Ku-ring-gai Council

Ku-ring-gai Integrated Transport Strategy

Final Report

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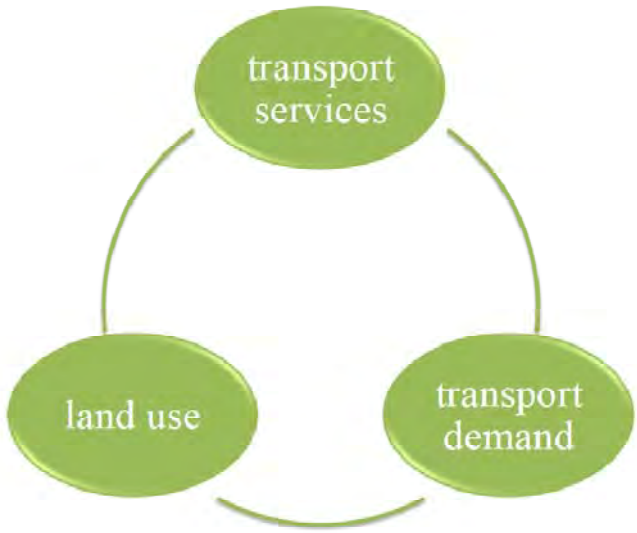
1 Introduction

Arup was commissioned by Ku-ring-gai Council to prepare a Ku-ring-gai Integrated Transport Strategy (ITS). For the sustainable future well being for Ku-ring-gai residents, employees and visitors, a well developed ITS is warranted to provide future guidance for Council's decision making in transport and land use planning.

Integrated transport strategies recognise that strategies for transport need to be considered within a holistic context where transport is inherently linked to land use, the built form, air quality, health and energy emissions. This process allows a range of parameters to be evaluated for Ku-ring-gai to achieve sustainable, balanced outcomes.



This ITS covers key issues through the Ku-ring-gai LGA in relation to:

- All forms of public transport
- Walking and cycling
- Roads, traffic and parking (including arterial/ regional road performance and key intersections)
- Integration of land use and transport/ transport accessibility
- Trip growth, and travel demand management

Ku-ring-gai ITS presents a vision for Ku-ring-gai's transport to 2020 and assigns plans and aims to short (5 years) and long term (10 years) time frames.

1.1 Study Area

The study area for the Strategy is primarily the Ku-ring-gai Local Government Area (LGA), however transport strategies that are not limited to the Ku-ring-gai LGA were also considered.

1.2 Objectives

The key objectives for the Ku-ring-gai ITS is to develop a strategic framework of actions to:

- Reduce the need to travel and the length of trips;
- Provide a choice of travel options for people and goods, and promote sustainable choices;
- Make it safe and easy for people to access goods, services and destinations, particularly by public transport, walking and cycling;
- Increase the share of trips by public transport, walking and cycling and reducing car dependency;
- Provide for the safe and efficient delivery of freight;
- Minimise the need for new transport infrastructure by integrating land use and transport more effectively;
- Achieve desired outcomes using the most cost-effective package of measures; and
- Identify areas for further detailed studies.

1.3 Targets

The identified actions are a combination of both short and long term actions consistent with community's values and vision, and also consistent with broader State and Federal government policies.

1.4 Methodology

The methodology follows a five stage process with a series of community and agency consultation workshops informing the process as shown below.

2 Transport and Land Use Planning Context

2.1 Introduction

This section provides an overview of relevant plans, policies and studies that inform the Ku-ring-gai ITS. The review of the documents is broken down into state, regional and local relevance as shown in the diagram below.

2.2 State Context

2.2.1 NSW State Plan 2010

NSW State Plan 2010 provides a framework for the delivery of service improvements for NSW through strategies, targets and actions. The *NSW State Plan 2010* relates to this Study through the following:

- **Better Transport and Liveable Cities**

  This chapter recognises the key link between transport links and jobs, facilities and quality of life. This chapter also includes priorities to improve the public transport system and the road network. Specific targets are:

  - Increase the proportion of total journeys to work by public transport in the Sydney Metropolitan region to 28% by 2016.
  - Increase the share of commute trips made by public transport:
    - To and from Sydney CBD during peak hours to 80% by 2016
    - To and from Parramatta CBD during peak hours to 50% by 2016
    - To and from Liverpool CBD during peak hours to 20% by 2016
    - To and from Penrith CBD during peak hours to 25% by 2016
  - Reduce road fatalities to 4.9 per 100,000 population by 2016
  - Increase the mode share of bicycle trips made in the Greater Sydney Region at a local and district level to 5% by 2016.
  - Increase the percentage of the population living within 30 minutes by public transport of a city or major centre in Metropolitan Sydney.

- **Healthy Communities**

  The chapter highlights the priority to 'Promote healthy lifestyles' through development and initiatives that can shape our lifestyles, such as influencing transport modes and supporting incidental exercise.

- **Green State**

  This chapter looks toward NSW being a 'green state.' The priority, 'Tackle climate change' seeks to promote initiatives that reduce carbon dioxide emissions, including those from transport.

Commentary

The *State Plan's* priorities align with developing transport strategies that guide sustainable outcomes. Transport infrastructure improvements identified by the *State Plan* support increased transport choices to allow for more journeys to be undertaken with more sustainable forms of transport. The *State Plan's* priorities towards healthy communities guide the Ku-ring-gai ITS towards encouraging active transport choices to facilitate healthy lifestyles and to reduce carbon dioxide emissions.

2.2.2 NSW Government's Metropolitan Plan for Sydney 2036, NSW Government's Sydney Metropolitan Strategy - City of Cities and North Subregional Strategy

NSW Government's Metropolitan Plan for Sydney 2036 (2010)

The NSW Government updated the *Metropolitan Plan for Sydney* in 2010 to review the *Sydney Metropolitan Strategy* (2005) and ensure that it is responding to the challenges facing Sydney. The *Metropolitan Plan for Sydney 2036* is founded by the following policy settings:

- Establish no new Greenfield fronts to Sydney's existing urban footprint under the Plan
- Increase the proportion of homes within 30 minutes by public transport of jobs in a Major Centre, ensuring more jobs are located closer to home
- Build at least 70% of new homes in the existing urban area
- Enable residential and employment growth in areas where there is available or planned public transport capacity
- Build at least 80% of all new homes within the walking catchments of existing and planned centres of all sizes with good public transport
- Locate 50% of planned employment capacity in Western Sydney
- Plan land use, service provision and infrastructure capacity for 770,000 additional homes by 2036 and 760,000 more jobs by 2036.

The *Metropolitan Plan for Sydney 2036* continues to highlight the importance of integrating transport and land use planning to overcome Sydney's challenges of managing congestion and reducing Sydney's energy related greenhouse gas emissions. The *Plan* also promotes actions to support sustainable travel, including the implementation of the NSW Bike Plan and Work Place Travel Plans.

The current plan updates the dwelling and employment targets for Sydney's subregions as shown in the table below.

Table 1 Dwelling and Employment Targets (2010)

Subregion	**Net Additional Dwelling Target 2036** **(Metropolitan Plan for Sydney 2036-2010)**	**Net Additional Dwelling Target 2036** **(Sydney Metropolitan Plan - 2005)**	**Net Additional Employment target 2036** **(Metropolitan Plan for Sydney 2036-2010)**	**Net Additional Employment target 2036** **(Sydney Metropolitan Plan - 2005)**
North	+ 29,000	+21,000	+15,000	+13,500

Dwelling and employment targets at the LGA level and updates to Subregional Plans have not yet been released.

NSW Government's Metropolitan Strategy – City of Cities (2005)

The *Sydney Metropolitan Strategy - City of Cities* is a strategic planning document that provides a broad framework for the growth and development of Sydney towards 2031. It outlines the vision, challenges and directions facing Sydney in

relation to: Economy and Employment, Centres and Corridors, Housing, Transport, Environment and Resources, Parks and Public Places and Implementation and Governance. The *Strategy* identifies five aims including:

- Enhance liveability
- Strengthen economic competitiveness
- Ensure fairness
- Protect the environment
- Improve governance

Under the *Sydney Metropolitan Strategy*, Ku-ring-gai lies within the North Subregion. In order to accommodate the future population and demand for employment, the North Subregion has been assigned an employment capacity target of 92,500 jobs by 2031 (an additional 13,500 jobs from 2004) and a dwelling target of 109,000 dwellings by 2031 (an additional 21,000 dwellings from 2004).

Draft North Subregional Strategy (2007)

The *Draft North Subregional Strategy* outlines key employment and housing growth earmarked for the Ku-ring-gai LGA. The Ku-ring-gai LGA is targeted to accommodate 10,000 more dwellings and 4,500 more jobs to 2031. Dwelling and employment targets for the North Sydney Region of Councils (NSROC) are shown in Table 2.

Table 2 Dwelling and Employment Targets (2007)

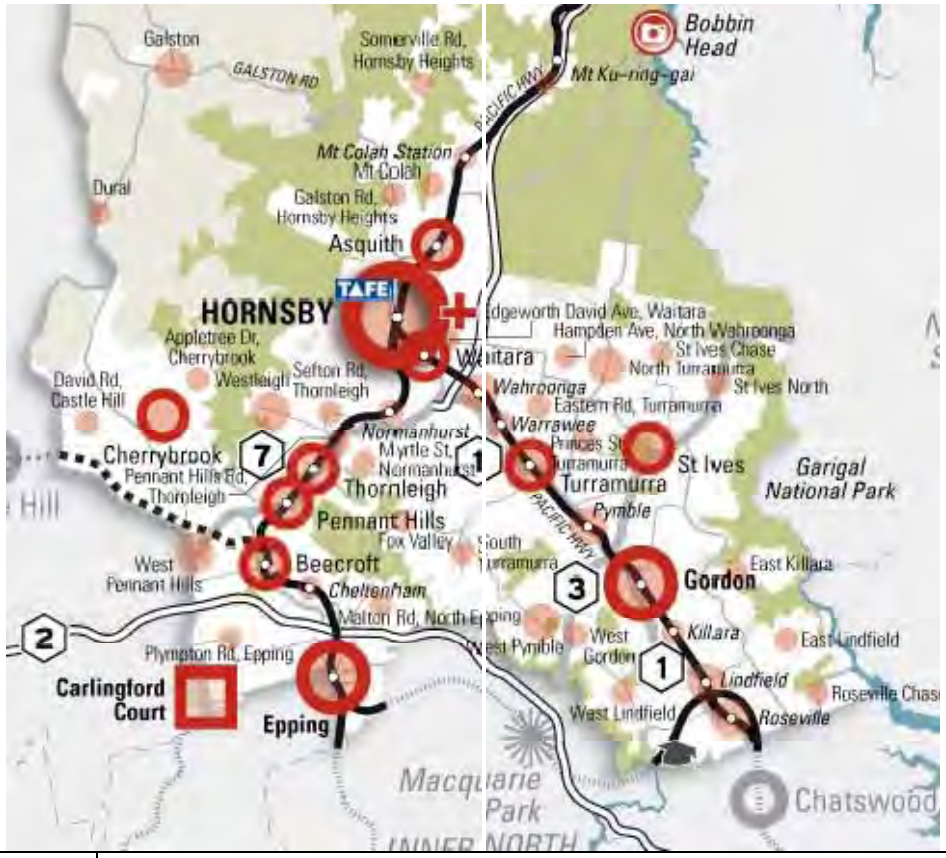
Local Government Area	Dwelling Target for 2030	Employment Target for 2030
Ku-ring-gai	10,000	4,500
Hunters Hill	1,200	300
Hornsby	11,000	9,000
Lane Cove	3,900	6,500
Ryde	12,000	21,000
Willoughby	6,800	16,000
Warringah	10,300	12,500

Note: These targets have been superseded by the NSW Government's Metropolitan Plan for Sydney (2036) as described earlier in this section.

Hornsby is recognised as the key Major Centre within the North Subregion. The *Strategy* describes Ku-ring-gai as an area that 'supports a variety of businesses and provides niche cultural and retail services, however no heavy industry exists.' Areas of Ku-ring-gai are classified by the *Strategy* as per Figure 1. The Ku-ring-gai LGA is characterised by the town centre of Gordon, villages of Turramurra and St Ives and a number of small villages and neighbourhood centres. The classification of centres provides direction for the provision of services and types of development to be planned for at the local level.

Figure 1 Classification of Centres and Villages in Ku-ring-gai LGA (2007)

Source: Draft North Subregional Strategy (2007)



Key	Strategy Classification and Description
	Town Centre Town Centres have one or two supermarkets, community facilities, medical centre, schools, etc. Contain between 4,500 and 9,500 dwellings. Usually a residential origin than employment destination.
	Villages A strip of shops and surrounding residential area with a 5 to 10 minute walk contains a small supermarket, hairdresser, take-away food shops. Contain between 2,100 and 5,500 dwellings.
	Small Villages A small strip of shops and adjacent residential area within a 5 to 10 minute walk. Contain between 800 and 2,700 dwellings.
	Neighbourhood Centres One or a small cluster of shops and services. Contain between 150 and 900 dwellings

Beyond the LGA, the key nodes of Chatswood, Macquarie Park, Frenchs Forest, St Leonards and Epping provide important economic, employment and retail roles for Ku-ring-gai.

Key outcomes from the *draft North Subregional Strategy* include:

- Increase housing choice, particularly around centres and public transport nodes;
- Strengthen Hornsby as a Major Centre;

- Enhance local centres through focusing increased housing choice and revitalisation of the existing retail/ commercial centres;
- Maintain rural and resource lands

The *draft North Subregional Strategy* highlights the following relevant to the Ku-ring-gai ITS:

- **Transport**:

  This chapter highlights the Subregion's reliance on the rail line. The *Strategy* identifies improvements to the public transport access to and from the Subregion through the development of the Epping to Chatswood Rail Link (opened in 2009) and Strategic Bus Corridors. Three Strategic Bus Corridors are planned through the Ku-ring-gai LGA.

- **Employment and Economy:**

  The *draft North Subregional Strategy* highlights that there are no strategic employment land precincts identified in Ku-ring-gai LGA. The *Strategy* also highlights that access to the Subregion through transport links have a significant influence the economic future of the Subregion.

- **Housing:**

  A significant driver for change in the housing needs for the area is the aging of the resident population. Housing development growth is focused along the Rail Lines.

Commentary

Directions from the *Subregional Strategy* to increase the amount of dwellings in the Subregion have resulted in increased development along the Rail Line and along Pacific Highway. The reliance on the rail line as a key form of public transport suggests that there is a need to enhance and maintain the service to provide for additional growth, however no improvements to the existing line through the Ku-ring-gai LGA are planned.

The importance of integrated transport strategies are highlighted through the need to respond to changing demographics in the area. The *draft North Subregional Strategy* emphasises the need for residential development that enables residents to 'age in place' with small, self sufficient dwellings and good access to services and public transport.

The *draft North Subregional Strategy* also highlights the Subregion's proximity to national parks and open spaces. Providing access to these parks and recreational areas is a key mechanism to enable the community to acknowledge the value of these lands.

2.2.3 Metropolitan Transport Plan – Connecting the City of Cities (2010)

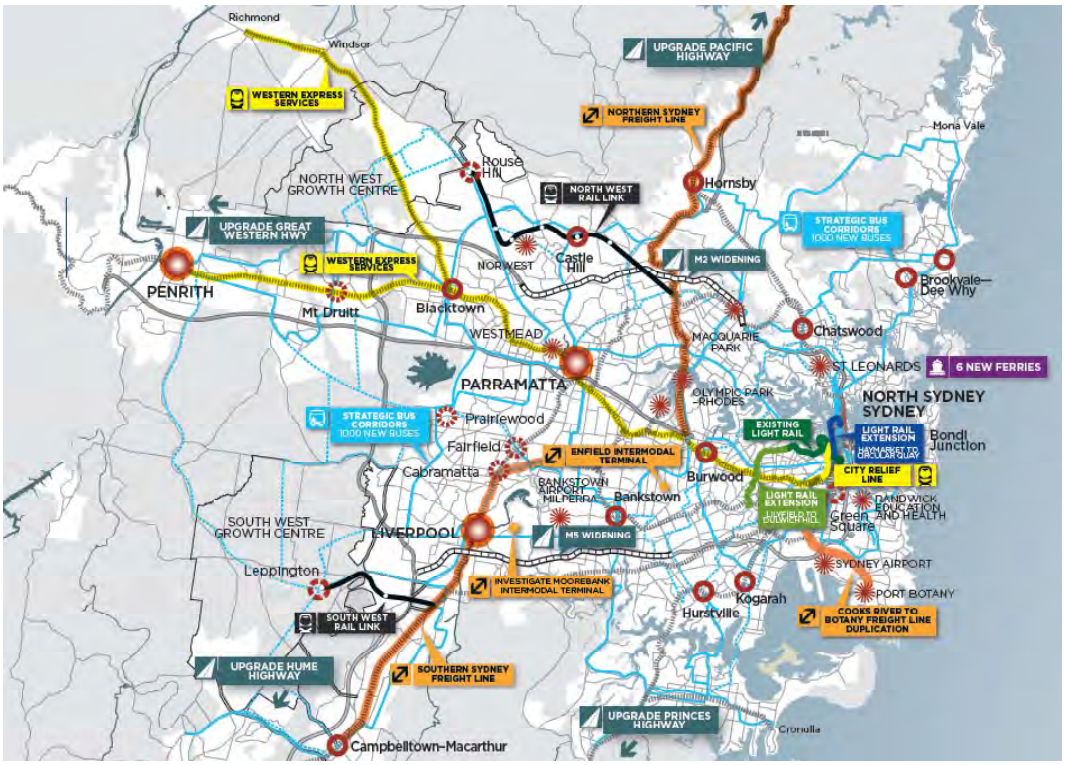
The *Metropolitan Transport Plan* sits under the *NSW State Plan 2010* to deliver a key vision for Sydney's transport. The four key vision statements are:

- Commuting to work easily and quickly
- Transport and services accessible to all members of our community

- An efficient, integrated and customer focused public transport system
- Revitalised neighbourhoods with improved transport hubs

The *Metropolitan Transport Plan* highlights the role of transport in Sydney as needing to go beyond catering for growth to being able to contribute to shaping a compact and efficient city. The *Metropolitan Transport Plan* is shown in Figure 2.

Figure 2 Metropolitan Transport Plan (2010)



Source: NSW Government, 2010

Rail

The *Metropolitan Transport Plan* outlines the following improvements to the rail network for 2010 – 2020:

- Constructing the South West Rail Link;
- Constructing the City Relief Line, adding new rolling stock and new platforms to busy CBD stations, leading to more and faster trains from Western Sydney;
- Beginning construction of the North West Rail Link;
- Rolling out new train carriages including Waratah and OSCARs to provide air conditioning to all passenger rail carriages;
- Extending light rail operations to Dulwich Hill and through the CBD.

Buses

Three strategic bus corridors are planned through the Ku-ring-gai LGA. These include:

- 8 - Hornsby – Chatswood;
- 15 - Chatswood - Dee Why/Brookvale; and
- 36 - Mona Vale – Macquarie.

Bicycle and Pedestrian Infrastructure

A key element of the *Metropolitan Transport Plan* is the NSW Bikeplan 2010 that outlines the delivery of the building of missing cycle links in the Metro Sydney Bike Network and provide funding to assist local councils in improving local cycleway networks. The *Plan* recognises the potential to shift a high number of short trips (under 10 kilometres) from car to active transport alternatives such as cycling and walking.

Commentary

The *Metropolitan Transport Plan* aligns with the key foundations of the ITS as it recognises the strong links between land use planning and transport and the need for integration between both to enhance the social and economic value of Sydney. The *Plan's* vision responds to the significant shift in aging population in the Ku-ring-gai area and the need to provide accessible transport options for all. It also highlights that the city's economy relies on good transport infrastructure to allow access to jobs, and also highlights that the perception of transport access needs to be regarded high to encourage investment into of employment centres. A response from the Northern Sydney Region of Councils (NSROC) suggests that the poor perception of transport infrastructure impacts potential investment in the northern region and the *Metropolitan Transport Plan* should respond to this.

Specific to Ku-ring-gai, the *Plan* identifies strategic bus corridors through Ku-ring-gai and upgrades to Pacific Highway, however no major upgrades to rail links in the area are identified.

2.2.4 NSW Government Submission to Infrastructure Australia, August 2010

The *NSW Government submission to Infrastructure Australia* highlights that overcoming transport challenges in NSW, in particular Sydney, have a significant role in achieving national and state objectives. The *Submission* seeks funding for a series of transport project that the NSW Government suggests align with Infrastructure Australia's national strategic priorities of:

1. Expand Australia's productivity capacity
2. Increase Australia's productivity
3. Diversify Australia's economic capabilities
4. Build on Australia's global competitive advantage
5. Develop our cities and regions

6. Reduce greenhouse emissions
7. Improve social equity and quality of life in our cities and our regions

The *Submission* seeks funding for the detailed planning and delivery of the 'priority projects' of:

- **North West Rail Link –** This link would provide better access to north - west Sydney, including the Norwest Business Park.
- **Northern Sydney Freight Rail Corridor** - This project has the potential to reduce vehicle freight movement through Ku-ring-gai and reduce pressure on the passenger rail system.

The NSW Government is also seeking funding to facilitate initial phases of development:

- **F3 to M2 Link –**This project has the potential to reduce through vehicle movements in Ku-ring-gai
- **Parramatta to Epping Rail Link –** This link would provide a rail connection to Parramatta as a key employment area and enable better utilisation of the CityRail network.

Commentary

The *Submission* asserts the strong connection between improvements to the transport system and meeting national and state objectives of economic prosperity and sustainability. The *Submission* identifies a series of transport infrastructure for Sydney that requires funding from the Federal Government that has potential to improve the transport situation in Ku-ring-gai. The *Submission* highlights that whilst Federal Government is not directly responsible for transport planning, funding can be sought by State Government to assist in the planning and delivery of major projects.

2.2.5 The Integrated Land Use and Transport (ILUT) Package, DUAP 2001

The *Integrated Land Use and Transport Package* provides a guidance to assist councils in implementing the objective of 'promoting attractive and convenient places to live and work.' This *Package* emphasises the need for urban structures, building forms, land use location, development designs, subdivision and street layouts to achieve sustainable transport objectives. The *Package* introduces the following concepts to be considered when planning for transport choice:

Convenience — the transport mode needs to be easy to find and use, and to transfer from one mode to another.

Information — reliable information at accessible locations is essential to encourage use of various travel alternatives.

Proximity — transport facilities and services, such as cycle paths and bus services, need to be in close, convenient and obvious locations to people's trip origins and destinations.

Destination choice — the more destinations that can be linked on a public transport route, the more attractive it will be.

Directness — routes should take the shortest and least deviating course, with priority to achieve fast travel times for walking, cycling and public transport (e.g. pedestrian links, dedicated bus lanes, and bikeways).

Security — the environment for walking and waiting needs to be comfortable and safe from personal attack or conflicts with traffic (e.g. waiting areas sheltered from the elements, natural surveillance, good lighting, bike lanes on major roads).

Commentary

The *Integrated Land use and Transport Package* highlights the key role that planning has in facilitating sustainable transport as well as its role in inhibiting transport choice. The *Package* recognises that transport planning concepts need to be considered at all stages of land use planning to result in successful urban communities.

2.3 Regional Context

The Northern Sydney Regional Organisation of Councils (NSROC) brings together Ku-ring-gai, Hornsby, Hunters Hill, Lane Cove, North Sydney, Ryde and Willoughby Councils to achieve coordinated responses and cooperation related to regional issues. NSROC provides a platform for the councils in the region to influence issues beyond their immediate LGA boundaries to bring benefits to the region.

2.3.1 NSROC Submission to Metropolitan Transport Plan, May 2010

NSROC recommends the following key projects for the region, in order of priority:

- North-West Rail or Metro link
- Parramatta to Epping Rail link
- Second Harbour Bridge rail crossing and fast North Shore line
- Bus or light rail link from Chatswood to the Northern Beaches
- Transport strategies for Military – Spit Corridor, Victoria Road, Pennant Hills Road and the Pacific Highway
- Completion of M2- F3 link into the Sydney Orbital
- Improved regional rail services to the Central Coast and Newcastle

2.3.2 NSROC Sustainability Plan, September 2008

The *NSROC Sustainability Plan* provides an overarching document for the Region that is intended to guide planning and policy documents in the relevant councils. The *Plan* is a key document to act as a tool for communication and integration of common sustainability goals across the Region.

The *Plan* highlights the following transport and land use issues facing the Region:

- Use of private cars is trending upwards, already contributing to severe traffic congestion in many areas, and potential gridlock at peak commuting times;
- There is a lack of easy access to bus and rail intra-regional networks for many. This is likely to become a more serious issue as the population ages, and a greater mix of socio-economic groups populate the Region;
- Greenhouse gas emissions, noise pollution and pedestrian safety are already significant issues and will increase;
- Deterioration in the character and community values so sought after by northern Sydney residents will occur as congestion increases.

The *Plan* includes the following five goals relating to transport and traffic:

- Greater use of public transport to reduce use of private cars
- Increase healthy methods of travel

- Maximise job retention and working from home to reduce car use and improve community

Commentary

The *NSROC Sustainability Plan* places the ITS within the regional context and asserts the need for the ITS to respond to surrounding LGA policy and planning including bicycle route plans, parking policy etc.

2.3.3 Surrounding Councils

Considering strategies and planning documents from council areas surrounding Ku-ring-gai provides an opportunity to co-ordinate transport across the region. Key considerations from the surrounding councils are outlined below.

Hornsby Shire Council

- Hornsby's recently completed *Housing Strategy (2010)* considers consolidated underground parking as a key consideration in meeting the future housing needs for the area.
- Key proposed transport projects, the North West Rail Link and the F3 to M2 Road Link, would have major impacts on transport in the area, also influencing Ku-ring-gai.
- Hornsby's *Integrated Land Use and Planning Strategy (2004)* provides guidance on relevant strategies for the Ku-ring-gai ITS and regional links for cycling and walking trails will be co-ordinated into Ku-ring-gai's ITS.

Ryde City Council

- Cycling routes identified in the *Ryde Bike Plan (2007)* are to be co-ordinated into strategies for cycling in the Ku-ring-gai ITS.
- The *Ryde Integrated Transport and Land Use Strategy (2007)* provides guidance on relevant strategies for the Ku-ring-gai ITS.
- The bus provided by Council that services the Top Ryde shopping centre provides an example of a community transport that may be implemented as part of the Ku-ring-gai ITS.

Willoughby Council

- To provide for regional cycling routes that connect to the city, cycling routes identified in the *Willoughby Bike Plan (2006)* are to be co-ordinated into strategies in the Ku-ring-gai ITS.
- The examples of community transport, including the 'Council Cab' and 'Loop Bus' are to be investigated further to inform strategies for the Ku-ring-gai ITS.

Warringah Council

- To provide for regional cycling routes, cycling routes identified in the *Warringah Bike Plan (2010)* are to be co-ordinated into strategies in the Ku-ring-gai ITS.

- *Shaping Our Future* (SHOROC, 2010) provides guidance on relevant transport strategies for the north-eastern region of Sydney, including Warringah. A major transport direction in the strategy is "Strengthening public transport and road linkages with particular focus on: the East/West corridor between the Major Centre of Dee Why/Brookvale and Frenchs Forest and from Frenchs Forest and Mona Vale to Chatswood, Macquarie/Ryde and beyond; and improvements to the crucial North/South corridor."
- The transport implications for Ku-ring-gai from future development in the Frenchs Forest area, including a major hospital, are to be considered.

2.4 Local Context

Land use planning and development in Ku-ring-gai is guided at the local level by Council through a series of planning instruments, plans and policies. The *Ku-ring-gai Local Environmental Plan (LEP) Town Centres 2010* and the *Ku-ring-gai Planning Scheme Ordinance (KPSO)* provide statutory controls for development and the Development Control Plan (DCP) supplements these instruments with detailed planning and design direction. A series of policies and plans directly relevant to Ku-ring-gai also help guide building and development in the area.

2.4.1 Local Environmental Planning

The current statutory planning instruments relevant to Ku-ring-gai LGA are:

- Ku-ring-gai Planning Scheme Ordinance
- Ku-ring-gai Local Environmental Plan (Town Centres) 2010 (KLEP 2010)

The *Ku-ring-gai LEP (Town Centres) 2010* relates to Ku-ring-gai's six major centres – St Ives, Turramurra, Pymble, Gordon, Lindfield, and Roseville. Council is currently working towards the Principal LEP for the whole of Ku-ring-gai LGA to be gazetted in 2011. Therefore, the existing *Ku-ring-gai Planning Scheme Ordinance* applies to land outside the six major centres.

The Principal LEP seeks to incorporate the dwelling and employment targets assigned to the LGA by the *Sydney Metropolitan Plan*.

Ku-ring-gai Principal LEP

The Department of Planning & Infrastructure requires councils across the State to develop a LEP within the standard template on which the new Ku-ring-gai LEP will be based. Council is currently undertaking studies that will feed into the Principal LEP for the whole of the Ku-ring-gai that is required to be gazetted in 2011. The final Principal LEP will cover the whole of the Ku-ring-gai LGA and incorporate the *Ku-ring-gai LEP (Town Centres) 2010.*

Ku-ring-gai LEP (Town Centres) 2010

The *Ku-ring-gai LEP (Town Centres) 2010* responds to the dwelling and employment targets assigned to the LGA by the *Sydney Metropolitan Plan* and the *draft North Subregional Plan.* The aims of *Ku-ring-gai LEP (Town Centres) 2010* are:

(a) to establish a hierarchy of centres for Ku-ring-gai,

(b) to facilitate the development of the centres to enhance Ku-ring-gai's economic role and cater to the retail and commercial needs of the local community,

(c) to provide a variety of housing choice within and adjacent to the centres,

(d) to protect, enhance and manage land having special aesthetic, ecological, social, cultural or conservation values for the benefit of present and future generations.

Commentary

The *Ku-ring-gai LEP (Town Centres) 2010* provides a series of controls that relates to a model where high and medium residential density and local centre uses are concentrated around train stations and major roads. This model supports and encourages use of public transport and access to key transport nodes. It is understood that the Principal LEP for Ku-ring-gai will not contain any major zoning changes as a majority of Ku-ring-gai's dwelling and employment targets will be met by development in these town centres. The ITS provides a strategy for broader transport and traffic actions, to be considered through the development of the Principal LEP and DCP.

2.4.2 Development Control Plans

Development Control Plans supplement LEPs. Relevant to the Ku-ring-gai ITS are the *Ku-ring-gai DCP (Town Centres) 2010* and the *Ku-ring-gai Council DCP 43 – Car Parking (1998)*.

Ku-ring-gai DCP (Town Centres) 2010

The *Ku-ring-gai DCP (Town Centres) 2010* relates to St Ives, Turramurra, Pymble, Gordon, Lindfield, and Roseville Centres and provides detailed provisions for development aligning with the *Ku-ring-gai LEP (Town Centres) 2010*. The key elements of the town centre DCPs are outlined below.

'St Ives town centre will become a high density mixed use area located on Mona Vale Road between Shinfield Avenue and Stanley Street.' Features include:

- Increases in retail services
- Increased Council facilities, library, neighbourhood centre, youth centre, and possible child care centre
- Pedestrian only lane
- Traffic signals at Mona Vale Road to enter St Ives Shopping Centre
- Bus facilities

'Turramurra will become a moderate-sized mixed use centre located along the Pacific Highway between Turramurra Avenue and Duff Street.' Features include:

- New major shopping centre
- Footpath widening in Rohini Street
- Council parking to be relocated to basement parking upon redevelopment

'Pymble will be a compact main street based centre offering a local service function.' Features include:

- Expansion of retail in Park Crescent
- Pedestrian access way from Grandview Street and Robert Pymble Park

'Gordon town centre will become the primary retail and commercial centre for Ku-ring-gai.' Features include:

- High density mixed use along Pacific Highway

- Retail core on western side of Pacific Highway
- Civic Hub around Park Avenue
- Transport hub on St Johns Avenue and Henry Street

'Lindfield town centre will be a high density mixed use centre extending along the Pacific Highway and Lindfield Avenue.' Features include:

- Expanded shopping centre
- Town centre to be developed on the existing Council car park
- Council Library
- Closure of Tyron Place and parts of Tyron Lane
- New "Village Green" on Woodford Lane.

'Roseville will develop as a small high density mixed use centre located on the Pacific Highway and Hill Street between Maclaurin Parade and Roseville Avenue.' Features include:

- Support entertainment precinct along Pacific Highway
- Increase parking along Larkin St
- Retail local character of Hill St retail
- New Village Green on Lord St
- New pedestrian laneways through arcades.

The *Ku-ring-gai DCP (Town Centres) 2010* also details car parking rates relevant to the town centres using minimum rates.

Ku-ring-gai DCP 43 – Car Parking 1998

The *Ku-ring-gai DCP 43 – Car Parking (1998)* prescribes a series of parking rates for developments. The *DCP* parking rates provide a basis for assessing development proposals. The *DCP* indicates that Council will also consider a proposal on its merits in a performance based assessment relating to meeting the *DCP* objectives and design elements.

Commentary

The *Ku-ring-gai DCP (Town Centres) 2010* supports development for community and local retail and services and also features urban design elements that support pedestrian activity. Car parking rates in the *Ku-ring-gai DCP (Town Centres) 2010* and *Ku-ring-gai DCP 43 – Car Parking (1998)* recognise the strong influence that car parking provision can have on transport choice. Selected car parking rates in *DCPs* respond to access to public transport and the *DCPs* suggests that rates may be reduced where demonstrated demand is low. The *DCP* further suggests that parking may be shared with different uses, supported by studies and where satisfied by Council.

The Action Plans in the ITS will further review relevant Council DCPs to ensure transport and land use goals are being implemented at the development control level.

2.4.3 Sustainability Vision Summary Report 2008 – 2033, Ku-ring-gai to Global

This *Report* summarises the vision for Ku-ring-gai over the next 25 years. The vision is a local response to global, national and regional sustainability issues and provides a foundation for Council programs, plans and policy. The Sustainability Vision forms a basis for the Ku-ring-gai Community Strategic Plan. Following a consultation process, the vision for Ku-ring-gai was developed.

'Ku-ring-gai will be a creative, healthy and liveable place where people respect each other, conserve the magnificent environment and society for the children and grandchildren of the future.'

Commentary

Ku-ring-gai's sustainability vision provides direction for the ITS to respond to the aspiration of Ku-ring-gai being a creative, health and liveable place. The ITS has a role in;

- providing an innovative strategy for transport issues;
- working towards conserving resources including fossil fuels;
- encouraging active transport and active lifestyles;
- providing safe and easy places for shopping, playing and recreation; and
- providing access for people of all genders, ages, abilities and culture.

2.4.4 Ku-ring-gai Community Strategic Plan, 2009

The *Ku-ring-gai Community Strategic Plan* outlines issues, objectives and targets relating to Council's roles of:

- Community Development;
- Urban Environment;
- Natural Environment;
- Planning; and
- Civic and Corporate Services.

The *Strategic Plan* informs Council's Management Plan and Operational Plan.

The 20 year targets relevant to the ITS include:

- **Traffic:** No increase in recorded accidents on Council managed roads
- **Planning:** 90% implementation of the LEP and DCP

Commentary

The targets from the *Strategic Plan* will be coordinated into relevant Action Plans throughout the ITS.

2.4.5 Ku-ring-gai Council Climate Change Policy

The *Ku-ring-gai Council Climate Change Policy* responds to the implication of climate change on Ku-ring-gai's community, environment and economic sustainability with the following targets for Council facilities and vehicles:

- 20% reduction in greenhouse gas emissions from electricity
- 20% reduction in fuel use

Commentary

The targets from *Climate Change Policy* will be coordinated into relevant Action Plans throughout the ITS.

2.4.6 Ku-ring-gai Traffic and Transport Policy, July 2010

The *Ku-ring-gai Traffic and Transport Policy* outlines Council's response to transport and traffic issues. The *Policy* recognises transport and traffic issues affecting Ku-ring-gai are multi layered and the responsibility in managing and responding to these issues may be beyond Council's control. This *Policy* provides guidance for traffic and transport issues at a local level and forms part of Council's Management Plan.

The *Policy* provides a series of Preferred Approaches to the following issues.

- Road Hierarchy
- Road Safety
- Driver Visibility
- Speed Limits
- Traffic Calming
- Traffic Facilities
- On – Street Parking
- Council – Controlled Car Parks
- Resident Parking Schemes
- Pedestrians
- School Safety
- Road Safety Promotion
- Public Transport
- Heavy Vehicles
- Development Proposals
- Roadside Fencing
- Special Events
- State Roads and Other State Responsibilities
- Cyclist
- Community Consultation
- Funding
- Roadside Memorials

Commentary

As a flexible, living document, the *Ku-ring-gai Traffic and Transport Policy* will be reviewed more closely under the relevant Action Plans in the ITS. The ITS will seek to make recommendations for the *Ku-ring-gai Traffic and Transport Policy* where relevant. The *Policy* provides a response to traffic and transport issues within the control of Council. Beyond this *Policy*, the ITS provides a platform for lobbying and influence at a regional and state level.

2.4.7 Previous Studies

Other relevant studies that were reviewed as part of this Strategy to be referred to in relevant sections of this report include:

- Traffic and transport base study, GHD, 2000
- Traffic and transport studies for Ku-ring-gai's six town centres
- Ku-ring-gai Council Bicycle Plan, 1995
- Ku-ring-gai Council draft Parking Management Plan 2010
- Ku-ring-gai Council draft Public Domain Plan 2010
- Town centre maps/yield tables
- Ku-ring-gai Contributions Plan 2010
- Ku-ring-gai Council Satisfaction survey

2.5 Other External Drivers

2.5.1 Sustainability Context

Shaping a sustainable future will be one of the greatest challenges of the 21st century globally, and for Australian cities. The recent Commonwealth report *State of Australian Cities 2010* describes the national urban condition as far from resilient. Our ability to live sustainably will be challenged with the issues of increased population, depletion of resources, land use demand and economic pressures.

Australia has been experiencing a trend toward larger homes, despite lower occupancy rates. A report by Commsec (2009) suggests that the average new Australian home is now 215m² which is one of the largest in the world. As the urban form is shaped by the demand for housing type; the trend for larger homes will bring implications for transport and access to work, recreation and services.

The need for travel and reliance on vehicles has a significant impact on energy and greenhouse gas emissions. Household transport, as well as transport for food and goods consumed by the household, is one of the strongest sources of greenhouse gas emissions. Consumption of goods relates closely to the expected increase in freight movement in Australia by three fold by 2050 (NSW Government, 2010). This will bring significant pressure on the road and rail system and associated emissions, noise and increases in freight costs The Australian Sustainable Built Environment Council report *Cities for the future: Baseline report and key issues 2010* highlights that at current trends, transport in Australian cities is forecast to become more inefficient in terms of cost, time, emissions and passenger movements.

Contributing to road transport emissions is Australia's high dependence on private vehicles. Sydney residents, including Ku-ring-gai residents, rely heavily on private vehicles for a range of trip purposes. The *Household Travel Survey Summary Report 2009* indicates that more than half of all car trips made in Sydney are less than five kilometres.

Reliance on private vehicles for mobility also has a direct influence on health across a number of factors including reduced levels of physical activity and obesity (Wen et al. 2006). The National Preventative Health Taskforce (2009) recognises that Australia is one of the most overweight developed nations, with over 60% of adults and 25% of children overweight or obese. Design of urban environments with transport opportunities beyond private vehicles as well as walkable community design is fundamental in improving the health of Australians.

As Australia looks towards a sustainable future, choices at a local level hold a significant opportunity to affect change toward a lifestyle that has a reduced impact on resources, maintains productivity in the economy and supports a high quality of life. Transport is fundamentally about the movement of people and goods. This relies on an integrated land use and planning system that allows people to get where they want to go when they want efficiently and safely as well as providing people with services and goods within convenient locations. Integrating land use planning and transport through a series of strategies presents an opportunity to transform our cities and contribute to liveable urban spaces.

Shaping a sustainable future will be one of the greatest challenges of the 21st century globally, and for Australian cities. National, state and local bodies will have to respond to the issues of increased population, depletion of resources, land use demand and economic pressures. A proactive response to these challenges will need to be established to guide our cities and environments to those that are sustainable and resilient. This section identifies a range of policies and strategies that have the opportunity to drive change and influence land use and transport aspects of Ku-ring-gai.

2.5.2 Commonwealth Government Policy

The Commonwealth Government has committed to a carbon reduction target to 2020 which includes a reduction of transport emissions. Following the Conference of the Parties to the Kyoto Protocol held in Copenhagen in December 2009, countries were requested to report their reduction pledges to cut and limit greenhouse gases by 2020. Australia has pledged to reduce its emissions by at least 5 per cent below 2000 levels by 2020. Further to this, Australia has committed to reduce its greenhouse gas emissions by up to 25% on 2000 levels by 2020 if there is a global agreement to stabilise levels of greenhouse gases in the atmosphere at 450 ppm CO_2-eq or lower. To reach these targets, it is widely acknowledged that a price on carbon will be required. The form of this policy mechanism, however, is still highly uncertain.

If the pricing mechanism broadly follows the cap and trade scheme proposed by the Commonwealth Government's planned Carbon Pollution Reduction Scheme (in 2009 - 2010), greenhouse gas emitters, including suppliers of fuel for transportation, will be required to pay for each tonne of greenhouse gas they emit. The additional cost to generators would be passed on to consumers to some extent. One of the impacts will be that public transport will become more cost competitive as fossil fuel generation is penalised.

The current Commonwealth Government is proposing to impose a price on carbon. Details of the pricing plan were released in July 2011 but the measures have not yet been legislated. The proposal is for a gradually increasing carbon price for three years before transitioning to a cap-and-trade emissions trading scheme in 2015. The imposition of an additional cost to greenhouse gas emitters is expected to have an impact on the overall cost of living. For example, a nominal carbon price of $23 per tonne of greenhouse gas could mean a significant increase in the price of petrol, resulting in the discouragement of private vehicles as a means of transportation. The policy represents an opportunity for jobs growth and greater investment in low-emission industries, including public transport.

The *State of Australian Cities 2010* acknowledges that transport emissions are one of the strongest sources of emissions growth in Australia, and its increasing trend is of particular concern to Australia's cities which feature high levels of personal car use and automobile dependency. It is envisaged that in order to achieve the Commonwealth Government's carbon reduction target by 2020, all levels of government will need to formulate and implement strategies to reduce personal car use and automobile dependency. A step towards this change is the adoption of TravelSmart programs by Australian state governments.

The *Our Cities, Our Future - A National Urban Policy for a Productive, Sustainable and Liveable Future* (Commonwealth Government, 2011) sets in

place the Australian Government's objectives and directions for cities. It highlights the various roles and need for integration between State, Territory and Local Governments, the private sector and individuals. The document suggests the Commonwealth Government is going to play a more active role in the planning and development of urban areas.

2.5.3 NSW Government Policy

In August 2010, the NSW Government announced the state's old greenhouse gas target of stabilisation by 2025 has been replaced with a target to reduce emissions by at least 5% by 2020 in line with the minimum national target. Mitigation measures to achieve this target will be detailed in the forthcoming NSW Climate Change Action Plan. The Department of Environment, Climate Change and Water is currently finalising a draft plan for community consultation.

The NSW Government has committed its agency operations to becoming carbon neutral by 2020, such that emissions from all buildings, car fleets, air travel and waste sent to landfill are reduced or offset. The NSW Government aims to lead by example and encourage the wider NSW public to reduce their greenhouse gas emissions.

Offsetting of emissions is to be considered in 2014, after all other means of reducing emissions have been put in place, and if recommended and agreed, will commence from 2020.

2.5.4 Policy and Strategy

A series of case studies and strategies that have been implemented internationally have also been explored to consider their future impact on Ku-ring-gai.

Road Pricing

A road pricing system is currently in operation in London, which aims to reduce private vehicle use in the central areas of the city. Since the scheme started, London has seen traffic entering the original charging zone reduced by 21%, an increase in cycling within the zone by 43% and public transport successfully accommodating displaced car users.

Serious consideration of road pricing systems in Australia has not occurred. Evidence from the London experience indicate the potential benefits and opportunities a system can bring towards reducing private vehicle usage and promoting the use of active transport modes in NSW. The detailed operations of a system may include time-of-day restrictions and geographical limitations, such as limiting peak-hour vehicular access to the Central Business District of Sydney.

Integrated Ticketing

Integrating various modes of public transport available to an urban resident or worker can encourage them to undertake more travel by public transport and is likely to encourage them to walk more between modes. Integrated ticketing is a critical part of achieving a seamless public transport network. Successful examples of integrated ticketing systems include the Octopus Card in Hong Kong, the Oyster Card in London, the Navigo Pass in Paris and the Go card in Brisbane.

NSW has been attempting to deliver an integrated ticketing system for public transport for several years and is expected to be delivered in the coming years. This initiative is expected to encourage residents and workers to use public transport and reduce their private vehicle usage.

Green Vehicles

Green transport fleets, such as electric vehicle technology or hybrid vehicles have the potential to reduce emissions associated with transport. Hybrid vehicles achieve a better fuel efficiency compared to standard vehicles with a regular combustion engine and hence emit lower air pollutants such as carbon monoxide, nitrogen oxides, particulate matter, volatile organic compounds, benzene and lower levels of carbon dioxide. Green vehicles can help to work towards minimising emissions from transport. Technology advances that have helped develop green vehicles can contribute towards more sustainable transport choices; however broader change to undertake a lifestyle with low environmental impact will be more significant in working towards sustainable and resilient cities.

Peak Oil

Global consumption of conventional oil has been growing steadily since the mid-1980s at 1.5% per year, but a growing group of petroleum geologists predict that supplies of conventional oil will start to fall within a few years. Many existing oil fields are going into decline and fewer new major sources of oil are being discovered. Extraction of oil from new sources is generally more costly that extraction from existing sources.

In response to peak oil, there is recognition for the need to implement measures to reduce our society's dependence on fossil fuels, and reduce the impact of fluctuations in oil prices. Similarly, with the effect of a carbon tax, the impact of costs of fossil fuels on consumers will allow public transport and choices that reduce the use of fossil fuels will become more cost competitive.

3 Analysis of Existing Conditions

This section analyses the characteristics of Ku-ring-gai, transport services in the area and the nature of transport patterns in Ku-ring-gai to provide a foundation for relevant Action Plans. Most data is presented on a LGA basis and not smaller travel zones unless stated.

Note: Figures referenced in this section are included as an appendix

3.1 Characteristics of Ku-ring-gai

Ku-ring-gai LGA lies in the northern part of Sydney, approximately 16 kilometres from the Sydney CBD and is bordered by the LGAs of Hornsby, Ryde, Willoughby and Warringah (as shown in Figure 3). The LGA is characterised by significant areas of national park and urban bushland. Ku-ring-gai itself has no heavy industry or large scale employment areas; it is however, in close proximity to key employment nodes of Hornsby, Macquarie Park, Chatswood and Frenchs Forest.

Pockets of higher population density in Ku-ring-gai are focused around the key transport spines of the rail line and Pacific Highway as well as the Town Centres, as shown in Figure 4 and Figure 5. Key generators and attractors of activity include:

- shopping centres and retail areas;
- commercial and industrial areas;
- schools and child care centres;
- hospitals and medical facilities;
- recreation facilities (e.g. pools, sports facilities, parks)
- community centres; and
- public transport facilities.

These locations form key transport desire lines and inform the demand and need for the provision of transport facilities.

Ku-ring-gai's population and employment densities are illustrated in Figure 5 and Figure 6. Population density is highest along the Pacific Highway – North Shore Rail Line corridor and also St Ives town centre. The highest population density in Ku-ring-gai is slightly lower than the highest in Hornsby LGA (Waitara – Hornsby) and significantly lower than Chatswood.

The distribution of jobs is also closely related to the town centres. However, the locations with the highest employment densities in Ku-ring-gai are:

- Pymble business park near the corner of Pacific Highway and Ryde Road (due mainly to office jobs)
- St Ives town centre (due mainly to retail jobs)
- Wahroonga (due mainly to education-related jobs)
- Sydney Adventist Hospital (due mainly to medical-related jobs)

The highest employment density in Ku-ring-gai is similar to the highest in Hornsby LGA, but significantly lower than Macquarie Park and Chatswood.

The age structure of Ku-ring-gai (Chart 1) displays prominent proportions of the community in the older person age group (65+). Compared to the Sydney average of 12%, Ku-ring-gai's older person age group makes up 17% of the population (ABS, 2006). Of significance is Ku-ring-gai's relatively low proportion of adults aged from 24 to 54 (34% of the population), compared to 45% of the Sydney population. Ku-ring-gai's age structure has implications for land use and transport. The higher proportion of older age group and lower proportion of adults aged 24 – 54 (generally of working age) in Ku-ring-gai suggests a need for the provision of public transport outside peak times. Land use planning also needs to be relevant to local community age groups to enable independent living and access for all age groups and abilities.

Reflecting the high use of private vehicles for travel in Ku-ring-gai are car ownership levels. Ku-ring-gai LGA's average car ownership level of 1.88 cars per household is the highest amongst the surrounding councils and is significantly above the Sydney average of approximately 1.5 (Chart 2).

3.2 Ku-ring-gai Transport Facilities

Ku-ring-gai supports a number of town centres along the rail line and Pacific Highway in addition to St Ives situated on Mona Vale Road.

The North Shore Rail Line provides a key transport spine through the LGA. Services to the City and Hornsby generally operate on a 15 minute interval or slightly less in peak periods. Services to the City take approximately 25 minutes from Roseville and 40 minutes from Wahroonga. Services to Hornsby take approximately 20 minutes from Roseville and 5 minutes from Wahroonga.

In peak periods Central Coast services use the line with express services stopping at Turramurra, Gordon and occasionally Pymble. The Epping to Parramatta Rail Line passes underneath the south-eastern portion of the LGA but has no stops in Ku-ring-gai. Cross-regional train trips require interchanging at Hornsby, Chatswood or the City. Commuter car parks are provided at some stations within the LGA although the supply is inadequate to meet demand and therefore significant on-street parking occurs around stations.

Figure 7, however, shows, only that only approximately 25% of Ku-ring-gai's population is within easy walking distance (800m) of a rail station.

Bus services in Ku-ring-gai cover most of the LGA and a high proportion of locations are within 400m of a bus stop. Services are operated by two private companies - TransdevTSL Shorelink and Forest Coach Lines, and the NSW Government Sydney Buses in the eastern portion of the LGA. None of the recently introduced high-capacity, high-frequency Metrobus routes serve the Ku-ring-gai LGA. Figure 8 shows all bus services, including school buses.

The administrative hierarchy of roads within Ku-ring-gai is shown in Figure 9. State roads perform a state function and are fully funded and managed by the RTA, regional roads are funded by both Council and the RTA, and local roads are managed by Council. The Pacific Highway, Ryde Road – Mona Vale Road and Boundary Street – Warringah Road are the only state roads within the LGA. Important regional roads include:

- Junction Road – Burns Road – Killeaton Street – Eastern Arterial Road – Archbold Road (known as Secondary Route 2043)
- The Comenarra Parkway – Yanko Road
- Lady Game Drive
- Kissing Point Road
- Fox Valley Road
- Bobbin Head Road

There are limited formal bicycle routes in Ku-ring-gai as shown in Figure 10. Most cycling trips currently occur within the context of normal traffic lanes rather than on bike lanes or off-road paths.

3.3 Analysis of Transport Data

Figure 11 displays the locations of where Ku-ring-gai residents work. The map shows that approximately 28% of workers living in Ku-ring-gai also work within the LGA. A further 23% work in Sydney CBD. A significant proportion of residents also travel to the nearby LGAs of Willoughby, North Sydney and Ryde. Approximately 3,900 or 8% of Ku-ring-gai's workers work primarily from home and this figure is significantly higher than the Sydney average.

Figure 12 shows the origin location of people travelling to Ku-ring-gai for work. Following Ku-ring-gai, Hornsby LGA has the highest proportion of people travelling to Ku-ring-gai for work. The adjacent LGAs of Warringah, Willoughby, Ryde and Parramatta are also significant origin locations for people travelling to Ku-ring-gai for work.

Figure 11 and Figure 12 highlight the desire lines for transport at peak times. Of particular importance is that some of these desire lines are not catered for by the rail network and bus services are inadequate.

According to NSW Government data, peak on-time running for North Shore Line services (i.e. arriving within 4 minutes of scheduled time) averaged 95% over the 2009-10 financial year – a figure that is similar to the Sydney average. For the same time period, service capacity is up to 150% in the morning peak (to the City, measured at St Leonards) and 160% in the afternoon peak (from the City, measured at St Leonards). 100% capacity represents the situation where all seats are taken. Almost all lines across the CityRail network operate at similar capacity levels to the North Shore line.

Most bus services within Ku-ring-gai are not subject to similar capacity constraints that occur on the rail network. The services are, however, often indirect and therefore travel times slow when compared with private vehicle travel. In addition, due to congestion on the road network and a lack of bus priority measures, buses are subject to further delays. Buses also typically run on low frequencies with fewer or no services at night and weekends.

Chart 5 shows the proportion of all trips that start and finish in the North Subregion (Ku-ring-gai and Hornsby LGAs). The key element of the chart is the comparison with other regions rather than the actual magnitudes. The chart highlights that the North Subregion has one of the lowest rates of trip containment in the Sydney metropolitan region. Over 40% of trips made by Ku-ring-gai and Hornsby residents are to destinations outside the North Subregion for purposes such as employment, recreation and shopping etc. A number of factors contribute to Ku-ring-gai's relatively low trip containment levels, including:

- a significantly higher number of workers residing in Ku-ring-gai than there are jobs
- the lack of major shopping centres within Ku-ring-gai

Trip containment is closely related to land use through the provision of employment, recreation and retail areas in close proximity to homes. High levels of trip containment leads to reduced travel distances and travel times.

Chart 4 to Chart 7 relate to the mode of travel for either all trips or a subset - journey to work trips.

As shown in Chart 4, the use of the private vehicle dominates the mode of transport accounting for 74% of all trips in Ku-ring-gai. Rail travel is relatively high and bus travel is relatively low compared to some other parts of Sydney.

Chart 5 shows that for people who live in the LGA and work either in Ku-ring-gai or elsewhere, private vehicle is the dominant mode of transport. Train travel accounts for one quarter of these trips. Chart 6 shows that for people who work in Ku-ring-gai and live either in the LGA or elsewhere, private car accounts for more than 70% of journey to work trips for all LGAs except for those travelling from Willoughby. The low use of train and bus for journeys from Ryde and Warringah highlight the limited public transport services available to access Ku-ring-gai from these LGAs.

Figure 13 presents a comparison of journey to work for those living close to rail stations in Ku-ring-gai compared to those living some distance away. It shows that those living near rail stations are significantly more likely to use rail for the journey to work and hence less likely to use cars.

For travel to work, Ku-ring-gai experienced a slight growth in car use from 2001 to 2006 as shown in Chart 7. Travel to work by bus and walking also increased and rail travel decreased.

Chart 8 to Chart 10 relate to travel times and distances for either all trips or a subset - journey to work trips.

For all trips, including recreation, shopping and work etc, Ku-ring-gai residents travel an average of 82 minutes per person per day (Chart 8). This differs only slightly to the Sydney average of 80 minutes per day. As shown in Chart 9 and Chart 10, average daily travel distance for Ku-ring-gai residents is similar to those of surrounding areas with the exception of Hornsby that has longer travel times and distances.

Chart 11 shows rail patronage data for the North Shore Rail Line. Gordon is the primary station within Ku-ring-gai followed by Turramurra. Approximately 7,300 rail journeys are made from Gordon on a typical weekday ranging down to Warrawee with 1,100. Over half the rail trips on a typical weekday are made during the weekday peak hours highlighting that the mode split for rail is much higher for the journey to work and school than for other trip purposes.

Table 3 shows historical traffic volumes on main roads in and around Ku-ring-gai. It can be seen that many roads carry high traffic volumes with many experiencing significant increases over the last decade. The performance of a road network in an urban environment is governed by the performance of key intersections. Many critical intersections in Ku-ring-gai are currently operating at or close to capacity during peak hours, particularly along Pacific Highway, Mona Vale Road-Ryde Road and Boundary Street.

Although freight movements on Ku-ring-gai's roads are relatively low compared to many other areas of Sydney, they are still significant. Truck volumes are highest on Pacific Highway between the F3 and Mona Vale Road, and Ryde Road between Pacific Highway and Ryde LGA. The Pacific Highway south of Mona Vale Road and Mona Vale Road also carry significant trucks volumes but considerably less than the volumes on the aforementioned sections of these routes. Secondary Route 2043, which has a 3 tonne load limit for much of its length,

carries relatively low truck volumes. The North Shore Rail Line is not used for freight transport.

Relatively few truck trips are generated within Ku-ring-gai with the only significant statistical location being the Pymble business park area. Therefore, most of the truck trips on Ku-ring-gai's roads are through trips without an origin or destination within the LGA.

The NSW Government forecasts heavy vehicle movements to increase by 2.2% per annum between 2006 and 2036, faster than light commercial vehicle trips which are predicted to grow by 1.1% per year[1].

Table 3 Traffic Volumes

Road	**Location**	**AADT***				
		1996	**1999**	**2002**	**2005**	**2008**
State Roads						
F3 Freeway	Wahroonga-at Edgeworth David Ave bridge	67,468	74,364	78,600	76,649	75,056
Pacific Highway	Hornsby-S of Edgw'th David Ave	30,706	34,109	33,192	32,584	n/a
	Wahroonga-E of F3	58,395	58,975	60,472	61,228	55,909
	Turramurra-N of Womerah St	71,406	67,717	71,842	64,181	n/a
	Pymble-S of Telegraph Rd	60,955	63,086	63,557	64,050	60,377
	Killara-S of Cecil St	49,039	48,876	49,022	47,816	45,236
	Roseville-S of Clanville Rd	58,456	60,139	57,398	57,310	n/a
	Chatswood-S of Boundary St	61,827	63,331	47,169	62,700	58,044
Mona Vale Road	Terrey Hills-W of Forest Way	43,909	48,610	49,186	48,819	48,552
	Pymble-N of Woodlands Ave	40,426	44,959	44,083	40,906	42,305
Ryde Road	West Pymble-S of West St	57,329	64,618	60,364	62,022	n/a
	West Pymble-S of Yanko Rd	66,585	73,458	70,760	70,997	n/a
Boundary Street	Roseville-W of Clermiston Av	38,082	38,459	37,819	34,704	36,125
Warringah Road	Forestville-W of Melwood Av	65,613	66,392	68,284	65,701	n/a
Regional Roads						
Archbold Road	Roseville-N of Earl St	32,556	31,982	28,720	29,956	n/a
Bobbin Head Road	Turramurra-S of Boomerang St	8,448	8,008	8,599	8,664	n/a
Comenarra Parkway	West Pymble-W of Parker Ave		17,155	18,573	18,011	n/a
Eastern Arterial Road	St Ives-S of Nicholson Ave	16,923	19,601	18,806	18,248	17,709
Edgeworth David Ave	Waitara-E of Douglas Ave	19,204	20,083	21,069	21,163	21,305
Fox Valley Road	Wahroonga-W of Lucinda Ave	16,367	16,195	16,442	16,535	n/a
Kissing Point Road	Sth Turramurra-S of Wattle Pl	10,351	9,692	9,677	9,455	n/a
Lady Game Drive	West Pymble-E of Ryde Rd	17,243	18,084	18,574	18,856	n/a

*AADT – Annual Average Daily Traffic assessed as the total volume of traffic recorded at a specific location taken over a calendar year divided by the number of days in that year.

[1] Bureau of Transport Statistics, *Freight Movements in Sydney*, July 2010

Figure 14 shows the trend in AM Peak speeds on major Sydney roads. It shows that average speeds have remained relatively constant between 25 and 40 km/h. Current average speeds on the Pacific Highway are similar to those exhibited a decade ago. Improvements to the road network and traffic management measures are generally offset by increases in traffic volumes.

Crash data for the Ku-ring-gai LGA for the five year period between 2005 – 2009 is shown on Figure 15. The figure highlights that crashes are generally a function of traffic volumes, i.e. crashes are concentrated along major transport routes.

Recent research by Department of Transport has identified a small but significant trend towards lower driving licence holding rates among young adults in Sydney, in particular among persons in the 20-30 age group. Between 1999 and 2009, the percentage of persons in Sydney throughout the 20-30 age range holding driving licences decreased quite noticeably from approximately 85% in 1999 to 75% in 2009.

This recent ten year period is the first time this type of trend has become evident in the driving licence statistics for the Sydney region and the trend is also more evident among young males than young females. There is also, however, a counter trend towards increasing driving licence holding rates among all older age groups.

The significance of this type of trend for future car driver behaviour and the likely use of transport modes other than private cars in areas of Ku-ring-gai LGA is strongly related to population demographic trends. Ku-ring-gai LGA is one of the areas in Sydney that has most difficulty retaining this age group of the population. A combination of social and demographic factors are responsible for this. The high historic levels of property prices for detached dwellings in most areas of the LGA and the corresponding shortages of smaller and cheaper dwellings in areas of the LGA which still have good access to public transport, have been significant factors which have discouraged most persons in the 20-30 age range from residing in the LGA. This type of trend can quickly become self reinforcing as the lack of appropriate age related recreation and entertainment facilities within the LGA for persons of these age groups then becomes a further factor in young adults decisions to relocate to other areas.

4 Consultation

A series of workshops were conducted during the development of the ITS to engage community and agency stakeholders in the development of a transport vision for Ku-ring-gai. The Draft Report of the Ku-ring-gai Integrated Transport Strategy was also placed on public exhibition and amended in response to submissions from the community and agencies.

4.1 Community Workshops

4.1.1 Workshop 1

The first community consultation workshop was held at Ku-ring-gai Council Chambers on Tuesday, 30th November 2010 from 6pm to 8pm. The main purpose of the workshop, attended by approximately 60 members of the public, was to:

- Gain a vision for the future of transport in Ku-ring-gai
- Discuss opportunities and constraints

A summary of responses to the two exercises are presented below.

Visioning Exercise

The first exercise involved answering the following question:

> *What do you want transport in/to/from Ku-ring-gai to look like in 10 / 20 years*

Common themes that emerged from the visioning exercise are summarised in Table 4.

Table 4 Community Workshop 1 – Visioning Exercise

Common Themes
• Affordable public transport
• Improved access to train stations
• Efficient, reliable, frequent transport services
• Commuter car parks at rail stations
• Improved transport connections to employment nodes, including Parramatta and Macquarie Park
• Improvements to bus terminals and taxi stands at railway stations
• Integrated transport network that provides community members with a choice of accessible, resource efficient transport methods to connect their home, work and leisure activities
• Convenient and safe access and movement by all modes of transport (walking, cycling, public transport and car) to, from and within the area
• Bicycle rail trail through the LGA
• Education and information to maximise use of alternatives to private car use

Common Themes
• Increased choice of available transport with alternatives to private car use
• Facilities for bicycles including separated cycleways, bike lockers, bike sharing and racks at town centres and rail stations • Small, frequent mini bus servicing the suburbs and feed into town centres and rail stations • Transport available for all ages and abilities • Well maintained footpaths and pedestrian facilities • Local shops and services in local centres

Opportunities and Constraints Exercise

The second exercise involved identifying opportunities and constraints across a range of areas as summarised in Table 5. Maps of Ku-ring-gai LGA were used to highlight specific locations.

Table 5 Community Workshop 1 – Opportunities and Constraints Exercise

Land Use and Travel Demand	
Opportunities	*Constraints*
- Mixed land uses that support movement for older people - Allows people to work at home - Stagger work and school start times - Provide shop delivery services and home delivery - Support medium sized village centres - Live near work - Provide greater variety and provision of services in centres	
Public Transport	
Opportunities	*Constraints*
- Local/ community bus system that provides connection between greater municipal area to feed into rail lines - Provide regional connections to North Ryde, Macquarie Park, Airport, Homebush Bay and Northern Beaches - Incentives for public transport use - Employment packages that include annual transport fees - Late night public transport services - Rail stations to meet accessibility standards - Reduced fares for early/late travel - Improved taxi services and infrastructure - Scooter sharing service similar to Paris service - Improved bus stop facilities - Transit lanes for bus routes - On call demand buses - Real time tracking of public transport	- Integration of funding and service provision from Council/ State/ Federal Government

Cycling	
Opportunities	*Constraints*
- Green links connecting open space and recreation - Improved bicycle parking – secure, lighting, sufficient, passive surveillance - Improved regional network - Safe/separated cycle routes including a rail corridor path - Facilitate cycling for short trips - Facilitate multi modal trips - Encourage cycling to schools and school sporting events	- Topography - Overcoming safety concerns
Walking	
Opportunities	*Constraints*
- Improve footpath condition, including widening of footpaths - Walking buses to schools - Improve lighting for pedestrians - Safe pathways for segways - Improved crossing facilities - School drop off areas away from main gates	- Access to services within close walking distance
Traffic	
Opportunities	*Constraints*
- Removing through traffic from Pacific Hwy with M2 to F3 connection - Removing parking off main roads - Car share schemes - More realistic pricing of road transport - Concessions on environmentally friendly cars - Plan for technology changes – e.g. electric car charging stations - Neighbour aid service	- Reliance on State and Federal funding and implementation - Balance parking provision with the need to support local business and support on street activity - Changing technologies
Car Parking	
Opportunities	*Constraints*
- Commuter car parking at rail stations - Enforce penalties for illegal parking and parking in disabled zones - Provide kiss and ride facilities at rail stations - Underground parking at railway stations - Designated parking areas for motorised scooters and bicycles	- Balancing provision of car parking and the impact of increased traffic into local centres
Implementation	
Opportunities	*Constraints*
- Provide free bus passes for a month to encourage use - Implement changes gradually through trials to prove success of change	- Resistance to change

Note: It is recognised that land use, transport services and travel demand are inherently linked; therefore some responses may overlap across themes.

4.1.2 Workshop 2

The second community consultation workshop was held at Ku-ring-gai Council Chambers on Tuesday 15th February 2011 from 6:30pm to 7:30pm. The main purpose of the workshop, attended by approximately 20 members of the public, was to:

- Inform residents of the process involved in developing the draft Action Plans and outline the remaining stages of the study
- Understand how workshop responses helped shape the proposed transport strategies and actions
- Provide a summary of the context of the draft Action Plans and objectives
- Provide a summary of the key Actions
- Discuss actions that require further clarification

An open discussion session was held in Workshop 2 as summarised in Table 6.

Table 6 Community Workshop 2 – Question and Answer Session

Comments / Discussion	**Response**
Schools were recognised as a key element that influences traffic congestion. Staggering of school times was highlighted as already in place and having minimal effect on congestion. Many out of area private schools now operate their own chartered bus services to take students from residential locations within Ku-ring-gai LGA to private schools in other areas of Sydney.	The primary issue is the appropriate management of on-street parking areas in the vicinity of schools for different vehicle movements e.g. school buses, car passenger drop off/pick ups and car parking Further interaction and discussion between Council and schools is encouraged to identify opportunities for the provision of shuttle buses, walking school buses, changes in school drop off areas etc. Within individual schools, the use of different start and finish times for senior, junior and infants classes should be considered to minimise localised “school generated” peaks of traffic activity, although it is acknowledged that some parents with multiple children at the same school may find this inconvenient.
State Government was identified as a key organisation responsible for making major changes to the transport situation in Ku-ring-gai. The Strategy needs to identify ways of putting pressure on the State Government to speed up the implementation of Integrated Transport Strategy proposals.	The ITS Action Plan will need to have a strong focus on providing a framework for influencing State Government as well as enabling NSROC and surrounding councils to develop a coordinated push for transport changes in the region. In some cases such as the proposed F3-M2 Road link and the proposed Parramatta to Epping Rail Link, the Commonwealth Government is now the key agency responsible for funding the project so liaison is required at that level of government also.

Comments / Discussion	Response
Full time clearways on Pacific Highway were discussed in terms of advantages and disadvantages. Clearways on main roads allow traffic to flow more freely.	Parking on main roads provides a buffer between traffic and pedestrians, supports business on main roads through allowing convenient parking.
Full time clearways on other routes were discussed, including some routes, e.g. Penshurst Street, which are outside the Ku-ring-gai Council area and on roads within Ku-ring-gai LGA where poor visibility was considered to make car parking dangerous for other road users.	These types of proposals would help to speed up car travel for some Ku-ring-gai Council residents. It is not really appropriate for Ku-ring-gai to request these changes on roads which are outside the Ku-ring-gai Council area, but the potential need and/or benefit of implementing full time clearways restrictions on some roads (i.e. sub arterial type roads) within Ku-ring-gai LGA could be investigated.
Bus routes in Ku-ring-gai do not provide for convenient local and regional travel. Private bus routes in the area are not integrated well with public bus routes for in the east of Ku-ring-gai and adjoining LGAs. A combination of circuitous route / multiple stops and direct route / minimal stops bus services is required.	The ITS Action Plan suggests an investigation into a high frequency loop bus service to better connect the rail network. It also includes recommendations relating to the strategic bus corridors and Metro bus routes. For some existing circuitous bus routes, e.g. route 575 and route 582, a combination of limited stop and more direct routes (eliminating some of the more circuitous sections) should be provided especially during the 6.30-9.30am and 3.30-6.30pm peak travel periods. At some locations such as on the Rohini Street approach to the Pacific Highway at Turramurra and on Mona Vale Road at St Ives, the future provision of bus priority at intersections is being considered as a key recommendation of the ITS strategy.
Better access to the Warringah area was highlighted as a need	The ITS Action Plan suggests a transit corridor from Chatswood to the Northern Beaches along the Warringah Road corridor.

4.2 Agency Workshop

An agency workshop was held at Ku-ring-gai Council Library on Thursday, 2nd December 2010 from 2pm to 4pm. The main purpose of the agency workshop was to:

- Understand the current status of plans and policies with relevance to Ku-ring-gai
- Discuss constraints and opportunities across a range of transport options

Participants in the agency workshop were representatives of the following agencies and organisations.

- Department of Transport (DoT)
- RTA
- Transdev TSL
- Forest Coach Lines
- Hornsby Shire Council
- Ryde City Council
- Warringah Council
- Willoughby Council
- Bike North

A summary of the issues discussed at the workshop is presented in Table 7.

Table 7 Agency Workshop – Summary

Department of Transport
- Three priorities for DoT – Bus Planning are 1. Maintain feeder services to rail stations, 2. Maintain school services, 3. Develop new strategic corridors - NSW Government has committed to all strategic bus corridors to be implemented by 2014 - NSW Government will be providing an additional 100 buses per year - DoT has conducted a series of interchange studies, including one for Gordon, but at this stage there is no funding for construction
Transdev TSL
- There are limited bus stop facilities currently along the Strategic Bus Corridors - Reliability and travel times need to be improved at selected areas: Wahroonga, Gordon Interchange, Turramurra Interchange, Mona Vale Road - Ryde Road corridor
Forest Coach Lines
- Ideally bus lanes should be implemented along routes to improve journey times - Mona Vale Road - Ryde Road corridor is critical and requires bus lanes
RTA
- RTA welcomes the traffic management measures to roads/traffic within Ku-ring-gai Town Centre proposals - RTA highlighted various funding opportunities to assist with transport works including: Black Spot funding, Pedestrian and Bike Planning Projects, Intersection upgrades
Hornsby Shire Council
- Cycling routes from Hornsby should be integrated into Ku-ring-gai for a regional cycling network - Lower parking rates are proposed for Hornsby Housing Strategy
Ryde City Council

- Cycling routes from Ryde should be integrated into Ku-ring-gai for a regional cycling network - Local bus loop around Top Ryde has been operating for 3 years, fully funded by Council with good patronage
Warringah Council
- Bus rapid transit is the preferred transport to serve the Warringah Road corridor - Transport demand will change with future development of Frenchs Forest as a 'specialised centre' and Frenchs Forest Hospital
Willoughby Council
- Chatswood is a key node for travel demand and as an interchange station
Bike North
- Much of the population is within an easy cycling distance of 2.5km from rail stations - Bikes on trains and buses is important to enable multi modal active transport - More bike parking is required at stations – well lit, open, passive surveillance, secure

4.3 Public Exhibition

The Draft Ku-ring-gai Integrated Transport Strategy was placed on formal public exhibition from Friday 1 April 2011 to Friday 6 May 2011. The exhibition was in both hard copy format at various Council facilities and electronic copy format on Council's web site.

Formal notification of the exhibition period was made according to Council's standard policies and included newspapers, Council's web page, libraries, council chambers and emails. Attendees at the community and agency workshops were also informed of the exhibition period.

A detailed listing of submissions received in response to the public exhibition was prepared by Council and reported separately. The submissions were reviewed and the Draft Ku-ring-gai Integrated Transport Strategy was amended accordingly.

5 Land Use Planning Action Plan

5.1 Context

Strong links exist between land use planning and transport, and integration between both is essential to enhance the social and economic value of an area. Good land use planning is fundamental to reducing the need to travel and reducing the length of trips. Through the location of land uses, building form, development designs and street layout, land use planning can influence the need to travel, transport mode choices, journey times and journey distances.

Land uses surrounding public transport nodes are an important element in providing alternatives to private car travel. Supporting existing or planned public transport with higher densities of housing and employment provides opportunities for sustainable transport choices to access home and work.

Ku-ring-gai is characterised by a number of town centres along the railway line supplemented by small villages and neighbourhood centres. It is therefore important for land use planning to allow for a mix of land uses at attractor nodes to reduce the amount of trips people need to undertake. The location of a variety of land uses (residential, retail, employment, open space, community facilities etc) within walking or cycling distance encourages public transport usage and active transport modes and can help to minimise private car use. Land use planning policy that allows home businesses can also reduce the need to travel.

Principles that support integrated transport and land use planning should be applied at all levels of planning; State, Regional and Local via strategic policy, land use planning, development codes and guidelines, project design and assessment. This Integrated Transport Strategy should not be viewed in isolation and is one component of a series of inter-related policies.

5.2 Objectives

- Reduce the need to travel
- Reduce journey lengths and journey times
- Increase the proportion of trips that can be undertaken by non-car modes
- Meet NSW government targets for employment and housing for Ku-ring-gai (*NSW Government Plan for Sydney 2036)*
- Minimise the need for new transport infrastructure by integrating land use and transport more effectively
- Maximise job retention (i.e. people living and working in Ku-ring-gai) and working from home
- Increase the proportion of people living near major public transport corridors
- Increase the proportion of jobs that are located near major public transport corridors
- Provide increased community and retail services in town centres
- Provide housing choice, particularly for those who may not want to own a car and allow residents of Ku-ring-gai to ‘age in place’

5.3 Actions and Outcomes

5.3.1 A1. Continue to deliver remaining dwelling and employment targets in locations with good public transport

Ku-ring-gai has an obligation to meet dwelling and employment targets as part of the NSW Government's *Metropolitan Plan for Sydney 2036*. The targets, which have already been set, are reflected in Council's planning policies as discussed in Section 2.4. There are interrelated benefits in co-locating residential, employment and public transport nodes.

Travel mode splits for journey to work data and household travel data highlight that private vehicle transport is the dominant form of transport in Ku-ring-gai. Closely related to transport mode choice are resident's proximity to good public transport. Only one-quarter of Ku-ring-gai's population is within easy walking distance of a rail station. In order to provide convenient transport choices that are an alternate to private vehicle use, increased dwelling and employment densities should be focused on public transport nodes.

Focusing dwelling and employment development within good access to public transport supports existing public transport infrastructure with increased patronage opportunities. Increased development in close proximity to public transport nodes can also encourage further development – e.g. retail and service that can increase activity and vitality of areas.

To meet the NSW Government's dwelling and employment targets, there needs to be coordination between Council and Department of Planning & Infrastructure. Targets need to be periodically reviewed to ensure they are relevant to the area and provision of public transport. Public transport services may also need to be improved to support any increase in development as discussed in subsequent actions. Council has a role to ensure the Local Environmental Plan and other planning strategies is consistent with this Action.

5.3.2 A2. Strengthen village centres by providing greater variety and availability of services

The location of a variety of services within existing centres can minimise the need for long journeys. The NSW Government's *Sydney Metropolitan Strategy* (2007) suggests that the North Subregion has one of the lowest rates of trip containment in the Sydney metropolitan region. Over 40% of trips made by Ku-ring-gai and Hornsby residents, for purposes such as employment, recreation and retail are to destinations outside the North Subregion.

Ku-ring-gai does not have a major shopping centre within the LGA and therefore residents are forced to journey to surrounding centres, particularly Hornsby Westfield, Macquarie Centre and Chatswood to undertake many retail and service activities. Encouraging retail and service uses in town and village centres within Ku-ring-gai through business zoning and statutory requirements would provide residents the opportunity to undertake more retail and service activities locally. Strengthening village and town centres also has the potential to bring benefits to

the wider community through increased activity and vitality in town and village centres.

5.3.3 A3. Support policies that increase the number of jobs in adjoining centres

Journey to work data (2006 Census) suggests that approximately 28% of Ku-ring-gai residents work within the LGA and a further 8% work from home. This level of trip containment is relatively low compared to the Sydney average. For those travelling out of Ku-ring-gai LGA for work, the main destinations are Sydney CBD, North Sydney, Chatswood, St Leonards and Macquarie Park.

Trips for employment place significant pressure on the transport system because they concentrate trips to select locations within peak times. Passenger loads on the North Shore Line are significantly over capacity during peak periods.

Strengthening the employment areas in and around Ku-ring-gai LGA in areas such as Hornsby, Macquarie Park, Chatswood and Frenchs Forest would provide increased opportunities for Ku-ring-gai residents to choose to work closer to home and therefore reduce work trip distances.

This Action is a regional action, recognising that Council does not have direct control over policies from surrounding councils. Council should therefore work with NSROC and other similar bodies to support higher trip containment for the region.

5.4 Summary

Table 8 Land Use Planning Action Plan

Number	Description	Responsible Organisation	Timeframe
A1	Continue to deliver remaining dwelling and employment targets in locations with good public transport	Ku-ring-gai Council / Department of Planning & Infrastructure	Ongoing
A2	Strengthen village centres by providing greater variety and availability of services	Ku-ring-gai Council	Ongoing
A3	Support policies that increase the number of jobs in adjoining centres	NSROC/ Department of Planning & Infrastructure	Ongoing

6 Council Policies and Travel Demand Management Action Plan

6.1 Context

Transport strategies seek to influence both the 'supply' and 'demand' sides of the transport task. Measures presented in subsequent sections relating to public transport, walking, cycling and the road network are predominantly supply-side measures.

Travel demand management targets the demand aspect of transport planning by seeking to minimise the need to travel, minimise journey distances and time and encouraging sustainable transport choices. Travel demand management helps provide increased capacity in an existing transport network and also encourages a more efficient use of existing infrastructure.

Travel demand management targets behavioural change by enabling transport users to make better use of existing infrastructure by providing support structures and incentives. For example, in many cases footpaths and cycleways are already available in communities; the challenge is to increase the usage of this infrastructure. Travel demand management actions usually consist of policies and initiatives designed to increase awareness, educate existing and potential users and encourage users to make more sustainable transport choices.

Land use policy and planning is a crucial element in enabling travel demand management through allowing home businesses and employment opportunities (reducing journey to work travel), as well as planning for walkable and self-sufficient villages and centres that provide a variety of services within walking distances to homes (reducing travel distances and times).

Appropriate Council policies are critical as a role model to the community to display approaches that reduce the need to travel, discourage private vehicle use and support sustainable transport choices. In addition, all of Council's policies, across a wide range of diverse areas, must be consistent with stated transport objectives.

6.2 Objectives

- Reduce the need to travel
- Reduce journey lengths and journey times
- Increase the proportion of trips that can be undertaken by non-car modes
- Encourage active transport and active lifestyles
- Allow Council to act as a champion of sustainability both inside and outside the region
- Ensure Council's transport policies are consistent with other Council policies

6.3 Action Plan

6.3.1 B1. Prepare and implement Workplace Travel Plans

A Workplace Travel Plan is a package of measures aimed at promoting sustainable travel within an organisation or co-located clusters of organisations. The emphasis is on reducing reliance on single occupancy car travel by raising awareness of and facilitating travel by sustainable transport alternatives. This approach is consistent with current Council, NSROC and Government policy objectives relating to transport.

The NSW Government has prepared detailed guidelines, including case studies, on the provision of Workplace Travel Plans[2]. The plans bring many benefits to staff and the community including:

- Staff can enjoy improved health, less stress, a better quality of life, cost and time savings, and greater travel choice.
- Organisations will gain from increased productivity from a healthier workforce, cost savings and reduced demand for car parking, with less congestion and better access for employees, visitors and deliveries.
- A contribution to reduced traffic congestion.
- A contribution to improved air quality, less noise and pollution, and a reduced impact on wider environmental issues.

Council can implement Workplace Travel Plans for all major facilities including the administrative centre, works depots, health centres and libraries. This will bring the benefits highlighted above and will also visibly demonstrate Council's commitment to integrated and sustainable transport.

Council can also encourage existing major employers, such as shopping centres, hospitals, schools, universities and business parks to implement their own Workplace Travel Plans, and such plans could be included as a condition of consent for some new developments.

6.3.2 B2. Implement measures to increase the number of people working from home

Working from home can reduce the load on the transport system, particularly at peak times, through a reduction in travel. It is estimated that approximately 8% or 3,900 of Ku-ring-gai workers work primarily from home and this figure is significantly higher than the Sydney average.

Of the Ku-ring-gai residents that work away from home, more than 80% undertake their journey by private vehicle as the primary mode. Minimising the need to travel for work will reduce private vehicle use and associated congestion and environmental impacts and also contribute to minimising pressures on public transport.

Council has an ongoing role to encourage working from home and home based business through zoning, statutory requirements and the development approvals

[2] http://www.pcal.nsw.gov.au/workplace_travel_plan

process. Council and NSW Government have a responsibility to support home business through providing information and coordinating networks through the community[3].

To encourage working from home, Ku-ring-gai Council could:

- Provide information on the benefits of home based businesses and working from home
- Provide contacts for support for people to start their own business
- Hold networking events for home businesses to learn and share experiences.

Minimising the need to travel can also be addressed through Council encouraging retailers to provide home delivery services.

6.3.3 B3. Implement measures to increase the level of student travel to school by non-car modes

The Ku-ring-gai area has a relatively high number of schools, particularly schools that draw students from a wide catchment area. Travel associated with schools is therefore considerable and is very concentrated around school start and finish times. In addition, particularly in the morning peak, school travel generally coincides with peak travel times for travel to work.

Addressing travel demand management at a school level can provide significant improvements to the transport system in Ku-ring-gai as well as contribute to improvements to the health of students and staff and the urban environment. Nationally, the mode of travel for children in Australia travelling to school has significantly shifted from active (walking/cycling) to inactive (car) modes in the past 30 years. Use of private school bus services has also declined due to more students travelling from outside the local area.

The implementation of successful student travel measures requires a ‘hands on’ approach which involves school staff and students working with parents, members of the wider community and Council to develop responsive actions that are specific to the local area and school. Whilst the school travel situation is dominated by student travel, measures must also be introduced to reduce the level of car travel by staff.

A range of measures should be investigated including:

- Consideration of staggering school start/finish times in locations where a number of schools are closely located.
- The allocation of priority to bus stops along frontage roads rather than to car parking. This not only physically enables easier access to schools by bus, but it is also a visual indication that bus and other non car modes are viable modes of transport to school.
- The provision of highly visible and secure bike parking facilities. It has been observed that current bike parking units often do not meet Australian Standards.

[3] An example of a local council supporting home business is Mooney Valley City Council, Victoria; http://www.mvcc.vic.gov.au/about-the-council/business-in-moonee-valley/home-based-business.aspx

- Introduction of more private cross-regional bus services to serve key locations where students and staff live.
- Introduction of formal measures to reduce the number of senior students driving to school[4].
- Introduction of car pooling schemes for staff and other Workplace Travel Plan measures (refer to Action B1).
- Introduction of Walking School Buses. These, which are encouraged by the Australian Government through the TravelSmart Australia program, seek to provide a safe environment for children to walk to school. They involve an organised group of school students that walk to and from school within a safe and supervised environment. Parents act as the 'drivers' of the bus and direct the group of students, picking up passengers on route to school. The program has received positive feedback from staff, parents and students, allowing students and carers to engage in physical activity and social interaction as well as reducing car traffic around schools.

Measures to increase the level of student travel to school by non-car modes need to be addressed through locally devised and implemented initiatives with commitment from Council, school staff, students and parents.

6.3.4 B4. Increase information and education about alternatives to private car use

The provision of information is an effective way to allow people to make informed decisions about their transport choices and understand the impacts of their choices. Understanding transport services and travel choices is a key element for a well designed public transport system. Information can be in a wide variety of formats including websites, posters, hotlines, flyers and competitions.

Trip planners, such as the NSW Government's 131.500.com website, should be promoted as a good source of information about the most convenient way to undertake trips. 'Real time' bus and train information showing the location and status of each service will become more widely available in the future.

Extensive research has been conducted into the 'real cost' of driving, accounting for not only the costs of buying and maintaining a car, petrol, registration, insurance and depreciation, but also factoring in infrastructure requirements and impacts on urban form, air quality and resource consumption.

Council is one of the main providers of information to the local community and should use the many avenues available to increase information and education about alternatives to private car use.

6.3.5 B5. Develop and support transport services that are accessible to all members of the community

The age structure of Ku-ring-gai displays prominent proportions of the community in the older persons age group and this proportion will increase as the population ages. Accessible transport for older people and those less mobile therefore needs to be a key component of Ku-ring-gai's transport system.

[4] An example is Loreto Normanhurst where the number of senior students permitted to drive to school is limited

Council can address this issue in a range of ways including the provision of good quality pedestrian facilities, easy access to public transport and the provision of community transport. Implementing actions from the recent bus stop audits will makes bus stops more accessible for older or less-able members of the community. A number of Ku-ring-gai's railway stations do not have lifts. Ku-ring-gai's existing community transport service may need to be expanded in the future as demand grows.

The existing Hornsby/Ku-ring-gai Community Transport Service provides a transport service for group and individual transport for frail aged people, younger people with disabilities and their carers. Jointly funded by the Federal Government's Home and Community Care program and NSW Department of Health, Council should continue to support this service through provision and distribution of information about the service to the community.

The Ku-ring-gai Shuttle Bus Service (run by Ku-ring-gai Council and Hornsby Ku-ring-gai Community Aged Disabled Transport Services Inc) provides a door to door transport service one day a week. For a fee (more affordable than a taxi fare) the bus provides access to shopping centres, social groups, train stations, recreation activities etc. Council should regularly review the service to assess if it needs to be expanded in the future as demand grows.

The provision of transport services that are accessible to all allows the community to continue to conduct everyday activities within Ku-ring-gai and allow older residents to 'age in place.'

6.3.6 B6. Ensure consistency between Ku-ring-gai Council policies and the Integrated Transport Strategy

A number of Ku-ring-gai Council's policies aim for Ku-ring-gai to be a creative, healthy and liveable place. Council's transport policies need to be consistent with this aim by addressing the following:

- Providing innovative strategies for transport issues;
- Conserving resources and reducing fuel use;
- Encouraging active transport and active lifestyles;
- Providing convenient access to shopping, recreation and services; and
- Providing access for people of all gender, age and ability.

The *Traffic and Transport Policy* outlines Council's policy on various elements of the transport system and should be periodically updated to ensure consistency with the Integrated Transport Strategy.

All of Council's policies and operational and management plans should be consistent with the adopted actions from the Integrated Transport Strategy and this will involve ongoing monitoring and review.

6.4 Summary

Table 9 Council Policies and Travel Demand Management Action Plan

Number	Description	Responsible Organisation	Timeframe
B1	Prepare and implement Workplace Travel Plans	Ku-ring-gai Council	Short Term (0 – 5years)
B2	Implement measures to increase the number of people working from home	Ku-ring-gai Council / NSW Government	Ongoing
B3	Implement measures to increase the level of student travel to school by non-car modes	Ku-ring-gai Council / Schools / P&C Associations	Short Term (0 – 5 years)
B4	Increase information and education about alternatives to private car use	Ku-ring-gai Council / Department of Transport	Ongoing
B5	Develop and support transport services that are accessible to all members of the community	Ku-ring-gai Council / Department of Transport	Ongoing
B6	Ensure consistency between Ku-ring-gai Council policies and the Integrated Transport Strategy	Ku-ring-gai Council	Ongoing

7 Walking and Cycling Action Plan

7.1 Context

Walking is an important travel mode for both solely pedestrian based journeys and also parts of trips which involve bus, rail or car journeys. Communities and town centres with walking and cycling at the forefront of design provide attractive, liveable areas with high levels of street activity, improved safety and a high quality of environment. Walkable and cycleable environments facilitate greater public transport use and also contribute to healthy communities through the encouragement of physical activity.

Developing actions to encourage walking and cycling has potential to make significant changes to transport patterns by shifting the high number of short trips (under 5km) that are currently undertaken by car to walking and cycling modes.

Actions for walking and cycling should consider the community's transport infrastructure as well as the land use structure. Convenience shopping facilities, employment areas, community facilities, transport nodes and homes need to be within easy walking and cycling distance to promote walking and cycling.

Walking and cycling infrastructure should consider the legibility, connectivity and amenity of footpaths and cycleways. Non-infrastructure initiatives are also important to encourage people to make their whole journey by walking or cycling, or supporting people to start, end or link their transport activities by walking or cycling.

7.2 Objectives

- Increase the proportion of trips that can be undertaken by non-car modes
- Improve the general walking environment
- Increase cycling mode share of bicycle trips to 5% by 2016 (*NSW State Plan)*
- Encourage active transport and active lifestyles
- Enhance liveability (NSW Government's *Metropolitan Plan for Sydney 2036)*

7.3 Action Plan

7.3.1 C1. Prepare and progressively implement a Ku-ring-gai Bike Plan

Bike plans provide a framework for developing an LGA-wide cycling strategy to increase cycling levels. Bike plans co-ordinate investment in a network of safe and coherent bicycle routes, which are integrated with the development and implementation of programs. Recommendations from a bike plan should consist of infrastructure programs and education and information programs.

Stakeholders, particularly local cyclists, are integral to the development of a bike plan by providing an understanding of cycling in the community and necessary

infrastructure requirements. Bike plans apply a strategic view to cycling to allow connections with surrounding council bike plans and planned routes.

Bike plans include encouragement programs covering such areas as promotional, educational, community and employer programs as well as cycle tourism. A recent example of encouraging cycling is Council's proposal to develop mountain bike facilities in the North Wahroonga area. This facility will provide an avenue for needed skills development, as well as promoting cycling as a viable transport mode for everyday trips. Council could also conduct cycling workshops including 'beginners guide to cycling', 'riding in Ku-ring-gai' and 'bike maintenance'.

The Bike Plan should include the following items from the *Ku-ring-gai Contributions Plan 2010*:

- New pedestrian/cycle link over railway line at northern end of Turramurra Station
- Investigate new pedestrian/cycle link over Pacific Highway at Lindfield
- Investigate new pedestrian/cycle connection at Pymble from Telegraph Road to Station Street

It should also include regional links identified in the *NSW Bike Plan* (refer to Action C2).

Bike plans should be reviewed every 5-10 years and the *Ku-ring-gai Bicycle Transport Plan* (1995) is not consistent with current best practice. The RTA provides funding assistance to local councils in the preparation of bike plans and in the implementation of associated infrastructure measures[5]. Regional routes have traditionally been the responsibility of the RTA whilst local routes the responsibility of local councils. Council should give a high priority to preparing and progressively implementing a Ku-ring-gai Bike Plan.

7.3.2 C2. Implement regional bike routes as described in the NSW Bike Plan

The *NSW Bike Plan* (2010) identifies investments and initiatives to continue the growth in cycling in NSW through an improved regional bike route network in the Sydney Metropolitan area and subregional areas, support programs and implementation strategies. The following regional routes pass through Ku-ring-gai:

- Chatswood to Hornsby rail trail
- Gordon to Mona Vale

However, at this stage there is no firm funding commitment from the NSW Government to construct these regional routes. Preparation of a Ku-ring-gai Bike Plan (refer to Action C1) will increase pressure on the NSW Government to construct the facilities. A high quality network of regional routes is required as a platform for meeting the *NSW State Plan* targets.

Council can also partner with the NSW Government in a range of social programs and encouragement actions including cycling skills and awareness training, and more access to information for cyclists.

[5] Further information on the preparation of bike plans can be found in the RTA's *How to Prepare a Bike Plan* guide

7.3.3 C3. Prepare and progressively implement a Ku-ring-gai Pedestrian Access and Mobility Plan

Pedestrian Access and Mobility Plans (PAMPs) provide a framework for developing an LGA wide walking strategy to increase walking levels, to make walking more convenient and to increase safety levels.

The development of a PAMP recognises that walking is an important travel mode. A PAMP for a selected area seeks to develop a safe network for all pedestrians, considering especially the needs of older persons, children and people with mobility impairments. It focuses on the development of a pedestrian route network that connects key pedestrian generators and attractors, responds to existing pedestrian issues in the area (crash history, barriers, access to public transport, resident concerns etc) and provides a framework for councils to undertake improvements to enhance the pedestrian environment.

A PAMP concentrates on delivering physical infrastructure enhancements including:

- Improvements to existing crossings and new crossings
- Construction of new footpaths
- Footpath condition improvements
- Provision of accessible footpaths and crossings (e.g. kerb ramps and accessible bus stops)
- Infrastructure to enhance pedestrian environment including wayfinding devices.

PAMPs should be reviewed every 5-10 years. The RTA provides funding assistance to local councils in the preparation of PAMPs and in the implementation of associated infrastructure measures[6]. Council should give a high priority to preparing and progressively implementing a Ku-ring-gai Pedestrian Access and Mobility Plan with a particular focus on key town centres. Preparation of a PAMP would be consistent with the objectives of the *NSW Walking Strategy*[7].

7.3.4 C4. Incorporate the provision of bicycle facilities in key locations

The provision of adequate end-of-trip facilities for users is a key component of increasing the bicycle mode share in Ku-ring-gai.

The average ‘easy’ cycling distance is estimated to be 5 km. Providing secure bicycle parking at rail stations increases the catchment of Ku-ring-gai residents that are able to access rail services and helps facilitate cycling as part of multi modal travel. High quality bicycle parking facilities should be located in town centres in prominent locations with high passive surveillance.

New office developments and workplaces should include facilities for change rooms, lockers and bike storage for workers. Council has the responsibility to ensure controls, including DCPs, require bike facilities to be included in new

[6] Further information on the preparation of PAMPs can be found in the RTA’s *How to Prepare a Pedestrian Access and Mobility Plan* guide
[7] *NSW Walking Strategy* (2011), Premier's Council for Active Living

developments. The provision of bicycle facilities should also be addressed in the Ku-ring-gai Bike Plan (refer to Action C1).

The *Ku-ring-gai Council Car Parking DCP* and the *Ku-ring-gai DCP (Town Centres)* provides recommendations that bicycle parking facilities are provided in dwellings and office buildings. These recommendations should be strengthened to increase the level of end-of-trip facilities for cyclists. Council should also work with the community to provide end-of-trip facilities in existing developments.

7.4 Summary

Table 10 Walking and Cycling Action Plan

Number	Description	Responsible Organisation	Timeframe
C1	Prepare and progressively implement a Ku-ring-gai Bike Plan	Ku-ring-gai Council with assistance from RTA	Short Term (0 – 5years)
C2	Implement regional bike routes as described in the NSW Bike Plan	RTA	Medium Term (5 – 10 years)
C3	Prepare and progressively implement a Ku-ring-gai Pedestrian Access and Mobility Plan	Ku-ring-gai Council with assistance from RTA	Short Term (0 – 5 years)
C4	Incorporate the provision of bicycle facilities in key locations	Ku-ring-gai Council/ RTA	Ongoing

8 Public Transport Action Plan

8.1 Context

Public transport systems are inherently linked to sustainability and accessibility. The availability of a successful public transport system can bring environmental, social, health and economic benefits and is an essential aspect in facilitating changes towards sustainable transport choices, reducing reliance on private car travel and reducing society's impact on resources.

A city's economy has a close relationship with public transport by relying on good public transport infrastructure to allow access to jobs and services. An area that is perceived as highly accessible has economic benefits as it can encourage investment into employment centres.

Currently, public transport in Ku-ring-gai revolves around peak hour use of the North Shore Rail Line and school travel. Bus and train usage outside peak hours is relatively low. It is also recognised, however, that public transport is primarily the responsibility of the NSW government and not Council.

A successful public transport system can enhance the social sustainability of an area by providing access to a system that allows people to access key locations and services regardless of age, mobility or income level. A good public transport system also facilitates healthy lifestyles by supporting incidental exercise through users walking and cycling to rail stations and bus stops.

A public transport system that is integrated into the demographic and spatial context of an area is important. For example, Ku-ring-gai's land use and transport needs should respond to the aging population of the area with residential development that enables residents to 'age in place' with small, self sufficient dwellings and good access to services and public transport.

Infrastructure actions towards improving the public transport system itself in Ku-ring-gai are largely out of Council's control. However through a series of local policies and travel demand management actions, Council is able to facilitate greater use of the public transport system. Council, together with surrounding councils and regional council organisations, has a responsibility of lobbying State and Federal government for improvements to public transport system infrastructure and services.

8.2 Objectives

- Increase the proportion of trips that can be undertaken by public transport modes
- Improve public transport services, particularly with seamless connections between bus and train services
- Revitalise town centres and neighbourhoods with improved transport hubs
- Provide public transport access for people of all gender, age, ability and income level

8.3 Action Plan

8.3.1 D1. Construct Parramatta to Epping Rail Link

The Parramatta to Epping Rail Link is a key link in the Sydney metropolitan rail network. Construction of the link would bring two key benefits:

- improved access to Parramatta, Epping and locations between these two centres
- increased capacity across the entire CityRail network by creating more train paths, allowing more train services to operate on other lines

Although the link lies outside the Ku-ring-gai LGA it will improve travel to and from Ku-ring-gai, particularly to major centres such as Parramatta and Macquarie Park. It also represents an opportunity to improve train services on the North Shore Line.

The NSW Government has committed to completing the link within the next decade although this will require a funding partnership with the Federal government.

Council, in conjunction with other local councils across Sydney, should continue to highlight the economic and environmental benefits of constructing the rail link.

8.3.2 D2. Construct North West Rail Link

The North West Rail Link is a key link in the Sydney metropolitan rail network. Construction of the link would bring two key benefits:

- improved access to the north-western region of Sydney including Epping, Castle Hill and Rouse Hill
- increased capacity across the entire CityRail network by creating more train paths, allowing more train services to operate on other lines

Although the link lies outside the Ku-ring-gai LGA it will improve travel to and from Ku-ring-gai, particularly from the northwest growth areas. It also represents an opportunity to improve train services on the North Shore Line.

The NSW Government has committed to completing the link within the next decade although this will require a funding partnership with the Federal government.

For both the Parramatta to Epping Rail Link and the North West Rail Link to accommodate train services at an acceptable frequency, additional capacity is required at critical locations elsewhere on the CityRail network. In particular, this includes a second harbour crossing, additional train paths through the CBD and quadruplication of the North Shore Line south of Chatswood.

Council, in conjunction with other local councils across Sydney, should continue to highlight the economic and environmental benefits of constructing the rail link.

8.3.3 D3. Construct Northern Sydney Freight Rail Corridor

The Northern Sydney Freight Corridor Program includes a number of infrastructure projects to improve freight and passenger rail services along the rail

corridor between Sydney and Newcastle. It will reduce delays caused by freight and passenger trains competing for the same tracks between Sydney and Newcastle.

Feasibility studies have been undertaken and implementation is expected to take up to five years.

The CityRail network is highly integrated so that delays on one line can result in delays on other lines. The project has the potential to improve the reliability of passenger rail services along the North Shore Line and also to reduce vehicle freight movement through Ku-ring-gai via a shift from road transport to rail transport.

Council, in conjunction with other local councils across Sydney, should continue to highlight the economic and environmental benefits of the project.

8.3.4 D4. Construct transit link from Chatswood to the Northern Beaches

Three road corridors serve the Northern Beaches region – Military Road-Spit Bridge, Warringah Road and Mona Vale Road. Much of the travel to/from this region must pass through Ku-ring-gai and this will continue to increase, particularly if Frenchs Forest develops as a specialised centre.

Public transport to the Northern Beaches region is currently in the form of buses using existing road infrastructure. The NSW Government has no plans for a mass transit system, apart from implementing a number of strategic bus corridors (refer to Action D5).

In the longer term, consideration should be given to alternative forms of public transport such as dedicated busways, light rail, metro rail or heavy rail. Although most recent government and non-government transport plans advocate busways and “bus first” roads to serve the Warringah Road corridor, forms of rail should not be discounted.

Council, in conjunction with other local councils across northern Sydney, should continue to highlight the economic and environmental benefits of a transit link from Chatswood to the Northern Beaches.

8.3.5 D5. Implement strategic bus corridors through Ku-ring-gai

The Strategic Bus Corridor program was first announced by the NSW Government in 2004 as recommended by the Unsworth Review of bus services in NSW. 43 corridors are planned for the Sydney metropolitan area with a final completion date of 2014. The corridors use a combination of both infrastructure and technological solutions to improve average bus speeds.

Unfortunately, little progress has been made on the three corridors that directly serve the Ku-ring-gai region:

- Route 8 Hornsby to Chatswood (via Secondary Route 2043)
- Route 15 Chatswood to Dee Why/Brookvale (via Warringah Road)

- Route 36 Mona Vale to Macquarie Park (via Mona Vale Road and Ryde Road)

Council, in conjunction with other local councils across northern Sydney, should continue to highlight the economic and environmental benefits of implementation of the strategic bus corridors.

8.3.6 D6. Introduce new Metrobus services

The Metrobus network commenced in 2010 and will be gradually expanded across Sydney. The network provides more frequent buses and more direct services on a number of key routes. They fill a gap between direct rail services on a limited number of fixed routes and localised, slow, frequently stopping bus services. They supplement rather than replace existing bus services.

Early reports suggest that, in general, the Metrobus services have been a success. However, at this stage there are no plans for services covering the Ku-ring-gai area. Two new routes are recommended to complement the existing network:

- Mona Vale to Macquarie Park via St Ives
- Hornsby to Chatswood via Secondary Route 2043

Council, in conjunction with other local councils across northern Sydney, should work with Department of Transport to implement the suggested additional routes to the Metrobus network.

8.3.7 D7. Improve bus priority measures at critical locations

The reliability and travel times of bus services in Ku-ring-gai is greatly affected by traffic congestion at a number of critical locations. Bus priority measures seek to give priority to buses over other vehicles and recognises that each bus can carry the equivalent number of passengers as 50 single-occupancy cars. Bus priority measures include continuous red bus lanes and bus priority at traffic signals.

There are a number of critical road network locations in Ku-ring-gai that significantly delay the operation of buses, including, but not limited to:

- Mona Vale Road through St Ives
- Ryde Road in vicinity of Yanko Road and Lady Game Drive
- Pacific Highway / Mona Vale Road intersection, particularly for access to Gordon
- Rohini Street and Kissing Point Road near Pacific Highway

Investigations of appropriate bus priority measures at these and other locations should be undertaken. Measures would be required on both RTA and Council controlled roads. Implementation of measures will improve the reliability of bus services and reduce bus journey times.

8.3.8 D8. Upgrade key bus/train interchanges

Interchanges are a critical component of Sydney's public transport network. However, Ku-ring-gai travel data suggests that relatively few bus-train or train-bus trips occur in Ku-ring-gai and one contributing factor is the poor quality of interchanges.

Major interchanges should be located at locations characterised by:

- high frequency rail services
- high passenger volumes
- major origin and destination points for trips
- high proportions of passengers transferring between modes
- being a focal point of an extensive strategic bus corridor network and local bus network
- town centres with extensive commercial and retail facilities.

Department of Transport has recently undertaken scoping studies at 25 transport interchanges across Sydney, including Gordon. However, funding for implementation of works has been reallocated to the commuter car park program (refer to Action D9).

Within Ku-ring-gai, improved interchanges are required at:

- Gordon
- Turramurra; and
- Wahroonga

Council should work with Department of Transport to construct better bus/rail interchanges at these three locations. This will increase the level of public transport usage and will also reduce the need for costly commuter car parking.

8.3.9 D9. Provide additional commuter car parking at Ku-ring-gai rail stations

A significant proportion of train trips in Ku-ring-gai are car-train trips either with the driver parking or via 'kiss and ride'. These trip types will continue to be a significant type of trip.

An insufficient level of commuter parking at Ku-ring-gai's rail stations has long been recognised. However, the provision of additional commuter parking is difficult due to a lack of available space and the high costs involved.

Commuter parking at rail stations is provided by CityRail in the form of off-street car parks and by Council in the form of on-street parking. The NSW Government is currently in the midst of a ten year $400 million commuter car park program. Over 30 rail stations have been identified for works but none of these are within Ku-ring-gai.

Council should work with CityRail to increase the supply of commuter parking at Ku-ring-gai's rail stations. 'Kiss and ride' facilities should also be improved by increasing the available kerb space at existing locations and adding new locations to ensure facilities are provided on both sides of the railway line.

8.3.10 D10. Provide accessible access to all rail stations and bus stops

Public transport should be easily available to people of all gender, age and ability.

The majority of rail stations across Sydney were constructed using steps to access the platform. This type of infrastructure makes it difficult for some people to use train services, particularly those in wheelchairs or using prams.

The NSW Government has gradually been implementing 'easy access' provisions at rail stations, usually in the form of lifts. Ku-ring-gai stations with easy access are Turramurra, Gordon and Lindfield. It is unlikely that other Ku-ring-gai stations will be upgraded in the short term.

Local councils have responsibility for the provision of most bus service infrastructure such as bus stops. All bus stops must meet Disability Discrimination Act 1992 (the DDA) compliance by 2022. Council conducted an audit in 2010 identifying actions required to meet these requirements to improve the accessibility of all bus stops.

Council should work with CityRail to increase the number of Ku-ring-gai's rail stations with easy access provisions. Council should also gradually implement the recommendations of the bus stop audit.

8.3.11 D11. Implement changes to CityRail timetable

Passenger loadings on peak hour rail services on the North Shore Line operate at capacity in the peak direction. In addition, trains from Hornsby to the city travel slower now than they did 30 years ago. Train services between Hornsby and Chatswood were reduced to accommodate services on the Epping to Macquarie Park Line.

A range of measures could be considered to improve services on the North Shore Rail Line including:

- re-introduce more rail services commencing/terminating at Gordon
- increase the number of express services during peak periods
- provide for better coordination of services at transferring stations - Chatswood and Hornsby
- increase train travel speeds by eliminating unnecessarily long dwell times at stations

Council should work with CityRail to implement these measures to improve services on the North Shore Rail Line.

8.3.12 D12. Investigate opportunity for high frequency St Ives – Pymble – Gordon shuttle bus service

St Ives is the only major town centre within Ku-ring-gai that is not located on the rail line and as a result public transport usage around St Ives is lower than along the rail corridor.

A medium to high frequency loop shuttle bus service could be operated by Council and/or Department of Transport in both directions around a triangular route linking the three town centres of Gordon, Pymble and St Ives including the commercial/business park development which is located along both sides of the Pacific Highway between Pymble and Gordon.

These areas represent the ‘core area’ of economic activity of the Ku-ring-gai area, where the localised travel demand for short trips to and from and between these centres is greatest and can most effectively be served by shuttle buses. The service will reduce the demand for Council to provide additional car parking in these centres, where there is currently a shortage of suitable vacant land such that additional car parking would have to be constructed in expensive underground or multi level car parks.

Several other examples of this type of shuttle bus service now operate in a range of areas of Sydney including Parramatta, Artarmon, Macquarie Park, Manly and the City. They are a combination of Council-funded and State-funded services. These existing operations should be investigated to develop a suitable system, route and bus size for a Ku-ring-gai LGA route.

8.4 Summary

Table 11 Public Transport Action Plan

Number	Description	Responsible Organisation	Timeframe
D1	Construct Parramatta to Epping Rail Link	Federal and NSW Governments	Short term (0-5) years)
D2	Construct North West Rail Link	Federal and NSW Governments	Short term (0-5) years)
D3	Construct Northern Sydney Freight Rail Corridor	Federal and NSW Governments	Short term (0-5) years)
D4	Construct transit link from Chatswood to the Northern Beaches	Federal and NSW Governments	Medium term (5-10 years)
D5	Implement strategic bus corridors through Ku-ring-gai	NSW Government	Short term (0-5) years)
D6	Introduce new Metrobus services	NSW Government	Short term (0-5) years)
D7	Improve bus priority measures at critical locations	Department of Transport / Ku-ring-gai Council	Short term (0-5) years)
D8	Upgrade key bus/train interchanges	Department of Transport	Short term (0-5) years)
D9	Provide additional commuter car parking at Ku-ring-gai rail stations	CityRail	Medium term (5-10 years)
D10	Provide accessible access to all rail stations and bus stops	CityRail / Ku-ring-gai Council	Short term (0-5) years)
D11	Implement changes to CityRail timetable	CityRail	Short term (0-5) years)
D12	Investigate opportunity for high frequency St Ives – Pymble – Gordon shuttle bus service	Ku-ring-gai Council / Department of Transport	Short Term (0 – 5 years)

9 Vehicular Traffic Management Action Plan

9.1 Context

The majority of trips within Ku-ring-gai LGA, with the exception of journey to work trips for those living near the railway line, are undertaken by car. Car ownership levels in Ku-ring-gai are amongst the highest in the Sydney metropolitan region. In addition, Ku-ring-gai's location results in considerable amount of through traffic particularly to/from the Central Coast region.

Growth pressures, travel habits and car ownership rates contribute to vehicle traffic and associated issues of congestion, loss of amenity, safety concerns and parking issues. Vehicle traffic issues must be approached within an integrated transport and land use planning framework, recognising that behaviour, accessibility, availability of transport choices and parking policy have a role in addressing traffic issues.

Increasing capacity on roads is not always an appropriate response to reducing traffic congestion. Infrastructure and policy associated with parking supply, public transport, walking and cycling, and land use all have the opportunity to make better use of available road capacity.

The operation of the road network within Ku-ring-gai is a partnership between the NSW Government and Council. Arterial roads that carry high traffic volumes are fully funded and managed by the RTA. Major road projects may also receive federal funding. Therefore, it is important to understand that management of the road network cannot always be directly addressed by Council. Council and surrounding councils have a responsibility to lobby state authorities for support and improvements to the road network.

9.2 Objectives

- Improve the operation of the road network via targeted infrastructure and traffic management measures
- Reduce the volume of inter-regional traffic through Ku-ring-gai
- Increase bus priority on main roads
- Reduce levels of congestion and improved amenity in town centres and residential areas
- Reduce the number and severity of vehicle crashes

9.3 Action Plan

9.3.1 E1. Construct F3 to M2 Motorway link

The F3 to M2 Motorway link is a key missing link in Sydney's motorway network, providing a connection between the orbital network and the F3. The link is of national significance and is part of the National Highway network. At a local level, the link has the potential to reduce through vehicle movements in Ku-ring-gai.

In 2004 the F3 to Sydney Orbital Link Study was completed and recommended a tunnel under Pennant Hills Road between the southern end of the F3 at Wahroonga and the M2 at the Pennant Hills Road interchange. An independent review was conducted by the federal government in 2007. Council's current position is that it supports the need for the link although it opposes a surface route for the connection.

The project, however, has never proceeded beyond feasibility stage. Construction is dependent on a combination of state and federal funding, and also possibly private sector funding if it was operated as a toll road. The link does not feature in the NSW Government's ten year Metropolitan Transport Plan, nor has it received funding through the Federal Government's Infrastructure Australia agency. One reason for the lack of federal funding is that the NSW Government needs to have the project 'shovel-ready' before funding will even be considered.

Council, in conjunction with other local councils in the northern region of Sydney, should continue to highlight the economic and environmental benefits of constructing the link and ensure that the NSW Government progresses it to a shovel-ready stage.

9.3.2 E2. Upgrade capacity at critical intersections and pinch points

Ku-ring-gai's arterial road network is a mature road network that has experienced no major changes since the F3 extension to Wahroonga in the 1980s and the M2 in the 1990s. It is unlikely that any new arterial links will be built in the short term. As a result, increases in capacity will mainly occur through improvements to traffic management, e.g. traffic signal phasing, parking management etc, and localised minor works.

There are a number of critical intersections in Ku-ring-gai that constrain the operation of the road network, including, but not limited to:

- Pacific Highway / Rohini Street (Turramurra)
- Pacific Highway / Livingstone Avenue (Pymble)
- Pacific Highway / Park Avenue / Dumaresq Street (Gordon)
- Pacific Highway / Havilah Road / Balfour Street (Lindfield)
- Pacific Highway / Clanville Road / Shirley Road (Roseville)
- Pacific Highway / Boundary Street (Roseville)
- Ryde Road / Yanko Road (West Pymble)
- Ryde Road / Lady Game Drive (West Pymble)

There are also a number of critical 'pinch points' including, but not limited to:

- Pacific Highway through Turramurra
- Pacific Highway through Pymble
- Mona Vale Road through St Ives

Implementing improvements at these intersections and pinch points, however, is difficult due to a lack of available space within road reserves and other constraints such as narrow bridges over the railway line.

Improvements at some of these locations, developed after extensive investigations, are included in the *Ku-ring-gai Contributions Plan 2010*.

All of these locations are on State roads and Council should continue to work with the RTA to investigate and implement appropriate solutions.

9.3.3 E3. Implement road network improvements from Ku-ring-gai Contributions Plan 2010

The *Ku-ring-gai Contributions Plan 2010* is a legal mechanism for obtaining direct contributions from developers towards the provision, extension and/or augmentation of various types of community infrastructure including local roads and local bus facilities.

The Plan applies to Wahroonga, Turramurra, Pymble, St Ives, Gordon, Lindfield and Roseville town centres. Works were identified through a series of town centre traffic studies. Key works include, but are not limited to:

- **Wahroonga**: New traffic signals at Illoura Avenue/Millewa Avenue.
- **Turramurra**: Relocate Pacific Highway/Rohini Street traffic signals to Pacific Highway/Turramurra Avenue in conjunction with new road from Gilroy Avenue to Turramurra Avenue; Upgrade the intersection of Pacific Highway and Kissing Point Road; New road link over railway line at northern end of Turramurra Station.
- **Pymble**: Conversion of Grandview Street to one way southbound with angle parking; Modifications to traffic signals at Pacific Highway intersections with Telegraph Road and Livingstone Avenue.
- **St Ives**: Modifications to traffic signals at Mona Vale Road intersections with Stanley Street and Memorial Avenue; New traffic signals on Mona Vale Road mid-way between the existing signals at Cowan Road and Memorial Avenue, for direct access to the retail centre; New traffic signals at Killeaton Street/Cowan Road.
- **Gordon**: Improvements/modifications to traffic signals at Pacific Highway intersections with Park Avenue, Dumaresq Street, Moree Street and St Johns Avenue; Modifications to traffic flow on Park Avenue, Wade Lane and St Johns Avenue.
- **Lindfield**: Relocation of Lindfield Avenue traffic signals to Tryon Road intersection.
- **Roseville**: Modifications to traffic signals at Pacific Highway/MacLaurin Parade.

The Plan describes the nexus between potential developments and works, describes the works in detail, the estimated capital cost and the applicable development contribution by land use type.

Items from the Plan will be gradually implemented as development occurs and sufficient funds are generated.

9.3.4 E4. Review administrative road hierarchy of roads within Ku-ring-gai

State roads perform an inter-regional function and are fully funded and managed by the RTA; regional roads are funded by both Council and the RTA; and local roads are managed by Council.

There are many roads in Ku-ring-gai that carry high traffic volumes despite being classified as regional or local roads. An example is Secondary Route 2043 (Junction Road to Archbold Road), a regional route that carries up to 30,000 vehicles per day (vpd). This route essentially performs a state road function and relieves some on the pressure of the parallel Pacific Highway route. Much of the traffic using the route is generated outside Ku-ring-gai LGA. Council, however, is responsible for a major proportion of funding for upgrades and maintenance along the route.

The NSW Government, in conjunction with local councils, regularly reviews the state's administrative road hierarchy. Council should ensure that all roads carrying significant traffic volumes are appropriately classified so that they receive adequate NSW Government funding.

9.3.5 E5. Implement road safety measures on local and regional roads

Council is responsible for implementing road safety measures on local and regional roads. Funding generally comes from Council's operational budgets supplemented by various federal and state programmes.

Council has developed a criteria for prioritising road safety measures based on recorded crash history, traffic volumes, traffic speeds, proximity to schools, level of community concern and pedestrian/cycle usage. This criteria is described in the *Ku-ring-gai Traffic and Transport Policy*.

Council should continue to implement road safety measures as part of the Ku-ring-gai Integrated Transport Strategy.

9.3.6 E6. Implement traffic calming measures at appropriate locations

The congested nature of the arterial road network in Ku-ring-gai results in significant traffic volumes using local roads. Intrusion of through traffic into local roads and high traffic speeds result in loss of amenity for residents. In an attempt to combat this, Council has over the years installed traffic calming devices.

Traffic calming measures should not be implemented extensively throughout the LGA. They do, however, have a role to play at appropriate locations in conjunction with improvements to the arterial road network. Council should continue to identify local routes used by excessive volumes of through traffic and implement appropriate traffic management measures. The *Ku-ring-gai Traffic and Transport Policy* provides more specific guidance on the appropriate locations for such measures and the type of facilities to be used.

9.4 Summary

Table 12 Vehicular Traffic Management Action Plan

Number	Description	Responsible Organisation	Timeframe
E1	Construct F3 to M2 Motorway link	Federal and NSW Governments	Medium term (5-10 years)
E2	Upgrade capacity at critical intersections and pinch points	RTA	Ongoing
E3	Implement road network improvements from Ku-ring-gai Contributions Plan 2010	Ku-ring-gai Council	Ongoing
E4	Review administrative road hierarchy of roads within Ku-ring-gai	Ku-ring-gai Council / RTA	Ongoing
E5	Implement road safety measures on local and regional roads	Ku-ring-gai Council	Ongoing
E6	Implement traffic calming measures at appropriate locations	Ku-ring-gai Council	Ongoing

10 Parking Management Action Plan

10.1 Context

Parking is a necessary component of a modern transportation system as it supports the use of private vehicles. It is, however, no longer considered either feasible or desirable to cater for unlimited growth of traffic in town centres. Management of the amount and type of parking is, therefore, an important means of influencing overall levels of traffic demand, as well as the balance between different purposes of car trips which are generated.

Parking also consumes a considerable amount of land and in Ku-ring-gai this is usually in locations with high land values. Construction of unlimited parking is usually not physically or economically feasible. In town centres along the railway line, there are competing demands for available parking spaces including park-and-ride, employees and shoppers.

Ku-ring-gai Council traditionally employs time limits to manage available demand, with short-term parking within the core of town centres and unrestricted all-day parking further away. Some other councils, particularly in inner city areas, also use pay parking to manage available demand.

Development controls stipulating required parking rates for new developments have traditionally been based on unrestrained vehicle demand and presented as minimum required rates. There has been a gradual shift in recent times with parking rates now often presented as maximum permissible rates.

Parking management approaches seek to address the impact of parking and reduce associated traffic congestion, encourage other modes of transport, utilise parking spaces more efficiently and equitably whilst still supporting businesses, public transport and other land uses.

It is essential that parking rates and the provision of parking respond to the context and consider proximity to public transport, land use and sharing of different uses. For example, Ku-ring-gai has a strong reliance on the rail line, but only approximately a quarter of the LGA's residents are within easy walking distance of a rail station. It is therefore relevant for park and ride facilities to be provided to the Ku-ring-gai community to facilitate public transport use. Similarly, the availability of parking is necessary for Ku-ring-gai's town centres to compete with large regional shopping centres in adjoining LGAs.

10.2 Objectives

- Ensure parking policies are consistent with broader transport and land use strategies.
- Manage the amount and type of parking to influence overall levels of traffic demand.
- Provide an equitable balance of available parking supply to support different purposes of car trips including park and ride, all-day employee parking and short-term shopping parking.
- Provide sufficient parking to support local businesses.
- Provide additional parking only where a need can be clearly justified and demonstrated to be cost-effective.

- Determine parking rates for new developments on the basis of influencing overall traffic demand rather than providing for unrestrained levels of supply.
- Provide incentives for the use of high occupancy vehicles, including car pools, car share schemes and community buses.

10.3 Action Plan

10.3.1 F1. Implement recommendations from the Town Centres Parking Management Plan

The *Town Centres Parking Management Plan 2009* outlines parking strategies in each of the six town centres (Turramurra, Pymble, St Ives, Gordon, Lindfield and Roseville) in relation to land uses, long/short term parking and parking for other modes of transport. Specific strategies include locations for additional parking, time restriction changes, and enforcement and compliance strategies.

Items from the Plan should be gradually implemented as opportunities arise and as sufficient funds become available. Most items are the responsibility of Council although various state government agencies are stakeholders for some items such as railway commuter car parks.

The Plan should also be periodically reviewed to maintain consistency with broader transport and land use strategies.

10.3.2 F2. Review parking rates for new developments

The *Ku-ring-gai Development Control Plan (Town Centres) 2010* stipulates a series of minimum on-site parking rates for various type of land use. Rates for locations outside the town centres are stipulated in *Development Control Plan No.43 – Car Parking*.

Parking is an important tool for managing traffic demand and encouraging alternative modes of travel. The parking rates contained in the two relevant control plans should be reviewed with consideration of the following:

- presentation of on-site parking rates as *maximum* permissible rates rather than *minimum* rates
- a flexible approach to parking supply such as contributions to public transport improvements in lieu of providing required level of on-site parking
- different parking rates for different areas based on proximity to public transport
- reduction in parking rates where dual use can be demonstrated

10.3.3 F3. Provide dedicated parking spaces for car share vehicles

Car share schemes are a recent innovation in the Sydney metropolitan area with most activity currently confined to inner city areas. Residents or businesses can join a privately operated car share scheme to use a car when they need one, without the cost and hassle of car ownership. Cars are parked in dedicated parking

areas, either on-street or in car parks, and can be booked for periods as short as an hour or as long as a few days.

Car share schemes generally reduce car usage and reduce the amount of parking required in new developments. The schemes result in lower car usage because participants generally use cars more efficiently by carefully planning trips and combining multiple trips. Some buyers/renters of residential units choose not to own a car and do not want the cost of one or more car spaces included in their purchase or rental cost.

Encouragement of car share schemes generally require the support of local councils. A number of operators have indicated a desire to operate across the entire metropolitan region if appropriate incentives can be provided. Ku-ring-gai Council can cost-effectively support such a measure by introducing a number of car share spaces in key town centres.

10.3.4 F4. Investigate the implementation of paid parking

Public parking at Ku-ring-gai Council-owned car parks and all on-street parking is free for users with the exception of the Culworth Avenue car park adjacent to Killara Station.

Parking charges can be levied to maximise the use of available parking spaces and to influence overall levels of traffic demand. It can also be used to reduce peak demand levels by encouraging activity to occur outside peak periods. The imposition of a parking charging system can also improve the level of enforcement of time limits.

Revenue generated from parking charges can be used to contribute to the supply and maintenance of parking facilities and to assist in the implementation of other actions associated with the provision of transport services.

Peak parking demand exceeds supply in most town centres in Ku-ring-gai. These centres could benefit from paid parking because it would increase parking turnover and increase the availability of spaces.

Council should investigate the implementation of paid parking at selected locations as part of a suite of actions relating to the provision of an integrated, equitable and cost-efficient approach to parking policy and broader transport planning.

10.3.5 F5. Improve parking enforcement measures

Most parking in Ku-ring-gai's town centres is subject to time limits. Inadequate enforcement levels can lead to a significant amount of short term parking spaces being taken up by vehicles overstaying time limits. This results in inefficient use of available parking and can result in a perceived impression of inadequate parking supply.

The level of parking enforcement must be sufficient to ensure that motorists have a perception that they are likely to receive an infringement notice if they overstay time limits.

Parking enforcement can be improved by a range of measures including:

- increased patrols by Council rangers, particularly targeting critical car parks
- electronic enforcement options

Parking enforcement can also be improved by the introduction of paid parking as discussed in the preceding section.

Council should investigate the implementation of improved parking enforcement measures particularly at critical locations where parking demand regularly exceeds parking supply.

10.4 Summary

Table 13 Parking Management Action Plan

Number	Description	Responsible Organisation	Timeframe
F1	Implement recommendations from the Town Centres Parking Management Plan	Ku-ring-gai Council / Department of Transport / CityRail	Ongoing
F2	Review parking rates for new developments	Ku-ring-gai Council	Ongoing
F3	Provide dedicated parking spaces for car share vehicles	Ku-ring-gai Council	Short term (0-5 years)
F4	Investigate the implementation of paid parking	Ku-ring-gai Council	Short term (0-5 years)
F5	Improve parking enforcement measures	Ku-ring-gai Council	Ongoing

11 Implementation and Monitoring Plan

11.1 Implementation Plan

The Action Plans presented in the preceding sections include an organisation or organisations responsible for the implementation of each action and also a timeframe priority. The organisations and timeframes are indicative only and should be used as a guide. Some actions are specific items such as an infrastructure project whilst other actions are ongoing such as policy measures.

Timeframes and priorities have been assigned with consideration of:

- meeting action plan objectives
- benefit to the community
- relationship to government strategies
- local impact
- cost

Council has a role to play in the implementation of all the actions although it is recognised that other organisations such as the State government has primary responsibility for some actions. Once adopted, Council needs to demonstrate how it is addressing each of the actions through its processes, management and long term strategy. As a broader strategy, the ITS relies not only on Council but a coordination with stakeholders, residents, State Government, Federal Government and local action groups to ensure actions are undertaken and objectives of the ITS are met.

The ITS is a broad framework for strategic transport actions to be implemented. It is recognised that not all the actions identified within the ITS will be able to be undertaken by Council due to funding constraints.

Funding sources for actions that are the responsibility of Council could include:

- Council funding including general revenue, developer contributions and special levies[8]
- Grants and other State/Federal programs
- User-pay arrangements

Funding for actions that are directly under the control of Council will need to be integrated with Council's Delivery Program and Operational Plan 2010 – 2014 and longer term financial plans.

Existing State Government funding sources include:

- RTA 50/50 funding for the development of bike plans, provision of cycleways and supporting cycling infrastructure
- RTA 50/50 funding for the development of PAMPs and provision of pedestrian facilities
- RTA 50/50 funding for the provision of traffic calming facilities (e.g. as part of LATM)

[8] Council has collected funds from ratepayers through an Environmental Levy since 2005 which increases rates by 5%

- RTA 50/50 funding for accident blackspots
- Metropolitan Green Space program providing funding for improving links between bushland, parks, waterways and centres
- Education for Sustainability Grants Program funding for facilitating changes in community attitudes and behaviour in support of sustainability, through education for sustainability
- NSW Bike Week RTA funding for the promotion and advertising component of Bike Week events budgets
- NSW Department of Sport and Recreation Facility Grant Program 50/50 to develop actions towards active transport.

Currently, the main Federal Government funding source are:

- The Roads to Recovery program that helps local government maintain and upgrade the local roads network. Council was allocated approximately $500,000 for local roads for 2010 – 2011.
- The Black Spot Program that provides funding measures for infrastructures such as traffic signals and roundabouts at dangerous locations to help to reduce the risk of crashes. Funding is allocated on a case-by-case basis and as a result there is no guarantee that a council will receive any funding through this program.

Council should support and undertake promotional activities for the ITS through public exhibition and community promotion programs to ensure a wide understanding of the plan. Understanding of the ITS will allow relevant stakeholders and responsible organisations to take ownership of the Action Plans and contribute to the implementation of the actions within the Strategy.

11.2 Monitoring Plan

Monitoring is a key component of the ITS so that progress towards stated objectives and targets can be measured. Implementation of the ITS should also be monitored to ensure there is consistency with relevant Council policy and plans, LEP, DCP, Traffic and Transport Policy and Government strategy.

The monitoring plan may evolve over time as new data and information becomes available in relation to demographic, economic, social and environmental trends.

Table 14 summarises some of the measurable data sources that could be used to monitor implementation progress of the ITS. Other monitoring sources could be established by Council such as automatic cycle counters on key cycling routes and regular parking surveys. This data would be developed into a monitoring tool once key targets and actions have been adopted by Council.

Table 14 Monitoring Plan Data

Data Description	Data Source	Usage
5-yearly ABS Census (2006, 2011, 2016 etc)	Australian Bureau of Statistics	• mode split for journey to work • number of vehicles per household • number of people living and working in Ku-ring-gai • number of people working from home • origin/destination of journey to work trips
Household Travel Survey	Department of Transport	• mode split for all trips types • number of vehicles per household • travel time and distance • trip containment levels
Rail station barrier counts	CityRail	• rail patronage by station
Rail service capacity	CityRail	• change in service capacity on North Shore Line
GIS mapping	Council	• proportion of dwellings and jobs within 400m of a bus route and 800m of rail line
Crash data	RTA	• change in crash rates on all roads
Bicycle count data	RTA	• cycling levels on selected cycle routes
Cycle network data	Council	• length of on-road and off-road cycleways
Bus operations	Bus operators	• change in average bus travel speeds
Parking	Council	• overall parking supply and proportion of short term versus long term parking spaces • change in average turnover per parking space
Traffic data	Council, RTA	• change in traffic volumes on main roads • change in heavy vehicle movements
Vehicle travel speeds	RTA	• trend in average travel speeds on main roads

12 Summary and Conclusions

The Ku-ring-gai Integrated Transport Strategy recognises that strategies for transport need to be considered within a holistic context where transport is inherently linked to land use, the built form, air quality, health and energy emissions.

The Ku-ring-gai ITS provides a strategy that addresses Ku-ring-gai's local characteristics, transport facilities, transport data, and influences on the transport system. The Strategy recognises that choices at a local level hold significant opportunity to affect change toward a community that has a reduced impact on resources, maintains productivity in the economy and supports a high quality of life. The Strategy therefore provides a local foundation for the development of actions that address issues relevant to Ku-ring-gai at a local, regional, state and federal level.

The development of the Ku-ring-gai ITS followed a process that analysed the existing situation and local context to develop draft strategies with inputs from consultation workshops to result in the development of a range of actions under each of the following categories:

- Land Use Planning
- Council Policies and Travel Demand Management
- Walking and Cycling Action Plan
- Public Transport
- Vehicular Traffic Management
- Parking Management

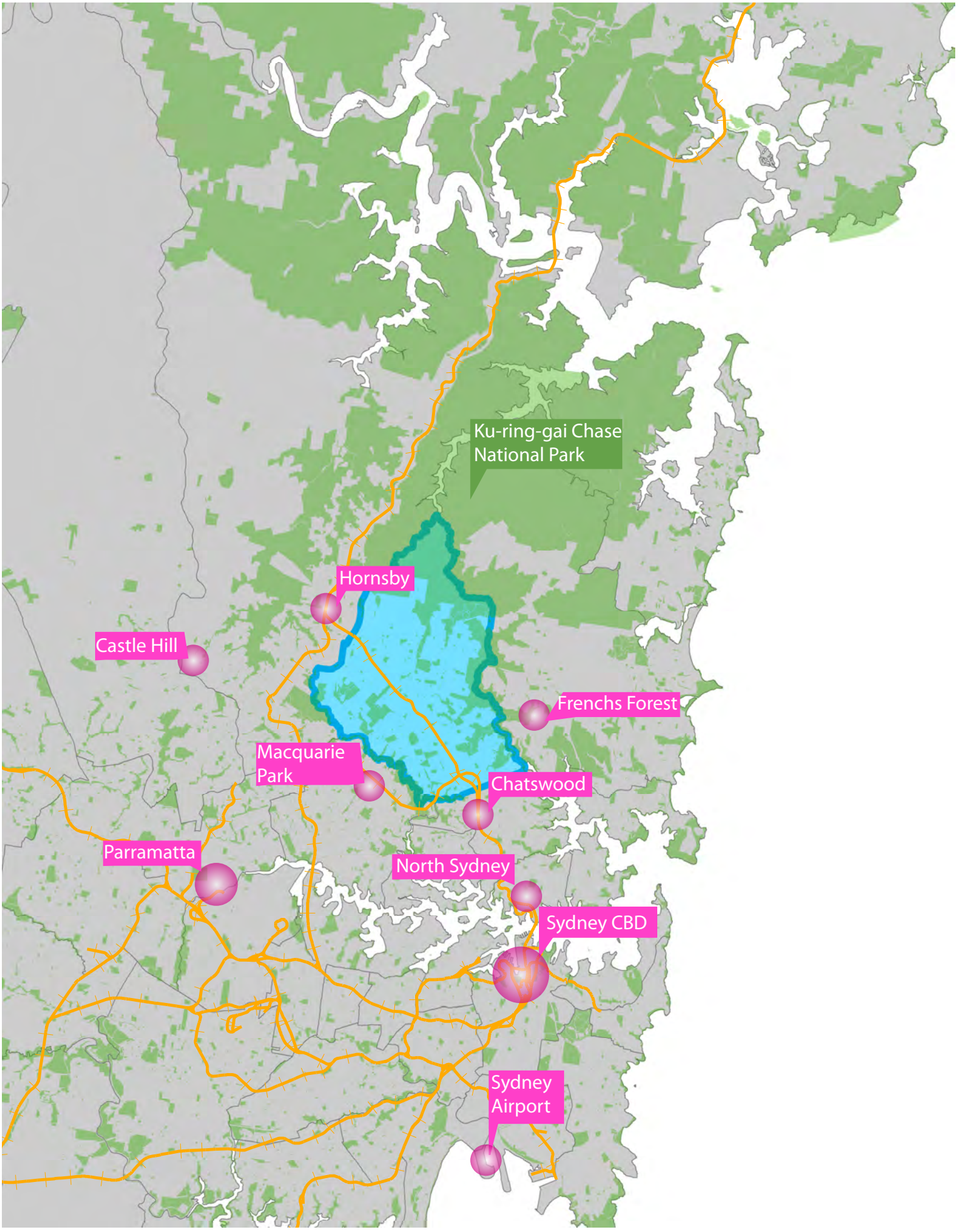
Actions were developed to respond to local issues; however the realm of responsibility of implementation extends beyond the local jurisdiction and relies on close interaction with regional and state authorities.

The Action Plan provides a program for implementation of the ITS and identifies relevant organisations that are responsible for undertaking actions to meet the stated objectives. The Action Plan also assigns a timeframe for each of the actions to be implemented with specific actions identified for further detailed studies.

This Integrated Transport Strategy should not be viewed in isolation and is one component of a series of inter-related policies. The ITS complements a wide range of State, Regional and local strategies, policies and operational plans.

Appendix A

Figures and Charts for Chapter 3



Legend

- Ku-ring-gai
- LGA Boundaries
- NSW National Parks
- Rail Line

KU-RING-GAI REGIONAL CONTEXT MAP

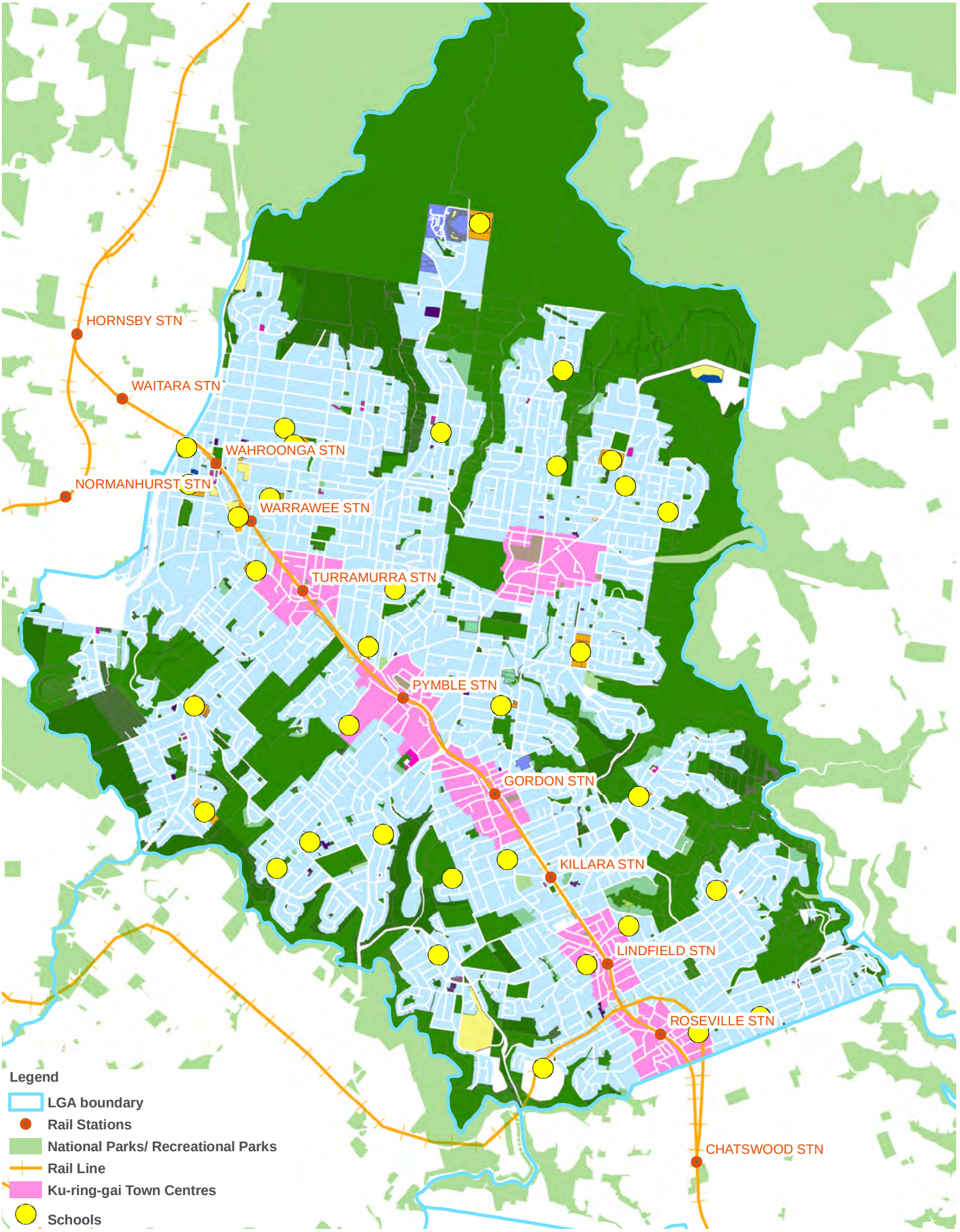
KU-RING-GAI Integrated Transport Strategy
221119

0 2 4 8 12 Kilometres

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 3



KU-RING-GAI ATTRACTORS + GENERATORS

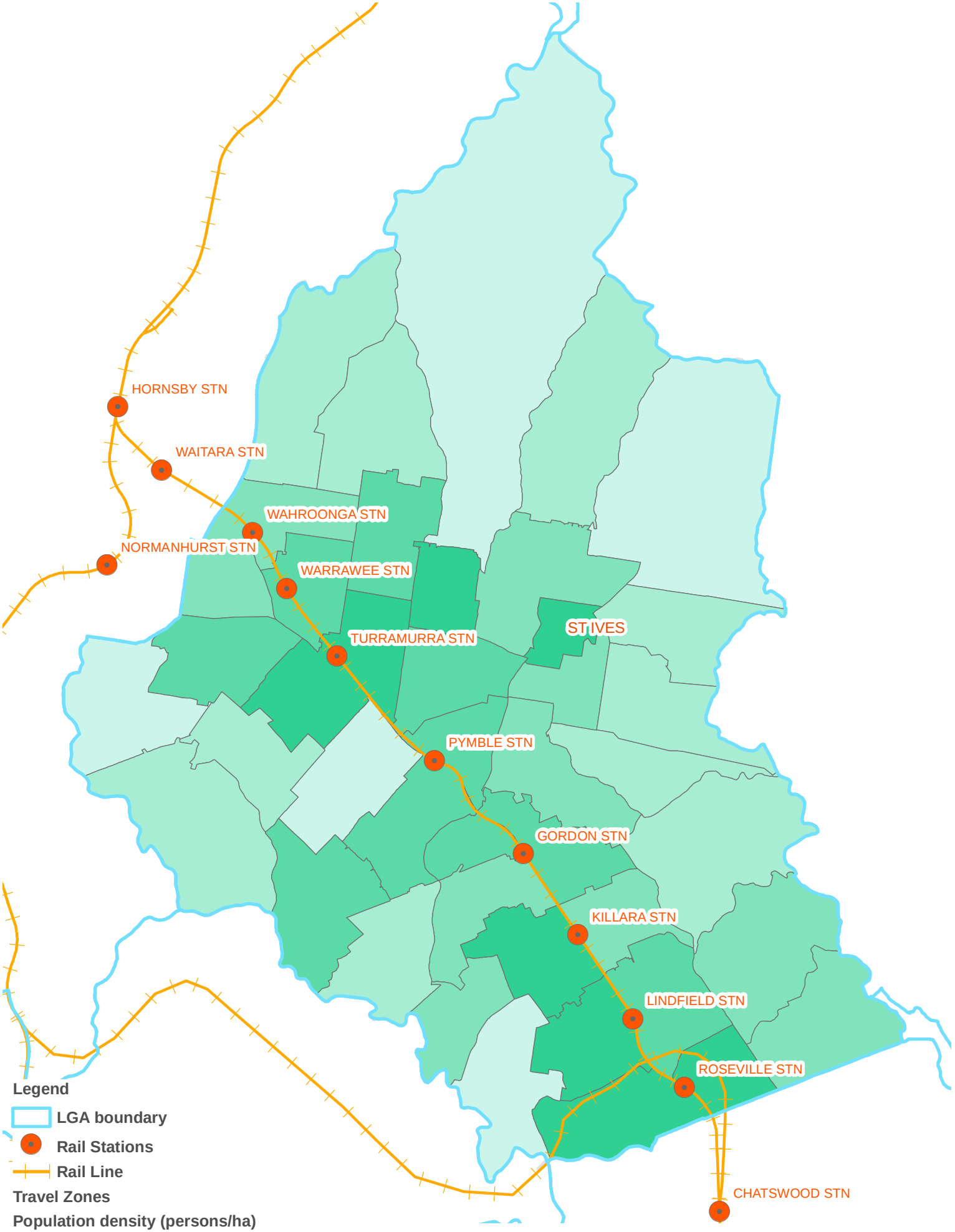
KU-RING-GAI Integrated Transport Strategy
221119

0 0.5 1 2 3 Kilometres

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 4



KU-RING-GAI POPULATION DENSITY BY TRAVEL ZONES

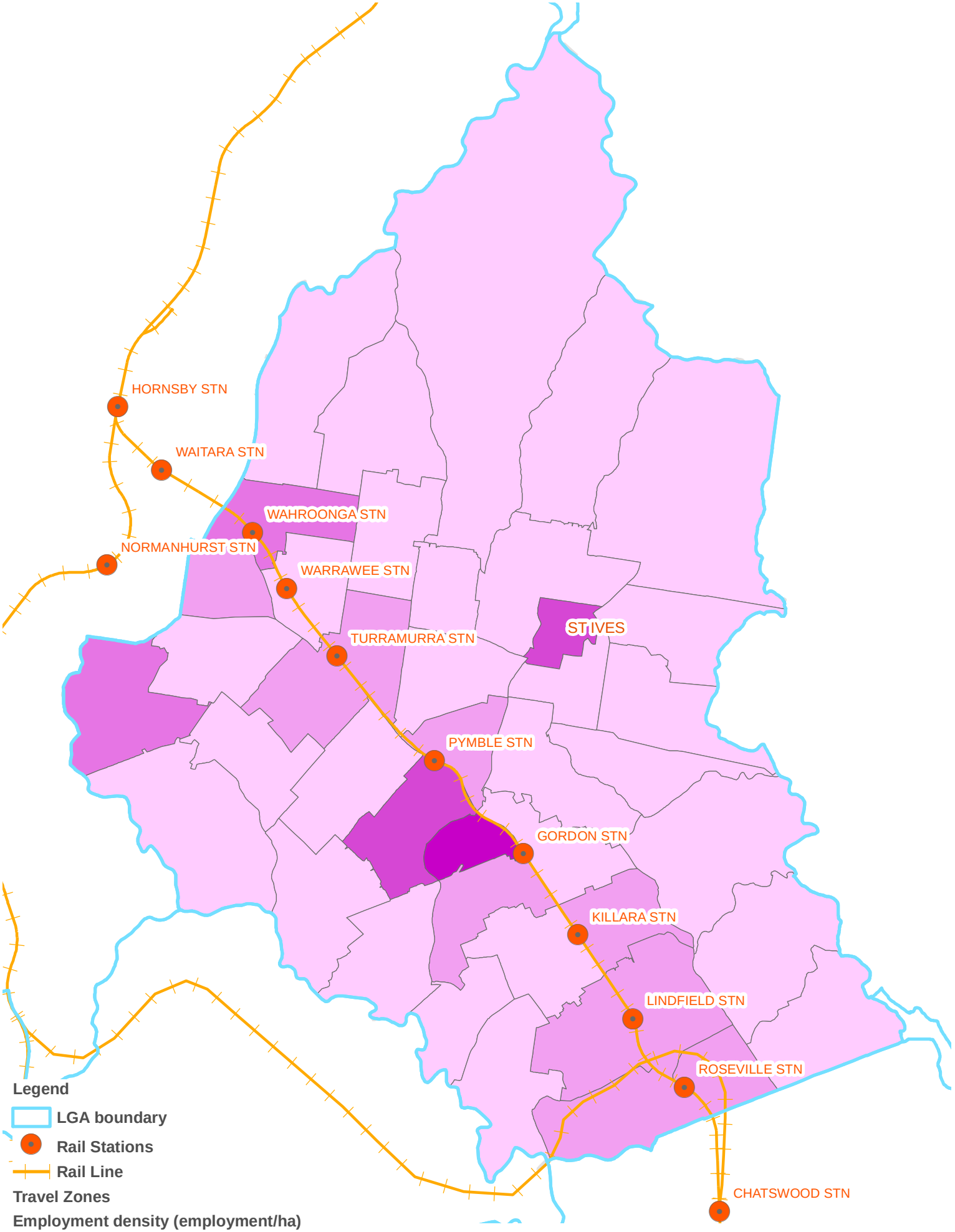
Data Source:
Transport NSW 2007 Household Travel Survey
KU-RING-GAI Integrated Transport Strategy
221119

0 0.5 1 2 3 Kilometres

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 5



Legend

- LGA boundary
- Rail Stations
- Rail Line

Travel Zones

Employment density (employment/ha)

- 0.5 - 5.0
- 5.0 - 10.0
- 10.0 - 20.0
- 20.0 - 30.0
- 30.0 - 60.0

KU-RING-GAI EMPLOYMENT DENSITY BY TRAVEL ZONES

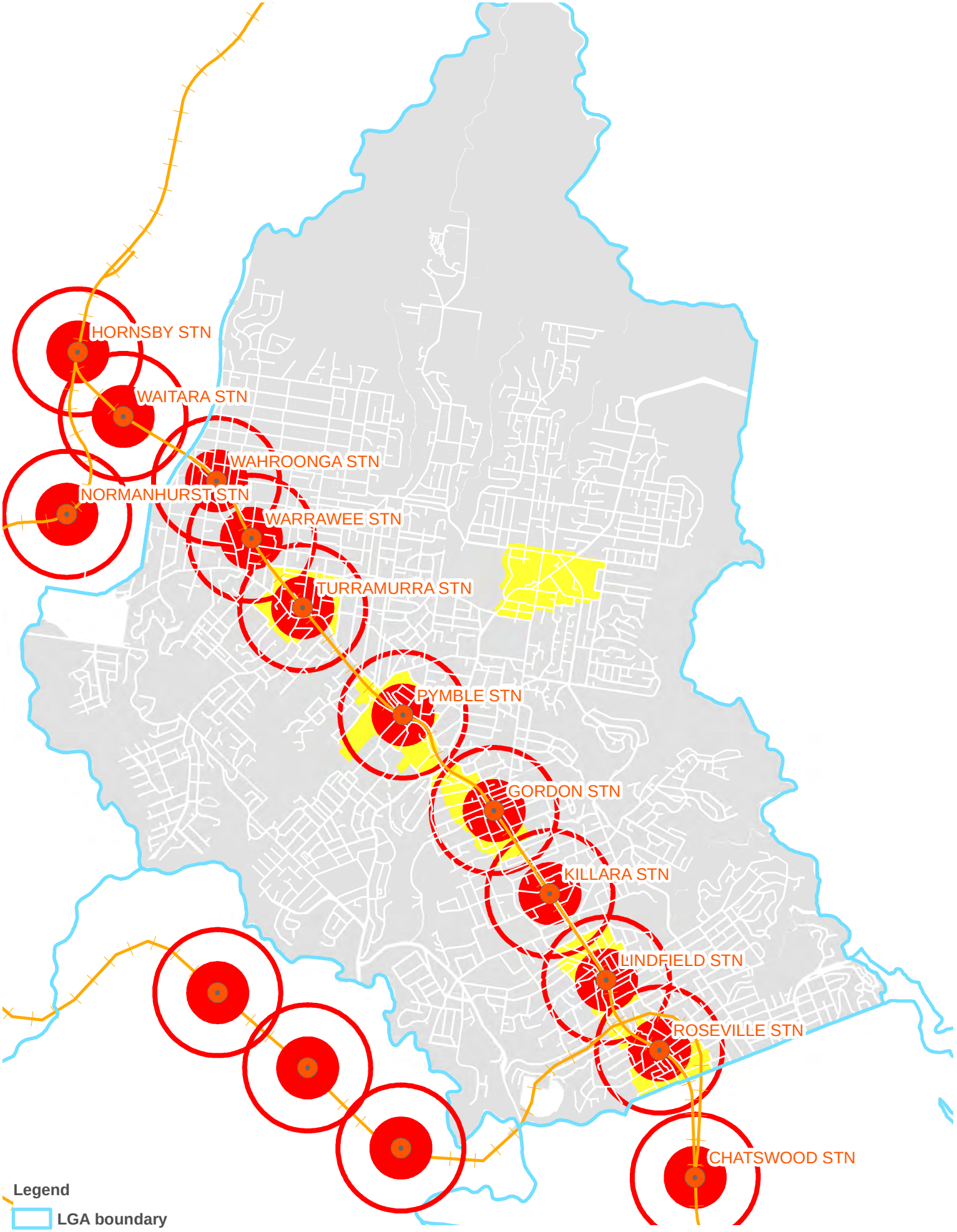
Data Source:
Transport NSW 2007 Household Travel Survey
KU-RING-GAI Integrated Transport Strategy
221119

0 0.5 1 2 3 Kilometres

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 6



KU-RING-GAI RAIL STATIONS
+ WALKING CATCHMENTS

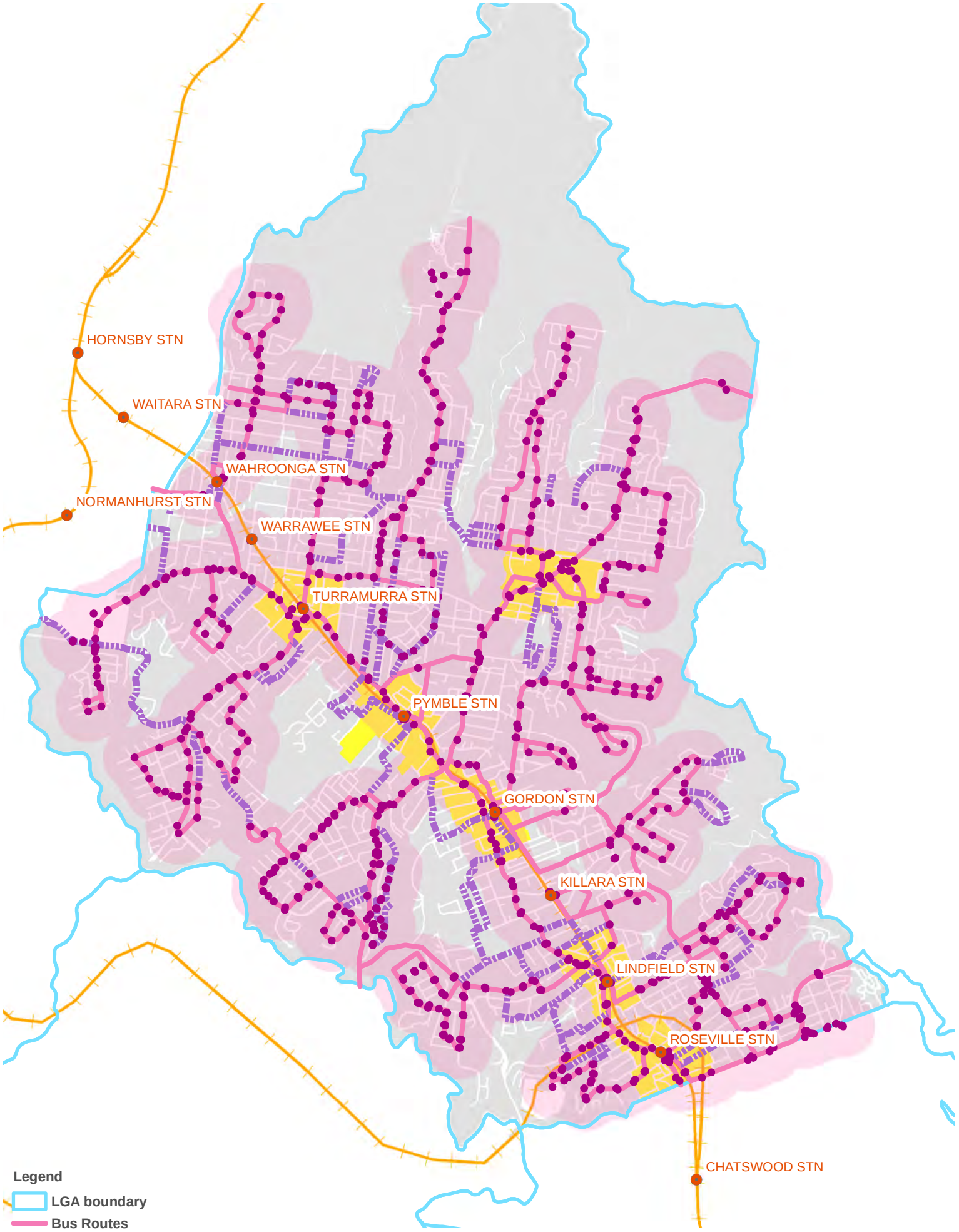
KU-RING-GAI Integrated Transport Strategy
221119

0 0.5 1 2 3 Kilometres

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 7



KU-RING-GAI BUS STOPS
+ WALKING CATCHMENTS

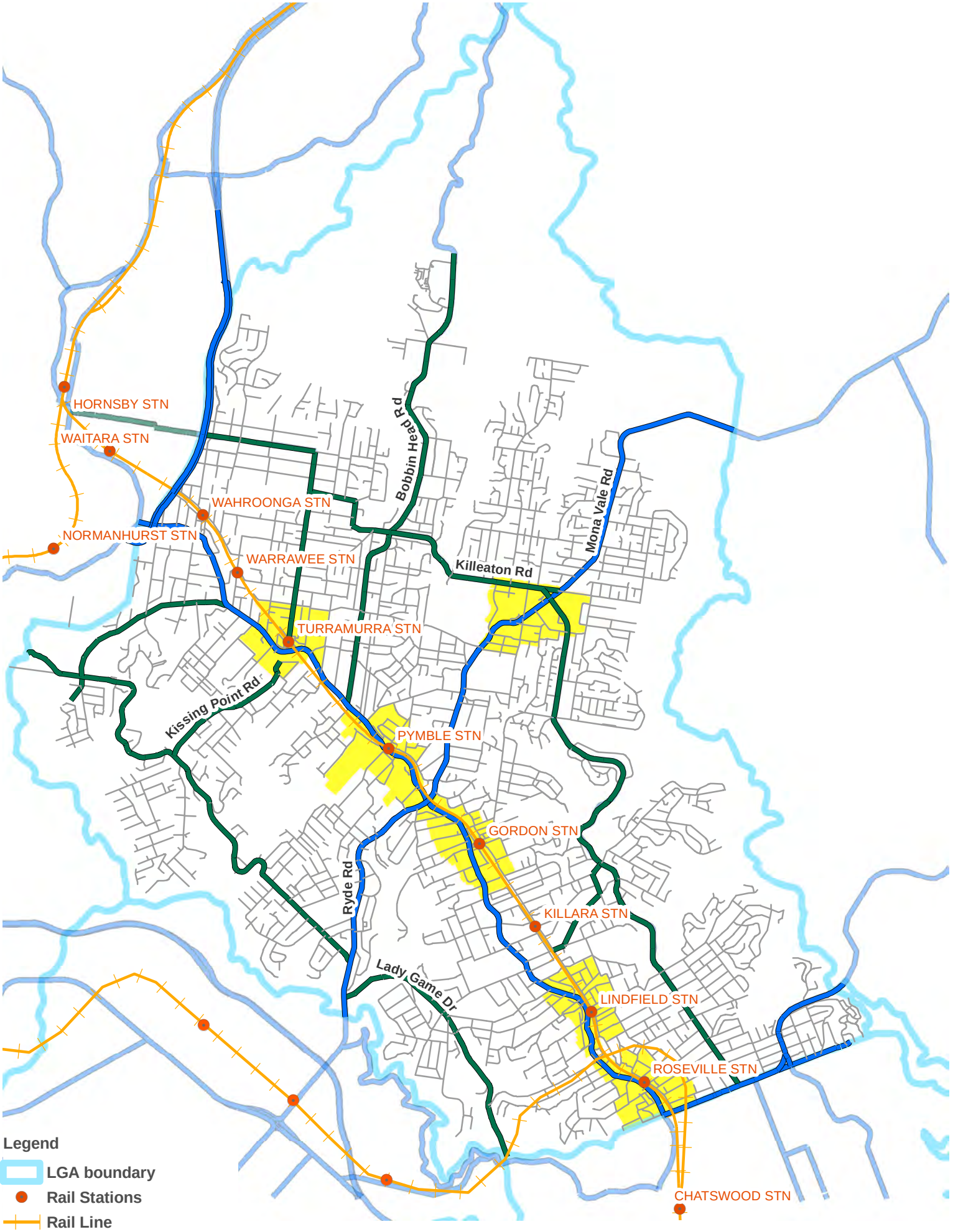
KU-RING-GAI Integrated Transport Strategy
221119

0 0.5 1 2 3 Kilometres

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 8



Legend

- LGA boundary
- Rail Stations
- Rail Line

Road Hierarchy

- State
- Regional
- Local Roads
- Ku-ring-gai Town Centres

KU-RING-GAI
ROAD HIERARCHY

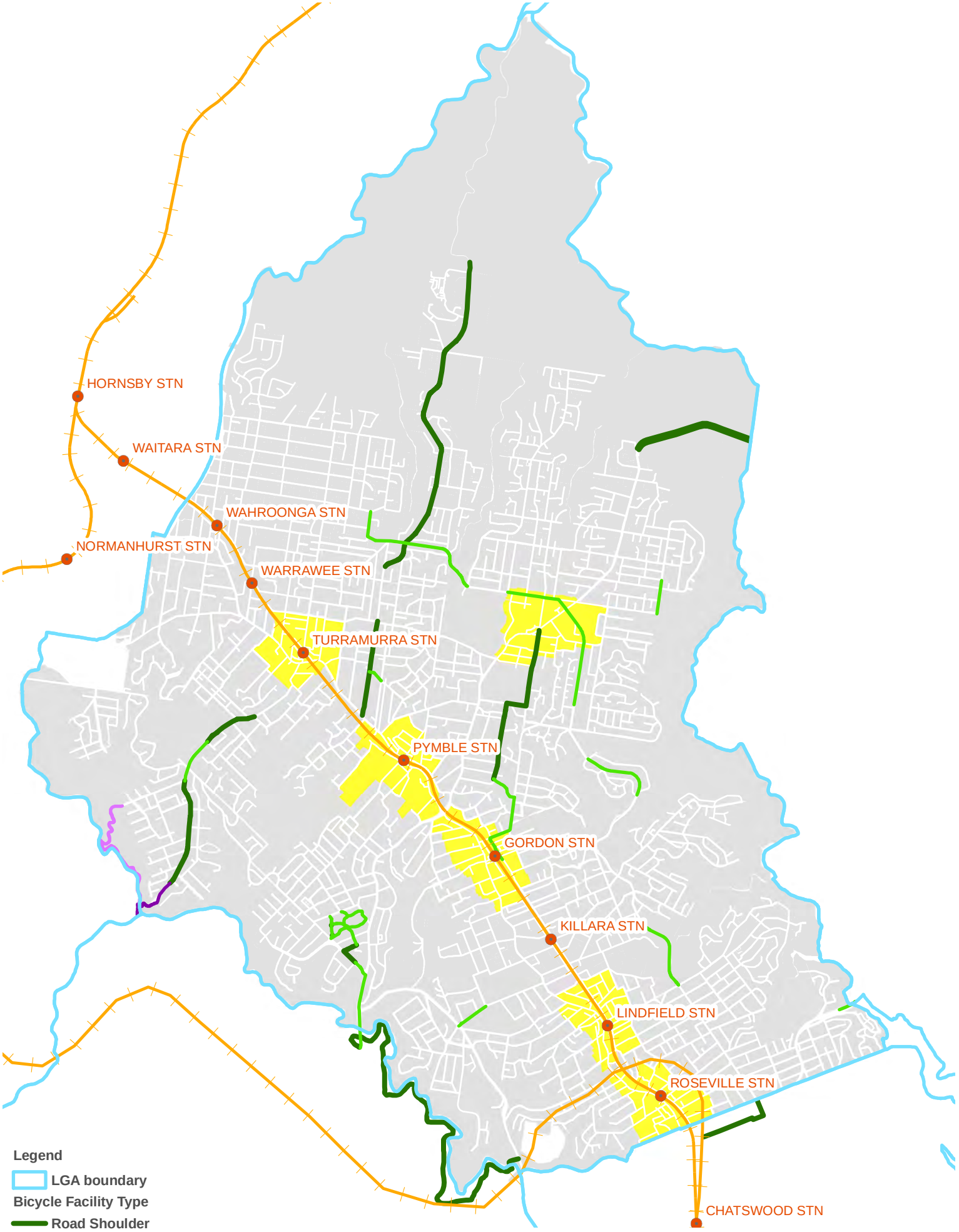
KU-RING-GAI Integrated Transport Strategy
221119

0 0.5 1 2 3 Kilometres

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 9



KU-RING-GAI BICYCLE FACILITIES

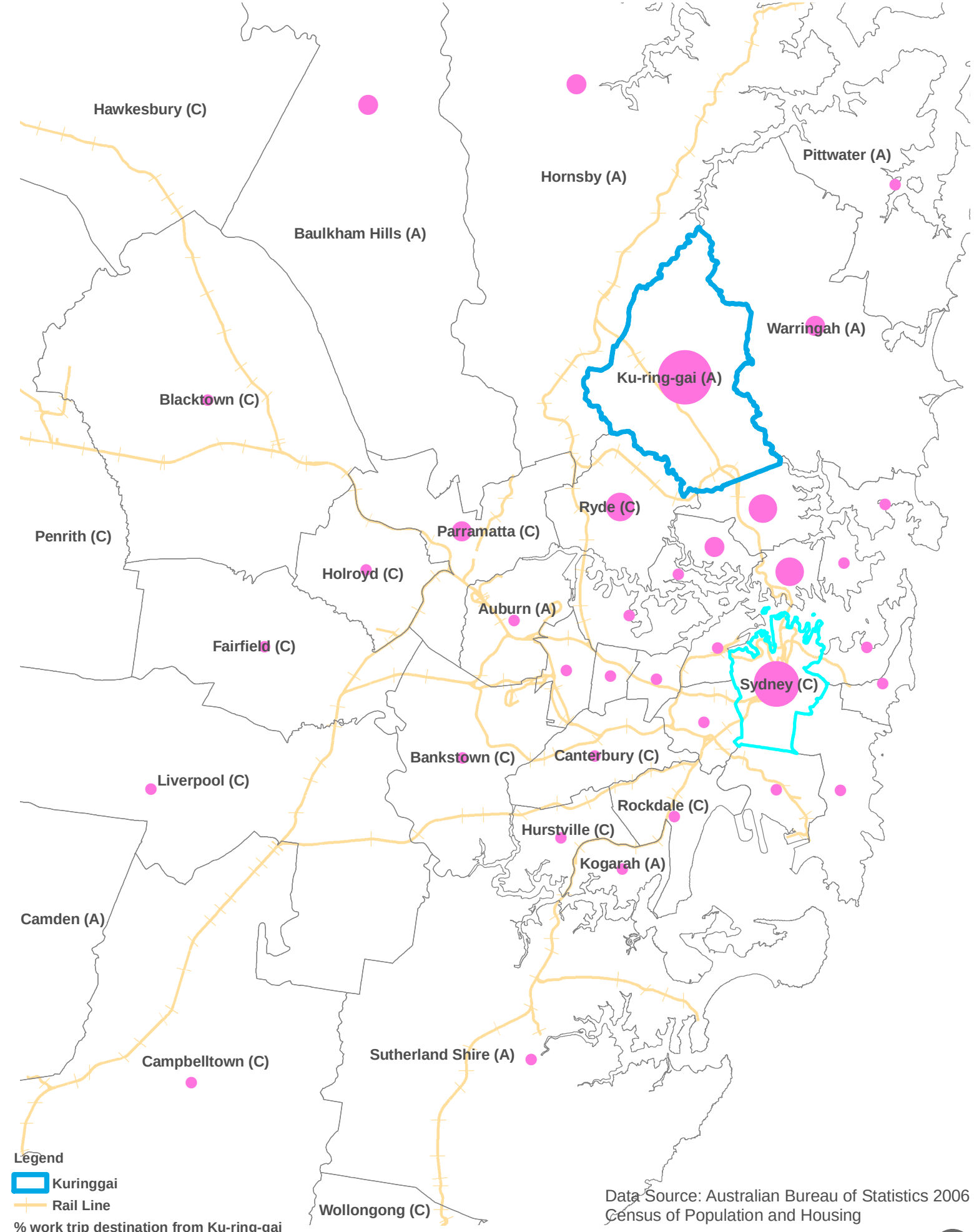
KU-RING-GAI Integrated Transport Srategy
221119

0 0.5 1 2 3 Kilometres

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 10



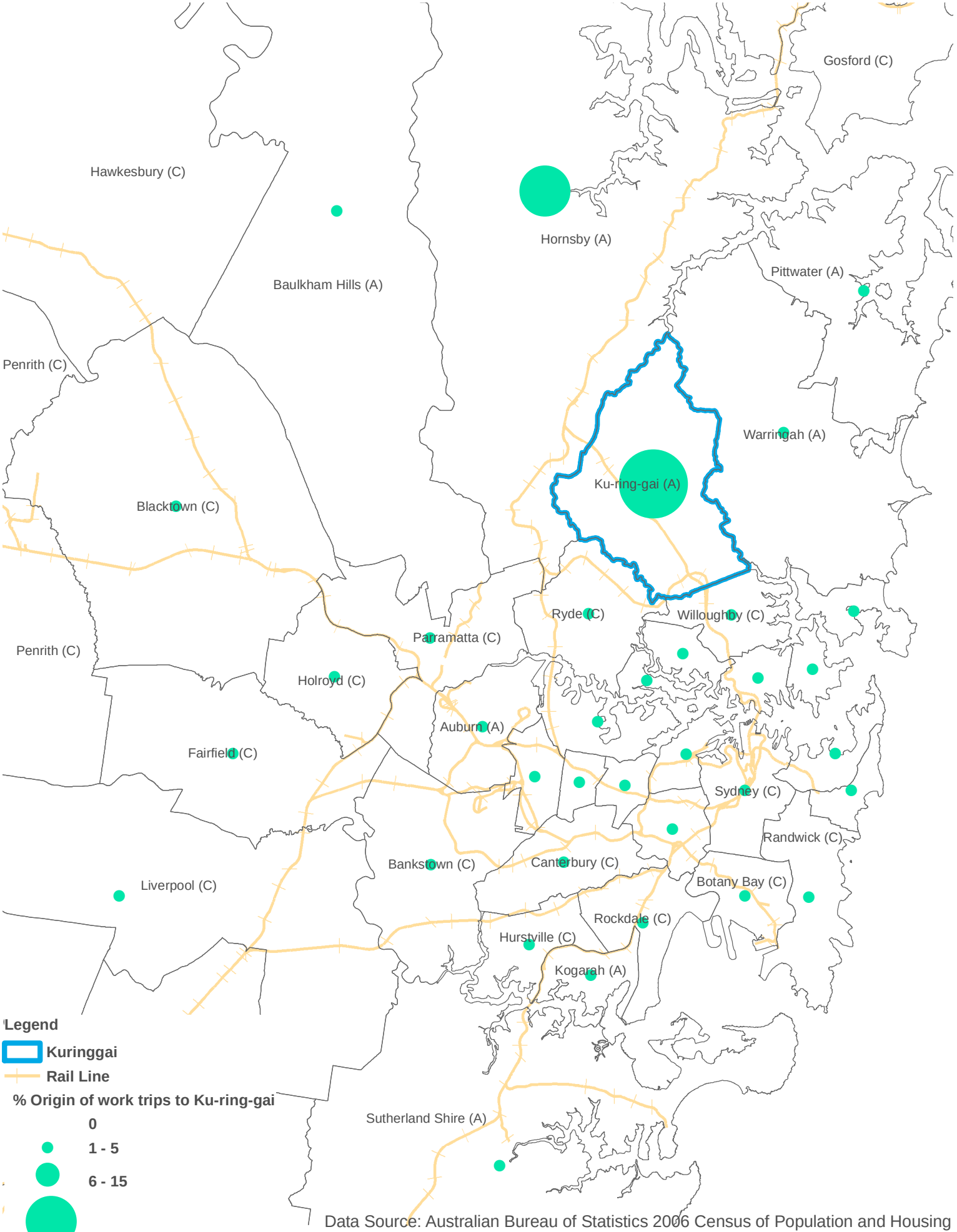
DESTINATION OF WORK TRIPS FROM KU-RING-GAI By LGA

KU-RING-GAI Integrated Transport Strategy
221119

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 11



Data Source: Australian Bureau of Statistics 2006 Census of Population and Housing

ORIGIN OF WORK TRIPS TO KU-RING-GAI By LGA

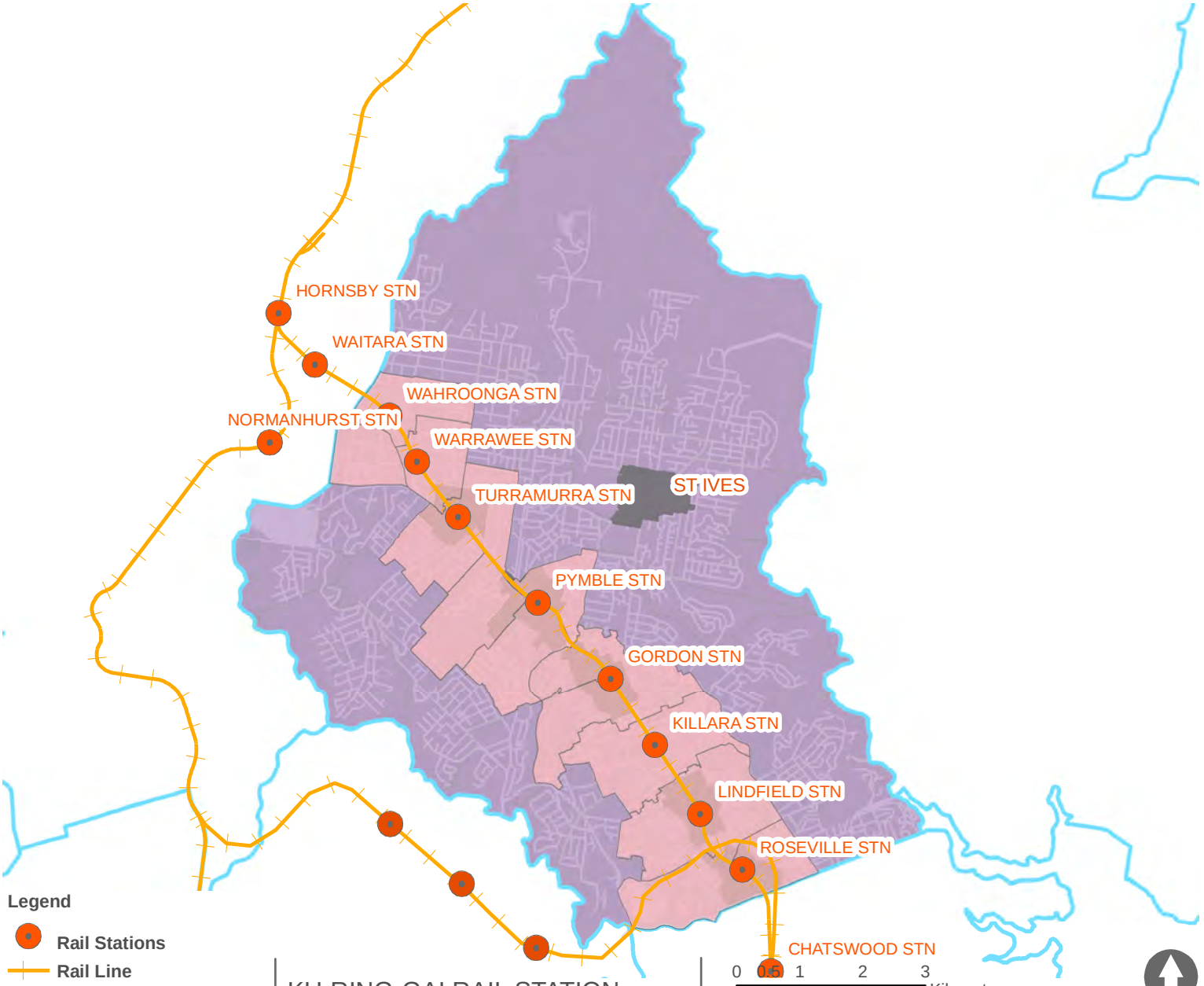
KU-RING-GAI Integrated Transport Strategy
221119

0 2.5 5 10 15 Kilometres

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 12


HORNSBY STN
WAITARA STN
WAHROONGA STN
NORMANHURST STN
WARRAWEE STN
TURRAMURRA STN
ST IVES
PYMBLE STN
GORDON STN
KILLARA STN
LINDFIELD STN
ROSEVILLE STN
CHATSWOOD STN
Legend
Rail Stations
Rail Line
LGA boundary
Rail Station Travel Zones
Other Travel Zones
Ku-ring-gai Town Centres
0 0.5 1 2 3
Kilometres
KU-RING-GAI RAIL STATION TRAVEL ZONES
KU-RING-GAI Integrated Transport Strategy
221119
ARUP
00 19-11-10 SLM JPH JPH
Issue Date By Chkd Appd

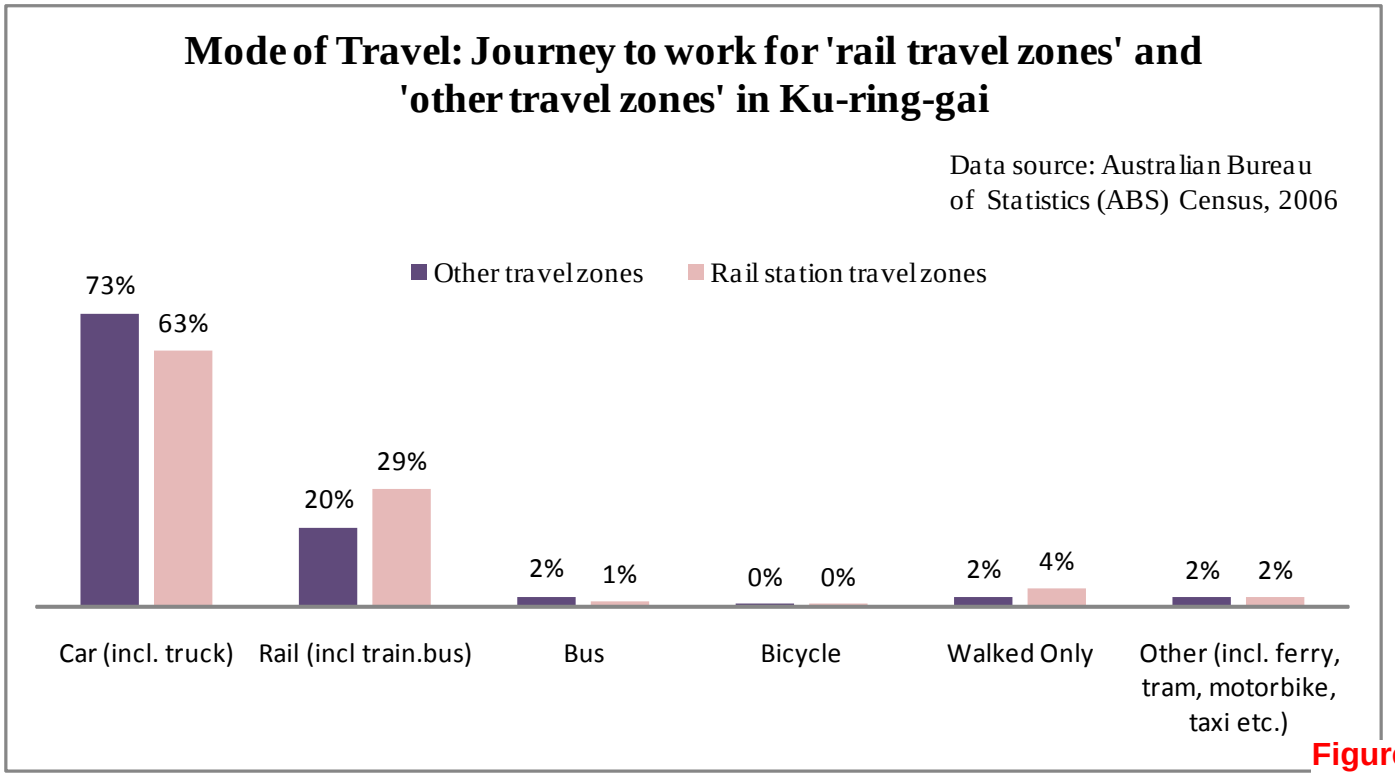
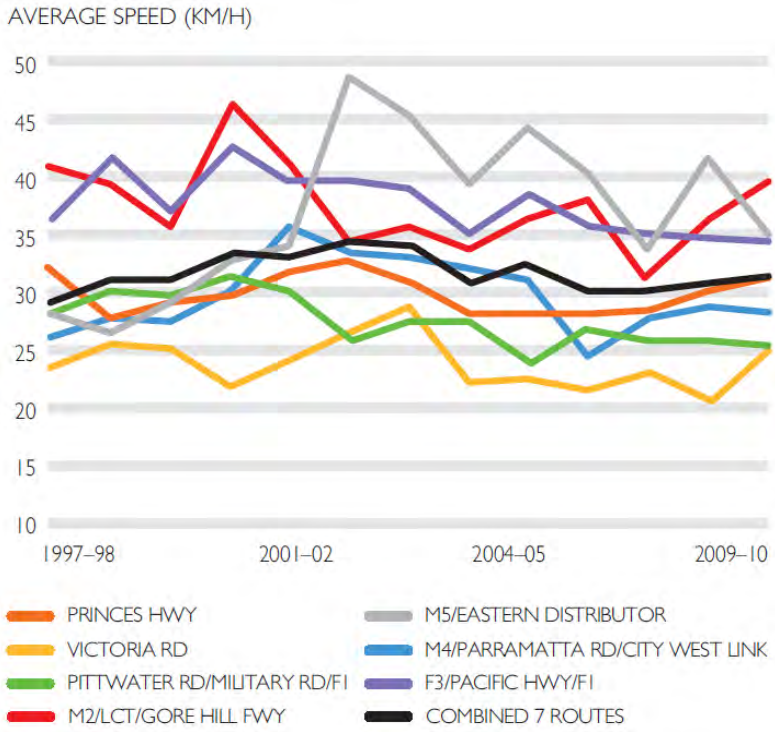
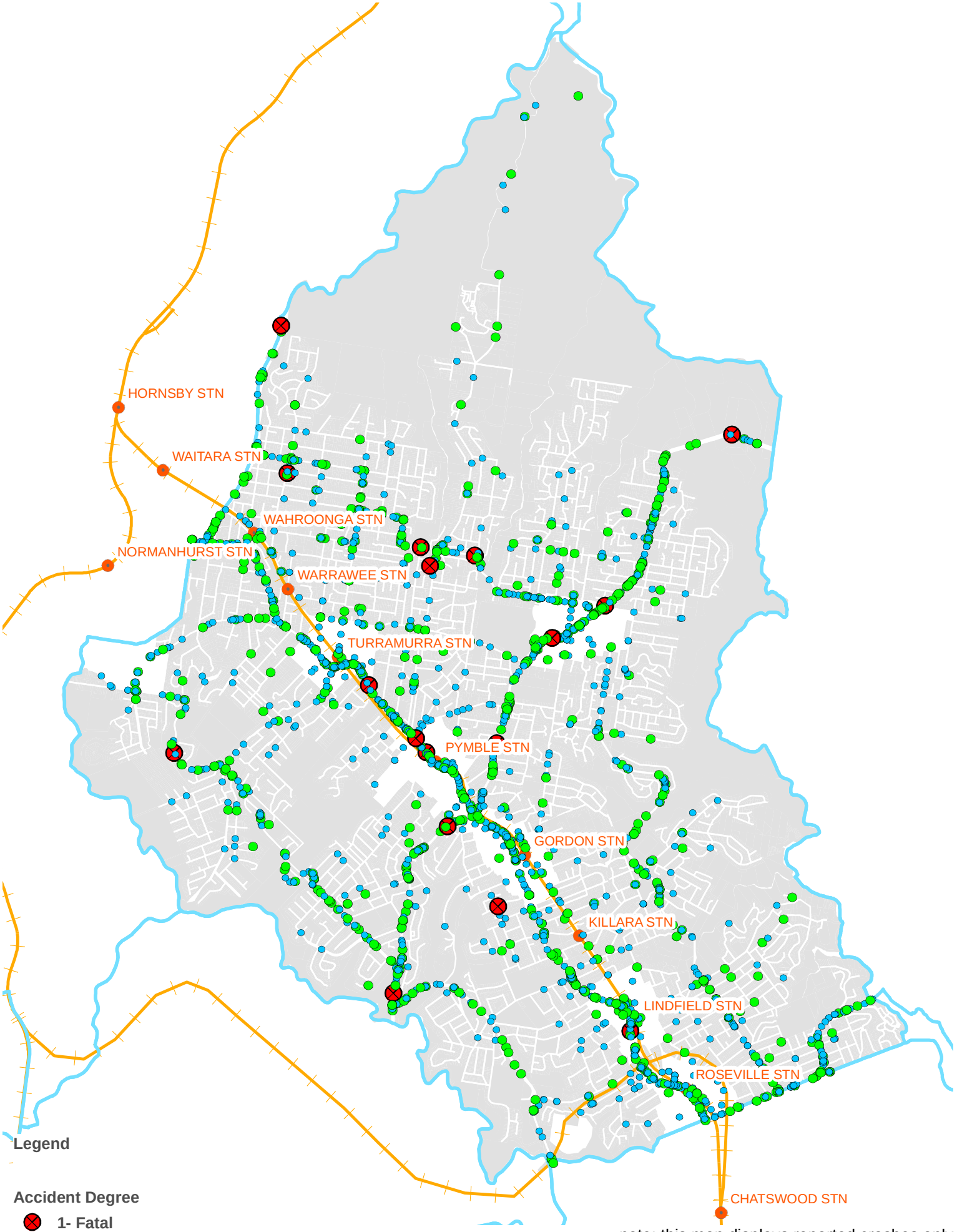

Mode of Travel: Journey to work for 'rail travel zones' and 'other travel zones' in Ku-ring-gai
Data source: Australian Bureau of Statistics (ABS) Census, 2006
Other travel zones
Rail station travel zones
73%
63%
20%
29%
2%
1%
0%
0%
2%
4%
2%
2%
Car (incl. truck)
Rail (incl train.bus)
Bus
Bicycle
Walked Only
Other (incl. ferry, tram, motorbike, taxi etc.)

Figure 13

Figure 14 Trends in Average Speed of Major Roads in AM peak

Source: RTA, 2010





Legend

Accident Degree

- 1- Fatal
- 2- Admitted Injury
- 3- Treated Injury
- Rail Stations
- LGA boundary
- Rail Line

note: this map displays reported crashes only

0 0.5 1 2 3 Kilometres

KU-RING-GAI CRASH DATA MAP
RTA DATA 2005 - 2009

KU-RING-GAI Integrated Transport Study
221119

ARUP

Issue	Date	By	Chkd	Appd
00	19-11-10	SLM	JPH	JPH

Figure 15

Chart 1 Age Profile of Ku-ring-gai (2006)

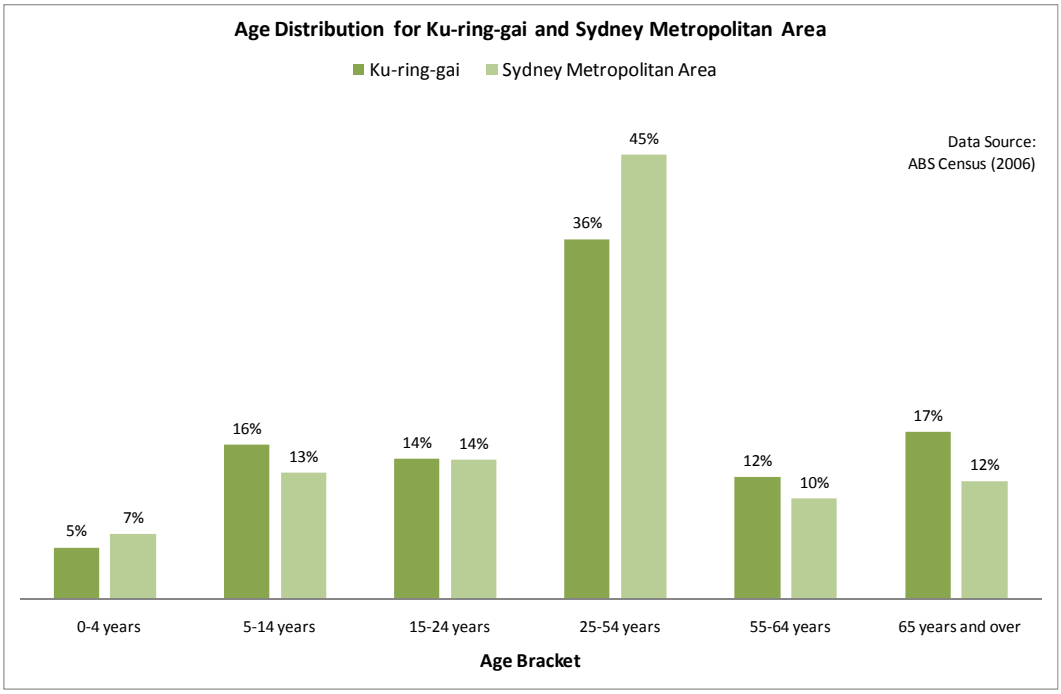


Chart 2 Number of Vehicles per Household

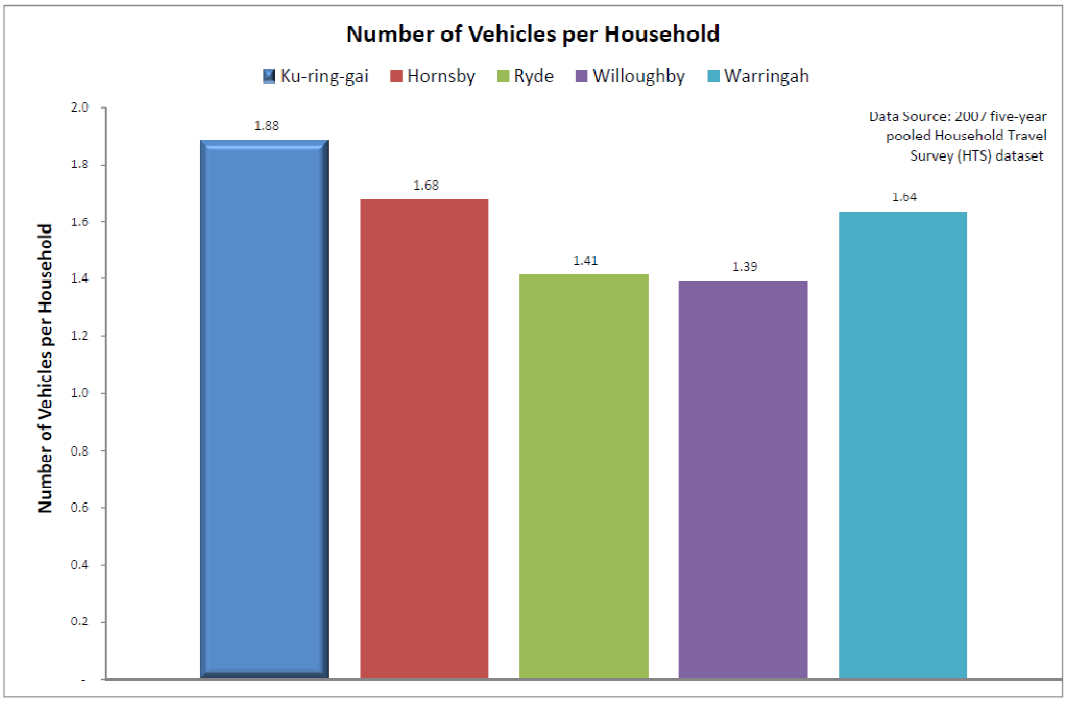


Chart 3 Trip Containment by Subregion

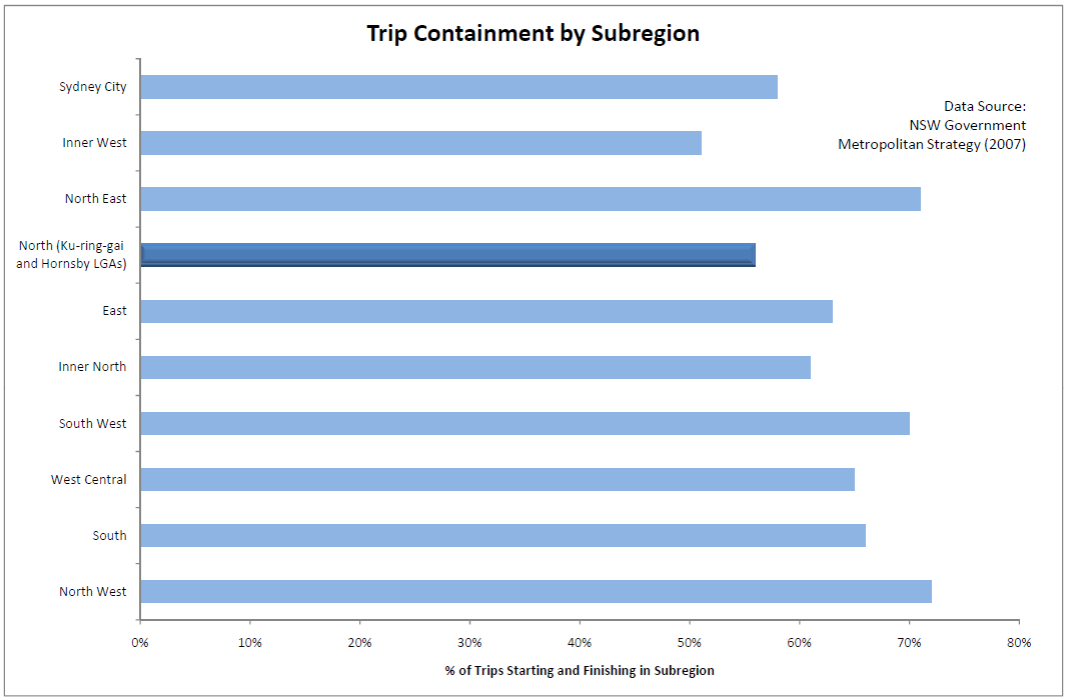


Chart 4 Mode of Travel – % of All Trips

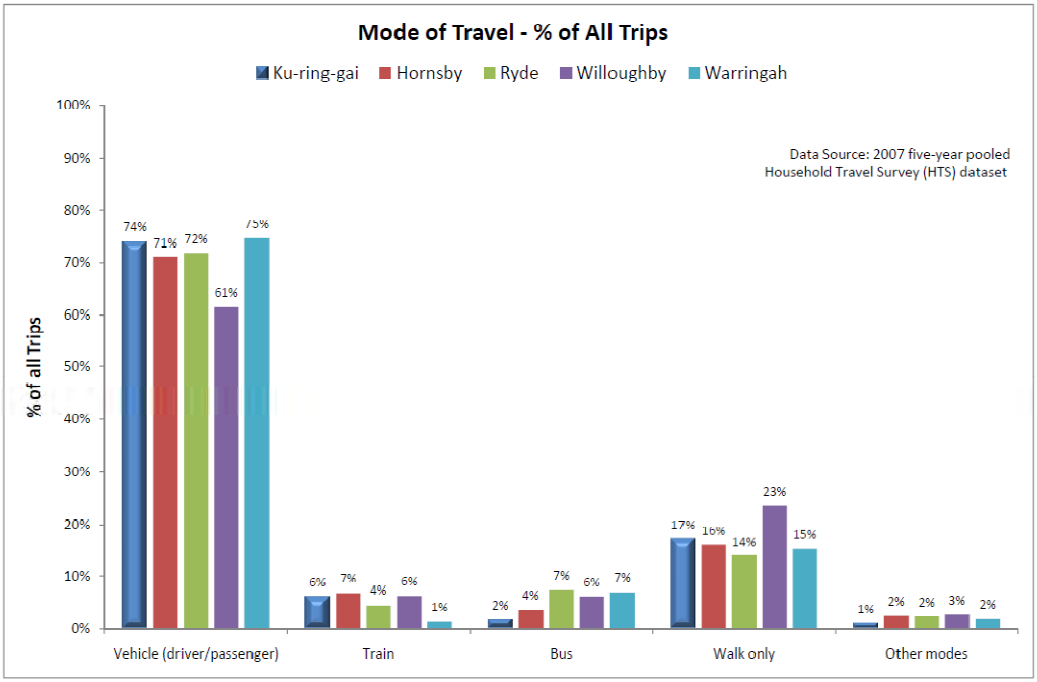


Chart 5 Mode of Travel: Journey to Work - Persons *Living* in LGA

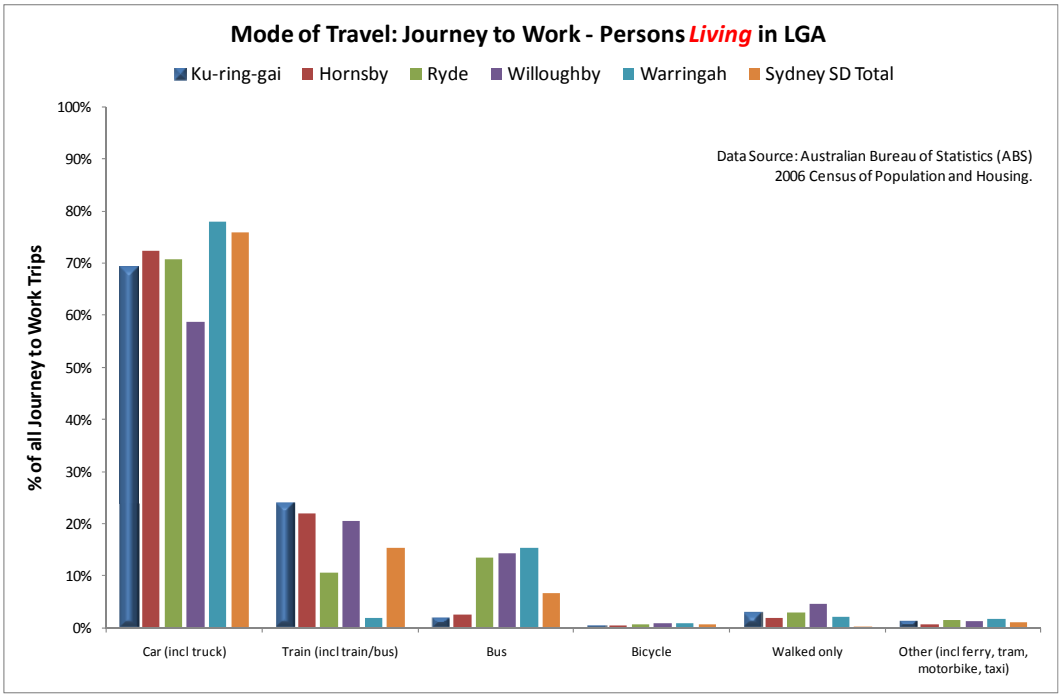


Chart 6 Mode of Travel: Journey to Work - Persons *Working* in LGA

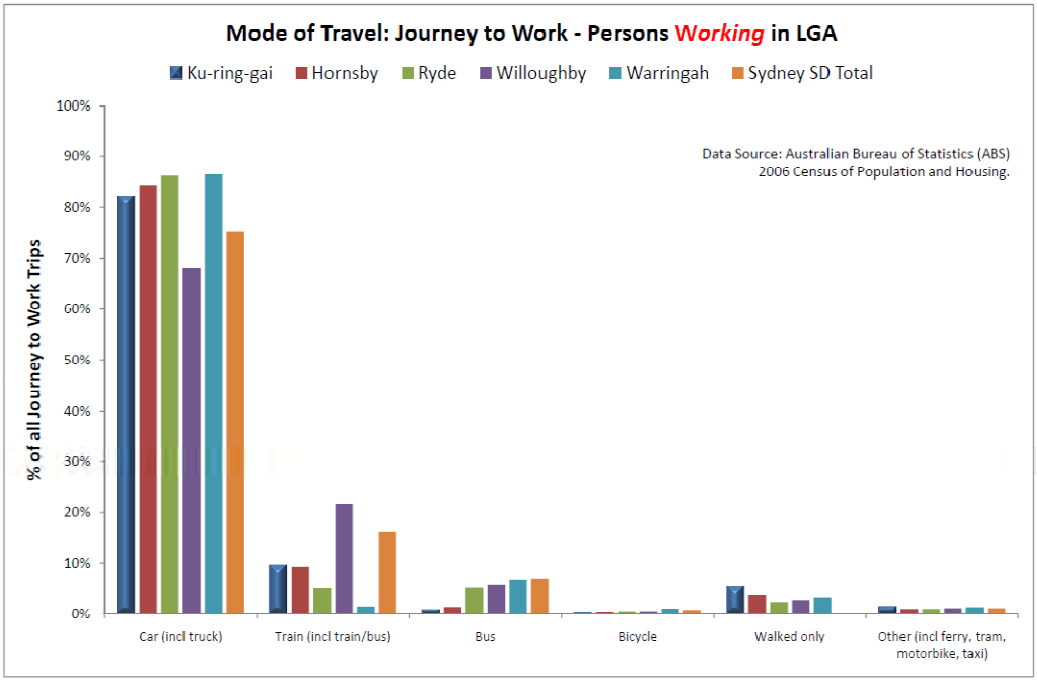


Chart 7 Change in Journey to Work Mode Split

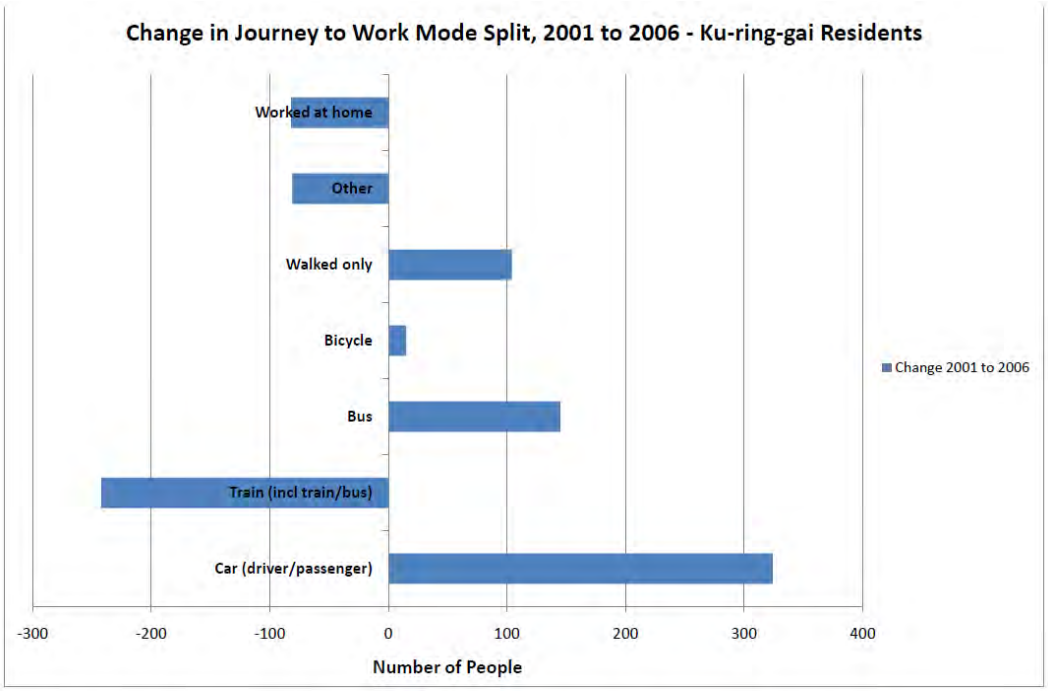


Chart 8 Total Daily Travel Time – All Trips

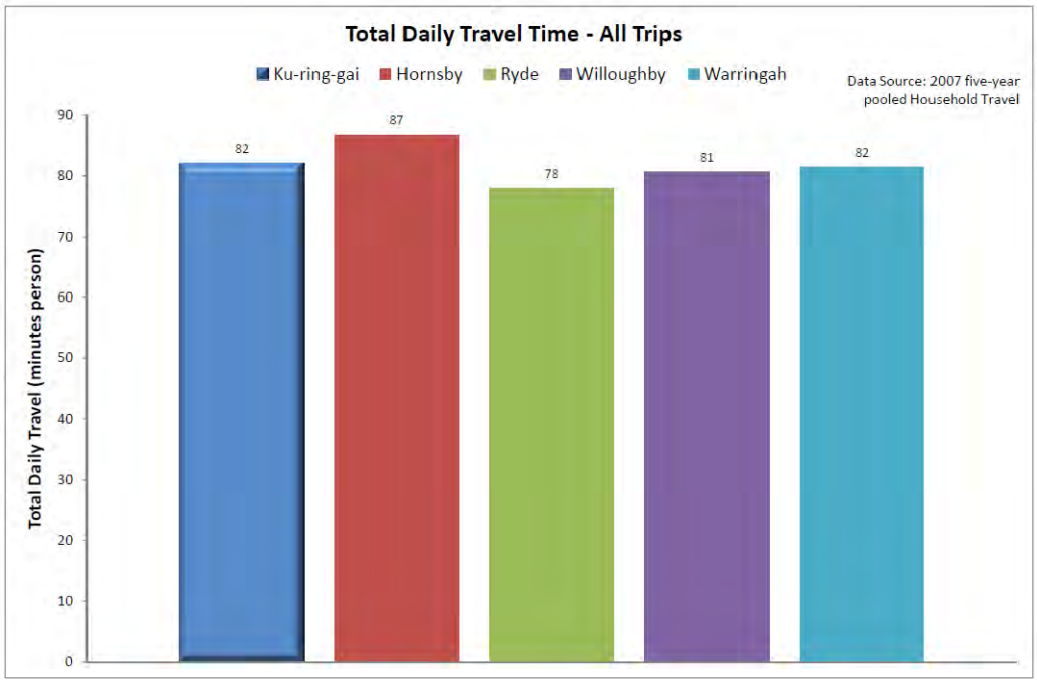


Chart 9 Total Daily Travel Distance – All Trips

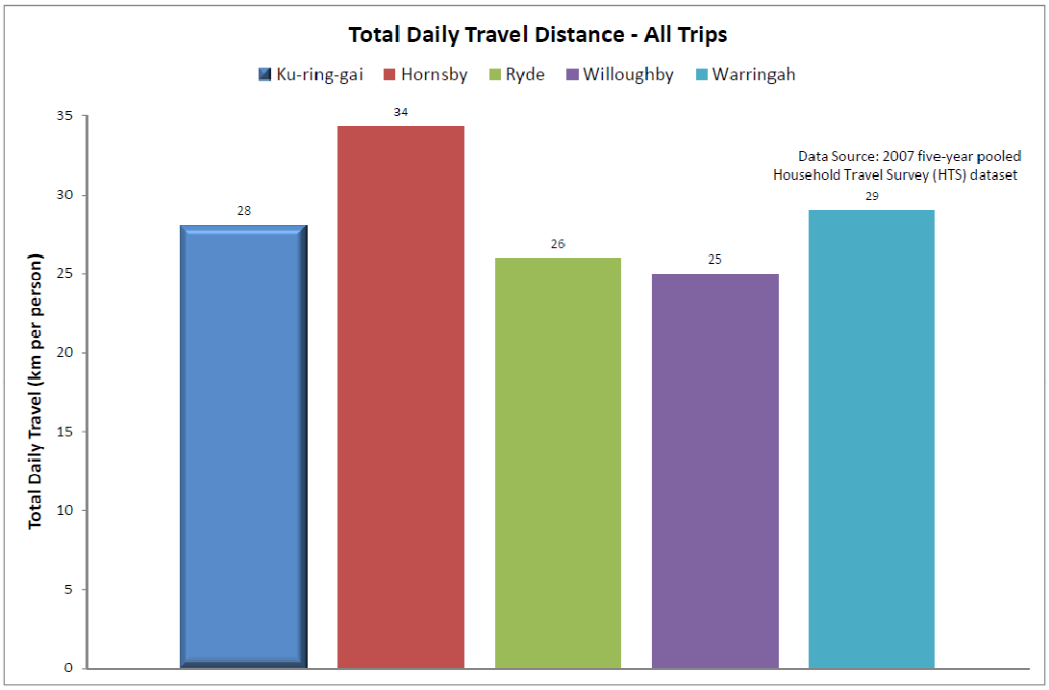


Chart 10 Average Trip Duration – Journey to Work

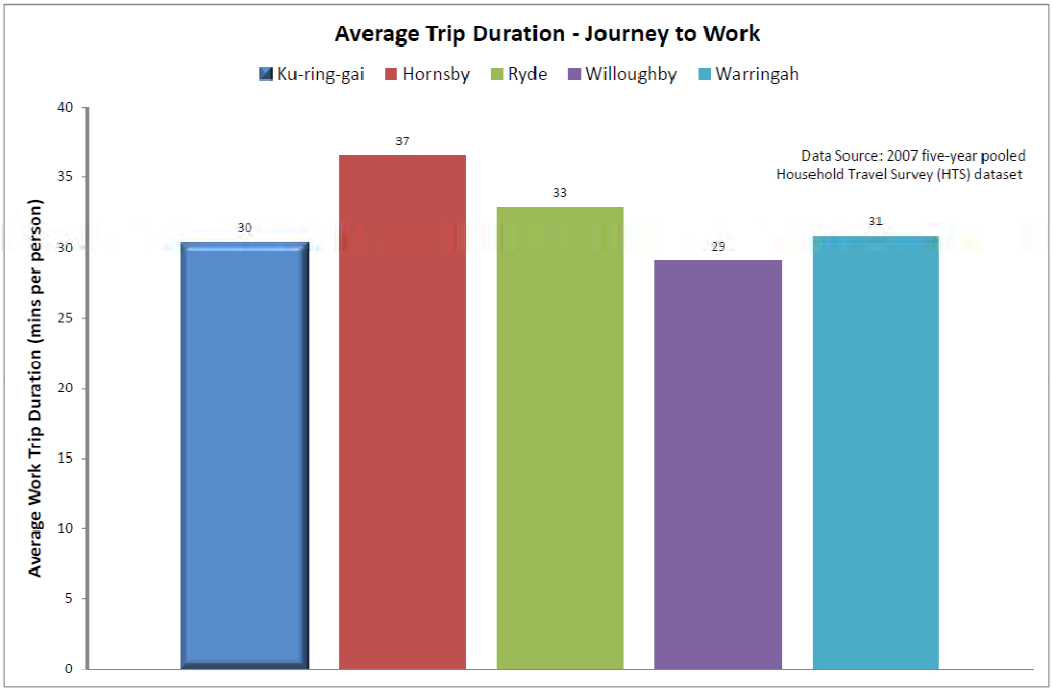


Chart 11 Rail Patronage by Station