Port Stephens Council

Report for Nelson Bay Town Centre

Transport and Parking Study

Final Report

23 May 2013

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- *qualitative assessment against strategy objectives;*
- *consideration that the survey data are representative of local traffic conditions;*
- *intersection modeling undertaken for Year 2011 only; and*
- *traffic data provided a good representation of typical peak traffic conditions during major event days.*

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1. Introduction

1.1 Overview

GHD was commissioned by Port Stephens Council (PSC) to undertake a Transport and Parking Study ('The Study') for Nelson Bay with the view of supporting the revision of the draft Nelson Bay 2030 Strategy. The draft Nelson Bay 2030 Strategy seeks to provide a clear direction for the future growth of Nelson Bay having regard to the targets for additional population and employment outlined in the Lower Hunter Regional Strategy (NSW Government, 2006) and the town's tourism role in the wider Tomaree Tourism and Lifestyle Growth area.

The purpose of this investigation is to identify and confirm appropriate transport planning principles and provide improvement measures required to support the planned future growth of the town centre. These improvements should consider access and movement around the town centre as well as support the future redevelopment of the foreshore area. The strategies will form a package of improvement measures, which highlight priorities and provide action plans that can be used to assist the future planning of Nelson Bay.

1.2 Objectives

The key outcomes of the Nelson Bay Transport and Parking Study are:

- To investigate the capability of the road and transport network under a typical peak traffic conditions and to better understand the demand characteristics of a tourism and lifestyle area;
- To identify deficiencies in the transport network and parking limitations; and
- To develop a package of transport measures that will help to enhance the town centre transport network and its future development potential.

1.3 Study Approach

In order to develop realistic and achievable transport outcomes for Nelson Bay, the study was required to take a staged approach that firstly built an appropriate level of intelligence to both inform and focus recommendations and the staging of improvements. This staged approach provided a broad understanding of the current issues, the desired levels of activity in the town centre, the current objectives of the growth strategy and development control policies, and enabled the project to develop a range of improvement packages.

The study investigation has involved stakeholder workshops, which allowed stakeholders to inform the study outcomes. The selected improvement options and its staging offer an extensive package of measures that are required to manage travel demand, now and in the future. The appraisal process adopted reviews each option against its ability to support a backdrop of broader local and regional objectives and strategies with the key aim of improving the management of assets, access and movement across the town centre transport network.

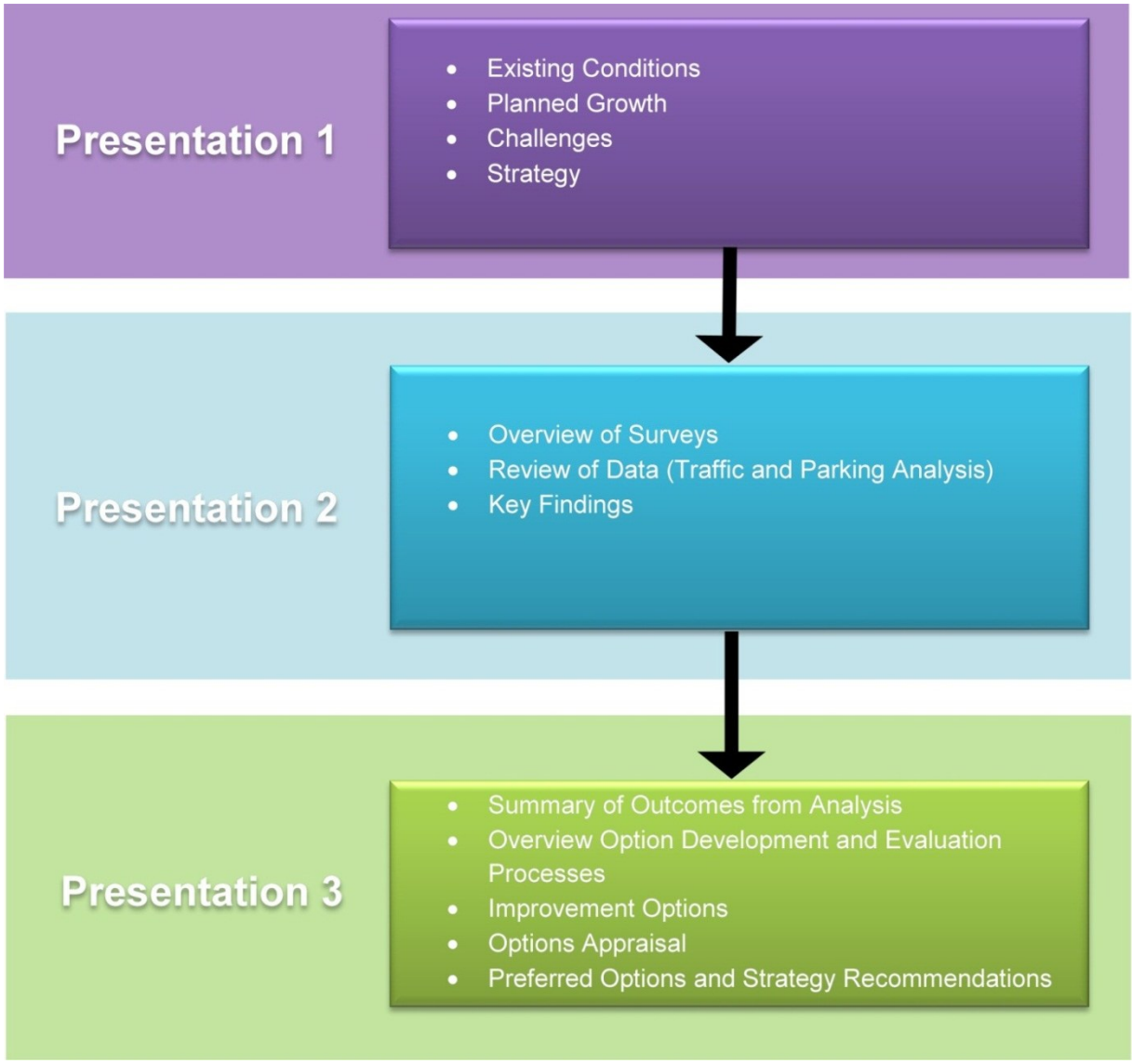
In this regard, the Study has aimed to provide a transport and parking framework that can support

growth, address known deficiencies and protect the character of Nelson Bay through improving the quality of the current transportation system. The transport strategies developed as part of the study have focused on achievable targets and supporting the vision for Nelson Bay within the wider Tomaree Tourism and Lifestyle Growth Area.

1.4 Consultation Process

The study has involved the attendance and presentation of findings at three stakeholder workshops, which were attended by key representatives from local community groups, local businesses and Council. The process adopted and its content is presented in Figure 1.

Figure 1 Study Stakeholder Consultation Process



The intent of these workshops was to inform stakeholders of the progress of the study, present the findings to date and the process adopted for identifying and evaluating options for improving the transport and parking environment in Nelson Bay. Most importantly, the purpose of the stakeholder engagement was used to inform, seek feedback on progress and to ensure the study addressed the key needs, and provided the necessary direction and solutions to inform the completion of the 2030 Nelson Bay Strategy.

Key study directions recorded as part of the stakeholder workshops are summarised as follows:

- Donald Street east car park is perceived locally to be an undesirable and underutilised town centre asset;
- The operation of Victoria Parade is impacted by delays due to traffic levels in the high season and operation of the pedestrian traffic signals outside of this period;
- The difficulty of identifying available parking;
- To consider conditions outside of high season in the planning of infrastructure, i.e. additional delay to everyday users from the provision of traffic lights to resolve a 4-6 week peak season issue;
- Focus on sustainable solutions that resolve current deficiencies and barriers before delivering more costly infrastructure that is deemed to be required to support increases in peak season traffic;
- The need to consider access needs of the current population and what would attract and encourage business activity; and
- To better manage demand, the network and current assets.

1.5 Report Structure

The remainder of this report is structured as follows:

- Section 2 – **Local and Regional Context** reviews relevant growth strategies, planning policies and background information applicable to the study.
- Section 3 – **Transport Infrastructure and Services** reviews the existing traffic, road, public transport, parking, pedestrian and cycling conditions within Nelson Bay.
- Section 4 – **Indicators to Achieve Sustainable Accessibility** presents a range of key indicators that are typically used to measure performance and to evaluate potential options that can be used to support the long-term masterplan for Nelson Bay.
- Section 5 – **Data Sources and Service Measures** provides an understanding of the current performance of the transport network and parking facilities in Nelson Bay under 2011 peak traffic conditions and sets out the service measures to be used.
- Section 6 – **Network Evaluation** provides the results of the assessment of existing and projected peak traffic conditions for intersections and roads in the study area. Bus service frequency and pedestrian and cyclist movement patterns are reviewed, road crash data is analysed and parking utilisation is assessed.
- Section 7 – **The Strategy** outlines the issues, design principles, strategy improvement options and

action plans that will help to better manage current and future travel demand, improve the transport environment and support the objectives set in the draft Nelson Bay 2030 Strategy.

- Section 8 – **Summary and Next Steps** summarises the findings of this study and the next steps in the implementation of the improvement option work packages.

2. Local and Regional Context

This section reviews the relevant regional and local planning strategies and proposals that influence the current and future planning of Nelson Bay town centre.

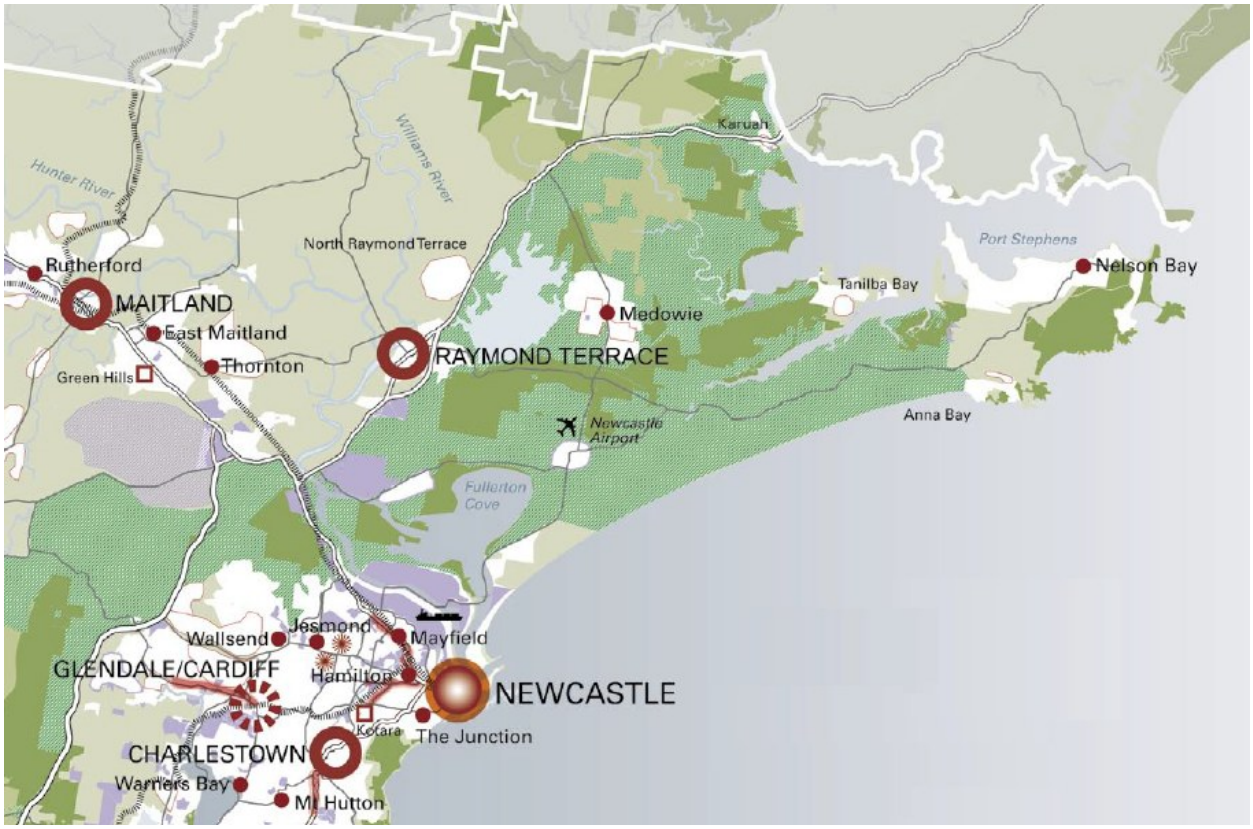
2.1 Location

Nelson Bay is located on the Tomaree Peninsula in the Port Stephens Local Government Area (LGA), approximately 45km east of Raymond Terrace, 58km north east of Newcastle and 206km north of Sydney. The location of Nelson Bay on the Tomaree peninsula restricts regional access to the town.

Nelson Bay has been designated as a town centre in the 'Lower Hunter Regional Strategy, NSW Department of Planning, 2006' (LHRS) with specialisation as a centre for recreation, tourism and culture for the Port Stephens LGA.

Figure 1 shows the location of Nelson Bay, and its geographical location in relation to other key centres, such as Raymond Terrace and Newcastle.

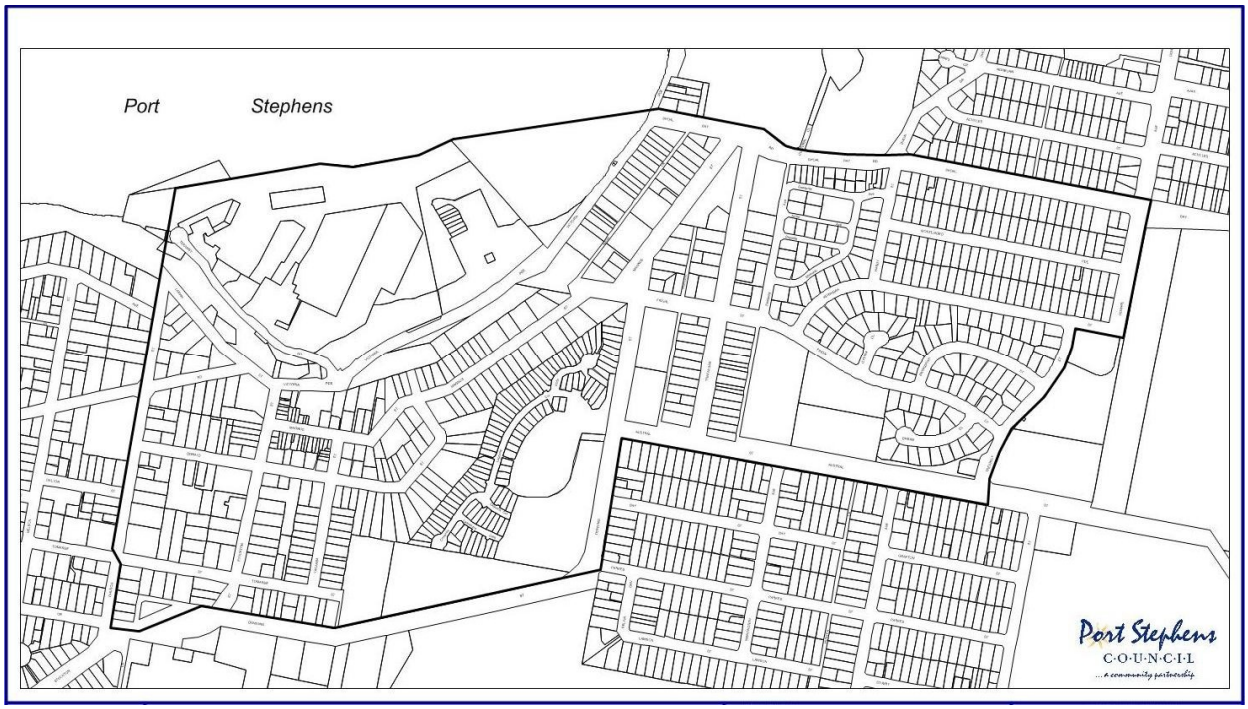
Figure 2 Key Urban Centres in the Lower Hunter Region



Source: Lower Hunter Regional Strategy, NSW Department of Planning, 2006

The study area consists of the area shown in Figure 2, although the traffic and parking investigation has been primarily focused on the town centre and providing an appropriate bypass route.

Figure 3 Nelson Bay Traffic and Parking Study Area

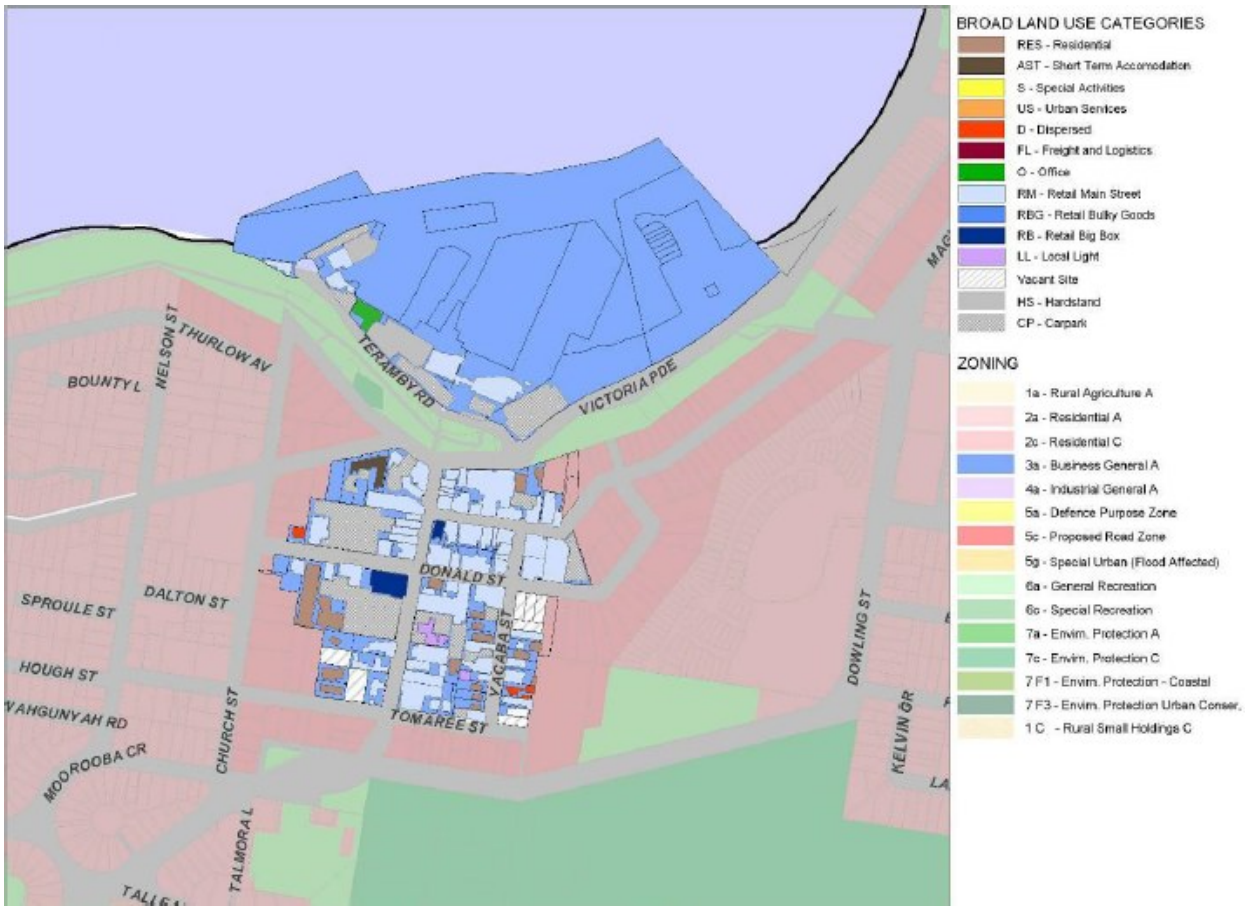


Source: Port Stephens Council, 2011

2.2 Existing Land Uses

Existing land uses in Nelson Bay have been identified from the Port Stephens Retail and Commercial Centres Study Draft Report, SGS, 2009 and is shown in Figure 4.

Figure 4 Nelson Bay Town Centre and Foreshore Land Uses



Source: Port Stephens Retail and Commercial Centres Study – Draft Report, SGS, 2009

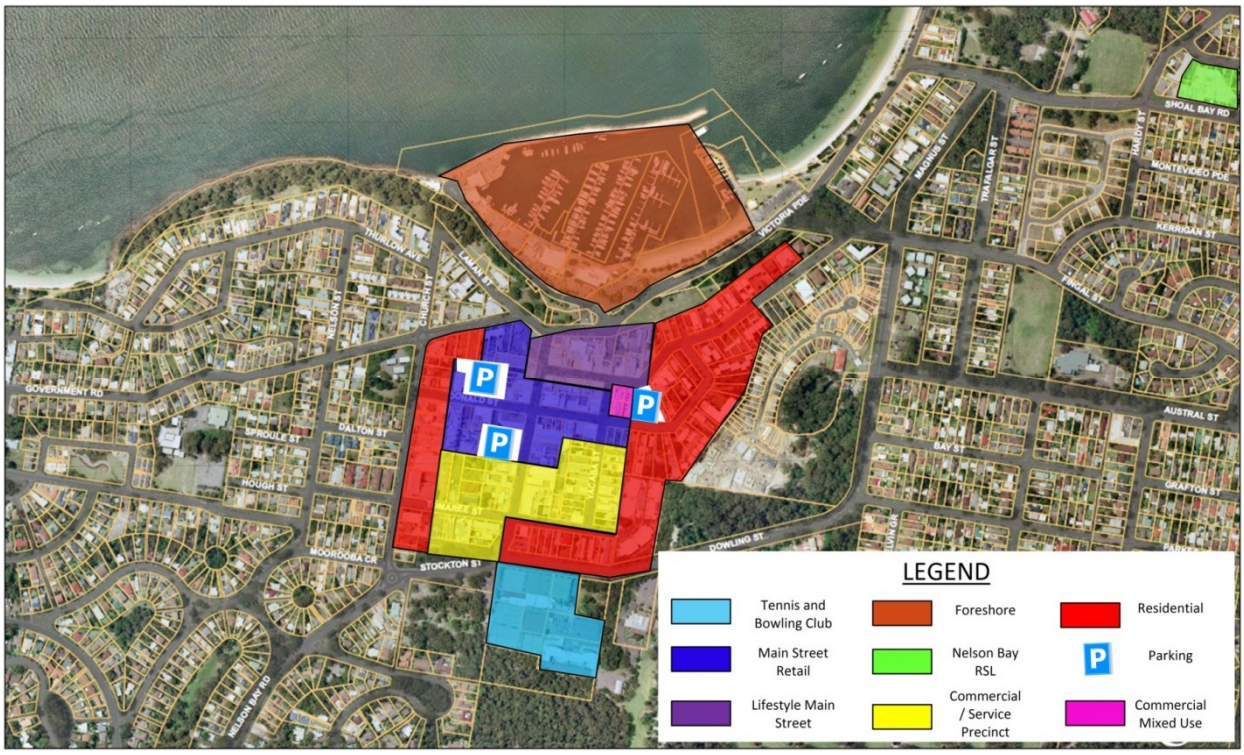
The map highlights that the majority of the town centre and foreshore is occupied by 'Retail Main Street' land uses which include shops, cafes and restaurants. Other features include:

- The zoning at the intersection of Donald Street with Stockton Street for retail 'big box', which is currently leased by Coles supermarket;
- Main street retail and offices zoned along the foreshore;
- Approximately 20 per centre of high valued land within the town centre zoned and used for parking; and
- Some areas of available vacant land (approximately 5 per cent) situated on the edges of the town centre in Yacaaba, Donald and Tomaree Streets.

Nelson Bay's town centre contains land zoned for residential uses, which are situated within a short walking distance of areas considered to be the Main Streets in the town centre (i.e. Stockton Street north, Donald Street west and Magnus Street west). The area surrounding the town centre is zoned for low to medium residential density to the east and west, and for recreational purposes to the north and south. This land use arrangement provides a good level of transport and land use integration through

offering direct access from the surrounding community to the town centre and high quality recreation facilities, such as the tennis club, bowling club, golf course and open spaces along the foreshore area. Refer to Figure 5 for an understanding of the assumed precinct structure and functions in the town centre and foreshore areas.

Figure 5 Key Destinations in Nelson Bay Town Centre



Source: Port Stephens Council Digital Data, 2011

2.3 Planning Policy and Strategy

The following section provides an understanding of both regional and local planning strategy and policy objectives that the study should consider and support.

2.3.1 Strategic Objectives

Lower Hunter Regional Strategy (2006)

The Lower Hunter Regional Strategy (LHRS) provides the following, which is relevant to this study:

- NSW government's position on the future of the Lower Hunter Region;
- A regional planning framework to complement and inform other relevant State planning instruments;
- A regional urban structure through a hierarchy of urban centres with Nelson Bay identified as having a specialisation in tourism;

- A future growth target understood to cover both Nelson Bay and Tomaree Peninsula for projected growth of an additional 1200 dwellings and 1500 jobs by 2031 with the majority of these jobs focused in and around Nelson Bay town centre;
- An understanding that Nelson Bay has a role in supporting economic activity and employment in the Lower Hunter region;
- Promotes the importance of integrated land use and transport planning approach in the future planning of the region and centres to achieve the growth target goals; and
- Encourages better connecting homes, employment and services to provide an opportunity to support growth by reducing the need to travel and its associated impacts on energy use and emissions.

The LHRS does not identify any other strategies which are applicable to the management of transport or parking within the Nelson Bay town centre.

2.3.2 Local Government Objectives

Port Stephens Planning Strategy (2011)

The Port Stephens Planning Strategy (PSPS) builds on the 2007 Community Settlement and Infrastructure Strategy by providing a comprehensive planning strategy for the Local Government Area (LGA). The PSPS responds to the State Government's Lower Hunter Regional Strategy (LHRS) and Lower Hunter Regional Conservation Plan (LHRCP) by providing local level detail. The PSPS identifies the following challenges and opportunities relating to Nelson Bay:

- General
  - Opportunity to expand the town centre or foreshore is limited by land availability, the Tomaree National Park and the Port Stephens waterway and will have to be delivered through intensification in and around the town centre;
  - The scenery and characteristics of Nelson Bay attracts both residents and tourists to the LGA and needs to be protected;
  - The seasonal nature of the tourism industry places pressure on infrastructure over the summer period; and
  - Potential opportunities for expansion at a sustainable level of growth are linked to building higher quality services around the existing water based and tourism industry, and targeting more visitation and business activity outside of the high season peak.
- Residential
  - Historically land use intensification in the town centre has occurred as a result of residential uses relating to holiday lettings;
  - The focus for revitalisation is the likely need to intensify residential development and provide more diverse housing choice to attract permanent residents to the area, which would support the town centre outside of the peak tourism season; and
  - There is potential to delivery 600 new dwellings as infill on land zoned for residential/mixed use commercial development and over 150 new dwellings on Greenfield land to be zoned for new

residential uses over the next 25 years in or around Nelson Bay town centre.

- Commercial/ Retail
  - A large proportion or 53,000 m^2 of occupied floor space in the town centre is non-retail (business and personal servicing);
  - There is currently a low commercial floor space ratio across the town centre, which is due to the number of low value off-street surface car parks;
  - The forecast increase in commercial/retail floor space between 2009 and 2031 for Nelson Bay is on the same scale to Raymond Terrace;
  - There is insufficient capacity within the current zoned town centre land use to accommodate this projected increase; and
  - Intensification of development within the existing town centre is feasible and a suitable option, which includes the removal and replacement of existing car parks.

Draft Nelson Bay 2030 Strategy (May 2011)

The draft Nelson Bay 2030 Strategy (NBS 2030) was prepared by PSC and outlines a number of strategies for Nelson Bay town centre. The acceptance of the strategy will result in amendments to Chapter C4 - Nelson Bay Town Centre of the existing Port Stephens Development Control Plan 2007. The strategy discusses provision and management strategies for the road network, parking, and pedestrian and cyclists facilities in the town centre.

The key traffic and transportation aspects in the draft strategy are:

- Improve access and movement to support increased development in the town centre and address wider peak traffic flow and circulation issues;
- Encourage the increased use of alternative modes of transportation, including walking, cycling and public transport (buses, taxis, etc.) to reduce congestion and excess demand on both off-street and kerbside parking facilities;
- Prioritise pedestrian access to town centre and reduce reliance on private vehicles; and
- Provide a high quality pedestrian experience by creating desirable streetscapes.

Nelson Bay Policy for Future Development of the Town Centre and Foreshore (August 2010)

The 'Policy for Future Development of the Town Centre and Foreshore – Strategic Planning Principles' (the Policy) was developed by Ports Stephens Council to provide a framework for decision making by linking State planning policy to local needs and expectations. The Policy highlights that the current disconnection between the town centre and the waterfront is currently seen as an economic disadvantage to the town. Its major need and priority for supporting the future growth of Nelson Bay is to improve the integration of the town centre and the foreshore, so that it is considered to be the "same place". To support this approach, the Policy highlights the following issues that need to be addressed:

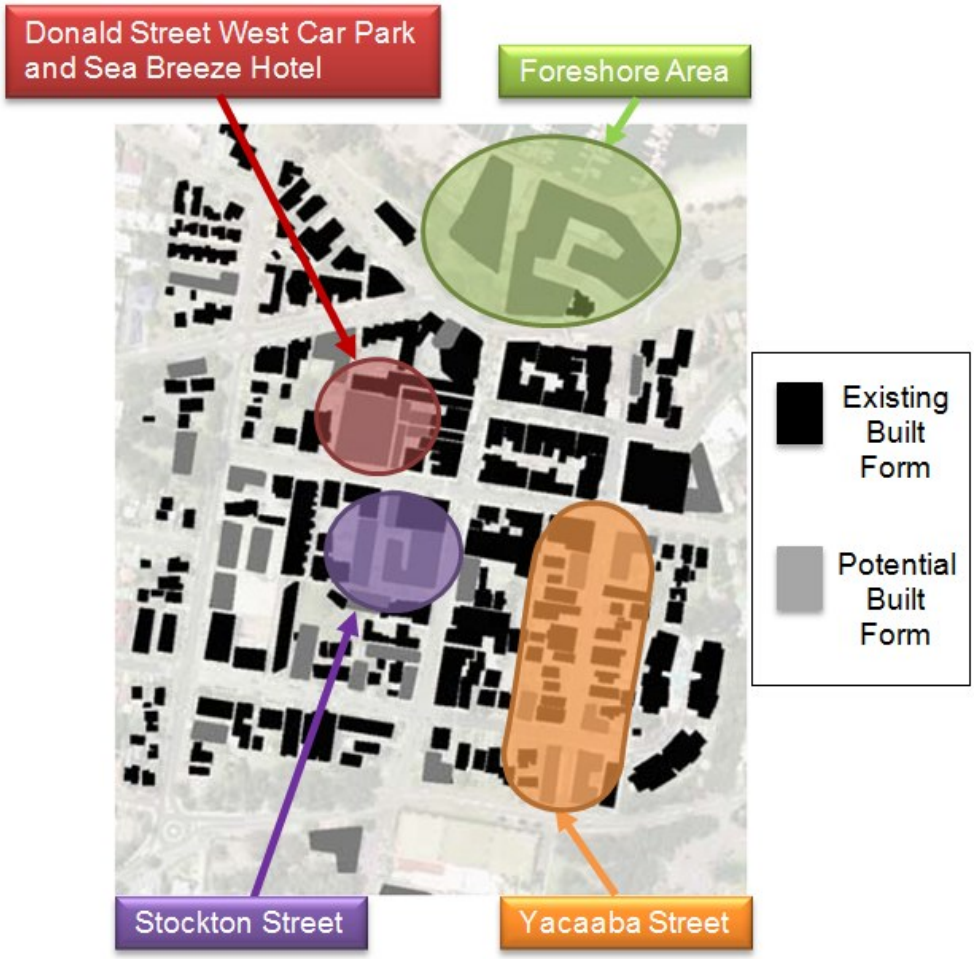
- The current road network limits connectivity;
- Disconnection between functions and activities carried out in the town centre and at the waterfront;

- Open space between the town centre and waterfront may act as a barrier;
- Traffic behaviour and the design of the street environment needs to be reviewed to slow traffic in the town centre;
- A lack of direct links for car access between the waterfront and the town centre; and
- The need for complementary development controls to apply to both the town centre and waterfront area.

Modelling the Development Capacity of the Town Centre (March 2011)

The 'Modelling the Development Capacity of the Town Centre – Nelson Bay Town Centre' is a study undertaken by Design Urban Pty Ltd on behalf of Port Stephens Council to understand the redevelopment potential of Nelson Bay town centre. Refer to Figure 6 for a snapshot of the outcome of the study.

Figure 6 Development Potential in Town Centre



Source: Modelling the Development Capacity of the Town Centre, Design Urban Pty Ltd, March 2011

The study concentrated on the redevelopment potential in terms of what can be undertaken to revitalise the town centre and has been used to inform the planning and rezoning process for the town centre area. The report highlighted the following opportunities:

- To replace existing off-street surface car parks with built form that could incorporate parking;
- Allow development intensification between Donald Street and Government Road east of Stockton Street, and along Stockton Street and to a less extent Yacaaba Street between Tomaree and Donald Streets;
- The potential to reduce the parking rate for larger residential dwellings to one and remove visitor parking; and
- Possible future connections from Yacaaba Street to Dowling Street to the south and Victoria Parade/ Government Road to the north.

The above redevelopment opportunity are based around optimising vacant land, intensification of underutilised areas and promoting the redevelopment of areas deemed to be at the end of its economic life. The land areas identified have the potential to supply an area that is greater than the growth targets specified in the draft Nelson Bay 2030 Strategy and LHRS.

Port Stephens Development Control Plan (2007)

Parts B3 'Parking, Traffic and Transport' and C4 'Nelson Bay Town Centre' of the Port Stephens Development Control Plan (DCP) produced by Port Stephens Council was reviewed in relation to improving transport and parking in Nelson Bay.

Part B3 outlines controls for the provision of transport infrastructure and parking and highlights the following:

- An aim to 'maximise efficiency and patronage on bus services' through the provision of bus stops, prioritising movement and facilities;
- Support for new development, change of use or intensification of existing businesses applications that offer agreements that would consolidate parking by utilising alternative sites or making a contribution towards development of parking spaces as part of Council's Section 94 plan for the area; and
- Provide design standards to address access to developments, internal roads and circulation, and parking bays.

Part C4 outlines controls for the development of Nelson Bay town centre and in particular focuses on pedestrian access, mobility and streetscape controls. This part requires new development to:

- Encourage pedestrian movement throughout the entire centre without discontinuity;
- Promote interconnect streets and avoid terminating arcades, which is identified to be particularly desirable within the core town centre area; and
- To design town centre streetscapes that allows for attractive and functional outdoor environments.

Port Stephens Local Environmental Plan[1]

Under the current Local Environmental Plan (LEP) it highlights the following:

- Section 41 (1) indicates that direct access to certain roads is restricted and no new means of vehicular access shall be formed without consent of Council and the relevant road authority. This includes under sub section (b) Nelson Bay Road (Main Road 108) from the roundabout of Stockton Street with Church Street in Nelson Bay to the boundary of the Port Stephens LGA; and
- Section 42 indicates that development fronting an arterial road will not receive consent to an application from the consent authority unless (a) access to the land is provided by a road other than the arterial road, wherever practicable; and (b) it does not adversely affect the safety and efficiency of the arterial road.

This policy recognises the importance of network design in supporting traffic movement and network efficiency. By doing so, it identifies the need to protect certain routes that have a primary movement role to ensure that safety and efficiency targets are met.

2.3.3 Nelson Bay Boat Harbour and Foreshore Revitalisation Project[2]

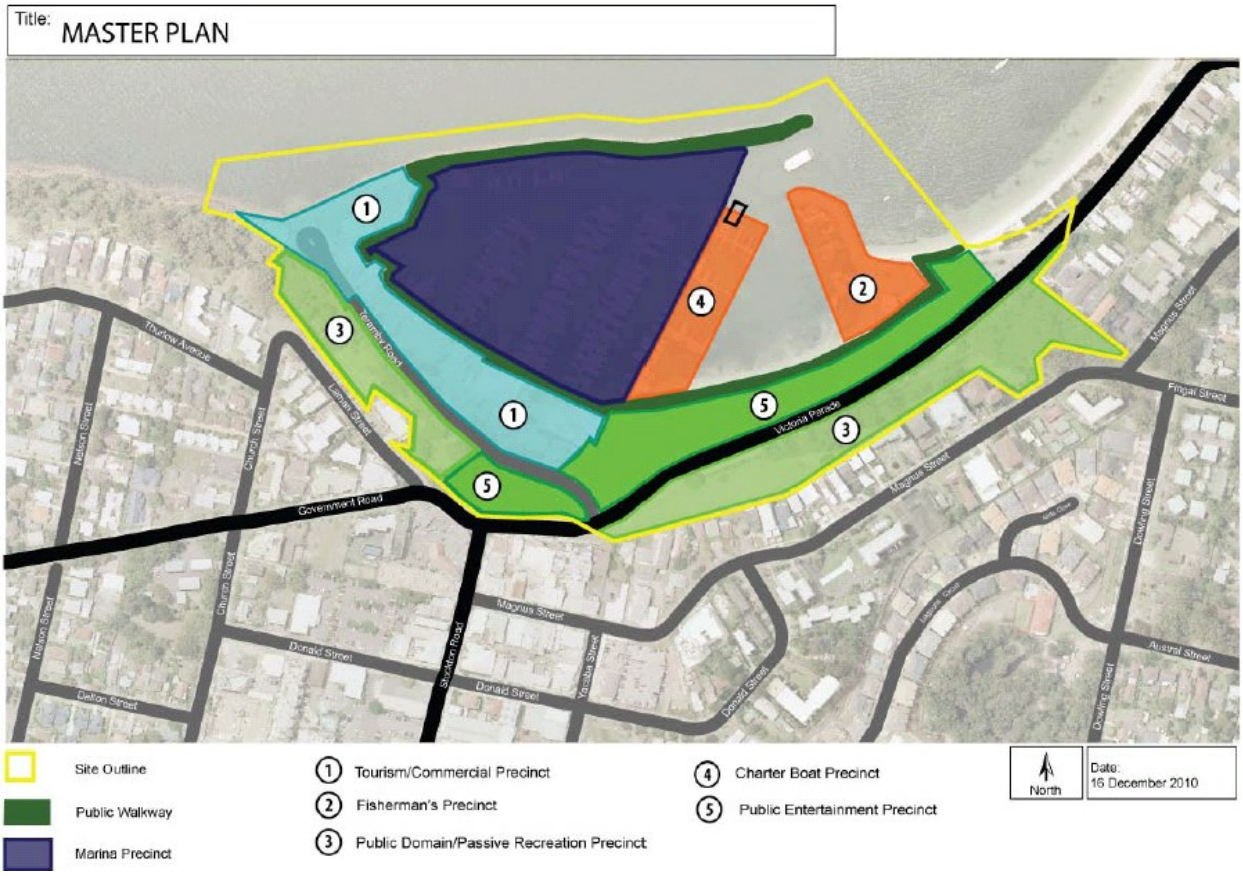
This is a joint initiative between the Land & Property Management Authority (LPMA) and Ardent Leisure, which previously developed a high level draft concept plan for supporting future development within the harbour and foreshore areas. The focus of the plan was to attract investment, support long-term growth in Nelson Bay and help to diversify its economy by adding other business activities to its tourism base. The plan aims to improve access for locals by providing better connection with the town centre and enhancing the experience from visiting the foreshore. The objective of this plan is to provide benefit through offering improvements in the quality of the environment, access and spreading of the level of business activity across the year.

The project was originally intended to be lodged as a Part 3A application and went through some initial community consultation for the formulation of a concept plan. The concept plan development stage identified a number of key issues, including traffic management and parking arrangements during high season and a need for a holistic approach for the future planning of Nelson Bay. The draft concept plan separates the foreshore area into six precincts; a marine, tourism and commercial, fisherman's, public domain and passive recreation, charter boat, and public entertainment precincts, as detailed in Figure 7.

[1] Port Stephens Local Environmental Plan (Port Stephens Council, 2000)

[2] Nelson Bay Boat Harbour and Foreshore Revitalisation Project (Ardent Leisure, 2010)

Figure 7 Foreshore Masterplan (Dec 2010)



Workshops undertaken as part of the planning process indicated car parking could be removed from precinct 3 and incorporated into a new facility in precinct 5 or consolidated in the town centre. Event parking was also highlighted as being required in other locations especially during high season.

Public Exhibition Draft Nelson Bay Foreshore Concept Plan (March 2011)

The draft Concept Plan was exhibited from 9 March 2011 until 19 April 2011 on LPMA's website and at the Nelson Bay Visitor Information Centre. A summary of the responses was formulated by Hampton's Property Services, which identified the following associated with transport and parking:

- Traffic and parking to be one of the biggest infrastructure issues for the area with congestion and parking overload during the peak tourist season;
- The proposal will impact on the town centre road network and parking supply and should aim to provide a holistic/integrated traffic and parking plan for both the foreshore and Nelson Bay town centre in subsequent planning stages of the project;
- Expansion of seasonal uses and hotel facility would put further pressure on existing infrastructure already at capacity during seasonal peaks;
- Access to foreshore area may be improved through the closure of the existing car park and possible

relocating the newly proposed parking facilities from within the hillside of Victoria Parade to Donald Street (expanding existing facilities);

- Locate car parking on the fringe of the town serviced by shuttle bus operations during peak periods; and
- Widening of the foreshore area to include a harbour frontage boardwalk within precinct 3.

The draft concept plan has not finalised during the study evaluation process.

2.3.4 Other Development Proposals

The following development proposals were identified during the study evaluation.

Existing Coles Supermarket Site

This site is situated to the southwest of the intersection of Donald Street with Stockton Street and has recently been purchased by Woolworths Limited, whom are seeking to redevelop the site once the current lease to Coles supermarkets has expired. It is currently unknown if the proposal is aimed at expanding the facility to support future planned residential and employment growth within the town centre, or if it is only seeking to upgrade the current structure and site operations. The proposal will only be confirmed once a development application is received by Council from the proponent.

Hotel and Conference Centre

Stakeholders have indicated that there is a need for a high quality hotel and conference facility in Nelson to help diversify the economy away from reliance on high season tourism. This facility was not identified during discussion to contribute towards an expansion of the existing high season peak, but instead provide a facility that can hold events, attract business and encourage all year round activity in Nelson Bay. The proposal will only be confirmed once a development application is received by Council from the proponent.

2.4 Population

The ‘Port Stephens Tourism Plan 2010 – Diagnostic Report’ indicates that ‘Port Stephens has a population of approximately 65,000, which are situated in 5 geographical areas. The majority of the population is concentrated on the Tomaree Peninsula and in the Raymond Terrace (central corridor area). 37% of the LGA's population (22,389 people at the 2006 Census) resides on the Tomaree Peninsula, with 20.6% residing in the Corlette-Nelson Bay-Shoal Bay-Fingal Bay area’. The Tomaree Peninsula is the main tourist destination in the LGA with tourism focussed on Nelson Bay as a centre for future growth.

2.4.1 Strategic Objectives

The Lower Hunter aims to benefit from its growth opportunities whilst maintaining its environmental and lifestyle values. In order to achieve this goal, it recognises the need to carefully plan where growth is needed, and to identify how it can ensure that environmental, economic and social balanced lifestyle outcomes are obtained now and in the future.

The LHRS identifies that an additional 1200 dwellings will be created in Nelson Bay by 2031, which in broad terms can be estimated to be a 50% increase in the number of dwellings in the Nelson Bay centre and its catchment. The draft Nelson Bay 2030 Strategy indicates that the boundaries of the 'specialised centre' are not defined, however, the urban consolidation principles set within the strategy indicates that the intent is to accommodate growth in and around the Nelson Bay town centre, rather than within the entire Tomaree Peninsula. It also indicates that the growth projections are approximate and the final estimates are subject to change.

2.4.2 Local Government Objectives

The 'Nelson Bay Policy for Future Development of the Town Centre and Foreshore, Port Stephens Council, 2010' (PFDTCF) estimates the population for Nelson Bay as 5,249 in 2006. The Policy identifies that the population of Nelson Bay is expected to grow at an average rate of 1.5% per year from 2006 to 2036 with key incremental years shown in Table 1.

Table 1 Nelson Bay Forecast Population Growth

Year	2006	2011	2021	2026	2031
Total Population	5,249	5,687	6,646	7,115	7,587

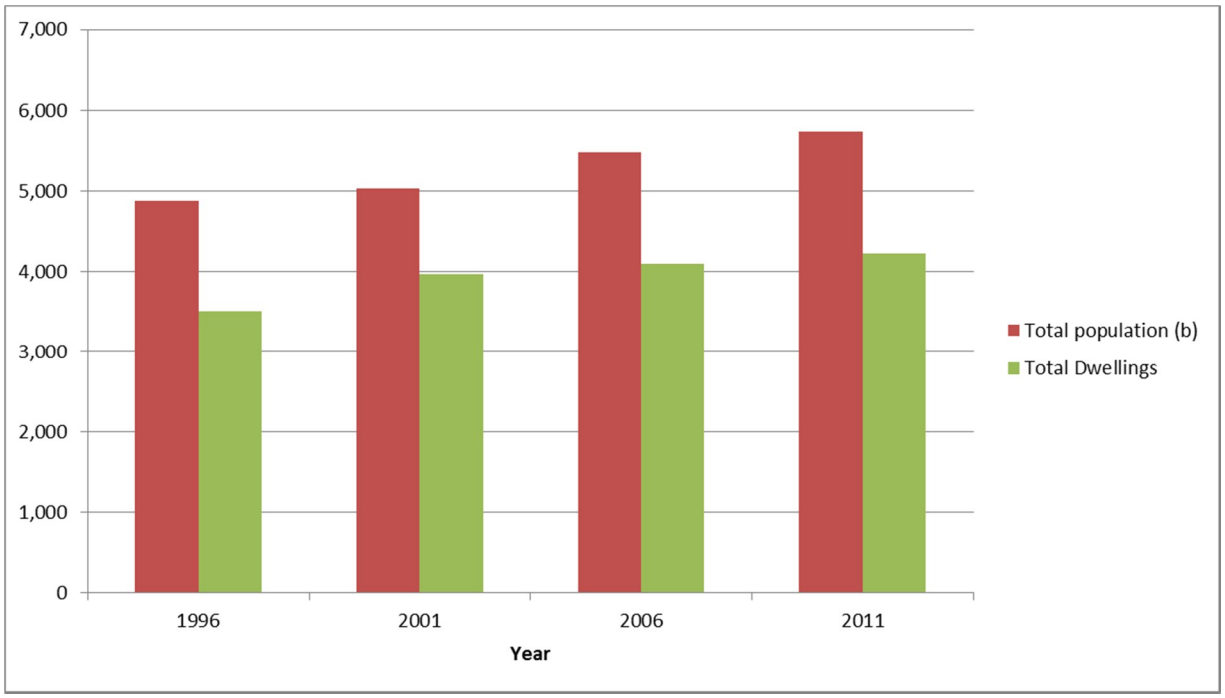
The draft Nelson Bay 2030 Strategy (NBS 2030) indicates that 'Nelson Bay is predicted to have the highest population growth rate of any locality within the Tomaree Peninsula'. The NBS 2030 also states that there is an 'ongoing decline in the average number of people in each dwelling', which together with the population forecast indicates the dwelling forecast provides only a small allowance for increases in tourist accommodation.

2.4.3 Population Forecasts

Additional analysis of the 1996 to 2011 census data for Nelson Bay suburbs highlighted the following and is supported by key data sets presented in Figure 8:

- The population was recorded to have increased by approximately 864 people or approximately 18.0% between 1996 and 2011 (15 year period); and
- The number of dwellings has increased by approximately 730 or approximately 21.0% from approximately 3,500 to 4,230.

Figure 8 Nelson Bay: Historical Population & Dwelling Trends



Source: ABS Census Data 1996 to 2011

Based on a review of the population and dwelling data, it is estimated that there is an average of 1.36 persons per household in Nelson Bay in 2011. This figure is low and may reflect the size of the dwellings or that some dwellings are not occupied during low season periods.

2.5 Employment

This section highlights the regional and local planning objectives for encouraging growth through the promotion of Nelson Bay's specialisation in tourism.

2.5.1 Strategic Objectives

The LHRS indicates that the region has recently enjoyed strong job growth and a reduction in its unemployment rate. The majority of this growth in the region has been identified to be linked to tertiary sectors, such as health, education, financial and personal services, as well as tourism. This trend was identified in the strategy to continue and strengthen. Building upon this expectation for growth, the LHRS identifies that an additional 1500 jobs will be created in Nelson Bay by 2031, which covers the Tomaree Peninsula and in broad terms is highlighted to mean that approximate 50% of the estimated increase in jobs will occur in Nelson Bay.

In reference to the type of the employment that will be created, 'Towards 2020 - NSW Tourism Masterplan[3]' (Masterplan) presents the strategy for improving tourism in NSW and in particular, focuses on urban areas whose economies are reliant on the industry. The 'Masterplan' highlights that 'a successful New South Wales tourism industry will focus on yield, not just numbers of visitors. Yield is

[3] Towards 2020 – New South Wales Tourism Masterplan, Tourism NSW, 2002.

more than total visitor expenditure' and relates to generating sustainable (or all year round) employment opportunities and 'minimising the impact a visitor has on a host community'. The plan encourages tourist based economies to focus on attracting the 'right kinds of businesses', which are 'properly managed' and can 'create prosperity for communities' through protecting and even enhancing the business environment and the community. It encourages centres to target market segments that can 'provide higher economic returns' and to consider the 'social and environmental impact'. In the case of Nelson Bay, this can be achieved through the creation of other market segments that align with the current role of the centre and are attracted by its unique attributes.

2.5.2 Local Government Objectives

According to the information published in the 'Port Stephens Economic Development Strategy Report, Buchan, 2007', (the Economic Development Strategy) there were 2,627 jobs in Nelson Bay in 2001. This equates to 14.8% of all jobs in the Port Stephens LGA. The data presented in this strategy highlights that the services industry is the primary employer in Nelson Bay, providing 65% of employment, with the tourism related accommodation, hospitality and restaurant sectors accounting for nearly a third of these jobs. The majority of the remaining jobs are made up of the goods production industry and business and knowledge based services.

The draft Nelson Bay 2030 Strategy (NBS 2030) indicates that the town centre catchment is made up of around '5,400 jobs and serves a population of 19,300' with a '53% self-sufficiency' rating. Some 2,974 of these jobs or 55% of jobs in the Tomaree Peninsula are identified to be situated in Nelson Bay, with an additional 1,002 jobs (or 18%) in Anna Bay, 1,015 jobs (or 19%) in Corlette, and 432 jobs (8%) in Fingal Bay/Shoal Bay. Growth predictions have been estimated to maintain the self-sufficiency 'rate to 2021'.

A major component of the planned growth is the provision of office and retail space and opportunities within Nelson Bay town centre with the NBS 2030 predicting the provision of the following by 2031:

- Office Space: 8,500m^2, which is estimated to amount to 450 jobs;
- Retail Space: 8,500m^2, which is estimated to amount to 240 jobs and includes food service jobs in retail sector;
- Additional accommodation and food service facilities, which is estimated to amount to 200 jobs; and
- A new high quality hotel and conference centre, which is identified to be critical to establishing a more sustainable/ all year round event industry and improving the economic performance of the town centre.

The Port Stephens Commercial and Industrial Lands Study projected the additional floor space for Nelson Bay town centre by 2016, which is presented in Table 2.

Table 2 Nelson Bay Commercial Floorspace Forecast

Design Year	2006	2011	2016
Floorspace (m2)	53,000	58,129 (+5,129)	67,393 (+14,393)

Source: Port Stephens Commercial and Industrial Lands Study, June 2010, Port Stephens Council.

The information presented implies that 30% of new retail/ commercial floorspace are scheduled to be delivered by 2011 and that over 80% of planned new retail and commercial development will implemented by 2016.

The overall strategy for improving the Nelson Bay economy is not necessarily aimed at increasing the peak tourism capacity of the area, but instead focused on improving the quality of business related facilities and supporting an event related business market. This is identified to have the potential to create an additional 900 jobs (or 60% of jobs projected by 2031 in the LHRS) in Nelson Bay town centre. The key focus of job creation is to strengthen the economic base of Nelson Bay and encourage business and event related activity outside of the tourism seasonal peaks. On this basis, the majority of forecast job growth may not have a significant impact on the current seasonal peaks. Instead these jobs may be associated with supporting the planned increase in the frequency of events in the shoulder peaks or low season periods, which may not necessarily result in a requirement for additional capacity or future growth.

2.5.3 Employment Forecast

Employment data for the Nelson Bay Town Centre has been collated from information provided in 'TDC Employment Forecasts – October 2009 Release, Bureau of Transport Statistics (BTS)' and is provided in Table 3.

Table 3 Nelson Bay Forecast Employment Growth

Area	2006	2011	2016	2021	2026	2031	2036
Nelson Bay West	400	416	435	465	481	497	516
Nelson Bay and Fly Point	1,832	1,956	2,091	2,254	2,334	2,413	2,510
Total	2,233	2,372	2,526	2,720	2,815	2,910	3,026

Source: TDC Employment Forecasts – October 2009 Release, Bureau of Transport Statistics (BTS)

The data indicates that a total of 2,372 people were included as part of employment forecast for Nelson Bay in 2011 and 2,233 jobs in 2006. This is expected to grow to 3,026 people by 2036 or by approximately 650 new jobs (or approximately 800 additional jobs after 2006) in the town centre area (including Fly Point) from the 2011 base. This employment forecast represents over 80% of the estimated increase in total people employed within the Nelson Bay town centre. These estimates are consistent with those predicted in the LHRS and draft Nelson Bay 2030 Strategy and also highlight that the majority of new employment is currently linked to normal weekday job creation, which may not necessarily result in growth in current seasonal peaks. As an outcome, planned growth may not require increases in network capacity, which is typically associated seasonal traffic demand.

2.6 Network Demand

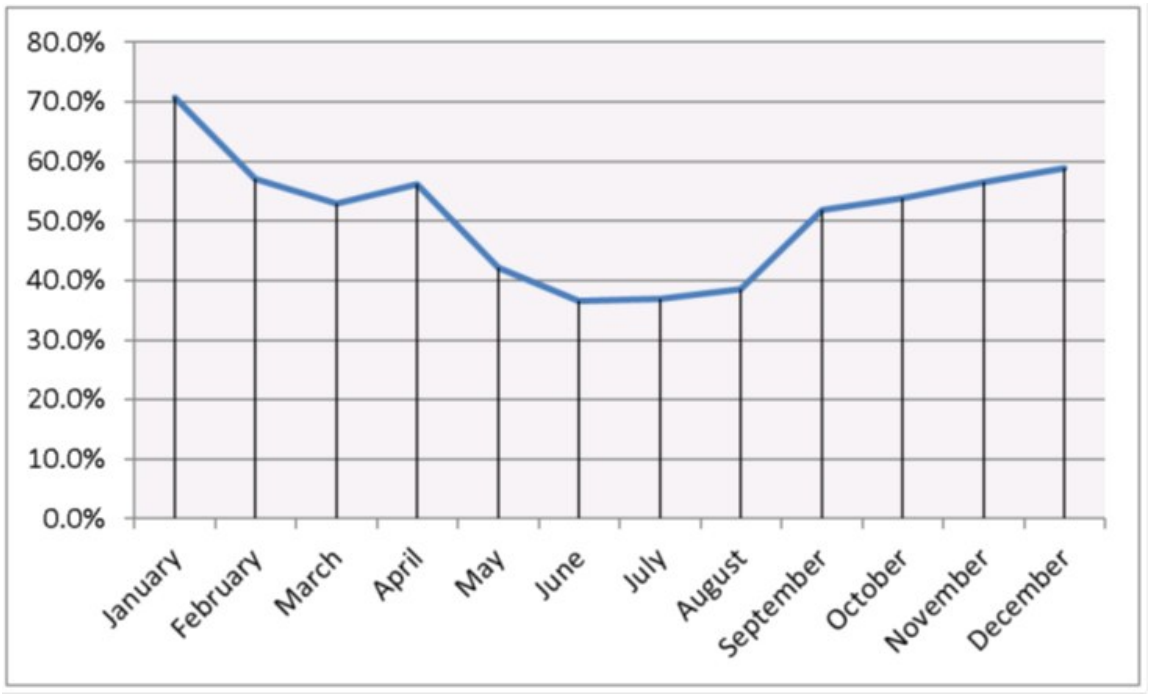
Typically the network design of towns and urban settlements is influenced by the market it serves and its related demand profile. Nelson Bay is an urban centre that is heavily reliant on the tourism industry, and as a result, seasonal traffic patterns and associated land use expansion and change will influence how the network is required to perform. Historical traffic can be used to understand how traffic behaves and help to identify how and where traffic demand has grown.

2.6.1 Seasonal Traffic Demand

This study is identified to be limited by a lack of seasonal or historical traffic data, which would typically be used to understand growth, seasonal traffic and performance of the network. Discussions with Council and other stakeholders indicated that traffic volumes are subject to significant seasonal influences, which reach a peak in late December/early January, at Easter, and when events occur during other school holiday periods. The key road corridors identified to accommodate seasonal traffic growth are identified to be Nelson Bay Road, Church Street, Government Road and Victoria Parade.

Season trends are displayed in the Port Stephens Tourist Plan 2010[6] and indicates that over 40% of property in Nelson Bay and Shoal Bay during the 2006 census (August) was not occupied. The seasonal demand profile for Nelson Bay can be better understood through reviewing the historical annual seasonal occupancy rates, which are presented in Figure 9.

Figure 9 Average Monthly Occupancy Rates (2008)



Source – Port Stephens Tourist Plan 2010

The graph indicates that the provision of physical infrastructure associated with high season peak demand may only be required in January, when on average occupancy rates are at 70%. Further

[6] Port Stephens Tourism Plan 2010 – Diagnostic Report, by Jenny Rand & Associates/ Dain Simpson Associates for Industry & Investment NSW, Ports Stephens Council and Port Stephens Tourism Limited.,

observation of the above occupancy trend indicates that seven of the twelve months generate a tourist occupancy rate ranging between 50% and 60%, and includes February to April and September to November. This peak appears to represent the peak shoulder period or a more common peak trend than that presented for January. Based on these trends the month of February, April, November and December display high average occupancy rates and as a result would provide a good representation of traffic condition during the shoulder peak period.

Other information that references seasonal traffic is the 'Port Stephens Tourist Plan 2030', which indicates that parking and access are major issues for the peak season, and when major events are held in Nelson Bay. It indicates that demand exceeds supply during these periods and recommends that a traffic management plan should be adopted to help prioritise movement and address access and parking needs for local businesses and residents. This study has undertaken a survey during a major event period in November in order to obtain a better understanding of the major event demand profile and its impact on network performance and parking.

2.6.2 Peak Demand

The 'Tastes at the Bay' festival has been chosen to develop an understanding of demand levels and infrastructure needs associated with peak shoulder seasonal months combined with an organised major event on a weekend. The event itself occurs in November and would typically attract a high proportion of day visitors rather than tourists. Tourists typically stay overnight or longer, and as a result, are considered to have a lower impact on the capacity of the transport network.

Based on the above, the 'Tastes at the Bay' festival will provide a good understanding of the capacity limitations of the current network and the location of over and underutilised infrastructure.

In reference to future growth it is acknowledged that the focus of planning is to encourage more events and people to stay for longer periods rather than additional demand from tourists that visit for the day and place significant pressure on the transport network. It is also acknowledged that the planned growth in population and jobs is expected to be taken up by residents that permanently reside in Nelson Bay. As a result, traffic growth generated from new development is likely to be low.

The 'Tastes at the Bay' is acknowledged to be a unique event, which attracts higher than normal traffic demand along the regional and town centre network. This demand is understood to be in excess of that generated during the normal commuter peak periods and like most organised events its timing is unlikely to impact on the commuter peak period.

On this basis, the 'Tastes at the Bay' will provide a good network capacity profile for the design of both current and future network improvements. Future estimates indicate that future growth is unlikely to be high and as a conservative estimate may increase at a rate of 1.5% per annum (based on employment and residential forecast) or could result in a 30% increase in traffic over a 20 year period. If the peak traffic profile for the 'Tastes at the Bay' is over and above a 30% increase in normal commuter traffic, then it can be assumed that designing for the 'Tastes at the Bay' event is sufficient for accommodating normal peak commuter traffic now and in the future. It is also acknowledged the planned economic growth profile for Nelson Bay is not aimed at increasing the quantum of demand on a peak event day, but instead it aims to encourage the same size of event on a more frequent basis. The basis for

modelling future growth will be assessed and confirmed as part of the review of daily and peak hour traffic volumes in section 6.2 of this report.

2.7 Travel Characteristics

The travel characteristics of people who reside in Nelson Bay have been assessed based on information available from the Bureau of Transport Statistics and Australian national census data.

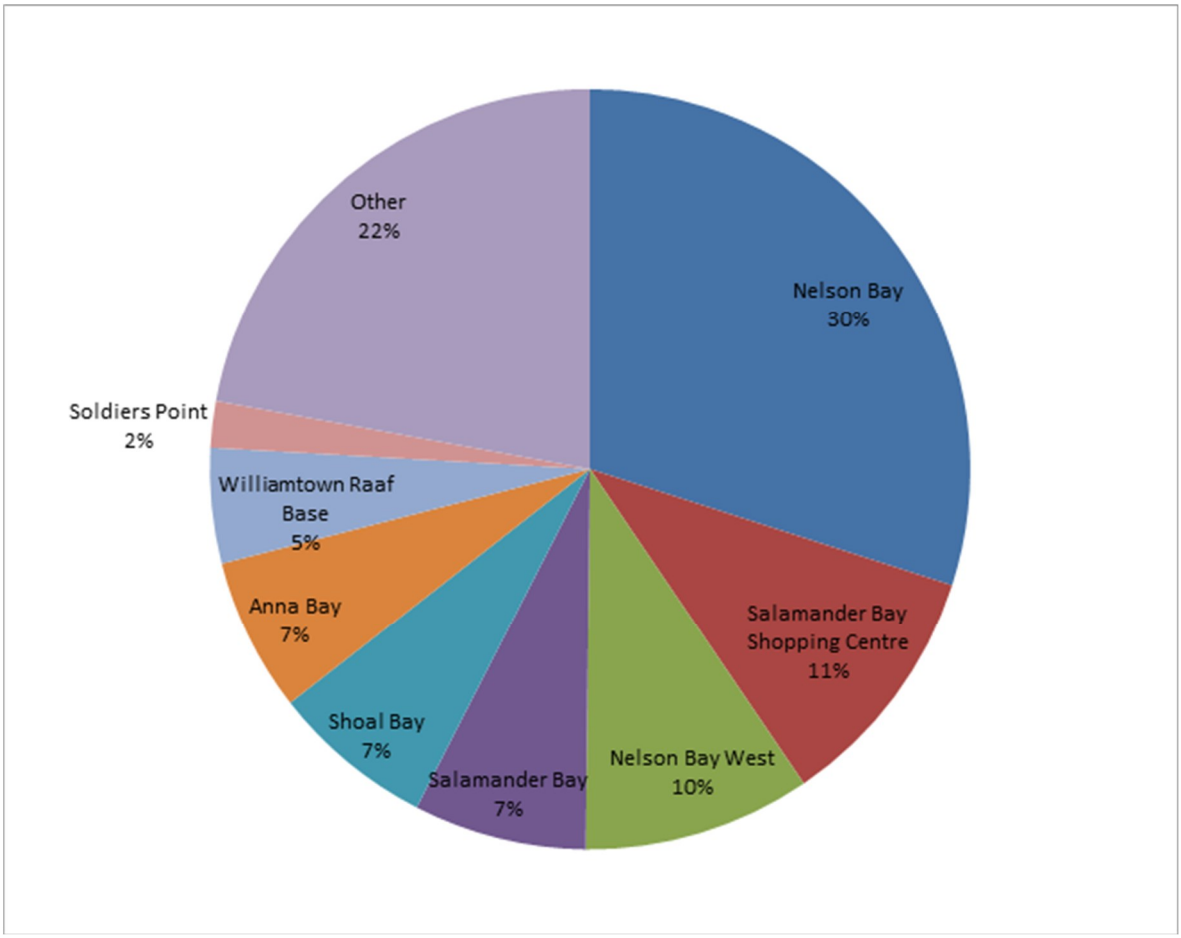
2.7.1 Travel Patterns

Figure 10 provides a summary of the place of work for residents of Nelson Bay. This data indicates that around 40% of the population in Nelson Bay live and work in the suburb of Nelson Bay. These findings highlight that with balanced growth in residents and employment there is potential for a proportion of Nelson Bay residents to choose not travel to work by private vehicle, and instead select an alternative travel mode.

Other notable journey to work trends from Nelson Bay include trips to Corlette or Salamander Bay Shopping Centre (11%), Salamander Bay (7%), Shoal Bay (7% identified as Zenith Beach in the survey information) and Anna Bay (7% identified as Little Kingsley Beach and includes Fishermans Bay, Boat Harbour and Taylors Beach). The majority of these locations are within a 5km radius of Nelson Bay or in the case of Anna Bay within 10km, and are served by existing bus route services. It is also acknowledged that public transport is an option, however there is significant convenience and journey travel time advantages from travel by private vehicle in comparison to public transport.

The trip containment potential presented in is a snapshot of the total working population in the low season (August) on a particular working day. It is noted from the objectives of both the LHRS and the draft Nelson Bay 2030 Strategy is to encourage more people to access Nelson Bay by walking or cycling and as a result minimise the impact on parking or road upgrades. This data set indicates that there is potential to manage growth through creating jobs and encouraging population growth within Nelson Bay, which will reduce the overall need to supply additional and excessive infrastructure.

Figure 10 Employment Destinations for Nelson Bay Residents

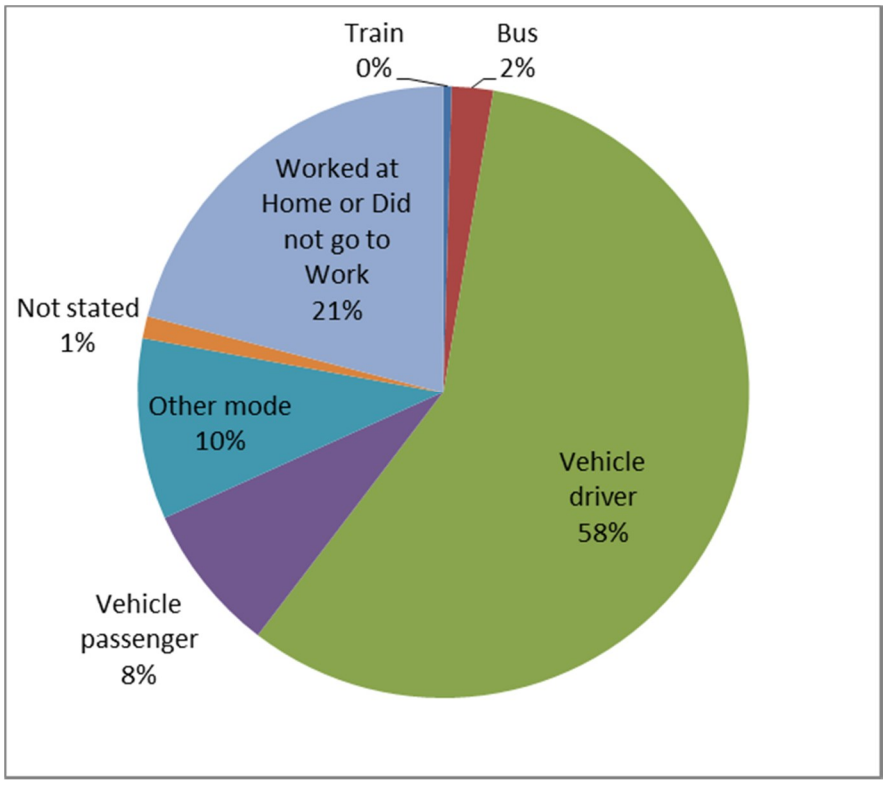


Source: Journey to Work (JTW - travel zones 3504 and 3511), TDC 2006

2.7.2 Mode Choice

Figure 11 provides a summary of the Journey-to-Work (JTW) travel modes for people residing in Nelson Bay. The data indicates that approximately 65% of people who live in Nelson Bay prefer to travel to work using a private vehicle. It is also noted that JTW by public transport represents only 2% of total travel and 10% of travel was stated as 'other mode', which captures walking and cycling. Further evaluation of the 'worked at home or did not go to work' data set indicated that the response range may be influenced by seasonal and part time workers who are not employed due to survey being undertaken in the low season.

Figure 11 Nelson Bay Journey-to-Work Travel Mode

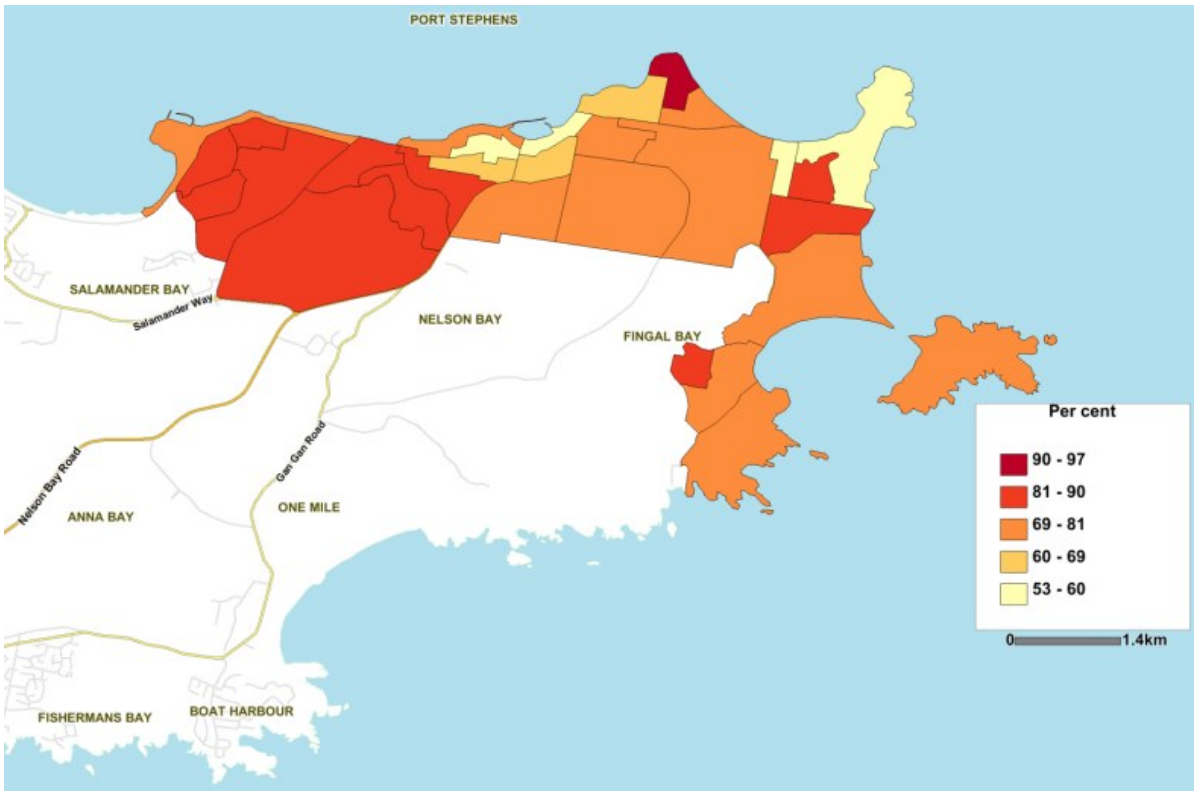


Source: Journey to Work (JTW – travel zones 3504 and 3511), TDC 2006

Figure 12 provides a 2006 area snapshot of the journey to work by car profile for Nelson Bay residents. The information confirms that there is a higher car mode share for journeys to work for most Nelson Bay residents. It is noted that areas identified to be within close proximity to Nelson Bay town centre and the foreshore exhibit a lower private vehicle mode share profile (69% or less).

The relatively high proportion of workers that make trips by car highlights the challenge to promote travel by alternative mode choices and the need to support growth through sustainable forms of travel.

Figure 12 Car Mode Shares for Journey to Work Trips



Source: Australian Bureau of Statistics, 2007

2.8 Previous Studies

Traffic and Parking Strategy for Nelson Bay Business and Foreshore Precinct (1997)

The Port Stephens Council 'Traffic and Parking Strategy for Nelson Bay Business and Foreshore Precinct' presented the following:

- That the historical access routes to the town centre and foreshore area was Stockton Street and that this was previously downgraded to promote Church Street - Government Road – Victoria Parade for accessing the Foreshore and as a through route;
- Dowling Street (defined as a residential bypass) was introduced to support the further development of the area and to offer an alternative route to Fingal Bay and Shoal Bay;
- The network performance was generally reported to be satisfactory with certain intersection such as Donald Street with Church Street impacted by peak season traffic;
- Significant traffic growth was predicted to occur both during the peak and off peak periods under a business as usual scenario and it is currently unknown if these growth predictions may not have been realised; and
- To accommodate future growth it was recommended to expand both Donald Street east and west car

parks and on-street parking capacity improvements through changes to angle parking.

Stage 1 Nelson Bay CBD & Foreshore Parking Strategy – draft Options Paper (2002)

The Port Stephens Council 'Stage 1 Nelson Bay CBD & Foreshore Parking Strategy – draft Options Paper' presented the following:

- On-street parking along Victoria Parade and the lack of parking creates additional traffic and delays to through movement and traffic flow;
- A need to eliminate long stay coach parking along the foreshore and identify a more suitable area for accommodating this need; and
- A need to encourage parking turnover through the introduction of time restrictions, increases in enforcement and paid parking to capitalise its strategic importance.

Angled parking, time restrictions and parking fees have been implemented along the foreshore area and used to manage parking on a day to day basis.

2.9 Summary

Table 4 provides an understanding of the connection between regional (Lower Hunter Regional Strategy) and local (Draft Nelson Bay 2030 Strategy (NBS 2030)) strategies.

Table 4 Alignment of Regional and Local Objectives

Lower Hunter Regional Strategy (2006)	Relevant Regional Objectives	NBS2030 - Strategic Planning Principles	Local Transport Objectives
Protect and promotion of centres	Maintain character of existing centres and protects Port Stephens foreshore	Create a sense of place and focal points Connect the town centre and waterfront	Support public transport Encourage walking and cycling
Plan for Growth	Allow for higher density and planned growth in centres	Provide for Economic Stimulus	Better manage access to the town centre and planned growth
Improve Access	Promotes sustainable transport and healthier communities	Improve access links, network efficiency and traffic circulation	Improve network efficiency and circulation

Lower Hunter Regional Strategy (2006)	Relevant Regional Objectives	NBS2030 - Strategic Planning Principles	Local Transport Objectives
Better infrastructure	Cycleway development for Port Stephens	Improve pedestrian amenity	Remove network deficiencies
	Supports more efficient use of infrastructure	Funding public infrastructure	Optimise parking

The strategy objectives indicate the improvement plan should focus on the removal of current network deficiencies, optimising network operations and supporting growth in Nelson Bay through better managing peak traffic demand. The key findings from reviewing the local and regional context will be used to inform the transport and parking plan for Nelson Bay and includes:

- Planning of transport in Nelson Bay town centre should be driven by sustainable levels of growth;
- Planning for the high season peak is not sustainable and the shoulder peak tourism periods represent a more continuous peak profile for the planning of the network;
- Intensification of land use in Nelson Bay town centre is likely to be concentrated along Stockton Street, Donald Street and Yacaaba Street and the foreshore area;
- The revitalisation of the town centre is focused on developing quality land uses that would support all year round business activity and events and through encouraging more permanent residents to reside in proximity of the town centre;
- Growth does not necessarily mean an increase in high season demand but is more likely result in an increase in all year round activity and the number of major events that occur outside of high season;
- High season activity impacts on the town centre and needs to be better managed;
- Parking from the foreshore maybe relocated to the edge of the town centre in the future;
- A typical shoulder peak seasonal day without a major event can easily be accommodated by Nelson Bay's current road and parking infrastructure;
- It would be beneficial if the current network is designed to efficiently manage access and circulation for a major event during the peak shoulder season, which is expected to be a desirable network design peak; and
- Access by public transport, walking an cycling and its connection to parking is critical in the planning of access, protecting areas of high activity and improving connectivity between the foreshore and town centre.

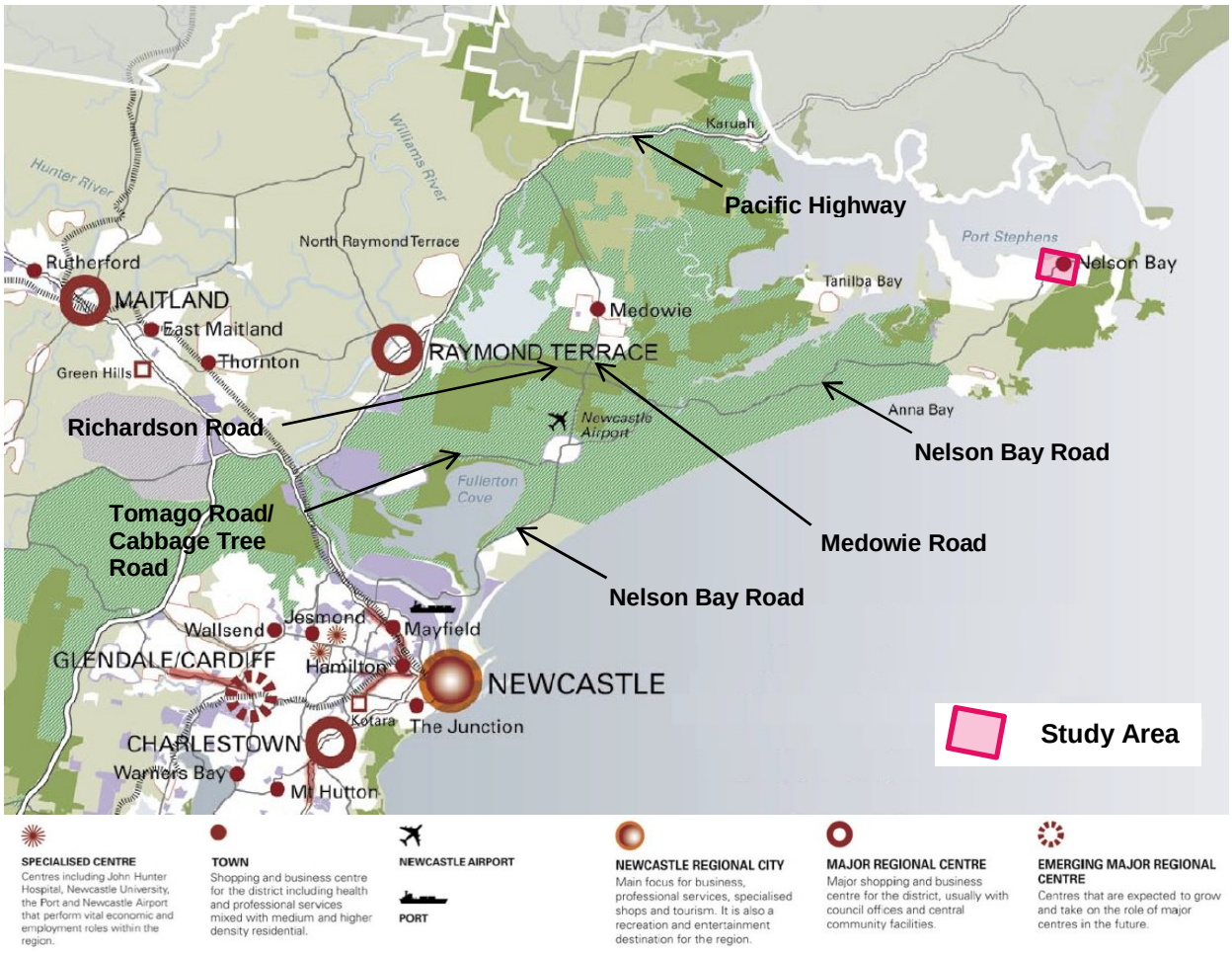
3. Transport Infrastructure and Services

This section reviews the existing traffic, road, public transport, parking, pedestrian and cycling conditions within Nelson Bay. The analysis and evaluation of current transport performance will assist in understanding the current and likely future challenges of the road network and parking supply of Nelson Bay.

3.1 Regional Linkages

The key regional road connections servicing Nelson Bay are shown in Figure 13 and summarised below.

Figure 13 Regional Road Links



Source: Lower Hunter Regional Strategy, 2006

A summary of the key regional road routes that serve Nelson Bay area as follows:

Pacific Highway

Pacific Highway is classified as State Highway No. 10 and functions as a main arterial road linking Sydney and Brisbane. It provides the main access route to and from Nelson Bay for visitors from outside of the Lower Hunter region. The Pacific Highway in the vicinity of Richardson Road carried an annual average daily traffic (AADT) of more than 23,000 vehicles in 2004.

Richardson Road

Richardson Road is classified as Main Road 104 and functions as a regional main road linking the Pacific Highway with Nelson Bay Road and other destinations to the west, including Raymond Terrace and Williamtown. Traffic information for 2004 indicates that in the vicinity of the Pacific Highway, Richardson Road had an AADT of approximately 14,000 vehicles.

Tomago Road/Cabbage Tree Road

Tomago Road/Cabbage Tree Road is classified as Main Road 302 and functions as a regional main road link for traffic wanting to access Nelson Bay from the Pacific Highway. Traffic information for 2004 indicates that in the vicinity of Williamtown, Cabbage Tree Road had an AADT of approximately 5,600 vehicles.

Nelson Bay Road

Nelson Bay Road is classified as Main Road 108 and functions as the only main route to the Tomaree peninsula, which includes Nelson Bay. Traffic information for 2004 indicates that the average daily traffic on Nelson Bay Road, in the vicinity of Salamander Bay was approximately 13,100 vehicles.

The local road network and connectivity to other local centres are described in section 3.2, which includes access routes to Salamander Bay and Colette to the west, and Fingal Bay and Shoal Bay to the east.

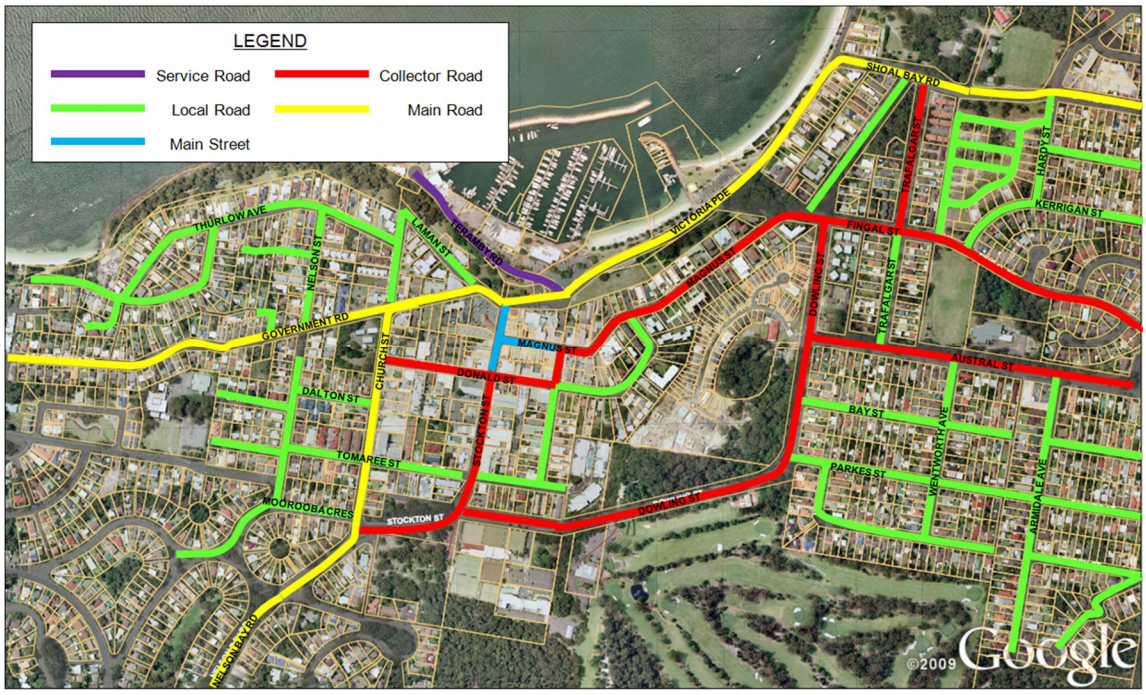
3.2 Town Centre Street Network

Figure 14 to Figure 16 provides an understanding of the existing road network characteristics in Nelson Bay town centre.

The street network in Nelson Bay town centre is a regular grid pattern, which is identified to have some missing connections to the higher order road network. This includes the current lack of connectivity between Yacaaba Street and Victoria Parade-Government Road or Dowling Street.

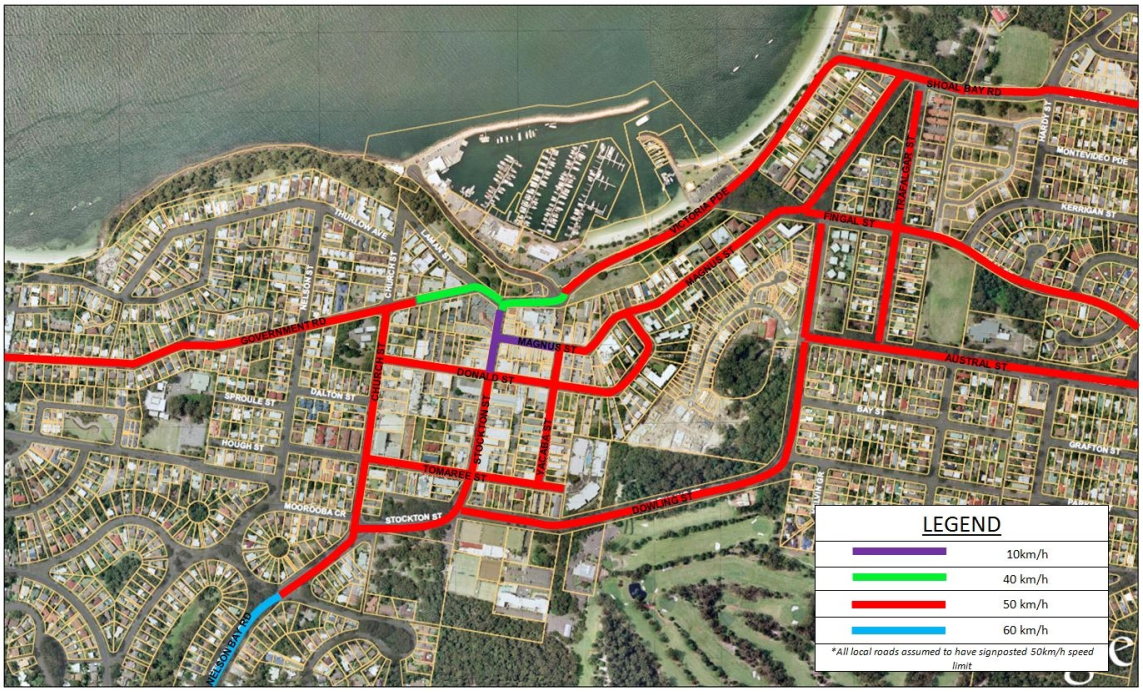
Nelson Bay Road, Church Street and Victoria Parade currently serve as the key traffic routes for through traffic and traffic travelling to the foreshore. Government Road west offers an alternative route for traffic travelling to destinations situated to the west, such as Colette and Salamander Bay. Key access routes to the town centre include Stockton Street (southern gateway) and Donald Street (western gateway), which serve as the main streets in the commercial core of the town centre. Other key access links in the town centre street network include Yacaaba Street and Magnus Street (eastern gateway).

Figure 14 Town Centre Road Hierarchy Plan



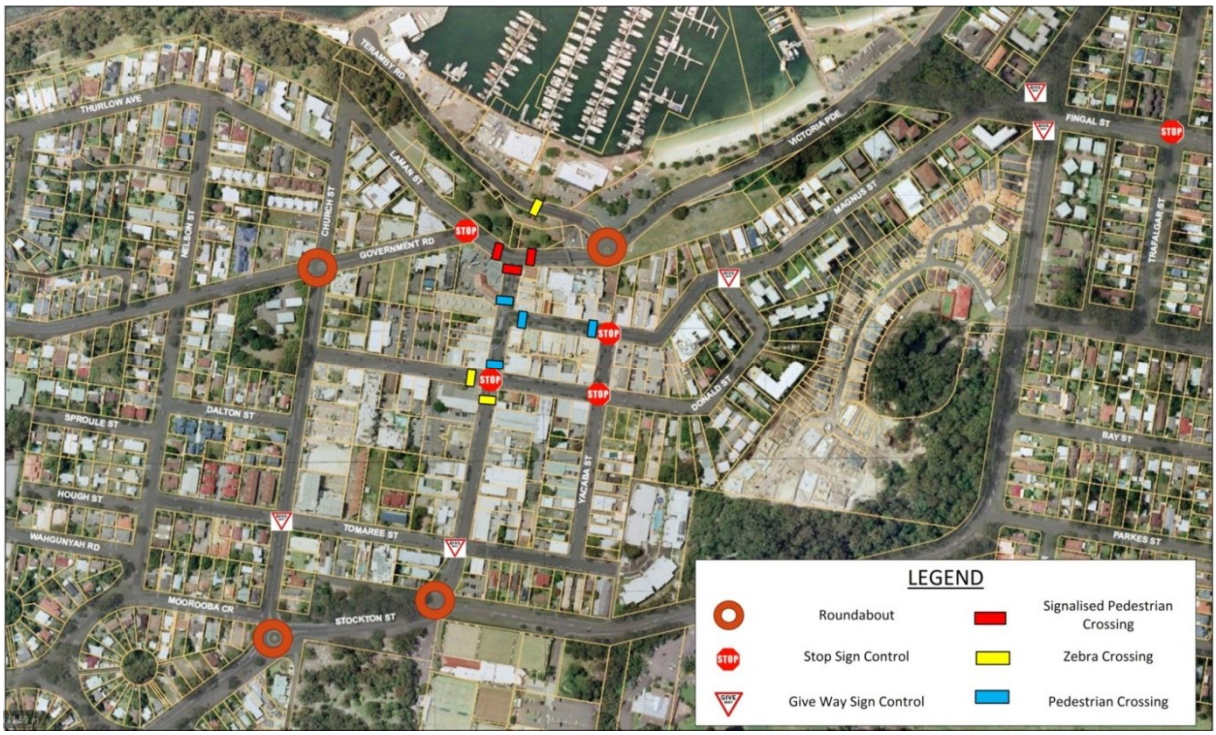
Source: Port Stephens Council Digital Data, 2011

Figure 15 Town Centre Speed Zone Plan



Source: Port Stephens Council Digital Data, 2011

Figure 16 Town Centre Intersection Control Plan



Source: Port Stephens Council Digital Data, 2011

Key observations from the review of traffic conditions in the town centre indicate that:

- On a day to day basis the local transport network operates satisfactorily;
- Speed within the town centre is controlled by low signposted speed limits, traffic management treatments and streetscape design in areas of high activity;
- The town centre has numerous pedestrian treatments that supports the function of Stockton Street north, Donald Street and Magnus Street west;
- Key intersections situated around the boundary of the town centre are controlled by roundabouts;
- The intersection of Donald Street and Church Street has no visible traffic control; and
- The residential bypass route along Dowling Street is complex and diverts to Trafalgar Street to access Shoal Bay Road.

A summary of key roads in Nelson Bay town centre are as follows:

3.2.1 Stockton Street

Stockton Street serves as a local main road and acts as the southern gateway to the Nelson Bay town centre. It is a two-way road with two traffic lanes for the majority of its length with a section between Government Road and Donald Street operating as a one lane one-way link for southbound traffic. The one-way section of the road travels through the heart of the town centre and provides access through the

westbound traffic lane of Victoria Parade. The road section situated between Government Road and Dowling Street provides parallel kerbside parking on both sides of the road, which is signposted with short-term parking restrictions. Most intersections are controlled under stop or give way conditions, and between Tomaree and Donald Street the road section has numerous access points to a mix of different uses, including medium density residential, a service station and an access from Coles car park.

Figure 17 Stockton Street Facing North From Tomaree Street

Figure 18 Stockton Street Facing North From Donald Street

3.2.2 Victoria Parade

Victoria Parade serves as a local main road and acts as both a bypass and the eastern gateway to the Nelson Bay town centre and the foreshore area. The road itself provides access to the Nelson Bay foreshore, Shoal Bay Road to the east, and Colette and Salamander Bay via Government Road to the west. The road configuration has one lane in each direction and fronts town centre and foreshore uses. Along its eastern section it accommodates time restricted parallel and angled kerbside parking. Access to this route is restricted due to the topography and the surrounding land use.

3.2.3 Government Road

Government Road serves as a local main road and acts as both a bypass and the western gateway to the Nelson Bay town centre and the foreshore area. The road itself provides access to both Nelson Bay town centre and foreshore area via Victoria Parade to the east, and Colette and Salamander Bay to the west. The road configuration has one lane in each direction and fronts residential, town centre and foreshore uses. Along its eastern section it accommodates a limited number of time restricted parallel kerbside parking spaces and offers access to surrounding local roads via priority controlled intersections.

Figure 19 Government Road Facing East From Stockton Street

3.2.4 Dowling Street

Dowling Street serves as a collector road and a defacto bypass around Nelson Bay town centre. The route also serves as a connection to Stockton Street and Nelson Bay Road to the west, and residential areas in Nelson Bay east and Shoal Bay Road to the west. The road configuration has one lane in each direction, with a limited number of road connections and access points from fronting properties and solid double continuous centre lines. Most intersections are controlled by line marking and giveway and stop signs, and the road has limited provision for kerbside parking. Fronting property includes the bowling club

and golf club to the west and residential properties in the east.

Figure 20 Dowling Street Facing East From Stockton Street

3.2.5 Magnus Street

Magnus Street links the town centre with local areas to the east and acts as a secondary eastern gateway to the town centre at Yacaaba Street. It also acts as a key bus corridor for services travelling to and from Fly Point, Shoal Bay and Fingal Bay. The western end of Magnus (between Stockton Street and Yacaaba Street) provides access to the heart of Nelson Bay town centre and has a signposted 10km/h speed limit. The streetscape and operation complements its 'Main Street' characteristics and feel and is supported by a one-way westbound direction restriction and parallel time restricted kerbside parking on both sides of the road. To the east of Yacaaba Street the road operates as a two-way road serving tourist accommodation and residential land uses. The road travels along some steep grades and navigates a number of tight bends that restrict visibility to oncoming traffic and other road users.

Figure 21 Magnus St Facing East from Donald St East Car Park

Figure 22 Magnus Street Facing East from the Stockton Street

3.2.6 Donald Street

Donald Street is a key town centre east west route, which supports the two main town centre car parks, Coles car park and operates as the key bus corridor through the town centre. The road link acts as the

gateway to the town centre in the west and serves retail outlets, commercial businesses and the town centre bus interchange and taxi rank. The road has one traffic lane in each direction and provides time restricted parallel kerbside parking between Stockton and Yacaaba Streets. Between Stockton Street and Church Street the road section has numerous access points to small and large scale off-street car parking areas.

Figure 23 Donald Street Facing West from Yacaaba Street

3.2.7 Yacaaba Street

Yacaaba Street offers an alternative north south town centre route running parallel with Stockton Street. It fronts the edge of town retail and commercial businesses along with some mixed use residential and vacant lots. Activity is concentrated at its northern end where it provides connection to Donald and Magnus Street and access to the eastern Donald Street car park. At its southern end it connects with Tomaree Street and serves both commercial, professional services and low to medium density residential uses. Yacaaba Street has one lane in each direction and provides time restricted parallel kerbside parking.

Figure 24 Yacaaba Street Facing South from Magnus Street

3.3 Parking

Both on-street and off-street parking provision is provided in Nelson Bay. On-street parking facilities in the Nelson Bay Town Centre are characterised by time-restricted parallel parking kerbside spaces located along Donald Street, Stockton Street, Tomaree Street, Magnus Street, and Yacaaba Street. In addition, there are time-restricted spaces located along Victoria Parade in the Nelson Bay foreshore area.

Figure 25 Kerbside Parking Stockton Street

Outside of the town centre and foreshore area most residential streets situated within walking distance of the town centre are unrestricted and available for all day parking.

Off-street parking facilities in the Nelson Bay Town Centre comprise of a multi-storey car park and an at-grade car park both located on Donald Street. In addition, two at-grade car parks are situated along the foreshore area.

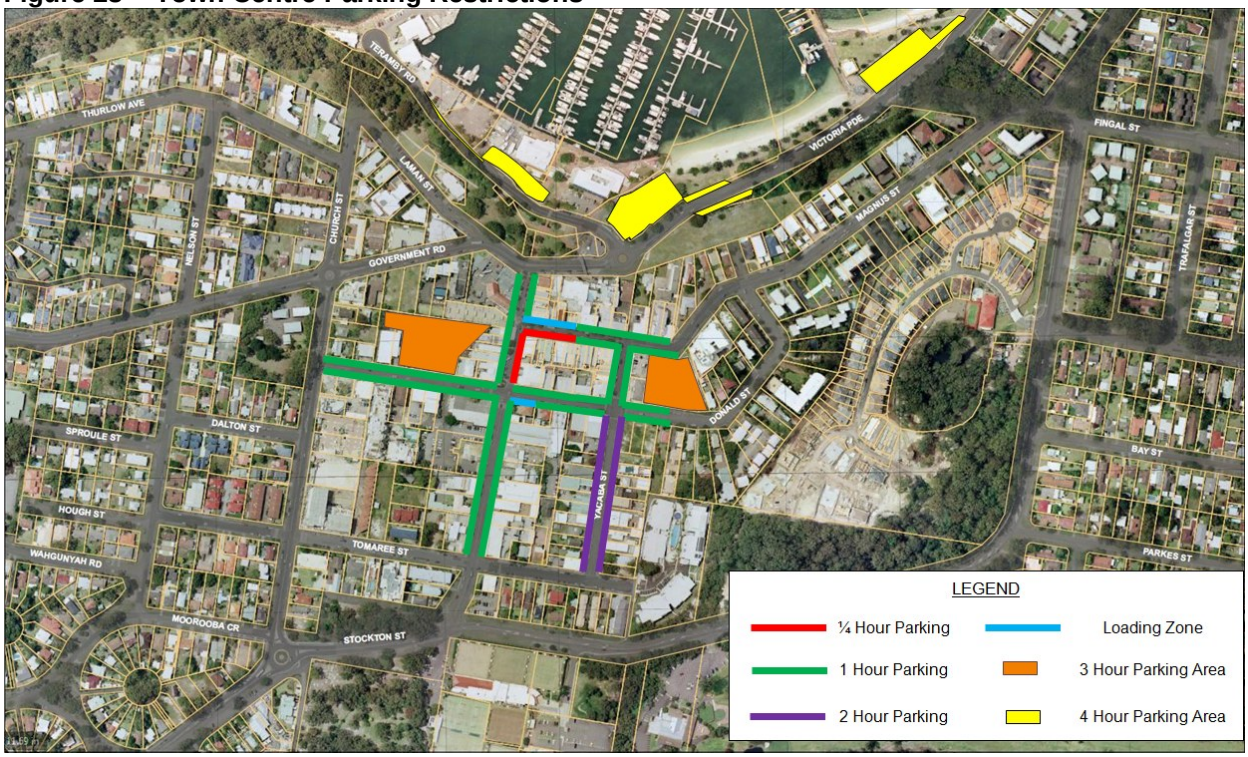
Figure 26 Donald Street East Car Park

Figure 27 Donald Street West Car Park

3.3.1 Parking Restrictions

Figure 28 shows the town centre and foreshore parking provision, along with the parking restrictions for parking in each location. This plan indicates that the majority of on-street parking provided in the Town Centre is restricted to one hour, with some 2 hour parking in Yacaaba Street and fifteen minute parking and loading zones for short sections of Magnus Street, Donald Street and Stockton Street. The off-street parking facilities offer a time limit restriction of three hours. In the foreshore area, both on-street and off-street parking is controlled through 'pay and display' paid parking facilities and a four-hour time restriction limit.

Figure 28 Town Centre Parking Restrictions



Source: Port Stephens Council Digital Data, 2011

3.3.2 Parking Supply

The 'Stage 1 Nelson Bay CBD and Foreshore Parking Strategy - draft Options Paper' completed by Port Stephens Council in 2002 indicated that in general there is 1090 off-street parking spaces within Nelson Bay Town centre and foreshore area with approximately 340 of this situated along the foreshore. These parking supply estimates apply to the town centre only, and were reviewed as part of the GHD parking surveys undertaken during the 'Tastes at the Bay' festival, and are shown in Table 5 and Table 6.

Table 5 Town Centre On-street Parking Supply

Street Name	Parking Capacity
Magnus Street	26
Donald Street	44
Stockton Street	55
Yacaaba Street	49

Table 6 Town Centre Off-Street Parking Supply

Car Park Name	Parking Capacity
Donald Street West (Open Car Park)	92
Donald Street East (Multi-Storey Car Park)	174
Donald Street Vacant Lot	30

The information presented above indicates that approximately 300 off-street parking spaces in the town centre are managed and controlled by Council and the remaining 800 are assumed to be managed by private landowners in the town centre or situated along the foreshore area. Significant private off-street parking areas situated within the town centre and available to the general public include Coles, cinema and the bowling club.

Figure 29 Access to Coles Car Park from Donald Street

3.3.3 Parking Management

Current car parking management in Nelson Bay can be generally characterised by the following:

- Practically all kerb spaces in the town centre accommodate car parking, except for Church Street and limited stretches on Donald Street, Government Road and eastern sections of Magnus Street and those spaces designated as bus zones;
- There are currently time restrictions in place for most parking spaces (although no information on levels of infringements were assessed in this review);
- Off-street car park at Donald Street west is controlled by signposted time restrictions;
- No parking user fees are currently being charged in Nelson Bay town centre;
- Both off-street car parks in Teramby Road and on-street parking spaces in Victoria Parade are controlled through time restriction signposting and parking user fees; and
- Surveys and site observations indicate more intense parking demand occurs in the town centre high activity areas (Magnus Street and Stockton Street), Donald Street west car parking, Donald Street and Teramby Street car park.

3.3.4 Accessible Parking

A review of on-street accessible parking spaces in the town centre reveals the following key findings:

- On-street accessible parking is provided on the western end of Magnus Street and northern end of Stockton Street;
- Quantum of accessible parking spaces on Magnus Street and Stockton Street appears to be sufficient to satisfy demand during a weekday during the peak shoulder tourism period;
- There is limited provision of on-street accessible spaces outside of the signposted 10km/h high activity areas; and
- Accessible parking is provided in Donald Street west and Teramby Road car parks and was observed to offer spare capacity on a weekday during the peak shoulder tourism period.

3.3.5 Shared Parking

Traditionally, development controls have favoured the provision of private car parking for each development, based on an average peak trip generation rate from RTA surveys. When viewed within the context of a local centre, this approach tends to provide an oversupply of fragmented parking areas with undesirable impacts on urban form and amenity.

This is already evident in some portions of Magnus Street, Donald Street and Stockton Street, where commercial and residential developments provide off-street parking associated with the development and on-street parking is also still provided. These off-street car parking areas require multiple access points and are often underutilised outside of peak season and can potentially be shared with other nearby parking generators to manage the requirements for parking supply in the town centre.

3.3.6 Foreshore Area Parking Supply

The impact from the proposed development of the Foreshore area is relatively unknown and current planning indicates that parking may be relocated to a new car park at Donald Street west. It is intended that a new parking area would be a shared facility and utilised by customers associated with both existing and future developments. This presents an opportunity to remove traffic and on-street from Government Road and Victoria Parade, reduce pedestrian vehicle conflict and further improve the streetscape. Further details of the Foreshore Area Masterplan are expected to be released in the future and were not made available for this study. The ability to accommodate parking and a major event park-and-ride site, control parking across the network and support improvements in town centre access by bus, walking and cycling is critical for managing for frequent major events in Nelson Bay.

3.3.7 Review of Port Stephens DCP on Parking

Summary of key findings from the review of Port Stephens DCP 2007 Chapter B3 – Parking, Traffic and Transport relating to provision of car parking facilities in commercial centres are as follows:

- Port Stephens Council DCP Chapter B3 applies to the entire LGA; there is no specific DCP relating to parking in Nelson Bay;
- There is provision for reduction in minimum parking rates for sharing between residential and non-residential uses (B3.C8);
- Guidance needs to be included that the traffic study should include a profile of the variation of parking demand, in order to assess opportunities for shared parking;
- B3.C8: DCP allows for reduction in required parking spaces for certain conditions, however, provides no indication of a relationship with locality, mix use density or public transport accessibility as a consideration for reducing the parking requirement;
- Further guidance needs to be provided on the scope of traffic studies to enable parking demand and provision rate reductions to be considered and evaluated on a consistent basis; and
- The Parking DCP only covers car parking and no provision is made for bicycle parking.

3.3.8 Section 94 Contributions

The Port Stephens DCP Chapter B3 Paragraph C5 allows for cash-in-lieu contribution for on-site provision of parking spaces (Section 94). Paragraph B3.C6 indicates Council would need to use S94 contributions on acquisition of land and construction of public parking facilities in vicinity of the development proposal. Exceptions noted are those for residential or tourist uses.

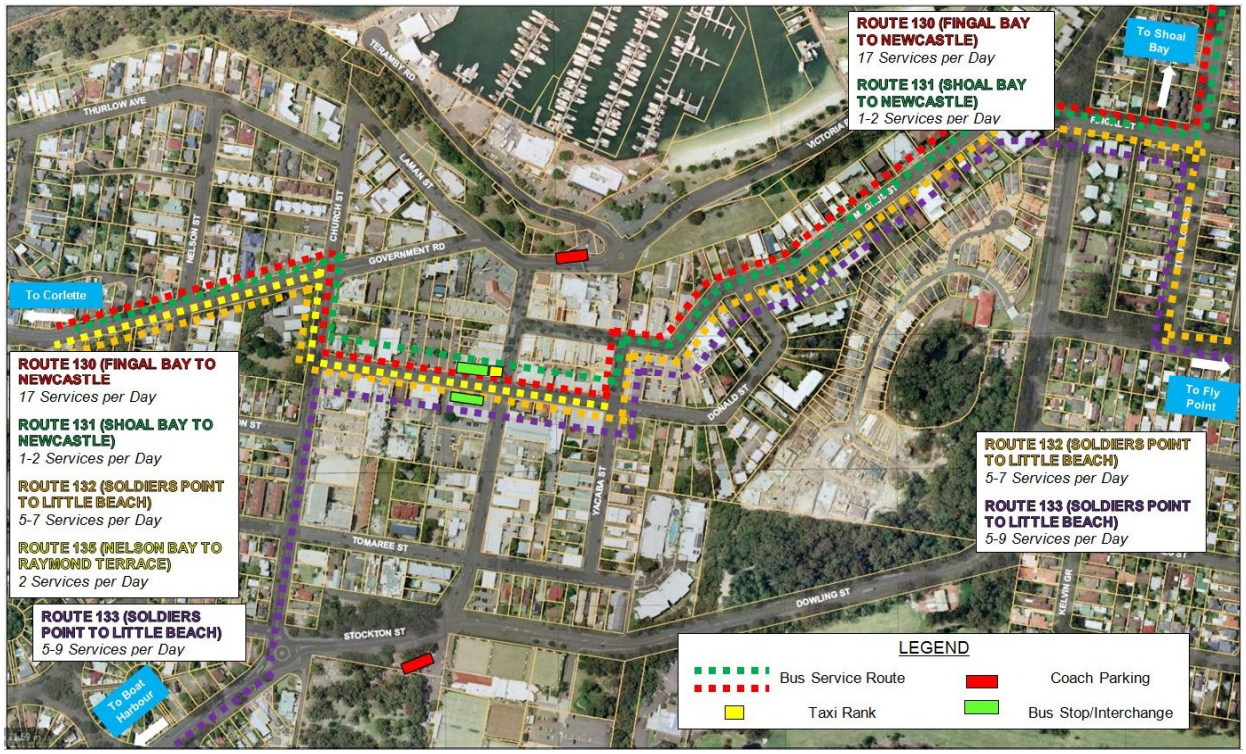
3.4 Public Transport

Nelson Bay is served by a local and regional bus network operated by Port Stephens Coaches. Five bus services operate from Nelson Bay, providing regional links with Boat Harbour, Corlette, Shoal Bay, and Fly Point.

Figure 30 shows bus routes and bus and coach facilities within the Nelson Bay town centre and

foreshore.

Figure 30 Public Transport Routes and Facilities



Source: Port Stephens Council Digital Data, 2011

Figure 30 identifies that the primary bus stop or town centre transport interchange in Nelson Bay is located along Donald Street in the town centre. Bus services 130, 131, 132 and 135 access the Donald Street bus stops (Nelson Bay bus interchange) via Government Road, whilst the route 133 travels via Stockton Street.

Figure 31 Nelson Bay Bus Interchange on Donald Street

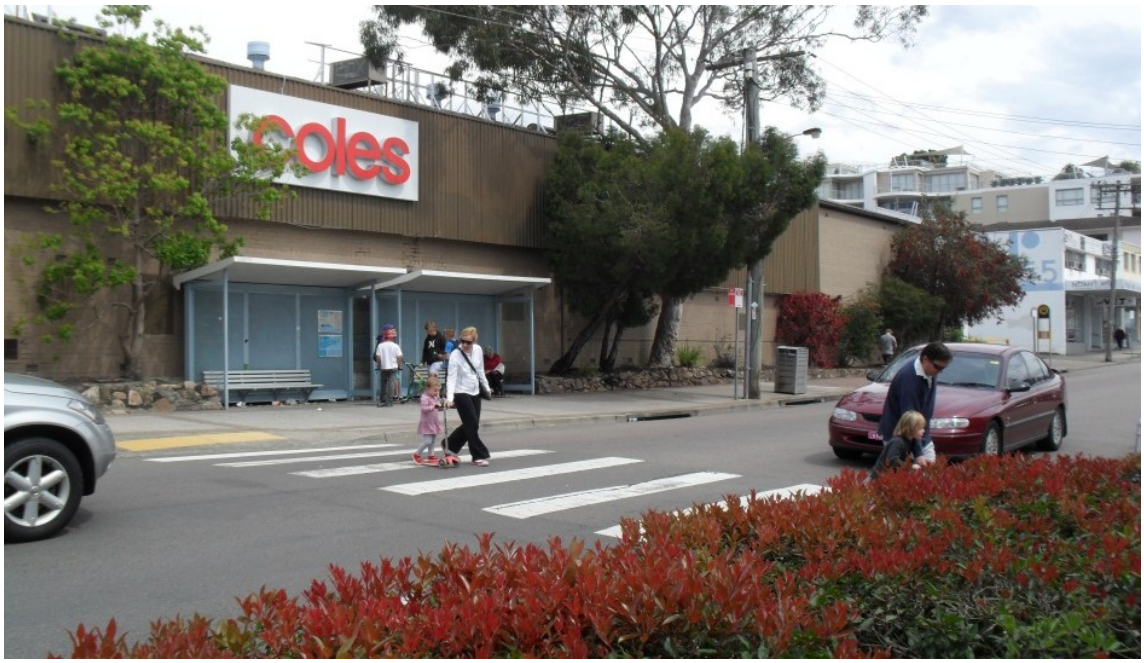


Figure 32 133 Bus Service on Magnus Street

In addition to the Port Stephens Coaches bus services, a number of tourist coaches provide access to Nelson Bay. A significant number of visitors arrive by touring buses, with coach stops located along Teramby Street and Stockton Street. A signposted taxi zone is also situated adjacent to the bus interchange on Donald Street (refer to Figure 30).

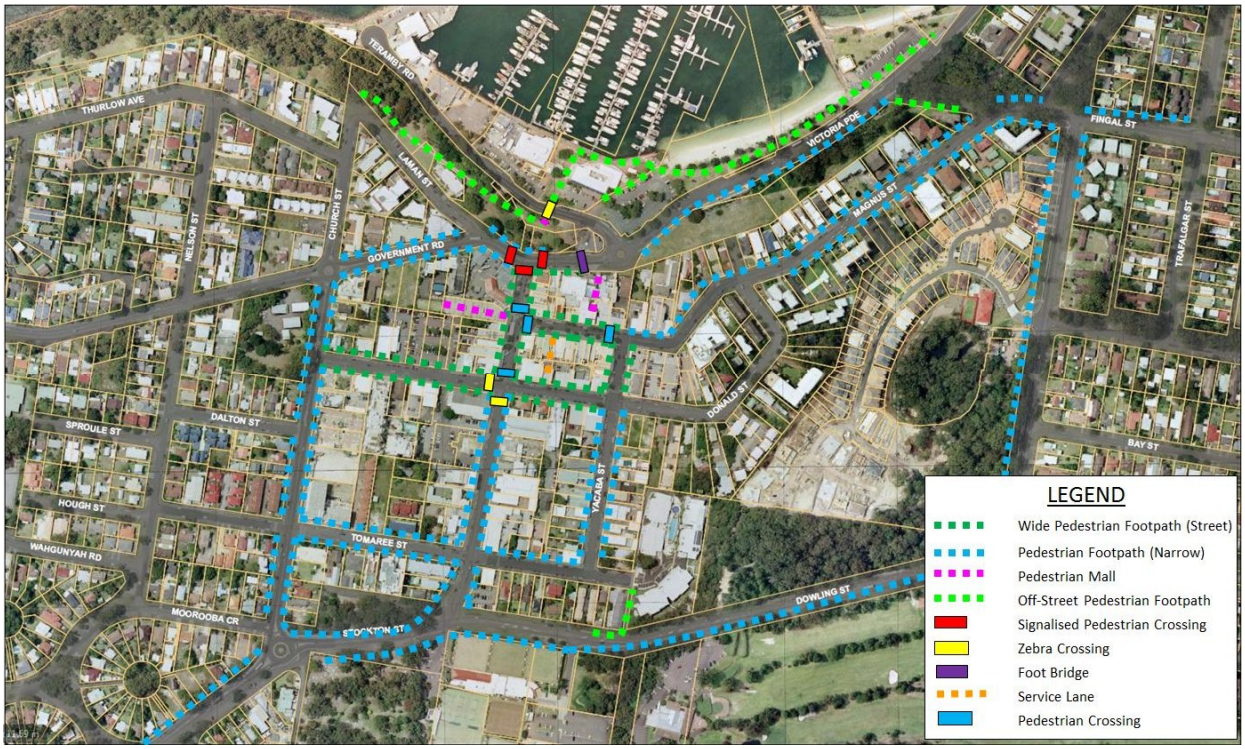
3.5 Pedestrian and Cycle Network

3.5.1 Pedestrian Network

Nelson Bay features an extensive pedestrian footpath network which links the main commercial precinct with adjacent foreshore and residential areas. There is a widespread network of narrow on-street footpaths that feature prominently throughout the Town Centre and neighbouring residential zones. In addition to this, the foreshore area provides a network of off-street pedestrian footpaths which provide connection with the Wharf, Shoal Bay Road, Magnus Street and Fly Point.

An illustration of pedestrian facilities in the Nelson Bay Town Centre is provided in Figure 33.

Figure 33 Town Centre Pedestrian Facilities



Source: Port Stephens Council Digital Data, 2011

Figure 33 shows that pedestrian crossing facilities are situated at the intersection of Donald Street/Stockton Street, Magnus Street/Stockton Street, Government Road/Stockton Street and Teramby Road. In addition, a pedestrian footbridge is situated on Victoria Parade, increasing accessibility between the Town Centre and foreshore area.

Figure 34 Magnus Street east of Yacaaba Street (narrow paths)

Figure 35 Donald Street with Stockton Street (crossing facilities)

Figure 36 Donald St facing west at the Bus Stop and Taxi Zone (Core Area)

Figure 37 Magnus St facing west towards Stockton St (kerbside dining)

Figure 38 Stockton St facing south towards Magnus St (Core Area)

Figure 39 Cascade Arcade linking Stockton St and Donald St West Car Park

Figure 40 Victoria Pde – Town Centre-Foreshore Pedestrians Links

Figure 41 Apex Park – Town Centre-Foreshore Pedestrian Connection

Figure 42 Teramby Road - Town Centre-Foreshore Pedestrian Connection

Figure 43 Nelson Bay Marina – Foreshore Walk

Figure 44 Victoria Parade - Foreshore Walk (Shared Path)

3.5.2 Cycle Network

Refer to Figure 45 for a schematic map highlighting existing cycling facility provision in the town centre. Cycling facilities in the Nelson Bay Town Centre are limited to a shared path that runs along the foreshore area and a short section of on-road cycle lane. The off-road route that runs along the foreshore is understood to be in conflict with areas that attract high volumes of pedestrian activity in proximity to Apex Park and the Marina precinct.

It is noted that the town centre does not appear to have a network of dedicated on-road bicycle lanes, except for a short link on Government Road between Stockton Street and Laman Street. The on-road cycle facility on Government Road is provided to assist cyclist movement between the Victoria Parade foreshore walk and Laman Street west of Apex Park. No other on or off-road cycle lane facilities were identified that would facilitate access between the town centre and its surrounding residential catchments.

Observations during the site visit indicated that there is a lack of designated cycling facilities for parking bicycles or shared end of trip facilities that would support cycling as a travel mode option for accessing Nelson Bay.

Figure 45 Town Centre Cycling Facilities

Source: Port Stephens Council Digital Data, 2011

Figure 46 Government Rd facing west from Stockton St (Bicycle Lane)

4. Indicators to Achieve Sustainable Accessibility

4.1 Overview

The Transport and Parking Study has been prepared on the basis of managing travel demand by maximising existing infrastructure and service provision and promoting accessibility options through more sustainable modes of transport such as walking, cycling and public transport. The following section presents a range of key indicators that are typically used to measure performance and to evaluate potential options that can be used to support the long-term masterplan for Nelson Bay. This evaluation technique will help to establish a framework for identifying a range of improvements that form the transport and parking plan for Nelson Bay.

These indicators have been grouped according under the following components:

- Improving non-car mode share;
- Promoting public transport and active transport use;
- Establishing public transport service quality;
- Robust network planning;
- Land use and public transport integration;
- Land use and private transport integration; and
- Maintaining road network performance.

4.2 Mode Share

Journey-to-Work (JTW) data from the ABS and the BTS indicate that in 2006, the car mode share for Nelson Bay was surveyed to be 66% (refer to section 1.1) with 2% captured by bus and approximately 10% by walking and cycling. The *Lower Hunter Regional Strategy* indicates that "*the historical focus of providing new housing in urban release areas is being reflected in very low levels of public transport usage, increasing congestion on key connecting roads and underutilised infrastructure capacity in some existing urban areas*".

If a better mode share to public transport and active transport is not achieved, a range of interrelated outcomes can be expected, as summarised below:

- A smaller proportion of all trips will be carried on public and active transport modes, resulting in more trips being made in private vehicles and increased investment required in the less efficient private transport system;
- The public transport network and active transport facilities will fall short of its potential to contribute to an efficient and effective access system, and the public transport system as a whole would be less viable and require additional subsidies;
- There would be an increased propensity for traffic congestion in and around the development. This will tend to reduce the amenity of the area and reduce the efficiency of the transport and access

network serving it (i.e. increasing its 'operating cost');

- It will reduce the attractiveness of the area to investors due to poor levels of access;
- It will reduce the development potential of the area due to the lack of capacity available in its transport and access network and the network into which it integrates; and
- More space will be needed for car parking.

All of these would be expected to contribute to a negative impact on the value and competitiveness of Nelson Bay, particularly as a town with a significant tourist function that supports the Lower Hunter economy.

4.3 Promoting Public Transport Use

Provision of a public transport system to serve Nelson Bay will not, by itself, be sufficient to achieve the required mode share on public transport and thus to achieve competitive levels of access for Tomaree peninsula. It will be necessary to provide a public transport service that is sufficiently attractive that people will *choose* to use it.

If the public transport system were provided in a manner that does not reflect people's requirements, there would be a reduced mode share to public transport, with outcomes as outlined in section 4.2. Transport planning should focus on developing an interconnected network of quality public transport nodes and services that are easily accessed and that respond to the needs of users.

The focus should not be limited to strategic level planning. Planning for development at all levels need to be planned in conscious consideration of the objectives of achieving public transport mode shift targets, and this will ultimately involve all planning and design aspects to encourage people towards the planned shift. Details that need to be considered that contribute towards achieving the desired customer focused outcomes, are as follows:

- Facilities planning and design;
- Fare integration;
- System integration;
- Operational considerations (e.g. timetable interfaces among different public transport modes); and
- Other measures, for example, such as provisions in DCPs limiting parking availability.

To address these issues and understand what public transport can achieve the following questions need to be answered:

- How easy would it be to find and access public transport?
- Is the trip direct and how long does it take in comparison to other modes?
- How much does it cost in comparison to other modes?

4.4 Public Transport Service Quality

Public transport services should run on links / corridors that provide public transport with sufficient

operational priority to ensure a very high degree of reliability (i.e. immunity from any foreseeable delays and uncertainties associated with private transport modes) and attractive operating speeds.

A key feature of quality public transport services is frequency. It is understood that current bus services in Nelson Bay operate on a low frequency, however there are five separate routes that serve the town centre and other access to similar locations in the surrounding suburbs before travelling to other destinations. As a result, the frequency to neighbouring suburbs is considered satisfactory in comparison with other centres in the Lower Hunter.

In view of the principles to promote public transport, and Nelson Bay's designation as a town centre, consideration for more frequent services to and from Nelson Bay need to be given. This should also review the potential to expand service area coverage and weekend service's needs, which would typically enable public transport to become an attractive alternative.

4.5 Network Planning

The *Outer Metropolitan Service Planning Guidelines* (NSW Transport and Infrastructure, 2009) provide for principles in the planning of public transport routes.

The main desire for a bus route network is to achieve a balance between the need and ease of access, and minimising travel time. Accessibility invariably relates to proximity to services, and in order to provide a wider coverage, bus routes will tend to be circuitous to achieve this desire. However, the consequent outcome would be longer travel times.

The *Guidelines* prescribe public transport service coverage to built-up residential areas with higher population densities within a 400 metre walk trip to a bus service during the daytime, and an 800 metre walk trip to a bus service at night.

The network should be legible, providing clear and simple to understand routes, as well as provide direct service with limited diversions. The intensification of Nelson Bay with permanent land use for jobs and additional residents aligns with these principles, however, the extent of development external to the town centre is unknown and needs to be controlled and planned to align with planned improvements in network coverage and service frequency. These principles can also be applied to the issue of managing demand and road capacity during major events and as a direction the location of parking should aim to help to reduce congestion and by doing so offer a point to transfer onto more efficient modes. These modes will need to offer reliable and high frequency services and connect with key central destinations during peak periods.

4.6 Land Use and Public Transport Integration

One of the key actions under Transport in the Lower Hunter Regional Strategy is to: "c*oncentrate employment and residential development in proximity to public transport to maximise transport access*".

The *Integrating Land Use and Transport (ILUT)* policy package developed by the Department of Planning sets out objectives and principles that are important in shaping a transport strategy for expanding an urban centre, such as Nelson Bay. The ILUT principles are aimed at:

- Increasing access by public transport, walking and cycling;
- Encouraging people to travel shorter distances and make fewer trips; and
- Reducing car dependency.

The promotion of public transport use needs to be integrated with measures to reduce car dependency, and can be achieved by planning for efficient locations, densities and facilities for key trip generators and to maximise access by public transport.

The provision of bus services in the Hunter Region would be in various level of public transport hierarchy: regional routes, district routes, and where required, local routes. These bus services will need to be integrated with the broader public transport network that service Nelson Bay, its surrounding areas and provide for movement around the region.

4.7 Land Use and Private Transport Integration

Measures that integrate land use planning with trips by private vehicle are interrelated to the availability of parking and urban policy that supports the use of parking as a travel demand management tool. This is based on supply needs for vehicles and the requirement for each private vehicle trip to start and end with parking. It is an inherent component of the private vehicle trip and is a strong influence in mode choice. Land use integration will require that the provision of parking needs to be investigated and considered. The availability of free or cheap parking and its convenience will encourage more car trips regardless of the availability of public transport and good accessibility by walking and cycling.

This means that development authorities would need to influence parking availability either through actual limits on provision (i.e. maximum parking instead of the traditional minimum rates), cost of parking, and time restrictions. Where appropriate, compatible co-located land uses should be identified and considered for parking rate reductions (lower costs of construction and land allocation needs), if it is situated in a centre and has non-conflicting parking provision needs then there is an option to share. This may be achieved through the provision of parking stations situated on the edge of the town centre offering good accessibility to town centre land uses and the surrounding strategic road network.

These principles support the location of car parks on the edge of town, which in the case of Nelson Bay and its demand profile could potentially include a larger consolidated car park at either Donald Street, on entry to the town or at park-and-ride site situated on Nelson Bay Road.

4.8 Network Performance

One indicator of the robustness of the transport strategy for Nelson Bay will be the overall performance of the road network in satisfying the levels of travel demand. However, attaining acceptable vehicle flow levels of service along road corridors and at intersections will need to be balanced with the overall accessibility and day to day and seasonal movement level needs for Nelson Bay.

There will inherently be areas of conflict between vehicle flows attributing to road network performance, and the continuity and directness of access for pedestrians, cyclists and public transport users, either in locational or temporal aspects. The desires for a better-performing road network will need to be balanced with the other transport objectives for Nelson Bay and has a direct relationship with parking and the

attractiveness and quality of both active and public transport alternatives.

A particular focus for this planning principle is along town centre core streets, such as Stockton Street, Donald Street and Government Road, where levels of conflict exist and intensify with additional demand pressure generated during events or tourism peaks. The removal and relocation of this conflict through prioritising movement in these areas for appropriate modes will help create a safer and more efficient network that can satisfy demand in highly concentrated core areas.

4.9 Summary of Indicators

Table 7 below shows a summary of the transport planning indicators discussed.

Table 7 Transport Planning Indicators

	Metric	Indicators
1	Mode Share	Adopt a minimum public transport mode share target for major event days, the peak season and day to day commuter trips, with the target to be agreed with the Department of Planning and Infrastructure and Transport for NSW. This should take into account NSW 2021 and aim to increase the public transport mode share target to 10% (an increase of 8%) and focus on the planning of new development and events. Future bus network planning should take this target into account.
2	Focus on people using public transport	The planning of the public transport system should reflect the needs and expectations of the people who are going to choose to use it. This entails a fundamentally different approach to planning for traffic and should focus on likely user groups, key destinations and the needs of tourists.
3	Public transport service quality - reliability and speed	The *Service Planning Guidelines* for buses provides the following guidelines relevant to bus operating frequency and travel times: ◗ Regional routes: 30-60 minutes travel time; 10-25 km in length; can operate on strategic transport corridors. ◗ District routes: link residential areas to the nearest district centre and a strategic transport corridor, or another mode or node, that operates to the nearest designated centre. With growth planned in Nelson Bay and in the surrounding precincts, and other employment centres in the LGA, demand-based frequency changes should be investigated regularly and follow the direction provided in the guideline. The ultimate aim is to improve frequency and reliability of services to help manage increases in travel demand.

	Metric	Indicators
4	Network planning	Public transport routes within Nelson Bay should link to key transfer nodes and trip generators in the surrounding region. This includes other growth centres within Port Stephens LGA, nearby major regional centres such as Raymond Terrace, Maitland, and Newcastle Regional City. The planning for increases in services should account for known deficiencies in road network capacity in the future and align with current services and parking opportunities. The focus during peak periods is to encourage day visitors to park in locations external to the town centre and foreshore areas to avoid congested areas. The aim is to limit parking and make a shuttle bus alternative attractive to the potential user group by offering a direct, efficient and reliable service and discouraging vehicle travel into the centre.
5	Land use and public transport integration	Public transport corridors should run *through* the core and service key destinations that are not easily accessible by car (lack of parking or cost difference). Planning for public transport should focus on the highest intensity land uses and activity areas around the primary public transport network such that the potential passenger catchment is within a 400 metre radius of a stop.
6	Land use and private transport integration	Arterial roads should run *around* development parcels and activity areas. Access to major parking facilities should be located directly off the arterial road network, or at least along routes that do not conflict with key pedestrian and cyclist corridors. Parking should be used as a point to funnel demand on to more efficient and appropriate travel modes, especially when network capacity is limited and peak demand levels are not constant.
8	Road network performance	Standards of service for strategic road network planning of Nelson Bay road network relate to: ◗ Protection of town centre and key activity areas from through traffic intrusion. ◗ Provision of an orderly and legible road network. ◗ Provision of adequate capacity to meet reasonable community expectations on the higher order traffic carrying roads. The first two issues are addressed by developing an orderly road hierarchy with specific design standards and target maximum traffic loads related to the road hierarchy. The issue of adequate capacity on the major road network is addressed by defining acceptable levels of service (volume to capacity ratios). Target maximum volume / capacity for road links set to 0.8. The minimum acceptable level of service standards for intersections Level of Service D.

5. Data Sources and Service Measures

This section provides an understanding of the current performance of the transport network and parking facilities in Nelson Bay under 2011 peak traffic conditions. The assessment has been based on surveyed traffic and parking volume data undertaken by GHD in November 2011 and historical traffic and crash data (2005-10) provided to GHD by Port Stephens Council (PSC).

5.1 Transport Data

5.1.1 Movement or Activity Counts

Traffic and pedestrian count surveys were undertaken over the weekend of the 'Tastes at the Bay' festival in Nelson Bay, which occurred on Saturday 5th and Sunday 6th November 2011. Additional link 'tube' count surveys were undertaken by PSC on behalf of GHD between 2 November and 9 November 2011 and 9 November and 17 November 2011.

The intersection and pedestrian counts were undertaken for the periods 08:30-10:30, 12:00-14:00 and 16:00-18:00 on Saturday 5 November 2011. Link counts were completed continuously over 24 hours for the full survey period. The locations of the traffic surveys are shows in Figure 47.

Figure 47 Traffic Survey Locations

Source: Port Stephens Council Digital Data, 2011

Pedestrian survey counts were undertaken on Saturday 5 November 2011 during the weekend of the 'Tastes at the Bay' festival at the following intersections:

- Donald Street with Church Street;
- Donald Street with Stockton Street;
- Donald Street with Yacaaba Street;
- Magnus Street with Yacaaba Street; and
- Tomaree Street with Stockton Street.

5.1.2 Seasonal Travel Patterns

As indicated in section 2.6.1, there is a limited amount of data that is available on seasonal traffic volume factors for roads within Nelson Bay town centre or its key access routes. This limitation has made it very difficult to understand peak seasonal variation factors or the length of that period. Data presented in the Port Stephens 2010 Tourist Plan and other traffic volume data sets provided by Council for the study indicate that November and the Taste for the Bay festival provides a good understanding of capacity needs along the road network. The 'Tastes at the Bay' event is understood to attract high volumes of day visitors and occurs during the peak tourist shoulder period. It is understood that future planned growth in Nelson Bay will be based around an event demand profile, which in the future are planned to occur on a more frequent basis and support jobs and sustainable growth profile for Nelson Bay.

Based on the above information, the Taste of Bay event is deemed to provide a consistent measure of typical peak conditions. These conditions will become more frequent in the future and as a result is deemed to be suitable for designing a network for Nelson By and managing access and measuring network performance.

5.1.3 Bus Services

Current bus services serving Nelson Bay and the Tomaree Peninsula are operated by Ports Stephens Coaches. A detailed summary of bus service routes and the frequency of bus services operating within the Nelson Bay Town Centre are provided in Table 8.

Table 8 Bus Service Routes ad Frequency Estimates

Route No.	Route	Direction	Weekday Operating Hours	Weekday Average Frequency	Weekend Operating Hours	No. of Services	Weekend Average Frequency
130	Fingal Bay to Newcastle *via Nelson Bay, Salamander Bay and Airport*	SB	5.33am – 10.08pm	1 hour	6.35am – 9.15pm	9	1.5 hours
		NB	5.45am – 9.30pm	1 hour	7.42am – 8.35pm	8	1.5 hours
131	Shoal Bay to Newcastle	SB	8.20am	1 per day	N/A		N/A

Route No.	Route	Direction	Weekday Operating Hours	Weekday Average Frequency	Weekend Operating Hours	No. of Services	Weekend Average Frequency
	(Express) *via Nelson Bay, Salamander Bay and Airport*	NB	11.27am - 6.10pm	3 hours	N/A		N/A
132	Soldiers Point to Little Beach *via Salamander Bay, Vintage Estate and Nelson Bay (Mon-Fri)*	SB	10.18am - 9.23pm	1.5 hours	11.55am - 7.50pm	3	3 hours
		NB	8.53am - 9.10pm	2 hours	8.45am - 7.30pm	4	3 hours
133	Soldiers Point to Little Beach *via Salamander Bay, Galoola Drive and Nelson Bay (7 Days)*	SB	7.50am-3.53pm	1.5 hours	9.32am - 12.58pm	2	2 hours
		NB	7.37am - 6.35pm	1 hour	12.52pm - 3.37pm	2	2 hours
135	Nelson bay to Raymond Terrace *via Salamander Bay (Mon-Fri)*	WB	7.25am - 2.20pm	3 hours	N/A		N/A
		EB	9.57am - 4.57pm	3 hours	N/A		N/A

Source: http://www.pscoaches.com.au
*Note: * NB – Newcastle to Port Stephens, SB – Port Stephens to Newcastle, EB – Raymond Terrace to Nelson Bay, WB – Nelson Bay – Raymond Terrace.*

5.1.4 Parking

Parking surveys were undertaken on Saturday 5 November 2011 during the weekend of the 'Tastes at the Bay' festival. This weekend was chosen in order to gain an understanding of the utilisation of parking resources in Nelson Bay during periods of increased demand, such as an event weekend or school holiday period. Parking surveys were undertaken by recording the parking utilisation each hour, from 09:00 to 17:00, at the following locations:

- Donald Street;
- Stockton Street;
- Yacaaba Street;
- Magnus Street;
- Donald Street West (open car park);
- Donald Street East (multi-storey car park); and
- Donald Street vacant lot (sometimes used for parking).

The location of the parking surveys are shown in Figure 48.

Figure 48 Parking Survey Coverage

Source: Port Stephens Council Digital Data, 2011

5.2 Service Measures

This section sets out the service measures used to assess the performance of intersections and roads, parking needs, safety, service frequency levels for bus services and performance measures adopted to promote walking and cycling.

5.2.1 Intersection Performance

The performance of the road network is largely dependent on the operating performance of key intersections, which are critical capacity control points along the road network. It is therefore appropriate to consider intersection operation as a measure of capacity of the road network. The SIDRA Intersection 5.0 software has been used to assess the peak hour operating performance of the intersections.

Intersection performance can be graded on several measures; however it is considered that the most useful is the average vehicle delay (AVD) per vehicle (expressed in seconds per vehicle). The AVD is a measure of operational performance of an intersection relating to its LOS.

The average vehicle delay is equated to a corresponding level of service (LOS), which ranges from A (best) to F (worst). The criteria for evaluating the operational performance of intersections are provided in Table 9.

Table 9 Intersection Level of Service Range

LOS	Average Delay/ Vehicle (secs)	Traffic Signals & Roundabouts	Give-way & Stop signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 to 42	Satisfactory	Satisfactory, but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays; roundabout requires other control mode	At capacity; requires other control mode
F	exceeding 70	Unsatisfactory; requires additional capacity	Unsatisfactory, requires other control mode.

Source: Guide to Traffic Generating Developments (RMS 2002)

Notes:
1. *The average delay assessed for signalised intersections is over all movements.*
2. *For roundabouts and priority control intersections (with Stop and Give Way signs or operating under the T-junction rule), the critical criterion for assessment is the movement with the highest delay per vehicle. Average delay is expressed in seconds per vehicle.*

The criteria for evaluating the performance of intersections are for all intersections to perform at a LoS of C or better, unless it is desirable not to encourage vehicle traffic through this area under certain peak event conditions.

5.2.2 Midblock Performance

The AUSTROADS Guide to Traffic Management – Part 3: Traffic Studies and Analysis defines “capacity” in accordance with the Transport Research Board Highway Capacity Manual 2000:

‘Capacity is the maximum hourly rate at which persons or vehicles can be reasonably expected to traverse a point or uniform section of lane or roadway during a given time period under the prevailing roadway, traffic and control conditions’.

Typical roadway capacities for urban streets with interrupted flows are given in Section 5.2 of the AUSTROADS Guide to Traffic Management. These capacity values are shown below in Table 10.

Table 10 Typical Mid-block Capacities for Urban Streets

Type of Lane	One-Way Mid-block Capacity (vph*)
Median or inner lane	
Divided Road	1,000
Undivided Road	900

Source: 'Guide to Traffic Engineering Practice: Part 2 – Roadway Capacity', *AUSTROADS*, 1999

**vehicles per hour per traffic lane*

The AUSTROADS Guide to Traffic Management – Part 3: Traffic Studies and Analysis (2009) outlines Level of Service criteria for mid-block sections of road based on volume-to-capacity ratios (VCR). A summary of these Levels of Service is presented below in Table 11.

Table 11 Level of Service Descriptions for Roads

Level of Service	Uninterrupted Flow Facilities	Interrupted Flow Facilities	VCR Range
A	Free flow conditions in which individual drivers are unaffected by the presence of others in the traffic stream.	Primarily free flow operations at average travel speeds and vehicles are completely unimpeded in their ability to manoeuvre within the traffic stream.	0.00 to 0.34
B	Zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream.	Reasonably unimpeded operations at average travel speeds.	0.35 to 0.50
C	Also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream.	Stable operations; however ability to manoeuver and change lanes in mid-block locations may be more restricted and intersection controls may contribute to lower average travel speeds.	0.51 to 0.74
D	Close to the limit of stable flow and is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream.	A range in which small increases in flow may cause substantial increases in delay and decreases in travel speed.	0.75 to 0.89
E	Occurs when traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream.	Characterised by significant delays and reductions in average speed.	0.90 to 0.99

Level of Service	Uninterrupted Flow Facilities	Interrupted Flow Facilities	VCR Range
F	In the zone of forced flow and flow breakdown, this results in queuing and delays.	Characterised by urban street flow at extremely low speeds and Intersection congestion is likely at critical locations.	1.0 or greater.

Source: Adapted from AUSTROADS Guide to Traffic Management - Part 3: Traffic Studies and Analysis

The criteria for evaluating midblock performance of roads is for all road sections to perform at a LoS of C or better during typical weekday peak periods and have the ability to accommodate a 40% increase (identified event day peak traffic growth factor which is above the conservatively estimated 20 year growth factor of 1.5% per annum) without performing at a LoS E or worse.

5.2.3 Parking

The following service measures were applied to measuring current parking needs:

- An 85% occupancy profile was selected to understand parking capacity issues associated with parking within the town centre on an event day;
- A factor of 5% of total traffic staying beyond the parking time restriction was identified as a benchmark for understanding issues with parking overstay and enforcement needs in Nelson Bay; and
- If parking rates for new development are higher than the parking rates used in other centres with similar characteristics then consider revising the current DCP and adopting a lower rate for new development.

5.2.4 Crashes

The following service performance measures were applied to identify and address safety issues:

- Locations with three crashes or more over a 5 year period require further investigation;
- Crashes involving a fatality over a five year period require further investigation; and
- Intersections with crash histories that are likely to be impacted by peak period traffic and planned town centre improvements require further investigation.

5.2.5 Bus Services

To assist in promoting the use of bus services as a viable alternative to the private car for travel to Nelson Bay, the following performance measures were adopted:

- Services should achieve at a minimum of an hourly frequency during peak periods or above, along key corridors; and
- During event days and high season the service frequency should increase to at least one bus service every 30 minutes or above (desirable to have a 10 minute service frequency at park-and-ride sites)

along a key demand corridor that is impacted by congestion and excess parking demand.

Increases in bus service frequency along with an attractive public transport interchange in a central location (visible) to the town centre offer a desired outcome for managing short-term increases in demand, i.e. during an event day and the high season tourism periods. It will also offer an opportunity to promote public transport on a day to day basis when capacity issues are not an issue.

5.2.6 Walking and Cycling

To assist in promoting the use of walking and cycling as a viable alternative to the private car for travel to Nelson Bay, the following performance measures were adopted:

- All roads should offer a safe crossing point to town centre gateways;
- All roads in the town centre should have a footpath;
- Pedestrians to have movement priority along identified Main Streets.; and
- At least one cycle route should be provided in each direction (east, south and west) from all surrounding catchment areas to Nelson Bay.

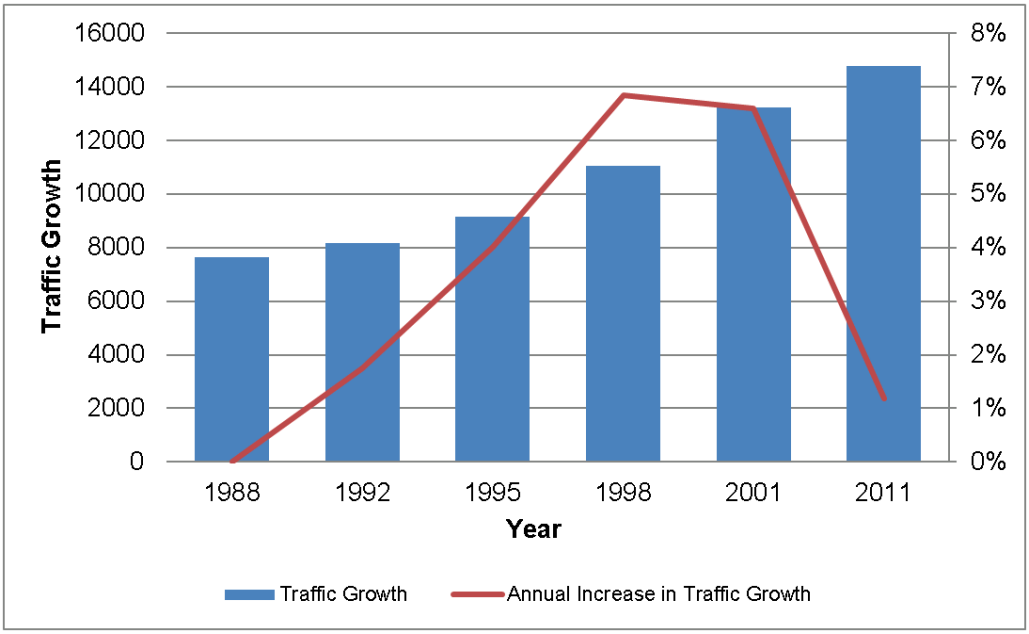
6. Network Evaluation

The performance of critical sections of the Nelson Bay town centre road network has been assessed based on traffic data obtained during the survey period and the performance criteria listed under section 5.2. The performance assessment includes both midblock and intersections, and has been limited to the information that has been obtained during the study period.

6.1 Historical Traffic Growth

Figure 49 provides an understanding of traffic growth along Nelson Bay Road between 1988 and 2011, which has been taken from count sites in close proximity to the Nelson Bay town centre.

Figure 49 Historical Traffic Growth on Nelson Bay Road



Source: 'Traffic Volume Data for Hunter Region 2001, RTA' and PSC traffic volume survey data collated in Nov 2011.

The above data set indicates that traffic has grown significantly over the last 20 years. The growth in traffic peaked around 1998 to 2001 and during the last ten years has reduced to an annual increase of approximately 1%.

6.2 Traffic Volumes

Table 12 and Table 13 provide a comparison of total daily traffic volumes and the daily traffic profile for both weekend event day and a typical weekday.

Table 12 Daily Traffic Flows (Two way flows)

Road	Daily Traffic Flow (Two-way)		
	Saturday (event)	**Sunday (event)**	**Typical Weekday**
Nelson Bay Road	15426 (+11%)	14497 (+4%)	13874
Government Road	11806 (+42%)	11271 (+35%)	8320
Church Street	7700 (+24%)	7503 (+21%)	6218
Magnus Street	3548 (+26%)	2901 (+3%)	2827
Dowling Street	N/A*	N/A*	5713*

Source: daily traffic volume data obtained for November 2011 from Port Stephens Council
*Note: * represents site vandalized during the survey period. (+42%) represent the percentage increase in daily traffic in comparison to observed typical weekday traffic volumes.*

The above information indicates that daily traffic levels were significantly higher for an event day (over 10%) than those presented for a typical working day.

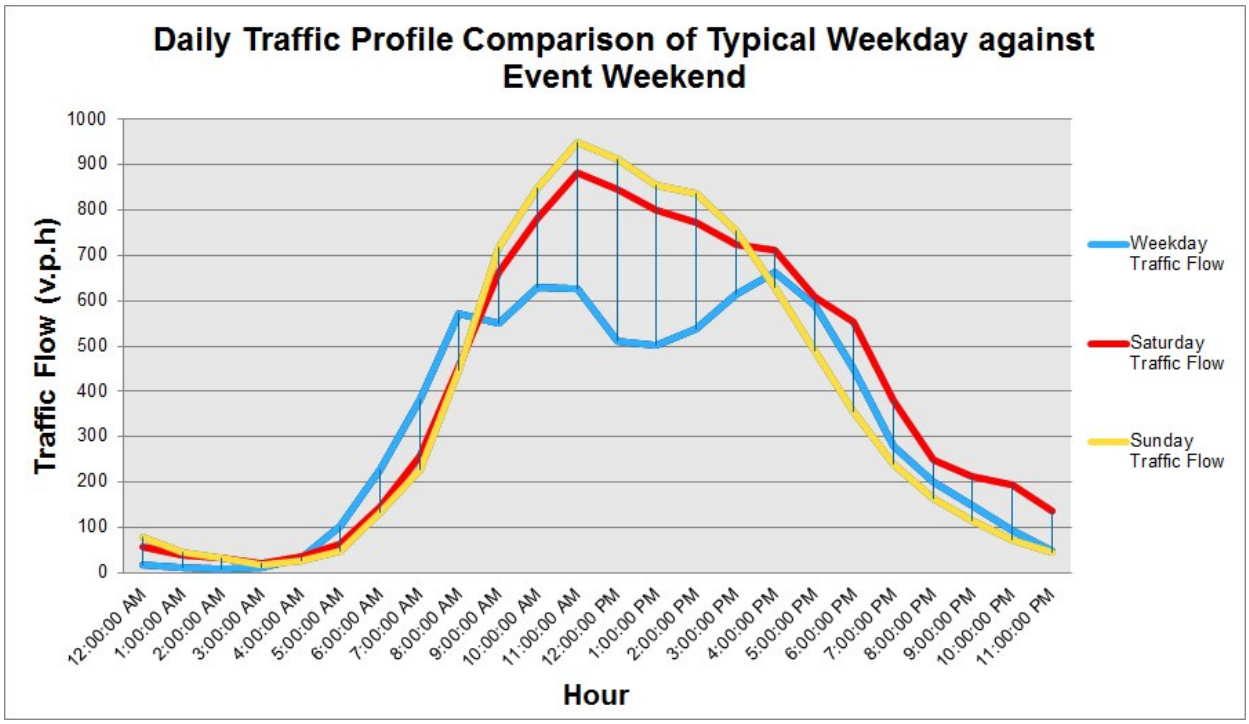
Table 13 Peak Hour Traffic Flows (Two way flows)

Road	Daily Traffic Flow					
	Saturday (event)		**Sunday (event)**		**Typical Weekday**	
	NB/EB	**SB/WB**	**NB/EB**	**SB/WB**	**NB/EB**	**SB/WB**
Nelson Bay Rd	906 (39%)	681 (17%)	819 (25%)	633 (9%)	653	580
Government Rd	638 (66%)	464 (43%)	599 (56%)	441 (36%)	385	324
Church Street	474 (87%)	340 (42%)	422 (66%)	262 (10%)	254	239
Magnus Street	164 (16%)	148 (3%)	176 (25%)	175 (22%)	141	143
Dowling Street	N/A*		N/A*		322	245

Source: peak hour traffic volume data obtained for November 2011 from Port Stephens Council
*Note: * represents site vandalized during the survey period. (39%) represent the percentage increase in peak hour traffic in comparison to observed typical weekday traffic volumes.*

The above information indicates that peak hour traffic levels were significantly higher for an event day (up to 87%) than those presented for a typical working day.

Figure 50 Event Day versus Typical Weekday Comparison



Source: daily traffic volume data obtained for November 2011 from Port Stephens Council
Note: traffic profile displays the average two way traffic volume along four roads and is presented for each hour of the day.

Based on an appraisal of total traffic volumes across all traffic count sites, it is apparent that traffic levels during the peak hour on an event day Sunday presents a 40% increase in traffic demand than that recorded during the peak hour on a typical weekday. It is also noted that traffic levels on the Saturday are within 10% of the peak hour and daily traffic volumes generated on the Sunday event day. Based on these findings, the modelling of network performance on either the Saturday or Sunday during the 'Tastes at the Bay' festival is considered to offer a good representation of known capacity needs for general peak traffic demand in and around Nelson Bay.

The intention of this study is to understand current and future network capacity needs by evaluating the capacity of the network against peak operations on an event day.

6.3 Midblock Performance

The following analysis provides an understanding of both event day traffic conditions during the 'Tastes at the Bay' festival and typical weekday peak conditions.

6.3.1 Typical Weekday Traffic Conditions (November 2011)

Table 14 and Figure 51 provide an understanding of the performance levels of the road network in and around Nelson Bay on a typical weekday during November.

Table 14 Typical Weekday Peak Hour Flows & LoS

	NB /EB	SB /WB	V/C (NB /EB)	LoS	V/C (SB /WB)	LoS
Church St	254	239	0.28	A	0.27	A
Government Road	385	324	0.43	B	0.36	A
Magnus St	141	143	0.16	A	0.16	A
Nelson Bay Rd	653	580	0.73	C	0.64	C
Dowling Street	322	245	0.36	B	0.27	A

Source: daily traffic volume data obtained for November 2011 from Port Stephens Council and Port Stephens Council Historical Traffic Volume Data.

Note: *NB indicates northbound direction, EB indicates eastbound direction, SB indicates southbound direction and WB indicates westbound direction.*

It is apparent from the information presented in Table 14 and Figure 51 that the performance of all roads surveyed during a typical weekday peak hour period performed satisfactory with some spare capacity

Figure 51 Typical Weekday Network Performance Plots

Source: Port Stephens Council Digital Data, 2011.
Note: LoS has been calculated using a combination of PSC November 2011 and historical weekday average peak hour and peak directional traffic volume data.

6.3.2 Sunday Event Day – 'Tastes at the Bay' Traffic Conditions (November 2011)

Table 15 and Figure 52 provides an understanding of a Sunday event day (weekend) traffic conditions in Nelson Bay and are based on November 2011 traffic counts during the 'Tastes at the Bay' festival.

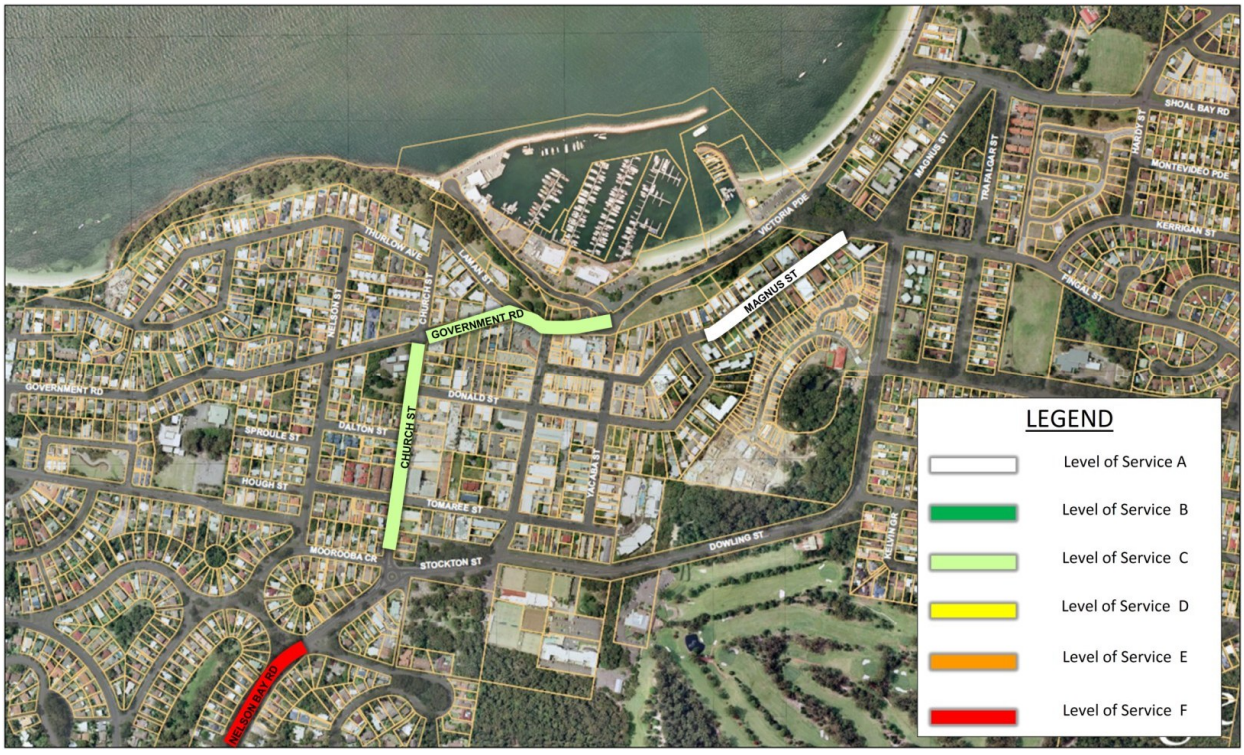
Table 15 Event Day (Sun) Peak Hour Flows & LoS

	NB /EB	SB /WB	V/C (NB /EB)	LoS	V/C (SB /WB)	LoS
Church St	474	340	0.53	C	0.38	B
Government Road	638	464	0.71	C	0.52	C
Magnus St	164	148	0.18	A	0.16	A
Nelson Bay Rd	906	681	1.01	F	0.76	D

Source: Port Stephen Council, November 2011, MetroCount collected vehicle classified tube counts.

Note: NB indicates northbound direction, EB indicates eastbound direction, SB indicates southbound direction and WB indicates westbound direction.

Figure 52 Road Network LoS: Peak Period Event Day (Sun)



Source: Port Stephens Council Digital Data, 2011.
Note: LoS has been calculated using PSC 'Tastes at the Bay' event day November 2011 peak hour and peak directional traffic volume data.

The performance results in Table 15 indicate that there is spare capacity on most roads except Nelson

Bay Road during a typical event day peak hour period with both Church Street and Government Road operating close to capacity in the peak hour. Both Table 15 and Figure 52 indicate that peak directional traffic flows can impact on the efficient operation of the road network and especially access to Nelson Bay, Shoal Bay and Fingal Bay during these peak periods. The traffic flow exceeded a level of service D between 10am and 2pm on this event day along Nelson Bay Road in the inbound direction only.

6.3.3 Saturday Event Day – 'Tastes at the Bay' Traffic Conditions (November 2011)

Table 16 and Figure 53 provides an understanding of a Saturday event day (weekend) traffic conditions in Nelson Bay and are based on November 2011 traffic counts during the 'Tastes at the Bay' festival.

Table 16 Event Day (Sat) Peak Hour Flows & LoS

	NB /EB	SB /WB	V/C (NB /EB)	LoS	V/C (SB /WB)	LoS
Church St	422	262	0.47	B	0.29	A
Government Road	599	441	0.67	C	0.49	B
Magnus St	176	175	0.20	A	0.19	A
Nelson Bay Rd	819	633	0.91	E	0.70	C

Source: Port Stephen Council, November 2011, MetroCount collected vehicle classified tube counts.

Note: NB indicates northbound direction, EB indicates eastbound direction, SB indicates southbound direction and WB indicates westbound direction.

The performance results presented in Table 16 indicate that there is spare capacity on most roads except Nelson Bay Road during a typical event day peak hour period, with Government Road also operating close to capacity. Both Table 16 and Figure 53 presented similar results to those experienced during the Sunday, with peak directional traffic potentially impacting on the efficiency of the network and access to Nelson Bay, Shoal Bay and Fingal Bay during this peak period. The traffic flows exceeded a level of service D between 10am and 1pm in the inbound direction and between 11am and 4pm in the outbound direction on Nelson Bay Road only.

Consideration of additional capacity or travel demand management measures should be considered to better manage the impact on the network and the effects on access to other surrounding precincts. Due to the demand being event day related and likely to be generated by day visitors to an event held in the area the management of event related demand through external park-and-ride sites may offer a more effective solution to road capacity enhancements and should be investigated further.

Figure 53 Road Network LoS: Peak Period Event Day (Sat)

Source: Port Stephens Council Digital Data, 2011.
Note: LoS has been calculated using PSC 'Tastes at the Bay' event day November 2011 peak hour and peak directional traffic volume data.

6.3.4 2031 Traffic Conditions

It is acknowledged that Nelson Bay Road is the pinch point on the road network during a major event. It is typically expected that traffic demand will grow in the future along the network, and the typical approach taken to measuring growth is to increase traffic levels on the basis of the size and function of new proposed development. This would result in widening of roads and upgrades to intersections to accommodate expected growth, which will need to be matched by increases in parking.

In the case of Nelson Bay, the peak does not occur on a day to day basis and the day to day peak can easily be accommodated under the current infrastructure. Instead of designing for the day to day peak, Nelson Bay is focused on peaks that occur on a less frequent basis as a result of an event. Consequently, increasing road capacity may not always be viable. It is also noted that under the guidance provided in both the local and regional strategies the aim is to minimise the impact on the local community. The measurement of growth is also unknown and it is more likely that growth actually means the growing of demand during the shoulder peak periods and result in an increase in the number of events that occur rather than a peak quantum capacity increase.

Vehicle demand starts and ends with a parking space and if this demand can be shifted to a point that does not impact on congested parts of the road network then it would be deemed to optimise assets and

align with local and regional strategy goals. The management of increases in traffic demand should also aim to protect core areas of the town centre, prioritise pedestrian activity and support improvements in the quality of public transport system. This management approach is typically used for managing travel demand associated with events where temporary infrastructure is better suited to providing the solution than the permanent provision of services and infrastructure. The solution is related to the temporary nature of the problem, the cost of the project and the impact from its implementation on the local community.

Due to these reasons and the previous strategy recommendation for the control of peak period traffic conditions through the implementation of a transport management plan, it is considered more appropriate to control access to Nelson Bay and facilitate a transfer of visitors onto more efficient transport modes. As a result, the future measurement of future traffic levels on Nelson Bay Road is not necessary as traffic levels measured for a major event will form the basis of the major event network design.

6.4 Intersection Performance

Critical periods for the operation of the Nelson Bay road network are identified in section 6.2 to occur during event days and the peak tourist season. The analysis highlights during an event day the peak can represent an increase of over 40% above the typical weekday commuter peak conditions. Based on these characteristics, any improvements required on the transport network should target event day conditions, which are targeted to become more common in the future.

6.4.1 Intersection Performance on a Typical Event Day

The performance of the existing road network is largely dependent on the operating performance of key intersections which are critical capacity control points on the road network. SIDRA[7] Intersection was used to assess the existing event day peak hour operating performance of intersections identified in Table 17. An evaluation of intersection capacity was undertaken to understand network operating conditions at critical locations along the Nelson Bay town centre road network under the above peak traffic conditions. Table 17 provides the performance outputs from the assessment.

Table 17 Intersection Performance: Peak Period Event Day (Sat)

Intersection	Method of Control	Worst Approach LoS	Maximum Delay (s)	95% Queue (m)
Church Street / Donald Street	Give Way	B	30.8	26.9
Stockton Street / Donald Street	Stop Control	D	42.9	19.9
Stockton Street / Tomaree Street	Give-way Control	A	10.4	8.0
Yacaaba Street / Donald Street	Stop Control	A	11.6	10.7
Yacaaba Street / Magnus Street	Stop Control	A	13.2	5.7

Note- the performance of the intersection has been evaluated using peak hour traffic data obtained during an event day (Tastes at

[7] SIDRA – Computer modelling package which analyses the operation of intersections controlled by traffic signals, priority signs and roundabouts.

the Bay – Saturday, 5th November 2011)

It is apparent from the information presented in Table 17 that the performance of all intersections during a typical event day peak period is satisfactory. It is also noted that traffic at the intersection of Donald Street with Stockton Street will experience some level of delay. Further evaluation of the conditions at this intersection indicated that the performance is impacted by high pedestrian flows across Donald Street, which conflicts with circulating traffic. Site observations and supporting data highlighted that this is a focal point for pedestrian movement in the town centre and it may be undesirable to encourage or promote vehicle access to the town centre via Stockton Street.

Access to car parks at Donald Street west and east can be obtained via Church Street and Yacaaba Street respectively, and the current delays may act as a desirable traffic management measure during peak periods. This measure is supported and complements expected improvements to wayfinding signage for access to car parks in the town centre and areas situated beyond.

6.4.2 Church Street with Donald Street Improvement Options

Consultation with stakeholders indicated that the intersection of Church Street with Donald Street was a concern during event day operations. A further review and assessment of intersection operations was undertaken to better understand actual observed traffic conditions. Current traffic controls at this intersection are limited with no linemarked yield line or signposted traffic control on the Donald Street approach. However, observations during peak period traffic conditions indicated that drivers stop and give way to Church Street traffic approach from the north and south. Under observed peak traffic conditions it is acknowledged that the intersection actually operates under give-way traffic control conditions. The intersection has been remodelled under stop sign and roundabout control arrangements to better understand the implications on performance. The results from the assessments are presented in Table 18.

The result highlights that under these intersection arrangements the levels of service are C and B under stop sign control and roundabout control, respectively. The analysis result for the stop sign case indicates that average delays have increased on the Donald Street approach indicating that a crash assessment should be undertaken to better understand current road safety risks.

Table 18 Peak Event Day Intersection Performance: Church Street with Donald Street Options

Intersection	Method of Control	LoS	Average Delay (s)	95% Queue (m)
Church Street / Donald Street	Stop Sign Control	C	33.4	26.9
Church Street / Donald Street	Roundabout	B	10.3	27.7

Note- the performance of the intersection has been evaluated using peak hour traffic data obtained during an event day (Tastes at the Bay – Saturday, 5th November 2011)

The remodelling of the intersection under roundabout control indicates that the intersection would perform satisfactorily as follows:

- Reduced delays during typical event day traffic conditions;
- Safer and more efficient traffic arrangement for vehicles exiting the town centre via the western gateway and access to Donald Street west car park; and
- Improved bus service access and movement from Donald Street to Church Street south.

Based on these results a roundabout traffic arrangement is recommended at this location to better manage conflicting traffic movement and improve peak network performance. This type of arrangement will also help to define Donald Street as the western gateway to the town centre and should be supported by a new gateway treatment.

6.4.3 2031 Event Day Network Evaluation

A conservative approach has been adopted for understanding the potential impacts from planned growth in employment and population in the Nelson Bay town centre. This approach includes increasing event day traffic in Nelson Bay town centre by 25% in order to test intersection improvements and to identify if any additional upgrades to intersection should be considered. The results from this test are presented in Table 19.

It is apparent from the information presented in Table 19 that the performance of all intersections during a future event peak period with traffic growth is satisfactory, except for the intersection of Donald Street with Stockton Street and Donald Street with Church Street. Both present similar results to those experienced under the event day peak periods.

Table 19 2031 Peak Event Day Intersection Performance

Intersection	Method of Control	LoS	Maximum Delay (s)	95% Queue (m)
Church Street / Donald Street	Stop Control*	F	200.3	185.9
Upgraded Church Street / Donald Street	Roundabout	A	11.4	23.3
Stockton Street / Donald Street	Stop Control	F	596.8	287.7
Stockton Street / Tomaree Street	Give-way Control	A	11.6	11.5
Yacaaba Street / Donald Street	Stop Control	A	11.9	14.9
Yacaaba Street / Magnus Street	Stop Control	A	14.3	8.2

Note- the performance of the intersection has been evaluated using peak hour traffic data obtained during an event day (Tastes at the Bay – Saturday, 5th November 2011). It assumes 25% increase in traffic from 2011 Tastes at the Bay demand levels.

The results for the intersection of Donald Street with Stockton Street indicate that there will be some delay for traffic on Stockton Street due to pedestrian activity in the area. Discussions with stakeholders, current planning of network access arrangements and observations of peak traffic conditions highlight that it is a desirable situation and traffic should be encouraged to be redirect away from this intersection.

In general, traffic using this intersection is in conflict with pedestrian movement, which should have a higher priority at this point in the town centre network. The traffic levels are generated by vehicles seeking access to parking areas (kerbside, Donald Street west, Donald Street east or Coles car park) and other more desirable routes to these facilities should be promoted. This includes access to Coles or Donald Street west car park from Donald Street via Church Street and to Donald Street east car park from Yacaaba Street via Tomaree Street. The promotion of these routes together with other streetscape and wayfinding improvements should reduce the amount of vehicle and pedestrian conflict at this point in the network.

The performance of Donald Street with Church Street intersection was also evaluated as a roundabout, which is the proposal identified to satisfy demand under a typical event day peak traffic conditions (refer to section 6.4.2). The results indicate that under 2031 event day traffic conditions (including a 25% growth in traffic) the intersection performs satisfactorily.

The proposal for managing access to car parks, which is aimed at shifting traffic away from the intersection of Donald Street with Stockton Street to other routes will result in the redistribution traffic and may impact other intersections. Under this proposal, traffic will be encouraged to be redirected to the new proposed roundabout at Church Street with Donald Street, which together with other town centre intersections is evaluated in section 6.4.4.

6.4.4 Town Centre Parking Access Improvements

This section appraises the impact from redistributing traffic from Stockton Street towards Yacaaba Street and Church Street to access public off-street parking areas on Donald Street (Donald Street east and west car parks). The assumptions developed for reassigning traffic in Nelson Bay town centre are based on 2031 event day traffic levels and the following:

- 50% of traffic currently travelling on Stockton Street (between Tomaree Street and Donald Street) is distributed towards Donald Street car parks west and east:
  - 50% of the redistributed traffic is redirected on to Church Street and is expected to travel to Donald Street (western gateway); and
  - 50% of redistributed traffic is redirected on to Tomaree Street and Yacaaba Street and is expected to travel to Donald or Magnus Streets (eastern gateway).
- 50% of traffic wanting to access Stockton Street from Victoria Parade to travel to Donald Street will be redirected:
  - 50% of this redirected foreshore traffic will be assigned to Church Street and access Donald Street via the proposed roundabout (western gateway); and
  - The remaining traffic is assumed to represent traffic previously wanting to bypass Nelson Bay and as a result of the proposed Dowling Street town centre bypass should be removed from this area of the Nelson Bay road network.

The results from this test are presented in Table 20.

Table 20 2031 Peak Event Intersection Performance:

Intersection	Method of Control	LoS	Maximum Delay (s)	95% Queue (m)
Stockton Street / Donald Street	Stop Control	D	49.6	13.9
Upgraded Church Street / Donald Street	Roundabout	A	11.6	25.5

Note- the performance of the intersection has been evaluated using peak hour traffic data obtained during an event day (Tastes at the Bay – Saturday, 5th November 2011) It assumes some redistributed of traffic and 25% increase in traffic from 2011 Tastes at the Bay demand levels.

The above results indicate that all intersections perform at a 'satisfactory' level of service in the future with the upgrade to Donald Street and Church Street intersection to roundabout control and 2031 redistributed traffic.

6.4.5 Summary of Findings

In general terms the evaluation of traffic conditions on a typical weekday in both November 2011 and February 2012 indicated that all roads and intersections performed satisfactory with minimal delays experienced along the road network.

The installation of the following improvements will assist in the management of traffic flow along the town centre road network under current event day traffic conditions:

- The upgrade of the intersection at Donald Street with Church Street to a roundabout.
- Improved directional signage to parking areas will assist in removing circulating traffic from high activity areas, such as Stockton Street and Donald Street.
- The operation of an external Park-and-Ride sites during an event day with advanced warning signs of limited parking, time restrictions and parking charges in the town centre and foreshore areas.

All of the above mentioned traffic management improvement measures are expected to offer improved network conditions along Nelson Bay Road, Church Street, Government Road, Donald Street and Stockton Street during event day peak hour periods and reduce the level of delay due to conflict in the town centre.

Nelson Bay Road performs poorly under event day peak conditions and will impact on the performance of the network and the volume of traffic that is able to enter Nelson Bay and travel to its surrounding suburbs, including Fingal Bay and Shoal Bay. The operation of a park-and-ride site, which encourages traffic generated by day visitors to travel to the foreshore area and town centre by shuttle bus services, will help to reduce pressure on this road link. This improvement is expected to be supported by other travel demand management measures, including ITS and parking management.

Testing of traffic conditions under 2031 event day traffic conditions and the above proposal has also been undertaken and indicate that the network will perform satisfactorily under the above proposed traffic management improvements.

6.5 Bus Service Assessment

Assessment of bus timetable information indicates that during a typical weekday, there are between 30 and 37 bus services per direction operating within the Nelson Bay town centre. This represents approximately two bus services per hour per direction during a typical weekday. The Government Road – Donald Street – Magnus Street has a desirable bus service frequency of 30 minutes during peak periods and the Church Street – Nelson Bay Road route offers an hourly service frequency.

The potential to improve bus service frequency between key destinations should be considered as part of addressing current and potential future capacity deficiency along Nelson Bay Road. This may only be achieved during peak season and event days held at Nelson Bay by supporting service frequency improvements through supplementary bus services operating between a park-and-ride site and the town centre and possible other nearby destinations.

6.6 Walking and Cycling Assessments

Pedestrian movement surveys were conducted to identify key pedestrian desire lines to provide a focus for the management of conflict between pedestrians and vehicles. Journey to work or education catchments are also mapped.

6.6.1 Pedestrian Volumes and Network Conflict

The results of the pedestrian survey conducted are provided in Figure 54.

Figure 54 Pedestrian Survey Count Results

Source: Port Stephens Council Digital Data, 2011.

Note: numbers represent peak hour pedestrian flows during an event day (Tastes at the Bay – Saturday, 5th November 2011)

Figure 54 indicates that 63% of surveyed pedestrian movements occurred at the intersection of Donald

Street and Stockton Street. Additional observations highlight that the intersection of Magnus Street and Yacaaba Street, which serves the Donald Street east car park, is another intersection that attracts significant pedestrian movement during event days. Based on these findings it is apparent that the key pedestrian desire lines are situated in the northern sections of Yacaaba and Stockton Streets, Magnus Street west, and in Donald Street between Donald Street west car park and Yacaaba Street.

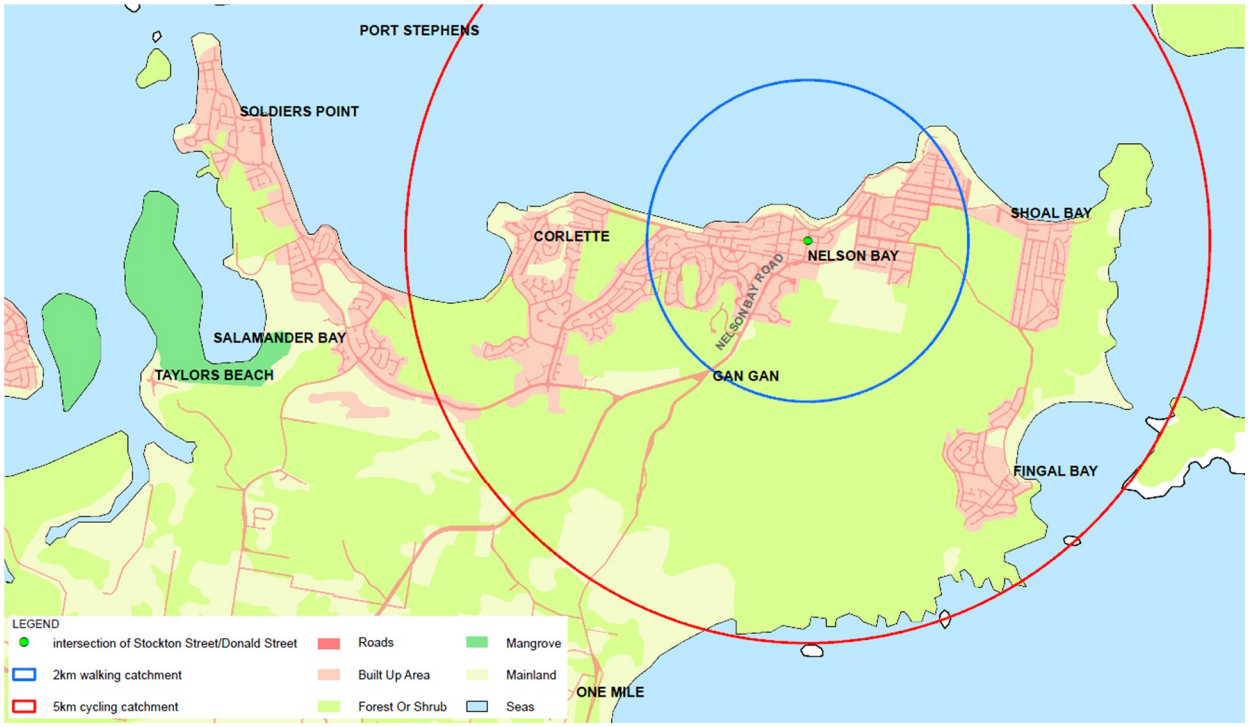
Consideration needs to be given to managing conflict between pedestrian and traffic movement through the core areas of the town centre. These should be supported by improvements in the streetscape to promote accessibility and pedestrian amenity within town centre. The aim is to encourage and promote walking as a safe and efficient travel mode for moving around the town centre and to the foreshore areas, and can only be achieved through better managing other conflicting movements.

6.6.2 Walking and Cycling Spatial Analysis

Five kilometres is often considered to be an acceptable cycling distance for commuting and travelling to education facilities. This equates to a 30 minute travel time at an average speed of 8km/h and should be encouraged to support a healthier residential population. Figure 55 provides an understanding of the market catchment that could potentially travel by bicycle for trips to Nelson Bay.

The plan indicates that a high proportion of the Nelson Bay catchment could potentially travel to Nelson Bay by bike, although it is also acknowledged that not all trips or residents are suited to cycling.

Figure 55 Nelson Bay Active Transport Spatial Analysis



6.7 Road Safety

Road crash information for the Nelson Bay town centre was analysed using data provided by PSC for the five- year period (2005-2010). A summary of the data is provided in Figure 56 and Figure 57.

The key trends observed from the data are as follows:

- 30 crashes occurred during the six-year study period along the town centre road network;
- 80% of the crashes occurred at intersections;
- 60% of the recorded road crashes resulted in an injury, and no fatalities were recorded during this period;
- More than 50% of crashes had a relationship with the operation of Stockton Street;
- 6 of the crashes (20%) involved pedestrians and cyclists with crashes recorded at intersections at Stockton Street with Donald Street and Victoria Parade and Teramby Road;
- 43% (13) of all crashes were recorded to occur as a result of a relationship with vehicle performing a conflicting turning movement at an intersection; and
- 23% (7) of all crashes occurred at the Stockton Street with Tomaree Street intersection.

Figure 56 Nelson Bay Crash History Snapshot (2005-10)

Source: Port Stephens Council Digital Data, 2011 and historical crash data(2005-2010) obtained from PSC

Note: Green circles represent crashes with recorded injuries and red triangles indicated a non-injury (property damage) recorded crash. Only crashes reported to the police are recorded in this data base, which does not include near misses.

Improvements to the Stockton Street with Tomaree Street intersection should be a primary objective along with reducing conflict and protecting pedestrian movement at the intersection of Stockton Street with Donald Street. It is noted that a roundabout was recently constructed at Stockton Street with Dowling Street, which has resulted in a reduction in the number of crashes in this area. Current and future operational needs should also be considered for the intersection of Donald Street with Church Street and the roundabout at Victoria Parade with Teramby Road.

Figure 57 Crashes Recorded at Town Centre Intersections

Source: Port Stephens Council Digital Data, 2011

6.8 Parking

This section presents the results of analysis of parking utilisation survey data, identifies locations where vehicles stay beyond the time restrictions and reviews parking rate provision for new development.

6.8.1 Parking Utilisation

Parking surveys undertaken on the Saturday of the 'Tastes at the Bay' festival have been analysed to understand parking utilisation rates in key car parking locations that support the town centre. The findings from the appraisal of off and on-street parking in the town centre are shown in Table 21 and Figure 58, and include parking locations, and average and maximum (peak) utilisation rates.

Table 21 Analysis of Parking Survey Counts

On-Street Parking			Off-Street Parking		
Location	**% Average Utilisation**	**% Maximum Utilisation**	**Location**	**% Average Utilisation**	**% Maximum Utilisation**
Donald Street	76%	95%	Donald Street East	45%	74%
Magnus Street	81%	92%			
Stockton Street	75%	89%	Donald Street West	86%	100%
Yacaaba Street	62%	82%			
Total	73%	88%		65%	86%

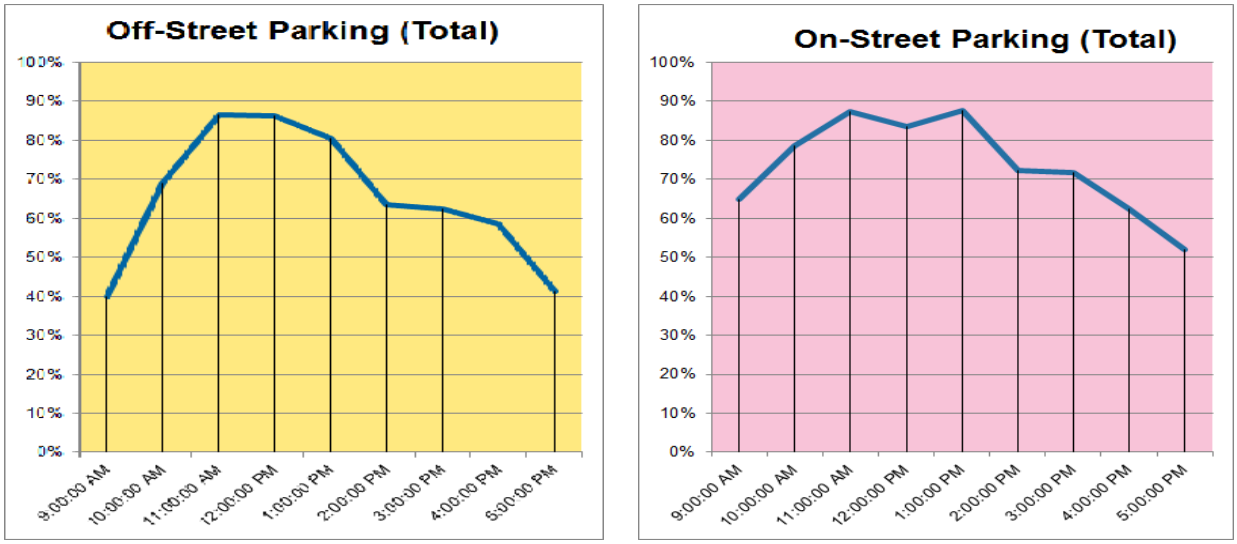
Source: Port Stephens Council Digital Data, 2011 and GHD parking surveys undertaken on an event day (Tastes at the Bay – Saturday, 5th November 2011).
Note: Utilisation is based on parking occupancy surveys undertaken every hour between 09:00 to 17:00 during the above event day.

In summary the parking appraisal indicated the following:

- Donald Street West car park and Stockton Street are the most popular parking areas and are situated with good access to core areas of the town centre;
- Donald Street West car park was the only parking area to reach capacity during the survey period;
- On-street car parking in Stockton, Magnus and Donald Streets recorded high average utilisation rates due to their proximity to town centre facilities; and
- There is spare capacity in the off-street car park on the eastern side of the town centre during peak demand periods on an event day and this may reflect poor wayfinding and its visual presentation.

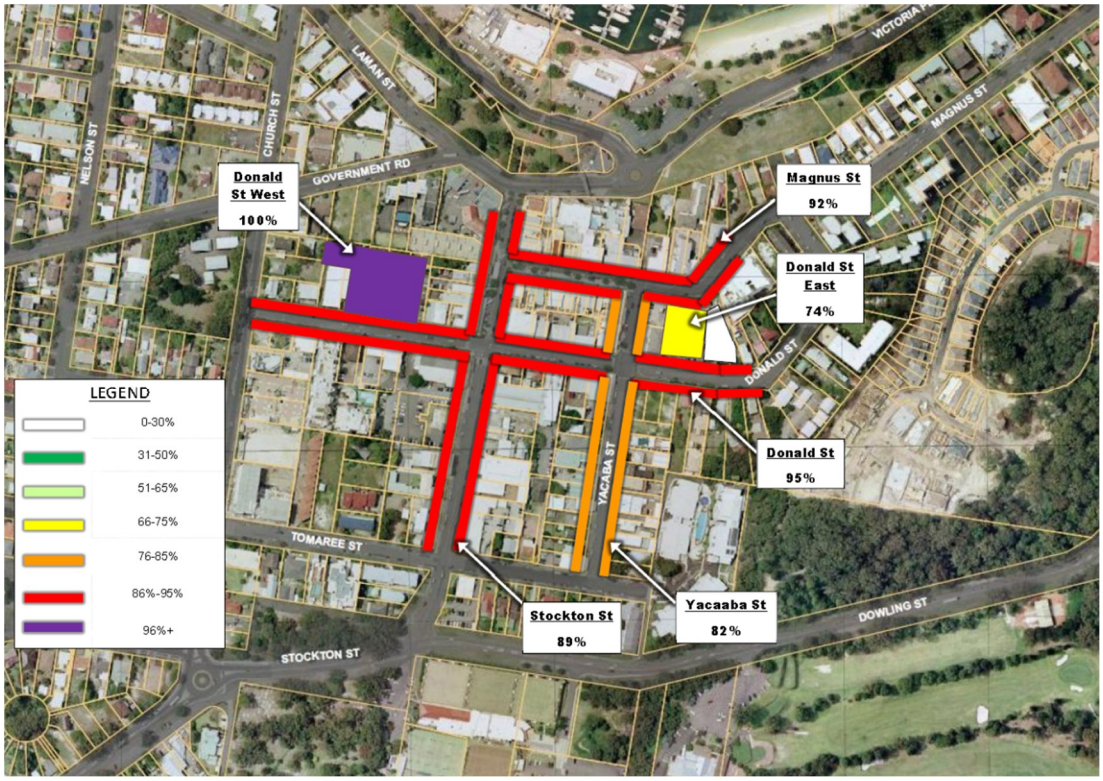
The daily utilisation parking profile for on and off-street parking areas are illustrated in Table 21 and Figure 58.

Figure 58 Daily Off and On-Street Parking Utilisation Rates



Source: GHD parking surveys undertaken on an event day (Tastes at the Bay – Saturday, 5th November 2011)
Note: Utilisation is based on parking occupancy surveys undertaken every hour between 09:00 to 17:00 during the above event day.

Figure 59 Maximum Parking Utilisation Rates

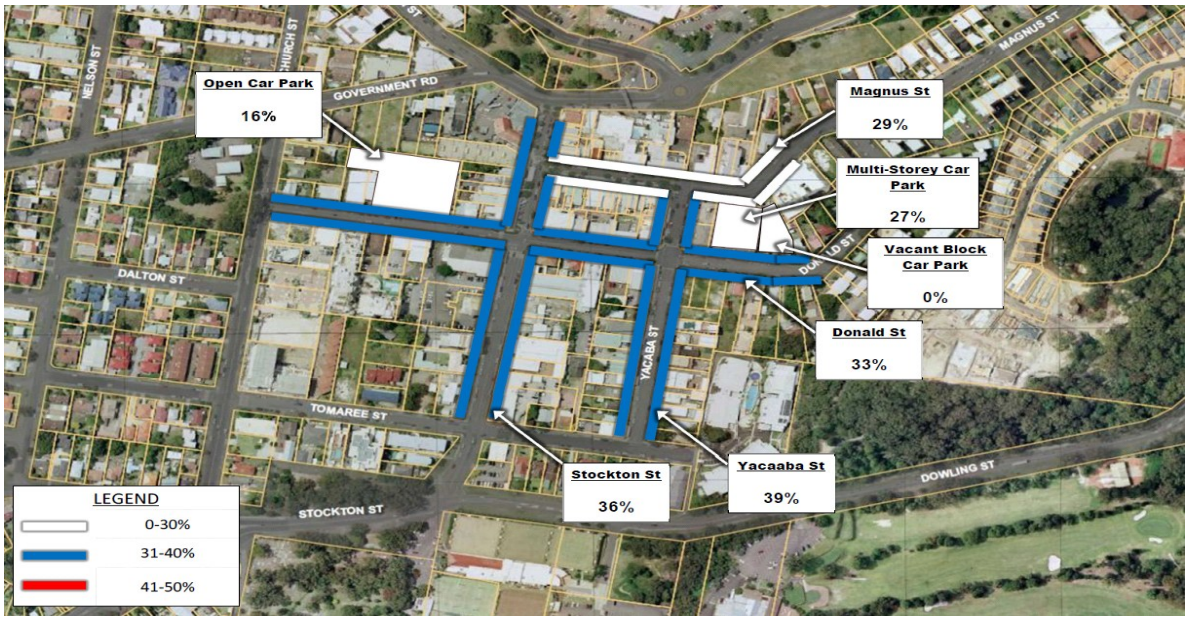


Source: Port Stephens Council Digital Data, 2011

6.8.2 Parking Overstay

Additional analysis was used to identify if there is a trend for parked vehicles to stay beyond the signposted parking time restrictions (overstay).

Figure 60 Locations Impacted By Parking Overstay



Source: Port Stephens Council Digital Data, 2011 and GHD parking surveys undertaken on an event day (Tastes at the Bay – Saturday, 5th November 2011).
Note: Overstay is based on vehicles recorded to overstay beyond the signposted parking restriction during the surveys undertaken every hour between 09:00 to 17:00 during the above event day.

Analysis of the data sets indicated that there is a parking overstay trend that occurs during peak periods on an event day. The overstay problem appears to be associated with on-street locations (in most cases over 30% of vehicles that park appear to overstay), and to a lesser extent this trend occurs in off-street parking areas. Overstay indicates that assets are not being maximised and in this case, accessibility of some land uses and business in the town centre may be impacted. It also is likely to result in increases circulating traffic, as vehicles search for an available parking space, which conflicts with pedestrian movement and have a negative impact on the performance of intersections in the town centre.

Improved enforcement may help to address is issue, which is an identified problem on an event day in Nelson Bay with 28% of all parked vehicles staying for longer than the permitted parking duration.

6.8.3 Parking Provision Rates Comparison

Table 22 provides a summary of the parking rate comparison undertaken using the current Port Stephens Development Control Plan (DCP) 2007, Road and Maritime Services standard guidelines[8] and other local council DCPs that were deemed to have similar area characteristics. The purpose of the review is to understand the current benchmark parking codes and based on the general codes if there is potential to adjust the current rates. The lower of parking rates is the current Port Stephens DCP 2007 is

[8] RTA Guide to Traffic Generating Developments, RMS, 2002.

envisaged to generally support event and high season travel demand management measures and increased use of active transport and public transport for travel in and around Nelson Bay.

Table 22 Review of New Development Parking Codes

Use	Facility	Port Stephens Council		Other DCPs	Action
Commercial	Hotel		1 space per Hotel room	Byron Shire Council and Lake Macquarie City Council increase parking rate based on room size.	No Action.
	Additional facilities associated with Hotel accommodation		Not applicable	Byron Shire Council 1 space /5m^2 of bar area 1.5 spaces /10m^2 for restaurant or function room 1 space per 2 employees	Adopt Byron Shire Council parking rates for additional hotel facilities that support future land use proposals.
	Hotel - Bar	Within Commercial Centre	1 space per 7m^2 licensed floor area 1 space per 10m^2 courtyard/beer garden	PSC rate in line with rates specified by Byron Shire Council and Lake Macquarie City Council.	No Action.
	Restaurant	Within Commercial Centre	4.5 spaces per 100m^2 GFA	Other council areas use higher rates except Lake Macquarie, which is slightly lower.	No Action.
		Outside Commercial Centre	15 spaces per 100m^2 GFA or 1 space per 3 seats (whichever is greater)		No Action
	Commercial Premises		1 space per 40m^2 GFA	PSC rate in line with most other DCPs. Byron Shire Council specified a higher parking rate.	No Action.
	Shop		1 space per 20m^2 GLFA	Lake Macquarie City Council and Coffs Harbour City Council specify a lower parking rate.	No Action.
Residential	Dwelling	Up to 2 bed	1	PSC rate in line with most other DCPs. RMS specify a lower parking rate for 3 beds or more.	No Action.
		More than 2 bed	2		
	Flats	Less than 100m^2 More than 100m^2 Visitor spaces	1 per dwelling 2 per dwelling 1 per 3 per dwellings	Macquarie City Council and RMS specify a lower parking rate for larger dwellings. Byron Shire Council and Lake Macquarie City Council, specifies a lower visitor parking rate.	Potential to lower for dwellings more than 100m^2 to 1.5 per dwelling and visitor parking rate to 1 per 4 dwellings.

The findings from this review indicated that there is potential to reduce the parking rates in the current Port Stephens DCP (2007) for flats over 100m^2 and for visitor parking. The inclusion of parking for additional hotel facilities may need to be a consideration of proposed new development along the foreshore.

6.9 Summary

Based on the surveys and analysis undertaken, the following key points were noted:

- Road Network;
  - The road network performs well, with spare capacity available during a typical weekday peak periods; and
  - Under a weekend event peak period the road network performed satisfactory in most locations with some areas identified to require additional capacity improvements.
- Midblock and intersection performance;
  - Stockton Street with Donald Street and Church Street with Donald Street intersection are key nodes in the network and were observed to perform at or near to capacity during weekend event day peak periods;
  - Assessment of the Donald Street/Stockton Street intersection indicated that delays occurred due largely to the volume of pedestrians and its conflict with circulating traffic in the town centre during an event day peak period;
  - The intersection of Church Street with Donald Street would benefit from upgrading to a roundabout and offer spare capacity during event day peak periods to accommodate future growth;
  - All other intersections appraised offer spare capacity during event day peak periods and can accommodate future growth;
  - Nelson Bay Road is operating over capacity during peak periods on a weekend event day;
  - Church Road was recorded to have spare capacity of over 250 vehicles in the peak direction at peak times on an event day;
  - Government Road was recorded to have over 5% spare capacity at peak times on an event day;
  - Magnus Street was recorded to have spare capacity of over 250 vehicles in the peak direction at peak times on an event day;
  - Dowling Street was recorded to have substantial available capacity at peak times on a typical weekday; and
  - Capacity enhancements or the removal of traffic from Nelson Bay Road, Stockton Street and Donald Street would assist improve the performance of the network during peak periods on weekend event day.
- Crash History
  - The intersections of Stockton Street with Dowling Street and Stockton Street with Tomaree Street recorded the highest crash rates in Nelson Bay, representing approximately 40% of all crashes.

The former intersection has been improved to roundabout control and resulted in a reduction in recorded crashes. The latter intersection is a remaining issue and should be addressed as part of future works;

- Victoria Parade recorded a number of crashes along its entire length, which reflects the level of activity, parking conflict, and its use as a through route by traffic travelling to areas to the east of the town centre; and
- Dowling Street was observed to have a relative low crash history rate.

- Parking
  - Parking was well utilised on an event day in November with spare capacity identified at all times in Donald Street east car park, which indicates that it is an underutilised asset;
  - Donald Street west car park and Stockton Street were identified to be the most popular parking destinations in the town centre performing with parking utilisation levels of 80% or above throughout a weekend event day;
  - An average parking overstay rate of 28% was identified for vehicles parking beyond the current time restrictions during a weekend event day;
  - On-street parking in Donald, Yacaaba, Magnus and Stockton Streets and off-street parking in Donald Street east car park were identified as locations impacted by vehicles parking beyond the time restrictions with an average overstay rate of 20% or over;
  - There is potential to reduce the current DCP 2007 parking rate requirement for flats over 100m^2 and visitor parking;
  - There is a need to establish an additional hotel facilities parking rate for new development; and
  - Bicycle parking is not formally provided.
- Public Transport
  - Town Centre is served by a 30 min bus service frequency during peak times along Government Road and Magnus Street and an hourly bus service frequency along Stockton Street - Nelson Bay Road;
  - The current journey to work mode share for people travelling by bus is 2%; and
  - A park-and-ride site external to the town centre may help to support improvement in public transport service frequency.
- Pedestrian amenity
  - Pedestrian activity is concentrated in the town centre and foreshore areas and results in conflict with vehicle movement at Victoria Parade and along Stockton Street;
  - The performance at the intersection of Stockton Street with Donald Street is impacted by conflict between circulating traffic and pedestrian movement during peak periods on a weekend event day.;
  - There is limited pedestrian or cycling movement from areas to the west with Church Street;
  - Most roads located to the south of Donald Street were identified to have poor quality footpaths and/ or cycle environment and overall its connectivity to the town centre would benefit from

infrastructure related improvement; and

– There is potential to support growth in walking and cycling through targeting growth within Nelson Bay town centre and foreshore areas, encouraging higher quality medium density mixed land use development and improving access by cycling or walking from existing surrounding areas to the west and east.

7. The Strategy

This section outlines improvement options that have been developed to improve the current transport environment within Nelson Bay and support for the draft Nelson Bay 2030 Strategy.

7.1 Transport Improvement Framework

The strategic planning principles and local and regional transport objectives for supporting the future growth and transformation of Nelson Bay are highlighted in Table 3 and summarised below:

1. Provide a **safe and efficient network** for travel to Nelson Bay and support predicted growth in the draft Nelson Bay 2030 Strategy (refer to road network management);
2. Improve the **management of parking** and accommodating future growth (refer to parking management);
3. Optimising **access and circulation** within the town centre (refer to road network management);
4. Support and **encourage public transport** (refer to public transport); and
5. Support and **encourage** walking and cycling (refer to active transport).

The above principles together with the findings from the network appraisal were used to identify issues and a high level transport improvement framework, which are presented in Figure 61 and Figure 62.

Figure 61 Town Centre Network Conflict Profile

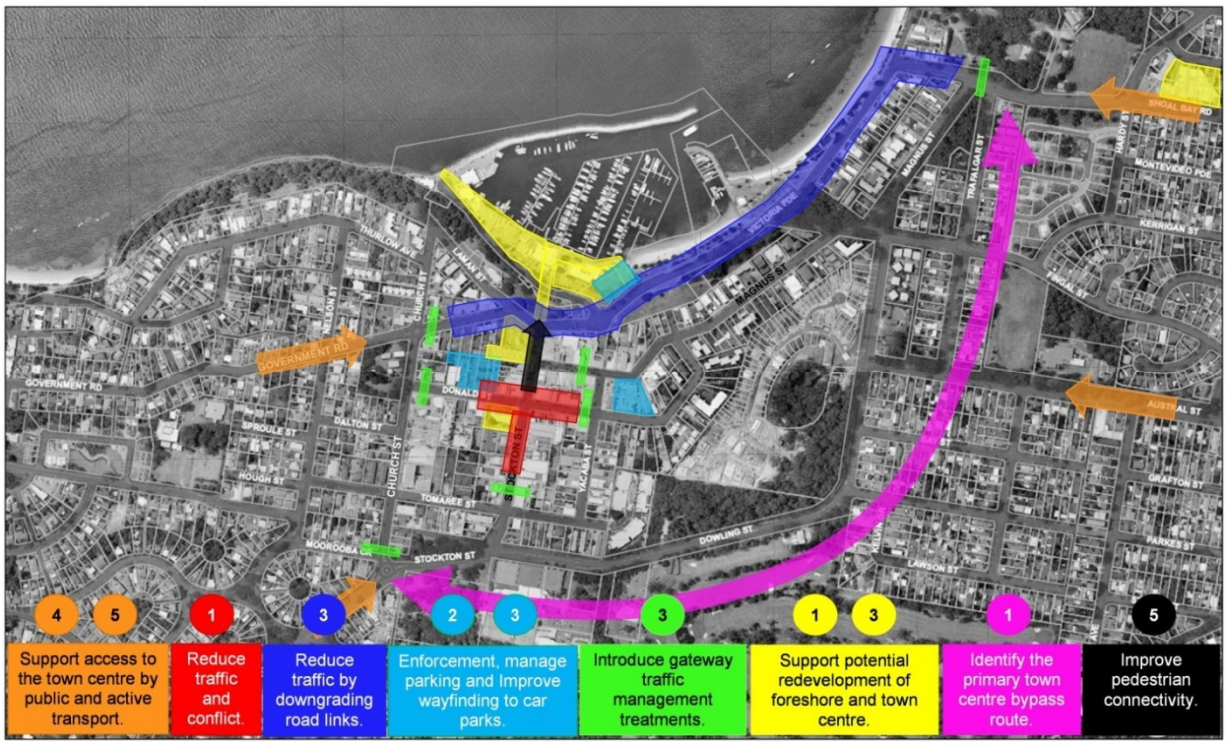
Source: Port Stephens Council Digital Data, 2011

Figure 61 indicates that the downgrading of certain roads and the refinement of access routes to and around the town centre would assist in reducing conflict, better managing demand and improve movement efficiency in and around the town centre. Based on this concept the following road function downgrades are recommended to be considered as part of the improvement option assessment:

- Stockton Street north of Tomaree Street to be downgraded as an access route to parking areas and to discourage circulating traffic in the town centre;
- Donald Street between Donald Street west car park and Yacaaba Street to be downgraded to discourage circulating traffic in the town centre;
- Government Road between Church Street and Teramby Road to be downgraded to discourage through traffic and improve pedestrian connectivity between the town centre and foreshore areas;
- Downgrade Victoria Parade between Teramby Road and Magnus Street to discourage through traffic and promote the Dowling Street bypass; and
- A possible Park-and-Ride site to the south of Nelson Bay and the introduction of Dowling Street as a town centre bypass route would also assist in managing travel demand during peak periods and help to optimise current network assets.

The high level improvement framework is presented in Figure 62 and discussed in further detail within the strategy section of this document.

Figure 62 Nelson Bay Transport Improvement Framework



Source: Port Stephens Council Digital Data, 2011

The numbers shown in Figure 62 are directly linked to the themes identified in section 7.1 and associated with the following strategies:

1. Road network management – focus on improving safe and network efficiency;
2. Parking management – focus on better managing parking and accommodating growth;
3. Road network management – focus on optimising town centre access and improving traffic circulation;
4. Public transport – focus on supporting and encourage public transport; and
5. Active transport – focus on supporting and encouraging people to walk and cycle.

This high level transport improvement framework will be described in further detail in the following sections.

7.2 Road Network Management Strategy

The following section outlines the Road Network Management Strategy, which aims to provide an attractive, efficient and safe road network for all users.

7.2.1 Local Road Network Issues

The key road network issues in Nelson Bay relate to:

- Road hierarchy – defining the hierarchical structure of the town centre street network in the context of improving access to eastern areas of Nelson Bay, Fingal Bay and Shoal Bay, the role of the Nelson Bay as a specialised tourism area, protecting the urban core, and the relationship between Foreshore area and town centre;
- Road cross-section/layout – assessment of the appropriateness of current road cross-section layouts for the key streets in the town centre in light of changing roles, functions and priorities; and
- Traffic management – identify measures that would assist in achieving road network development and integrated transport objectives.

7.2.2 Road Network Management Task

The key elements in formulating the Road Network Strategy are provided below:

- Provides an integrated approach to road network planning and management across the various categories of roads such as local, regional, state and national roads;
- Recognises the different roles that various roads perform and provides specific controls or objectives for each type of road environment;
- Understands the function of roads can vary along their length according to movement and access functions, and therefore objectives and tools for management should also vary;
- Manages the competing demands for access to the road network;
- Where possible, segregates user classes across the road hierarchy, which will generally aid in

maintaining the efficiency and safety of the road environment for all users; and

- Provides a structured approach to road network development that recognises the changing role of roads within Nelson Bay will play as the centre's economy changes to more consistent tourism related business activity and events.

In order to achieve these goals, it is recommended that Port Stephens Council develop an integrated road network strategy that will ensure important roads serving Nelson Bay are developed and managed in a way that achieves the approach outlined.

7.2.3 Road Network Management Principles

The Road Network Management Strategy has been developed using the following planning principles.

Providing for Economic Activity and Land Use Change

It is recognised that whilst Nelson Bay has traditionally been the tourism centre for Ports Stephens LGA, its role as a specialised tourism area under the Lower Hunter Regional Strategy requires it to accommodate a proportionate share of targeted increases in population and employment. These target increases and planned improvements in the quality of the product the centre offers will result in changes in the economic framework, day to day activity and land use and as a result will affect the demand for transport, specifically road transport. Economic activity and its relationship with the surrounding catchment in the Tomaree Peninsula will create additional travel demand to and from Nelson Bay as it evolves as a specialised tourism centre.

Providing a Bypass

The Nelson Bay road network is signposted to function in several different ways, which is driven by previous historical changes to the network and additional needs under seasonal traffic trends. This current arrangement leads to confusion as several routes are signposted as a bypass and travel either through or around the town. This includes the Church Street-Government Road- Victoria Parade bypass, Church Street – Donald Street – Magnus Street high vehicle bypass, and Dowling Street – Fingal Street – Trafalgar Street bypass. A bypass should offer a fast and efficient route and aims to minimise conflict. Due to the level of activity during peak periods and events the Government Road - Victoria Road route option is not available as a bypass during busy periods when the need for a bypass is critical to efficiently managing access to and around the centre.

Most locals are aware of the Dowling Street bypass, which unlike other route options avoids conflict in the town centre and highly conflicting activity along the foreshore. This route forms an efficient bypass around the town centre and enables vehicles to travel east to Fingal Bay and Shoal Bay.

Protecting Core Activity Areas

In the town centre, it is appropriate to slow traffic to match the surrounding land use environment. This has already resulted in speed restrictions of 10 km/h, 40 km/h and 50 km/h. A range of traffic management tools can be introduced to further slow traffic in the town centre, including narrowed lanes, reduced number of lanes, gateway treatments, provision for kerbside angled parking, and thresholds at intersections as well as speed enforcement strategies.

Providing for Pedestrians, Cyclists and Public Transport

There is now a greater recognition in the community that roads are transport corridors that must provide for a range of uses in addition to private vehicle traffic. Prioritisation of infrastructure for pedestrians, cyclists and public transport is required for a range of reasons including providing for greater equity, lower environmental impacts and creation of sustainable and attractive neighbourhoods.

As roads are upgraded within Nelson Bay, and as traffic growth leads to congestion, the need for alternative facilities for pedestrians, cyclists and public transport will become even more pressing.

Maintaining Safety and Amenity on Local Roads

The traditional role for local government with respect to road transport has been to provide, control and manage local roads. This role is a vitally important part of the integrated transport approach. On local roads, the key objective will be the ability to provide for local accessibility while maintaining a safe and attractive urban environment. This is achieved through a variety of approaches including adequate network planning, maintenance and where required, traffic calming.

7.2.4 Road Network Management Improvement Strategy

This section outlines the Road Network Management improvement options that have been developed for Nelson Bay. The improvement options are designed to assist with the safe and efficient management of traffic flow to car parks within the town centre, to protect high activity areas and support the gradual development and implementation of an integrated transport strategy for Nelson Bay.

Strategy RNM 1 – Revise Road Hierarchy (1)

Revise the existing road hierarchy based on functional classification and focus on movement efficiency and access and the better integration of land use and the road based transport network.

Approach

The traditional road hierarchy is based on a functional system that categorises roads in terms of their traffic function. This predicates a focus on vehicular movement and provides for mobility under road categories, which include arterial roads, sub-arterial roads, collector roads and local roads. Together, the functional hierarchy address the vehicular movement requirements for an area.

In general, the higher order roads are deemed to have a predominant ‘traffic function’ while the lower order roads have a predominant ‘access function’. It is important to take a balanced approach in the planning of routes, which should not be solely dominated by satisfying road demand and mobility when planning, designing and managing the road system. This type of approach would be at the expense of other user groups and the accessibility function also played to some extent by the high order road system serving established urban centres. It is just as important in the planning of the road hierarchy to consider the needs of local businesses, cyclists, pedestrians and bus services and to understand access requirements, which will help to deliver a more balanced outcome that can provide an integrated solution and encourage the access by other modes.

The planning of a bypass options is critical to the success of providing an integrated road network and offering improvements in efficiency and safety outcomes. The aim of the route is to provide an efficient,

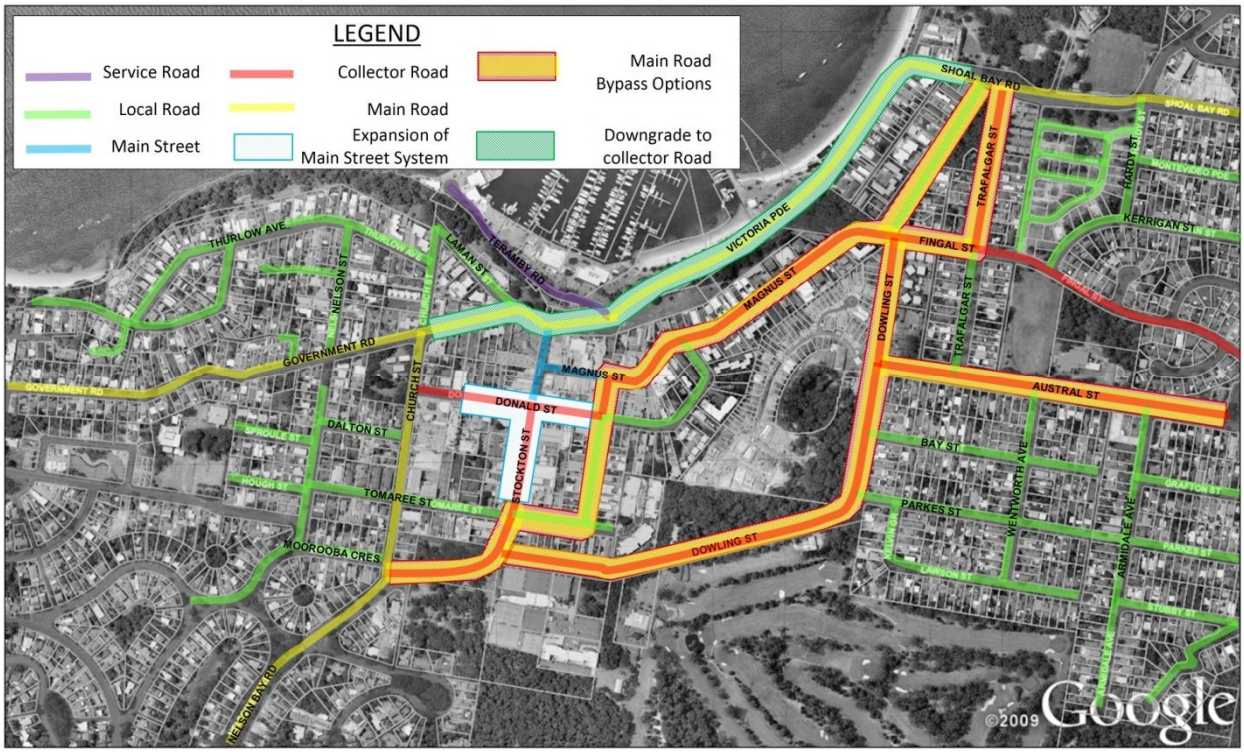
safe, direct and consistent route, which avoids delays that could be encountered in Nelson Bay when travelling east to neighbouring suburbs. Figure 63 provides an understanding of the current options and the basic principles for reducing conflict in high activity areas.

Strategy RNM 1a – Improve and promote Dowling Street - Trafalgar Street as an interim bypass

Requirements - Signpost as the preferred route for traffic travelling to destinations to the east of Nelson Bay town centre. Other associated improvements include:

- Improving critical intersections;
- Introducing traffic management that would aim to complement gateway treatments;
- Investigate and improve access and obstacles to safe and efficient movement along the corridor;
- Remove signage indicating Victoria Parade as a possible through route to destinations in Shoal Bay and Fingal Bay; and
- Undertake a road safety audit along the route to ensure that road safety risks are mitigated, impact on surrounding residential areas is appropriately managed and to ensure that intersections have the optimum layout to support the revised through traffic route and the desired access routes to surrounding areas.

Figure 63 Road Network Improvement Options



Source: Port Stephens Council Digital Data, 2011

Strategy RNM 1b - Develop Dowling Street and Magnus Street as a permanent bypass.

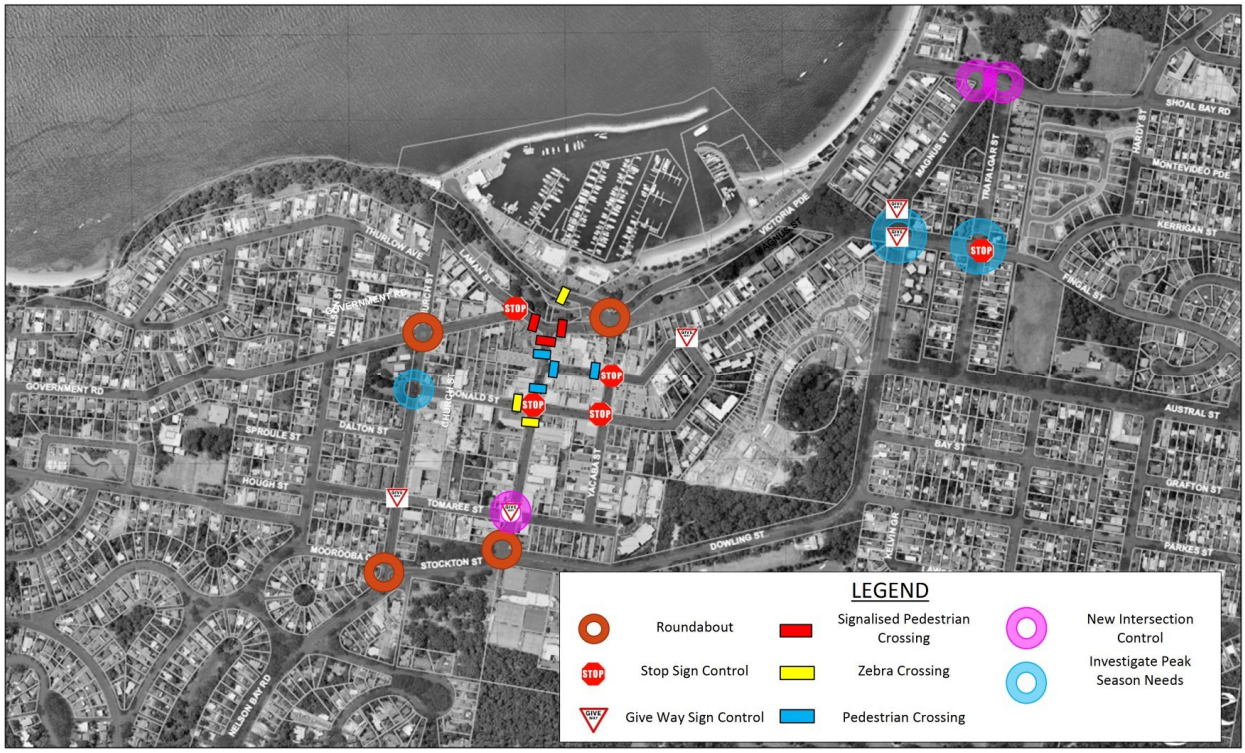
Requirements – Similar to those mentioned under improvement option 1a. This option would provide enhance the current bypass arrangement by reducing route complexity and conflict by aligning Dowling Street at the intersection with Magnus and Fingal Streets.

As indicated in the results of the SIDRA analysis of event peak flows in Table 20, the Stockton Street with Donald Street and Church Street with Donald Street intersections are critical and perform with a relatively poor level of service during peak periods. These routes are also key access routes to car parks and the town centre main streets. It is essential that a proposed bypass route removes pressure from these intersections by managing and separating traffic flow through the centre.

Preliminary design and associated road development appraisals should be undertaken for the implementation of a town bypass along Magnus Street and Dowling Street. The design should include gateway intersection treatments and wayfinding improvements to promote the new route and to remove traffic pressure from Nelson Bay. The gateway intersections and decision making points are critical treatments for the implementation of this scheme and should be implemented at the intersections of Stockton Road with Nelson Bay Road and Stockton with Dowling Street in the west and in the longer term Shoal Bay Rd with Magnus St in the east. This permanent bypass route requires the realignment of Magnus Street at the eastern end of Dowling Street to make it a continuous through route. This will create a safe, efficient and legible route around the town centre and the planned reconfiguration of the intersection should provide priority to movements along the Magnus Street - Dowling Street bypass route.

In order to implement this scheme and test the appropriateness of intersection it is important to collect additional traffic data, undertake detailed analysis of intersection performance and better understand the performance needs under various seasonal traffic scenarios. Once movement trends and requirements are better understood and managed, it will be necessary to undertake road safety audits to help further advance the development of a preliminary road design concept for the bypass.

Figure 64 Traffic Control Improvement Options



Source: Port Stephens Council Digital Data, 2011

Strategy RNM 1c - Reprioritise movement at bypass intersections (2)

Requirements – Reprioritise movement at the Trafalgar Street with Shoal Bay Road (interim) and Magnus Street with Shoal Bay Road (permanent) intersections to provide priority for traffic travelling to Shoal Bay and Fingal Bay, and support the operation of the town centre bypass presented in options 1a and 1b.

Upgrade one of the above intersections and install town centre/foreshore gateway treatments to identify destinations and the purpose of the route. This can be achieved through either the installation of a roundabout or redefining the priority movement at the intersection.

Strategy RNM 1d - Downgrade Victoria Parade (3)

Requirements – Downgrade Victoria Parade as a through route to Shoal Bay and Fingal Bay, and promote as a route for access to the foreshore only. Use signage and traffic calming measures to discourage traffic and divert it away from Victoria Parade for trips to destinations beyond the foreshore.

Reduce the signposted speed limits along Victoria Parade to Magnus/Trafalgar Street and extend the existing 40km/h speed zone on Government Road to Church Street. This improvement option allows for a safer and more pedestrian friendly environment along the foreshore and helps to reduce the levels of traffic during events that acts as a barrier for pedestrians moving between the foreshore and town centre. This should be implemented and assessed in conjunction with the requirements set in the 'Guide to Identifying and Implementing 40km/h Speed Limits in High Volume Pedestrian Areas[9]' and NSW Speed

[9] 40 km/h speed limits in high volume pedestrian areas: A guide to identifying and implementing 40 km/h speed limits in high volume pedestrian areas. Roads and Maritime Services.

Zoning Guidelines[10].

Strategy RNM 1e – Downgrade Stockton Street (12)

Requirement – Reduce the width of Stockton Street between Tomaree Street and Donald Street to discourage through traffic movement in an area that attracts high levels of activity during event days. The aim is to help to reduce conflict at the intersection of Donald Street and Stockton Street by discouraging the use of Stockton Street as a thoroughfare and offering an opportunity to improve pedestrian amenity and potential increase on-street parking supply. Pedestrian amenity can be improved by reducing traffic levels, widening footpaths, consolidating vehicle access points, decreasing speed limits and offer additional on-street parking supply (through a change from parallel parking to 90 degree or other angled parking arrangements).

Strategy RNM 2 - Investigate the feasibility of introducing the Yacaaba Street extension (4)

Requirements – This is proposed to be achieved through the creation of a new road link between the Magnus Street with Yacaaba Street intersection and the Teramby Street with Government Road/Victoria Parade roundabout. An initial appraisal has been undertaken of the available options to identify the functionality needs of this link, which will be used to inform the feasibility of this option. The options assessed included:

- Improvement Option a – Two way street providing an additional vehicle link between the town centre and foreshore area;
- Improvement Option b –One way southbound for traffic travelling from foreshore to town centre;
- Improvement Option c – One way northbound for traffic travelling from town centre to the foreshore;
- Improvement Option d – Bus only transit link to support a shuttle bus or extension to the existing bus service routes; and
- Improvement Option e – Shared path only link for pedestrians and cyclists to travel between the foreshore and town centre and as a focal point to encourage other activity.

The finding from the initial appraisal indicates that each of the improvement options provide little short to medium-term benefit to the operation of the town centre road network without significant changes to land use and access. The future arrangement of the town centre and foreshore areas that would both benefit or be impacted by this proposal are not fully developed, nor are its advantages in relation to improvements in public transport or pedestrian connectivity.

The appraisal did identify that there is an opportunity to provide an additional pedestrian, cycle and public transport connection via this corridor between the town centre and foreshore areas, which could also offer access to the existing pedestrian bridge over Victoria Parade. This may offer advantages to commercial development on Yacaaba Street and Magnus Street and offer an opportunity for the Donald Street east car park to better serve users of the town centre and foreshore areas. In reference to the analysis it is currently unknown if the alignment of the corridor would be suited to vehicle or active transport access and this will need to be further investigated as part of developing a preliminary design and feasibility stages of the study.

On the basis of the preliminary analysis, it is recommended that this corridor is protected until the long-

[10] NSW Speed Zoning Guidelines, Roads and Maritime Services,2011.

term masterplan for Nelson Bay and its foreshore area is finalised. This will avoid the removal of a future corridor opportunity that could support growth and help to improve connectivity and accessibility in the town centre. It is also recommended that vertical alignment options are developed to better understand how a future link can be connected to the existing road network.

Strategy RNM 3 - Investigate upgrade needs for Nelson Bay Road and the Fingal Bypass (5)

Requirements – Previous studies and strategies have identified that improvement of Nelson Bay Road can be achieved through duplication or other capacity enhancements. These proposals are aimed at resolving a peak season capacity deficiency. The alternative to introducing capacity enhancement along Nelson Bay Road is to introduce the Fingal Bypass, which is also acknowledged as an option for resolving capacity issues along Nelson Bay Road. Further investigation of the road corridor reserved for either duplicating Nelson Bay Road or introducing a Fingal Bypass should be supported by continuous data collection and traffic appraisals. This would allow a better understanding of the annual and seasonal traffic growth and peak profiles that would help to justify the scheme and a preferred route option.

A conservative estimate of the future traffic on Nelson Bay Road can be made by assuming an average annual growth rate of 2%. Applying this rate over a period of ten years to the more critical northbound/eastbound peak hour flow of 653 vehicles for a typical weekday (refer Table 14) results in a traffic flow of 718 vehicles per hour in 2021. The volume to capacity ratio in this period ranges between 0.75 to 0.89, or a level of service D. Based on this analysis, Nelson Bay Road has adequate capacity to accommodate typical weekday traffic flows for a period of approximately 10 years. It is also noted peak major event and high season traffic conditions are not addressed under this appraisal and are identified to result in Nelson Bay Road performing unsatisfactory during certain periods.

It is recommended that seasonal traffic conditions and growth is monitored annually to help to obtain a detailed understanding of traffic conditions, peak frequency and performance along Nelson Bay Road. This information is required to develop and appraise the benefit and feasibility of a future bypass for the Tomaree Peninsula and the township of Nelson Bay.

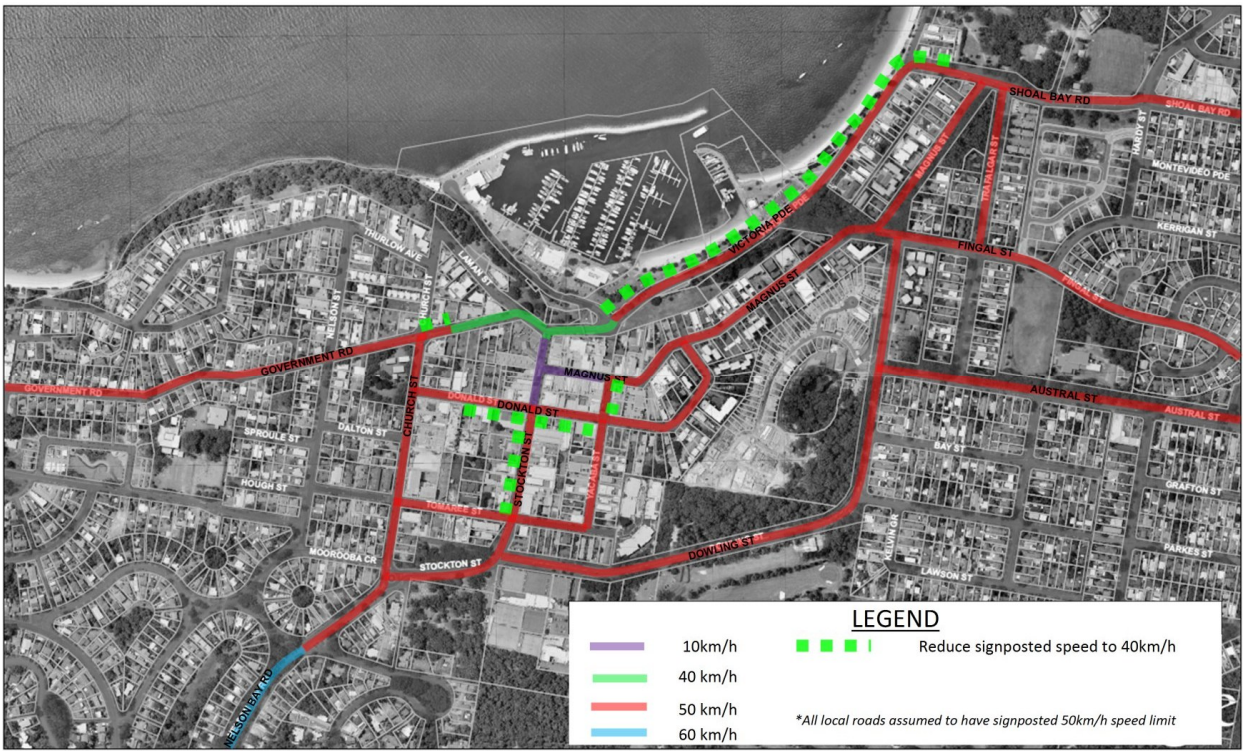
Strategy RNM 4 - Reduce signposted speed limits in main streets (11)

Requirement – Reduce the signposted speed limit from 50km/h to 40km/h in the core areas of the town centre, which function as town centre main streets. This includes Stockton Street (between Donald Street and Tomaree Street) and Donald Street (between the Donald Street west car park and Yacaaba Street) and will help to improve pedestrian amenity, manage conflict, discourage through traffic and help to define the boundary of high activity in the town centre road network. This should be implemented and assessed in conjunction with the requirements set in the 'Guide to Identifying and Implementing 40km/h Speed Limits in High Volume Pedestrian Areas[11]' and NSW Speed Zoning Guidelines[12].

[11] 40 km/h speed limits in high volume pedestrian areas: A guide to identifying and implementing 40 km/h speed limits in high volume pedestrian areas. Roads and Maritime Services.

[12] NSW Speed Zoning Guidelines, Roads and Maritime Services,2011.

Figure 65 Traffic Management Improvement Options



Source: Port Stephens Council Digital Data, 2011

Strategy RNM 5 – Reduce crash rates by upgrading traffic management (13)

Requirement – Investigate options for changes to the intersection controls at the Stockton Street with Tomaree Street intersection. This could be supported by signage that encourages traffic to travel along preferred access routes to parking areas and other town centre destinations.

Strategy RNM 6 – Introduce town centre gateway treatments (26)

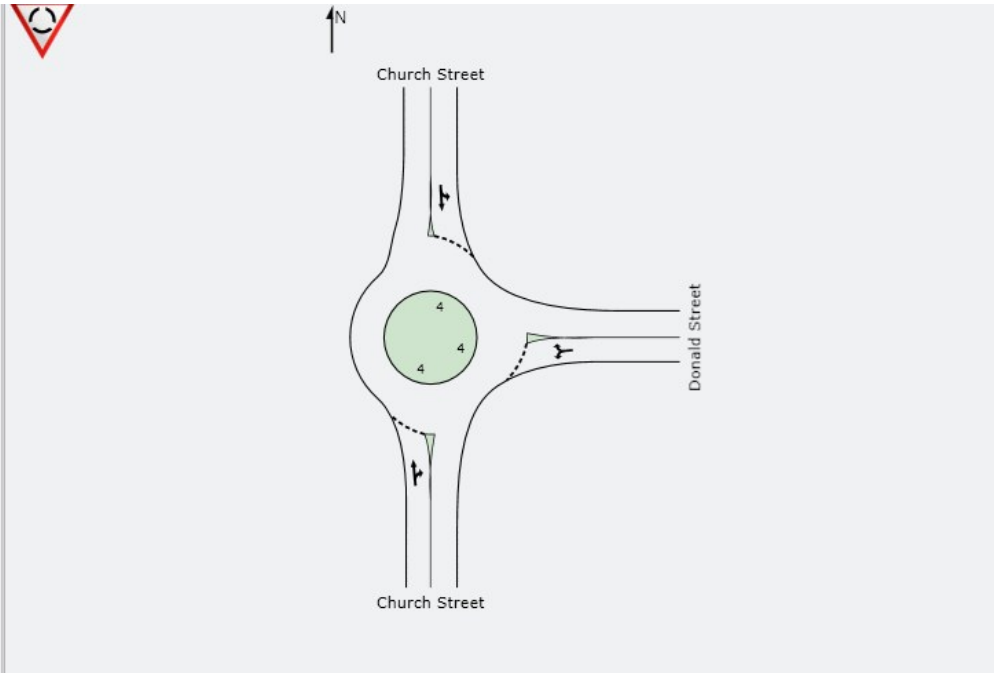
Requirement – Install gateway treatments on town centre and foreshore area entry points to increase awareness of the function of the road system in this area and to complement planned changes in signposted speeds. This improvement option supports the local transport strategy objective for controlling access, improving safety and supporting growth by improving road network operations in the town centre and foreshore areas.

Strategy RNM 7 – Upgrade Church St with Donald St to a roundabout (27)

Requirement – Install a roundabout to replace the existing traffic control arrangement at the Church Street with Donald Street intersection to assist bus movement, potential future growth, peak period event day traffic conditions (refer Figure 66). This treatment will help to delineate Donald Street west as the western gateway to the town centre and supports Church Street as a route for bypassing the town centre and foreshore areas. This improvement option supports the local transport strategy objective for controlling access, improving safety and supporting growth by improving road network operations in the

town centre and foreshore areas.

Figure 66 Proposed Roundabout at Church St / Donald St



7.3 Parking Strategy

This section recognises the competing demands for car parking and sets out a Parking Strategy to manage the use of parking to improve overall accessibility, manage traffic levels and reduce traffic impacts.

7.3.1 Local Parking Issues

The key issues relating to parking in Nelson Bay town centre include:

- Physical configuration of Stockton Street kerbside parking between Tomaree Street and Donald Street may contribute to the perception of high volumes of through traffic and concerns, which impacts on accessibility and pedestrian safety. Even if through traffic is discouraged, the configuration of parking and access arrangements may continue to contribute to relatively high volumes of car movements;
- The removal of parking in the foreshore area and the redevelopment of the Donald Street west car park. This site is intended to cater for not only the redevelopment of the foreshore area, but also of other existing and new developments in the town centre. The impacts of the traffic generated by this significant car parking area needs to be considered in more detail as design progresses and further details of development and their staging is better understood;
- The development of a major event and peak season park-and-ride site. This site is intended to cater

for major event parking demand and the impacts from reducing traffic and parking demand on Nelson Bay Road and town centre roads and parking areas needs to be considered in more detail as the concept and design progresses;

- Opportunities for shared parking need to be investigated to assess the quantum of kerbside car parking spaces that may need to be made redundant if the Donald Street west car park development or external park-and-ride site is implemented; and
- Future parking strategies need to consider progressive restrictions (time limits, pay parking) if objectives of reducing dependence on private car travel are to be achieved.

7.3.2 Parking Task

The key elements in formulating the Parking Strategy for Nelson Bay are provided below:

- Establish the basis of local parking needs and the required day to day balance for attracting visitors travelling to Nelson Bay during peak, shoulder peak and non-peak tourist periods;
- Recognise that as the intensity of development or the number of major events increases it will not be possible to meet unrestrained parking demand in some parts of the town centre;
- Promote parking as a travel demand management measure and an important part of a package of measures to improve overall accessibility, manage traffic levels and reduce transport impacts; and
- Extract the highest value out of existing and proposed parking facilities with the recognition that on-street parking is not an entitlement, but rather a resource to be managed and distributed within the community and that the removal of 'free' or discounted parking may improve access.

It will therefore be necessary for Port Stephens Council to develop an area wide parking framework (and associated controls) that will best achieve the transport and accessibility aspirations of Nelson Bay.

7.3.3 Parking Principles

Parking User Types

The different types of parking users expected to park in Nelson Bay town centre are understood to consist of:

- Short-term visitor parking

Typically short-term visitor parking is situated on-street or in an off-street car park controlled by Council. This type of facility should cater for vehicles staying up to 2 hours and are typical controlled through time restrictions and parking fees or a combination of the two, and enforced by council's rangers. Legible and direct access to these areas is critical and the user generally presents a characteristic that shows a willingness to pay for locality and convenience.

- Commercial parking

Commercial parking is typically situated off-street in proximity to a commercial centre and requires good road access. Depending on the on-street parking restrictions, this parking user type can sometimes be supported by on-street parking. The planning of parking for this user group should concentrate on

offering access to available spaces and minimising the need to cruise to identify an available parking bay. The off-street parking facilities are often shared with other surrounding land uses and in the case of Nelson Bay can sometimes conflict with high season demand. This user type can stay up to 6 hours and is typically controlled through pricing and time restrictions, which is either set by Council or a private land owner. These types of facilities and user group will be generated by activity both in the town centre and foreshore area and would ideally be incorporated into future development / re-development in such a way that provides both a high quality urban design and traffic outcome.

- Commuter or Employee parking.

Commuter parking is typically provided in an off-street location by the facility it serves and in the case of Nelson Bay this would be generated by employment at local businesses. The demand is all day or long-term and is not highly sensitive to location. As a result, it may be driven to the edge of town centres, due to its perceived value and State Government's desire to control traffic growth by shifting this type of demand towards public and active transport. The adoption of parking controls that shifts parking demand further aware from the town centre needs to take into consideration together with its potential impact on surrounding residential areas. The parking itself needs to be highly accessible from key transport corridors and be provided on a consistent basis. Due the day to day use of this facility and the potential associated cost, commercial parking users are typically attracted to areas that don't have parking controls or fees and are situated within easy walking distance of a centre. User perceptions of safety, security and amenity should be considered in the design of these types of facilities, which are likely to be required during major events and high season.

- Long-term visitor parking

Typically long-term visitor parking is situated on-street or in an off-street car park, which is managed by either council or a private land owner. This type of facility should cater for vehicles travelling to the area on a one off basis and staying over 5 hours. The parking itself needs to be highly visible and accessible from key transport corridors and should easily be associated with the facility it serves through signage. The user typically highly values access, however is sensitive to costs and will consider attractive alternatives, if sites within proximity to the town centre and foreshore are promoted to be less desirable (through parking cost and availability). The display of information highlighting the parking arrangement on the day together with enforcement of parking areas within proximity to the centre during major events or high season is critical to successfully managing both congestion and parking demand in Nelson Bay. The enforcement is expected to be undertaken by council's rangers and signage and external parking may be outsourced to providers by the business benefactors.

Parking Demand

The nature of demand for parking is highly dependent on the location and mix of land uses in a particular area. Typically, parking demand is at its highest where higher density mixed use areas exist and in some cases conflict and are in competition for a limited parking supply resource. This can occur in centres with a retail, transport, recreation and local employment function. The parking duration for these land uses vary, and as a result the value of parking should be closely associated with need and usage. In general terms, shopping requires short-term parking (one to two hours duration), while parking at transport nodes, employment areas or tourist destination is typically for the duration of normal business hours, but

in some cases it can extend beyond this period. The presence of (all day) commuter or tourist parking is sometimes at the expense of commercial and retail activity, which typically occurs after commuters have arrived, attracts a higher turnover and requires the availability of short stay parking spaces in proximity to the centre.

Parking must therefore be sensitively located and managed. With these fluctuating demands for parking, a balanced approach is needed that incorporates both local accessibility to nearby shops and other services, whilst also catering for reason levels of demand generated for all-day parking by commuters and tourists.

The Benefits and Costs of Parking

Increasing parking availability can be used as a tool to stimulate activity in centres by improving access to facilities and services. However, widespread car park construction would be costly, add to congestion on the road network and may be to the detriment of nearby centres. Therefore, a common approach is to increase the availability of parking spaces by encouraging greater turnover. This can be achieved by limiting the duration of parking (e.g. to 1-2 hours) or by charging a time-based fee, usually via parking meters.

Parking as Part of an Integrated Transport Strategy

A strategy that focuses on the provision and management of parking facilities is necessary for Nelson Bay to ensure that parking is closely aligned with other transport strategies. Parking should be seen as one part of an integrated system to provide access to centres and services, in conjunction with travel by other modes such including public transport, walking and cycling. The impacts of parking and associated traffic generation should also be understood and managed.

Parking demand needs to be considered in the wider context of the LGA, the roads that provide access to potential parking facilities and the availability of alternatives such as public transport. Therefore, the level of parking provision should depend on the level of road access and the quality of alternative modes of access.

Travellers should be provided with the right information to allow them to modify their travel patterns and to take advantage of other parking options or alternative access modes. In the short to medium term, a reduction in the availability of car parking will encourage the use of alternative modes, resulting in positive effects not only for Nelson Bay, but other nearby centres as well. However, in order to maintain accessibility, this option is only possible if implemented in conjunction with supporting active transport improvements (for shorter distance trips) and high quality public transport alternatives.

7.3.4 Parking Management Strategy Improvement Options

This section outlines the Parking Management improvement options that have been developed for Nelson Bay. The improvement options are designed to assist with the management of traffic flow within the town centre, encourage movement between the town centre and the foreshore, and to increase pedestrian activity within the town centre.

Figure 67 Parking Management Improvement Options

Source: Port Stephens Council Digital Data, 2011

Strategy P1 –Improve direction signage and access to Donald Street car parks (6)

Requirement - Develop a town centre wayfinding direction parking signage plan to promote direct access to the off-street car parks in Donald Street. This will help to reduce cruising along town centre streets and help to influence decision making by offer clear directions along main road routes that avoid local congestion points within the town centre.

Strategy P2 – Provide long-term parking in town centre to promote access to the foreshore (7)

Requirement - This improvement option aims to provide long-term parking in a designated area of the town centre and encourage people to walk to the foreshore via the town centre. This can be achieved in the short-term through signing Donald Street east car park as a designated long stay/all day car park for both the Town Centre and Foreshore areas. In the longer term, it can be achieved through supporting future expansion plans for Donald Street west car park and the provision of designated parking and signage to promote it as a car park that serves the foreshore. Localised road network improvements may be required to support this option and should be further investigated once the project and its scale is better understood.

Strategy P3 – Improve town centre off-street parking facilities (8)

Requirement – Upgrade Donald Street east car park to increase its attractiveness to users and in the longer term redevelop Donald Street west car park to consolidate parking and filter visitors of the foreshore via the town centre. Identify funding sources and options for the upgrade of Donald Street east

car park, which includes signing, linemarking, landscaping, entrances, facades, lighting and security monitoring. The level of supporting infrastructure and funding required for Donald Street west car park will be better understood once the scale of redevelopment opportunity is better known.

Strategy P4 – **Improve parking enforcement during event days.**

Requirement - Improve parking enforcement in the town centre to address identified peak period overstay issues with an aim of optimising the use of existing parking assets by freeing up capacity through encouraging parking turnover during the peak periods. Parking enforcement should be targeted in high valued areas such as the foreshore and in the town centre.

Strategy P5 – Expand paid parking coverage

Requirement - Expand the existing paid parking to town centre during the peak season to help manage parking demand and to encourage parking turnover. After the introduction of better enforcement undertake a paid parking feasibility study to determine need, scheme coverage and required parking fee rates, which would help to better manage traffic demand and parking supply in the foreshore and town centre areas during high season and event days. This option is likely to be linked to a Park-and-Ride facility that is situated external to Nelson Bay and supported by real time parking information signage that informs visitors of parking availability and associated parking fees.

Strategy P6 – Provide a high season/event day parking (Park-and-Ride) (28)

Requirement – This improvement option should be coordinated with improvements in public transport services. The feasibility of implementing a satellite Park-and-Ride car park is reliant on improvement in bus operations or the introduction of a shuttle bus services during event days to help better manage parking supply. The public transport component ensures that a more efficient mode of transport is offered to help reduce traffic levels on approaches to Nelson Bay town centre and foreshore areas. This option will need to be supported by the implementation of parking information signage warning visitors of the lack of parking in Nelson Bay and the alternative option for travelling to Nelson Bay town centre and the foreshore area. It may also support a reduction in the quantum of works associated with the implementation of capacity improvements along Nelson Bay Road or help to delay the project known as the Fingal Bypass through better managing traffic demand along Nelson Bay Road during event days. The use of Tomaree Sports Centre is a possible option for this type of facility and should be further investigated by Council.

Strategy P7 – Provide advance parking information signage (29)

Requirement – Install parking information signage on Nelson Bay Road that informs visitors of the availability of parking in the town centre and foreshore areas. Such signage can also be used to encourage visitors to use certain areas through advertising availability and parking fees, which could help to promote a Park-and-Ride site as an alternative access option for travel into the town centre. This will help to reduce traffic levels in the town centre, influence decision making and encourage visitors to park and catch public transport to the town centre and foreshore areas. This improvement option supports the local transport strategy objective by protecting the town centre during peak periods and supporting growth by increasing parking supply and reducing demand along the town centre and foreshore road network.

Strategy P8 – Develop a Town Centre Parking Management Plan

Requirement – Develop a Parking Management Plan for Nelson Bay town centre and its foreshore area, which defines the goals for parking provision that is built on a clearly defined parking management sand travel demand management structure. The plan should identify a hierarchy of users, link policies and controls, and consider the impacts of current proposals and high season and event day demand to help identify the quantum of car parking spaces required in the town centre, foreshore area and at an external parking site served by public transport.

The approach to developing the Parking Plan for Nelson Bay needs to consider the principles outlined above:

- Parking user types – differentiate among the separate types of parking users;
- A desirable level of parking demand;
- Benefits and costs of parking;
- Parking management as an effective land use planning tool to achieve integration with transport planning objectives; and
- Demand management needs during high season and event days.

As facilities in the town centre, foreshore area and a possible park-and-ride site will provide shared parking facilities and managed through time restrictions and parking fees, consideration will need to be given to day to day operating requirements of these areas, the possibility of rearranging on-street car parking spaces in the town centre, particularly on Stockton Street south of Donald Street, and the need to protect surrounding residential street from parking overspill.

Strategy P9 – Alternative Uses for Section 94 Contributions

Consider allowing Section 94 contributions to fund uses other than for constructing car parks and park-and-ride facilities and services. In line with sustainable transport objectives, an integrated approach to transport and parking improvement needs to be taken. This considers parking management as a crucial tool in implementing an integrated plan, and the blanket provision of car parking supply only serves to reinforce priorities on private car modes.

Requirement – Consideration needs to be given, for cash contributions to be used for schemes that would reduce car dependency. Alternatively, this consideration can extend to allow developers to demonstrate that schemes that reduce car dependency (e.g. funding public transport or shuttle bus services) are implemented as part of Conditions of Consent for Development Applications, in lieu of providing parking spaces. These will be subject to agreement with Council. Examples of these measures include funding of public transport improvements or the introduction of community transport services where visitors to a development can access the town centre or foreshore area without a private car, or workplace travel and town centre access plans, which help to minimise or reduce the need to use cars to access centres served by other modes.

Strategy P10 – Consider Maximum Car Parking Requirements

Requirement – Consider maximum car parking requirements for new development based on

accessibility to public transport. Car parking requirements for new developments are typically based on satisfying peak demand with limited consideration of the potential for trips to be made by public transport. This premise often leads to many more car parking spaces being built than are required during normal conditions. Therefore, it is may be appropriate to consider less car parking for new developments in areas that can be made accessibility to public transport during periods of peak demand.

The following steps are recommended to implement this strategy:

- Identify areas that can be made accessible to day to day and event based public transport services;
- Consult with other Councils, particularly those designated with the planning of a specialised tourism area to determine current practice regarding parking controls for new development in Nelson Bay;
- Revise the Development Control Plan on Car Parking as required (e.g. consider a separate DCP chapter specifically for Nelson Bay Car Parking);
- Consider revising or lowering parking provision rates for certain individual land uses or development types as it applies to Nelson Bay town centre (i.e. parking rates for the town centre may require lesser parking spaces compared with parking provision rates for other areas within Port Stephens LGA); and
- Consider review of DCP to allow for developments (including residential) to demonstrate opportunities for shared parking to reduce required parking provision.

7.4 Public Transport Strategy

This section outlines the public transport strategy and has the main focus improving the quality of the public transport service, encouraging more people to use public transport and helping to manage traffic growth and vehicle demand within Nelson Bay.

7.4.1 Local Public Transport Issues

Current public transport mode share is low and is not considered to be an attractive option for day to day access to Nelson Bay or travel around the Tomaree Peninsula. Low patronage impacts on service quality and the overall viability of these public transport services. This is a 'vicious cycle' and typically results in a greater dependence on private car travel due to its overall attractiveness and convenience in comparison to its alternatives. .

Public transport is a critical component of a sustainable functioning centre. The higher the public transport mode share, the more opportunities there are for accommodating more intense and concentrated activities. With limited public transport use, access and mobility for medium- to long-distance trips are dependent on the private car, which presents issues relating to congestion, constraints in available space for parking, emissions, and safety.

To implement an effective and efficient public transport strategy in an area that is established and doesn't require the facility on a day to day basis is problematic. Residents and day to day commuters are less likely to change travel mode unless the potential benefits are made clear and can be offered on a consistent basis. Travel behaviour change will be hard to implement, as the majority of Nelson Bay

residents and employees are accustomed to travelling by car.

Deterrents to using current bus services exist in Nelson Bay as bus services traverse a circuitous street network with low land use densities, and as a result, travel times cannot compete with access by private vehicle on a day to day basis. Consequently, certain routes are seen to provide an irregular and unreliable service, which is not convenient for its potential user base that have alternative travel options and thus results in low patronage level on services.

7.4.2 Public Transport Task

The planning and operation of public transport in Nelson Bay will need to be undertaken in such a way that:

- Informing decision making relating to key public transport corridors and services that is controlled and managed by State Government, unlike roads Port Stephens is not directly responsible for this local service and can only lobby the State for improvements and play a support role;
- Promote and align local public transport with user needs and help to integrate local needs with the broader public transport network and its seasonal demand trends;
- Focus on the user of the public transport services, and plan public transport operations to best serve their needs;
- Structure service provision around both development and activity intensification, as public transport plays a critical role in managing demand and becomes increasingly important when the road network is under pressure from congestion and offers an opportunity to better manage network capacity and assets;
- Prioritise access by public transport over access by private vehicles and ensure that residents and visitors are aware of this advantage and are not dependent on the private vehicles for mobility for access to Nelson Bay and around the Tomaree Peninsula;
- Educate business and residents of the advantages of using public transport services for access and their ability to improve network efficiency, safety and community well bring;
- Support the development and improvement of the public transport network through planning and designing for the integration of land use, the public domain and the transport system and promoting the introduction of high quality pedestrian and cycling environments around key nodes, facilities and public transport corridors;
- Plan around the value (lowers emissions, reduces infrastructure costs and travel time, maximises existing road space or assets, supports growth, improves urban amenity and is safer) and potential of public transport as a travel demand management measure and its important role in improving overall accessibility and managing transport impacts in Nelson Bay and across the Tomaree Peninsula during high season and major events; and
- Recognise the planned evolution in the land use at Nelson Bay and around the Tomaree Peninsula and how this will affect the communities' expectations with respect to travelling by public transport.

7.4.3 Public Transport Principles

Integrated Land Use and Public Transport Planning

In order to inform regional and local planning, the public transport network needs to do more than solely adapt and the planning and provision will only evolve through consultation with stakeholders and users in conjunction with changes in planning policies and development controls. The outer areas of many urban areas suffer from poor public transport and other facilities because planning is often conducted in an incremental or piecemeal process. The benefits of an integrated land use and transport planning process with respect to managing seasonal demand and the redevelopment of urban areas include:

- Co-location of key community facilities, shops and other trip attractors along bus routes and at central points where several services converge, making it easier to access local facilities for residents;
- Faster and more efficient bus routes that can efficiently serve residential areas without undue deviations due to limited through road connections; and
- Earlier introduction, support and promotion of public transport services, rather than relying on passenger demand to naturally grow in the absence of an attractive service or offering a competitive alternative to the car.

The current public transport service must be revised in the context of an integrated transport network and aim to better service key nodes, develop direct high quality and efficient bus corridors and offer a competitive and effective service that minimises delays and costs associated with transferring before entering Nelson Bay or travelling around the Tomaree Peninsula.

Network Features

The key features of a quality public transport network, which should be considered in the review of Port Stephens and the Tomaree Peninsula services include:

- Policy frequency and span – the ability of network routes and timetabled services to provide a frequency level across the day from early in the morning to late at night.

The Outer Metropolitan Service Planning Guidelines (NSWTI, 2009) provide guidance on frequencies by route type.

- High operating speed and reliability – the ability of network routes and timetabled services to provide attractive service speeds and high levels of reliability.

Bus routes should be largely immune from congestion and delays associated with general traffic;

- Easy connections between lines – the ability of network routes and timetabled services to offer efficient transfers across the public transport network.

The convenience of transfers needs to be maximised through the frequency of services, its timing and also through special attention to the physical facilities at transfer points;

- Good legibility and usability – the network should be easy to comprehend (at a macro/system level) and easy to navigate (at a micro/user level).
- The network that links with facilities and centres – the network should support both established and

centres concepts outlined in the Lower Hunter Regional Strategy.

This is the foundation of the Lower Hunter's land use vision. In particular, the network needs to provide the most direct route between any two centres.

- Promoting accessibility over mobility – the network, and its integration with land use, needs to focus on providing appropriate levels of accessibility without relying on unsustainable levels of mobility.

By clustering a range of land uses along a public transport corridor or network, it will become increasingly useful and attractive to users and help to reduce the overall need to use private vehicles to access everyday services, including employment, retail and commercial activities.

- Integration with land use – the network would have a two-fold connection with land use.

Firstly, it serves areas with the highest public transport ridership, densities and mix of uses. In this way, higher ridership is rewarded with increased service. Secondly, it should be an important factor in determining land use mechanisms and zoning in Nelson Bay and the surrounding Tomaree Peninsula.

Facilities

Nelson Bay is the specialised tourism centre for the Tomaree Peninsula tourism area. As it is the centre and the focal point for tourism it will need to improve its public transport interchange to ensure that it has the following facilities:

- Attractive easy to identify shelters promoting information on services, cost and coverage;
- Comfortable facilities and seating;
- Access to public toilets;
- Car passenger drop-off and pick-up zones;
- Bicycle parking; and
- Security and safety facilities – including lighting and surveillance.

7.4.4 Public Transport Improvement Options

This section outlines the public transport strategy with the main aim of managing demand to improve the amenity for public transport users and provide an alternative to car use for trips to Nelson Bay.

Strategy PT1 – Public Transport Service Planning

Port Stephens Council to engage with bus operators and Transport for NSW in undertaking regular reviews of public transport services for Nelson Bay and the Tomaree Peninsula specialised tourism area, in line with the Outer Metropolitan Service Planning Guidelines.

The key aim is to provide an integrated network of regular, reliable and public transport services and in most cases this is the responsibility of others. Port Stephens Council has limited control over the integration of the land use and public transport provision process, but can influence performance through:

- Control of the land use process, which can locate density and transit-supportive design along public

transport corridors, dictating future potential public transport ridership;

- Control over some of the streets on which the public transport services will run. On streets it manages, PSC has almost total control over peak and average public transport operating speeds, and largely influences public transport reliability; and
- Control of parking areas and their location and operation.

Port Stephens Council can therefore work with public transport providers to achieve the goals of the public transport strategy and overall road network and parking strategies.

Strategy PT2 –Improve the attractiveness of the public transport interchange (15).

Requirement – Provide improved bus stop shelters, including seating, lighting and better service information to support and encourage use of public transport for travel in and around Nelson Bay.

Strategy PT3 – Investigate the feasibility of introducing a Park-and-Ride

Requirement – Investigate the feasibility of implementing a satellite Park-and-Ride car park with complementary shuttle bus services during event days to help better manage parking supply and network capacity deficiencies within and on approach to Nelson Bay town centre and foreshore areas. This option will need to be supported by the implementation of parking information signage warning visitors of the lack of parking in Nelson Bay and the alternative option for travelling to Nelson Bay town centre and the foreshore area. It may also support a delay in the implementation of road network upgrades through better managing traffic demand along Nelson Bay Road during event days. The use of Tomaree Sports Centre appears to be an attractive option due to:

- It serving an existing bus service route (No 133 running between Fingal Bay, Shoal Bay, Nelson Bay and Salamander Bay), which potentially could be increased to allow for additional patronage;
- Already having an identity as a site used for event day parking and was previously utilised for this purpose during the new year fireworks event day; and
- It being located on the key road route into Nelson Bay and requires minimal new infrastructure.

The bus system should be designed to offer convenient and frequent services during arrival and departure periods. For instance, a 10 minute frequency would offer a service frequency that is convenient enough not to warrant a timetable (turn up and go concept).

The location of the site and distance away from Nelson Bay is critical and would ensure the following is achieved:

- A convenient point to transfer between modes to access Nelson Bay;
- A point that is visible to the majority of traffic wanting to access Nelson Bay;
- Ability of the bus fleet to cover the bus route within a short time period to support convenient, frequency and reliability – also reduce costs and fleet size;
- Positioned in a location that offers a visible solution to a known problem; and
- Is flexible and can be switched on and off on a needs basis or can be easily operated on a more permanent basis.

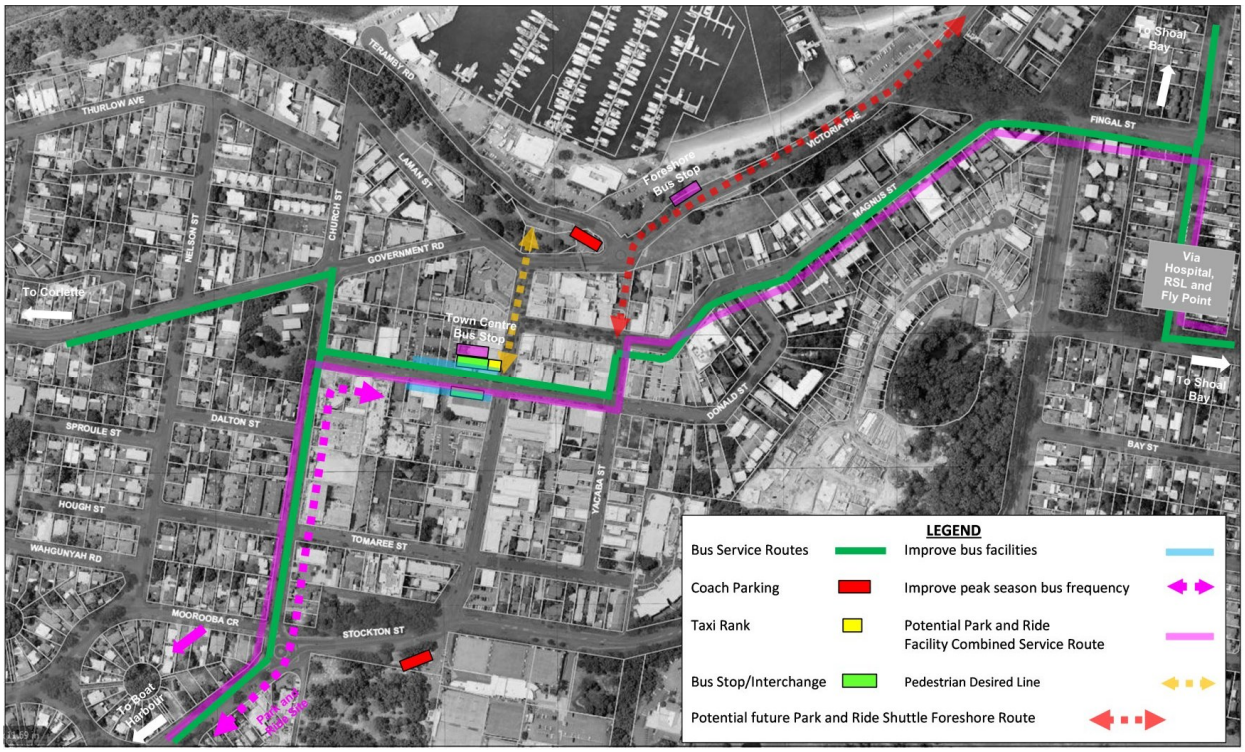
The bus service needs to be designed to offer fast and convenient access to key destinations that are impacted by high levels of activity during a peak event period. It would be direct and have priority over other general traffic movement and obtain access areas that may be restricted to others.

Parking restrictions within the central core need to support the scheme by constraining parking for long periods of time and implement parking fees for the convenience of parking in Nelson Bay or at the Marina.

The time based on-street parking restrictions need to support current off-street schemes by expanding time-based parking restrictions and enforcement to make these locations less convenient and prevent overspill to residential streets within a easily walking distance of the marina and town centre.

Parking and ride fares are required to be significantly lower than parking fees charged at the Marina or in the town centre (in more convenient locations) with group package discounts to reduce the financial impact (up to two children under 16 travelling free when accompanied by a fare-paying adult) and help to realign costs associated with a vehicle with multiple occupants.

Figure 68 Public Transport Improvement Options



Source: Port Stephens Council Digital Data, 2011

Strategy PT4 – Public Transport Accessibility

Requirement – Consider the accessibility needs of disadvantaged user groups who are not currently well served by the existing public transport network, and consider the potential for extension of community transport services or other transport modes to meet their needs.

Disadvantaged public transport users groups such as children, the elderly, women, the unemployed, and those on a low income or without a car can suffer disproportionately from an ineffective public transport network. Consideration of the needs of these user groups and provision of new transport options may lead to better transport provision across a variety of modes and methods.

Strategy PT5 – Fare-Free Zone for Public Transport

Requirement – Consider designating a fare free zone that serves access between a park-and-ride site, the town centre and foreshore area during high season and major event days for bus services.

Integrating the provision of affordable and efficient public transport services within Nelson Bay during high season and on a major event day will be a key factor in ensuring that the town centre and foreshore areas function efficiently during these periods and with planned development in the future growth.

In order to further reduce dependency on private cars, consideration needs to be given to offer free bus services within urban core of the town centre. A system that allows fare-free travel is currently in operation in the inner part of Newcastle for seven days a week. Other urban centres in metropolitan Sydney (e.g. Sydney, Parramatta, Penrith, Bankstown, etc.) are also provided with free shuttle bus services within city centres. These free shuttle buses are operated by the State Government.

7.5 Active Transport Strategy

Sound planning and the provision of high quality facilities for pedestrians and cyclists constitute a critical element of the transport strategy for Nelson Bay. The following improvement options aim to encourage pedestrian and cycling activity in the town centre through access improvements and protecting areas of the town centre from increases in traffic to help improve mode share and the environmental outcomes for the Tomaree Peninsula.

7.5.1 Pedestrian and Cycling Issues

Barriers to Walking and Cycling

Walking and cycling are valued as a means of transportation and recreation due to their low cost, low impact, wide suitability and health benefits. However, there are numerous barriers to increasing walking and cycling, namely, a lack of infrastructure, heightened safety concerns, long trip distances and an urban form structured to favour motor vehicle use.

The draft Nelson Bay 2030 Strategy (NBS 2030) provides a framework for encouraging the increased use of alternative modes for travel to, from and around Nelson Bay town centre. It focuses on prioritising infrastructure and designing facilities to help increase the number of trips made by walking and cycling and improving connectivity between the town centre, the foreshore and its surrounding catchment. This will help to break barriers that currently exist, which includes a lack of supporting facilities. Currently, there are no shared paths/cycleways that directly offer access to the town centre from surrounding residential areas. Access within core areas of the town centre are supported by low signposted traffic speeds, however, this is sometimes in conflict with access points and kerbside parking. Cycling facilities beyond the town centre and foreshore areas appear to be limited and in some cases terminate at the periphery of the foreshore area and does travel or offer facilities in the town centre. Pedestrian activity is

encouraged through the provision of widened footpaths, landscaping, street furniture and footpath activity such as roadside dining, however this is isolated and needs to be expanded to better connect the town centre, areas to the west and south, and the foreshore walk and foreshore area. The redevelopment of areas along Stockton, Donald and Yacaaba Streets and the Foreshore area should consider how the pedestrian and cycling environment and connections can be improved through incorporating these needs into the design of buildings and the upgrade of streetscapes.

Infrastructure Opportunities

There is an opportunity to intensify walking and cycling through the provision of a suitable environment within existing and future urban areas. The provision of infrastructure such as walking and cycle paths should be clearly defined and separated from roads and traffic, and on occasion it is also necessary to provide separation between cyclists and pedestrians. Potential conflict areas with traffic can be improved, through upgrading intersections, the installation of traffic signals and pedestrian crossings. Other infrastructure approaches include widening footpaths, improving surfaces and improvements to street lighting, which enhances safety and reduces barriers to walking and cycling to key destinations.

The redevelopment of the Marina and Foreshore area, in conjunction with improvements to Dowling Street, Nelson Bay Road, Stockton Street, Donald Street and a possible extension to Yacaaba Street presents opportunities for establishing a comprehensive walking and cycle environment throughout the Nelson Bay town centre. These network improvements also provide an opportunity to extend the existing shared path network from the foreshore to the town centre and beyond including the Tomaree Sports Complex and Salamander Way.

Social Opportunities

Opportunities to promote walking and cycling should consider a wide range of tools, rather than only infrastructure responses. One approach would be to promote community awareness through encouraging children to walk to school, visitors to walk to the town centre and foreshore area from surrounding hotels, and residents that are situated within a walking catchment of local services and facilities in the town centre. The promotion of access by walking and cycling fosters independence and promotes a healthier more active lifestyle, which is argued to be a key reason for living and visiting Nelson Bay. Other approaches that support and encourage people to use active transport and a means of travel include cycle weeks, the promotion of safe cycle or pedestrian routes and financial incentives for cycling to work.

Supporting New Development

Once the above issues have been identified, the focus shifts to providing appropriate plans and networks in existing and new areas identified for change. One option is incremental provision of walking and cycling paths as areas are expanded and intensified. If facilities are not proposed or in place, then travel choices will be influenced by a lack of facilities and routes and needs to be overcome through the better planning and control of new developments.

Integration with Other Transport Modes and Urban Planning

The planning of improvement to the pedestrian and bicycle environments cannot be considered in isolation as it impacts on all other forms of transport and the design of the urban environment. In order to

successfully achieve a desirable outcome, the planning of the pedestrian and bicycle network needs to be integrated with the accessibility needs of existing and potential bus networks, redeveloped areas and the planning for mixing and intensifying land use. The planning of the land use and supporting infrastructure is particularly important for urban centres, where the locality of facilities and services should be planned around walkable catchments to encourage people to automatically walk or cycle to move around Nelson Bay.

Urban design also plays a key role in achieving satisfactory pedestrian and cycling outcomes. The environment should be planned so that residents find it easier to walk or cycle to shops, and designed with an aim of reducing travel speeds, discouraging direct access by car and providing facilities to support access by walking and cycling.

The layout of Stockton Street, Donald Street and Yacaaba Street will need to be improved in a way that integrates walking and cycling modes with the planned function and design of each road. This should be completed to improve connectivity between areas and serve planned facilities in the centre, such as encouraging access to bus stops.

7.5.2 Walking and Cycling Task

The primary objective of the combined Walking and Cycling Strategy is to encourage greater use of walking and cycling as a means of transport and recreation. Walking and cycling are valued due to their low cost, low impact, wide suitability and health benefits. Safety is also an important element for walking and cycling, which can be supported through improved layouts at intersections and provision of walking and cycling paths that protect users from road traffic. In order to be successful any walking and cycle strategy needs to better integrate with all mode strategies as both parking for private vehicles and public transport requires access by walking to reach their point of destination.

7.5.3 Walking and Cycling Principles

The provision and management of walking and cycling facilities and opportunities in Nelson Bay and the Tomaree Peninsula will be undertaken in such a way that:

- Understands the key walking and cycling needs in the region;
- Recognises the role walking and cycling plays in the reduction of car-based trips in Nelson Bay, and how the provision of improved facilities and opportunities can help promote mode change in the future;
- Understands the need for the separation of pedestrians and cyclists from motor vehicle traffic;
- Identifies mechanisms for the community to have regular input into the provision of walking and cycling facilities;
- Recognises that all trips involve walking at either the beginning or end (or both) of the journey, resulting in the need for connections between parking and public transport areas and destinations;
- Incorporates walking and cycling issues into the planning and improvement of the road network, parking and public transport;

- Recognise that walking and cycling paths can form key routes between destinations; and
- Understand that walking and cycling trips perform a variety of functions, not only travel from an origin to a destination, but such trips are also undertaken for recreation and/or health benefits, which can be influenced by the amenity of the route.

It is therefore necessary for Port Stephens Council to develop a walking and cycling framework that will best achieve the aspirations of the Tomaree Peninsula. This may apply not only to Nelson Bay, but should include all other centres within the Port Stephens LGA.

Achieving a Positive Walking Environment

Walking is the simplest form of transportation. It is available to all people (inclusive of those who use mobility aids), is free and has insignificant environmental cost. Furthermore, all trips involve some walking component, if only from the car park to the shop. Planning for pedestrians is therefore of primary importance to transportation planning.

Pedestrians use every part of the public domain, including roads, footpaths, nature strips, shopping centres and other public spaces and that they are particularly vulnerable to cars and other motorised traffic. The provision of pedestrian infrastructure should not only aim to fulfil the requirements of existing users and comply with relevant standards, it should also aim to promote walking for transport, recreation and health and help to increase the number of trips taken by foot in Nelson Bay. Such an outcome would result in fewer car trips, healthier residents and visitors and a more active (and safe) public domain.

A number of goals are required in order to provide a high quality pedestrian environment:

- Safety – in terms of safe crossing locations, lighting and security;
- Direct – facilities serving desire lines between major areas of activity;
- Pleasant – attractive walking environment;
- Suitable for all users – accommodate the number of pedestrians, continuous paths, free of obstructions, satisfy needs of hearing and vision impaired users; and
- Feed public transport – offer access to bus stops and remove obstacles to pedestrian use.

Achieving a Positive Cycling Environment

Cycling is a highly efficient, environmentally benign form of transport. As with walking, cyclists are improving their health and contributing to an active environment at a human scale. Cyclists move around the public domain in various ways, largely depending on the trip purpose and rider characteristics. For example, children will tend to use footpaths and cycle at lower speeds, while an adult on the way to work may prefer to ride along the fastest and most direct route available (on or off-road).

Cyclists therefore move through an ‘environment’ in a similar way to pedestrians, although the speed and distance, which they travel, mean that they identify more with the concept of a network. Attention to cycling facilities should not be confined to one or two ‘routes’ or ‘links’ in an area, as trip origins and destinations are diverse. Every street must be a safe route for cyclists and be designed in accordance with the function, traffic volume and width of the street.

Infrastructure for cycling can be designed in a similar way to other vehicles, through consideration of

speed, sight distance, priority at intersections etc. However, bicycles have a degree of manoeuvrability that makes them somewhat unpredictable to motorists and pedestrians. Therefore, the design of both on and off-road facilities should aim to encourage predictability and clear priority at all conflict points. Cyclists needs reflect those for pedestrians and the planning principles of facilities should mirror pedestrians, including safety, directness, pleasantness and suitable for all users. One particular principle that also needs to be considered in planning for cycle facilities are end of trip facilities, such as bicycle parking and the availability of showers and change rooms, particularly for offices. Bicycle users need to know that their bike will be safe from theft while it is not attended. Where appropriate, complementary facilities for staff bike parking also need to be provided. These include change rooms, showers and lockers.

7.5.4 Active Transport Improvement Strategies

The Active Transport Strategy has been developed and incorporates the following strategy improvement options.

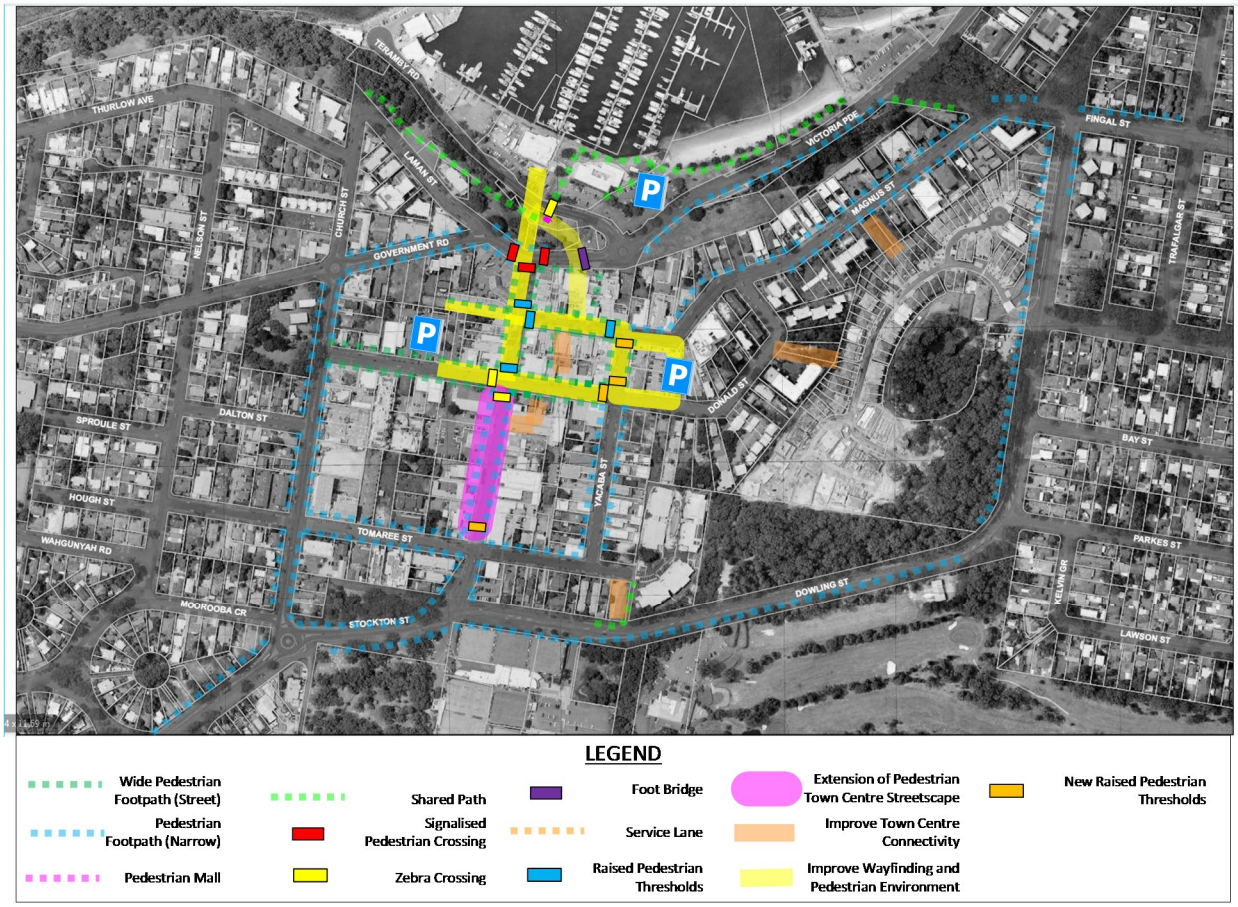
Strategy AT 1 - Improve wayfinding and identification signage (17)

Requirement – Develop a town centre wayfinding pedestrian signage plan to inform and promote access to key destinations by walking or cycling. This will help to reduce traffic levels in the town centre, influence decision making and encourage visitors to walk from off-street car parks to the town centre and foreshore areas. The signage should include directions and walk times to popular destinations and the key transport hubs (car parks, bus stops, and coach parking areas) and may be funded through developer contributions as part of the town centre revitalisation. It is recommended that Council produces a Mobility Map to inform and promote access to key destinations by walking or cycling.

Strategy AT 2 - Provide additional pedestrian crossing facilities (18)

Requirement – Improve pedestrian access and safety within and from the Donald Street east car park. Promote this as a long-term car park for accessing the foreshore and improving connectivity between off-street car parks, the Nelson Bay town centre main street and the foreshore area. Introduce landscaping, marked pedestrian footpaths, lighting, signage and additional pedestrian crossing facilities.

Figure 69 Pedestrian Facility Improvement Options



Source: Port Stephens Council Digital Data, 2011

Strategy AT 3 - Widen footpaths along Stockton Street to promote and encourage Main Street activities (19)

Requirement – Widen footpaths along Stockton Street between Donald Street and Tomaree Street to provide a streetscape that better suits the level of activity attracted during event days and peak season. The widening of footpaths and changes to streetscape will encourage greater pedestrian amenity and comfort in addition to discouraging this route as a through route for accessing town centre car parks or for land uses that require high vehicle activity frontages. Refer to Figure 69 for typical streetscape treatments.

Strategy AT 4 – Develop a PAMP and improve the condition and provision of footpaths (20)

Requirement – Develop an overarching plan and priorities for improving the walking environment in the town centre and to its surrounding catchment. Identify and introduce missing sections of footpaths on Tomaree Street and Yacaaba Street, improve the footpath connection between Dowling Street and Tomaree Street, and support a new direct pedestrian connection between the town centre and residential areas to the east.

Strategy AT 5 - Close Stockton Street north to traffic during event days and high season periods (21)

Requirement – Review the feasibility of pedestrianizing Stockton Street north between Magnus Street and Government Road to improve pedestrian amenity and encourage streetscape improvements on the key pedestrian corridor used to connect the town centre with the foreshore area. Refer to Figure 69 for typical streetscape treatments.

Strategy AT 6 - Improve town centre walking environment (22)

Requirement – Encourage new development to open up existing pedestrian shopping malls and provide through connections between town centre streets. This may be achieved through increasing density within town centre blocks and the creation of squares that serve new commercial development and provide access to surrounding streets. Parking and vehicle access to new development should be a key consideration especially for new development that fronts Stockton Street and Donald Street.

Strategy AT 7 - Increase the visibility of cycling through developing a bike plan and expanding the cycle network (23)

Requirement – **-** Increase the visibility of cycling through the development of a bike plan for Nelson Bay and the Tomaree Peninsula and encouraging the development of additional cycle routes, as shown on Figure 70. Plan and identify additional cycle routes from areas to the east and south with Nelson Bay Road, Church Road, Donald Street and Austral Street identify as possible new cycle routes to improve access to Nelson Bay town centre from surrounding areas. Investigate the feasibility of:

- Connecting areas to the east via Austral Street and Donald Street (green broken line) or alternatively with the foreshore (yellow line shown as RTA proposed on-road option); and
- Connecting areas to the south via the provision of a dedicated shared off-road path along Nelson Bay Road and Church Street.

Strategy AT 8 - Include a section on bicycle parking in Port Stephens DCP (24)

Requirement – Include a section on the provision of bicycle parking for new development in the Port Stephens DCP. This should be included in Chapter B3, which specifies requirements for parking, traffic and transport arrangements and specify that all proposed development in the town centre and foreshore should consider access by walking and cycling.

Figure 70 Cycling Infrastructure Improvements

Source: Port Stephens Council Digital Data, 2011

Strategy AT 9 - Improve and encourage access by active transport by providing bicycle parking facilities (25)

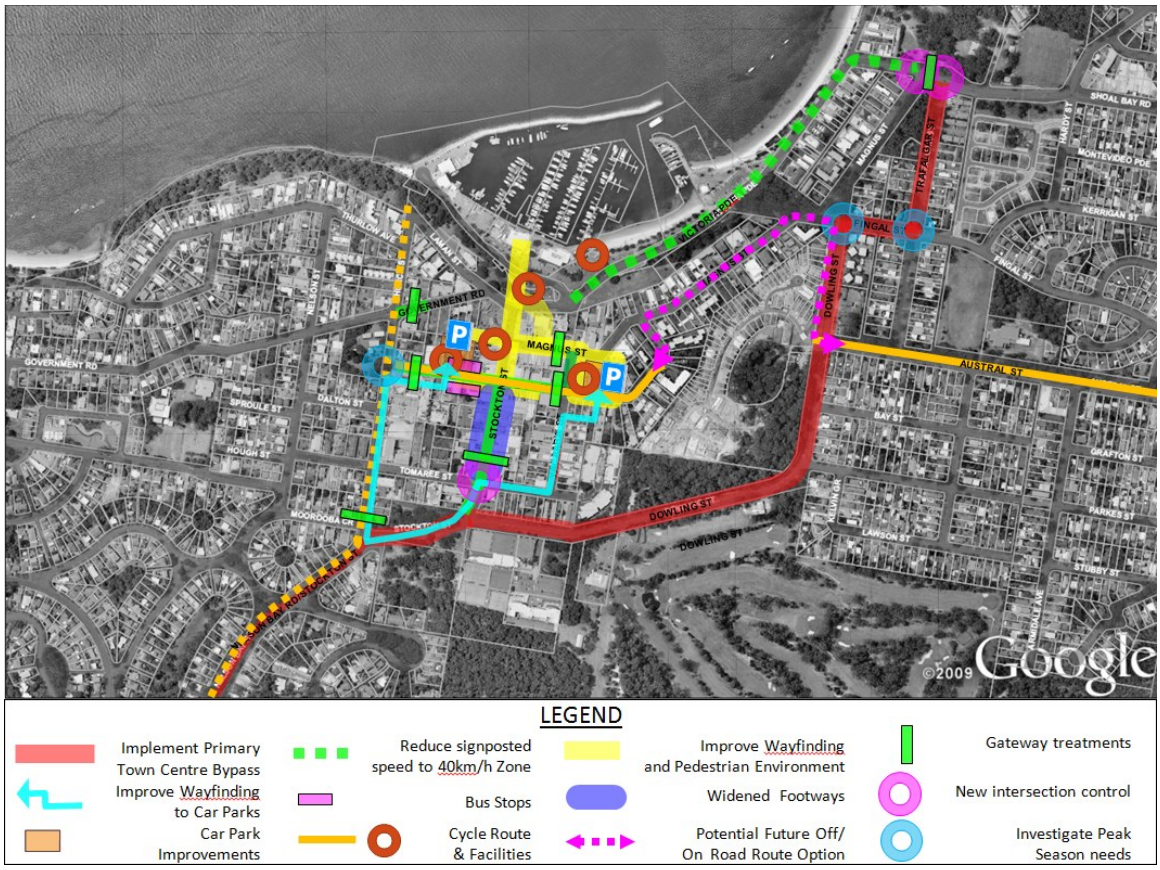
Requirement – Plan and identify locations for installing bike stands in the town centre, foreshore area and other high activity areas. This improvement option supports the local transport strategy objective for encouraging greater use of bicycles as a mode of transport within Nelson Bay and across the Tomaree Peninsula.

7.6 Improvement Plans

Four action plans have been developed to align with the strategies developed for Nelson Bay. The actions contained in the strategies have been prioritised to reflect the importance in terms of its all year round need, ability to support planned growth and its affordability. These action plans are presented in the following sub sections.

Figure 71 provides a visual representation of high priority improvement measures required to support economic activity, safety and access to Nelson Bay.

Figure 71 Short-Medium-term Improvement Package



Source: Port Stephens Council Digital Data, 2011

7.6.1 Road Network Management Action Plan

Road network management improvements aim to provide a safe and more efficient road network through the delivery of the following strategies.

Table 23 Road Network Management Action Plan

Policy No	Description	Delivery Timeframe	Responsibility	Actions
RNM 1a	Dowling Street/Trafalgar Street town centre bypass	Short	Council	Undertake a road safety audit along the route to identify any safety issues associated with designating this route for through-traffic travelling to areas east of Nelson Bay town centre. Implement as part of the gateway treatments, redefining the road hierarchy and improving network efficiency in the town centre. Identify project cost, funding and then implement new infrastructure in coordination with other strategies listed under RNM 1. After completion, monitor seasonal and typical daily peak capacity needs through the continuous collection of consistent traffic data sets. Use data sets to review and refine road network improvement concepts and inform decision making for further route improvements and the need for capacity improvement along Nelson Bay Road or a new Fingal Bay Bypass.
RNM 1b	Dowling Street/Magnus Street realignment	Medium	Council	Refer to 1a for all relevant actions.
RNM 1c	Reprioritising movement at intersection along the Dowling St bypass	Short	Council	Implement as part of the gateway treatments, redefining the road hierarchy and improving network efficiency in the town centre. Refer to 1a for all relevant actions once option 1b is implemented.
RNM 1d	Downgrade Victoria Parade	Short to Medium	Council	Implement as part of the gateway treatments, redefining the road hierarchy and function in the town centre and improving pedestrian amenity in the town centre. Identify project cost, funding and then implement new infrastructure in coordination with the above works.

Policy No	Description	Delivery Timeframe	Responsibility	Actions
RNM 1e	Downgrade Stockton Street	Short to Medium	Council	Implement as part of the gateway treatments, redefining the road hierarchy and function in the town centre and improving pedestrian amenity in the town centre. Identify project cost, funding and then implement new infrastructure in coordination with the above works.
RNM 2	Yacaaba Street extension	Medium to Long	Council	Not identified to be a critical to improve the operation of the road network in Nelson Bay in the short to medium-term. Review after implementation of Options 1a, 2, 3, 6, 14, 16 & 22. A required action will be driven by the need to remove traffic from Victoria Parade and offer direct access to the town centre car parks. Will be influenced by the location of new parking areas for the foreshore and a decision in the long-term of Donald Street east car park and likely pedestrianizing of Stockton Street north (Option 22). Once the above is completed then identify project cost, funding opportunities and coordinate required works with the planned redevelopment of the foreshore and town centre and new identified parking stations.

Policy No	Description	Delivery Timeframe	Responsibility	Actions
RNM 3	Improvement Option 5 – Improve Nelson Bay Road or Fingal Bypass	Medium to Long	Council	Linked to capacity deficiencies identified on Nelson Bay Road, potential impact on travel times to Fingal and Shoal Bay and a need to manage high season travel demand. Further investigation required and should be undertaken after the implementation of the Nelson Bay town centre bypass and the testing of the success of a high season and event Park-and-Ride parking scheme. After completion of the above, monitor seasonal and typical daily peak capacity and performance through the continuous collection of consistent traffic data sets. Use data sets to inform decision making process by identifying the annual performance need, scoping project requirements, revisit previous work undertaken and reviewing conditions of reserved road corridor and other potential options. Once the above is completed then project costs and funding opportunities need to be identified and coordinated with the planned redevelopment of the foreshore, Nelson Bay town centre and any planned activity in Fingal and Shoal Bays.
RNM 4	Reduce the signposted speed limits in town centre Main Streets (Pedestrian amenity)	Short to Medium	Council	Implement as part of the gateway treatments, redefining the road hierarchy and function in the town centre and improving pedestrian amenity in the town centre. Identify project cost, funding and then implement new infrastructure in coordination with the above works
RNM 5	Reduce crash rate by upgrading traffic management	Short	Council	Review traffic management arrangements at the intersection of Stockton Street with Tomaree Street. Reprioritise movement at Stockton Street with Tomaree Street intersection (northern gateway) to support RNM 1e. Change parking station wayfinding signage. Undertake a road safety audit on proposed design arrangement.

Policy No	Description	Delivery Timeframe	Responsibility	Actions
RNM 6	Introduction of Town Centre and Foreshore Gateway Treatments	Short	Council	Develop concept design and undertake road safety audit. Implement as part of the redefining the road hierarchy, improving pedestrian amenity and improving network efficiency in the town centre. Identify project cost, funding and then implement new infrastructure in coordination with the above works.
RNM 7	Upgrade the intersection of Donald Street with Church Street	Short to Medium	Council	Develop concept design and undertake road safety audit. Implement as part of the managing peak demand, redefining the road hierarchy, the western town centre gateway treatment, improving network efficiency in the town centre, supporting bus services and providing future network capacity. Identify preferred scheme, project cost, funding and then implement new infrastructure in coordination with the above works.

7.6.2 Parking Management Action Plan

Parking management improvements aim to improve access to parking and the way it is managed through the delivery of the following strategies.

Table 24 Parking Management Action Plan

Policy No	Description	Priority	Responsibility	Actions
P 1	Improve wayfinding parking signage strategy	Short	Council	Develop strategy and design requirements and align with the Nelson Bay Parking Management Plan. Identify project cost and funding Implement as part of managing peak demand in the town centre, optimising existing infrastructure and improving network efficiency in the town centre.

Policy No	Description	Priority	Responsibility	Actions
P 2	Provide Long-term Parking in Town Centre	Short to Medium	Council	Develop a signage strategy and parking bays in Donald Street east car park that can be utilised as long-term visitor parking. Identify project cost, funding and then implement new arrangement in coordination with the Nelson Bay Parking Management Plan. In the longer term redevelop Donald Street west car park to consolidate parking and filter visitors travelling to the foreshore via the town centre (day to day activity).
P 3	Upgrade to Donald Street east car park	Short to Medium	Council	Short-term need to optimise the functionality of the asset and offer visible spare capacity to current town centre and foreshore users. Upgrade Donald Street east car park to increase its attractiveness to users and Identify funding sources and options for the upgrade of Donald Street east car park, which includes signing, linemarking, landscaping, entrances, facades, lighting and security monitoring. Identify project cost, funding and then implement new arrangement in coordination with the Nelson Bay Parking Management Plan.
P 4	Improve parking enforcement	Short to Medium	Council	Identify high season demand periods and event days. Consult with parking rangers and identify funding for additional resources to control and protect high valued parking areas during busy periods.
P 5	Expand paid parking in the town centre	Medium	Council	Review after the implementation of better parking enforcement during event days and the high season. Review funding options for improving parking facilities, implementing park-and-ride and improving public transport services. Coordinate with the Nelson Bay Parking Management Plan. Undertaken a feasibility study to identify project cost, funding and how it should be implemented.

Policy No	Description	Priority	Responsibility	Actions
PM 6	Provide high season/ event day parking (Park-and-Ride) south of the town centre	Medium	Council/ TfNSW	Identify location and service and capacity requirements, project cost and possible funding sources. Refine concept and discuss with public transport providers and Transport for NSW.
PM 7	Provide high season and event parking information signage	Medium	Council/ RMS	Identify location and operational requirements for managing parking and traffic demand to the town centre. Identify capacity requirements, project cost and funding sources. Refine concept and discuss with public transport providers and Transport for NSW.
P 8	Develop a Town Centre Parking Management Plan	Short	Council	Use information contained in this strategy to develop a parking management plan for Nelson Bay town centre and the foreshore area Manage potential impacts on surrounding residential areas and develop plan to protect these areas from town centre and foreshore area overspill Protect the town centre from excessive high season and major event parking demand. Consult with key town centre and foreshore stakeholders and the community regarding day to day and event related parking plans.
P 9	Alternative Uses for Section 94 Contributions	Medium	Council	Identify options for reducing parking on the basis of a section 94 contribution. Identify projects requiring additional cross funding. Identify an appropriate contribution levy. Implement as part of Conditions of Consent for Development Applications in lieu of supplying the parking requirement.

Policy No	Description	Priority	Responsibility	Actions
P 10	Consider maximum car parking requirements	Medium	Council	Identify areas that are highly accessible by public and active transport Identify peak demand periods and parking needs. Identify opportunities for shared parking against overall parking supply. Consider opportunity to resolve parking deficiency through adoption of parking and ride sites Review other Council policies. Revise DCP parking requirements.

7.6.3 Public Transport Action Plan

The public transport strategy provides an integrated approach to managing travel demand through improving the public transport service and structuring the network to encourage more people to use the system, and will be managed through the implementation of the following strategies.

Table 25 Public Transport Action Plan

Policy No	Description	Priority	Responsibility	Actions
PT 1	Public Transport Service Plan	Short to Medium	TfNSW	Support TfNSW in the review of public transport service needs for Nelson Bay and the Tomaree Peninsula under low and high season demand trends. Work with public transport providers to identify ways of improving services and increasing frequencies during events and high season. Review the impact on services from an increase in frequency in major events in Nelson Bay and the redevelopment of the foreshore area.

Policy No	Description	Priority	Responsibility	Actions
PT 2	Improve the attractiveness of the public transport interchange	Short	Council	Review facilities at bus interchange (seating, lighting, access, information) Consult with community regarding needs. Review against TfNSW facility requirements guide. Identify funding sources for improvements
PT 3	Improving public transport services	Medium	Council	Identify sites that can operate as park-and-ride facilities. Develop a concept for operating the site and days in a year that it may be operational. Review conflict with other activities. Undertake a feasibility study. Develop a marketing plan for the service and facility. Consult with TfNSW and promote the scheme and its benefits. Lobby TfNSW for funding and identify funding options for site related improvements. Coordination with other event related improvements.
PT 4	Public Transport accessibility	Short to medium	Council/ TfNSW	Review and develop a market sector plan to capture service needs for disadvantaged groups. Review these needs against current service provision and other community transport service options
PT 5	Fare free route service for public transport	Medium	Council/ TfNSW	Review options and identify the benefits from removing bus fares for travel to and from Nelson Bay during peak demand periods. Identify how this may align with the expansion of parking fees within the town centre and foreshore areas. Lobby TfNSW for funding and to undertake a pilot scheme to measure its potential level of success in managing travel demand.

7.6.4 Access Management

The active transport strategy provides an integrated approach to managing travel demand through implementing treatments to promote safe and efficient access to the town centre, protect high activity areas and encourage more people to walk and cycle, , and will be managed through the implementation of the following strategies.

Table 26 Active Transport Action Plan

Policy No	Description	Priority	Responsibility	Actions
AT 1	Improve wayfinding and identification signage for pedestrians	High	Council	Develop and design a wayfinding plan to promote key destinations, guide visitors and promote walking around Nelson Bay. Identify project cost, funding and then implement new infrastructure
AT 2	Provide additional pedestrian crossing facilities in the town access and foreshore area	Short to Medium	Council	Consider as part of improving Donald Street east car park the installation of a pedestrian threshold across Yacaaba Street to facilitate pedestrian access to the town centre. Identify the feasibility of introducing a scrambled crossing at Stockton Street with Government Road. Identify project cost, funding and then implement new infrastructure in coordination with the above works
AT 3	Widen footpaths along Stockton Street	Short to Medium	Council	Consider as part of the downgrading of Stockton Street and potential to fund from the expansion of paid parking area. Develop a concept for expanding footpaths and serving possible future land uses including the Woolworths site proposal. Identify project cost, funding and then implement new infrastructure in coordination with schemes that aim to refine the road hierarchy, better manage peak demand, protect the town centre core and provide direct access to car parks.

Policy No	Description	Priority	Responsibility	Actions
AT 4	Develop a PAMP and improve the condition of footpaths	Medium	Council	Review footpath conditions around the town centre and on access routes to the foreshore area. Develop a plan for reviewing conditions, funding and prioritising improvements and maintaining these assets. Identify missing footpath links in the town centre and on routes to the town centre. Identify if the missing footpaths are fronting vacant land and consider completing as part of early work and obtaining funding through developer contribution. Develop and design a missing link plan, identify project cost, developer contribution funding and then implement new infrastructure.
AT 5	Close Stockton Street north during major events and high season	Medium	Council	Investigate the feasibility of closing the northern section of Stockton Street to traffic during peak season and major events. Develop a scheme and procedure that can facilitate this closure during peak periods. Identify project cost and funding. Align the closure with the implementation of other infrastructure improvements and land use changes including Donald Street west car park, Yacaaba Street extension, protecting the town centre core, widening of footpaths in Stockton Street, park-and-ride shuttle services and the downgrading of Government Road.
AT 6	Improve town centre walking environment	Medium	Council	Consider improve pedestrian environment in town centre by revising current LEP 2000 and developing a Council position on property access points in the Town Centre (Main Streets) and along key transport routes (Main Roads) to the town centre. Use this policy to consider development applications with the intention of reducing conflict points along Main Streets and Main Roads.

Policy No	Description	Priority	Responsibility	Actions
AT 7	Increase visibility of cycling through developing a bike plan and expanding the cycle network	Medium	Council	Review cycle network conditions around the town centre and on access routes to the foreshore area. Develop a plan for reviewing conditions, funding and prioritising improvements and maintaining these assets. Identify missing cycle links in the town centre and on routes to the town centre from key destinations. Improve on-road facilities and provide safe crossing point across the regional road system. Develop a plan that extends the current cycle network into surrounding catchments. Introduce cycle racks in key town centre and foreshore areas (cycle facilities) Develop a Council policy position on end of trip cycle parking supply for new development in the Town Centre and foreshore areas. Include a consideration for the provision of cycle parking facilities in Port Stephens DCP Use this policy to consider cross funding of shared facilities from new development applications and other Government programs.

8. Summary and Next Steps

8.1 Summary

The development of Nelson Bay is flexible and will be driven by local development and business opportunities that aim to promote Nelson Bay as an all year round destination. This Transport and Parking Study considers both existing peak operational needs and the potential impacts from the revitalising Nelson Bay. Based on these findings, strategies and action plans have been developed to manage travel, and support a future growth strategy for Nelson Bay. These strategies were categorised into the following:

- Road network strategy;
- Parking strategy;
- Public transport strategy; and
- Walking and cycling strategy.

8.1.1 Road Network Strategy

The road network strategy provides an integrated approach to road network planning and management that aims to meet the following requirements:

- Providing for economic activity and land use change;
- Managing seasonal demand and providing a bypass;
- Protecting core activity areas;
- Provide for pedestrians, cyclists and public transport; and
- Maintain safety and amenity.

The following strategies and action plans have been developed for Nelson Bay to help address the above aims:

- RNM1 – Revised road hierarchy, which includes:
  - RNM 1a - Dowling Street Town Centre Bypass (short-term action);
  - RNM 1b - Realignment of Magnus Street with the Dowling Street and Fingal Street intersection (medium-term action);
  - RNM 1c – Reprioritising movement at intersections along the Dowling Street bypass (short-term)
  - RNM 1d – Downgrade Victoria Parade (short to medium-term); and
  - RNM 1e – Downgrade Stockton Street (short to medium-term).
- RNM2 – Investigate the feasibility of Yacaaba Street extension (medium to long-term);
- RNM3 – Investigate the feasibility of upgrading Nelson Bay Road or a new Fingal Bypass (medium to long-term);

- RNM4 – Reduce signposted speed limit in main streets (short to medium-term);
- RNM5 – Reduce historical crash rates by upgrading traffic management (short-term);
- RNM6 – Introduce town centre gateway treatments (short-term); and
- RNM7 – Construct a roundabout at Church Street with Donald Street (short to medium-term).

8.1.2 Parking Strategy

The road network strategy provides an integrated approach to managing parking, event demand, improving parking operations during higher demand periods and supports growth. The road network strategy aims to meet the following requirements:

- Serve local parking needs and the required day to day balance for attracting visitors travelling to Nelson Bay during peak, shoulder peak and non-peak tourist periods;
- Recognise that as development intensifies or the number of major events increases it will not be possible to meet unrestrained parking demand in some parts of the town centre;
- Promote parking as a travel demand management measure and an important part of a package of measures to improve overall accessibility, manage traffic levels and reduce transport impacts;
- Extracts the highest value out of existing and proposed parking facilities; and
- Encourage Port Stephens Council to develop an area wide parking framework that will best achieve the transport and accessibility aspirations of Nelson Bay.

The following strategies and action plans have been developed for Nelson Bay to help address the above aims:

- P1 – Improve direction signage and access to Donald Street Car Parks (short-term);
- P2 – Provide for long-term parking in the town centre and promote connectivity with the foreshore (short to medium-term);
- P3 – Improve town centre off-street parking facilities (short to medium-term);
- P4 – Improve parking enforcement during high season and major events (short to medium-term);
- P5 – Expand paid parking coverage (medium-term);
- P6 – Provide a park-and-ride site for major events and high season (medium-term);
- P7 – Provide advance warning and parking information signage to better manage event demand (medium-term);
- P8 – Develop a town centre parking management plan (short-term);
- P9 – Alternative uses for Section 94 contribution (medium-term); and
- P10 – Consider maximum car parking requirements (medium-term).

8.1.3 Public Transport Strategy

The public transport strategy provides an integrated approach to managing travel demand through

improving the public transport service and structuring the network to encourage more people to use the system. The public transport strategy aims to meet the following requirements:

- Playing a support role to inform decision making undertaken by State Government relating to key public transport corridors and services;
- Promoting and aligning local public transport with user needs and helping to attract and inform users and better integrate with the broader public transport network and its seasonal demand trends;
- Structuring service provision around both development and activity intensification to relieve pressure from congestion and offer an opportunity to better manage network capacity and assets;
- Prioritise access by public transport over access by private vehicles and ensure that residents and visitors are aware of its advantages;
- Educate businesses and residents of the advantages of using public transport services for access, and their ability to improve network efficiency, safety and community well-being; and
- Support the development and improvement of the public transport network through planning and designing for the integration of land use and the transport system.

The following strategies and action plans have been developed for Nelson Bay to help address the above aims:

- PT1 – Public Transport Service Plan (short to medium-term);
- PT2 – Improve the attractiveness of the public transport interchange (short-term);
- PT3 – Investigate the feasibility of introducing park-and-ride (medium-term);
- PT4 - Public transport accessibility (short to medium-term); and
- PT5 – Fare-free route service for public transport (medium-term).

8.1.4 Active Transport Strategy

The active transport strategy provides an integrated approach to managing travel demand in and around the foreshore and town centre by creating and structuring the urban network so that it is safe and convenient to travel by walking or cycling to key destinations. The active transport strategy aims to meet the following requirements:

- Recognise the role walking and cycling plays in the reduction of car-based trips in Nelson Bay;
- Recognises that all trips involve walking at either the beginning or end (or both) of the journey, resulting in the need for connections between parking, the public transport system and key destinations;
- Incorporates walking and cycling issues into the planning and improvement of the road network, parking and public transport;
- Understand that walking and cycling trips perform a variety of functions, not only travel from an origin to a destination, but such trips are also undertaken for recreation and/or health benefits, which can be influenced by the amenity of the route;

- Recognises the need to improve the pedestrian environment in the town centre and to its surrounding catchments; and
- Encourages Port Stephens Council to develop a walking and cycling framework that will best achieve the aspirations of Nelson Bay and the Tomaree Peninsula.

The following strategies and action plans have been developed for Nelson Bay to help address the above aims:

- AT1 – Improve wayfinding and identification signage (short-term);
- AT 2 - Provide additional pedestrian crossing facilities (short – medium-term);
- AT 3 - Widen footpaths along Stockton Street to promote and encourage Main Street activities (short to medium-term);
- AT4 – Develop a PAMP and improve the condition and provision of footpaths (medium-term);
- AT5 - Close Stockton Street north to traffic during event days and high season periods (medium-term);
- AT6 - Improve town centre walking environment (medium-term); and
- AT7 - Increase the visibility of cycling through developing a bike plan and expanding the cycle network (medium-term).

8.1.5 Integrated Transport Strategy

These individual strategies, considered collectively, comprise the Integrated Transport Strategy for Nelson Bay.

8.2 Next Steps

The transport and parking strategies and action plans identified for Nelson Bay have been developed both to respond to transport issues and complement the principles outcomes described in the draft Nelson Bay 2030 Strategy.

In addition, the findings of this review necessitate follow-on actions and review, which includes the revision of existing Council policy documents and planning of operational and infrastructure improvements that will help to better manage transport and accommodate future growth in Nelson Bay. These include:

- Identify funding for the collection of detailed traffic and parking data sets that will inform decision making and allow Council to monitor both seasonal trends and the performance of the network over time;
- Monitor the performance of the road network against desirable operating conditions;
- Confirming the land use plans for the eastern side of the town centre and foreshore areas, which will dictate the functionality requirements for a Yacaaba Street extension;
- Undertake a road safety audit of the proposed Dowling Street town centre bypass route;

- Plan and set up a transport committee for investigating the feasibility of upgrading Nelson Bay Road to a dual carriageway beyond Anna Bay, and introducing a permanent event/high season Park-and-Ride site for accessing Nelson Bay and the Tomaree Peninsula;
- Review and implement recommended parking code changes identified as part of the benchmark comparison review and include a provision for bicycle parking associated with new town centre and foreshore developments;
- Review LEP and provide direction for consolidating parking in the town centre and limited access points along town centre Main Streets. These measures should further consider access arrangement needs and potential impacts from the redevelopment of Coles site by Woolworths and the Stockton Street service station;
- Consolidate off-street parking on the periphery of the town centre, reduce traffic activity on town centre Main Streets and the foreshore and promote Stockton Street and Apex Park as focal points for pedestrian activity;
- Review of Section 94 contributions for the upgrade of intersections, introduction of gateway treatments and improvements in wayfinding;
- Further investigate the feasibility of redeveloping Donald Street east and Donald Street west Car Parks; and
- Develop detailed plans, identify funding mechanisms and plan towards the implementation of short to medium-term improvement options.

Appendix A

2011 Intersection Performance

Peak period performance at critical town centre intersections during a weekend event day in November 2011.

LANE SUMMARY

Site: Church_Donald_IP - give way - Conversion

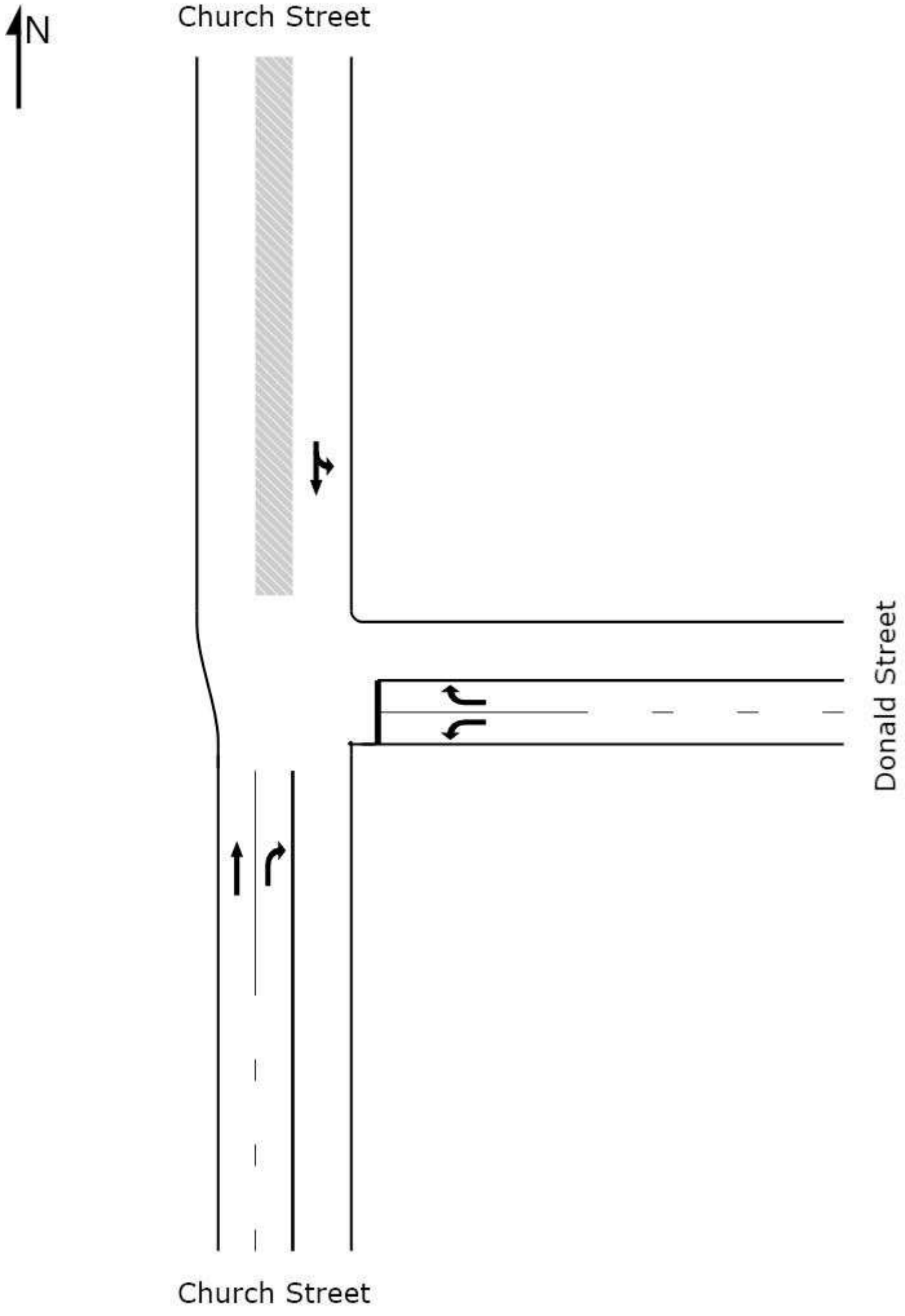
Three-way intersection with 2-lane major road (Give Way)
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Church Street																
Lane 1	0	356	0	356	0.0	1950	0.182	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	0	94	94	2.2	975	0.096	100	9.9	LOS A	0.4	2.7	500	–	0.0	0.0
Approach	0	356	94	449	0.5		0.182		2.1	NA	0.4	2.7				
East: Donald Street																
Lane 1	91	0	0	91	0.0	874	0.104	100	9.8	LOS A	0.4	2.6	500	–	0.0	0.0
Lane 2	0	0	175	175	0.0	272	0.641	100	30.8	LOS C	3.8	26.9	500	–	0.0	0.0
Approach	91	0	175	265	0.0		0.641		23.7	LOS B	3.8	26.9				
North: Church Street																
Lane 1	163	206	0	369	0.0	1908	0.194	100	3.6	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	163	206	0	369	0.0		0.194		3.6	NA	0.0	0.0				
Intersection				1084	0.2		0.641		7.9	NA	3.8	26.9				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

N
Church Street
Donald Street
Church Street


N
Church Street
Donald Street
Church Street

LANE SUMMARY

Site: Church_Donald_IP

Three-way intersection with 2-lane major road (Stop control)
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Church Street																
Lane 1	0	356	0	356	0.0	1950	0.182	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	0	94	94	2.2	763	0.123	100	10.6	LOS A	0.5	3.2	500	–	0.0	0.0
Approach	0	356	94	449	0.5		0.182		2.2	NA	0.5	3.2				
East: Donald Street																
Lane 1	91	0	0	91	0.0	874	0.104	100	12.3	LOS A	0.4	2.6	500	–	0.0	0.0
Lane 2	0	0	175	175	0.0	272	0.641	100	33.4	LOS C	3.8	26.9	500	–	0.0	0.0
Approach	91	0	175	265	0.0		0.641		26.2	LOS B	3.8	26.9				
North: Church Street																
Lane 1	163	206	0	369	0.0	1908	0.194	100	3.6	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	163	206	0	369	0.0		0.194		3.6	NA	0.0	0.0				
Intersection				1084	0.2		0.641		8.6	NA	3.8	26.9				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

LANE SUMMARY

Stockton Street - Donald Street

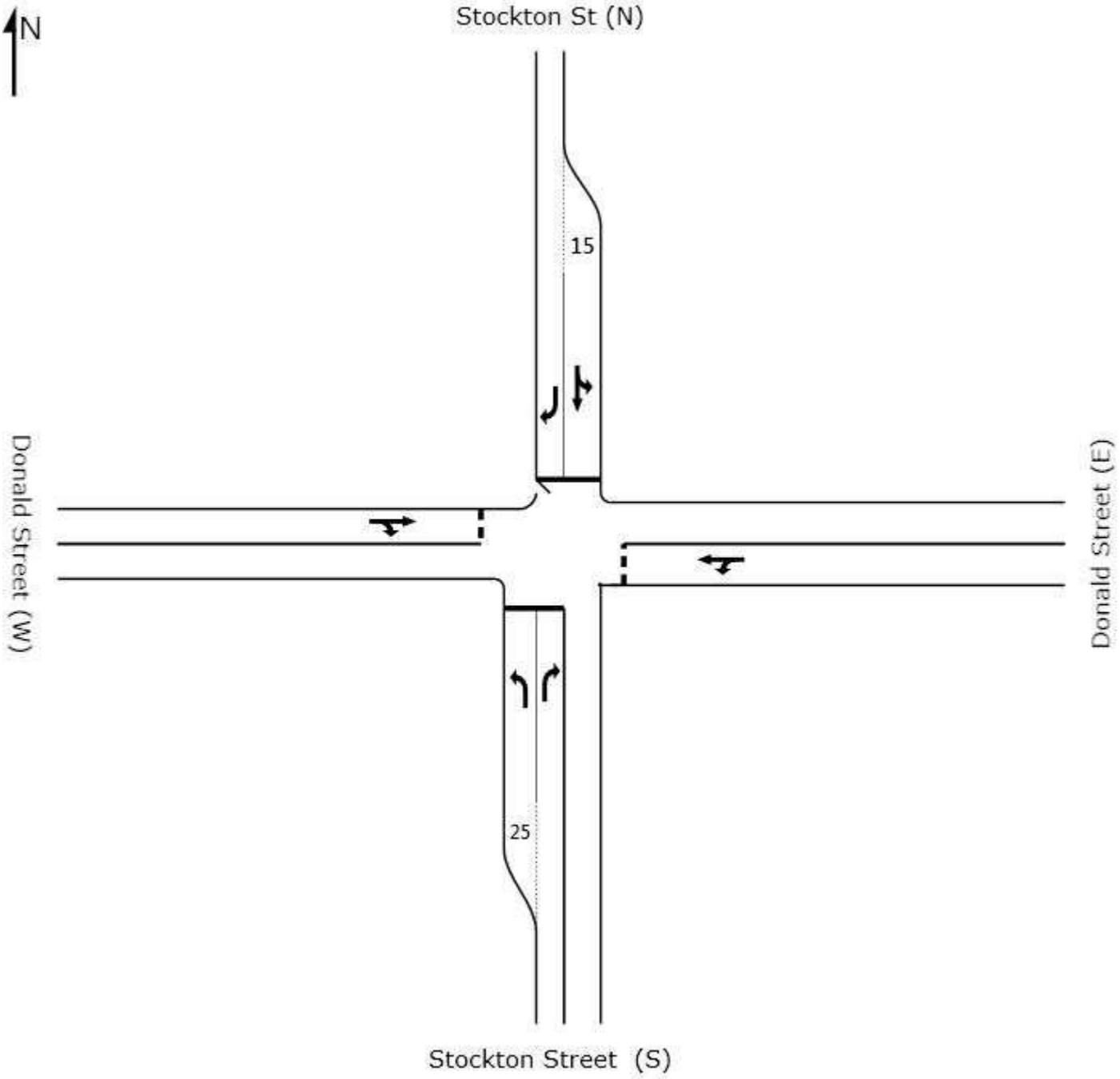
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Stockton Street (S)																
Lane 1	140	0	0	140	0.7	437	0.320	100	16.2	LOS B	1.3	9.4	25	Turn Bay	0.0	0.0
Lane 2	0	0	126	126	0.0	321	0.392	100	20.9	LOS B	1.9	13.0	500	–	0.0	0.0
Approach	140	0	126	266	0.4		0.392		18.4	LOS B	1.9	13.0				
South East: Zebra Crossing at S																
Lane 1	0	200	0	200	0.0	6000	0.033	100	0.0	LOS A	0.0	0.0	10	–	0.0	0.0
Approach	0	200	0	200	0.0		0.033		0.0	NA	0.0	0.0				
East: Donald Street (E)																
Lane 1	35	90	0	125	1.6	814	0.154	100	2.8	LOS A	0.6	4.2	500	–	0.0	0.0
Approach	35	90	0	125	1.6		0.154		2.8	LOS A	0.6	4.2				
North: Stockton St (N)																
Lane 1	93	99	0	192	0.0	525[1]	0.366	100	12.6	LOS A	1.5	10.2	15	Turn Bay	0.0	0.0
Lane 2	0	0	103	103	0.0	170	0.607	100	42.9	LOS D	2.8	19.9	500	–	0.0	0.0
Approach	93	99	103	295	0.0		0.607		23.2	LOS B	2.8	19.9				
West: Donald Street (W)																
Lane 1	0	120	45	165	0.0	667	0.247	100	4.5	LOS A	1.0	7.1	500	–	0.0	0.0
Approach	0	120	45	165	0.0		0.247		4.5	LOS A	1.0	7.1				
South West: Zebra Crossing at W																
Lane 1	0	586	0	586	0.0	6000	0.098	100	0.0	LOS A	0.0	0.0	8	–	0.0	0.0
Approach	0	586	0	586	0.0		0.098		0.0	NA	0.0	0.0				
Intersection				1637	0.2		0.607		7.8	NA	2.8	19.9				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect


N
Stockton St (N)
15
Donald Street (W)
Donald Street (E)
25
Stockton Street (S)

LANE SUMMARY

Site: Stockton_Tomaree_IP

Four-way intersection with 2-lane major road (Give-Way control)

Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Stockton Street																
Lane 1	13	191	55	258	0.0	1530	0.169	100	3.8	LOS A	1.1	8.0	500	–	0.0	0.0
Approach	13	191	55	258	0.0		0.169		3.8	NA	1.1	8.0				
East: Tomaree Street																
Lane 1	93	16	20	128	0.0	1189	0.108	100	9.4	LOS A	0.5	3.4	500	–	0.0	0.0
Approach	93	16	20	128	0.0		0.108		9.4	LOS A	0.5	3.4				
North: Stockton Street																
Lane 1	42	181	17	240	0.0	1790	0.134	100	3.2	LOS A	1.0	6.7	500	–	0.0	0.0
Approach	42	181	17	240	0.0		0.134		3.2	NA	1.0	6.7				
West: Tomaree Street																
Lane 1	20	20	9	49	0.0	794	0.062	100	10.4	LOS A	0.3	1.8	500	–	0.0	0.0
Approach	20	20	9	49	0.0		0.062		10.4	LOS A	0.3	1.8				
Intersection				676	0.0		0.169		5.1	NA	1.1	8.0				

Level of Service (LOS) Method: Delay (RTA NSW).

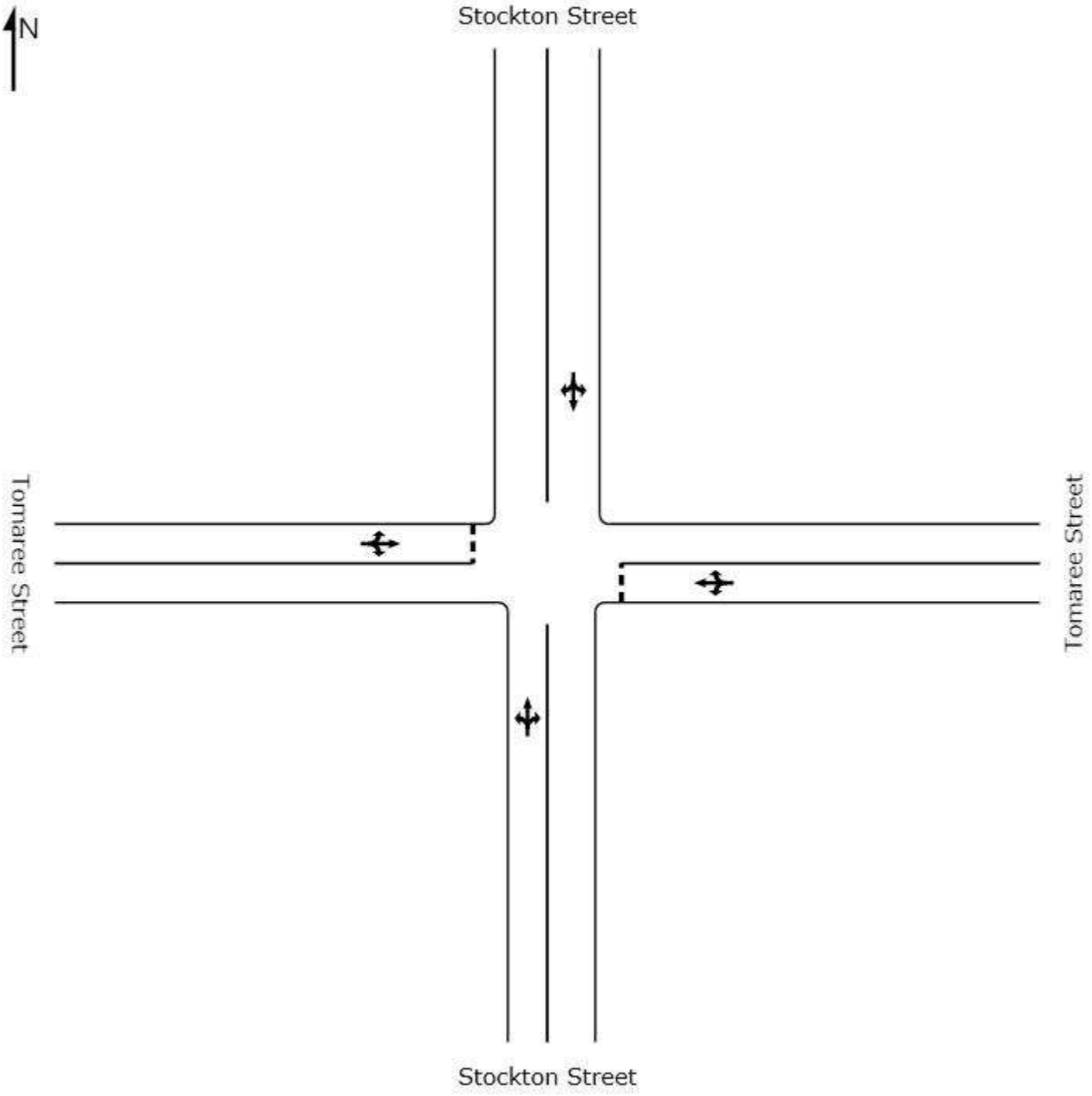
Lane LOS values are based on average delay per lane.

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

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

SIDRA Standard Delay Model used.

SIDRA INTERSECTION


N
Stockton Street
Tomaree Street
Tomaree Street
Stockton Street

LANE SUMMARY

Site: Yacaaba_Donald_IP

Four-way intersection with 2-lane major road (Stop control)

Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Yacaaba Streert																
Lane 1	23	53	26	102	0.0	1525	0.067	100	4.4	LOS A	0.4	2.6	500	–	0.0	0.0
Approach	23	53	26	102	0.0		0.067		4.4	NA	0.4	2.6				
East: Donald Street																
Lane 1	32	46	9	87	0.0	1026	0.085	100	11.6	LOS A	0.4	2.6	500	–	0.0	0.0
Approach	32	46	9	87	0.0		0.085		11.6	LOS A	0.4	2.6				
North: Yacaaba Street																
Lane 1	13	40	51	103	0.0	1184	0.087	100	6.2	LOS A	0.4	3.0	500	–	0.0	0.0
Approach	13	40	51	103	0.0		0.087		6.2	NA	0.4	3.0				
West: Donald Street																
Lane 1	206	113	35	354	0.0	1242	0.285	100	11.4	LOS A	1.5	10.7	500	–	0.0	0.0
Approach	206	113	35	354	0.0		0.285		11.4	LOS A	1.5	10.7				
Intersection				646	0.0		0.285		9.5	NA	1.5	10.7				

Level of Service (LOS) Method: Delay (RTA NSW).

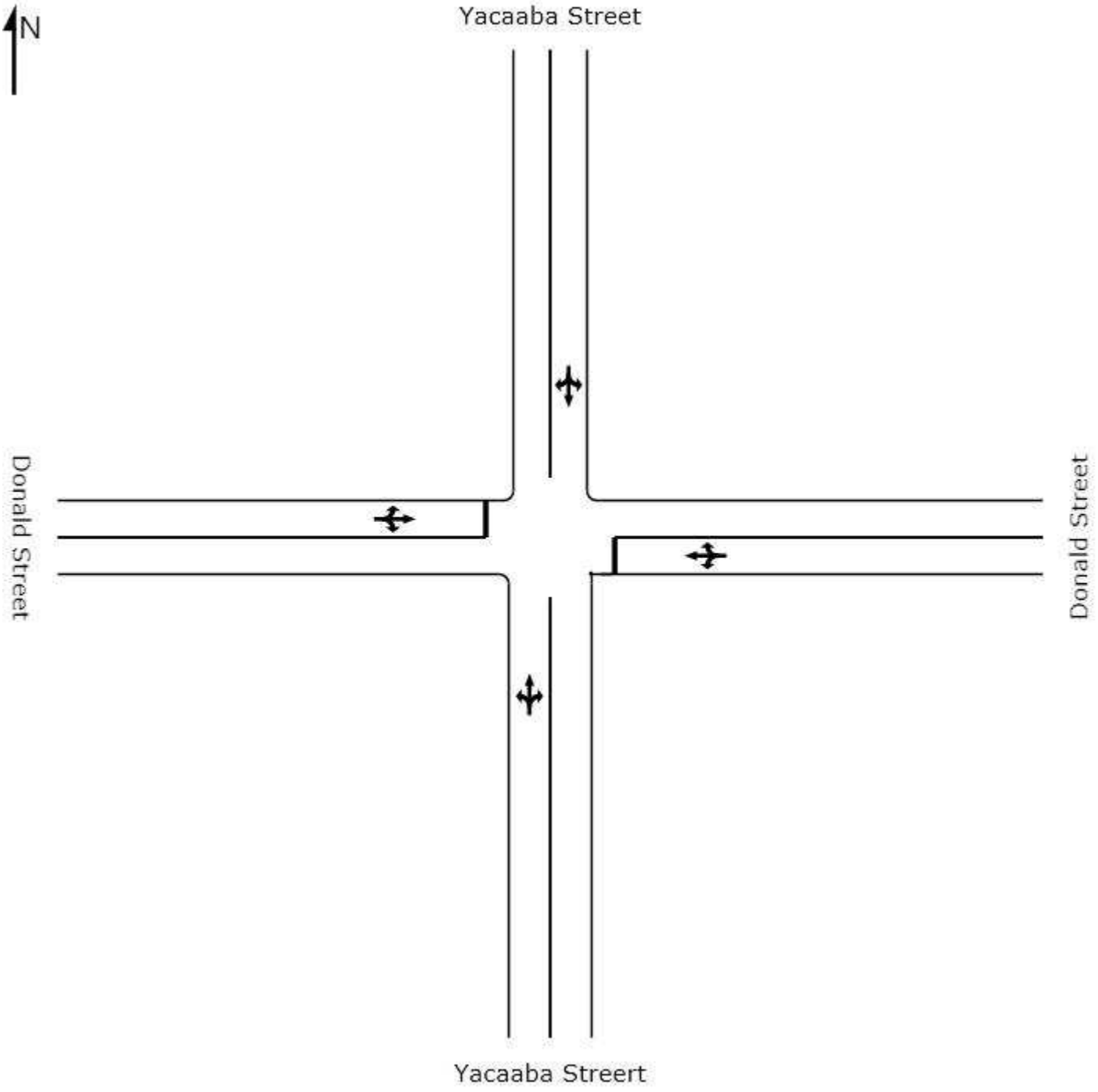
Lane LOS values are based on average delay per lane.

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

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

SIDRA Standard Delay Model used.

SIDRA INTERSECTION


N
Yacaaba Street
Donald Street
Donald Street
Yacaaba Streert

LANE SUMMARY

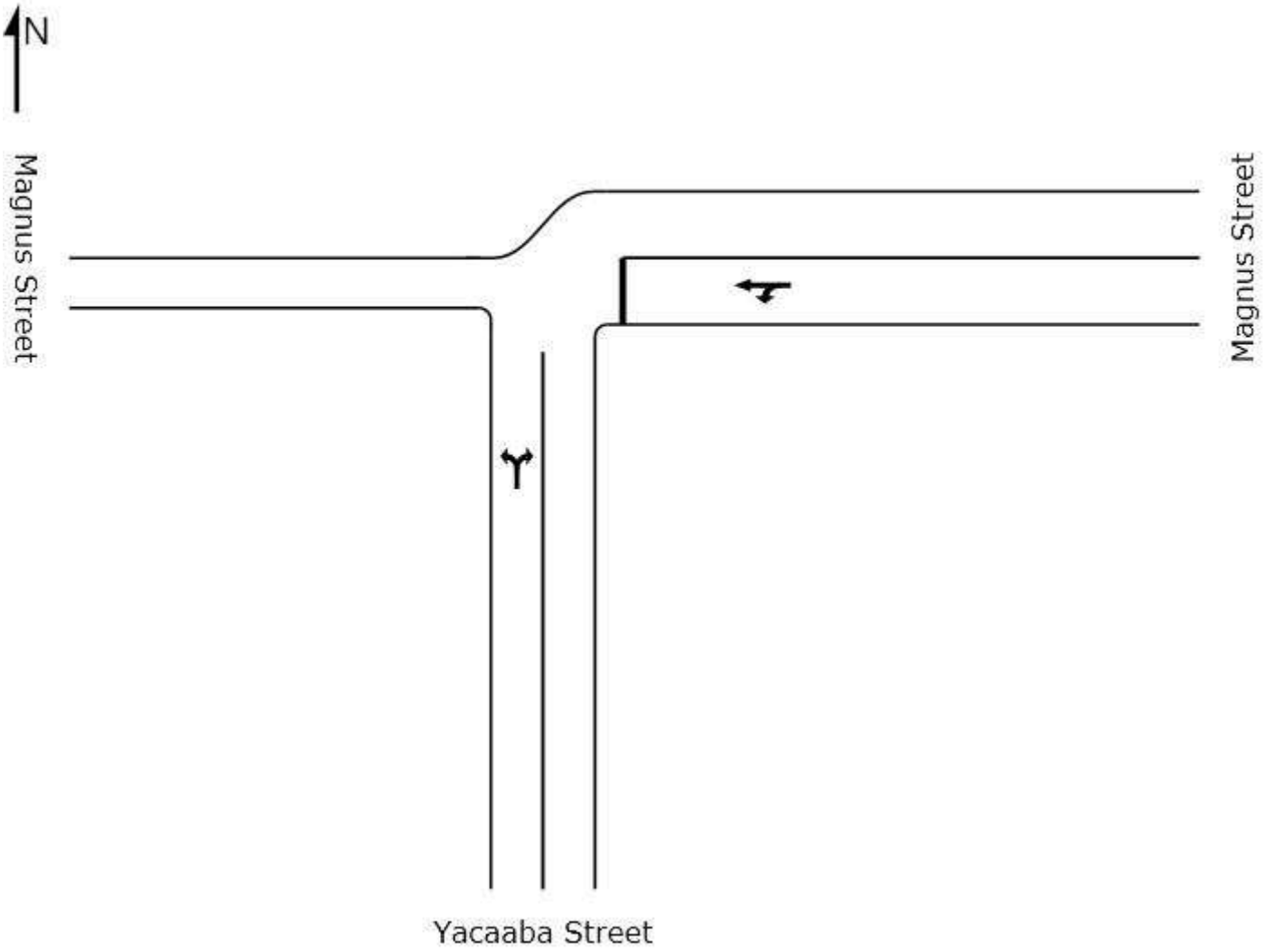
Site: Yacaaba_Magnus_IP

Three-way intersection with 2-lane major road (Stop control)
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Yacaaba Street																
Lane 1	86	0	172	258	0.0	1857	0.139	100	8.1	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	86	0	172	258	0.0		0.139		8.1	NA	0.0	0.0				
East: Magnus Street																
Lane 1	100	34	0	134	0.0	1312	0.102	100	13.2	LOS A	0.8	5.7	500	–	0.0	0.0
Approach	100	34	0	134	0.0		0.102		13.2	LOS A	0.8	5.7				
Intersection				392	0.0		0.139		9.9	NA	0.8	5.7				

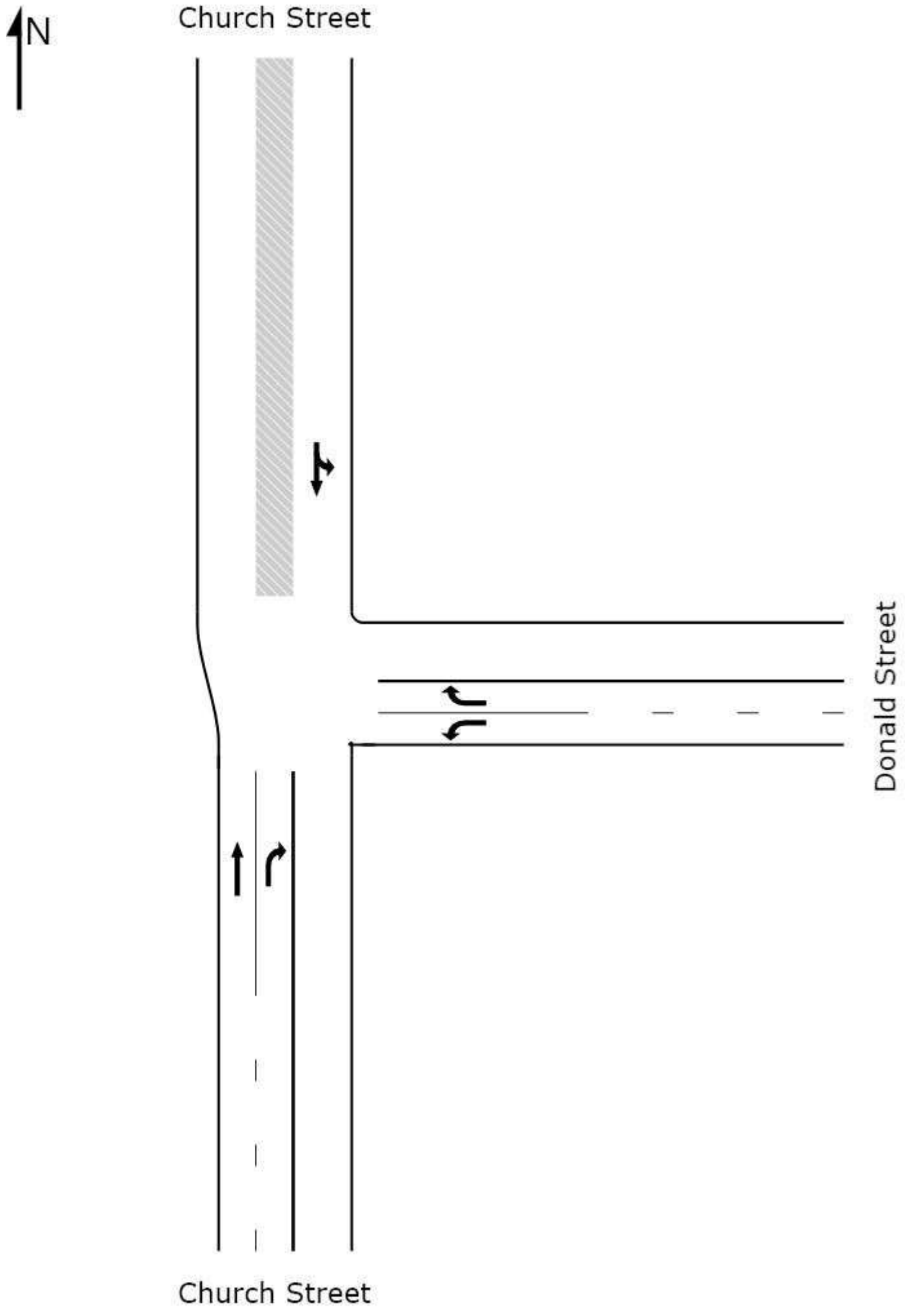
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.


N
Magnus Street
Magnus Street
Yacaaba Street

Appendix B

Review of Future Traffic Conditions

Assessment of Peak Period Performance Needs and Intersection Control Requirements


N
Church Street
Donald Street
Church Street

LANE SUMMARY

Site: Church_Donald_IP

Three-way intersection with 2-lane major road (Stop control)
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Church Street																
Lane 1	0	445	0	445	0.0	1950	0.228	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	0	117	117	2.2	670	0.174	100	11.6	LOS A	0.6	4.6	500	–	0.0	0.0
Approach	0	445	117	562	0.5		0.228		2.4	NA	0.6	4.6				
East: Donald Street																
Lane 1	114	0	0	114	0.0	796	0.143	100	10.4	LOS A	0.5	3.7	500	–	0.0	0.0
Lane 2	0	0	219	219	0.0	191	1.146	100	200.3	LOS F	26.6	185.9	500	–	0.0	0.0
Approach	114	0	219	333	0.0		1.146		135.4	NA	26.6	185.9				
North: Church Street																
Lane 1	204	258	0	462	0.0	1908	0.242	100	3.6	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	204	258	0	462	0.0		0.242		3.6	NA	0.0	0.0				
Intersection				1357	0.2		1.146		35.4	NA	26.6	185.9				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

LANE SUMMARY

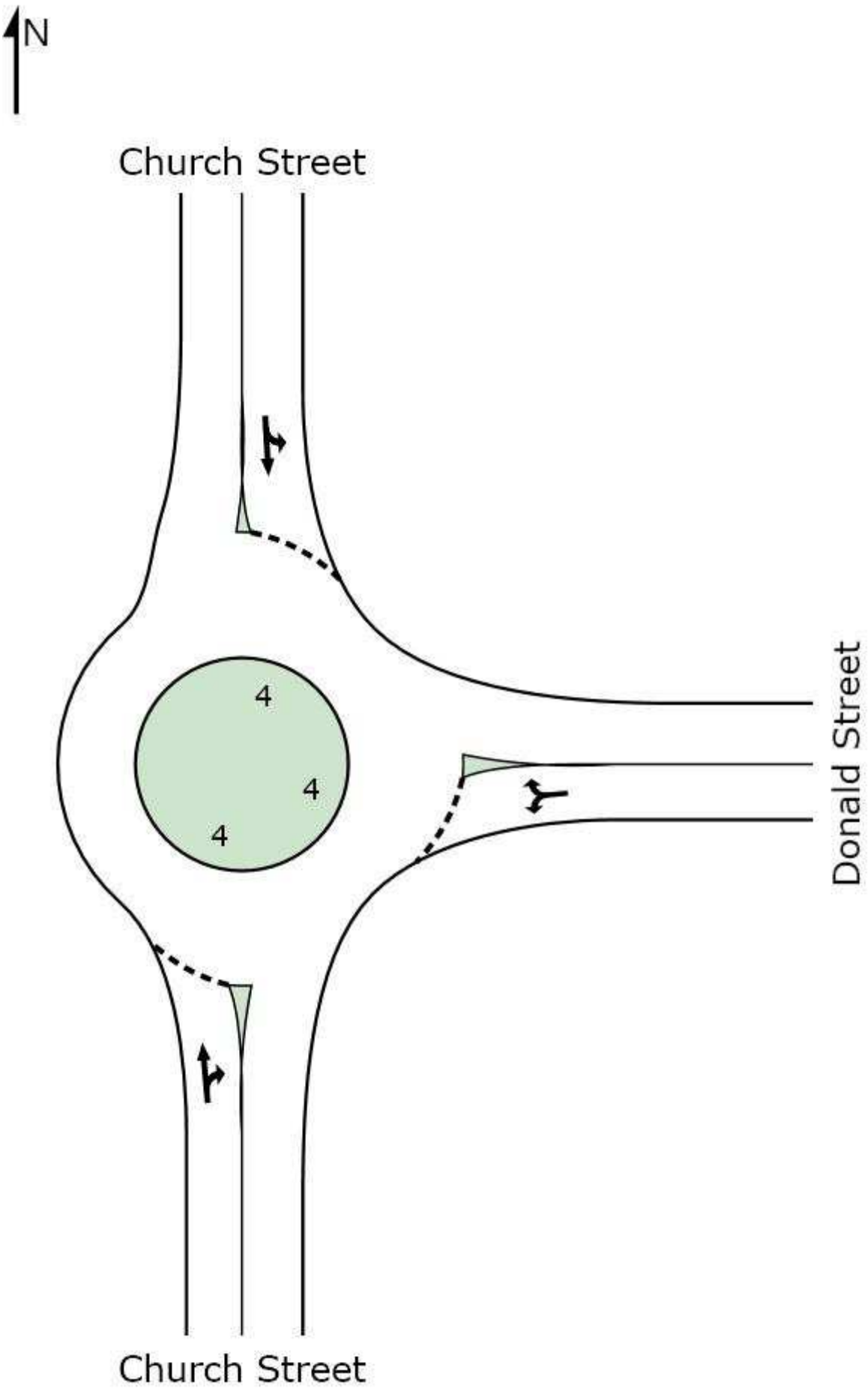
Site: Church_Donald_IP - Redist Traffic

Three-way intersection with 2-lane major road (Stop control)
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Church Street																
Lane 1	0	445	0	445	0.0	1950	0.228	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	0	174	174	2.2	515	0.337	100	15.0	LOS B	1.5	10.6	500	–	0.0	0.0
Approach	0	445	174	619	0.6		0.337		4.2	NA	1.5	10.6				
East: Donald Street																
Lane 1	85	0	0	85	0.0	631	0.135	100	11.9	LOS A	0.5	3.3	500	–	0.0	0.0
Lane 2	0	0	164	164	0.0	122	1.345	100	386.7	LOS F	32.9	230.4	500	–	0.0	0.0
Approach	85	0	164	249	0.0		1.345		258.6	NA	32.9	230.4				
North: Church Street																
Lane 1	301	369	0	671	0.0	1907	0.352	100	3.7	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	301	369	0	671	0.0		0.352		3.7	NA	0.0	0.0				
Intersection				1539	0.3		1.345		45.2	NA	32.9	230.4				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.


N
Church Street
Donald Street
4
4
4
Church Street

LANE SUMMARY

Site: Church_Donald_IP - Conversion

Three-way intersection with 2-lane major road (Stop control)
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Church Street																
Lane 1	0	445	117	562	0.5	1101	0.510	100	9.6	LOS A	3.3	23.3	500	–	0.0	0.0
Approach	0	445	117	562	0.5		0.510		9.6	LOS A	3.3	23.3				
East: Donald Street																
Lane 1	114	0	219	333	0.0	1029	0.323	100	11.4	LOS A	1.6	11.4	500	–	0.0	0.0
Approach	114	0	219	333	0.0		0.323		11.4	LOS A	1.6	11.4				
North: Church Street																
Lane 1	204	258	0	462	0.0	1239	0.373	100	8.7	LOS A	1.9	13.3	500	–	0.0	0.0
Approach	204	258	0	462	0.0		0.373		8.7	LOS A	1.9	13.3				
Intersection				1357	0.2		0.510		9.7	LOS A	3.3	23.3				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

LANE SUMMARY

Site: Church_Donald_IP - Conversion - Redist Traffic

Three-way intersection with 2-lane major road (Stop control)
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Church Street																
Lane 1	0	445	174	619	0.6	1174	0.527	100	9.5	LOS A	3.6	25.5	500	–	0.0	0.0
Approach	0	445	174	619	0.6		0.527		9.5	LOS A	3.6	25.5				
East: Donald Street																
Lane 1	85	0	164	249	0.0	984	0.254	100	11.6	LOS A	1.3	9.0	500	–	0.0	0.0
Approach	85	0	164	249	0.0		0.254		11.6	LOS A	1.3	9.0				
North: Church Street																
Lane 1	301	369	0	671	0.0	1200	0.559	100	9.0	LOS A	3.6	25.0	500	–	0.0	0.0
Approach	301	369	0	671	0.0		0.559		9.0	LOS A	3.6	25.0				
Intersection				1539	0.3		0.559		9.6	LOS A	3.6	25.5				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

LANE SUMMARY

Site: Stockton_Donald_IP - Conversion

Stockton Street - Donald Street

Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Stockton Street (S)																
Lane 1	175	0	0	175	0.7	322	0.543	100	23.8	LOS B	2.6	18.2	25	Turn Bay	0.0	0.0
Lane 2	0	0	158	158	0.0	238	0.664	100	35.1	LOS C	3.9	27.0	500	–	0.0	0.0
Approach	175	0	158	333	0.4		0.664		29.1	LOS C	3.9	27.0				
South East: Zebra Crossing at S																
Lane 1	0	250	0	250	0.0	6000	0.042	100	0.0	LOS A	0.0	0.0	10	–	0.0	0.0
Approach	0	250	0	250	0.0		0.042		0.0	NA	0.0	0.0				
East: Donald Street (E)																
Lane 1	44	113	0	157	1.6	662	0.237	100	4.4	LOS A	0.9	6.6	500	–	0.0	0.0
Approach	44	113	0	157	1.6		0.237		4.4	LOS A	0.9	6.6				
North: Stockton St (N)																
Lane 1	116	124	0	240	0.0	489[1]	0.491	100	16.1	LOS B	2.7	19.1	15	Turn Bay	0.0	12.7
Lane 2	0	0	129	129	0.0	101	1.277	100	596.8	LOS F	41.1	287.7	500	–	0.0	0.0
Approach	116	124	129	369	0.0		1.277		219.1	LOS F	41.1	287.7				
West: Donald Street (W)																
Lane 1	0	150	56	206	0.0	516	0.399	100	8.2	LOS A	1.9	13.2	500	–	0.0	0.0
Approach	0	150	56	206	0.0		0.399		8.2	LOS A	1.9	13.2				
South West: Zebra Crossing at W																
Lane 1	0	732	0	732	0.0	6000	0.122	100	0.0	LOS A	0.0	0.0	8	–	0.0	0.0
Approach	0	732	0	732	0.0		0.122		0.0	NA	0.0	0.0				
Intersection				2047	0.2		1.277		45.4	NA	41.1	287.7				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

LANE SUMMARY

Site: Stockton_Donald_IP - Conversion - Redist Traffic

Stockton Street - Donald Street

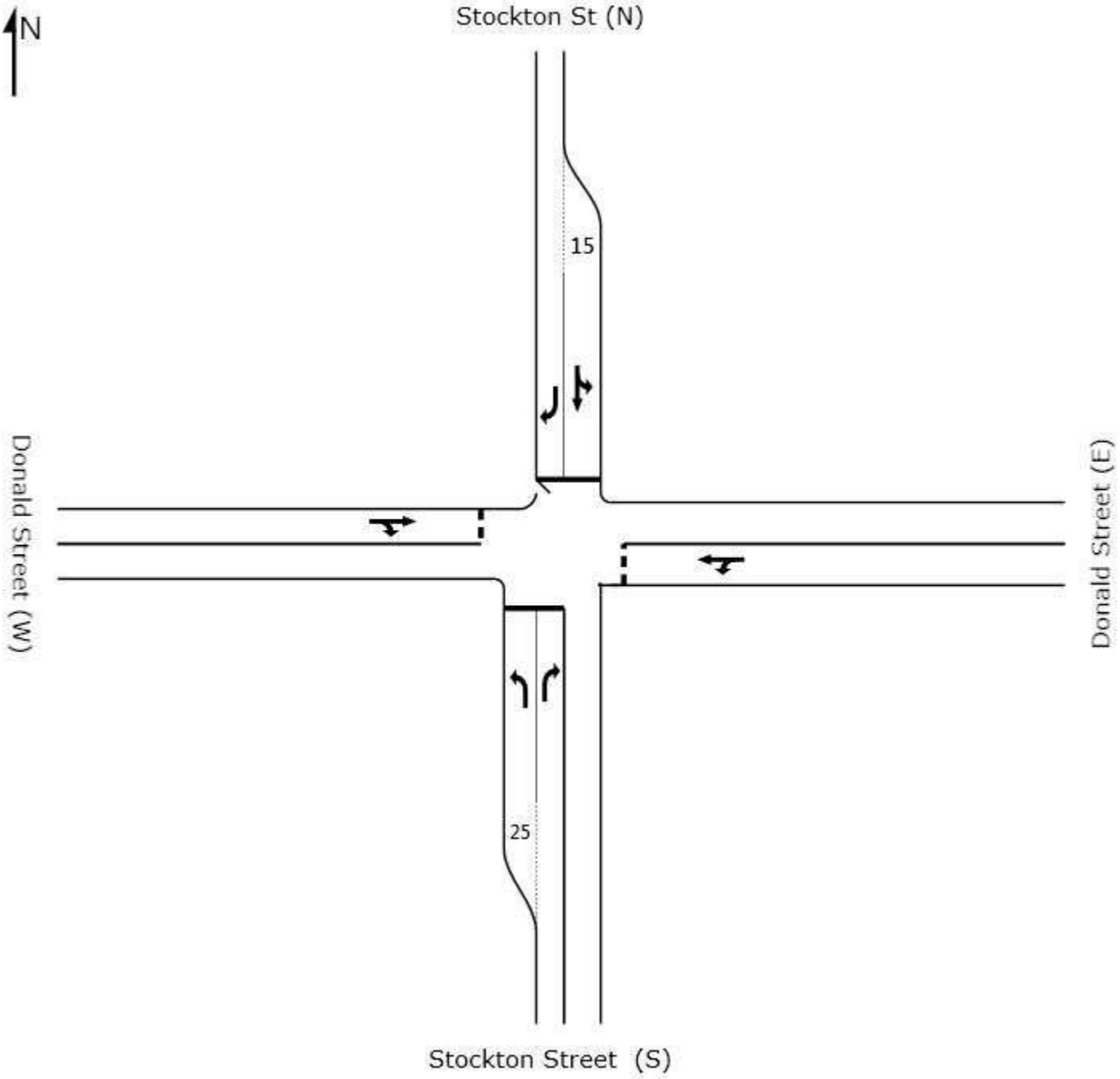
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Stockton Street (S)																
Lane 1	88	0	0	88	0.7	322	0.273	100	19.4	LOS B	1.0	7.1	25	Turn Bay	0.0	0.0
Lane 2	0	0	79	79	0.0	305	0.259	100	19.5	LOS B	1.0	7.2	500	–	0.0	0.0
Approach	88	0	79	167	0.4		0.273		19.4	LOS B	1.0	7.2				
South East: Zebra Crossing at S																
Lane 1	0	250	0	250	0.0	6000	0.042	100	0.0	LOS A	0.0	0.0	10	–	0.0	0.0
Approach	0	250	0	250	0.0		0.042		0.0	NA	0.0	0.0				
East: Donald Street (E)																
Lane 1	44	113	0	157	1.6	662	0.237	100	4.4	LOS A	0.9	6.6	500	–	0.0	0.0
Approach	44	113	0	157	1.6		0.237		4.4	LOS A	0.9	6.6				
North: Stockton St (N)																
Lane 1	58	62	0	120	0.0	490[1]	0.245	100	12.8	LOS A	0.8	5.7	15	Turn Bay	0.0	0.0
Lane 2	0	0	64	64	0.0	126	0.509	100	49.6	LOS D	2.0	13.9	500	–	0.0	0.0
Approach	58	62	64	184	0.0		0.509		25.6	LOS B	2.0	13.9				
West: Donald Street (W)																
Lane 1	0	150	42	192	0.0	526	0.365	100	7.6	LOS A	1.7	11.6	500	–	0.0	0.0
Approach	0	150	42	192	0.0		0.365		7.6	LOS A	1.7	11.6				
South West: Zebra Crossing at W																
Lane 1	0	732	0	732	0.0	6000	0.122	100	0.0	LOS A	0.0	0.0	8	–	0.0	0.0
Approach	0	732	0	732	0.0		0.122		0.0	NA	0.0	0.0				
Intersection				1682	0.2		0.509		6.0	NA	2.0	13.9				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect


N
Stockton St (N)
15
Donald Street (W)
Donald Street (E)
25
Stockton Street (S)

LANE SUMMARY

Site: Stockton_Tomaree_IP

Four-way intersection with 2-lane major road (Give-Way control)

Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Stockton Street																
Lane 1	16	238	68	322	0.0	1485	0.217	100	4.5	LOS A	1.6	11.5	500	–	0.0	0.0
Approach	16	238	68	322	0.0		0.217		4.5	NA	1.6	11.5				
East: Tomaree Street																
Lane 1	116	20	25	161	0.0	1071	0.150	100	9.9	LOS A	0.7	4.7	500	–	0.0	0.0
Approach	116	20	25	161	0.0		0.150		9.9	LOS A	0.7	4.7				
North: Stockton Street																
Lane 1	53	226	21	300	0.0	1776	0.169	100	3.6	LOS A	1.3	9.2	500	–	0.0	0.0
Approach	53	226	21	300	0.0		0.169		3.6	NA	1.3	9.2				
West: Tomaree Street																
Lane 1	25	25	12	62	0.0	667	0.093	100	11.6	LOS A	0.4	2.6	500	–	0.0	0.0
Approach	25	25	12	62	0.0		0.093		11.6	LOS A	0.4	2.6				
Intersection				845	0.0		0.217		5.7	NA	1.6	11.5				

Level of Service (LOS) Method: Delay (RTA NSW).

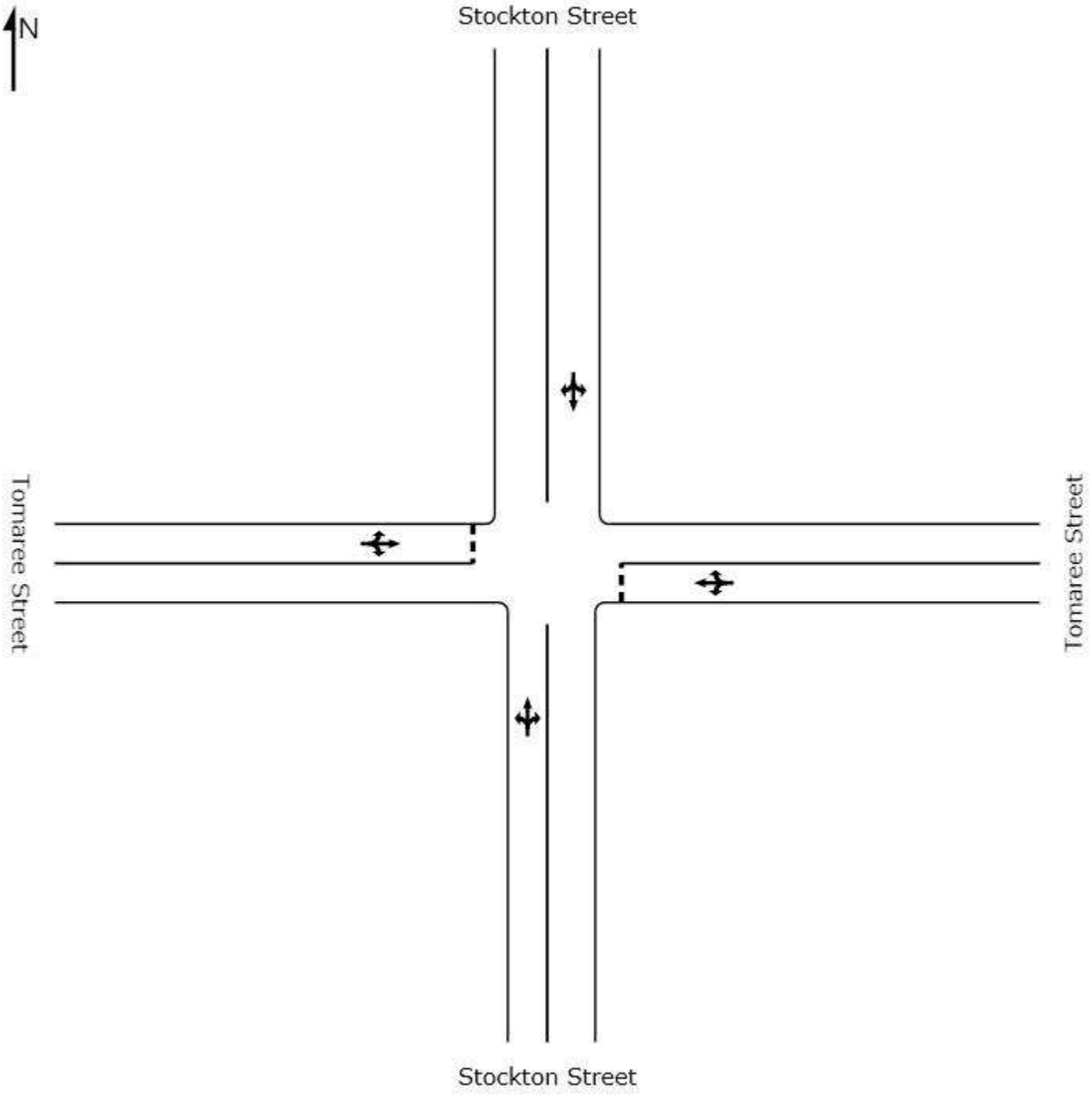
Lane LOS values are based on average delay per lane.

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

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

SIDRA Standard Delay Model used.

SIDRA INTERSECTION


N
Stockton Street
Tomaree Street
Tomaree Street
Stockton Street

LANE SUMMARY

Site: Yacaaba_Donald_IP

Four-way intersection with 2-lane major road (Stop control)

Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Yacaaba Streert																
Lane 1	29	66	33	128	0.0	1517	0.085	100	4.5	LOS A	0.5	3.4	500	–	0.0	0.0
Approach	29	66	33	128	0.0		0.085		4.5	NA	0.5	3.4				
East: Donald Street																
Lane 1	40	58	12	109	0.0	963	0.114	100	11.9	LOS A	0.5	3.5	500	–	0.0	0.0
Approach	40	58	12	109	0.0		0.114		11.9	LOS A	0.5	3.5				
North: Yacaaba Street																
Lane 1	16	51	63	129	0.0	1143	0.113	100	6.6	LOS A	0.6	4.1	500	–	0.0	0.0
Approach	16	51	63	129	0.0		0.113		6.6	NA	0.6	4.1				
West: Donald Street																
Lane 1	258	141	43	442	0.0	1188	0.372	100	11.7	LOS A	2.1	14.9	500	–	0.0	0.0
Approach	258	141	43	442	0.0		0.372		11.7	LOS A	2.1	14.9				
Intersection				809	0.0		0.372		9.8	NA	2.1	14.9				

Level of Service (LOS) Method: Delay (RTA NSW).

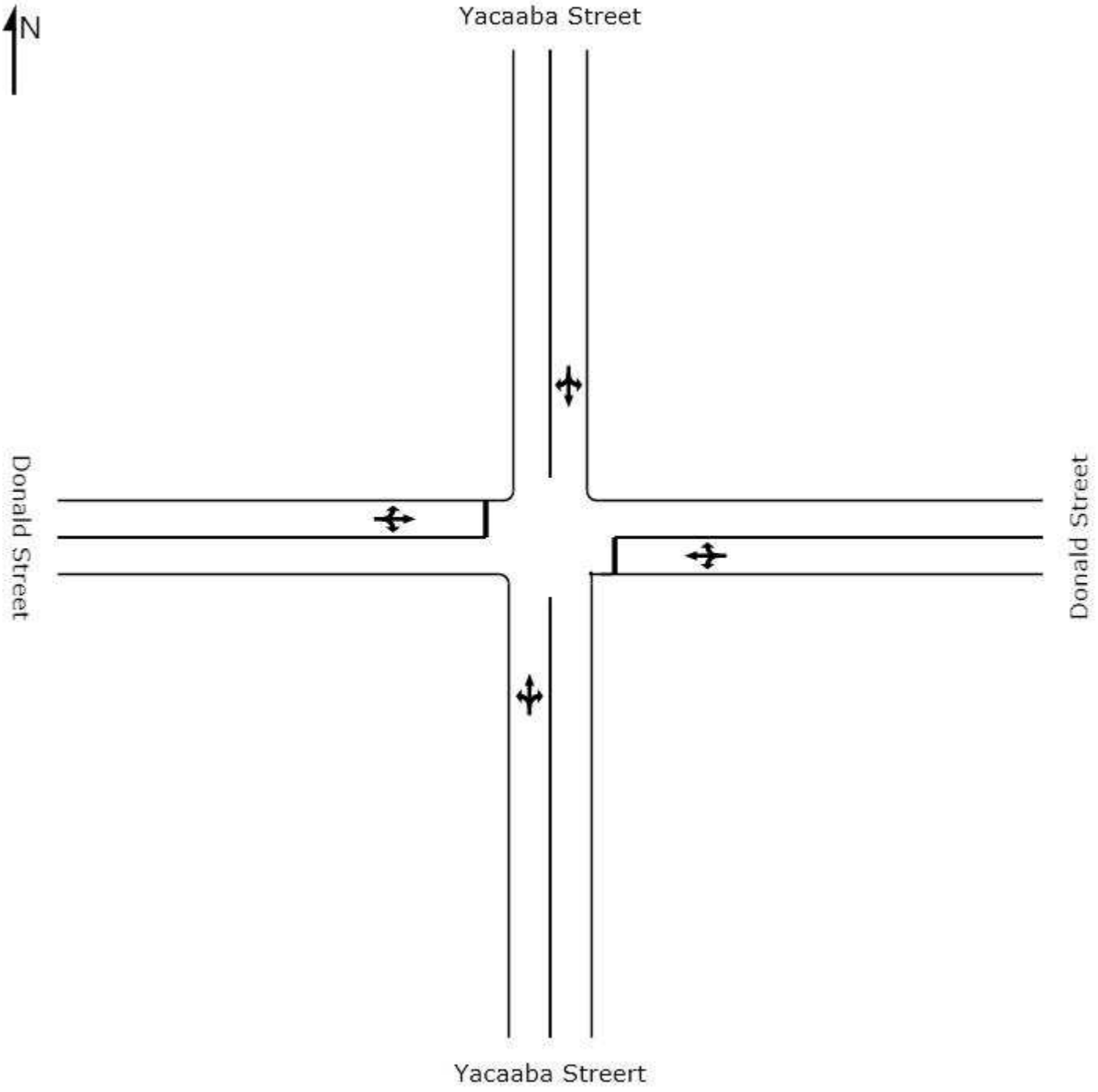
Lane LOS values are based on average delay per lane.

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

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

SIDRA Standard Delay Model used.

SIDRA INTERSECTION


N
Yacaaba Street
Donald Street
Donald Street
Yacaaba Streert

LANE SUMMARY

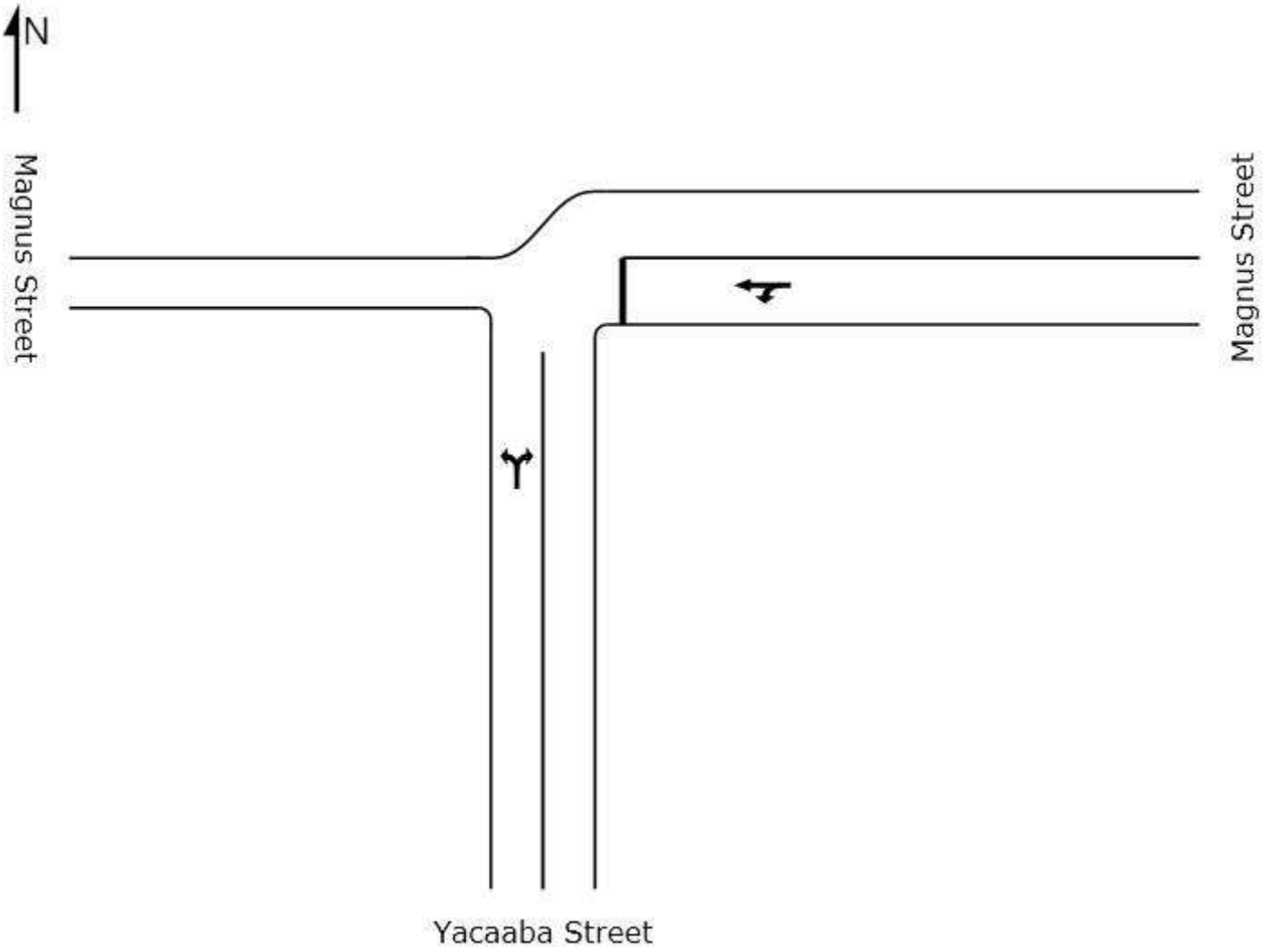
Site: Yacaaba_Magnus_IP

Three-way intersection with 2-lane major road (Stop control)
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Yacaaba Street																
Lane 1	108	0	215	323	0.0	1857	0.174	100	8.1	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	108	0	215	323	0.0		0.174		8.1	NA	0.0	0.0				
East: Magnus Street																
Lane 1	125	42	0	167	0.0	1243	0.135	100	14.3	LOS A	1.2	8.2	500	–	0.0	0.0
Approach	125	42	0	167	0.0		0.135		14.3	LOS A	1.2	8.2				
Intersection				491	0.0		0.174		10.3	NA	1.2	8.2				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.


N
Magnus Street
Magnus Street
Yacaaba Street

Appendix C

Review of Yacaaba St Extension Options

Qualitative assessment of potential configuration options and functionality needs for the proposed Yacaaba Street Extension between Victoria Parade and Donald Street

Assessment Scoring System

The qualitative appraisal includes:

- Advantages and disadvantages of each options against doing nothing;
- A review of each option's alignment with planning principles identified in the Draft Nelson Bay 2030 strategy; and
- A review of each option's alignment with key stakeholder needs; and
- The affordability of each option in terms of likely project costs associated with implementation.

The evaluation technique adopted for each of the above qualitative assessment components are described below.

7.3 Advantages and Disadvantages of the Proposal

This component of the assessment evaluates each option against its ability to address current known transport network deficiencies. The scoring system adopted as part of this qualitative assessment assigns the score of:

- 3 (positive and coloured green), where it is viewed that its identified that the improvement option has the ability to improve current transport network conditions and these outweigh any potential negative effects.
- 1 (neutral and coloured), where the improvement option has a neutral contribution to improving current transport network deficiencies, and does not have any negative effects.
- 0 (negative and coloured red), where the improvement option has a negative effects on current transport network conditions and these are deemed to outweigh its benefits.

7.4 Aligns with draft NBS 2030 Planning Principles

The assessment will evaluate each option against its ability to support the above planning principle objectives, a identified in section 7.1. The scoring system adopted as part of this qualitative assessment is as follows with each improvement options assigned a score of:

- 3 (coloured green and reflecting a positive contribution), where it is viewed to support the planning principle objective or an overall of more than 9 when evaluated against all six planning principles;
- 1 (coloured amber and reflecting a neutral contribution), where it neither supports or has a negative impact on a principle planning objective, or an overall of between 5 and 9 when evaluated against all six planning principles.
- 0 (coloured red and reflecting a negative contribution), where it is deemed not to support a planning principle objective, or an overall of less than 5 when evaluated against all six planning principles.

The scoring used in Appendix D indicates that when the six selected NBS 2030 planning principles are grouped, the total combined scores can range between 0 and 18 with the total scores ranked as follows:

- Over 11 (positive and coloured green), where it is viewed to have mostly positive contribution to achieving the goals of the NBS 2030 (over three positives planning principles met);

- 6 to 10 (neutral and coloured), where it is identified to have a combination of mostly neutral with some positive planning principle alignment; or
- 0 to 5 (negative and coloured red), where the scheme does not align with the goals of the NBS 2030.

7.5 High Level Review of Potential Scheme Costs

This section evaluates each option against the potential costs of implementation. The scoring system adopted as part of this qualitative assessment is as follows with each improvement options assigned a score of:

- 3 meaning a relatively low cost project (represented by $ and coloured green), where it is viewed that the cost could be accounted for by either a standard replacement maintenance item or within the current minor works capital budget;
- 1 indicating a medium cost project (represented by $$ and coloured orange), where it is viewed that the cost could not be accounted for as a standard replacement maintenance item or within a current minor works capital budget and therefore adjustments and increases to the capital works budget are required;
- 0 identifies that the costs associated with this project are significant (represented by $$$ and coloured red), where it is viewed that the cost could not be accounted for in a council capital works budget and requires additional funding from developers, State or Federal Government or a combination of the above.

Refer to Appendix C and Appendix D for a detailed understanding of the individual improvement option scores against the merits of each scheme, affordability, its ability to align with both draft NBS 2030 planning principles and key community needs.

7.6 Total Scores Summary

This section provides the summary score ranges, which will be used to evaluate each improvement options, The score ranges consist of:

- 15 and above (preferred scheme and coloured green), where it is viewed that the improvement option offers significant merits, addresses current and future needs, and is deemed to be affordable.
- 10 to 14 (not a priority and coloured orange), where it is viewed that the improvement option offers some benefit but it is not a key priority at this moment in time and probably falls outside of the current 5 year improvement works program and funding.
- 0 to 9 (a low priority and coloured red), where it is viewed that the improvement options benefits are not at this point in time fully understood and would definitely not form part of the current 5 year capital works program or local funding streams.

Stage 1 – Options Appraisal Process
Road Network Improvement Options

Description	Pros	Cons	+/-	Cost
Option 4a –Yacaaba Street extension (two way)	◗ Completes a missing link between foreshore from the town centre ◗ May assist reduce conflict at Government Rd/ Stockton St ◗ May assist high season temp closure of Government Rd at Stockton St ◗ May assist high season temp/ perm closure of Stockton St north	◗ Availability of funding, land and constructability issues ◗ Poor alignment and gradient issues ◗ Conflict with activity and movement along Magnus Street (west) ◗ Potential safety issues and impact on town centre accessibility ◗ May result in higher congestion levels in the town centre.	Negative	$$$$$
Option 4b –Yacaaba Street extension (one way south/ town centre bound)	◗ Completes a missing link between foreshore from the town centre ◗ May assist reduce conflict at Government Road/ Stockton St ◗ May assist high season temp closure of Government R at Stockton St ◗ May assist high season temp/ perm closure of Stockton St north ◗ Help to remove traffic from foreshore & promote parking in the town centre ◗ Narrower road corridor in comparison to two way option ◗ May support bus service route improvements & Park & Ride	◗ Availability of funding, land and constructability issues ◗ Poor alignment and gradient issues ◗ Conflict with activity and movement along Magnus Street (west) ◗ Potential safety issues and impact on town centre accessibility ◗ May result in higher congestion levels in the town centre.	Neutral	$$$$

Stage 1 – Options Appraisal Process
Road Network Improvement Options

Description	Pros	Cons	+/-	Cost
Option 4c –Yacaaba Street extension (one way north/ foreshore bound)	◗ Completes a missing link between foreshore from the town centre ◗ May assist reduce conflict at Government Road/ Stockton St ◗ Narrower road corridor in comparison to two way option	◗ Availability of funding, land and constructability issues ◗ Poor alignment and gradient issues ◗ Conflict with Magnus Street (west) ◗ Potential safety issues and impact on town centre accessibility ◗ Congestion in the town centre. ◗ Limited opportunity to support road closures.@ Stockton St/ Govt Rd ◗ Additional traffic on Donald St . ◗ Does not help to remove traffic from Victoria Parade	Negative	$$$$
Option 4d –Yacaaba Street extension (transit link only)	◗ Completes a missing link between foreshore from the town centre ◗ May support bus service route improvements & Park & Ride ◗ Potential to serve coach movement between town centre and foreshore ◗ Reduces potential conflicting movement generate from a new link	◗ Availability of funding, land and constructability issues ◗ Poor alignment and gradient issues ◗ Potential safety issues and impact on town centre accessibility ◗ Limited opportunity to support road closures.@ Stockton St/ Govt Rd ◗ Does not help to remove traffic from Victoria Parade	Neutral	$$$$$

Stage 1 – Options Appraisal Process
Road Network Improvement Options

Description	Pros	Cons	+/-	Cost
Option 4e–Yacaaba Street extension (active transport connection only)	◗ Completes a missing link between foreshore from the town centre ◗ Serves an existing pedestrian desire line ◗ Reduces potential conflicting movement generate from a new link ◗ Narrower road alignment ◗ Opportunity for additional active frontages & focal point	◗ Availability of funding, land and constructability issues ◗ Poor alignment and gradient issues ◗ Potential safety issues ◗ Limited opportunity to support road closures.@ Stockton St/ Govt Rd ◗ Does not help to remove traffic from Victoria Parade ◗ May remove pedestrian activity from Apex Park and town centre ◗ Requires supporting improvements @ Teremby/Govt Rd/ Victoria Pde	Neutral	$$$$

Example of Stage 2 – Options Appraisal Process
Road Network Improvement Options

Description	Economic	Connectivity	Access and Circulation	Amenity & Safety	Funding	Sense of Place	Total Score
Option 4a –Yacaaba Street extension (two way)	1	3	3	1	0	1	9
Option 4b –Yacaaba Street extension (one way south/ town centre bound)	1	3	3	1	0	3	11
Option 4c –Yacaaba Street extension (one way north/ foreshore bound)	1	1	1	1	0	0	4
Option 4d –Yacaaba Street extension (transit link only)	1	1	1	1	0	1	5
Option 4e–Yacaaba Street extension (active transport connection only)	1	3	3	1	0	1	9

Road Network Improvement Options

Description	Pros & Cons	Costs	Alignment with Principles
Option 4a –Yacaaba Street extension (two way)	Negative	$$$$$	9
Option 4b –Yacaaba Street extension (one way south/ town centre bound)	Neutral	$$$$	11
Option 4c –Yacaaba Street extension (one way north/ foreshore bound)	Negative	$$$$	4
Option 4d –Yacaaba Street extension (transit link only)	Neutral	$$$$$	5
Option 4e–Yacaaba Street extension (active transport connection only)	Neutral	$$$$	9

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2	JT	GH		GH		20/12/12
3	ML	GH		GH		23/04/13
4	JT	GH		SK		23/05/13