic conditions in the Lewis Road and Capital City Boulevard area. Improvement measures may include the provision of roundabouts and priority intersection measures.

East – West Link Road - As future growth in the area results in increased traffic being generated within the study area, the need for an east west link through Knox Central becomes apparent. This link will provide additional connectivity to the surrounding arterial road network. Traffic modelling has suggested that the link between Lewis Road and Scoresby Road may be implemented in a staged manner, with a section from Scoresby Road to Parkhurst Drive provided in the first instance. An extension to Lewis Road to further improve permeability and the distribution of traffic through the study area should be provided at a later time.

DELWP Access Connections - The development identified within the DELWP masterplan and the increased industry generated traffic in the area around Lewis Road and Parkhurst Drive will provide a need for new and improved connections from those locations to Burwood Highway and Scoresby Road. The nature and timing of these connections will be determined by the feasibility of the proposed access locations outlined in the DELWP masterplan and also through consultation with and endorsement from VicRoads.

Burwood Highway Intersections between High Street Road and Scoresby Road - The intersection modelling has also identified opportunities to streamline the existing intersections on Burwood Highway, particularly by allowing simultaneous right turn movements from the north and south legs at the intersections with High Street Road and Scoresby Road.

Identified Road Network Issues and Potential



Road Network Recommendations

The identification of the road network issues and opportunities through the existing conditions analysis, the traffic modelling process, and consultation with Council officers allowed the following recommendations to be determined. These are presented in the table below with the priority in terms of delivery and the responsibility for the delivery. An indication of how these recommendations address the identified issues is also shown. These recommendations have also been identified where appropriate in the following road network recommendations figure.

Road Network Recommendations and Implementation

Item Ref	Project Description / Recommendation	Responsibility	Priority	Issues Addressed
R1	Advocate to VicRoads for the signalisation of the Lewis Road/Boronia Road intersection, and implement VicRoads endorsed intersection layout and signal plans.	VicRoads / Knox City Council	Short Term	I3
R2	Advocate to VicRoads to undertake intersection timing and phasing analysis at key intersections on Burwood Highway and Stud Road to identify improvements in the performance of the existing intersection arrangements.	VicRoads / Knox City Council	Short Term	I1, I2
R3	Further investigate the timing and nature of the proposed north south link road connecting Eastgate Court, Bridgewood Court, and Capital City Boulevard.	Knox City Council	Short Term	Future Network
R4	Further investigate the form of intersection connections that can be feasibly provided to Lewis Road north of Burwood Highway, and the proposed north-south link, particularly at the intersections with Bridgewood Court and Eastgate Court.	Knox City Council	Short Term	Future Network
R5	Investigate whether the preferred access to the existing Lakewood Drive/Burwood Highway intersection through the DELWP site as proposed in the draft DELWP precinct masterplan is feasible.	Knox City Council	Short Term	Future Network
R6	Consult with VicRoads to determine an acceptable configuration for the intersections on Burwood Highway between High Street Road and Scoresby Road, considering the options tested in this study.	VicRoads / Knox City Council	Short Term	I4, I5
R7	Investigate the feasibility of providing a staged construction of the identified East-West road connection between Scoresby Road and Lewis Road, and the timing of the implementation of the stages as part of the detailed planning for the DELWP site.	Knox City Council	Medium Term	Future Network
R8	Design and construct the East-West link road as per the recommendations identified in the feasibility study recommended in R7.	Knox City Council	Long Term	Future Network
R9	Implement the VicRoads endorsed intersection configuration along Burwood Highway between Lewis Road and Scoresby Road.	VicRoads / Knox City Council	Medium – Long Term	I4, I5

These recommendations are also illustrated on the following plan.

Public Transport Assessment

Existing Public Transport Network

Knox Central is serviced solely by bus services, with Westfield Knox operating as the bus interchange for a number of local and more strategic bus services. Bus service frequencies accessing Knox Central vary considerably, coupled with the current network coverage, leave significant gaps in the network

The closest railway stations to the study area are Bayswater Station (approximately 3.5km north-east) and Boronia Station (approximately 2.5km north-east).

The nearest tram route to the study area is Route 75 Tram (Etihad Stadium Docklands to Vermont South), which terminates at Burwood Highway / Hanover Road, Vermont South, approximately 5km west of the study area. The Knox Transit Link (Bus Route 732) connects to Tram Route 75 at the Vermont South terminus to Westfield Knox Shopping Centre site, this service meets every tram service at the Vermont South terminus.

Public Transport Issues & Opportunities

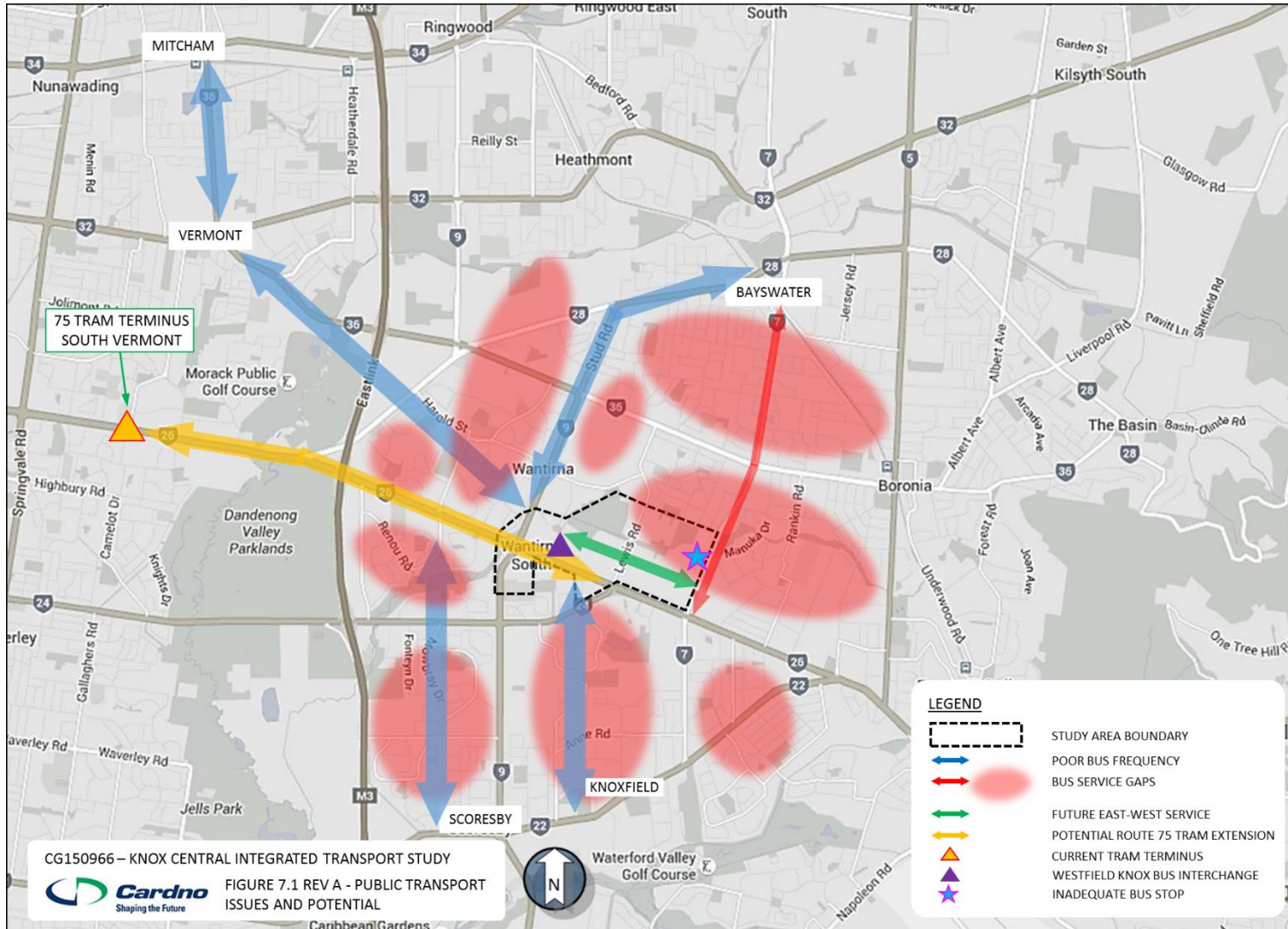
The existing public transport issues that have been identified throughout Knox Central are summarised in the table below, and are shown on the following figure.

Existing Public Transport Issues and Potential

Reference	Public Transport Issue
16	A number of the bus routes that access the study area from local catchments have a very poor frequency. These include route numbers 757 and 758 from the south and a number of key bus services (routes 664 and 738) from surrounding activity centres and transport hubs such as Bayswater, Vermont and Mitcham.
17	There are a number of service gaps in the network accessing Knox Central, including areas of Wantirna, Bayswater, Boronia, Knoxfield and Scoresby. There is a significant gap in the service along Scoresby Road between Bayswater and the intersection at Burwood Highway.

Reference	Public Transport Issue
18	While there is currently not the existing road network or demand for services internal to the Knox Central study area, there will be an opportunity in the future to provide an east west service through the precinct that will provide access to future commercial and residential development in Knox Central.
19	A number of bus stops servicing Knox Central do not provide shelters or adequate service information, which may discourage use of the buses at night or during inclement weather. A particular area of concern is the stop on Scoresby Road near the Fairhills School.
110	The Route 75 tram service from the CBD terminates at Burwood Highway / Hanover Road, in Vermont South, approximately 5km west of Knox Central. There is an opportunity to extend the tram service to Knox Central in the future.

Identified Public Transport Network Issues and Potential



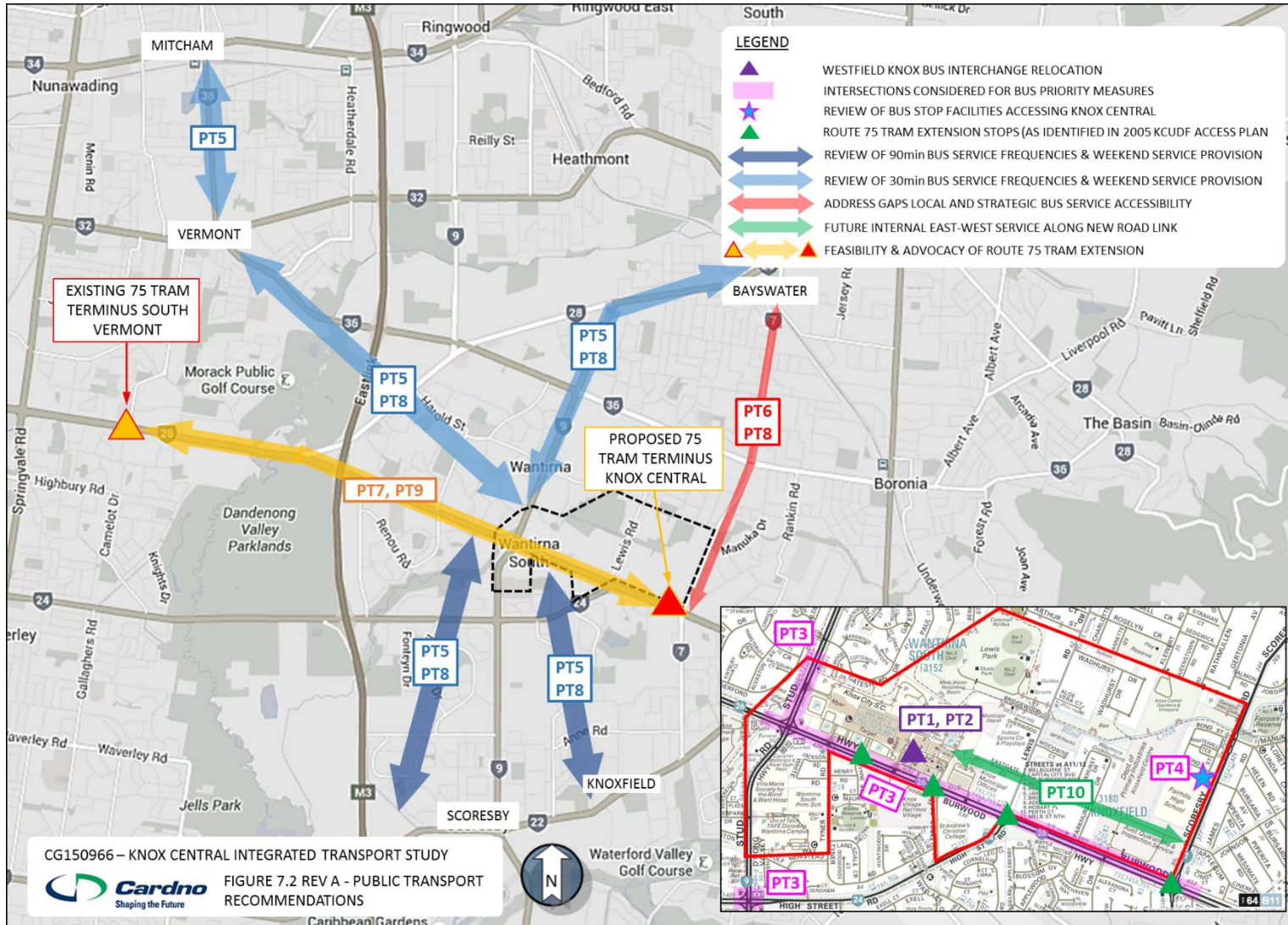
Public Transport Recommendations

The identification of the public transport issues and opportunities through the existing conditions analysis, and consultation with Council officers allowed the following recommendations to be determined. These are presented in the table below with the priority in terms of delivery and the responsibility for the delivery. An indication of how these recommendations address the identified issues is also shown. These recommendations have also been identified where appropriate in the following public transport recommendations figure.

Public Transport Recommendations and Implementation

Item Ref	Project Description / Recommendation	Responsibility	Priority	Issues Addressed
PT1	Support the relocation of the bus interchange as proposed under the Westfield Knox Stage 1 development.	PTV / Knox City Council	Short Term	Future Network
PT2	Liaise and coordinate with PTV to undertake a public transport awareness campaign associated with the relocation of the bus interchange at Westfield Knox.	PTV / Knox City Council	Short Term	Future Network
PT3	Investigate the potential to improve bus priority measures at intersections along Burwood Highway and Stud Road accessing the relocated bus interchange within Westfield Knox.	PTV / Knox City Council	Short Term	16, 17, 18
PT4	Liaise and work with PTV to improve service information and the provision and maintenance of shelters at appropriate bus stops on the surrounding network.	PTV / Knox City Council	Short Term	19
PT5	Liaise and work with PTV to assess the need to increase service frequencies on identified routes across the bus network servicing Knox Central.	PTV / Knox City Council	Short Term	16
PT6	Liaise and work with PTV to further investigate and identify gaps in the local bus network to improve accessibility to bus services to Knox Central and neighbouring activity centres including the Wantirna Health Precinct.	PTV / Knox City Council	Short Term	17
PT7	Undertake a feasibility study into the need and viability of the Route 75 tram extension along Burwood Highway to Knox Central.	PTV / Knox City Council	Medium Term	110
PT8	Advocate the delivery of network frequency and coverage improvement projects identified in the short term.	PTV / Knox City Council	Medium Term	16, 17
PT9	Advocate for the delivery of the Route 75 tram route extension.	PTV / Knox City Council	Short Term	110
PT10	Design and construct the East-West link road as per the recommendations identified in the feasibility study recommended in R7.	Knox City Council	Long Term	18

Public Transport Recommendations



Pedestrian and Cycle Network Assessment

Existing Pedestrian and Cyclist Network

Foot paths are typically located on both sides of the road within Knox Central, and shared paths are provided along sections of Burwood Highway, Stud Road and Scoresby Road.

There is currently very limited dedicated on-road cycle facilities throughout Knox Central. The existing bicycle network is primarily comprised of the shared path provision.

The Blind Creek Trail forms the ‘spine’ of pedestrian and bicycle movements through Knox Central, providing an east west link throughout the study area. Underpasses are typically provided to spatially separate the pedestrian cross movements from major vehicular routes (Scoresby Road, Lewis Road and Burwood Highway).

Blind Creek Trail does disconnect at Stud Road where pedestrians and cyclists must currently cross a slip lane accessing Westfield Knox, to utilise the traffic signals on Stud Road to continue along the Blind Creek. It is proposed to improve this disconnect as part of the Stage 1 development of the Westfield Knox site.

As part of the High Street Road duplication, signalised pedestrian crossings have been provided on High Street Road. A three metre shared path has also been constructed along the southern side of High Street Road between Burwood Highway and Stud Road.

Pedestrian and Cycle Network Issues & Opportunities

The existing pedestrian and cycle network issues that have been identified throughout Knox Central are summarised in the table below, and are shown on the following figure.

Existing Pedestrian and Cycle Network Issues and Potential

Reference	Pedestrian and Cycle Network Issue
I11	There are insufficient pedestrian crossing times at signalised intersections along Burwood Highway to cater for pedestrians with limited mobility or children. This is a particular concern given the land uses south of Burwood Highway including aged care facilities and schools.
I12	Pedestrian phases are currently not automatic at intersections along Burwood Highway and need to be activated by the push button.
I13	The new shared path on the southeast corner of the Burwood Highway / High Street Road intersection is discontinuous. There are no current plans

Reference	Pedestrian and Cycle Network Issue
	according to VicRoads to provide any further connections to the surrounding network beyond this point.
I14	An informal pedestrian route has formed across the front of a loading zone at the north-east corner of the Westfield Knox site creating a hazard of pedestrians and service vehicles.
I15	Pedestrians and cyclists using Blind Creek Trail currently have to cross Stud Road where they are required to utilise the traffic signals at the Westfield Knox access. This includes traversing an unsignalised left turn slip lane at the intersection, creating a conflict point with oncoming vehicles.
I16	The shared path on Scoresby Road is currently in poor condition, with uneven concrete surface and overgrown planting and other obstacles, likely to discourage use of the path by cyclists.
I17	There are currently a number of underpasses on Blind Creek Trail that do not have signs or warning markings, creating a hazard for cyclists.
I18	There is a lack of north south cycle links through Knox Central, however an informal desire line currently exists to Blind Creek Trail from the northern end of Parkhurst Drive. A link at this location would help promote cycling as a means of transport for workers employed in the industrial estates.
I19	Existing narrow paths surrounding the Knox Westfield Shopping Centre do not encourage bicycle movements to/from or across the site.
I20	There is an opportunity to further integrate pedestrian and cycle network connectivity and facilities through Knox Central with the proposed east west road network link.
I21	There is also potential to further integrate pedestrian and cycle connections through Knox Central with the proposed north south road network links
I22	There is currently a lack of end of trip facilities for cyclists at key trip generators within Knox Central
I23	There is a lack of dedicated on-road bicycle lanes within Knox Central, and across Knox more broadly.

Pedestrian and Cycle Network Recommendations

The identification of the pedestrian and cycle network issues and opportunities through the existing conditions analysis, and consultation with Council officers allowed the following recommendations to be determined. These are presented in the table below with the priority in terms of delivery and the responsibility for the delivery. An indication of how these recommendations address the identified issues is also shown. These recommendations have also been identified where appropriate in the following pedestrian and cycle network recommendations figure.

Pedestrian and Cycle Network Recommendations and Implementation

Item Ref	Project Description / Recommendation	Responsibility	Priority	Issues Addressed
PC1	Widen the footpath on the northern side of Burwood Highway between Stud Road and Melbourne Road to function as a shared bicycle / pedestrian path.	Westfield	Short Term	I19
PC2	Widen the footpath on the eastern side of Stud Road between the Blind Creek Trail link and Burwood Highway to function as a shared bicycle / pedestrian path.	Westfield	Short Term	I19
PC3	Provide a pedestrian crossing on each carriageway where the Blind Creek Trail meets Stud Road to provide direct connectivity for the trail.	Westfield	Short Term	I15
PC4	Provide additional pedestrian and shared path access points from Westfield Knox to the external foot or shared paths to the north and south of the shopping centre. Provide proposed additional cycle parking facilities as per Stage 1 development plan for Westfield Knox.	Westfield	Short Term	I19
PC5	Provide a link between Parkhurst Drive and Blind Creek Trail and through to the Community Garden / Old Orchard Winery site north of Blind Creek Trail at the existing desire lines to formalise access for pedestrians and cyclists through this area.	Knox City Council	Short Term	I18
PC6	Determine measures to improve shared path connectivity from High Street Road to north of Burwood Highway and implement measures identified.	Knox City Council / VicRoads	Short Term	I13
PC7	Improve wayfinding to shopping centre at new pedestrian crossing on High Street Road between Wolf Street and Wallace Road.	Knox City Council	Short Term	Future Network
PC8	Provide a short term measure to direct pedestrians away from the entrance to the loading dock on Melbourne Road along the north-east corner of the Knox City.	Westfield	Short Term	I14
PC9	Undertake a review of the shared path along the western side of Scoresby Road to include the provision of signage, the foot/cycle path condition, and its suitability as a shared path and identify improvement measures and implement the proposed measures.	Knox City Council	Short Term	I16

Knox Central Integrated Transport Study – Report

Prepared for Knox City Council

Item Ref	Project Description / Recommendation	Responsibility	Priority	Issues Addressed
PC10	Commission Blind Creek Trail audit, and implement identified improvement measures.	Knox City Council	Short Term	I17
PC11	Increase crossing times and automate pedestrian phases at the identified signalised intersections on Burwood Highway.	VicRoads / Knox City Council	Short Term	I11, I12
PC12	Commission a study to investigate north-south cycle links through the study area north of Burwood Highway, including Lewis Road and Parkhurst Drive.	Knox City Council	Medium Term	I18
PC13	Advocate to VicRoads regarding reducing the speed limit along Burwood Highway between Stud Road and High Street Road from the existing 80km/h to 60 km/h in order to improve safety for pedestrians and cyclists crossing the road, particularly through the SmartRoads pedestrian activity zone.	Knox City Council / VicRoads	Medium Term	I11
PC14	Provide additional north-south access points to Blind Creek Trail to service new and existing development.	Knox City Council / Developers	Medium Term	I18, I21
PC15	Integrate pedestrian and cycle facilities into the proposed East-West link road.	Knox City Council	Long Term	I20
PC16	Integrate north south cycle link proposals into existing and proposed road network as identified through in the study outlined in PC12.	Knox City Council	Long Term	I20
PC17	Consider on-road bicycle lanes in future reviews of bicycle infrastructure across Knox.	Knox City Council	Medium Term	I23
PC18	Provide a link between Blind Creek Trail and the Community Garden / Vineyard site to provide access for pedestrians and cyclists through this area.	Knox City Council	Long Term	I18

Pedestrian & Cycling Recommendations



Car Parking Assessment

Existing Parking Provision

There is considerable parking provided within Knox Central, as Westfield Knox currently provides approximately 6,300 free parking spaces for customers, including dedicated accessible and parents with pram spaces. There are multiple access points off Stud Road and Burwood Highway to the Westfield Knox car park facilities.

Outside of Westfield Knox, there is also a considerable amount of dedicated and on-street parking provided including:

- Knox City Council staff and visitor off street parking;
- DELWP site staff parking;
- Fairhills High School staff parking;
- Parkhurst Drive and Lewis Road industrial estates – combination of on street and off street parking reserved for each tenancy;
- Bond Street / Whitehall Terrace residential on-street parking

Utilisation of on-street car parking provisions were observed to be typically moderate, with the exception of Parkhurst Drive which experiences high utilisation, which is common for an industrial precinct.

Car Parking Issues & Opportunities

The existing car parking issues that have been identified throughout Knox Central are summarised in the table below, and are shown on the following figure.

Potential Car Parking Issues

Reference	Car Parking Issue
I23	Potential parking overspill from Westfield Knox into surrounding Knox Central streets and car parks and neighboring residential streets.
I24	Car parking demand exceeding supply within Knox Central, causing overspill into Westfield Knox and/or neighboring residential streets.

Reference	Car Parking Issue
I25	Car parking generated by the industrial area increasing and spilling into surrounding streets with Knox Central and beyond.
I26	Car ownership outstripping the statutory supply requirements for new residential development in Knox Central, resulting in on-street resident parking demand.

Car Parking Recommendations

The identification of the car parking issues and opportunities through the existing conditions analysis, and consultation with Council officers allowed the following recommendations to be determined. These are presented in the table below with the priority in terms of delivery and the responsibility for the delivery. An indication of how these recommendations address the identified issues is also shown.

Car Parking Recommendations and Implementation

Item Ref	Project Description / Recommendation	Responsibility	Priority	Issues Addressed
P1	Require that statutory car parking rates are satisfied for new developments in order to provide adequate off street parking.	Knox City Council	Short – Long Term	I22
P2	Commission parking assessments to monitor on-street and Council managed off-street parking as development progresses in the Knox Central.	Knox City Council	Medium Term	I22
P3	Require Green Travel Plans for all appropriate residential and commercial developments as per the requirements set out in Council policy developed under the Knox ITP actions.	Knox City Council	Medium Term	I22, I23, I24
P4	Prepare a Precinct Parking Plan for Knox Central as per the requirements set out in Council policy developed under the Knox ITP actions to manage parking throughout the study area as development increases.	Knox City Council	Medium - Long Term	I21, I22, I23, I24
P5	Support provision for electric cars in both residential and commercial car parks, with dedicated charge points for electric cars in public car parks.	Knox City Council	Medium - Long Term	Future Provision
P6	Support parking provision for rideshare vehicles in locations that will encourage usage.	Knox City Council	Medium - Long Term	Future Provision

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Appendices

Appendix A Existing Conditions – Traffic Volumes & SIDRA Outputs

Appendix B Strategic Modelling Detail & Analysis

Appendix C Local Intersection SIDRA Modelling & Analysis

Appendix D Standard Cross Sections

1 Introduction

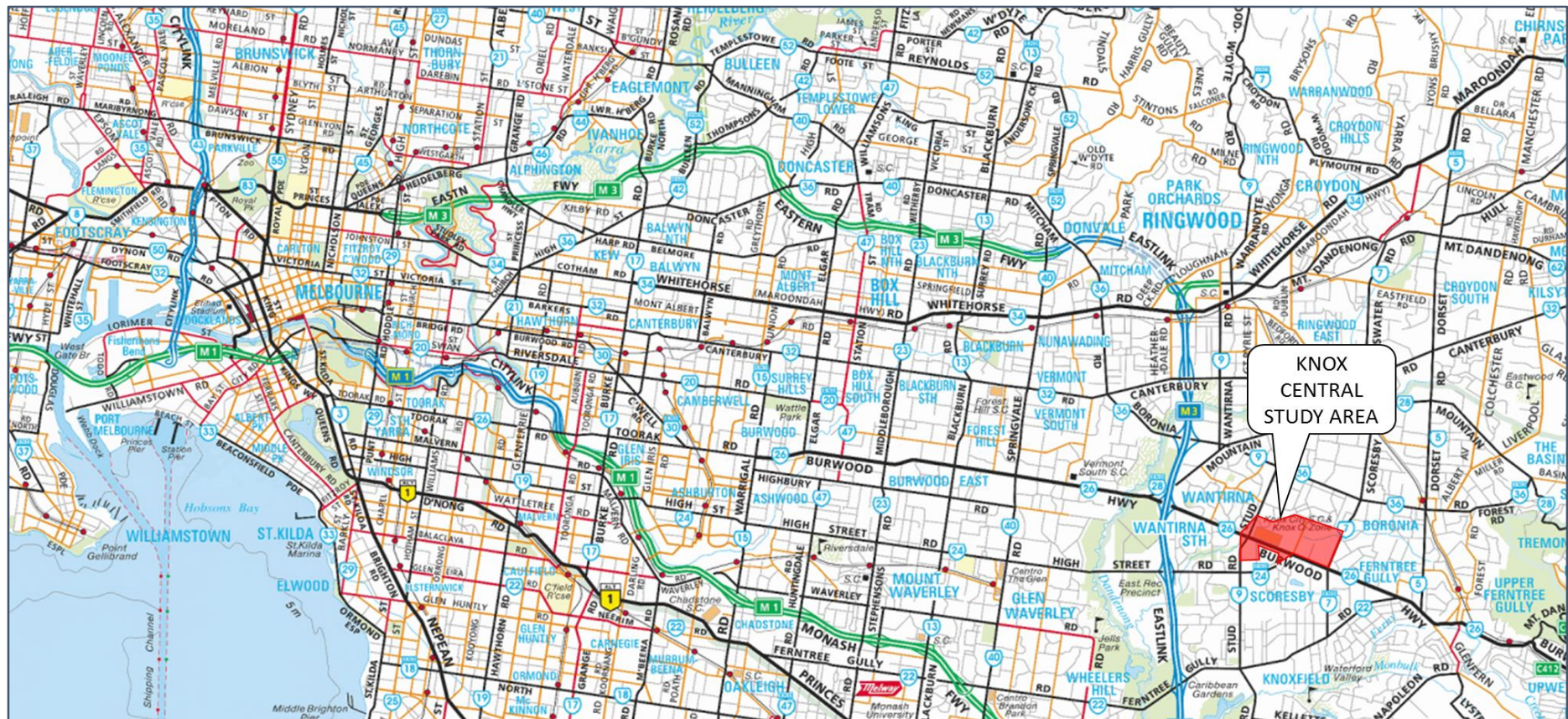
1.1 Background

Cardno Victoria Pty Ltd (Cardno) has been engaged by Knox City Council to complete an Integrated Transport Study to inform the preparation of the Structure Plan for the Knox Central Activity Centre (Knox Central). Knox Central is the municipality's largest Activity

Centre and currently includes civic, retail, industrial, commercial, educational, aged care, recreational, entertainment, and residential land uses and public open space.

Knox Central is located approximately 35 kilometres east of the Melbourne CBD and covers an area of approximately 200 hectares. The location of the Knox Central Study Area in the context of the wider road network is outlined in Figure 1-1.

Figure 1-1 Knox Central Study Area



The purpose of the Knox Central Structure Plan is to contemporise the Knox Central Urban Design Framework (KCUDF) which was adopted by Council in 2005. At the time, the KCUDF articulated Council’s vision for the precinct as a:

“modern mixed-use activity centre, bringing about a shift in the role and form by focusing on the highest quality urban design and the broadest possible range of activities in a physically, economically, socially and culturally cohesive vital place.”

Further detail on the KCUDF is provided in section 3.2.5 of this report.

The Structure Plan will include recommendations for planning controls and policies to implement land use and development objectives and strategies through an amendment to the Knox Planning Scheme. The Structure Plan will also identify necessary infrastructure improvements within the study area.

1.2 Purpose of the Integrated Transport Study

The purpose of the Knox Central Integrated Transport Strategy (ITS) is to identify deficiencies and areas of opportunity in the Knox Central study area in order to develop a framework for the future investment in transport network improvements as development grows and demand increases in the study area. The tasks involved in the development of the ITS are outlined in Figure 1-2.

Figure 1-2 Key Study Tasks



This ITS report refers to and builds upon the earlier study background reports prepared during the development of the ITS which are outlined as follows:

- Existing Conditions Transport Assessment Report (17 February 2016);
- Information Review and Gap Analysis Report (17 February 2016); and
- Model Development Paper (17 February 2016).

This report also builds on subsequent transport modelling and analysis to provide an evidence base upon which a set of improvement measures can be developed.

1.3 Referenced Documents

A number of background documents and studies have been considered in preparing this ITS, including:

- The Transport Integration Act (2010) (TIA);
- Plan Melbourne – the current Metropolitan Planning Strategy;
- VicRoads' SmartRoads Road User Hierarchy for Knox City;
- Knox Vision: Our City, Our Future (2013-2017);
- The Knox City Plan (2013-2017);
- The Knox Planning Scheme;
- The Knox Integrated Transport Plan (2015 – 2025);
- The Knox Liveable Streets Plan (2012-2022);
- The Knox City Council Mobility Study (2011);
- The Knox Community Safety Plan (2013-2017);
- The Knox City Council Engineering Standards;
- The Knox Pedestrian Plan (2005);
- The Knox Bicycle Plan Review (2008);
- The Knox Central Urban Design Framework (2005);
- The Knox Central Sustainable Transport Options Report (2008);
- The Knox Central: Land Use, Economic and Property Analysis Report (2015);
- Knox Central Qualitative Movement Economy Report (2008);

- Westfield Knox Shopping Centre Development Plan and associated reports, including the Transport Impact Assessment Report (2013) and the Westfield Knox Shopping Centre Expansion Pedestrian and Cycle Movement Plan (2014); and
- Other documents as identified throughout this report.

1.4 Consultation

The ITS was undertaken in close consultation with Knox City Council officers. Progress reports were provided to Council Officers over the duration of the study for their review and comment, and two project workshops were also held with Council officers during the development of the ITS report. Council officers also provided Cardno with a considerable amount of relevant background information and reports to inform this report.

2 Site Location, Land Use and Planning

2.1 Site Location

The Knox Central Activity Centre is located approximately 35 kilometres east of the Melbourne CBD and has an area of approximately 200 hectares.

The overall study area is irregular in shape and is generally bounded by Scoresby Road to the east, Burwood Highway / Swinburne TAFE / St Andrews College to the south, Stud Road to the west and Westfield Knox / Lewis Park to the north.

Figure 2-1 shows the site boundary and location with respect to the surrounding road network.

2.2 Existing Land Use

Knox Central comprises a wide range of land uses that result in a cosmopolitan activity centre. Notably, Westfield Knox is the key attractor of visitors to the activity centre and contains a mix of retail and commercial uses. The following key land uses are within Knox Central, and are also identified in Figure 2-1:

- Educational facilities – Swinburne University of Technology, St Andrews Christian College, Wantirna South Primary School, and Fairhills High School;
- Large retail offer – dominated by a Westfield shopping centre ('Westfield Knox');
- Aged Care – Villa Maria and the Knox Village Retirement Village;
- Government uses – site operated by the Department of Environment, Land, Water and Planning (DELWP);
- Industrial/commercial area – primarily comprising warehouse, manufacturing and servicing operations;
- Environmental values and community/recreational assets – Blind Creek corridor, Lewis Park, shared pathways, sporting ovals, skate park, community garden, and views to the Dandenong Ranges;
- Residential land (low to high density); and
- Civic uses – Knox Civic Centre (offices) and Knox City Council operations centre.

Land use surrounding the study area typically comprises low density residential lots.

2.3 Planning Zones

The existing planning zoning for Knox Central shows a variety of statutory planning zones including commercial zones, public use zones, industrial zones, residential zones and priority development zones.

Further detail and a plan showing the existing land use planning zones is provided in the Existing Conditions Transport Assessment Report.

3 Planning Context & Existing Conditions

3.1 Introduction

In developing the ITS, Cardno undertook a detailed existing information review and gap analysis assessment of the study area. This included relevant policy and other background documentation, site visits, and consultation with Knox City Council officers.

The review included key State Government and local Knox City Council policy and other background reports. A more detailed analysis of the findings of the review of these documents is provided in the Information Review and Gap Analysis Report prepared as part of this study.

A comprehensive site visit coupled with an information review and considerable consultation with Council officers identified the current transport network provision and conditions, and also identified current and potential future gaps in the transport network. More detailed information regarding the existing transport network in the local area is provided in the Existing Conditions Transport Assessment Report prepared as part of this study.

The following sections summarise the key findings of these reviews, and refers to these ITS background reports for more information as appropriate.

Issues and opportunities that have been identified throughout this review have been summarised and shown on plans for each mode of transport in the respective assessment sections in this report.

3.2 Planning Policy Review

3.2.1 The Transport Integration Act (2010)

The Transport Integration Act (the Act) came into effect on 1 July 2010, with the purpose of creating a framework for the provision of an integrated and sustainable transport system in Victoria. The Act sets out six transport objectives as follows:

- Provide a means by which persons can access social and economic opportunities to support individual and community wellbeing;
- Facilitate economic prosperity;
- Actively contribute to environmental sustainability;

- Provide for the effective integration of transport and land use and facilitate access to social and economic opportunities;
- Facilitate network-wide efficient, coordinated and reliable movements of persons and goods at all times; and
- Be safe and support health and wellbeing.

In essence the Act aims to ensure all Government Department stakeholders work towards a common goal to provide an integrated and sustainable transport system. Departments and agencies are bound by the Act and are therefore required to have regard to the transport system objectives and decision-making principles when making decisions and exercising powers.

3.2.2 Plan Melbourne (2014)

Plan Melbourne is the current Metropolitan Planning Strategy, and was developed by the then State Government and adopted in May 2014, and is currently undergoing a 'refresh'. It is an integrated land use and transport plan aimed at guiding the way the city will grow and change over the next 40 years. It is a strategy to house, employ and connect more people to jobs and services closer to where they live. In terms of transport related objectives, *Plan Melbourne* indicates that it will "provide an integrated transport system connecting people to jobs and services, and goods to market".

Plan Melbourne aims to provide good-quality neighbourhood travel options to help people reach a wide range of local services and activities within 20 minutes, supporting social inclusion and well-being. The concept of a 20-minute neighbourhood as outlined in *Plan Melbourne* is illustrated in Figure 3-1.

Figure 3-1 The 20 Minute neighbourhood Concept



Plan Melbourne classifies Knox Central as an Existing Activity Centre. With this in mind, the future development of Knox Central must include planning for access via all transport modes including the promotion of sustainable transport modes (i.e. walking, cycling and public transport) as a means of access.

Further review is being taken of the 20 minute neighbourhood concept as part of the Plan Melbourne refresh. In particular, the Plan Melbourne Refresh Discussion Paper (Oct 2015) highlights that the 20 minute neighbourhood should refer to a 20 minute walking distance rather than to a 20 minute car journey, which further encourages the densification of communal activities and services, as illustrated in Figure 3-2.

More detailed information regarding the Plan Melbourne directions and initiatives regarding transport is provided in the Information Review and Gap Analysis Report.

Figure 3-2 The 20 Minute neighbourhood Concept – Plan Melbourne Refresh



3.2.3 SmartRoads

SmartRoads is a road network management approach developed by VicRoads, which recognises the increasing importance of public transport, walking and cycling as transport modes. It uses a set of guiding principles to establish the priority use of roads by transport mode, time of day, and place of activity. This approach also ensures that decisions about the operation of the road network support integrated land use and transport planning.

A key objective of SmartRoads is to reduce the level of 'through' traffic including heavy vehicles, and to promote access to the centres via alternative transport modes. This is achieved by designating and promoting certain Arterial Roads as preferred routes for traffic. Traffic is then encouraged to use the alternative routes and allow key road space within the activity centre to be prioritised for public transport, cyclists and pedestrians.

Knox Central Integrated Transport Study – Report

Prepared for Knox City Council

In this regard, Burwood Highway and Stud Road through the study area are nominated as a Bus Priority Route, as well as Bicycle Priority Routes through Knox Central. The Hierarchy also indicates a section of Burwood Highway near Westfield Knox, as a Pedestrian Priority area.

The SmartRoads Hierarchy further notes that within the wider area, EastLink, High Street Road, Boronia Road and Scoresby Road are envisaged as 'Preferred Traffic Routes' aimed at carrying through traffic volumes (inclusive of heavy vehicles). Burwood Highway is classified as a 'Traffic Route', rather than a 'Preferred Traffic Route'. This recognises the presence of the Knox Central Activity Centre and the need to balance accessibility by all modes in the vicinity of the centre along Burwood Highway.

More detailed information regarding the SmartRoads network hierarchy in the area is provided in the Information Review and Gap Analysis Report.

3.2.4 Knox Integrated Transport Plan 2015 - 2025

The Knox Integrated Transport Plan 2015 – 2025 (ITP) provides a framework for both the development and management of an integrated transport network to service the future needs of the Knox community and local businesses.

The ITP notes that the key issues facing the Knox community both now and into the future that are likely to impact on travel and transport decisions include rising fuel prices, changing population demographics (population increases and an aging population), rising obesity levels, rising greenhouse gas emissions, and road congestion.

The ITP was informed in part by community consultation, which identified a number of issues and noted the following specific projects:

- A tram to Knox;
- Bike hire scheme in Knox; and
- Wayfinding signage for both pedestrians and cyclists.

3.2.5 Knox Central Urban Design Framework (2005)



3.2.5.1 General

The Knox Central Urban Design Framework (KCUDF) was prepared in 2005 for Knox Central with the key aim of outlining the built form principles required to support a thriving, lively focal point and mixed use activity centre for the outer eastern suburbs.

The high level principles of the KCUDF form part of the Knox Planning Scheme through the Knox Central Principal Activity Centre local policy (Clause 22.04 of the Knox Planning Scheme). Two precincts have been rezoned to Priority Development Zones (Clause 37.06 of the Knox Planning Scheme), in order to support the objectives of the KCUDF.

The KCUDF notes that the transport related objectives for the study area include:

- Improving public transport access to the area;
- Creating on and off-road safe and attractive pedestrian routes throughout the study area;

- Providing safe and convenient cyclist and pedestrian connections to surrounding residential areas (all directions);
- Establishing identifiable road patterns throughout the study area;
- Improving accessibility between precincts within the study area; and
- Integrating the study area with surrounding land uses.

The KCUDF places a high priority on the use of sustainable transport modes, a theme which is to be considered throughout this study.

3.2.5.2 Movement and Access Objectives

The KCUDF proposed a number of movement and access objectives that were considered appropriate at the time that included:

- Improving public transport access to the area by extending the 75 tram route along Burwood Highway and establishing a modal interchange at the junction of Burwood Highway and Stud Road. Alternatively, the tram could terminate near the junction of Burwood Highway and Knox Ozone east, at the new public heart of Knox Central;
- Placing priority on pedestrian and cyclist movements and public transport accessibility throughout the study area in preference to cars;
- Creating convenient attractive and safe pedestrian and cycle paths along all roads and open spaces throughout the study area and along creek corridors that traverse the area;
- Providing safe and convenient pedestrian and cyclist links to surrounding residential areas in all directions;
- Establishing an easily identifiable road pattern throughout the study area with regular connections to the abutting arterial road network;
- Improving road access between precincts within the area, with an emphasis on connecting Westfield Knox and Knox Ozone through Council owned land to Lewis Road and improving accessibility to the northern parts of the study area and Lewis Park;
- Integrating and expanding the internal and external mall network within Westfield Knox with surrounding land uses, especially the municipality precinct to the east and residential, open space and recreational areas to the north towards Lewis Park; and

- Establishing convenient, safe and integrated underground or above ground car parking courts for all variety of land uses. Car parking should also be carefully integrated with suitable cycle storage.

3.2.5.3 KCUDF Access Plan

The KCUDF proposes a network of local roads that provide connectivity for local residents and other road users, while limiting through traffic. Features of the network are outlined as follows:

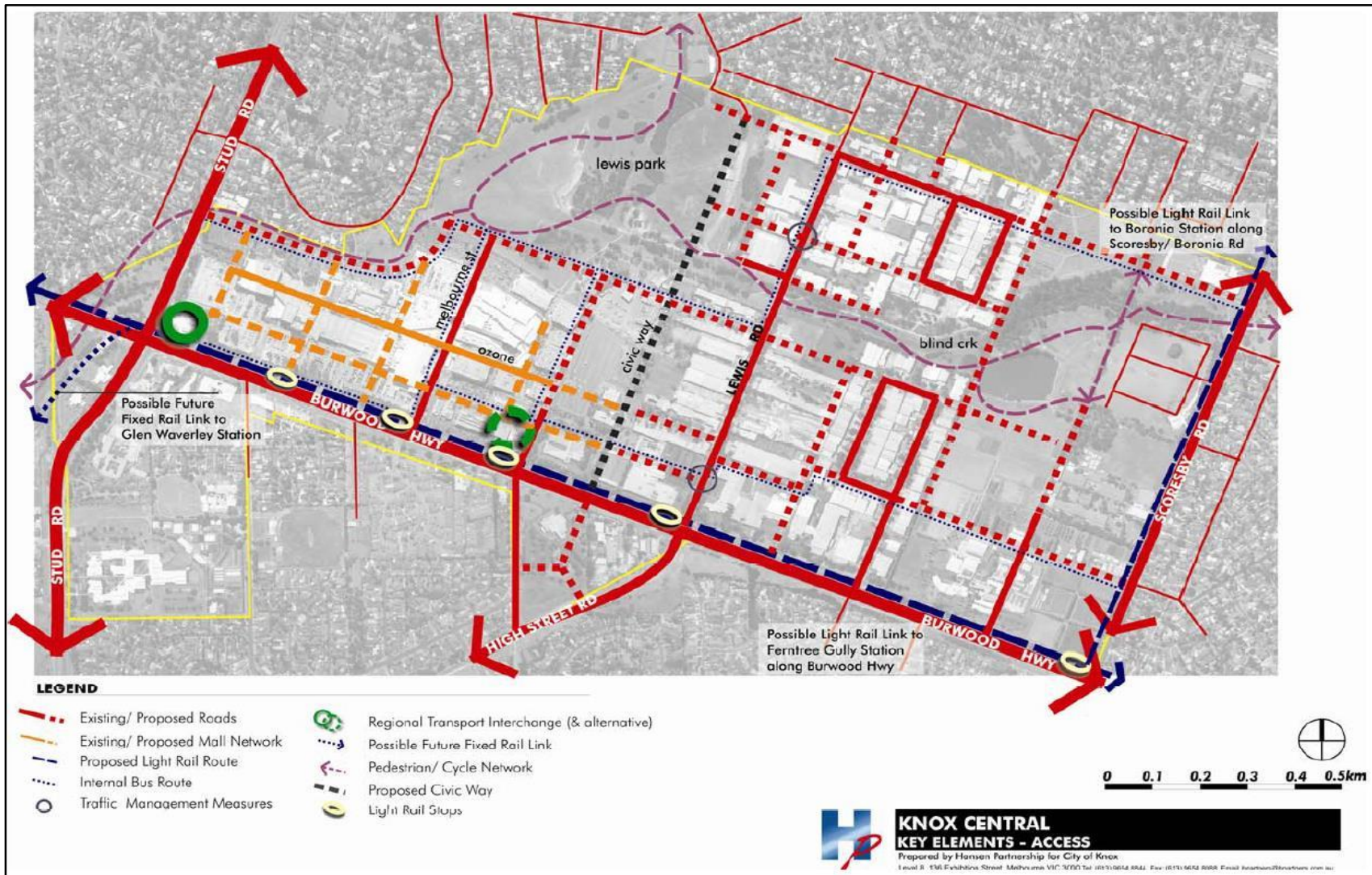
- A wider network of roads providing improved connectivity and flexibility that will result in traffic volumes being distributed more equitably across the internal road network;
- Traffic calming measures proposed to limit through traffic on Lewis Road;
- Provision of East-West roads where none currently exist;
- Additional network links in the retail/mall area to reduce traffic dependence on Melbourne Street; and
- East-West extensions of Parkhurst and Wadhurst Drives to improve industrial area access.

The KCUDF Transport and Movement Plan is provided as Figure 3-3.

Further detail on the KCUDF is provided in the Information Review and Gap Analysis Assessment Report.

The purpose of this ITS is to review and build upon the objectives that are considered relevant today through the recommendations proposed in this study. A review of the KCUDF Access Plan, identifying aspects that are still relevant is provided in section 10 this study, along with a discussion on why other aspects are no longer considered appropriate.

Figure 3-3 KCUDF Transport and Movement Plan



Source: Knox Central Urban Design Framework (July 2005)

3.2.6 Other Background Policy

A number of additional policy documents and guidelines were reviewed as part of the background work to this study, which are discussed further in the Information Review and Gap Analysis Report, including:

- **Knox Planning Scheme** – The Knox Council Planning Scheme notes that planning should ensure an integrated and sustainable transport system. The transport system should provide access to social and economic opportunities, facilitate economic prosperity, contribute to environmental sustainability, coordinate reliable movements of people and goods, and should be safe.
- **Knox Vision: Our City, Our Future 2013-2017** – The Knox Vision provides a picture of the future City that will deliver the lifestyle, jobs and industry, health and wellbeing desired by members of the Knox community. Transport aspirations are a key focus throughout the vision.
- **Knox City Plan 2013-2017** – The Knox City Plan sets out to achieve the aspirations of the Knox Vision. Transport strategies identified within the Plan include:
 - **Strategy 1.1.5** - *Increase walking and cycling networks that encourage physical activity and provide viable transport choices.*
 - **Strategy 1.2.3** - *Improve accessible public transport services and infrastructure so that public transport is a realistic transport choice for the Knox community.*
 - **Strategy 2.2.1** - *Develop an integrated transport network that provides transport choice to community members and businesses (including freight) in Knox.*
 - **Strategy 3.3.1** - *Significantly improved integrated and sustainable transport systems and infrastructure are provided to improve opportunity, choice and access for all.*
- **Knox Integrated City Strategy 2015-2017** - The Knox Integrated City Strategy was developed to provide the strategic direction to achieve the Knox Vision: Our City, Our Future and the Knox City Plan 2013-2017. The following 'areas of focus' in the Integrated City Strategy are relevant to transport and access issues within Knox Central:

- **Area of Focus 1.1** - *Improve the connections between existing shared paths and footpaths, especially to key places.*
- **Area of Focus 1.3** - *Continue to invest in community and physical infrastructure.*
- **Area of Focus 9.1** - *Improve the provision of integrated public transport options in Knox.*
- **Area of Focus 9.2** - *Advocate for diverse transport choices, better access to public transport services and better utilisation of the existing road network to support the movement and connection of people and goods, in, through and out of Knox.*
- **Area of Focus 9.3** - *Improve community awareness of the benefits of using sustainable transport options.*
- **Area of Focus 11.4** - *Foster viable and accessible Activity Centres commensurate with their role and function to meet community needs.*

Action 9.2.1 in the Integrated City Strategy is to 'enhance understanding of transport priorities for Knox, and implement a strategic advocacy approach focusing on the delivery of the Bayswater Grade Separation Project to ensure it aligns with and enables endorsed strategic plans for Bayswater, the extension of tram service number 75 to Knox Central, and the extension of a rail line to Rowville.'

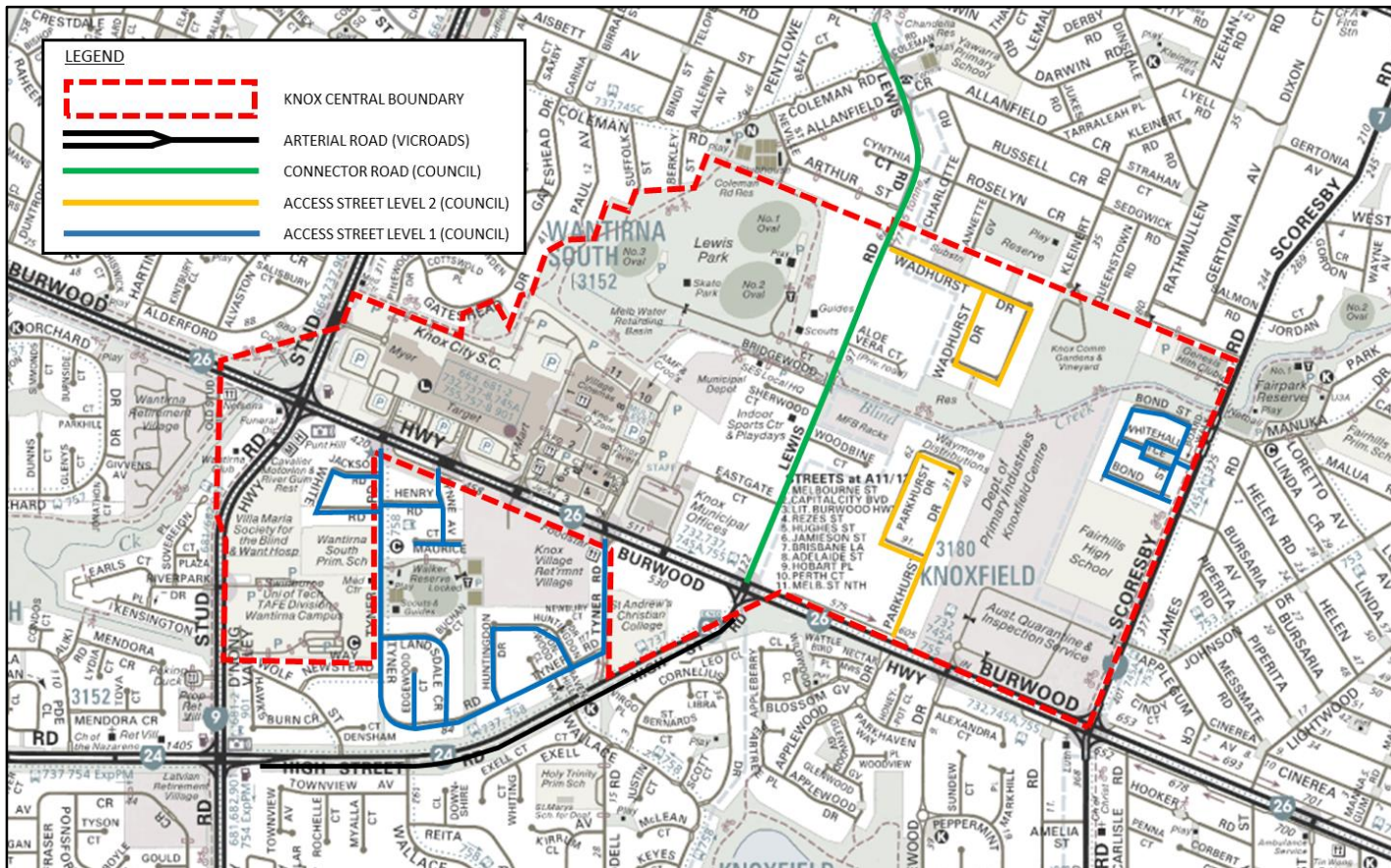
- **Knox Central Sustainable Transport Options Report (2008)** – This report outlines that the travel to and from the Knox Central study area is overwhelmingly dominated by private vehicle travel. The report also outlines gaps and improvement options for the public transport, walking and cycling networks.
- **Activity Centre Design Guidelines (2005)** – The Activity Centre Design Guidelines are intended to support councils and developers to create well designed activity centres in Victoria. The Guidelines provide advice to developers, planners and place managers on what constitutes best-practice in developing vibrant, high quality activity centres. Transport objectives feature under a number of the elements of the design considerations within the guidance

3.3 Existing Road Network

3.3.1 Road Network Hierarchy and Description

Knox Central sits East-West along the Burwood Highway Arterial Route between the north-south Arterial Routes Stud Road to the west and Scoresby Road to the east. The internal study area road network further consists of local Connector and Access Streets that connect the site to the surrounding Arterial Road network. The existing road network hierarchy within the vicinity of Knox Central is illustrated in Figure 3-4.

Figure 3-4 Road Network Hierarchy



3.3.1.1 Arterial Road Network

Burwood Highway is an Arterial Road aligned generally in an East-West direction from Monbulk Road in Belgrave to Warrigal Road in Burwood where it continues as Toorak Road in to the Melbourne CBD.

Within Knox Central, Burwood Highway is currently a divided carriageway with three through traffic lanes in each direction. There are generally auxiliary turning lanes and a landscaped median provided between the intersections within the study area. Along the frontage of the Westfield Knox site, an additional through traffic lane (4 total) is provided in the eastbound direction.

Stud Road is an Arterial Road aligned in a north-south direction which runs from Mountain Highway in Bayswater to the north, to Clow Street in Dandenong to the south. Stud Road typically provides for three traffic lanes in each direction separated by a landscaped median.

Scoresby Road is an Arterial Road also aligned in a north-south direction which extends from Ferntree Gully Road in the south, to Mountain Highway in the north where it continues as Bayswater Road and Croydon-Scoresby Road.

Within the bounds of the study area, Scoresby Road provides an undivided carriageway with two lanes in each direction. Auxiliary turn lanes are provided where appropriate. A signalised pedestrian crossing is provided on Scoresby Road, approximately 300m north of the intersection with Burwood Highway, to facilitate pedestrian movements to and from Fairhills High School.

High Street Road is an arterial road extending west from Burwood Highway to St Kilda Road in Prahran.

Historically, High Street Road has provided a single traffic lane in each direction between Stud Road and Burwood Highway. Construction works were undertaken as part of the High Street Road duplication project in 2015, with full duplication provided in early 2016.

This project provided a divided carriageway on High Street Road that now has two traffic lanes in each direction between Stud Road and Burwood Highway. The intersection of High Street Road / Tyner Road has also to be upgraded to a signalised intersection that includes signalised pedestrian crossing facilities. The intersections of High Street Road with Stud Road and Burwood Highway have also been upgraded.

A new signalised pedestrian crossing on High Street Road, west of Wallace Road, has been provided as part of the works. A new shared path along the southern side of High Street Road has also been constructed as part of the project.

Figure 3-5 High Street Road Improvement Works (September 2015)



Source: Google Streetview 2015

3.3.1.2 Local Road Network

The balance of the road network within the study area is made up of a network of local streets which have developed over time to support increased traffic demand within the study area and to provide access to abutting properties.

Lewis Road is a key local road that provides a north-south connection through the study area, extending south from Boronia Road to Burwood Highway where it continues in a south-west direction as High Street Road.

Within the study area (south of Arthur Street), Lewis Road operates with a single carriageway in each direction, separated by a painted median. No stopping restrictions are applicable on both sides of Lewis Road between Arthur Street and Burwood Highway.

Tyner Road is a local road essentially comprising of two components: a straight section connection between Burwood Highway and High Street Road, and a loop connection back to Burwood Highway.

The straight connection between Burwood Highway and High Street Road operates with a single traffic lane in each direction in addition to a kerbside parking lane on the eastern side only.

North of High Street Road, the loop component extends west and provides access to a number of residential dwellings as well as Wantirna South Primary School. The loop ultimately connects to Burwood Highway to the north. This section of Tyner Road operates with a single traffic lane in each with kerbside parallel parking.

Parkhurst Drive is a local road serving an industrial area which is accessed from a Burwood Highway service road which extends north from Burwood Highway and then loops back onto itself. Parkhurst Drive is characterised by industrial land use on both sides.

Parkhurst Drive provides a wide carriageway that accommodates a single traffic lane in each direction in addition to unrestricted on-street parking on both sides.

3.3.2 Road Network Operation and Performance

A detailed analysis of the current road network performance and the traffic surveys undertaken as part of this study is provided in the Existing Conditions Transport Assessment Report.

3.3.2.1 Link Volume and Capacity Analysis

A summary review of the existing performance of the road network links is provided in Table A1 in Appendix A of this report.

In summary, Burwood Highway currently carries approximately 41,000 vehicles per day, Stud Road carries in the order of 39,000 vehicles per day, Scoresby Road carries around 22,000 vehicles per day and High Street Road carries in the order of 17,000 vehicles per

day. It is shown that each of the arterial roads are currently operating within their theoretical capacities.

It also shows that the local roads including roads within the study area currently operate within their environmental capacities¹ (as defined by Clause 56.06 of the Planning Scheme), with the exception of Lewis Road which operates above its environmental capacity, but within the theoretical midblock capacity². Each of the local roads that provide access for current development traffic within Knox Central operate well within their theoretical midblock capacities.

3.3.2.2 Intersection Analysis

A number of key intersections on the arterial road network were analysed using SIDRA intersection software to assess their existing performance levels. These include:

- Tyner Road / High Street Road;
- Burwood Highway / High Street Road;
- Stud Road / High Street Road; and
- Lewis Road / Boronia Road.

The SIDRA intersection software provides information about the capacity of an intersection in terms of a range of parameters which include the Degree of Saturation (DoS).

The DoS is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Various DoS value ranges and their corresponding Level of Service (LoS) descriptions are shown in Table 3-1.

¹ Environmental capacity refers to the 'ideal' traffic flows typically used when planning for new roads

² The Theoretical Midblock Capacity of a road is based on the AustRoads Standards "Guide to Traffic Management – Part 3 Traffic Studies & Analysis" document which provides guidance on the daily traffic carrying capacity of urban roads.

Table 3-1 Degree of Saturation Ratings

Level of Service Rating	Level of Service Description	Signalised Intersections	Unsignalised Intersections
A	Excellent	Up to 0.60	Up to 0.60
B	Very Good	0.60 to 0.70	0.60 to 0.70
C	Good	0.70 to 0.80	0.70 to 0.90
D	Acceptable	0.80 to 0.90	0.90 to 0.95
E	Poor	0.90 to 1.00	0.95 to 1.00
F	Very Poor	Above 1.00	Above 1.00

For signalised intersections, a DoS of around 0.95 has been typically considered the “ideal” upper limit, beyond which queues and delays increase disproportionately. For unsignalised intersections a DoS of 0.9 is considered the “ideal” upper limit.

The SIDRA models have been generally run with a 120-160 second cycle time and incorporate VicRoads’ SCATs phasing data. Furthermore, all the SIDRA modelling includes pedestrian movements at signalised intersections.

A summary of the results of the SIDRA Intersection analysis is shown in Table A2 in Appendix A, with the full detailed results included in the Existing Conditions Transport Assessment Report.

The results of the SIDRA modelling are summarised below in relation to the levels of service outlined in Table 3-1.

The **Tyner Road / High Street Road** intersection was modelled in its unsignalised form as was current at the time of modelling. It was shown to be operating within capacity in the AM peak with an ‘excellent’ level of service, however it was well above capacity during the PM peak with a ‘very poor’ level of service. It is however noted that this intersection was in the process of being upgraded and will operate as a signalised intersection, improving the general levels of service during both peak times.

The **High Street Road / Lewis Road / Burwood Highway** intersection in its pre-upgrade layout, is operating slightly above capacity during both the AM and PM peak hours with

‘poor’ and ‘very poor’ levels of service respectively. This generally resulted in long queues along the Burwood Highway approaches. The average delay times do however indicate that the intersection clears regularly and does not result in wider network operational failure.

The **Stud Road / High Street Road** intersection in its pre-upgrade layout, is operating above capacity during both the AM and PM peak hours with ‘very poor’ levels of service, resulting in long queues on all approaches at varying times. The associated average delay times do however indicate that the intersection clears regularly and does not result in wider network operational failure.

The **Boronia Road / Lewis Road** intersection in its current unsignalised form, is operating significantly above capacity during the AM peak hour with a ‘very poor’ level of service and close to capacity in the PM peak hour with an ‘acceptable’ level of service.

The nature of the performance in the AM peak indicates that the Boronia Road / Lewis Road intersection should be considered for signalisation in the short term

A review of the observed traffic volumes in relation to the theoretical capacity on each of the arterial roads is provided in the Information Review and Gap Analysis Report.

3.3.3 Traffic Accident Review

VicRoads’ ‘CrashStats’ provides access to a database containing Victorian Road Crash Statistics from 1987 onwards, for crashes where at least one person was injured. The current version of CrashStats contains collision data up until 31st December 2013, though collisions which are involved in court action where a decision has not been reached are excluded from the data set.

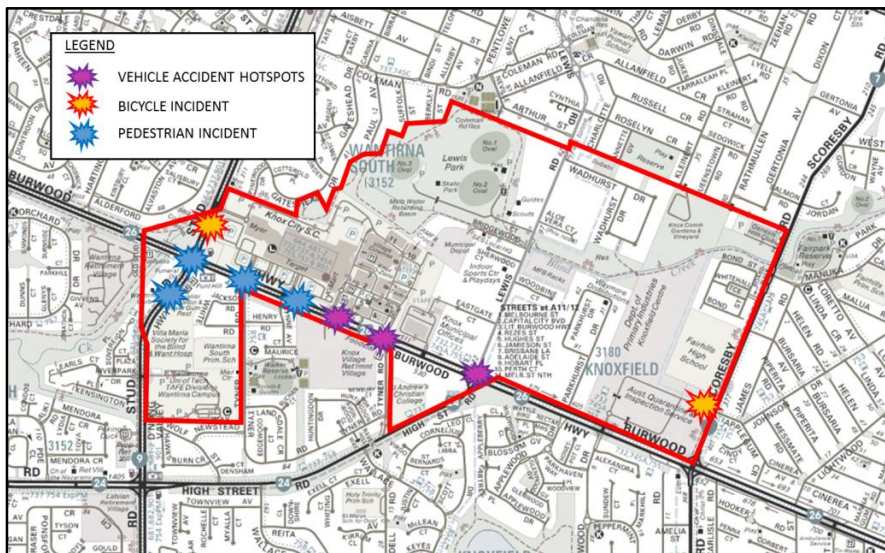
The CrashStats data was examined for all recorded vehicular collisions in the vicinity of the site, within the last five years (from 1st January 2009 to 31st December 2013), to assess the recent crash history. The results indicate that a total of 96 collisions occurred within the study area, with the three predominate locations shown on Figure 3-6 and identified as follows:

- Nine collisions occurred at the intersection of Burwood Highway and Melbourne Street (Westfield Knox access) of which one of the recorded accidents including a fatality;
- Eight collisions occurred at the intersection of Burwood Highway and High Street Road; and
- Six collisions occurred at the intersection of Burwood Highway and Capital City Boulevard (Westfield Knox access).

The CrashStats data was also examined for all recorded pedestrian and bicycle incidents in the study area, within the last five years (from 1st January 2009 to 31st December 2013), to assess the recent incident history.

A total two bicycle incidents and five pedestrian incidents were recorded, with the locations also illustrated in Figure 3-6

Figure 3-6 Incidents Involving Pedestrians and Cyclists



It is understood that the two bicycle incidents involved both a bicycle striking a vehicle on the carriageway, and a vehicle striking a bicycle at an intersection. Each of the five

pedestrian incidents involved a vehicle striking a pedestrian, typically during turning movements at intersections.

3.3.4 SmartRoads

The VicRoads SmartRoads Road User Hierarchy indicates that Burwood Highway and Stud Road are nominated as a Bus Priority Route, as well as Bicycle Priority Routes through Knox Central. Burwood Highway between the Tyner Road (loop) intersections is also a nominated Pedestrian Priority Route.

The role of the section of Burwood Highway between the Tyner Road (loop) intersections as a pedestrian priority route identified in the SmartRoads network needs to be strengthened and promoted.

3.4 Public Transport

3.4.1 Existing Public Transport Services

Knox Central is serviced solely by bus services, with Westfield Knox notably operating as the bus interchange for a number of local and more strategic bus services.

The closest railway stations to the study area are Bayswater Station (approximately 3.5km north-east) and Boronia Station (approximately 2.5km north-east).

The nearest tram route to the study area is Tram Route 75 (Etihad Stadium Docklands to Vermont South), which terminates at Burwood Highway / Hanover Road, Vermont South, approximately 5km west of the study area. The Knox Transit Link (Bus Route 732) connects to Tram Route 75 at the Vermont South terminus to Westfield Knox Shopping Centre site, this service meets every tram service at the Vermont South terminus.

Bus services operating in the vicinity of the study area are illustrated in Figure 3-7, with a description of the bus service provision and frequency detailed in Table 3-2.

Figure 3-7 Public Transport Provisions

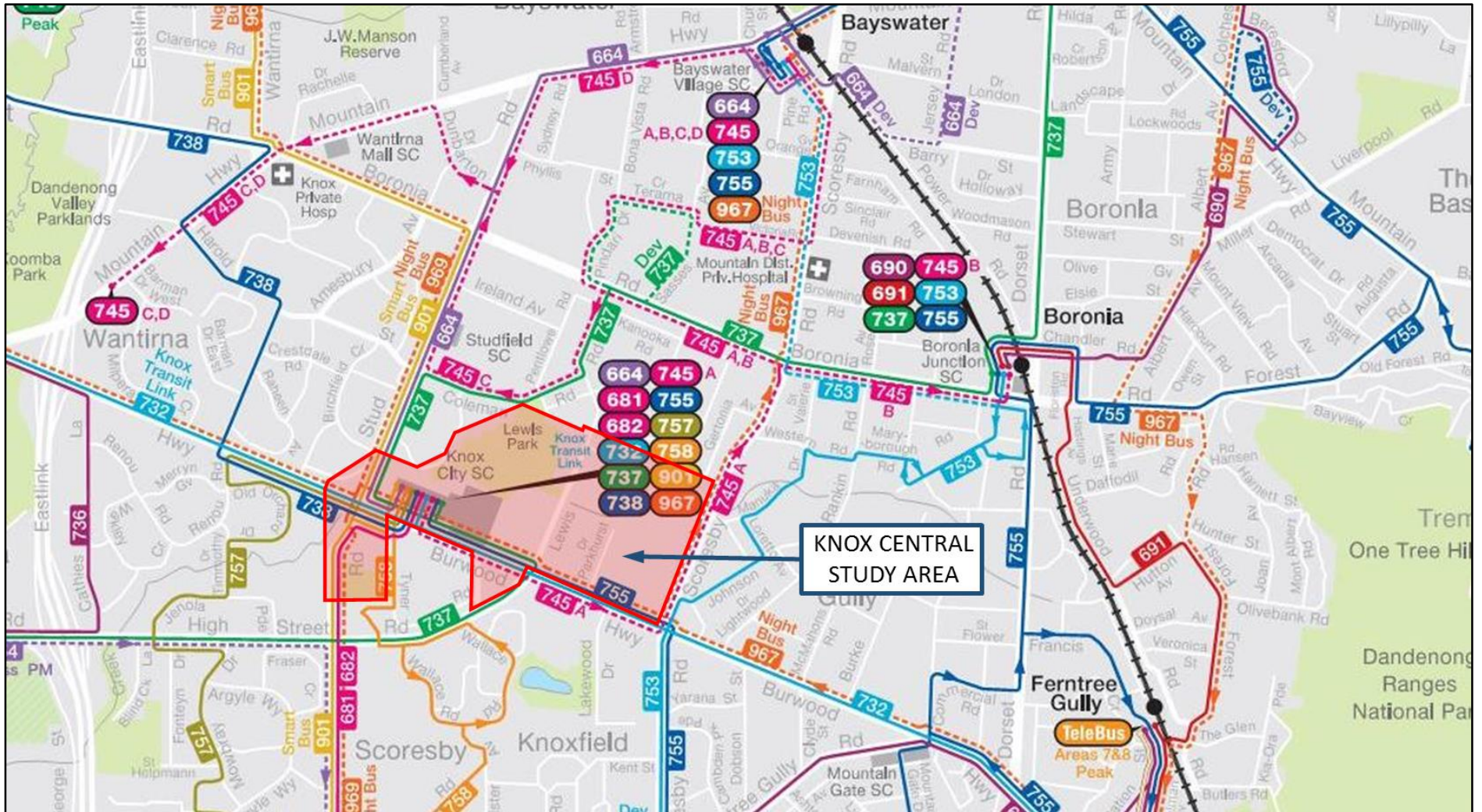


Table 3-2 Bus Service Summary

Bus Route Number	Service Description	Weekday			Weekend		
		Inbound	Outbound	Frequency	Inbound	Outbound	Frequency
664	Chirside Park - Knox City via Croydon & Bayswater	6:00am – 9:15pm	6:00am – 9:20pm	30 minutes	8:10am – 10:40pm	7:30am – 9:45pm	30 min
681	Lysterfield - Knox City via Wantirna, Scoresby, Rowville (clockwise)	10:35am – 9:25pm	9:20am – 8:10pm	20 minutes / 40 minutes – 2 hours	8:56am – 7:05pm	9:20am – 5:50pm	1 hour 15 – 45 min
682	Lysterfield - Knox City via Wantirna, Scoresby, Rowville (anti-clockwise)	8:40am – 10:15pm	10:05am – 9:10pm	20 minutes / 40 minutes – 2 hours	8:40am – 7:45pm	10:05am – 6:30pm	1 hour 15 – 45 min
732 – Inc. the Knox Transit Link)	Box Hill - Upper Ferntree Gully via Vermont South, Knox City, Mountain Gate	4:40am – 1:05am	4:40am – 1:05am	10 - 15 minutes	4:35am – 1:10am	4:35am – 1:10am	10 - 15 min
737	Croydon - Monash University via Boronia, Knox City Shopping Centre, Glen Waverley	6:00am – 9:40pm	6:15am – 9:40pm	20 minutes	5:55am – 9:40pm	5:55am – 9:40pm	40 min
738	Mitcham - Knox City via Knox Private Hospital, Wantirna Secondary College	7:00am – 10:00pm	6:00am – 9:00pm	30 minutes	9:00am – 9:55pm	8:00am – 9:10pm	1 hour
745	Knox City - Bayswater - Wantirna Primary School	2:30pm	N/A	Runs Once Daily	N/A	N/A	N/A
745a	Knox City - Bayswater	2:30pm	N/A	Runs Once Daily	N/A	N/A	N/A
755	Bayswater - Knox City via Basin, Boronia, Ferntree Gully	6:40am – 9:40am	6:00am – 8:55pm	30 minutes	8:50am – 9:50am	7:45am – 8:55pm	1 hour
757	Knox City - Scoresby via Old Orchards Drive	8:05am – 5:40pm	8:10am – 6:20pm	1 hour 30 minutes	N/A	N/A	N/A
758	Knox City - Knoxfield via Wallace Road	9:30am – 6:15pm	8:55am – 5:45pm	1 hour 30 minutes	N/A	N/A	N/A
901	Frankston - Melbourne Airport (SMARTBUS Service)	5:05am – 12:45am	5:05am – 12:45am	15 minutes	5:55am – 1:00am	6:00am – 1:00am	30 min

Bus Route Number	Service Description	Weekday			Weekend		
		Inbound	Outbound	Frequency	Inbound	Outbound	Frequency
967	Glen Waverley - Burwood Hwy - Bayswater (returns via Bayswater North - Ferntree Gully)	N/A	N/A	N/A	1:20am – 6:20am	1:20am – 6:20am	1 hour
968	City – Knox – Bayswater – Belgrave (Nightrider)	N/A	N/A	N/A	12:25am – 4:25am	12:25am – 4:25am	30 min
969	City - Caulfield - Ferntree Gully Rd - Rowville - Wantirna – Ringwood	N/A	N/A	N/A	12:10am – 5:50am	12:10am – 5:50am	30 min/1 hour

Access to the bus interchange in the Westfield Knox site is via a signalised intersection with Tyner Road. The intersection provides signalised pedestrian crossings on the north, east and south approaches.

A number of the bus routes that access the study area from local catchments have a very poor frequency. Route numbers 757 and 758 from the south, either side of Stud Road run once every 90 minutes. A number of key bus services from surrounding activity centres and transport hubs run at a 30 minute frequency. These include routes 755 and 664 providing the primary bus connection from Boronia and Bayswater and further north, and route 738 through Vermont from Mitcham.

Service frequencies are generally poorer in the evenings and on weekends across the network.

3.4.2 Existing Bus Patronage Data

The Transport Impact Assessment submitted for the Westfield Knox redevelopment includes patronage survey data for the existing bus operation on a typical Friday and Saturday period. The results of these surveys are summarised in the Existing Conditions Transport Assessment Report.

The results of the surveys indicate that the bus interchange utilisation is greatest during the Friday PM peak period, during which time the peak demands are approximately double those recorded during the Friday AM peak period and the Saturday lunchtime peak period. This

indicates that PM commuter peak and Friday evening shopping centre peak period coincide at this time. The results of the survey also indicate a busy peak period mid-afternoon on a Friday which appears to coincide with school finishing times.

3.4.3 Network Gaps

While there are a number of bus services accessing Knox Central, there are also gaps surrounding the study area between network catchment areas on direct routes. Areas identified are shown on Figure 3-8 and include:

- Wantirna, west of Stud Road, between Burwood Highway and Boronia Road;
- North of Boronia Road, between Stud Road and the rail line between Bayswater and Boronia;
- Ferntree Gully, east of the study area and north of Burwood Highway;
- Knoxfield and Scoresby, south of High Street Road between Stud Road and Scoresby Road;
- Scoresby, south of High Street Road between Stud Road and Eastlink; and
- Scoresby Road, between Bayswater and Burwood Highway.

3.4.4 Proposed Bus Interchange Changes

As part of the proposed Westfield Knox Shopping Centre redevelopment, the existing bus interchange within the site will be relocated to the east of Melbourne Street. An additional seven bus bays are to be provided with this bus station improvement, as indicatively shown on the plan prepared by GTA Consultants, shown in Figure 3-9

3.4.5 Site Observations

On-site observations indicate that accessibility to existing bus services is typically good. It is noted that a number of bus stops do not currently include shelters which may discourage their use at night or during inclement weather.

Specifically, the bus stop on the Fairhills School frontage does not include a shelter and does not provide a direct link into the school which may discourage use of the bus service.

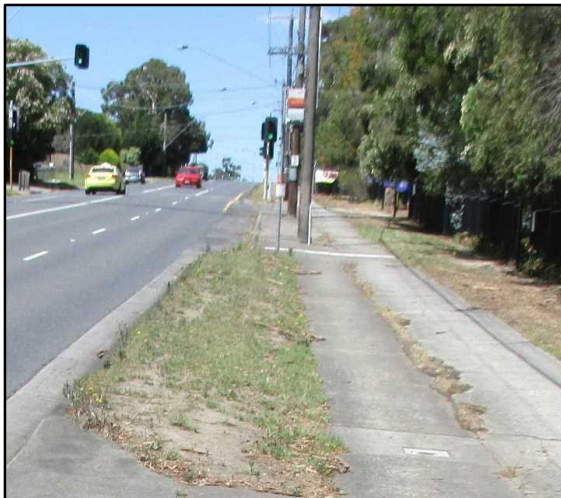
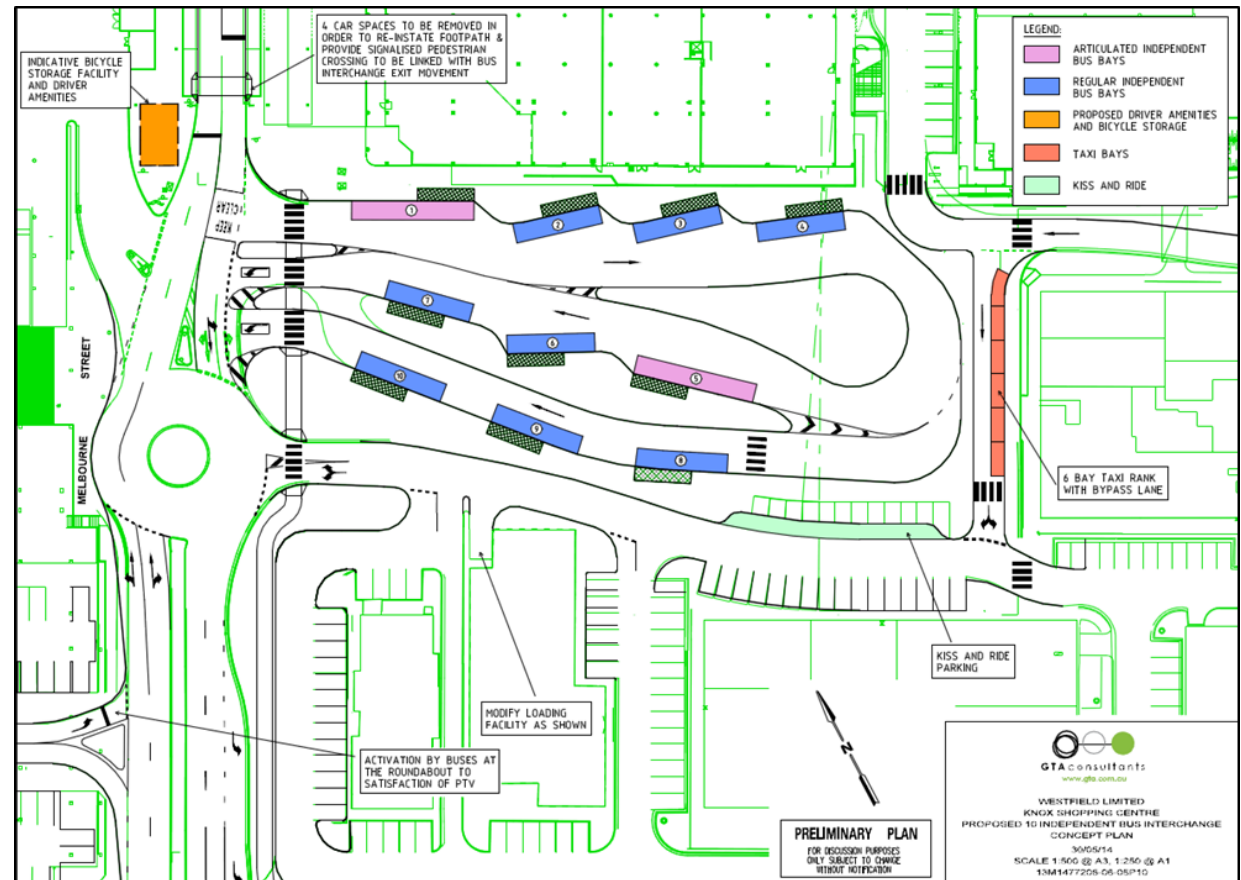


Figure 3-9 Future Westfield Knox Bus Interchange



Source: GTA Consultants 30/05/2014

3.5 Pedestrians and Cyclists

3.5.1 Key Routes

Pedestrian paths are typically located on both sides of roads within the study area. Shared paths are also provided along sections of Burwood Highway, Stud Road and Scoresby Road.

There is currently very limited dedicated on-road cycle facilities throughout Knox Central. The existing bicycle network is primarily comprised of the shared path provision.

The Blind Creek Trail forms the ‘spine’ of pedestrian and bicycle movements through Knox Central, providing an east west link throughout the study area. Underpasses are typically provided within the study area to spatially separate the pedestrian cross movements from major vehicular routes (Scoresby Road, Lewis Road and Burwood Highway). However, the Blind Creek Trail does disconnect at Stud Road where pedestrians and cyclists must currently cross a slip lane in to the Westfield Knox Shopping Centre site to utilise the traffic signals on Stud Road to continue along the Blind Creek. This disconnect is proposed to be improved as part of the Stage 1 development of the Westfield Knox site.

Knox City Council commissioned bicycle and pedestrian surveys at key locations on the Blind Creek Trail in March 2013. A review of the survey data as provided in the Existing Conditions Transport Assessment Report indicates good utilisation of the Blind Creek Trail, with some 200 bicycles per day (two-way) at the Burwood Highway underpass end and some 140 bicycles per day (two-way) at the Scoresby Road underpass end of the trail.

At the Stud Road intersection, where bicycles are required to utilise the traffic signals at the Westfield Knox Shopping Centre access (including traversing a left turn slip lane at the intersection), some 150 bicycles per day traverse this connection.

3.5.2 Site Observations

3.5.2.1 Pedestrian Network

Observations on-site indicate that pedestrian paths are typically kept clear of obstructions or overgrowth and are generally in good condition.

It was observed that the crossing times for pedestrians at the signalised intersections along the Burwood Highway were considered to be inadequate. In particular, the crossing time

offered to pedestrians crossing Burwood Highway at the intersection of Burwood Highway / Stud Road was observed to be inadequate for an able-bodied pedestrian and not suitable for those with a mobility impairment or children. This is a particular concern given the land uses to the south of the Burwood Highway which include aged care facilities and schools.

It was also observed that the pedestrian phases at the signalised intersections were not activated unless the pedestrian push button was used. Given the activity centre status of the area and that Burwood Highway is a SmartRoads Pedestrian Priority Route through the study area, consideration should be given to automatic activation of the pedestrian phases in every signal cycle at all the intersections along the Burwood Highway throughout Knox Central.

Undesirable pedestrian crossings was observed across the front of a loading dock on Melbourne Street at the north-east corner of the Westfield Knox Shopping Centre site due to pedestrian demands through the area as shown in Figure 3-10.

Figure 3-10 Pedestrian Crossings at Loading Dock on Melbourne Street (Westfield Knox)



While outside the study area, a shared path on the southeast corner of the Burwood Highway / High Street Road is discontinuous once at the intersection, as shown in Figure 3-11. A review of the VicRoads website³ indicates that no shared path connections are proposed in this location as part of the current High Street Road Upgrade project.

Figure 3-11 Shared Path Termination at Burwood Highway



3.5.2.2 Cycle Network

There is currently little dedicated provision for cyclists, with the shared path network providing the only designated cycle network within Knox Central.

The Blind Creek Trail provides an excellent opportunity for cyclists and pedestrians to traverse the study area in the East-West direction segregated from vehicular traffic. Where cyclists are required to mix with vehicular traffic in the study area however, vehicles are dominant over cyclists. There is a lack of on-road bicycle lanes within Knox broadly (not just

within Knox Central). This is an issue across the arterial road network within the municipality and could be considered as part of a review of bicycle infrastructure across Knox.

The existing paths surrounding Westfield Knox do not encourage bicycle movements to/from or across the site. In particular the path on the northern side of Burwood Highway is typically 1.5m wide with a 2.5m offset from the vehicular carriageway, it is not a shared path and is undesirable for cyclists. It is however noted that the Stage 1 development of the Westfield Knox site will include the provision of a continuous shared path at least 2.5m wide, along the Stud Road site frontage and along the Burwood Highway site frontage between Stud Road and Melbourne Road.

As part of the High Street Road duplication project, signalised pedestrian crossings have been provided on High Street Road. A three metre shared path has also been constructed along the southern side of High Street Road between Burwood Highway and Stud Road.

The on-site observations also indicated that:

- The western side of Scoresby Road is designated as a shared path, however the footpath appears in poor condition. Overgrown planting and obstacles were observed within the path, and coupled with the steep gradient, it is likely to discourage use by cyclists;
- A potential connection between the Parkhurst Drive industrial estate and Blind Creek Trail has not been provided. Such a link would promote cycling for employees to/from the industrial area;
- Within the study area, the Blind Creek Trail includes three underpasses, none of which have any caution marking or signage on the overhead obstruction; and
- An informal path has formed through a corner within the Blind Creek Trail alignment near Scoresby Road.

3.5.3 Identified Planned Infrastructure Proposals

As part of the Westfield Knox Shopping Centre redevelopment works, a number of upgrades to pedestrian and bicycle infrastructure have been proposed. These include:

- Widening of the path on the northern side of Burwood Highway to function as a shared bicycle / pedestrian path;

³See https://www.vicroads.vic.gov.au/~ /media/images/planning-and-projects/high-st-mapchanged-traffic-conditions_large.ashx?la=en

- Widening of the path on the eastern side of Stud Road to function as a shared bicycle / pedestrian path; and
- Addition of bicycle lanterns at most intersections on the approaches to Westfield Knox Shopping Centre.

The planned pedestrian and bicycle infrastructure is discussed further in section 4 of this report.

It is noted that with the proposed works taking place, the gaps within the shared path network are generally improved. However a gap will continue to exist on the south side of Burwood Highway between Lynne Avenue and Tyner Road (west).

It is also noted that the introduction of bicycle lanterns at Lynne Avenue will strengthen the north-south off-road pedestrian / bicycle connection via Lynne Avenue to Tyner Road. This link however currently discontinues at High Street Road (south of Tyner Road) and should be incorporated into the overall pedestrian path network.

The promotion of the new bicycle lanterns at the signalised crossings at High Street Road could also be considered as part of a north-south bicycle route.

3.6 Car Parking

3.6.1 Provision and Observations

There is considerable parking provision within Knox Central. Westfield Knox provides approximately 6,300 free parking spaces for customers, including dedicated accessible and parents with pram spaces. There are multiple access points off Stud Road and Burwood Highway to the Westfield Knox car park facilities.

Outside of Westfield Knox, there is a considerable amount of dedicated and on-street parking provided including:

- Knox City Council staff and visitor off street parking;
- DELWP site staff parking;
- Fairhills High School staff parking;
- Parkhurst Drive and Lewis Road industrial estates – combination of on street and off street parking reserved for each tenancy;
- Bond Street / Whitehall Terrace residential on-street parking

Utilisation of on-street car parking provisions were observed to be typically moderate, with the exception of Parkhurst Drive which experiences high utilisation, which is common for an industrial precinct.

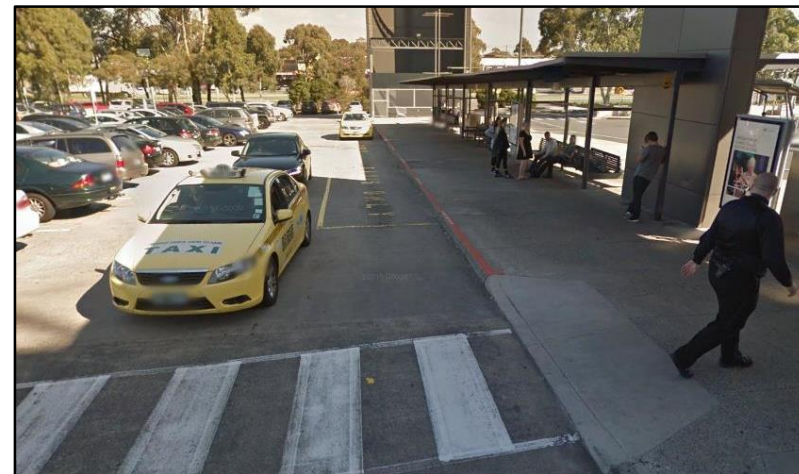
3.6.2 Parking Restrictions

Residential areas are provided with the greatest flexibility of unrestricted car parking. Short term parking restrictions (with appropriate resident permits excepted), are in place on Jackson Road, White Road, Lynne Avenue and Maurice Court near the Burwood Highway retail strip along with Tyner Road and Henry Street near the Wantirna South Primary school, to discourage non-residential parking.

Short term parking restrictions are provided at the frontage of Wantirna South Primary School site (Tyner Road) during school pick-up/drop-off periods (8:15am-9:15am and 3pm-4pm School Days). Further afield short term parking restrictions are provided along Tyner Road.

3.6.3 Taxi Parking Facilities

There are two existing taxi ranks provided within Westfield Knox with the primary rank located adjacent to the bus interchange, and a secondary rank operating later into the night within the Knox Ozone. Further taxi facilities are provided on Adelaide Street.



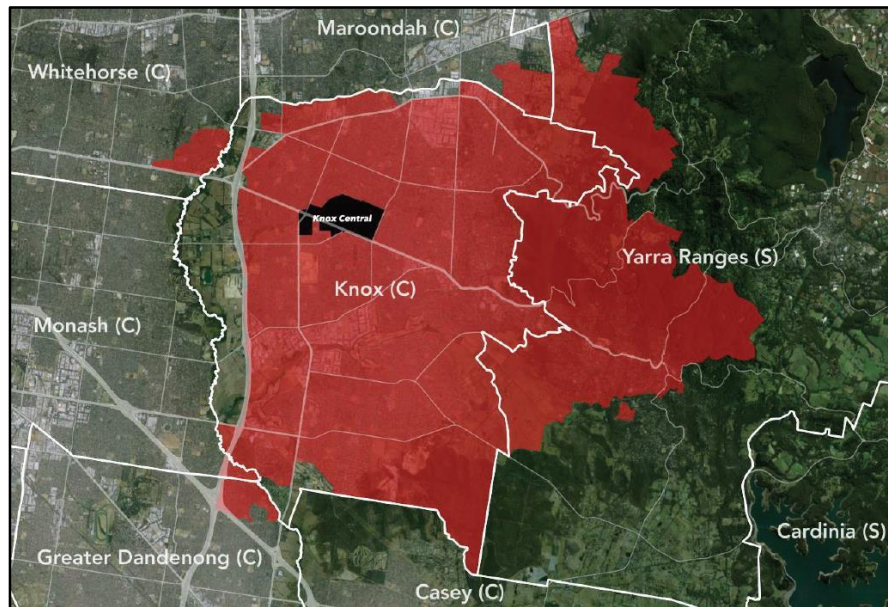
4 Future Development

4.1 Overview

The Knox Central: Land Use, Economic and Property Analysis Report (Geografia, 8 October 2015) provides an assessment of the economic, property and land use trends affecting Knox Central. The report includes modelling of land use demand and land capacity in the Activity Centre and will inform the preparation of the Knox Central Structure Plan.

The report includes key findings for varying land use types along with the associated implications for the Structure Planning process. The report also outlines the Knox Central Primary catchment area which is reproduced in Figure 4-1.

Figure 4-1 Knox Central Primary Catchment Area



The report also provides a land supply capacity analysis for the study area. The assumptions informing this analysis are summarised as follows:

- Site coverage ratios of 50%, giving consideration to the need to accommodate communal spaces, open space, and access requirements. This reflects the building patterns around Knox Central;
- Average apartment size of 200sqm including private open space, but excluding parking provision (which is generally provided at a basement level in new apartment developments in Knox Central). This reflects the average apartment size of contemporary apartment buildings in Knox Central that have recently been approved/constructed;
- Average townhouse/semi-detached housing lots that are 200sqm in area. This reflects the average townhouse lot size in nearby contemporary developments, such as Waverley Park. This figure includes private open space and car parking provision, and allows for the average townhouse being constructed over two storeys;
- The average height of buildings across a site have been informed by existing development in Knox Central, and design requirements within the 2005 Knox Central Urban Design Framework; and
- Redevelopment probabilities are based on discussions with Knox City Council planning staff and observation of development activity around the area.

The results of this analysis note that there is sufficient capacity within the study area to accommodate further growth as outlined in Tables 4-1 and 4-2.

Table 4-1 – Knox Central Land Capacity Summary (2025)

Type	Low	Medium	High
Apartments (Dwellings)	2,106	2,196	2,258
Townhouses (Dwellings)	415	472	501
Retail / Hospitality (sqm)	27,543	29,319	30,109
Office (sqm)	34,121	36,455	38,117
Industry (sqm)	740	920	1,100

Table 4-2 – Knox Central Land Capacity Summary (2035)

Type	Low	Medium	High
Apartments (Dwellings)	3,642	3,780	3,925
Townhouses (Dwellings)	549	603	630
Retail / Hospitality (sqm)	42,178	44,178	47,113
Office (sqm)	64,122	67,009	69,905
Industry (sqm)	2,070	2,290	2,530

The report recommends that the Structure Plan should promote flexible activity and land use mixes. On this basis, the “High” scenario land use yields will be tested as part of this study.

4.2 Key Development Sites

4.2.1 Westfield Knox

4.2.1.1 Westfield Knox Shopping Centre Development Plan

The approved ‘Stage 1’ development of the Westfield Knox site includes the following elements:

- Extension of the shopping centre to the south toward Burwood Highway. A total of 46,000 square metres of additional floor space, comprising 36,451 square metres of shop floor area and 9,549 square metres for restricted retail and non-retail uses will be provided in the extension, which will create a new internal east-west mall to run parallel with the existing mall;
- A circular porte cochere (main feature entrance) is proposed at the western end of Burwood Highway, at the Tyner Road intersection. Existing intersections along Burwood Highway are to be modified and upgraded. The existing intersection on Stud Road is to be removed with a new intersection constructed at the northern end of the Stud Road boundary;

- The existing bus interchange is to be removed. A new bus interchange is proposed within Knox Ozone, to the north of Hungry Jacks. The bus interchange will be accessed via Melbourne Street with provision for 10 bays (including two articulated bays). New facilities will include bicycle storage and driver amenities. A new taxi rank will be co-located at this site;
- The Knox Municipal Library to be re-located to a new temporary tenancy within Knox Ozone. Otherwise, there are no changes to floor area or uses within Knox Ozone, with the proposal confined to the retail centre;
- Approximately 2,700 new car parking spaces are to be provided within a new basement, on the roof of the proposed building and in modified and new decked parking areas on the west and north side of the existing building. This will increase the total number of car parking spaces in the Centre to approximately 8,850 spaces; and
- Construction of new loading bays are proposed to service the additional retail floor area, accessed via the Lynne Avenue intersection.

4.2.1.2 Westfield Knox Transport Impact Assessments

The Transport Impact Assessment Report (prepared by GTA Consultants, dated 16 December 2013) outlines the traffic and transport impacts of the Development Plan.

The report notes that the development proposal seeks to increase the floor area of Knox City by 46,000sqm, through Stage 1 of the development. This increase is to be accompanied by modifications to the vehicle access arrangements, the creation of a relocated bus interchange, an increase in the provision of parking for cars and bicycles, and the provision of new loading areas.

The key findings of the report are summarised as follows:

- The proposed location of the bus interchange is to be positioned on the northeast corner of the Burwood Highway/Melbourne Road intersection, generally in accordance with the location as specified in the KCUDF;
- The proposed bus interchange location is expected to improve the overall accessibility of Knox City and Knox Ozone (and commercial uses to the east) by bus, by providing a high-quality interchange at a location more central to and integrated within the Centre;
- The design of the bus interchange represents an efficient design, with the provision of a total of twelve bus bays considered to be appropriate;
- The proposed development will not prejudice the potential extension of tram route 75 (should this extension be completed by the State Government in the future);
- Bicycle parking facilities are to be provided as part of the expansion in accordance with statutory requirements;
- The proposed development will incorporate improved walking and cycling pathways between the centre and surrounding land uses;
- The proposed development incorporates an improved taxi rank which is to be located adjacent the new bus interchange;
- The proposed post-development car parking supply of approximately 8,900 car spaces is expected to adequately cater for the car parking demand of the expanded Centre and is generally in accordance with the range of the statutory car parking requirements; and

- The traffic impacts of the proposed development will be mitigated by the road works proposed at vehicle access points to the Centre and at the Burwood Highway/ Stud Road intersection.

The Westfield Knox Shopping Centre Expansion Pedestrian and Cycle Movement Plan (dated March 2014) outlines the existing and proposed pedestrian and cyclist network improvements which have been included in Figure 4-2. Figure 4-2 is also provided at the end of this report in a larger scale.



Figure 4-2 Westfield Knox Shopping Centre Pedestrian & Cyclist Movement Plan (LandDesign Partnership Pty Ltd March 2014)

