Final Report

Rotorua Bus Network Review

Prepared for Bay of Plenty Regional Council

By Beca Ltd (Beca)

29 September 2014
Executive Summary

Beca Limited was commissioned by the Bay of Plenty Regional Council to review options to improve the efficiency of the bus network in Rotorua’s urban area. This review will to inform new contracts for bus service due to be procured in 2015. The review process included discussions with a number of key stakeholders, notably Rotorua District Council and the current bus operator.

The Rotorua urban bus network has seen increasing patronage in the last decade, despite many of the current bus routes in Rotorua providing a relatively slow service compared to a trip by car. The Bay of Plenty Regional Public Transport Plan 2013 sets out policies to provide frequent, reliable, convenient and efficient urban services.

The main strengths of Rotorua’s bus network are its good basic route structure, standardised service frequencies, the efficiency of bus utilisation and the simple fare system. A new fleet has recently been introduced which provides more capacity, and will make boarding and alighting easier.

The main deficiencies are the circuitous routes (designed to give good coverage), which tend to be slow and difficult for new users to understand, the poor coverage of the Rotorua Central retail area in the inner city, overcrowding and service reliability on some routes, the lack of evening services, and safety and security issues at the present inner city terminus on Pukuatua Street.

Based on a review of current public transport policies and stakeholder requirements, a number of principles were identified on which the future network should be based. These included patronage, access and mobility, legibility and efficiency principles, and addressing a number of inner city transport issues.

Analysis of the existing network revealed that the routes operated in the outer urban area are generally efficient and serve the existing and potential future markets well. Directness of routes is compromised however in some areas in order to achieve route coverage.

A wide range of route revisions to were considered in the outer urban area, including revising frequencies of part or all of the route, truncating route sections, revising route sections to make services more direct and switching parts of routes between other routes.

A number of route changes were identified which could make the bus network simpler, more direct and improve efficiency and overall performance.

The main changes recommended are:

- Route 1 (Ngongotaha) to operate via Rotorua Hospital instead of via Ranolf Street
- Split Route 2 (Polytech) into two separate half hourly services, one operating to the Polytechnic via Fenton Street and one operating via Ranolf Street
- Link Route 4 (Sunnybrook) and Route 8 (Westbrook) into a new combined service, running in both a clockwise and anticlockwise direction
- Link Route 5 (Western Heights) and Route 7 (Mitchell Downs) into a new combined service, running in both a clockwise and anticlockwise direction
- Route 6 (Koutu) to be revised to include an additional one-way loop serving Kawaha Point
- Revise Route 9 (Springfield) to operate as a large one-way ‘loop by omitting the current end of route loop via Jackson Street and Nikau Street and continuing along Otonga Road and Old Taupo Road to rejoin the existing route north of Hillcrest Avenue.
Where the revised routes would omit residential areas currently served, the proposed new route is considered to be within reasonable walking distance of the proposed new route for most existing bus users. Some of these route revisions will require Rotorua District Council to provide new bus stops in some locations.

For the inner city area, consideration was given to a number of alternative inner centre bus routes and locations for bus facilities.

It was concluded that buses should continue to serve the existing inner city bus facility at Pukuatua Street, but be amended to also serve the Rotorua Central retail mall. The inclusion of Rotorua Central in the route is dependent however upon revisions being made to routes elsewhere in the city to offset the additional travel times and operating costs that could be incurred in serving Rotorua Central.

It is recommended that improvements are made to the amenity of passenger facilities to help address existing social issues, and that bus stop facilities on Pukuatua Street are improved to provide greater capacity and operational flexibility.

Rotorua District Council has indicated a preference for all buses to operate in a loop around the inner city. The review concluded that the operation of a short loop serving Pukuatua Street, Amohia Street, Rotorua Central and Fenton Street may be practical, but further discussions are needed with the bus operator to confirm this option will not adversely impact on service performance and reliability.

The adoption of a longer loop incorporating Arawa Street, Ranolf Street (or Amohia Street), Victoria Street and Fenton Street is not recommended however, as it would probably have too adverse an impact on service performance and reliability.

The efficiency savings proposed may make it possible to operate additional services later at night, but this will require further negotiations with the bus operator when the new contracts are negotiated.

To implement the recommended changes to the network will require time to enable stakeholders and the public to be adequately informed of the proposed changes to the network, and to enable them to comment on the proposals. Once the proposals have been consulted with key stakeholders, notably Rotorua District Council, there is likely to be considerable value in a formal round of consultation on the detailed proposals, encompassing user groups and the public.
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1 Introduction

1.1 Background to the Review

The Rotorua urban bus network has seen increasing patronage in the last decade, especially with the introduction of free travel for students of the Waikato Institute of Technology (WIT) in 2009. Whilst additional services have been introduced to cater for this demand, the increased patronage is resulting in overcrowding at peak times. Bay of Plenty Regional Council (BOPRC) has recently negotiated with the current bus operator to utilise higher capacity and fully accessible fleet of buses.

Many of the current bus routes in Rotorua provide a relatively slow service compared to a trip by car, as the bus routes were designed to optimise coverage. This priority has changed, with the Bay of Plenty Regional Public Transport Plan 2013 (RPTP) setting out policies for high quality (frequent, reliable, convenient and efficient) urban services.

BOPRC places significant emphasis on cost effectiveness of services, and believes that the network has further potential to increase patronage with more direct, simple services operated by the new higher capacity accessible fleet of buses. It also anticipates that future network improvements are focused on delivery of the regional strategic corridor levels of service which link the Rotorua Airport with the inner city and tourist destinations in the west.

In 2013 BOPRC staff conducted a network review for Rotorua’s bus services. The main focus of the 2013 review was to use route design to improve on-time performance without increasing the size of the bus fleet. The review prompted discussion, but ultimately Council did not reach a consensus on the review outcome. It was decided to retain the status quo in terms of routes and service provision, and conduct this review with a wider scope.

1.2 Desired Outcomes of this Review

Beca Limited (Beca) was engaged by the BOPRC in June 2014 to identify, investigate and report on the options that will potentially meet the following desired outcomes:

- Align bus services in Rotorua with the RPTP policies, specifically to move services to a more efficient operation designed to optimise patronage and increase on-time performance
- Contribute to the revitalisation within the inner city of Rotorua
- Improve the routing of services within the inner city to ensure that the routes are future proofed
- Identify preferred inner city bus stop locations
- Develop the existing bus services to become patronage based services to compete effectively as a viable alternative to the private car.

Recommendations are required to have no significant resource cost implications (i.e. they are required to be broadly cost neutral). The review was therefore required to give a broad indication of the effect on changes on operational costs.

BOPRC anticipate that the 2014 review will build on the 2013 work and be informed by the work Rotorua District Council (RDC) are doing to stimulate inner city regeneration.

The review is to inform future bus service contracts to be procured by the BOPRC for the Rotorua urban service in 2015.

Tourist buses are not within the scope of this review.
1.3 Overview of Review Approach

1.3.1 Task 1 - Review Current Bus Network Performance and Operations

A review of all routes and timetables and service operations was undertaken to understand the current bus network operation and its performance, the infrastructure it uses, and the scope for improvements to be made. The review included an analysis of socio-economic and demographic data to better understand the market currently being served by the bus network and to help identify opportunities to improve the network.

Beca staff also visited and travelled on the city’s bus network to gain a better understanding of the current situation, and discussions also took place with the following key stakeholders:

- RDC
- Waiariki Institute of Technology (WIT)
- Reesby (the currently contracted bus service operator)
- Rotorua Police
- Councillors Lyall Thurston, Glenys Searancke and Karen Hunt
- Rotorua Airport.

1.3.2 Task 2 - Establish the Key Principles and Aims to Guide the Review

A number of principles and aims were defined to guide the review of routes, based on the key goals and objectives of the stakeholders. These were identified from a review of relevant transport and future development strategies/policies, as well as from the discussions with key stakeholders.

1.3.3 Task 3 - Identify and Evaluate Opportunities for Improvements to the Bus Network

A number of options to improve the inner city and wider urban area bus network were identified. The options were evaluated against the key principles and aims for the bus network. GIS analysis was undertaken to examine the effect of route changes on the route length and on the residential catchment area served.

1.3.4 Task 4 - Determine Recommendations for Future Changes to the Bus Network

Based on the outcome of the evaluation process, a number of recommendations were made and suggestions made with regard to how the changes could be progressed towards implementation.

1.4 Report Structure

This report summarises the findings of the review. It is structured in five further sections following this introduction:

- Section 2 contains an analysis of the current bus network and the market it currently serves
- Section 3 reviews a number of current policies and strategies to inform the key principles and aims which have guided the review
- Section 4 outlines a number of options to improve the bus network in Rotorua inner city area
- Section 5 outlines a number of options to improve the bus network in the outer urban area of Rotorua
- Section 6 summarises the main recommendations to improve the network, and outlines the next steps necessary to advance the proposals.
2 The Current Bus Network Performance and Operation

2.1 Routes and Timetables Operated

The Rotorua urban network consists of ten routes, centred on the inner city area, as shown schematically in Figure 2.1 and in more detail in Appendix A. All bus routes converge on the main inner city bus facility on Pukuatua Street.

Figure 2.1: Rotorua Urban Bus Network

2.1.1 Service Frequencies and Hours of Operation

All but one of the ten routes operates every 30 minutes on Mondays to Saturdays. Route 2 operates every 15 minutes on Mondays to Fridays and every 30 minutes on Saturdays. Service frequencies on Sundays are every hour. Two additional bus services were introduced in 2012 to run in the morning and one in the afternoon (on Mondays to Fridays in term times only) direct between the Polytechnic and the inner centre to ease the pressure on the timetabled Route 2 services.

Services operate between approximately 06.30 and 18.30 hours on all routes on Monday to Saturdays. Sunday services operate between approximately 07.00 and 16.30 hours.

2.1.2 Cross City Services

None of the services are advertised as cross-city services though six of the ten routes are linked together at the Pukuatua Street inner city terminus for operational reasons (i.e. to make best use of the resources used to provide the services). These are:

- Route 1 (Ngongotaha) and Route 7 (Mitchell Downs)
- Route 8 (Westbrook) and Route 10 (Airport)
- Route 3 (Owhata) and Route 5 (Western Heights).
Route 2 (Polytech) is operated independently of other routes. This allows the highest capacity buses to be used on this route.

2.1.3 Interchange Opportunities

During the day four of the routes (i.e. Routes 1, 5, 6 and 9) are currently timed to arrive at and depart from Pukuatua Street at the same time every 30 minutes (on the hour and half past the hour). This is planned, in part, to maximise interchange opportunities. The times of other services from Pukuatua Street are shown on Figure 2.2.

![Figure 2.2: Future Inner City Bus Departure Times](image)

The limited capacity of the bus stops at Pukuatua Street (in part) prevents a true ‘pulse-time’ network to operate, whereby all bus routes are scheduled to arrive and depart at the same time to maximise interchange opportunities. A more significant constraint however is that many of the routes have different round trip (i.e. ‘out and back’) travel times, which means that achieving a true pulse-time network could only be achieved with additional resources (i.e. buses and drivers).

2.2 Fare System and Transfer Tickets

A flat fare system is existence for all trips made on the Rotorua urban bus network. Fares can be paid by cash ($2.50) or by a pre-purchased electronic card ($1.75). A day ticket is also available ($7.80). Children under five travel for free, and holders of NZ Supergold cards travel for free in the off-peak period (between the hours of 9am to 3pm on weekdays, and any time on weekends and public holidays).

Free transfer tickets are issued on request at the start of a trip for journeys made within 60 minutes of issue between all routes, except for people travelling between Route 3 (Owhata) and Route 10 (Airport) and between Route 5 (Western Heights) and Route 7 (Mitchell Downs). This is the current fares policy.

2.3 Demand and Market Served

2.3.1 By Route

Figure 2.3 shows the total demand for travel by route over the latest one year period for which data is available, and the number of tickets sold by ticket type. This shows that Route 2 (Polytech) is by far the busiest bus service. The next busiest services are Route 1 (Ngongotaha), Route 5 (Western Heights) and Route 7 (Mitchell Downs). Demand on these three routes is approximately 45% of
demand on Route 2. The least busy service is Route 9 (Springfield), though this is one of the shorter routes on the network.

Demand often exceeds capacity at peak times on some routes, in particular on Route 2 (Polytech), Routes 5 (Western Heights), Route 7 (Mitchell Downs). Overcrowding is anticipated to reduce on Route 5 and 7 when the full fleet of higher capacity low floor buses are fully introduced in the near future. Larger vehicles are already used on Route 2 (Polytech).

**Figure 2.3: Bus Demand by Route**

2.3.2 Transfer Tickets

Route 8 as the highest number of transfer tickets issued of all the routes (9.3%), as shown in Figure 2.4. The proportion of transfer tickets varies between 5.5% (on Route 6) and 9.3% (on Route 8).
2.3.3 Polytechnic Student Pass Demand

Figure 2.5 shows, not surprisingly, that the greatest use of the student pass is on Route 2. The proportion of pass holders on the other routes varies between 9.2% (Route 1) and 16.6% (Route 4).

2.3.4 Supergold Card Users

Figure 2.5 shows that the proportion of Supergold card users varies between 7.5% (Route 4) and 16.4% (Route 8).

2.3.5 By Time of Day and Day of Week

Patronage data by time of day and day of week has not been analysed. However, observations and discussions with stakeholders indicate that the busiest times are during the morning and evening peak periods on Mondays to Fridays (approximately between 8am – 9am and 5pm - 6pm). Demand for travel at weekends is lower than demand for travel on Mondays to Fridays, especially on Sundays when service frequencies are lower than on a Saturday or Monday to Friday.

2.3.6 Customer Demographics Travel Characteristics

Information on existing customer demographics is not available. Anecdotal evidence indicates that a high proportion of bus users are students and the elderly. This is supported by data on the high the level of use of bus services by Polytechnic pass holders and Supergold cards. The dominant users of bus services in Rotorua are therefore people who have limited other travel choices (i.e. ‘captive’ users).

The network also serves all major retail and education establishments, though it does not serve the Rotorua Central retail area to the west of the inner city area very well at present. Only one route serves Rotorua Hospital at present.
Rotorua is a significant tourist destination, attracting an estimated 3.2 million visitors in 2010. All of the main tourist attractions are reasonably served by the bus network, with the exception of the Redwoods (Whakarewarewa Forest), to the south-east of the inner city. Anecdotal evidence indicates, however, that the majority of tourists have their own transport available to them, or use private buses to reach the main tourist destinations.

In order to better understand the current network and the demographics of current and potential future bus users, an analysis has been undertaken of the following demographics:

- Population living within 200m and 400 of bus stops (see Appendix A)
- Population density (see Appendix B)
- Employment density (see Appendix B)
- Vehicle ownership (see Appendix B).

Some key points which can be noted from the plans contained in Appendix A and B include:

- The busiest routes tend to be those routes which serve the areas with the greatest population and/or the areas with the lowest levels of vehicle ownership
- There is a fairly close correlation between the level of demand on a route and the population residing within 200-400m of the bus stops served by the route
- The current network serves most high density areas of population well, with the exception of Kawaha Point, parts of Lynmore (to the east of Selwyn Road) and parts of Springfield (to the south of Springfield Road)
- The highest density of employment is in the central area
- Other employment nodes exist at the industrial areas to the west and east of the city
- Most employment areas are served reasonably well by the network, with the exception of the Ngapuna industrial area (Vaughan Road), to the east of Rotorua (off State Highway 30).

### 2.4 Inner City Bus Stop Infrastructure

#### 2.4.1 Stop Locations and Catchment Area

There are five main on-street bus stops for urban bus service in Rotorua’s inner centre. These are at the following locations, as shown in Figure 2.5, together with the approximate 200m catchment area served by the main stops:

- Pukuatua Street, between Tutanekai Street and Amohia Street - used by all routes and forming the main terminus for Rotorua’s bus services
- Fenton Street, between Amohau Street and Eruera Street - used by all routes when entering the inner city apart from Route 1
- Hinemaru Street, between Arawa Street and Hinemoa Street - used by Route 10 when leaving the inner city
- Amohau Street, between Ranolf Street and Amohia Street - used by Routes 2, 4, 5, 6, 7, 8 and by Route 9 when entering the inner city and by Routes 2 and 3 when leaving the inner city
- Fenton Street, between Haupapa Street and Arawa Street (outside the i-site) - which is only used by Route 10 when leaving the city.
The plan shows that a large proportion of the inner city is within 200m walking distance of the main two stops on Pukuatua Street and Fenton Street. However the large Rotorua Central retail area, to the south of Amohau Street, is served less well by these two stops.

2.4.2 Passenger Amenity, Safety and Security

From a passenger amenity perspective the main bus stop area on Pukuatua Street has some key deficiencies. The current facilities do not provide a comfortable waiting environment. They are exposed to the wind, rain and other elements and do not provide facilities such as refreshments, ticket sales, personalised travel information or toilets.

Street lighting at the Pukuatua Street stop is poor. In quiet times people feel uncomfortable going there and they are often perceived to be unsafe, partly because of the proximity of the facility to the Work and Income New Zealand (WINZ) premises located opposite the bus facility and the nearby High/District Courts on Tutanekai Street.

The Police and RDC have highlighted that there are a number of social issues contributing to the safety and security concerns, and dealing with these issues can take up a significant amount of Police time. A key catalyst of the social issues was considered to be the availability of ‘legal high’ drugs at three nearby shops, though it is understood that instances of begging, nuisance activity, assaults and theft in the area has reduced since the drugs recently became unlawful. Many of these issues were identified in a Crime Prevention Through Environmental Review (CPTED) undertaken of the current design and use of various sites in Rotorua for RDC.

The other inner city bus stops at Hinemaru Street, Amohau Street and Fenton Street also have only very basic facilities for passengers, but are located in better lit and generally safer, more secure areas of the inner city.

2.5 Patronage Growth and Annual Trip Rates per Person

Bus patronage has risen from 119,000 trips in 2001/2 to approximately one million trips in 2012/13. Between 2005/6 and 2012/13 the average annual growth rate was approximately 15%.

The annual trip rate per person in Rotorua has increased from around 2.2 in 2001/2 to around 17.4 in 2012/13. The current trip rate per person in the Tauranga city area is approximately 15.3.

2.6 Bus Fleet Utilisation and Layover

A major component of bus schedules is bus layover. This is the time scheduled between a bus’ arrival time and its departure time on a subsequent trip. The time is required to minimise the impact of late running of a previous trip on the on-time departure of the next trip, and is sometimes referred to as recovery time. Layover time also allows drivers to take toilet breaks, change destination displays, etc. Layover time in bus schedules is typically three to five minutes but can be longer.

The bus fleet operating Rotorua’s bus services is currently utilised intensively. The timetable operated is very resource driven. In a typical hour, the fleet of 13 buses is timetabled to be operating of 720 minutes, and have 60 minutes of ‘layover’ time. Only one route is scheduled to have more than five minutes layover between trips at Pukautua Street (Route 3, which has a 15 minute layover period).

2.7 Overall Strengths and Weaknesses of the Network

The main strengths of Rotorua’s bus network are its good basic route structure, standardised service frequencies, the efficiency of bus utilisation and the simple fare system. The new fleet
recently introduced provides more capacity, and helps overcome some of the challenges elderly passengers had with boarding and alighting from the older buses which were used.

The main deficiencies are the circuitous routes (designed to give good coverage), which tend to be slow and difficult for new users to understand, the poor coverage of the Rotorua Central retail area in the inner city, overcrowding and service reliability on some routes, the lack of evening services, and safety and security issues at the present inner city terminus on Pukuatua Street. Potentially more can be done, therefore, to make the bus network more safe, attractive, understandable and cost effective.

It should be noted however that generating additional demand at peak times will be constrained by the fleet size. The majority of growth in demand is therefore likely to be stimulated outside the Monday to Friday peak period.

It should also be noted that that no further consideration has been given to the times of day services operate as this is out of scope of the review. Future contracts for bus services may however specify a requirement to operate for longer periods of the day if efficiency gains are achieved arising from this review which make it possible.
3 Key Principles and Aims to Guide the Review

3.1 Policy and Strategy Context

3.1.1 Government Policy Statement on Land Transport 2012/3 to 2021/22

In July 2014, the draft Government Policy Statement on Land Transport (GPS) 2015/16 to 2024/25 was released for formal engagement. It outlines the government’s priorities for expenditure and determines how funding is allocated between activities such as public transport and local roads. The draft GPS proposes to continue the main priorities from the current GPS (2012/3 to 2021/22), which came into force on 1 July 2012. These include a focus on projects supporting efficiency and value for money. Matched to this is an increasing expectation for efficiency and accountability from local ratepayers. These two drivers of government expenditure are changing the way public transport services are prioritised. They both underpin the NZ Transport Agency’s policy on public transport farebox recovery (i.e. the proportion of operating expenses met by fares), which requires a national average farebox recovery of 50%.

3.1.2 Bay of Plenty Regional Land Transport Strategy 2011-2041

The Regional Land Transport Strategy (RLTS) sets the direction for the Bay of Plenty’s transport system for the next 30 years. Its vision is “best transport systems for a growing economy and a safe and vibrant Bay lifestyle”. The strategy is supported by outcomes in six strategy areas relevant to public transport service provision in the Bay of Plenty, including land use and transport integration and access and mobility.

The preferred strategic option in the RLTS is an Optimised Transport System, which seeks to channel an increasing proportion of the projected growth in travel demands into sustainable modes that do not involve single occupancy vehicle use. Public transport has an important role to play, particularly in providing for short to medium distance journeys within urban areas. Giving effect to the Optimised Transport System will mean initiatives to improve the efficiency of the region’s public transport services.

3.1.3 Bay of Plenty Regional Council Public Transport Plan 2013

The RPTP is a statutory document that gives effect to the public transport components of the Bay of Plenty RLTS. The purpose of the Plan is:

- A means of encouraging regional councils and public transport operators to work together in developing public transport services and infrastructure
- An instrument for engaging with the public in the region on the design and operation of the public transport network
- A statement of:
  - the public transport services that are integral to the public transport network
  - the policies and procedures that apply to these services
  - the information and infrastructure that support those services.

The RLTS identifies a number of issues that are relevant to the provision of public transport in Rotorua. A key issue is that the levels of funding available for public transport services risk diminishing the value of previous investment in this mode.

The plan includes three policies which are relevant to the objective of providing reliable and integrated public transport services in Rotorua, as summarised in Table 3.1.
Table 3.1: Policies Related to Public Transport Networks and Services

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<td>Provide high quality (frequent, reliable, convenient and efficient) urban services on Regional Strategic Corridors to support urban accessibility</td>
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<td>2</td>
<td>Provide public transport services on Urban Connector routes to support Regional Strategic corridors</td>
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<td>3</td>
<td>Regularly review service levels on Urban Connector routes to support areas demonstrating high demand for public transport</td>
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The Plan indicates that patronage considerations will be the primary driver for changes to bus service frequency on Urban Connector routes. The Plan contains the following thresholds for considering an increase or reduction in service on Urban Connector routes:

- Maintain services: 12-24 passengers per in-service hour (on average)
- Adjust quality: 7-12 passengers per in-service hour (on average)
- Enhance service: 24+ passengers per in-service hour (on average).

Service specifications in the Plan detail the areas that will be served by public transport and the type of service that can be expected in each area.

3.1.4 Rotorua Integrated Network Strategy 2012-2042

In 2012 the Rotorua Integrated Network Strategy (RINS) was completed. The strategy guides and informs local transport programmes and future growth management planning. It was prepared to ensure that investment in the transport network is appropriately directed and help determine funding priority. The objective for the RINS is to support economic growth, safety and accessibility with an affordable, integrated, safe, responsive, and sustainable land transport system. It was written by the RDC, BOPRC and the NZ Transport Agency and has been endorsed by the NZ Transport Agency’s Board.

The strategy recognises the importance of inner city revitalisation for a prosperous and sustainable Rotorua. The strategy recognises the increasing demand for transfer and terminal facilities for urban, regional and tourist coach services. It recognises that existing facilities are at capacity. Along with the Victoria Street Arterial and the inner city focus this strategy recognises the need for an inner city Transport Centre in Rotorua.

3.1.5 Proposed District Plan for Rotorua

The currently proposed Rotorua District Plan has been built on consultation with the community, and has eight key improvement goals. One of these is to strengthen a vibrant, strong and compact inner city. The district plan aims to revitalise the inner city by consolidating business into the area and making it the focal point for commercial and cultural activity.

The inner city boundaries reflect the precincts of the urban design framework. Areas of the inner city, particularly towards the lakefront, have new policy frameworks to promote tourist accommodation and commercial activity consistent with its setting. “Permitted baselines” have also been introduced to the inner city to limit the need for resource consents when building or renovating, and the need to provide on-site parking in the inner city is no longer a consent requirement.

The District Plan includes new policy frameworks that promote additional tourist accommodation in the inner city, particularly towards the lakefront.
3.1.6 Rotorua Inner City Revitalisation Strategy (Rotorua 2030)

RDC is currently investing in revitalising inner-city Rotorua. One of the seven goals of its revitalisation strategy is developing a 'vibrant city heart, waahi pumanawa' that attracts people and activity. By 2016 the outcomes of success are:

- Few empty shops
- People on the streets
- Optimistic retailers
- More diverse use of the inner city
- Being viewed as an exciting and safe place to live, work and visit.

RDC’s draft Annual Plan 2013/14 includes $200,000 for local bus routes and tourist bus parking improvements. Staff at both BOPRC and RDC are currently working on options to rearrange local bus routes within the inner city. The strategy suggests that future bus routes will circulate passengers along Fenton, Arawa, Amohia Streets and through Rotorua Central.

3.2 Future Changes in Land Use and Demographics

3.2.1 Residential Growth

The 2013 Census reveals that the Rotorua District population declined by 621 people over the period 2006 to 2013 (to 68,590).

The National Institute of Demographic and Economic Analysis (NIDEA) 2014 review of demographic and labour projections 2013-2063 completed for Smartgrowth suggests that the district population will grow by 0.8% in the 2013 to 2033 period from approximately 68,600 to 69,100. The overall projected growth rate is not anticipated to place any significant additional pressure on the bus network.

The population aged over 65 years is predicted to increase from 13.4% of the total population to 24.8% by 2033. This may place greater pressure on the bus network.

3.2.2 Commercial Aspirations for the Central Area

The Rotorua 2030 document produced by RDC provides an indication of the likely future nature of land use in the inner city. We understand that the consultation process included commercial developers, and therefore the document has a measure of support from those who will be undertaking the investment.

RDC has prepared the Rotorua 2030 Inner City Revitalisation Report which records the responses from a community consultation process as well as a summary of numerous studies and current initiatives and more that are planned for the inner city. The inner city is promoted as a series of existing and future precincts as follows:

- Entertainment Precinct in the northern sector centred on Tutanekai Street
- Boutique Precinct – centred on Tutanekai Street south
- Haupapa Street Precinct in the east centred in the east
- Rotorua Central Precinct – the “book-end” in the south currently divorced from the CBD by the state highway
- Lakefront Precinct – proposed in the north around the lake front for mixed use development. This has been proposed in the review of the District Plan.
The densest concentration of labour (workplace address) in the inner city is currently in the Arawa, Haupapa and parts of Whakaue and Eruera Streets. The proposed precinct development will likely increase the workforce numbers in the north at the lake-side and stretch and dissipate the employment numbers.

On the basis of these projections of changes in commercial activity in the inner city, it would appear unlikely to change the overall distribution if demand for bus services, though it may lead to an increase in demand.

### 3.2.3 Polytechnic

The Polytechnic does not expect their student headcount to increase over the next 5-10 years, but the proportion of overseas students is expected to rise. Overseas students tend to be more reliant on public transport than other students, and therefore increased demand for student travel is expected.

### 3.2.4 Rotorua Airport

The proportion of trips made to the Airport by bus (by both staff and Airport passengers) is currently very low. Rotorua Airport forecasts the annual passenger throughput to increase from approximately 215,000 at present to 244,000 by 2021 (i.e. by almost 15%). This is not anticipated to translate into significant additional demand for bus services.

### 3.3 Key Principles to Guide the Development of the Recommended Future Network

Based on our review of current public transport policies and strategies of the stakeholders, a number of principles were identified on which the future network has been reviewed against. These have been developed around patronage, access and mobility, legibility and efficiency principles, and around the requirements of the inner city.

#### 3.3.1 Patronage Principles

The following patronage principles were defined for the future bus network:

- Focus on serving demand from three broad user groups:
  - Education based trips targeted at those under 24-years accessing schools and tertiary institutes
  - People over 60-years of age who primarily use the service during the off-peak period to access shopping, essential services and for recreational purposes
  - Commuters in peak periods who wish to access the major employment centres
- Achieve a good match between demand and:
  - The route, number and timing of services
  - Bus capacity
- A stable route structure and stopping pattern
- Serve the areas and destinations most likely to generate the maximum demand.

#### 3.3.2 Access and Mobility Principles

The following access and mobility principles were defined:

- Provide a service to people in the community without access to a motor vehicle (e.g. the mobility impaired)
- People will walk further to take a high frequency service at a high quality stop.
3.3.3 Legibility Principles

The following legibility principles were defined:

- Routes that are as direct as possible, without unnecessary impedance, deviation or variation
- Clock-face schedules
- Regular headways
- Schedules that provide for relatively easy transfers where routes cross or join
- Common corridors to be used by bus routes where possible.

3.3.4 Efficiency Principles

The following efficiency principles were defined:

- More direct and simpler routes
- Different peak and off-peak frequencies if needed to match capacity and demand
- Scheduling that makes efficient use of the bus fleet
- Scheduling that avoids, as far as possible, the clumping of buses in common corridors.
- To ensure an efficient and effective bus network into the future it must:
  - Be affordable and meet farebox recovery targets
  - Be integrated within land transport policy and investment decision making, recognising that bus currently plays a minor role in the total transport task.

3.3.5 Inner City Bus Network Requirements

The following requirements have been identified (in order of priority) for an inner city bus facility:

- Be safe and secure for all users, incorporating good urban design and contributing to public amenity
- Be accessible and serve a wide range of inner city trip origins/destinations well
- Be served efficiently from an operation perspective
- Provide enough space for buses to layover between trips (ideally at a single location to maximise the scope for services to be planned to interchange)
- Maximise the opportunity for bus passengers to interchange between different routes
- Provide capacity for potential future growth in bus use
- Be prominent
- Provide a high quality passenger waiting space
- Make efficient use of space in inner city area.
4 Inner Centre Bus Network Options

4.1 Context

There is no universal ‘best’ solution in terms of whether to concentrate bus services in a major facility or terminal where trips start and finish or to operate services through the inner city, or to serve one or more on-street or off-street facilities. Different cities adopt different strategies for different reasons and, once adopted, the strategy influences bus route planning options and outcomes.

If an inner city area is particularly compact and all the key destinations would be within easy walk of a central location, then a single location facility may be a good option. However, in larger inner city areas, no single location may effectively serve the city’s transport needs. A number of cities have opted instead to extend bus routes through the inner city area, to better serve a range of passenger destinations.

Some cities find that on-street bus facilities in the inner city provide much greater flexibility for approach and departure routes, fit better within the fabric of the city and have substantially lower costs. They also benefit from increased activity at street level, providing improved personal safety. High quality passenger facilities can be provided through shop front waiting lounges. An important part of this approach is extending bus services to terminate away from the highest-value, most congested parts of the inner city. This has the dual benefits of reducing the size of the inner city facility and improving bus servicing of the inner city.

4.2 Potential Options

Taking into account the inner city bus network requirements identified in the previous chapter, a number of possible options were identified for improved inner city bus facilities for Rotorua, as follows:

- Option 1 – Continue to use the existing bus stops on Pukuatua Street (with improved amenity)
- Option 2 - Improve the amenity and capacity of the existing bus stops on Pukuatua Street
- Option 3 – Reroute all routes to serve Rotorua Central instead of Pukuatua Street
- Option 4 – Revise the routes to serve both Pukuatua Street and Rotorua Central
- Option 5 – Revise all routes to operate via a large loop around the inner city
- Option 6 – Revise all routes to operate via a smaller loop around the inner city
- Option 7 – Switch all routes to a new on-street facility on Haupapa Street
- Option 8 – Switch all routes to a new on-street facility on Arawa Street
- Option 9 – Extend some or all routes to a new layover area to make better use of the existing on-street at Pukuatua Street
- Option 10 – Operate all routes as cross city services using the existing stops on Pukuatua Street.

Some of these options are shown in Figure 4.1 and all options are described in more detail below.
HORIZONTAL DATUM: New Zealand Geodetic Datum 2000 For practical purposes, NZGD2000 equates to WGS84 VERTICAL DATUM: Mean Sea Level PROJECTION: New Zealand Transverse Mercator 2000 © Bay of Plenty Regional Council, 2013 © Sourced from Land Information New Zealand data. CROWN COPYRIGHT RESERVED

Figure 4.1: Inner City Bus Options

Rotorua City Centre Bus Stops
3818780-CK-013
4.3 Option Description

4.3.1 Option 1 – Improve the Amenity of the Existing Stops on Pukuatua Street

This option involves all routes continuing to use the existing bus stops on Pukuatua Street. It assumes that streetscape/urban design improvements are provided to help overcome the amenity and poor perception of safety and security at the terminal. This option can be regarded as the do minimum option.

4.3.2 Option 2 – Improve the Amenity and Capacity of the Existing Stops on Pukuatua Street

This option is the same as Option 1, but also includes infrastructure improvements to provide more capacity for buses by providing additional bus stops to the east of Tutaneikai Street.

This option also includes providing additional bus stops on the opposite side of the Pukuatua Street to the existing stops (if required). This would give greater flexibility with regard to the routes taken by buses operating in the inner city area.

Plans of the potential options to provide additional capacity and operational flexibility at the bus stops on Pukuatua Street are contained in Appendix C. Of these the provision of stops on the opposite side of the road to where stops are currently provided is the improvement which would have greatest benefit to operational efficiency as it would allow some services to follow shorter routes in the inner city.

4.3.3 Option 3 – Reroute Services to Rotorua Central

This option involves re-routing bus services to the new bus stops recently constructed at Rotorua Central.

The option of relocating some, but not all, services to Rotorua Central from Pukuatua Street was not examined in detail, as this would reduce the opportunity for convenient interchange to take place between services. This is not considered desirable given the large amount of interchange that does currently take place on the network.

4.3.4 Option 4 - Serve both Pukuatua Street and Rotorua Central

This option involves amending the routes of some or all bus routes to serve the stops at Rotorua Central in addition to serving the bus facilities at Pukuatua Street.

Potential (i.e. illustrative) changes to the routes that would operate have been identified for this option, and are shown in the plans in Appendix D (i.e. Test 1).

4.3.5 Option 5 – Operate via a Large Loop Around the Inner City

This option involves routing all services in a one-way loop around the inner city to serve a number of stops, similar to the option suggested by RDC in their Rotorua 2030 Strategy document. A loop route was also suggested in the CPTED review undertaken for RDC.

For the purpose of evaluating this option, a one-way loop via Victoria Street, Fenton Street, Arawa Street and Ranolf Street has been assumed. A route via Ranolf Street was assumed instead of via Amohia Street, as Ranolf Street is better suited to bus operations.

An anti-clockwise direction of operation was assumed, as this would enable to bus stops on the route to be located on the inside of the loop. Serving the loop in a one-way direction as opposed to a two-way direction is also preferable as it would be more legible for bus users.
Stops could be provided on Arawa Street, Ranolf Street, Fenton Street and Victoria Street.

Potential (i.e. illustrative) changes to routes have been identified for this option, and are shown in Appendix D (i.e. Test 2).

4.3.6 Option 6 – Operate via a Smaller Loop Around the Inner City

This option involves routing all services in a smaller one-way loop around the inner city, serving Pukuatua Street (instead of Arawa Street), Amohia Street (instead of Ranolf Street), Rotorua Central (instead of Victoria Street) and Fenton Street.

In this option it has been assumed that buses operate via the existing internal (east-west) road immediately to the south side of Rotorua Central, instead of via Victoria Street. It is recognised however that routing the buses via the internal access road at Rotorua Central may not be practical in the short term as it would probably be dependent on changes to the road design (e.g. removal of road humps and probably the relocation of taxi ranks).

Services are also assumed to operating in an anti-clockwise direction (as Option 5). Stops could be provided on Pukuatua Street, Amohia Street, Fenton Street and at Rotorua Central.

Potential (i.e. illustrative) changes to routes have been identified for this option, and are shown in Appendix D (i.e. Test 3).

4.3.7 Option 7 - Use a New Facility on Haupapa Street

The option involves developing a new interchange on Huapapa Street (between Tutanekai Street and Fenton Street). Three potential options have been identified and are contained in Appendix C. We are aware that further (more radical) options were identified in the 2010 Urban Design framework, but these may be too expensive to implement.

4.3.8 Option 8 - Use a New Facility on Arawa Street

The option involves developing a new interchange on Arawa Street (between Tutanekai Street and Fenton Street). Two potential options have been identified which could be relatively inexpensive to implement, as contained in Appendix C.

4.3.9 Option 9 - Extend Services to a New Layover Area

It would be possible to utilise a smaller inner city facility if services were extended to a new layover area. A number of potential layover locations exist in the inner city, as shown in Appendix C.

4.3.10 Option 10 – Operate All Routes as Cross City Services

This option involves all services operating as cross city services, using the existing stops on Pukuatua Street. As indicated earlier in this report, interworking bus routes currently takes place for operational reasons. Advertising the fact that some routes are linked together could make the bus services more attractive as it would provide potential users with the option of through services between a wider range of origins and destinations.

It may also be possible to link other existing bus services together, namely Route 2, 4, 6 and 9. Potential (i.e. illustrative) changes to routes have been identified for this option, and are shown in Appendix D (i.e. Test 4).
4.4 Option Evaluation

Each of the options has been scored against the principles on which the inner city bus network requirements, as defined in Chapter 3. Options have been scored on a seven point scale from -3 (negative) to 3 (positive), where 0 is neutral.

In order to inform the evaluation, the impact of this change on route distances has been calculated for the stronger options. This analysis is contained in Appendix D for Tests 1 to 4 inclusive.

The main findings of this analysis are summarised in Table 4.1. A commentary on the main factors which affect the evaluation results is given below.

4.4.1 Option 1 – Improve the Amenity of the Existing Stops on Pukuatua Street

The evaluation of this option suggests that the option has some merit as the existing facility can be served relatively efficiently from an operational perspective. Retaining an option whereby all services provide interchange opportunities at a single central city location also has advantages.

The main disadvantage of continuing to serve the current facility is that the bus network would provide relatively poor coverage of the inner city area. It would also help address some of the social issues associated with the existing facility, albeit significant expenditure is likely to be required to address all user safety and security issues.

4.4.2 Option 2 – Improve the Amenity and Capacity of the Existing Stops on Pukuatua Street

This Option scores very well. It provides greater flexibility for future growth and provides greater operational flexibility than exists at present. The main disadvantage of this option is that Rotorua Central is not well served.

4.4.3 Option 3 – Reroute Services to Rotorua Central

This option scores poorly. The main disadvantage of rerouting all services to Rotorua Central is that the facility recently constructed does not have enough capacity for all existing routes to use as a terminal facility. In particular there is insufficient space for buses to layover between trips. This option would also result in some bus services providing poor coverage of parts of the central city.

There may however be scope to construct a bus facility large enough to accommodate all services at Rotorua Central and provide enough space for layover to take place. Some potential options are included in Appendix C. However, based on the earlier analysis of the 200m catchment area of existing stops in Rotorua, if buses only served Rotorua Central in the inner city, this would result in some parts of Rotorua’s inner city being poorly served by buses.

Overall, the option of rerouting all services to Rotorua Central is not recommended.

4.4.4 Option 4 - Serve both Pukuatua Street and Rotorua Central

This option scores the highest, though it would result in an overall increase in distance buses have to travel which could have an adverse impact on performance (see Table 1 in Appendix D). The successful implementation of this option will depend largely on whether changes can be made to the routes of buses outside the inner city to compensate from the additional route distance/time involved in serving Rotorua Central.
### Table 4.1: Evaluation of Options

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Option 1: Improve the Amenity of the existing stops on Pukuatua Street</th>
<th>Option 2: Improve the Amenity and Capacity of existing stops on Pukuatua Street</th>
<th>Option 3: Reroute All Services to Rotorua Central</th>
<th>Option 4: Serve both Pukuatua Street and Rotorua Central</th>
<th>Option 5: Operate via a Large Loop Around the Inner City</th>
<th>Option 6: Operate via a Smaller Loop Around the Inner City</th>
<th>Option 7: Use a New Facility on Haupapa Street</th>
<th>Option 8: Use a New Facility on Arawa Street</th>
<th>Option 9: Extend Services to a New Layover</th>
<th>Option 10: Operate All Routes as Cross City Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be safe and secure for all users, incorporating good urban design and contributing to public amenity</td>
<td>-2</td>
<td>-2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>-2</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>Be accessible and serves a wide range of inner city trip origins/destinations well</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Be served efficiently from an operation perspective</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>-2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>Provides enough space for buses to layover between trips</td>
<td>1</td>
<td>3</td>
<td>-3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Maximises the opportunity for bus passengers to interchange between routes</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<td>2</td>
</tr>
<tr>
<td>Provides capacity for potential future growth in bus use</td>
<td>-2</td>
<td>2</td>
<td>-3</td>
<td>2</td>
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<td>2</td>
<td>2</td>
<td>-2</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>Prominent</td>
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<td>1</td>
<td>-1</td>
<td>2</td>
<td>-2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Provide a high quality passenger waiting space</td>
<td>1</td>
<td>1</td>
<td>-2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>Makes efficient use of space in inner city</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>-1</td>
<td>2</td>
</tr>
<tr>
<td><strong>OVERALL SCORE</strong></td>
<td><strong>6</strong></td>
<td><strong>14</strong></td>
<td><strong>0</strong></td>
<td><strong>18</strong></td>
<td><strong>6</strong></td>
<td><strong>15</strong></td>
<td><strong>12</strong></td>
<td><strong>12</strong></td>
<td><strong>0</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>
4.4.5 Option 5 – Operate via a Large Loop Around the Inner City

This option scores relatively poorly. It has the advantage that it would serve more of the trip generators and attractors in the inner city than are served at present, and would provide a simple coherent network for users. The main disadvantages of the option are its significant impact on route length and therefore on bus service operating costs and operational performance.

Another potential disadvantage of this option is that the provision of multiple stops in the inner city could make the bus network less easy to use for those who need to interchange between services. As it would still be important to schedule (i.e. timetable) services to provide connections at a single stop, bus stop capacity comparable to that currently provided at the Pukuatua Street facility would be needed. It is doubtful that a location could be defined on the proposed ring where sufficient capacity exists for buses to timed to meet at to provide connections between services.

This option is therefore not recommended to be considered further.

4.4.6 Option 6 – Operate via a Smaller Loop around the Inner City

This option scores second highest. It would serve the main trip generators and attractors in the inner city well. The main disadvantages of the option are its impact on route length and therefore on bus service operating costs and operational performance.

This option is also only recommended to be implemented in conjunction with revisions to routes elsewhere in the city.

Further discussions are also recommended to take place with the existing bus operator to assess whether this option is achievable with current resources. There is a risk that the operation of all services via a fixed loop could have an adverse impact on service performance and reliability, and therefore have operating cost implications.

Further dialogue is also recommended to take place with the owners of the Rotorua Central mall to explore whether bus facilities can be improved at this location. Improvements at this location could make the introduction of a loop option more practical.

Further work should also consider whether the inclusion of stops on the loop at Amohia Street and Fenton Street is practical. The inclusion of these stops to the loop route could increase the chance of buses not being able to operate reliably.

4.4.7 Option 7 - Use a New Facility on Haupapa Street

The option of developing a new interchange on Huapapa Street appears scores well. However, whilst this option has the advantage of providing a facility at a single location where there is room to provide adequate layover space and improved facilities for users, this location is more remote from Rotorua Central than the existing facility at Pukuatua Street. This option could be a longer-term alternative to the use of Pukuatua Street.

4.4.8 Option 8 - Use a New Facility on Arawa Street

As with Option 7, the option of developing a new interchange on Arawa Street scores well. However, whilst this option has the advantage of providing a facility at a single location where there is room to provide adequate layover space and improved facilities for users, this location is more remote from Rotorua Central than the existing facility at Pukuatua Street and a potential new facility at Haupapa Street. This option is also recommended to be examined further as a longer-term alternative to the use of Pukuatua Street.
4.4.9 Option 9 - Extend Services to a New Layover Area

This option scores poorly because the current bus schedules provide very little scope to include an additional trip to and from a layover area for most routes. There is very little scope to amend them to allow for this unless additional resources are used. This option is not recommended to be considered further therefore.

4.4.10 Option 10 – Operate All Routes as Cross City Services

This option scores poorly because advertising the existing linked services as through services could make the reliable delivery of services more complex because the operator would be required to deliver a more complex service than they are currently contracted to provide. Furthermore, linking other services together which are not currently linked would require the current schedules to be revised to make this possible which will have resource cost implications.

4.5 Recommended Option

Based on the evaluation of options, it is recommended that until changes are made to routes in the outer area to address performance issues, the existing bus facility on Pukuatua Street continues to be used. Improvements to the capacity and amenity of the stops on Pukuatua Street are recommended however to provide greater operational flexibility and to help address the existing user safety and security issues (i.e. Option 2).

If the bus routes are amended in the rest of the Rotorua urban area to make them more direct and therefore quicker, it may be possible to amend the existing inner city bus routes to serve both the existing stops on Pukuatua Street and the recently constructed bus stops at the Rotorua Central retail mall (i.e. Option 4).

The future operation of buses via an inner city loop serving Pukuatua Street, Amohia Street, Rotorua Central and Fenton Street (i.e. Option 6) is also worth considering. This option will probably cost more to operate than Option 4, and could have a greater adverse impact on service reliability/performance than if buses operate between Pukuatua Street and Rotorua Central via the most direct route available. Further discussion is therefore recommended to consider the impact of the proposed inner city loop on operating costs and service performance, and to explore whether bus facilities at Rotorua Central mall can be improved.
Outer Urban Area Bus Network Options

This chapter contains a summary of the review of a number of options to revise the bus network in the outer urban area of Rotorua. The options considered included:

- Revising service frequencies
- Splitting routes
- Minor changes to individual routes (including switching some parts of one route to another route)
- Combining or splitting routes to enable resources to be utilised more efficiently.

Each of these potential network changes is discussed in turn, and then the main advantages and disadvantages of each change are considered in relation to the key principles on which the future bus network has been reviewed against (as defined in Chapter 3).

5.1 Revising Service Frequencies

Reducing the frequencies of some of the less busy routes on the network, such as Route 9 (Springfield), will allow the frequency of some of the busier parts of the network, such as Route 2 (Polytech), to be increased. This could be done at certain times of the day, or at all times of the day, and could theoretically allow supply to be better matched with demand across the network.

Experience in New Zealand and overseas suggests a half hourly frequency to be the minimum service level required for urban public transport to attract and retain customers however. Furthermore, serving parts of routes less frequently than other parts is likely to be confusing for customers, and is therefore not consistent with the key objective of marking the network more legible.

Consideration was also given to operating some parts of individual routes less frequently than other parts (e.g. by serving part of a route on alternate journeys only, or at certain times of the day only such as during off-peak times). This could also help better match supply with demand, but is likely to be confusing for customers.

It could also create confusion for customers because it could result in an ‘uneven’ timetable. This is a situation whereby the timing of buses at a particular point on the route would not be consistent between those journeys that served one route variations and the timing of those journeys that served a different route variation if different route variations were operated at the same time of the day.

Changing the frequency of whole routes, or parts of some routes, is not recommended therefore.

5.2 Splitting Routes

It would be possible to split the existing Route 2 (Polytech) into two separate routes operating with a 30 minute frequency. This would enable Fenton Street and Ranolf Street to be served in both directions, rather than one-way only at present. It would also enable one of the two new routes to terminate at the Polytechnic, instead of continuing to the present Tihi-O-Tonga terminus (at Kerswell Terrace / Sloane Avenue), which would reduce operating costs.

It is noted however that some additional bus stops would need to be provided on some parts of the revised routes where they do not exist at present. This would require further discussion with RDC.

The disadvantage of this option is that additional services would need to operate on a weekend if the present frequencies along both Fenton Street and Ranolf Street are to be maintained.
Alternatively the existing Route 2 could be operated at weekends, or both routes could operate less frequently than on Mondays to Fridays, if operating costs are not to increase.

On balance the change in route is considered to be of overall benefit, as it will make better use of existing resources and provide an improved service for both the Fenton Street and Ranolf Street areas.

It is suggested that both of the new routes operate at weekends at reduced frequencies to avoid compromising the legibility of the network.

No other service has been considered to be split, as all other services only operate with a half-hourly frequency on Mondays to Fridays, and therefore any splitting of these routes would result in services operating with a frequency that is less than the desirable minimum.

5.3 Minor Changes to Individual Routes

A number of options to refine individual routes, with the aim of omitting sections of route which serve areas of low catchment or areas where the catchment is located in close proximity to other roads which are, or could be served by buses.

For all of the options identified, the effect of the potential route change on the route length and on the overall catchment served has been calculated. This analysis is contained in Appendix E. The route options considered, main advantages and disadvantages, and overall conclusion are summarised for each route in Tables 5.1 to 5.10 inclusive. The main options analysed are illustrated on the figures contained in Appendix E.
### Table 5.1: Analysis of Options for Route 1 (Ngongotaha)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loop north of SH36/Wikaraka Street intersection (serving Waiteti Road, Cemellia Drive, Leonard Street, Landscape Drive, Ranginui Street, Waiteti Road)</td>
<td>Omit loop</td>
<td>Would reduce the route travel time by 3-4 minutes</td>
<td>Serves an area of high demand which is located some distance from the rest of the route</td>
<td>Not recommended</td>
</tr>
<tr>
<td>2</td>
<td>Deviation from Hood Street (west of School Road) via Hood Street, Frances Street, Bruce Street and Hood Street</td>
<td>Omit deviation and operate directly along Hood Street (by turning right from School Road into Hood Street)</td>
<td>Would reduce the route travel time by 1-2 minutes</td>
<td>Serves an area of quite high demand. Journey time savings are only modest.</td>
<td>Not recommended</td>
</tr>
<tr>
<td>3</td>
<td>SH5/SH36 roundabout to Western Road/School Road interchange</td>
<td>Operate via SH5 and Western Road</td>
<td>Would reduce the route travel time by 2-3 minutes</td>
<td>Would result in a significant population which are currently served by the bus stops between the SH5/SH36 intersection and Ngongotaha being inconvenienced. Journey time savings are only modest</td>
<td>Not recommended</td>
</tr>
<tr>
<td>4</td>
<td>Deviation from Wikaraka Street via Okona Crescent, Openana Street, Tamaki Street, Tura Street</td>
<td>Operate directly via Wikaraka Street</td>
<td>Would reduce travel time by 1-2 minutes</td>
<td>Would omit three stops Would result in the service omitting a significant residential catchment area.</td>
<td>Not recommended</td>
</tr>
<tr>
<td>5</td>
<td>Ranolf Street</td>
<td>Enter the inner city via Rotorua Hospital</td>
<td>Improves frequency of buses serving the Hospital</td>
<td>Service reduced on Ranolf Street</td>
<td>Recommended</td>
</tr>
</tbody>
</table>

### Table 5.2: Analysis of Options for Route 2 (Polytech)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diversion via Fenton Park area (Marguerita Street, Hilda Street, Ward Avenue, Deere Avenue, McKee Avenue, Trigg Avenue, Sala Street)</td>
<td>Omit via Fenton Street (between Marguerita Street and Sala Street)</td>
<td>Would reduce the route travel time by 4-5 minutes</td>
<td>Would not serve a significant catchment area</td>
<td>Not recommended</td>
</tr>
<tr>
<td>2</td>
<td>Diversion via Fenton Park area (Marguerita Street, Hilda Street, Ward Avenue, Deere Avenue, McKee Avenue, Trigg Avenue, Sala Street)</td>
<td>Switch to Route 3</td>
<td>Would reduce the route travel time by 4-5 minutes</td>
<td>Would not be possible to cover this part of the route within the Route 3 timetable. Could only be achieved by trimming other parts of Route 3</td>
<td>Not recommended</td>
</tr>
</tbody>
</table>
### Table 5.3: Analysis of Options for Route 3 (Oehata)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loop serving Holdens Bay (via Sunrise Avenue, Rewarewa Street, Pohutukawa Drive, Sequoia Crescent, Rewarewa Street, Sunrise Avenue)</td>
<td>Omit loop</td>
<td>Would reduce the route travel time by 4-5 minutes</td>
<td>Serves an area of very high demand which is located some distance from the rest of the route</td>
<td>Not recommended</td>
</tr>
<tr>
<td>2</td>
<td>Deviation from Wharenui Road via Leith Road, Wingrove Road, Coulter Road, SH30</td>
<td>Operate direct along Wharenui Road between Leith Road and SH30</td>
<td>Would reduce the route travel time by 4-5 minutes</td>
<td>No significant disadvantages. Stops on the alternative route could be provided which would not increase walk times for users significantly</td>
<td>This variation could only be implemented in conjunction with omitting Holden’s Bay (see above), and therefore is not recommended</td>
</tr>
<tr>
<td>3</td>
<td>Deviation via Morey Street</td>
<td>Operate via Marino Road, Vaughan Road, Owaha Road</td>
<td>Would serve part of Vaughan Road which is some distance from existing bus stops</td>
<td>Would omit serving the Morey Street area, which is a significant catchment area on the route</td>
<td>Not recommended. It would be better to serve Vaughan Road by changes to Route 10 (in the longer term, as and when more development takes place)</td>
</tr>
</tbody>
</table>

### Table 5.4: Analysis of Options for Route 4 (Sunnybrook)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deviation from Sunset Road via Wrigley Road and Ford Road</td>
<td>Omit deviation (operate direct via Sunset Road)</td>
<td>Would reduce the route travel time by 2-3 minutes</td>
<td>Would increase the distance some existing bus users would need to walk to bus stops.</td>
<td>Recommended (in order to enable Route 4 to be combined with Route 8. Stops on the proposed revised route could be provided which would not increase walk times for users significantly. New stops would need to be provided on Sunset Road)</td>
</tr>
<tr>
<td>2</td>
<td>Loop via Pukehangi Road, Pegasus Drive, Orion Street, Pandora Avenue</td>
<td>Omit loop from route and operate via Sunset Road (in both directions)</td>
<td>Would reduce the route travel time by 4-5 minutes</td>
<td>Would increase the distance some existing bus users would need to walk to bus stops.</td>
<td>Recommended (in order to enable Route 4 to be combined with Route 8). Stops on the proposed revised route could be provided which would not increase walk times for users significantly. New stops would need to be provided on the west side of Sunset Road</td>
</tr>
</tbody>
</table>

### Table 5.5: Analysis of Options for Route 5 (Western Heights)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Via Kea Street (Selwyn Heights)</td>
<td>Quarry Road (between SH5 and Kea Street)</td>
<td>Would reduce the route travel time by 2-3 minutes</td>
<td>Would increase the distance some existing bus users would need to walk to bus stops</td>
<td>Recommended. Stops on the alternative route could be provided which would not increase walk times for users significantly. New stops would need to be provided on Quarry Road.</td>
</tr>
<tr>
<td>2</td>
<td>Via Fairview Road, Steeles Lane</td>
<td>Omit roads from route and operate via Quarry Road</td>
<td>Would make the route more legible, and avoid duplicating part of Route 7 (Mitchell Downs)</td>
<td>Existing users boarding the route at stops on Fairview Road and Steelers Lane would have to walk further.</td>
<td>Recommended. The advantages of improving the legibility of the route outweigh the disadvantages.</td>
</tr>
</tbody>
</table>
### Table 5.6: Analysis of Options for Route 6 (Koutu)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Via Fairview Road, Steeles Lane</td>
<td>Operate via Park Road, Bell Road, Fairview Road (east of Bell Road), Steelers Lane</td>
<td>Would increase the catchment served by the route</td>
<td>Would increase the route travel time by 4-5 minutes</td>
<td>Not Recommended</td>
</tr>
<tr>
<td>4</td>
<td>Tarewa Street</td>
<td>Via Rotorua Hospital</td>
<td>Improved links to Rotorua Hospital</td>
<td>Could extend the route journey time and adversely impact on the reliability of an already busy service. Would also leave a residential care home on Tarewa Street not served by public transport.</td>
<td>Not recommended</td>
</tr>
</tbody>
</table>

### Table 5.7: Analysis of Options for Route 7 (Mitchell Downs)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loop from Clayton Road/Pukehangi Road intersection via Pukehangi Road, Blomfield Road, Goldie Street, Homedale Street and Edmund Road to Clayton Road/Edmund Road intersection</td>
<td>Omit loop (operate via Clayton Road in both directions between Pukehangi Road and Edmund Road)</td>
<td>Would reduce the route travel time by 2-3 minutes</td>
<td>Increased walk times for some existing bus users, though new bus stops could be provided on Clayton Road to reduce this adverse impact.</td>
<td>Not recommended in isolation, but is recommended in order to enable Route 7 to be combined with Route 5.</td>
</tr>
</tbody>
</table>

### Table 5.8: Analysis of Options for Route 8 (Westbrook)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pukehangi Street to Petrie Street via Hator Street and Neri Crescent</td>
<td>Operate direct between Pukehangi Street and Petrie Street via Hator Street</td>
<td>Would reduce the route travel time by 1-2 minutes</td>
<td>Increased walk times for some existing bus users.</td>
<td>Not recommended</td>
</tr>
<tr>
<td>2</td>
<td>Pukehangi Street to Petrie Street via Hator Street and Neri Crescent</td>
<td>Link to Route 8 via Springfield Road</td>
<td>Would enable route to be linked with Route 8</td>
<td>Increased walk times for some existing bus users</td>
<td>Recommended. New bus stops could be provided on Springfield Road to reduce this adverse impact</td>
</tr>
</tbody>
</table>
### Table 5.9: Analysis of Options for Route 9 (Springfield)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pererika Street and Old Taupo Road (between Pererika Street and Malfroy Road)</td>
<td>Operate via Ranolf Street and Malfroy Road (between the Pererika Street/Malfroy Road intersection and the Malfroy Road/Old Taupo Road intersection)</td>
<td>Increases frequency of services on Malfroy Road</td>
<td>Existing bus users on Pererika Street will have further to walk to catch a bus. Unlikely to result in any significant time saving.</td>
<td>Not recommended.</td>
</tr>
<tr>
<td>2</td>
<td>Via Hillcrest Avenue and Huia Street</td>
<td>Old Taupo Road (south of Hillcrest Avenue and Deven Street West (between Old Taupo Road and Huia Street)</td>
<td>Would reduce the route travel time by 2-3 minutes</td>
<td>Increased walk times for some existing bus users.</td>
<td>Not recommended</td>
</tr>
<tr>
<td>3</td>
<td>McDowell Street, Otonga Road (between McDowell Street and Springfield Road)</td>
<td>Operate via Springfield Road (east of McDowell Street)</td>
<td>Would reduce the route travel time by 1-2 minutes</td>
<td>Increased walk times for some existing bus users. Requires new bus stops to be provided on Springfield Road</td>
<td>Not recommended</td>
</tr>
<tr>
<td>4</td>
<td>Nikau Street and Jackson Street</td>
<td>Service continues along Otonga Road (north of Jackson Street) and Devon Street to rejoin the existing route at the Devon Street / Huia Street intersection)</td>
<td>Would reduce the route travel time by 1-2 minutes</td>
<td>Increased walk times for some existing bus users. Requires new bus stops to be provided on Otonga Road</td>
<td>Not recommended</td>
</tr>
<tr>
<td>5</td>
<td>Existing return route from the Otonga Road / Jackson Street intersection to the Manuka Crescent / Old Taupo Road intersection</td>
<td>Service continues along Otonga Road (north of Jackson Street) and Devon Street to rejoin the existing route at the Old Taupo Road/ Hillcrest Avenue intersection</td>
<td>Would reduce the route travel time by up to 5 minutes. Provides a bus service on Otonga Road north of Jackson Street</td>
<td>Will increase the length of journey for some existing bus users</td>
<td>Recommended. The time savings by making this change are likely to outweigh the disadvantages</td>
</tr>
</tbody>
</table>

### Table 5.10: Analysis of Options for Route 10 (Airport)

<table>
<thead>
<tr>
<th>Route Variation</th>
<th>Existing Route</th>
<th>Potential Alternative Route</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Overall Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fennyson Drive, Vaughan Road, Owhata Road</td>
<td>Omit roads from route</td>
<td>Would reduce the route travel time by 3-4 minutes</td>
<td>Serves an area of moderate demand which is located some distance from other bus stops</td>
<td>Not recommended</td>
</tr>
<tr>
<td>2</td>
<td>SH30 (between Marino Road and Fennyson Drive), Fennyson Drive, Vaughan Road, Owhata Road</td>
<td>Operate via Marino Road, Vaughan Road, Owhata Road</td>
<td>Would serve part of Vaughan Road which is some distance from existing bus stops, and development is planned to occur on this road in future</td>
<td>Would omit serving existing stops on SH30 which serve areas of Lynmore.</td>
<td>Not recommended in the short-term, but may be worth considering in the longer term, as and when more development takes place</td>
</tr>
<tr>
<td>3</td>
<td>Hannah's Bay (Loop via Robinson Avenue, Cooper Avenue, Willow Avenue, Lee Road)</td>
<td>Omit roads from route</td>
<td>Would reduce the route travel time by 3-4 minutes</td>
<td>Serves an area of high demand which is located some distance from other bus stops</td>
<td>Not recommended</td>
</tr>
</tbody>
</table>
5.4 Combined Routes

During the course of examining the merits of changes to parts of existing routes, consideration was also given to the possibility of link some of the existing routes together at the outer end of the route to form long ‘loops’ with buses heading out on one radial corridor and returning via a different corridor. This could have the advantage of giving some bus users a greater opportunity to get to a destination by travelling in either direction of the combined route. The route changes could therefore provide more travel options than exist at present.

As explained more fully in Tables 5.4, 5.5, 5.7 and 5.8, the following two routes are recommended to be combined to form long loops:

- Route 5 (Western Heights) and Route 7 (Mitchell Downs)
- Route 4 (Sunnybrook) and Route 8 (Westbrook)

The main disadvantage of this is that it may no longer be possible to serve some parts of the existing routes. However the route catchment analysis contained in Appendix E indicates that the adverse impacts on existing bus would be minimal as the alternative route will serve most of the existing catchment. It is noted however that some additional bus stops would need to be provided on some parts of the network where they do not exist at present. This would require further discussion with RDC.

5.5 Extensions to Existing Routes

As is indicated in Table 5.9, it is recommended that the existing Route 9 is revised to form a long 1-way loop. The main advantage of this is that it would reduce the overall two-way route length, though it is acknowledged that for some existing users of the route the length of journey would be increased. It is also noted that some additional bus stops would need to be provided on the short section of the route (along Otonga Road between Jackson Street and Devon Street West, and along Old Taupo Road between Devin Street West and Hillcreat Road) where they do not exist at present. This would require further discussion with RDC.

5.6 Summary of Recommended Route Changes

The recommended changes to each route in the outer urban area are summarised below and illustrated in Appendix F.

5.6.1 Route 1 (Ngongotaha)

No changes are proposed to this route, other than for the route to operate via Rotorua Hospital instead of via Ranolf Street. This will provide an improved level of service to the Hospital.

5.6.2 Route 2 (Polytech)

It is recommended that this route is split into two separate services:

- A service which operates between the inner city and the present Tihi-O-Tonga terminus (at Kerswell Terrace / Sloane Avenue) via Fenton Street (in both directions)
- A service which operates between the inner city and the Polytech only one via Ranolf Street (on both directions).

This will provide Fenton Street and Ranolf Street with improved service levels, and enable operating cost savings to be made by operating fewer services to the present Tihi-O-Tonga terminus.
Both services are proposed to operate with a 30 minute frequency (Mondays to Fridays). The splitting of the route can be done with existing resources.

The frequency of weekend services would be hourly on Saturdays and every two hours on Sundays.

5.6.3 Route 3 (Owhta)

No changes to Route 3 are proposed.

5.6.4 Route 4 (Sunnybrook)

It is recommended that Route 4 is combined with Route 8 (Westbrook). The combined service would operate via Pukehangi Road (between Pagasus Drive and Malfroy Road). The revised route will therefore omit existing diversions from Sunset Road via Wrigley Road and Ford Road and the loop via Pegasus Drive, Orion Street and Pandora Avenue. This will enable the new service to provide a quicker service to the majority of its current customers.

The route is recommended to operate in both directions of travel. This will have the advantage of providing users of the service at the outer (western) end of the route with the choice of catching the service in either a clockwise or anti-clockwise direction, thereby (in effect) providing a service every 15 minutes to some parts of the route.

5.6.5 Route 5 (Western Heights)

It is recommended that Route 5 is combined with Route 7 (Mitchell Downs) by being extended along Clayton Road (west of Spencer Road). The route is to operate via Old Quarry Road instead of Kea Street. Fairview Road and Steelers Lane are to be omitted from the new route. This will enable the new service to provide a quicker service to the majority of its current customers.

The route is recommended to operate in both directions of travel. This will have the advantage of providing users of the service at the outer (western) end of the route with the choice of catching the service in either a clockwise or anti-clockwise direction, thereby (in effect) providing a service every 15 minutes to some parts of the route.

5.6.6 Route 6 (Koutu)

It is recommended that Route 6 is modified to include an additional one-way loop serving Kawaha Point (via Kawaha Point Road, Grand View Road and Aquarius Drive). The slightly longer route could be operated at marginal additional costs with existing resources.

5.6.7 Route 7 (Mitchell Downs)

As indicated earlier, it is recommended that this route is combined with Route 5 (Western Heights). The route is recommended to operate in both directions of travel.

5.6.8 Route 8 (Westbrook)

As indicated earlier, it is recommended that this route is combined with Route 4 (Sunnybrook). The new route would omit the existing ‘end of route’ loop via Hator Street and Neri Crescent. The route is recommended to operate in both directions of travel.
5.6.9 Route 9 (Springfield)

It is recommended that this route is revised to operate in future as a large one-way 'loop by omitting
the current end of route loop via Jackson Street and Nikau Street and continuing along Otonga
Road (north of Jackson Street) and Old Taupo Road, to re-join the existing route at the intersection
of Old Taupo Road and Hillcrest Avenue.

5.6.10 Route 10 (Airport)

No changes are proposed to this route.

5.7 Bus Stop Infrastructure Implications

Bus stops will be required to be provided on the following roads that the proposed revised routes
will serve that are not currently served:

- Route 2 (Polytech) – Bus stops will need to be provided on both sides of the full length of both
  routes (some of the roads, notably sections of Fenton Street and Ranolf Street already have bus
  stops on both sides of the road)
- Route 4 (Sunnybrook) - Bus stops will need to be provided on Sunset Road (between Wrigley
  Road and Ford Road) and on Pukehangi Road (between Pegasus Drive and Malfroy Road
- Route 5 (Western Heights) - Bus stops will need to be provided on Old Quarry Road (between
  State Highway 5 and Kea Street), Clayton Road (between Spencer Street and Pukehanga
  Road) and on Pukehanga Road (between Clayton Road and Bloomfield Street).
- Route 6 (Koutu) - Bus stops will need to be provided on one side of Kawaha Point Road, Grand
  View Road and Acquarious Drive
- Route 9 (Springfield) - Bus stops will need to be provided on one side of Otonga Road (north of
  Jackson Street) and Old Taupo Road.

Indicative bus stop locations are shown in the plans contained in Appendix F.

5.8 Operating Cost Implications

The options identified for the outer urban area are calculated to result in a slight increase in the
route kilometres operated across the network. The increase in kilometres operated is likely to be
offset by higher running speeds which could be achieved on the revised routes.

Changes to the routes of services in the inner city are also likely to increase slightly if services are
revised to serve both the existing stop on Pukuatua Street and Rotorua Central.

The overall change in operating costs is not anticipated to be significant therefore.

Estimating the revenue implications of the proposed changes in detail is beyond the scope of the
study, but the changes are not anticipated to have an adverse impact on revenues, and could
potentially stimulate some increased demand/revenue, particularly in off-peak periods where there
is spare capacity for growth.
6  Recommended Network Changes

This chapter provides a summary of the recommended network changes, and outlines some key next steps towards implementing these recommendations.

6.1  Summary of Network Changes Recommended in the Outer Urban Area

The main changes recommended are:

- Route 1 (Ngongotaha) to operate via Rotorua Hospital instead of via Ranolf Street
- Split Route 2 (Polytech) into two separate half hourly services, one operating to the Polytechnic via Fenton Street and one operating via Ranolf Street
- Link Route 4 (Sunnybrook) and Route 8 (Westbrook) into a new combined service, running in both a clockwise and anticlockwise direction
- Link Route 5 (Western Heights) and Route 7 (Mitchell Downs) into a new combined service, running in both a clockwise and anticlockwise direction
- Route 6 (Koutu) to be revised to include an additional one-way loop serving Kawaha Point
- Revise Route 9 (Springfield) to operate as a large one-way 'loop by omitting the current end of route loop via Jackson Street and Nikau Street and continuing along Otonga Road and Old Taupo Road to rejoin the existing route north of Hillcrest Avenue.

No changes are proposed to Route 3 (Owhata) and Route 10 (Airport).

6.2  Summary of Network Changes Recommended for the Inner City

It is recommended that buses continue to serve the existing inner city terminus on Pukuatua Street, and that improvements are made to the passenger amenity facilities and to the infrastructure to provide additional capacity and operational flexibility (Option 2).

If the recommended changes to routes in the outer area are implemented, it is also recommended that routes in the inner city are modified to serve the Rotorua Central retail area as well as the Pukuatua Street facility (Option 4). This will increase the route distance operated and increase bus travel times, but the patronage benefits are likely to outweigh the additional operating costs. To overcome any additional adverse impact this change could have on service performance, it is recommended that this change is made in conjunction with the recommended changes to routes in the outer area.

Consideration has been given to operating all services via a one-way loop around the inner city, as is currently suggested by RDC. Whilst this option would provide a simple coherent network, and provide bus users with more choice of boarding and alighting locations in the inner city, the additional costs and time incurred by buses operating this loop may result in this option being unsuitable, particularly if a large loop is adopted.

Further consideration is recommended to be given to the impact of the shorter loop option (Option 6) on service performance and reliability before a loop option is adopted in preference to Option 4.

6.3  Next Steps

To implement the recommended changes to the network will require time to enable stakeholders and the public to be adequately informed of the proposed changes to the network and enable them to comment on the proposals.

It will be important to undertake consultation to obtain “buy in” from key stakeholders on the general concepts and overall shape of the proposed future network. Key stakeholders to be consulted will
include RDC and the NZ Transport Agency, as well as BOPRC management. Following this, there is likely to be considerable value in a formal round of consultation on the detailed proposals, encompassing user groups and the public.

Further discussion will be required with RDC in particular to provide additional bus stops on roads that the proposed routes will serve that are not currently served. It is acknowledged that implementation of the infrastructure required to make the bus network changes is a risk to implementation of the proposals, as is reaching agreement with RDC on the route and stops served by buses in the inner city.

At all times it will be important to adopt a robust approach to consultation, to avoid compromising the key principles that have been established for the future bus network.

Following a period of stakeholder and public consultation, further work may be required to refine the strategy before embarking on implementation.

Targeted communication activities will be required to educate customers and the general public about changes resulting from the network review. The consultation process can provide an opportunity for BOPRC to grow its customer base through proactively targeting and promoting the benefits of the network to new customers.

It will also be important to monitor, evaluate and modify when required, the network after these changes have been implemented. The scale of the final changes, and the impact observed, will influence the timeframe with which the network will be monitored before corrective action is taken. The significance of monitoring, evaluating and making corrective action will enable BOPRC to manage the impacts to passengers, operations and operational performance.
Appendix A

Existing Bus Network and Route Catchment Areas
This map contains data derived in part or wholly from sources other than Beca, and therefore, no representations or warranties are made by Beca as to the accuracy or completeness of this information.

Contains information sourced from LINZ. Crown Copyright Reserved. Basemap source: LINZ & Eagle Technology.
Based on 2013 census data, usually resident population by meshblock level, rounded to nearest 100. Where a buffer intersects part of a meshblock, population is calculated based on the area inside.

Route length multiplied by 2 for services 1, 3, 4, 5, 6, 7, 8, 9, 10 and by 4 for Route 2 to represent the frequency of services.

<table>
<thead>
<tr>
<th>Population Serviced</th>
<th>Service Length (km per hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4000</td>
<td>55.1</td>
</tr>
<tr>
<td>6500</td>
<td>47.9</td>
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<td>3300</td>
<td>44.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>349.5</strong></td>
</tr>
</tbody>
</table>

Legend:
- Existing Bus Stops
- Route 1: Ngongotaha
- Route 2: Polytech
- Route 3: Owhata
- Route 4: Sindanbrook
- Route 5: Western Heights
- Route 6: Koutu
- Route 7: Mitcham Downs
- Route 8: Westbrook
- Route 9: Springfield
- Route 10: Rotorua Airport

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Appendix B

Demographic and Socio-Economic Analysis
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Legend
- Existing Bus Routes
- Workplace Address (2013 Census)
- Working population per hectare
  - < 10
  - 10 - 20
  - 20 - 30
  - 30 - 40
  - 40 - 50
  - 50 - 60
  - 60 - 70
  - 70+

Revision Author Verified
Approved Date

Title:
Existing Rotorua Bus Network

Discipline:
GIS

Drawing No:
GIS-3818780-03

Client:
Bay of Plenty Regional Council

Project:
Rotorua Bus Network Design

Employment Density
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Appendix C

Potential Locations for Improved Bus Stops in the Inner City
Appendix D

Route Variations Examined for the Inner City
Appendix E

Route Variations Examined in the Outer Urban Area
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Route 1, Option 0
Route Options
Route 1, Option 1

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Scale: 1:27,000

Route Options
Route 1, Option 2
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Route Options

Route 1, Option 3
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Route Options
Route 3, Option 1
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Title: Route Options

Route 3, Option 2

Client: Bay of Plenty Regional Council

Project: Rotorua Bus Network Review

Drawing No: GIS-3918780-09-05-2
Route Options
Route 4, Option 1

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Route Options
Route 4, Option 2

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Route Options
Route 5, Option 1

Title: Route Options
Discipline: GIS
Drawing No: GIS-3818780-09-05-1
Client: Bay of Plenty Regional Council
Project: Rotorua Bus Network Review

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Route Options
Route 5, Option 2

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Client: Bay of Plenty Regional Council
Project: Rotorua Bus Network Review

Discipline: GIS
Drawing No: GIS-381780-09-05-2

Revision: DJL DRAFT DRAFT 5/08/2014

Approved Date: 2 RJL HEC AL 26/08/2014
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Route Options
Route 5, Option 3
Route Options
Route 6, Option 0
Route Options

Route 6, Option 1
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Route Options
Route 6, Option 2
Route Options
Route 7, Option 0

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Title: Route Options
Project: Rotorua Bus Network Review
Client: Bay of Plenty Regional Council
Discipline: GIS
Drawing No: GIS-3818780-09-07-1

Route Options
Route 7, Option 1
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Map intended for distribution as a PDF document.

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Route Options
Route 9, Option 0

Map Scale @ A3: 1:12,500

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Revision Author Verified
Approved Date

Title:
Route Options

Discipline:
GIS

Drawing No:
GIS-3818780-09-09-1

Client:
Bay of Plenty Regional Council

Project:
Rotorua Bus Network Review

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Route 9, Option 1
Route Options

Route 9, Option 2
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Title: Route Options

Route 9, Option 4

Client: Bay of Plenty Regional Council

Project: Rotorua Bus Network Review

Drawing No: GIS-391701-03-05-4

Revision Author: Verified

Approved Date: 5/08/2014

Map Scale @ A3: 1:12,500

0 250 500 125 Metres

RJL DRAFT 26/08/2014

RJL HEC AL 26/08/2014
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Route Options

Route 10, Option 0
Title:

Route Options

Route 10, Option 1
Route Options

Route 10, Option 3

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1. Based on 2013 census data, usually resident population by meshblock level, rounded to nearest 100. Where a buffer intersects part of a Meshblock, population is calculated based on the area inside.

2. Route length multiplied by 2 for services 1, 2A, 2B, 3, 6, 9, 10 and by 4 for Routes 4 and 8 to represent the frequency of services.

<table>
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<tr>
<th>Service</th>
<th>Population Serviced</th>
<th>Service Length (km per hour)</th>
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<tbody>
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<tr>
<td>2A</td>
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<td>1500</td>
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<td>3</td>
<td>2600</td>
<td>40.5</td>
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<tr>
<td>4 and 8</td>
<td>4100</td>
<td>55.0</td>
</tr>
<tr>
<td>5 and 7</td>
<td>4900</td>
<td>68.0</td>
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<td>Total</td>
<td>23900</td>
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</table>

Legend
- Preferred Bus Stops
- Route 1: Ngongotaha
- Route 2A: Polytech
- Route 2B: Polytech
- Route 3: Owhata
- Route 4 and 8: Sunnybrook / Westbrook
- Route 5 and 7: Western Heights / Mitchell Downs
- Route 6: Koutu
- Route 9: Springfield
- Route 10: Rotorua Airport

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2. Route length multiplied by 2 for services 1, 2A, 2B, 3, 6, 9, 10 and by 4 for Routes 4/8 and 5/7 to represent the frequency of services.

Legend
- Preferred Bus Stops

<table>
<thead>
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<th>Route</th>
<th>Population Serviced</th>
<th>Service Length (km per hour)</th>
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<tbody>
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<tr>
<td>Route 3: Ohakune</td>
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<tr>
<td>Route 10: Rotorua Airport</td>
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<td>360.3</td>
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**Title:** Proposed Rotorua Bus Network

**Client:** Bay of Plenty Regional Council

**Project:** Rotorua Bus Network Review

**Discipline:** GIS