Department of Town & Country Planning

VUDA & SABETO

Advisory Plan

Department of Town and Country Planning
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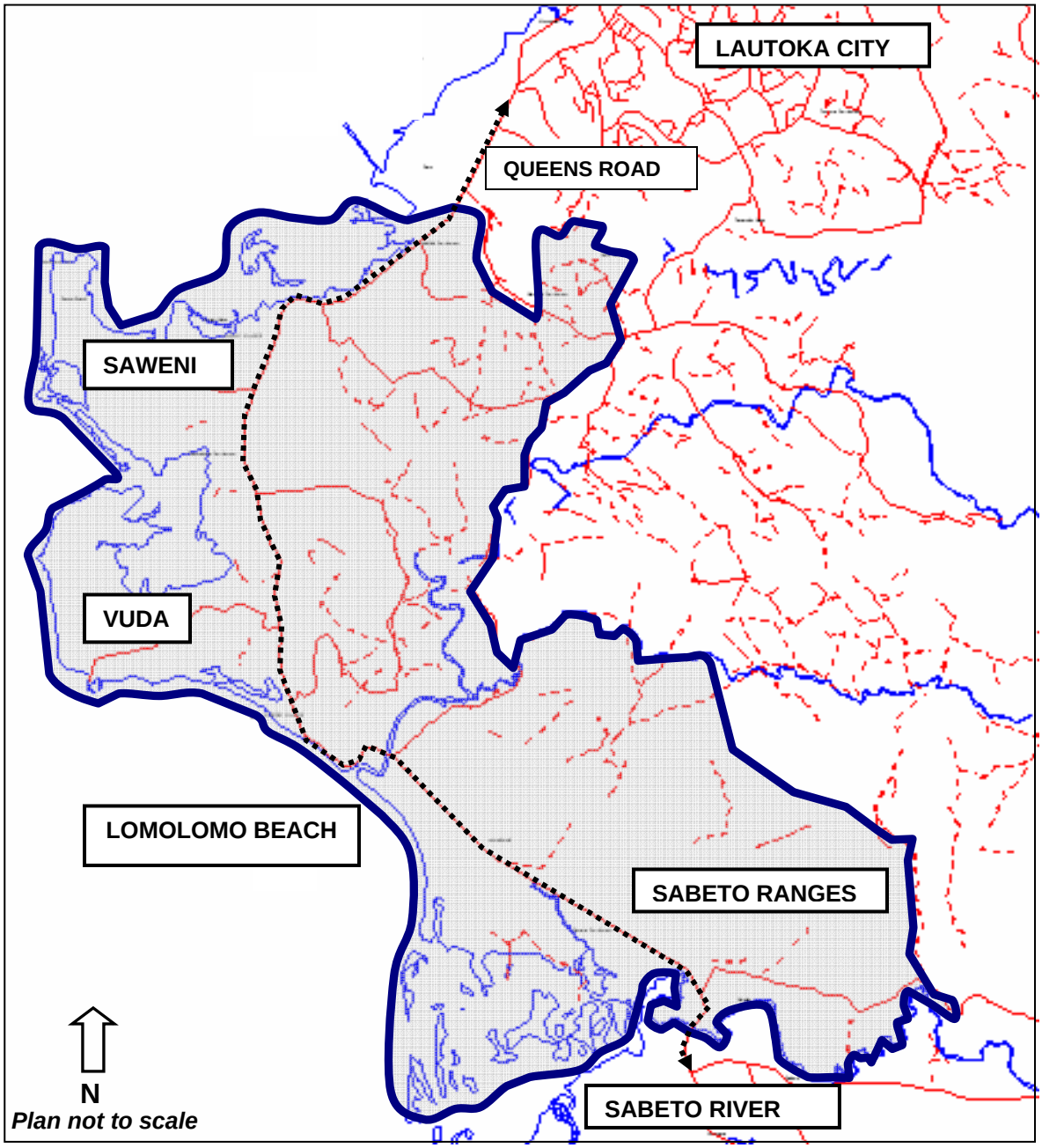
1.0 Introduction

1.1 Purpose of Advisory Plan

The purpose of this Advisory Plan is to guide future development within the area that encompasses Saweni, Vuda, and Lomolomo through to the Sabeto River. The study area lies within Ba Province in the Western Division.

Figure 1 Advisory Plan Study Area Map



The study area was selected due to the trend of fewer farming practices (particularly sugar cane) and increasing demand for tourist and residential development. Boundaries of the study area follow the enumeration area boundaries used by the Fiji Bureau of Statistics.

The study area falls within the Lautoka Rural Local Authority and currently is not subject to any form of land-use guidance plan. The land within the study area is generally zoned for rural/agriculture use. However, throughout the area individual sites have been approved for other uses including commercial, industrial, tourism and residential developments.

The Advisory Plan will aim for orderly and sustainable development by delineating appropriate land-uses for Crown and freehold land and providing policies to control future development across the entire study area.

1.2 How to use this Document

Town Planning Act 1999

The Town Planning Act defines areas which have been declared by the Director of Town and Country Planning as 'Town Planning Areas'. These areas are generally urbanised townships where development is controlled by Town Planning Schemes, which set out appropriate zones and policies. However, an Advisory Plan guides development for land that falls outside of declared Town Planning Areas (rural areas), and therefore it has no statutory status under the Act – hence its *'advisory'* role.

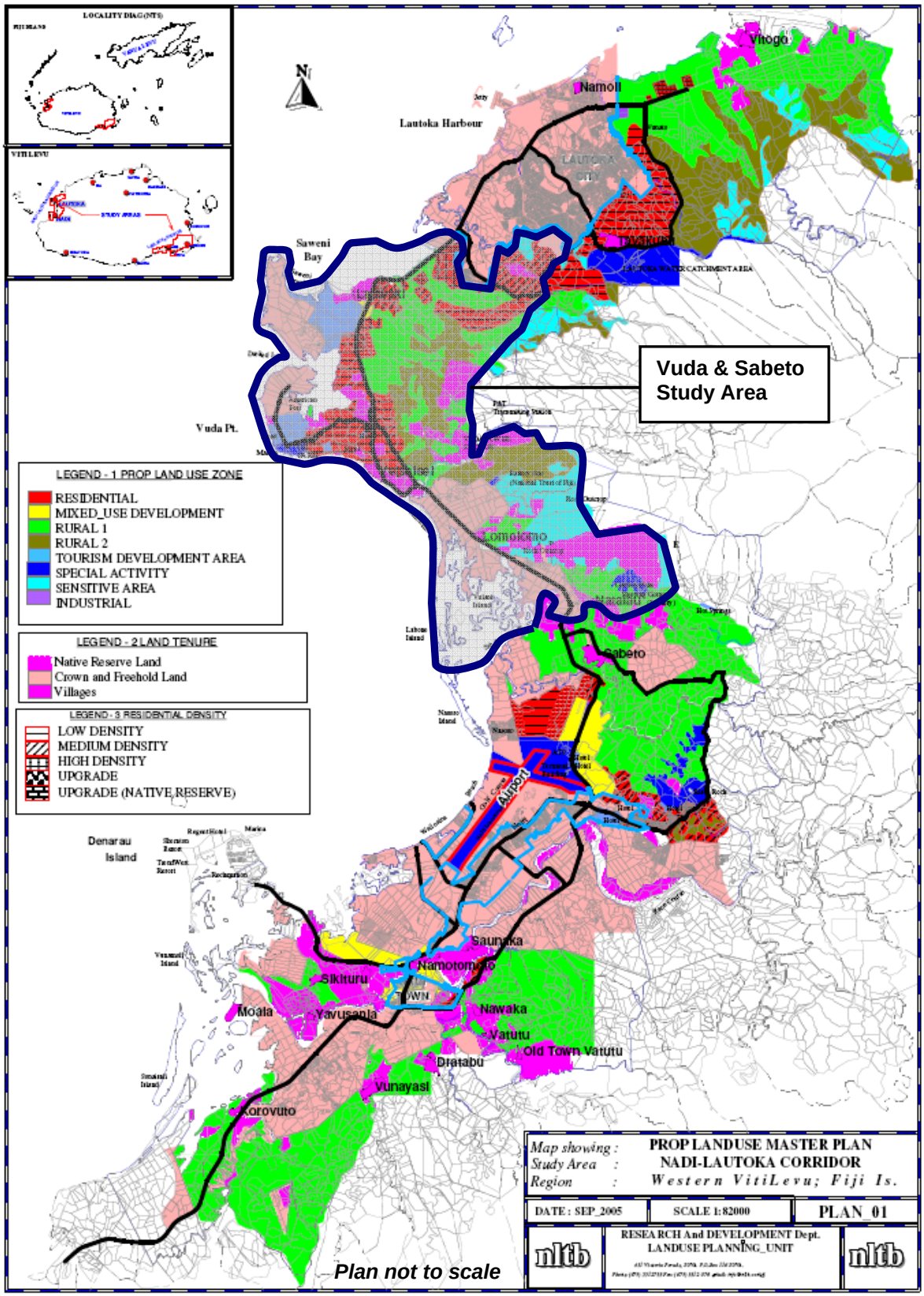
NLTB Lautoka-Nadi Corridor Land Use Study

In 2005 the Native Land Trust Board (NLTB) created a Lautoka-Nadi Corridor Master Plan which designates appropriate land-uses for native land within the region. The Master Plan was subsequently endorsed with conditions, by the Director for Town and Country Planning and is currently used as a guide for assessing planning applications.

The Vuda and Sabeto Advisory Plan only covers part of the Nadi-Lautoka Corridor, but will supplement NLTB's Master Plan by:

- 'filling in the gaps' – the Vuda and Sabeto Advisory Plan will designate appropriate land-uses for Crown and freehold land which were not addressed within NLTB's Plan;
- providing policies to guide the orderly and sustainable development of the study area; and
- providing triggers for when other stakeholder agency's comments should be sought as part of the assessment process.

Figure 2 NLTB Lautoka-Nadi Master Plan (showing Study Area)
Source: NLTB 2005



Moratorium on State Land

A moratorium preventing Crown land being sub-divided or rezoned to a higher use, which was in place for approximately one year, was lifted on 1st January 2009. The main purpose of the moratorium was to protect agricultural land from fragmentation as primary production is one of the major drivers of the Fijian economy. From now on, each proposal for subdivision of Crown agricultural land will be considered on its merits.

1.3 Key Aims of the Advisory Plan

The Advisory Plan seeks a number of outcomes for the study area:

- Efficient use of infrastructure
- Protection of prime agricultural land
- Protection of the natural environment, including mangroves and natural water systems
- Identification of appropriate areas for future residential, commercial, industrial and tourism development
- Development that is generally orderly, safe, accessible and is not visually detrimental to its locality
- The creation of opportunities for people living in the study area to ease the burden on urban centres.

The Advisory Plan is a long-term plan which aims to guide development over the next 10-20 years.

1.4 Advisory Plan Methodology

The methodology for the preparation of the Draft Vuda and Sabeto Advisory Plan has incorporated the following research methods:

- Questionnaires distributed to government departments and non-government agencies
- Review of development trends over the past three years based on DTCP records of applications received for rezoning, development and subdivision of land
- Survey of existing land-uses for Crown and freehold land holdings within the study area.
- Face-to-face interviews with residents and business operators within the Crown and freehold areas
- Review of available reports, data and information
- In-house DTCP consultation
- Key stakeholder workshop held in Lautoka, 26 November 2008
- Distribution of draft report to all stakeholders for review and comment.

1.5 Abbreviations

The abbreviations used within this document are as follows:

AFL	Airports Fiji Limited
CAAFI	Civil Aviation Authority of the Fiji Islands
DTCP	Department of Town and Country Planning
EIA	Environment Impact Assessment
EU	European Union
FEA	Fiji Electricity Authority
FSC	Fiji Sugar Corporation
IPCC	Intergovernmental Panel on Climate Change
NFA	National Fire Authority
NLTB	Native Land Trust Board
MLGHSSE	Ministry of Local Government, Housing, Squatter Settlement and Environment
MRD	Mineral Resources Department
OECD	Organization for Economic Co-operation and Development
OHS	Occupational Health and Safety
PPE	Public Participation Exercise

1.6 Acknowledgement

The Department of Town and Country Planning would like to acknowledge and thank all of the stakeholders that have provided advice, information or other assistance in relation to this project. Without such collaboration the Department would be unable to complete this project and others of its kind. The effort and time invested by other agencies and individuals is most appreciated.

2.0 Study Area Context

2.1 Land

The study area is located between Nadi Town and Lautoka City and functions as a transport corridor between these two urban centres, as well as a being a prime sugar cane region. Localities such as Lomolomo and Lauwaki contain small nodes of residential and commercial development.

Topography

The study area is predominantly characterised by flat agricultural land and rolling foothills. The Sabeto Ranges contrast with this landscape by its sudden and domineering presence within the south of the study area. Conversely, Vuda, Saweni and the Sabeto delta areas consist of low lying mangroves and mud flats. Land varies from only a few metres above sea level in areas such as Vulani to almost 500 metres above sea level in the Sabeto Ranges.

The following maps (Figure 3 and Figure 4) provide a good overall depiction of the topography of the study area.

Figure 3 3D Terrain Map
Source: MRD 2008

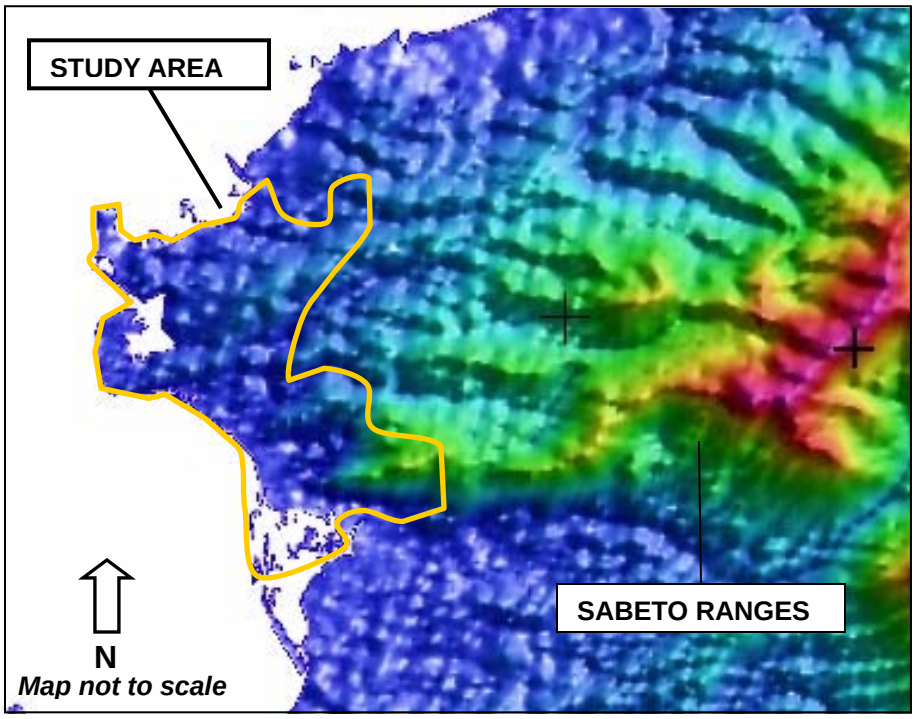


Figure 4 NLTB Nadi-Lautoka Land Use Study: Topography Map Excerpt
Source: NLTB 2005

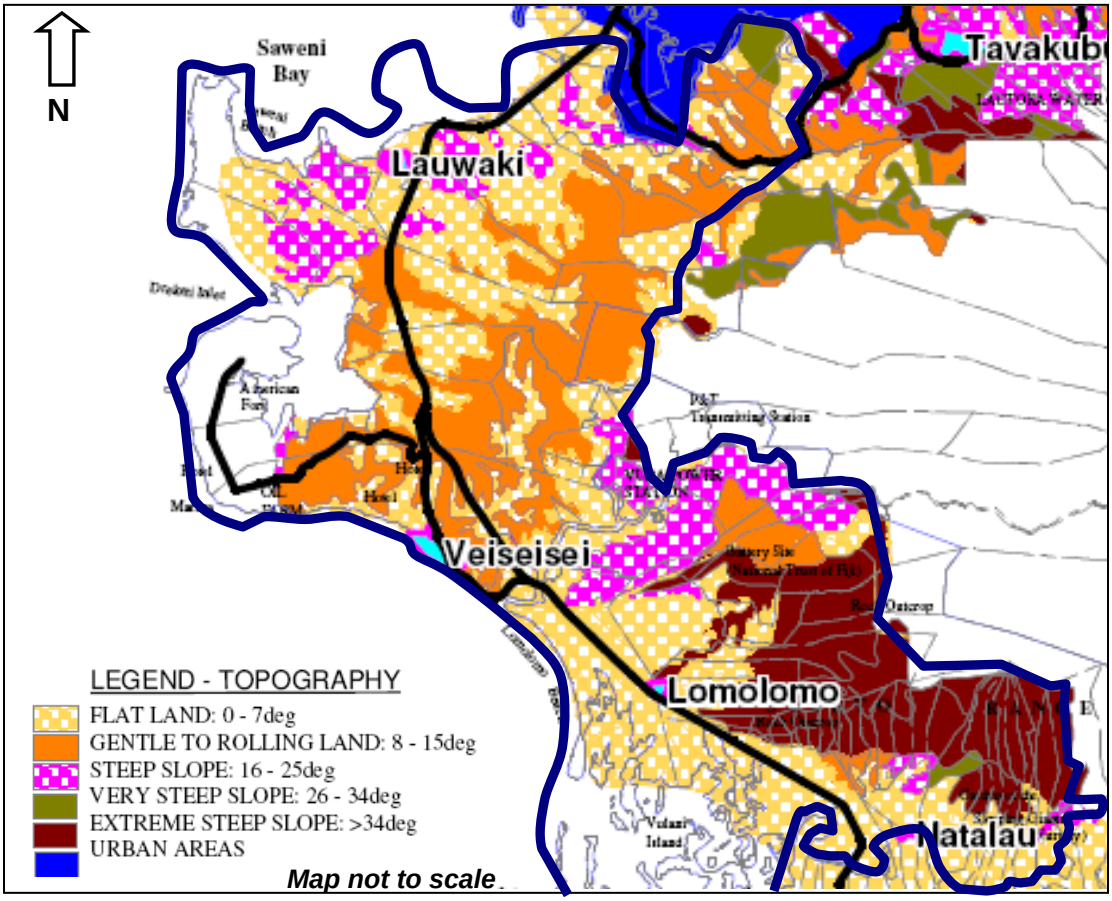


Figure 5 Typical Landscape: Undulating Plains & Sabeto Ranges

Climate

The Fiji Meteorological Bureau (2008) has provided an overview of the climatic conditions of the Nadi/Lautoka region:

- Annual mean air temperature has increased over the past 65 years with 2007 being the warmest year during this period.
- Annual mean (highest daytime) air temperature has increased over the past 65 years with 1998 being the warmest year during this period.
- Annual mean (lowest night time) air temperature has increased over the past 65 years with 2007 being the warmest year during this period.

The Bureau further advises that the Intergovernmental Panel on Climate Change (IPCC) has estimated that air temperatures will increase between 1.8 and 4 degrees Celsius by 2099. Similarly, there has also been increase in global Sea Surface Temperatures and sea levels. The IPCC predict a sea level rise of between 0.2-0.6 metres by 2099.

In terms of rainfall, the prime concern is inter-annual variability with an average of one to two major droughts in Fiji per decade and a likelihood of increased frequency of droughts.

In the Southwest Pacific there has been a trend of less frequent topical cyclones since 1970, however the strength of the cyclones (wind speed and amount of rainfall) has increased. Thus there has been, and will continue to be, a trend of less frequent but more intense tropical storms.

Hydrology

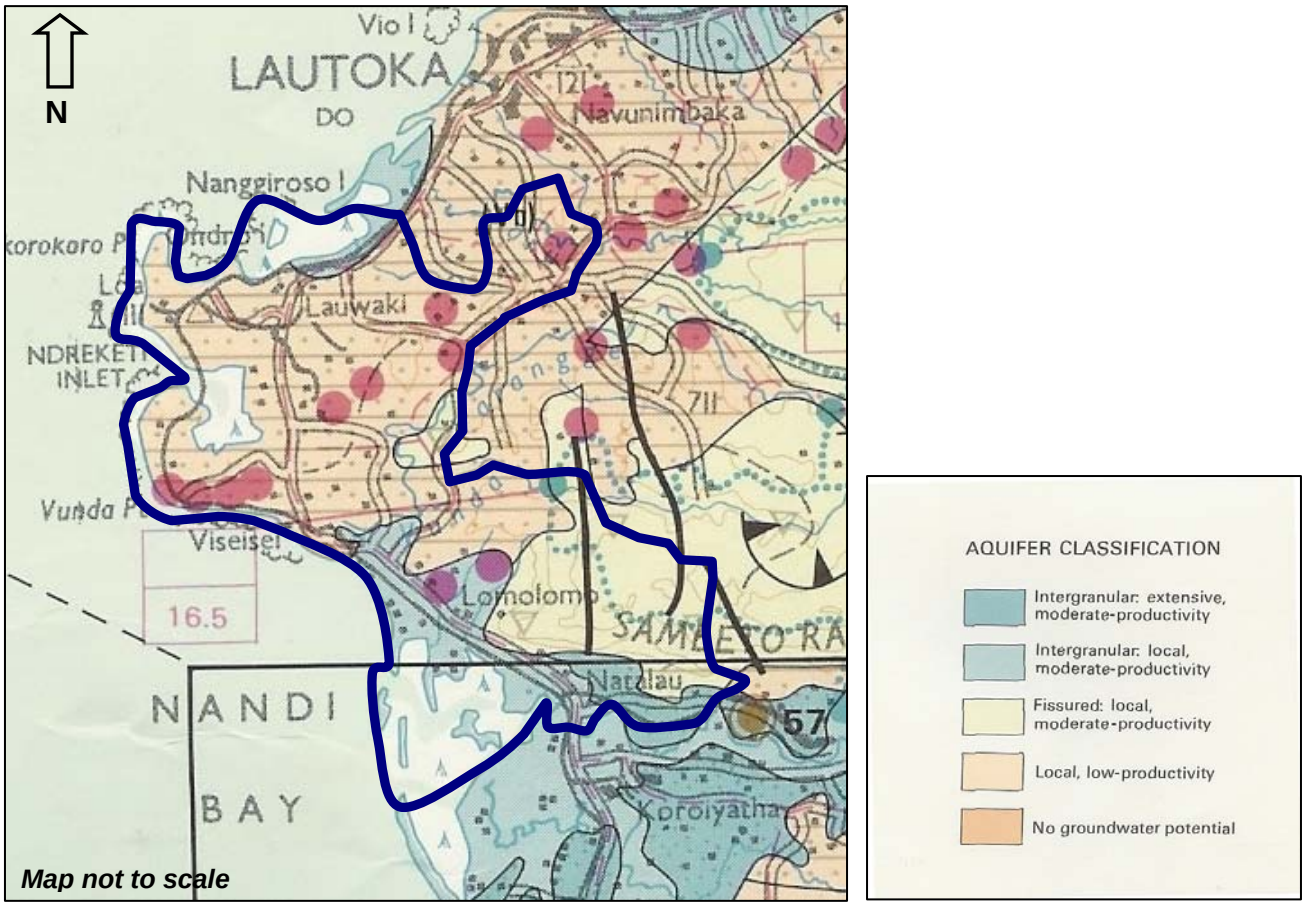
The Advisory Plan study area lies within the Ba and Koroimavua Volcanic Groups where groundwater is potable except at some coastal locations due to saline intrusion. In 1991 the Ba and Koroimavua Volcanic Group aquifers supplied domestic water to around 5000 people (Gale, 1991). Indeed several of the residents surveyed as part of the Public Participation Exercise (PPE) for the Vuda and Sabeto Advisory Plan indicated that they had a well as a 'back up' water supply to their PWD mains water supply. These wells were likely to have been the main water supply source prior to mains connection.

There are several aquifers within the study area with varying productivity:

- Northern part of the study area down to Viseisei Village — Low productivity
- Lomolomo to Sabeto River — Moderate productivity
- Sabeto Ranges — Moderate productivity

In addition to the above, a thermal-mineral spring is located near Natalau/Sabeto, just north of the Sabeto River.

Figure 6 Aquifer Productivity Map: Excerpt
Source: Gale 1991

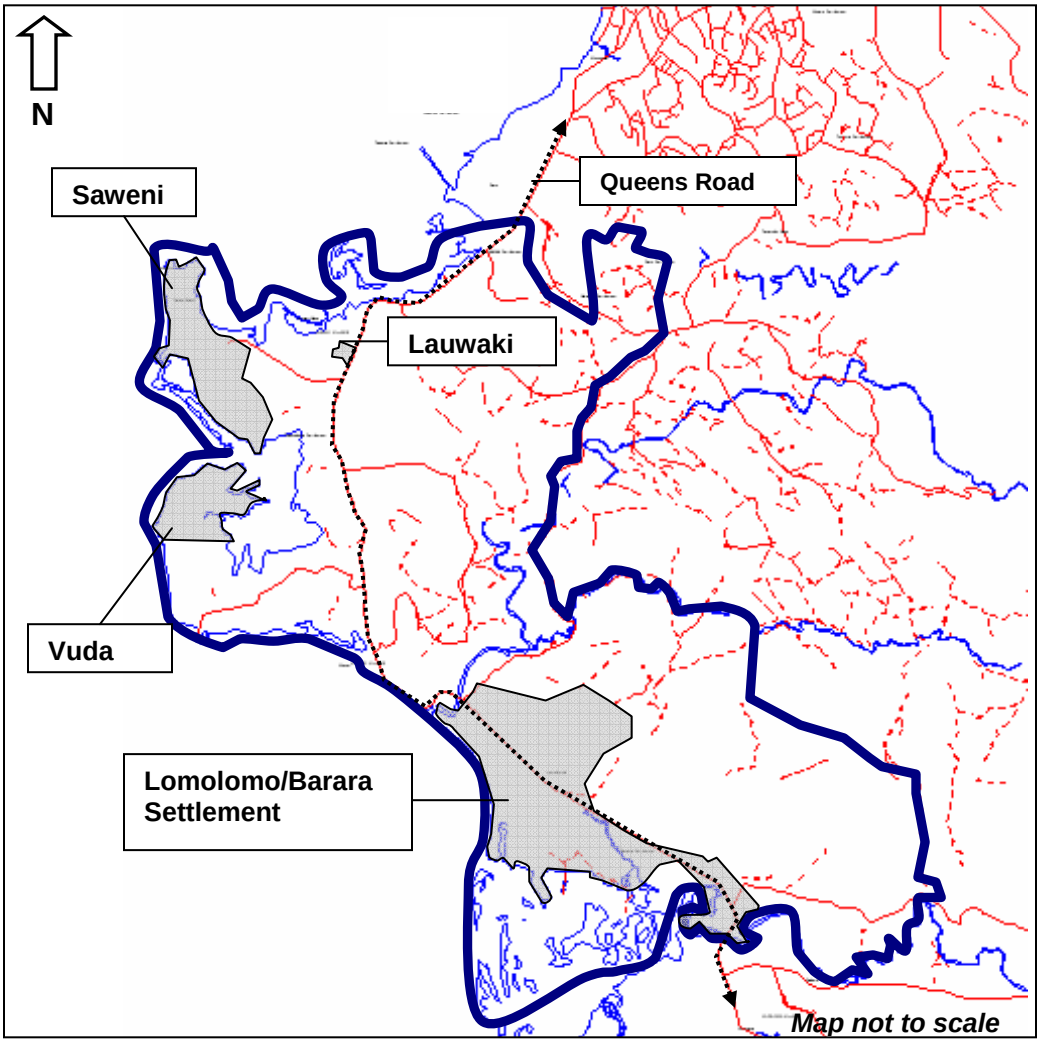


The Mineral Resources Department has indicated that investigations into utilising the groundwater supply to supplement existing drinking water sources for the Nadi-Lautoka corridor are likely to commence in the near future. Additionally, there is potential for commercial groundwater bottling enterprises.

Land Tenure

Within Fiji the majority of land is owned by native Fijians (around 88 percent), with eight percent being freehold and four percent owned by the Crown (Fiji Islands Bureau of Statistics 2008a p.3). Within the study area the only freehold land is located at Lauwaki and Crown land is located at Vuda, Saweni and Lomolomo/Barara Settlement. The remainder is held within native ownership.

Figure 7 Freehold and Crown Lands Map



There is a substantial amount of native land within the study area which is vacant with no standing lease agreements. Allotments with leases are mainly for agricultural purposes, with a small number being for residential purposes. Informal settlements have developed to the north of Lauwaki and to the south, at Delaisaweni. However, since the completion of NLTB's Lautoka-Nadi Corridor Land Use Plan in 2005, these settlements have been formalised. Informal or 'squatter' settlements are generally a result of a shortage of affordable and properly serviced land, as opposed to a shortage of land per se (NLTB pp xiii & xi). Informal settlements are generally permitted by the landowners but have no formal lease arrangement with NLTB.

The land owned by the Crown (Saweni, Vuda and Lomolomo/Barara Settlement) is held under lease contracts which specify the agreed use of the land holding:

Figure 8 Crown Leases within Study Area
Source: Department of Lands 2008

Type of Land Use Class	Percentage of Total Leases
Agricultural	67%
Commercial	3%
Educational	1%
Industrial	2%
Religious	1%
Residential	25%
Special	1%

Unsurprisingly, the majority of leases are for agricultural purposes (67 percent) followed by residential leases which represent 25 percent of Crown leases within the study area.

The following table shows the percentage of leases which will expire over the coming years:

Figure 9 Crown Lease Expiration within Study Area
Source: Department of Land 2008

Time Period	Percentage of Leases Due to Expire
2008 – 2012	7%
2013 – 2018	34%
2019 – 2024	8%
2025 – 2030	1%
2031 – 2035	7%
2035 onwards	42%

In the next ten years 41% of leases will expire. This could impact significantly on the character and role of the Crown land holdings if many agricultural leases are not renewed as fewer people choose to pursue farming for a living. A lot of land may potentially be left idle unless the sugar cane industry strengthens or other markets are pursued.

2.2 Population

The *Census 2007 Results* (Fiji Islands Bureau of Statistics 2008b) provides up-to-date information on the current population trends in Fiji, including within geographic areas.

Figure 10 Population Size and Growth by Ethnicity and Geographic Sector
Source: Fiji Bureau of Statistics 2008b, p.1

Geographic Sector	Ethnic Group	Population Size	
		1996	2007
Total Fiji	All	775,077	837,271
	Fijians	393.575	475,739
	Indians	338,818	313,798
	Others	42,684	47,734
Rural Sector	All	415,582	412,425
	Fijians	232,240	264,235
	Indians	170,783	135,918
	Others	12,559	12,272
Urban Sector	All	359,495	424,846
	Fijians	161,335	211,504
	Indians	168,035	177,880
	Others	30,125	35,462

The above table shows that there was an overall decline in people living in the rural sector between 1996 and 2007. However, although there are fewer Indo-Fijians living in rural areas there is actually an increase in the number of indigenous Fijians. Unsurprisingly, there was a general increase in the number of both Fijians and Indo-Fijians living in urban areas, which is reflective of the urbanisation that Fiji has been experiencing. Currently around 51 percent of people are now living in urban areas and it is expected that by 2030 61 percent of the population will reside in urban areas.

Fiji has continued to experience low population growth, with an average growth rate of 0.7 percent per year. Lower fertility and rate of emigration (particularly for the Indo-Fijian population) are the key contributing factors for the slow growth rate.

The Western Division has been growing at the national average rate, despite a high level of out-migration of rural Indo-Fijians from Ba province. This is due to a high influx of Fijians, as per the national trend.

With the expiration of native leases and falling world sugar prices the mainly Indo-Fijian population who have traditionally lived as sugar cane farmers, are migrating into towns and cities seeking work.

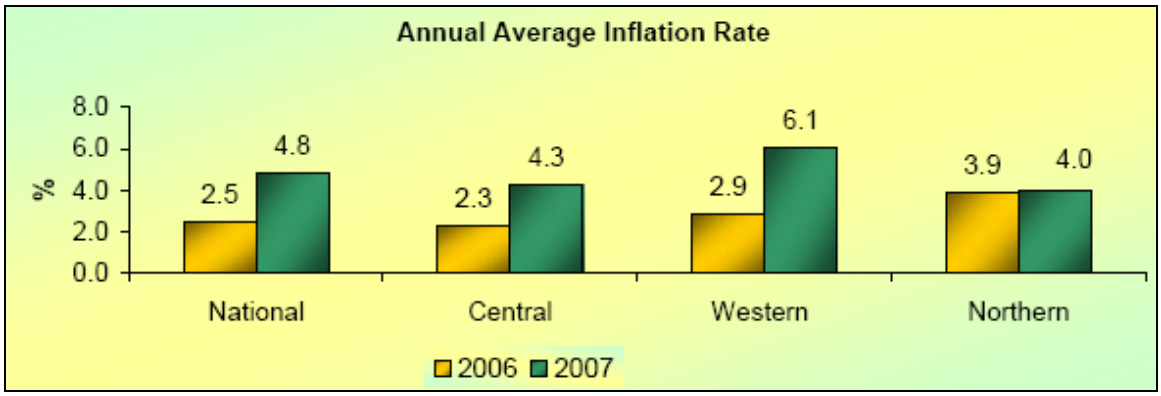
However, the following table which provides a breakdown of the population of the study area shows that there is still a higher number of Indo-Fijians living in the area than indigenous Fijians:

Figure 11 2007 Census Data: Provisional Population Results for Study Area
Source: Fiji Bureau of Statistics 2008c

Location (Enumeration Areas)	Population				
	Fijian	**Indian**	**Rotuman**	**Other**	**Total**
Lauwaki Village	582	120	-	3	705
Saru Back Road, Saru Tawatawa, Reservoir Rd, Vaivai (pt), Navula (pt), Saru Wairabetia, MGM School	116	645	-	-	761
Vaivai (pt)	6	514	6	4	530
Vuda Back Rd, Saru, Navula (pt), Vaivai (pt)	69	525	-	3	597
Viseisei (pt), Wairbetia, Saweni, Vuda Power Station	48	523	-	2	573
Wairabetia (pt), Saweni (pt)	81	560	11	3	655
Wairabetia (pt)	35	614	-	-	649
Wairabetia (pt)	33	517	2	8	560
Tuaniveibona, Viseisei (pt)	204	543	-	8	755
Saweni	50	470	-	1	521
Saweni (pt), Dreketi (pt)	70	419	1	26	516
Saweni Beach Rd, Saweni (pt)	109	428	5	18	560
Large Dreketi	76	373	8	2	459
Vuda Point, Anchorage Resort	150	203	-	13	366
Viseisei Village	698	-	-	-	698
Viseisei (pt)	23	491	-	2	516
Bila, Viseisei (pt)	173	482	6	3	664
Lomolomo (pt), Vuda Back Road (pt), Lomolomo Public School	55	457	2	8	522
Lomolomo Village	370	365	9	-	744
Natalau Village, Wailoko (pt), Nawai, Vunayawa	367	230	-	9	606
Wailoko, Barara, Lomolomo	127	328	2	4	461
Wairabetia (pt)	70	157	-	4	231
Velovelo (pt)	80	351	-	-	431
Velovelo (pt)	130	405	-	1	536
Saru	155	95	-	1	251
Natabua	215	488	6	2	711
TOTALS	**4,092**	**10,303**	**58**	**125**	**14,578**

Residents living within the Advisory Plan study area have a high likelihood of experiencing poverty and hardship. The following table shows that the Western Division has experienced a very high inflation rate (6.1 percent) over the 2006-2007 period compared with other divisions, although nationally the inflation rate has also risen from 2.5 percent in 2006 to 4.8 percent in 2007.

Figure 12 Annual Average Inflation Rate
Source: Fiji Islands Bureau of Statistics, 2008a p.34



Additionally, 40 percent of people living in rural areas are living in poverty compared to 29 percent in urban areas. The Western Division records 37 percent of residents living in poverty, second to the Northern Division, with 53 percent (Fiji Islands Bureau of Statistics 2008a p.12).

Based on 2000-2002 figures from the Sugar Cane Grower
s Council, the average annual cane farmer's income falls below the national poverty line (Rao 2003, p.304). As such, it could be expected that the predominance of sugar cane farming combined with the rural nature of the study area places residents at a higher risk of living in poverty.

The *Fiji Islands Population Profile Based on 1996 Census: A Guide for Planners and Policy Makers* (Secretariat of the Pacific Community 1996) emphasis the importance of creating opportunities in rural areas which will also assist in slowing the rural-urban drift. Opportunities can be created via the:

- Establishment of industries and businesses; and
- Establishment of necessary conditions for development, such as providing access to land and utilities and improving infrastructure and social services.

Accordingly, the Master Plan in Section 5 has attempted to broaden the options for living and working within the Vuda and Sabeto study area by designating areas for tourism, commercial/industrial and residential development.

2.3 Development Trends

Sugar Cane Industry

Traditionally the Western Division, including the subject area, has been dominated by agricultural pursuits and in particular, sugar cane farming. However, the sugar cane industry is under threat for several reasons:

- Falling world sugar prices and potential loss of EU subsidised prices for Fijian sugar.
- Expiry of agricultural leases: According to a 2003 report prepared by the Sugar Cane Industry, around 10,300 leases will expire over the next 25 years (NLTB p.xii)
- Restructuring of the sugar cane industry which may force approximately 5000 farmers out of the industry (NLTB p. xii).
- Younger generations choosing not to work on family cane farms due to the financial and physical hardships faced of farming life (Rao 2003 p.311).
- Degraded state of agricultural soil due to past unsustainable farming practices (NLTB p.xii).

The decline of sugar cane farming is evident within the study area from the high number of vacant/overgrown agricultural allotments, particularly at Vuda and Saweni. The figures from the 2007 census also reflect this decline:

- Local Primary Production of sugar cane fell from 3,192,000 tonnes in 2006 to 2,513,000 tonnes in 2007.
- Local Manufactured Production of sugar fell from 307,000 tonnes in 2006 to 240,000 in 2007 (Fiji Islands Bureau of Statistics 2008a pp.25-26).

Notwithstanding the above, in 2004 the 'Agriculture, Forestry and Fishing' industry employed the highest number of people in Fiji, followed by the 'Wholesale and Retail Trades, Restaurants and Hotels' industry (Fiji Islands Bureau of Statistics 2008a p.23). Therefore, it is important that within the study area the agriculture (and tourist) industries are actively supported. However, the existing character and role of the area is likely to change in the coming years and the issue is to ensure that these changes are managed in an economic and sustainable way.

Review of Applications Received by DTCP

A review of applications received between 2005 and 2007 and pertaining to land within the study area was undertaken. As the study area lies outside a declared 'Town Planning Area' and is without a Town Planning Scheme, all applications received by the Lautoka Rural Local Authority are forwarded to the DTCP for assessment. The following applications were reviewed:

- Rezoning Applications — In most cases the existing use of the land is 'rural/agricultural' and applications are seeking to rezone land to a more intensive use such as 'residential', 'commercial' or 'tourism'.
- Sub-division Applications — These are applications to subdivide land into smaller allotments, often for the purpose of a new land-use.
- Development Applications — These are applications for new development or changes/extensions to existing developments.

Whilst many applications at the time of review were still undecided and several had been refused, the purpose of the review was to demonstrate the *demand* for development, regardless whether it is ultimately permitted or not by DTCP.

There was no discernable pattern for applications received over the review period. Rezoning applications received for both Lautoka Rural and the study area increased while the total subdivision applications decreased, although there was a small spike in applications received for the study area in 2006. Development applications for both Lautoka Rural and the study area were significantly less during 2006, but increased again in 2007 to a similar number received during 2005.

Applications pertaining to land within the study area represented 59 percent of all rezoning applications and 44 percent of all subdivision applications received for the Lautoka Rural Local Authority area - which demonstrates the type of development pressure the study area is facing. Many of the applications not relating to the study area were for tourism developments in the western islands.

Figure 13 DTCP Rezoning applications 2005-2007

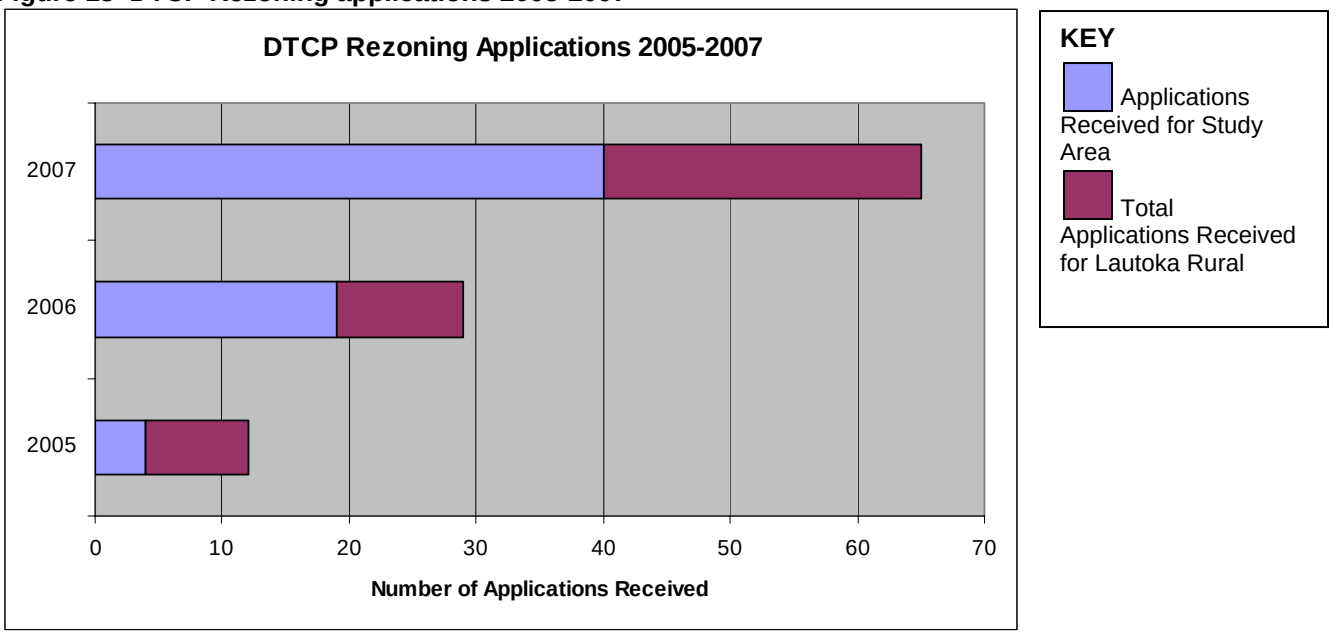


Figure 14 DTCP Subdivision Applications 2005-2007

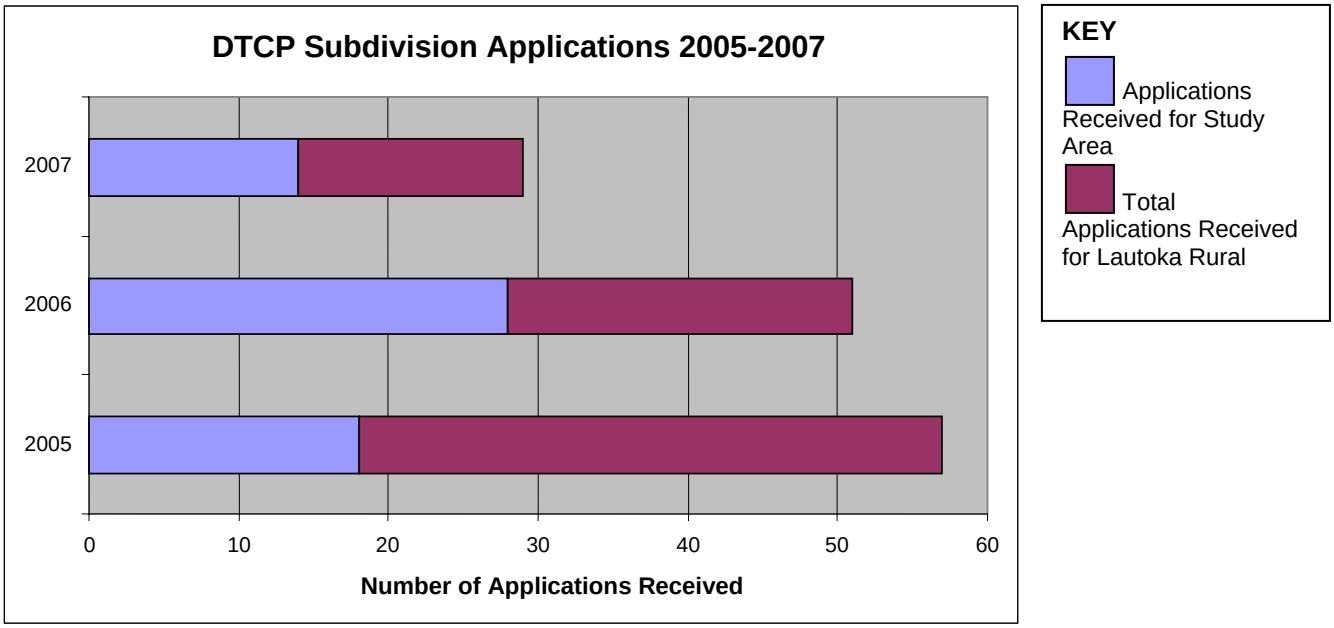
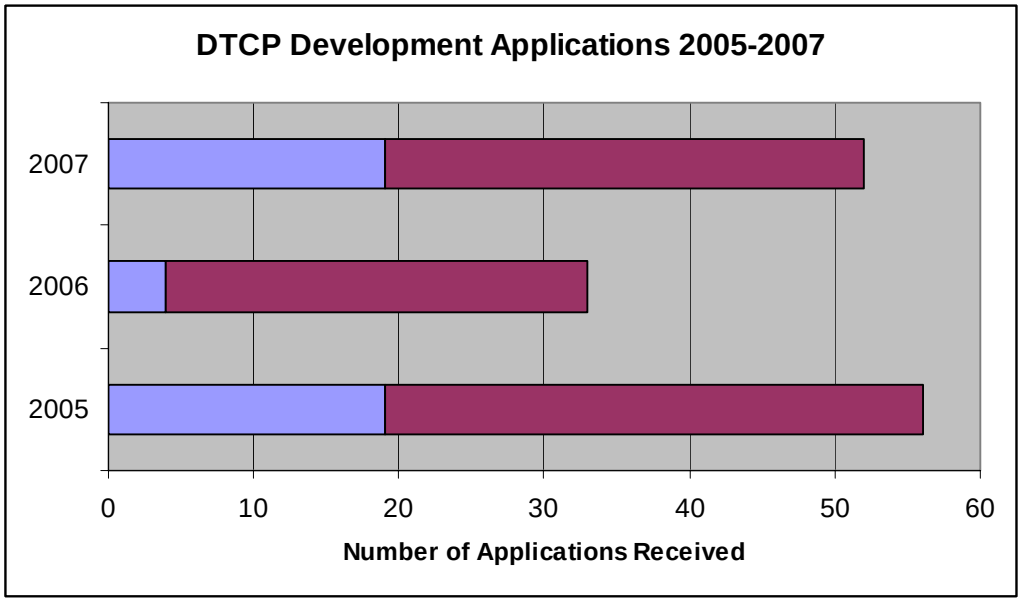


Figure 15 DTCP Development Applications 2005-2007



Applications for residential development within the study area were the highest across all categories: 62 percent of rezoning applications, 78 percent of subdivision applications and 36 percent of development applications. Seventeen percent of subdivision applications were for agriculture allotments although these were generally also seeking residential allotments as well. The higher number of rezoning and subdivision applications to development applications reflects, in part, the trend for existing dwellings to be subdivided from their agricultural land

holding. In most cases, this is a response to the ceasing of farming practices (usually sugar cane) where the tenants wish to remain living where they are.

Tourism and commercial developments are also in demand representing 21 percent and 17 percent respectively of rezoning applications within the study area and 12 percent and 13 percent respectively of subdivision applications.

Applications for telecommunication infrastructure is increasing with five development applications and one rezoning application received in 2007. During 2005-2006 only one application for a telecommunication development was received.

The applications for subdivisions, in particular, provide an insight to the future development of the study area:

- A total of 550 additional allotments were sought for the 2005-2007 period totalling 168.6 hectares in area. At the time of the review 42 applications (or 70 percent of all applications) had been approved, equating to 385 additional allotments covering a total 118 hectares of land.

- A number of subdivision applications contemplated mixed-use developments whilst other proposals were large, such as a proposal for 54 residential allotments located on the eastern bank of the Dreketi Inlet (approved September 2007).

The additional numbers of approved allotments require water, power and telecommunication services as well as suitable means for sewerage and rubbish disposal. New residents will also require access to social services including schools, churches and health care. For these reasons suitable areas need to be strategically identified and planned as future 'growth' areas.

Fragmentation and loss of agricultural land is also an on-going concern which ad-hoc subdivision and development contributes to.

DTCP staff have noticed a tendency for many approved proposals, particularly tourist developments and residential subdivisions, to not eventuate on the ground. This is applicable to Fiji as a whole. It is thought that a great deal of land speculation occurs and that securing suitable financing may also be a factor. As such, many of the applications for subdivision and rezoning applications may never actually result in a development and provide a slightly skewed view of what development which is actually occurring.

2.4 Existing Development Potential

Vulani

The Vulani site is a long and narrow sand spit located within an area characterised by low lying mangroves in the Sabeto River delta. It has been earmarked for tourism development and has been in the concept stage for some years. It has been rezoned for tourism use but applications for subdivision or development have not yet been lodged at the time of writing.

The EIA Report prepared by Tonkin and Taylor International Ltd (April 2007) assesses the three-stage concept proposal, which consists of the following:

- Several hotels located within a 'hotel zone' (five 300 bed hotels, one 100 bed hotel, one 75 bed hotel and one 50 bed hotel)
- 15 hectare salt water lagoon (for swimming) with landscaping and beach sands
- 100 berth marina
- International standard golf course
- 200 'canal' houses allowing for boats to be moored at the edge of the property
- 400 'golf course' residential lots
- 50 over-water bures and 150 duplex units
- Town centre with shopping and services for visitors and residents on the island

The above concept will require the conversion of approximately 130 hectares of mangroves and will potentially require its own waste water treatment plant. Tonkin and Taylor International Ltd found the proposed development concept to be satisfactory.

The Vulani proposal is similar to Port Denarau in terms of its potential role as a tourist hub. This makes it a very significant development within the study area but also within the Nadi-Lautoka Corridor. Its realisation would inevitably draw more tourists further north of Nadi and provide more commercial/employment potential for the region. As a consequence, people would be attracted to the area and there would be more demand for residential development and associated services.

The University of Fiji

The University of Fiji opened in December 2004 and is located on Queens Road at Saweni, next to Vishnu Deo High School. It is Fiji's first national university and is the country's second university after the University of the South Pacific, located in Suva.

As the University of Fiji expands and attracts a larger student base it can be expected that there will be a subsequent demand for further housing and services. The NLTB Master Plan has allocated land in the immediate locality of the University for low-density residential development and rural uses. However, mixed use development (including commercial uses) and higher-density residential areas are located a few kilometers to the north, at Lauwaki.

Vuda

The Vuda locality is home to the Vuda Power Station located off the Vuda Back Road and the Shell Oil Terminal, located at Vuda Point. Both sites play an important role in the energy requirements of the region.

The First Landing Resort (site of the landing of the first Fijians), Anchorage Resort and Vuda Marina collectively provide the focal point for the tourist industry in the study area, which is otherwise dominated by farming. The *Fiji Tourism Development Plan 2007-2016* (Sustainable Tourism Development consortium et al 2007, p.82) recognises that Vuda Point has ongoing potential for tourism development as does the area north of the Point, towards Saweni.

A tourism operator within the Vuda area has stressed that developments which are incompatible with tourism development, such as industrial developments, should not be permitted so as not to compromise the appeal of the region to visitors.

2.5 Urban Rural Relationship

The relationship between rural areas and urban centres is significant. Fiji is experiencing rapid urbanisation, particularly in the peri-urban regions, with approximately half of the population based in urban centres. Over the past 20 years there has been an ongoing rise in the percentage of people living in urban areas:

- 1986 – 38.7% urban population
- 1996 – 46.4% urban population (MLGHSSE 2004, p.7)
- 2007 – 51% urban population (Fiji Islands Bureau of Statistics 2008b, p.4).

This migration into cities and towns has been fuelled by the expiration of native leases, a decline in the sugar industry and the benefits urban centres offer in terms of employment, health and educational services. Additionally, urban centres play an important role within the agricultural, fisheries and tourism sectors in the provision of industrial processing, services, distribution of goods and market support (MLGHSS 2004, p.8). The relationship between the rural and urban sector is therefore inter-dependent.

One of the major problems arising from the rural-to-urban migration is the increase in squatter settlements which often occur in peri-urban areas. These

settlements arise in a haphazard manner although many eventually receive formal recognition. Although formalising squatter settlement provides social and economic security to residents, it is a reactive solution that does not result in coordinated or strategic urban growth.

Identifying areas for residential growth in advance is a preferable way of dealing with urban expansion as it allows for a controlled and planned urban environment where infrastructure and social services can be implemented in a strategic and cost efficient manner.

Opening land up for residential development within rural areas (particularly in locations which are accessible to urban centres) is one means of curbing the out-migration of residents from the rural domain and decreasing the number of people moving into the city.

Accordingly, several areas are identified as being appropriate for residential growth as part of the Master Plan in Section 5.

At the time of writing the Department of Housing and Squatter Settlement has not earmarked any areas within the study area for squatter relocation settlements. It should also be noted that allocating appropriate areas for future residential development is only one small step in curbing the evolvement of squatter settlements.

3.0 Constraints and Opportunities

3.1 Land Capability

Department of Land Resources Planning and Development has provided a Land Capability Map of the study area, which delineates areas of varying arable capabilities, based on the quality of soils.

Figure 16 Land Capability Map
Source: Department of Land Resources Planning and Development 2008

LAND CLASSES

Class II Arable
Good arable land. Slight limitations making it difficult to manage than Class I.

Class III Arable
Fair arable land. Moderate limitations, restricts choice of crops, make special conservation practices. Requires moderate improvement.

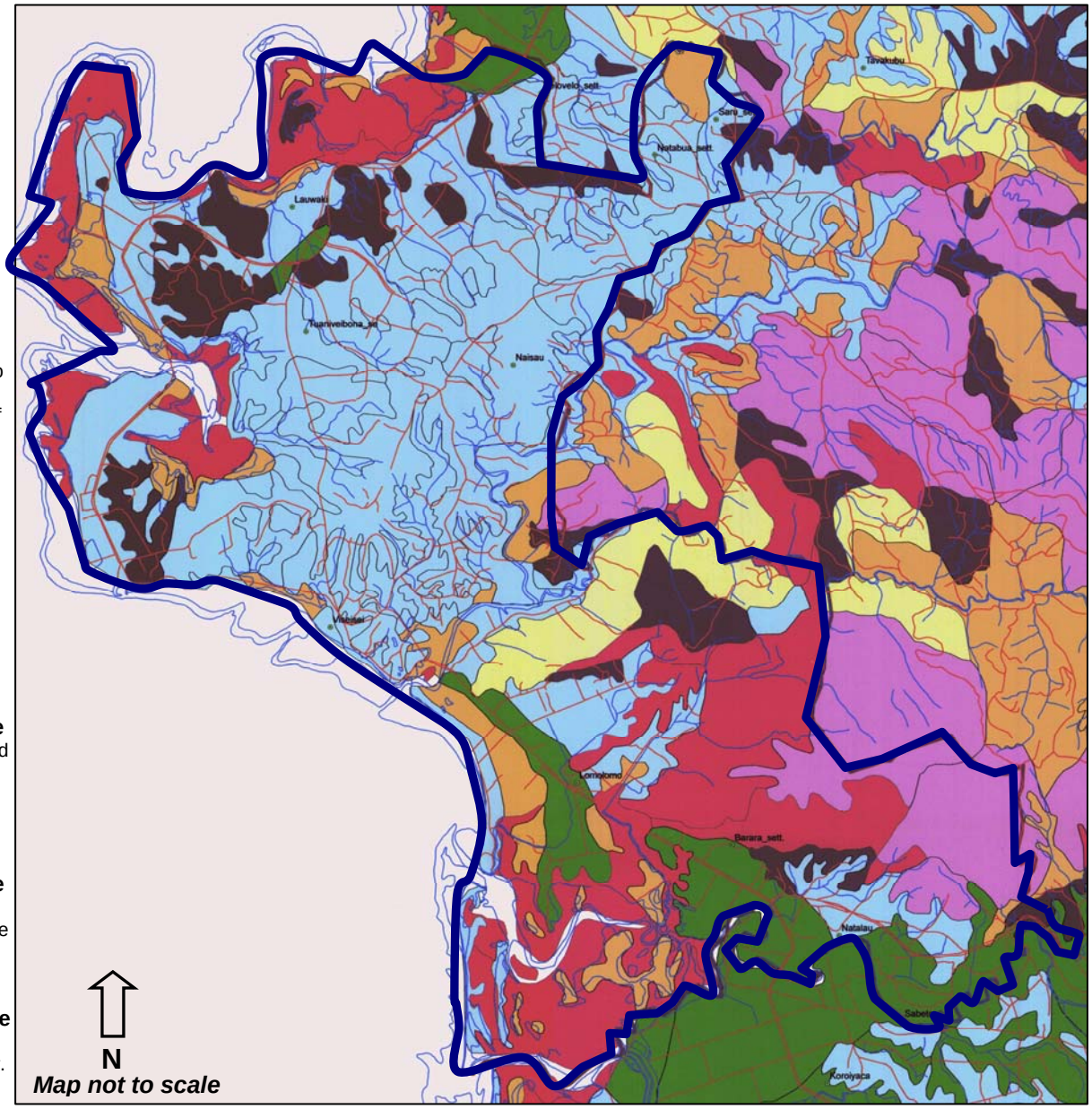
Class IV Arable
Marginal arable land. Good to fair treecrop land. Severe limitations restricting choice of crops necessitates intensive conservation treatment and very careful management. Problem soils as far as arable cultivation is concerned. Requires major improvement.

Class V Non Arable
Good grazing land. Slight limitations. Requires slight improvement. Grazing or forestry.

Class VI Non Arable
Marginal grazing land but good for forestry, moderate to severe limitations, requires moderate to major improvement.

Class VII Non Arable
Fair to marginal forestry land. Unsuitable for grazing. Severe to very severe limitations. Require major improvements.

Class VIII Non Arable
Unsuitable for productive use in either agriculture or forestry. Reserve for catchment and wild life protection purposes.



The Land Capability Map shows that there is little Class II good quality arable land within the subject area, apart from a pocket near Lauwaki and some near Lomolomo and the Barara Settlement.

There is a substantial amount of Class III arable land within the subject area which, although suitable for agricultural use, requires conservation measures in order for it to be cultivated. There are several areas of Class IV near Vuda, Saweni and Lauwaki which are best suited to tree-cropping and require major improvement for cultivation purposes.

Along the coastal areas, particularly around Saweni, Dreketi Inlet and the Sabeto Delta area, very poor Class VIII land is located which is unsuitable for any type of agricultural production. This land mainly consists of mangrove habitat and is too saline for agricultural purposes.

The Department of Land Resources Planning and Development (2008) have requested that all areas which have been classified as 'arable' land are to be left for agricultural purposes. However, some areas of arable land have been designated for non-agricultural uses within the Master Plan in Section 5. This is in recognition of the gradual trend away from farming, together with the need to provide residential and employment opportunities within the study area.

3.2 Infrastructure

Roads

The key roads within the study area are maintained by the Department of National Roads (refer to Figure18) and part from Queens Road and Vuda Point Road the roads are unsealed.

The remaining non-government controlled roads are maintained either by the Ministry of Provincial Development or Department of Lands. Alternatively cane roads are maintained by farmers, or in some cases farmers will make financial contributions to the responsible authority for the road upkeep.

The Department of National Roads requires a minimum 20 metre road reserve for main roads and secondary roads. Schedule G of the General Provisions specifies the minimum setback of buildings from roads:

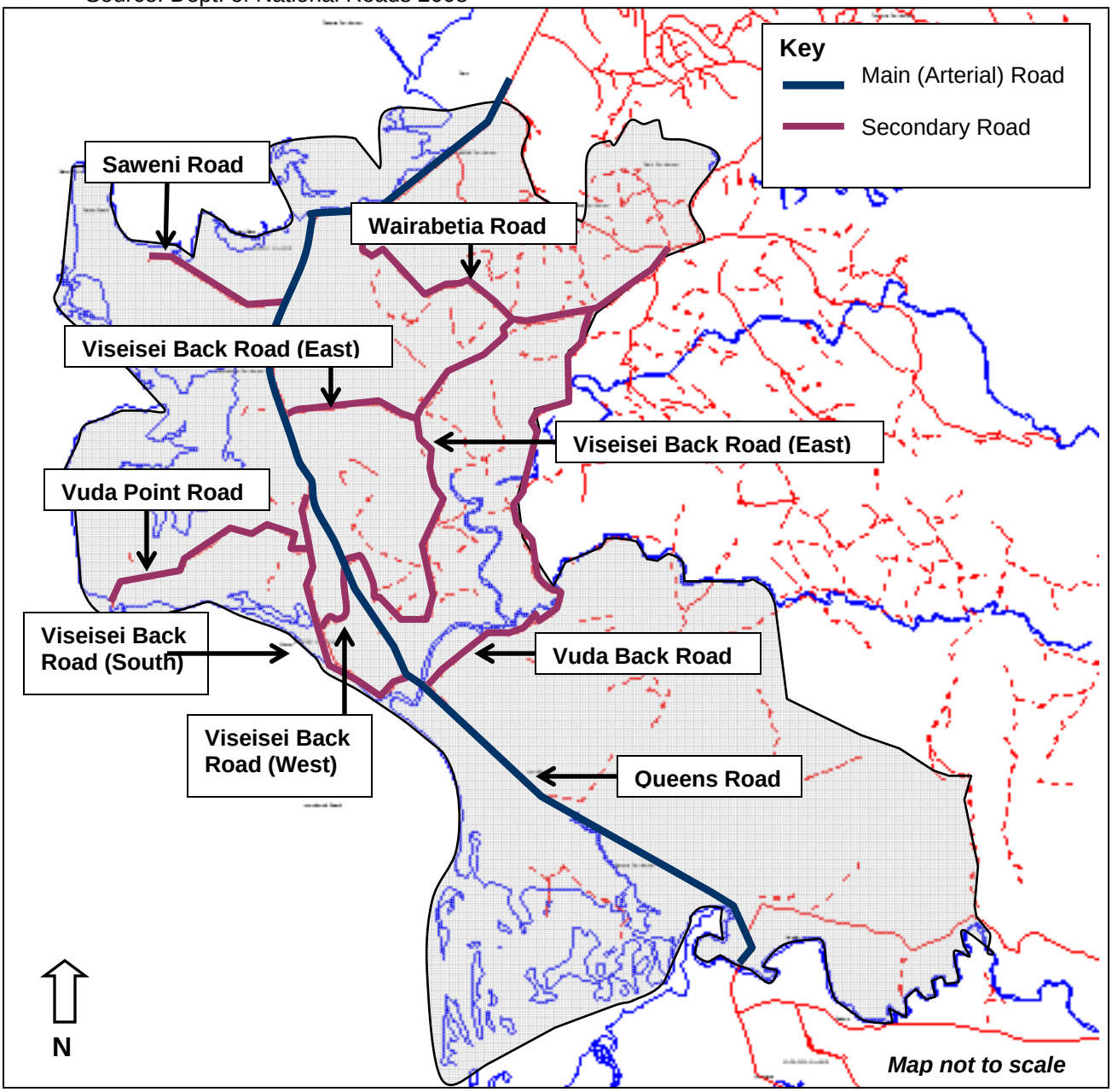
Figure 17 Road Classifications
Source: General Provisions, Town Planning Act 1999

Road Classification	Relevant Road(s) in Study Area	Minimum Building Setback from Road Reserve Boundary
• Main Road	Queens Road	18 metres
• Secondary Road	As per map (Figure 18)	12 metres
• Country Roads	All other roads	12 metres

Residents interviewed as part of the PPE noted the general lack of maintenance of roads within the study area. The quality of roads impacts greatly on the accessibility of an area for both private and public transport, which in turn, has an impact on the quality of life that residents will have.

It is noted that a Nadi Town Bypass Road has been proposed by the Department of National Roads. This road would facilitate greater accessibility between areas north and south of Nadi and may increase traffic movements on Queens Road within the study area.

Figure 18 Key Road Network Map
Source: Dept. of National Roads 2008



The issue of illegal access points onto Queens Road has been identified by the Lautoka Rural Local Authority. An increase in the number of access points causes a greater disruption to traffic and hence increases the risk of car accidents. This risk is generally greater in rural areas where cars will often be traveling at higher speeds. Lautoka Rural Local Authority has also raised the issue of 'ribbon' development appearing along the Queens Road, citing Lomolomo as a key area where this has occurred. Such 'ribbon' development directly contributes to the number of access points onto Queens Road.

The Australian *Guide to Traffic Generating Developments* (Roads and Traffic Authority 2002) provides guidelines on minimising the impacts that developments may inflict onto adjacent road networks: New developments, where appropriate, should:

- Avoid direct vehicle access onto a major road.
- Use auxiliary lanes, such as de-acceleration and acceleration lanes, to minimise conflicts between traffic entering or exiting fast-moving traffic.
- Ensure that vehicles entering or exiting a driveway are visible to approaching motorists and pedestrians. Similarly, vehicles entering or exiting a property must have a good line-of-site in order to see approaching vehicles or pedestrians.
- Be located away from major roads or intersections, if generating high traffic volumes.
- Allow for turn-around space so that vehicles can exit sites in a forward motion (if located on a busy road).
- Ensure that on-street queuing of traffic does not occur.

By following the above principles a safer and more efficient road network can be established in the area. These principles have been converted into policies in Section 5.3 of this document.

Water

The Public Works Department (PWD) is currently preparing a new Master Plan for water supply for the Lautoka-Nadi corridor; however this is not due for completion for some time. Accordingly, the *Nadi-Lautoka Regional Water Supply Scheme: Final Master Plan Report* (PNG Pacific Consultants 1996) provides the most recent information on water supply system for the region.

The existing water supply network is as follows:

Figure 19 Overview of Water Supply System
Source: PNG Pacific Consultants 1996

Source	Treatment Plant	Destination of Treated Water	Area of Water Supply
Vaturu Dam located on Nadi River about 30 kms inland from Nadi	Water is treated at Nagado Water Treatment Plant and then is stored in the Nagado clear water reservoir	Water gravitates to Nadi reservoirs and to the Vuda and Saru reservoirs at Lautoka.	Nadi and Lautoka
Diversion weirs on Buabua, Nalau and Varaqe Creeks near Lautoka	Water is treated at Saru Water Treatment Plant and then is stored in the Saru clear water reservoir	Water from Nagado is mixed with the water in Saru. From Saru, water is also delivered to the Lautoka reservoirs at Vuda and Buabua.	Lautoka

In the past, problems with the water supply in the region have included water quality, low pressure and unreliability of supply. In 1995 the water consumption for Lautoka was approximately 19 mega litres per day. Lautoka and Nadi combined saw the consumption of approximately 46 mega litres per day with 13 mega litres (29 percent) unaccounted for. Unaccounted water is water that has been lost via leakage or from illegal tapping of the system.

The expected population increase within the Nadi-Lautoka corridor from 123,000 in 1996 to 204,000 in 2016 is expected to be accommodated by the existing water supply system without the need to access additional sources.

In 1996 resorts accounted for 6 percent of water consumption and were expected to account for around 15 percent of consumption by 2016. Accordingly, the Water Supply Master Plan prioritised upgrading the system to existing consumers and proposed tourist developments, including those at Vulani and Saweni. Lower priority was given to the expansion of new areas.

Several improvements to the 1996 water supply system were outlined within the water supply plan and in 2004 government funding was allocated for a water supply package in the Nadi-Lautoka area (MLGHSSE 2004, p.41). The information from residents and business operators gained from the PPE indicated that generally water supply was good although several residents experienced water cuts from time-to-time. Thus it can be surmised that many of the problems previously experienced with the water supply have been rectified since 1996.

Sewerage

Currently, within the study area all residents and businesses have septic tanks for sewerage collection. This appears to be a satisfactory situation for now. However, in the event of new large-scale subdivisions or tourist developments it is more appropriate to utilise communal septic systems. The Department of Water and Sewerage do not have any plans to connect the study area to mains sewerage in the foreseeable future with their schedule of works concentrating on urban and peri-urban areas only.

Rubbish Disposal

Currently within the study area all residents and businesses are responsible for disposing of their own rubbish as Rural Local Authorities do not provide rubbish collection. Disposal is by burning and burial. The PPE exercise indicated that most residents find this to be a satisfactory arrangement and in general residents do not wish to pay a levy for rubbish collection services.

In some instances it may be appropriate for larger developments or residential subdivisions to have rubbish removed by a private contractor. However, the method of rubbish disposal falls under the responsibility and direction of the Rural Local Authority and is therefore not considered within the scope of this Advisory Plan.

Airport

The study area lies within the Nadi Airport Control Zone (a 'Control Zone' is established at the convergence of air routes around an aerodrome). This means that the study area lies within the flight path for aircraft approaching Nadi from the west or north-west. At times aircraft will be required to descend lower than 1000 feet over the study area.

The 'Tivua Lane' flight path used by helicopters and sea planes at heights of up to 500 feet is also proximate to the study area.

A navigation beacon is located near Viseisei Village which is a critical instrument for guiding aircraft that is arriving and departing from Nadi Airport. Other telecommunication infrastructure (such as mobile phone base stations) can interfere with radio signals and electronic devices that communicate with aircraft. Recently, a mobile phone tower erected at Saweni had to be taken down for this very reason.

All tall structures proposed within the study area should be referred to the Civil Aviation Authority for Fiji Islands (CAAFI) for comment as they may require specific lighting or colouring to mitigate potential hazards for arriving and departing aircraft. The Noise Control Area for Nadi Airport (2006) does not extend into the study area and therefore noise impacts will not be experienced by residents.

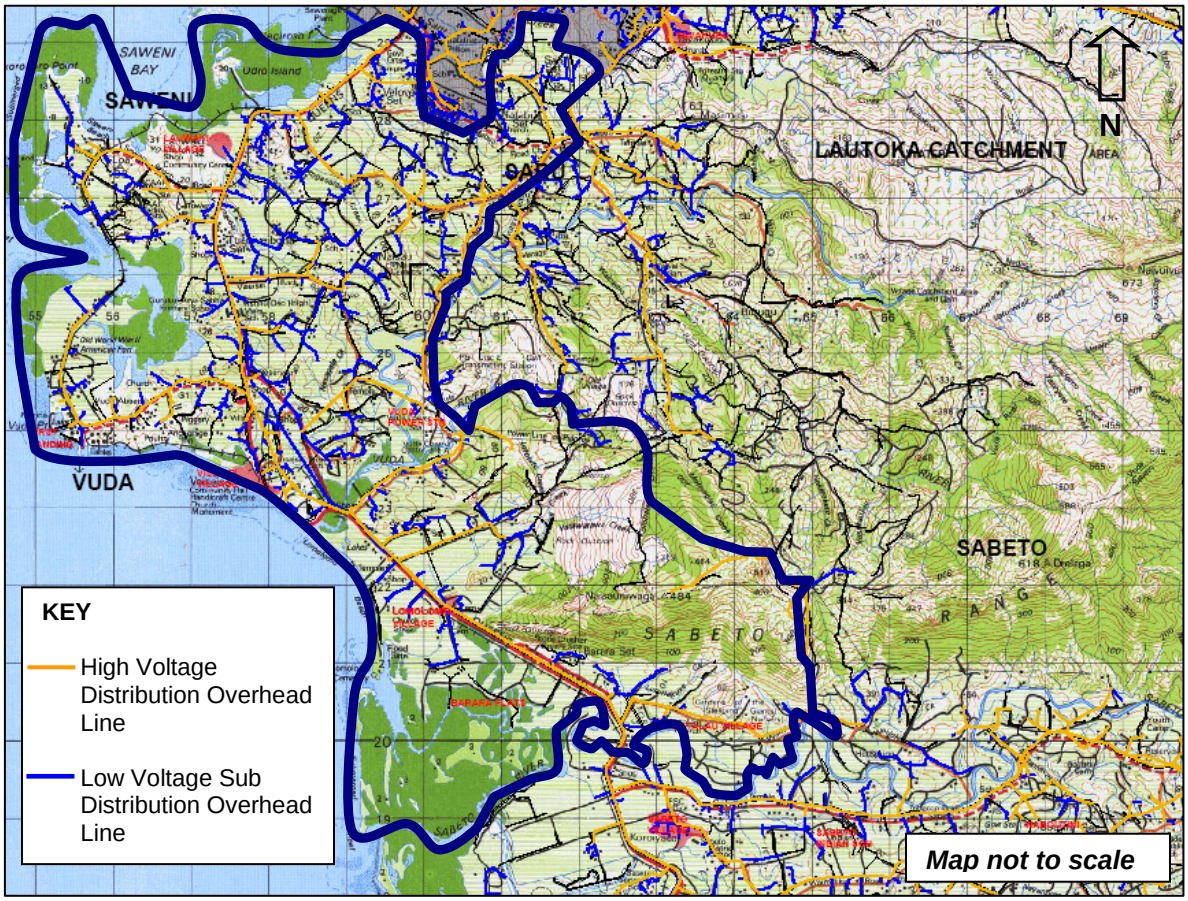
Electricity

The electrical network is managed by Fiji Electricity Authority (FEA) and they have advised that the network in the study area is well established with power generation provided by the Vuda Power Station. Currently there are no plans to extend the network in the area as it is able to accommodate growth in the short-term. However, *"any large commercial or industrial development…will require further strengthening of our sub-transmission and distribution network"* (FEA 2008).

Strengthening the network can be a lengthy process and as such FEA should be kept informed of plans for future urban expansion as well as any significant development proposals as they arise.

The below map delineates the FEA network. The orange 'High Voltage Distribution Overhead Lines' are 11000 volts. Once the lines pass through either a 'one phase' or 'three phase' transformer the voltage is converted to 240 or 415 volts respectively. These power lines are represented in blue as 'Low Voltage Sub-Distribution Overhead Lines'. Rural domestic consumers use the 'one phase' (240 volt) system whilst heavy consumers (e.g. large industrial or tourist developments) use the 'three phase' 415 volt system.

Figure 20 FEA Electricity Network Map
Source: FEA 2008



3.3 *Disaster Management*

Pacific Island countries are amongst the most vulnerable to extreme natural disasters such as cyclones and floods. With increased global temperatures and the likelihood for more extreme and variable weather conditions, Pacific Island states must develop risk management plans to mitigate the effects of natural disasters. Planning, in particular, can play a key role in risk management.

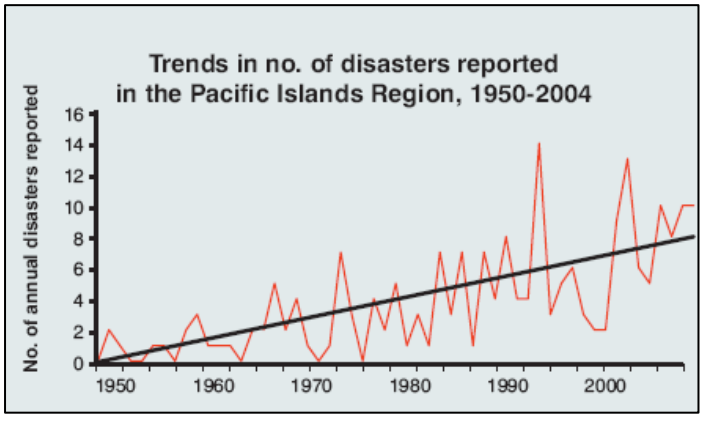
Figure 21 Estimated Economic and Social Impact of Disasters in Selected Pacific Island Countries 1950-2004
Source: Bettencourt et al 2006, p.2

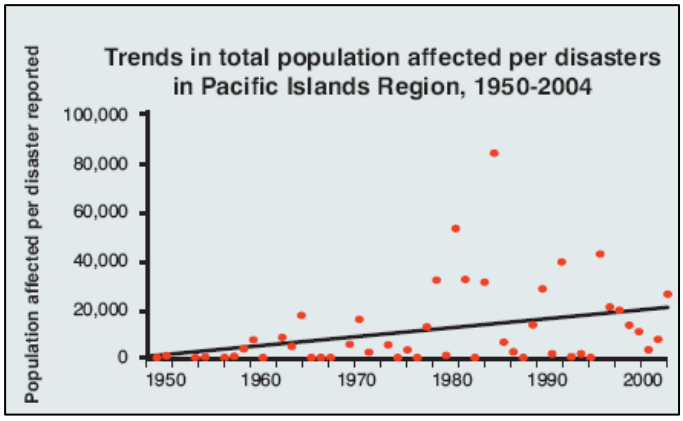
			Average population affected (%)		Average impact on GDP (%)	
Country	**No. of disasters reported**	**Total reported losses in 2004 ($USm)**	**In disaster years**	**In all years**	**In disaster years**	**In all years**
Fiji	38	$1,174.60	10.8%	5.1%	7.7%	2.7%
Samoa	12	$743.30	42.2%	6.1%	45.6%	6.6%
Vanuatu	37	$384.10	15.5%	4.5%	30.0%	4.4%
Tonga	16	$171.10	42.0%	5.3%	14.2%	1.8%
Guam	11	$3,056.30	3.7%	0.5%	N/A	N/A

The above table shows that Fiji experienced the highest number of disasters of the five selected Pacific Islands, but recorded one of the lower percentages for population affected and impact on GDP. This may be because disasters have generally not affected the major urban centres.

The Pacific as a whole has experienced an increase in the number of reported disasters and total population affected per disaster over the previous 54 years as demonstrated below:

Figure 22 Natural Disaster Trends in the Pacific 1950-2004
Source: Bettencourt et al 2006, p.2





Climate change is key factor in the number of natural disasters and it is estimated that in Fiji climate change could result in up to 100 percent increase in cyclone damage, 20-30 percent increase in the epidemic potential of dengue fever and 9-15 percent decline in the yield of major crops (World Bank cited in Bettencourt et al 2006, p.7). For example, flash floods that hit the Northern Division in July 2008 caused approximately $16,000 worth of damage to dalo crops in the area. Up to 90 percent of crops were damaged, many of which had been replanted after floods in January six months earlier (Silaitoga 2008).

Bettencourt et al (2006, p viii) notes the lessons learned from past experiences in dealing with natural disasters:

- *Efforts to prevent or minimize damage from natural hazards pay off in the long run.*
- *Risk management efforts have proven far more cost effective than waiting for the impact and then repairing the damage.*
- *Risk management is most cost effective when it is introduced early in the planning of key investments.*
- *Adopting 'no regrets' measures, such as planting mangroves to stabilize coastal land and climate-proofing key investments, can go a long way towards reducing* vulnerability.

The long-term benefits from implementing disaster mitigation measures are usually not experienced for many years and therefore governments will often prefer to concentrate on other more high profile matters such as health or education.

However, Fiji *has* recognised the importance of disaster mitigation measures and prepared a *Fiji National Disaster Management Plan* (Government of Fiji 1995). This plan states that tropical cyclones are the major cause of destruction in Fiji with flooding and landslides also an annual occurrence during the wet season. The plan recognises a number of factors which contribute to the vulnerability of populations. Several key factors are as follows:

- Settlements located in low lying coastal areas
- Settlements located on flood plains
- Diminished vegetation reducing absorption capabilities of land
- Settlements located on or at the base of steep slopes with soft soils

An assessment of hazard potential for the major urban areas of Viti Levu was conducted by Blong (1994). The findings regarding Lautoka and Nadi are most relevant as these two centres are proximate to the study area. An overview of key findings is provided in Figure 23:

Figure 23 Natural Hazard Assessment
Source: Blong 1994

Natural Hazard	What Causes Hazard	Areas Affected	Hazard Predictions/Estimates for Study Area
Tsunamis	Generated from distant or local earthquakes or submarine landslides	Coastal towns	For Lautoka and Nadi: 2 metre high tsunamis are possible for 1 in 50 year events on parts of the coast protected by a reef, and 5 metres high tsunamis where reefs offer no protection.
Storm Surges	Results from raised water level associated with reduced atmospheric pressure and wind pushing water onto the coast.	Coastal towns	For Lautoka and Nadi: 1 in 50 storm surge event at all coastal towns is 6-8 metres. (Heights may be mitigated by various factors).
Tropical Cyclones	Storm system characterised by low pressure and thunder storms that produce strong winds and flooding rain.	All areas in Fiji are likely to experience similar frequency and severity of tropical cyclones.	Estimated expected cyclone frequency in an average 50 year period: 38 for Nadi and 20 for Lautoka.
Landslides	Usually results from heavy rain associated with tropical cyclone. Will particularly occur on cut slopes. Can also be triggered by earthquakes.	Areas of steep or cut slopes.	Not possible to estimate magnitudes or frequencies.
Earthquakes	A tremor in the earth's surface usually triggered by the release of underground stress along a fault line.	Northern Vanua Levu and Yasawas second most active area in Fiji with earthquakes felt frequently in Nadi, Lautoka and Ba.	For Nadi, Lautoka, Ba and Labasa: average 1 in 50 year event of 6 MMI[1]
Floods *(riverine flooding – excludes flash flooding).*	Often produced from substantial rainfall associated with tropical cyclones (represents around 80% of recorded floods)	All urban areas	• Lautoka - The worst recorded flood 'Bebe' in 1972 (up to 2 to 4 feet deep) represents 1 in 50 year event. • Nadi – February 1993 flood represents 1 in 5-6 year event. (Note worst recorded flood event was 'Oscar' in 1983 - 12 foot deep at market).

[1] MMI = *Modified Mercalli Intensities* which rate the intensities of earthquakes on a scale of 1-12: 1 being 'not felt by many'; 6 being 'strong', felt by all with some damage; and 12 being 'catastrophic' with total damage.

The National Disaster Management office has advised that the primary issue within the study area is flooding. This was confirmed during the PPE where flooding was one of the most common issues cited by residents.

According to the National Disaster Management office, the most affected areas within the study area are the low-lying areas around the Sabeto River and the tributaries leading to the river. Additionally, Velovelo and Lauwaki Village are also identified as areas prone to flooding.

There is no specific flood data for the study area, however the information in Figure 23 is likely to be the most relevant and can be used as a rough guide to hazard predictions.

3.4 National Fire Authority

The National Fire Authority (NFA) provides fire fighting services to the study area from stations located at Lautoka and Nadi. The NFA (2006) *Annual Report* states that out of the 1802 emergency incidents throughout Fiji in 2006, 34 percent were attributed to bush, rubbish or cane fires (2006, p.10) Additionally, out of the monthly breakdown of 'major fires of 2006', ten of the months recorded 'major' fires in the Western Division. The majority of these fires were in relation to bush fires (2006, p.12). Accordingly, the study area can be considered a relatively high risk fire area due to it's:

- Rural nature and associated bushland
- High prevalence of sugar cane farms
- Absence of rubbish collection which increases the potential for fire, arising from inadequate storage or disposal of rubbish.

The NFA will respond to all emergency calls, however if there is not an available fire-hydrant the water carried on a fire truck will only be sufficient for approximately one minute's worth of output.

Subdivision applications are referred to NFA for comment by DTCP as part of the assessment process (although applicants are responsible for arranging and paying for the referral). There are no specific criteria to dictate which applications must be referred to NFA. However, generally subdivision schemes comprising of several allotments or more and subdivisions situated in areas not accessible by PWD water supply require NFA's comments. Applications for the creation of one or two allotments are generally not referred to NFA.

Development applications for the construction of buildings are not referred to NFA for comment as part of the development assessment process. Instead, this is done as part of OHS clearance which falls under the responsibility of the Department of Labour.

3.5 Mineral Extraction

Within the study area there are three mining tenements licenses which allow the holder to prospect for precious, metalliferous and earthly minerals. Within the subject area gold and silver are the key elements to be found.

Tenements SPL 1368 and SPL 1361 are held by Geopacific Ltd and SPL1457 is held by Fine Metals Ltd.

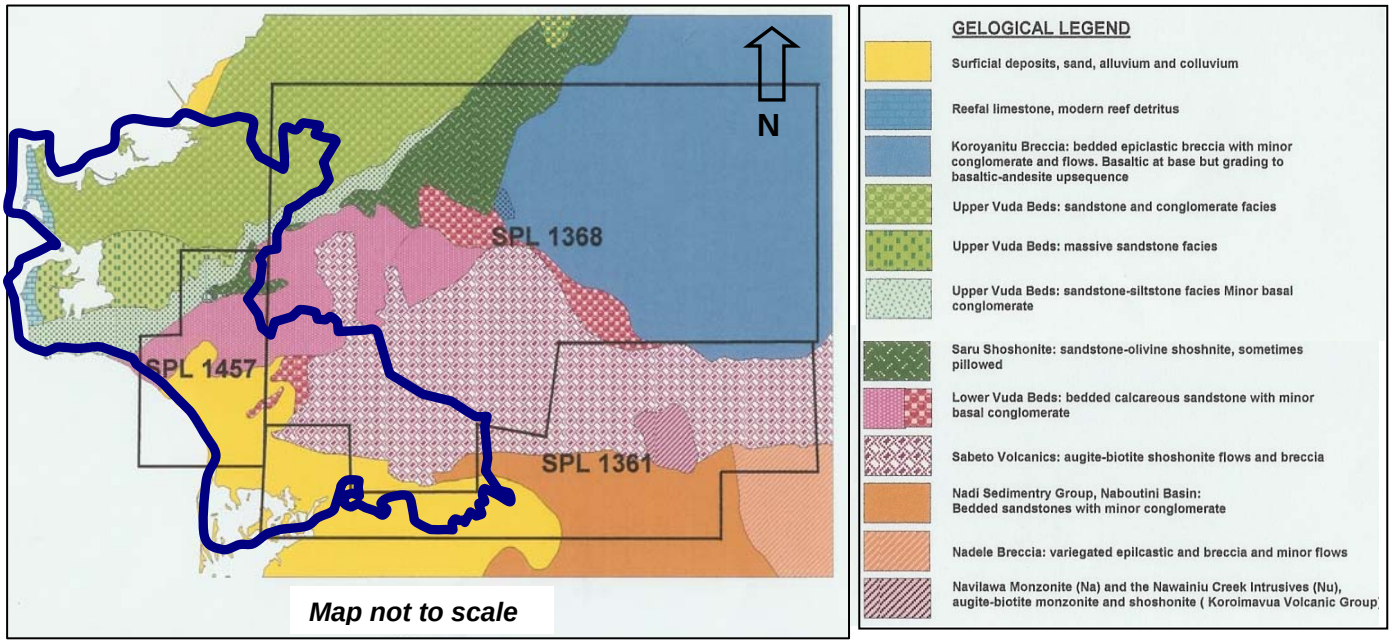
In addition to the above, there are several quarries within the study area:

- Lomolomo quarry — no longer operational
- Vuda quarry — operational
- Sabeto quarry — operational
- Emalu — operational
- Naicavui — under assessment

The Vuda quarry is the oldest operational quarry and requires expansion, hence the advent of Emalu and proposal of Naicavui quarry (all three are situated close together near the Vuda FEA Power Station).

Due to the nature of quarrying, which involves drilling and blasting and results in associated noise vibrations, it is important to ensure developments are well set back from these operations. The Mineral Resources Department recommends a 200 metre buffer from the edge of the lease boundary.

Figure 24 Tenements for Mineral Prospecting
Source: MRD 2008



3.6 Environment

Naikorokoro Point

The Ministry of Environment in conjunction with Dr Dick Watling of Environmental Consultants Fiji Ltd identified the land at Naikorokoro Point, Saweni, as being unsuitable for development due to its significance as a breeding ground for migratory birds. In a letter addressed to the Director of Lands and Survey the Principal Environmental Officer, Mr Davetanivalu (2007), details the reasons for refusing development at the site:

- The site is of national significance as a breeding ground for migratory birds and is internationally listed as a birding region on Viti Levu – one of very few left on Viti Levu.
- Fiji is a party to the international Convention on Biological Diversity and Ramsar Wetlands Convention[2].
- The Environment Management Act 2005 requires the identification and preservation of areas of national importance to Fiji.
- Protocols such as the SPREP Convention and Apia Convention of 1989 require Fiji to properly manage such important habitats[3].

In consideration of the above information, any future development proposals proximate to Naikorokoro Point will need to be carefully assessed as to the potential impact on the birds' breeding habitat. All proposals will require an EIA to be carried out as part of the assessment process.

Mangroves

Mangroves are an important resource for Fiji and perform the following functions:

- Protecting the coast from damage caused by storm surges and waves
- Providing a habitat for fish breeding
- Providing fuelwood for both domestic and commercial purposes
- Providing resources for traditional uses, e.g. medicines, dyes and building materials.

Threats to mangrove habitats include:

- Reclamation: in the past mangroves have undergone reclamation for the purpose of agriculture (mainly sugar cane) although their soils are

[2] The Ramsar Wetlands Convention in an international treaty that provides a framework for national action and international cooperation for the conservation of wetlands.
[3]The SPRRP Convention is concerned for the implementation of environment management procedures within the South Pacific. The Apia Convention is concerned with the conservation of ecosystems in the South Pacific.

generally of poor quality. Reclamation has also been for tourism and other urban purposes.

- Changed hydrology: Mangroves have come under threat from up-stream deforestation, which causes sediments to clog the rivers that in turn impact upon the water levels and hydrology of the mangrove areas.
- Pollution.

In 1986 Dr Dick Watling prepared a *Mangrove Management Plan for Fiji* which was a joint project of the Fiji Government and South Pacific Commission.

This study concluded that within the Nadi Bay Locale (which incorporates the study area) approved or developed mangrove reclamation totalled approximately 600 hectares or 15 percent of the original mangrove resource in the Locale. This represented three times the national average of mangrove reclamation.

The mangroves in the Nadi Bay Locale are generally less hardy that those found in the Suva-Navua Locale and are more exposed to cyclones which arrive from the north-west.

The Mangrove Management Plan for Fiji (Watling 1986) classified existing mangroves into different 'management zones' based on their value and best future uses. No mangroves within the Nadi Bay Locale warranted a 'National Reserve' status.

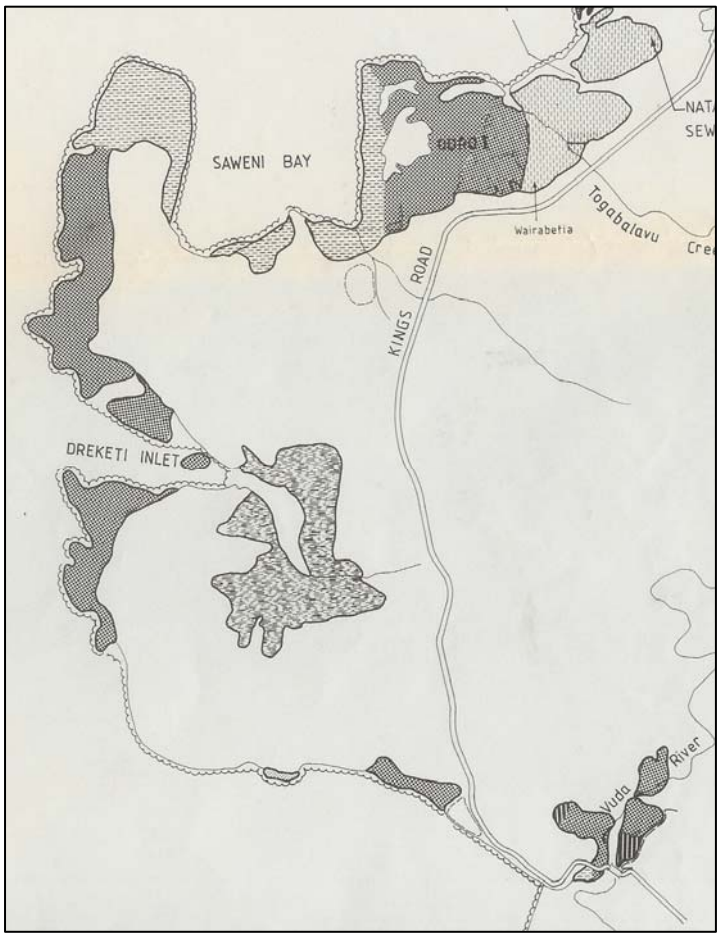
Figure 25 Mangrove Management Zones
Source: Watling 1986

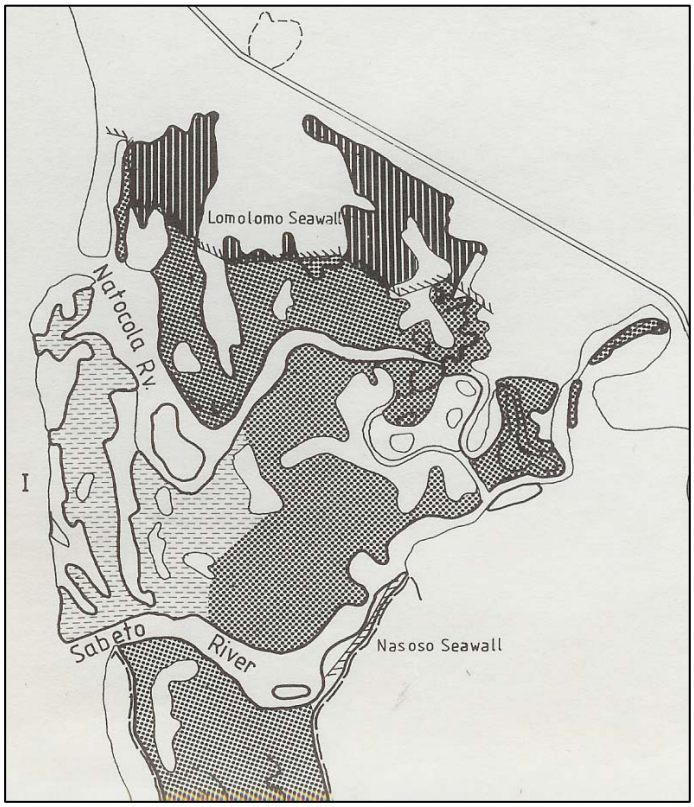
Area	Classification
Saweni (North)	Tourism
Saweni/Dreketi	Traditional (fishing, fuelwood, building materials, medicines etc)
Dreketi Inlet	Resource Reserve (subject to heavy firewood collection and requires protection)
Vulani	Tourism, Traditional Use, Agriculture

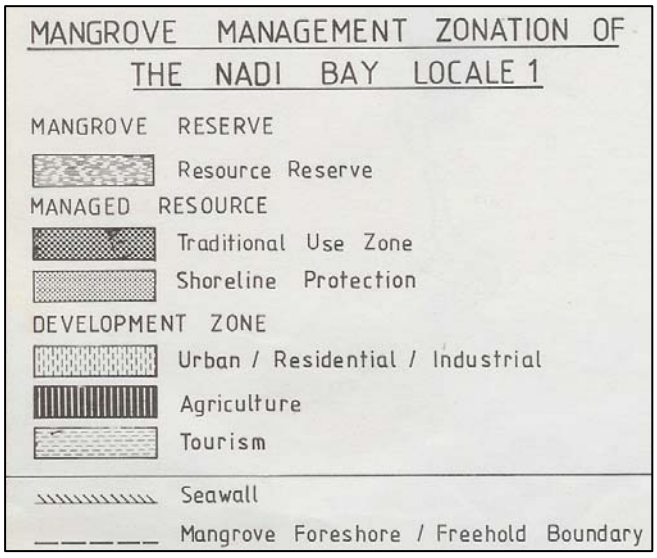
It is noted that Saweni (north) is classified as being appropriate for tourism use. However, in light of the findings regarding the importance of Naikorokoro Point as a migratory bird breeding ground, tourism development would not be appropriate in this area.

The Saweni/Dreketi and Dreketi Inlet areas require protection from development as areas identified for traditional uses and a resource reserve. Conversely, Vulani is deemed appropriate for several uses including agricultural production and tourism development.

Figure 26 Proposed Mangrove Management Zonation in the Nadi Bay Locale: Map Excerpts
Source: Watling 1986







***Above Left*: Vuda, Dreketi Inlet & Vuda**

***Above Right:* Sabeto Delta & Vulani**

***Right*: Key to Proposed Mangrove Zonation**

An OECD report, *Development and Climate Change in Fiji: Focus on Coastal Mangroves* (Agrawala et al 2003), estimates that it is not clear how much mangrove habitat has been lost on Viti Levu, but it could be as high as 30 percent.

The importance of mangroves in disaster mitigation should not be underestimated. In addition to sea rise, erratic and extreme climatic conditions are expected to be experienced in the future as a result of the El-Nino and La-Nina[4] meteorological effects.

Fiji has significant human settlements and natural ecosystems in coastal areas which are particularly vulnerable to climate change impacts. Many coastal settlements and tourist resorts have built sea walls to protect themselves from sea level rise and wave surges. However, these walls are now considered to have numerous detrimental impacts:

- The walls breach in storms and are required to be re-built
- The seawalls require on-going maintenance
- The construction of the walls results in the loss of the beach
- The coast around the sea walls are more susceptible to erosion
- Due to the loss of the beach, seawalls reduce the potential of an environment which is conducive to mangrove habitat

Thus, instead of building a physical barrier to the sea, protecting mangrove and wetland habitats so that they can act as a natural barrier is now considered the best practice strategy in dealing with sea level rise.

Agrawala et al (2003 p. 44) acknowledges that mangroves tend to lose out to the immediate benefits that development offers, but cautions:

> *The benefits from mangrove conservation tend to accrue either to small communities with not much voice in government, or else to future generations with no present voice. The benefits from mangrove destruction tend to accrue to developers, companies, or towns with more direct access to government and who can demonstrate more tangible and immediate rewards by reclaiming mangrove land.*

Accordingly, the protection of existing mangroves within the study area is important, especially for future generations and particularly if increased coastal densities are to be expected in the coming years.

[4] El-Nino and La Nina are temperature fluctuations in surface waters of the tropical Eastern Pacific Ocean and are associated with floods, droughts and other climatic disturbances. Although a natural phenomenon their intensity of frequency is thought to be effected by global warming.

Traditional Fishing Rights

Native Customary Fishing Rights or *qoliqoli* are an important part of traditional Fijian custom. Fishing provides income and food for many villages. Therefore, development that impacts upon the ability for Fijians to fish, or that may deplete the supply of fish, is not desirable.

There are two Native Fishing Groups that have rights over the waters adjacent to the coast of the study area. The main one that covers the northern portion of the study area coast down to the Natagoloa Creek is the 'Vanua of Vuda'. The waters from the Natagoloa Creek to the Sabeto River (and beyond) belong to 'Vanua of Sabeto'.

Long-term implications for fishing need to be considered for all development applications proximate to the coast. The long term consequences of a development need to be considered against the short term benefits such as monetary compensation or employment for local villagers. Whilst consultation with the *qoliqoli* will be carried out as part of an EIA, identification of potential impacts of a development (either direct or indirect) should be acknowledged and considered as part of the development assessment process.

Other Guidelines for Environmental Protection

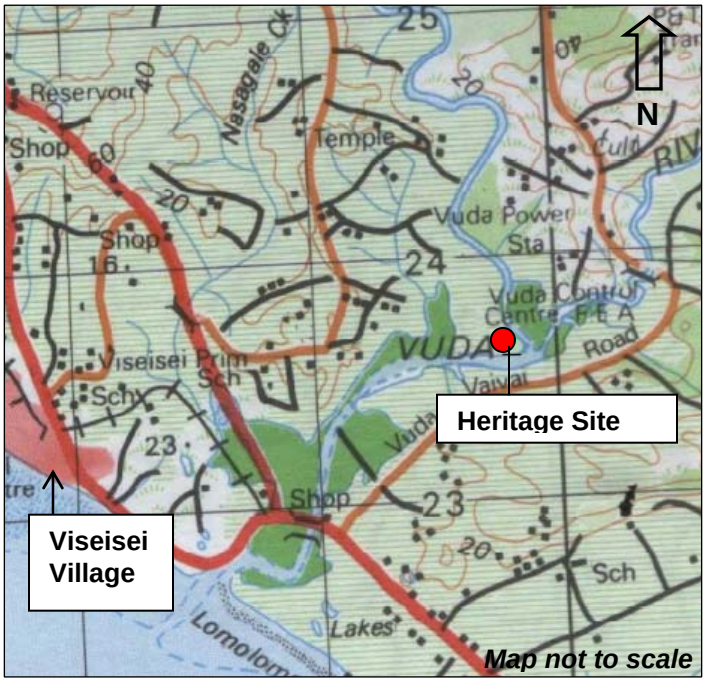
Schedule two of the Environmental Management Act 2005 lists all development types (25 in total) that must undergo an EIA assessment (refer to Appendix A for an excerpt of this list). This list is important for DTCP and other assessing authorities to be aware of so that referrals to the Department of Environment for an EIA are made where appropriate. Essentially, all proposals that *could* have an impact on natural resources or systems must undergo an EIA.

The *Fiji Tourism Development Plan 2007-2016* (Sustainable Tourism Development Consortium et al 2007) suggests a list of guidelines that prospective tourist developments should be assessed against to ensure that they are sustainable. These guidelines have been converted into policies in Section 5.4 of this document. The full list of guidelines are included at Appendix B for reference and should be considered by DTCP for incorporation into the General Provisions.

Sites of Importance

The Fiji Museum and National Trust of Fiji were contacted regarding potential sites of heritage value within the study area. No places were identified except for one archeological site discovered in December 1969, situated on the banks of the Vuda River and located north-east of Viseisei Village:

Figure 27 Archeological Site Map: Veiseisei
Source: Fiji Museum 2008

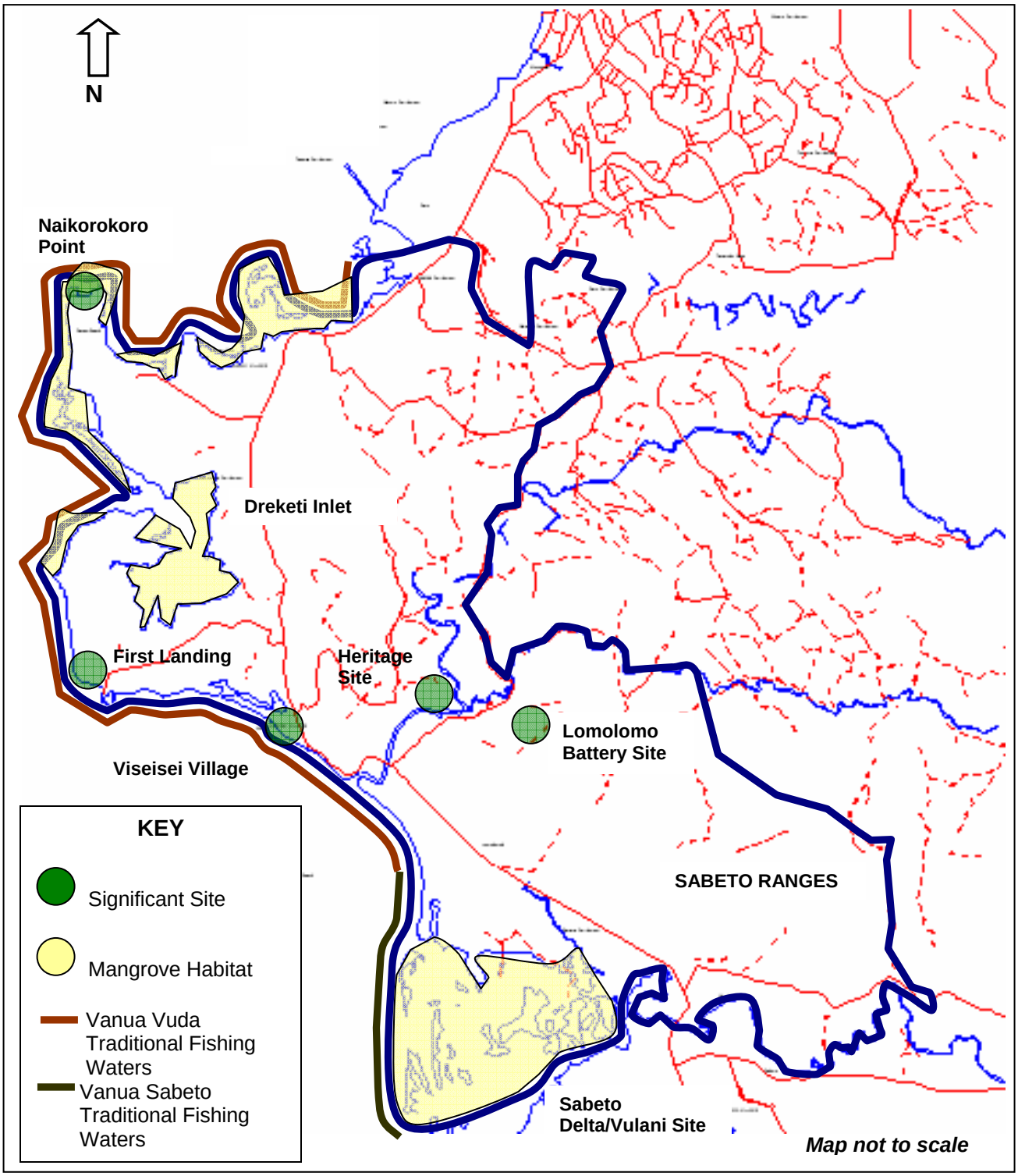


The heritage site is located on Native Reserve land where the Town Planning Act does not have any status. In Native Reserves traditional land owners are able to build without going through the planning approval process and as such, there is no scope to control development so that the site is not damaged. However, should the land be de-reserved or for future developments proximate to the heritage site (but outside of the Native Reserve), comments from the Fiji Museum should be sought regarding any potential impacts.

Notwithstanding this, there are several sites possessing national or regional significance within the study area (NLTB 2005, p.44). The following sites are note worthy due to their intangible values:

Site	Details	Type of Significance
• Tu'aleita (Sabeto Ranges)	Mountain ranges where ancestral Fijians follow to reach the Nakauvadra.	Cultural/Historical
• First Landing Resort	Claimed to be the landing site of the first Fijians.	Cultural/Historical
• Veiseisei Village	Claimed as the first village to be settled by the Fijian people.	Cultural/Historical
• Lomolomo Battery Site	The Lomolomo site was a key defence for Fiji during the Second World when much of the Pacific was under threat.	Historical

Figure 28 Places of Significance Map



3.7 Tourism

The tourism industry is a major driver of Fiji's economy representing 12.5 percent of GDP in 2005, providing 21,400 jobs and earning an estimated tax revenue of $140 million for the Government.

In 2006 Fiji received a total 545,168 visitors and accommodated 347 tourist properties with a total of 9,070 rooms. The Department of Tourism is aiming for an increase to 1.1 million visitors and 16,000 rooms by 2016.

The west of Viti Levu is increasingly becoming a focus for tourism development and in late 2006 development proposals collectively contemplated an additional 3,288 rooms at 25 properties (Dept of Tourism 2007, p.4).

Within the study area, Vuda Point and Saweni are identified as areas suitable for potential tourism development, with Vuda Point already accommodating a marina, Vuda lookout and the First Landing Resort. Saweni Bay is identified as a potential recreational hub for Lautoka and Nadi communities. The Vulani site located in the Sabeto River delta is recognised as having the potential to be a key tourism hub, similar to Port Denarau (Dept of Tourism 2004, p.84).

Notwithstanding the potential for intensified tourism development within the study area, the *Fiji Tourism Development Plan* also recognizes the importance of development being sustainable. Accordingly, a number of policies to protect natural assets (particularly marine and water based assets) are suggested as future assessment criteria (included at Appendix B).

Additionally, the *Fiji Tourism Development Plan* notes the potential for social upheaval with the introduction of larger resorts developments:

> *In remote areas larger resorts increase a drain on local resources and have the potential to increase social and ecological impacts. In particular larger resorts in remote areas, near smaller villages can create employment which attracts additional people to settle in villages and can create social upheaval. There is a fine line between creating local prosperity with employment (which is highly desirable) and causing undesirable social impacts* (2007, p.76).

As such, tourism development must be carefully planned and developed within the study area to prevent negative social and environmental impacts.

4.0 Public Participation Exercise

4.1 Survey Methodology

A Public Participation Exercise (PPE) was carried out between 22 and 24 July 2008. The PPE focused on the pockets of Crown and freehold land within the study area as NLTB had already conducted a comprehensive consultation exercise for Native Land as part of the preparation of the *Nadi-Lautoka Corridor Land Use Plan*. Additionally, limited time and resources prevented consultation across the entire study area. Accordingly, interviews were conducted in the following areas:

- Lauwaki Village (freehold)
- Saweni Beach area (Crown land)
- Vuda area (Crown land)
- Barara Settlement area (Crown land)
- Lomolomo area (Crown land)

Interviewees were randomly selected and a total of 107 surveys were completed: 95 residential plus two civic, one tourist, six commercial, two industrial and one service station. Based on an estimate of 4.63 persons per household (Fiji Islands Bureau of Statistics 2008a p.8), the surveys represent approximately 495 people, which equates to 3 percent of the study area's population.

The purpose of the surveys was to ascertain what sorts of problems residents and business operators were experiencing, what had attracted them to the area and what types of development were occurring within their localities. This information could then be used as part of determining what sorts of future development would be appropriate within the study area.

4.2 Survey Limitations

The information gathered is only indicative of general trends and issues experienced by residents within the PPE study area. The survey procedure was open to many variables which prevent the data being regarded as conclusive including:

- The interview sample is not statistically large enough to be representative of the PPE subject areas.
- Some communication difficulties were experienced due to different levels of English ability between the interviewers and interviewees.
- Some of the survey questions required subjective responses and some responses could also be subject to interpretation by the interviewer.

The 95 residential survey findings have been converted into statistics, whilst the non-residential surveys have not been converted due their small sample and range of land-uses.

4.3 Resident Survey Findings

Land and People

Out of the land that was surveyed approximately half was used for residential purposes and the other half for agricultural/rural.

The majority of the properties (44 percent) contained one dwelling whilst 25 percent contained two dwellings and 29 percent contained three or more dwellings. In most cases multiple dwellings on the property were accommodated by extended family.

The majority of people interviewed were leasing the property from the Department of Lands (or a relative was) but 14 percent were sub-leasing from the lessee. This is an informal arrangement as Department of Lands does not issue sub-leases and is therefore regarded as squatting.

One interviewee acknowledged that their application for a lease had not yet been approved by Department of Lands and therefore they were illegally squatting.

Individual household sizes generally consisted of an average of 4-6 people: 3-4 adults and 1-2 children.

Most people had lived on their land for over 10 years (71 percent of respondents) and at least 25 percent indicated that they had lived in that area for over 20 years. A lot of land had been held in the same family for several generations and had been subdivided over the years to accommodate family members. Many of the young women interviewed were newer to the area and had married into the landholding family.

However, some residents had moved to the area because they had to vacate previous housing due to land being reserved. The subject area was attractive as cheap rental prices could be obtained and the location provided good access to Lautoka and Nadi for employment and services.

Ninety-five percent of people indicated that they intended to stay in the area and the majority of people (98 percent) did not experience conflicts with surrounding land uses, almost all being residential or agricultural.

Agricultural Land

Out of 43 people who were farming 36 (or 84 percent) were farming sugar cane and 15 (35 percent) were growing vegetables. Most who were growing vegetables were doing so for subsistence reasons or in addition to sugar cane. Out of 13 people who stated they no longer were farming their land, eight explained that this was because they could earn more money in other employment.

Infrastructure

All people had access to mains water and were connected to electricity (bar one person). In general water supply was deemed to be satisfactory with 90 percent of people stating that it was 'good' or 'adequate' and electricity supply was cited as being 'good' by 92 percent of people. Similarly, sewerage disposal was deemed to be either 'good' or 'adequate' by 94 percent of respondents.

Nearly all respondents used 'EasyTel'[5] because the landline connections provided poor service or were not installed in their area. Notwithstanding this, 14 percent of people still found the EastyTel connection to be 'poor', particularly in Lomolomo and Saweni.

All respondents had mobile phone access. Only six people surveyed had internet access.

All households either burnt or buried their rubbish. Most were happy to do so with 85 percent citing that rubbish disposal was 'good' or 'adequate'. Several people indicated they would prefer road side collection if it was an option whilst others indicated they did not because of the rates they would have to pay.

Twenty-five percent of people indicated that their land experienced frequent or heavy flooding and poor drainage was cited by 38 percent of respondents as an issue.

Thirty-five percent of people reported that the roads required upgrading and maintenance, although most were satisfied with the access to their properties. Many people reported that they used either a private vehicle or bus for transport. The majority felt that the bus service was adequate.

Services

All respondents went into Lautoka for health services with 25 percent attending the Lautoka Hospital in particular. Twelve percent cited medical centres at Nadi, Namaka and Natabua as services that they also used.

[5] EasyTel is a wireless telephone system which operates similar to a mobile phone network.

Nearly all interviewees went to Lautoka for their weekly shopping. Twenty five percent of people also went into Nadi or Namaka and one elderly lady did hers at the Lauwaki Women's Cooperative.

The study area is well serviced in terms of schools, which includes Veiseisei Primary, Lomolomo Primary, Dreketi Sangam Primary, Vuda District Primary, Sabeto Sangam Primary and Gurukul Primary. High schools include Pundit Vishnu Deo High, Tilak High and Natabua High. Lautoka also provides numerous other school options such as Jasper William, Lautoka Central, Lautoka Methodist, Lautoka Muslim and Lautoka Chinese schools. Additionally the University of Fiji is located at Saweni.

The PPE subject area is accessible to a wide range of religious institutions with Hindu Temples located at Lomolomo, Vuda, Saweni, Dreketi and Lautoka; Mosques located at Vuda, Saweni and Lautoka and an array of Christian churches located mainly in Lautoka. Several people also stated that they would travel into Nadi to attend Mosque or Temple.

The PPE subject area was predominantly Hindu (75 percent) with seven percent being Muslim and nine percent being Christian. Six percent of respondents indicated that they did not partake in any religious worship.

Emergency Services

In terms of emergency services, nobody used ambulances as residents would travel to hospital by private means if required.

Only one gentleman in the Barara area reported that he was unfortunate enough to require the services of the NFA when his house caught alight. It burnt down as it took around 20-25 minutes for a fire truck to arrive, having to travel from either Nadi or Lautoka.

The police received a mixed response. Many people reported that the police did patrol their area and would come if called. However, some reported that it would take a long time for them to arrive which could possibly be due to a lack of police vehicles.

4.4 Non-Resident Survey Findings

A number of interviews were conducted with staff of non-residential land uses including civic, tourism, commercial and industrial.

Figure 29 Non-Residential Survey Respondents

Name	Location	Details	Years of Operation	Type of Land Use
Dreketi Sangam Primary School	Saweni Beach Road	Primary school with 53 students and 5 staff	58 years (established in 1940)	Civic
Lomolomo Police Post	Queens Road	Police station – 6 staff	9 years (established in 1999)	Civic (located on Agricultural Land)
Sera's Shopping Centre	Queens Road	Small grocery shop – family business	2 years	Commercial
Hotel Catering Equipment Supplies (Fiji) Ltd	Barara Settlement area – off of Queens Road	Import and distribute frozen foods – 17 staff	8 years	Commercial
Praveena's Mini Mart	Dreketi	Small grocery shop – family business	2-5 years	Commercial
Kishore Enterprises	Near Vuda Back Road junction	Groceries and hardware – family business	1 year	Commercial
Lauwaki Shopping Centre	Queens Road, Lauwaki	Small grocery shop – family business	2 years	Commercial
Mohin's Mart	Queen's Road, Lauwaki	Service station and shop – 6 staff	Less than 2 years	Special Use – Service Station
Balram's Motor Repairs	Queens Road & Vuda Back Road Junction	Motor repairs – family business	8 years	Industrial
Ravin's Motor Repairs	Saweni	Motor repairs – family business	2-5 years	Industrial
Orchid Inn Ltd	Saweni	Tourist accommodation – 14 staff	Yet to officially open	Special Use - Tourism
Not recorded	Saweni	Not recorded	Over 10 years	Not recorded

Some of the key points arising from these interviews are as follows:

- Business turnover was found to be 'fair' or 'good'.
- Employees were mostly from the local area.
- Security was generally found to be good, although one family-run business had experienced a traumatic robbery and were looking to relocate.
- Roads were generally found to be in need of repair and drainage/flooding issues were cited as a problem in several cases.
- The location of the PPE subject areas were generally thought to be ideal for commercial development due to the central location between key

urban centres of Nadi and Lautoka which accommodate the international airport and wharf respectively.

- The beachfront at Lomolomo was also acknowledged as an ideal place for commercial development.
- Saweni was acknowledged as an area that is expanding with commercial, industrial and tourism developments along the coastal areas.
- Locations in Saweni, off the main Queens Road, attracted local patrons whilst those on the highway attracted passer-bys in addition to locals. The Orchid Inn in Saweni cited the remoteness of their location as an attraction in itself.
- The head teacher of the Dreketi Sangam Primary School thought that there were too many schools in the area and that the proximity of the highway made it easy for residents to access schools further away. Additionally, for their school, inconvenient bus times made it difficult to attract non-locals.
- Cane crushing season could be both a positive and negative for businesses. One business experienced the blocking of an access point to his business by the cane train during crushing season. Another found that crushing season was one of their busiest times due the influx of people.
- It was thought that more residential development in the area would make businesses more viable due to the increase in population.

4.5 PPE Overview

Overall, people were positive about living and working in the PPE subject areas although several expressed that they were experiencing general hardship from the increasing cost of living.

Forty-three people (45 percent) of people were still farming, of which 38 percent were farming sugar cane, but evidently the character of the area is undergoing some change with more people living on smaller residential blocks and working in Lautoka.

The key issues that arose from the surveys were:

- *Roads* – namely their degraded state and lack of maintenance. Areas made accessible via good quality roads bring the increased potential for bus services, business opportunities and residential development.
- *Drainage and flooding* – obviously during hurricanes and very heavy periods of rainfall flooding will occur to some extent. However, this issue was raised numerous times and several people mentioned that un-maintained drains that had become blocked were the cause.
- *Poor telecommunications* – EasyTel was used by many residents in preference to land line phones, however some still found their connection poor. Good reliable telecommunication is a key to the development of an area providing both security and connection to the outside world.

5.0 Master Plan

The preparation of the Master Plan has taken into account existing land-uses, development trends and the development potential of the land. The Master Plan provides:

- Future land-uses for Crown and freehold land
- Development policies to attain desired outcomes
- Triggers for referrals to stakeholder agencies for comment.

5.1 Definitions

Zones used within this document are generally defined within the General Provisions. However, the 'Mixed' zone has been derived from the NLTB Master Plan in order to achieve in a consistent approach to planning in the region. Terms are explained below.

Agricultural Development

Agricultural development is defined within the General Provisions as *"the use of land for purposes as defined in the Local Government Act 1972 and includes agriculture, pisciculture and any building necessary to the pursuit of any such Agricultural Development"*. Within the NLTB Master Plan agricultural areas are defined as either 'Rural 1' or 'Rural 2' depending on the quality of the land. 'Rural 2' is of a lower quality and may be considered for future urban expansion if necessary. However, the Director for Town and Country Planning determined that both Rural 1 and Rural 2 zones should be protected for agricultural pursuits and accordingly this Advisory Plan does not differentiate between the types of agricultural land.

Residential Development

Residential development can essentially be defined as self contained, habitable accommodation. Areas designated for residential development within the Advisory Plan should adhere to the minimum site areas defined within the General Provisions for residential development in a rural area.

Civic Development

Civic development can be generally defined as development which performs a community service role and typically will be places such as schools, places of worship, community halls, recreation facilities or government building/grounds. A comprehensive list of civic developments can be found within the General Provisions.

Note that land for civic development is not designated within the Advisory Plan. However, civic development is a conditional development within commercial and residential zones, as per the General Provisions. Therefore, civic developments should be located within designated residential zones or mixed commercial/industrial zones and will be assessed on merit.

Special Use Development

'Special Use' development is development which is usually a specific land-use that does not fall within the zone categories detailed in the General Provisions. For example, tourist development typically falls under the 'special use' category with zones such as 'Special Use (Tourist Villas)' or 'Special Use (Integrated Resort Development)'. Areas for tourist development are designated within the Advisory Plan.

Commercial Development

Commercial development is generally the type of development that can be found in any main street precinct and includes offices, banks, post offices, shops, hairdressers and restaurants. Commercial development is appropriate within the 'Mixed Commercial/Industrial' areas of the Advisory Plan.

Mixed Use Development

The Director for Town and Country Planning declared that the 'Mixed Use' zone stated within the NLTB Master Plan should instead be a mixed Commercial/Industrial zone. Therefore, as part of this Advisory Plan, a 'Mixed Commercial/Industrial' zone is designated for several areas. However, this zone *does not* contemplate 'Heavy' or 'Noxious' forms of industrial development. This zone is intended to service the local residential population and provide local business and employment opportunities.

Industrial Development

Industrial development is divided into several categories within the General Provisions:

- 'Light Industrial A' and 'Light Industrial B' are fairly inoffensive developments that create little impact on neighbouring properties and include industries such as locksmiths, watchmakers and printers.
- 'Heavy Industrial Development' and 'Noxious Industrial Development' are both developments that will create a significant impact on their surrounds via noise, vibrations, fumes, dust, glare or smoke or other undesirable emissions or waste products.
- General Industrial Development encompasses all industries excluding 'Heavy' or 'Noxious' and is described within the General Provisions as

"development for bulk-storage, sale of new and used motor vehicles, laundries, bakeries, [and] warehouses…"

As previously stated areas within the Advisory Plan which contemplate industrial development (i.e. the Mixed Commercial/Industrial zones) are only appropriate for Light and General industries.

Minimum Development Specifications:

The following minimum allotment sizes are as per the minimum allotment sizes for rural areas stated in the General Provisions (Section 49, Schedule F). Additional specifications regarding frontages and plot ratios have been included for some developments, to provide clearer guidance:

Figure 30 Minimum Development Specifications

Zone	Minimum Allotment Size	Minimum Allotment Frontage	Minimum Plot Ratio/Density
Residential	1000 m^2	20 m	0.2:1
Boarding House/Multi Unit Residential	2000 m^2	25 m	0.2:1
Commercial	1000 m^2	20 m	0.3:1
Industrial	2000 m^2	25 m	0.5:1
Tourism (hotel or resort complex)	1.2 hectare	On merit	Refer to Schedule C (1) 'Type B Development'
Agricultural	1.2 hectares	50 metres	-
Civic	On merits		

5.2 Future Land Use

This section addresses future land uses for Crown and freehold land within the subject area. As previously mentioned, the NLTB Master Plan has already allocated land-uses for Native Land within the whole Nadi-Lautoka Corridor region.

Lauwaki

Lauwaki is the only freehold land within the subject area. It currently accommodates a service station and a shop fronting onto Queens Road. Vacant land and residential development make up the remainder of the relatively small land holding. The Lauwaki Village itself is located to the rear of the subject land. On the opposite side of the road a supermarket has received approval in principle and another allotment has received subdivision approval for the purpose of a car rental yard. A residential area exists to the north/east the site, adjacent to Queens Road. Other scattered pockets of residential development are located to the south.

Figure 31 Lauwaki: Existing Pattern of Land-Use Map

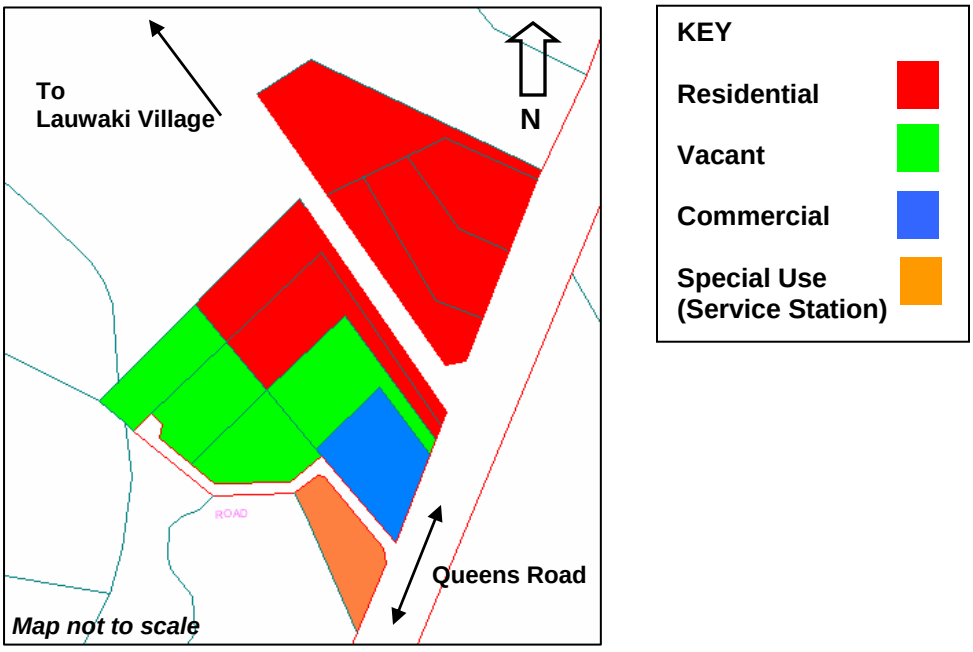


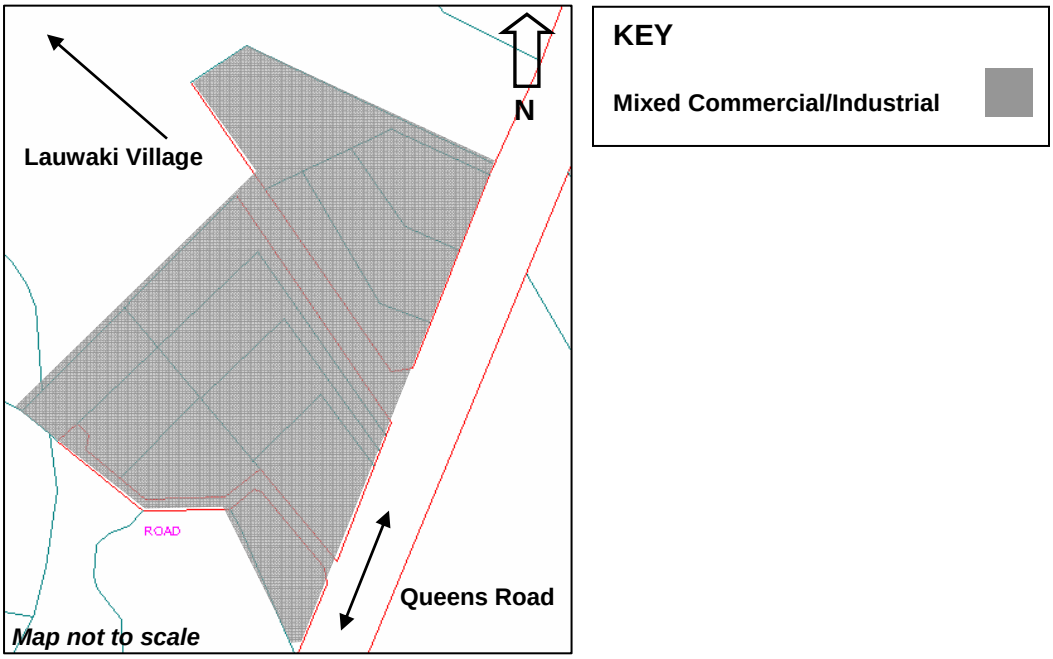
Figure 32 Lauwaki: North View

Figure 33 Lauwaki: Aerial Perspective
Source: Google Earth

NLTB designates the Lauwaki area for 'Mixed Use Development', which is defined as *"central areas in which, commercial, general, industrial and administrative activities take place"* (2005 p.57). Accordingly, the subject freehold land should also be designed for this use. However, as there is no recognised 'Mixed Use' zone within the Town Planning Act, a 'Mixed Commercial/Industrial' zone has been implemented.

Note that 'industrial' uses should be confined to those defined within the General Provisions as 'general' industries:

Figure 34 Lauwaki: Future Land-Use Map



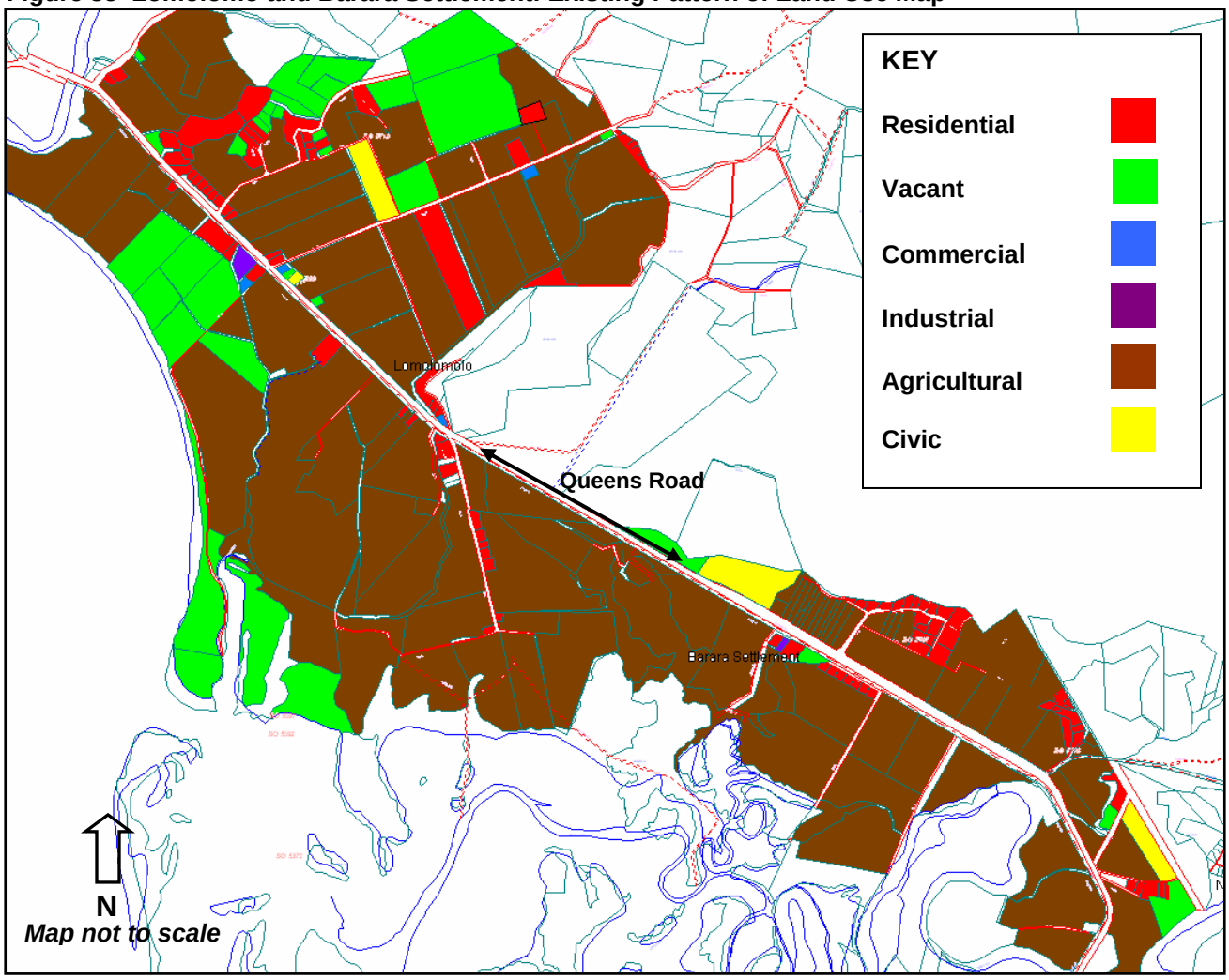
Lomolomo and Barara Settlement

This Crown land holding is approximately 1200 acres in area and is primarily agricultural in nature. On both the eastern and western sides of Queens Road there are several scattered non-agricultural uses, such as residential, civic and commercial developments. Additionally, small pockets of residential development are located throughout the subject area.

As part of the NLTB Master Plan, most of the adjacent native land is either designated as 'Rural', 'Native Reserve' or part of a 'Sensitive Zone', which encompasses part of the Sabeto Ranges and is intended to *"protect very steep slopes and rock outcrop of regional and national importance"* (NLTB 2005 p.58). Note that as there is no 'Sensitive Zone' defined within the General Provisions the Director for Town and Country Planning has stated that the zone should instead be a 'Rural (Sensitive Zone)'.

The Land Capability Map (Figure 16) designates the majority of land abutting Queens Road as good arable land that should be protected for agricultural use. This is further supported by the high level of agricultural activity that already exists in the area.

Figure 35 Lomolomo and Barara Settlement: Existing Pattern of Land Use Map



The Lomolomo/Barara subject land is experiencing the development of small pockets of residential allotments. Such ad-hoc development is undesirable as it is an inefficient use of land as well as a contributing factor to the fragmentation of agricultural land. As such, the two main areas already experiencing residential development are allocated for future residential growth.

A commercial/industrial hub is deemed appropriate in view of the area's existing and future residential development, potential tourism development, flat topography and strategic location between two major urban centres. A site on

the eastern side of Queens Road is preferred as the cane train tracks are located on the west side and could potentially cause traffic congestion during cane cutting season.

The most appropriate location for such as site is towards the northern end, where there already exists industrial, commercial and civic development and therefore is already an existing 'slow' point for traffic. Additionally, the land designated for the commercial/industrial development is accessible via existing access roads and does not requiring further junctions off of Queens Road to be created.

The site of the prospective Vulani Resort has been designated for tourism development in accordance with its existing zoning. Notwithstanding this, given the sensitive nature of the location (mangrove habitat), such a development should seek to minimise disturbance to the delta ecosystem. If the Vulani development does eventuate, it may be necessary to expand residential and 'mixed' use areas in the region to meet the demands of a likely increase in population. However, this scenario would not be expected to occur for some time.

The Lomolomo Beach area has tourist development potential, which is reflected by the rezoning of the area to 'tourism' several years ago – although no development has since occurred. Notwithstanding this, Lomolomo Beach combined with the Vulani site promises to create a significant tourist hub in the area which will provide employment and economic benefits to the region.

Figure 36 Lomolomo/Barara Settlement: South View

Figure 37 Lomolomo and Barara Settlement: Aerial Perspective

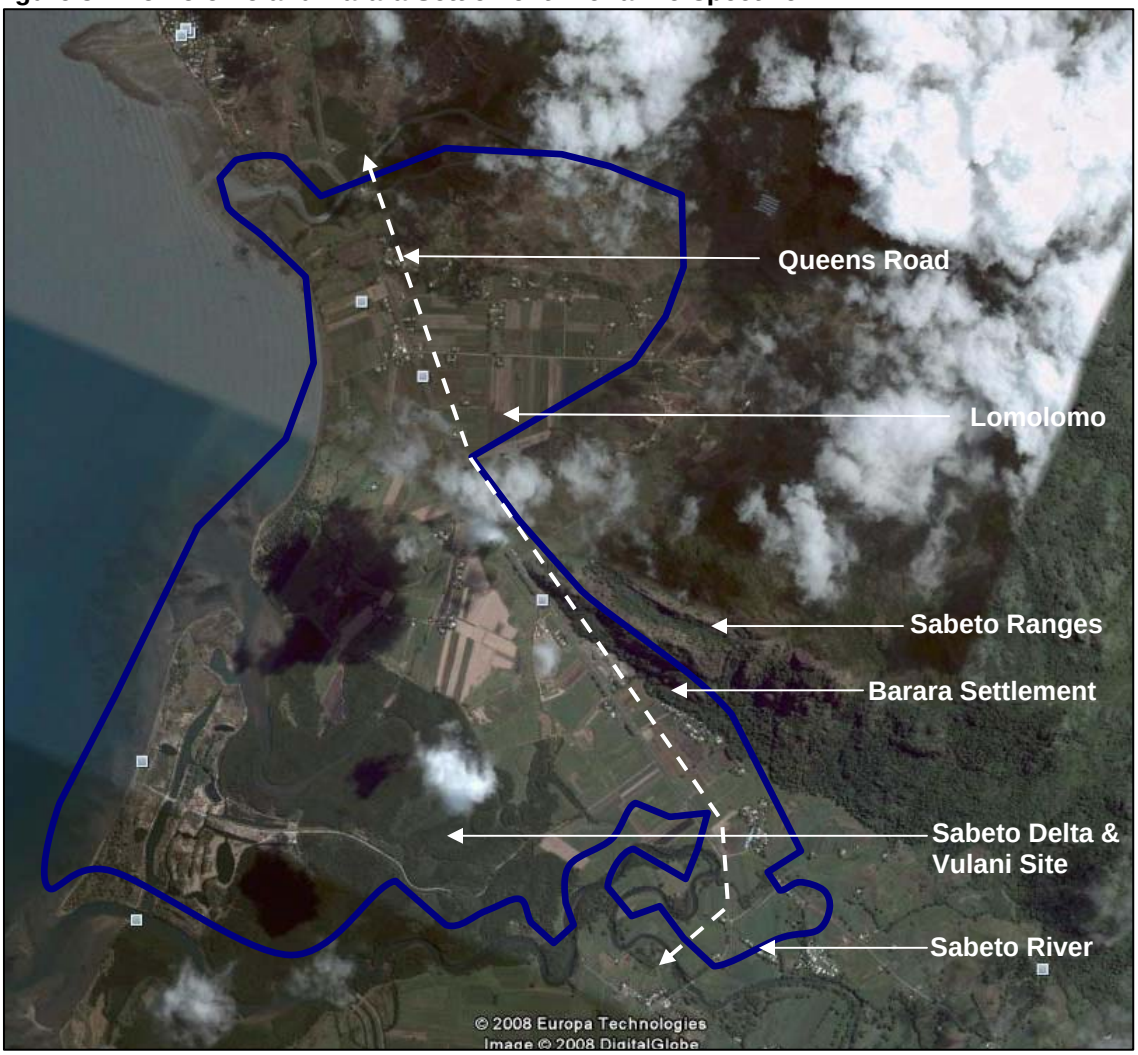
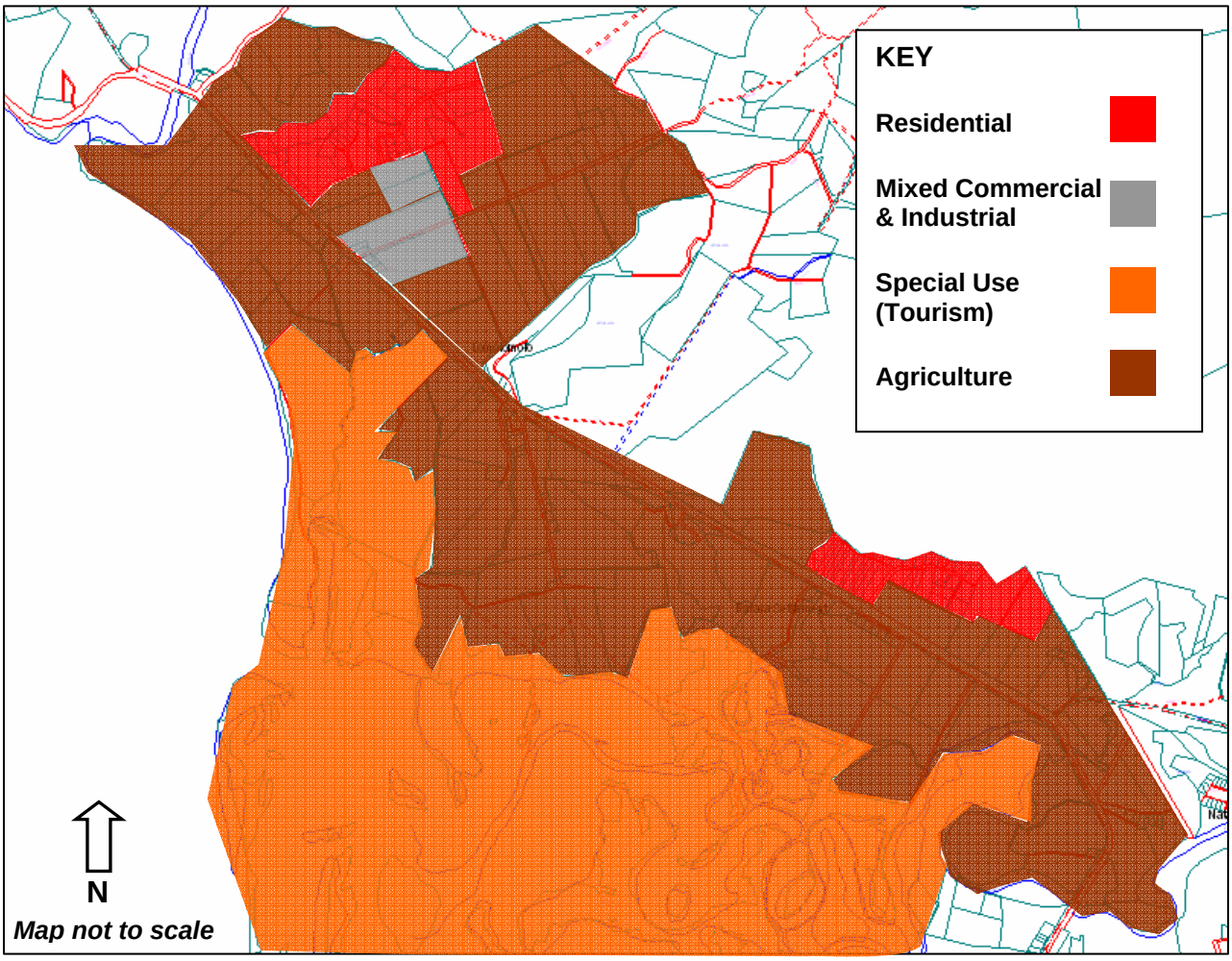


Figure 38 Dwellings at Foot of the Sabeto Ranges

Figure 39 Lomolomo and Barara Settlement: Future Land-Use Map



Saweni.

The Saweni area is characterised by a combination of farmed and vacant agricultural allotments. There are two emerging residential areas to the north and south, with the south being the more significant of the two. Land to the south-west is undergoing earth works at the time of writing to accommodate a hotel and residential development. The 'Orchid Inn', a new hotel development, is located to the north-east of the site and close to Saweni Beach which is an attraction for locals and tourists alike. NLTB has also designated the native land immediately to the east of the Saweni Crown site for tourism development.

The aerial perspective (Figure 41) clearly shows the mangrove habitat fringing the coast to the north and west. As previously discussed in Section 3.6, these mangrove areas require protection from future development.

Figure 40 Saweni: Existing Pattern of Land-Use

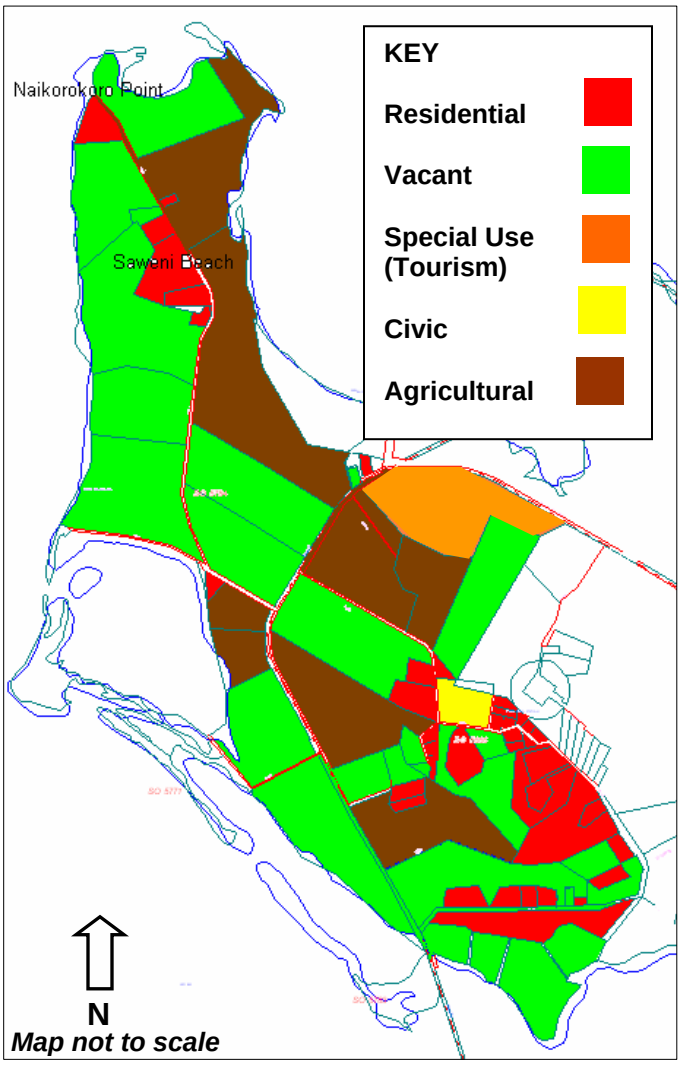


Figure 41 Saweni: Aerial Perspective
Source: Google Earth

Notwithstanding this, Saweni's tourism potential is recognised within the *Fiji Tourism Development Plan 2007-2016* (2007, p.84). Accordingly, the south-western allotments are designated for future tourism use, being unsuitable for agricultural cultivation and the Orchid Inn site is designated for tourism development to reflect its current use and its proximity to Saweni Beach.

Residential development in the area is expected to increase as fewer families choose to farm the land, which is a trend reflected by the existing number of vacant agricultural allotments. Additionally, Saweni's close proximity to Lauwaki, which is designed by NLTB as a 'mixed use' urban hub, will also be a trigger for further residential growth. In view of this, a residential area in the south has been identified to build upon what already exists.

The subject land is flat and low-lying, making it more susceptible to sea-rise and other natural disasters. Drainage/flooding problems were also cited by numerous residents interviewed as part of the PPE. As such, less intensive land-uses are appropriate for much of the area, particularly for land immediately adjacent to the coast. Accordingly, agricultural use has been applied to the northern portion of the subject site where arable land of a reasonable quality (Class III) exists.

Figure 42 Saweni: Future Pattern of Land-Use Map

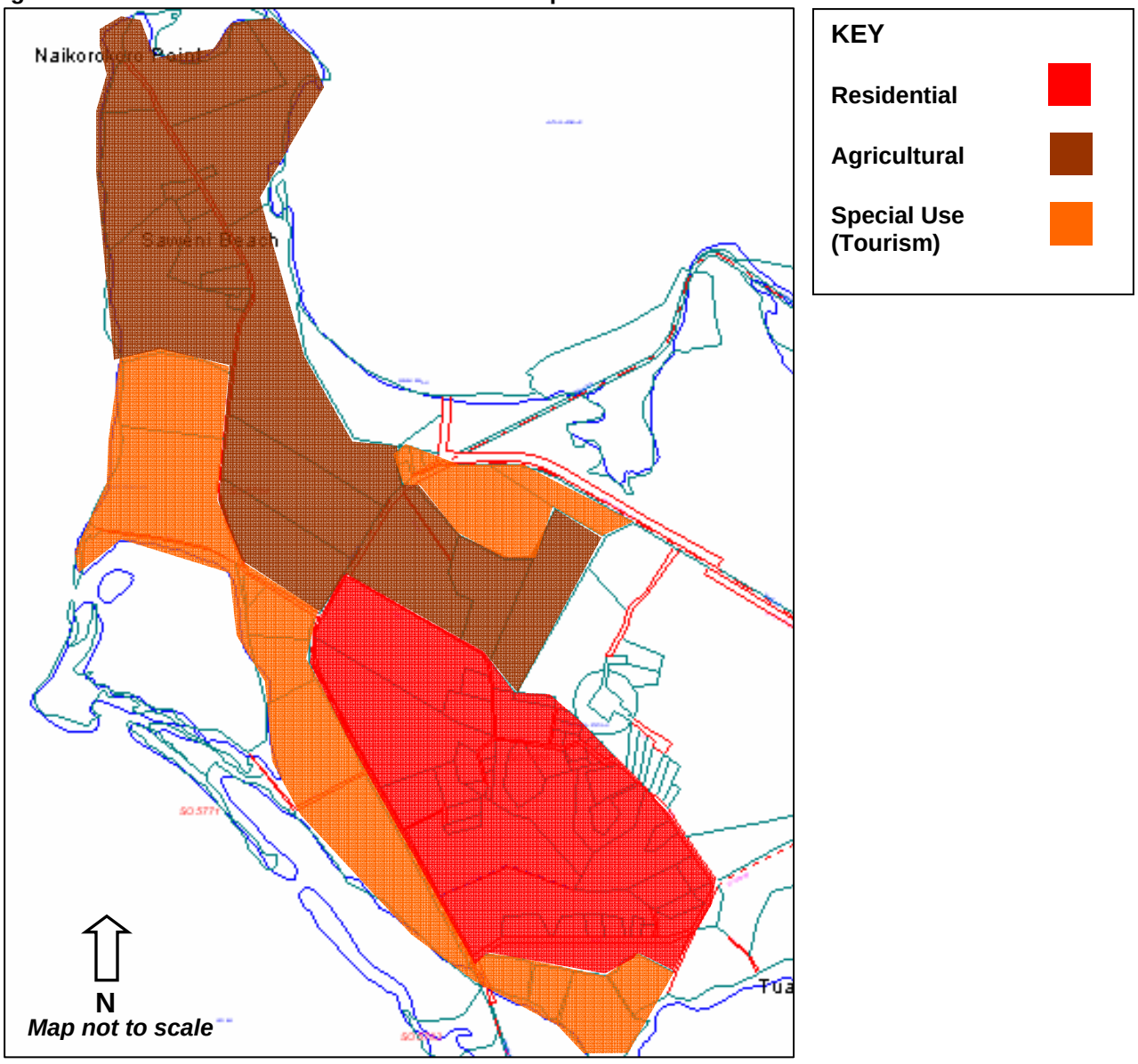


Figure 43 Saweni: South-West View

Vuda

Vuda is located to the south of Saweni with the Dreketi Inlet separating the two peninsulas. The land, like Saweni, is flat, low-lying and fringed with mangroves. As the aerial perspective (Figure 43) shows, most of the land is agricultural with dwellings located close to the road.

The existing land-use map (Figure 44) reveals a roughly equal mix of farmed and vacant allotments.

According to the Land Capability Map (Figure 16), the majority of the Vuda Crown Land consists of arable land with some poorer quality Class IV arable land to the south-east, although this is currently being farmed. The NLTB Master Plan has designated the land immediately to the south of the Vuda Crown subject land for tourism development.

Figure 44 Vuda: Aerial Perspective
Source: Google Earth

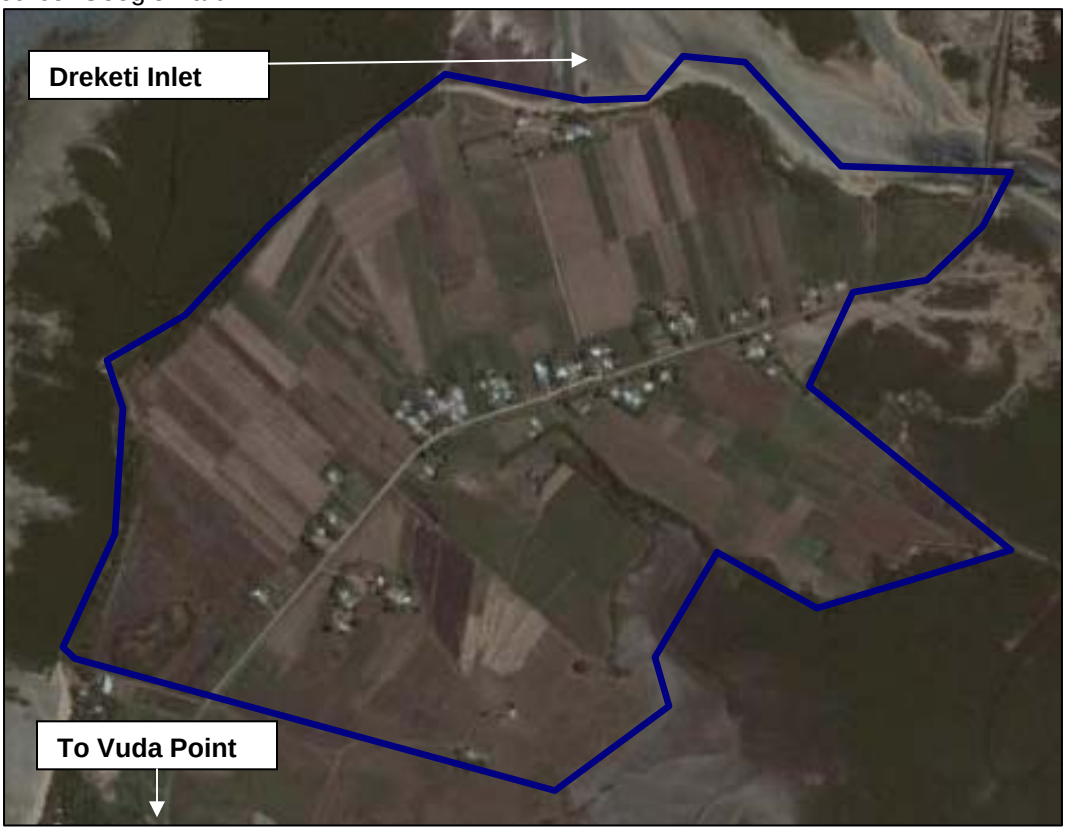
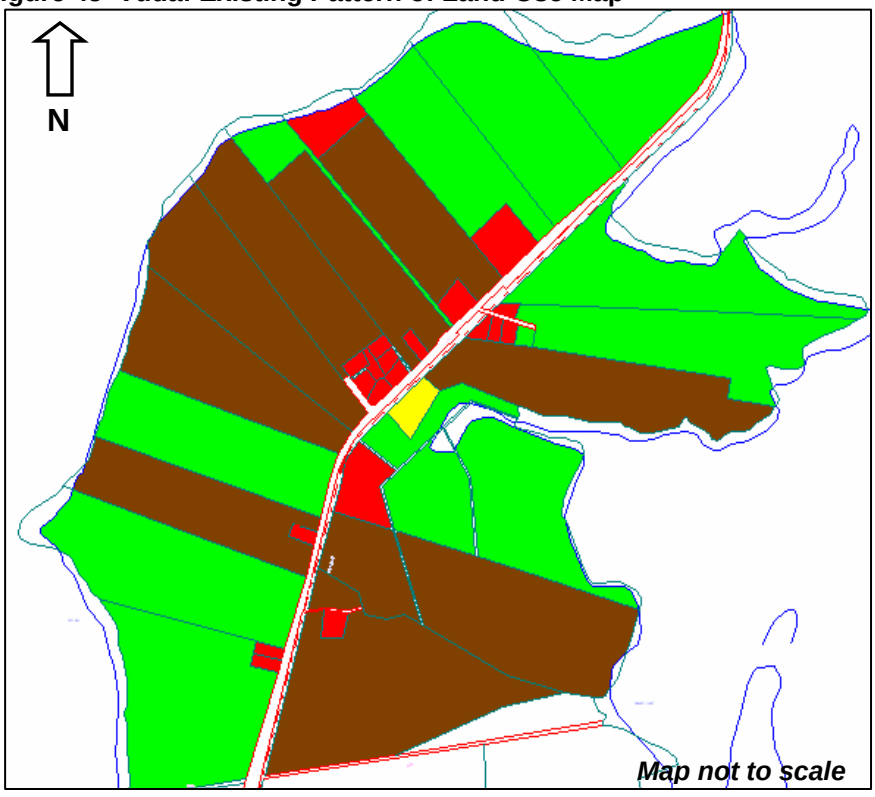
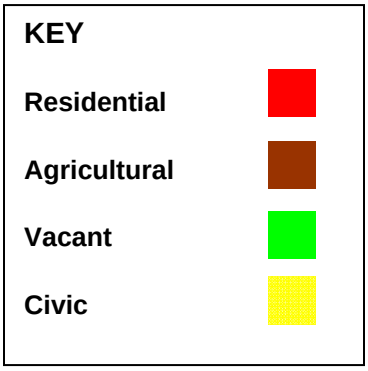


Figure 45 Vuda: Existing Pattern of Land-Use Map





As with Saweni, many residents reported poor drainage or flooding as a problem. In consideration of the low-lying nature of the land and areas already earmarked for tourism development at both Saweni and Vuda, it is considered appropriate that most of the Vuda Crown land be left for agricultural cultivation.

It is important to preserve land for primary production because although sugar cane production is declining, agriculture is still a key industry in Fiji. Accordingly, agricultural land must be protected to ensure its long-term viability, particularly in the anticipation that other agricultural industries will take off in the future and/or that the sugar industry will recover.

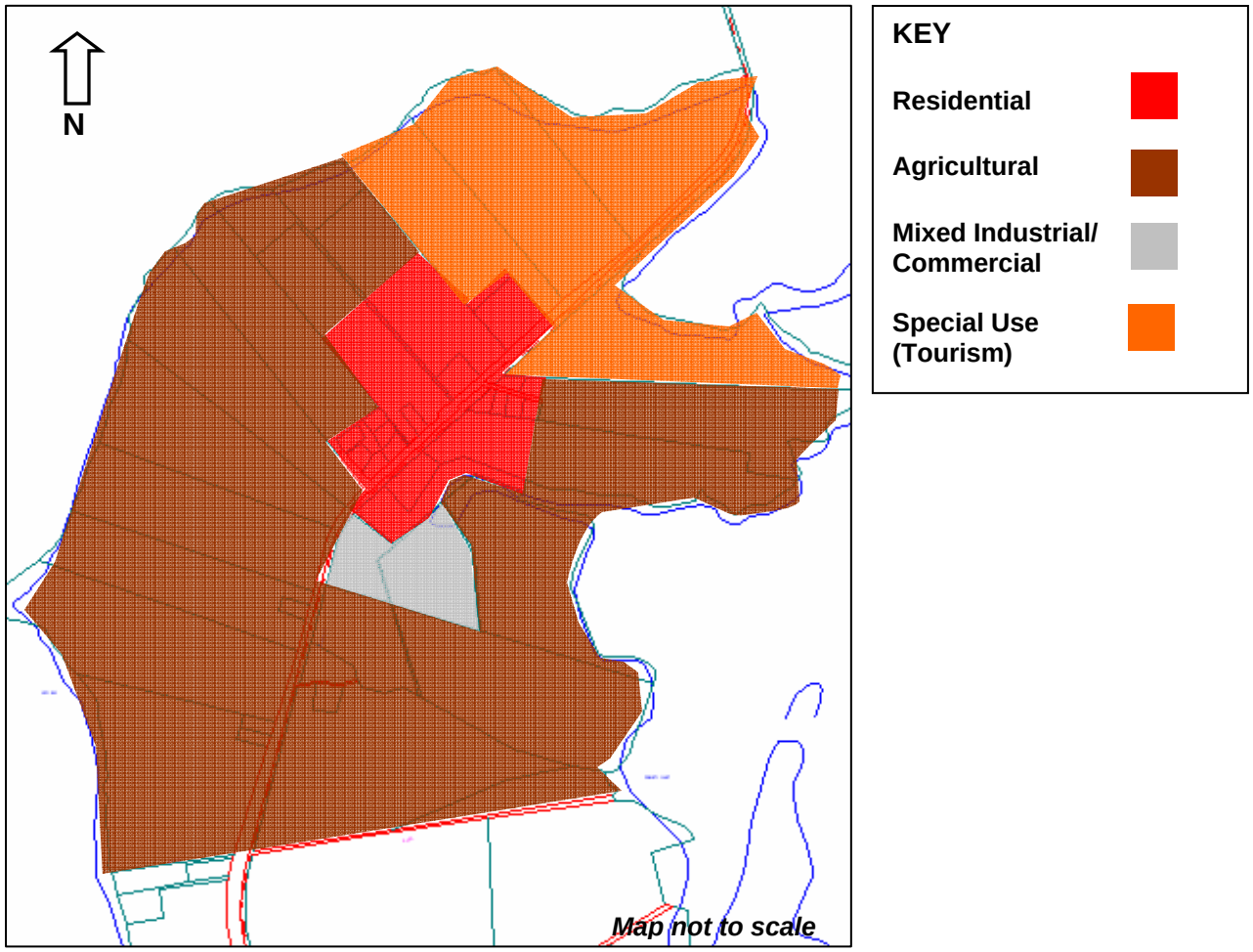
Notwithstanding this, it is also reasonable to expect that there will be a future demand for smaller residential allotments as fewer families continue to farm sugar cane and if the anticipated tourism expansion occurs in the region. For this reason, a central area is designated for residential and mixed commercial/industrial development. This will allow for greater accessibility to services by residents and create a small 'hub' within the area.

Two large allotments to the north of the Vuda site (at Saweni) have been recently rezoned for tourism purposes. In response to this, the vacant northern allotments at Vuda are also allocated for tourism purposes so that this area can, together with the tourism development underway at Saweni, form a central tourism precinct in the Vuda/Saweni locality.

Watling (1986) designed the mangrove area along the Vuda western coast for 'traditional' uses and the mangroves to the north which forms part of the Dreketi Inlet, as a 'Resource Reserve'. These areas are therefore not suitable for development and should be protected.

Figure 46 Vuda: Mixture of Cultivated and Vacant Land

Figure 47 Future Land-Use Map



5.3 Policies

The following policies are applicable to the entire Vuda and Sabeto Study Area and must be read in conjunction with the General Provisions of the Town Planning Act 1999; they are a supplement, not substitute, to the General Provisions.

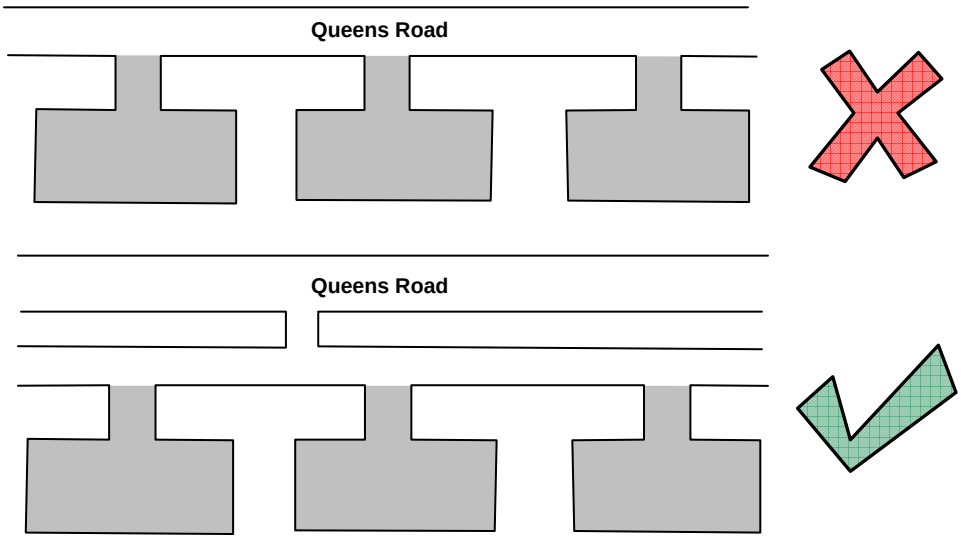
Roads

Desired Outcome

Increased safety for motorists by reducing access points along Queens Road and reducing ribbon development.

Policies

1. The creation of allotments which have vehicular access directly onto Queens Road should be avoided.
2. Vehicles entering or exiting a driveway must be visible to approaching motorists and pedestrians.
3. Access points must have a good line-of-site so that motorists entering or exiting a property can see approaching vehicles or pedestrians.
4. Developments which generate high traffic volumes should not have direct access onto Queens Road or be situated close to intersections on Queens Road.
5. Allotments with direct access onto Queens Road must provide access that allows vehicles to enter and exit the property in a forward motion.
6. Development should not result in on-street queuing of traffic, particularly on Queens Road.
7. Roads must be well maintained in order to provide safe and convenient access for private vehicles, public transport and emergency vehicles.



Environment

Desired Outcomes

- Protection of mangrove habitats.
- Protection of the breeding grounds of migratory birds at Naikorokoro Point.
- Protection of natural marine and river systems.

Policies

1. Development at Naikorokoro Point, and development proximate to Naikorokoro Point which may have a negative affect on the breeding habitat of migratory birds, should not occur.
2. Development which may result in the depletion of fish stocks or inhibit the traditional owners from engaging in fishing activities should not occur.
3. The removal of mangrove habitats at Saweni, Dreketi Inlet and Vuda should not occur.
4. Removal of mangroves at Vulani should be minimised and development of the area should not result in a detrimental impact to the delta eco-system.
5. New developments should integrate with the natural environment and avoid significant disturbance to existing eco-systems such as mangrove habitats or natural water systems.
6. The construction of sea walls as a way of managing coastal systems or as a tool for disaster risk management should be avoided.

Disaster Management

Desired Outcome

Reduction of the human and economical cost of natural disasters.

Policies

1. Development in the flood prone areas of the Sabeto River and its tributaries should be avoided.
2. High-density development should be avoided in low-lying areas, such as Vuda and Saweni as they are more susceptible to natural disasters such as flooding.
3. Floor levels of habitable rooms should be of a sufficient height above Mean Sea Level to prevent inundation during 1 in 50 year flood event in the following flood prone areas:
    i. Low-lying areas of Vuda, Saweni and Vulani
    ii. Localities of Velovelo and Lauwaki Village
    iii. Sabeto River and its tributaries

4. Development should not be located at the base of sloping land that is susceptible to landslides.
5. Development that requires cutting into slopes should be avoided to minimise the occurrence of landslides.
6. Mangrove habitats should be retained as way of providing natural protection to the coast.

Drainage

Desired Outcome

Appropriate disposal of stormwater which does not negatively impact on surrounding lands or natural water systems.

Policy:

1. Development should implement appropriate stormwater drainage systems using the following methods:
    i. Minimising the amount of stormwater run-off through the retention of onsite vegetation.
    ii. Implementing drainage for new development which is suitable for the topography of the subject site.
    iii. Discharging storm water so that is does not have a negative impact on adjacent properties.
    iv. Providing for on-site capture, detention and re-use of rain-water.
    v. Maintaining drainage systems to prevent blockages or leakages which cause flooding.
    vi. Removing pollutants from onsite stormwater prior to discharge into external drainage or water systems.

Water and Sewerage

Desired Outcome

Reduced impacts from large developments on the capacity of mains water supply to assist in long-term sustainable water usage.

Policies

1. Significant developments such as tourist resorts or large residential subdivisions should provide for the onsite collection, storage and re-use of water, in order to reduce mains water consumption.
2. Large-scale residential and tourist developments should implement a communal septic system in order to reduce the amount of land required for soakage.

Note: the General Provisions stipulate that residential subdivisions exceeding 60 lots and hotel or tourism complexes should employ *"an approved sewerage treatment plant and effluent disposal"* (Section 51, Schedule F).

Culture

Desired Outcome

Protection of sites of national or regional significance.

Policies

1. Development should not negatively impact upon either the cultural or historical values of the Sabeto Ranges, Viseisei Village or Lomolomo Battery site.
2. Development that compromises the unique scenic quality of the Sabeto Ranges should not occur.

Agriculture

Desired Outcome

Good quality farming land is protected for agricultural cultivation.

Policies

1. Areas designated within the Vuda and Sabeto Advisory Plan for agricultural production should not be fragmented via subdivision or contemplate development of a higher or more intensive use.
2. The subdivision of land designated for agricultural use should only occur if the resulting allotments are suitable for commercial agricultural purposes.

Quarrying

Desired Outcome

Protection of residents from the negative impacts of quarry site operations.

Policy

1. Development must be situated a minimum 200 metres from the lease boundary of a quarry site to avoid the noise and vibration impacts of quarry operations.

Tourism

Desired Outcome

- Tourism development which does not negatively impact on the natural environment, existing land uses, infrastructure capacity or local amenity.
- Tourism areas protected from incompatible development.

Policies

1. Tourist development should not have an adverse impact on the surrounding locality by achieving the following:
    i. Low-density design
    ii. Retention of as much of the natural landform and existing significant vegetation as possible
    iii. Not exceeding the capacity of existing infrastructure or services (e.g. roads, water supply etc)
    iv. Siting or screening the development to be visually unobtrusive when viewed from outside of the site
    v. Utilisation of on-site collection, storage and reuse of water
    vi. Employing sustainable management practices such as recycling and eco-friendly waste management solutions
    vii. Safe guarding natural environments and eco-systems, especially natural water and coastal systems, from pollution or other detrimental impacts.
2. Localities designated for tourism development should not accommodate land-uses which may detract from the amenity, scenic quality or other desirable attributes of the area.

Health

Desired Outcome

Provision of a healthy living environment.

Policy

1. Development that in any way may cause adverse impacts on the health and wellbeing of residents and the general public should not occur.

5.4 Referrals

As part of the planning assessment process, relevant stakeholder agencies are requested to submit their comments regarding proposed developments. Referral agencies include government departments as well as private agencies such as FEA and Fiji Sugar Corporation (FSC). In additional to the standard referral procedures employed by DTCP, the following table provides specific triggers for agency referrals.

Figure 48 Study Area Referral Triggers

Referral Agency	Proposals to be Referred	Reason
FEA	Any major developments such as tourist resorts or large residential subdivisions.	To ensure that dramatic increases in electricity demand can be met. Also, to allow FEA to keep track of future electricity demands to allow sufficient time for the network to be upgraded if required.
AFL & CAFFI	Any tall structures but particularly mobile phone towers.	To ensure there is no interference with aeronautical communication systems and/or so that appropriate lighting and painting of structures can be advised (to alert pilots of potential obstacles in the flight path).
Department of Environment *(for EIA assessment)*	Any development proposal at, or proximate to, Naikorokoro Point.	To ensure the breeding habitat of migratory birds is not degraded.
	Development requiring the construction of a seawall.	To assess potential impacts as seawalls are no longer considered a desirable coastal management tool and potentially lead to undesirable impacts such as erosion.
	Development that may directly or indirectly impact on a mangrove habitat.	To ensure the loss of mangrove habitats is minimised as mangroves play a large role in the protection of coastal environments and are a habitat for fish breeding and resource for traditional uses.
MRD	Development proposals within 200 metres of the boundary of a quarry site.	To prevent inappropriate development (such as residential development) occurring where impacts from quarrying, such as blasting and drilling will be experienced.

Referral Agency	Proposals to be Referred	Reason
	Development located on or at the base of a slope.	To ensure proposed developments are not in a high risk landslide area.
- Department of National Roads - National Road Safety Council	Development proposing new access points directly off of Queens Road.	To ensure that the number of access points off of Queens Road is minimised and that road safety will not be reduced.
- National Disaster Management - Drainage and Irrigation	Development proposed in low-lying areas of Vuda, Saweni and Vulani, or adjacent to the Sabeto River.	To ensure inappropriate development does not occur in areas subject to natural disasters such as flooding and to obtain advice on appropriate disaster mitigation measures.
NFA	Subdivisions exceeding three allotments (excluding those where the subdivision is to create separate titles for existing development).	To ensure the provision of adequate access for fire trucks and water supply and to advise on fire hydrant placement.
FSC	Developments with access points which require crossing the cane railway track.	To ensure the operations of the cane railway are not hindered and that access to developments is safe.
Fiji Museum	Development proximate to the archeological site on the bank of the Vuda River (refer to Figure 27 for location).	To ensure the heritage value of the site is not compromised.
Department of Lands	Subdivision of any Crown land.	Although the moratorium on Crown land has been lifted, all subdivisions will now be considered by the Department of Lands on a merit basis.
NLTB	Allotments which are adjacent to native land and which are subject to a subdivision or a rezoning proposal.	To ensure that the proposal will not negatively impact upon Native Land.
SIT	For rezoning or subdivision of agricultural land for a different purpose.	To ensure the land is not under a cane contract.

6.0 Conclusion

The Vuda and Sabeto Advisory Plan provides guidance for the long-term development of the study area (i.e. for the next 10-20 years). Notwithstanding this, the Advisory Plan should not be a static document and may require regular review and amendment, particularly in the advent of large scale tourist resorts, such as the proposed Vulani Resort.

The future land-uses and policies stated within this document are advisory only. However, they should be adhered to as much as possible as neither the NLTB Master Plan nor the Vuda & Sabeto Advisory Plan will serve any long-term benefit if their guidelines are regularly disregarded.

The desired outcome of this document is for development that protects long-term interests while meeting present day needs. For example, agricultural land requires protection but the existing need for residential development can equally not be ignored.

The Vuda and Sabeto Advisory Plan has attempted to reconcile such short and long-term needs. However, its success in achieving these goals will ultimately be determined over time.

Many stakeholders consulted as part of this project stated the need for better communication and collaboration between government departments to ensure a coordinated approach to future development. Additionally, it was recognised that more vigilance in dealing with people that do not adhere to development/lease/environmental standards must occur to uphold the integrity of governmental systems and to ensure desired outcomes are met.

Land-use planning requires a holistic and dedicated approach from all parts of government and the community to be successful. This collective approach will enable plans such as the Vuda and Sabeto Advisory Plan to play a beneficial role in Fiji's future development.

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APPENDIX A

Environmental Management Act (2005) – Schedule 2
List of Developments Requiring an Environmental Impact Assessment

Schedule 2 (Section 27) Environmental Management Act 2005

Development Proposals

Part 1 – Approved by EIA Administrator

1. The following development proposals are to be approved by the EIA Administrator –

    a) a proposal that could result in erosion of any coast, coastline, beach or foreshore;
    b) a proposal that could result in the pollution of any marine waters, ground water, freshwater body or other water resource;
    c) a proposal that could result in the contamination or degradation of any agricultural area or land important for agriculture;
    d) a proposal for construction of an airport;
    e) a proposal for construction of a hotel or tourist resort;
    f) a proposal for mining, reclaiming of minerals or reprocessing of tailings;
    g) a proposal for construction of a dam, artificial lake, hydro-electric scheme or irrigation project;
    h) a proposal for heavy industrial development or noxious industrial development;
    i) a proposal for commercial logging or for a saw milling operation;
    j) a proposal that could alter tidal action, wave action, currents or other natural processes of the sea, including but not limited to reclamation of the sea, mangrove areas, foreshore, rivers or creeks, or construction of a jetty, dock, wharf, pier or bridge;
    k) a proposal that would introduce pollutants or properties to the air that are disagreeable or potentially harmful to people and wildlife;
    l) a proposal that could jeopardize the continued existence of any protected, rare, threatened or endangered species or its critical habitat or nesting grounds;
    m) a proposal that could deplete populations of migratory species including, but not limited to, birds, seas turtle, fish , marine mammals;
    n) a proposal that could harm or destroy designated or proposed protected areas including, but not limited to, conservation areas, national parks, wildlife refuges, wildlife preserves, wildlife sanctuaries, mangrove conservation areas, forest reserves, fishing grounds (including reef fisheries), fish aggregation and spawning sites, fishing or gleaning areas, fish nursery areas, urban parks, recreational areas and any other category or area designated by a written law;
    o) a proposal that could destroy or damage an ecosystem of national importance, including, but not limited to, a beach, coral reef, rock

and gravel deposit, sand deposit, island, native forest, agricultural area, lagoon, sea-grass bed, mangrove swamp natural pass or channel, natural lake or pond, a pelagic (open ocean) ecosystem or an estuary;

p) a proposal that would result in the introduction of genetically modified organisms or of non-native species that could compete with or destroy and native species;
q) a proposal for the construction of a landfill facility, composting plant, marine outfall or waster water treatment plan;
r) a proposal that involves dredging or excavating a river bed;
s) a proposal that is controversial from an environmental standpoint, or is not supported for environmental or resource management reasons by a significant number of representatives from the local community, local government, churches, villages and other groups;
t) a proposal that could lead to the depletion of non-renewable resources;
u) a proposal that could challenge or contravene established customary controls over the use of natural resources;
v) a proposal that could result in any trans-boundary movement of wastes that could have an impact on human health, the environment or natural resources in any neighbouring country;
w) a proposal financed by an international or local development finance institution and which requires an EIA as a condition of the finance;
x) a proposal for farming or agricultural method or system that could result in the contamination of degradation of any agricultural area or land important for agriculture;
y) a proposal for a residential subdivision for more than 10 lots.

Part 2 – Approved by Approving Authority

1. The following development proposal are to be approved by an approving authority –

a) a proposal that requires processing only because it could endanger or degrade public health or sanitation;
b) a proposal that requires processing only because it could harm or destroy important cultural resources including, but not limited to, archaeological sites, cemeteries, historical sites and landmarks;
c) a proposal for a residential subdivision of not more than 10 lots;
d) a proposal for civic or community development;
e) a proposal for general commercial development;
f) a proposal for general industrial development.

APPENDIX B

Fiji Tourism Development Plan 2007-2016
Proposed Guidelines for Sustainable Development

The following guidelines are recommended as an assessment tool for proposed tourist developments within the *Fiji Tourism Plan 2007-2016* (Sustainable Tourism Development Consortium et al 2007, p.116-118):

Water

- Tourism properties should have a sustainable supply of potable water.
- Tourism properties should not adversely affect the natural hydrological regime.
- Tourism development should not cause erosion, sedimentation or adversely effect water quality.
- Tourism development should not cause erosion, sedimentation or adversely effect water quality.
- Tourism properties sewage disposal should be sustainable.
- Tourism developments should have mechanisms to ensure recycling is maximized and that waste is only disposed of to a sustainably managed landfill.

Coastal Development

- Tourism development should not adversely affect coastal processes.
- The assessment of impact on coastal processes should address the totality of the development and its potential to cause change in coastal systems rather than just a set back for buildings.
- Tourism development should avoid disturbance of mangrove and other intact littoral habitats as far as possible.
- Tourism development should not adversely affect the local marine ecology.

Forest Protection

- Tourism development should not adversely affect natural forests and where forests have previously been disturbed should involve revegetation.

Wildlife protection

- Tourism development should preserve wildlife habitat, not adversely effect species of conservation concern and should contribute to wildlife conservation.

Landscape Protection

- Tourism development should present natural landscapes and complement built landscapes

Scenic Amenity

- Building should not be sited or of such height, mass or size that they become dominant scenic alterations from areas of public (community or tourist) view such as roads, trails and the sea.

Eco-efficiency: Energy, Water and Waste

- Tourism development should meet best practice performance techniques and benchmarks for energy and water efficiency and minimal waster production.
- Exiting tourism development should benchmark and move towards best practice eco-efficiency.
- Eco-efficiency benchmarking, such as the Green Globe/Earthcheck benchmarking process should be implemented.
- Information on best practice eco-efficiency measures and equipment suitable for Fiji should be implemented.