Fiji Roads Authority

Greater Suva Transportation Strategy

2015 -2030

Fiji Roads Authority

GREATER SUVA TRANSPORTATION STRATEGY

Final Report

Client: Fiji Roads Authority (FRA)
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This report was prepared by:

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The report has been endorsed by the following stakeholders

Ministry of Local Government, Urban Development, Housing & Environment
LGUDHE

Fiji Police
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Housing Authority
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Nausori Town Council

NASINU TOWN COUNCIL

Other stakeholders that were involved in the development of this strategy included:

Land Transport Authority
Lami Town Council
Ministry of Strategic Planning, National Development and Statistics
Ministry of Works, Transport and Public Utilities
Suva City Council

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Fiji Roads Authority

THE VISION

GREATER SUVA ASPIRES TO HAVE AN INTEGRATED AND SUSTAINABLE TRANSPORT SYSTEM THAT CONTRIBUTES TO AN INCLUSIVE, PROSPEROUS AND ENVIRONMENTALLY RESPONSIBLE REGION.

Executive Summary

Background

The Greater Suva Area (GSA) comprises the councils of Lami, Suva, Nasinu and Nausori. The region has historically been shaped by short-term decision making that has directly influenced the transportation system. The Fiji Roads Authority (FRA) has commissioned a long-term strategy to allow the GSA to improve:

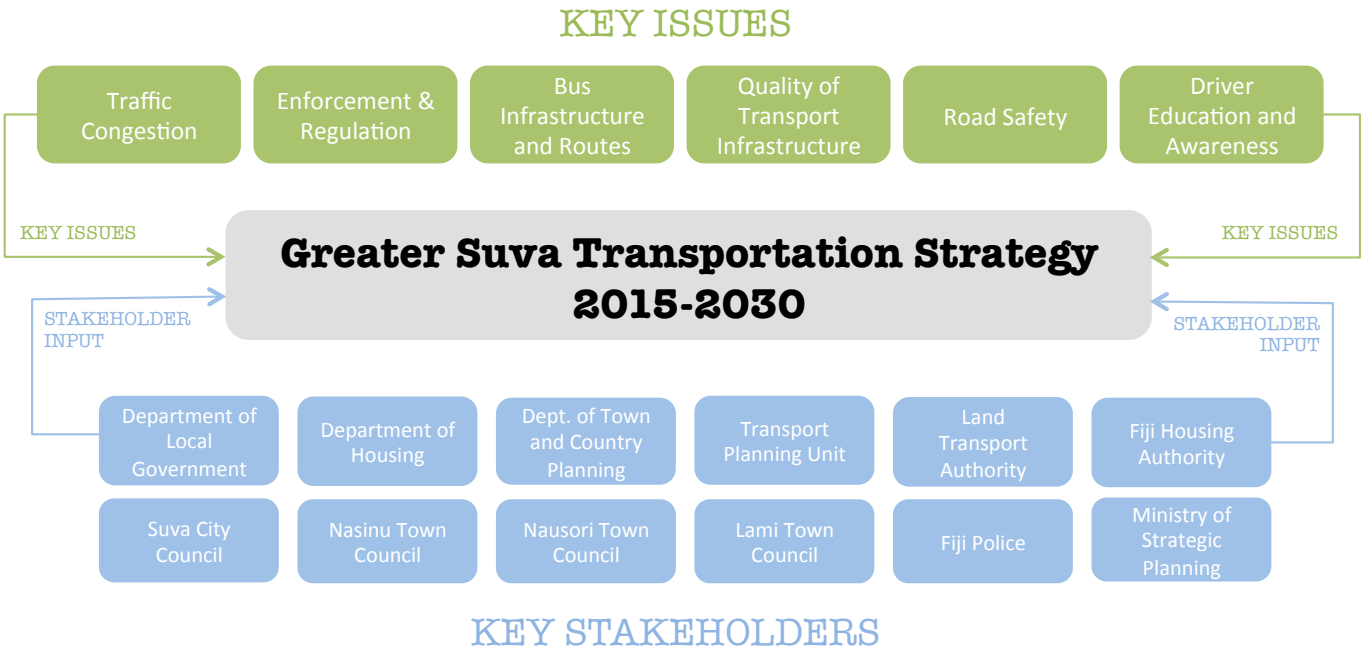
- Liveability as an urban centre
- Economic prosperity
- Social inclusion
- Environmental sustainability

Land use projections suggest that the GSA could grow from a current population of 280,000 to around 350,000 by 2030. Areas on the periphery of the GSA, such as west of Lami and beyond Nausori Town, could lead to an expansion of the definition of the GSA and increase this growth even further. With this in mind the existing traffic congestion and road safety issues faced by the GSA will intensify unless decisive action is taken to implement the recommendations of the transport strategy.

The Greater Suva Transportation Strategy (GSTS, the Strategy) is a transport blueprint for the GSA over the next 15 years. It replaces the 2001 Strategy and has been prepared over six months with extensive input from a wide range of Stakeholders and the Fiji Roads Authority.

Identification of Issues

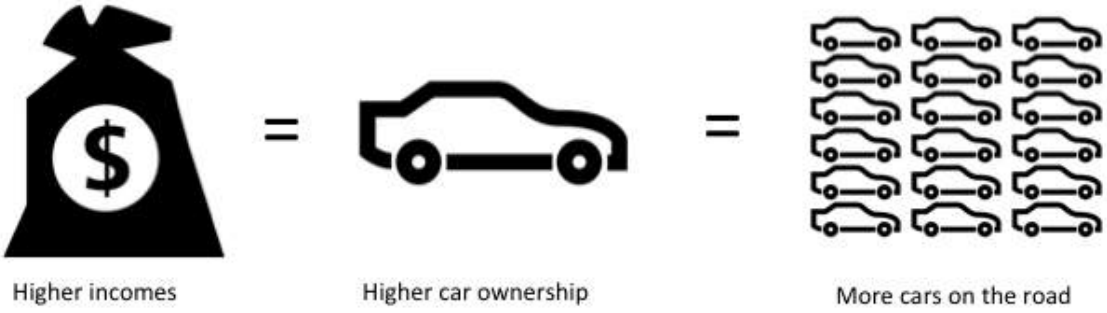
In summary, the GSTS addresses six key issues, as identified by the following key Stakeholders:



Modelling undertaken specifically for this study revealed that between 2014 and 2030, peak hour traffic on Kings Road is predicted to increase by 22% and travel times by 25%. This is based on the conservative assumption that buses retain their role as the main mode of transport in the GSA.

Many nations similar to Fiji have found that with increasing prosperity and population that car ownership per household increases, which in turn impacts upon traffic congestion and road safety. This is illustrated in the following graphics:

If Fiji follows other developing countries



Similarly for the Greater Suva Area

Developing Solutions

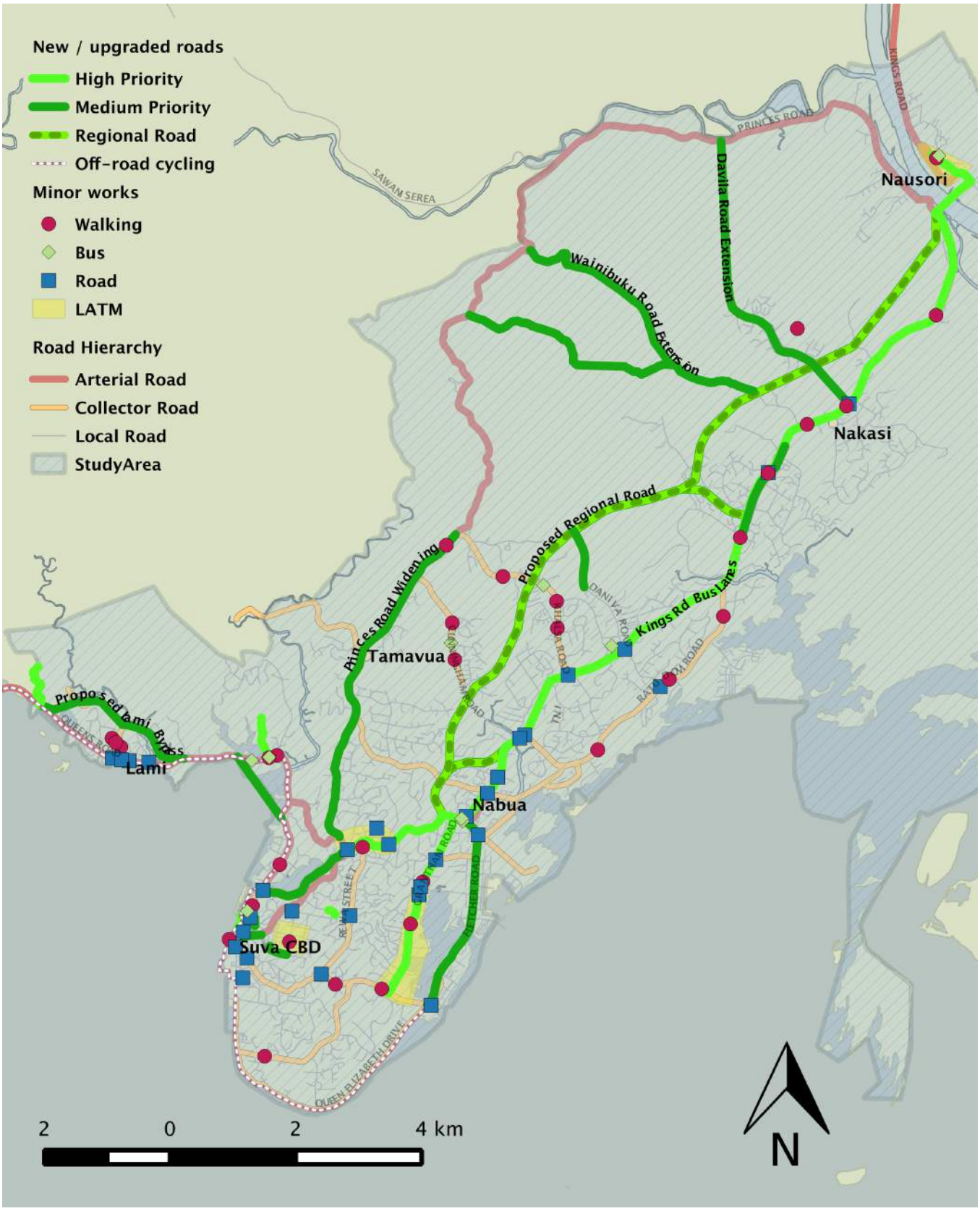
To tackle the issues with the transport network, a list of 137 priority projects was identified. These projects were shared with Stakeholders, tested through a variety of technical assessments and put through an evaluation framework to refine and prioritise them. The projects represent $1 billion (FJD) of investment over the next 15-years, spread across the study area and shared amongst a variety of Stakeholders. Seven key programs (collection of projects) identified in the study include:

1. **Dedicated Bus Lanes** – primarily Kings Road and Grantham Road, followed by investigations into other suitable roads. Depending on the results of a feasibility study, this could involve dedicating sections of road for use by bus only, including bus jump lanes at intersections to give buses priority over other vehicles. As the dominant means of carrying people around the GSA, giving priority to buses is a key focus of the strategy to enable more efficient use of the available road space.

2. **Improved Bus Terminals** – Suva and Nausori bus terminals need to be upgraded to cater for future growth in a safe and efficient manner. Work at these locations is underway, however further work is required to integrate the bus terminals with the surrounding transport network. Nasinu is lacking a bus terminal and establishing one will enable better management of bus routes and coordination with other modes.
3. **Linked Traffic Signals** – specifically in the Suva CBD and along the Suva-Nausori corridor. Linking traffic signals using a vehicle actuated system will improve the management of the available road capacity. Signalisation of existing intersections will enable them to be linked and therefore coordinated with surrounding signalised intersections.
4. **Improved Pedestrian Safety** – an analysis of crash data from the Fiji Police Force traffic division reveals that pedestrians are over-represented amongst crashes. Pedestrians must be protected through new pedestrian crossings, improved lighting and adequate footpaths.
5. **Enforcement** – a constant theme throughout engagement with Stakeholders was the lack of enforcement of road rules. Increasing enforcement will improve traffic flow, reduce fatalities and benefit health, wellbeing and the environment through lower carbon emissions.
6. **Intersection Upgrades** – 31 intersections have been identified for improvement over the short term, predominantly on road safety grounds.
7. **Planning** – further planning is required beyond this study to enable a more efficient bus network to be designed, future road capacity upgrades to be staged and budgeted and data collection programs implemented as a basis for future decision making

The priority options that relate to a specific location are summarised in the following graphic.

Priority Options (excluding regulatory and planning options)



Staging Plan and Action Plan

To facilitate the implementation of the Strategy a Staging Plan and an Action Plan were developed based on an evaluation of value-for-money of each option. This was the key output of the study and enables FRA and Stakeholders to incorporate the recommended actions into future planning.

The Staging Plan provides both FRA and Stakeholders with an outline of the order in which the recommended projects could be implemented. The plan is based on a transport framework that has sought to ensure that the projects included within the Staging and Action Plan have a direct correlation with key transport issues and the objectives of the study. The framework is underpinned by measures such as value-for-money and affordability and these values have been incorporated within the prioritisation and staging of the projects. Since this is a 15-year plan, the approach adopted has been to create a dynamic Staging Plan that can be readily reshaped as a result of fluctuating economic, environmental or political conditions.

The Action Plan provides further detail with respect to the recommended next steps for FRA and key Stakeholders. When actioned, the suite of projects will redefine the GSA and create an integrated and sustainable transport system that contributes to an inclusive, prosperous and environmentally responsible urbanised area.

Full details of the Staging Plan and Action Plan are contained in Section 7 of this report.

Successful Implementation of the Strategy

To ensure that the 2014 Greater Suva Transportation Strategy is successfully implemented the following steps are crucial:

ENGAGE *– with Stakeholders and the community*

ALIGN *– budgets with the Strategy*

MONITOR *– and evaluate implementation*

ADAPT *– to changes in the environment*

To ensure that these steps are followed and the Strategy is successfully implemented it is strongly recommended that the Steering Committee for this project (with the addition of the Fiji Police Force, the four relevant Councils and the Ministry of Strategic Planning, National Development and Statistics) continue to meet every six months to monitor and review the progress of the study. This will also enable the Strategy to be regularly reviewed in light of changes in the external environment (economic, political, social, environmental) to confirm the strategic relevance of all options, re-prioritise where appropriate and facilitate information sharing between the FRA and Stakeholders.

Definitions

ADB – Asian Development Bank
AFL – Airports Fiji Limited
CBD – Central Business District
CDIA – Cities Development Initiatives for Asia
CWM – Colonial War Memorial (Hospital)
DLG – Department of Local Government
DOH – Department of Health
DOS – Degrees of Saturation
DTCP – Department of Town and Country Planning
FBOA – Fiji Bus Operators Association
FBOS – Fiji Bureau of Statistics
FJD – Fiji Dollars
FNU – Fiji National University
FRA – Fiji Roads Authority
FRUP – Fiji Roads Upgrade Program
GSA – Greater Suva Area
GSTS – Greater Suva Transportation Strategy
HA – Housing Authority
LATM – Local Areas Traffic Management
LTA – Land Transport Authority
LTC – Lami Town Council
MOT – Ministry of Tourism
NASRUP – Nadi and Suva Road Upgrading Project
NTC – Nausori Town Council
NTC – Nasinu Town Council
NZ – New Zealand
OD – Origin-Destination
OSM – Open Street Map
PSV – Public Service Vehicle
PRIF – Pacific Region Infrastructure Facility
RSYC – Royal Suva Yacht Club
SC – Shopping Centre
SCATS – Sydney Coordinated Adaptive Traffic System
SCC – Suva City Council
SOPAC – Secretariat of the Pacific Community - Applied Geoscience and Technology Division
SFA – Strategic Focus Area
TBC – To Be Confirmed
TIA – Transport Integration Act
TLTB – iTaukei Land Trust Board
TPU – Transport Planning Unit
USP - University of the South Pacific

Table of Contents

1 Introduction

1.1 Shaping the Future of the Greater Suva Area

The Greater Suva Area (GSA) has historically been shaped by short-term decision making that has impacted on the transportation network. By taking a step back and preparing a long-term, strategic vision, the boundaries will be set to enable the GSA to become:

- A highly liveable urban centre
- Economically prosperous
- Socially inclusive
- Environmentally friendly

The GSA is expected to continue to grow and develop and a long-term plan is therefore required to manage the change in land use and resultant changes in transport demands and patterns. That long-term plan is the Greater Suva Transportation Strategy (GSTS, the Strategy), which this document outlines. The GSTS will enable the GSA to obtain the largest benefit from future opportunities, which are supported by the transport network whether they be social, economic or environmental benefits.

The GSTS has a large focus on integration to ensure that relevant decision makers are involved in transport decisions both now and into the future.

1.2 Objectives

Following stakeholder engagement, the objectives of the study were defined as follows:

A. Develop an integrated multi-modal strategy for freight, public transport, general traffic, walking, and cycling
B. Recommend infrastructure and operations for the metropolitan road network (including road safety)
C. Recommend infrastructure and traffic management operations for the Suva CBD and inner city areas, including on-street parking
D. Investigate the public transport network and on-street infrastructure to support it
E. Investigate walking and cycling networks and on and off-street infrastructure to support it
F. Identify a staging plan for implementation

The key issues that were identified by Stakeholders are relatively consistent across all modes of transport. The six key issues with the GSA transportation network are as follows:

Key Transport Issues in Greater Suva:

- Traffic congestion, particularly during peak periods
- Bus infrastructure and routes
- Quality and lack of infrastructure to support safe and efficient travel
- Road safety (including pedestrians, signage, road markings and lighting)
- Enforcement and regulation
- Driver education and awareness

The above issues are clearly visible as transport users travel across the transport system. Without significant upgrades to the transportation network, the expected population growth and economic development will further exacerbate the existing issues across the transport network. Decisive action is required to directly address the above issues.

1.3 Study Exclusions

The study brief, prepared by the Fiji Roads Authority (FRA), specified that road maintenance, institution and policy initiatives were not to be reviewed as part of this study. As listed above, enforcement and regulation was one of the top six issues. Given the importance of this issue and its influence on the operation of the transport network, the Strategy does contain suggestions on where improvements can be made from an enforcement and regulatory perspective. FRA cannot implement these alone, instead Stakeholders such as the Land Transport Authority (LTA), Department of Local Government and the Fiji Police Force must jointly consider an integrated approach.

1.4 Strategy Context

Five documents acted as the primary references when considering the GSA in a strategic context:

- '*Constitution of The Republic of Fiji'*, Fiji Government, 2013
- '*Roadmap for Democracy and Sustainable Socio-Economic Development 2010-2014'*, Ministry of Strategic Planning, National Development and Statistics, 2010
- *'A Green Growth Framework for Fiji: Restoring the Balance in Development that is Sustainable for Our Future*', Ministry of Strategic Planning, National Development and Statistics, 2014
- '*Transportation Study of the Greater Suva Urban Area'*. Prepared by GHD for the Ministry of Works and Energy, 2001
- *'Fiji National Transport Sector Plan'* 1993 and a Policy Review and Update in 2004[1].These documents were prepared by Beca International Consultants for the Fiji Government.

The GSTS supersedes the 2001 Greater Suva Strategy and it should be considered alongside the updated Fiji National Transport Sector Plan that is due for completion at the end of 2014[2]. It is expected that the updated Fiji National Transport Sector Plan will deal with the overarching issues of policy and regulation.

[1] *A 2009 update was drafted but never published*

[2] *This is being prepared by the Ministry of Works, Transport and Public Utilities*

1.5 Stakeholder Engagement

Stakeholder engagement was conducted in a variety of ways throughout the study as outlined in the following sections.

1.5.1 Steering Committee

A project Steering Committee was formed to guide the study and to endorse the findings. The members of the Steering Committee were:

- Fiji Roads Authority
- Land Transport Authority
- Department of Town and Country Planning
- Department of Local Government
- Department of Housing
- Housing Authority of Fiji
- Transport Planning Unit

1.5.2 Stakeholder Workshops

To help generate and test ideas, workshops were arranged with invited Stakeholders. The first workshop was held on the 5th of February 2014 and was attended by over 70 people, invitees included ministerial departments, local councils, bus operators, taxi groups, cycling groups, private companies, universities, disabled access groups and the local media. A full list of attendees is provided in Appendix B.

A second Stakeholders workshop was held on the 17th of March 2014 with a smaller number of people in order to facilitate more focused discussions with Stakeholders that have the skills to assess the feasibility of proposed options. The following agencies attended:

- Fiji Roads Authority
- Land Transport Authority
- Transport Planning Unit
- Housing Authority of Fiji
- Department of Local Government
- Department of Town and Country Planning
- Nasinu Town Council
- Nausori Town Council
- Fiji Police Force
- Suva City Council
- Department of Housing

A third Stakeholders workshop was held on the 17th of July 2014 with a small group of Stakeholders to present the strategy and seek their endorsement. The following agencies attended:

- Fiji Roads Authority
- Land Transport Authority
- Transport Planning Unit
- Ministry of Strategic Planning, National Development and Statistics
- Nasinu Town Council
- Nausori Town Council
- Suva City Council

1.5.3 One-on-one discussions

Where detailed information such as strategic plans, transport data, proposed project plans or project updates were required, the study team liaised with Stakeholders on an individual basis. The input from the following agencies and organisations is greatly appreciated:

- Airports Fiji Limited
- Asian Development Bank
- Cycling Fiji
- Department of Housing
- Department of Town and Country Planning
- Fiji Bureau of Statistics
- Fiji National Provident Fund
- Fiji Police Force (Traffic Control)
- Fiji Ports Authority
- Fiji Roads Authority
- Housing Authority of Fiji
- iTaukei Land Trust Board
- Lami Town Council
- Land Transport Authority
- Ministry of Education
- Ministry of Strategic Planning, National Development and Statistics
- MWH Global
- Nasinu Town Council
- Nausori Town Council
- Shore Buses Limited
- Suva City Council
- Tebera Bus Transport Limited
- Transport Planning Unit

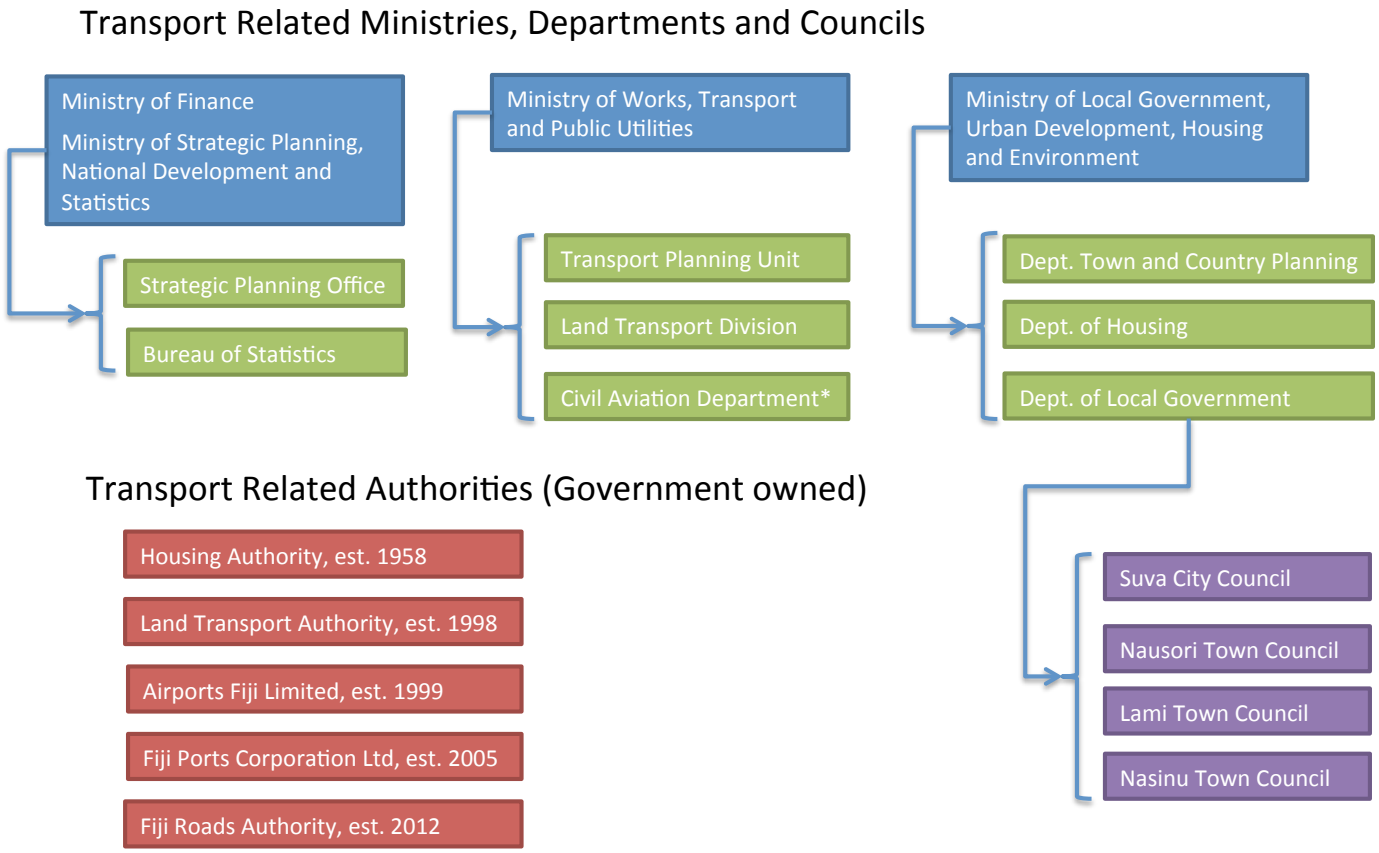
2 Setting the Scene

2.1 Governance

In January 2012 the Fiji Government passed a Decree constituting, the 'Fiji Roads Authority'. FRA is a corporate body that is governed by a Board appointed by the Prime Minister. Effective control of the road network throughout Greater Suva passed to the Fiji Roads Authority in 2012. FRA is responsible for all roads and bridges that were formerly managed by both the former Department of National Roads (DNR) and the Municipal Councils. FRA will progressively assume responsibility for all of the other (country) roads that are used for public transport. It is also responsible for all of the public jetties in Fiji.

In addition to FRA there are a number of other government organisations relevant to the implementation and development of a Transportation Strategy. The key organisations are shown in Figure 1, the five bodies shown in red (lower left hand corner) sit outside of the ministries and were setup primarily to improve financial management and operational efficiency. The bodies typically have a reporting line directly to the Prime Minister's or Attorney General's Office. The Fiji Police Force also plays a vital role in enforcing many of the road rules.

Figure 1: Relevant government bodies for a transportation strategy



* Civil Aviation also falls under the Attorney Generals' portfolio

2.2 Fiji Transport Overview

In 2014 Fiji had an estimated population close to 900,000 people, with almost one in every three persons (280,000) living in the Greater Suva Area[3]. There are more than 11,000 kilometers of roads and 936 bridges that are managed in three geographic divisions across the whole of Fiji. Slightly less than 1,500 kilometers of these roads are sealed and there is a significant proportion that are cane or rural roads of a minimal (sometimes very minimal) standard[4].

The majority (approximately 80%) of the sealed roads in Fiji are on the main island of Viti Levu where the capital city Suva is situated. Two key roads connect to circumnavigate Viti Levu, Queens Road runs along the southern and western edges of the island between Lautoka and Suva, and Kings Road runs along the northern and eastern edges. Due to mountainous terrain there are a limited number of roads travelling through the interior of the island (see Figure 2) and there is minimal redundancy for key routes. There are 33 sets of traffic lights across all of Fiji, 15 have been connected to a SCATS system, all of which are in the GSA, but none of these are currently actuated[5] signals.

Looking south-west towards the Nausori market, May 2014

Due to its location Fiji has become a major hub for shipping services between North America, Australia and New Zealand. In addition, Fiji acts as a distribution center for regional South Pacific countries. Fiji has two natural harbours at Suva and Lautoka, with the Port of Suva being Fiji's largest and busiest. In addition to container, fishing and inter-island vessels, 48 cruise ships were scheduled to stop at Suva in 2014[6]. These have a significant impact on the land transport network as thousands of tourists disembark for the day. The majority of Fiji's sea freight is delivered to Kings Wharf in Suva where it is then disbursed across Viti Levu by land transport.

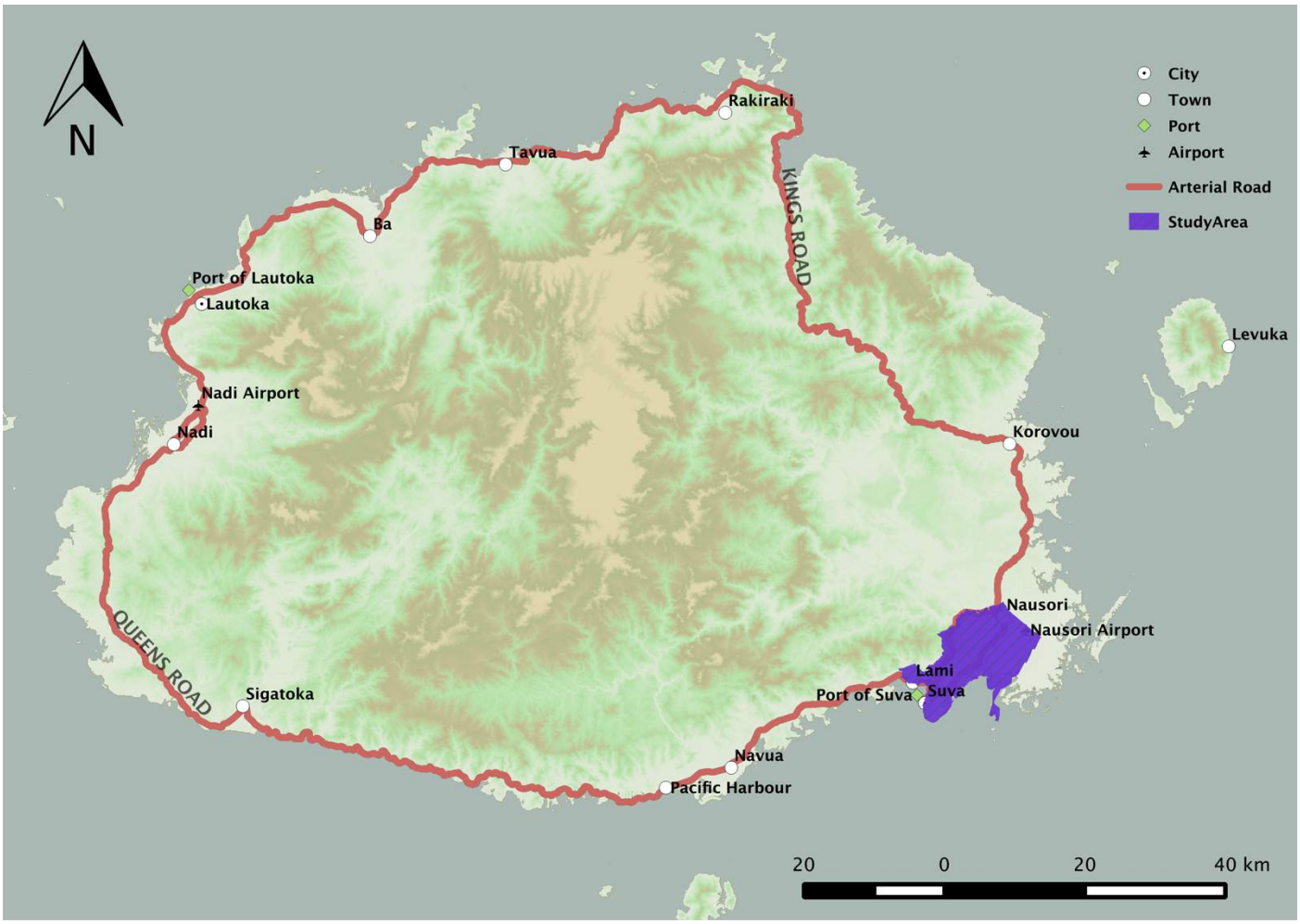
[3] *This includes Lami , Suva, Nasinu and Nausori urban and peri-urban areas. Population estimates based on FBOS Census growth rates from 1996 to 2007*

[4] *FRA Corporate Plan 2013*

[5] *An intersection that has the ability to detect vehicles, through indication loops for example, is said to be actuated*

[6] *Fiji Ports Corporation Limited Cruise Schedule January-February 2014, accessed 23 June 2014*

Figure 2: Topography, key roads and ports on Viti Levu, Fiji



Fiji's two international airports are located on Viti Levu, the busiest airport is located on the west coast in Nadi and caters mainly for tourism. A smaller airport with limited international flights is located in Nausori, 23kms north-east of the Suva CBD. In 2011 Nausori Airport handled 31,855 international passengers (2% of Fiji's international passengers) and 187,928 domestic passengers[7]. There is minimal airfreight handled at Nausori as there are no cargo storage facilities at the terminal and aircraft weight is limited by the length of the runway. Fiji Airways commenced a direct Sydney – Nausori flight in May 2014 using a Boeing 737-700, this is the first stage in attracting more direct international flights to the airport. Future plans include a new terminal and extension of the runway to enable larger aircraft to takeoff and land at full capacity. These plans however still require approval from the Airports Fiji Limited (AFL) board and government approval and are not guaranteed[8].

The only rail lines in Fiji are for the transportation of sugar cane, this is a relatively extensive network with an estimated 590km of line still in operation[9]. However it uses an extremely narrow gauge (610mm) and would need to be updated before being suitable for long distance passenger travel.

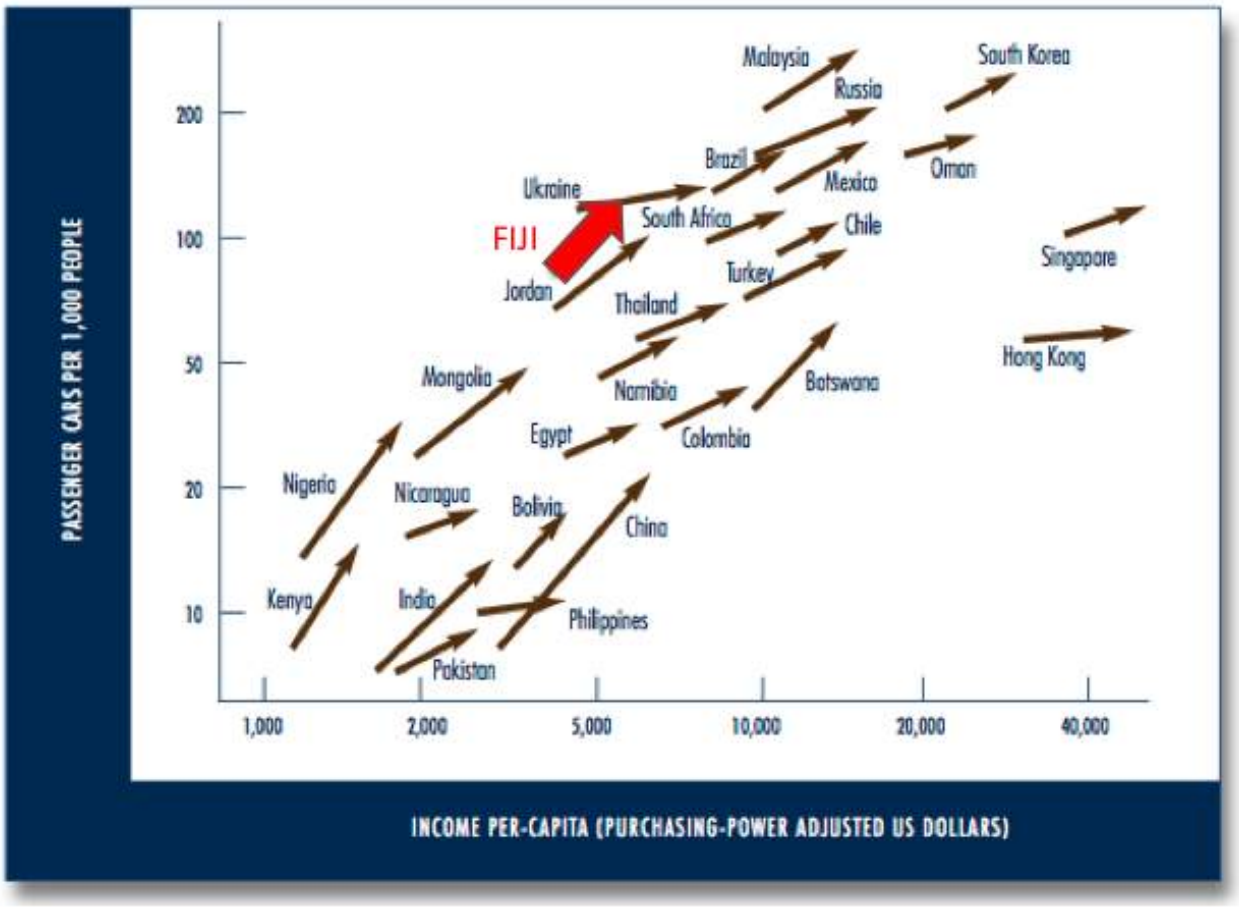
[7] *Airport Fiji Limited, Annual Report 2011*

[8] *Based on discussions with AFL*

[9] *http://basementgeographer.com/sugarcane-railways/*

Therefore the vast majority of travel within Fiji's islands, in particular Viti Levu, is made using road based transport modes. The most popular being bus, taxi and private vehicle. According to the LTA, the number of vehicle registrations in Fiji has increased by 43% in the period 2002 to 2012, with a total of 176,600 vehicles registered in 2012 and over 5,000 new vehicles being registered each year[10]. This is a considerably faster rate of growth than has been experienced by population, in 1975 there was one vehicle registered for every 20 people, by 2000 it was one vehicle for every seven people now there is one vehicle for every five people. This trend is consistent across other developing nations around the world with vehicle ownership increasing as the nations develop and prosper over time. As shown in Figure 3, Fiji already has a comparatively high vehicle ownership for countries with a similar income per capita. To avoid growth in vehicle ownership it typically requires extreme regulation such as that found in Singapore.

Figure 3: Income per capita compared to the number of private vehicles



SOURCE: Rising Automobile Dependency, Sustainable Urban Transport Technical Document #8, German Federal Government (GIZ)

As well as an increase in vehicle registrations, population trends suggest an increased urbanisation of Fiji. Between the last two census years (1997 and 2007), the total population of Fiji increased by 52,000. There was a net reduction in those living in rural areas of 10,000 people and an increase of 62,000 people of those residing in urban areas. The Greater Suva Area accounted for more than half of this urban growth, the remainder occurred mostly in Nadi and Lautoka.

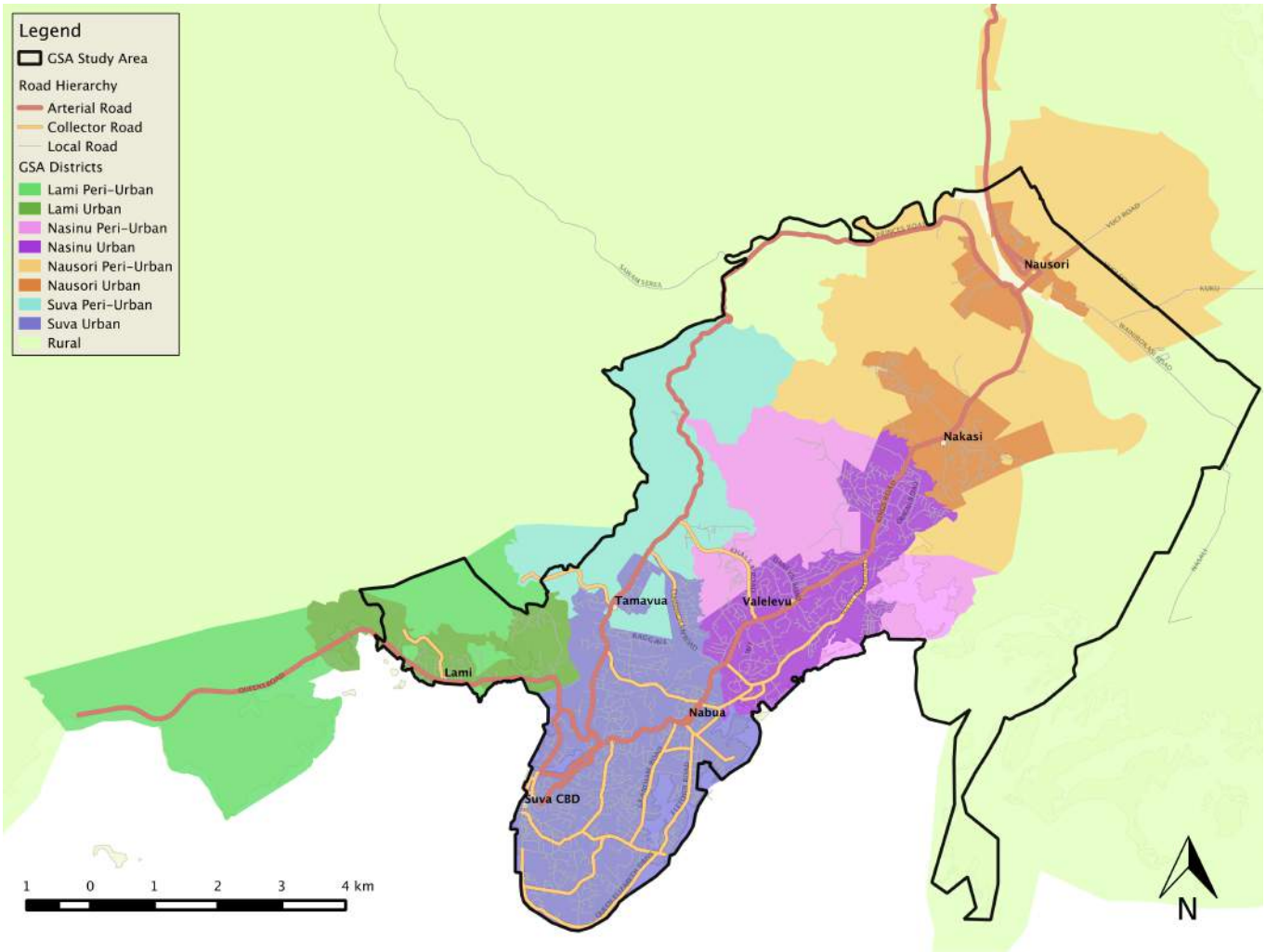
[10] *Fiji Bureau of Statistics*

2.3 Study Area Overview

2.3.1 Location

The project study area is the GSA, situated on the south-east coast of Viti Levu, Fiji's largest island. It consists of all the urban and peri-urban areas contained within the Lami Town Council, Suva City Council, Nasinu Town Council and Nausori Town Council. Geographically, the study area extends west to Lami Town and its peri-urban area, north to the Waimanu River, and north-east to the Rewa River (but including Nausori Town, the corridor to Nausori Airport and the immediate surrounds). The study area is shown in Figure 4 and comprises a mix of freehold, crown and native land.

Figure 4: Greater Suva study area



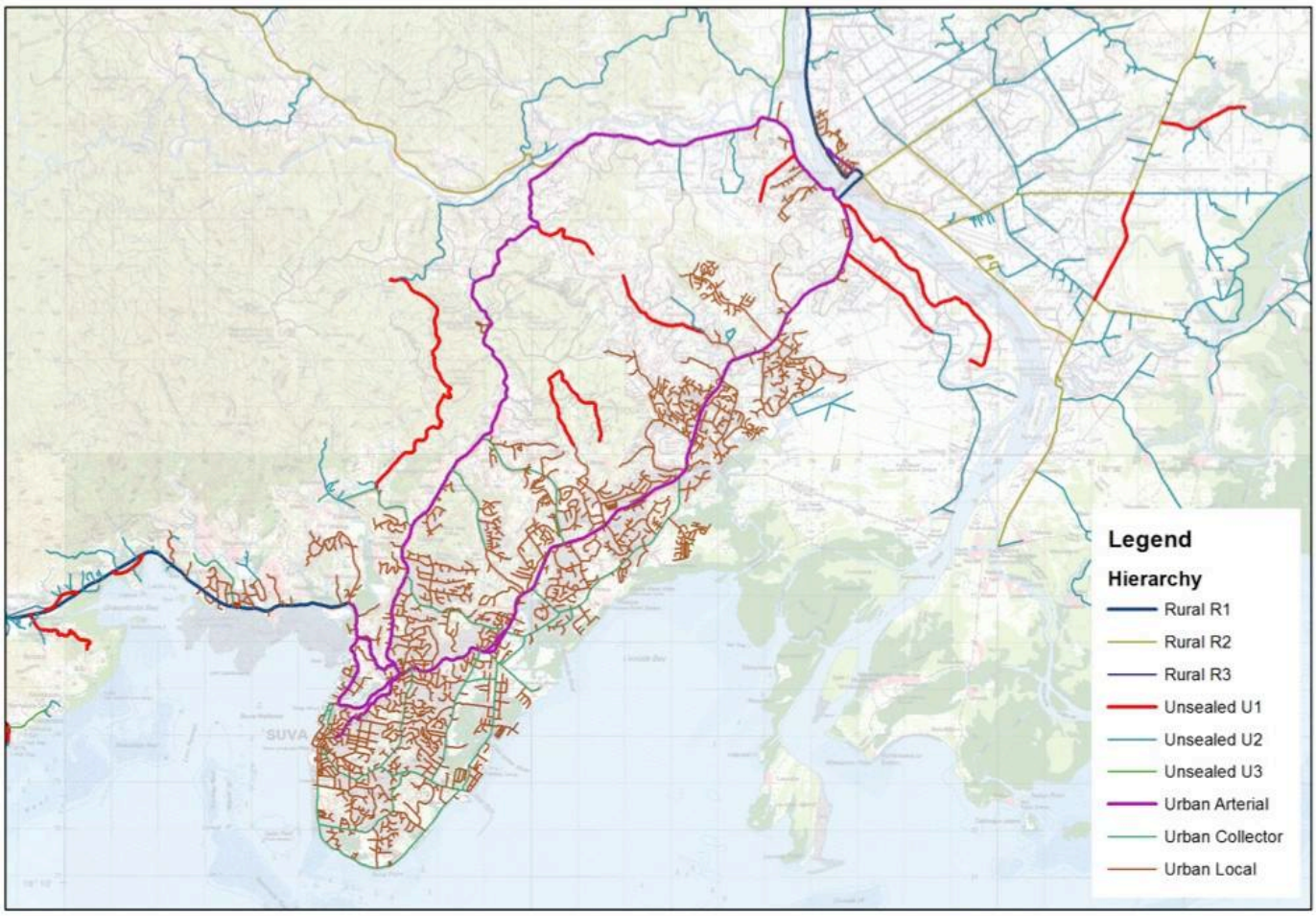
Suva City is situated on a peninsula and the region is characterised by hilly and undulating terrain. This, combined with many streams and rivers, creates natural barriers to urban development and transportation network.

2.3.2 Road network

Generally, beyond the major roadways there is no distinction between major and minor local roads. This lack of a defined road hierarchy has resulted in a more organic development of intersection priority and traffic patterns across the local road network. The major road network is shown in Figure 5. The road network is restricted by the topography and presence of waterways that are located across the peninsula. The existing road network suffers from a lack of redundancy should the operation of a key link (such as Queens Road) be impacted upon. In many instances there are no alternate routes to key roads. Road access to the CBD is provided via three major road corridors:

- Kings Road - linking Suva to Nausori and the north coast of Viti Levu
- Queens Road – linking Suva to Lautoka via Lami, Pacific Harbour and Nadi
- Princes Road – via the Tamavua Ridge to the Waimanu River and Nausori

Figure 5: Road hierarchy plan (as being developed by FRA/MWH)



SOURCE: MWH Global

Of particular interest is the vital role that bridges play in connecting the road network. Bridges support large volumes of traffic across the network with key bridge links as follows:

- Kings Road, Nausori (crossing the Rewa River)
- Foster Road, Suva (Walu Bay)
- Various bridges, Suva CBD (Nabukalou Creek)
- Queens Road, Lami (various locations)

The transport network within the study area has suffered from a lack of investment over the past few decades and while the growth in vehicle numbers has continued, the road infrastructure to support those vehicles is aging and in need of repair and upgrade. This has been recognised by the Fiji Government and FRA has taken a proactive approach to address this need

2.3.3 Urban Development

A large amount of urban development is concentrated along both sides of Kings Road in Nasinu and Nausori. This is a key transport corridor that connects the Port of Suva and the Suva CBD to the population centers to the north and the Nausori International Airport. A considerable amount of land development is planned along Kings Road and to the west of Lami as outlined in Section 2.4.

The GSA is Fiji's largest urban center and Suva is the national capital and seat of Government. The GSA has grown significantly over the past twenty years and has emerged as an important economic, commercial and service center for Fiji and the South Pacific Region. With an estimated population of 280,000 in 2014, the GSA accounts for 31% of Fiji's population, and 59% of its urban population. Settlements within the urban areas typically consist of:

- Urban villages
- Informal and squatter settlements
- Private and Housing Authority residential subdivisions
- High-density housing estates

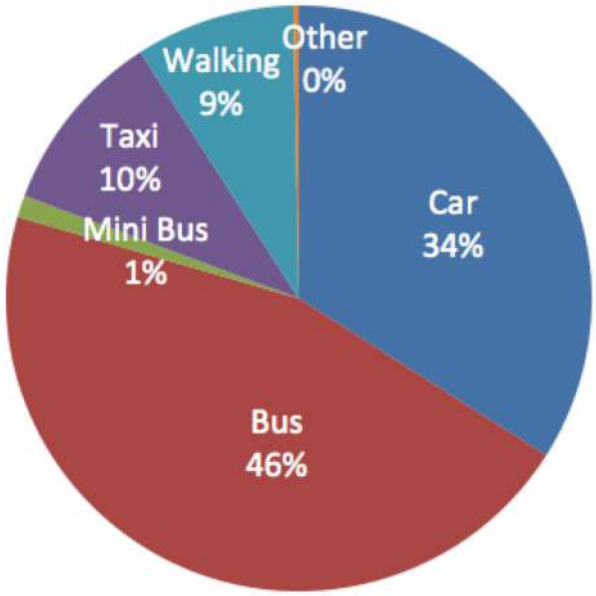
Significant growth is occurring in informal settlements, with an estimated 17% of the GSA's population residing within informal settlements in 2011[11]. Informal settlements tend to have high levels of poverty and associated poor living standards. The demand for urban services in these areas is high, however without legal land tenure and the collection of rates, it is difficult for government to fund the provision of these services.

[11] *Draft Prefeasibility Study for GSA Sustainable Urban Transport Project – Volume 1, May 2012 CDIA Consultant's Report*

2.3.4 Mode Shares

The latest available survey of mode shares was conducted in 2001[12] (see Figure 6). It highlights the reliance on public service vehicles (bus, taxi and mini-bus) as they accounted for 57% of all trips. More recent classified counts[13] around the GSA support these numbers. For example, Fiji's busiest intersection[14] is where Waimanu Road, Princes Road, Ratu Mara Road and Edinburgh Road meet, it handles 5,600 buses and 61,700 cars, taxis and trucks during the period 6am till 6pm. Due to the high occupancy of buses and low occupancy of private vehicles this means buses are carrying around 60% of the people on the road per day. This is consistent with other intersections around the GSA, particularly along the Suva-Nausori corridor. Additional surveys conducted in 2014 in the Suva CBD support this trend, although the number of taxis is almost as high as private vehicles. The majority of these are empty taxis looking for passengers and adding to traffic congestion.

Figure 6: 2001 GSA Modes Shares (all journeys)



2.3.5 Public Transport

Public transport within the study area is provided by bus, mini-bus and taxi. Buses in particular are an integral part of transporting Fijian's in and around the study area. Suva has an affordable, reliable and frequent system that is well utilised.

The buses in service vary widely in terms of length of route, vehicle type and age. Many of the buses in operation are older style vehicles, which produce significant emissions, are noisy, are outdated and in disrepair and do not cater for mobility impaired users. In 2009, 30% of the bus fleet was over 20 years in age[15].

There are several main bus interchanges within the study area. The Suva bus stand is the largest of these, it experiences congestion and a severe lack of capacity along with a host of other operational issues on most days. Similar issues are experienced at other key bus stations such as Nausori. Road side facilities are typically basic and on busy routes the area available for boarding and alighting activities is insufficient. The lack of road space for key bus stops results in stops over queuing, which impacts significantly on the operation of the road network for other road users.

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[12] *Transportation Study of the Greater Suva Urban Area, 2001*

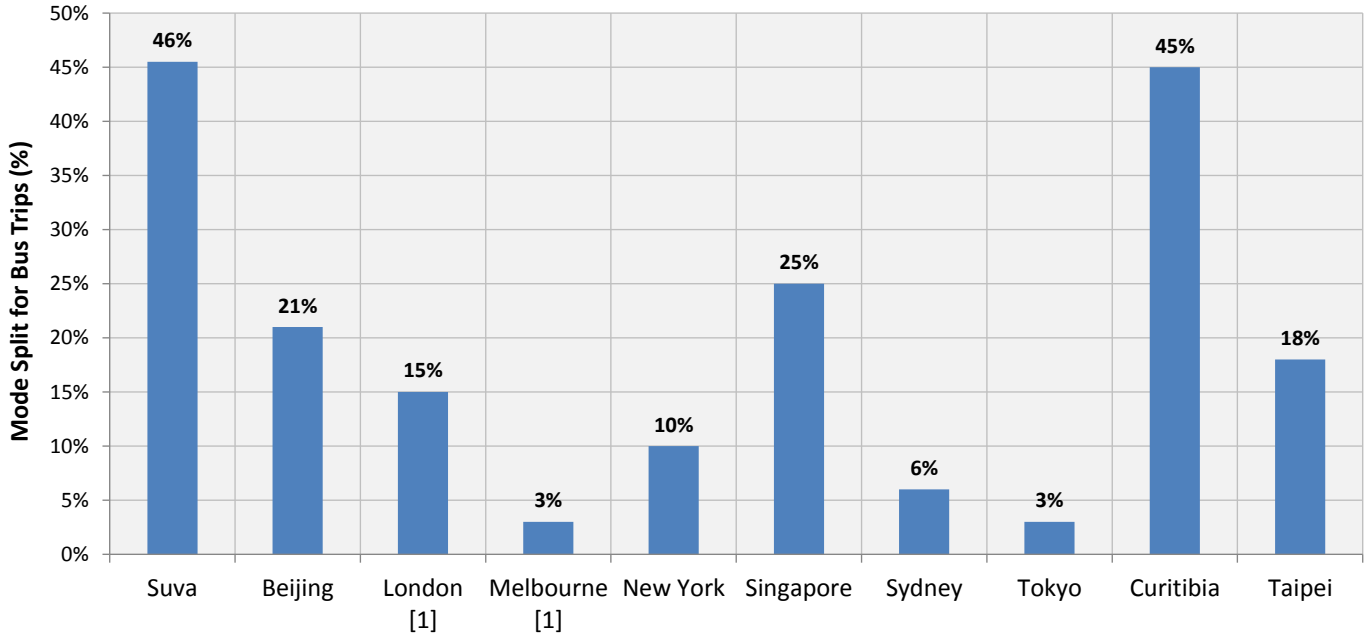
[13] *Department of National Roads, 2009 (traffic volumes represent traffic volumes from 6am till 6pm on November 11, 2009)*

[14] *This is closely followed by the Walu Bay Roundabout (7,000 buses, 59,000 other vehicles) and the Mead Road Roundabout (3,800 buses, 61,600 other vehicles)*

[15] *Fiji Bus Industry Review (Orion Consulting Associates, October 2009)*

Figure 7 shows that Suva has a high mode share for buses when compared to other metropolitan areas around the world. It is noted that many of the cities shown also rely on rail and other modes (such as light rail) for public transport journeys. In any event, the high usage of buses across the study area is significant and indicates an engrained culture of public transport usage. Moreover, this mode share figure has been achieved with a public transport network that is largely unplanned and uncoordinated. New services are added to the network by operators where a commercial opportunity exists, rather than as a result of network planning or the need to improve the bus network coverage. At bus interchanges and at bus stops very little formalised information exists with respect to bus routes and timetabling. As a result of the lack of public transport network planning, bus routes are concentrated along key arterial routes with a significant volume of these services using Kings Road for travel between the Suva CBD bus station and other locations along the Suva to Nausori corridor.

Figure 7: Comparative bus mode share by city



[1] Includes bus and tram. Sources: Suva data sourced from - Transportation Study of the Greater Suva Urban Area (GHD, 2001), Data for all the other cities obtained from the Land Transport Authority of Singapore, Journeys publication, November Issue 2011.

As is the case in many island nations, numerous minibus operators provide services which operate throughout the study area. Minibuses (also known as mini-vans) carry in the order of 8 to 15 people. The use of minibuses is increasing and taking patronage away from bus operators. Legal minibuses are licensed by the LTA to operate on specific long-distance routes across the study area. Minibus operators generally join together to form minibus associations that manage vehicles across specific routes to provide a continuous level of service for passengers. Associations will operate both legal (yellow number plates) and illegal minibuses (white number plates). A passenger will typically decide to travel on a minibus during peak times and on routes with a high level of demand as this mode provides a shorter travel time with a shorter wait for the next service. Fares are regulated to be slightly higher than bus fares, however fares are varied regularly to match with the temporal nature of travel demand.

An estimated taxi fleet of 7,000 registered vehicles operates across the GSA. Taxis operate out of base stations and have drive within defined areas for the bulk of their trips. The standard flagfall is $1.50 in

addition to a per distance charge of $0.10 per 100m.

2.3.6 Car Parking

Car parking within each town centre consists of both metered roadside parking ($0.80 per hour, typically not time restricted) and off-street parking facilities that are operated either by Council or private car park operators. Other on-street parking (i.e. free parking) does not exist within the Suva CBD. Outside of the Suva CBD, free parking can generally be found at retail and commercial centres or along roads outside the town centres.

Car parking utilisation surveys in the Suva CBD (13 February 2014) indicate that there are around 628 officially recognised on-street spaces controlled by parking meters with an average occupancy of 80% during the day. Variation occurs between streets from 30% to 100% occupancy. Of the 29 streets controlled by car parking meters, 13 of them (45%) had occupancies of 85% or greater.

Eight major public off-street car parks exist within the Suva CBD. A summary of these car parks and the associated occupancy of these spaces is summarised in Table 1. The majority of areas have occupancy of around 60–70%. While the occupancy of the majority of areas would indicate available car parking, it is noted that the overall supply in a number of car parks is relatively low, resulting in limited car parking spaces remaining vacant. Some notable exceptions include the Suva City Council Foreshore Car Park and the Central Street Car Park which have an occupancy close to 90%, on the other hand the Stewart Street Car Park has an occupancy of only 34%.

Table 1: Off-street public car parking supply and demand

Location	No. of Spaces	Spaces Occupied* (Occupancy)	Parking Charge (per hour)
Suva City Council Foreshore Car Park	145	124 (86%)	$ 1.50
Grey Street / Ellery Street Car Park	86	54 (63%)	$ 2.00
Raojibhai Patel Street Car Park	21	14 (67%)	Free
Central Street Car Park	59	53 (90%)	$ 1.00
Stewart Street Car Park	32	11 (34%)	$ 1.50
Market Car Park	29	20 (69%)	
Civic Car Park	289	204 (71%)	$ 1.00 ($52.30 p/month)
Civic Tower	78	41 (53%)	Reserve Parking Only
Total	**739**	**521 (70.5%)**	

* Time of observation varied between 1:45pm and 5:45pm

2.3.7 Walking and Cycling

The current pedestrian facilities in the Greater Suva Area are limited to some major roads and do not offer a suitable level of service to support walking as a safe mode of travel. As a result, pedestrians often walk on the edge of the road which increases their exposure to being struck by vehicles.

There are currently no provisions for cycling, and bicycles on Fiji roads are a rare sight. People mainly cycle as a recreational activity but occasionally commute within the urban areas.

2.4 Land Use

The population of the Greater Suva Area has grown by over 100,000 people over the last 30 years as shown in Table 2. Using data compiled from the Fiji Housing Authority, Department of Town and Country Planning and the iTaukei Land Transport Board, the study team has projected what the GSA could look like in 2030. The anticipated increase in population from 2014 is some 65,000 people, predominantly in Nasinu and Nausori with rural or mangrove areas being redeveloped for residential use as shown in Figure 8. In Suva and Lami, population density will increase through squatter upgrades and the reclamation of mangroves.

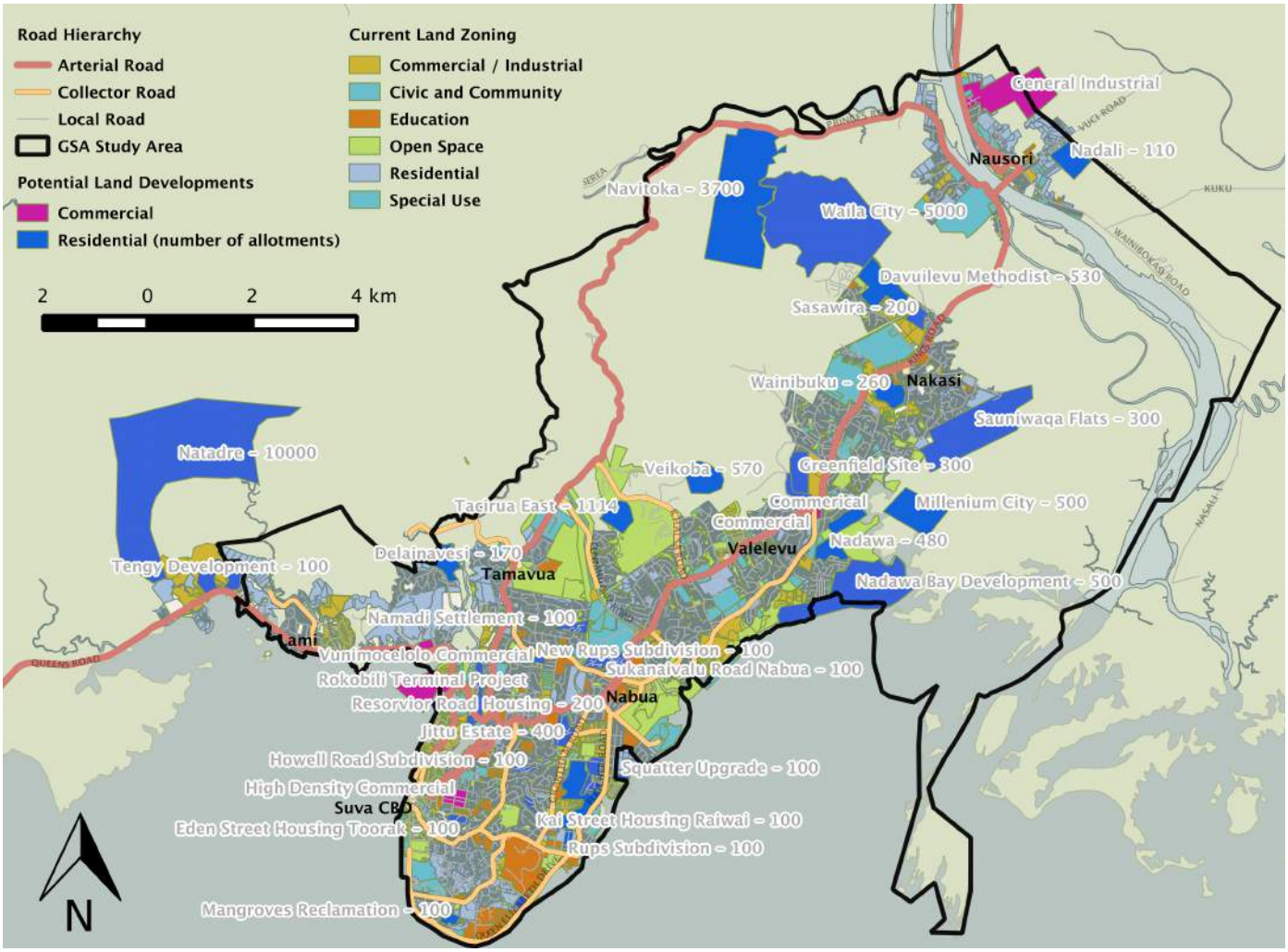
Not included in these figures are areas on the periphery of the GSA which could by 2030 be incorporated into one of the existing GSA Municipal Councils. Potential redevelopment sites are concentrated to the northeast of the GSA (stimulated by expansion of the Nausori International Airport) and also to the west of Lami, in particular the Natadre site earmarked by the Department of Lands which has the potential to house the entire population of Lautoka. These growth regions are largely consistent with those reported in the Urban Growth Management Plan (UGMAP) for the Greater Suva Region, the most recent urban development planning document for the GSA, published in 2004.

Table 2: GSA population (1986 – 2030)

Area	1986	1996	2007	2014 (e)	2030 (p)
Suva City	74,520	77,366	75,225	76,000	88,000
Suva Peri-Urban	65,890	90,609	10,953	11,000	11,500
Nasinu Town			75,719	95,000	99,000
Nasinu Peri-Urban			11,051	14,000	29,000
Nausori Town	5,242	5,744	24,630	33,000	38,500
Nausori Peri-Urban	9,093	15,873	22,181	30,000	56,000
Lami Town	9,330	10,556	10,474	11,000	12,500
Lami Peri-Urban	8,592	8,372	9,749	10,000	10,500
Total Study Area	**172,667**	**208,520**	**239,982**	**280,000**	**345,000**

Source: 2001 GHD Report and FBOS Census Tables, (p) study team prediction based on past growth rates

Figure 8: Greater Suva Area, expected growth areas (number of residential allotments listed on map)



The anticipated future population growth[16] is likely to have a significant impact on the transport network. The key impacts include:

- Additional traffic needing to use existing roads (increased congestion and road deterioration)
- Increased housing developments further from the Suva CBD employment precinct (increased journey time)
- A need for additional transport services and infrastructure to support new developments
- An increase in vehicle ownership per capita (lower vehicle occupancy)

[16] *As found in the 2001 study, no official population predictions are made by FBOS or other relevant authorities*

3 Transport Frameworks

3.1 Overview

To assist in the assessment of transport options that will follow, an overarching transport framework was first established to provide a fundamental basis for the development of the GSTS. A successful transport framework provides robust decision making guidelines, to ensure that transport investments and actions are directed to achieve broader social, economic and environmental aims.

3.2 The Adopted Transport Framework Model

After reviewing a variety of transport frameworks around the world the (Victorian) Transport Integration Act 2010 (the Act) was considered the best fit for the GSA since it offers a proven model with a sound policy framework and strong linkages between transport and land use planning. In particular:

- The objectives and principles guiding the Act are directly relevant to the objectives of the Greater Suva Transportation Strategy
- The Act's approach to include all relevant agencies under the Act is directly relevant to Fiji, where a number of agencies are responsible for transport and land use decision making.

The Act is the primary transport statute for the state of Victoria, Australia and this transport framework approach is considered to offer a number of benefits in the context of Greater Suva, including:

Benefits for Greater Suva:

- Can lead to significant changes to the way transport and land use authorities make decisions.
- The Act enshrines a triple bottom line (economic, social and environmental costs and benefits) approach to decision making about transport and land use matters.
- The Act requires that all transport agencies work together to achieve an integrated and sustainable transport system, and that land use agencies take account of transport issues in land use decisions.
- The Act is effective at changing the focus of organisations that traditionally only considered a single transport mode.
- The Act is consistent with and has regard for the six objectives of the study.

The Act provides a comprehensive policy framework that can be used to underpin the fundamental elements associated with the delivery of Greater Suva's transport solutions. The overarching vision for achieving this can be summarised in the following vision statement:

Vision:

The Greater Suva Area aspires to have an integrated and sustainable transport system that contributes to an inclusive, prosperous and environmentally responsible region.

The primary objectives that underpin the development of an integrated transport strategy are presented in Table 3.

Table 3: Transport integration act policy framework – transport system objectives[17]

Transport System Objectives	Methods	GSTS Application
Social and Economic Inclusion Development of a transport system through which social and economic opportunities are available to support individual and community wellbeing.	• Minimise barriers to make the transport system accessible to all people • Provide customised infrastructure, services and support to facilitate access by people with unique needs.	• Respond to user expectations • Provide infrastructure to support mobility impaired persons • Maintain affordability of public transport fares
Economic Prosperity An economically prosperous transport system contributes to the productivity of existing businesses and helps people to access a wide range of job opportunities.	Develop a transport system that: • Facilitates effective access for persons and goods to places of employment, markets and services. • Increases efficiency through improved timelines and reduced costs. • Fosters competition by enabling access to markets • Supports financial sustainability	• Encourage business clustering through effective land use planning • Keep transport costs affordable and improve journey times • Improve business access to markets
Environmental Sustainability Environmentally responsible decisions protect, conserve and improve the natural environment, improving living conditions for whole community. The transport system should actively contribute towards this.	• Protect, conserve and improve the natural environment • Reduce transport-related greenhouse gas emissions • Promote and invest in energy and transport technologies that have the least impact on the natural environment. • Prepare for and adapt to the challenges posed by climate change. • Reduce distances travelled to access people, places and goods	• Reduce vehicle emissions and encourage alternative fuel sources • Adopt measures to reduce congestion and improve transport efficiency • Invest in more energy efficient vehicle fleets • Increase the use of environmentally friendly transport (e.g. cycling, walking, electric vehicles)
Integration of Transport and Land Use Effective transport and land use integration facilitates access to social and economic opportunities.	• Improved accessibility and transport efficiency through reduced private vehicle trips, greater mobility within local communities and better access to residences, employment, markets, services and recreation.	• Policy initiatives to embed transport requirements in land use planning documents. • Improve access within established communities to promote localised trips. Can be achieved through better

[17] *Modified from the Transport Integration Act 2010 Policy Framework <http://www.transport.vic.gov.au/legislation/transport-integration-act/transport-integration-act-fact-sheets> accessed 12 February 2014.*

Transport System Objectives	Methods	GSTS Application
	• Align the transport system and land uses to be complementary and supportive: a) transport decisions are made having regard for the current and future impact on land use; b) transport infrastructure and services delivered rapidly to respond to changing land uses and associated transport demands	transport links and infrastructure and the provision of services to support transport operations. • Proactively deliver transport infrastructure and associated services to new growth areas and areas of intensified activity.
Efficiency, Coordination and Reliability The transport system should facilitate network-wide efficient, coordinated and reliable movements of persons and goods at all times.	• Balance network efficiency to optimise the network capacity and reduce journey times for all modes. • Ensure efficient use of resources (infrastructure, land, services and energy) • Facilitate seamless travel within and between different modes of transport • Provide predictable and reliable services and journey times.	• Develop measures to address congestion in order to improve journey times and route reliability. • Promote collaboration between government departments and responsible Authorities in order to share planning and resourcing to deliver coordinated outcomes.
Safety, Health and Wellbeing The transport system should be safe and designed to support health and wellbeing.	• Continually improve safety performance through the delivery of safe transport infrastructure and safe transport system user behaviour. • Avoid and minimise exposure to harm due to the transport system. • Promote transport modes energy sources that positively contribute to health and wellbeing.	• Upgrade roads and supporting transport infrastructure to meet current safety standards and guidelines. • Provide infrastructure to support active travel modes (walking and cycling). • Improve road safety awareness across all users.

The primary decision making principles that underpin the development of an integrated transport strategy are presented in Table 4.

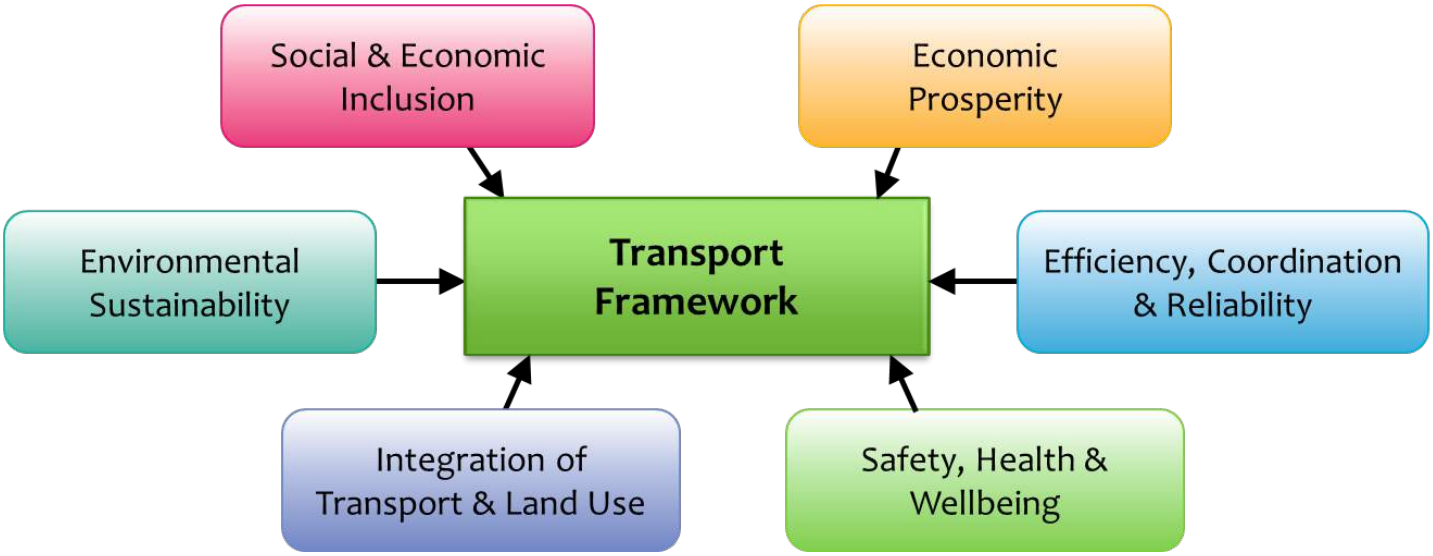
Table 4: Transport integration act policy framework – transport system decision making principles[18]

Decision Making Principles	Description
Integrated Decision Making	Strive to achieve Government policy objectives through coordination between all levels of government and government agencies and with the private sector.
Triple Bottom Line Assessment	Assess all of the economic, social and environmental costs and benefits taking into account externalities and value for money.
Equity	Equity between persons regardless of personal attributes, (age, physical ability, ethnicity, culture, gender, financial status) or location (growth area, urban, regional, rural or remote areas). Equity between generations by not compromising the ability of future generations to meet their needs.
Transport System User Perspective	Understanding the requirements and informational needs of transport system users. Enhance the useability and quality of experiences delivered by the transport system.
The Precautionary Principle	Where faced with threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. • Careful evaluation to avoid serious or irreversible damage to the environment wherever practicable. • Assessment of the risk-weighted consequences of various options.
Stakeholder Engagement and Community Participation	Take into account the interests of Stakeholders including transport system users and members of the local community. Adopt appropriate processes for stakeholder engagement.
Transparency	Members of the public should have access to reliable and relevant information in appropriate forms to facilitate a good understanding of transport issues and the process by which transport system decisions are made.

[18] *Modified from the Transport Integration Act 2010 Policy Framework <http://www.transport.vic.gov.au/legislation/transport-integration-act/transport-integration-act-fact-sheets> accessed 12 February 2014.*

The objectives and principles listed in Table 3 and Table 4 have been used to guide and inform the development of the GSTS. The Act has been adopted as the Transport Framework for the GSTS. Adhering to this Transport Framework ensures that a systematic approach is followed that will achieve the best possible outcomes across all levels of society. A summary of the six transport system objectives is shown in Figure 9.

Figure 9: Transport framework



3.3 Issues Compared to Objectives

Table 5 has been prepared to show the relationship between the Transport Framework and the associated transport issues and aims. This is not intended to be a definitive list, but is considered to capture some of the primary and recurrent issues within the GSA. A detailed assessment of the issues within the GSA is outlined in Section 4 with further supporting evidence in Appendix D. It can be seen that several issues (e.g. road safety, congestion, aging infrastructure) are repeated when categorised across the transport system objectives. This highlights their importance as an issue to be prioritised and addressed as part of the strategy delivery.

Table 5: Summary of issues and objectives

Transport Framework		GSTS Study Objectives	Key Transport Issues	GSTS Aims / Outcomes
1	**Social and economic inclusion**	A. An integrated multi-modal strategy B. Infrastructure and operations for the metropolitan road network C. Infrastructure and traffic management operations D. The public transport network and on-street infrastructure E. Walking and cycling networks and infrastructure F. Staging plan showing with timeframes	- Access to transport services - Equitable use of road space - Aging infrastructure	- Infrastructure to support mobility impaired - Maintain affordable public transport fares - Provision of transport services in outer-urban settlements
2	**Economic prosperity**		- Traffic congestion - Road safety - Aging infrastructure - Regulation and competition	- Effective land use planning - Improve journey times - Keep transport costs affordable - Improve regulation and foster healthy competition
3	**Environmental sustainability**		- Vehicle emissions - Driver behaviour - Traffic congestion - Aging vehicle fleets - Vehicle dominated transport modes	- Reduce vehicle emissions / encourage alternative fuels - Increase walking and cycling - Reduce congestion and improve transport efficiency - Improve driver behaviour
4	**Integration of transport and land use**		- Access to transport services in new growth areas & settlements - Traffic congestion - Poor connectivity - Effective collaboration between Authorities	- Effective land use planning - Promote localised trips - Improved transport network permeability - Improved planning and collaboration between Authorities
5	**Efficiency, coordination and reliability**		- Driver behaviour - Traffic congestion - Aging infrastructure - Regulation of buses and taxis - Road safety - Regular and reliable data collection	- Improve journey times - Reduce congestion and improve transport efficiency - Improved planning and collaboration between Authorities - Upgrade vehicle fleet and improve regulation - Improve regulation of public transport services - Implement and maintain comprehensive transport data collection
6	**Safety, health and wellbeing**		- Road safety - Aging infrastructure - Driver behaviour - Vehicle emissions - Equitable use of road space - Vehicle-dominated transport modes	- Renew aging transport infrastructure to meet current safety standards - Provide infrastructure to support safe walking and cycling - Reduce vehicle emissions - Improve road safety awareness across all users

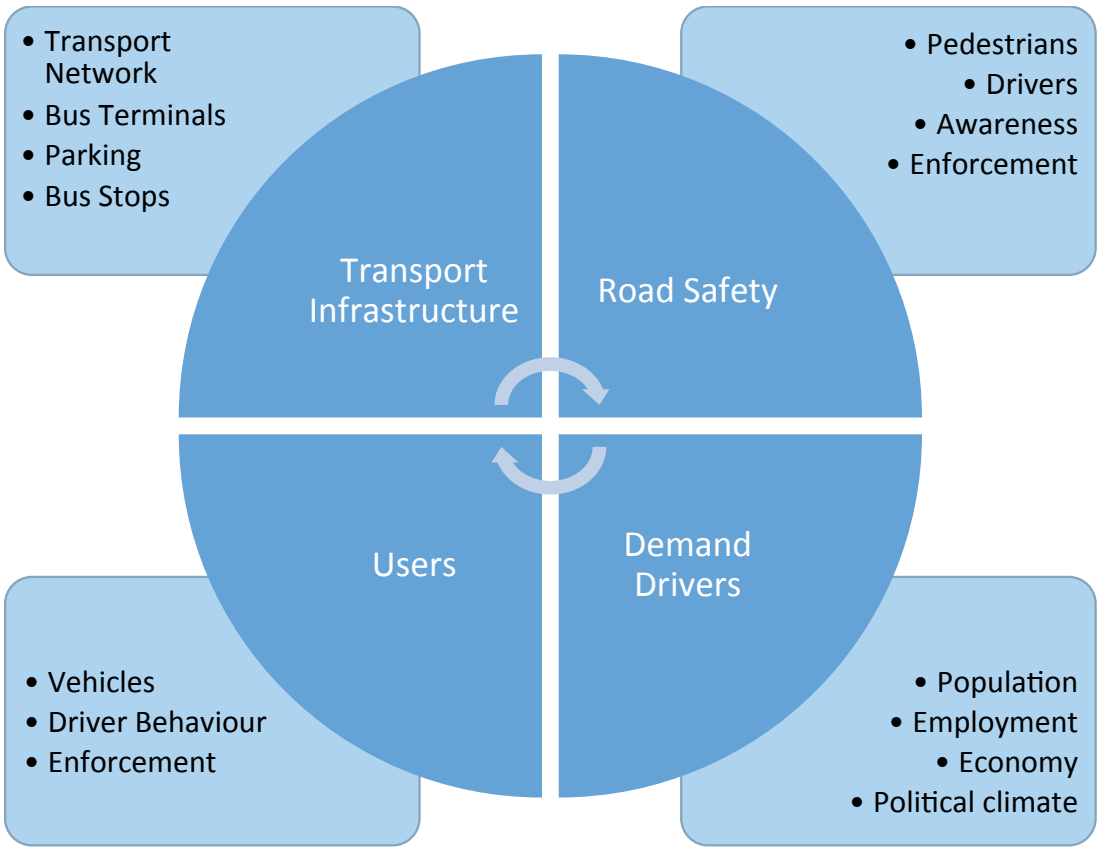
4 Transport Challenges

Stakeholders were asked about the issues across the GSA transport network and an extensive list was collated. The issues raised are summarised in Figure 10 where the size of the word gives an indication of how often the issue was raised by Stakeholders[19]. The top four individual issues raised by Stakeholders were traffic congestion, inadequate bus bays, peak hour traffic management and signage. To assess all of these issues and understand the challenges that will be faced in the future, the strategy focussed on the broad themes of *Transport Infrastructure, Road Safety, Users and Demand Drivers* as shown in Figure 11, each of these topics is discussed in this section. Further details on transport issues and opportunities in the GSA can be found in Appendix D.

Figure 10: Transportation issues identified in the Greater Suva Area

[19] *Produced using an online program called Wordle <www.wordle.net>*

Figure 11: Transportation challenges faced by the Greater Suva Area



4.1 Transport Infrastructure

The Greater Suva transport network faces numerous challenges, particularly the lack of redundancy should any blockages occur on key arterial roads. Moreover, the condition of infrastructure supporting buses is generally poor and acts as a deterrent in encouraging increased investment by operators and greater use of this important form of mass transit by travellers. There are however many opportunities to improve the situation. A summary of the key issues associated with the transport infrastructure and the vehicles that use it, along with the opportunities to address these are shown in Table 6.

Table 6: Summary of transportation issues

Mode	Issue	Opportunities
Bus	• Planning and co-ordination • Bus station operation, capacity and access • Bus stop operation and capacity (including informal boarding and alighting)	• Redevelop major bus stands • Improve regulation • Rationalise and upgrade bus stops • Extend bus routes and facilities to permeate new developments
Mini-bus	• Planning and co-ordination • Regulation • Minibus driver behaviour	• Improve regulation and enforcement • Coordinate route planning, integrate with bus networks

Mode	Issue	Opportunities
Taxi	• Regulation • Taxi driver behaviour • Age and safety of vehicle fleet • Proportion of empty running taxis	• Improve regulation and enforcement of adherence to base stations • Upgrade vehicle fleet to improve safety and reduce vehicle emissions
Walking	• Discontinuous footpath network • Lack of formal road crossing opportunities • Vehicle speeds • Lack of public street lighting - particularly in peri-urban and rural areas • Absent or poorly designed crossings at signalised intersections	• Prepare a priority pedestrian network plan • Install street lights in residential areas and maintain existing infrastructure • Identify safe routes to school • Maintain flashing pedestrian lights and upgrade to LED lighting • Promote the health and fitness benefits of walking.
Cycling	• No provision for cyclists on or off road • Driver awareness and perceptions towards cyclists as legitimate road users • Narrow roads and no separation from vehicles • No designated routes • Vehicle volumes and speeds	• Legitimise cycling as a viable form of transport through integration with planning and design frameworks • Prepare a bicycle network plan • Adopt a staged approach – initially provide a safe, off-road facility, promote and encourage the use of it and monitor the use. As demand grows, expand the network.
Road Network Operation	• Traffic congestion • Coordination of existing traffic signals • Operation of pedestrian crossings (including school crossings) • Lack of network redundancy • Manual intervention by Police	• Improve network operations to provide efficient, safe and integrated traffic network • Provision of more time-separated pedestrian crossings • Linking of existing and future traffic signals (SCATS)
Physical Road Network	• Intersection design (including provision of right turn lanes and heavy vehicles) • CBD road capacity • Road network and infrastructure condition (including delineation) • Street lighting	• Address deficiencies within physical infrastructure to improve road network • Better intersection design to enable safe opportunities for turning vehicles • Undertake road safety audits of existing Blackspot locations and for all future road and intersection designs
Other Road Network	• Lack of enforcement / level of regulation • Driver behaviour • Speed limits • Impact on air quality / noise pollution	• Driver education to improve behaviour • Increase enforcement of speeds and road user behaviour • Newer vehicle fleets targeting safer vehicles and reduced emissions
Car Parking	• Lack of parking time restrictions. • Differential car parking pricing between on-street and off-street facilities • A lack of parking enforcement and small fines, • Limited / inconsistent parking guidance signage	• Introduction of parking time restrictions • Variation of parking pricing structures to prioritise the use of off-street parking • Improvements to parking guidance signage to minimise search times • Increased parking enforcement

4.2 Road Safety

4.2.1 Overview

Road safety is a significant concern for the Government of Fiji. *"On average, one person dies every week due to traffic accidents. The number of casualties is much more."*[20] Road trauma has a high impact on all Fijians. It costs lives and livelihoods and has devastating outcomes for the lives of family, friends, colleagues, employers as well as impacting upon investment, health care and hospitals. Road traffic accidents cost the Fiji economy in the order of $30-40 million dollars annually.

The Government recognises the importance of addressing these serious issues in a timely and systematic approach and this commitment is demonstrated in the Government's participation in the United Nations *"Decade of Action for Road Safety 2011-2020."* The Government of Fiji accepted the call from the UN General Assembly, inviting all member states to implement road safety activities based on the five pillars of the Global Plan for the Decade of Action for Road Safety: 1) Road safety management, 2) Safer roads and mobility, 3) Safer vehicles, 4) Safer road users and 5) Post crash response. The Government has expanded this list to focus on delivering Action Plans for the following seven Strategic Focus Areas (SFAs):

1. Safer Roads
2. Safer Drivers
3. Safer Vehicles
4. Road Safety Education
5. Post Accident Care
6. Accident Data and Research
7. Traffic Law Enforcement

Fiji's Road Safety Target:

"To reduce the annual fatalities from the current 8 per 10,000 vehicles to 4 per 10,000 vehicles by the year 2020, and a reduction in accident numbers by 5% annually."

- Fiji Decade of Action for Road Safety, 2011-2020 National Action Plan

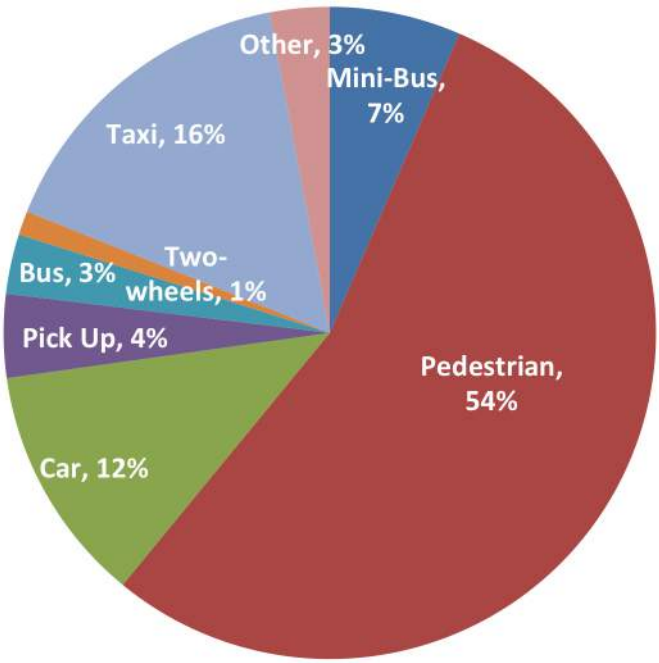
4.2.2 Key issues

Pedestrians are significantly over represented in the available reported crash statistics. Figure 12 indicates that over 50% of the recorded[21] people injured in the GSA in 2013, as a result of a crash with a motorised vehicle, where pedestrians. Pedestrians, by nature are the most vulnerable road user, having no physical protection in the event of a collision. This is exacerbated when children and the elderly are involved in accidents. Taxis represent the second largest accident group, comprising 16% of the recorded casualties in 2013. It is noted that 2013 is the first year in the last decade that taxis have surpassed cars in terms of the number of recorded accidents.

[20] *Fiji Decade of Action for Road Safety, 2011-2020 National Action Plan*

[21] *Fiji Police Force Crash Statistics Database*

Figure 12: Breakdown of casualties by mode in GSA (2013)



'Other' includes heavy goods vehicles and tractors.
"Two-wheels' includes motorcycle and bicycle.
Excludes crashes in which no injury was caused.

Almost all journeys involve some component of walking. Pedestrian safety therefore affects the whole community. Dangers to pedestrians primarily occur at uncontrolled crossings, areas of poor lighting, at controlled pedestrian crossings, on the roadside when footpaths are not provided (particularly at night), property access points and walking in car parks where vehicles are reversing.

It is useful to consider the history of crashes over time in order to identify any patterns or trends. Figure 13 shows the total number of casualties by mode between 2008 and 2013.

Figure 13: Number of casualties resulting from crashes in Greater Suva by mode (2008-2013)

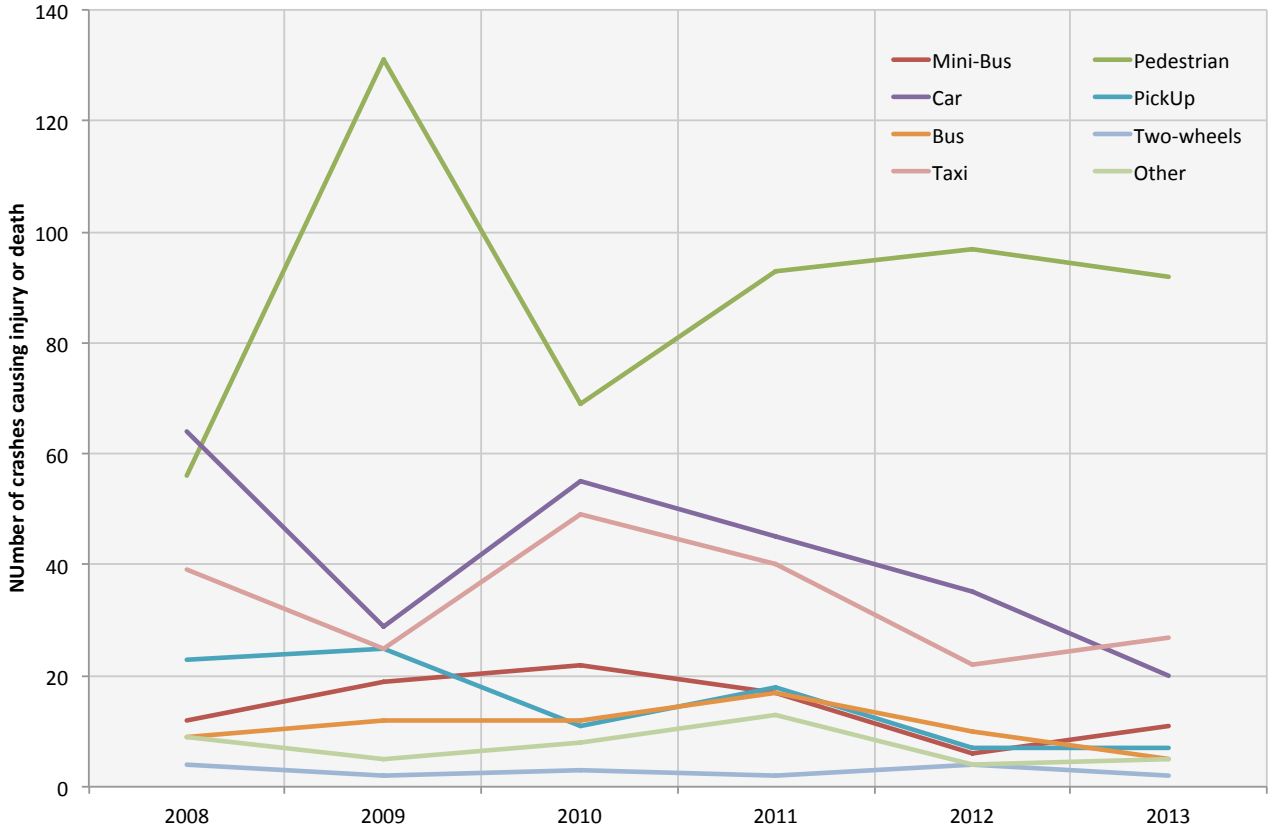
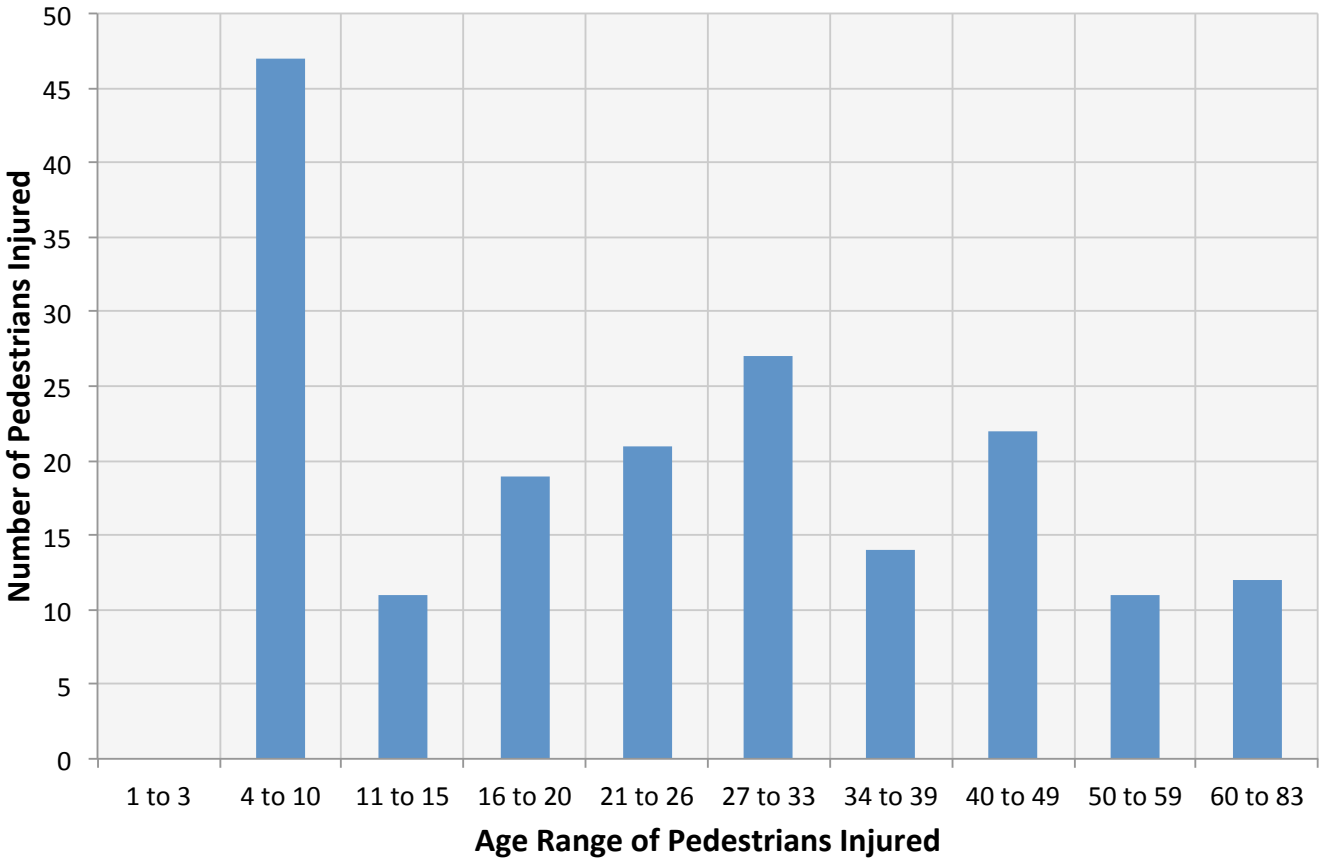


Figure 13 reiterates that pedestrians, cars and taxis are the predominant user groups represented in the casualty crash statistics and have been for the past six years. In the most recent two years of reporting (2012-2013) the number of pedestrian accidents was higher than all other modes combined.

Pedestrians are the most vulnerable road users, with young children in particular being susceptible to injury due to their developing road sense and awareness of danger. This is highlighted in Figure 14, where it can be seen that young pedestrians (ages 4 to 10 years old) represent 26% of all recorded pedestrian injuries in 2013[22].

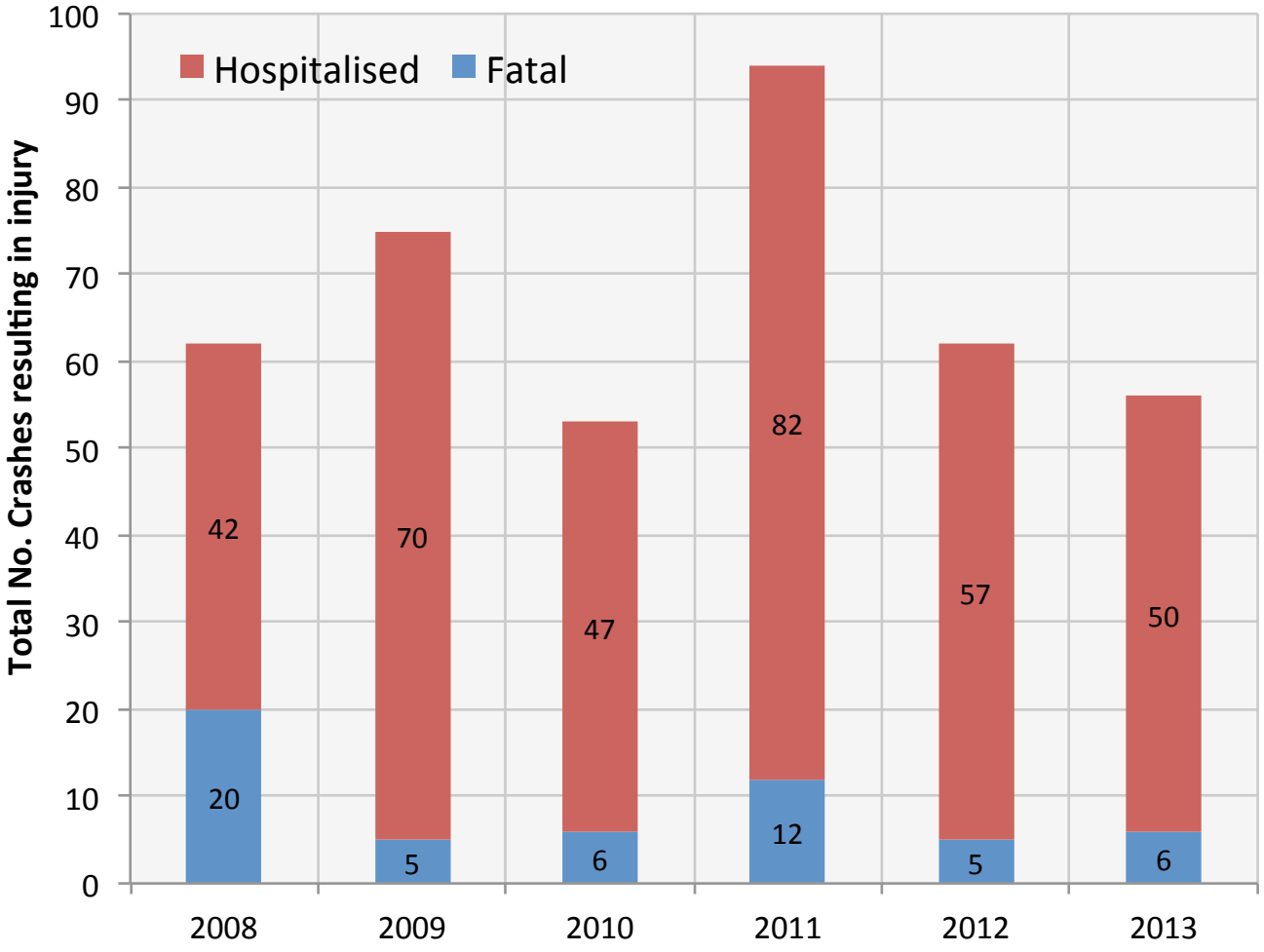
Figure 14: Number of pedestrians injured in crashes, by age group, in the GSA (2013)



[22] *For those accidents where the age of the pedestrian was recorded.*

Of all reported crashes it is the fatal and hospitalised accidents that result in the greatest impact on the community. The number of fatal and hospitalised injuries has generally not declined in the most recent six-year period as shown in Figure 15. Reducing these crash numbers will therefore be a key goal of future road safety initiatives due to the effect that they have on the wider community.

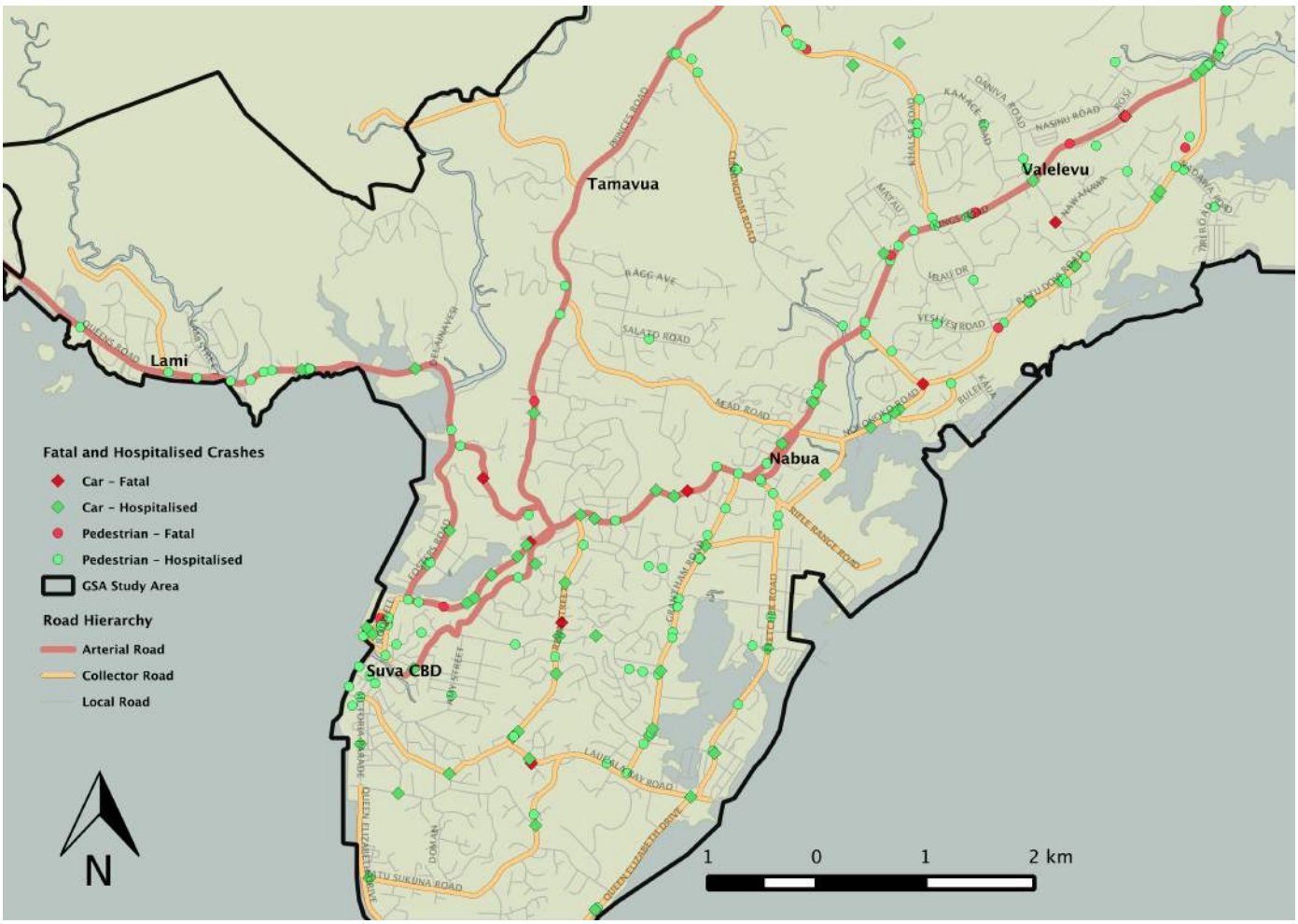
Figure 15: Total number of crashes resulting in hospitalisation or death in Greater Suva (2008-2013)



The concentration of fatal and hospitalised crashes in the southern half of the GSA is shown in Figure 16. The crashes tend to be concentrated on the Kings Road corridor, Suva CBD, Queens Road and other collector roads. These locations typically carry high vehicle volumes and areas of concentrated pedestrian and vehicle activity. Looking at the entire study area, a number of locations have a high concentration of accidents between 2009 and 2013, including:

- Suva CBD: 2 fatalities, 14 pedestrians hospitalised
- Kings Road, near Beaumont Road: 2 fatalities, 13 pedestrians hospitalised
- Kings Road between Ratu Dovi Road and Narere: 1 fatality, 10 pedestrians hospitalised
- Kings Road, Koronivia Research Station: 7 pedestrians hospitalised

Figure 16: Fatal and hospitalised accident locations in the southern half of the GSA (2009-2013)



4.2.3 Objectives

The Fiji Decade of Action for Road Safety 2011-2020 outlines the Strategic Focus Areas (SFA) and identifies actions and performance indicators to be delivered by the responsible stakeholder.

The SFAs should provide the framework and platform to facilitate safety improvements across all areas. It is important that a collaborative approach is adopted between all responsible Stakeholders so that an integrated approach can be achieved with the best possible outcomes. An overarching goal for the SFAs should be accident prevention and this is a key component of ongoing Blackspot program initiatives. Further discussion on road safety considerations is provided in Appendix D of this report.

4.3 Users

A significant challenge that cannot be addressed by FRA alone is the general non-compliance with respect to road rules by drivers and the low levels of enforcement by authorities across the transport network. It is not uncommon to see the following occur on a daily basis across the transport network:

- Speeding
- Buses stopping outside of designated bus stops
- Over crowded buses
- Rural taxies operating in urban areas
- Mini-buses not abiding by their designated route
- Black smoke being emitted by vehicles
- Vehicles other than buses using bus bays (see image to the right)
- Dangerous passing maneuvers (see image below)
- Taxis circling for passengers rather than returning to their taxi stand
- Jaywalking
- Slow moving vehicles leading to driver frustration
- Police directing traffic during peak periods

Victoria Parade, Suva
Car parked illegally in a bus bay

The Public Service Vehicle (PSV) industry (bus, taxi and mini-bus) is highly competitive with numerous operators vying for passengers. This often leads to drivers (and owners) seeking to reduce travel time. This is particularly prevalent in locations where operators know enforcement is limited or non-existent.

Vehicle ownership, being a status symbol in Fiji, may lead to a sense of entitlement over other modes of transport. These factors can lead to a contempt for road rules and need to be managed through higher levels of enforcement – both through the presence of enforcement officers (or technology) and increased fines (that are collected) to act as a deterrent for breaking the law.

Currently the LTA has 49 officers across Fiji dedicated to enforcement. The Fiji Police Force has 72 dedicated traffic officers operating within the GSA. Suva City Council, with the highest number of parking bays in the GSA has 8 officers dedicated to enforcement. The FRA at present, do not manage any enforcement officers[23]. The numbers outlined above are currently insufficient to deter unlawful behaviour across the transport network.

Princes Road, overtaking across double lines

[23] *These numbers were supplied by Stakeholders*

4.4 Demand Drivers

The rapid population growth in the GSA is fuelling the demand for travel on the transport network. The fundamental demand drivers for traffic are population, employment and education. Where people are employed and educated, in relation to where they live are important drivers of travel patterns. Mode choice (i.e. car or bus) is driven by factors such as distance, travel time, modes available, pricing and group size.

Taking into consideration the locations of expected land developments within the GSA over the next 15 years (as described in Section 2.4), the resultant change in population that can be expected is shown in Figure 17. The most significant growth is likely to be along the Suva-Nausori corridor, particularly around what are currently classified as the Nasinu and Nausori peri-urban areas (see Table 7). Planning must be undertaken to support these growing population centres by ensuring there is sufficient new employment and education centres within close proximity[24]. Without such centres a large portion of the future population will be forced to travel long distances to existing employment centres such as the Suva CBD. Such a scenario will significantly worsen congestion on Kings Road and within Suva CBD itself. This again further highlights the important relationship between land use and transport planning.

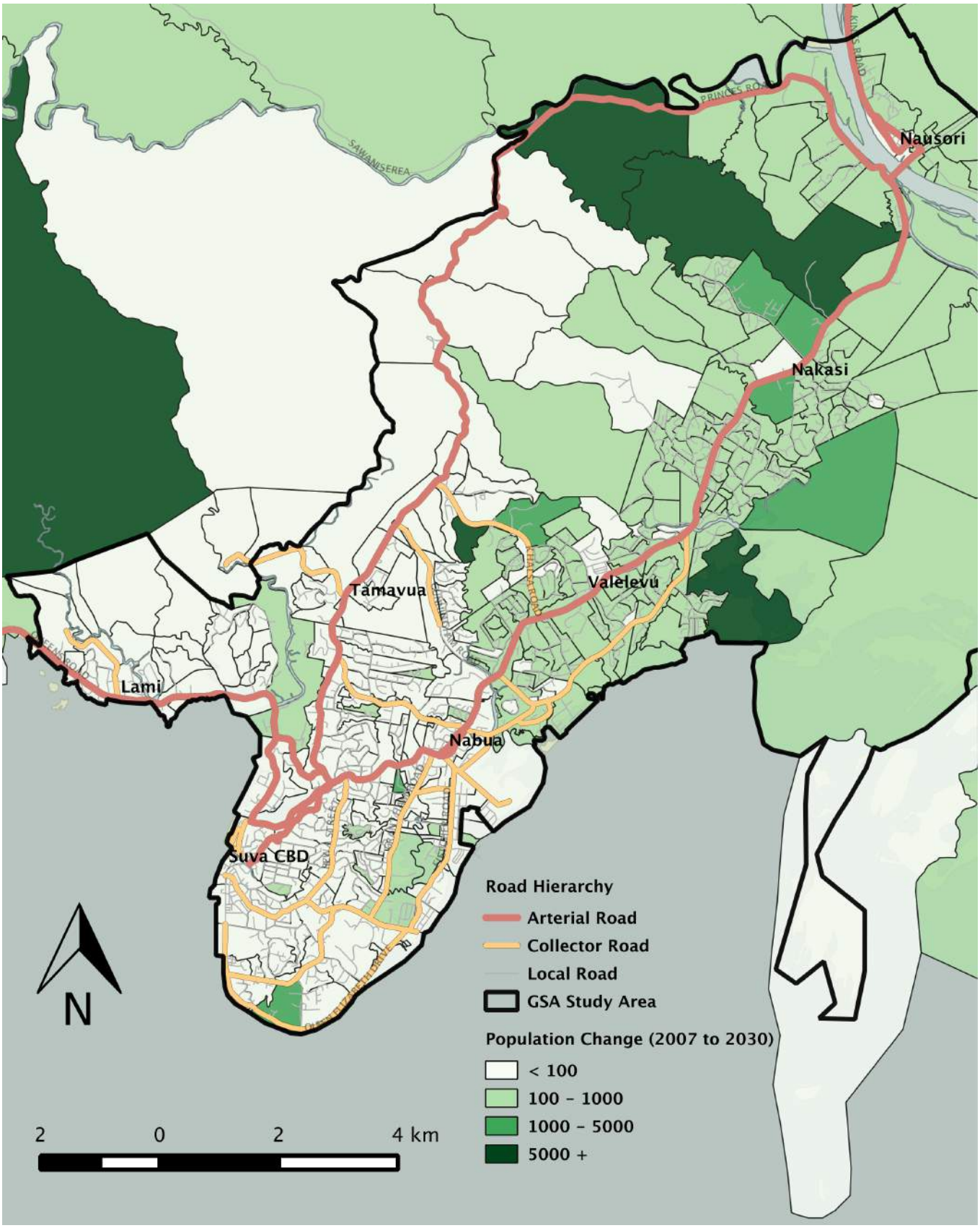
Table 7: GSA population and forecast population change (2007 – 2030)

Area	2007	2014 (p)	2030 (p)	Growth 2014-2030
Suva City	75,225	76,000	88,000	12,000
Suva Peri-Urban	10,953	11,000	11,500	500
Nasinu Town	75,719	95,000	99,000	4,000
Nasinu Peri-Urban	11,051	14,000	29,000	15,000
Nausori Town	24,630	33,000	38,500	5,500
Nausori Peri-Urban	22,181	30,000	56,000	26,000
Lami Town	10,474	11,000	12,500	1,500
Lami Peri-Urban	9,749	10,000	10,500	500
Total Study Area	**239,982**	**280,000**	**345,000**	**65,000**

Source: FBOS 2007 Census Tables plus study team prediction (p) based on past growth rates and expected land developments

[24] *There are some examples of good planning such as Waila City which is a mixed use development*

Figure 17: Population increase, 2007 to 2030

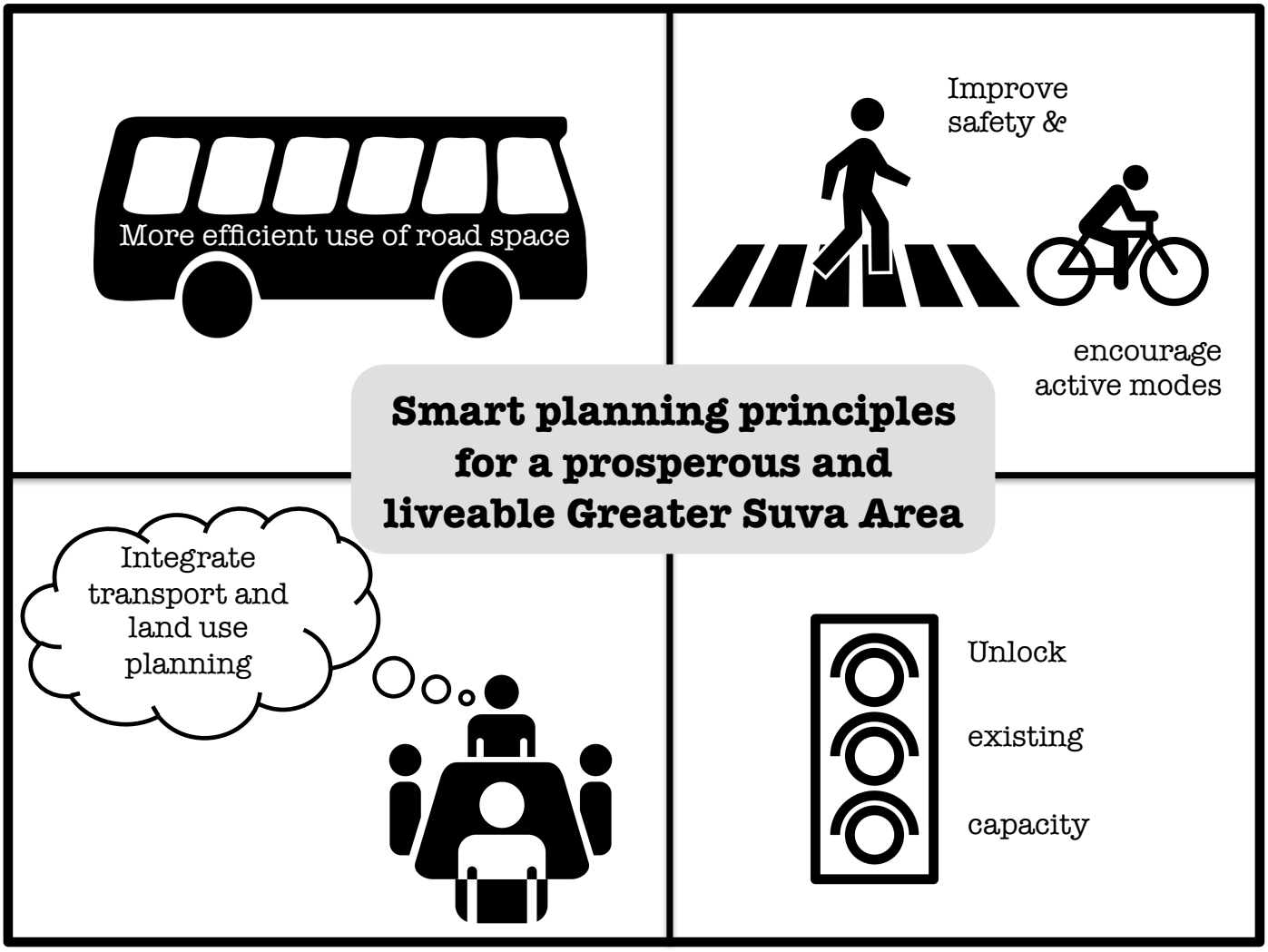


5 Developing the Solutions

5.1 Planning Principles

Before developing any solutions to the key issues it was assumed that projects already underway, or scheduled, will be completed to a satisfactory standard[25]. Furthermore, rather than assuming that the growth in private vehicle use will continue unabated and additional roads will be provided to meet demand, the focus has been on developing solutions that involve well considered, cost-effective planning. Four planning principles were adopted to guide the development of solutions for the GSA, these are shown in Figure 18 and described in more detail on the following pages.

Figure 18: Smart planning principles



Icons courtesy of The Noun Project

[25] *Refer to Table 10 for a list of projects assumed to be proceeding*

5.1.1 More efficient use of road space

Existing projects planned or underway suggest that a number of key arterial roads (Kings Road and Ratu Dovi Road) will be expanded to four-lanes in width in the near future. In order to ensure road space allocation is as efficient as possible, it is important to prioritise high capacity vehicles. Such vehicles need to be able to compete with private vehicles with respect to journey time and reliability. Figure 19 provides an example of the difference in road space required for one bus compared to the same number of cars required to transport the same number of people (assuming one person per car). In the space it takes to accommodate 60 cars, a road could accommodate around sixteen buses or more than 600 bikes.

If one lane on Kings Road during the peak periods was dedicated solely for the use of buses it would improve the travel time of the buses by separating them from the congestion caused by traffic with lower vehicle occupancy. Combined with upgrades to the vehicle fleet and bus stops, bus travel would become more appealing for the wider population. Given that 60 cars use the same road space as 16 buses and assuming an average occupancy of 2 people per car and 40 people per bus, buses can carry more than five times as many people as cars for the same amount of road space. With a dedicated bus lane Kings Road could carry more people per day and align it with developed nations which typically rely on public transport to carry the majority of the working population to work each day.

In addition to Kings Road and Ratu Dovi Road there are a number of other roads which have the potential to be widened to four-lanes at a relatively low cost such as Grantham Road, Fletcher Road and Princes Road.

Figure 19: Road space comparison between pedestrians, cyclists, buses and cars

Source: <http://www.bikeoz.com.au/index.php/cycling-promotion-fund> accessed 11 February 2014

To further drive the efficient use of road space, travel demand management techniques can be used to influence more sustainable transport through the promotion of car pooling, park and ride, active modes, spreading working hours and promoting working from home.

5.1.2 Unlock existing capacity

Across the GSA there are three main types of intersections controls – roundabouts, signalised intersections and non-signalised intersections (monitored through the use of give-way and stop signs). The suitability of different intersection control types depends on the volume and flow of traffic. As the volume of traffic increases, as has been experienced in the GSA, a change in the control type and layout of an intersection can increase intersection capacity and reduce average delays.

Rewa Street and Laucala Bay Road Roundabout, 8am

At intersections that are already signalised, there exists the ability to activate vehicle actuated signaling as opposed to fixed phasing. Actuated signaling allows the signal phasing to adapt to the flow of traffic at any given time. Furthermore it is possible to co-ordinate traffic signals by linking them together via software such as SCATS.

5.1.3 Integrate transport and land use planning

The lack of integration between transport and land use planning is a common challenge for cities across the world. A lack of integration is more prevalent in developing countries where economic development is typically fast-tracked at the expense of thorough planning. However, the impact of poor planning can have a long lasting effect on the economy, the transport network and its users.

Specific examples include residential developments where there is no nearby employment or education. The resultant impact is that residents need to travel long distances from their homes in order to work, attend places of education and shop, all of which adds to congestion on the transport network. Alternatively commercial developments are often approved without proper planning to minimise the impact on the surrounding transport network.

Residential developments must be supported by appropriate facilities within a convenient distance. Commercial and residential developments must be designed to minimise the impact on the surrounding transport network and active modes (preferably off-road) must be supported.

5.1.4 Improve safety to encourage active modes

As highlighted in Section 4.2, crash data for the GSA reveals that pedestrians are over-represented (in 2013, 53% of all injuries resulting from crashes occurred to pedestrians). Pedestrians should be protected through the installation of new pedestrian crossings, improved lighting, markings at existing crossings and dedicated footpaths.

Improved enforcement of road rules to regulate traffic flows would be of significant benefit to the safety of pedestrians and would encourage active modes of transport. These modes are integral to the improved operation of the transport network by reducing congestion and providing health benefits to those who switch to active modes.

The number of cyclists (and motorcyclists) are significantly under-represented on the road, both of these modes of transport are not well supported by the existing transport network and have a low level of utilisation. If the condition of the roads can be improved along with the behavior (and awareness of motorists) then the opportunity exists to increase the mode shares for these modes by providing dedicated bike lanes (and off-road paths).

5.2 Initial Long List of Options

The early stages of the project included a comprehensive background review of all previous studies and documents that may have an impact on or inform the development of the GSTS. This review, along with the Stakeholder workshop, provided the study team with a broad picture of the primary transport issues across the GSA. This in turn helped to develop a long list of options for assessment. An overview of the long list development process is shown in Figure 20, a summary of each of the inputs is then provided in the following sections.

Figure 20: Option identification process

5.2.1 2001 GSTS Options

The initial source of options was derived from a review of the recommendations presented in the 2001 study report. The report recommended a total of 91 road-related projects, a summary of the current status of these projects is provided in Table 8, where it can be seen that 56% of the proposed projects have been completed (or are in progress) since 2001. The remaining 44% (representing 40 projects) remain incomplete.

Table 8: 2001 Greater Suva Transportation Study – status of road project recommendations

Project Type	Complete	Partially Complete	Not complete	Total
Intersection Improvement Projects	7	2	5	14
Project Capital Projects	13	1	20	34
Road Network Link Improvements	5	0	2	7
Road Improvements	22	1	13	36
Total	**47 (52%)**	**4 (4%)**	**40 (44%)**	**91 (100%)**

Source: MWH Global and Stakeholders

In addition to the specific road projects, the 2001 study included a proposed action plan covering a range of strategy areas with an associated priority assigned to each item. The priorities were rated A to E, with A being the highest (short-term) and E being the lowest (beyond the timeframe of the study). The majority of the non-road-related items were identified as priority A, however as can be seen in Table 9 only two out of 35 projects have been fully completed and 26% are listed as 'in progress', the projects on which some progress has been made mainly constitute safety initiatives being implemented by LTA and Police and an ADB funded Fiji Transport Sector Plan scheduled for completion by the end of 2014. The non-road projects include a mix of projects from various Strategy Areas as summarised in Table 9.

Table 9: 2001 Greater Suva Transportation Study – status of non-road project recommendations

Strategy Area	Complete	Partially complete	In progress	Not completed	Total
Institutional and Policy Initiatives	1	0	3	4	8
Parking Management Measures	1	1	1	5	8
Public Transport Initiatives	0	2	2	4	8
Alternative Transport Initiatives	0	0	0	2	2
Road Safety Initiatives	0	0	3	1	4
Local Area Traffic Management	0	1	0	4	5
Total	**2 (6%)**	**4 (11%)**	**9 (26%)**	**20 (57%)**	**35 (100%)**

Source: MWH Global and Stakeholders

5.2.2 Issues and Demand Drivers

Blackspot locations and areas with known road safety issues were confirmed based upon a review of Police crash statistics. These locations were added to the options list sourced from the 2001 Study. The collation of land use data (current and future) enabled an assessment of future problematic areas. The land use data also formed the base for the development of a model for the entire GSA primary road network. A comprehensive analysis of existing issues and opportunities is provided in Section 4.

5.2.3 Alternative Options

A number of large projects which were either not in the 2001 study or had been progressed further since 2001 were reviewed. These included the following:

- Lami Bypass – feasibility study conducted by MWH Global
- Waikimbutu Bypass – high level plans held by TLTB
- Regional Road – road reserve provided by DTCP and Roughton Report, 2005
- Coastal Road – proposed routes and analysis as per the Roughton Report, 2005
- Rokobili Terminal – Investor prospectus provided by Fiji Ports Corporation
- Coastal Cycling Route – concept plan provided by Cycling Fiji
- Suva Bus Stand – 2004 plan provided by SCC, discussions on latest plans being developed
- Nausori Bus Stand – 2014 relocation plan provided by NTC

A summary of the key findings and recommendations from the reports outlined above are provided in Appendix A.

5.2.4 Stakeholder workshops

As described in Section 1.5, extensive Stakeholder engagement was conducted through a project Steering Committee, workshops and one-on-one discussions involving more than 60 organisations. A full list of Stakeholders engaged with is provided in Appendix B.

5.2.5 Site visit and desktop reviews

In addition to the above, site inspections and a thorough review of all available literature was undertaken. Additionally discussions with agencies undertaking complementary studies provided further background for the generation of options. Refer to Appendix A for a list of relevant studies, both completed and ongoing.

5.2.6 Projects assumed to be proceeding

There are a number of projects that either commenced during the study or will definitely be proceeding and were not considered as part of the options evaluation. Details of these projects are shown in Table 10.

Table 10: Projects assumed to be proceeding and excluded from further options assessment

Project Type	Project Description	Comment
Bus Infrastructure Upgrade	Suva Market, Bus Terminal and foreshore redevelopment.	Suva City Council has announced an $80M upgrade. Currently in the design stage. Excludes any works outside the boundary of the existing market and bus terminal.
	Nausori Market and Bus Terminal relocation	Construction underway, to be completed by the early 2015. Taxi and mini-bus stands are not being relocated as part of this project.
	Bus e-Ticketing system for the payment of fares on public transport.	Currently held up with technology provider issues. Full implementation date unknown.
Capital Cost Projects	NASRUP 2A/2B - widen Kings Road to 4-lanes between Nabua and Nausori	Planning underway for some sections, others waiting to be tendered
	NASRUP 2C – upgrade Wainibokasi Road (Nausori to Airport entrance)	Released for construction
	Airport Diversion Road	Preferred alignment selected. No work has commenced
	Ratu Dovi Road widening to 4-lanes	Partially complete, final stage currently on hold
	Fletcher Road Bridge	New bridge to be constructed, works not yet scheduled
Road Improvements	Rehabilitation and resealing works	Significant program of works underway throughout the GSA (including roads and bridges)

5.2.7 Long List Summary

The long list of 156 potential options represents an extensive list of possible opportunities to improve the transport infrastructure, road safety, policy environment and management of the GSA. A high-level summary of the options developed is shown in Table 11.

Table 11: Long list categories and options summary

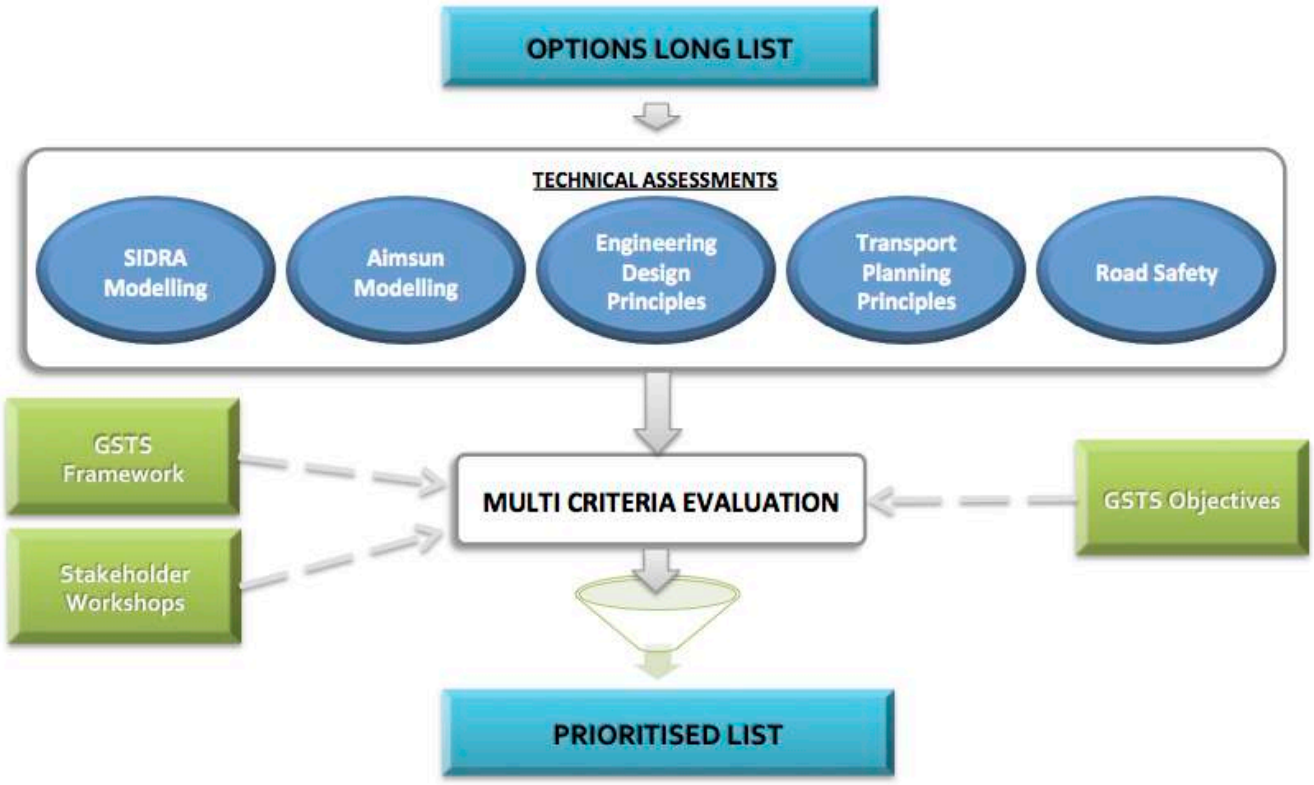
Option Category	Number of Options	Predominant Options
Bus	19	Bus Terminal redevelopments, regulation, bus stops (rationalise and upgrade), expand network
Road	66	Intersection upgrades, capacity upgrades, new links, signalisation, safety improvements, lighting, signal coordination
Car Parking	6	Review restrictions, pricing and signage. Increase enforcement
Walking	39	New or upgraded pedestrian crossings, footpaths, lighting
Cycling	3	Policy integration, network plan, coastal path
Regulatory	14	Enforcement (speed, taxis, buses, vehicle safety), education, policy changes
Other	9	Local Area Traffic Management (LATM), travel demand management, data collection programs, road works scheduling
TOTAL	**156**	

From Table 11 it can be seen that a high portion of the options are road-related, this is consistent with the high number of road options in the 2001 study. However many of the road related options in this study provide improvements for all road users, in particular buses as they represent more than half of all on-road passenger movements in the GSA. As a result there are a number of bus specific projects that focus on bus infrastructure to deliver efficiency and service improvements for bus passengers. There are also a substantial number of options relating to walking, the majority being upgrading or installing new pedestrian crossings around schools, transport hubs and other activity centers. Some pedestrian crossings will impact upon the capacity of the road network. However, in many instances the proposed pedestrian crossing upgrades will enhance the performance of the crossing points, reduce the impact on through traffic and as a consequence reduce traffic congestion.

5.3 Evaluation Process

An overview of the tools and the process used to assess and evaluate the 156 options is shown in Figure 21. The elements are then discussed in more detail in the following sections.

Figure 21: Option assessment and evaluation process



5.4 Technical Assessments

Technical assessments were conducted on each option using the most appropriate tool for the selected option. The technical assessment tools used to evaluate the options are listed in Table 12 and provide a summary of the areas and parameters that they target.

Table 12: Summary of technical assessment tools

Technical Assessment Tools				
SIDRA Modelling	Aimsun Modelling	Engineering Design Principles	Transport Planning Principles	Road Safety
Including: Intersection capacity, geometry changes, signalisation and upgrades	Including: Road capacity assessments, new link opportunities and network changes	Including: Safety improvements, pedestrian crossings, intersection re-design	Including: Bus network expansion, demand management, cycle network, parking, bus stop improvements	Including: Blackspot assessments, accident trends and road safety programs

A brief summary of each assessment tool is provided below. Further details, including background, outputs and results from the technical assessments are included in Appendix F.

5.4.1 SIDRA Modelling

Seven intersections across the study area were selected for assessment using SIDRA. SIDRA is a micro-analytical computer based modelling package used for the evaluation of alternative intersection designs in terms of capacity, level of service and other intersection performance indicators. The program can assess multiple intersection configurations and crossing types.

5.4.2 Aimsun Modelling

Six network options were tested at a broad level using the Greater Suva Model. The options focused on delivering improved capacity by creating new links and providing additional lanes. Options also considered the possible benefits of providing dedicated lanes for buses/taxis to promote more consistent travel speeds and reduced journey times. Specific outputs from the individual options are provided in Appendix F.

5.4.3 Engineering Design Principles

The Engineering Design Principles were principally applied to localised areas of the road network with a focus on delivering safety and efficiency improvements to intersections and pedestrian crossings. They were also applied to Local Area Traffic Management (LATM) schemes for neighbourhoods and longer-term strategic plans for key arterial roads and bypasses.

5.4.4 Transport Planning Principles

Transport Planning Principles were used to assess the value of overarching regulatory programs, network and operational planning programs and public transport improvement programs.

5.4.5 Road Safety

Road safety elements underpin many of the assessments and recommendations, and there is also a level of overlap between the Engineering, Transport Planning and Road Safety assessment tools. While Road

Safety was a consideration within the majority of assessments, it was also applied directly to assess road safety initiatives such as speeding or pedestrian awareness campaigns. It was also an important factor when prioritising the Blackspot locations and assessing the crash trends throughout the GSA. Delivering safety to pedestrians, through improved crossings and education.

5.5 Multi Criteria Evaluation Process

The options evaluation was informed by the study team's knowledge of the study area as well as local traffic patterns, future land development, road safety issues and trends and fundamental traffic engineering and transport planning principles. Furthermore, each option was assessed against the overarching transport framework and the GSTS objectives to ensure that the goals of the transport system were met. The long list was further refined to divide the options into the three categories shown in Figure 22.

Figure 22: Refined option categories

1) **High Priority Options** – *typically options that offer achievable, high impact returns in the short to medium term. These options are considered to be the baseline options to respond to the existing transportation issues in the GSA.*
2) **Medium Priority Options** – *options that are generally medium to long term in scope and should be considered as additions to the first priority options. They are, when added to the First Priority Options, these options are aspirational options that will contribute to further enhancing the productivity and liveability of the GSA.*
3) **Other Options** – *options that were excluded from further evaluation at this time, either due to not being feasible, already committed to or completed or not considered to fall within the timeframes or scope of this study.*

Each of the option categories are discussed in further detail below.

5.5.1 High Priority Options

For the purposes of establishing the High Priority Options the evaluation criteria shown in Table 13 was adopted. A total of 73 options met these criteria. As discussed earlier, a transport framework[26] has been

[26] *Transport Integration Act 2010 (Australia)*

adopted to ensure that a comprehensive and integrated strategy for the GSA is developed. How the six transport framework objectives relate to the evaluation criteria for High Priority Options is also shown in Table 13.

Table 13: Evaluation criteria for high priority options

No.	Assessment Category	Transport Framework References
1	**Value for money** *A measure of the option's ability to be delivered cost-effectively, relative to the anticipated resultant benefits.*	All areas All six TIA objectives
2	**Impact** *Options will deliver clear benefits for the community. The option has a positive impact on the triple bottom line.*	Safety of road users, reductions in travel times, improving environmental sustainability (including vehicle emissions), reducing congestion
3	**Achievable** *Options can be delivered (subject to appropriate funding) as independent entities, or built upon in future years. They are realistic and have a positive impact on the triple bottom line.*	Appropriate funding streams available, coordinated approach, achievable within policy and regulatory frameworks Enhances economic prosperity
4	**Equity** *Options have a positive impact on the broader community, are inclusive, have regard for stakeholder feedback and ideally cover multiple jurisdictions. Options should also consider equity between generations.*	Social and economic inclusion

5.5.2 Medium Priority Options

The Medium Priority Options represent all the remaining viable options, with a total of 64 options falling within this category. Many of the options are aspirational or provide desirable improvements that will contribute to enhancing the productivity and liveability of the GSA. These options range from short to long term in terms of timing and can be considered as additions to the high priority options. These options should be considered where funding permits.

5.5.3 Other Options

The third category of options were those that were excluded from further evaluation, with a total of 19 options falling within this category. The options were excluded for a number of reasons, including: not considered to be viable, a long-term prospect which stretches beyond the timelines set out for this study, or the project could be addressed by other options.

The most significant projects to be excluded, and the reasons for their exclusion are as follows:

- Coastal Road: the Regional Road alignment provides better network connectivity for current residents and better serves planned future developments. Environmental concerns remain over the Coastal Road alignment.
- Tamavua Valley Tunnel: Estimated costs from the 2001 study were vastly underestimated, does little to ease congestion along the Suva to Nausori corridor.

5.6 Estimate of Probable Costs

An estimate of probable cost[27] was determined for each option based on knowledge of capital project costs [28] combined with additional costs associated with design, management and allowing for contingencies as necessary. Some examples of typical projects and their cost range are shown in Table 14. For the strategy and policy related options (i.e. non-road related), the study team assigned an approximate cost estimate based on professional judgement and a knowledge of the study area and policy climate in Fiji. More details on cost assumptions can be found in Appendix E. The cost estimate for individual projects is provided in Appendix C.

Table 14: Cost estimate ranges and typical projects

Option Category	Cost ($FJD)				
	Low ($0-$100k)	Low-Med ($100-$250k)	Med ($250-$500k)	Med-High ($500k-$1M)	High ($>1M)
	TYPICAL PROJECT EXAMPLES				
	Zebra crossing with flashing lights	Intersection lighting upgrade	Unsignalised intersection upgrade	New roundabout or traffic signals	Road widening, duplication, Bus Terminals
High Priority	10	10	15	13	25
Medium Priority	1	20	11	7	25

It is acknowledged that the estimates of probable cost are high-level estimates at this time in accordance with their strategic context. There is a wide variation in the costs associated with the larger, more substantial project options. As a whole, the cost of implementing the high and medium priority options is in the order of $1 billion over 15 years (in 2014 Fijian dollars).

[27] *Broad level cost estimates in this study must not be relied upon for quoting, budgeting or construction purposes. More detailed estimates can only be prepared from detailed civil engineering design drawings and require the services of a qualified quantity surveyor.*

[28] *Initial estimates provided by MWH Global and modified by the study team.*

6 Summary of Transport Options

6.1 Greater Suva's Transportation Options

The following pages present the high and medium priority options that can be mapped and allow for the options to be assessed geographically by council. Options that can't be mapped include policy and regulation options as well as work programs that do not have specific locations yet identified (such as footpaths for new housing estates). For a more detailed description of each project refer to Appendix C.

6.1.1 LAMI TOWN COUNCIL

PLACES OF SIGNIFICANCE

Lami Town, Wailada Industrial Estate,

CURRENT POPULATION

20,500 (2007 census)

FUTURE POPULATION GROWTH TO 2030

2,000 to 5,000 (estimated)

CURRENT NUMBER OF JOBS

7,000 (FNPF statistics)

FUTURE JOB GROWTH TO 2030

2,000 to 4,000 (estimated)

IMPORTANT FUTURE INITIATIVES

Mangrove reclamation
Industrial area growth
Nadara Development (Dept of Lands)
Improved water supply
Delainavesi housing development

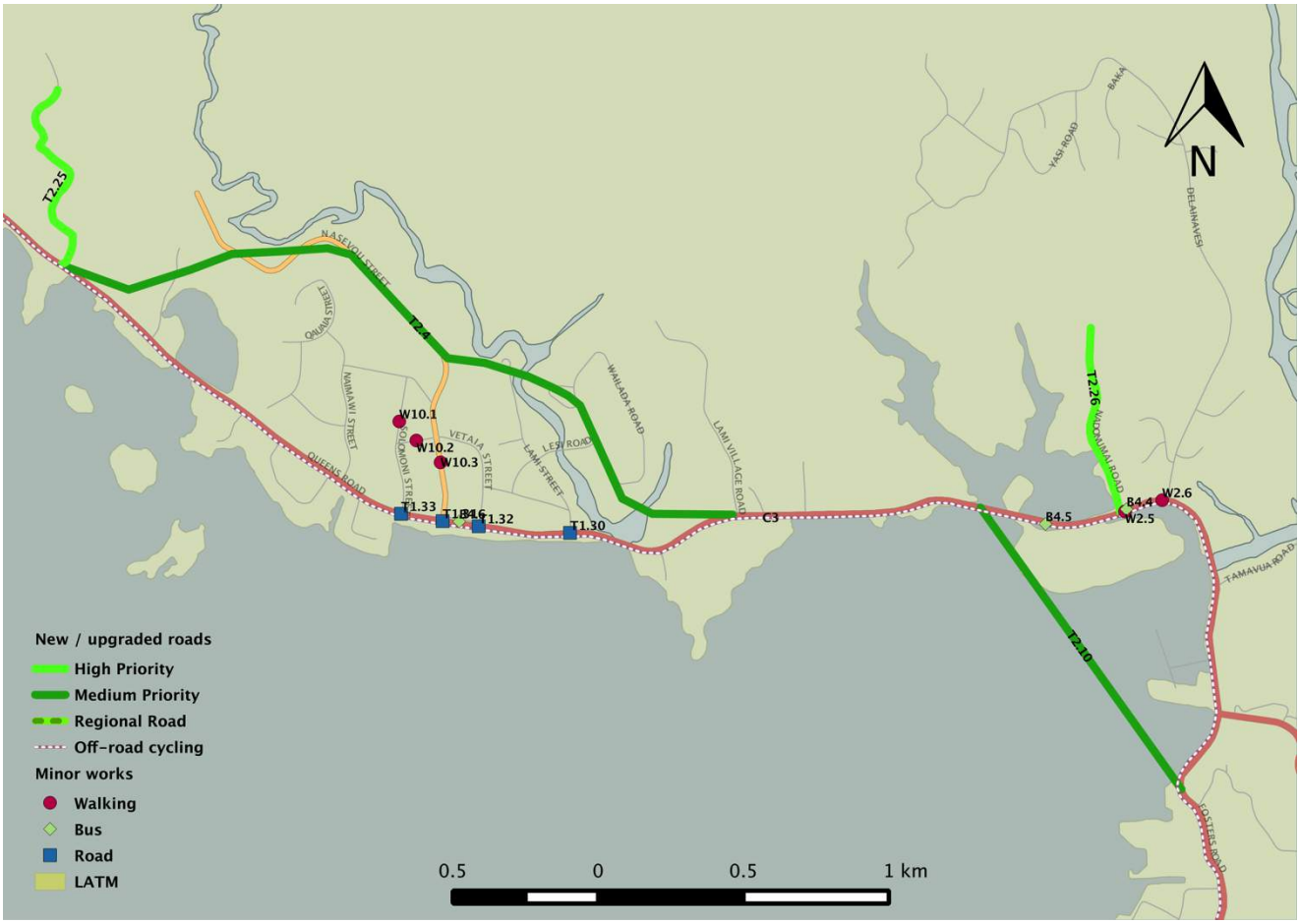
SHORT TERM PROJECTS (next 5 years)

- B4.4 Queens Rd and Nadonumai Rd, new bus bays
- B4.5 Queens Rd and Baro subdivision, new bus bays
- B4.6 Expand Lami Town Bus Bays (eastbound)
- C3 Coastal recreational walking and cycling path
- T1.30 Queens Rd / Lami St Right hand turn lane
- T1.31 Queens Rd / Nasevou St Right hand turn lane
- T1.32 Queens Rd / Vetaia St Right hand turn lane
- T1.33 Queens Rd / Solomoni St Right hand turn lane
- T2.25 Kalekana Settlement Rd Upgrade
- T2.26 Nadonumai Rd Upgrade
- W10.1 Footpaths along Solomoni St (Queens Rd to Quaia Crossing)
- W10.3 Footpaths along Nasevou St (Queens Rd to Nakula St)

LONGER TERM PROJECTS (within15 years)

- T2.4 Lami Bypass (potentially staged)
- T2.19 Queens Rd Widening
- W2.5 New pedestrian crossing of Queens Rd at Nadonumai Rd
- W2.6 New pedestrian crossing of Queens Rd at Delainavesi Rd
- W10.2 Footpaths along Labiko and Vetaia St
- T2.10 Rokobili Terminal, new road

Figure 23: Lami Town Council projects map



6.1.2 NAUSORI TOWN COUNCIL

PLACES OF SIGNIFICANCE

Nausori Town, Nausori Airport, Nakasi

CURRENT POPULATION

46,500 (2007 census)

FUTURE POPULATION GROWTH TO 2030

35,000 to 55,000 (estimated)

CURRENT NUMBER OF JOBS

2,000 (FNPF statistics)

FUTURE JOB GROWTH TO 2030

1,000 to 5,000 (estimated)

IMPORTANT FUTURE INITIATIVES

Nausori Airport Upgrade
Kings Road widening
Waila City
Housing developments

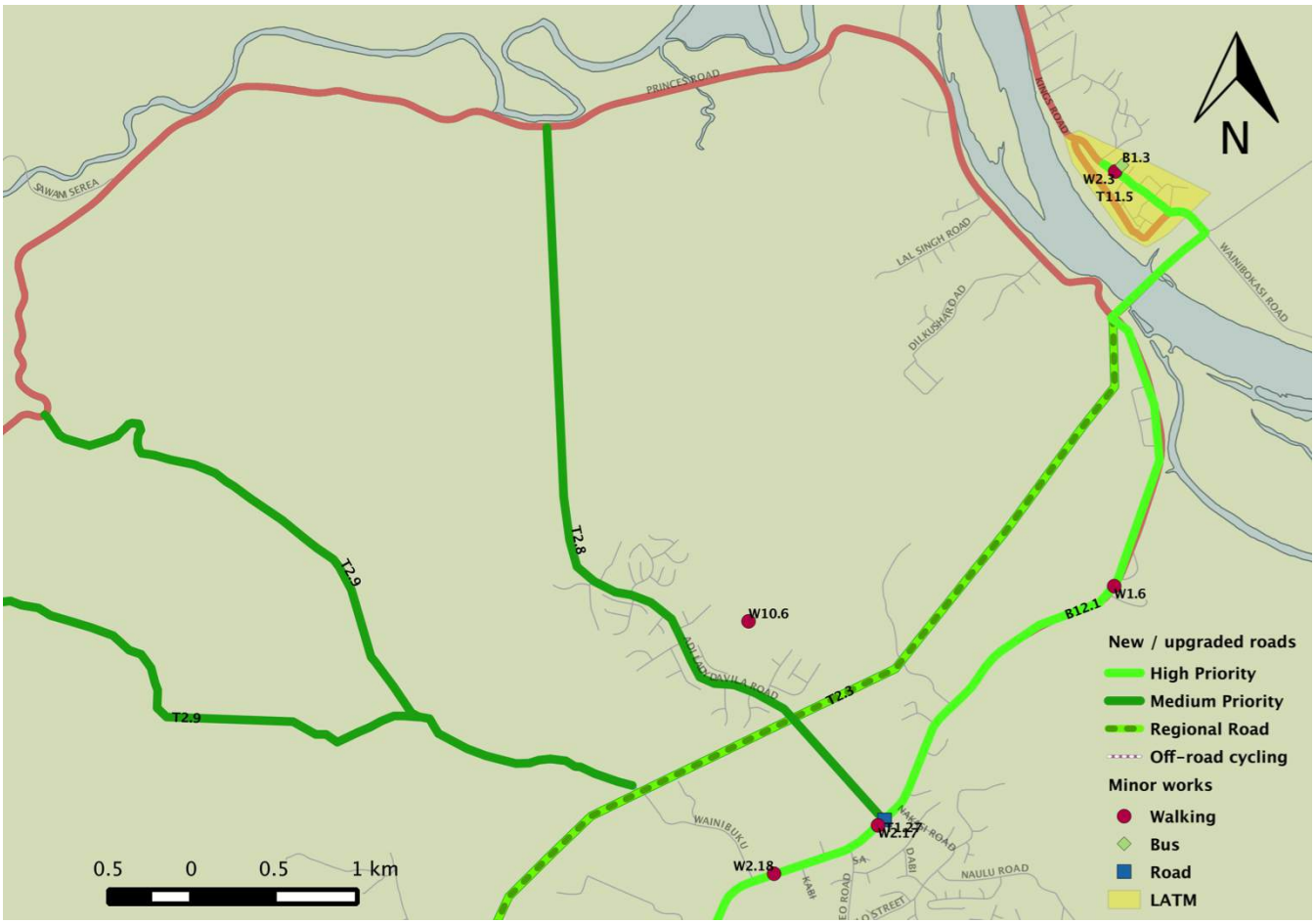
PRIORITY PROJECTS (next 5 years)

- B1.3 Nausori Bus Terminal Relocation, technical support
- B12.1 Kings Road dedicated bus lanes
- T11.5 Nausori Township LATM plan
- W1.6 Koronovia Research School, upgraded ped crossing
- W2.3 Nausori bypass, ped crossing between new market and bus terminal

LONGER TERM PROJECTS (within 15 years)

- T1.27 Adi Lady Davila Rd / Kings Rd intersection upgrade
- T2.3 Regional Road
- T2.8 Adi Lady Davila Rd Upgrade and extension
- T2.9 Wainibuku Rd Extension
- W2.17 Bhawani Dayal School, install ped crossing
- W2.18 Nasinu Muslim College, install ped crossing
- W10.6 Davuilevu Methodist Subdivision, upgrade/install footpaths

Figure 24: Nausori Town Council projects map



6.1.3 NASINU TOWN COUNCIL

PLACES OF SIGNIFICANCE

Valelevu, Kalabu tax free zone, Makoi, Laucala Beach

CURRENT POPULATION

87,500 (2007 census)

FUTURE POPULATION GROWTH TO 2030

30,000 to 40,000 (estimated)

CURRENT NUMBER OF JOBS

21,000 (FNPF statistics)

FUTURE JOB GROWTH TO 2030

8,000 to 12,000 (estimated)

IMPORTANT FUTURE INITIATIVES

Kings Road and Datu Dovi Road Widening
Nasinu bus terminal
Housing developments

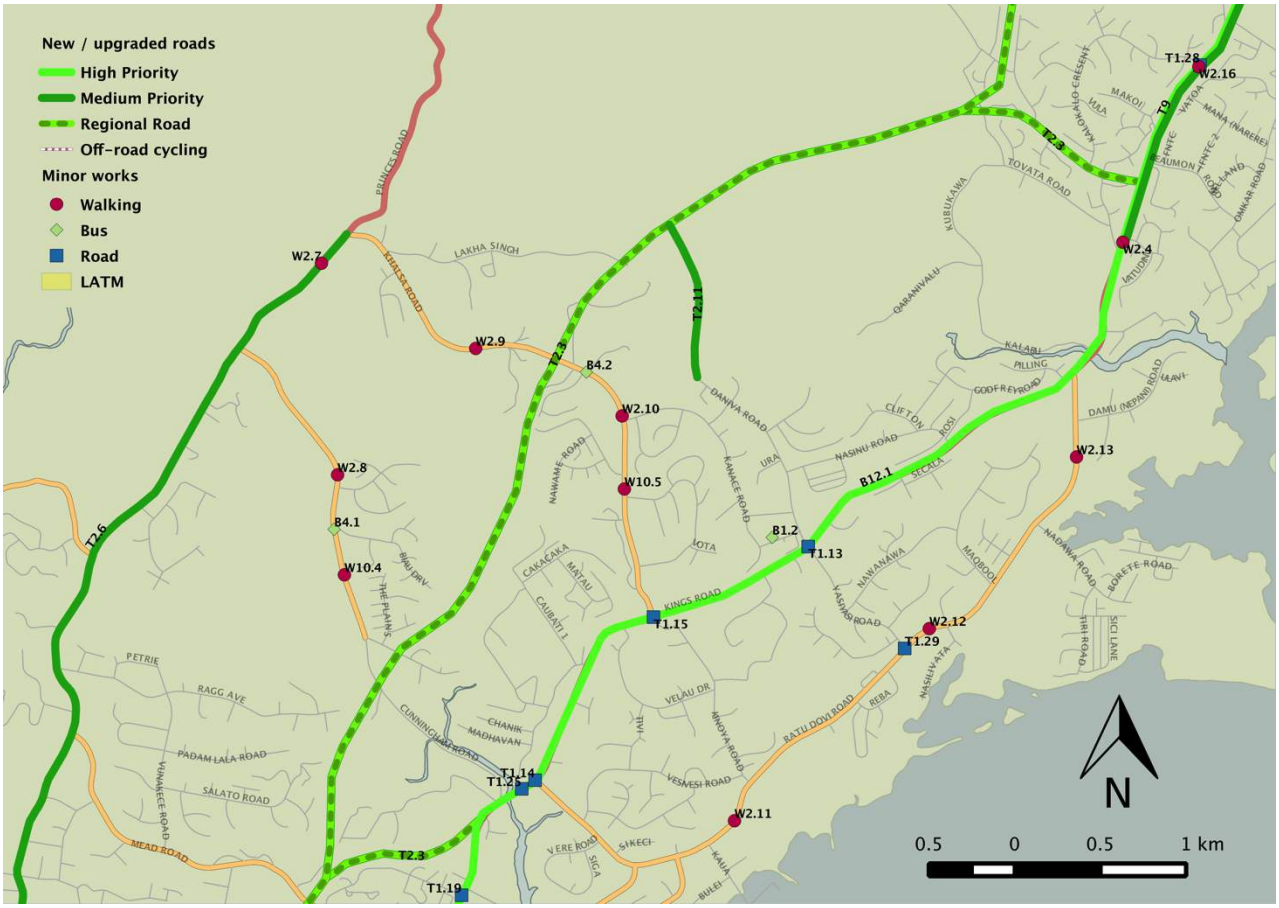
PRIORITY PROJECTS (next 5 years)

- B1.2 Nasinu Bus Terminal
- B4.2 Khalsa Rd and Vunisinu Rd, new bus bays
- B12.1 Kings Road dedicated bus lanes
- T1.14 Kings Rd / Ratu Dovi Rd, intersection upgrade
- T1.15 Kings Rd / Khalsa Rd (Kinoya), intersection upgrade
- W2.11 Ratu Dovi Rd (Vivrass SC), new ped crossing
- W2.12 Ratu Dovi Rd, Nadera, new ped crossing

LONGER TERM PROJECTS (within 15 years)

- T1.13 Kings Rd / Yasiyasi Rd / Daniva Rd
- T1.25 Kings Rd / Wainuvula Rd (South)
- T1.28 Kalokalo Cr / Kings Rd
- T1.29 Ratu Dovi Rd / Yasiyasi Rd
- T2.3 Regional Road
- T2.6 Widen Princes Rd to 4-lanes
- T2.11 Daniva Road extension, to Regional Road
- T9 Remove direct access onto Kings Rd, Narere and Nakasi
- W2.4 Muanikoso / Kings Rd, new ped crossing
- W2.7 Princes Rd southwest of Khalsa Rd, new ped crossing
- W2.9 Khalsa Rd / Tacirua Estate Rd, new ped crossing
- W2.10 Khalsa Rd north of Kanace Rd, new ped crossing
- W2.13 John Bosco School, Ratu Dovi Rd, new ped crossing
- W2.16 Kings Rd / Kalokalo Cr, new ped crossing
- W10.5 Khalsa Rd (full length), install new footpaths

Figure 25: Nasinu Town Council projects map



6.1.4 SUVA CITY COUNCIL

PLACES OF SIGNIFICANCE

Suva CBD, Samabula, Nabua, Tamavua, USP, Sports Precinct, Port, Market, Suva bus stand

CURRENT POPULATION

85,700 (2007 census)

FUTURE POPULATION GROWTH TO 2030

8,000 to 14,000 (estimated)

CURRENT NUMBER OF JOBS

85,000 (FNPF statistics)

FUTURE JOB GROWTH TO 2030

30,000 to 40,000 (estimated)

IMPORTANT FUTURE INITIATIVES

Suva Market and Bus Stand Redevelopment
Rokobili Terminal Project
Land Developments along Grantham Road
Foreshore Redevelopments

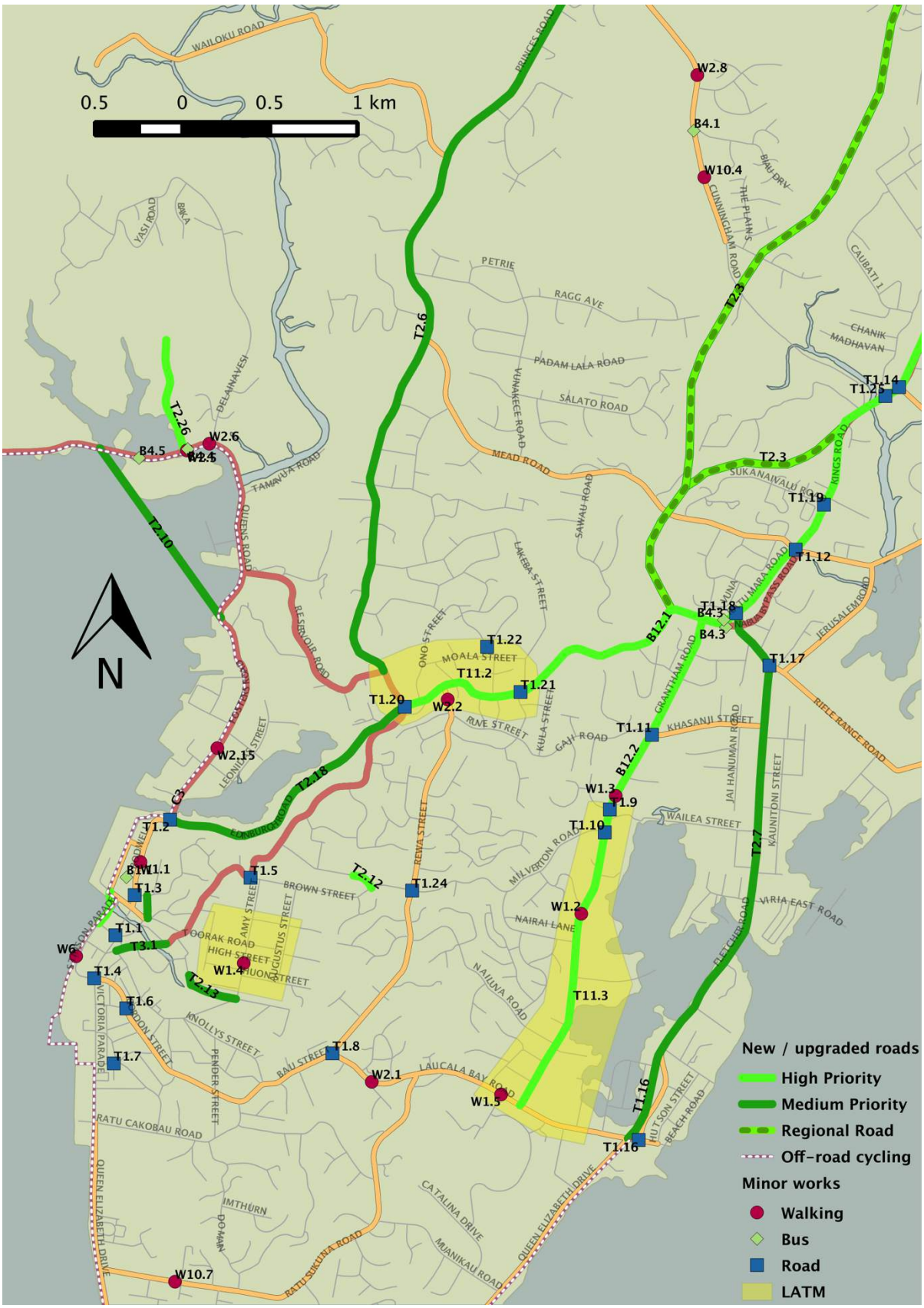
LONGER TERM PROJECTS (within 15 years)

- T2.3 Regional Road
- B12.2 Grantham Road dedicated bus lanes
- T1.3 Rodwell Rd / Robertson Rd, intersection upgrade
- T1.4 Victoria Pde / Gordon St / Scott St, intersection upgrade
- T1.6 Gordon St / Macarthur St / Hercules St, intersection upgrade
- T1.7 Loftus St/Thurston St/Gladstone Rd, intersection upgrade
- T1.11 Grantham Rd / Gaji Rd / Karsanji St, intersection upgrade
- T1.16 Fletcher Rd (south) realignment
- T1.17 Fletcher Rd / Jerusalem Rd, intersection upgrade
- T1.24 Rewa St / Milverton Rd / Brown St, intersection upgrade
- T2.6 Widen Princes Rd to 4-lanes
- T2.7 Widen Fletcher Rd to 4-lanes
- T2.13 New road link connecting Raojibhai Patel to Holland St
- T2.18 Edinburgh Road widening
- T3.1 Renwick Road to be made two-way for the full length
- W1.4 Amy St, upgrade ped crossing
- W2.8 Cunningham Rd north of Biau Dr, new ped crossing
- W10.7 Ratu Sukuna Rd (Draiba Primary to Nasese shops), install footpath

PRIORITY PROJECTS (next 5 years)

- B1.1 Suva City Bus Station Redevelopment
- B4.1 Cunningham Rd and Baiu Dr, new bus bays
- B4.3 Expansion of Nabua bus bays
- B12.1 Kings Road dedicated bus lanes
- C3 Coastal recreational walking and cycling path
- T1.1 Scott St / Thompson St / Edward St, intersection upgrade
- T1.2 Walu Bay Roundabout, intersection upgrade
- T1.5 Waimanu Rd / Brown St, intersection upgrade
- T1.8 Bau St / Rewa St, intersection upgrade
- T1.9 Grantham Rd / Falvey St, intersection upgrade
- T1.10 Grantham Rd / Milverton Rd, intersection upgrade
- T1.12 Kings Rd / Mead Rd Roundabout, intersection upgrade
- T1.18 Ratu Mara Rd / Fletcher Rd, intersection upgrade
- T1.19 Kings Rd / Sukanaivulu Rd, intersection upgrade
- T1.20 Ratu Mara Rd / Princes Rd, intersection upgrade
- T1.21 Ratu Mara Rd / Belo St / Lakeba St, intersection upgrade
- T1.22 Namuka St / Fulaga St, intersection upgrade
- T2.12 New road link connecting Extension Rd to Brown St
- T2.16 New Stinson Parade Bridge (Nabukalou Creek)
- T3.2 Reverse the direction of Nina Street
- T11.1 Toorak Precinct Local Area Traffic Management
- T11.2 Samabula Precinct LATM - Focus on Ratu Mara Rd corridor
- T11.3 Raiwaqi - Laucala Bay Precinct (Grantham Rd) LATM
- W1.1 Rodwell Rd (between Renown St and Robertson Rd), upgrade ped crossing
- W1.2 Grantham Rd (between Bryce St and Nairai Rd) , upgrade ped crossing
- W1.3 Grantham Rd (between Falvey St and Auto City), upgrade ped crossing
- W1.5 Laucala Bay Rd (USP), signalised ped crossing
- W2.1 Yat Sen Primary and Secondary School, ped crossing upgrade
- W2.2 Suva Primary School (Rewa St), ped crossing upgrade
- W2.15 Queens Rd between Walu Bay Rd and Suva Prison
- W6 Suva CBD water front revitalisation
- W10.4 Cunningham Rd (full length), new footpaths

Figure 26: Suva City Council projects map



7 An Integrated Strategy for Greater Suva

7.1 Introduction

The issues currently facing the GSA transportation network (see Section 4) will only be exacerbated by the expected future growth in employment and population. Decisive action is required to implement the identified options (see Section 6 and Appendix C), therefore this section sets out a strategy for staging the options and the initial actions required to implement each option.

It is important to remember that the GSTS is a high-level, strategic document that provides a blueprint for the creation of a more liveable, prosperous and efficient GSA. The Strategy is not intended to include detailed project descriptions and costings for direct implementation, but rather, to provide a generalised list of prioritised projects. The Strategy does not replace the need for further preliminary investigations, business cases and detailed studies to allow the projects to be brought to the delivery phase.

When actioned, the suite of projects will redefine the GSA and move towards an integrated and sustainable transport system that contributes to an inclusive, prosperous and environmentally responsible urbanised area.

7.2 Evaluation Methodology

To establish the prioritisation and staging of the projects, the projects were evaluated based upon value for money, impact, achievability and equity as described previously in Table 13. The estimation of probable cost was used to inform the value for money of each project based on the expected impact of the project.

> *Good value for money is the optimal use of resources to achieve the intended outcomes.*[29]
> - National Audit Office, UK

In addition to the four key criteria shown in Table 13, the overarching transport framework objectives also informed the staging process. Value for money is a measure that is embedded within the transport framework adopted for the GSTS. This measure relates to achieving the optimum balance of whole-life project cost and quality to meet society's requirements. Its assessment involves striking the best balance between the three E's" of economy, efficiency and effectiveness.[30]

[29] *Analytical framework for assessing Value for Money, National Audit Office*

[30] *Value for money and international development: Deconstructing myths to promote a more constructive discussion. OECD Development Co-operation Directorate, May 2012.*

Economy *– reducing the cost of resources used for an activity, with regard for maintaining quality*

Efficiency *– increasing output for a given input, or minimising input for a given output, with regard for maintaining quality*

Effectiveness *– successfully achieving the intended outcomes from an activity*

The continual reference and alignment with the transport framework in terms of assessment ensures that the projects are evaluated consistently. A holistic approach has been used to determine the most appropriate staging program. This includes using the transport framework as an umbrella, while also having consideration for the criteria in Table 13 and the anticipated commencement date and duration of the projects.

7.3 Staging Plan

The Staging Plan provides both FRA and Stakeholders with a clear outline of the recommended projects and their proposed order of implementation.

As described earlier, the Staging Plan can be considered as a pipeline of projects over time (across the next 15 years – the study timeframe). It is noted that as a result of external forces (such as economic pressures, changes in population forecasts or changes in transport mode share) the projects contained within the Staging Plan can be flexed back and forth according to the current pressures and influences at the time. An emphasis has been placed on the projects to be delivered within the next 10 years since these will have an important influence on establishing best practices and processes and reshaping the urban landscape.

A summary of the proposed Staging Plan is presented in Figure 27. For ease of presentation this figure includes single line items for the following project areas, which are then shown in more detail in Figure 28.

- Pedestrian crossing upgrade program (6 individual locations)
- New pedestrian crossing investigation program (17 individual locations)
- Intersection upgrade program (31 individual locations)
- Footpath installation program (7 individual locations)
- Bus infrastructure upgrade program (6 individual stops + future upgrades to 600+ stops)
- School crossing upgrade program (an estimated 75 individual school crossings)

The time period assigned to these programs in Figure 27 represents the earliest commencing project and the longest to complete. It is noted that the school crossing upgrade program does not have defined individual projects, but involves a package of works upgrading an assumed number of school crossings per annum.

Figure 27: Overall Staging Plan (2015-2030)

KEY

- Fiji Roads Authority (FRA)
- Land Transport Authority (LTA)
- Fiji Police
- Suva City Council (SCC)
- Nasinu Town Council (NTC)
- Department of Local Government (DLG)

Other Partners:

FBOS = Fiji Bureau of Statistics
DOH = Department of Housing
MoH = Minister of Housing
NauTC = Nausori Town Council
DTCP = Dept of Town and Country Planning
HA = Housing Authority
FPC = Fiji Ports Corporation

Option Number	Short Project Description	Primary Owner	Partners	Short Term Projects					Medium Term Projects					Long Term Projects					Cost ($m)
				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
B1.1	Suva City Bus Station Redevelopment	FRA	-																$10m
B8	Bus network planning	LTA	LTA																$0.5m
B12.1	Kings Road dedicated bus lanes	FRA	LTA																$40m
C1	Integration of cycling into planning, policy & design frameworks	FRA	-																$0.2m
CP2	Review of car parking pricing	DLG	DLG																$0.2m
O1	Road works scheduling plan	FRA	-																$0.05m
T3.5	CBD road network review and modelling	FRA	-																$0.4m
W3	Suva CBD pedestrian network development	FRA	-																$0.3m
W8	Develop safe routes to schools	FRA	MoH																$0.5m
B1.3	Nausori Bus Terminal Relocation	FRA	NauTC																$2m
O3	Traffic data collection program	FRA	LTA/FBOS/DLG																$7m
R4	Speed enforcement campaign	Police	LTA																$20m
T2.12	Extension Road - Brown Street Link	FRA	-																$1.41m
T3.4	Link traffic signals	FRA	-																$12m
T4	Launch Fiji Blackspot program	FRA	Police																$30m
R2	Expand general enforcement team	LTA	Police																$37.5m
R8	Taxi operation monitoring	LTA	-																$20m
T6	Street lighting upgrades and expansion of street light coverage	FRA	-																$20m
W9	Pedestrian crossing lights upgrade program	FRA	-																$15m
T8	Traffic Impact Assessments for Developments	FRA	DTCP																$0.2m
CP1	Review of on-street car parking restrictions	DLG	FRA																$0.2m
R3	Review operation of mini-buses	LTA	-																$0.2m
T2.16	Stinson Parade Bridge and Traffic Network Updates	FRA	SCC																$4m
T2.26	Nadonumai Road (Lami)	FRA	-																$3.25m
T11.3	Grantham Road (Raiwaqa to Laucala Bay Precinct) LATM	FRA	SCC																$0.7m
T11.5	Nausori Township Local Area Traffic Management	FRA	NauTC																$0.7m
T2.25	Kalekana Settlement Road (Lami)	FRA	-																$4m
T3.2	Reverse the direction of Nina Street	FRA	-																$0.05m
T11.2	Samabula Precinct LATM - Focus on Ratu Mara Rd corridor	FRA	SCC																$1.4m
C2	Establish core bicycle priority network	FRA	-																$0.4m
CP4	Car parking enforcement	LTA	DLG																$9.5m
W4	Suva CBD pedestrian facilities upgrade program	FRA	-																$26m
B1.2	Nasinu Bus Terminal	NTC	DTCP/FRA/LTA																$5m
T11.1	Toorak Precinct Local Area Traffic Management	FRA	-																$0.7m
W12	New Housing Estates	FRA	DOH/ HA/ DTCP																$13m
O2	Travel demand management	FRA	LTA / DLG																$0.2m
C3	Coastal recreational walking and cycling path	FRA	SCC / LTC																$10.8m
CP6	Improved access to CBD car parks	FRA	SCC																$0.2m
R7	Upgrade Maap database	Police	-																$0.2m
W5	Suva CBD pedestrian wayfinding strategy	FRA	-																$0.1m
W6	Suva CBD water front revitalisation	FRA	-																$0.5m
CP3	CBD car parking guidance signage	FRA	FRA																$0.8m
R1.1	Heavy vehicle route planning	FRA	LTA																$0.8m
T2.10	Rokobili Terminal Road	FRA	FPC																$21.2m
T7	Driver training to improve driver behaviour	LTA	-																$1.4m
T2.4	Lami Bypass	FRA	-																$31.08m
R1.2	Expand heavy vehicle enforcement team	LTA	-																$5m
B2	Bus regulation enhancements	LTA	Police																$7m
B6	Vehicle emissions restriction program	LTA	Police																$1.5m
B11	Public transport vehicle testing program	LTA	Police																$3m
B12.3	Dedicated bus lanes investigations	FRA	FRA																$0.5m
B7	Bus driver training scheme	LTA	-																$5m
B9	Bus network monitoring program	LTA	-																$2m
W7	Pedestrian awareness campaign	LTA	-																$5.5m
B12.2	Grantham Road dedicated bus lanes	FRA	LTA																$12m
CP5	Park and Ride facilities	FRA	DTCP																$5m
T3.1	Renwick Road to be made two-way for the full length	FRA	FRA																$1.5m
T2.8	Adi Lady Davila Road Upgrade and extension	FRA	HA																$83.2m
T9	Remove direct driveway access onto Kings Road	FRA	DTCP																$11.4m
T2.6	Widen Princes Road to 4-lanes	FRA	-																$56.16m
R9	Bus stop rationalisation program	LTA	Police																$0.8m
T2.3	Regional Road	FRA	-																$249.6m
T2.7	Widen Fletcher Road to 4-lanes	FRA	-																$29.12m
T2.13	Raojibhai Patel Street and Holland Street link	FRA	-																$2.82m
T2.18	Edinburgh Road widening	FRA	-																$12m
T2.9	Wainibuku Extension	FRA	HA																$47m
T2.11	Daniva Road extension	FRA	-																$9.4m
T2.19	Queens Road widening	FRA	-																$57.2m
PEDESTRIAN CROSSING UPGRADE PROGRAM		**FRA**																	**$0.95m**
NEW PEDESTRIAN CROSSING LOCATION INVESTIGATION PROGRAM		**FRA**																	**$3.55m**
INTERSECTION IMPROVEMENT PROGRAM		**FRA**																	**$16.7m**
FOOTPATH INSTALLATION PROGRAM		**FRA**																	**$8.84m**
BUS INFRASTRUCTURE IMPROVEMENT PROGRAM		**FRA**																	**$4.55m**
SCHOOL CROSSING UPGRADE PROGRAM		**FRA**																	**$8.0m**

Figure 28: Program Staging Plan (2015-2030)

KEY

Fiji Roads Authority (FRA)

Other Partners:

DOH = Department of Housing

Option Number	Short Project Description	Primary Owner	Partners	Short Term Projects					Medium Term Projects					Long Term Projects					Cost ($m)
				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
PEDESTRIAN CROSSING UPGRADE PROGRAM																			
W1.6	Koronovia Research School	FRA	-																$0.05m
W1.2	Grantham Rd (between Bryce St & Nairai Rd)	FRA	-																$0.15m
W1.3	Grantham Rd (at Raiwaqa between Falvey St and Auto City Place)	FRA	-																$0.15m
W1.1	Rodwell Rd (between Renown St & Robertson Rd)	FRA	-																$0.15m
W1.5	Laucala Bay Rd (USP)	FRA	-																$0.3m
W1.4	Amy St pedestrian treatment	FRA	-																$0.15m
NEW PEDESTRIAN CROSSING LOCATION INVESTIGATION PROGRAM																			
W2.1	Yat Sen Primary and Secondary School - Laucala Bay Rd	FRA	-																$0.5m
W2.3	Nausori Bypass (between new market and bus stand)	FRA	-																$0.5m
W2.15	Queens Rd between Walu Bay Roundabout and Suva Prison	FRA	-																$0.3m
W2.2	Suva Primary School (Rewa St, between Ratu Mara Rd and Kikau St	FRA	-																$0.15m
W2.11	Ratu Dovi Rd north-east of Kaua Rd	FRA	-																$0.15m
W2.12	Ratu Dovi Rd, Nadera. Opp. Dr Ram Lakhan School	FRA	-																$0.3m
W2.4	Muanikoso intersection with Kings Rd	FRA	-																$0.15m
W2.5	Queens Rd at Nadonumai Rd, Lami	FRA	-																$0.15m
W2.6	Queens Rd at Delainavesi Rd, Lami	FRA	-																$0.15m
W2.7	Princes Rd southwest of Khalsa Rd	FRA	-																$0.15m
W2.8	Cunningham Rd 100m north of Biau Dr	FRA	-																$0.15m
W2.9	Khalsa Rd west of Tacirua Estate Rd	FRA	-																$0.15m
W2.10	Khalsa Rd north of Kanace Rd	FRA	-																$0.15m
W2.13	Ratu Dovi Rd outside John Bosco School	FRA	-																$0.15m
W2.16	Kings Rd at Kalokalo Cr intersection	FRA	-																$0.15m
W2.17	Bhawani Dayal School (Kings Rd, Nakasi)	FRA	-																$0.15m
W2.18	Nasinu Muslim College (Kings Rd / Wainibuku Rd)	FRA	-																$0.15m
INTERSECTION IMPROVEMENT PROGRAM																			
T1.30	Queens Rd / Lami St (Wailada Estate)	FRA	-																$0.05m
T1.31	Queens Rd / Nasevou St (Lami Town)	FRA	-																$0.05m
T1.32	Queens Rd / Vetaia St (Lami Town)	FRA	-																$0.05m
T1.33	Queens Rd / Solomoni St (Lami Town)	FRA	-																$0.05m
T1.5	Waimanu Rd / Brown St	FRA	-																$0.8m
T1.2	Walu Bay Roundabout: Foster Rd / Harris Rd / Edinburgh Dr	FRA	-																$0.8m
T1.18	Ratu Mara Rd / Fletcher Rd	FRA	-																$0.4m
T1.8	Bau St / Rewa St	FRA	-																$0.4m
T1.9	Grantham Rd / Falvey St	FRA	-																$0.4m
T1.10	Grantham Rd / Milverton Rd	FRA	-																$0.4m
T1.14	Kings Rd / Ratu Dovi Rd (Centrepoint)	FRA	-																$0.4m
T1.15	Kings Rd / Khalsa Rd (Kinoya)	FRA	-																$0.4m
T1.19	Kings Rd / Sukanaivulu Rd	FRA	-																$0.4m
T1.12	Kings Rd / Mead Rd / Ratu Mara Rd / Golf Link Rd Roundabout	FRA	-																$1.5m
T1.21	Ratu Mara Rd / Belo St / Lakeba St	FRA	-																$0.4m
T1.22	Namuka St / Fulaga St	FRA	-																$0.2m
T1.20	Ratu Mara Rd / Princes Rd / Edinburgh Drive / Waimanu Rd	FRA	-																$1.5m
T1.1	Scott St / Thompson St / Edward St	FRA	-																$0.8m
T1.3	Rodwell Rd / Robertson Rd	FRA	-																$0.4m
T1.13	Kings Rd / Yasiyasi Rd / Daniva Rd	FRA	-																$0.8m
T1.7	Loftus St/Thurston St/Gladstone Rd	FRA	-																$0.2m
T1.25	Kings Rd / Wainuvula Rd (South)	FRA	-																$0.4m
T1.24	Rewa St / Milverton Rd / Brown St	FRA	-																$0.8m
T1.29	Ratu Dovi Rd / Yasiyasi Rd	FRA	-																$0.4m
T1.4	Victoria Pde / Gordon St / Scott St	FRA	-																$0.4m
T1.6	Gordon St / Macarthur St / Hercules St	FRA	-																$0.4m
T1.11	Grantham Rd / Gaji Rd / Karsanji St	FRA	-																$0.8m
T1.17	Fletcher Rd / Jerusalem Rd / Mukta Ben Rd / Rifle Range Rd	FRA	-																$0.8m
T1.28	Kalokalo Cr / Kings Rd	FRA	-																$0.4m
T1.27	Adi Lady Davila / Kings Rd	FRA	-																$0.4m
T1.16	Fletcher Rd (south) realignment	FRA	-																$1.5m
FOOTPATH INSTALLATION PROGRAM																			
W10.3	Nasevou St, Lami (Queens Rd to Quaia Crossing)	FRA	-																$1.44m
W10.2	Labiko and Vetaia St, Lami	FRA	-																$0.4m
W10.1	Solomoni St, Lami (Queens Rd to Nakula St)	FRA	-																$0.4m
W10.4	Cunningham Rd (Kings Rd to Princes Rd)	FRA	-																$2.8m
W10.6	Davuilevu Methodist Subdivision	FRA	DOH																$0.5m
W10.7	Ratu Sukuna Rd (between Draiba Primary and Nasese shops)	FRA	-																$0.5m
W10.5	Khalsa Rd (Kings Rd to Princes Rd)	FRA	-																$2.8m
BUS INFRASTRUCTURE IMPROVEMENT PROGRAM																			
B4.1	Cunningham Rd / Baiu Dr Bus Bays	FRA	-																$0.05m
B4.2	Khalsa Rd / Vunisinu Rd Bus Bays	FRA	-																$0.05m
B4.3	Expansion of Nabua Bus Bays	FRA	-																$0.5m
B4.4	Queens Rd / Nadonumai Rd Bus Bays (eastbound)	FRA	-																$0.05m
B4.5	Queens Rd / Baro subdivision Bus Bays (westbound)	FRA	-																$0.05m
B4.6	Expansion of Lami Town Bus Bays	FRA	-																$0.25m
B4	Bus stop upgrade program	FRA	-																$3.6m
SCHOOL CROSSING UPGRADE PROGRAM																			
W11	School crossing upgrade program	FRA	-																$8m

From Figure 27 it can be seen that a number of regulatory changes, key projects and aggregated programs will run for the duration of the Staging Plan (15 years). These are typically ongoing, annual programs (such as the Blackspot program, data collection and speed enforcement) that do not have an end date and therefore are likely to continue beyond 2030 (subject to progress made, ongoing reviews and funding).

The highest priority projects, along with those that have minimal implementation barriers and have a high impact in terms of achieving the desired outcomes, have generally been assigned immediate commencement dates. This is consistent with the goals of the strategy.

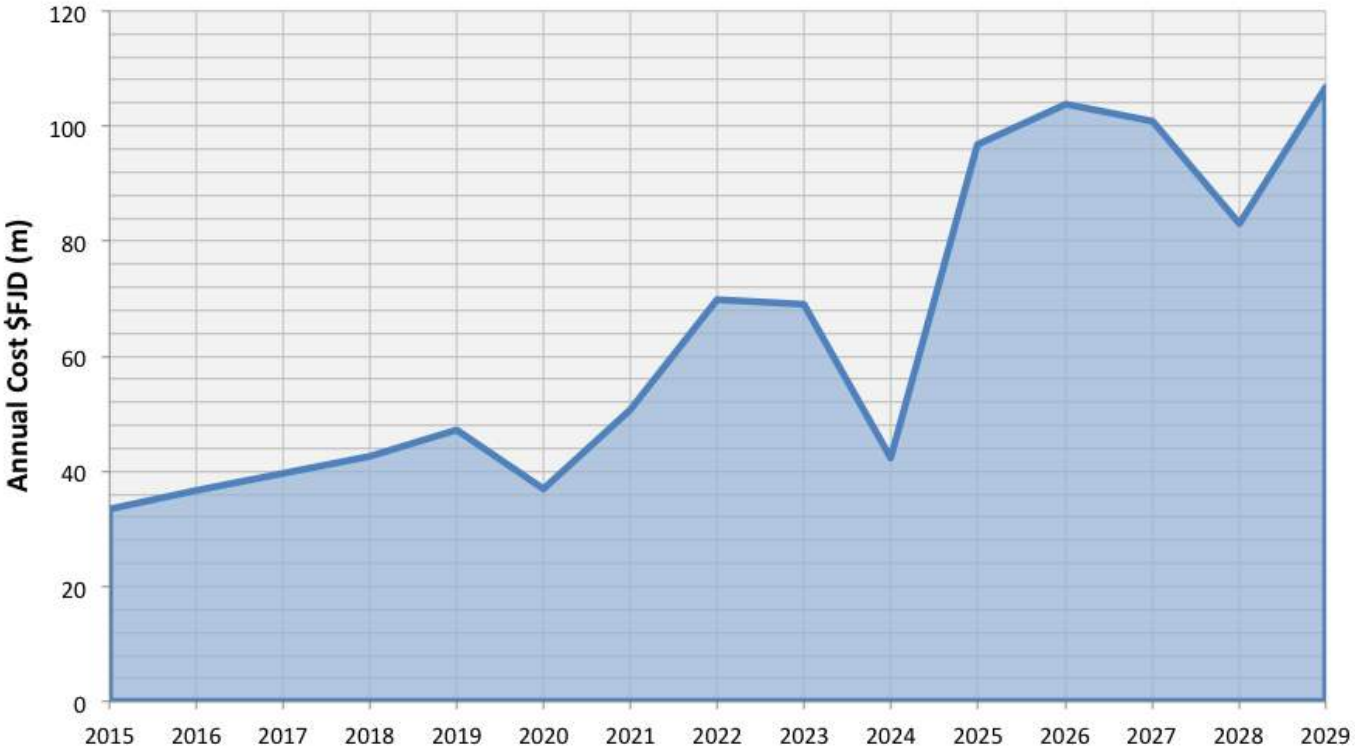
While every effort has been made during the development of the strategy to determine the expected resources and timeframes of the projects, the information provided includes high level estimates of probable cost and does not replace the need for a sound business case to be prepared for all major projects. For this Staging Plan to remain relevant and the priorities to be representative of Greater Suva's current needs, it is essential that the plan be regularly reviewed, monitored and modified, as required, to most appropriately target the key issues of the day. Further information with respect to reviewing and monitoring the strategy is provided in Section 8.

In order to obtain an indicative annual expenditure for the next fifteen years based on the above Staging Plan, the average annual project costs have been aggregated and are presented in Figure 29. It is important to note that Figure 29 is a broad level, indicative estimate and does not make allowance for variations in project expenditure over the duration of a project (e.g. a five year project may spend 50% of the budget in the first year).

The investment profile allows for the following:

- The initial five year period requires the lowest annual investment and is focused on low-cost, high impact projects. Over this period FRA is assumed to also be heavily investing in maintenance and renewals projects.
- Expenditure increases from 2020 onwards with all projects requiring annual funding now implemented
- The spike in project expenditure at 2025 relates to the start of the Regional Road Project and other high cost projects
- The final five years of project expenditure have the highest level of investment per annum due to a small number of high cost projects (such as widening of Queens Rd and Fletcher Rd), these projects could be pushed out beyond the 15 year timeframe of this study.

Figure 29: Annual expenditure on projects by year, 2015-2030 ($FJD2014)



7.4 Action Plan

The Staging Plan described earlier provides an outline of the key projects and programs along with their likely cost and duration. This is necessary to fulfill the strategic objectives of the study and enables the project interdependencies to be articulated. To assist Stakeholders to further prioritise and plan for the implementation of the projects, an Action Plan has been developed that outlines the suggested projects to be delivered in the first ten years of the Staging Plan.

Table 15 provides a summary of the years 2015 to 2019, within each of the five years the projects have been grouped into three levels of priority.

1) **High Priority A** – *options that offer the highest value for money and are achievable in the short to medium term. These options are considered to be the baseline options to respond to the existing transportation issues in the GSA.*
2) **High Priority B** – *options that are achievable in the short to medium term but offer lower value for money than the High Priority A options. These options are still considered to be part of the baseline options to respond to the existing transportation issues in the GSA but could be deferred if funding is not available.*
3) **Medium Priority**– *options that are generally medium to long term in scope and should be considered as additions to the High Priority options. They are aspirational options that will contribute to further enhancing productivity and liveability in the GSA.*

The actioning of these projects over the next five years will provide important immediate benefits and improvements, along with establishing a good foundation that can be built upon in subsequent projects Table 16 summarises the projects to be delivered from 2020 to 2024. Refer to Appendix C for full project descriptions.

The Action Plan has deliberately focussed on delivering actions over the next ten years. Actions beyond this period are longer term projects and these will be reviewed, along with all of the actions, on an annual basis, with the priorities and actions updated as a result of external influences. Many projects will span a number of years. The Action Plan identifies the first year in which some form of work (planning, design or implementation) will commence.

Table 15: Proposed short-term actions (2015-2019)

Option No.	Project	Action	Ownership
2015 Projects			
2015 High Priority A			
B1.1	Suva City Bus Station Redevelopment	Liaise with SCC to Integrate external road infrastructure with the proposed Suva City Bus Station Redevelopment. Develop concept designs for the surrounding road network.	FRA / LTA / SCC
B4.1, B4.2 B4.4, B4.5	New Bus Bays	Design and implement new bus bays on Cunningham Rd, Khalsa Rd and Queens Rd.	FRA
B4.3, B4.6	Expand existing bus bays	Plan, design and implement new layout options to increase capacity of the bus bays at Nabua and Lami Town.	FRA
B8	Bus network planning	Prepare a Public Bus Network Development Plan – tender data collection and study to consultants	LTA / FRA
B12.1	Kings Road dedicated bus lanes	Conduct feasibility into bus lanes along Kings Road from Nausori to Samabula. Design and construction to follow.	FRA / LTA
C1	Integration of cycling into planning	In-house project, FRA to identify appropriate staff to carry out cycling review and updates to procedures	FRA
CP2	Review of car parking pricing	Economic study to be tendered to consultants. Results to be used by Councils to justify a pricing increase to government.	DLG
O1	Road works scheduling plan	In-house project, FRA to identify appropriate staff to update road work scheduling plans	FRA
T1.5	Intersection improvements	Road safety audit, concept and detailed design for Waimanu Rd / Brown St intersection	FRA
T1.30, T1.31 T1.32, T1.33	Intersection Improvements	Design and construct right hand turn bays and increase intersection geometry along Queens Rd at Lami St, Nasevou St, Vetaia St and Solomoni St.	FRA
T3.5	CBD road network review and modelling	Tender to consultants an update to the GSA Aimsun model and review of the CBD road network.	FRA
W1.6	Pedestrian Crossing Upgrade Program	Upgrade lights at Koronovia Research School pedestrian crossing and install signage to direct pedestrians to crossing	FRA
W2.1, W2.3 W2.15	New Pedestrian Crossing Program	Review, design and implement new pedestrian crossings at Yat Sen Primary School, the new Nausori market a and Queens Rd between Walu Bay Roundabout and Suva Prison	FRA

Option No.	Project	Action	Ownership
W3	Suva CBD pedestrian network development	Tender to consultants a study to develop a Suva CBD pedestrian network (this feeds into option W4, the implementation of pedestrian upgrades)	FRA
W8	Develop safe routes to schools	Tender to consultants a study to identify the safest walking routes to schools.	FRA / Min. of Education
2015 High Priority B			
B1.3	Nausori Bus Terminal Relocation	Manage and design the relocation and integration of taxi and mini-bus stands within or adjacent to the new bus stand and market area.	FRA / NTC
O3	Traffic data collection program	Tender study to consultants to develop and implement a program for yearly traffic data collection and analysis within the GSA.	FRA / FBOS / LTA / DLG
R4	Speed enforcement campaign	Prepare business case and lobby government to increase budgets for speed enforcement campaign. Including new equipment and additional enforcement staff.	Police / LTA
T2.12	Extension Road to Brown St, new link	Undertake a feasibility assessment and prepare concept design plans for a new link from Extension Rd to Brown St. Review traffic management around CWM hospital	FRA
T3.4	Link traffic signals	Commence program to identify and implement how to link traffic signals using SCATS	FRA
T4	Launch Blackspot program	Develop and implement an internal program to use the Fiji Police Maap Database (crash statistics) to prioritise future intersection upgrades. Allocate budget for the program.	FRA / Police
W10.3	Footpath Installation Program	Design and install new footpaths along Nasevou St (Lami) from Queens Rd to Quaia Crossing	FRA
W11	School crossing upgrade program	Develop and implement an internal program to identify school crossing upgrades at critical locations. Allocate budget for the program.	FRA
2015 Medium Priority			
R2	Expand general enforcement team	Prepare business case and lobby government to increase budgets for staff dedicated to enforcement	LTA / Police
R8	Taxi operation monitoring	Prepare business case and lobby government to setup a taxi monitoring division within LTA	LTA
T6	Street lighting upgrades and expansion of street light coverage	Develop and implement an internal program to establish a routine maintenance and renewal program for existing streetlights and investigate opportunities to install streetlights. Allocate budget for the program.	FRA
T8	TIA's for developments	Nominate and train staff across organisations to properly evaluate the impacts of commercial and residential developments on the surrounding road networks	FRA / DTCP
W9	Pedestrian crossing lights upgrade program	Develop and implement an internal program to establish a routine maintenance and renewal program for existing pedestrian crossing lights. Allocate budget for the program.	FRA

Option No.	Project	Action	Ownership
2016 Projects			
2016 High Priority A			
CP1	Review of on-street car parking restrictions	Study to be tendered to consultants. Results to be used by Councils to introduce new short-term restrictions in high use areas	Councils / FRA
R3	Review operation of mini-buses	Feasibility study to be tendered to consultants to review government policy/enforcement of mini-bus operation.	LTA
T1.2	Intersection Improvements	Investigate, design and construct intersection upgrades at Walu Bay Roundabout	FRA
T1.18	Intersection improvements	Road safety audit, concept and detailed design for Ratu Mara Rd / Fletcher Rd intersection	FRA
T2.16	Capacity improvement	Design and construct a new alignment for Stinson Parade Bridge to the west and urban renewal of existing bridge for pedestrians	FRA / SCC
2016 High Priority B			
T2.25, T2.26	Capacity improvement	Design and construct upgraded road surface at Nadonumai Road (Lami) and Kalekana Settlement Road (Lami). FRA to make these a priority under road renewal program.	FRA
T11.2, T11.3 T11.5	Local Area Traffic Management	LATM studies to be tendered to consultants for Grantham Rd, Samabula and Nausori Town.	FRA / SCC / NTC
2016 Medium Priority			
T3.2	Reverse the direction of Nina Street	Prepare concept and detailed design plans to reverse the direction of traffic on Nina Street (if supported by T3.5)	FRA
2017 Projects			
2017 High Priority A			
C2	Establish core bicycle priority network	Tender to consultants a study to develop a GSA cycling network	FRA
T1.8, T1.10	Intersection Improvements (signalisation)	Prepare concept and detailed design to convert Bau St / Rewa St and Grantham Rd / Milverton Rd to signalised intersections. Install SCATS.	FRA
T1.9	Intersection Improvements	Road safety audit, concept and detailed design for Grantham Rd / Falvey St intersection	FRA
W1.2, W1.3	Pedestrian Crossing Upgrade Program	Prepare concept and detailed design plans then implement signalised pedestrian crossings along Grantham Rd	FRA
W2.2	New Pedestrian Crossing Program	Review, design and implement new pedestrian crossings at Suva Primary School	FRA
2017 High Priority B			
B1.2	Nasinu Bus Terminal	Acquire and rezone land. Plan and design a transport hub within Nasinu (preferred site is Valelevu),	DTCP / FRA / NTC / LTA
CP4	Car parking enforcement	Prepare business case and lobby government to increase budgets for car parking enforcement officers	LTA / DLG
W4	Suva CBD pedestrian facilities upgrade	Develop and implement a program for the re-surfacing of footpaths and associated pedestrian facilities.	FRA

Option No.	Project	Action	Ownership
2017 Medium Priority			
T1.12, T1.14 T1.15	Intersection Improvements	Road safety audit, concept and detailed design for Kings Rd / Mead Rd Roundabout, Kings Rd / Ratu Dovi Rd (Centrepoint), Kings Rd / Khalsa Rd	FRA
T1.19	Intersection Improvements	Prepare concept and detailed design to convert Kings Rd / Sukanaivulu Rd to signalised intersections. Install SCATS.	FRA
T11.1	Local Area Traffic Management	LATM study to be tendered to consultants for Toorak Precinct	FRA / SCC
W1.1, W1.5	Pedestrian Crossing Upgrade Program	Prepare concept and detailed design plans, and construct signalised ped crossings on Rodwell Rd and Laucala Bay Rd	FRA
W10.2	Footpath Installation Program	Design and install new footpaths along Labiko and Vetaia St from Lami Town to Marist Convent School	FRA
W12	Footpath Installation Program	Implement program to identify, design and install footpaths along local streets when housing developments occur	DTCP / DTCP / HA / DoH
2018 Projects			
2018 High Priority A			
B4	Bus stop upgrade program	Develop and implement a program to upgrade bus stop infrastructure to provide footpaths, passenger information, seating, lighting, and shelter.	FRA
O2	Travel demand management	Tender to consultants the development of a program to drive mode shift towards sustainable transport modes	FRA / LTA / DLG
T1.21, T1.22	Intersection Upgrades	Undertake a road safety audit followed by a concept and detailed design for intersection upgrades at Ratu Mara Rd / Belo St / Lakeba St and Namuka St / Fulaga St	FRA
W2.11 W2.12	New Pedestrian Crossing Program	Prepare concept and detailed design plans, and construct signalised pedestrian crossings on Ratu Dovi Rd (Vivrass SC and Dr Ram Lakhan Memorial School)	FRA
2018 High Priority B			
C3	Coastal recreational walking and cycling path	Design and construct a high quality recreational off-road shared path following the coastline between Lami and Suva Point	FRA
2018 Medium Priority			
CP6	Improved access to CBD car parks	Tender to consultants a study to review existing access to car parks in the CBD. Develop and implement solutions that will minimise the impact on peak hour traffic.	FRA / SCC
R7	Upgrade Maap database	Upgrade the existing crash database to enhance the ability to analyse blackspots and present crash statistics. Develop into a user pays system.	Police
T1.20	Intersection Investigation	Investigate redesign of Ratu Mara Rd / Princes Rd / Edinburgh Drive / Waimanu Rd intersection and bus stops	FRA
W5	Suva CBD pedestrian wayfinding strategy	Implement the pedestrian wayfinding strategy for the Suva CBD as outlined in option W4	FRA
W6	Suva CBD water front revitalisation	Plan and design for improved pedestrian amenity following Stinson Parade Bridge rebuild (option T2.16)	FRA

Option No.	Project	Action	Ownership
W10.1	Footpath Installation Program	Design and install new footpaths along Solomoni St (Lami)	FRA
2019 Projects			
2019 High Priority A			
T1.1	Intersection Improvement	Investigate, design and construct intersection upgrades at Scott St / Thompson St intersection	FRA
2019 High Priority B			
CP3	CBD car parking guidance signage	Planning study to be tendered to consultants. Existing signage identified and new signage erected.	FRA / SCC
R1.1	Heavy vehicle route planning	Tender to consultants a study to develop a designated heavy vehicle road network and classify routes that will have restricted heavy vehicle usage.	FRA / LTA
2019 Medium Priority			
T2.4	Lami Bypass	Undertake a feasibility route options study, and subsequently plan, design, and construct a two-lane inland bypass of Lami Town in stages.	FRA
T2.10	Rokobili Terminal Road	Conduct traffic studies to evaluate the design and benefits of the proposed new road. Develop detailed design.	FRA / Ports Authority
T7	Driver training	Review the existing driver education training material and the stringency of licence testing.	LTA
W10.4	Footpath Installation Program	Design and install new footpaths along the full length of Cunningham Road	FRA

Table 16: Proposed medium-term actions (2020-2024)

Option No.	Project	Action	Ownership
2020-2024 Projects			
B2	Bus regulation enhancements	Prepare business case and lobby government to increase budgets for enforcement of bus regulations	LTA / Police
B6	Vehicle emissions restriction program	Promote awareness of the 'black smoke' hotline. Heavier prosecution of vehicles emitting black smoke	LTA / Police
B7	Bus driver training scheme	Develop an education program (additional to licence training and testing) for the drivers of public bus services.	LTA
B9	Bus network monitoring program	Establish a framework for the performance monitoring of contracted bus operators.	LTA
B11	Public transport vehicle testing program	Establish legislation and framework for accredited and registered bus operators to undergo annual testing for vehicle safety.	LTA
B12.2, B12.3	Dedicated bus lanes	Plan, design and construct dedicated bus lanes along Grantham Rd. Investigate options for further locations, including Fletcher Rd, Rewa St, Laucala Bay Rd, Ratu Dovi Rd, Bau St, Queens Rd, Princes Rd and Victoria Parade.	FRA / LTA
CP5	Park and Ride facilities	Plan and construct park and ride facilities at key sites along the Suva-Nausori corridor (in conjunction with dedicated bus lane option B12)	FRA / DTCP
R1.2	Expand heavy vehicle enforcement team	Prepare business case and lobby government to increase budgets for the enforcement of heavy vehicles including load limits and restricted access roads.	LTA
T1.3 T1.4 T1.6 T1.7 T1.11 T1.13 T1.17 T1.24 T1.25 T1.27 T1.28 T1.29	Intersection Improvement Program	Undertake a road safety audit followed by a concept and detailed design for intersection upgrades at: Rodwell Rd / Robertson Rd Victoria Pde / Gordon St / Scott St Gordon St / Macarthur St / Hercules St Loftus St / Thurston St / Gladstone Rd Grantham Rd / Gaji Rd / Karsanji St Kings Rd / Yasiyasi Rd / Daniva Rd Fletcher Rd / Jerusalem Rd / Mukta Ben Rd / Rifle Range Rd Rewa St / Milverton Rd / Brown St Kings Rd / Wainuvula Rd (South) Adi Lady Davila and Kings Rd Kalokalo Cr / Kings Rd Ratu Dovi Rd / Yasiyasi Rd	FRA
T2.6, T2.8	Capacity upgrades	Undertake a feasibility study, and subsequently plan, design, and construct 4-laning projects on Princes Rd and Adi Lady Davila Rd (including extension)	FRA / HA
T3.1	Network improvements	Prepare concept and detailed design plans to allow two-way movements along Renwick Rd. (if supported by T3.5)	FRA
T9	Network improvements	Conduct feasibility assessment and prepare concept designs for the removal of direct access onto Kings Rd in Narere and Nakasi, (to be replaced with service lanes)	FRA / DTCP
W1.4	Pedestrian Crossing Upgrade Program	Prepare concept and detailed design plans, and construct signalised pedestrian crossings on Amy Street	FRA

Option No.	Project	Action	Ownership
W2.4 W2.5 W2.6 W2.7 W2.8 W2.9 W2.10 W2.13 W2.16 W2.17 W2.18	New Pedestrian Crossing Program	Prepare concept and detailed design plans, and construct new pedestrian crossings on: Muanikoso intersection with Kings Rd Queens Rd at Nadonumai Rd, Lami Queens Rd at Delainavesi Rd, Lami Princes Rd southwest of Khalsa Rd Cunningham Rd 100m north of Biau Dr Khalsa Rd west of Tacirua Estate Rd Khalsa Rd north of Kanace Rd Ratu Dovi Rd outside John Bosco School Kings Rd at Kalokalo Cr intersection Bhawani Dayal School (Kings Rd and Wainibuku Road) Nasinu Muslim College (Kings Rd, Nakasi)	FRA
W7	Pedestrian awareness campaign	Develop an education campaign that raises awareness of pedestrians as vulnerable road users	LTA
W10.5 W10.6 W10.7	Footpath Installation Program	Design and install new footpaths along: Khalsa Rd (Kings Rd to Princes Rd) Davuilevu Methodist Subdivision Ratu Sukuna Rd (between Draiba Primary and Nasese shops)	FRA

Descriptions of the main technical projects are provided below:

- Traffic signal linking or urban traffic control is a form of an intelligent transport system (ITS) that optimises traffic flow. Significant operating cost savings can be made by using self-calibrating software, which removes the need for manual control. Such signal linking systems are used in many countries across the world. Urban traffic control responds automatically to changes in traffic flow through the use of vehicle detectors.
- The provision of integrated transport interchanges will have a significant impact on the ease of operation of sustainable modes particularly at key nodes (such as the Suva CBD). Reducing walking interchange distances and improving access to and from such interchanges.
- Dedicated bus lanes are provided to improve travel times for buses. In the case of Kings Road it is proposed to dedicate sections of road for the use of bus only and provide bus jump lanes at all signalised intersections to give buses local priority at signalised intersections. This would also involve a change to road rules to give buses priority when pulling out from bus bays.
- The development of a bus network plan will have a two-fold impact upon bus travel as a mode. Initially the network plan will provide further guidance to existing users and operators as to the extent and operation of the network. Secondly, the network plan will allow for gaps within the bus coverage across the GSA to be identified and addressed in due course. The same concept is true for pedestrian and cycling network plans.

7.5 Interdependencies

Interdependencies between options were considered in establishing the proposed Staging Plan. In this regard, there are a range of options that are dependent upon, or influenced by, the outcomes of other larger options. Table 17 summarises the interdependencies by option or program.

Table 17: Interdependency between options

Option No.	Description	Dependent On
B4	*Bus stop upgrade program*	**B8 - Bus network planning** Before bus stop infrastructure is upgraded, a comprehensive bus network plan is required to ensure that investment is targeted and responds to network requirements.
B12.1	*Kings Road dedicated bus lanes*	Planning can begin immediately, however implementation depends on Kings Road being widened to 4-lanes (existing FRA Project)
B12.2 T2.7 T2.6 T2.19 T2.18	*Grantham Rd bus lanes* *Fletcher Road widening* *Princes Road widening* *Queens Road widening* *Edinburgh Road widening*	**B12.3 - Dedicated bus lanes investigations** The business case for widening will depend on the feasibility of dedicated bus lanes being effectively implemented on these roads.
C3	*Coastal recreational walking and cycling path*	**C2 – Establish Core Bicycle Priority Network** The development of this route should ideally be informed by the preparation of an overarching core bicycle priority network, to ensure that concept designs are well integrated with the broader cycling network.
CP3	*Car parking guidance signage (CBD) Program*	**CP6 – Improved Access to CBD Car Parks** This study will inform the signage program
CP4	*Car parking enforcement*	**CP1 - Review of on-street car parking restrictions** **CP2 - Review of car parking pricing** An increase in enforcement should be informed by a review of existing process, procedures, restrictions and pricing.
CP5	*Park and Ride facilities*	**B12.1 – Kings Rd dedicated bus lanes** Park and ride facilities should be implemented following the provision of dedicated bus lanes. This will increase the likelihood of uptake at the park and ride facilities as bus travel times will become more competitive with private travel.
R1.2	*Expand heavy vehicle enforcement team*	**R1.1 - Heavy vehicle route planning** The enforcement component related to regulation of restricted access roads must be precluded by the development of heavy vehicle routes

Option No.	Description	Dependent On
T1.1 T1.2 T1.3 W1.1	*Scott St / Edward St / Thomson St* *Walu Bay Roundabout: Foster Rd / Harris Rd / Edinburgh Dr* *Rodwell St / Robertson Rd* *Rodwell Rd (between Renown St and Robertson Rd*	**B1.1 - Suva Bus Station upgrade works** The design of the surrounding road network and pedestrian crossings should have consideration for the future operation of the Suva Bus Station, to ensure that all vehicle movements are considered. **T2.16 Stinson Parade Bridge and Traffic Network Updates** The reinstatement of Stinson Parade Bridge will enable a rework of the surrounding traffic network. This will impact on the design of surrounding intersections.
T1.9, T1.12 T1.13, T1.14 T1.15, T1.18 T1.19, T1.21	*Various intersection improvements*	**T4 – Launch Fiji Blackspot Program** These intersections have been included based on high accident numbers. They could form the initial intersections dealt with by the Blackspot program.
T1.9 T1.10 W1.2 W1.3 W1.5	*Grantham Rd / Falvey St* *Grantham Rd / Milverton Rd* *Grantham Rd / Bryce St* *Grantham Rd / Auto City* *Laucala Bay Rd (USP)*	**T11.3 – Raiwaqa to Laucala Bay Precinct Local Area Traffic Management** Intersection and pedestrian crossing design should take place following resolution of local access arrangements identified and implemented as part of the LATM scheme.
T1.16	*Fletcher Rd (south) realignment*	**T2.7 Widen Fletcher Rd to 4-lanes** The realignment will most likely only be justified if the road is widened to 4-lanes
T1.20 T1.21 T1.22 W2.2	*Ratu Mara Rd / Belo St / Lakeba St* *Namuka St / Fulaga St* *Rewa St / Milverton Rd* *Suva Primary School*	**T11.2 – Samabula Precinct Local Area Traffic Management** Intersection and pedestrian crossing design should take place following resolution of local access arrangements identified and implemented as part of the LATM scheme.
T1.25	*Kings Rd / Wainuvula Rd (South)*	**T1.14 - Kings Rd / Ratu Dovi Rd (Centrepoint)** Design works are to be coordinated for proximity reasons.
T2.10	*Rokobili Terminal Road*	Triggered by the relocation and expansion of the Rokobili Terminal itself (Fiji Ports project)
T2.11	*Daniva Road Extension*	**T2.3 – Regional Road** This option provides a direct link to the Regional Road.
T2.13	*Raojibhai Patel St and Holland Street link*	**CP6 – Improved access to CBD Car Parks** **T3.5 – Suva CBD Modelling** Overarching studies required to ensure this option is delivered appropriately.
T2.16 T3.1 T3.5	*Stinson Parade Bridge and Traffic Network Updates* *Renwick Road to be made two-way for the full length* *Reverse the flow of Nina St*	**T3.5 – Suva CBD Modelling** Modelling outputs underpins justification for proposed works.
T11.5	*Nausori Township Local Area Traffic Management*	**B1.3 – Nausori Bus Terminal Relocation** Local area traffic management will be beneficial after existing plans for the relocated bus terminal are complete.

Option No.	Description	Dependent On
W1.4	*Amy St pedestrian treatment*	**T11.1 – Toorak Precinct Precinct LATM** Pedestrian crossing design should take place following resolution of local access arrangements identified and implemented as part of the LATM scheme.
W4 W5	*Suva CBD pedestrian facilities upgrade program* *Suva CBD pedestrian wayfinding strategy*	**W3 – Suva CBD Pedestrian Network Development** Network development will inform both infrastructure upgrades and the wayfinding strategy.
W6	*Suva CBD waterfront revitalisation*	Suva City Bus Terminal, Market and Foreshore Redevelopment (SCC Project) **W3 - Suva CBD Pedestrian Network Development** **T2.16 – Stinson Parade Bridge and Traffic Network Updates** Urban realm project will need to be planned with regards to other important projects in the area.
W7	*Pedestrian awareness campaign*	**T4 – Launch Fiji Blackspot Program** Pedestrian awareness will need to ensure it does not duplicate works completed as part of the blackspot program
W11	*School crossing upgrade program*	**W8 – Develop Safe Routes to School** Overarching safe routes program will directly inform school crossing upgrades.

7.6 Ownership

Each project or program has been assigned to a single agency to plan, manage and deliver the associated transport infrastructure, campaign or suite of options – they are referred to as the primary owner. In some instances, Stakeholders will be required to support the primary owner to successfully implement an option – referred to as a partner. For example in the case of the option to implement a '*Vehicle emission restriction program*' (option B6), LTA has been assigned as the owner of the option, but the Fiji Police Force will be a key partner due to their involvement in prosecuting vehicles with high levels of emissions. It is the primary owners responsibility to establish how the project will be implemented and how partner agencies will be engaged.

A summary of the ownership of options is shown in Table 18, this table highlights that the majority of the options have been assigned to FRA, followed by the LTA and the Fiji Police Force. Agencies such as the Department of Local Government, Department of Town and Country Planning, Housing Authority and Councils due to their broad level of interface with the transport system contribute to the implementation of the strategy as partners rather than being responsible for the delivery of options.

FRA commissioned the GSTS and it is logical that the responsibility for the Strategy's delivery and implementation rests firmly with FRA. Furthermore, FRA will play a large role in ensuring that partner organisations are fulfilling their roles within the study in terms or planning and delivery.

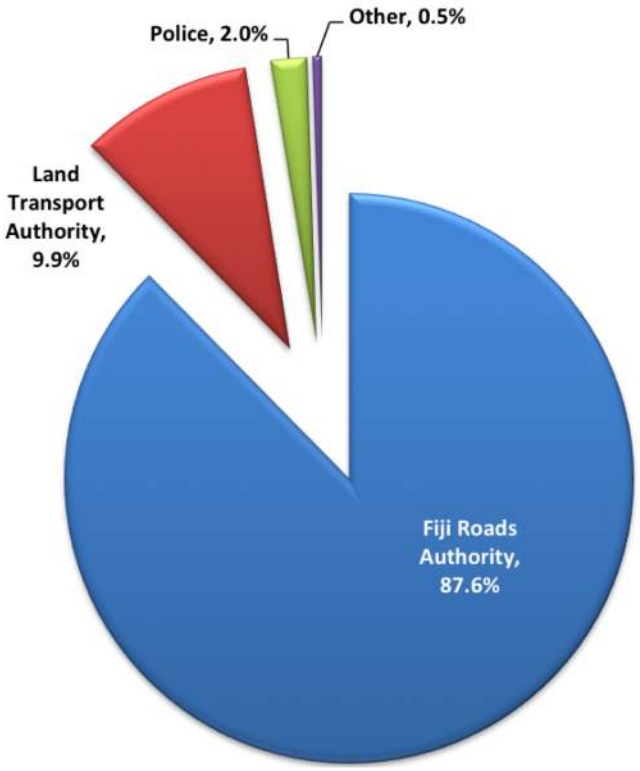
Table 18: Option ownership by timing and cost

OWNER	PRIMARY OWNER						Projects as partner
	0-5 year projects	Cost ($M)	5-10 year projects	Cost ($M)	10-15 year projects	Cost ($M)	
Fiji Roads Authority	76	288.5	34	181.6	8	408.6	3
Land Transport Authority	6	69.1	7	29	1	0.8	8
Police	2	20.4	0	0	0	0	6
Nasinu Town Council	1	5	0	0	0	0	0
Dept. of Local Government	2	0.4	0	0	0	0	3
Suva City Council	0	0	0	0	0	0	7
Department of Town and Country Planning	0	0	0	0	0	0	5
Department of Housing	0	0	0	0	0	0	2
Housing Authority	0	0	0	0	0	0	3
Nausori Town Council	0	0	0	0	0	0	2
Fiji Ports Authority	0	0	0	0	0	0	1
Ministry of Education	0	0	0	0	0	0	1
TOTAL	**87**	**383.4**	**41**	**210.6**	**9**	**409.4**	**41**

The proportional allocation of project expenditure according to the responsible stakeholder is presented in Figure 30. The full cost of each project has been assigned to the primary owner.

It is highly recommended that the Steering Committee established for this project (with the addition of the Fiji Police Force, the four relevant Councils, Ministry of Finance and the Ministry of Strategic Planning, National Development and Statistics) continue to meet every six months to monitor and review the progress of the study. This will also enable the strategy to be regularly reviewed in light of changes in the external environment (economic, political, social, environmental) to confirm the strategic relevance of all options and re-prioritise where appropriate. This is discussed further in Section 8.

Figure 30: Project expenditure by primary owner (2015-2030)



8 Strategy Implementation and Conclusion

There is no value in developing a strategy if it is not implemented. A failure to implement a strategy is often a direct result of a lack of direction in terms of delivery and implementation (or indeed appropriate checks and balances) within the strategy. To ensure that the Greater Suva Transportation Strategy is successfully implemented the following steps are crucial:

***ENGAGE** – with Stakeholders and the community*

***ALIGN** – budgets with the Strategy*

***MONITOR** – and evaluate implementation*

***ADAPT** – to changes in the environment*

8.1 Engage

The GSTS has been developed using a collaborative process involving a Steering Committee with active representatives from FRA and Stakeholders along with larger stakeholder workshops throughout the process. Every effort has been made to engage with key agencies to ensure a high level of familiarity and involvement with the entire strategy. In addition, the final strategy has been shared with and presented to key Stakeholders.

Furthermore, since this is a 15-year strategy, FRA must ensure that not only the short-term actions are implemented but also that in dealing with partner agencies that the strategy is referenced and relied upon for future works (noting the need to review the Strategy at regular intervals to ensure external factors have not altered the original strategy priorities).

To encourage engagement with the Strategy it is recommended that the existing GSTS Steering Committee be continued with the addition of the Fiji Police Force, the four relevant Councils, Ministry of Finance and the Ministry of Strategic Planning, National Development and Statistics (see Section 8.3).

8.2 Align

The options outlined in this strategy should be integrated into annual budgets for the responsible agencies. For FRA this means integration of the GSTS Action Plan with the Public Sector Investment Programme and Asset Management Plans. This should be an immediate priority for FRA along with commencing more detailed planning and investigation as outlined in the Action Plan.

Similarly, other Stakeholders should use the GSTS to inform strategic planning and use the GSTS as justification for future funding. Specific examples include LTA pushing for a significant increase in enforcement officers.

8.3 Monitor

As mentioned in Section 8.1, the GSTS Steering Committee should continue to meet to monitor and review the progress of the study. Regular meetings should be held every six months, where the status of options are both updated and where possible assessed for performance. In order to assess performance a continuous program of data collection and analysis will be required as per one of the recommended high priority projects (traffic counts, travel-time surveys, bus patronage). Also to be discussed are the future projects and programs by agency, to ensure future proposals and directions are in line with the GSTS vision, strategic aims and objectives.

The suggested members of the GSTS Steering Committee are as follows:

- Fiji Roads Authority, CEO
- Land Transport Authority, CEO
- Fiji Police Force, Director of Traffic Transport Control
- Transport Planning Unit, Director
- Ministry of Strategic Planning, National Development and Statistics, Permanent Secretary
- Ministry of Finance, Permanent Secretary
- Department of Local Government, Director
- Department of Town and Country Planning, Director
- Department of Housing, Director
- Housing Authority of Fiji, CEO
- Nausori Town Council, Special Administrator
- Nasinu Town Council, Special Administrator
- Lami Town Council, Special Administrator
- Suva City Council, Special Administrator

FRA will need to appoint a dedicated chairperson to co-ordinate meetings and undertake the required administrative tasks associated with regular meetings. Roles and responsibilities need to be defined within the committee to ensure it runs successfully. An output of the committee should be an annual report which evaluates progress against the GSTS Action Plan.

8.4 Adapt

To maintain relevance over time the GSTS must be adaptable and flexible enough to respond to:

- New land use developments
- Non-road transport developments (airports, ports)
- Budgetary decreases or increases
- Political drivers
- Environmental conditions (pollution)
- Behavioural changes (i.e decreased bus-mode share or increased bike mode share)
- Technological advancements (i.e electric vehicles)
- Developments outside Fiji

The Strategy should be reviewed annually as part of the GSTS Steering Committee to confirm the strategic relevance of each option in the Strategy in light of changes in external conditions. Changes in the external environment, which are either currently uncertain or foreseen, could necessitate changes to the strategy or affect the ability to achieve the studies aims and objectives. It is likely that certain events will trigger the need for a re-prioritisation of certain options or even the addition of new options.

8.5 Conclusion

The GSA is a major urban hub of the South Pacific and its rapid growth has resulted in a number of deficiencies in the transportation network. Planned investment in high impact projects has the potential in the future to assist in making the GSA a highly liveable and prosperous region. To do this the transport network must give priority to mass transit and encourage active travel modes by improving safety and regulation.

The Staging Plan and Action Plan provided as part of the GSTS outlines what infrastructure should be delivered to contribute to the vision of the GSA. This blueprint for the transport system will make key steps towards ensuring the GSA has an integrated and sustainable transport system that contributes to an inclusive, prosperous and environmentally responsible region.

Appendix A Other Studies

Previous Transportation Strategy for Greater Suva

The '*Transportation Study of the Greater Suva Urban Area*' was prepared by GHD (Australia) in March 2001. The transportation strategy was based largely around a mostly pre-defined list of projects, some of which had been around since the 1970's. The action plan for road projects was based primarily on addressing deficiencies identified from a NETANAL[31] transport model. Whilst the transportation strategy covered all modes, the resultant strategy defined a large number of road projects with little or no specific initiatives for public transport, walking, cycling and general traffic management.

Transport modelling undertaken was extensive in scope and resulted in the recommendation of some projects that did not appear to be justified such as a tunnel through Tamavua. Unfortunately the model developed is not owned by FRA (or any other government bodies) and was not available to the consultant team for this study.

Some important data collection exercises were undertaken including a Home Interview Survey (650 households, 3,500 people), Journey-to-Work Survey (of 2,600 employed persons) as well as sample vehicle occupancy surveys and vehicle counts. Unfortunately none of these have been repeated on a routine basis since 2001 so the ability to analyse trends cannot be done formally. Bus was found to be the dominant mode of transport in the GSA and it is likely to still be the dominant mode today.

Other Relevant Transport and Land Use Studies

In addition to the 2001 Transportation Strategy, numerous other reports of relevance have been reviewed, these studies are listed in Table A-1, along with the key recommendations or findings from those reports. There are also a number of studies of interest to the GSTS that ran currently with this study. They are listed in Table A-2, along with a description of their relevance to the GSTS.

Table A-1: Studies reviewed

Report name and year	Author	Key recommendations / findings
Fiji National Transport Sector Plan 1993	Beca / ADB	• Develop standard guidelines for transport infrastructure assessment and economic appraisal • Establish a Transport Planning Unit • Establish a Transport Database and regular data collection • FRUP2 and FRUP3 • Road projects focused on sealing of unsealed roads • Supports formation of LTA and a need for more effective enforcement of vehicle construction and use
Fiji National Transport Sector Plan 2004, Policy Review and Update	Beca / ADB	• Install weighbridge equipment • Monitor overloaded vehicles and emissions

[31] *A strategic transport modelling software package, no longer widely used*

Report name and year	Author	Key recommendations / findings
Decade of Action for Road Safety Booklet, 2011-2020	Fiji Government	• Safe roads, drivers and vehicles • Road safety education • Accident data and research • Traffic law enforcement
Fiji National Energy Policy 2013-2020	National Energy Policy Review Advisory Committee	• Transport sector heavily relies on imported fuel • Promote fuel efficiency through regulation of motor vehicles. • Support transport policy that encourages a shift to energy efficient modes of transport
A Green Growth Framework for Fiji: Restoring the Balance in Development that is Sustainable for Our Future, 2014	Ministry of Strategic Planning, National Development and Statistics	• Encourage the use of fuel-efficient vehicles to reduce the transport sectors dependence on imported fossil fuels, including through the review of existing relevant policies. • Develop and demonstrate alternative fuel sources for land transport. • Shift towards public transportation and non-motorised land transport, due to the significant increase in the number of vehicles on Fiji's roads.
Roadmap for Democracy and Sustainable Socio-Economic Development 2010-2014	Ministry of Strategic Planning, National Development and Statistics	• Goal: To provide cost-efficient transport services that are safe and environmentally sustainable to enhance access to services and markets • Strategy: Promote the use of public transport • Strategy: Introduction of effective measures to reduce the number of road deaths through enabling legal frameworks • Strategy: continue investment in the construction, maintenance and upgrading of the national transport network supported by enabling legislation and regulation enforced • Strategy: Ensure access to all forms of transport • Strategy: Promote the use of fuel efficient vehicles
Constitution of The Republic of Fiji, 2013	Prime Ministers Office	• Every person has the right of access, membership or admission, without discrimination on a prohibited ground, to…public transportation services and taxis (26.5) • The State must take reasonable measures within its available resources to achieve the progressive realisation of the right of every person to have reasonable access to transportation (34.1) • A person with any disability has the right to reasonable access to…public transport and information (42.1a)
Peoples Charter for Change, Peace and Progress, 2008	National Council for Building a Better Fiji	• Pillar 5: Achieving higher economic growth while ensuring sustainability • Pillar 6: Making more land available for productive and social purposes

Report name and year	Author	Key recommendations / findings
Report on the Fiji National Consultation Workshop on the Development of an Energy Efficiency Project for Land Transportation, 2008	SOPAC	• Improve energy use performance in transport vehicles • Reduce emissions from the land transport sector – monitor and enforce vehicle emissions • Reduce traffic congestion - through traffic management, real-time information and higher vehicle occupancy
Fiji Ports Development Project, 2011	ADB (Independent Evaluation Department)	• Kings Wharf has been a given a lifespan till 2020 • Next Suva Port Development Strategy needs to proceed
Urban Growth Management Plan (UGMAP) for the Greater Suva Region, 2004	ADB / Fiji Government	• Includes detailed maps of Urban Growth Plans • Need to review road design standards, especially new subdivisions and peri-urban areas
Urban Policy Action Plan 2004-06	ADB / Fiji Government	• 30% of population in underserviced peri-urban areas • Lack of planning contributing to rapidly growing squatter and informal settlements. • Supports integration of urban transport and road development into metropolitan planning in GSA • Transport system could become car dependant
Fiji Bus Industry Review, 2009	Orion Consulting Associates	• Significant data collection • Cost index model • Develop rural hub and spoke route system • E-ticketing and fraud reduction • Reduction of illegal operators (carriers and minibuses) • An integrated transport system • Establish a Public Transport Improvement Board
National Transport Consultative Forum Communiqué, 2013	TPU	• Review of 2012 actions – some consultancy conducted, few actions taken. • 2013 actions – focus on reviews and data collection. Main topics included alternate transport systems, traffic management and emissions / fuel efficiency
Airports Fiji Limited Annual Report 2011	AFL	• Air traffic data • No air traffic forecasts or masterplans included
Draft Feasibility Study for GSA Sustainable Urban Transport Project – Volume 1 and 2, 2012	CDIA	• Bus terminal upgrades at Suva, Nausori and Nasinu • Taxi stand upgrades at Nasinu and Lami • List of footpaths to upgrade • Specific intersection upgrades
Queens Road (Lami Town) Feasibility Report, 2013	MWH Global	• Road and signalling improvements for short and mid term • 4-lane Queens Road retained as long term solution

Report name and year	Author	Key recommendations / findings
Infrastructure Maintenance in the Pacific: Challenging the Build-Neglect-Rebuild Paradigm, 2013	PRIF	• Addressing resource constraints • Establishing accountability and appropriate incentives • Building organisational capability for asset management planning and implementation • Use of Development Assistance
Proposed Lami, Suva – Cycle Way, 2012	Cycling Fiji	• 18km recreational cycle-way from Wailekutu to Laucala Bay Road • Bike park at Lami
Rokobili Terminal Project (Investor Prospectus), 2012	Fiji Ports Corporation Limited	• $500 million international container and multi-purpose port facility • On 50.5 hectares of reclaimed land, 3km from current Port of Suva site • Kings Wharf to become a cruise ship terminal based on Darling Harbour (Sydney) • New road through the site from RSYC, north-west to Queens Road
Regional Road / Coastal Road, 2005	Roughton International	• Regional Route would be more expensive to build • Regional Road offers more development opportunities • Coastal Route preferred if tolling is considered (as a limited access expressway)
Suva Market and Bus Station Feasibility Study, 2004	Sharma Architects	• Without data collection, the traffic impact assessment concluded that the proposed development will create several vulnerable locations. Predominantly intersections on Rodwell Road, pedestrian crossing, and access points to multilevel car park.
Nausori bus stand relocation, 2014	Ashok Balgovind	• Bus stand geometry has been compressed since the initial design • No space to relocate taxi and mini-bus stands from current location

Table A-2: Ongoing studies of relevance

Report Name and authority	Timeframe	Organisation / Relevance
Fiji Tourism Strategy, Ministry of Tourism	Jan 2014 till July 2014	• Awarded to Tourism Research Board – NZ based consultants • Of most relevance are any proposed tourism plans for Nausori Airport and Port of Suva
Fiji National Transport Sector Plan, Ministry of Works, Transport and Public Utilities	April 2014 till Dec 2014	• Funded by ADB • Awarded to Beca International (Fiji and NZ) • Deals with policy and regulation issues, Fiji wide • Will recommend a small number of infrastructure projects for ADB funding

Report Name and authority	Timeframe	Organisation / Relevance
Speed Limit Review, LTA	Jan 2014 till TBC	• Awarded to consultants from Singapore • Reported aim is investigate feasibility of increasing speed limits on key arterials
Suva Market, Bus Terminal and Foreshore Redevelopment, SCC	May 2014 till Dec 2014	• Project managed by HLKJacobs (Fiji and NZ) • Focussed on redevelopment within the boundaries of the existing market and bus stand area • Foreshore redevelopment is focussed on the reclamation of land along Stinson Parade

A selection of extracts from previous reports that directly relate to options included in the GSTS are provided on the following pages.

Figure A-1: Proposed Lami-Suva cycle way, 2012

Figure A-2: Proposed redevelopment of the Suva Market and Bus Stand, 2004

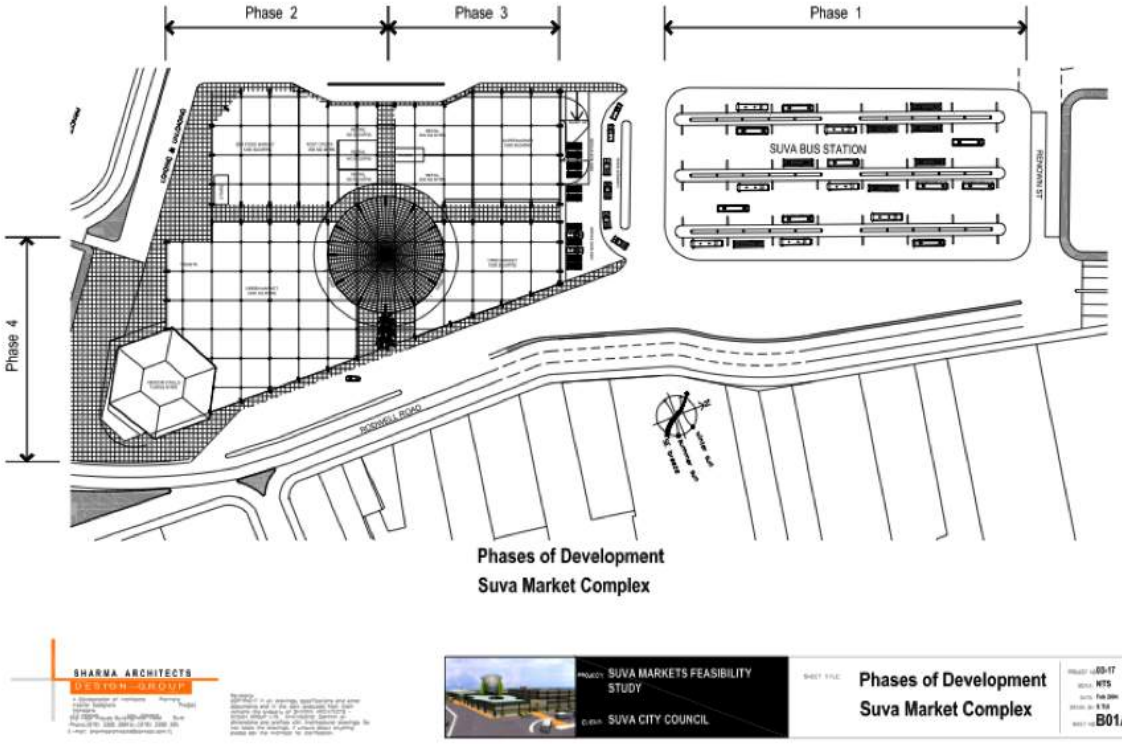


Figure A-3: Redevelopment plans for the Nausori Market and Bus Stand relocation, 2014

Figure A-4: Proposed coastal route, Roughton International report, 2005

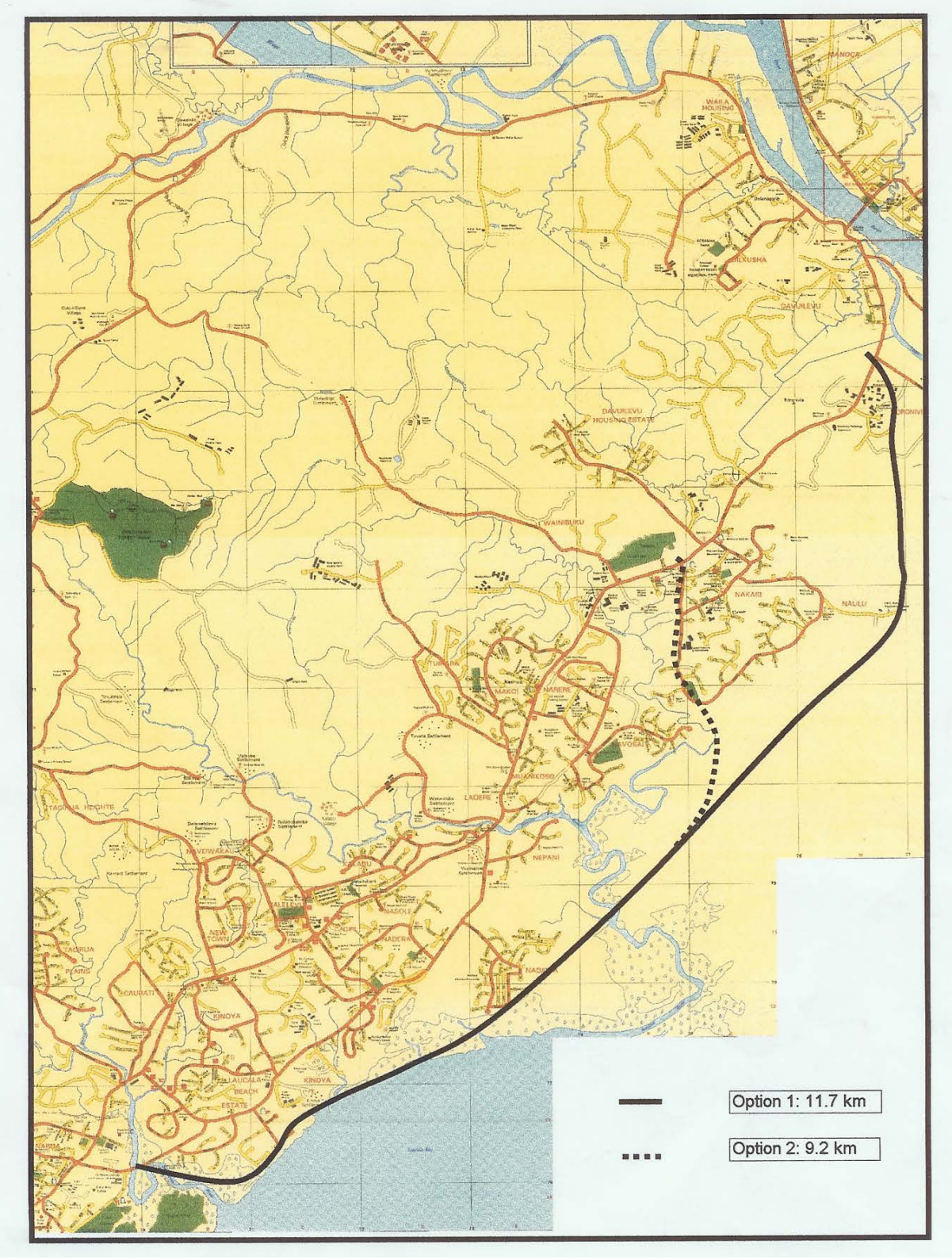
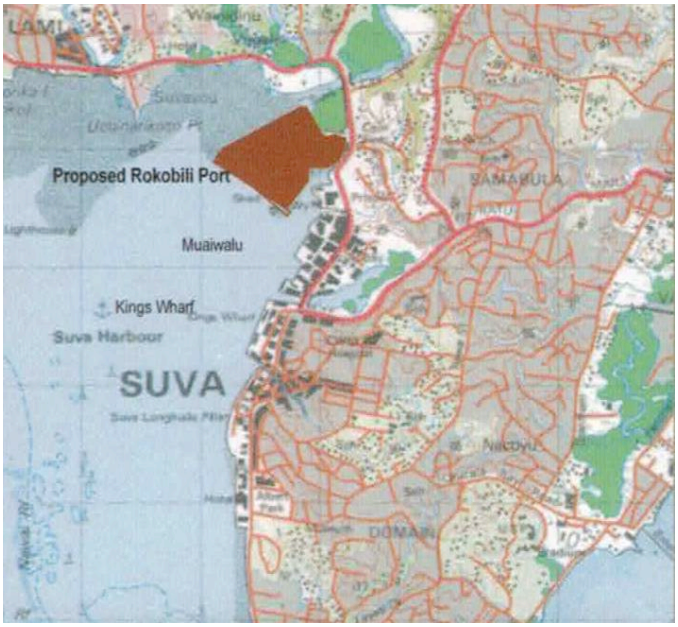


Figure A-5: Proposed Rokobili terminal project, 2013

Full Development

- 50.5 Ha reclamation (2.4 x 106m³ of fill)
  - Functions as above
  - Tax free zone
- 800m berthage
  - Water depth, as above
- Estimate F$500 (contingency, engineering)
- Geotechnical Study done over whole footprint of proposed development
- Fishing Rights have been paid to landowners
- EIA Study completed and approved by Environment Department
- Development Lease given by Lands Department



Appendix B Consultation Details

The following list is the list of organisations that attended the workshop on February 5th 2014:

- Basic Industries
- Carpenters Motors
- Cycling Fiji
- Department of Environment
- Department of Housing
- Department of Lands
- Department of Town and Country Planning
- Fiji Association of Architects
- Fiji Broadcasting Commission
- Fiji Bus Operators Association
- Fiji Disabled People's Association
- Fiji Electricity Authority
- Fiji Institute of Engineers
- Fiji Mini Bus Association
- Fiji One
- Fiji Police Force
- Fiji Ports Corporation Limited
- Fiji Roads Authority
- Fiji Sports Council
- Fiji Sun
- Fiji Taxi Association
- Fiji Times
- Fiji Water
- FMF Foods
- Housing Authority of Fiji
- Island Buses
- Lami Town Council
- Land Transport Authority
- Ministry for Rural and Maritime Development
- Ministry of Finance
- Ministry of Health
- Ministry of Industry and Trade
- Ministry of Public Enterprises, Communications, Civil Aviation and Tourism
- Ministry of Social Welfare, Women and Poverty Alleviation
- Ministry of Strategic Planning, National Development and Statistics
- MWH Global
- Naitasiri Provincial Council
- Nasinu Town Council
- Nausori Town Council
- New World Ltd
- Pacific Energy
- Paradise Beverages
- Public Rental Board
- Rewa Provincial Council
- St John Ambulance
- Suva City Council
- Tacirua Transport Co Ltd
- Tailevu Provincial Council
- Tebara Transport Ltd
- Telecom Fiji Limited
- TNT Express Worldwide Ltd
- University of the South Pacific
- Vinod Patel
- Water Authority Fiji
- Williams and Gosling Ltd

The following list is the list of organisations that were invited but were unable to attend workshop on February 5th 2014:

- CDP Services Ltd
- Citiline Bus Services Ltd
- Dee Cees Services Ltd
- Department of Civil Aviation
- DHL Express (Fiji)
- EMS Courier Post
- Federal Express
- Fiji Chamber of Commerce
- Fiji Commerce and Employers Federation
- Fiji National Council for Disabled Persons
- Fiji National University
- Housing Assistance and Relief Trust
- International Union for Conservation of Nature
- I'Taukei Land Trust Board
- Ministry of i-Taukei Affairs
- Ministry of Agriculture
- Ministry of Agriculture - Land and Water Resource Management Division
- Ministry of Education, National Heritage, Culture and Arts, Youth and Sports, Labour, Industrial Relations and Employment
- Mobil
- Nasese Bus Co Ltd
- National Fire Authority
- Nausori Rural Local Authority
- Nadera Transport Ltd
- Provincial Administrators Office - Rewa
- Provincial Administrators Office – Naitasiri
- Provincial Administrators Office – Tailevu
- Raiwaqa Buses Ltd
- Republic of Fiji Military Forces
- Suva Rural Local Authority
- Sunbeam Transport Ltd
- S Nair Transport
- TOTAL

The following organisations, who were unable to attend the workshop, were later consulted during the study:

- Airports Fiji Limited
- Department of Local Government
- Fiji Bureau of Statistics
- Fiji National Provident Fund
- Fiji Police Force
- Housing Authority of Fiji
- I'Taukei Land Trust Board
- Ministry of Works, Transport and Public Utilities
- Shorebus Limitied
- Tebara Bus Transport Limited
- Transport Planning Unit

Appendix C Detailed Options List

GSTS OPTIONS LONG LIST

Framework	GSTS Objectives	Key Issues
1. Social and economic inclusion	A - Integrated multi-modal strategy	Traffic Congestion
2. Economic prosperity	B - Infra. and ops. for the metro road network	Bus infrastructure and routes
3. Environmental sustainability	C - Infrastructure & traffic management operations	Quality of infrastructure
4. Integration of transport & land use	D - Public transport network & on-street infra.	Road safety
5. Efficiency, coordination & reliability	E - Walking & cycling networks and infrastrucure	Enforcement and Regulation
6. Safety, health & wellbeing	F - Staging plan showing timeframes	Driver education and awareness

Option No.	Title	Description	Assessment Detail	Responsible Authority	Priority (1=High, 2=Medium, 3=Excluded)	Evaluation method	Cost (1=Low Cost, 5=High Cost)	Value for Money (1-4)	ACTION (projects starting in next 10 years)	Estimate of Probable Cost (million)	Source / assumptions	Years to start	Duration	Dependant options
B	**Bus Options**													
B1	***Bus Teminal Upgrades***	***Upgrade and expand existing bus terminals***												
B1.1	Suva City bus station redevelopment	Suva City Council is planning an $80M redevelopment of the Suva market and bus stand. Transport authorities must be involved to ensure that the surrounding area is fully integrated with the new market and bus terminal - as well as adequate bus bays, footpaths, pedestrian crossings, signage, taxi stands, mini-bus stands, carrier stands and vendor access. This project will expand the SCC plans to enable an integrated urban renewal, waterfront, port, market and bus station project. This will completely overhaul the area and alter the traffic movements in the CBD.	Key infrastructure project	FRA / SCC / LTA	1	BP	5	1	Liaise with SCC to Integrate external road infrastructure with the proposed Suva City Bus Station Redevelopment. Develop concept designs for the surrounding road network.	10	Budget includes technical input to the bus terminal design and the development of an integrated urban renewal which extends from the market and bus terminal to the adjacent shops and waterfront (along Stinson Parade). Capital works allowance for alterations to the roads and footpaths surrounding the market and bus terminal.	0	5	
B1.2	Nasinu bus terminal	Develop a transport hub within Nasinu with enough space to allow some services to terminate in Nasinu. No provision for a bus terminal was included in the most recent Nasinu Town Planning Scheme. Locations such as the Valelevu Ground or Valelevu Police Station would be ideal sites. Project will require land re-zoning, design and construction.	Key infrastructure project to enable improvements for Valelevu and the entire bus network	NasTC / DTCP / FRA / LTA	1	BP	5	3	Acquire and rezone land. Plan and design a transport hub within Nasinu (Valelevu),	5	Half the cost of the Nausori Bus / Market relcoation. Includes design and construction.	2	2	
B1.3	Nausori bus terminal relocation	A new site for the Nausori Bus Terminal and Market is currently under construction and due for completion in early 2015. No provision has been made to re-locate the taxi or mini-bus stands and as such they will not integrate in an efficient manner with the new bus stand and market area. There is also insufficient car-parking close to the new site. NTC require assistance in planning for taxi / mini-bus relocation, new car parking bays and ensuring bus bays are well designed. FRA to be involved to avoid congestion on the Nausori Bypass Road.	Key infrastructure project	FRA / NauTC	1	BP	5	2	Manage and design the relocation and integration of the taxi and mini-bus stands with the new bus stand and market area.	2	Additional works on top of the NTC budget of $10M for the market and bus stand relocation	0	1	
B2	Bus regulation enhancements	Eliminate illegal vehicles and illegal operations (e.g operating outside of licensed zones), through legislation, amenities and/or prosecution. Follow the recommendations of the Fiji Bus Industry Review prepared by Orion Consulting Associates (October, 2009).	The Fiji Bus Industry Review prepared by Orion Consulting Associates (October, 2009) recommended that the LTA and Police eliminate both illegal vehicles and illegal operations (e.g operating outside of licensed zones), through legislation, amenities and/or prosecution	LTA / Police	1	BP	5	3	Prepare business plan and lobby government to increase budgets for enforcement of bus regulations	7	Assume 10 new officers @ $50k FJD per annum = $5M FJD over 10yrs + 2M program costs	5	10	
	Bus Stop Upgrade Program													
B4	Bus stop upgrade program	Develop a plan to upgrade bus stop infrastructure across the entire GSA to provide sealed footpaths, passenger information (i.e route and timetable information), seating, lighting, and shelter where possible.	Bus stop infrastructure such as sealed footpaths, route and timetable information seating, shelter and lighting will enhance usability , safety and contribute to bus mode choice accounting for a large nuber of trips as a sustainable transport mode.	FRA	1	BP	5	1	Develop and implement a program to upgrade bus stop infrastructure to provide footpaths, passenger information, seating, lighting, and shelter.	3.6	150km of metro sealed roads. Assume bus stop every 500m. Pair of stops per location = 600 stops. $6,000 FJD per stop. 600 stops over 12 years allows for 50 bus stop upgrades per year.	3	12	B8
B4.1	Cunningham Rd / Baiu Dr Bus Bays	Provide new bus bays at this location.	Installation of bus bays will improve passenger safety and efficiency of bus operations	FRA	1	RS	1	1	Design and implement new bus bays	0.05	Exclusive of option B4. New bus bay with sealed footpaths, passenger information (i.e route and timetable information), seating, lighting, and shelter	0	1	
B4.2	Khalsa Rd / Vunisinu Rd Bus Bays	Provide new bus bays at this location.	Installation of bus bays will improve passenger safety and efficiency of bus operations	FRA	1	RS	1	1	Design and implement new bus bays	0.05	Exclusive of option B4. New bus bay with sealed footpaths, passenger information (i.e route and timetable information), seating, lighting, and shelter	0	1	
B4.3	Expansion of Nabua Bus Bays	Investigate new layout options to increase capacity of the bus bays in Nabua. Consider traffic (motorised and pedestraians) movements in the surrounding area to optimise the efficiency and safety of the area. Consider implementing time restrictions to limit buses waiting at bays during peak periods.	Re-design would allow more efficient bus operations, improving safety for pedestrians, reducing congestion and travel times.	FRA	1	ENG / RS	4	1	Traffic management asessment followed by design and implementation of new layout options to increase capacity of the bus bays	0.75	Traffic study. Increase bays to allow an additional four buses to pick-up / set-down passengers	0	1	
B4.4	Queens Rd / Nadonumai Rd Bus Bays (eastbound)	Provide new bus bays - eastbound on Queens Rd as close to Nadonumai Rd as possible. A large number of people currently wait on the edge of Queens Rd	Installation of bus bays will improve passenger safety and efficiency of bus operations	FRA	1	RS	1	1	Design and implement new bus bays	0.05	Exclusive of option B4. New bus bay with sealed footpaths, passenger information (i.e route and timetable information), seating, lighting, and shelter	0	1	
B4.5	Queens Rd / Baro subdivision Bus Bays (westbound)	Provide new bus bays - westbound on Queens Rd as close to access road to developing industrial site as possible (Baro Subdivision, access road not yet named).	Installation of bus bays will improve passenger safety and efficiency of bus operations	FRA	1	RS	1	1	Design and implement new bus bays	0.05	Exclusive of option B4. New bus bay with sealed footpaths, passenger information (i.e route and timetable information), seating, lighting, and shelter	0	1	
B4.6	Expansion of Lami Town Bus Bays	Extend eastbound bus bays to cater for one additional bus. There are currently conflicts between long distance buses (slow to unload) and local buses (quick to unload)	Re-design would allow more efficient bus operations, reducing congestion and travel times.	FRA	1	ENG	3	1	Design and implement new layout options to increase capacity of the bus bays	0.25	Increase bays to allow an additional one bus in either direction	0	1	
B5	Extension of bus network	Monitor route coverage in growth areas and existing areas that are not feasible at present. Public transport should ideally be provided at the outset of new developments becoming operational, rather than being added later on once travel patterns have become established or entrenched. This also prevents social disadvantage for persons who may not have access to other forms of transport.	Happens organically		3	BP								
B6	Vehicle emissions restriction program	Promote awareness of the 'black smoke' hotline (e.g. mandatory bumper stickers on all buses and taxis to increase motorists awareness of how to report vehicles to LTA). Heavier prosecution of vehicles emitting black smoke ie impound vehicles	In principle, increased awareness may improve the effectivess of the 'black smoke' hotline.	LTA / Police	1	BP	5	3	Promote awareness of the 'black smoke' hotline. Heavier prosecution of vehicles emitting black smoke	1.5	Increased funding for existing programs. Assume 2 new officers @ $50k FJD per annum = $1.0M FJD over 10yrs + 0.5M program costs	5	10	
B7	Bus driver training scheme	Develop a program (separate to licensing training and testing) which educates drivers with specific skills and behaviour for the operation of public bus services.	In principle, an education program may assist to improve the overall quality of public bus services.	LTA	2	BP	5	1	Develop an education program (additional to licence training and testing) for the drivers of public bus services.	5	Approx 1300 buses in Fiji. Assume half in GSA, with two drivers per bus. 1300 drivers to be trained. Class sizes of 5 for one-week at a time. Train all drivers over first two years then new drivers and refresher courses in subsequent years. Assume 6 new officers @ $50k FJD per annum = $3M FJD over 10yrs + 2M program costs	5	10	
B8	Bus network planning	Prepare a Public Bus Network Development Plan to examine current and future demands. Collate data from bus operators and e-ticketing systems to enable a quantitative based approach to route planning and licensing. Aim is to facilitate better network co-ordination (especially at bus terminals), test alternate network models such as hub-and-spoke, plan for express services, expand the capacity of the existing network, co-ordinate with other modes and extend the network to growth areas. Consider updating road rules to give buses priority when pulling out of bus bays and bus stops. Include bus access to schools.	Bus network planning is generally acknowledged to guide a more efficient expansion of existing bus networks to service future demands, and may enable the co-ordination of various routes to improve overall efficiency of the bus network.	LTA / FRA	1	BP	4	1	Prepare a Public Bus Network Development Plan – tender data collection and study to consultants	0.5	Study to be tendered to consultants + FRA management fees	0	1	
B9	Bus network monitoring program	Establish a framework for the performance monitoring of contracted bus operators, to monitor conformance to minimum performance targets and service standards.	Performance monitoring provides accountability and transparency for contracted public bus operators, and may provide incentives to reach better peformance levels.	LTA	2	BP	5	2	Establish a framework for the performance monitoring of contracted bus operators	2	Assume 2 new officers @ $50k FJD per annum = $1M FJD over 10yrs + 1M program costs	5	10	
B11	Public transport vehicle testing program	Establish legislation and framework for accredited and registered bus operators to undergo annual testing for vehicle safety. Bus Safety Act 2009 (Vic) provides a reference.	Enforcement framework may provide an improved level of bus safety.	LTA / Police	2	BP	5	1	Establish legislation and framework for accredited and registered bus operators to undergo annual testing for vehicle safety.	3	Assume 650 buses to be tested annually, approx 3 per day. Will need a 4 new officers @ $50k FJD per annum = $2M FJD over 10yrs + 1M program costs	5	10	
B12	***Dedicated peak hour bus lanes***	***Provision of a bus only traffic lanes in the peak direction of travel (during AM and PM peaks) and or bus jump lanes. Utilise the existing left-hand lane of two-lane roads and may require partial widening at some intersections to enable a bus jump lane. Roads will be marked as bus only, along with appropriate signage (potentially electronic, dynamic gantries at key locations). A feasibility study and concept design is required to determine various factors such as extent of land acquisition, alignments, service relocations, regulatory changes and other matters before progression to detailed design. Driver education program and enforcement of bus lanes to follow implementation. Possible update to road rules required.***												
B12.1	Kings Road dedicated bus lanes	Nausori to Samabula - assuming Kings Road is first widened to four lanes. Investigation required to determine whether vehicles other than buses can use the lanes during peak periods.	Without prioritisation of buses on Kings Rd a mode shift towards mass transit, the projected traffic volumes will result in a highly congested road and increased journey times.	FRA / LTA	1	BP	5	1	Conduct feasibility into bus lanes along Kings Road from Nausori to Samabula. Design and construction to follow.	40	15km of road, assume $1M per KM for road markings and signage. 10 key intersections to add bus jumb lanes and upgrade signals @ 1M each. Electronic gantries at six locations to indicate when lanes are in operation @ 2M each. $3M contingency	0	5	Kings Rd widening (existing project)
B12.2	Grantham Road dedicated bus lanes	Ratu Mara Road to Laucala Bay Road - appropriate works will be required to enable 2-lanes of traffic in each direction within the existing road reserve over a stretch of approx. 3km. Minimal widening required, mostly clean up works and strengthening. Left-hand lane to be allocated to buses or become a high-occupancy vehicle lane. Further assessment/modelling is required to determine the best lane use strategy.	When widened to 4-lanes for all traffic there is less congestion and it carries 40-60% additional traffic. Main relief is to Fletcher Road. Using the extra lane as bus and taxi only would benefit all modes.	FRA / LTA	1	BP / AIM	5	2	Plan, design and construct dedicated bus lanes along Grantham Rd.	12	3km of road, assume $1M per KM for road markings and signage. Electronic gantries at three locations to indicate when lanes are in operation @ 2M each. $3M contingency	6	1	
B12.3	Dedicated bus lanes investigations	Investigate options for future dedicated bus lanes. Roads to be considered include: Fletcher Rd, Rewa St, Laucala Bay Rd, Ratu Dovi Rd, Bau St, Queens Rd, Princes Rd and Victoria Parade.	Dedicated bus lanes allow for improved operational efficiency and travel time reliability of bus services.	FRA	2	BP	4	1	Investigate options for further locations, including Fletcher Rd, Rewa St, Laucala Bay Rd, Ratu Dovi Rd, Bau St, Queens Rd, Princes Rd and Victoria Parade.	0.5	Study to be tendered to consultants + FRA management fees. Following implementation of Kings Rd bus lane. Capital cost of works not included	5	1	B12.1
C	**Cycling Options**													
C1	Integration of cycling into planning, policy and design frameworks	Identify appropriate planning, policy and guideline documents that can be updated to include references to cycling as a viable form of transport and link this to appropriate funding mechanisms to enable cycling infrastructure to be built	Planning, policy and guideline documents should include references to cycling as a viable form of transport, providing links to appropriate funding mechanisms to enable cycling infrastructure to be built (including end of trip and on road facilities)	FRA	1	BP	2	1	In-house project. FRA to identify appropriate staff to carry out cycling review and updates to procedures	0.2	Study to be tendered to consultants + FRA management fees	0	3	
C2	Establish core bicycle priority network	Investigate potential bicycle routes within the GSA that provide opportunities for the delivery of bicycle facilities. This will include a network that links key destinations and activity centres and has a combination of on and off-road facilities	Road planning and road space allocation in Suva has generally evolved with no specific provision made for cycling as a sustainable transport mode. Bicycle network planning may be used to guide investment and funding of bicycle facilities, to achieve the multi-modal objective of the Transport Strategy	FRA	1	BP	3	1	Tender to consultants a study to develop a GSA cycling network	0.4	Study to be tendered to consultants + FRA management fees	2	1	
C3	Coastal recreational walking and cycling path	Construct a high quality recreational shared path following the coastline between Lami and the University of South Pacific. Concept and detailed design to follow a review of the concept prepared by Cycling Fiji.	A high quality shared path promotes walking and cycling as transport modes, and could lead to a variety of related health and tourism benefits for the community.	FRA / SCC / LTC	1	ENG	5	3	Design and construct a high quality recreational off-road shared path following the coastline between Lami and Suva Point	10.8	18km @ 3m wide 0.6M per km	3	1	C2
CP	**Car Parking Options**													

GSTS OPTIONS LONG LIST

					Framework						GSTS Objectives						Key Issues											Costings				
Option No.	**Title**	**Description**	**Assessment Detail**	**Responsible Authority**	**1. Social and economic inclusion**	**2. Economic prosperity**	**3. Environmental sustainability**	**4. Integration of transport & land use**	**5. Efficiency, coordination & reliability**	**6. Safety, health & wellbeing**	**A - Integrated multi-modal strategy**	**B - Infra. and ops. for the metro road network**	**C - Infrastructure & traffic management operations**	**D - Public transport network & on-street infra.**	**E - Walking & cycling networks and infrastrucure**	**F - Staging plan showing timeframes**	**Traffic Congestion**	**Bus infrastructure and routes**	**Quality of infrastructure**	**Road safety**	**Enforcement and Regulation**	**Driver education and awareness**	**Priority (1=High, 2=Medium, 3=Excluded)**	**Evaluation method**	**Cost (1=Low Cost, 5=High Cost)**	**Value for Money (1-4)**	**ACTION (projects starting in next 10 years)**	**Estimate of Probable Cost (million)**	**Source / assumptions**	**Years to start**	**Duration**	**Dependant options**
CP1	Review of on-street car parking restrictions	Review existing on-street parking time restrictions and introduce new short-term parking restrictions in high use areas	Incorrect on-street car parking restriction in denser urban areas can create circulating traffic and 'side friction', leading to reduced through capacity. Car parking guidelines can be appropriately informed following a review of existing restrictions.	DLG / FRA																			1	BP	2	1	Study to be tendered to consultants. Results to be used by Councils to introduce new short-term restrictions in high use areas	0.2	Data collection and feasibility study to be tendered to consultants + FRA management fees	1	1	
CP2	Review of car parking pricing	Review car parking pricing structures (on street and off-street) in the Suva CBD, Lami Town, Nausori Town and relevant areas in Nasinu. Introduce new pricing to prioritise off-street parking and reduce congestion caused by circulating vehicles	The cost of car parking is very low across the GSA. In many instances parking restrictions are not enforced. Following CP1, the cost of pricing can be reviewed based on the existing levels of demand.	DLG																			1	BP	2	1	Economic study to be tendered to consultants. Results to be used by Councils to justify a pricing increase to government.	0.2	Economic study to be tendered to consultants (including data collection) + FRA management fees. Study to be used by Councils to justify a pricing increase to government	0	1	
CP3	CBD car parking guidance signage	Identify existing car parking direction signage. Develop and implement a replacement strategy with clear, consistent signage to reduce search times and encourage the use of underutilised areas.	Car parking guidance will reduce vacancy search times and encourage the use of underutilised area such as off-street car parks on the edge of the Suva CBD.	FRA / SCC																			1	BP	4	2	Planning study to be tendered to consultants. Existing signage identified and new signage erected.	0.8	Planning study to be tendered to consultants + FRA management fees ($0.2M). Assume 100 new signs @ $1000 each = $0.1M. Plus 0.3M program roll out costs.	4	5	CP6
CP4	Car parking enforcement	Increase car parking enforcement to ensure that the parking system operates as intended. Assume creation of dedicated division funding support and co-ordination over 15 years.	Enforcement levels are low and need to be increased. Existing car parking restrictions are not as effective as best practice requires due to the current levels of enforcement.	LTA / DLG																			1	BP	5	2	Prepare business plan and lobby government to increase budgets for car parking enforcement officers	9.5	Assume 10 new officers @ $50k FJD per annum = $6.5M FJD over 12yrs + 3M program costs	2	13	CP1 & CP2
CP5	Park and Ride facilities	Plan and construct park and ride facilities at key sites along the Suva-Nausori corridor and on the outskirts of the CBD. Car parks must be located adjacent to a bus interchange and express buses will operate from the car parks to key employment centres to ensure a well integrated transport system. Total car park capacity assumed to be 1000 vehicles across five sites. Staging of this project to be linked to B12.1 - Bus priority lanes.	Based on engineering best practice, park and ride facilities well alleviate congestion in and around the CBD by reducing unnecessary trips to the city centre.	FRA / DTCP																			1	BP	5	2	Plan and construct park and ride facilities at key sites along the Suva-Nausori corridor (in conjunction with dedicated bus lane option B12)	5	Planning study followed by construction. Assume 4 locations with 250 car park spaces @ $5000 per space to fully construct = $5M	6	2	B12.1
CP6	Improved access to CBD car parks	Review existing access to car parks in the CBD. Develop solutions which will minimise the impact on peak hour traffic. This could be tied in with T2.13	Best practice traffic engineering and transport planning should ensure that local access to car parking areas does not adversely impact traffic circulation on abbutting public roads, which may compromise road network performance.	FRA / SCC																			2	BP	2	1	Tender to consultants a study to review existing access to car parks in the CBD. Develop and implement solutions which will minimise the impact on peak hour traffic.	0.2	Feasability study to be tendered to consultants + FRA management fees	3	4	
O	**Other**																															
O1	Road works scheduling plan	Ensure major works occur during off-peak times. This may require procedural changes whereby authorisation is required to work within the road zone of arterial roads.	Best practice traffic management requires roadworks to be undertaken during off-peak times to avoid disruptions to the transport network during times when the road network is near capacity.	FRA																			1	BP	1	1	In-house project. FRA to identify appropriate staff to update road work scheduling plans	0.05	Minimal costs, FRA/MWH management costs to ensure it is worked into future road works plans.	0	1	
O2	Travel demand management	Develop program to drive mode shift towards sustainable transport modes	Best practice for achieving transport network operational efficiency	FRA / LTA / DLG																			1	BP	2	1	Tender to consultants the development of a program to drive mode shift towards sustainable transport modes	0.2	Feasability study to be tendered to consultants + management fees	3	2	
O3	Traffic data collection program	Develop and implement a program for yearly data collection within the Greater Suva area, to allow effective traffic analysis and assessment of traffic flow over time. The recommended program would include annual traffic counts (as a minimum, recommence the annual traffic counts undertaken by the Department of National Roads which ceased in 2009), regular tube counts at key mid-block locations, colloborate with the Fiji Bureau of Statistics to include transport related questions (i.e. method of travel to work) in their surveys, regular travel time surveys to assess congestions, and comprehensive one-day bus, mini-bus and taxi patronage counts.	Best practice for planning transport network improvement and analysing trends over time.	FRA / LTA / FBOS / DLG																			1	BP	5	2	Tender study to consultants to develop and implement a program for yearly data collection within the GSA	7	Annual costs: data collection costs = $0.2M. data management and analysis = $0.2M. Project overhead = $1M. Cost over 15 years = $7M	0	15	
R	**Regulatory Options**																															
R1.1	Heavy vehicle route planning	Develop a designated heavy vehicle road network to identify and classify routes which are appropriate for use by heavy vehicles, and placing restrictions on those which are not.	To provide a safe and resilient transport network heavy vehicles should be assigned specific routes on roads which can handle heavy loads.	FRA / LTA																			1	BP	4	2	Tender to consultants a study to develop a designated heavy vehicle road network and classify routes that will have restricted heavy vehicle usage.	0.8	Feasability study to be tendered to consultants + FRA management fees = $0.3M Implementation costs (driver education and enforcement) = $0.5M	4	1	
R1.2	Expand heavy vehicle enforcement team	Increase the number of staff dedicated to the enforcement of heavy vehicles (10 years of enforcement), including load limits and restricted access roads. The estimated funding requirement for this program is a reflection of costs only, and conservatively ignores any revenue streams generated from fines. Assume creation of dedicated division and funding support over 10 years.	To provide a safe and efficient transport network heavy vehicles need to be monitored and enforced as necessary to ensure such vehicles are adhering to the required road safety and regulatory guidelines.	LTA																			1	BP	5	2	Prepare business case and lobby government to increase budgets for the enforcement of heavy vehicles including load limits and restricted access roads.	5	Assume 10 new officers @ $50k FJD per annum = $18M FJD over 10yrs	5	10	R1.1
R2	Expand general enforcement team	Increase number of staff dedicated to the enforcement of vehicle emissions, unsafe vehicles and illegal taxi / mini-bus operation (15 years of enforcement). The estimated funding requirement for this program is a reflection of costs only, and conservatively ignores any revenue streams generated from fines. Assume creation of dedicated division and funding support over 15 years.	The aging vehicle fleet in operation is clearly visible from the roadside. Unroadworthy and polluting vehicles should be targeted and discouraged (through penalities) from continuing to travel on the road network.	LTA / Police																			1	BP	5	3	Prepare business plan and lobby government to increase budgets for staff dedicated to the enforcement	37.5	Assume new department with 50 staff @ $50k FJD per annum = $37.5M FJD over 15yrs	0	15	
R3	Review operation of mini-buses	Allow mini-buses to legally operate on alternate routes where there is demand. This will include a review of the existing policies governing mini-bus operation and is likely to require appropriate enforcement.	De-regulation of mini-bus operators may allow services to legally run which may not otherwise be viable, and may minimise the enforcement task.	LTA																			1	BP	2	1	Feasibility study to be tendered to consultants to review government policy/enforcement of mini-bus operation.	0.2	Feasibility study to be tendered to consultants + management fees	1	2	
R4	Speed enforcement campaign	Increase the number of police dedicated to enforcement of traffic speed, and develop a program for the rollout of additional speed cameras where speed is an issue (15 years of enforcement). Target locations should include identified blackspots, with cameras appropriately signed and placed so to moderate driver behaviour. The estimated funding requirement for this program is a reflection of costs only, and conservatively ignores any revenue streams generated from fines. Assume creation of dedicated division funding support and co-ordination over 15 years.	Speed enforcement and penalities are likely to act as a successful deterrent to vehicles exceeding the speed limit.	Police / LTA																			1	RS	5	2	Prepare business plan and lobby government to increase budgets for speed enforcement campaign.	20	Assume 20 staff @ $50k FJD per annum = $15M. program costs (assume $1M per annum)	0	15	
R5	Increase license checks	Undertake random driver license checks to reduce the risk of unsafe and illegal drivers on the road.	Already part of the LTA work program	Police / LTA																			3		-							
R6	Vehicle safety inspections	Undertake random vehicle inspections to reduce the incidences of unsafe vehicles on the road.	Already part of the LTA work program	Police / LTA																			3		-							
R7	Upgrade Maap database	Upgrade the database to enhance the ability to secruely store, analyse and present data. Make the data more widely available by creating a user pays system.	Database was setup over 10 years ago. Updating to a new database program will significantly improve the effectiveness of analyse in identifying blackspots	Police																			2	BP	2	1	Upgrade the existing crash database to enhance the ability to analyse blackspots and present crash statistics	0.4	Technical study to be tendered to consultants + management fees	3	1	
R8	Taxi operation monitoring	Stricter enforcement of taxi's operating from designated Taxi Base and illegal rural taxi operators in urban areas (reduce empty running taxis in CBD). Spot surveys indicate up to 1 in 3 vehicles in the CBD are taxis with no passengers (15 years of enforcement). Assume creation of dedicated division funding support and co-ordination over 15 years.	Increases in taxi fleet efficiency may be gained from de-regulating taxi base areas, allowing vehicles to distribute based on actual transport demands.	LTA																			1	BP	5	3	Prepare business plan and lobby government to setup a taxi monitoring division within LTA	20	Assume 20 staff @ $50k FJD per annum = $15M FJD over 15yrs + program coordination of $5M	0	15	
R9	Review of private licensing	Review the adequacy of existing driver accreditation, to improve the skill level and behaviour of new drivers on Fiji Roads.	Stakeholders rated this as a very low priority	LTA																			3		-							
R9	Bus stop rationalisation program	Plan and implement a training and enforcement campaign for the buses to be restricted to designated stopping locations along major network corridors to improve route efficiency.	The placement and spacing of bus stops is of key importance in maintaining pedestrian and passenger safety and convenience, as well as enabling bus services and the interaction with other motorised traffic to operate efficiently. Anectodal evidence suggests that there is considerable scope for improvement in this regard.	LTA / Police																			2	BP	2	2		0.8	Assumed similar costs to heavy vehicle route planning	10	1	
T	**Traffic**																															
T1	***Intersection Improvements Program***	***Operational and capacity improvements, separated right turns, deceleration lanes, slip lanes. Designed for all road users (including freight). Includes safety enhancements***																														
T1.1	Scott St / Thompson St / Edward St	Intersection upgrade works. Reconfigure intersection geometry and signalise to provide better level of service for pedestrians. Ensure design vehicles are accommodated. Upgrade to SCATS. This is a design project that will require concept and detailed design plans. Road safety design audits should also be included.	Reconfigured intersection geometry and signalisation will provide better level of service for pedestrians and ensure design vehicles are accommodated.	FRA																			1	ENG	4	1	Investigate, design and construct intersection upgrades	0.8	High level cost to plan, design and construct	4	2	B1.1, T2.16
T1.2	Walu Bay Roundabout: Foster Rd / Harris Rd / Edinburgh Dr	Complex Intersection upgrade - Upgrade to signals following further investigation. Upgrade to SCATS. In conjunction with Suva Bus Station upgrade. This is a design project that will require concept and detailed design plans. Road safety design audits should also be included.	SIDRA analysis indicates that this intersection currently operates at a very poor level of service. Conversion to a signalised T intersection provides an improvement to an 'acceptable' level of service. Notwithstanding the above, it is noted that only the individual intersection has been tested, and this does not account for the effects of downstream queueing from CBD traffic and the Suva bus interchange. Any signalisation of this intersection would be required to be undertaken in conjunction with the signal linking to CBD traffic signals.	FRA																			1	SID	4	1	Investigate, design and construct intersection upgrades	0.8	High level cost to plan, design and construct	1	2	B1.1, T2.16
T1.3	Rodwell Rd / Robertson Rd	Intersection upgrade works. Potentially tie into Suva Bus Terminal upgrade works and improvements to pedestrian connectivity. This will involve concept and detailed design plans.	Upgrading to a signalised intersection (along with other intersections in the Suva CBD) is likely to lead to significant capacity increases, as well as allowing safer movement of pedestrians across the legs of the intersection. Having regard to the proximity of the Suva Bus interchange, safe and efficient pedestrian movement is paramount.	FRA																			1	ENG	3	1	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.4	High level cost to plan, design and construct	5	2	B1.1, T2.16
T1.4	Victoria Pde / Gordon St / Scott St	Intersection upgrade works. Reconfigure intersection geometry and signalise to provide better level of service for pedestrians. Ensure design vehicles are accommodated. Upgrade to SCATS.	Upgrading to a signalised intersection (along with other intersections in the Suva CBD) is likely to lead to significant capacity increases, as well as allowing safer movement of pedestrians across the legs of the intersection. Having regard to the sites location, safe and efficient pedestrian movement is paramount.	FRA																			1	ENG	3	2	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.4	High level cost to plan, design and construct	7	2	

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Option No.	Title	Description	Assessment Detail	Responsible Authority	Framework: 1. Social and economic inclusion	2. Economic prosperity	3. Environmental sustainability	4. Integration of transport & land use	5. Efficiency, coordination & reliability	6. Safety, health & wellbeing	GSTS Objectives: A - Integrated multi-modal strategy	B - Infra. and ops. for the metro road network	C - Infrastructure & traffic management operations	D - Public transport network & on-street infra.	E - Walking & cycling networks and infrastrucure	F - Staging plan showing timeframes	Key Issues: Traffic Congestion	Bus infrastructure and routes	Quality of infrastructure	Road safety	Enforcement and Regulation	Driver education and awareness	Priority (1=High, 2=Medium, 3=Excluded)	Evaluation method	Cost (1=Low Cost, 5=High Cost)	Value for Money (1-4)	ACTION (projects starting in next 10 years)	Costings: Estimate of Probable Cost (million)	Source / assumptions	Years to start	Duration	Dependant options
T1.5	Waimanu Rd / Brown St	Intersection upgrade works. Includes treatments to improve the safety of the intersection through improved channelisation and clear priorities. This will include an existing conditions Road Safety audit followed by a concept and detailed design.	To improve safety a significant redesign, including the creation of a T-intersection with east approach giving way in addition to turn lanes is likely to improve intersection operation and sight lines.	FRA																			1	RS	4	1	Road safety audit, concept and detailed design	0.8	High level cost to plan, design and construct	0	2	
T1.6	Gordon St / Macarthur St / Hercules St	Intersection upgrade works. Potential to reclaim land on the northwest corner for alternative purposes (i.e. potential park and ride location)	Current design does not align with typical intersection standards, does not readily accommodate some turning movements. The design could be simplified to provide for alternate uses and increase ease of navigatin for pedestrians.	FRA																			2	ENG	3	2	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.4	High level cost to plan, design and construct	7	2	
T1.7	Loftus St/Thurston St/Gladstone Rd	Intersection upgrade works. Remove on-street parking near court house and bus stop.	Removal of on-street car parking will create better operational efficiency and increase the quality of bus stop infrastructure able to be provided.	FRA																			2	ENG	2	1	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.2	High level cost to plan, design and construct	5	2	
T1.8	Bau St / Rewa St	Intersection upgrade works. Convert to a signalised intersection. Install SCATS. Provide pedestrian crossing opportunities.	SIDRA testing indicates that conversion to a signalised intersection, with similar lane configurations leads to deteriorated operating conditions. This intersection performs better as a roundabout as opposed to a signalised intersection due to the relatively balanced traffic flow. Notwithstanding, SIDRA also indicated that this intersection currently operates at a 'very poor' level of service. SIDRA assessment indicated that a signalised intersection would require double right turns on both the south and east approaches to accommodate the existing peak hour traffic volumes within the intersection capacity; however this may likely require public acquisition of land. Notwithstanding the above, signals at this intersection may be warranted having regard to the wider benefits to pedestrian traffic and ability to link signals in the long term.	FRA																			1	SID	3	1	Prepare concept and detailed design to convert to signalised intersections. Install SCATS.	0.4	High level cost to plan, design and construct	2	2	
T1.9	Grantham Rd / Falvey St	Intersection upgrade works - Blackspot investigation. Intersection lighting upgrade. This will include an existing conditions Road Safety audit followed by a concept and detailed design.	A significant number of accidents have occurred at this intersection. A blackspot investigation may identify works which are able to improve safety.	FRA																			1	RS	3	1	Road safety audit, concept and detailed design	0.4	High level cost to plan, design and construct	2	2	T4
T1.10	Grantham Rd / Milverton Rd	Intersection upgrade works convert to signals. Install SCATS. Potential for development triggers and contribution to a signalised cross intersection from land development to the east.	SIDRA modelling indicates that this intersection currently operates at a 'very poor' level of service, with long queues and delays on the west approach. Option testing using SIDRA intersection indicates that conversion to a signalised intersection is likely to result in its operation improving to a 'good' level of service, with reduced queues and delays.	FRA																			1	SID	3	2	Prepare concept and detailed design to convert to signalised intersections. Install SCATS.	0.4	High level cost to plan, design and construct	2	2	
T1.11	Grantham Rd / Gaji Rd / Karsanji St	Intersection upgrade works. Investigate the existing roundabout operation and assess the benefits of upgrading to a signalised cross-intersection.	A volume to capacity review completed and indicates intersection upgrade may be beneficial.	FRA																			2	ENG	4	2	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.8	High level cost to plan, design and construct	7	2	
T1.12	Kings Rd / Mead Rd / Ratu Mara Rd / Golf Link Rd Roundabout	Intersection upgrade works - Works to address safety issues (major Blackspot). This will include an existing conditions Road Safety audit followed by a concept and detailed design. Long term plan for a flyover to be considered	Based on the available traffic volume data, option testing indicated that this roundabout operates slightly less efficiently on the whole as a metered roundabout, transitioning from a 'good' to 'acceptable' level of service. Notwithstanding the above, it is noted that this location is a 'Top 10' blackspot, and partial signalisation may provide significant safety benefits.	FRA																			2	SID	5	2	Road safety audit, concept and detailed design	1.5	High level cost to plan, design and construct	2	2	T4
T1.13	Kings Rd / Yasiyasi Rd / Daniva Rd	Intersection upgrade works. Signalised cross intersection, potential developer contributions triggered by redevelopment or expansion of tax free zone. This existing blackspot will include an existing conditions Road Safety audit followed by a concept and detailed design.	A signficiant number of accidents have occurred at this intersection. Controlling turning movements through signalisation is likely to improve intersection safety.	FRA																			1	RS	4	1	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.8	High level cost to plan, design and construct	5	2	T4
T1.14	Kings Rd / Ratu Dovi Rd (Centrepoint)	Intersection upgrade works - Blackspot investigation. This will include an existing conditions Road Safety audit followed by a concept and detailed design.	A significant number of accidents have occurred at this intersection. A blackspot investigation may identify works which are able to improve safety.	FRA																			2	RS	3	1	Road safety audit, concept and detailed design	0.4	High level cost to plan, design and construct	2	2	T4
T1.15	Kings Rd / Khalsa Rd (Kinoya)	Intersection upgrade works - Blackspot investigation. Intersection lighting upgrade. This will include an existing conditions Road Safety audit followed by a concept and detailed design.	A significant number of accidents have occurred at this intersection. A blackspot investigation may identify works which are able to improve safety.	FRA																			2	RS	3	1	Road safety audit, concept and detailed design	0.4	High level cost to plan, design and construct	2	2	T4
T1.16	Fletcher Rd (south) realignment	Realign southern section of Fletcher Rd to meet with Queen Elizabeth Drive utilising the existing road reserve. This will involve concept and detailed design plans.	As traffic volumes increase, the flow of traffic will be significantly improved by realigning the intersection to a standard x-crossing.	FRA																			2	BP	5	3		1.5	High level cost to plan, design and construct	11	2	T2.7
T1.17	Fletcher Rd / Jerusalem Rd / Mukta Ben Rd / Rifle Range Rd	Upgrade unsignalised intersection with Rifle Range Rd. This will involve concept and detailed design plans.	SIDRA analysis indicates this intersection operates at a 'good' level of service. Conversion to a signalised intersection does not provide capacity benefits. Notwithstanding the above, this intersection was nominated as a congestion area during stakeholder consultation, and on this basis further investigation (including comprehensive traffic surveys) should be considered.	FRA																			2	SID	4	2	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.8	High level cost to plan, design and construct	7	2	
T1.18	Ratu Mara Rd / Fletcher Rd	This intersection is an existing blackspot. The upgrade will require an existing conditions Road Safety audit followed by a concept and detailed design.	A significant number of accidents have occurred at this intersection. Further investigations are required to improve safety.	FRA																			1	RS	3	1	Road safety audit, concept and detailed design	0.4	High level cost to plan, design and construct	1	3	T4
T1.19	Kings Rd / Sukanaivulu Rd	Blackspot investigation. Potential to upgrade to traffic signals to increase safety of exit movements from Sukanaivulu Road. Consideration to be given to relocating the existing signalised pedestrian crossing as part of intersection signalisation works. This will include an existing conditions Road Safety audit followed by a concept and detailed design.	A significant number of accidents have occurred at this intersection. Signalisation may be warranted on safety grounds. (particularly pedestrian safety), subject of a more comprehensive road safety audit.	FRA																			2	RS	3	1	Prepare concept and detailed design to convert to signalised intersections. Install SCATS.	0.4	High level cost to plan, design and construct	2	2	T4
T1.20	Ratu Mara Rd / Princes Rd / Edinburgh Drive / Waimanu Rd	Key intersection and bus interchange. Long term planning required as traffic flows on Ratu Mara and Princes Roads increase. Potenetial for a complete redesign with possible flyover from Princes Rd to Waimanu Rd.	The intersection will be under significant strain in the future as traffic grows on both Ratu Mara and Princes Road. An intersection redesign will be required (including the possibility of flyover from Princes Rd to Waimanu), including the layout of surrounding bus bays, to avoid significant congestion and bus/car conflicts.	FRA																			2	ENG	5	2	Investigate redesign of Ratu Mara Rd / Princes Rd / Edinburgh Drive / Waimanu Rd intersection and bus stops	1.5	High level cost to plan, design and construct	3	2	T11.2
T1.21	Ratu Mara Rd / Belo St / Lakeba St	Intersection upgrade works. Create staggered cross-intersection. Include blackspot investigation. This will include an existing conditions Road Safety audit followed by a concept and detailed design.	A significant number of accidents have occurred at this intersection. Controlling turning movements through signalisation is likely to improve intersection safety.	FRA																			1	RS	3	1	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.4	High level cost to plan, design and construct	3	2	T11.2, T4
T1.22	Namuka St / Fulaga St	Intersection upgrade works. Define priority to resolve identified blackspot. This will require an existing conditions road safety audit followed by a concept and detailed design.	Improved delineation and priority is likely to significantly improve safety at this intersection	FRA																			1	RS	2	1	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.2	High level cost to plan, design and construct	3	2	T11.2, T4
T1.24	Rewa St / Milverton Rd / Brown St	Intersection upgrade works. Upgrade signalised cross intersection triggered by connection of Extension Road to Brown Street. Potential for land acquisition. This will involve concept and detailed design plans.	A SIDRA assessment indicates that the existing roundabout operates at a 'very poor' level of service, beyond its theoretical capacity. Conversion to a signalised intersection, with flaring to provide dedicated left and right turn lanes indicates that the intersection could be improved to operate at a 'good' level of service.	FRA																			2	SID	4	2	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.8	High level cost to plan, design and construct	6	2	
T1.25	Kings Rd / Wainuvula Rd (South)	Intersection upgrade works. Consider in combination with Kings Road/Ratu Dovi Road. This will require an existing conditions road safety audit followed by a concept and detailed design.	Traffic counts should be undertaken to determine if capacity upgrades are required. Blackspot investigation will reveal any site specific safety issues.	FRA																			2	ENG/RS	3	1	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.4	High level cost to plan, design and construct	5	2	T1.14
T1.26	Harris Street / Renown Street / Rodwell Street	Implement traffic signals and improve pedestrian facilities. This will involve concept and detailed design plans.	Can be tackled as part of the Suva Bus Station Redevlopment	FRA																			3									
T1.27	Adi Lady Davila / Kings Rd	Intersection upgrade works. Potential for development triggers and contribution from growth areas to the northwest. This will involve concept and detailed design plans.	Future development accessed via Adi Lady Davila Rd will likely trigger capacity and/or safety improvements. Best practice transport planning should identify this trigger point and implement appropriate design treatments.	FRA																			2	BP	3	2	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.4	High level cost to plan, design and construct	9	2	
T1.28	Kalokalo Cr / Kings Rd	Upgrade unsignalised intersection. This will involve concept and detailed design plans.	A signficiant number of accidents have occurred in this area. A blackspot investigation should be undertaken to identify site specific issues	FRA																			2	RS	3	2	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.4	High level cost to plan, design and construct	8	2	
T1.29	Ratu Dovi Rd / Yasiyasi Rd	Upgrade unsignalised intersection. This will involve an existing conditions road safety audit, concept and detailed design plans.	Intersection signalisation may be warranted on road safety grounds.	FRA																			2	RS	3	2	Undertake a Road Safety audit followed by a concept and detailed design for intersection upgrades	0.4	High level cost to plan, design and construct	6	2	
T1.30	Queens Rd / Lami St (Wailada Estate)	Right turn lane from Queens Rd has been added. Intersections needs further refinement to increase the length of the right hand turn bay and increase room to allow heavy vehicles and buses to make left-hand turns out of Lami St. This will involve concept and detailed design plans.	Intersection redesign is required to adress the requirements for freight and heavy vehicle access to the Wailada Estate industrial precinct. SIDRA assessment indicates that right turn lanes will improve capacity.	FRA																			1	SID	1	1	Design and construct right hand turn bays and increased intersection geometry	0.05	High level cost to plan, design and construct	0	1	
T1.31	Queens Rd / Nasevou St (Lami Town)	Add right turn lane from Queens Rd. Increase the geometry of the intersection to allow heavy vehicles and buses to make left-hand turns out of Nasevou St. This will involve concept and detailed design plans.	Minimal work required to improve traffic flow and reduce road / footpath damage	FRA																			1	ENG	1	1	Design and construct right hand turn bays and increased intersection geometry	0.05	High level cost to plan, design and construct	0	1	
T1.32	Queens Rd / Vetaia St (Lami Town)	Add right turn lane from Queens Rd. Increase the geometry of the intersection to allow heavy vehicles and buses to make left-hand turns out of Vetaia St. Consider reversing the direction of the service lane immediately in from of the service station to avoid adding another right hand turn bay.This will involve concept and detailed design plans.	Minimal work required to improve traffic flow and reduce road / footpath damage	FRA																			1	ENG	1	1	Design and construct right hand turn bays and increased intersection geometry	0.05	High level cost to plan, design and construct	0	1	

GSTS OPTIONS LONG LIST

					Framework						GSTS Objectives						Key Issues											Costings				
Option No.	Title	Description	Assessment Detail	Responsible Authority	1. Social and economic inclusion	2. Economic prosperity	3. Environmental sustainability	4. Integration of transport & land use	5. Efficiency, coordination & reliability	6. Safety, health & wellbeing	A - Integrated multi-modal strategy	B - Infra. and ops. for the metro road network	C - Infrastructure & traffic management operations	D - Public transport network & on-street infra.	E - Walking & cycling networks and infrastrucure	F - Staging plan showing timeframes	Traffic Congestion	Bus infrastructure and routes	Quality of infrastructure	Road safety	Enforcement and Regulation	Driver education and awareness	Priority (1=High, 2=Medium, 3=Excluded)	Evaluation method	Cost (1=Low Cost, 5=High Cost)	Value for Money (1-4)	ACTION (projects starting in next 10 years)	Estimate of Probable Cost (million)	Source / assumptions	Years to start	Duration	Dependant options
T1.33	Queens Rd / Solomoni St (Lami Town)	Add right turn lane from Queens Rd. Increase the geometry of the intersection to allow heavy vehicles and buses to make left-hand turns out of Solomoni St. This will involve concept and detailed design plans.	Minimal work required to improve traffic flow and reduce road / footpath damage	FRA																			1	ENG	1	1	Design and construct right hand turn bays and increased intersection geometry	0.05	High level cost to plan, design and construct	0	1	
T2	***Network Capacity Upgrades***																															
T2.1	Wainibokasi Bypass	Plan and construct a new major arterial that provides a second crossing of the Rewa River and can be used to stimulate development to the east of Nasinu. Running from Wainibokasi Rd (east of Nausori Airport) and then joiningRatu Dovi Rd at Nadera.	Too high a cost to be justified. Questionable whether land should be developed here due to low elevation.	FRA																			3	ENG	5							
T2.2	Coastal Road	Plan and construct an alternate major arterial to Kings Road, running to the south of Kings Rd along the coast between Laucala Bay Road and Nabua, including a third river crossing of the Samabula River.	Regional road alignment is superior for current residents and future development. Serioius environmental concerns over the proximity of the alignment with the coast and through mangrove areas.	FRA																			3	ENG	5							
T2.3	Regional Road	Plan, design, and construct an alternate major arterial to Kings Road, running from Rewa Bridge through the Nausori-Suva corridor to the north of Kings Rd along an existing road reserve. This project could be delivered in three stages. Initial work will involve a feasibility study, which would compare it to other alternatives.	Road network capacity improvement. Project has merit in the longer term, conduct pre-feasibility study. Modelling to be completed following the outcomes of further feasibility and alignment assessments.	FRA																			2	ENG	5	3	1.5m FJD in 2001 study	249.6	15.6km of new, 4-lane, sealed road @ 16M per KM.	10	5	
T2.4	Lami Bypass	Plan, design, and construct a two-lane inland bypass of Lami Town of approximately 3km in length. Initial work will involve a feasibility study which would compare it to other alternatives and look at staging. Stage 1 could involve the construction of one bridge to provide a second access to Wailada Estate and ease traffic on Lami St.	Road network capacity improvement. Project has merit in the longer term, conduct pre-feasibility study. Modelling to be completed following the outcomes of further feasibility and alignment assessments.	FRA																			2	ENG	5	3	Undertake a feasibility route options study, and subsequently plan, design, and construct a two-lane inland bypass of Lami Town in stages.	31.08	2.7km of new, 4-lane, sealed road @ 16M per KM + 3 bridges @ 1M each	4	3	
T2.6	Widen Princes Road to 4-lanes	Upgrade to 4-lanes over stretch of approx. 5.4km between Reservoir Rd and Khalsa Rd. Additional lanes could be allocated to buses or become high-occupancy vehicle lanes. Further assessment/modelling is required to determine the best lane use strategy.	Road network capacity improvement. Project has merit in the longer term, conduct pre-feasibility study. Modelling to be completed following the outcomes of further feasibility and alignment assessments.	FRA																			2	ENG	5	3	Undertake a feasibility study, and subsequently plan, design, and construct 4-laning project	56.16	Widen 5.4km of existing 2-lanes to 4-lanes @ 10.4M per KM.	9	3	B12.3
T2.7	Widen Fletcher Road to 4-lanes	Upgrade to 4-lanes and promote as an alternate route to Grantham or Rewa Streets. Additional lanes could be allocated to buses or become high-occupancy vehicle lanes. Further assessment/modelling is required to determine the best lane use strategy.	Road could handle projected traffic volumes without widening. No benefit to surrounding network.	FRA																			2	AIM	5	4	Possibility to combine with T1.16	29.12	Widen 2.8km of existing 2-lanes to 4-lanes @ 10.4M per KM.	10	3	B12.3
T2.8	Adi Lady Davila Road Upgrade and extension	Upgrade to four lanes in order to support the future growth along this corridor.	Road network capacity improvement. Project has merit in the longer term, conduct pre-feasibility study. Modelling to be completed following the outcomes of further feasibility and alignment assessments.	FRA / HA																			2	ENG	5	4	Undertake a feasibility study, and subsequently plan, design, and construct 4-laning project	83.2	5.2km of new, 4-lane, sealed road @ 16M per KM.	7	2	
T2.9	Wainibuku Extension	Connection and upgrade of unsealed roads to provide a new link between Kings Rd and Princess Rd. Two alternate connections onto Princess Rd have been identified	Road network capacity improvement. Project has merit in the longer term, conduct pre-feasibility study. Modelling to be completed following the outcomes of further feasibility and alignment assessments.	FRA / HA																			2	ENG	5	3	See GIS for alignment options	47	5km of new, 2-lane, sealed road @ 9.4M per KM.	12	3	
T2.10	Rokobili Terminal Road	Relocation of the container wharf to Rokobili Industrial Subdivision and associated link road. Whilst initial studies have been undertaken by the FIji Ports Authority. More detailed traffic studies are required, including an evaluation of traffic impacts, access arrangements, and freight task requirements. The terminal relocation offers the chance to provide an alternative crossing of Tamavua River and the potential to widen the bridge immediately to the west of the Old Suva Rubbish Dump - thus improving access between Suva and Lami	An increase in the amount of permitted acitivity at the Rokobili terminal may singificantly alter the existing traffic environment in the local vicinity. Any proposed access point shuold be investigated and studied to ensure any adverse impacts are mitigated.	FRA / Ports																			2	ENG	5	2	Conduct traffic studies to evaluate the design and benefits of the proposed new road. Develop detailed design.	21.2	1.2km of new, 4-lane, sealed road @ 16M per KM + 2 bridges @ 1M each	4	4	Rokobili Terminal Relocation
T2.11	Daniva Road extension	Link from Tax Free Zone and surrounds to Regional Road via Veikoba Estate. Dependant on implementation of the Regional Road	Road network capacity improvement. Project has merit in the longer term, conduct pre-feasibility study. Modelling to be completed following the outcomes of further feasibility and alignment assessments.	FRA																			2	ENG	5	3		9.4	1km of new, 2-lane, sealed road @ 9.4M per KM.	14	2	T2.3
T2.12	Extension Road - Brown Street Link	New link from Extension Rd to Brown St (behind CWM). SCC has already acquired the relevant land. Requires concept design and feasibility assessment.	Carries 400-500 vehicles in the AM peak hour. Relief offered to Brown, Waimanu and Mal Streets.	FRA																			1	AIM	4	2	Undertake a feasibility assessment and prepare concept design plans for a new link from Extension Rd to Brown St. Review traffic management around CWM hospital	1.41	0.15km of new, 2-lane, sealed road @ 9.4M per KM.	0	2	
T2.13	Raojibhai Patel Street and Holland Street link	New access point to the CBD. Should ease access/egress to carparks in in Ellery, Greig and Renwick Streets. Requires concept and detailed design.	A new CBD access point will provide additional network capacity and assist in relieving pressure of the existing access points.	FRA																			2	ENG	5	3		2.82	0.3km of new, 2-lane, sealed road @ 9.4M per KM.	11	2	CP6, T3.5
T2.14	Waimanu Road Dog Leg Removal	Remove dog Leg between CWM Hospital and Waimanu / Brown St intersection. This project is also addressed by the proposed project Waimanu Rd/Brown Street intersection upgrade, and will not be required if this goes ahead.	Preliminary investigation indicates that this project may not be required due to nearby intersection upgrades as part of another project. Relevant only if the Waimanu/Brown Street intersection upgrade does not proceed.	FRA																			3	ENG	5							
T2.15	Second Walu Bay Crossing	Extension of Harris / May St over Walu Bay	Included as part of the Rokobili Terminal Project	FRA																			3		5							
T2.16	Stinson Parade Bridge and Traffic Network Updates	Design and construct a new alignment for Stinson Parade Bridge to the west of the current bridge to improve the safety of the connection between Stinson Parade and Harris Rd. Retain the existing bridge as a pedestrian link. Realign the surrounding road network to best utilise Stinson Parade Bridge and relive other roads	Helps to aid congestion in the long term, enables a more efficient traffic network. Benefits the urban environment with an improved dedicated pedestrian bridge	FRA / SCC																			1	AIM	5	1	Design and construct a new alignment for Stinson Parade Bridge to the west, urban renewal of existing bridge for pedestrians. Plan revised road network to best utilise Stinson Parade Bridge	4	Realigned, 2-lane bridge + urban renewal of existing bridge and surrounds	1	2	T3.5
T2.17	Tamavua Valley Road Link	GSTS 2001 Project. New link connecting Queens Road with Mead Road/Kings Road via twin tunnels	Low cost-benefit (particularly given the very high cost of the project and lack of tunnelling expertise in Fiji)	FRA																			3	ENG	5							
T2.18	Edinburgh Road widening	Widen Edinburgh Rd to accommodate an additional traffic lane between Foster Rd and Princes Rd. This should include consideration of bus priority and should be undertaken with regard for any dedicated bus lane project on Kings Road.	Road network capacity improvement. Project has merit in the longer term, conduct pre-feasibility study. Modelling to be completed following the outcomes of further feasibility and alignment assessments.	FRA																			2	ENG	5	3	Land availability	12	Widen 1.5km of existing 3-lanes to 4-lanes @ 5.2M per KM. Contingency of $4.2M due to difficulties with available land.	11	2	B12.1, B12.3
T2.19	Queens Road widening	Queens Road widening (and potential realignment) to four lanes between Navesi Bridge and Lami.	Road network capacity improvement. Project has merit in the longer term, conduct pre-feasibility study. Modelling to be completed following the outcomes of further feasibility and alignment assessments.	FRA																			2	ENG	5	3	This option probably still has merit - but do we exclude it on the basis that it won't happen within the next 15 years?	57.2	Widen 5.5km of existing 2-lanes to 4-lanes @ 10.4M per KM.	14	3	B12.3
T2.20	Kalabo - Makoi alternative link.	GSTS 2001 Project	Not clear what the benefits would be	FRA																			3	BP								
T2.21	Amy Street Road widening and intersection improvements	GSTS 2001 Project	No space, very expensive. Could not be justified.	FRA																			3	ENG								
T2.22	Upgrade Ratu Dovi Road to two lanes each way and improve major intersections	GSTS 2001 Project. Upgrade Ratu Dovi Road to two lanes each way and improve major intersections.	Assume to be proceeding as part of current FRA work program	FRA																			3	-								
T2.23	Waila Link Road	GSTS 2001 Project	Not clear what the benefits would be	FRA																			3	ENG								
T2.24	Ruve Street/Grantham Road link	GSTS 2001 Project	Not clear what the benefits would be	FRA																			3	ENG								
T2.25	Kalekana Settlement Road (Lami)	Road condition is dire - buses and taxis will not service approximately 1000 residents along this road. Urgent upgrade required, does not necessarily need to be sealed. Exposed water pipes to be covered.	Will reconnect a significant number of people who are currently disconnected from the transport network.	FRA																			1	ENG	5	2	FRA to make this a priority project under the road renewals program. Design and construct upgraded road surface	4	0.8km of upgraded 2-lane unsealed road to a sealed road @ 5M per KM.	1	2	
T2.26	Nadonumai Road (Lami)	Road condition is very poor - buses are being damaged trying to service approximately 2000 residents and schools along this road. Urgent upgrade required, does not necessarily need to be sealed.	A significant number of people are at risk of being disconnected from the transport network due to the worsening road conditions.	FRA																			1	ENG	5	1	FRA to make this a priority project under the road renewals program. Design and construct upgraded road surface	3.25	0.65km of upgraded 2-lane unsealed road to a sealed road @ 5M per KM.	1	1	
T3	***Road network operational improvements***	***Review of signal timing, operations and opportunities to optimise efficiency***																														
T3.1	Renwick Road to be made two-way for the full length	Works to bridge over Nabukalou Creek to allow two-way movements (will remove traffic from ill-equipped back-streets). Requires concept and detailed design plans.	Road network capacity improvements expected. Medium priority option can have further assessment undertaken if priority changes.	FRA																			2	AIM	5	2	Prepare concept and detailed design plans to allow two-way movements along Renwick Rd. (if supported by T3.5)	1.5	0.3km of road widening and bridge widneing	6	1	T3.5
T3.2	Reverse the direction of Nina Street	Make Nina Street vehicles enter from Marks Street end instead of Robertson Road. At the moment motorists on Marks Street have to travel an unnecessarily long route to get to roads such as Harris St and Robertson St. Overall travel times will be shortened. Requires concept and detailed design plans.	Traffic on Nina St increases by 50%. Offers relief to the Rodwell / Mark St intersection.	FRA																			2	AIM	1	1	Prepare concept and detailed design plans to reverse the direction of traffic on Nina Street (if supported by T3.5)	0.05	Signage and road markings.	1	1	T3.5
T3.3	Road use charging	Investigate the potential for road use charging on congested routes to fund new infrastructure projects and encourage public transport use. Previous study of potential toll route between Suva and Nausori was undertaken in 2005. Unlikely to be publicly accepted.	Politically unpopular, not persued	FRA																			3	-	-							
T3.4	Link traffic signals	Link all traffic signals using SCATS. Anectodal evidence suggests that the effectiveness of SCATs has been undermined by poor pavement design and maintenance of signal detectors. Fundamental issues such as pavement design and material use (such as aggregate quality) may need to be adressed prior to signal linking eventuating.	Signal linking in the peak direction may be used to create a 'green wave' whereby drivers proceed through progressive green lights, reducing vehicle travel times and improving the efficiency of signalised corridors.	FRA																			1	ENG	5	2	Commence an internal program to identify and implement how to link traffic signals using SCATS	12	High-level estimate. Could be refined	0	3	
T3.5	CBD road network review and modelling	Prepare a detailed model of the entire Suva CBD to assess opportunities to improve the capacity of the existing network through changes to intersections and direction of traffic. Significant data collection will be required. Model could be an extension of the model developed for the GSTS.	A dedicated project to improve the accuracy of the Greater Suva Model for the CBD would help to justify future changes to the CBD network.	FRA																			1	BP	3	1	Tender to consultants an update to the GSA Aimsun model and review of the CBD road network.	0.4	Extension of the existing Aimsun model established for the GSTS. Consulting fees + FRA management fee	0	1	
	Broader Road Programs																															
T4	Launch Fiji Blackspot program	In association with Fiji Police, identify locations with the highest crash numbers, develop mitigation treatments and prioritise funding to treat them. This is to be undertaken in conjunction with the commitment in the Fiji Decade of Action for Road Safety to address 30 Blackspots by 2020. An initial set of intersections have been identified which overlap with the intersection upgrade program identified as part of projects.	Evidence and issue based responses to existing hotspots may prove a viable way to target non-behavioural aspects of road safety.	FRA / Police																			1	RS	5	2	Develop and implement an internal program to use the Fiji Police Maap Database (crash statistics) to prioritise future intersection upgrades. Allocate budget for the program.	30	High level estimate based on the the annual spend in Australia by the Federal Government for blackspots (AUD$45M p.a.) and the maintenance (Roads to Recovery) budget (AUD$350M p.a.). Assume GSA spend is $2M per annum. This will allow for approximatley 5-10 sites per annum to be addressed.	0	15	

GSTS OPTIONS LONG LIST

Option No.	Title	Description	Assessment Detail	Responsible Authority	Priority (1=High, 2=Medium, 3=Excluded)	Evaluation method	Cost (1=Low Cost, 5=High Cost)	Value for Money (1-4)	ACTION (projects starting in next 10 years)	Estimate of Probable Cost (million)	Source / assumptions	Years to start	Duration	Dependant options
T5	Signage review	Undertake a review of speed limit, directional signage, and standard road signage along critical corridors. Wayfinding signage helps to assist unfamiliar road users in navigating the road network, increase road safety, and can increase the efficiency of the road network through reducing circulating traffic.	Already being undertaken by LTA (speeds) and FRA (signage)	FRA	3	BP	2							
T6	Street lighting upgrades and expansion of street light coverage	Establish a routine maintenance and renewal program for existing street lights and investigate opportunities to install street lights in residential, peri-urban areas to improve pedestrian safety.	Street lighting generally improves road safety particularly for pedestrians.	FRA	1	RS	5	3	Develop and implement an internal program to establish a routine maintenance and renewal program for existing streetlights and investigate opportunities to install streetlights. Allocate budget for the program.	20	2013 spend = 0.87M FJD. Increase to 1.3M p.a.	0	15	
T7	Driver training to improve driver behaviour	Review the adequacy of existing training material available for driver education and the stringency of licence testing	Improved driver skills and awareness may lead to improved road safety and decreased social and health costs.	LTA	2	RS	5	2	Review the existing driver education training material and the stringency of licence testing.	1.4	Study to be tendered to consultants + LTA management fees = $0.4M plus implementation costs $1M	4	1	
T8	Traffic Impact Assessments for Developments	Ensure thorough Traffic Impact Assessments are conducted on major new developments (e.g. Damodar City, commercial and residential developments) and that appropriate measures are taken to cater for changed traffic patterns as a result of the development.	Traffic Impact Assessments will ensure that appropriate measures are taken to cater for changed traffic patterns as a result of the development.	FRA / DTCP	2	BP	2	1	Nominate and train staff across organisations to properly evaluate the impacts of residential and commerical developments on the surrounding road networks	0.2	Policy change, allowance for government management costs	0	1	
T9	Remove direct driveway access onto Kings Road	Removal of direct access onto Kings Rd in Narere & Nakasi between Muanikoso Road and Dauvilevu Farm Road, replace with service lanes. This would involve planning, community consultation, feasibility assessment (potentially including modelling) and concept designs.	Road network capacity improvement	FRA / DTCP	2	BP	5	2	Conduct feasibility assessment and prepare concept designs for the removal of direct access onto Kings Rd in Narere & Nakasi (to be replaced with service lanes).	11.4	1.6km, both sides of the roads. Service lanes @ 2M per KM + $5M for land acquisition	8	2	
T10	Queens Road Traffic Management	Reduce speed of traffic along Queens Rd on approach to Naimawi St to prevent accidents	Raised at workshop, but removed after site investigation.	FRA	3	RS	2							
T11	***Local Area Traffic Management (LATM)***	***Develop and implement plans to introduce traffic calming and local area traffic management measures within key study areas, with the general aim of improving safety, reducing traffic speeds, and restoring the balance between active travel modes and motorised vehicles***												
T11.1	Toorak Precinct Local Area Traffic Management	Develop and implement a Local Area Traffic Management plan for the Toorak Precinct	LATM programs may significantly improve pedestrian and vehicle safety amenity as well as the overall quality of the public realm.	FRA	2	ENG	4	2	LATM study to be tendered to consultants for Toorak Precinct	0.7	Some preliminary work has already been completed in a recent submission to DTCP. Build on this. Study to be tendered to consultants + LTA management fees = $0.2M plus implementation costs $0.5M	2	1	
T11.2	Samabula Precinct LATM - Focus on Ratu Mara Road corridor (Princes Road to Lakeba Street).	Develop and implement a Local Area Traffic Management plan for the Samabula Precinct. Potential to convert Matuka Street intersection to left-in left-out arrangement, and divert traffic to nearby signalised intersections to resolve identified blackspot. Potential to address local traffic issues along Waimanu Street between Princes Road and Ratu Mara Road and improve general pedestrian amenity in the area. This will include an existing conditions road safety audit, concept design, traffic counts, modelling and detailed design plans.	LATM programs may significantly improve pedestrian and vehicle safety amenity as well as the overall quality of the public realm.	FRA / SCC	2	ENG	5	2	LATM studies to be tendered to consultant	1.4	Study to be tendered to consultants + LTA management fees = $0.4M plus implementation costs $1M	1	1	
T11.3	Grantham Road (Raiwaqa to Laucala Bay Precinct) LATM	Develop and implement a Local Area Traffic Management plan along Grantham Rd between Raiwaqa and Laucala Bay Rd. Recent developments need to be integrated to ensure smooth traffic flows - take into consideration Damodar City, Sports City, Garden City, traffic lights, USP bus bays, USP pedestrian crossing Golden Century and Rup's Housing Development.	LATM programs may significantly improve pedestrian and vehicle safety amenity as well as the overall quality of the public realm.	FRA / SCC	1	ENG	4	2	LATM studies to be tendered to consultant	0.7	Study to be tendered to consultants + LTA management fees = $0.2M plus implementation costs $0.5M	1	1	
T11.4	Laucala Beach Precinct Local Area Traffic Management	Develop and implement a LATM plan for the Laucala Beach Precinct	Low priority - surrounding road works should ease traffic concerns	FRA / NTC	3	ENG	4							
T11.5	Nausori Township Local Area Traffic Management	In light of the relocation of the bus terminal and market, undertake a study to improve traffic flow in Nausori, particularly the triangle formed by Kings Rd and the Nausori Bypass. The impact of surrounding developments such as the hospital on Ram Khelawan Road are to included. Consider pedestrian infrastructure upgrades to ensure adequate pedestrian amenity and bus routes to service the existing commercial district.	LATM programs may significantly improve pedestrian and vehicle safety amenity as well as the overall quality of the public realm.	FRA / NauTC	1	ENG	4	2	LATM studies to be tendered to consultant	0.7	NTC has already collected some data. Study to be tendered to consultants + LTA management fees = $0.2M plus implementation costs $0.5M	1	1	B1.3
W1	***Pedestrian Crossings Upgrade Program***	***Review existing zebra pedestrian crossing locations, focussing on high demand crossings and identify opportunities to upgrade, signalise and improve these crossings***								15	Total W1 + W2 (including sub options). 1M per annum @ 150k per site	0	10	
W1.1	Rodwell Rd (between Renown St & Robertson Rd)	Widen and raise the existing signalised pedestrian crossing in a manner that discourages jaywalking, potentially including pedestrian fencing. This will involve concept and detailed design plans.	Widening and raising the existing signalised pedestrian crossing may discourage jaywalking and improve pedestrian safety. Pedestrian fencing may be used to supplement appropriately designed facilities which accommodate pedestrian desire lines.	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct signalised ped crossings	0.15	Fencing, concreting and signage	2	1	B1.1, T2.16
W1.2	Grantham Rd (between Bryce St & Nairai Rd)	Widen the existing crossing point and signalise pedestrian crossing. This will involve concept and detailed design plans.	Appropriates pedestrian facilities and associated lighting will improve pedestrian safety at this location	FRA	1	RS	2	1	Prepare concept and detailed design plans, and construct signalised ped crossings	0.15	150k per site	2	1	T11.3
W1.3	Grantham Rd (at Raiwaqa between Falvey St and Auto City Place)	Widen the existing crossing point and signalise pedestrian crossing. This will involve concept and detailed design plans.	Appropriates pedestrian facilities and will improve pedestrian safety at this location	FRA	1	RS	2	1	Prepare concept and detailed design plans, and construct signalised ped crossings	0.15	150k per site	2	1	T11.3
W1.4	Amy St pedestrian treatment	Upgraded crossing point (potentially raised) mid block or at nearby intersection. This will involve concept and detailed design plans.	Justified on the basis that crossing facilities can significantly improve pedestrian safety.	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct signalised ped crossings on Amy Street	0.15	150k per site	5	1	T11.1
W1.5	Laucala Bay Rd (USP)	Move crossing to new signalised intersection at Grantham Rd / Laucala Bay Rd or add new linked signalised intersection. This will involve concept and detailed design plans.	Justified on the basis that crossing facilities that accommodate actual desire lines can significantly improve pedestrian safety, as well as creating a more efficient road network.	FRA	2	RS	3	1	Prepare concept and detailed design plans, and construct signalised ped crossings	0.3	New pedestrian lights and road markings	2	1	T11.3
W1.6	Koronovia Research School	Upgrade light at pedestrian crossing and install signage to direct pedestrians to crossing	Justified on the basis that crossing facilities can significantly improve pedestrian safety.	FRA	1	RS	1	1	Upgrade lights at Koronovia Research School pedestrian crossing and install signage to direct pedestrians to crossing	0.05	New lights and signage only	0	1	
W2	***New Pedestrian Crossing Location Investigations***	***Provide new pedestrian facilities to address current issues***												
W2.1	Yat Sen Primary and Secondary School - Laucala Bay Rd	Heavily congested due to pedestrians and vehicles turning in/out of the school. Investigate potential re-design of area.	Redesign may mitigate existing traffic and pedestrian issues so that police traffic management is no longer required.	FRA	1	ENG	4	1	Review, design and implement new pedestrian crossings	0.5	Formal pedestrian crossing ($150k) and road re-alignments ($350k)	0	1	
W2.2	Suva Primary School (Rewa St, between Ratu Mara Rd and Kikau St)	Install a new signalised pedestrian crossing point. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	1	RS	2	1	Review, design and implement new pedestrian crossings at Suva Primary School	0.15	150k per site	2	1	T11.2
W2.3	Nausori Bypass (between new market and bus stand)	Review and upgrade the proposed signalised pedestrian crossing between the new Nausori bus stand and market. Options to separate pedestrians from vehicles should be investigated given the high levels of pedestrian activity on both sides of Kings Rd.	Appropriates pedestrian facilities should be provided to accommodate desire lines, create a sense of pedestrian space and result in a positive urban design outcome	FRA	1	BP	4	1	Review, design and implement new pedestrian crossings	0.5	Overpass, fencing and signage	0	1	
W2.4	Muanikoso intersection with Kings Rd	Install new pedestrian crossing point between the two existing bus bays (south of Muanikoso Rd) . This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.5	Queens Rd at Nadonumai Rd, Lami	Install new pedestrian crossing point. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.6	Queens Rd at Delainavesi Rd, Lami	Install new pedestrian crossing point. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.7	Princes Rd southwest of Khalsa Rd	Install new pedestrian crossing point. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.8	Cunningham Rd 100m north of Biau Dr	Install new pedestrian crossing point. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.9	Khalsa Rd west of Tacirua Estate Rd	Install new pedestrian crossing point. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.10	Khalsa Rd north of Kanace Rd	Install new pedestrian crossing point. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.11	Ratu Dovi Rd north-east of Kaua Rd (Between Coca-Cola Amatil & Vivrass S.C)	Install new pedestrian crossing point. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	1	RS	2	1	Prepare concept and detailed design plans, and construct signalised ped crossings	0.15	150k per site	3	1	
W2.12	Ratu Dovi Rd, Nadera. Opposite Dr Ram Lakhan School (west of Church Rd)	Install one or two new pedestrian crossing points depending on investigation. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	1	RS	3	1	Prepare concept and detailed design plans, and construct signalised ped crossings	0.3	2 sites at 150k per site	3	1	
W2.13	Ratu Dovi Rd outside John Bosco School	Install new pedestrian crossing point. This will involve concept and detailed design plans.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.15	Queens Rd between Walu Bay Roundabout and Suva Prison	Install new pedestrian crossing point. This will involve an investigation to the most appropriate location/s, followed by concept and detailed design plans. Link into existing bus bays.	Appropriates pedestrian facilities will improve pedestrian safety at this location	FRA	1	RS	3	1	Review, design and implement new pedestrian crossings	0.3	4-lanes: 300k per site	0	1	
W2.16	Kings Rd at Kalokalo Cr intersection	Install new pedestrian crossing point. This will involve concept and detailed design plans. This will involve concept and detailed design plans.	Justified on the basis that crossing facilities can significantly improve pedestrian safety.	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.17	Bhawani Dayal School (Kings Rd, Nakasi)	Install new pedestrian crossing point to resolve pedestrian visibility issues.	Justified on the basis that crossing facilities can significantly improve pedestrian safety.	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	
W2.18	Nasinu Muslim College (Kings Rd / Wainibuku Rd)	Install new pedestrian crossing point to resolve pedestrian visibility issues, including consideration of new street lighting	Justified on the basis that crossing facilities can significantly improve pedestrian safety.	FRA	2	RS	2	1	Prepare concept and detailed design plans, and construct new pedestrian crossings	0.15	150k per site	5	1	

GSTS OPTIONS LONG LIST

					Framework						GSTS Objectives						Key Issues											Costings				
Option No.	Title	Description	Assessment Detail	Responsible Authority	1. Social and economic inclusion	2. Economic prosperity	3. Environmental sustainability	4. Integration of transport & land use	5. Efficiency, coordination & reliability	6. Safety, health & wellbeing	A - Integrated multi-modal strategy	B - Infra. and ops. for the metro road network	C - Infrastructure & traffic management operations	D - Public transport network & on-street infra.	E - Walking & cycling networks and infrastrucure	F - Staging plan showing timeframes	Traffic Congestion	Bus infrastructure and routes	Quality of infrastructure	Road safety	Enforcement and Regulation	Driver education and awareness	Priority (1=High, 2=Medium, 3=Excluded)	Evaluation method	Cost (1=Low Cost, 5=High Cost)	Value for Money (1-4)	ACTION (projects starting in next 10 years)	Estimate of Probable Cost (million)	Source / assumptions	Years to start	Duration	Dependant options
W3	Suva CBD pedestrian network development	Identify key pedestrian routes and pathways in order to deliver improved infrastructure to these areas (see W4 below).	Best practice pedestrian planning can re-prioritise parts of the road network within urban centres, providing a higher quality walking environment and links to other sustainable transport modes. Pedestrian network planning assists in providing guidance on investment and funding decisions.	FRA																			1	BP	3	1	Tender to consultants a study to develop a Suva CBD pedestrian network (this feeds into option W4, the implementation of pedestrian upgrades)	0.3	Network development study to be tendered to consultants + LTA management fees = $0.3M	0	1	
W4	Suva CBD pedestrian facilities upgrade program	Develop and implement a program for the re-surfacing of footpaths, provision of pram ramps at road crossings, provision of seats and rubbish bins	Quality pedestrian facilities enhance the public realm and contribute to a more optimal walking environment	FRA																			1	BP	5	2	Develop and implement a program for the re-surfacing of footpaths and associated pedestrian facilities.	26	2M per annum for 13 years	2	13	W3
W5	Suva CBD pedestrian wayfinding strategy	Develop and implement a pedestrian wayfinding strategy to deliver clear, legible and succinct pedestrian wayfinding signage to key destinations within the CBD. Dependent on pedestrian network development.	Pedestrians have different needs from cars and follow different routes to the typical road network. A review and identification of wayfinding signage and infrastructure can improve east of navigation and the likelihood of utilising walking as a transport mode.	FRA																			2	BP	2	1	Implement the pedestrian wayfinding strategy for the Suva CBD as outlined in option W4	0.1	Assume strategy formed part of W3. Implementation involves 200 signs @ 5000 per sign.	3	1	W3
W6	Suva CBD water front revitalisation	Investigate opportunities to develop the Stinson Parade area (currently closed to traffic) to create an attractive, safe pedestrian environment, with opportunities to incorporate a recreational cycling path. This includes the permanent closure of Stinson Parade bridge.	Revitalisation may increase the likelihood of undertaking walking trips, with flow on benefits for community health.	FRA																			2	BP	2	2	Plan and design for improved pedestrian amenity following Stinson Parade Bridge rebuild (option T2.16)	0.5	Project allowance of $500k for revitalisation works - excludes bridge works	3	2	W3, T2.16, SCC Foreshore Redev'ment
W7	Pedestrian awareness campaign	Develop an education campaign that highlights the over representation of pedestrian crashes and encourages motorists to attribute greater respect to pedestrians as legitimate and vulnerable road users	Warranted on road safety grounds.	LTA																			2	RS	5	2	Develop an education campaign that raises awareness of pedestrians as vulnerable road users	5.5	Educational campaign to be tendered to consultants + LTA management fees = $0.5M. Implementation = $0.5M p.a.	5	10	T4
W8	Develop safe routes to schools	In conjunction with schools (primary schools in the first instance) identify the safest walking routes to schools and consider initiatives such as 'walking school buses'	Pedestrian planning for schools providesa higher quality walking environment and increases the safety of this vulnerable road user group. Pedestrian network planning assists in providing guidance on investment and funding decisions.	FRA / Min Educ																			1	RS	3	1	Tender to consultants a study to identify the safest walking routes to schools.	0.5	Study to be tendered to consultants + LTA management fees = $0.5M. Considerable amount of field work required.	0	1	
W9	Pedestrian crossing lights upgrade program	Establish a routine maintenance and renewal program for existing flashing pedestrian crossing lights	Best practice for road management, particularly considering deteriorating road quality.	FRA																			1	RS	5	3	Develop and implement an internal program to establish a routine maintenance and renewal program for existing flashing pedestrian crossing lights. Allocate budget for the program.	15	Increase current spend to $1M p.a.	0	15	
W10	**Footpath Installation Program**																															
W10.1	Solomoni St, Lami (Queens Rd to Nakula St)	Install footpaths along local street between Queens Rd and Labiko St.	Footpaths generally improve pedestrian safety by allocating road space seperated from motorised traffic.	FRA																			2	RS	3	2	Design and install new footpaths along Solomoni St (Lami)	0.4	Assume 500m of paving @ 0.8M KM	3	1	
W10.2	Labiko and Vetaia St, Lami	Install footpaths along local street, especially around the school.	Footpaths are generally improve pedestrian safety by allocating road space separated from motorised traffic.	FRA																			2	RS	3	2	Design and install new footpaths along Labiko and Vetaia St from Lami Town to Marist Convent School	0.4	Assume 500m of paving @ 0.8M KM	2	1	
W10.3	Nasevou St, Lami (Queens Rd to Quaia Crossing)	Install footpaths along local street from Queens Rd to Qauia Crossing. Large population, schools and new developments to be serviced.	Footpaths are generally improve pedestrian safety by allocating road space separated from motorised traffic.	FRA																			1	RS	3	2	Design and install new footpaths	1.44	Assume 1800m of paving @ 0.8M KM	0	1	
W10.4	Cunningham Rd (Kings Rd to Princes Rd)	Install footpaths along collector street, from Kings Rd to Princes Rd	Footpaths generally improve pedestrian safety by allocating road space seperated from motorised traffic.	FRA																			2	RS	5	2	Design and install new footpaths along Cunningham Road (full length)	2.8	Assume 3.5km of paving (Princes Rd to Kings Rd) @ $0.8M KM	4	1	
W10.5	Khalsa Rd (Kings Rd to Princes Rd)	Install footpaths along collector street, from Kings Rd to Princes Rd	Footpaths generally improve pedestrian safety by allocating road space seperated from motorised traffic.	FRA																			2	RS	5	2	Design and install new footpaths	2.8	Assume 3.5km of paving (Princes Rd to Kings Rd) @ $0.8M KM	8	1	
W10.6	Davuilevu Methodist Subdivision	Upgrade footpaths in new subdivision	Justified on the basis that crossing facilities can significantly improve pedestrian safety.	FRA / DOH																			2	RS	4	2	Design and install new footpaths	0.5	Assume 600m of paving @ 0.8M KM	7	1	
W10.7	Ratu Sukuna Rd (between Draiba Primary and Nasese shops)	Install footpaths along collector street	Footpaths generally improve pedestrian safety by allocating road space seperated from motorised traffic.	FRA																			2	RS	4	2	Design and install new footpaths	0.5	Assume 600m of paving @ 0.8M KM	7	1	
W11	School crossing upgrade program	Upgrade school crossings at critical locations to provide pedestrian flashing lights or pedestrian operated signalised crossings. 137 schools across GSA. Assume upgrade of 75 crossings at $100k per crossing.	Improving the existing school crossings will provide safe and efficient movement for pedestrians.	FRA																			1	ENG	5	2	Develop and implement an internal program to identify school crossing upgrades at critical locations. Allocate budget for the program.	8	137 schools according to GIS. Assume 75 upgrades. Assume $100k FJD per crossing	0	15	W8
W12	New Housing Estates	Install footpaths along local streets to connect with transport, shops and schools when housing developments occur	Footpaths generally improve pedestrian safety by allocating road space seperated from motorised traffic.	FRA / DOH / HA / DTCP																			2	RS	5	3	Implement program to identify, design and install footpaths along local streets when housing developments occur	13	Budget allowance of $1M pa	2	13	

Option Type
O Other
W Walking
C Cycling
T Traffic
B Bus
CP Car Parking
R Regulatory

Option Evaluation
SID SIDRA Modelling
AIM Aimsum Network Modelling
RS Road Safety
ENG Traffic Engineering Design Principles
BP Best Practice Transport Planning and Transport Regulation

Value for Money
1 Excellent
2 Good
3 Average
4 Fair

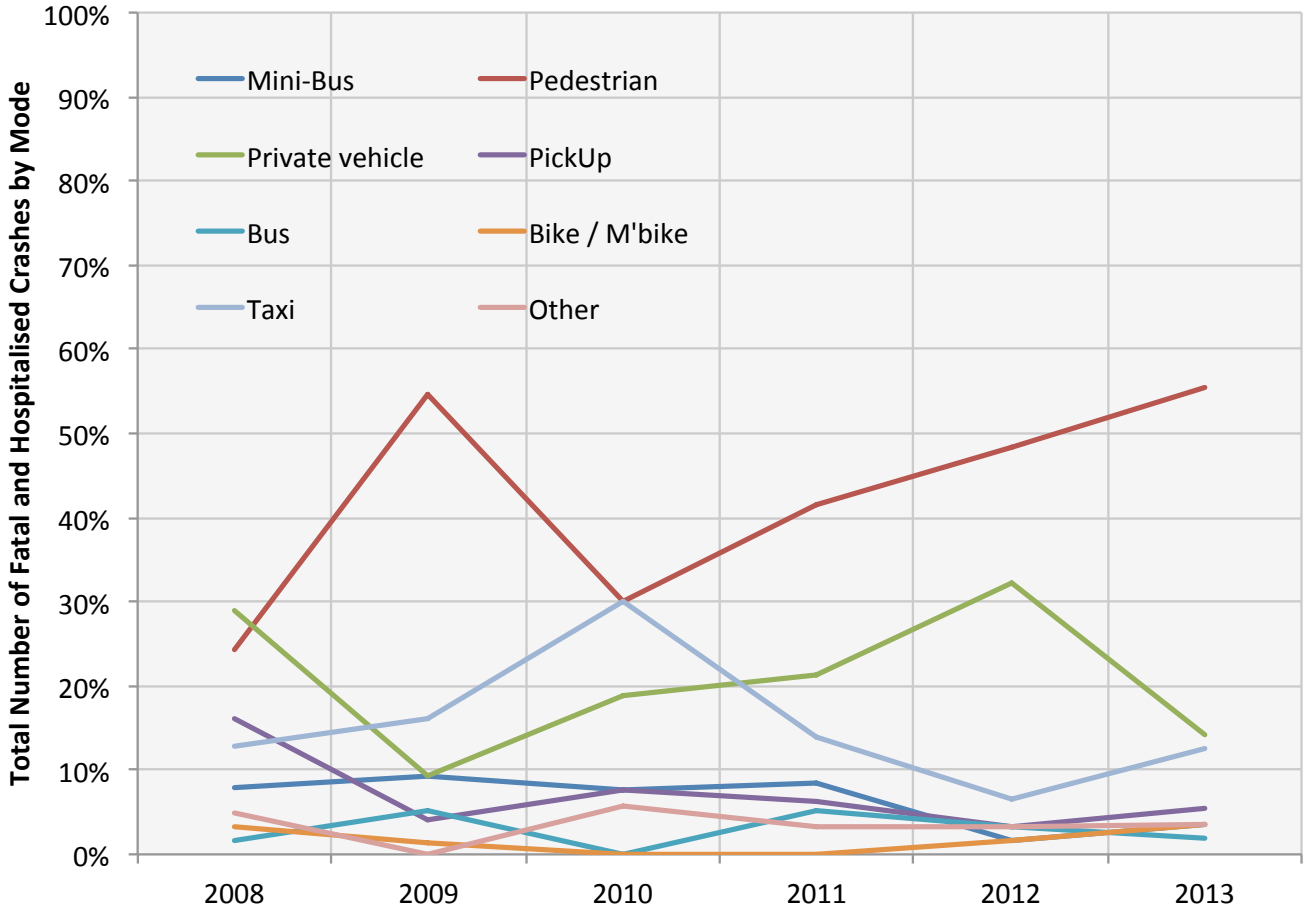
Costings
1 Low ($0-$50k)
2 Low ($50k-$250k)
3 Low ($250k-$500k)
4 Low ($500k-$1M)
5 High (>$1M)

Appendix D Issues and Opportunities

Road Safety

This section provides ancillary analysis that was not presented in the body of the report. From Figure D-1 it can be seen that the number of pedestrian injuries have been on the rise since 2010, with taxi occupants also rising between 2012 and 2013. Future road safety initiatives should focus on delivering improved safety for pedestrians of all ages, but particularly younger pedestrians.

Figure D-1: Total number crashes resulting in hospitalisation or death in Greater Suva (2008-2013)



The key road safety objectives are to provide a safe road environment for all users in the GSA, with a focus on reducing pedestrian accidents and the number of fatal and serious injury accidents. A summary of the main issues and opportunities to achieve these objectives is provided in Table D-1. An abbreviated version of this table is included in Table 6 of the main report.

Table D-1: Road safety issues and opportunities

Issues	Opportunities / Objectives
• Speeding • Driver behaviour (e.g. running of red lights, failing to give way, tailgating, poor lane discipline, incorrect use of multi-lane roundabouts) • Aging and unsafe vehicles (including limited seatbelts in the back of vehicles and limited use of child safety restraints) • Large volumes of buses on the road • Poor condition of the road infrastructure (including public street lighting and broken flashing pedestrian lights) • Poor intersection designs and layouts (e.g. poor sight lines, priorities, merges and conflicting turning movements)	• Deliver actions outlined in the following SFAs: - Safer Roads - Safer Drivers - Safer Vehicles - Road Safety Education - Post-Accident Care - Accident Data and Research - Traffic Law Enforcement • Prioritise remedial works and investigations and key Blackspot locations • Pedestrian awareness campaigns • Pedestrian crossing upgrade program to signalise key crossings and improve the safety of many school crossings • Provision of several new pedestrian crossings (including school crossings) • Provision of safe bus bays and upgrade bus bays at dangerous/high use locations • Street lighting upgrades • Develop safe routes to schools • Safe intersection design • Increased alcohol and drug driving enforcement initiatives

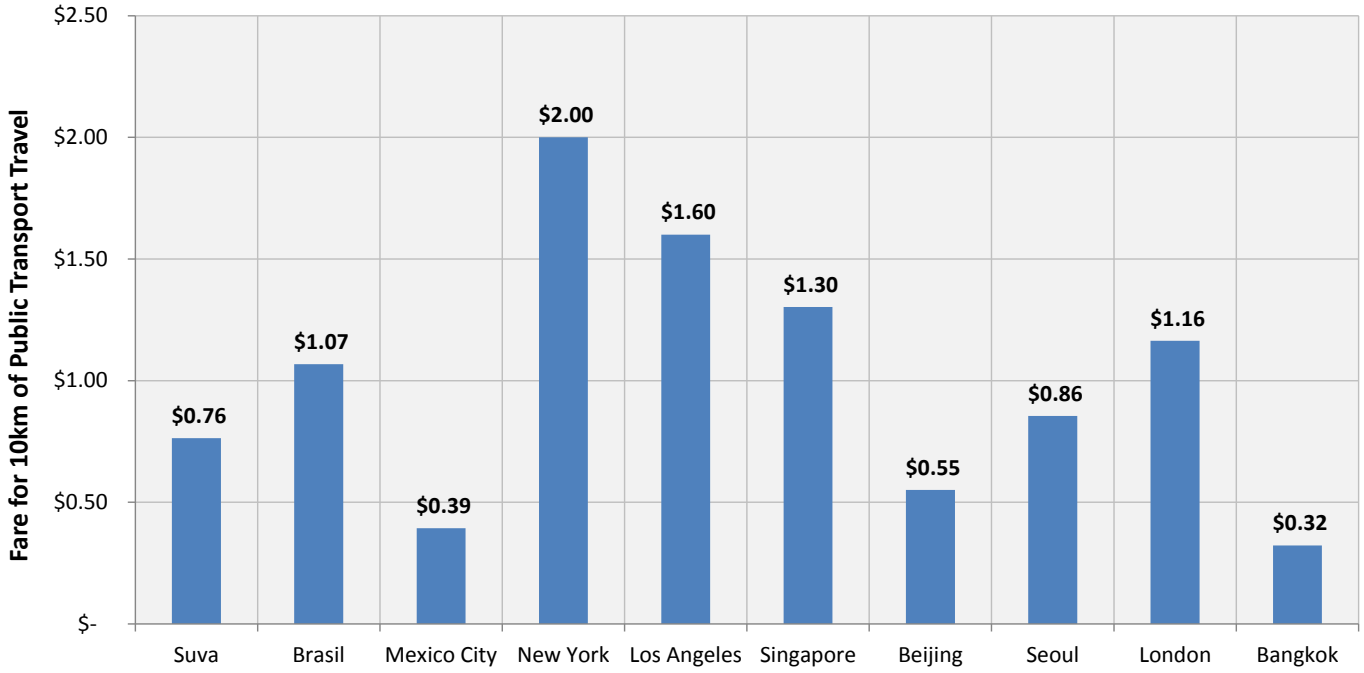
Public Transport

This section provides ancillary analysis that was not presented in the body of the report. The bus network, operating with controlled fares, has developed over time due to conscientious operators. Regulation is undertaken by the LTA with respect to fares, safety and competition using the LTA Act of 1998. The LTA Act is not strict on the level of emissions associated with bus transit. The LTA issues Road Route Licenses (RRLs) for buses. In 2009 an independent review of RRLs was completed and indicated there were 188 RRLs issued to 66 companies[32].

Many bus services offer e-ticketing with all services also dependent on cash payments for fares. Bus fares in Suva are low in comparison to those in other countries as shown in Figure D-2.

[32] *Fiji Bus Industry Review, Orion Consulting Associates, October 2009*

Figure D-2: Comparative daily bus fares by city (USD)



Fijian taxis, like in most other countries, offer a point-to-point service charging a tariff using a meter. Figure D-3 provides a comparison of Suva taxi fares in comparison to other global cities. It is noted that as is the case with other public transport options taxi fares are comparably low.

Figure D-3: Comparison of cost of 3km taxi journey

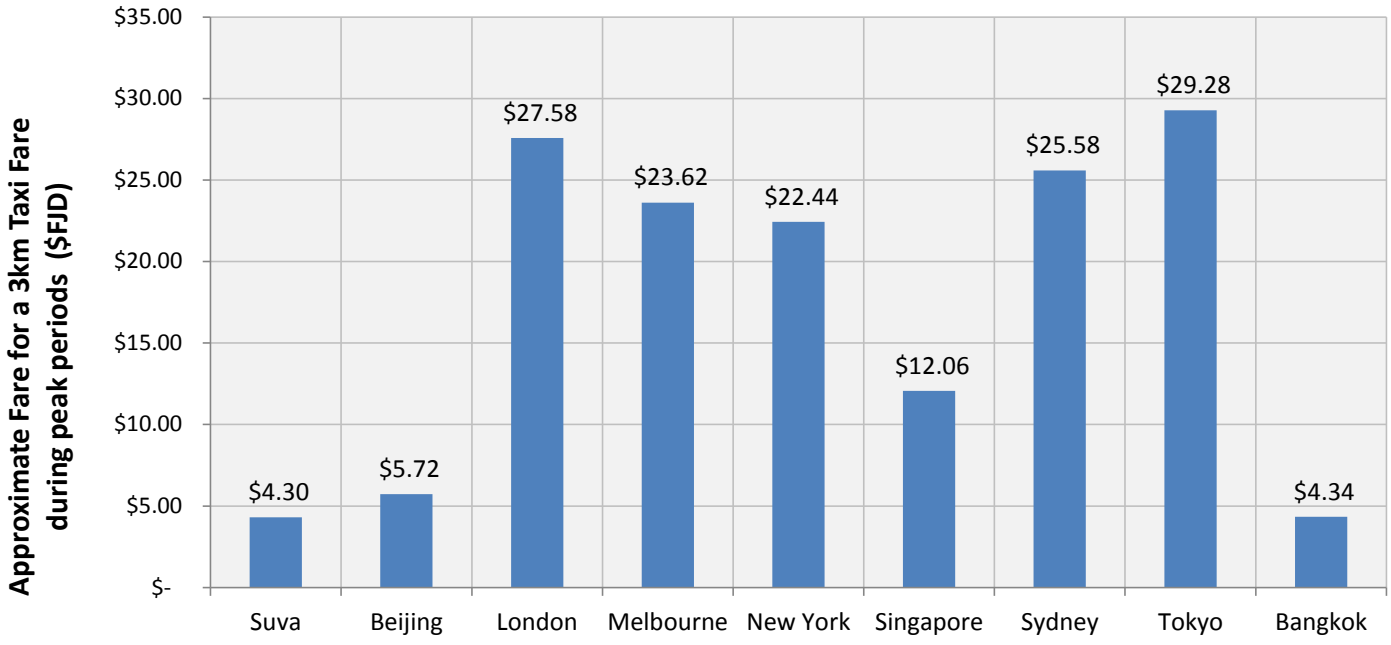


Table D-2 provides a list of the key issues associated with public transport within the Greater Suva Area. An abbreviated version of this table is included in Table 6 of the main report.

Table D-2:Summary of public transport issues

Mode	Issue	Opportunities
Bus	1. Planning and co-ordination 2. Bus station operation, capacity and access 3. Bus stop operation and capacity (including informal boarding and alighting) 4. Regulation 5. Vehicle emissions 6. Age and safety of vehicle fleet 7. Bus driver behaviour 8. Ticketing and fare collection	• Redevelop Suva City Bus Station • Improve regulation • Rationalise and upgrade bus stops • Extend routes and facilities to permeate new developments • Encourage upgrading of vehicle fleet to improve safety and reduce vehicle emissions • Establish training programs to educate drivers on safe driving practices • Consolidate operations and coordinate route planning • Review and consolidate ticketing practices, promoting e-ticketing
Mini-bus	1. Planning and co-ordination 2. Regulation 3. Informal pick up and set-down 4. Age and safety of vehicle fleet 5. Minibus driver behaviour	• Improve regulation and enforcement • Encourage upgrading of vehicle fleet to improve safety and reduce vehicle emissions • Establish training programs to educate drivers on safe driving practices • Consolidate operations and coordinate route planning
Taxi	1. Regulation 2. Taxi driver behaviour 3. Age and safety of vehicle fleet 4. Proportion of empty running taxis	• Improve regulation and enforcement of adherence to base stations • Encourage upgrading of vehicle fleet to improve safety and reduce vehicle emissions • Establish training programs to educate drivers on safe driving practices

Walking and Cycling

Walking

This section provides ancillary analysis that was not presented in the body of the report. Footpaths are generally provided on both sides of most urban roads, however in the older part of the Suva CBD they are often either too narrow or non-existent. Pedestrian paths are rarely provided in residential areas. Pedestrian crossings are generally controlled at major signalised intersections, other areas such as educational institutions are through “Zebra” crossings (see Table D-2) and for schools manually

controlled by school traffic marshals (school children controlling traffic by laying out traffic cones and using stop signs mounted on long poles under a teacher's supervision). AM and PM peak hour traffic in some locations is also controlled by traffic police (even overriding a signalised intersection). Due to delays and difficulties crossing roads, pedestrians may often jaywalk.

Figure D-4: Typical zebra crossing in operation

Grantham Road (at 5pm)

Walking is a key part of life in Fiji, however what may work well in low-density villages is not necessarily suitable in an urban environment that is rapidly growing. A clear plan is required to deliver a quality, connected pedestrian path network that encourages walking and affords these vulnerable road users a high level of safety.

Based on the above, the primary walking objective is to create a safe and enjoyable pedestrian environment in the GSA. A summary of the main issues and opportunities to achieve this objective is provided in Table D-3. An abbreviated version of this table is included in Table 6 of the main report.

Table D-3: Walking issues and opportunities

Issues	Opportunities / Objectives
• Discontinuous footpath network • Aging footpath infrastructure • Lack of formal road crossing opportunities • Limited footpath provision in peri-urban areas • Vehicle speeds • Lack of public street lighting - particularly in peri-urban and rural areas • Driver behaviour and attitudes to pedestrians • Recognition of walking as a legitimate transport mode • Pedestrian amenity (seats, shade, walking away from heavily trafficked streets) • Absent or poorly designed crossings at signalised intersections	• Identify key pedestrian routes and pathways and focus on providing improved infrastructure to support and define these as priority routes. • Prepare a priority pedestrian network plan that delineates walking connections in Central Suva, along with identifying longer, more scenic recreational routes • Improve pedestrian facilities in the Suva CBD, focusing on concentrated pedestrianised areas such as the Suva Bus Station and the Suva Market and Port • Educate motorists on giving way to pedestrians and attributing them greater respect as a legitimate road user • Run a campaign highlighting the number of pedestrian fatalities and serious injury crashes • Potential to activate the Suva water frontage to create an attractive, safe pedestrian environment • Install street lights in residential areas and regularly maintain existing lighting infrastructure • Identify safe routes to school • Consideration of annual car-free days • Ensure maintenance of flashing pedestrian lights and upgrade to LED lighting • Separation of pedestrians and motorised vehicles through either elevated or under-ground walkways • Promote the health and fitness benefits of walking.

Cycling

This section provides ancillary analysis that was not presented in the body of the report. In order to increase cycling participation and numbers in the GSA, appropriate supporting infrastructure needs to be provided. This includes an allocation of road space to cyclists, along with providing a combination of on and off-road facilities to cater for a range of rider types. The community are understood to harbour real and perceived safety concerns with respect to cycling – in part due to the neglect in providing for them in the planning and design of the city.

The health benefits of cycling are well documented. Cycling is considered to be a preventative health measure, particularly in terms of heart disease, Type 2 diabetes and some cancers. It has also been found to lead to a reduction in depression, stress and anxiety levels in individuals.

Based on the above, the primary cycling objective is to create a safe environment that is conducive to encouraging cycling in the GSA. A summary of the main issues and opportunities to achieve this objective is provided in Table D-4. An abbreviated version of this table is included in Table 6 of the main report.

Table D-4: Cycling issues and opportunities

Issues	Opportunities / Objectives
• No provision for cyclists on or off road • Driver awareness and perceptions towards cyclists as legitimate road users • Narrow roads and no separation from vehicles • No designated routes • Vehicle volumes and speeds	• Legitimise cycling as a viable form of transport through integration with planning and design frameworks, along with requisite funding allocation. • Determine potential bicycle priority routes and prepare a bicycle network plan linking key destinations and activity centres and including a combination of on and off-road bicycle facilities. • Awareness campaigns that run parallel to the introduction of new cycling infrastructure. • Ride to work day • Cycling Fiji bicycle park and rider training programs • Annual riding events that may involve the closure of a lane • Adopt a staged approach – initially provide a safe, off-road facility, promote and encourage the use of it and monitor the use. As demand grows, add to the network.

Traffic Network

This section provides ancillary analysis that was not presented in the body of the report. The condition of the road pavements across the study area is generally poor, however FRA has embarked on a significant plan to improve the quality of roads throughout Fiji with the government allocating more than $400million in the 2013 budget, this represents a substantial increase from previous years. Bridges tend to be reasonably old structures and maintenance has been neglected. FRA has closed two main bridges in Suva (on Stinson Parade and Fletcher Road) due to a lack of maintenance. The closure of the two bridges has been an inconvenience to the general public, Stinson Parade in the CBD remains closed after more than a year with engineering investigations still in progress, Fletcher Road has had a temporary bridge and signals installed to provide alternating one-way traffic flow.

Traffic congestion has mounted considerably in recent years, due to an increase in vehicles operating on the network, with a particular increase in heavy vehicles. The increase of car ownership across the study area is expected to exacerbate the levels of traffic congestion unless improvements are made.

Congestion occurs in numerous places across the study area, however the largest impacts are felt along the following corridors in the peak direction:

- Kings Road
- Queens Road
- Princes Road
- Grantham Road
- Rewa Street
- Fletcher Road
- Throughout the Suva CBD

The Port of Suva is the largest port in Fiji and is used for sea freight, cruise ships, the Fijian Navy, fishing vessels and tankers. The port is located close to the Suva CBD and has led to the development of significant industrial areas on the edge of the Suva CBD, such as Walu Bay. From an economic and efficiency point of view the management of freight traffic is a key issue.

The availability of historical traffic volumes is limited across the study area, an annual program of traffic counts by the Department of National Roads was last conducted in 2009. The different regions of the GSA all attract different mixes of traffic for business, industrial and educational purposes. The majority of trips are attracted from the Suva-Nausori corridor, which is the fastest growing population centre in all of Fiji[33].

Given the above commentary, Table D-5 provides a concise list of the key issues associated with the traffic network within the GSA. An abbreviated version of this table is included in Table 6 of the main report.

Table D-5: Traffic network Issues and opportunities

Item	Issue	Opportunity / Objective
Road Network Operation		
1	Traffic congestion	• Improve network operations to provide efficient, safe and integrated traffic network • Coordinated road network • Provision of more time-separated pedestrian crossings • Linking of existing and future traffic signals (SCATS)
2	Coordination of existing traffic signals	
3	Operation of pedestrian crossings (including school crossings)	
4	Lack of network resilience	
5	Scheduling road works during peak periods	
6	Efficient movement of freight	
Physical Road Network		
7	Intersection design (including provision of right turn lanes)	• Address deficiencies within physical infrastructure to improve road network • Better intersection design to enable safe opportunities for turning vehicles • Undertake road safety audits of existing Blackspot locations and for all future road / intersection designs
8	CBD road capacity	
9	Road network and infrastructure condition (including delineation)	
10	Lack of sufficient signage	
11	Street lighting	
12	Urban design / land use planning	
13	Intersection design (allowing for all vehicle types including heavy vehicles)	
Other		
14	Lack of enforcement / level of regulation	• Driver education to improve behaviour • Increase enforcement of speeds and
15	Driver behaviour	

[33] *Fiji Bureau of Statistics, 1997 – 2007 Census comparison*

Item	Issue	Opportunity / Objective
16	Speed limits	road user behaviour • Review speeds limits in urban areas • Newer vehicle fleets targeting safer vehicles and reduced emissions
17	Pedestrian behaviour and need for separation	
18	Impact on air quality / noise pollution	

Car Parking

Overview of car parking

This section provides ancillary analysis that was not presented in the body of the report. As a general rule, land uses generate and attract patrons, customers, staff and / or residents. A bi-product of access to these land uses is, in its simplest form, a 'trip'. Trips can be made by a variety of methods including (but not limited to) walking, cycling, public transport and / or the private motor vehicle. Car Parking provides an end of trip facility for the private motor vehicle mode.

The type of land use has differing levels of attractiveness (i.e. trip generation) and therefore different requirements for car parking. Different uses also have different customer bases and in turn different needs in regard to their required length of stay. Accordingly, different types of car parking are required (pick up drop off parking – 5 to 15 minutes, short term parking – 1 to 2 hours and long term parking – all day) to satisfy differing needs.

In an Activity Centre area, it is important to recognise the differing user group needs and attempt to balance the impacts that car parking can have on the centre. It is also recognised that car parking is a finite resource and as such considerations need to be given to the priority order in which drivers should have access to car parking. The considerations give regard to the mobility of drivers accessing a centre, the desire to promote sustainable and active modes of travel and servicing of businesses.

In respect of the Suva CBD area all trips are made by the private car in turn require car parking opportunities, and serve many differing land uses including (but not limited to) retail, restaurant, office, commercial, light industrial and recreation.

On-Street Parking

Parking time restrictions do not typically apply, only one section of road was found where parking is restricted to 30 minutes between 9:30am and 3:30pm[34].

A total of approximately 628 officially recognised spaces exist within the CBD area (marked spaces within the CBD area that are controlled by a parking meter) which have an overall occupancy of approximately 80% during the day[35].

[34] *Victoria Parade, southbound lane between Gordon and MacArthur Streets. Whilst there is signage, there are no actual parking bays marked on the road.*
[35] *Based on a one-day survey conducted on Thursday 13th February, 2014*

These occupancies are benchmarked against an effective capacity of 85%. Occupancies above such a level represents, given the dynamic nature of parking, a situation where drivers are unable to identify where vacant spaces exist. While demands above this theoretical capacity can and do exist, they are generally associated with excessive vehicle circulation in search of vacant car spaces, unless they are supported by improved car parking layout and/or management.

Issues and Opportunities

Car parking issues and opportunities are summarised in Table D-6. There are a number of opportunities that could provide substantial improvements to the operation of the parking system without significant infrastructure spending. An abbreviated version of this table is included in Table 6 of the main report.

Table D-6: Car parking issues and opportunities

Issues	Opportunities / Objectives
• Lack of parking time restrictions to allocate car parking to specific user groups. This results in priority and the best located spaces often being used as long term car parking, limiting the multi-use of a single car space by shoppers and visitors. • Differential car parking pricing between on-street and off-street facilities results in drivers preferring to use on-street facilities and creating road network congestion while searching for a vacant space. • Parking reaches and exceeds the effective capacity within a number of on-street parking areas, which in turn, will result in longer parking search times and increased road network congestion. • A lack of parking enforcement and small fines, results in a low deterrent for drivers to adhere to any relevant parking restrictions. • Limited/inconsistent parking guidance signage results in less preference being given to off-street locations.	• The development of preferred road space allocation priorities which can guide the allocation of parking to specific user groups. • Introduction of parking time restrictions to prioritise parking to specific preferred user groups. • Variation of parking pricing structures to prioritise the use of off-street parking as a means to reduce traffic congestion caused by vehicles searching for on-street car parking spaces. • Improvements to parking guidance signage to minimise search times looking for car parking area and encourage the use of currently underutilised parking areas. • Increased parking enforcement to ensure that the parking system operates as intended.

Appendix E Broad Level Cost Estimates

Table E-1: Broad level cost estimates

			Cost ($FJD)				
Category	Option Title	Description	Low ($0-$100k)	Low-Med ($100-$250k)	Med ($250k-$500k)	Med-High ($500k-$1M)	High (>$1M)
Intersection upgrade works	Intersection street lighting upgrade	Install or upgrade street lighting, assume four street light poles are required.		X			
	Unsignalised cross intersection upgrade	Provide new kerb and channel and resurface cross intersection and provide new linemarking.			X		
	Unsignalised T-intersection upgrade	Provide new kerb and channel and resurface T-intersection and provide new linemarking.			X		
	Signalised cross intersection upgrade	Provide new kerb and channel and resurface cross intersection and provide new linemarking.			X		
	Signalised T-intersection upgrade	Provide new kerb and channel and resurface T-intersection and provide new linemarking.				X	
	New roundabout at T-intersection	Replace unsignalised T-intersection with roundabout.				X	
	New roundabout at cross intersection	Replace unsignalised intersection with roundabout.				X	
	New traffic signals at T-intersection (or private property access road)	Replace unsignalised intersection with traffic signals.				X	
	New traffic signals at cross intersection	Replace unsignalised intersection with traffic signals. Assume two approach lanes per leg. Provide new kerb and channel and resurface cross intersection and provide new linemarking. Including induction loops and associated conduits.				X	
Pedestrian infrastructure upgrade	Zebra crossing	Provide zebra crossing with flashing yellow lights and appropriate signage.	X				
	Signalised pedestrian crossing	Upgrade unsignalised / zebra pedestrian crossing to signalised pedestrian crossing			X		
Bus infrastructure upgrade	Single Bus bay upgrade.	Provide indented bus bay for one bus (length 20m)	X				
	Double Bus bay upgrade.	Provide indented bus bay for two buses (length 40m)		X			

			Cost ($FJD)				
Category	Option Title	Description	Low ($0-$100k)	Low-Med ($100-$250k)	Med ($250k-$500k)	Med-High ($500k-$1M)	High (>$1M)
	Triple Bus bay upgrade.	Provide indented bus bay for one bus (length 60m)		X			
	Bus stop upgrade	New bus shelter. Signage within shelter. Bus stop signage post. Bench seating.	X				

Unit costs (provided by MWH)

- Upgrade 2-lane road to 4-lanes: $10.4M per km
- New 2-lane rd (including kerb and channel): $9.4M per km
- 2m wide footpath: $0.4M per km
- New pedestrian signals: $0.15M
- Signalised T-intersection: $0.3M
- Road signs (procurement and installation): $500

Other cost assumptions made:

- New enforcement officer (salary + on-costs): $50,000 per annum
- Upgraded bus stop: $6,000 per stop (based on a similar program in Western Australia[36])
- New 4-lane road (including kerb and channel): $16M per km
- Unsealed 2-lane road to sealed 2-lane road: $5M per km

[36] *http://www.pta.wa.gov.au/Projects/BusStopAccessibilityWorksProgram/tabid/308/Default.aspx*

Appendix F Technical Assessments

Overview

Technical assessments were undertaken on all options using five different assessment methods. The outputs from the assessments were then used to validate and refine the options.

Inputs that have been used as a basis for the assessments include (assessment type denoted in brackets):

- Traffic data (traffic modelling)
- Road traffic crash statistics (road safety assessments)
- Demographic data (traffic modelling)
- Traffic engineering principles (design, policy and planning options)
- Broad level cost estimates (evaluating the priority options)
- Knowledge of the local study area (supporting all assessments)

Assessing the options from a technical perspective allowed the study team to apply a further level of rigour to the options to ensure the likely impact of each option warrants its inclusion as part of the strategy.

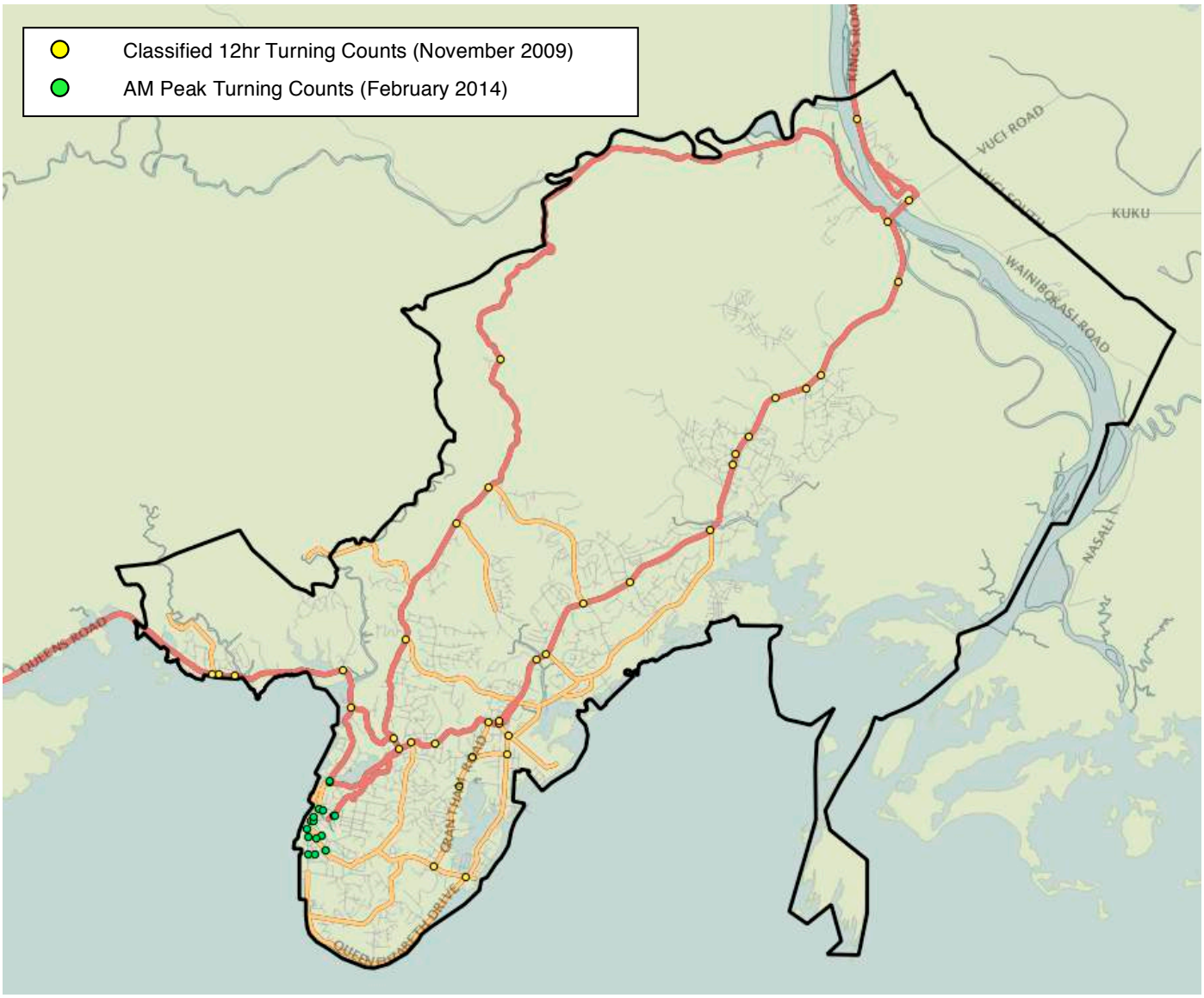
Traffic Data Collection

Traffic data has been collated from a variety of sources to form a baseline of traffic movements in the GSA. This baseline underpinned the technical assessment of options, and includes the following:

- AM Peak hour turning movement counts collected by the study team at 14 intersections around the Suva CBD. Survey data was collected via field survey between 6:30am and 9:30am, over four separate weekdays during February 2014.
- Classified 12-hour turning movement counts commissioned by the (former) Department of National Roads (DNR) at over 50 intersections across the GSA. Survey data was collected for a 12-hour period from 6am to 6pm on a typical weekday in November 2009. The data is aggregated and provides a 12-hour count only.
- 15 minute sample classified and vehicle occupancy counts collected by the study team at three mid-block locations around the Suva CBD. Survey data was collected via field survey on Thursday 13 February 2014.
- Travel-time surveys collected by the study team along eight separate routes on weekdays during February and March 2014.
- On-street and off-street public car park utilisation counts collected by the study team in the Suva CBD. Conducted on Thursday 13 February 2014.

The traffic count locations are illustrated in Figure F-1.

Figure F-1:Traffic data collection locations



The above traffic data has been utilised in the traffic modelling (including SIDRA and Aimsun), which reinforces the recommendations within the strategy. It should be noted however, that the availability of up-to-date, comprehensive traffic data from Stakeholders has been a constraint on the level of accuracy of the various traffic models produced as part of this study.

Intersection Assessment

The assessment methods included, but were not limited to, SIDRA INTERSECTION[37], and the use of an Aimsun Traffic Model to inform relative road network capacity improvements[38]. The operation of a

[37] *SIDRA INTERSECTION is a computer based modelling package which calculates intersection performance*

[38] *Aimsun is a computer based network modelling package which integrates travel demand modelling at the macroscopic level with mesoscopic, microscopic and hybrid simulation.*

select number of options relating to intersections has been assessed using *SIDRA INTERSECTION 6*[39]. SIDRA is a micro-analytical computer based modelling package for the evaluation of alternative intersection designs in terms of capacity, level of service and other intersection performance indicators. The program can assess multiple intersection configurations and crossing types.

The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised intersections, a DOS of around 0.95 has been typically considered the 'ideal' limit, beyond which queues and delays increase disproportionately. For unsignalised intersections, a DOS of around 0.90 is considered acceptable.

In order to produce quality outputs SIDRA is reliant on high quality data inputs. In this instance the lack of data accuracy hampered the ability to calibrate the individual models effectively. The availability of more detailed, recent and comprehensive data would be beneficial in delivering more robust results.

However, the assessments completed are for high-level purposes and are therefore considered fit for purpose (noting that a number of assumptions were required) to broadly assess the potential benefit of various options and inform their priority within the strategy. It is envisaged that the short-listed priority options will undergo further, more detailed technical assessments as part of further preliminary works and feasibility studies prior to detailed design and project-delivery stage (this level of review and assessment is outside the scope of this study).

A number of key assumptions and disclaimers in the use of the SIDRA modelling assessments are as follows:

- The assessment has utilised traffic volume data from the AM peak hour weekday collected in February 2014, where available. In the event that peak hour data is not available, peak traffic volumes have been factored from the 12-hour DNR counts using ratio of 11%.
- Where possible, existing SIDRA layouts have been modelled to reflect the likely operation of the intersection, this is based upon aerial photography and the study teams knowledge of the study area.
- Queue length and intersection delay statistics were not available for all intersections, therefore the SIDRA models have been calibrated to existing conditions, and are only appropriate for comparative purposes to understand the extent of changes that occur in the operation of the intersection (i.e. models should not be interpreted as quantifying existing conditions, but rather as a tool for option testing).
- In the absence of signal phasing diagrams a 'practical cycle time' phasing option was used in SIDRA to determine phase times for signalised intersections.

In light of the above, a SIDRA assessment was undertaken for those project options where modelling an isolated intersection was likely to provide meaningful results. In addition, SIDRA was used in instances where the capacity benefits of an 'alternative' scenario (such as intersection signalisation) could be clearly tested and compared against a base case. It is noted that many intersection upgrades can be justified on non-capacity related grounds such as road safety, and as such have not been investigated

[39] *Program used under license from Akcelik and Associates Pty Ltd.*

using this assessment tool. On this basis, several key intersections were chosen for analysis, with results below.

SIDRA Modelling Assessment Results

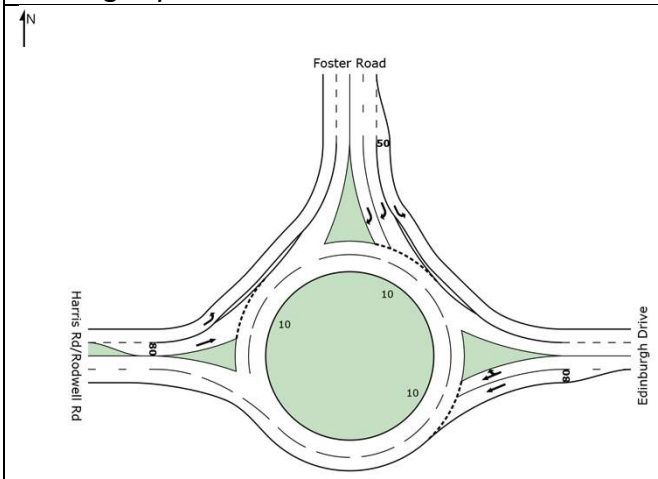
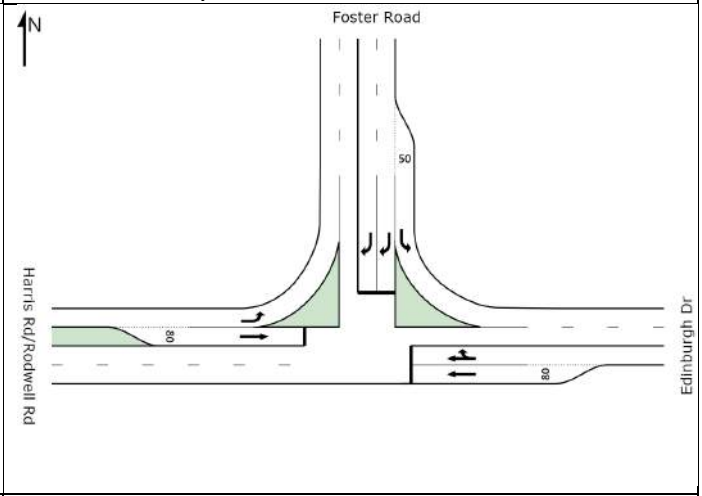
Seven intersections across the study area were selected for assessment using SIDRA as outlined above. A summary of the intersections modelled, including the proposed treatment and outcome, is shown in Table F-1, following the table are the output diagrams for each intersection.

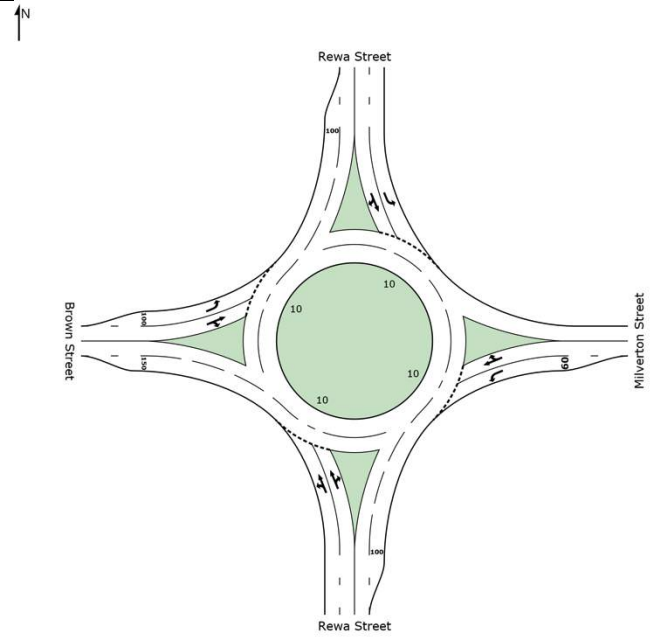
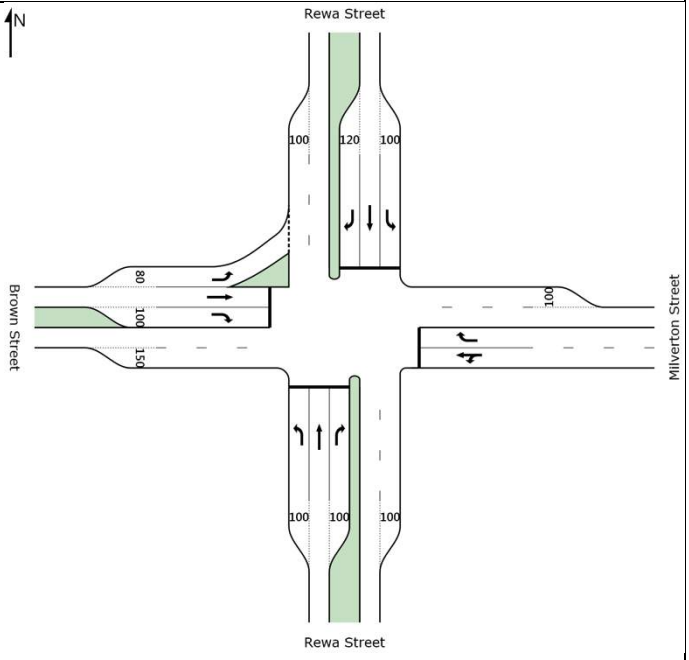
Table F-1: Intersections modelled using SIDRA

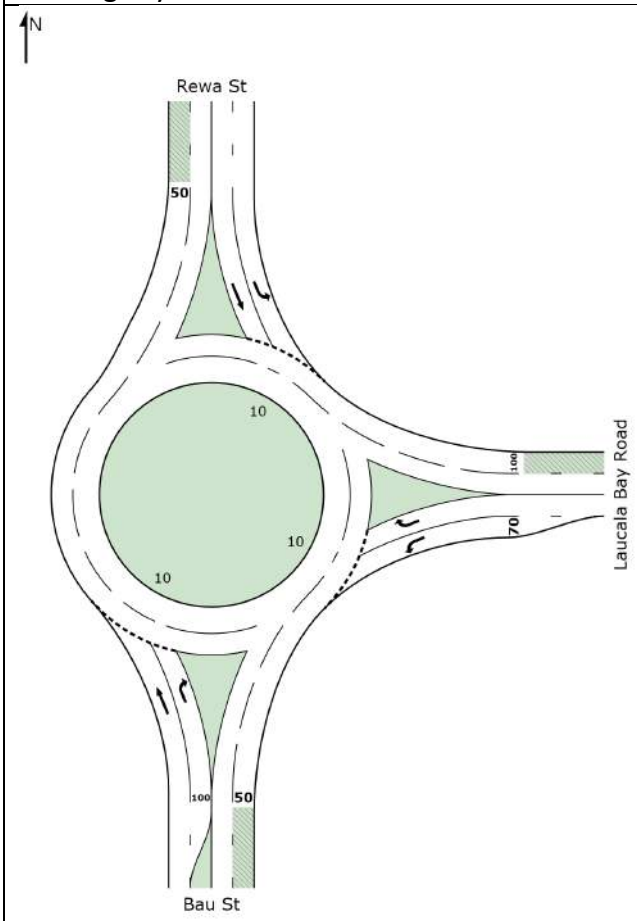
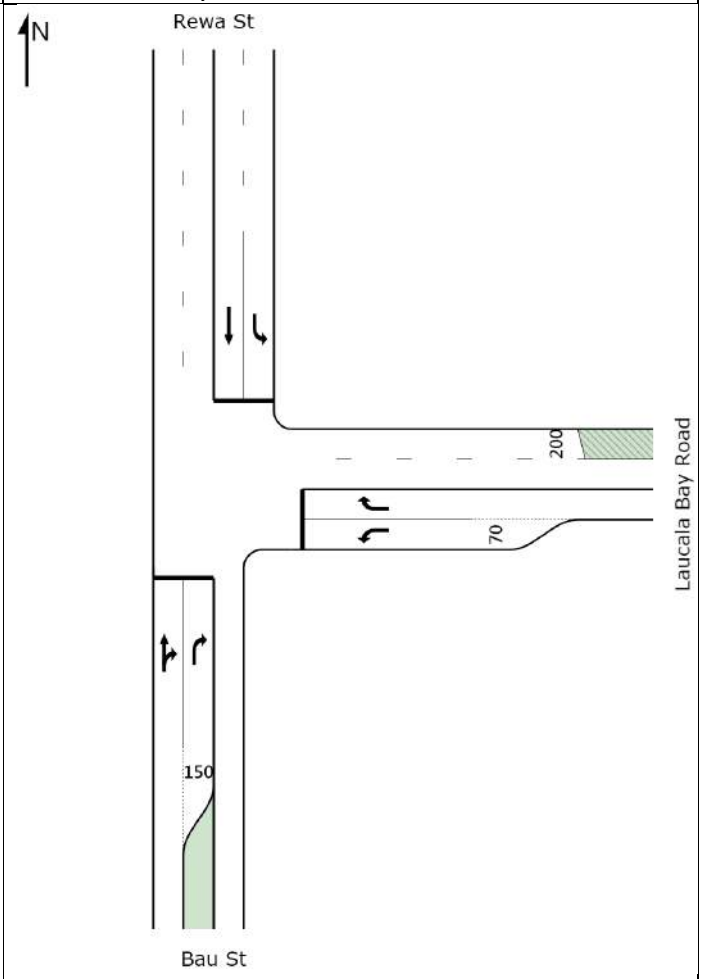
Ref	Intersection Location	Existing	Modelled	Benefit
T1.2	Walu Bay Roundabout: Foster Rd / Harris Rd / Edinburgh Dr	Roundabout	Signalised T-intersection	Positive
T1.8	Bau St / Rewa St	Roundabout	Signalised T-intersection	Positive (with double right turns)
T1.10	Grantham Road / Milverton Road	Unsignalised	Signalised	Positive
T1.12	Kings Rd / Mead Rd / Ratu Mara Rd / Golf Link Rd Roundabout	Roundabout	Metered roundabout	Negative
T1.24	Rewa St / Milverton Rd / Brown St	Roundabout	Signalised X-intersection	Positive
T1.30	Queens Rd / Wailada Estate Junction	Shared turn lanes	Separate turn lanes	Positive
T1.17	Fletcher Rd / Jerusalem Rd / Mukta Ben Rd / Rifle Range Rd	Roundabout	Signalised T-intersection	Positive

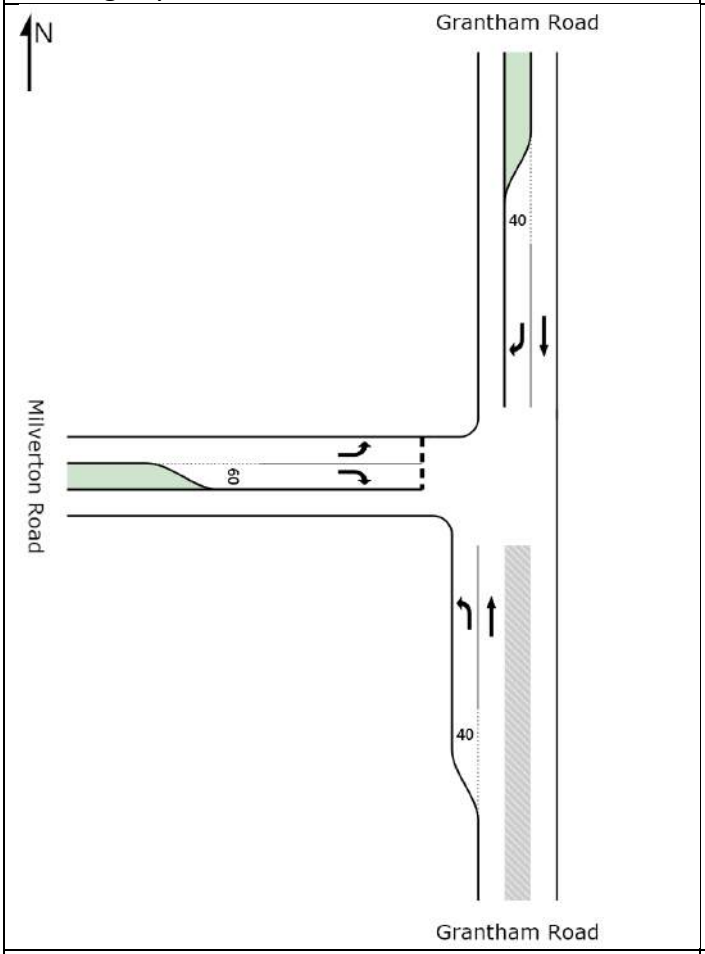
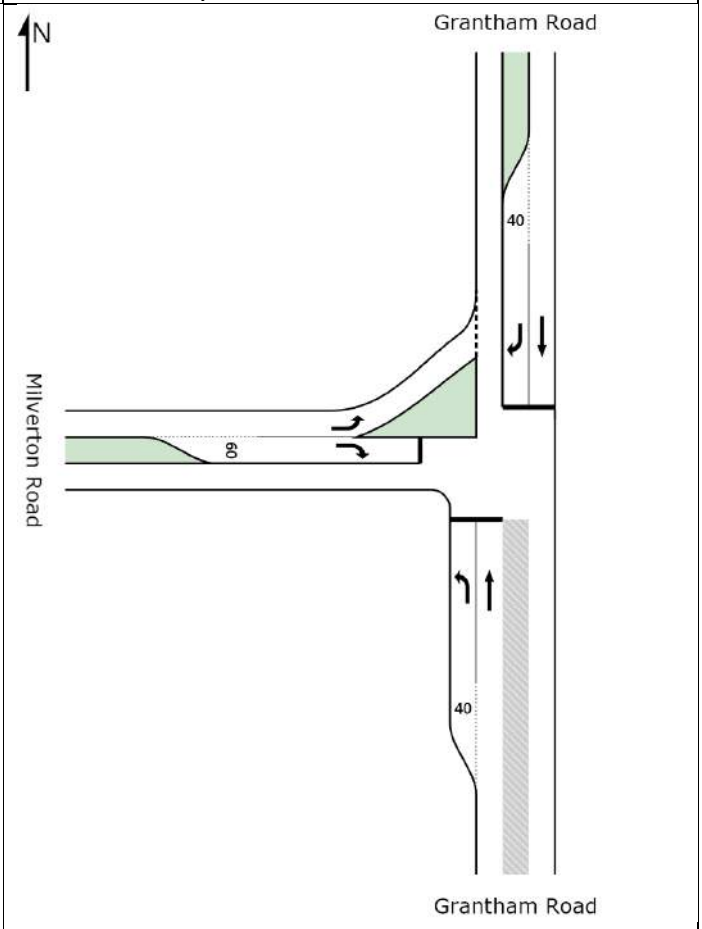
SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

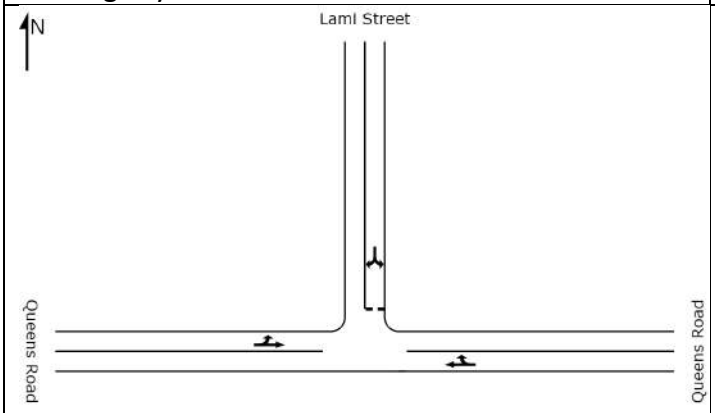
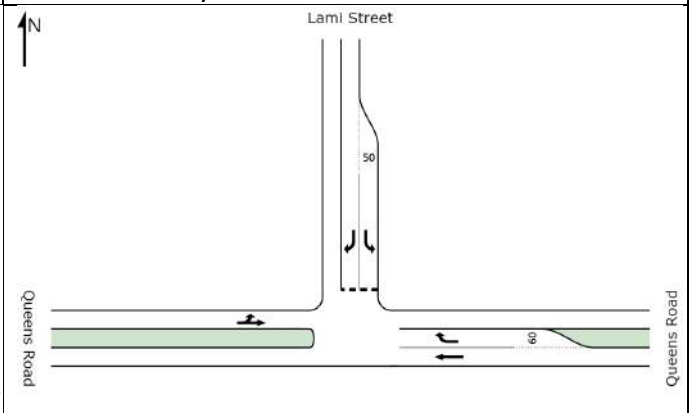
Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

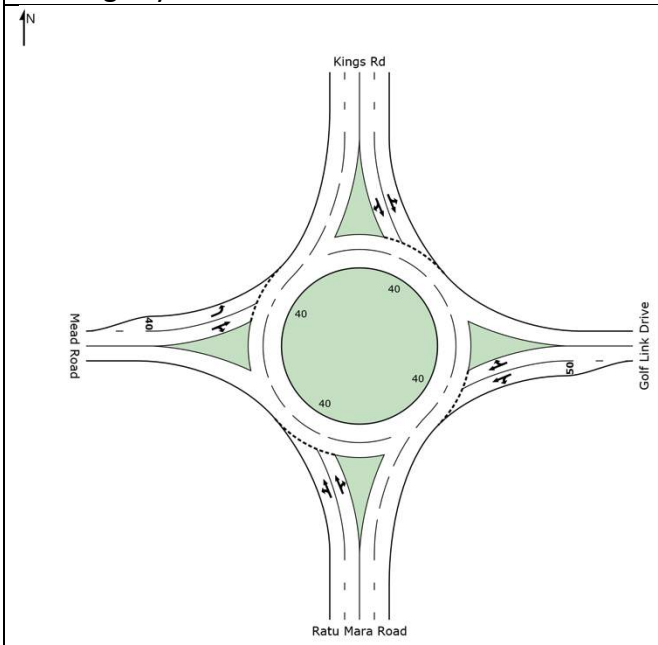
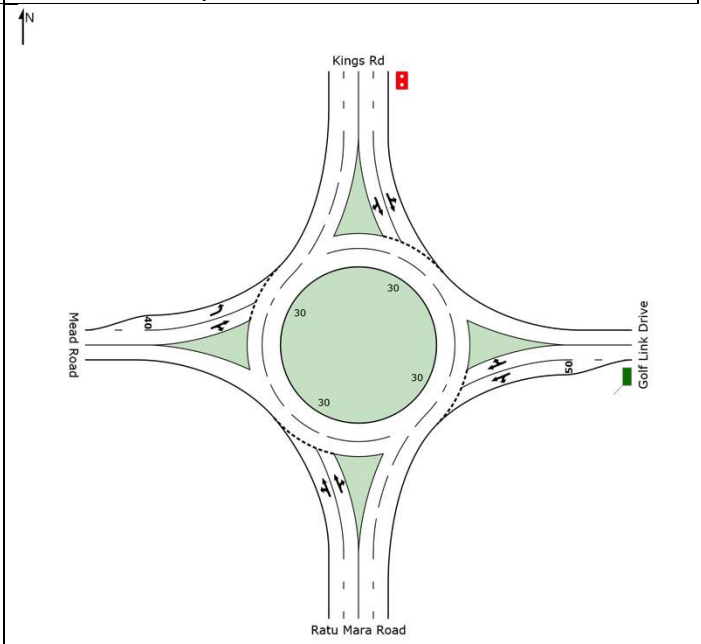
Intersection Improvement: T1.2 Edinburgh Dr / Harris St / Rodwell Rd	
Existing Layout	Alternative Layout
	
Existing Layout DoS: 0.94	Alternative Layout DoS: 0.89

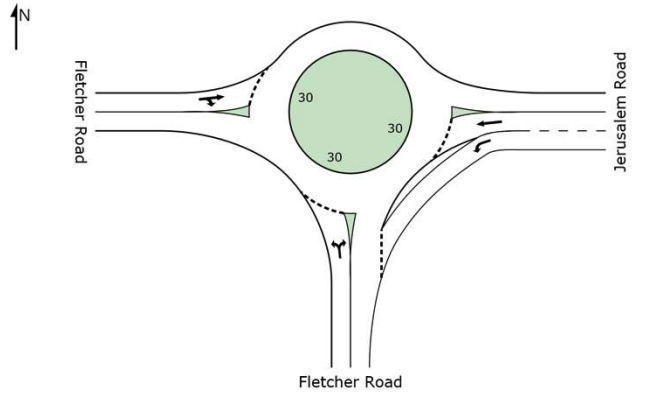
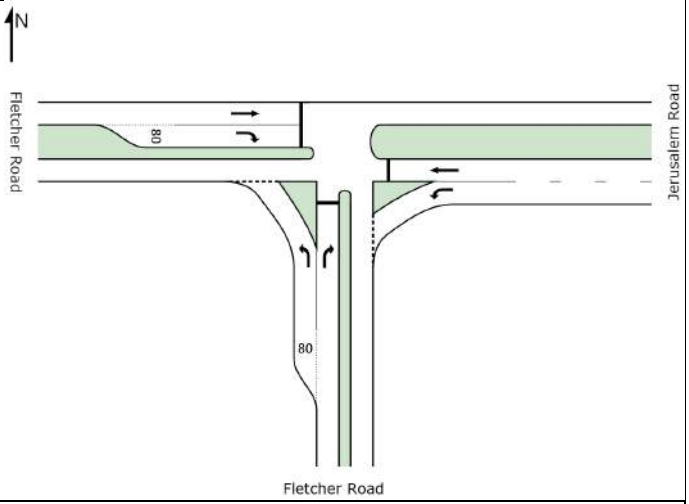
Intersection Improvement : T1.24 Rewa Street/ Milverton Road / Brown Street	
Existing Layout	Alternative Layout
	
Existing Layout DoS: 1.11	Alternative Layout DoS: 0.88

Intersection Improvement: T1.8 Rewa Street / Bau Street	
Existing Layout	Alternative Layout
	
Existing Layout DoS: 1.04	Alternative Layout DoS:0.85

Intersection Improvement: T1.10 Grantham Street / Milverton Street	
Existing Layout	Alternative Layout
	
Existing Layout DoS: 0.95	Alternative Layout DoS:0.76

Intersection Improvement : T1.30 Queens Street/ Lami Street	
Existing Layout	Alternative Layout
	
Existing Layout DoS: 0.48	Alternative Layout DoS: 0.28

Intersection Improvement: T1.12 Kings Road / Mead Road / Golf Links Drive	
Existing Layout	Alternative Layout
	
Existing Layout DoS: 0.71	Alternative Layout DoS:0.87

Intersection Improvement: T1.17 Fletcher Road/ Jerusalem Street / Rifle Range Road	
Existing Layout	Alternative Layout
	
Existing Layout DoS: 0.73	Alternative Layout DoS: 0.77

Transport Model

Background

The transport model was developed using Aimsun modelling software developed by Transport Simulation Systems (TSS). Aimsun is an integrated traffic modelling software that is used worldwide for traffic engineering, traffic simulation and transportation planning. Aimsun offers an extensive simulation environment that offers, in a single application, micro, meso and macro simulation tools.

Static traffic assignment models are generally used to estimate the link traffic volumes on a network over a period of time, i.e. how the trips given by demand origin-destination matrix will spread through the road network. Aimsun offers a number of different static traffic assignment methods and for the purpose of developing the Suva model, the Frank and Wolfe method for equilibrium traffic assignment has been adopted. This method is based on the calculation of shortest paths and path percentage usage.

Modelling Approach

The model comprises of the primary arterial network in the GSA and a zonal system based around key activity centres. The study area has been divided into 53 defined zones (16 zones in the Suva CBD and 37 urban zones in the remaining GSA), broadly based on established statistical enumeration areas. The zones have been developed based on available key transport demand drivers as follows:

- Population
- Employment
- School enrolments
- Proposed land developments

Using the above parameters it is possible to integrate land use impacts, which will in turn determine current and future traffic demands. An indication of the zones adopted for the model is shown in Figure F-2 (full study area) and Figure F-3 (Suva CBD). The base 2014 road network that has been modelled is shown in Figure F-4.

Figure F-2: GSA transport model zones – full study area

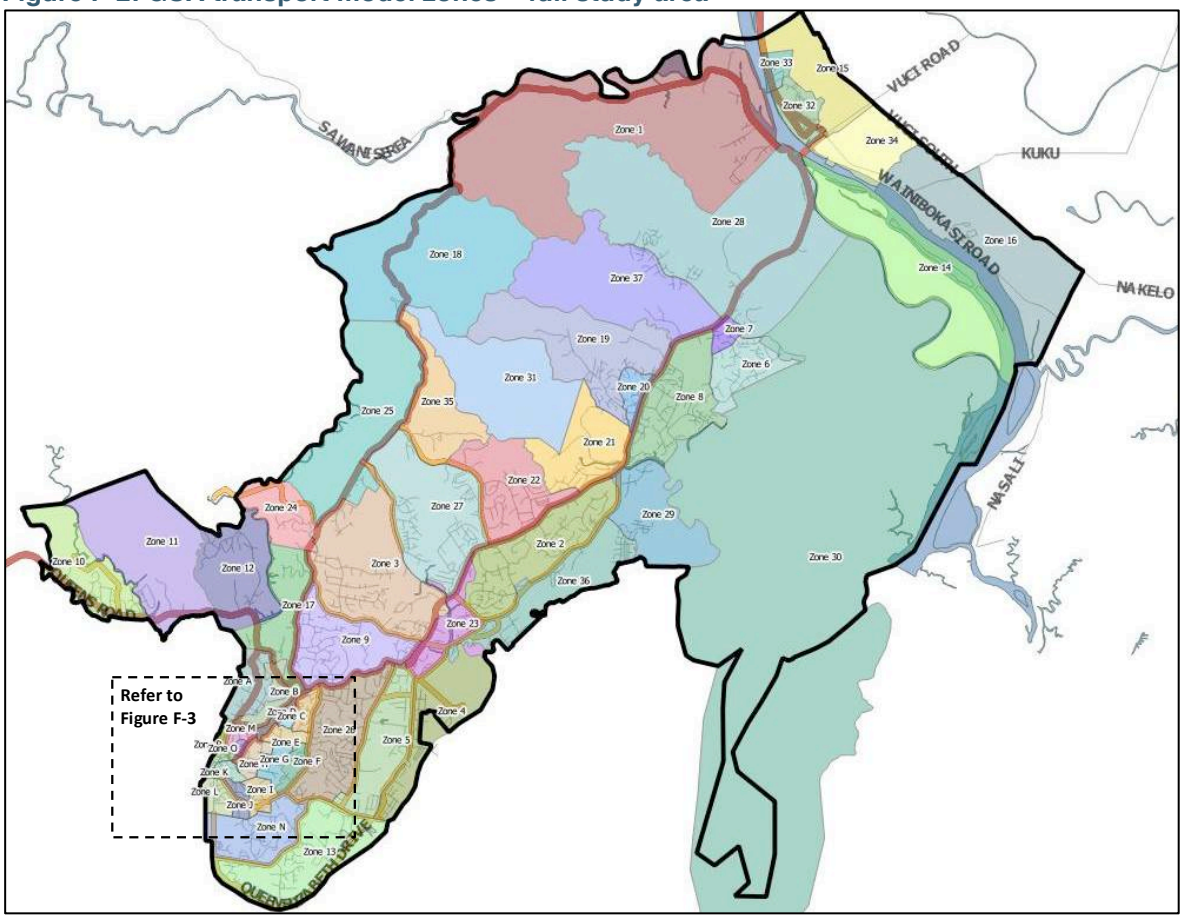


Figure F-3: GSA transport model zones – Suva CBD

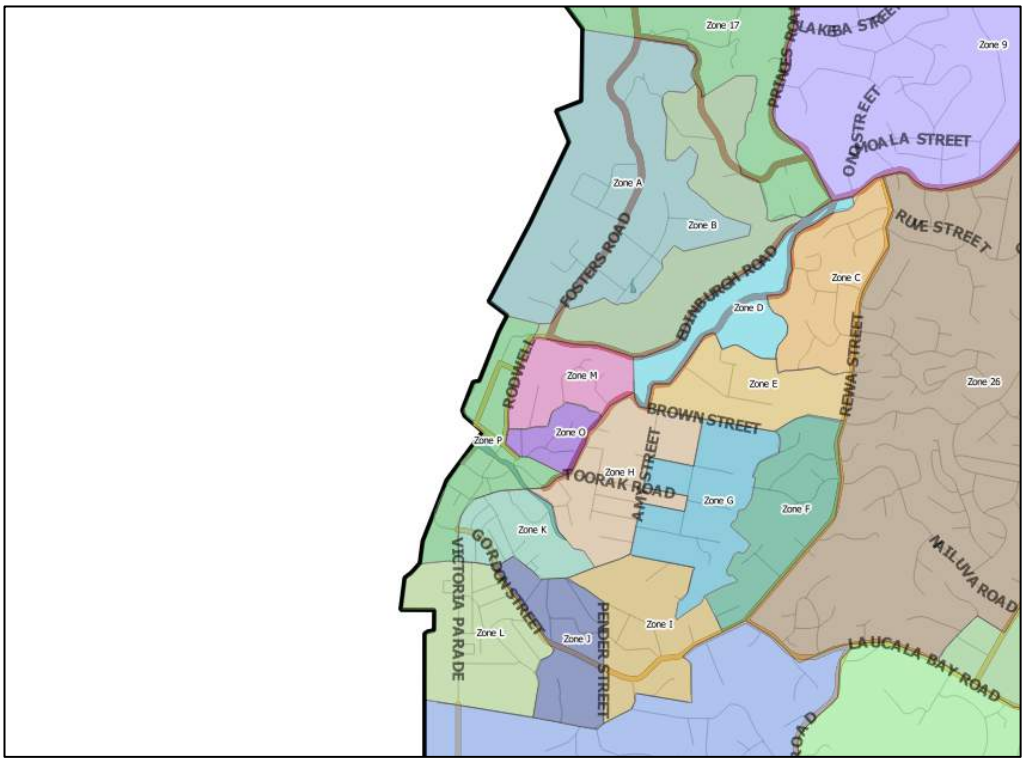
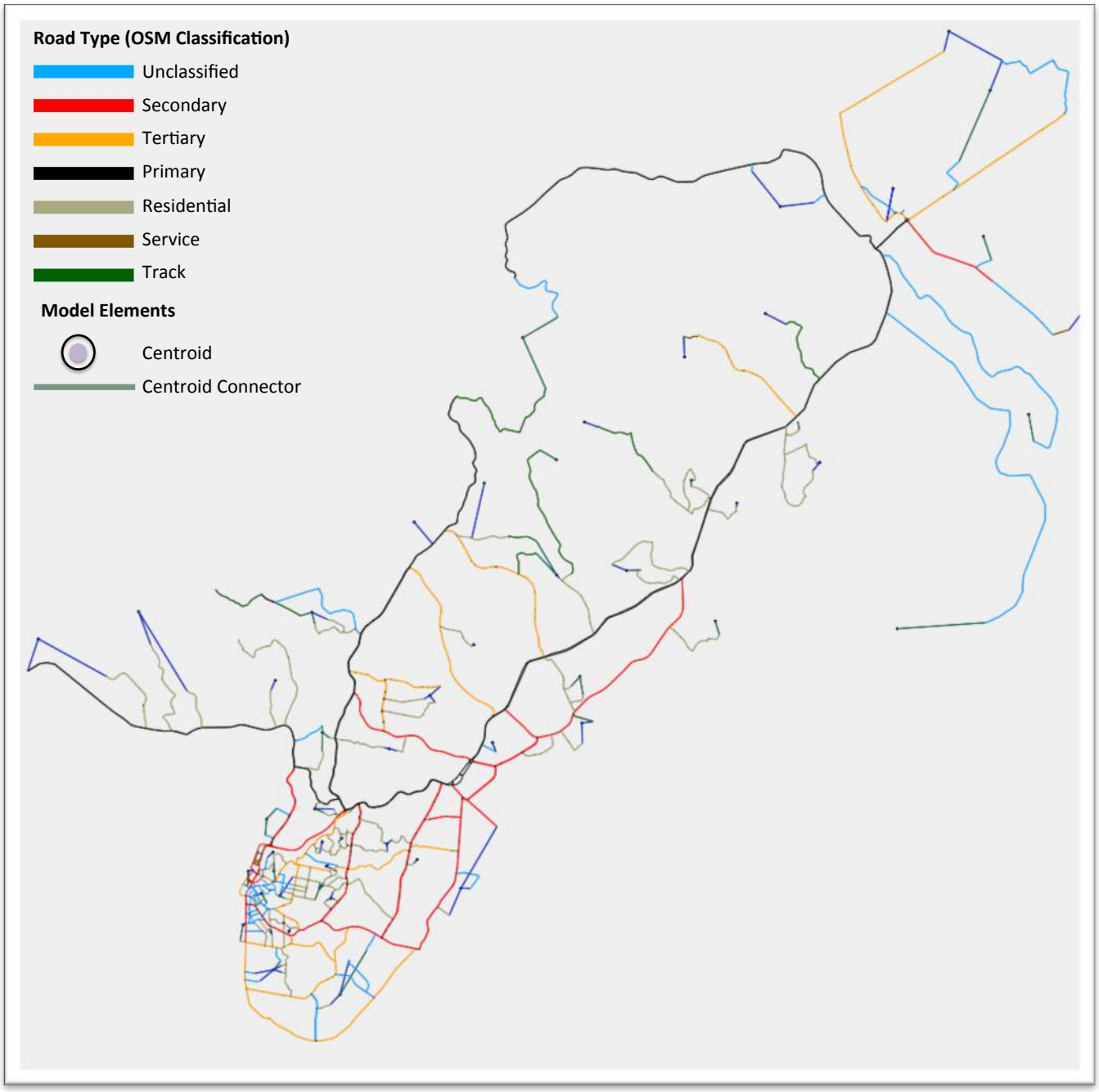


Figure F-4: GSA transport model – base 2014 modelled road network



Transport Modelling Challenges

Urban travel demand and mobility analysis has developed into a well-established modelling methodology, commonly known as the four step model. This model includes the following steps:

- Trip generation and attraction
- Trip distribution
- Modal split
- Trips assignment

Travel forecasting models are widely used in transportation planning to evaluate the impact of future changes in demographics, land use, or transportation facilities. Travel behaviour is introduced into these forecasting models through the sequence of the steps identified above.

One of the critical aspects of any transport model is their reliance on a vast amount of information and data, which forms the basis of the model development and calibration and validation. Access to travel and socio-economic data has proved to be one of the biggest challenges during the development of the Greater Suva model. The following points outline the biggest challenges encountered during this process.

Base Model

Currently, there are no existing models or any information on traffic generation, mode split, distribution that cover the GSA. In order to develop an accurate trip matrix and to build a model structure the following is required as a minimum:

1. Socio-economic data including population, employment and enrolment numbers;
2. Home interview surveys;
3. Origin-destination (OD) surveys; and
4. Peak hour traffic counts

Therefore to develop the Greater Suva model a number of assumptions were required to enable the modelling process. These assumptions include the following:

- Traffic Generation Rates: to estimate and forecast traffic generation rates for the model, standard rates were used based on the typical traffic generated by different land uses. The rates were based on municipalities in Melbourne (Australia) that were deemed to be most representative of the GSA Councils. Table F-2 and Table F-3 outline the rates adopted.

Table F-2: Transport model – trip production rates

Trip Type	Work	Education	Other
Based on	Adult population	Population aged 6-18	Population aged 0-5
Trip rate	0.221259	1.174665	0.100601

Table F-3: Transport model – trip attraction rates

Trip Type	Work	Education	Other
Based on	Employment	Enrolment	Employment
Trip rate	0.474801	1.142596	0.500437

- Traffic Distribution – a gravity model was initially applied for the development of the initial OD matrix. Due to the lack of OD surveys and trip length information, the matrix was expanded and adjusted with the use of available traffic counts and local knowledge on major trip production and attraction (such as the Suva CBD).
- Road Network - to develop the base road network structure (alignment and capacity) information from OpenStreetMap (OSM) was used. The network was checked against aerial photography and local knowledge acquired by the project team. Specific capacities were applied to different link types based on the OSM road classification.

Travel Demand

The most critical element of the modelling process was the development of a prior demand matrix. The adopted process converted available land use information into traffic demands. The generated demand matrix is for one hour in the AM peak and is represented as passenger car units. Separate demand matrices for different vehicle types were not developed. Given the high level purpose of the model and limited data availability, this next step would have been an unnecessarily complex and time consuming task. Given the lack of information on trip lengths and trip distribution, the prior demand matrix could only be validated by available traffic counts.

A summary of the land use data for the existing and future scenario (an estimate of activity based on population only) of the model is included in Table F-4. Growth in enrolments, employment and age categories were assumed to be consistent with the growth in total population per zone between 2014 and 2030.

Table F-4: Transport model – land use data

Traffic Zone	2014					2030	Population Growth
	Age 0-5	Age 6-18	Age 18+	Employment	Enrolments	Population	
Zone 1	851	2,581	5,899	591	645	27,137	191%
Zone 2	1,887	5,653	13,063	1,967	5,237	21,445	4%
Zone 3	974	2,920	6,910	2,919	511	11,960	11%
Zone 4	415	1,342	3,297	3,216	1,494	5,621	11%
Zone 5	660	1,731	4,382	2,787	1,578	9,182	36%
Zone 6	674	1,893	4,921	874	279	7,713	3%
Zone 7	159	472	1,306	185	1,918	1,996	3%
Zone 8	2,139	5,946	13,614	2,148	1,675	23,789	10%
Zone 9	761	2,312	6,552	2,177	4,598	10,280	7%

Traffic Zone	2014					2030	Population Growth
	Age 0-5	Age 6-18	Age 18+	Employment	Enrolments	Population	
Zone 10	485	1,177	2,616	1,479	617	4,349	2%
Zone 11	669	1,752	3,300	1,235	1,546	5,817	2%
Zone 12	505	1,618	3,028	62	554	6,036	17%
Zone 13	154	488	1,365	980	6,846	4,106	105%
Zone 14	249	615	1,146	-	148	2,320	15%
Zone 15	155	525	1,183	951	1,030	1,902	2%
Zone 16	354	1,103	2,371	-	214	4,149	8%
Zone 17	150	467	1,081	464	-	2,671	57%
Zone 18	152	374	845	-	-	1,425	4%
Zone 19	752	2,181	5,163	1,689	-	8,424	4%
Zone 20	387	919	2,597	413	582	4,063	4%
Zone 21	974	2,509	5,377	390	368	10,190	15%
Zone 22	1,248	3,724	8,289	2,797	1,817	16,463	24%
Zone 23	254	740	1,854	2,187	1,950	2,952	4%
Zone 24	132	356	945	82	-	1,477	3%
Zone 25	225	650	1,343	132	704	2,294	3%
Zone 26	1,599	5,003	12,522	1,684	3,294	22,312	17%
Zone 27	2,214	6,251	13,983	619	-	28,432	27%
Zone 28	733	2,690	5,614	594	2,317	36,220	301%
Zone 29	510	1,506	3,476	94	742	10,880	98%
Zone 30	501	1,476	3,247	85	360	7,490	43%
Zone 31	85	218	434	-	-	761	3%
Zone 32	146	525	1,173	1,911	347	1,890	2%
Zone 33	69	230	605	386	453	931	3%
Zone 34	219	864	1,843	436	1,700	3,506	20%
Zone 35	365	917	1,998	-	860	3,409	4%
Zone 36	1,031	2,976	6,978	2,494	403	11,427	4%
Zone 37	863	2,487	5,185	2,045	1,591	8,749	3%
Zone A	22	110	319	1,364	-	461	2%
Zone B	112	308	717	1,069	-	1,160	2%
Zone C	90	282	933	265	301	1,329	2%
Zone D	148	87	622	5	613	874	2%
Zone E	36	133	364	248	1,038	543	2%
Zone F	97	392	1,079	281	325	1,597	2%
Zone G	120	355	1,169	365	2,040	1,676	2%

Traffic Zone	2014					2030	Population Growth
	Age 0-5	Age 6-18	Age 18+	Employment	Enrolments	Population	
Zone H	69	224	963	1,725	643	1,281	2%
Zone I	72	229	691	65	2,143	1,481	49%
Zone J	39	102	463	390	-	616	2%
Zone K	14	28	135	1,328	336	180	2%
Zone L	1	13	77	2,195	-	93	2%
Zone M	14	53	249	1,760	-	322	2%
Zone N	231	773	1,852	1,842	1,991	2,911	2%
Zone O	7	15	86	1,016	-	110	2%
Zone P	2	5	121	3,350	-	131	2%

Transport Model Benefits

The Greater Suva transport model provides a high-level strategic tool that can assess large, long-term projects and quantify the impacts and benefits across the entire study area

The strategic model provides an ideal framework for any future detailed modelling that may be required as part of the refinement of any major works options. The advantage of modelling the entire study area within the Aimsun platform is that:

- Any options assessed will take into consideration wider network impacts
- More detail (such as a full road network with local streets) can be added within the full model
- The model can easily be extended and used in future to test a range of road network changes

As noted earlier, the transport model has been used as an evaluation tool to inform the selection of various options from the priority options list.

Calibration and Validation

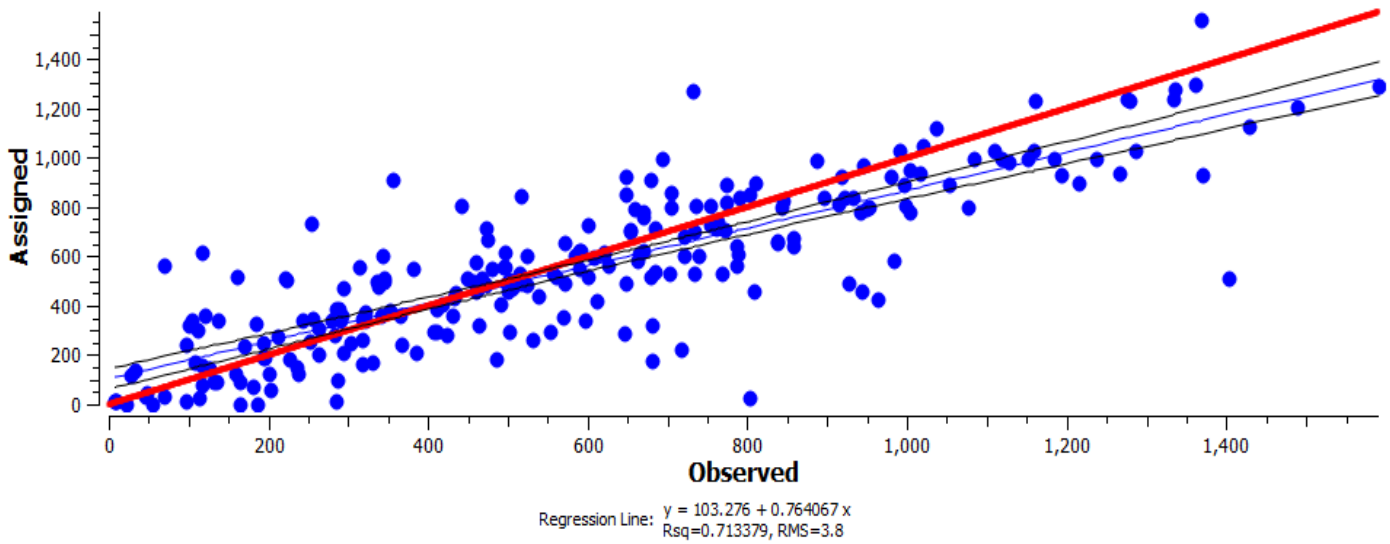
The prior demand matrix was assigned to the road network and a static matrix adjustment process was undertaken in Aimsun. During this process the assigned volumes were matched against the surveyed volumes and adjusted where required. Matrix Adjustment is a procedure for calibrating an Origin-Destination (OD) matrix from a prior matrix using traffic counts and/or turning traffic counts from a subset of the modelled road network for which traffic detection is available. Provided that the subset of links represent a significant portion of the modelled network, in both number and layout, then this information can be used to adjust the local OD matrix and get a better representation of the trip patterns.

The results of the static assignment with the adjusted demand matrix are presented using a regression plot that compares modelled and observed volumes (see Figure F-5). Generally, models are considered well calibrated when the coefficient of determination (Rsq) is greater than 0.9. In this instance due to the data available and local conditions (including driver behaviour) achieving a value this high is very

difficult without considerable data collection. For the intended high-level purposes the model is deemed to be calibrated to a sufficient extent for a strategic transportation study.

The results for the model show a number of outliers[40], these observed values are from the existing 2009 DNR traffic counts from which peak hour volumes were extracted. These outliers reduce the coefficient of determination, an updated set traffic counts (using the previous DNR locations) would further improve the level of model calibration, which is outside the scope of this study.

Figure F-5: Model Regression Plot



Network Modelling Assessment Results

A comparison of the base 2014 and 2030 networks indicated that the number of vehicles on the GSA road network in the AM peak hour traffic would increase from 36,700 vehicles per hour (vph) in 2014 to 43,500vph in 2030. This would result in the average vehicle speed across the network decreasing from 31.40 kilometres per hour (kph) to 25.12kph in 2030. This equates to an increase in average journey time of 25% across the road network.

Six network options were tested at a broad level using the Greater Suva model. A summary of these options, including the existing and proposed treatment and outcome, is shown in Table F-5.

[40] *An outlier is an observation point that is distant from other observations, it may indicate an error in data collection*

Table F-5: Greater Suva transport model outcomes

No	Description	Existing	Option modelled	Impact
1	Kings Road reduced to 2 lanes (impact on traffic of adding full bus lanes)	Mostly four-lane, two way carriageway. Some sections two-lane two way	Two-lane, two way carriageway	Only a 5% reduction in traffic (indicating few vehicles have a viable alternative route). Congestion as a result increases. This option does not account for the removal of buses from the modelled lanes or any change in mode share. **Relevant to option B12.1**
2	Grantham Road, widening to 4 lanes	Two-lane, two way carriageway	Four-lane, two way carriageway	Less congested and carries 40-60% additional traffic. Main relief is to Fletcher Road. Using the new lane for buses / taxis only in the peak periods would enhance travel times for those modes. **Relevant to option B12.2**
3	Fletcher Road, widening to 4 lanes	Two-lane, two way carriageway	Four-lane, two way carriageway	Fletcher Road is capable of supporting the projected traffic volumes without widening. No significant benefit to the surrounding network was found. **Relevant to option T2.7**
4	Extension Road to Brown Street Link	No link	New road connection of Extension Road to Brown Street	Carries around 450 vehicles in the AM peak hour. Relief offered to Brown, Waimanu and Mal Streets. Risk of being used as a through route rather than for hospital access. **Relevant to option T2.12**
5	Stinson Parade Bridge	No link	Strengthen bridge to allow for vehicular traffic – revert to previous road layout.	Eases congestion in the long term and offers more options for re-working the CBD road network. The model is not detailed enough to assess economic benefits of time savings. **Relevant to option T2.16**
6	Nina Street, reverse direction of one way street	One way in southbound direction	One way in northbound direction	Traffic on Nina St increases by 50%. Offers relief to the Rodwell / Mark St intersection. **Relevant to option T3.2**

A summary of AM peak volumes and volume / capacity ratios (VC) at selected locations are shown in Table F-6 through Table F-9 for each option at 2014 and 2030. Network volume plots for the 2014 and 2030 base networks are shown in Figure F-6 and Figure F-7 respectively.

Table F-6: 2014 AM peak hour volumes

No	Count Location	Base	Opt 1	Opt 2	Opt 3	Opt 4	Opt 5	Opt 6
1	Kings Rd north of Golf Link Rd	3883	**3677**	3924	3917	3919	4035	3896
2	Grantham Rd south of Milverton Rd	1437	1435	**2033**	1419	1450	1588	1447
3	Fletcher Rd south of Karsanji St	820	811	580	**1025**	800	848	824
4	Extension Rd – Brown St Link	0	0	0	0	**433**	0	0
5	Stinson Parade Bridge	0	0	0	0	0	**467**	0
6	Nina Street	459	466	481	492	466	546	**652**

Table F-7: 2014 AM peak hour VC ratio

No	Count Location	Base	Opt 1	Opt 2	Opt 3	Opt 4	Opt 5	Opt 6
1	Kings Rd north of Golf Link Rd	0.89	1.15	0.90	0.90	0.90	0.95	0.89
2	Grantham Rd south of Milverton Rd	0.80	0.80	0.56	0.79	0.81	0.88	0.80
3	Fletcher Rd south of Karsanji St	0.46	0.45	0.32	0.28	0.44	0.47	0.46
4	Extension Rd – Brown St Link	-	-	-	-	0.24	-	-
5	Stinson Parade Bridge	-	-	-	-	-	0.26	-
6	Nina Street	0.51	0.52	0.53	0.55	0.52	0.61	0.73

Table F-8: 2030 AM peak hour volumes

No	Count Location	Base	Opt 1	Opt 2	Opt 3	Opt 4	Opt 5	Opt 6
1	Kings Rd north of Golf Link Rd	4723	**4539**	4758	4791	4758	4571	4775
2	Grantham Rd south of Milverton Rd	1726	1657	**2740**	1578	1724	1711	1702
3	Fletcher Rd south of Karsanji St	1136	1167	874	**1689**	1177	1166	1145
4	Extension Rd – Brown St Link	0	0	0	0	**452**	0	0
5	Stinson Parade Bridge	0	0	0	0	0	**529**	0
6	Nina Street	406	394	434	461	441	495	**606**

Table F-9: 2030 AM peak hour VC ratio

No	Count Location	Base	Opt 1	Opt 2	Opt 3	Opt 4	Opt 5	Opt 6
1	Kings Rd north of Golf Link Rd	1.14	1.42	1.15	1.16	1.15	1.09	1.15
2	Grantham Rd south of Milverton Rd	0.96	0.92	0.76	0.88	0.96	0.95	0.95
3	Fletcher Rd south of Karsanji St	0.63	0.65	0.49	0.47	0.65	0.65	0.64
4	Extension Rd – Brown St Link	-	-	-	-	0.25	-	-
5	Stinson Parade Bridge	-	-	-	-	-	0.29	-
6	Nina Street	0.45	0.44	0.48	0.51	0.49	0.55	0.68

Figure F-6: Greater Suva Model – 2014 base network volumes (AM peak hour)

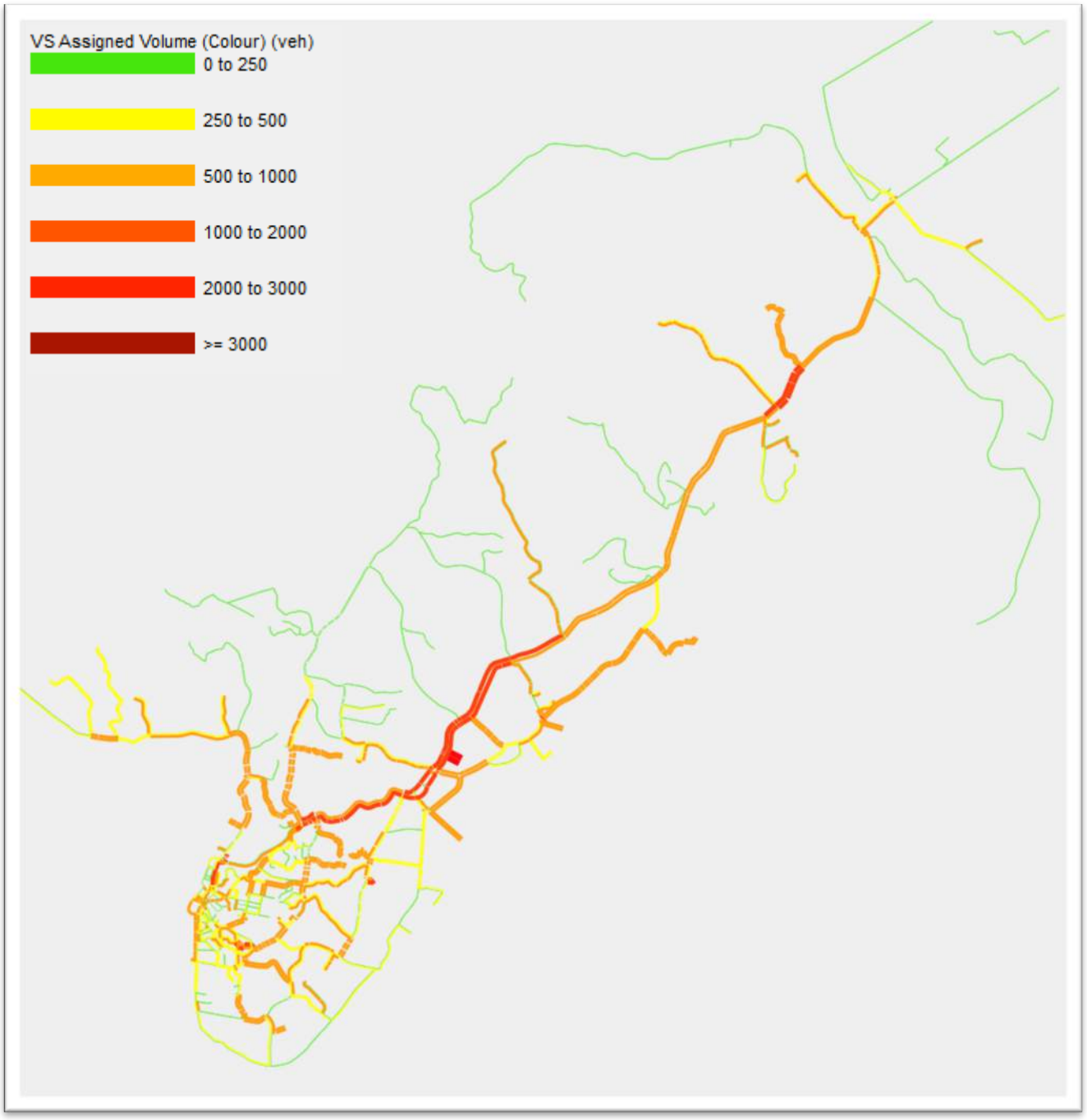
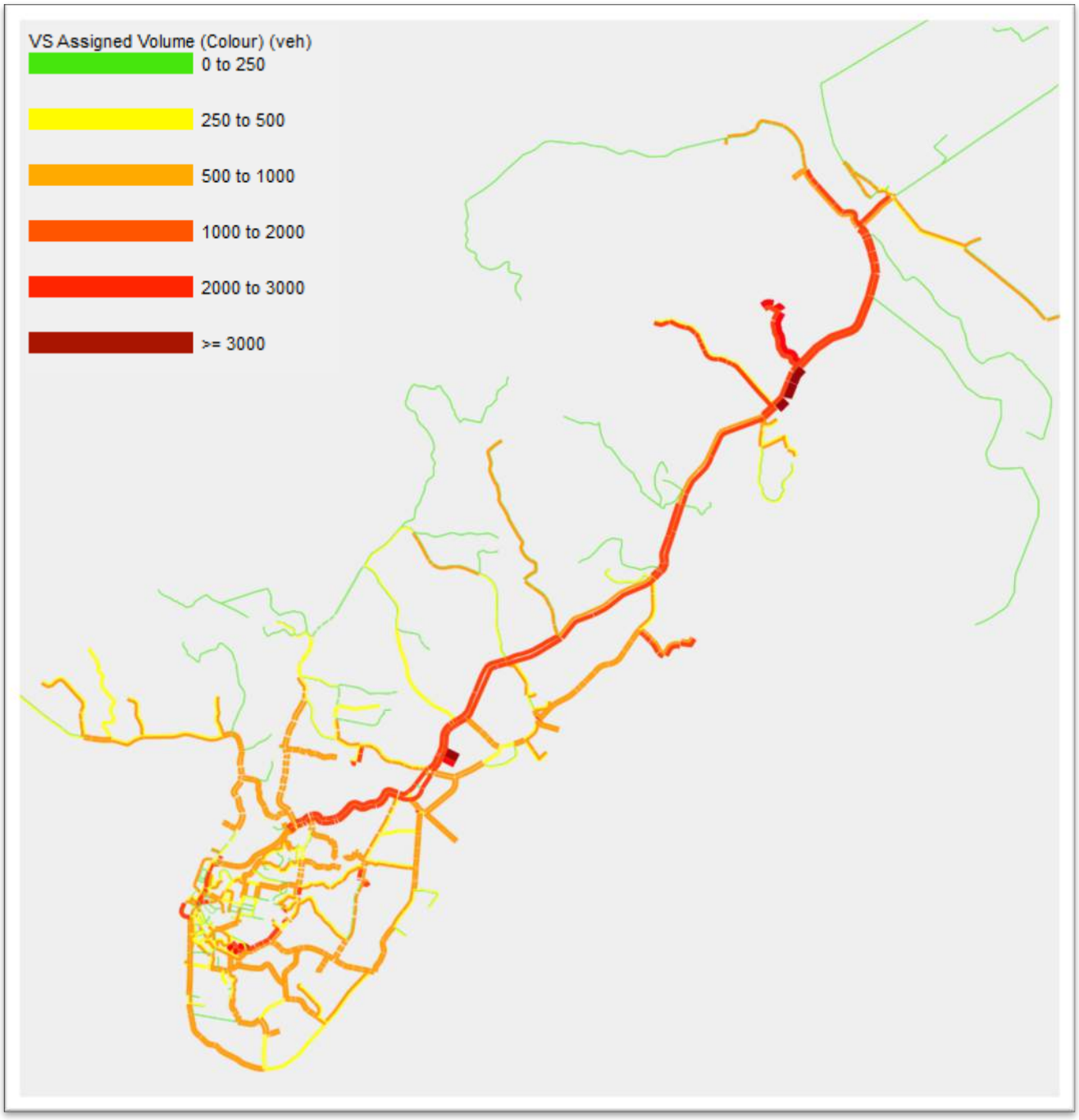


Figure F-7: Greater Suva Model – 2030 base network volumes (AM peak hour)



Road Safety

Road safety is a fundamental element of the GSTS and addressing accident Blackspot locations is an essential step towards reducing road trauma and delivering a safer road environment for all Fijians. The Fiji Decade of Action for Road Safety 2011-2020 outlines the SFAs and targeted actions designed to halve the number of fatalities by 2020 and deliver a 5% reduction in the annual number of accidents. The GSTS initiatives seek to align with the SFAs and road safety goals.

A review of the worst accident Blackspot locations was undertaken, with the worst ten sites summarised in Figure F-8 and shown geographically in Figure F-9. These were extracted from the Fiji Police Force Road Traffic Accidents Annual Report 2012 and include all accidents recorded at those locations between 2000 and 2012.

Figure F-8: Ten worst Blackspot locations (2000–2012)

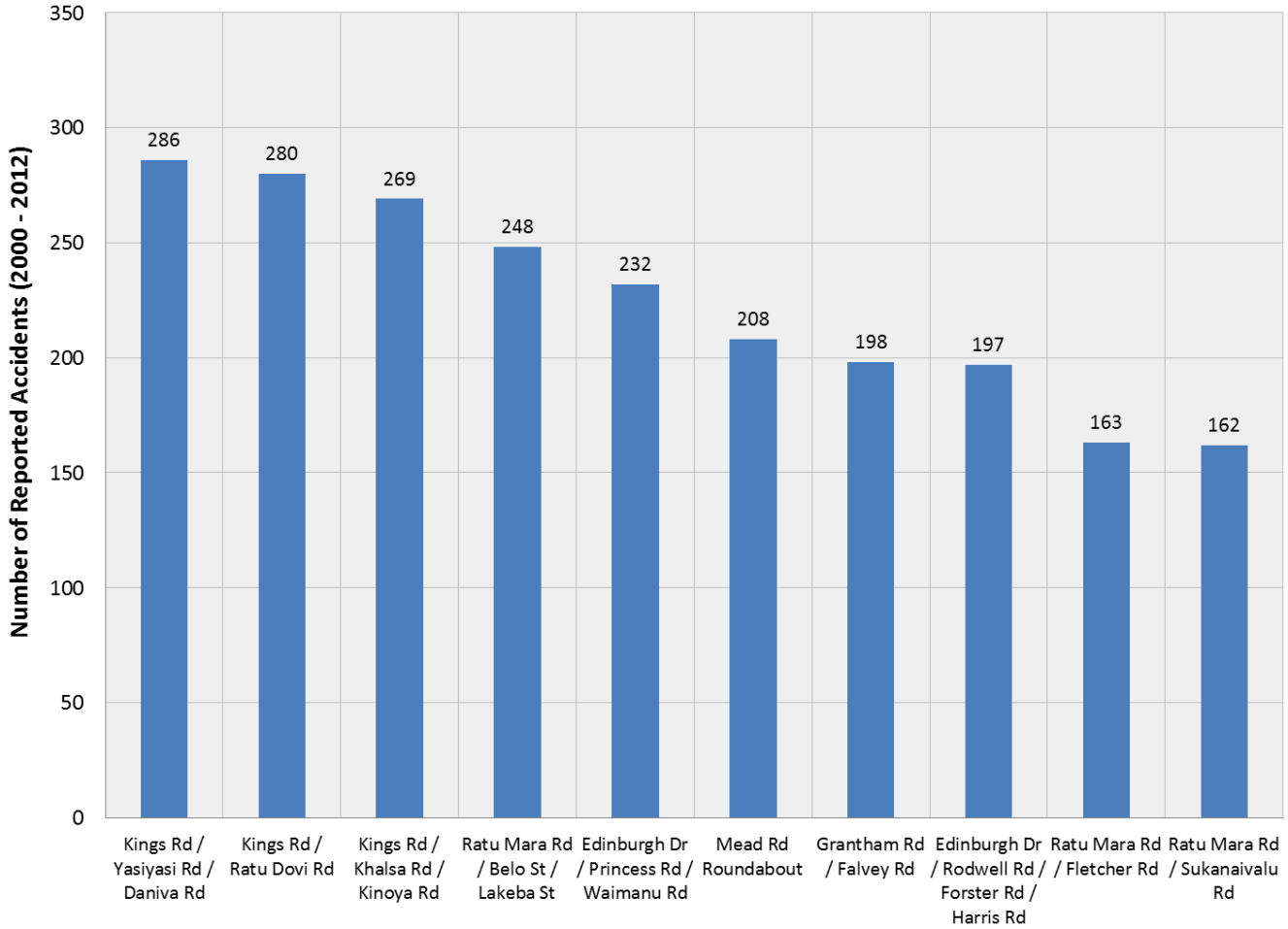
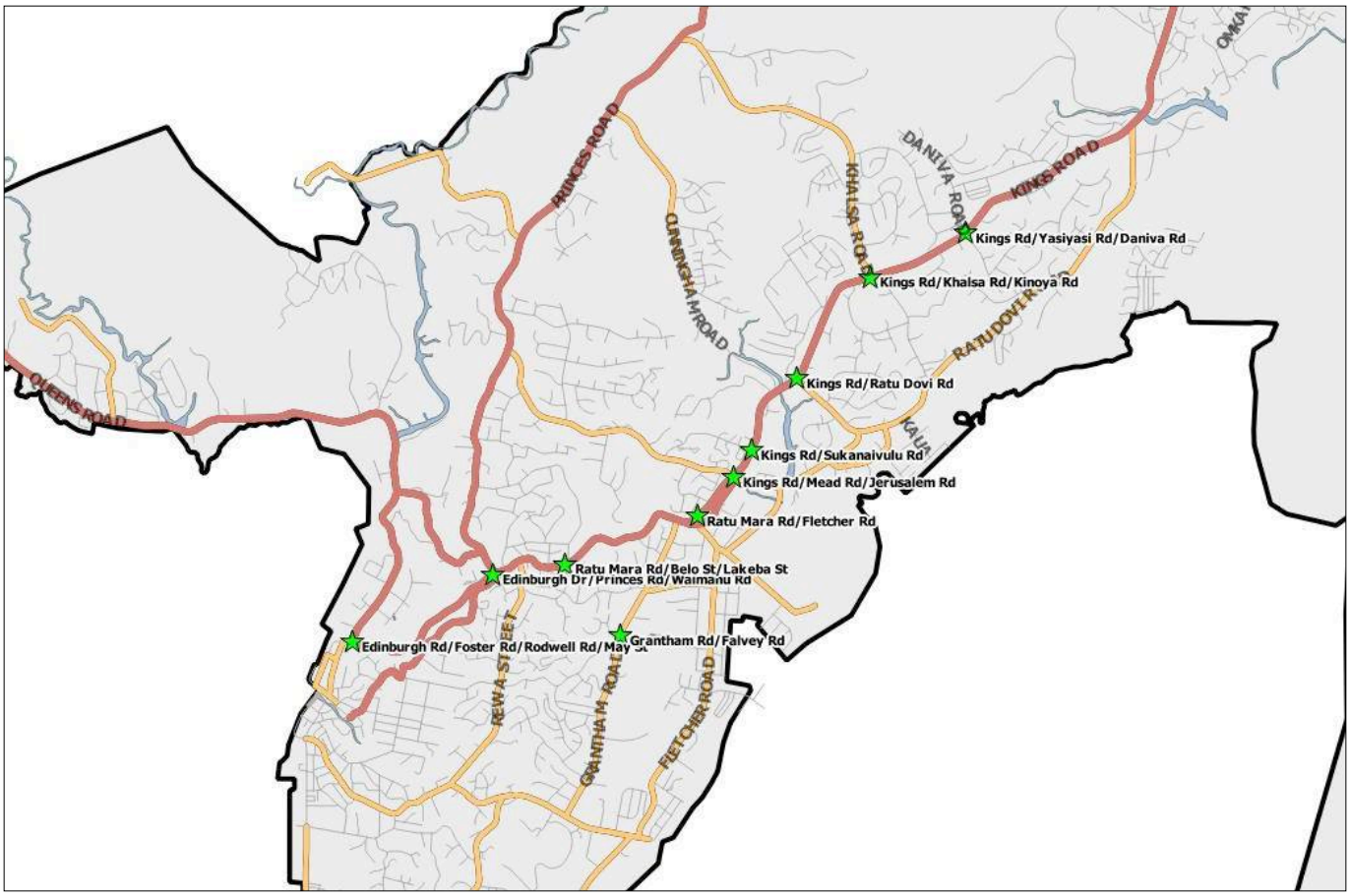


Figure F-9: Ten worst Blackspot locations (2000–2012)



The above locations have been included in the options long list, with recommendations for further road safety investigations and intersection upgrades and improvements. While the top ten Blackspots have been included in the GSTS options, the Fiji Blackspot program will continue to identify and assess the next highest accident Blackspot locations based on a review the recorded accident data and trends.

When delivering road safety initiatives (either as an intersection upgrade or discrete road safety strategy) it is important that a collaborative approach is adopted between all responsible Stakeholders so that an integrated approach can be achieved with the best possible outcomes. An overarching goal for all road safety initiatives should be accident prevention and this is reflected in the Fiji Decade of Action for Road Safety 2011-2020 action to undertake safety audits on all existing main and secondary roads by December 2020. Design-stage road safety auditing is also recommended for all proposed GSTS recommended design options (including intersection upgrades, signalling, pedestrian crossings and capacity upgrades).

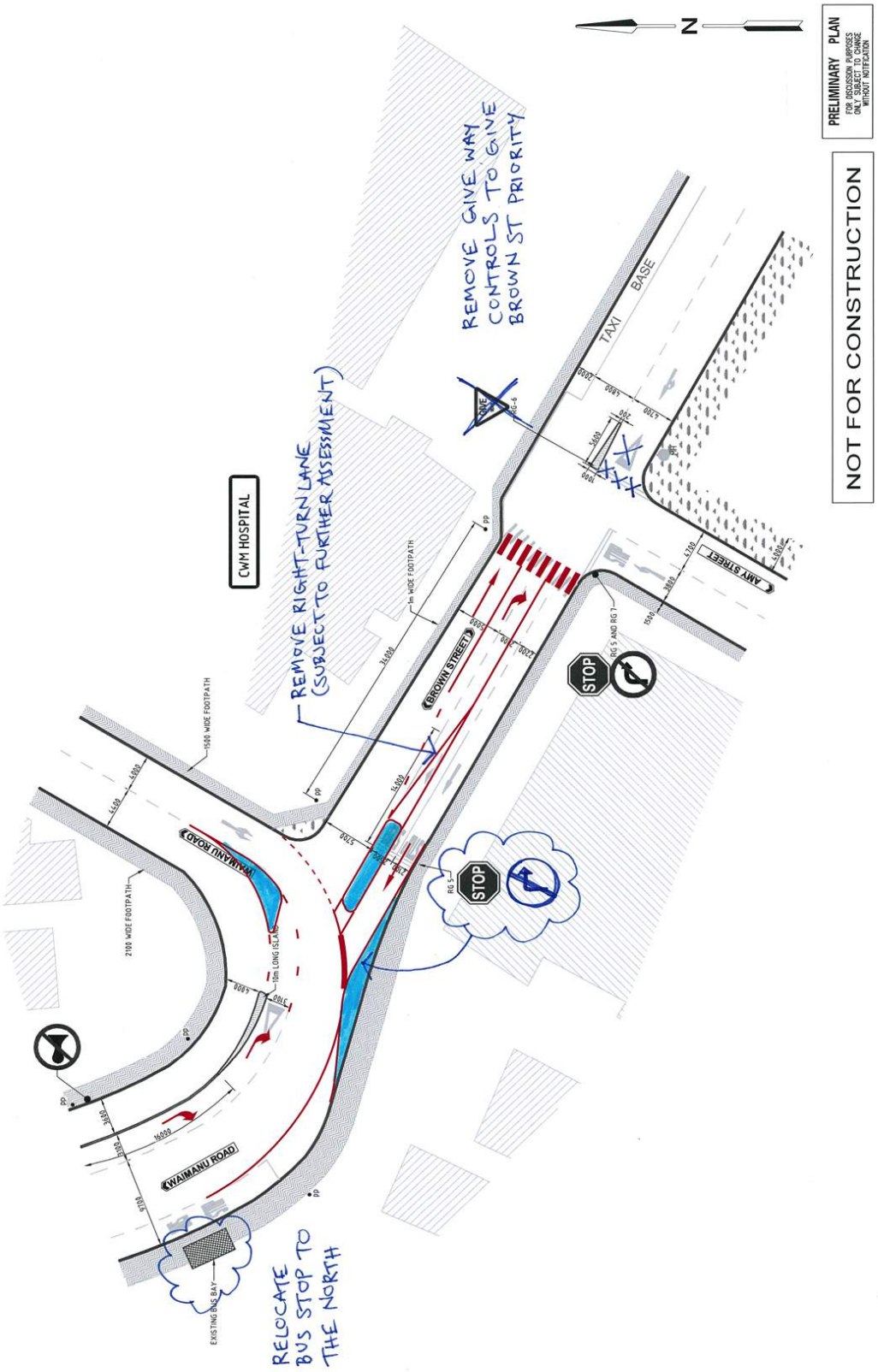
Other notable safety considerations include pedestrian crossing difficulties at roundabouts and other intersection layouts in the CBD area. While there is a culture of letting pedestrians cross through traffic, it is at roundabouts where the driver's attention is focused on selecting a gap in the traffic stream rather than looking for pedestrians which becomes an issue. Furthermore, the roundabouts in the GSA are typically tangential designs that can have minimal deflection. Increasing the deflection of these

roundabouts would encourage drivers to slow down. This has been considered in the technical assessments where a number of roundabouts have been modelled with a proposed conversion to signalised intersections. Additionally, there are challenges for pedestrians crossing within the CBD due in part to the three-lane Rodwell Road and Scott Street which creates a significant barrier. This issue would be considered in the pedestrian upgrade program and CBD pedestrian and walking improvements programs.

Road Safety Example Treatment

While road safety has been an important factor contributing to the selection and inclusion of options, many of the future road safety recommendations will follow once the necessary road safety audits and assessments have been undertake. These will guide and inform the inputs for the intersection upgrades and re-designs. It is acknowledged that this is a strategic document, however for the purpose of this report an example road safety treatment concept has been included for the intersection of Waimanu Road / Brown Street / Amy Street. This is designed to improve and define priorities, improve separation and delineation and reduce conflict. The concept treatment is included in Figure F-10. It is noted that this concept has not been assessed from a capacity or performance perspective and is subject to further design considerations.

Figure F-10: Possible safety improvements – Waimanu / Brown Street / Amy Street



Design changes are subject to a modelling assessment to confirm the adequacy of capacity impacts.

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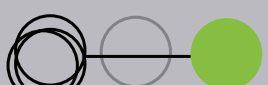

GTAconsultants

SCOPE
PACIFIC LIMITED
STRATEGIC CONSULTANTS IN PLANNING & ENGINEERING

Offices in Fiji and Australia
Contact John Richardson
+679 914 6547

Offices across Australia
Contact Peter Wills
+61 (0) 403 710 949

Based in Suva, Fiji
Contact Jacqueline Hughes
+679 999 9594