

# saibai

Sustainable Land Use Plan

PART 2



# saibai

The first man at Saibai was Mesea. He is usually called Melewal, because his home was a big bailer shell of the kind called Melewal. Melewal and Budia are called Muruig because they were the first people, no one else lived at Saibai before them. Budia arrived first when he saw Melewal crawl from the sea with an Alup shell (Bailer shell) on his back. Budia said to the new comer, “who are you? If you are man, answer me.”

Upon learning that the strange was indeed a man he invited him to live at Saibai. Before Melewal came, Budia lived in a hole in the ground, now he said,

“henceforth, now I shall live above ground, my home will be a Bugle shell.”

Both men used to leave their shell (home) and go for a walk. Melewal as a man, Budia as a Willy-wagtail bird (Seseku).

Two brothers, Nima and Poipoi and their sister Ereu lived at Magadaramkuiki, one day Ereu obtained permission from her brothers to hunt for crabs on the reef. A man named Gamai who was sailing back to his home Maiad, a village on the Papuan mainland asked Ereu to go with him. She agreed and the pair then travelled together in the canoe, hugging the eastern coast of Daudai to Gamai’s home Maiad. When Ereu failed to return from the reef by the morning, Nima and Poipoi set out in search for their sister. They walked across the swamp, then a short distance further they saw lying on the ground a piece of Bamboo such as that used to make a bow and arrow. Each said to the other, ‘someone must live here,’ so they called out, “Koimega (friend) are you here?”

Melewal left his shell and greeted them and asked, “where are you going?”

“We are looking for our sister, have you seen her?”, they asked.

“No”, said Melewal and asked “where is your canoe?”

Our canoe Binibin is our topi iana”, said Nima and Poipoi. The canoe, Binibin, was a magical one. Nima and Poipoi had a half coconut shell in their topi iana, When they wanted to travel by sea, they removed the half coconut shell from the topi iana and stuck a magic feather in it, the shell then transformed itself into the canoe, Binibin.

Budia and Melewal invited Nima and Poipoi to spend the night with them. The brothers refused and Budia said to them, after you go I shall return to my former home under the ground, never to be seen again. Tell my people who come after me that I will leave two remembrances of myself to them. A hole which will sometime appear in the ground at the spot I live and the bird Seseku into which I changed.”

Nima and Poipoi sailed on and reached Daudai. They sailed along the coast and named every place they saw. They continued to sail east and finally saw a light of the village Maiad, where their sister Ereu had gone with Gamia.

Ereu and Gamia married at Maiad, with Ereu’s brother’s permission and stayed there and lived happily ever after. Nima and Poipoi continued to sail on. Melewal stayed at Saibai in his Bailer shell home. Budia as promised now and then appears in a Willy Wagtail (Seseku) bird form when a hole appears in the ground.

Source: Museum, Horn Island, April 2008





# Land Use Plan Structure





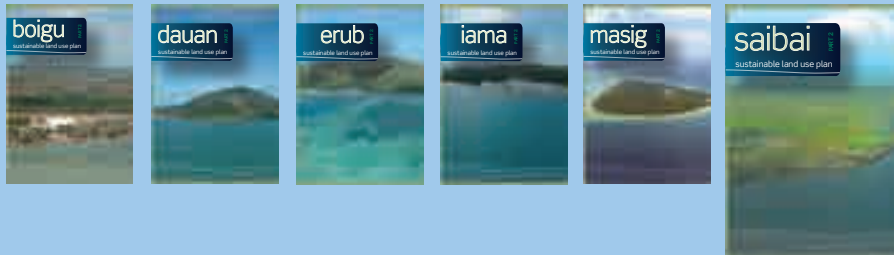
## PART 1

## Context & Background

- Introduction, Background and Overview of the Torres Strait
- How to Use the Sustainable Land Use Plan

## PART 2

## Island Overview



### A separate section of each island will detail the following topics–

- Island Overview
- Land Tenure & Native Title
- Natural Environment
  - plants, animals and birds
  - coastline
  - tides and storm surge
  - waterways and wetlands
  - land and soil
  - bushfire
- Cultural Heritage
- Community
  - population
  - housing
  - sustainable community expansion
  - community facilities and services
- Infrastructure
  - water
  - sewer
  - waste
  - electricity
  - telecommunications
  - roads
  - drainage
  - air access
  - sea access

Each topic includes best practice principles, an island overview, and an overview of the topic in the context of each island, land use strategies, land use projects, land use considerations, strategic outcomes and useful links.

## PART 3

## Interim Planning Assessment Process

A non-statutory framework for assessing development on the islands.

# Executive Summary





**In past years, the establishment of new communities and the growth of existing communities has often proceeded in a manner perceived as being unplanned and ad-hoc. Such an uncoordinated approach in remote communities has led to land management problems such as inappropriate locations of housing and inefficient, costly and haphazard provision of services such as water supply, sewerage, power and roads.**

The primary objective of reviewing land uses on Saibai is to provide a support decision making tool and guideline for the Community to plan for and manage the impacts of future development and that such development is sustainable.

Saibai is an area of significant cultural heritage value to the Traditional Owners and Community. Many sites are not recorded and are only known to the Traditional Owners. Consultation and liaison with Traditional Owners, engagement of cultural heritage observers and preparation of cultural heritage investigations are recommended for all development proposals.

Saibai is an extremely flat mud mangrove island with the community established on a narrow strip of beachfront that is at best a few metres above sea level. The community is inundated several times a year by King tides overtopping a basic stone seawall that was constructed in the mid 1900's and is in need of repair. The top of the seawall is at the level of Highest Astronomical Tide and needs raising to provide protection from storm surge and wind-increased tides.

The impacts of climate change and predicted sea-level rise will have a dramatic effect on Saibai over the next 100 years and as the extent of sea-level rise due to climate change become more quantifiable in the next few years, it may be that some of the houses on Saibai become more seriously affected by extreme tide events.

Saibai is Australia's northernmost point and three kilometres from the New Guinea mainland and as such plays a significant role in relation to Australian's border security.

Activities such as illegal immigration, illegal fishing and smuggling are a risk in the Torres Strait due to the proximity of Papua New Guinea and Indonesia. Furthermore, the Torres Strait serves as an early detection zone for the transmission of exotic pests and diseases into mainland Australia. Pathogens, diseases and weeds do not respect borders and with the seasonal winds coupled with the movement of people and animals, there is a high potential for unwanted pests, weeds and diseases. As part of the Torres Strait, Saibai also plays an important role in Australia's defence as it controls the main east-west shipping channel.



Despite Saibai's strategic defence importance, the question as to whether or not Community should be relocated and the island left to the sea or the Papua New Guineans is still discussed, usually by those not living on Saibai. This question arises due to the regular inundation of the village by the sea as much of Saibai is only just above the extreme tide events. However, Saibai's Community are unlikely to abandon their island home in the near future so a strategy of protection and gradual improvement of the land and living conditions needs to be adopted.

The **key environmental assets** of Saibai are the:

- mangrove habitat which is of a very high quality; and
- lagoon, which is an ecologically functional habitat for rare and threatened fauna.

Identified **land issues** are:

- the extremely flat, mud topography combined with the large interior swamps filled with brackish water and the extensive swamps and mangroves;
- undeveloped and relatively pristine condition of the coastline apart from around the village;
- location of the village on the northern narrow embankment, which is elevated above the inland water level by only approximately 200-500 millimetres;
- regular breaching of the sea wall around the village;
- changing land tenure system;
- increasing tide and storm surge levels;
- intermittent watercourses;
- potential acid sulfate soils;
- low to medium bushfire hazard;
- poor drainage;
- cultural heritage; and
- feral animals (dogs, cat, fish and deer).

Identified **Infrastructure issues** are:

- the sewerage design population of 600 persons is not predicted to be reached before 2017;
- the existing pump stations may require minor upgrades, if future development occurs in the area south west of the airstrip or the area south of the Telstra compound;
- if potential need for an additional pump station and rising main if development is planned further away from the town area at the eastern end of the airstrip;
- the high risk of salt water inundation of the sewer manhole covers which are generally marginally below the 4.0m HAT with the sea wall at 3.8 metres to 4.0 metres;
- effluent from the sewerage treatment plant is treated to a secondary level only and as such, is unsuitable to be considered for potable use;
- there is no land available for expansion of the waste depot;
- there is no soil available for cover of waste and previous requests to source what little soil is available has been unsuccessful;
- during king tides and storm surges, the tides comes over the sea wall;
- the sea wall is in varying degrees of deterioration, with some sections of the sea wall severely eroded providing little, if no protection during king tides and storm surges;
- predicted that the seawall will be 'overtopped' 73 days a year by the year 2100;
- in the short to medium term, works need to be undertaken to the existing sea wall to ensure that it is structurally sound and repair any damage;
- the seawall needs to be raised in stages to cover for the existing storm surge and to the predicted HAT levels in 2100;
- drainage from the area west of the airstrip requires attention;
- limited opportunity for viable alternative sources of energy; and
- the need to find a solution for the handling, sorting and disposal of waste.



Identified **strategic location** issues are:

- Saibai plays a significant role in Australian's border security against illegal immigration, illegal fishing, smuggling and transmission of exotic pests, weeds and diseases into mainland Australia;
- the debate on whether Community should be relocated due to the regular sea inundation of Saibai; and
- Community are unlikely to abandon their island home in the near future, so a strategy of protection and gradual improvement of the land and living conditions needs to be adopted.

Identified **population issues** are:

- steady population growth on Saibai which increased 1.80% in the past ten years. Current population is 370 persons;
- population profile will change over the next 25 years, with a doubling of the 65 plus age group and a decrease of young people; and
- median household size of 5.0 persons.

Identified **housing issues** are:

- the low-lying topography of the island;
- much of the island is subject to periodic inundation;
- the existing 21 vacant, serviced lots, which can cater for an additional 105 persons and are therefore sufficient to cater for the predicted population increase past 2017;
- the issues of clan location may affect the development of the existing 21 lots scattered throughout the village, so an investigation area immediately west of the dump access road and south of the existing village is proposed;
- the investigation area can provide up to 48 houses but requires major studies and significant investment including the cost associated with filling this area above highest astronomical tide (HAT);
- the need to use existing vacant lots for either dual occupancies (duplex) or townhouses or units to maximise land availability; and
- the need to supply diverse, affordable and sustainable housing to meet population changes and move towards a sustainable environment.

Identified **growth issues** are:

- a low growth rate of 1% which will generate:
  - an extra 39 persons over ten years;
  - an additional housing need of 1.5 houses per year; and
  - an additional 8 houses over ten years;
- a high growth rate of 2% which will generate:
  - can extra 83 persons over ten years;
  - additional housing need of 1.7 houses; and
  - an additional 17 houses over ten years; and
- options available to manage growth on Saibai are:
  - utilise existing serviced lots prior to encouraging development in the investigation area;
  - to increase residential density;
  - expansion of the residential areas; and
  - population capping.

Together the identified assets and issues above provide the basis for land use strategies, questions to ask for any proposed development and key land use outcomes. In summary,

- there is sufficient vacant and serviced land to cater for Saiba's predicted low and high growth rates;
- clan ownership patterns may inhibit the development of the vacant serviced lots;
- an investigation area has been identified but will require significant investment in studies and fill;
- Community must decide how they are going to adjust development on Saibai for climate change. What strategies are they going to adopt?

- if further development is to occur it:
  - should not be permitted in any area:
    - identified as an environmental asset;
    - identified as water catchment or in a known water catchment area;
    - encompassing head waters of waterways and wetlands;
- where it has detrimental impact on natural flow regimes and quality water systems;
- in areas affected by tides and storm surges;
- in areas of medium bushfire risk or part of areas identified as medium bushfire risk;
- near major infrastructure such as the Telstra Tower, sewerage treatment plants and generators;
- identified as affected by natural hazards such as tides, storm surges or acid sulfate soils;
- adjacent to areas identified as subject to high prone erosion; and
- west of the airstrip;
  - should be contained with the village and the identified investigation area which will require an increase in residential density;
  - must include diverse, affordable and sustainable housing to meet the needs of current and future residents and visitors. One area is to be investigated for potential development; and
  - must incorporate all processes, policies and decisions that protect and enhance the natural and made environments including cultural values and beliefs.





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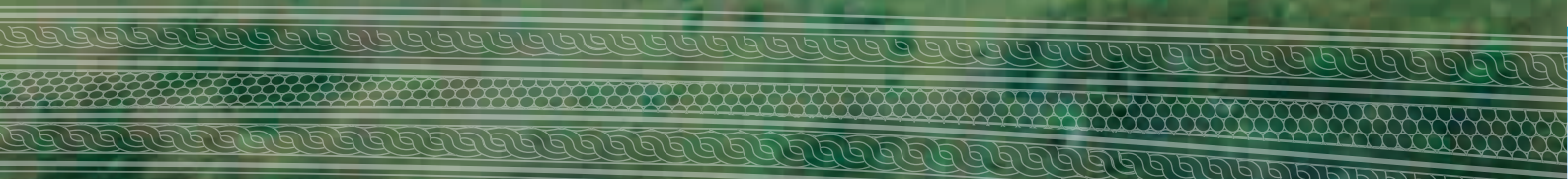
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# Island Overview

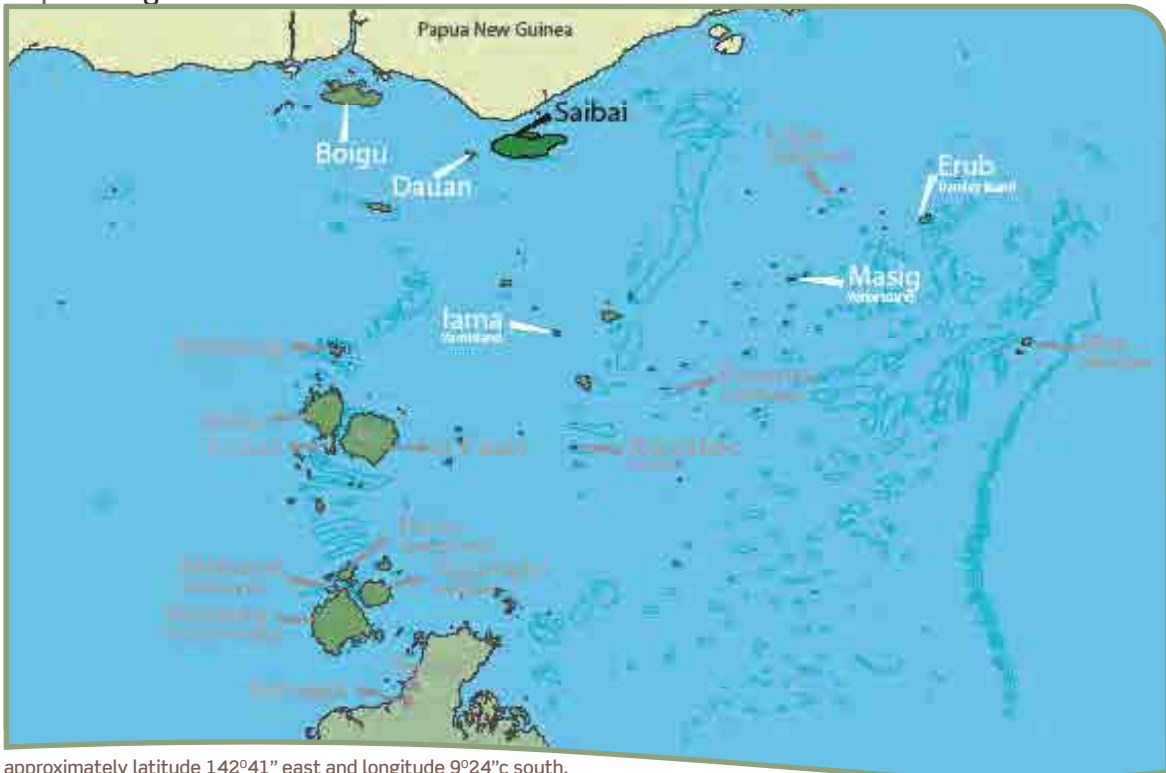


## 1.1 Location

Saibai is located in the top western group of islands in the Torres Strait, approximately 138 kilometres north of Horn Island and 3 kilometres south of Papua New Guinea.

Map 1 shows the location of Saibai in relation to the Torres Strait region, other islands (grey text) and the other five islands that form this Sustainable Land Use Plan are indicated in white text.

Map 1 Regional Location



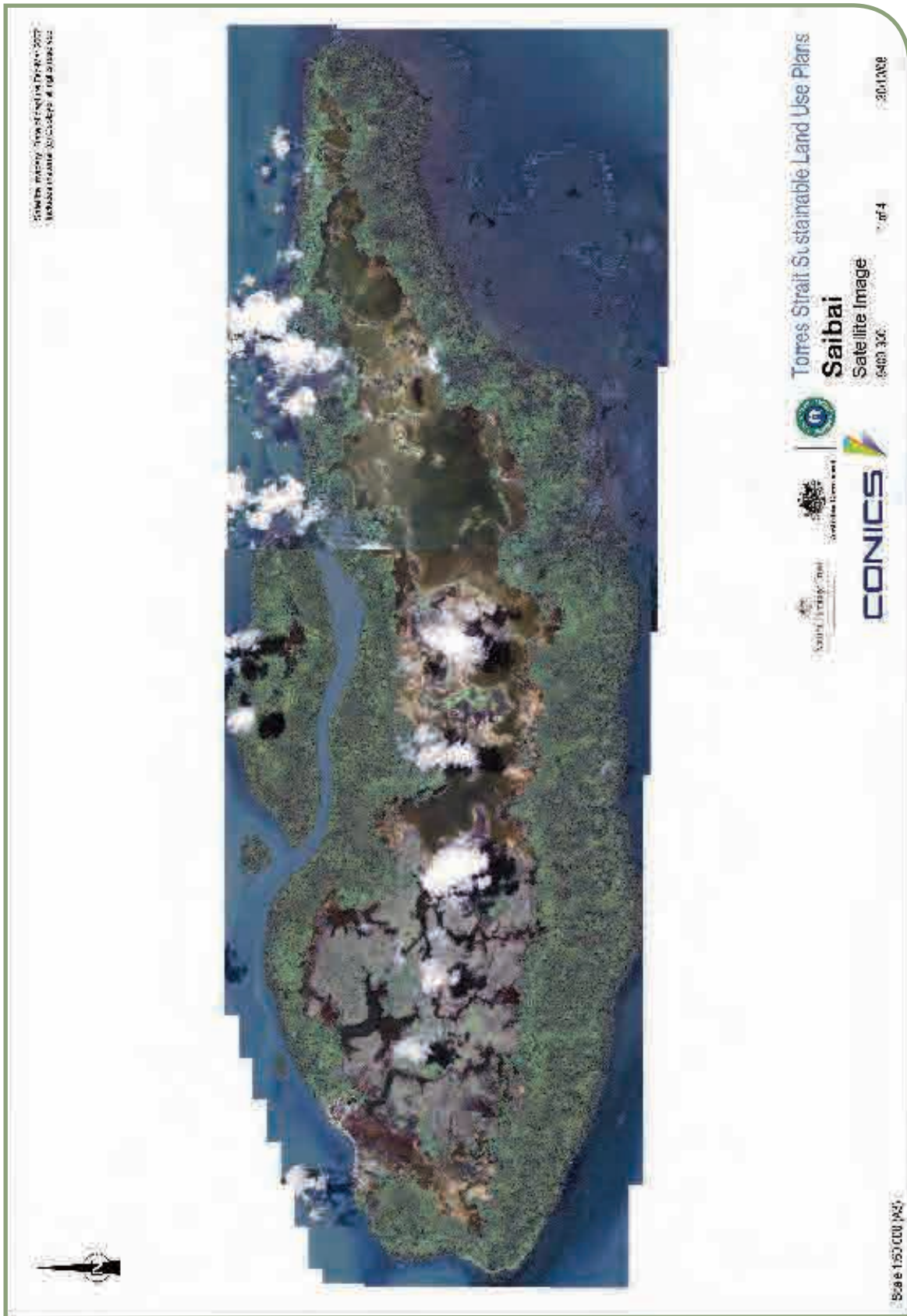
approximately latitude 142°41" east and longitude 9°24" south.



Source: Torres Strait Regional Authority.



Map 2 Satellite Image of Saibai



For more detail, refer to Map No. 9409-300 contained in Volume 3 - Maps

## 1.2 Physical Characteristics

The following is an overview of the physical characteristics of Saibai.

### 1.2.1 Topography

Saibai is a flat, mud island with large interior swamps filled with brackish water. It is approximately 22 kilometres long by 6.75 kilometres wide, with an approximate area of 10,400 hectares.

The village is located on a narrow embankment along the northern shoreline which is elevated above the inland water level by only approximately 200-500 millimetres. The village is between 1.7 metres to 2.0 metres above mean sea level.

Map 2 shows a satellite image of Saibai.

### 1.2.2 Geology

Saibai has occurred relatively recently in geological times through the consolidation and settlement of marine muds and silts on decayed coral platforms with origins most likely formed from vast quantities of sediment produced from the Fly River, Papua New Guinea.

The beach rock evident along the northern shore has been described as 'ferruginous and carbonate' beach rock.

### 1.2.3 Vegetation

The island is a mixture of mangrove fringe, flood plain and brackish swamps with mangroves lining most of the shoreline except in front of the village.

Other vegetation consists of coconut, almond, fig and mango trees within the village, with scrub on the higher portions of the interior of the island. Saltbushes and grasses abound in the swamps.

### 1.2.4 Waterways, Wetlands and Coasts

There are many watercourses on Saibai, many flowing only during the wet season.

The coastline of Saibai is predominately mudflats and mangroves located around the tidal margins of the island. The mudflats are exposed with little or no vegetation cover.

Despite the construction of a sea wall, the village is highly susceptible to coastal flooding during high tides and storm surges.



### 1.3 The Village

The village is located on a narrow embankment along the northern shoreline, with the airstrip located to the east of the island, somewhat protecting the parts of the village from inland inundation. The residential areas consists of residential dwellings, supported by Council offices, a church, primary school and preschool, Ibis store, health centre and community hall and outdoor sports courts. The cemetery is located just on the fringe the main village area to the west. Map 3 shows a satellite image of the village area with map 4a showing a satellite image of the adjoining brackish water adjoining the village. Map 4b shows the brackish water at the end of the airstrip.

Map 3 shows a satellite image of Saibai Village.

Maps 4a and 4b show a satellite image of inland Saibai.

### 1.4 Population

In 2006, the total population of Saibai was 370 persons, a 0.4% increase from the 2001 Census.

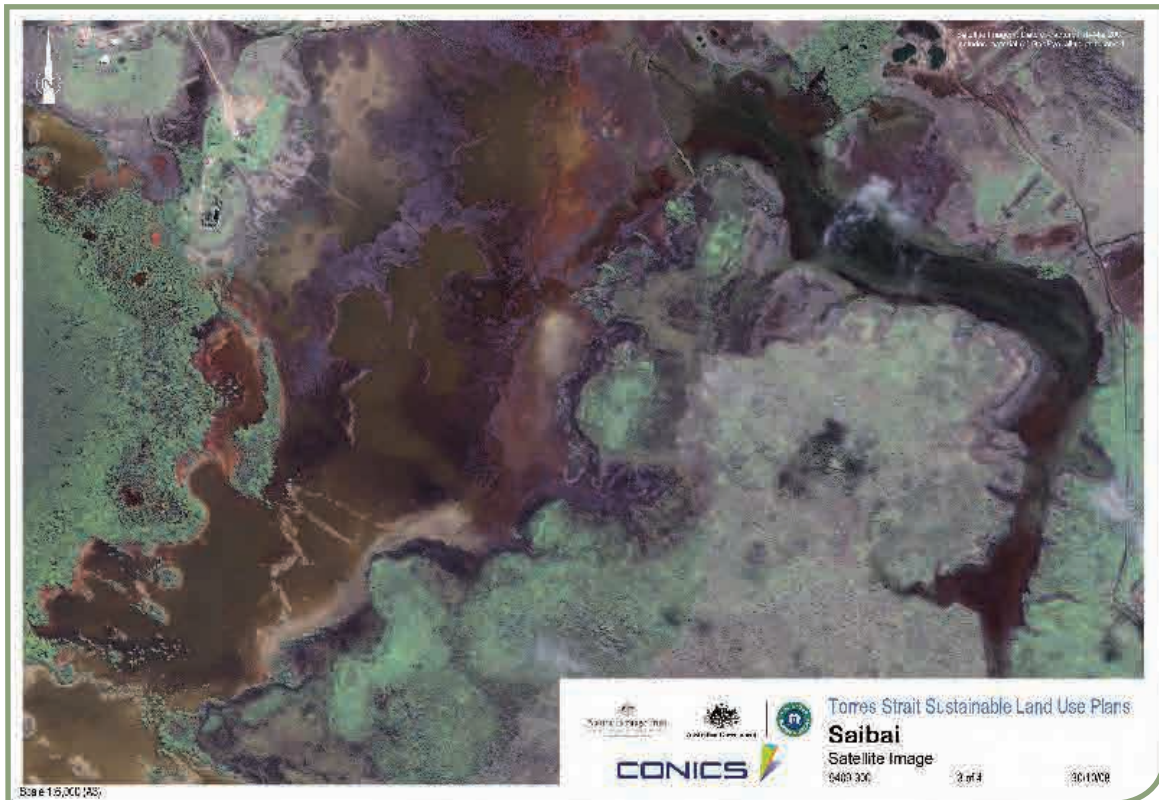
Map 3 Satellite Image of Saibai Village



For more detail, refer to Map No. 9409-300 contained in Volume 3 – Maps.



Map 4a Satellite Image of Inland Saibai



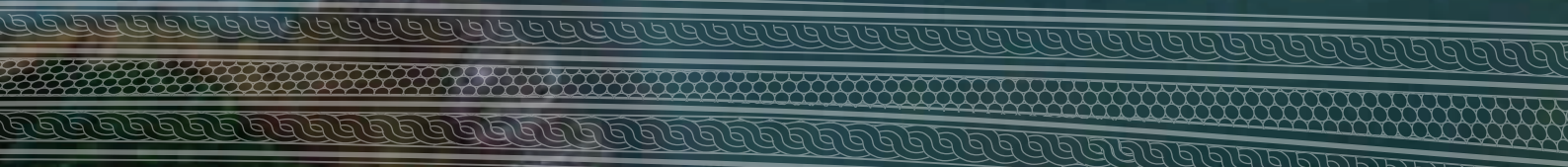
For more detail, refer to Map No. 9409-300 contained in Volume 3 – Maps.

Map 4b Satellite Image of Inland Saibai



For more detail, refer to Map No. 9409-300 contained in Volume 3 – Maps.

# Land Tenure & Native Title





## 2.1 Land Tenure

### 2.1.1 Best Practice

- Recognise ownership of traditional lands.
- Understand land tenure systems, particularly customary systems, when development land.
- A co-operative approach between all parties to land tenure, native title, development and land-management issues.

### 2.1.2 Overview of Current Situation

Saibai legal land tenure consists of a Deed of Grant in Trust (DOGIT) shown as Lot 3 on TS157, Parish of Giaka, County of Torres in the State of Queensland.

As the land is held in DOGIT, the term 'lot', in this Plan refers typically to the land surrounding a house or a building.

General the DOGIT covers most of the community including houses, council officers, shops and some roads and general infrastructure.

At the time of granting the DOGIT, some land was retained by the State of Queensland for specific purposes. Generally, these reservations were minor and may include land such as airstrips, some roads and community facilities such as schools. A search of the State government's land tenure system is required to determine the exact tenure of the land.

The Torres Strait Island Regional Council (TSIRC) is currently the trustee of the DOGIT, acting on behalf of the Torres Strait Islanders of the community. Council may issue leases over part of the DOGIT for various specific purposes including leases for infrastructure purposes (e.g. Telstra and Ergon Energy), Australian Customs Service facilities, health centres and commercial purposes. The existence of these leases is disclosed by searching the State's tenure database.

### 2.1.3 Issues Overview

Primary discussions are required to be held with Traditional Owners and the TSRIC with regard to approval for the provision of new development and infrastructure on the island. However, consideration also needs to be given to those members of the community who do not possess traditional land to ensure they and their families have the opportunity for housing.

The *Aboriginal and Torres Strait Islander Land Amendment Act 2008* was passed by the State government on 13 May 2008. The amendments in the Act aim to:

- encourage home ownership and provide long term leases for housing;
- assist the transfer of land not required for village purposes (outside of townships) to Indigenous land trusts;
- encourage economic development in Indigenous communities; and
- facilitate the construction of public infrastructure by providing a compulsory acquisition process.

This Act will change the land tenure on Saibai and, once in effect must be monitored.

### 2.1.4 Sustainable Land Tenure Outcomes

- Consultation with the TSIRC, Native Title Prescribed Body Corporate, Land Trusts and Traditional Owners occurs on a regular basis with their knowledge and values respected.
- Communities are in the best position to identify and priorities their needs and recommend how governments can best meet those need.



## 2.1.5 Useful Resources

### Legislation

*Aborigines and Torres Strait Islanders (Land Holding) Act 1985* (Qld) outlines the process for providing the grant of leases in perpetuity and other land to members of Torres Strait Island Communities.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

*Land Act 1994* (Qld) deals with the administration and management of non-freehold land and DOGIT and the creation of freehold land.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

The *Aboriginal and Torres Strait Islander Land Amendment Bill 2008* amends the *Aboriginal Land Act 1991*, the *Torres Strait Islander Land Act 1991*, the *Land Act 1994*, the *Local Government (Aboriginal Lands) Act 1978* and the *Native Title (Queensland) Act 1993*.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

*Torres Strait Islander Land Act 1991* (Qld) provides for the grant and claim and grant, of land as Torres Strait Islander Land and for other purposes.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

*Native Title Act 1993* (Cth) provides for the recognition and protection of Native Title rights and interest and establishes mechanisms for how future development and actions affect Native Title.

[www.comlaw.gov.au](http://www.comlaw.gov.au)

### Policies, Guidelines and Fact Sheets

*A Guide to Land Tenure in Queensland* outlines the types of tenure used in Queensland, including DOGITs, their characteristics and the various provisions of legislation, which apply to each.

[www.nrw.qld.gov.au/land/state/publications](http://www.nrw.qld.gov.au/land/state/publications)

### Websites

Department of Natural Resources and Water

[www.nrw.qld.gov.au](http://www.nrw.qld.gov.au)

## 2.2 Native Title

### 2.2.1 Best Practice

- Native title should respect, protect and identify Saibai's cultural heritage for present and future generations.
- A co-operative approach between all parties to land tenure, native title, development and land-management issues.
- Establish communication prior to starting a project to ensure inclusion and participation – involve Community in genuine negotiation at every stage of a project.
- Be sensitive of issues of language, naming and expression.
- Examine assumptions carefully – ask first, do not assume.
- Be informed about appropriate times to undertaken consultation and negotiation - be respectful of deaths in communities and cultural events.



### 2.2.2 Overview of Current Situation

Native title rights are held by the Saibai People as determined by a consent determination on 12 February 1999 *Saibai People v Queensland* (1999) FCA 158. Native title rights exist in the entire determination area being Saibai, Mawalmay Theora, Thawpay Kawamag and Kuykuthal Kawamag Islands in the Torres Strait. Native title is managed by the Saibai Mura Buway (Torres Strait Islanders) Corporation.

A native title sea claim is yet to be determined.

As of November 2008, the National Native Title Tribunal records indicated there was one Indigenous Land Use Agreements (ILUA):

- Telstra and Saibai ILUA (No. QI01/06 – Infrastructure).

Communication with the relevant Native Title Prescribed Body Corporate (PBC) will assist developers to identify local areas and objects of significance and avoid or mitigate disturbance. The Torres Strait Regional Authority (TSRA) through its Land and Sea Management Unit (LSMU) and Native Title Office can assist in contacting the relevant PBCs. The TSIRC will also be able to help with identifying the correct PBC contacts.



### 2.2.3 Issues Overview

Final decisions over native title claims can take time and it is essential to continue the provision of infrastructure to communities whilst a native title claim is being determined.

The *Native Title Act 1993* provides a system or process to facilitate dealings that may affect native title. Both during the claim process and after native title is recognised.

Native title claimants and those recognised as native title holders have the right to negotiate about some future acts, such as the proposal of a proposed development. As native title has been determined, a PBC has been established to represent native title interests. In many cases, an agreement is made between the PBC, the TSIRC and the proponent of the development to allow a development to proceed, as developments include the provision of major infrastructure or areas of land for future village expansion.

Enquiries should be made with the PBC, the TSIRC and or the TSRA's Native Title Office to determine if there are any existing agreements.

#### Indigenous Land Use Agreements

ILUAs are voluntary agreements about the use and management of land and/or water made between a native title party and other people who have an interest in the land and/or water covered by the claim such as pastoralists, farmers, resource explorers and producers, fishers, local government and State government officers. ILUAs are registered with the National Tribunal making them legally binding on the people who are parties to the agreement and all native titleholders for that area. ILUAs achieve certainty over access to and sustainable use of land, water and resources through negotiated recognition and just settlement leading to the resolution of native title claims.

## 2.2.4 Sustainable Native Title Outcomes

- Consultation with the Prescribed Body Corporate, Land Trusts and Traditional Owners occurs on a regular basis with their knowledge and values respected.
- ILUAs are encouraged, implemented and respected.
- Promotion of effective communication and transparent processes that are flexible to reflect particular circumstances of Saibai.



## 2.3 Useful Resources

### Legislation

*Native Title Act 1993* (Cth) provides for the recognition and protection of Native Title rights and interest and establishes mechanisms for how future development and actions affect Native Title.

[www.comlaw.gov.au](http://www.comlaw.gov.au)

### Indigenous Land Use Agreements

National Native Title Tribunal

[www.nntt.gov.au](http://www.nntt.gov.au)

### Policies, Guidelines and Fact Sheets

*Guidelines for Negotiation of an Indigenous Land Use Agreement* provides information on negotiating and registering an ILUA including the different types of ILUAs, the steps for negotiating an ILUA and the process for registering an ILUA. It also includes a sample ILUA.

[www.nrw.qld.gov.au/publications/nativetitle](http://www.nrw.qld.gov.au/publications/nativetitle)

### Websites

Department of Natural Resources and Water

[www.nrw.qld.gov.au](http://www.nrw.qld.gov.au)

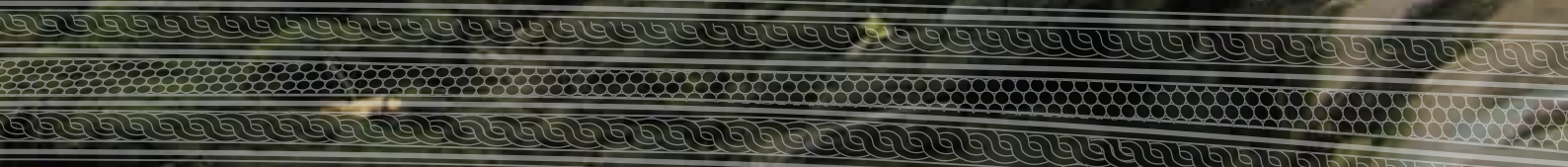
National Native Title Tribunal

[www.nntt.gov.au](http://www.nntt.gov.au)





# Natural Environment





**The natural environment, or the land and sea, is the core of Torres Strait communities' way of life, both now and in the future. Its existence, condition and health are essential to Community health. Their future, economy and way of life cannot be separated from how the land and sea is managed.**

Land and sea is so fundamental to Saibai Community that the impacts on land and sea must be part of all decisions and plans.

This Plan addresses the following with regard to the natural environment:

- plants, animals and birds;
- coastline;
- tides and storm surges;
- waterways and wetlands
- land and soil; and
- bushfire.

A report by Natural Solutions was undertaken on Saibai over a five day visit in late 2007. This report provides a snap shot in time and a base line for future studies and identified key natural assets, habitats, watercourses and natural land use issues for Community. It is not intended to be a complete scientific analysis of Saibai's natural environment. The report is written for the Saibai Community, the TSIRC and the TSRA. The Fauna and Habitat Assessment of Saibai, prepared by Natural Solutions Environmental Consultants, is included as Appendix 1.

Mapping of the Torres Strait regions remnant vegetation was undertaken in 2007/08 by 3D Environmental. The study identified vegetation communities across all islands and was undertaken to provide data suitable for adoption under the old State remnant vegetation regime administered by the Department of Natural Resources and Water (NRW). By late 2008, the draft mapping being provided by NRW had been completed but not made available to the public. The Vegetation Communities and Regional Ecosystem Assessment, prepared by 3D Environmental, is included as Appendix 2.





## 3.1 Plants, Animals and Birds

### 3.1.1 Best Practice

- The present generation ensure the health, diversity and productivity of the plants, animals and birds is maintained or enhanced for the benefit of future generations through:
  - the protection and conservation of native plants, animals, birds, habitat and habitat corridors;
  - conservation efforts focus on those plants, animals and birds which are uncommon and at risk;
  - clearing of native vegetation, which results in the loss of uncommon, at risk or threatened plants or the animals and birds that live in those areas, is minimised;
  - using renewable natural resources, sustainably and sensibly without significantly impacting other land uses;
  - managing animals, pests, weeds and disease so that their impact on the land and sea is minimised or avoided; and
  - integrating land and sea planning and management to ensure the negative impacts of human actions (e.g. development, vegetation clearing) on plants, animals and birds is minimised or prevented.
- The pattern of development on Saibai recognises the importance of plants, animals and birds, natural resources and their fundamental relationship to the quality of life and viability of Saibai and the wellbeing of its residents.
- Reduce the impacts of climate change on plants, animals and birds by:
  - recognising the importance of climate change on plants, animals and birds of Saibai;
  - avoiding decisions now that will make it more difficult to manage the impacts of climate change in the future; and
  - building understanding and knowledge of Community to address the impacts of climate change on the island's plants, animals and birds.



**”Plants, animals and birds are essential to the well being of Community as they are frequently associated with cultural significant activities and events. So, significant plants, animals and birds and their habitat need to be protected as they are part of the history and the future for the next generation.”**

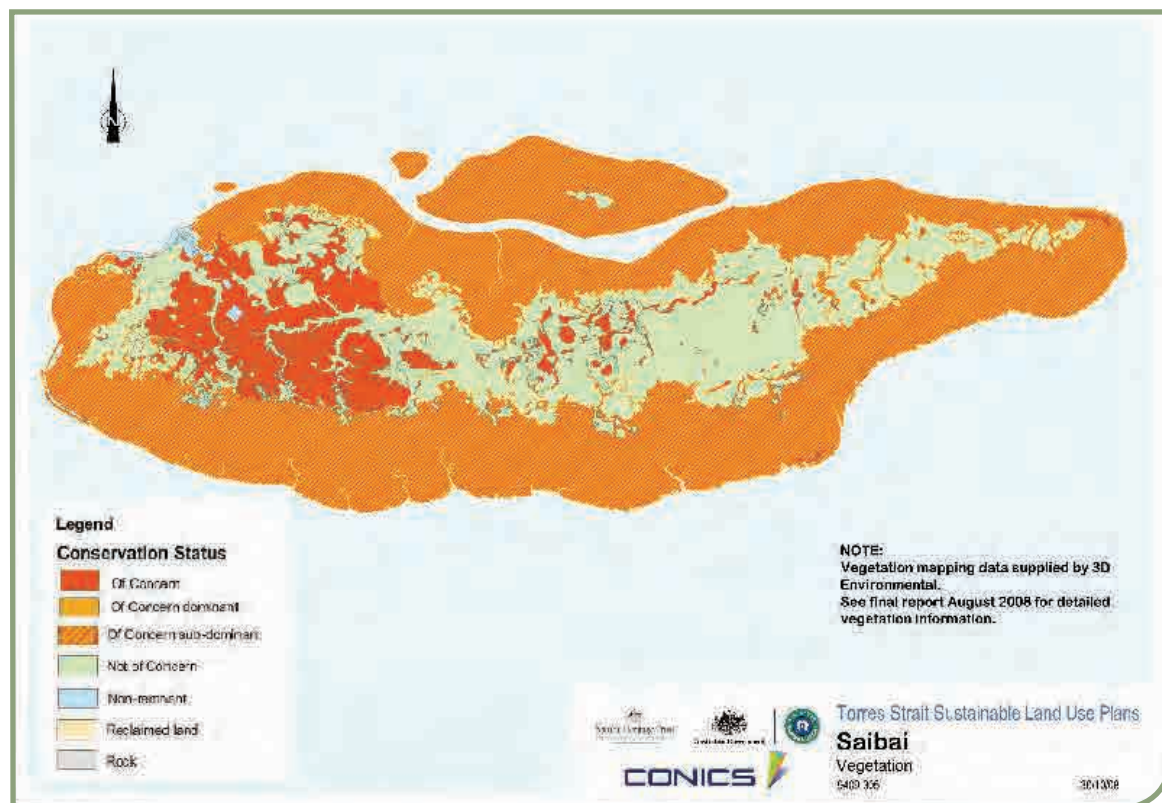
### 3.1.2 Overview of Current Situation

The land and sea of Saibai is the home or habitat of a range of plant and animal species. Apart from Traditional Owners knowledge, there is very little recorded data on Saibai. The preliminary fieldwork undertaken by Natural Solutions is part of the ongoing process of recording and identifying significant habitats, plants, birds and animals on Saibai. The notable ecological and habitat features of Saibai are the:

- mangrove habitat which are of a very high quality, and
- lagoon as it is an ecologically functional habitat for rare and threatened fauna.

Map 5 shows the significant vegetation communities on Saibai.

Map 5 Vegetation



For more detail, refer to Map No. 9409-305 contained in Volume 3 – Maps.

Notable rare and threatened fauna observed on Saibai include:

- Spectacled Flying fox (*Pteropus conspicillatus*) – vulnerable under the Environmental Protection Biodiversity Conservation (EPBC) Act 1999
- Jabiru Stork (*Ephippiorhynchus asiaticus*) - rare under the Nature Conservation Act 1992 (NCA)
- Emerald Monitor (*Varanus prasinus*) – vulnerable under the NCA
- False Water Rat (*Xeromys myoides*) – vulnerable under the NCA
- Mangrove Skink (*Emoia atrocostata*) – rare under the NCA.

Further details on habitat and fauna is included as Appendix 1.



**“Habitat areas are the different places that plants, animals and birds live and grow. Habitat areas provide food, water and shelter for plants, animals and birds.”**

Five habitat types were identified on Saibai, including:

#### **Grassland Habitat**

Grasslands are dominated by swards of kangaroo grass. A conspicuous feature of this habitat type, particularly in the slightly higher central western sections of the island, is the presence of groves of Pandanus. This habitat occurs over a gently undulating landform, often characterised by the presence of tall termite mounds. Grassland habitat ranges from moderate to high quality, increasing in quality with distance from the developed areas.

Fauna identified in relation to this habitat included a native rodent (*Melomys burtoni*) and ecotonal species such as the Varied Honeyeater. Reptiles included the skink *Carlia longipes* and a gecko (*Gehyra baliola*) which is considered to be restricted to the Torres Strait Islands and Papua New Guinea.



#### **Saltpan and Wetland Habitat**

Salt pans occupy a large majority of Saibai Island, with extensive tracts mostly inaccessible due to regular inundation and water logging. As such, these areas lack conspicuous vegetation other than small herbaceous, salt tolerant species.



Access difficulties prevented a thorough and detailed investigation from being undertaken of saltpan habitats. Nevertheless, this habitat is considered to be of high value due to its inaccessible nature and the protection this affords to fauna. Those areas, which are easily accessed, show visible signs of habitat degradation due to fire and pollution.

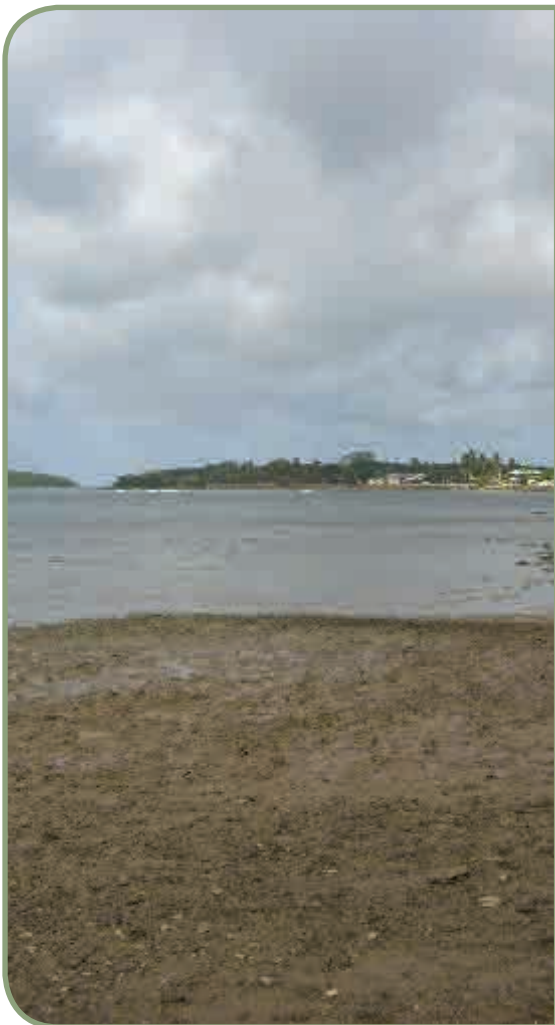
Fauna observed in this habitat, included birds such as Brolgas and Jabiru. The Jabiru is listed as rare under the *Nature Conservation Act 1992*. The Rusa Deer, a feral animal, was also sighted in these areas and is considered a ‘non-declared animal’ under the *Land Protection (Pest and Stock Route Management) Act 2002*.



### Mudflat Habitat

The mudflats along the northern face of the island are directly impacted by the activities in the developed area. Despite the pollution in this area, large numbers of birds (migratory waders) were identified in this area. Mudflats in other areas of the island are buffered from human interference by the inaccessibility of the land and as such are likely to be of high quality.

Marsh Sandpiper, Crested Tern, Silver Gull and Black-naped Tern were some of the bird species identified in this habitat. Many of the sea birds and wader species identified are protected under the JAMBA and CAMBA international agreements. The Foreshore Skink (*Emoia atrocostata*) identified as Rare under the *Nature Conservation Act 1992* is identified as a littoral zone opportunist between mudflat and man made rocky shore and mangroves.



### Mangrove Habitat

The mangrove community and associated marine plants extend well into the island from the coastal reaches. Narrow bands of vine forest fringe mangrove communities on alluvial soils or sand ridges (Stanton et al 2008) and add structural complexity to its ecology value.



The Emerald Monitor is likely to be found in ecotonal communities such as this. This vegetation community is in good structural condition providing a high quality habitat, with the exception of those areas adjacent to the developed areas which are highly disturbed due to vegetation being harvested for wood. Fauna identified in this habitat included the Spangled Drongo, Little Egret, Bar-shouldered Dove, Pale White Eye, Fig Bird, Orange-footed Scrub Fowl, Spectacled Monarch and various wader species.

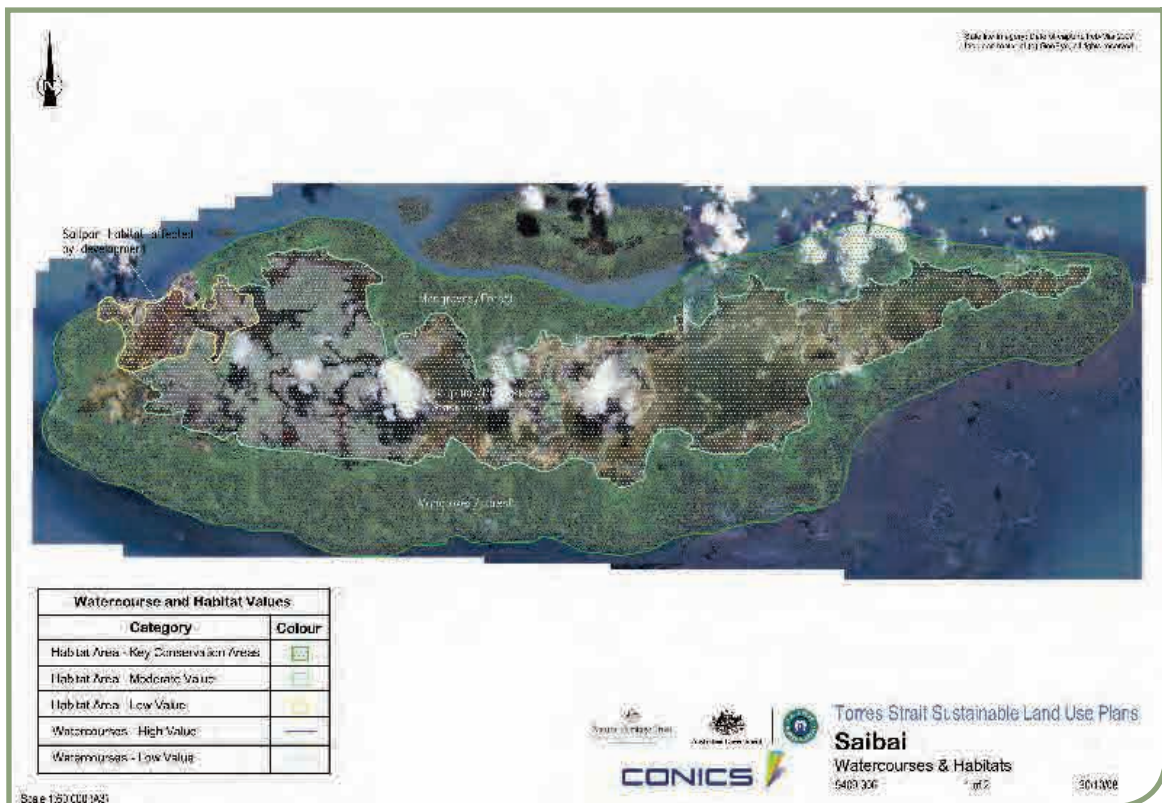
### Developed Areas

The developed sections of the island cover a small but intensive area along the northern fringe. Habitats in these areas are restricted to microhabitats provided by buildings, the rubbish tip and dumped vehicles. Bird species identified in the area were generalist species including the Masked Lapwing and the Peaceful Dove.

Maps 6a and 6b shows the habitat areas on Saibai.

Maps 7 & 8 shows the identified ecologically significant watercourse and habitat areas

Map 6a Watercourses and Habitat Areas



For more detail, refer to Map No. 9409-306 contained in Volume 3 - Maps



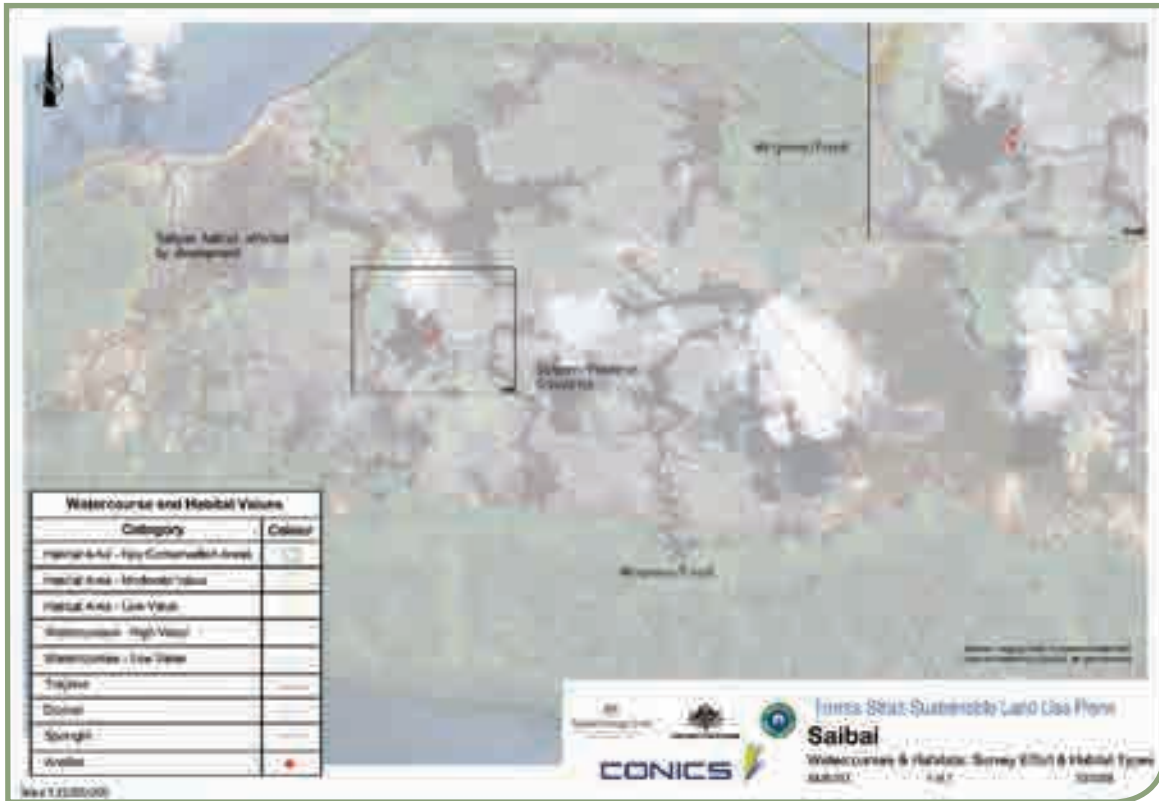
Map 6b Watercourses and Habitat Areas



For more detail, refer to Map No. 9409-306 contained in Volume 3 - Maps



Map 7 Ecologically Significant Watercourses and Habitats



For more detail, refer to Map No.9409-313 contained in Volume 3 - Maps.

Map 8 Ecologically Significant Watercourses and Habitats (Village)



For more detail, refer to Map No.9409-313 contained in Volume 3 - Maps.

**“Biodiversity (biological diversity) is the variety of all life forms, including the different plants, animals and micro-organisms, the genes they contain and the ecosystem of which they form a part of”**

### 3.1.3 Issues Overview

The distinct vegetated character of Saibai relies on the retention of biodiversity and ecosystems. In addition, many of the fauna species identified on Saibai are habitat specific or specialist animals – often requiring particular resources to persist in a given environment. The presence of threatened birds highlights the regional significance of Saibai to provide high quality habitat and long-term safe refuge for species of conservation importance.

For these reasons, it is vital that land must be protected for conservation purposes. Ideally, these areas will represent the full range of habitats and species found across the island and form corridors for the safe movement and successful breeding of wildlife within the island.

Such areas include the:

- extensive wetland and mangrove areas;
- savannah grasslands to the south of the village; and
- coastal mudflat areas along the shoreline of the island.



## “Fragmentation is caused when vegetation and habitat areas are cleared resulting in these areas being divided into smaller, isolated patches”

The main risk to continued health and diversity of local species is from continued fragmentation and disturbance of the existing habitat and the introduction of weeds and pests. Weed and pest control is also required to protect the localised ecological health and community wellbeing (over-population of cats and stray dogs was reported to be problematic on the island). Control of these animals could be conducted through periodic culling of stray dogs and cats; as well as placing limits on the numbers of pets allowed to be kept by island residents.

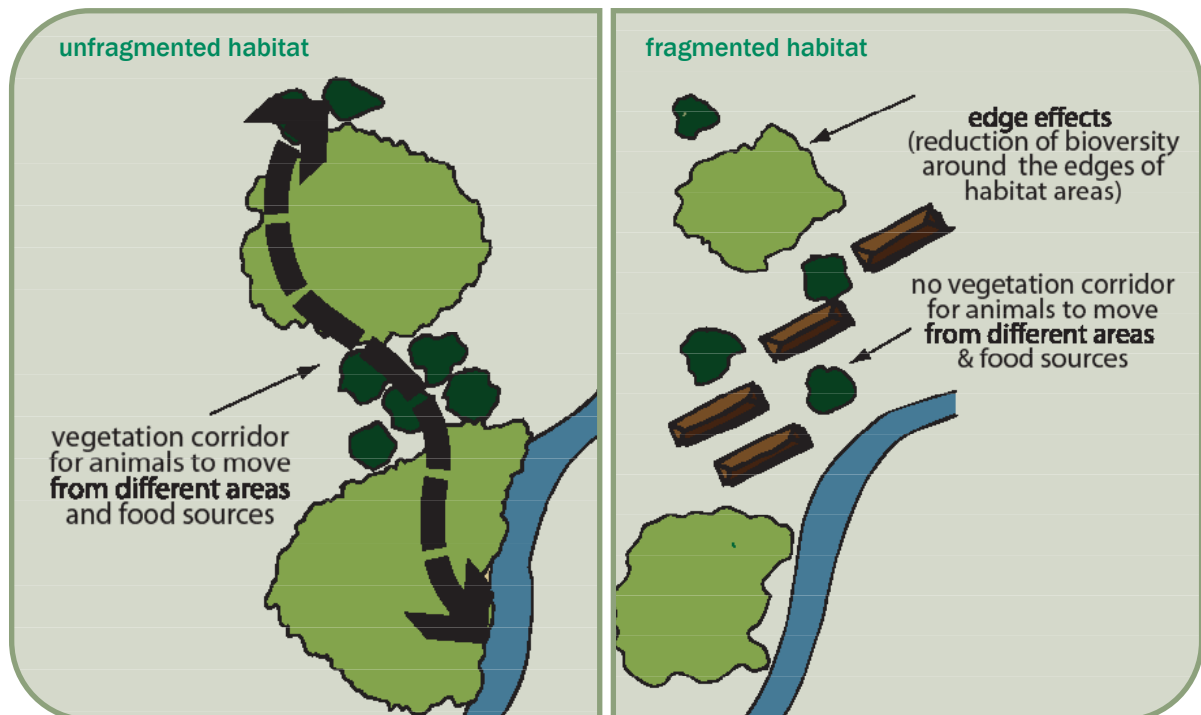
Figure 1 shows the effects of fragmentation on vegetation.

### 3.1.4 Land Use Strategy

To minimise existing and future development on Saibai’s plants, animals and birds, the following strategy is recommended:

- Those areas that are of critical environmental significance, host rare and endangered species, are in pristine condition and corridors that provide for the safe movement and successful breeding of wildlife should be protected:
  - from development; and
  - with a buffer of peripheral plantings of dense tree species to minimise encroachment into adjacent areas.

Figure 1 Vegetation Fragmentation





### 3.1.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Plants, Animals and Birds Best Practice, Land Use Strategy and Sustainable Outcomes?
- Has the development addressed its impact on the natural environment of Saibai?
- Has a minimum of 10 metres but up to 40 metres buffer been provided between the development and coastal vegetation (the buffer area should consist of coastal vegetation)?
- Is the development outside of areas identified for conservation particularly in areas such as mangrove forests or the shoreline?
- Where new corridors are being created as part of a revegetation program do they:
  - have a minimum width of 50 metres;
  - link remnant areas of bushland habitat;
  - provide landscape connectivity;
  - propose to revegetate using seed collected from plants that are indigenous to the Island; or
  - use plants grown from the area being revegetated;
  - introduce inappropriate non-indigenous plants into the natural areas; and
  - propose to control weed growth and remove areas of infestation?
- If development is being proposed in the village, or around existing infrastructure or in proposed investigation areas:
  - are buffers, a minimum of 50 metres wide being provided between the development and the area requiring protection;
  - does the proposed landscaping use plants native to Saibai;
  - will it introduce inappropriate plants into the natural areas; and
  - does it propose to control weed growth and eradicate areas of festation?

### 3.1.6 Land Use Projects

To minimise existing and future impact to Saibai plants, animals and birds, the following projects are recommended:

- Regulate indiscriminate dumping of rubbish and protect against local pollution.
- Regulate indiscriminate clearing and thinning of native vegetation, particularly mangroves.
- Rejuvenate areas where there have been changes in landform, drainage patterns and nutrient levels and where these changes are having an adverse impact on neighbouring vegetation.
- Implement a cat and dog management plan.

### 3.1.7 Sustainable Plants, Animals and Bird Outcomes

- The unique environmental values of Saibai are maintained and enhanced for current and future generations.
- The ecologically significant systems, sensitive coastal systems, areas identified as rare, endangered or vulnerable or environmental value are preserved and protected for nature conservation, landscape/scenic quality, biodiversity and habitat values, to ensure the integrity of natural processes.
- Sustainable development practices minimise the effects of development on plants, animals and birds.
- Areas that have rare, endangered or vulnerable plants, animals and bird habitats should be protected from development.
- Intensification of land uses and new development sites should not reduce Saibai's plants, animals and birds.
- Encourage community participation in planning, restoring and protecting Saibai's natural environment.

### 3.1.8 Useful Resources

#### Legislation

*Environmental Protection and Biodiversity Conservation Act 1999* (Cth) provides for the protection of the environment, particularly those areas of national significance, promotes the conservation of biodiversity and promotes a co-operative approach to the protection and management of the environment with Torres Strait Islanders.

[www.comlaw.gov.au](http://www.comlaw.gov.au)

*Nature Conservation Act 1992* (Qld) provides a process to protect significant habitat areas and identify plants, animals and birds, which are rare, threatened or endangered and mechanisms to protect and conserve them.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

*Vegetation Management Act 1999* (Qld) deals with the management and conservation of remnant vegetation.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

#### Policies, Guidelines and Fact Sheets

*Biodiversity – on our agenda* provides an overview of what is biodiversity and why it is important to conserve our plants, animals and birds

[www.nrm.gov.au/publications/factsheets](http://www.nrm.gov.au/publications/factsheets)

*National Strategy for the Conservation of Australia's Biodiversity* outlines the processes and systems implemented by the federal government to protect biological diversity and maintain ecological processes.

[www.environment.gov.au/biodiversity/publications/strategy](http://www.environment.gov.au/biodiversity/publications/strategy)

*Queensland Biodiversity Policy Framework: sustaining our national wealth* outlines the State government's approach to nature conservation, environmental protection and responsible land use planning to secure favourable environmental, economic and social outcomes.

[www.epa.qld.gov.au/publications](http://www.epa.qld.gov.au/publications)

#### Websites

Caring for our Country

[www.nrm.gov.au](http://www.nrm.gov.au)

## 3.2 Coastline

### 3.2.1 Best Practice

- The natural dynamic processes that shape the coast and beaches are respected.
- Maintain and enhance connectivity between marine and coastal habitat to ensure the healthy function of the coastal zone and marine environments.
- Coastal resources are used sustainably and sensibly.
- The Community's dependence on coastal resources for hunting and fishing is respected and integrated into the planning and management of the coastal zone.
- The ecological and cultural importance of the coastal zone is not compromised by inappropriate development and activities.
- Development within the coastal zone is managed in accordance with the principles of ecologically sustainable development and does not compromise access to the coastal zone.
- Reduce impacts of climate change on the coastline by:
  - recognising the importance of climate change on the coast;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the island's coastline.

### 3.2.2 Overview of Current Situation

Saibai's coastline has largely been undeveloped and is in relatively pristine condition, apart from around the village. Saibai village has a strong coastal focus, with the village concentrated along the northern shoreline of the island.

Along the shoreline of the village, a sea wall, to a height of 3.8 to 4.0 metres highest astronomical tide (HAT) has been constructed. However, the sea wall, which is in varying degrees of deterioration, with some sections of the sea wall severely eroded, provides little, if no protection, during king tides and storm surges and is regularly breached during storm surges and king tides, inundating the village.

The planning and management of the coastal and marine environment of Saibai is shared between the Commonwealth and State government and its agencies, the TSIRC and Traditional Owners. The Commonwealth government is responsible for waters beyond three nautical miles from low water mark of Saibai coastline.

Inside the three nautical mile limit and for coastal land, the State government exercises control of activities including licensing of waste disposal, protection of rare and endangered flora and fauna, oil pollution, mineral exploration and exploitation, water quality, marine navigation and provision of boating facilities.

The TSIRC is responsible for land above low tide water mark.



### 3.2.3 Issues Overview

The primary consideration for Saibai's coastline is the conservation and protection of its coastal environments, to facilitate the natural protection of the village from tidal inundation. While the village is located directly on the shoreline, future development is proposed to be on the southern side of the village.

The protection of the pristine natural environmental along Saibai's coastline should be addressed in all planning documents and processes relating to Saibai.

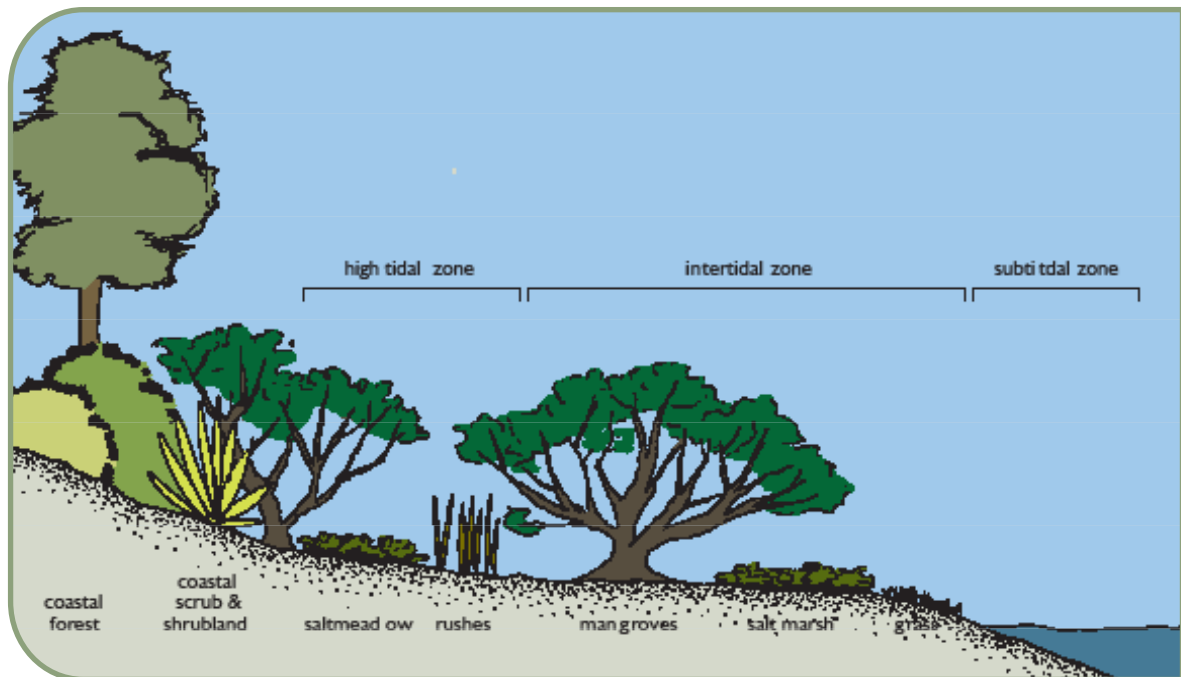
New development or changes to existing structures along the coast must be assessed for the long term suitability of the site and the vulnerability to natural coastal processes (coastal erosion, storm events and projected sea level rises).

When constructing, upgrading or maintaining coastal infrastructure, there must be an increasing focus on the principles of ecologically sustainable development to ensure that the values and the attributes of the coastline are not unduly compromised by inappropriate use and development of the environment.

Land use planning can only make good decisions if the best information is available and is understood and supported by Community. The involvement of Community in the decision making process is essential for the successful implementation of any land use strategy.

Figure 2 shows the different areas of the coastline, which form the 'coastal zone'.

Figure 2 The Coastal Zone



**“Beaches are often referred to as the sandy area that separates the sea from the land. However, this area is only part of the beach system which beings in the sand dunes above the high water mark and stretches out to the sea past where the waves break.**

**In areas where beaches occur, vegetation sand dunes provide coastal protection. Sand dunes absorb the erosive energy of waves generated by cyclones and storms. Dunes also hold reservoirs of sand to replenish the beach during periods of wave erosion. Vegetation on the dunes trap and hold sand blown from the beach aiding dune build up and stopping sand from being blown inland and lost from the active beach and dune system”**

### 3.2.4 Land Use Strategies

To minimise existing and future development on the coastline of Saibai and the impacts of natural hazards, the following strategies are recommended:

- Not permit urban development and infrastructure along the northern and southern coasts of Saibai, inaccessible parts of the coast.
- New development is contained with the village and the identified investigation areas.
- All development proposals must:
  - include landscaping and/or revegetation plans that are in accordance with the Best Practice, Land Use Strategies and Sustainable Outcomes in Section 3.1 Animals, Plants and Birds;
  - be developed in an ecologically sustainable manner;
  - maintain or improve the values of coastal wetland, estuaries, inlets, riverine corridors, dunes, shorelines, high scenic qualities and retain visual continuity; and
  - address the proposals vulnerability to natural coastal processes (coastal recession, storm events and projected sea level rises).

### 3.2.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Coastline Best Practice, Land Use Strategies and Sustainable Outcomes?
- Is the development in the village? If so, does it:
  - complement existing and multiple-use of suitable sites;
  - reflect and enhance the coastal character of the village and surrounding areas;
  - incorporate ecologically sustainable design;
  - maintain or improve the values of the coastline, the high scenic qualities and visual continuity;
  - address the proposal’s vulnerability to natural coastal processes (coastal recession, storm events and projected sea level rises);
  - address the impact of the proposal on water resources, environmental and social needs and infrastructure and population capacity; and
  - identify and protect important coastal assets of ecological, visual and cultural significance?

### 3.2.6 Sustainable Coastline Outcomes

- Protect and maintain Saibai's coast, including the foreshore, coastal wetlands, dunes, marine ecosystems, coastal marine waters and areas of geological and geomorphological, cultural and historic significance.
- Coordinate the management and use of natural marine resources to enhance community, economic and environmental values.
- Land adjoining coasts and beaches are for community purposes.
- An integrated approach and application of best practice to catchment and coastal management, waterways and wetlands is utilised to provide for environmental flow and the highest quality of water within Saibai's inland waters, estuaries and the sea.
- Community is involved in the protection and management of the coastline to ensure the protection of their cultural heritage.



### 3.2.7 Useful Resources

#### Legislation

*Coastal Protection and Management Act 1995* (Qld) provides for the protection, conservation, rehabilitation and management of the coast including resources and biological diversity.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

#### Policies, Guidelines and Fact Sheets

*Marine Debris Factsheet* outlines the cause and potential aims of marine based pollution and debris.

[www.amcs.org.au](http://www.amcs.org.au)

*Marine Pollution Factsheet* outlines the causes and potential aims of marine based pollution and debris.

[www.amcs.org.au](http://www.amcs.org.au)

*State Coastal Management Plan: Queensland's coastal policy* outlines the State government policies for the protection and management of Queensland coastal resources.

[www.epa.qld.gov.au](http://www.epa.qld.gov.au)

#### Websites

Environmental Protection Agency

[www.epa.qld.gov.au](http://www.epa.qld.gov.au)

Australian Maritime Conservation Society

[www.amcs.org.au](http://www.amcs.org.au)

CoastCare

[www.coastcare.com.au](http://www.coastcare.com.au)

OzCoasts

[www.ozcoasts.org.au](http://www.ozcoasts.org.au)



### 3.3 Tides & Storm Surge

#### 3.3.1 Best Practice

- Natural dynamic processes that shape the coastline are respected.
- Reduce community risk, exposure and damage to the adverse impacts of natural hazards such as tides and storm surges by planning coastal use and development to ensure that significant adverse effects of tides and storm surges are avoided, mitigated or remedied.
- The impacts of tide inundation and storm surge are reduced by limiting development along the coast.
- Where development cannot be avoided in areas identified as affected by tides and storm surges, it is to be undertaken in a manner that minimises impacts.
- Reduce the vulnerability of Saibai to the impacts of climate change by:
  - recognising the importance of climate change on the sea and land environments of Saibai;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the tide and storm surge levels.

#### 3.3.2 Overview of Current Situation

Due to the geographic location of the Torres Strait, the region is vulnerable to tropical cyclones and storms. The tropical cyclone and storm impacts on Community are exacerbated by poorly developed coastal infrastructure, inappropriate development along coastlines, lack of scientific research and housing design.

There is a sea wall constructed along the majority of the length of the village. However, during king tides and storm surges, the tides come over the sea wall. Further, the sea wall is in varying degrees of deterioration, with some sections of the sea wall severely eroded providing little, if no protection during king tides and storm surges.

This wall is generally at RL 4.0 which is the same height as the existing HAT. However, in recent years, the village area has been subject to tidal inundation due to the sea coming over the sea wall.



### 3.3.3 Issues Overview

The Intergovernmental Panel on Climate Change has projected sea levels to rise by the end of the twenty first century between 0.26 and 0.59 metres. The values predicting sea level rises are constantly being assessed, with some scientists advising of a further 0.2 metres be added to allow for melting ice caps. This would mean a total increase of 0.79 metres by 2100.

The sea level rise relates to a global worldwide average sea level rise and has been used, as there are no actual sea level predictions specifically for the Torres Strait. For this reason, this Plan has adopted a possible increase in sea level of 0.59 metres by 2100.

The adopted 0.59 metres should be revised at regular intervals to consider the current scientific consensus on sea level rise, as the impacts of sea level rising has a dramatic effect on Torres Strait communities. This is particularly important for the design and construction of infrastructure on the islands (such as sea walls, house slabs and desalination plants).

Figure 3 shows how storm surges impact of the village.

Figure 4 shows how with rising sea levels, storm surges will further impact on the village.

Map 9 shows the impact of coastal inundation and seal level rise.

Figure 3 Storm Surge Area

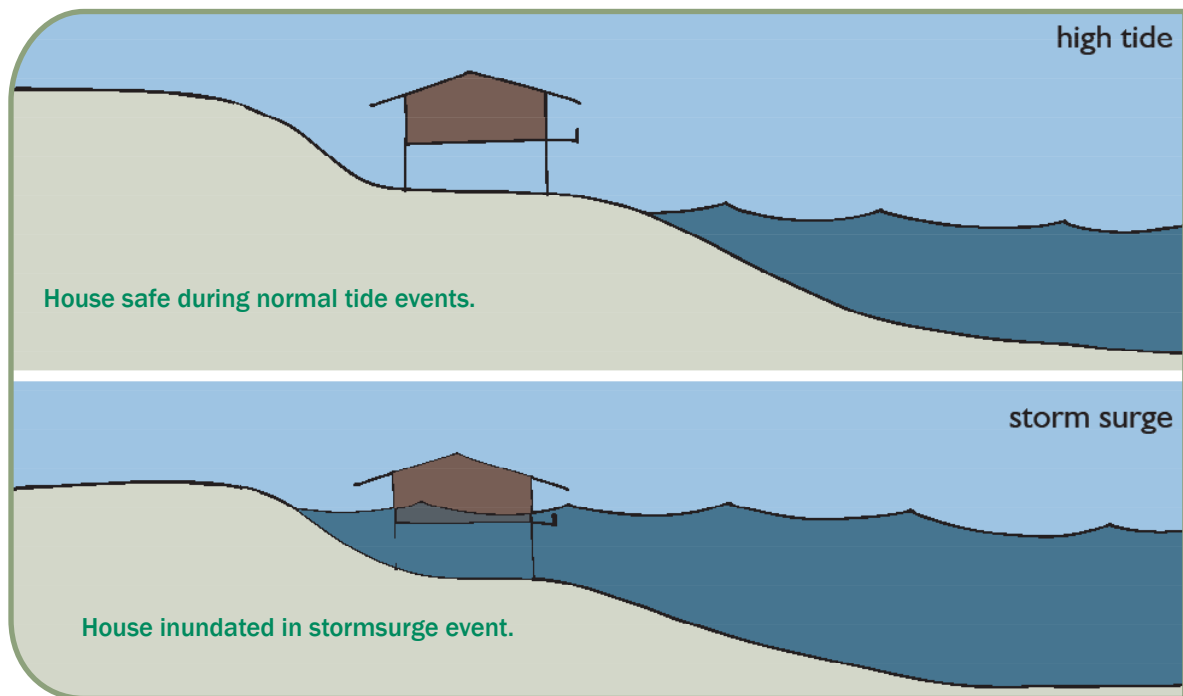
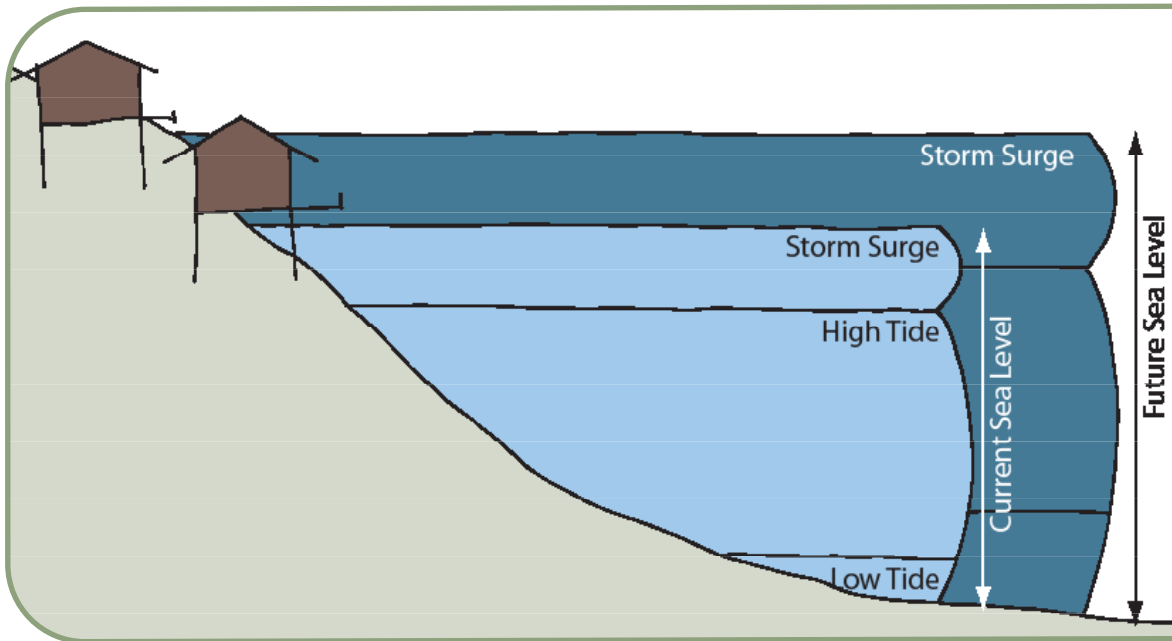
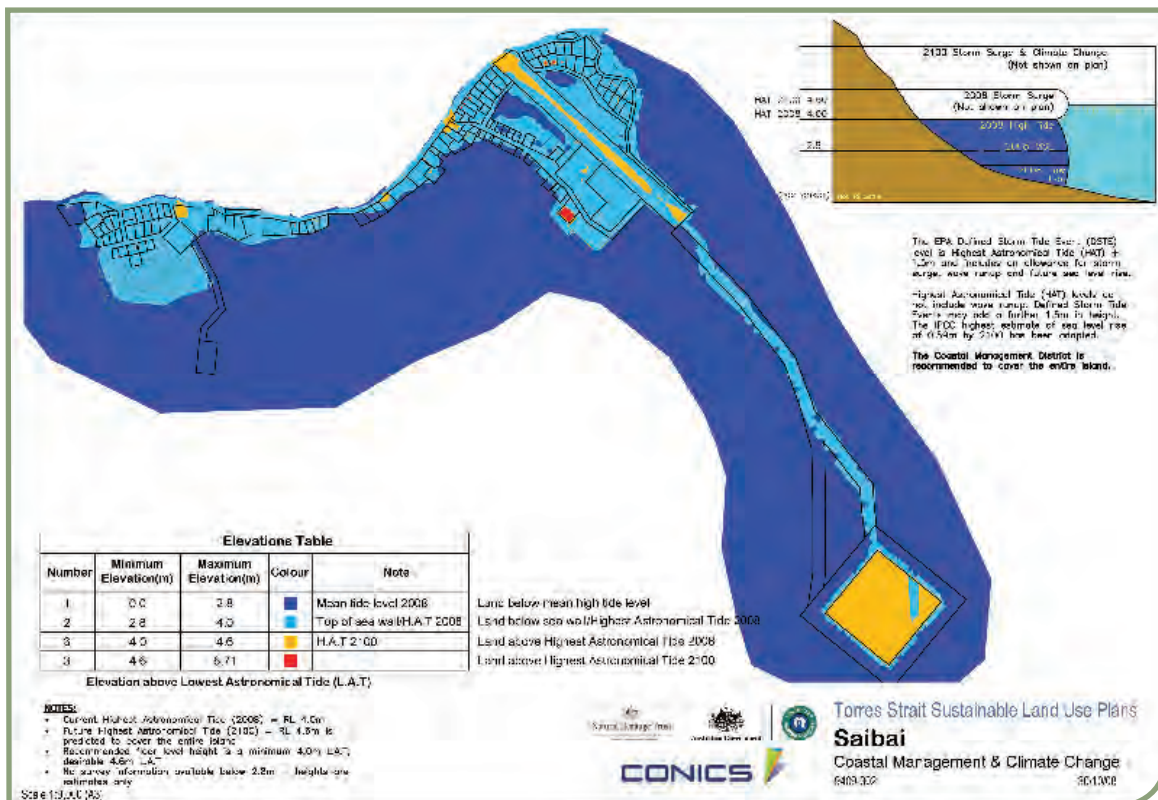


Figure 4 Climate Change and Sea Level Rise



Map 9 Coastal Management and Climate Change (Village)



For more detail, refer to Map No. 9409-302 contained in Volume 3 – Maps.



The only tidal information available for Saibai, are the predictions in the Seafarer Tide Charts published by the Australian Hydrographic Service 2008 version. The current island mapping is based on lowest astronomical tide (LAT) which is the same datum as the tide charts.

The Seafarer Tidal Predictions were analysed to see how many times the predicted high tide overtopped the seawall each day. This data predicted that during 2008 there would be no occasion when the seawall is overtopped. However, photographic evidence shows that the seawall has been overtopped, particularly during early 2007.

The current adopted amount for sea level rise over the next 100 years of 0.59 metres was then added to each high tide. When allowing for this sea level rise the predictions extrapolate to the seawall being overtopped 73 days a year by the year 2100

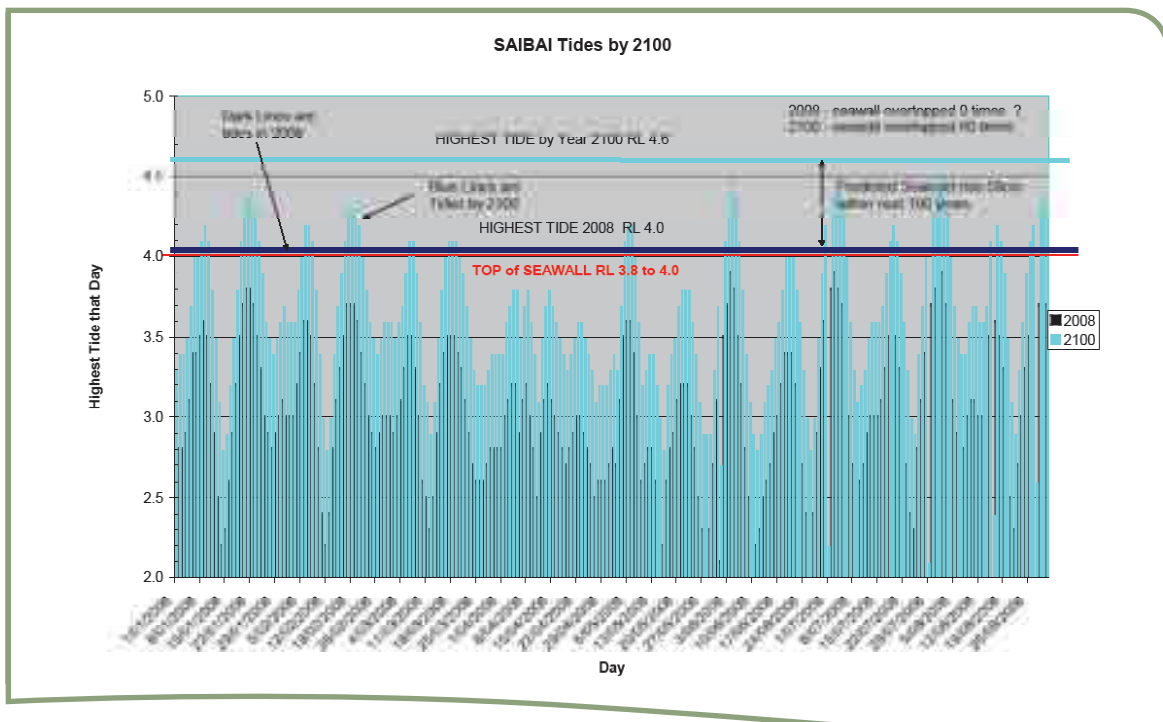
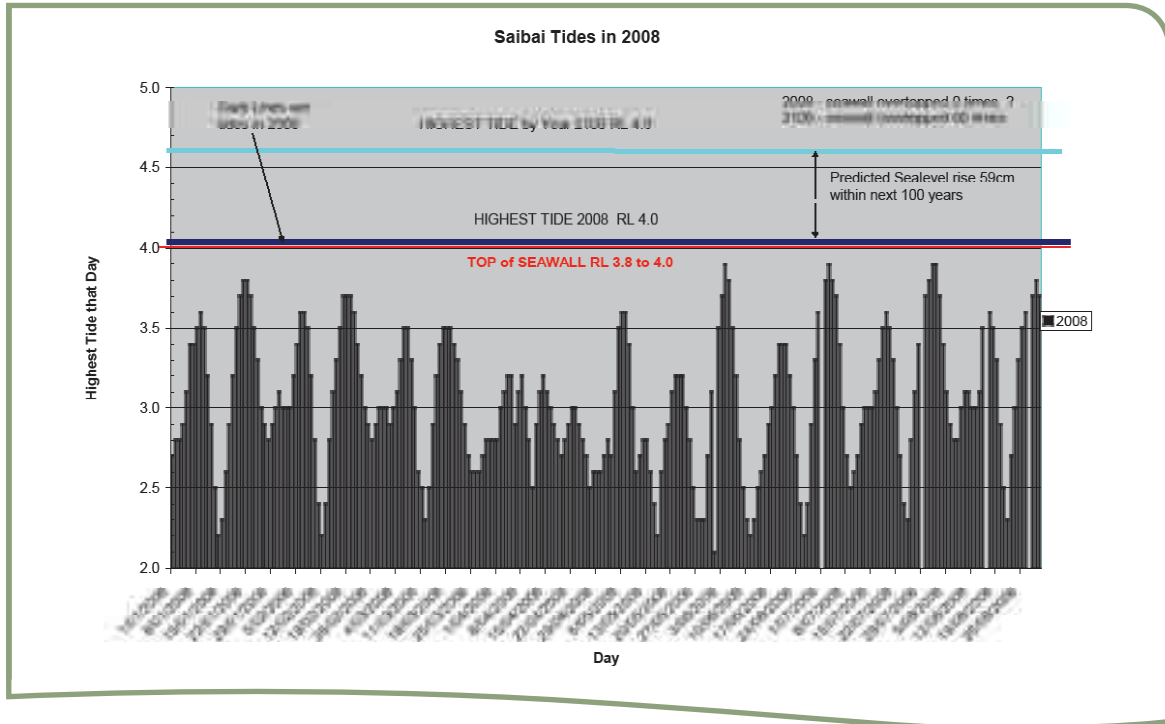
Table 1 shows the present and predicted tide levels.

Figure 5 show the frequency of present and predicted seawall beaches.

For this reason, designs for new houses or modifications to existing houses should incorporate mitigation measures that include a “refuge area” designed to withstand possible storm surge and tidal inundation in extreme events. This can be easily incorporated into existing designs by amending the walls of the existing ground floor toilet area from weatherboards to reinforced masonry/concrete walls that extend from the concrete slab to the upper ceiling of the first floor. These areas can contain toilet or laundry facilities downstairs and bathroom/toilet areas on the first floor. Ideally, access stairs should be located next to this core “refuge” area.



Figure 5 Present and Predicted Seawall Breaches



**Table 1 Present and Predicted Tide Levels**

Tide Description	Australian Height datum	Seafarer Tide Data (2008)	Island Mapping (Schlenker = LAT)	Tide Project 2008
Highest Astronomical Tide (HAT) 2100 adopting 0.59m rise		4.59	4.59	Not available
Highest Astronomical Tide 2008 (HAT)	Unknown	4.0	4.0	Not available
Top of Seawall		3.8 to 4.0	3.8 to 4.0	
Mean Higher High Water (MHHW)		2.8	2.8	Not available
Mean Lower High Water (MLHW)		2.4	2.4	Not available
Mean sea level (MSL)		1.7	1.7	Not available
Mean Higher Low Water (MHLW)		1.0	1.0	Not available
Mean Lower Low Water (MLLW)		0.6	0.6	Not available
Indian Spring Low water (ISLW)		-0.1	-0.1	Not available
Lowest Astronomical Tide (LAT)		0.0	0.0	Not available
Highest Astronomical Tide (HAT) 2100 adopting 0.59m rise		4.59	4.59	Not available
Highest Astronomical Tide 2008 (HAT)	Unknown	4.0	4.0	Not available
Top of Seawall		3.8 to 4.0	3.8 to 4.0	
Mean Higher High Water (MHHW)		2.8	2.8	Not available
Mean Lower High Water (MLHW)		2.4	2.4	Not available
Mean sea level (MSL)		1.7	1.7	Not available
Mean Higher Low Water (MHLW)		1.0	1.0	Not available
Mean Lower Low Water (MLLW)		0.6	0.6	Not available
Indian Spring Low water (ISLW)		-0.1	-0.1	Not available
Lowest Astronomical Tide (LAT)		0.0	0.0	Not available

Source: Australian Hydrographic Service, 2008

To improve the performance of the sea wall, it could be raised in stages to achieve protection from current predicted HAT – see to Table 2.



Table 2 Sea Wall Height Increase and Present and Predicted Impact on the Village

Stage	Level (LAT)	Incremental Height	Total Height above current wall	Comment
Current Height of Seawall /Bund wall	4.0			Village Inundated several times a year
Raise seawall to predicted future HAT in 2100 (0.59m rise)	4.6	0.6	0.6	Protect Village from predicted HAT by 2100.  Note: it this also protects the community from the additional effects of up to 0.6m of storm surge above the current 2008 HAT level.

In summary, in the short to medium term, works need to be undertaken to the existing sea wall to ensure that it is structurally sound and repair any damage. The seawall should be raised in stages:

- to cover for the existing storm surge; and
- to the predicted HAT levels in 2100.

The Coastal Planning for Adaptation to Global Climate Change identified physical impacts that include:

- submergence of low-lying wetland and dry land areas;
- erosion of soft shores by increasing offshore loss of sediment (e.g. beaches);
- increased salinity of estuaries and aquifers;
- rising coastal water tables; and
- increased and more severe coastal flooding and storm damage.

Saibai coastal ecosystems landforms – among them, mangroves, wetland and, coastal flood plains serve as natural shock absorbers for protecting coastal infrastructure and land uses against tropical storms; they also provide critical storage capacities for storm surges and floodwaters. When the functioning of these coastal and fringe systems is threatened and damaged Saibai's coastal and urban areas are vulnerable. Action needs to be taken to conserve and enhance the ecological and human resilience to the sea level rise and storm surges through effective land use planning. However, there are no land-use planning and design guidelines in the Torres Strait to provide incentives for developers and their architects to recognise or accommodate vulnerability to climate variability and change.

For Saibai, this includes a combination of strategies that are addressed in Section 3.3.4.



### 3.3.4 Land Use Strategies

On Saibai, relocating elsewhere on the island to minimise the impacts of king tides, storm surges and sea level rise is not a viable option, given that the village is currently on the highest ground. Therefore, a number of strategies are required to secure the long term viability of village in its existing location including –

- Not encouraging in areas identified as affected by tides and storm surges:
  - temporary buildings such as converted sheds;
  - structures used for the manufacture or storage of hazardous materials;
  - community infrastructure development such as shops or halls;
  - an increase in the number of people living, working or congregating; and
  - an intensification of uses or works that are likely to increase the adverse impacts of tides and storm surges.
- Encouraging development not to affect the physical coastal processes in ways that result in the:
  - erosion of adjacent coastal areas;
  - interference with the flow of water;
  - alteration of existing water flows; and
  - damages conditions for existing coastal vegetation.
- Redevelopment of the sea wall to be higher, thus reducing the number of time per year the sea breaches the sea wall.
- The seawall raising could be done in stages (of height) to achieve protection from current predicted HAT.
- The management and reduction of greenhouse gas emissions (mitigation) through the changing of Community awareness, knowledge and changing of behaviour.
- House designs for new or modifications to existing houses should incorporate mitigation measures that include:
  - a 'refuge area' which is built on concrete slab and includes reinforced masonry/concrete walls from the ground to the upper ceiling;
  - a 'strengthen area' that is generally a bathroom/ toilet or laundry/toilet;
  - an upper living area floor;
  - habitable floor levels of new proposals:
- a minimum of 4.0 metres LAT which is equivalent to the current HAT level; or
- a recommended level of 4.6 metres LAT (being the current predicted HAT level by 2100); and
  - mechanical and electrical works (e.g. pump stations) are above predicted 2100 HAT.
- The sea levels should be reviewed in 10 years to take into account the most current predictions.



Source: G. Hitchcock

### 3.3.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Tides and Storm Surge Best Practice, Land Use Strategies and Sustainable Outcomes?
- Is the development consistent with local and regional climate change response strategies?
- Where the development is proposed in an area identified as affected by tides and storm surges, is it
  - accompanied by a detailed hydraulic study;
  - designed to resist water forces as a result of inundation;
  - designed to incorporate any recent sea level rise research which changes the current predicted sea level rise of 0.59 metres; and
  - designed to prevent the intrusion of floodwaters as a result of inundation?
- Does the development affect counter disaster operations?

### 3.3.6 Land Use Projects

- To protect the environments on Saibai, a regular review of scientific data on predicted sea level rises is required. It is recommended that an investigation into the predicted sea level rise due to climate change should be undertaken specifically for the Torres Strait region. This investigation would provide information that is more relevant rather than the current adopted global value of 0.59 metres.
- In the short to medium term, works need to be undertaken to the existing sea wall to ensure that it is structurally sound and repair any damage.
- The sea wall should be raised in stages as follows:
  - to the existing 4.0 metres HAT;
  - then to cover for the existing storm surge; and
  - to then the predicted HAT levels in 2100.



Source: G. Hitchcock



### 3.3.7 Sustainable Outcomes for Areas affected by Tides and Storm Surge

- Coastal use and development is planned and managed to ensure that significant adverse effects of tidal inundation and storm surges on the natural and man made environments are avoided, mitigated or remedied.
- Development and use of the coast is to maintain and, where possible, enhance the quality of life for residents and visitors by avoiding areas identified as being adversely affected by tidal inundation and storm surges.
- Community determine the level of storm tide risk they are willing to accept.



Source: G. Hitchcock

### 3.3.8 Useful Resources

#### Legislation

*Coastal Protection and Management Act 1995* (Qld) provides for the protection, conservation, rehabilitation and management of the coast including resources and biological diversity.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

#### Policies, Guidelines and Fact Sheets

*Mitigating the Adverse Impacts of Storm Tide Inundation* provides advice and information on the interpretation and implementation of the Coastal Hazard Policy of the State Coastal Management Policy.

[www.epa.qld.gov.au/publications](http://www.epa.qld.gov.au/publications)

*2006 King Tides in the Torres Strait Factsheet* gives an overview of king tides in the Torres Strait 2006 and how the Environmental Protection Agency (EPA) uses this information in king tide predictions for the rest of the State.

[www.epa.qld.gov.au/publications](http://www.epa.qld.gov.au/publications)

*Queensland Storm Tide Information Resource Factsheet* provides an overview of the Queensland Storm Tide Information Resource, which seeks to compile and consolidate all available storm tide information in Queensland into a single, stand-alone and portable resource.

[www.epa.qld.gov.au/publications](http://www.epa.qld.gov.au/publications)

*Preparation of a Shoreline Erosion Management Plan Guideline* provide advice to local governments in preparation a Shoreline Erosion Management Plan to proactively plan for erosion management in erosion hotspot areas.

[www.epa.qld.gov.au/publications](http://www.epa.qld.gov.au/publications)

#### Websites

Environmental Protection Agency

[www.epa.qld.gov.au](http://www.epa.qld.gov.au)

National Tidal Centre

[www.bom.gov.au](http://www.bom.gov.au)

OzCoasts

[www.ozcoasts.org.au](http://www.ozcoasts.org.au)

## 3.4 Waterways and Wetlands

### 3.4.1 Best Practice

- Natural waterways, wetlands, catchments and associated natural dynamic processes that shape them are respected, managed to protect the ecological processes, enhance the water quality, conserve riparian ecological values and landscape quality, while acknowledging nature based recreation opportunities.
- The quality of all water sources are protected and, wherever possible, enhanced.
- The ecological and cultural importance of waterways and wetlands and their sources are not compromised by inappropriate development and activities.
- Maintain and enhance riparian corridors and buffers to ensure the healthy function of the riparian zone of waterways and wetlands.
- Reduce the vulnerability of Saibai to the impacts of climate change by:
  - recognising the importance of climate change on the waterways and wetlands environments of Saibai;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Saibai's waterways and wetlands.

### 3.4.2 Overview of Current Situation

As Saibai has large inundated areas that are tidally influenced, the island has limited waterway values other than those associated with marine drainage paths from mangroves and other inland areas. The extensive wetlands and mangrove areas are significant and important to the environment as well as Community for fishing and prawning.

**“Wetlands are predominately areas that are permanently, seasonally or intermittently waterlogged or inundated with water that may be fresh, saline, flowing or static. Seasonal wetlands, particularly seasonal waterlogged wetlands, often have a higher plant and animal species richness that permanent wetlands“**

The ecological services that the watercourses contribute to landscape processes, whether conspicuous surface features or partially underground, are crucial to the long-term environmental health of the island.

Maps 7 & 8 shows the identified ecologically significant watercourse and habitat areas.

**“A waterway can be a creek, brook, river or stream and include a lake, estuary or inlet at its base. Waterways also include floodplains and wetland systems that overflow into rivers, as well as any lakes or swamps that are filled by streams rather than shallow groundwater”**

### 3.4.3 Issues Overview

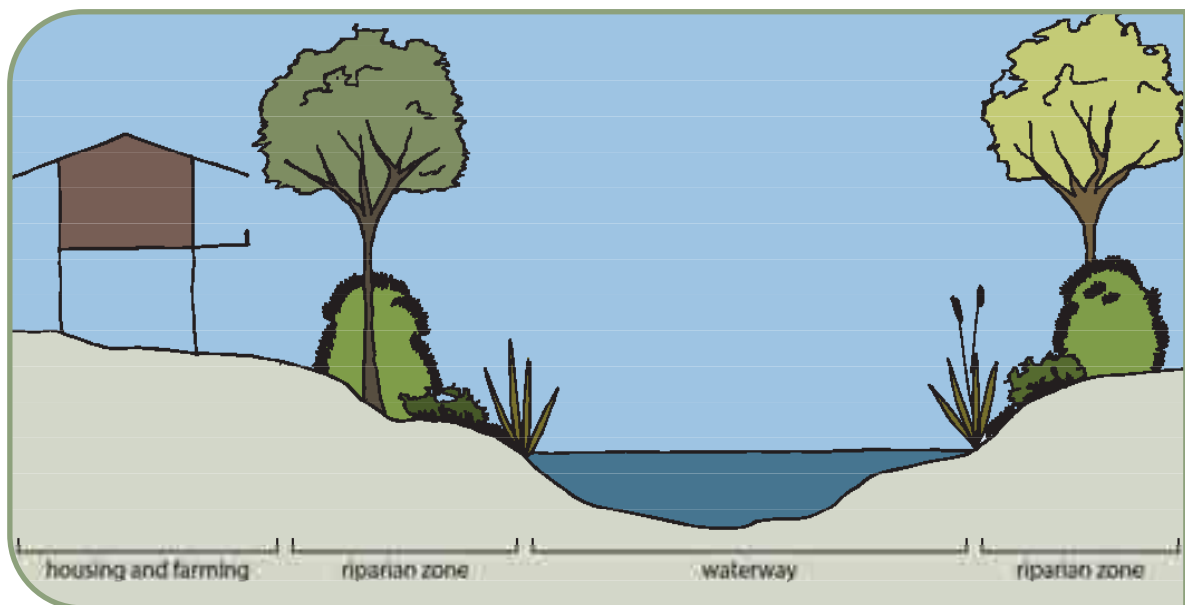
Waterways, wetlands, associated floodplains and riparian areas support a range of natural and economic functions, including habitat for land and sea wildlife, nursery grounds for creek and bay fisheries, potable water supplies, stormwater conveyance, provision of soils for building materials, ecological linkages, scenic amenity and recreational opportunities.

Land use activities are changing Saibai's waterways, wetlands and riparian areas. These changes can include the loss and degradation of riparian vegetation, increased nutrient levels, reduction in environmental flow and destructive increases in peak flows.

Wherever possible, particularly in areas of high conservation value, development should not be encouraged. Rehabilitating degraded waterways, wetlands and riparian areas should be undertaken to restore natural ecological functions.

Figure 6 shows how if buffer areas are left between waterways and wetlands, it provides protection to the waterways and wetlands from the impacts of development.

Figure 6 Waterway and Wetland Buffer





**“A catchment area or basin is land which is bounded by natural features such as hills or mountains from which all runoff water flows to a low point. This low point will be a dam, a location in a river or the mouth of a river where the water enters the ocean.”**

#### 3.4.4 Land Use Strategies

To minimise existing and future development impacts on Saibai’s waterways and wetlands the following strategies are recommended:

- All development proposals must:
  - include landscaping and/or revegetation plans that are in accordance with the Best Practice, Land Use Strategies and Sustainable Outcomes of Section 3.1 Plants, Animals and Birds;
  - be ecologically sustainable development;
  - maintain or improve the values of coastal wetland, estuaries, inlets, riverine corridors, dunes, shorelines, high scenic qualities and retain visual continuity;
  - address the proposals vulnerability to natural coastal processes (coastal recession, storm events and projected sea level rises); and
  - where adjacent to a degraded riparian corridor, include rehabilitation plans for the corridor.
- Development controls based on the assessed risk for developments near waters and wetlands include controls on minimum elevations, setbacks and lot sizes, as well as maximum densities and site coverage.
- Development is not encouraged:
  - at the head waters of waterways and wetlands;
  - where it has detrimental impact on natural flow regimes and quality water systems;
  - in areas within 40 metres of waterways and wetlands to provide a buffer between riparian areas and development; and
  - to utilise groundwater resources.

#### 3.4.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Waterways and Wetlands Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development:
  - protect water supply catchments and significant underground waterways;
  - retain vegetation cover to assist in maintaining an enhancing water quality;
  - maintain the absorptive capacity of soils;
  - maintain existing waterways and wetlands as a means of absorbing peak flows from floods or the effects of cyclones and storm surges; and
  - implement management practices during and after development to protect waterways and wetlands?



### 3.4.6 Land Use Projects

To minimise existing and future impact to Saibai's waterways, it is recommended to revegetate and restore the vegetation along the waterways near the village to provide buffers.



### 3.4.7 Sustainable Waterways and Wetland Outcomes

- Protect and where possible, restore catchments, waterways, water bodies, groundwater, water quality and dependent ecosystems such as marine environments while maintaining the economic and social values derived from water use.
- Development should not diminish the quality or quantity of water in groundwater systems, watercourses, nor should it diminish the volume of water flows in watercourses or wetlands.
- Water on Saibai is managed in a sustainable and integrated manner to provide adequate supplies for human and environmental uses.



### 3.4.8 Useful Resources

#### Policies, Guidelines and Fact Sheets

*Catchment and Water Quality* provides an overview of the link between the health of a water catchment and water quality.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Gully Erosion* gives an overview of what is gully erosion and what we can do to minimise its impacts.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*How Healthy is your Waterway? Assessing stream bank vegetation* describes how to find out if your waterways are healthy by ensuring a well vegetated riparian zone in order to minimise the impacts of erosion on water quality

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Overland Flow Water* provides an overview of what is overland flow water and why it is important to manage overland flow.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Strategic Plan for the Conservation and Management of Queensland's Wetlands* sets out the State government's intent for the conservation, values and functions of wetlands.

[www.epa.qld.gov.au/publications](http://www.epa.qld.gov.au/publications)

*Streambank Planting Guidelines and Hints* describes what type of vegetation you should plant in riparian zones and where to plant it.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Streambank Vegetation is Valuable* provides an overview of why we need vegetation riparian zones along our watercourses.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*The Hydrological Cycle* described the water cycle, both above, on and below the earth's surface.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*The Value of Wetlands* talks about the role of wetlands in nature conservation.

[www.wetlandcare.com.au/fact\\_sheets.asp](http://www.wetlandcare.com.au/fact_sheets.asp)

*What, Why and How Wetlands Work* provides an introduction to the important role that wetlands play and why we should protect them.

[www.wetlandcare.com.au/fact\\_sheets.asp](http://www.wetlandcare.com.au/fact_sheets.asp)

*What is Bank Erosion* talks about what is bank erosion and how it is caused.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

#### Websites

Department of Natural Resources and Water

[www.nrw.qld.gov.au](http://www.nrw.qld.gov.au)

Environmental Protection Agency

[www.epa.qld.gov.au](http://www.epa.qld.gov.au)

WetlandCare Australia

[www.wetlandcare.com.au](http://www.wetlandcare.com.au)





## 3.5 Land and Soil

### 3.5.1 Best Practice

- Minimise the impact of salinity and rising water tables on land uses, buildings and infrastructure by minimising land and soil disturbance.
- The management of the land and soil will be designed to work with nature rather than against nature and integrated with sea planning and management to ensure the negative impacts of human actions (e.g. development, vegetation clearing) on plants, animals and birds is minimised or avoided.
- Reduce the vulnerability of Saibai to the impacts of climate change by:
  - recognising the importance of climate change on Saibai's land and soil;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Saibai's land and soils.

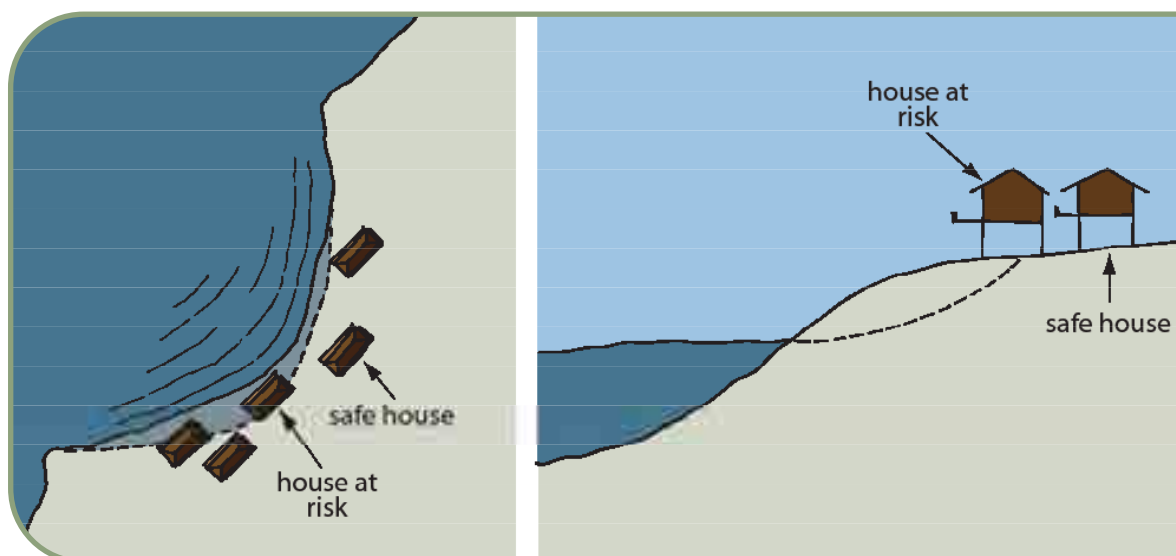
### 3.5.2 Overview of Current Situation

Saibai is an extremely flat mud island with large interior swamps, salt pans and grasslands filled with brackish water. As such, slope stability is not an issue for development. However, the shoreline is subject to significant coastal erosion due to natural forces, development and increasing tide levels.

A sea wall is constructed along the majority of the length of the village. However, during king tides and storm surges, the tides come over the sea wall inundating the village. Further, the sea wall is in varying degrees of deterioration, with some sections of the sea wall severely eroded providing little, if no protection.

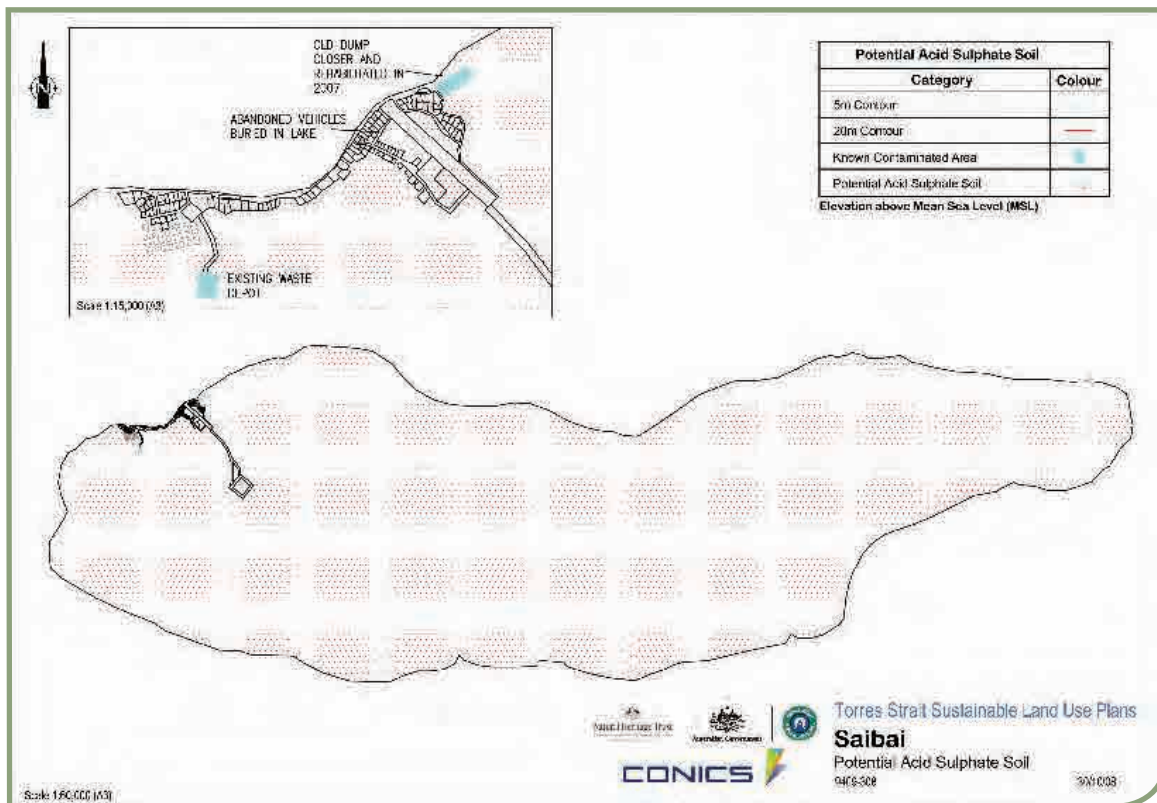
Figure 7 shows where the 'coastal erosion zone' can occur when there is no seawall.

Figure 7 Coastal Erosion



“Acid sulfate soils are naturally occurring soils and sediment containing iron sulfides, most commonly pyrite. When acid sulfate soils are exposed to air, the iron sulfides in the soil react with oxygen and water to produce a variety of iron compounds and sulphuric acid. Initially a chemical reaction, the process is accelerated by soil bacteria. The resulting acid sulfate soils can release other substances, including heavy metals, from the soil and into the surrounding environment.”

Map 10 Acid Sulfate Soils



For more detail, refer to Map No. 9409-308 contained in Volume 3 – Maps.

There is a lack of data available on soil types on Saibai. However, as Saibai is below 5 metres AHD, there is the potential for acid sulfate soils to be present.

Map 10 shows the potential location of acid sulfate soils.

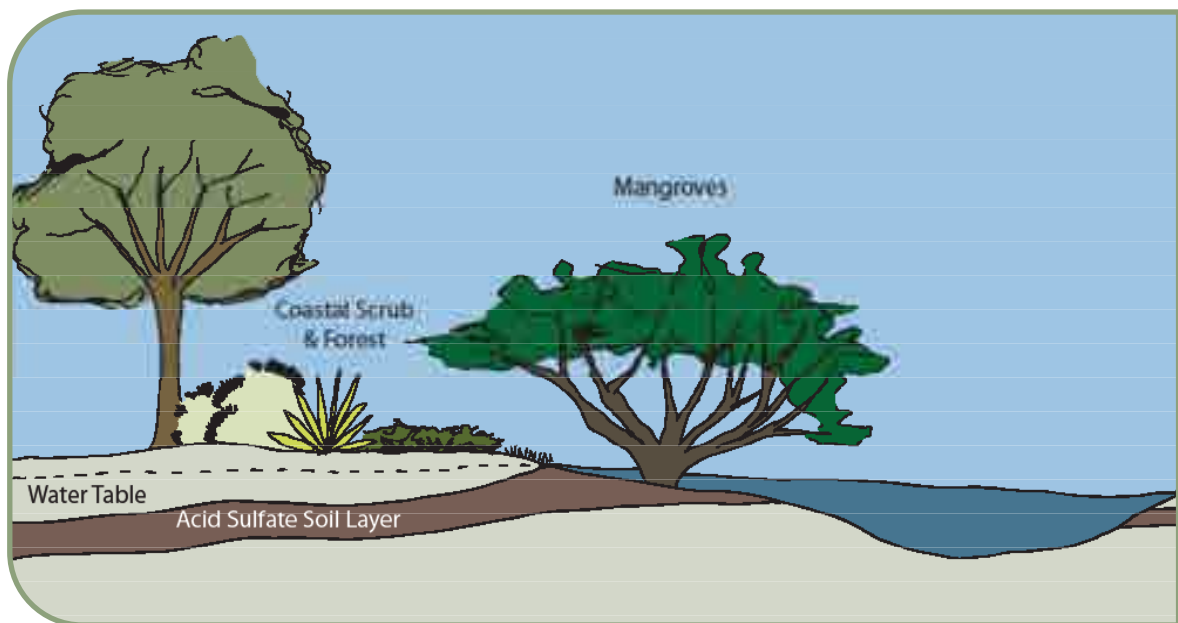
Figure 8 shows where acid sulfate soil is located within the soil layers.



“Acid sulfate soils can result in the corrosion of concrete, steel and some aluminium alloys used in buildings, drainage systems and roads. The use of acid sulfate soil material as site fill material or in embankments can affect plant growth and block pipe drainage systems due to the formation of iron oxides. Acid waters entering estuarine, coastal or riverine environments can kill fish and crustaceans and affect aquatic plants through direct acid exposure.

The presence of acid sulfate soil material produces an offensive odour, which smells like rotten eggs”

Figure 8 Acid Sulfate Soil





### 3.5.3 Issues Overview

The marsh-like nature of the island constrains any significant expansion of the existing village other than to the west of the dump access road, south of the village, although significant filling is required to provide protection from inland inundation.

Given that much of the village and associated community facilities and infrastructure are located on low lying areas, there is the potential for acid sulfate soils to be exposed during construction. Exposed acid sulfate soils can result in environmental harm such as fish kills and corrode infrastructure such as water and sewer pipes as well as building foundations.

### 3.5.4 Land Use Strategies

To minimise existing and future development on Saibai land and soil, the following strategies are recommended:

- All development should include landscaping and/or revegetation plans that are in accordance with the Best Practice, Land Use Strategies and Sustainable Outcomes of Section 3.1 Plants, Animals and Birds.
- Where development is proposed in areas at or below 5 metres AHD, an acid sulfate soil investigation is to undertaken and where necessary, an environmental management plan is prepared.
- Highly erodible or unstable soils are to be left in their natural condition to prevent erosion, sedimentation and water quality degradation problems.
- During construction of a development, soil erosion and sedimentation control measures must be in place prior to and during construction and maintenance.

### 3.5.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Land and Soil Best Practice, Land Use Strategies and Sustainable Outcomes?
- Where development occurs on land below 5 metres AHD are the acid sulfate soils disturbed when excavating or otherwise removing soil or sediment, extracting groundwater or filling land? If so, is the development proposal accompanied by a report on an:
  - acid sulfate soil investigation;
  - environmental management plan; and
  - ongoing management program for treating disturbed acid sulfate soils and drainage waters?



### 3.5.6 Sustainable Land and Soils Outcomes

- Development and use of the coast is to maintain and, where possible, enhance the quality of life for residents and visitors by avoiding areas identified as being adversely affected by acid sulfate soils and erosion.
- Drainage activities should avoid or minimise land degradation, including soil erosion, compaction, land instability, contamination, acidity, water logging, decline of native vegetation or, where appropriate, salinity and, where possible, land should be rehabilitated.
- Development involving acid sulfate soils should be planned and managed to avoid potential adverse effects on the natural and built environment (including infrastructure) and human health.

### 3.5.7 Useful Resources

#### Legislation

*Coastal Protection and Management Act 1995* (Qld) provides for the protection, conservation, rehabilitation and management of the coast including resources and biological diversity.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)



#### Policies, Guidelines and Fact Sheets

*State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide* sets out the State government's interest in ensuring the natural hazards of flood, bushfire and landslide are adequately considered when making decisions about development.

[www.dip.qld.gov.au/policies/index.php](http://www.dip.qld.gov.au/policies/index.php)

*State Planning Policy 2/02 – Planning and Managing Development Involving Acid Sulfate Soils* sets out the State interest concerning development involving acid sulphate soils in coastal areas.

[www.dip.qld.gov.au/policies/index.php](http://www.dip.qld.gov.au/policies/index.php)

*Acid Sulfate Soils in Queensland* explains what acid sulfate soils are, how they are formed, where they occur and what happens when they are disturbed.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Identifying Acid Sulfate Soils* describes the scientific process for identifying if acid sulfate soils are in the soil.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Managing Acid Sulfate Soils* provides an overview of the techniques which can be used to manage acid sulfate soils if they are disturbed.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Coastal Erosions* introduces what is coastal erosion and what are the causes of coastal erosion.

[www.bom.gov.au/pacificsealevel](http://www.bom.gov.au/pacificsealevel)

#### Websites

Department of Natural Resources and Water

[www.nrw.qld.gov.au](http://www.nrw.qld.gov.au)

Environmental Protection Agency

[www.epa.qld.gov.au](http://www.epa.qld.gov.au)

OzCoasts

[www.ozcoasts.org.au](http://www.ozcoasts.org.au)

## 3.6 Bushfire

### 3.6.1 Best Practice

- The management of areas prone to bushfire is to work with nature rather than against nature.
- The location and design of development is undertaken in a manner that:
  - does not alter natural fire regimes;
  - significantly increase the risk to human life, property and infrastructure from bush fire; and
  - minimises the potential risk to the safety and health of the community as a result of bushfire.
- Reduce the vulnerability of Saibai to the impacts of climate change by:
  - recognising the importance of climate change on Saibai's bushfire environment;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change Saibai's bushfire environment.

#### 3.6.2 Overview of Current Situation

Saibai is extensively covered with swamps and mangroves, which are subject to a low bushfire risk. However, the inland grasslands and saltpans pose a medium bushfire risk to the village.

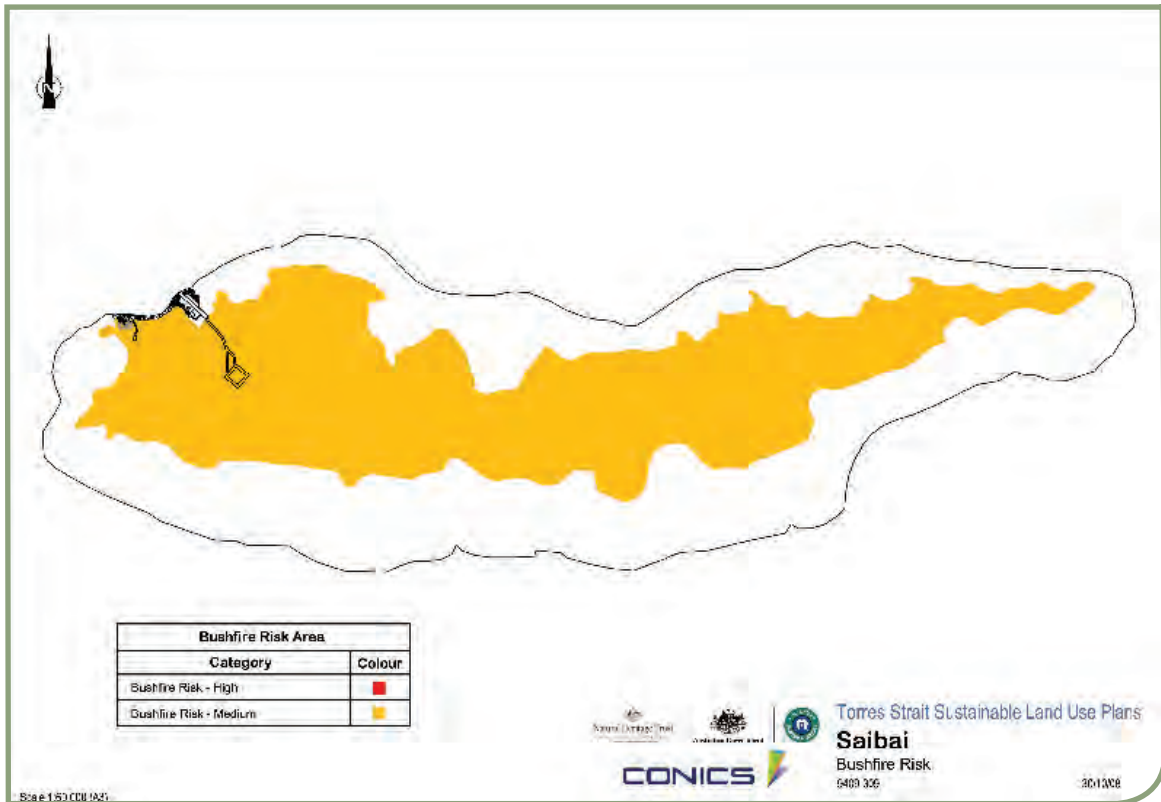
The presence of human occupation raises the likelihood and frequency of fire, which may significantly alter the ecological characteristics of Saibai. Inappropriate burning of mangroves and wetlands could cause the margins of this vegetation type to contract – effectively reducing its area and function as a habitat.

Using the *State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide* methodology, areas of Saibai are identified as low and medium bushfire risk.

Maps 11 & 12 shows the location of bushfire hazard areas.

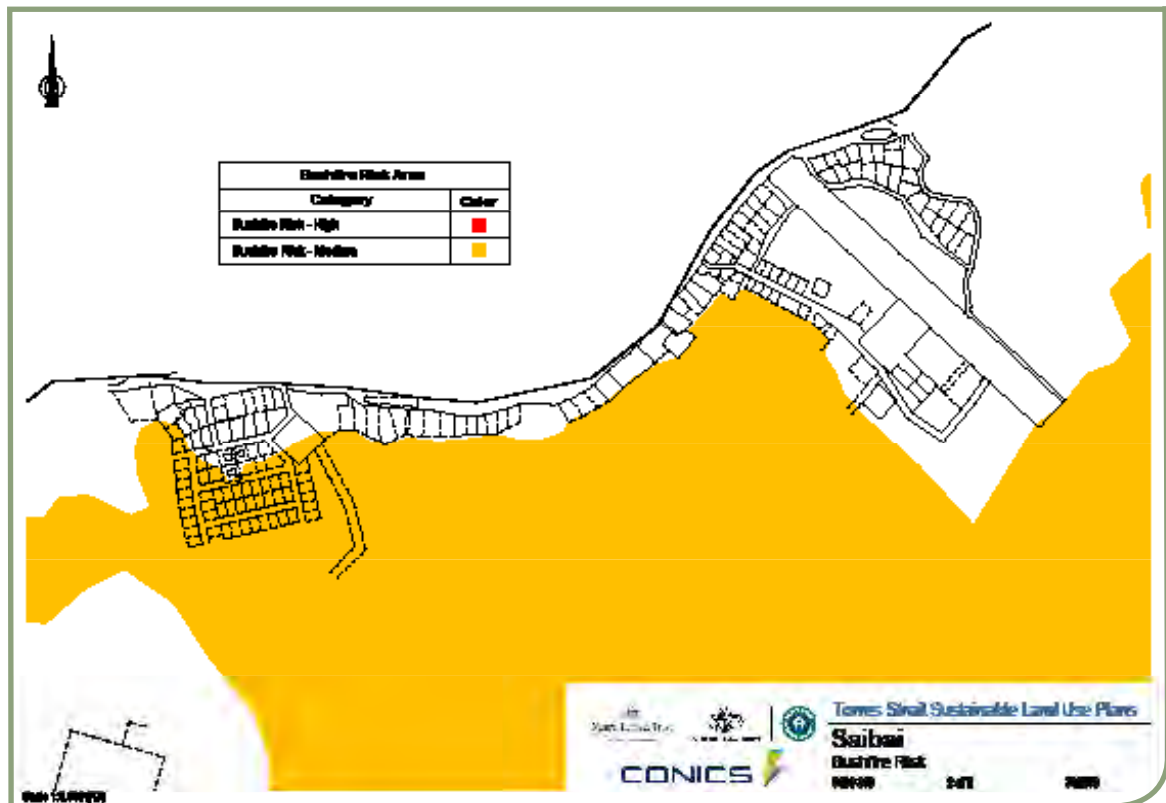


Map 11 Bushfire Risk



For more detail, refer to Map No. 9409-309 contained in Volume 3 – Maps.

Map 12 Bushfire Risk (Village)



For more detail, refer to Map No. 9409-309 contained in Volume 3 – Maps.

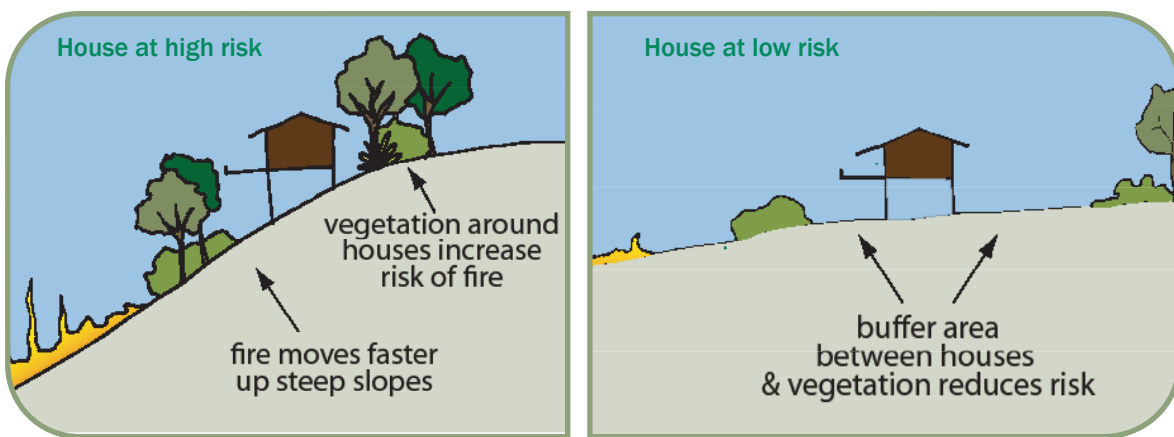
### 3.6.3 Issues Overview

Bushfires represent an ever present risk to life, property and the environment. While the obvious answer would be to avoid development near bushfire hazards or to prevent bushfires from occurring, neither are realistic options due to the growing demands for residential land and the growing understanding of the ecological processes dependent upon bushfire.

One of the ways of managing risks to life, land, property and the environment from bushfire is through appropriate land use planning strategies. Identifying bushfire prone areas across Saibai will inform future generations and guide where development should or should not occur at the beginning of the planning process.

Figure 9 shows how providing a firebreak between dwellings and bushfire hazard areas assists in reducing the threat of bushfire.

Figure 9 Bushfire Risk



### 3.6.4 Land Use Strategies

To minimise the impacts of bushfire on existing and future development, the following strategies are recommended:

- Development is not permitted in areas of high bushfire risk and on slopes adjacent or part of areas identified as high bushfire risk otherwise development must be compatible with the natural hazard where there is no other site suitable and reasonably available.
- New development must have access to and is accessible by sealed roads or high quality unsealed roads to facilitate emergency vehicle access.
- All development adjacent to or within an identified bushfire risk area must:
  - have setbacks as a firebreak which is maintained on an ongoing basis;
  - have access to adequate water supply;
  - not increase bushfire hazard or public safety risk;
  - maintain the health, safety and wellbeing of the community; and
  - minimise the impacts from bushfire on existing development.

### 3.6.5 Land Use Considerations

When assessing the impacts of bushfire on future development, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Bushfire Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development consider:
  - alternative sites where it is in an area of high bushfire risk; and
  - the risk to people and property?
- Is the development constructed of appropriate materials?
- Are appropriate firebreak setbacks provided between buildings and structures, including houses and infrastructure and bushfire risk areas?
- Is there adequate water supply and pressure and other appropriate infrastructure to protect a building or infrastructure from a fire?
- Does the development have a bushfire management plan, which includes the type of fire regime required to manage the ecological processes within the natural environments?

### 3.6.6 Land Use Projects

To protect Saibai’s existing development and infrastructure and to assist in further studies of the Investigation Areas, the following projects are recommended:

- Implement a bushfire management plan that covers at a minimum:
  - the establishment of firebreaks or control lines around grassland areas and long-term dry vegetation types (woodlands dominated by sclerophyll trees and shrubs in areas adjacent to human settlements;
  - controlled burning outside of the driest periods when slow, low-intensity fires can be managed;
  - mosaic burning (e.g. small patches of controlled burning to reduce excess fuel load accumulation so that there is always habitat connectivity provided);
  - fuel load maintenance;
  - the need for fire trails and the potential impact on pristine natural environments; and
  - undertake Community capacity building on:
    - sustainable fire management; and
    - property preparedness including planning for and maintenance requirements.





### 3.6.7 Sustainable Bushfire Outcomes

Development is planned and managed to ensure that significant adverse effects of bushfire on the natural and man made environments are avoided, mitigated or remedied.



### 3.6.8 Useful Resources

#### Policies, Guidelines and Fact Sheets

State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide sets out the State government’s interest in ensuring the natural hazards of flood, bushfire and landslide are adequately considered when making decisions about development.

[www.dip.qld.gov.au/policies/index.php](http://www.dip.qld.gov.au/policies/index.php)

*Your Bushfire Action Checklist* provides a list of tasks individuals and Community should do both during the bushfire season and out of season to ensure that if a bushfire occurs, minimum damage is done to property.

[www.fire.qld.gov.au](http://www.fire.qld.gov.au)

#### Websites

Queensland Fire & Rescue Service

[www.fire.qld.gov.au](http://www.fire.qld.gov.au)

# Cultural Heritage



## 4.1 Best Practice

- Places of cultural heritage significance are identified, protected and retained for the benefit of present and future generations.
- Traditional Owners:
  - are the primary source of information on the value of their heritage and how this is best conserved;
  - must have an active role in any heritage planning process;
  - own intellectual property and other information relating to their culture and heritage; and
  - are the key stakeholders in land use planning through their relationship with land and sea management and resources.
- Reduce the impacts of climate change on Community's cultural heritage by:
  - recognising the importance of climate change on Saibai's cultural heritage;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the Island's cultural heritage.

## 4.2 Overview of Current Situation

The entire island of Saibai is an area of significant cultural heritage value to the Traditional Owners and the people of Saibai.

While many significant and sacred sites are only known to Traditional Owners, a number of sites have been made known to the general public including:

- old village sites;
- middens;
- wells;
- cassava stones;
- coconut and bamboo groves;
- occupation deposit;
- horticultural fields;
- stone artefact scatters;
- ceramic sherds;
- shell and bone arrangements;
- Bu shells;
- stone tool quarry;
- ochre quarry; and
- canals.

To protect the cultural significance of these sites, the locations of these sites have not been disclosed.

Further details on Saibai's culturally significant places and sites is include in Appendix 3.

The Holy Trinity Church is identified as a State heritage building due to the churches importance in the development of missionary activity in the Torres Strait from 1981 onwards.

The State heritage citation for the Holy Trinity Church is included in Appendix 3.

Map 13 shows the location of the Holy Trinity Church.



Map 13 Holy Trinity Church



For more detail, refer to Map No. 9409-307 contained in Volume 3 – Maps.

There are seven (7) clans on Saibai, namely:

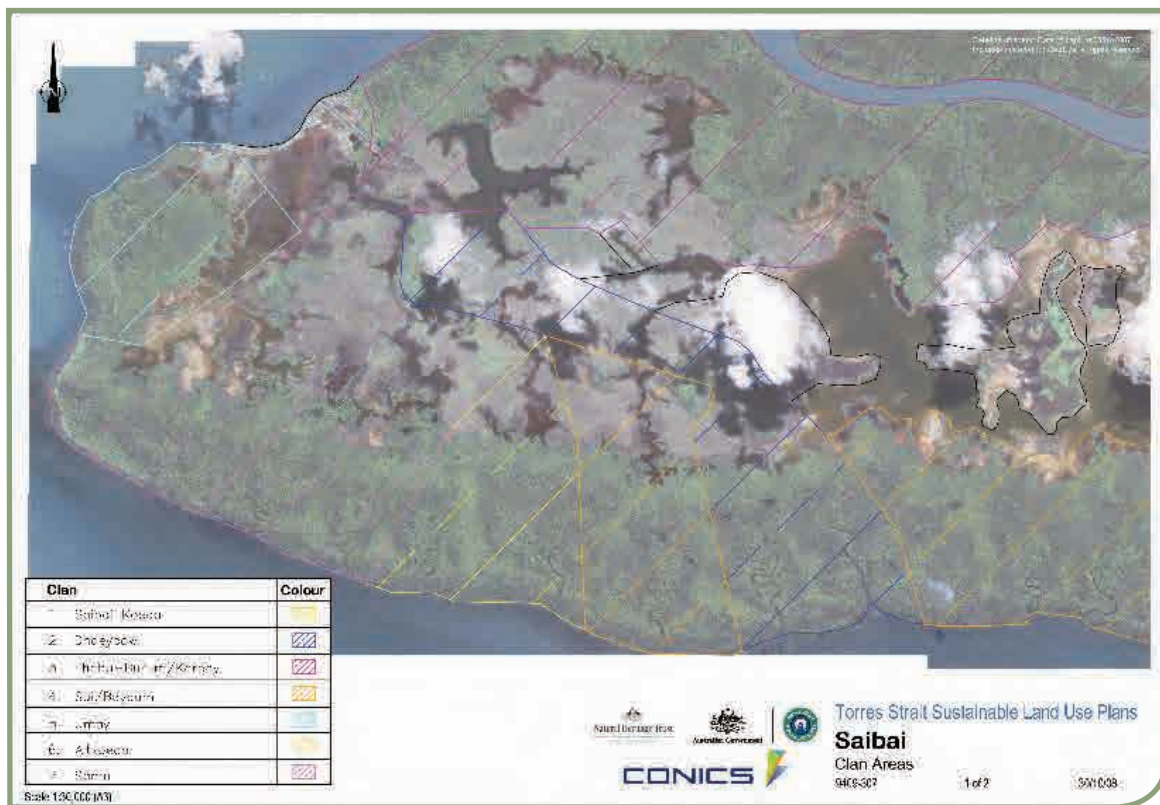
- Saibai Koedal;
- Dhoeybaw;
- Thabu-Burum/Karbay;
- Sui/Saydam;
- Umay;
- Aitkoedal; and
- Samu.

Map 14a and 14b shows the clan areas and boundaries on Saibai.



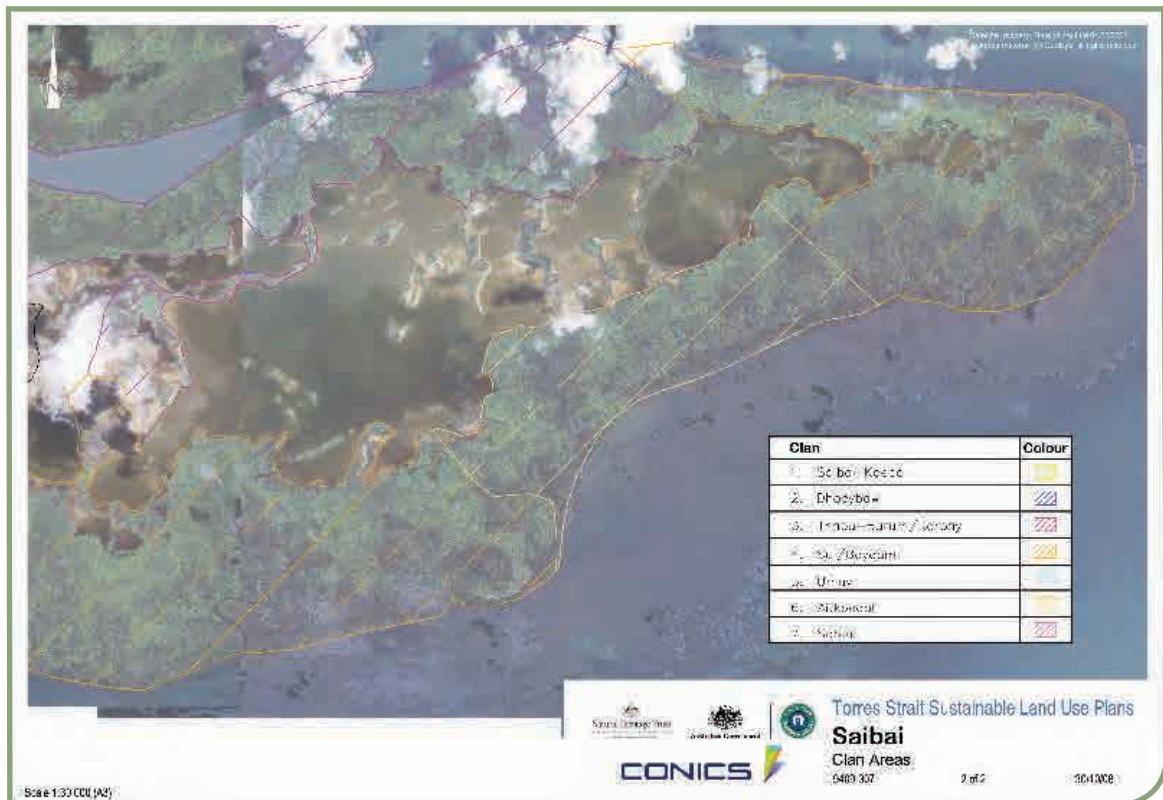
“In the Torres Strait, cultural heritage includes all traces of human activity in the physical environment. These are irreplaceable sources of information on people’s lives and activities and on the historical development of crafts, techniques and art. Because monuments, site and culturally significant environments are non-renewable resources, their management must have a long-term focus. Cultural monuments and significant sites are a source of emotional and aesthetic experiences for many people and today Island Communities can benefit from the preservation and active use of its cultural heritage”

Map 14a Clan Areas & Boundaries



For more detail, refer to Map No. 9409-307 contained in Volume 3 – Maps.

## Map 14b Clan Areas & Boundaries



For more detail, refer to Map No. 9409-307 contained in Volume 3 – Maps.

### 4.3 Issues Overview

Cultural heritage is about places of significance to people and helps us to understand the past and enrich the present. In the Torres Strait, there are areas of particular significance to people because of island custom (*Ailan Kastom*) and history, including contemporary history. They may be meeting places, monuments and landscapes. Areas of cultural significance may not be physically evident. With regard to Torres Strait Islander tradition, given the sacred nature of areas of significance, many sites have not been recorded on official heritage inventories and registers that are accessible to the public. Hence, without consultation and liaison with Traditional Owners, engagement of cultural heritage observers and preparation of cultural heritage investigations, areas of significance may be inadvertently damaged or destroyed.

On Saibai, there are numerous areas and objects of significant cultural, historical and archaeological significance. It is likely that the location of many of these have not been recorded. The *Torres Strait Islander Cultural Heritage Act 2003* provides blanket protection for Torres Strait Islander cultural heritage and its “Duty of Care” provisions require those conducting activities to take all reasonable and practicable measures to avoid harming it. Communication with the relevant PBC will assist developers to identify local areas and objects of significance and avoid or mitigate disturbance. The TSRA, through its LSMU and Native Title Office can assist in contacting the relevant PBC.



Given the nature of major development projects in the Torres Strait, the reality is that development often proceeds without undertaking appropriate studies, consultation or engagement of observers. As such, it is vital that any applicant of a development undertake their duty of care obligations and engage with Saibai's Traditional Owners in order to manage and protect their unique areas of cultural significance.

Engagement and partnerships with Community provides opportunities for information sharing and effective management of cultural values and heritage. Information about places of cultural heritage significance must be managed in a way that satisfies the custodians of the area and ensuring that there is access to sufficient data to ensure proper management and protection of Saibai's cultural heritage.

Not only are areas of significance at risk from development but also from impacts from storm surge, inundation and erosion, particular sites which are located close to the coastline such as middens and other low lying sites. The intensification of environmental impacts associated with climate change may result in some areas of significance being submerged or eroded. The existing cemetery is one case in point. Decisions need to be made whether or not the cemetery should be expanded in its present location or be relocated to avoid the tidal and storm surges.



## 4.4 Land Use Strategies

To protect Saibai's cultural heritage from proposed development, the following strategies are recommended:

- All proposed developments must be discussed with the PBC on the potential impacts of the development on cultural heritage.
- A written agreement (e.g. cultural heritage management plan) be prepared as part of the development proposal which addresses:
  - genuine consultation with Community to determine how they wish to safeguard and control their culture and/ or heritage;
  - how the development will protect the culture and heritage item or place;
  - the requirement for a cultural heritage survey prior to development proceeding;
  - the role of the PBC and Traditional Owners as observers during construction to monitor the impact on the culture and heritage items;
  - methods such as temporary markers that identify a buffer zone around the heritage item or place that must be removed after the building has been completed;
  - a remediation plan which outlines how and when a cultural heritage item or place will be reinstated if removed or damaged during construction; and
  - a 'sign off' process after construction is completed. This sign off must ensure that all parties are satisfied with the condition of the cultural heritage item or place is left in after construction is completed.
- All proposed developments must:
  - include the written agreement such as a cultural heritage management plan; and
  - undertake a site inventory including a search of NRW and the PBC's records.
- Community must identify, conserve and manage places of significant cultural heritage particularly those affected by natural hazards and determine which information is readily or not available for general public knowledge.
- The precautionary principle should be adopted where there is uncertainty about the cultural significance of an area or a site.
- All processes, policies and decisions that protect and enhance the natural and made environments must incorporate cultural values and beliefs and the role of Traditional Owners in Saibai's cultural heritage.



## 4.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted:

- Is the development in accordance with the Cultural Heritage Best Practice, Land Use Strategies and Sustainable Outcomes?
- Saibai is a significant area of cultural heritage to Community, so have all appropriate persons and State agencies been consulted?
- Does the development have an agreed cultural heritage management plan for the affected area and/or site?
- Where the development threatens a cultural heritage item, does it have a disaster mitigation plan? If it does, does it address where disturbance is unavoidable, the temporary relocation of the implement to a safe place?
- Does the development threaten the integrity and setting of heritage items through water run off, soil erosion or soil movement?

## 4.6 Land Use Projects

To protect Saibai’s cultural heritage, the following projects are recommended to be undertaken.

- A systematic, island focused cultural heritage survey. This survey should:
  - identify the nature and location of major cultural heritage sites and their likelihood of being affected by changes in land use; and
  - consider the confidentiality of such information (should it remain confidential solely for the use of the PBC, or be made publicly available).
- An analysis of the future of the existing cemetery.
- Facilitate opportunities for young people to build understanding and capacity about Saibai’s areas of cultural significance.





## 4.7 Sustainable Indigenous Cultural & Heritage Outcomes

- Development is planned and managed to ensure impact on the culture and heritage of Saibai is avoided, mitigated or remedied.
- The impact of climate change on Saibai cultural heritage is managed in a sustainable and integrated way to provide appropriate solutions.
- Ensure Community are involved in ongoing consultation to support the protection and healing of country and culture for future generations.



## 4.8 Useful Resources

### Legislation

*Torres Strait Island Cultural Heritage Act 2003* (Qld) provides for the effective recognition, protection and conservation of Torres Strait Island cultural heritage.

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

*Queensland Heritage Act 1992* (Qld) provides for the conservation of historical (non-indigenous) cultural heritage

[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

### Policies, Guidelines and Fact Sheets

*Duty of Care and Management Plan Guidelines – Aboriginal Cultural Heritage Act 2003* sets out reasonable and practical measures for meeting the duty of care obligations established in the *Aboriginal Cultural Heritage Act 2003*.

[www.nrw.qld.gov.au/cultural\\_heritage](http://www.nrw.qld.gov.au/cultural_heritage)

*Cultural Heritage – Your Duty of Care* explains the duty of care provisions under the *Aboriginal Cultural Heritage Act 2003*.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Cultural Heritage* provides an overview of the *Torres Strait Islander Cultural Heritage Act 2003*.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Aboriginal and Torres Strait Islander Cultural Heritage Places* introduces to the different types of cultural heritage places and sites e.g. middens, grinding groves etc.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Cultural Heritage Management Plan* explains what a cultural heritage management plan is and when one is required.

[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)

*Cultural Heritage Database and Register* explains what the cultural heritage database and register is and how entries are processed.

**[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)**

*Cultural Heritage Studies* provides an overview of why it is important to include sites of cultural significance on the cultural heritage register.

**[www.nrw.qld.gov.au/factsheets](http://www.nrw.qld.gov.au/factsheets)**

*Ask First: a guide to respecting Indigenous heritage places and values* is a guide to providing effective recognition, protection and conservation of Indigenous cultural heritage.

**[www.environment.gov.au/heritage/ahc/publications](http://www.environment.gov.au/heritage/ahc/publications)**

### Publications

Cordell, J. and McNiven, I. (1999) *Torres Strait Community Socio-Cultural Interests and Heritage Study: PNG gas project consultancy report*. Prepared for the Island Co-ordinating Council (Pipeline Reference Group), Torres Strait

Neal, R. A. (1989) *An Archaeological Inspection of Alternative Telecom Locations on Mabuia and Yam Island, Torres Strait*. Prepared for Department of Community Service and Ethnic Affairs, Brisbane.

### Websites

Department of Natural Resources and Water

**[www.nrw.qld.gov.au](http://www.nrw.qld.gov.au)**

Environmental Protection Agency

**[www.epa.qld.gov.au](http://www.epa.qld.gov.au)**

National Native Title Tribunal

**[www.nntt.gov.au](http://www.nntt.gov.au)**

Australian Heritage Council

**[www.environment.gov.au/heritage/ahc](http://www.environment.gov.au/heritage/ahc)**





# The Community





**Demographic trends and changes have significant influence on future development needs, the provision of community services and infrastructure. For example, if the population is ageing, then planning must ensure that the housing choice reflects the needs of an ageing population as well as ensuring the right community services, facilities and infrastructure is in place to support the ageing.**

Other topics such as community belonging, crime and safety, disability, food security and health are not addressed in this Plan as it is outside the scope of the project. It is recommended that a community well-being report be developed through a comprehensive community engagement process, as it would highlight the needs, concerns and aspirations of Community that will influence future development.

This Plan addresses the following with regards to the community:

- population;
- housing;
- sustainable community expansion; and
- community facilities and services.

## 5.1 Population

### 5.1.1 Best Practice

- Population and development are dealt with in a unified and comprehensive way with each Community developing its own solutions to population trends that reflect their values and cultural heritage.
- Land use development aligns with population profiles and trends.



Source: Torres Strait Regional Authority

### 5.1.2 Overview of Current Situation

The resident population of Saibai has increased in the past ten years as indicated in Table 3.

Table 3 Population Growth

Year	Population	Growth / Year (%)	Population Density: persons/km2
1996	310	NA	NA
2001	362	3.2	NA
2006	370	0.4	3.5

Source: ABS, 1996, 2001 and 2006

Whilst population growth has slowed substantially, there is insufficient evidence to say that this trend will continue. Saibai has an issue with what locals refer to as “stay overs” who are Papua New Guinean who come to Saibai to visit family and friends but stay a significant period-of-time on the island, placing strain on the islands resources and infrastructure. Further, on most days, Papua New Guineans come to Saibai to trade with islanders, shop and seek medical attention. This places further strain on the island’s resources, services and infrastructure.

However, it is generally considered that Census data concerning population is not an accurate reflection of the population of the island as many have not completed the questionnaire.

The 2006 Census indicates the following population characteristics:

- an average age of 23 years;
- 36.8% of the population is under the age of 15 years;
- 17.4% of the population is between the age of 15 and 24 years;
- 10.% of the population is between the ages of 25 and 34 years;
- 20.9% of the population is between the ages of 35 and 54 years; and
- 15.0% of the population is 55 years and older.

### 5.1.3 Land Use Strategy

To ensure that population trends and profiles are reflected in land use planning on Saibai it is recommended the population capacity, profiles and trends are reviewed regularly and appropriate adjustments made to ensure that an appropriate land supply and housing types are maintained.

### 5.1.4 Sustainable Population Outcomes

- Population profiles and trends are used to inform land use policy planning and development decision-making processes.
- Population and development capacity support a sustainable environment.

### 5.1.5 Useful Resources

#### Websites

Australian Bureau of Statistics (Census data)

[www.nrw.qld.gov.au](http://www.nrw.qld.gov.au)

## 5.2 Housing

### 5.2.1 Best Practice

- Provide a range of housing choices and opportunities in locations where there is a cost effective and efficient use of existing infrastructure and not be adversely impacted by natural hazards and climate change.
- Housing choices and stock matches demand and supply.
- Identifying new areas for residential development that provides a mix of housing types and densities without an adverse impact on existing infrastructure and the natural environment.
- Promotion and incorporation of sustainable design.
- Reduce the impacts of climate change on Community housing by:
  - recognising the importance of climate change on Saibai's housing;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on housing.

### 5.2.2 Overview of Current Situation

Given the nature of the island, the village is contained to a definable area along the northern shoreline. Houses located in the village are generally one storey, but are on stumps that elevates the house to the equivalent of a two-storey building.

Map 15a to 15c shows the types of dwellings (one or two storey dwellings).

Older houses and community facilities are generally one storey at ground level. Recent homes are generally, slab-on-ground open ground level, with the dwelling elevated on stumps and timber construction. Structures are generally in good condition.

There are currently 21 vacant serviced lots within the village.

The village also contains visitor accommodation, which is self-sufficient and each room having private bathroom facilities. Visitors who wish to use the accommodation must book through the Council office.

### Family Composition

The 2006 Census indicates following characteristics of family composition on Saibai:

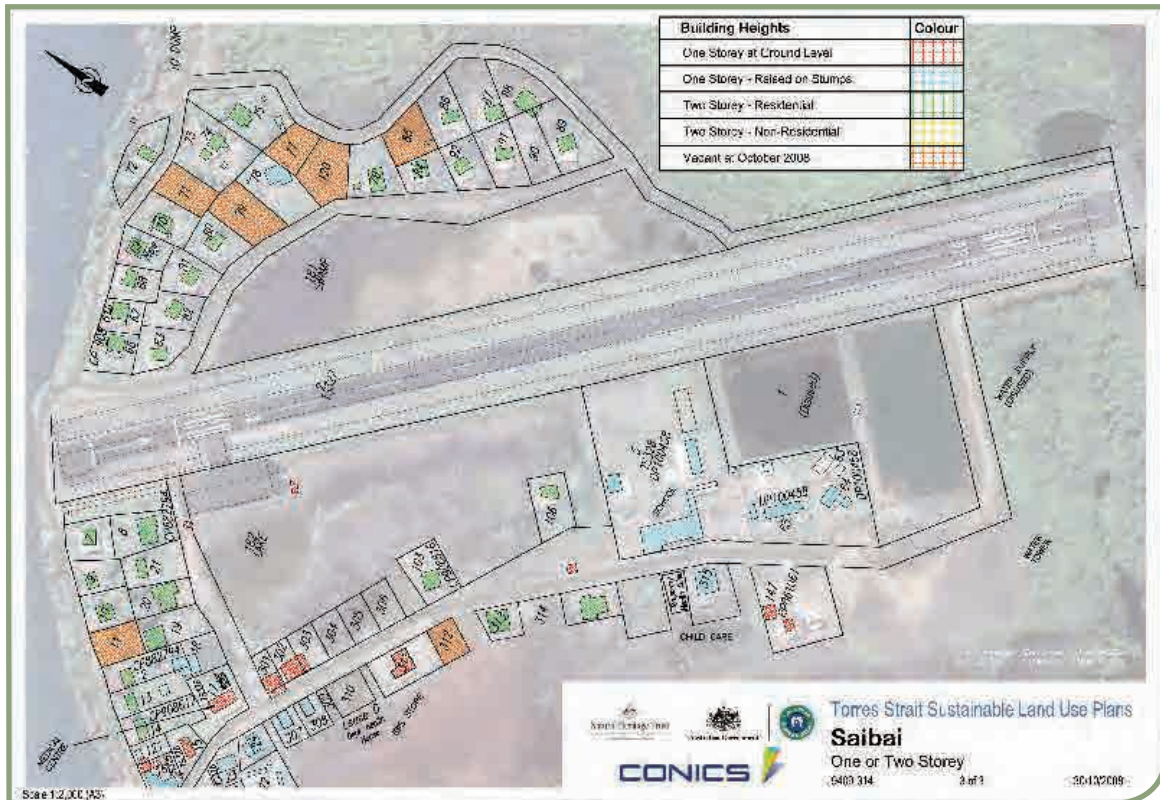
- five couples with no children;
- 28 families with children under 15 years;
- four families with children over 15 years;
- 31, one parent families with children under 15 years; and
- eight, one parent families with children over 15 years.







Map 15c One or Two Storey Dwellings



For more detail, refer to Map No. 9409-314 contained in Volume 3 – Maps.





### Household Composition

The 2006 Census indicates following characteristics about Saibai households:

- 74 households of which 17 consist of two people, 17 consist of three people and 16 consist of six or more people;
- 12 lone person households; and
- an average household size of 4.1 persons per dwelling.



### Housing Rental and Ownership

The 2006 Census indicates the following characteristics on Saibai housing rental and ownership:

- 60 households are paying rent to a housing co-operative, community or church group
- six households paying rent to a State or Territory housing authority;
- nine households paying rent to a non-stated landlord;
- no household paying a housing loan repayment;
- 3 privately owned dwellings (either fully owned or being purchased); and
- an average rent is \$60 per week.

In summary, housing on Saibai is public housing with the current number of dwellings meeting the demands of Community.

From the 2006 Census data, Saibai has an average household size of 4.1 persons per dwelling. However, due to seasonal population fluctuations an average of 5.0 persons per dwelling is used to assist in the calculation of the number of lots and dwellings required.

### 5.2.3 Issues Overview

With a steady population growth forecast for Saibai, there will be demand for new dwellings as the population increases over the next 10-20 years. Given the low-lying topography of the island and that much of the island is subject to periodic inundation, there is limited scope to expand the village. The only area suitable for future development is to the west of the dump access road, to the south of the village. However, with 21 serviced vacant lots within the village there are sufficient infill development opportunities available to meet demand over the next 10 years without need to develop the expansion area.

Refer to Section 5.3 Sustainable Community Expansion for more information.

As part of meeting population changes and preserving the land and sea relationship, providing diverse, sustainable, affordable housing options and a range of site sizes is a significant issue and key challenge for Community. Providing a range of housing choice assists in creating diverse communities and preventing social polarisation and displacement as well as protecting the natural environment. For example, it is important that affordable housing not be marginalised to fringe areas. It should be well located in relation to transport, community facilities and services, open space and recreation and education and employment opportunities.

In providing housing stock and choice to cater for the population growth and relocation of existing residents, the impact on the capacity of the existing landfill or dump must be taken into account.

Refer to Section 6.3 Waste for more information.



### 5.2.4 Land Use Strategies

To enable housing demand and supply to meet the population growth, the following strategy is recommended:

- Provide residential land to enable a supply of diverse, affordable and sustainable housing to meet the needs of current and future residents and visitors.



### 5.2.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Natural Environment, Cultural Heritage, Community and Infrastructure Best Practice and Infrastructure Land Use Strategies and Sustainable Outcomes?
- Is the development integrated with the landform and landscape?
- Does the development use:
  - energy efficiency principles in design;
  - minimise the reliance on fossil fuels for thermal comfort and water heating; and
  - minimise the use of materials, which deplete natural resources or create toxic pollution in their manufacture, use or disposal?
- If the development requires the demolition of an existing building, are the materials of the existing building to be reused? If so where? If not, how are the materials to be disposed?
- Does the development provide sufficient onsite vehicle, boat parking and access areas for residents?
- If the development is in an investigation areas, is all necessary infrastructure in place and operational for the development to proceed?

## 5.2.6 Sustainable Housing Outcomes

- Plan and manage urban area growth by limiting development along the coast and encouraging new development inland.
- Provide suitable residential land to enable a supply of diverse affordable and sustainable housing to meet the needs of current and future residents and visitors.
- The provision of a diverse choice of sustainable housing, which:
  - provides a high standard of sustainable living;
  - provides a variety of different residential lifestyle opportunities; and
  - is responsive to climate, landscape and the changing population structure of Saibai population while being affordable.
- Areas for residential use are developed to be consistent with the planned capacity for roads, community services and infrastructure for the island.

## 5.2.7 Useful Resources

### Policies, Plans & Guidelines

*Demographic Profile, Queensland Torres Strait Islander Communities* provides an overview of the 1996 to 2001 Census data for the 17 Torres Strait islands.

[www.dip.qld.gov.au/population-forecasting/indigenous-population-trends.html](http://www.dip.qld.gov.au/population-forecasting/indigenous-population-trends.html)

*State Planning Policy 1/07 – Housing and Residential Development* sets out the State government’s interest in ensuring that local governments identify their community’s housing needs and analysis and modify if necessary, their planning schemes to remove barriers and provide opportunities for housing options that respond to identified needs.

[www.dip.qld.gov.au/policies/index/php](http://www.dip.qld.gov.au/policies/index/php)

### Websites

Australian Bureau of Statistics (Census data)

[www.nrw.qld.gov.au](http://www.nrw.qld.gov.au)



## 5.3 Sustainable Community Expansion

### 5.3.1 Current and Predicted Growth Overview

The population is expected to grow between a low growth rate of an additional 4 persons/year, being an addition 39 people between 2007-2017 and a high growth rate of 8 persons/year, being an additional 83 people between 2007-2017. In summary, in 2017, the population of Saibai is predicted to be between 410 – 450 people.

Table 4 shows the estimate population growth and housing demand for Saibai over the next 10 years.

This Plan considers two growth scenarios based on a low growth rate of 1.0% and a high growth of 2.0 % for the next ten years.

- A low growth rate of 1.0% which will generate:
  - an extra 39 persons over ten years;
  - an additional 12 houses over ten years; and
  - additional housing need of 1.25 houses per year at an average of 5 person per household).
- A high growth rate of 2.0% which will generate:
  - an extra 83 persons over ten years;
  - an additional 17 houses over ten years; and
  - additional housing need of 1.7 houses per year at an average of 5 person per household).

**Table 4** Estimated Population Growth and Housing Demand

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	addit. persons	addit. houses at 5pph
Low Growth (1.0%)	370	374	377	381	385	389	393	397	401	405	409	413	39 persons over ten years	8 houses over ten years
High Growth (2.0%)	370	377	385	393	400	409	417	425	434	442	451	460	83 persons over ten years	17 houses over ten years

Source: ABS 2006



### 5.3.2 Issues Overview

Saibai is Australia's northernmost point and three kilometres from the New Guinea mainland and as such plays a significant role in relation to Australian's border security.

Activities such as illegal immigration, illegal fishing and smuggling are a risk in the Torres Strait due to the proximity of Papua New Guinea and Indonesia. Furthermore, the Torres Strait serves as an early detection zone for the transmission of exotic pests and diseases into mainland Australia. Pathogens, diseases and weeds do not respect borders and with the seasonal winds coupled with the movement of people and animals, there is a high potential for unwanted pests, weeds and diseases. As part of the Torres Strait, Saibai also plays an important role in Australia's defence as it controls the main east-west shipping channel.

Despite Saibai's strategic defence importance, the question as to whether or not Community should be relocated and the island left to the sea or the Papua New Guineans is still discussed, usually by those not living on Saibai. This question arises due to the regular inundation of the village by the sea as much of Saibai is only just above the extreme tide events.

The impacts of climate change and predicted sea-level rise will have a dramatic effect on Saibai over the next 100 years and as the extent of sea-level rise due to climate change become more quantifiable in the next few years, it may be that some of the houses on Saibai become more seriously affected by extreme tide events.

However, Saibai's Community are unlikely to abandon their island home in the near future so a strategy of protection and gradual improvement of the land and living conditions needs be adopted. Such strategies include:

- Enabling Community to restore the local and regional significant flora and fauna of Saibai.
- In the short to medium term, work needs to be undertaken to the existing sea wall to ensure that it is structurally sound and repair any damage. The seawall should be raised in stages as follows:
  - to cover for the existing storm surge ; and
  - to the predicted HAT levels in 2100.
- House designs for new or modifications to existing houses should incorporate mitigation measures that are addressed in Section 3.3.3 Land Use Strategies and Sustainable Housing considerations outlined in Section 5.2.6 Housing Land Use Strategies.
- Reviewing sea levels in 10 years to take into account the most current predictions.
- Managing Saibai's development growth.

With steady population growth forecast for Saibai, there will be demand for new dwellings as the population increases over the next 10 years, with a need of approximately 8-17 dwellings.

Some of the options available to manage growth on Saibai are:

- using existing vacant lots in the village (village infill development);
- increasing residential density in the village;
- village relocation; and
- expanding the residential area.

These options are outlined in detail.

### Village Infill Development

There are currently 21 vacant serviced lots within the village. As such, there are sufficient infill development opportunities within the village to accommodate future housing demand. However, the village is divided into clan groups. Given that the majority of the vacant lots are at either extreme of the village, it may be that there are not sufficient infill opportunities for all clan groups.

### Increase Residential Density

Increasing density is generally undertaken by providing a mix of housing types that use less land than a 3 bedroom dwelling house. Examples include dual occupancies (duplex or a house with two units), townhouses or units. The benefits of increased residential density include:

- more economic use of existing infrastructure and serviced land;
- reduced need for investment in new infrastructure;
- better access to existing services and facilities;
- combining existing land patterns whilst increasing the number of people living on Saibai; and
- more sustainable housing patterns.



### Village Relocation

Regardless of where houses are located in the village, during king tides and storm surges when the ocean breaches of the sea wall, the majority of the village is subject to tidal inundation. As such, it is not recommend to relocate any houses on the shoreline to other locations within the village or village expansion area.

Community has indicated that there may be opportunities to relocate the village to “possibly higher land inland from the existing village”. However, current mapping of ground heights is limited to only that area around the existing houses and a small strip of road going out to the existing water storage. Higher land does not appear to be obvious although it is hard to tell given the low lying and flat nature of Saibai. In any case, relocation of the entire village and services to a new higher location – if one can be found would require extensive studies and costing. It is anticipated that the proposed 2009 LIDAR project to survey the entirety of Saibai will assist in determining if this option is viable.

### Expansion of the Village Area

Currently there is individual filling of house sites along School Road, however this area is approximately 1m lower than the land south of the Telstra tower and consequently it is relatively more expensive to fill.

Given the low-lying topography of the island and that much of the island is subject to periodic inundation, there is limited scope for expanding the village. The only area suitable for future development is to utilise land immediately west of the dump access road and south of the existing village, providing for 44 lots.

This area will require the provision of services and substantial fill. As such, development should not occur within the expansion area until all infill development opportunities on serviced lots have been used. The development of this area will accommodate more housing than what is required for under the high growth scenario.

### Population Capping

Due to the regular tidal inundation of Saibai and the restricted opportunities to expand or relocated the existing village, Community must decide on how they are going to address these issues. What strategies are they going to adopt? For example:

- do they have a maximum number of people living on Saibai (population cap) by voluntarily limiting return of people to Saibai?
- restrict development without specifically limiting the number of residents and visitors, that is do not build any new houses.

Table 5 shows the advantages and disadvantages of a population cap.



### 5.3.3 Land Use Strategies

The population trends, profiles and infrastructure limitations mean that the land use strategies must be developed to:

- Manage the total population trend in a way that retains urban and island character.
- Identify and locate land suitable for urban development in non-coastal areas. Area have been identified subject to further investigations to address impacts on the environment and infrastructure.
- Provide choice in housing form and affordability in appropriate locations.
- Increase the residential density in the village without comprising the amenity and character of the village and increasing the risk to natural hazards such as storm surge and tides.

Map 16 shows the future land use intent for lots within the village.

Maps 17a-d shows the lots, which are presently suitable for development due to access to services. These lots are shown as “Village”. Areas that may be suitable for development in the future, subject to further investigation and/or once services have been provided, are shown as “Investigation Area”.

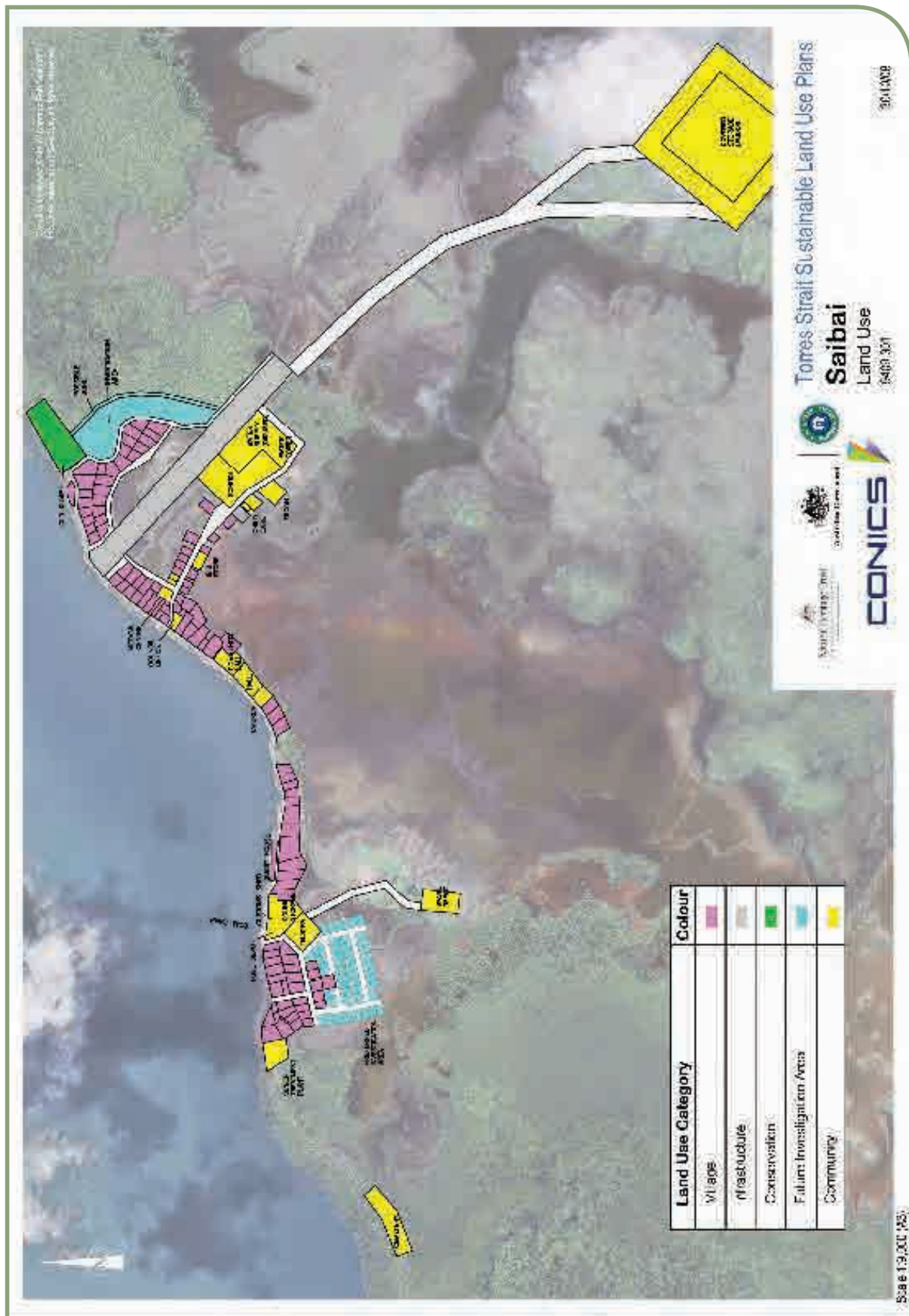
Map 17e illustrates the relationship between the need to increase floor level height & sea tide levels.

**Table 5 Advantages and Disadvantages of a Population Cap**

Advantages	Disadvantages
Protection of the natural environment, Saibai character and Community cultural heritage	Does not protect the environment from new development
Certainty about infrastructure planning, particularly water supply, sewerage and roads	Further development becomes progressively more exclusive
Development is sustainable	Population of Saibai may drift towards extreme levels.
Ongoing community engagement and support	Village character may loose some of its vibrancy due to the lack of population mix.
	Continuation of the population cap depends on Community will
	How development may impact on cultural heritage



Map 16 Land Use (Village)



For more detail, refer to Map No. 9409-301 contained in Volume 3 – Maps.

Map 17a Village



For more detail, refer to Map No. 9409-312 contained in Volume 3 - Maps



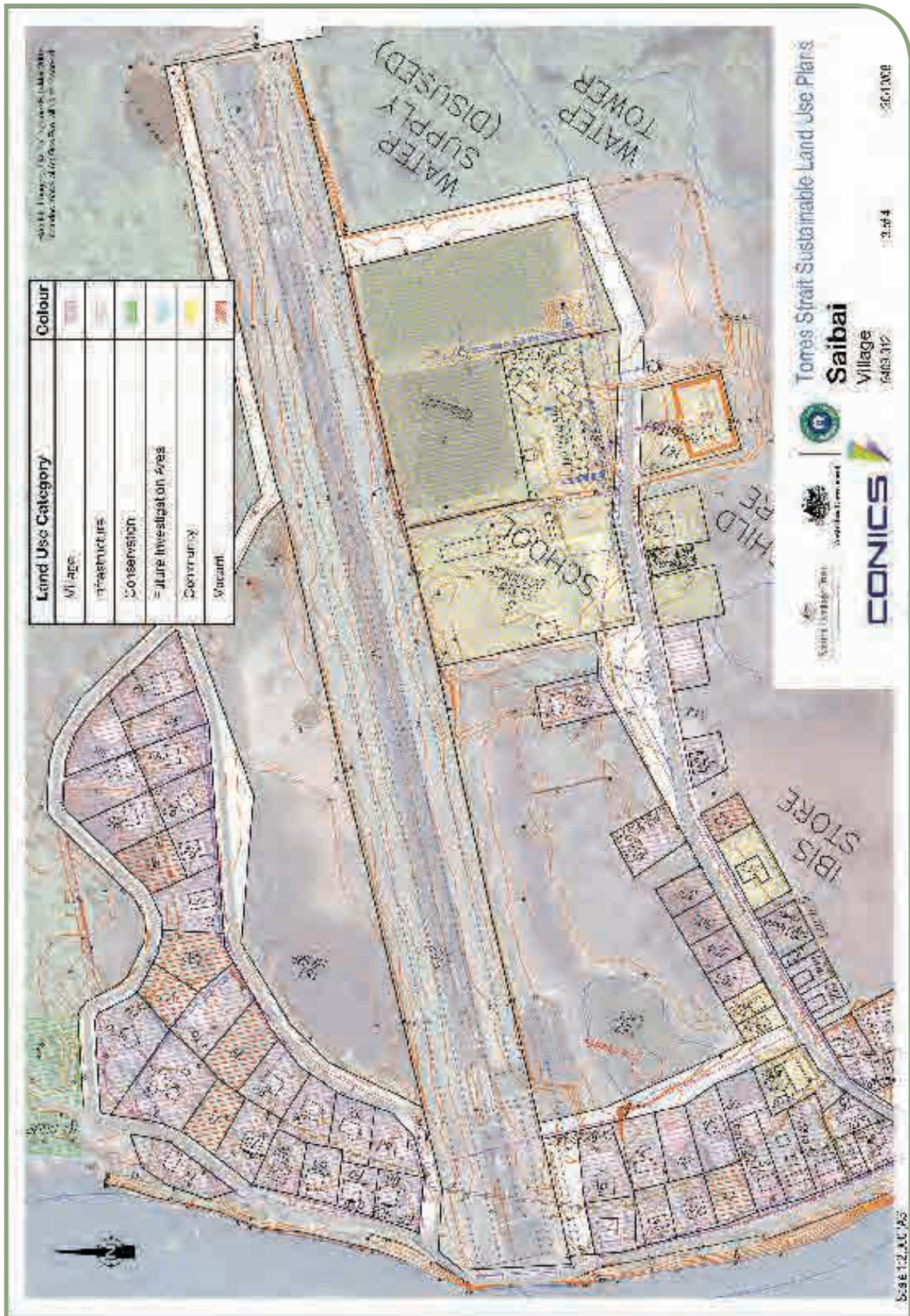
Map 17b Village



For more detail, refer to Map No. 9409-312 contained in Volume 3 - Maps



Map 17c Village

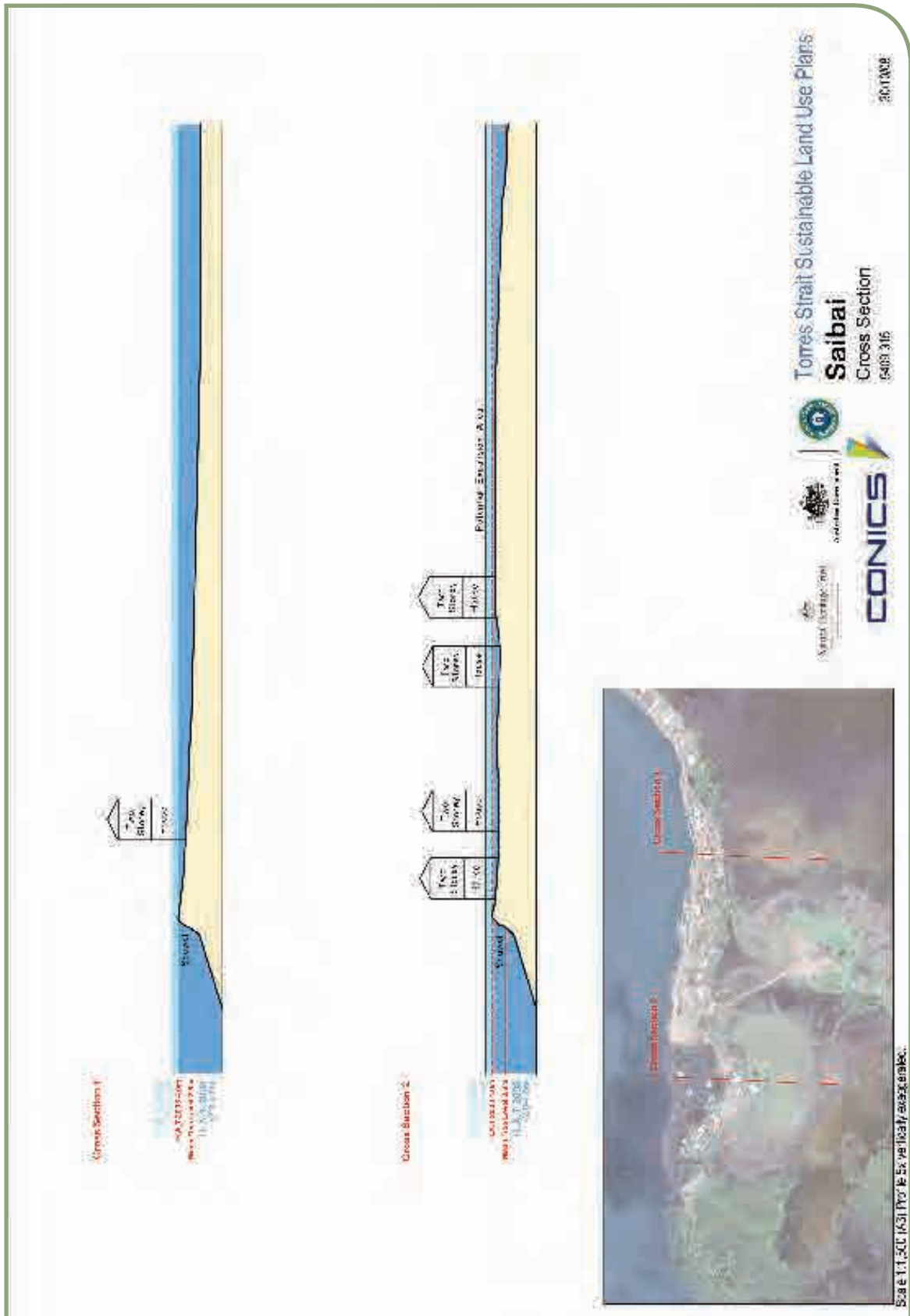


For more detail, refer to Map No. 9409-312 contained in Volume 3 - Maps





Map 17e Cross Section



For more detail, refer to Map No. 9409-315 contained in Volume 3 - Maps



The timeline (Figure 10) shows how Saibai's current infrastructure will limit Saibai's population growth. Based on existing landfill, Saibai has reached full house; That is, the landfill cannot cater for an increase in population.

### 5.3.4 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

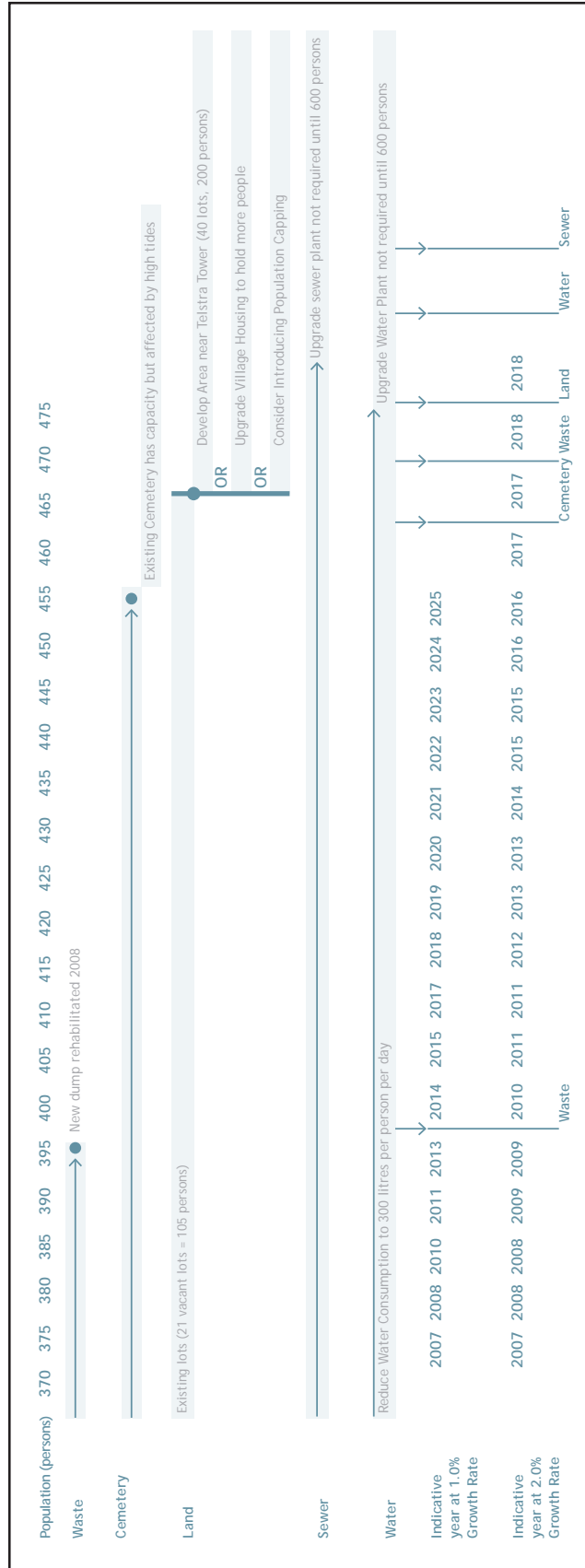
- Is the development in accordance with the Sustainable Community Expansion Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development consider its impact on population capacity, profile and trends and the effects of growth and change on Saibai?
- Is the development consistent with the strategies developed to address development growth?

### 5.3.5 Sustainable Community Expansion Outcomes

- Decision making focuses on reducing the impacts of population growth and development on natural resources and the environment.
- A highly liveable community where there are a range of services and activities for all people who work together to identify, prioritise and address community issues.



Figure 10 Timeline Limits on Population Growth



## 5.4 Community Facilities and Services

### 5.4.1 Best Practice

- Communities are created with a recognisable character and sense of place which have a high level of amenity, safety, connectivity and integration between existing and new places.
- Create well-designed, safe and healthy environments that encourage active community participation, promote healthy lifestyles, prevent crime and maintain social equity and diversity.
- Maximise access to appropriate social and retail infrastructure for all residents.
- Reduce the vulnerability of existing and future community facilities and services to the impacts of climate change by:
  - avoiding decisions now that will make it more difficult to manage climate change risks in the future;
  - building understanding and capacity of the community to deal with the impacts of climate change on their community facilities and services; and
  - providing community facilities and services in locations not adversely impacted by natural hazards.

### 5.4.2 Overview of Current Situation

The 2006 Census indicated the following statistics:

#### Employment and Volunteering

The 2006 Census indicates the following characteristics for employment and volunteering:

- 130 people living on Saibai are employed;
- an average household weekly income of \$618.00;
- an average individual weekly income of \$224.00;
- 30.0% of those working were between the ages of 15 to 24 years;
- 53.1% of those working were between the ages of 25 to 54 years;
- 43.2% of Community on Saibai undertake some form volunteer work in the 2006 Census. Volunteer work in the 2006 Census is someone who worked for an organisation or a group doing unpaid voluntary work in the 12 months prior to the Census;
- 25.0% of those undertaking volunteer work were between the ages of 15 and 24 years;
- 47.8% of those undertaking volunteer work were between the ages of 25 and 54 years.

Table 6 shows the types of employment sectors people work in.





**Table 6 Employment Sectors**

Employment Industry	Construction	Public Administration & Safety	Education & Training	Health Care & Social Assistance	Wholesale Trade	Retail Trade	Other	Not Stated
People	0	64	15	19	0	3	5	27

Source: ABS 2006

### Educational Attainment

From the 2006 Census, 110 people were studying or undertaking some form of further education program or training. This is 32.47% of the total population. Of those undertaking education:

- 7.3% were attending pre school;
- 47.3% were attending primary school;
- 7.3% were attending secondary school;
- 4.5% were attending a technical or further educational institutional;
- none were attending university; and
- 33.6% were undertaking another form of educational program or training.

The 2006 Census also shows that those that left school were over the age of 15, 30.1% left after completing Year 12 with another 33.8% leaving after completing Year 10. This means that 63.9% completed schooling after the age of 15 years.

Table 7 shows the community facilities that are available on Saibai.

Table 8 shows the retail and public office facilities and services that are available on Saibai.

Table 9 shows the recreational facilities that are available on Saibai.

**Table 7 Community Facilities**

Facility	Provided ( ✓ = Yes; x = No)	Location
Pre school	✓	Included with Primary School
Primary School	✓	Located to the rear of the Village, south of the airstrip
Health Care Centre	✓	The existing Health Care Centre will be temporarily moved whilst a new one is constructed
High school	x	Students go to Thursday Island

Table 8 Retail and Public Office Facilities and Services

Facility	Provided ( ✓ = Yes; x = No)	Location
Administration Offices/Workshop	✓	Corner Esplanade and School Road
Community Hall (including indoor sports courts)	✓	Located on Lot 30 Esplanade
Guest House	✓	Located at the western end of the village, near Council storage area
Contractor Accommodation	✓	Included in the Guest House
Church	✓	Adjoining the Community Hall
SES depot	x	Proposed to go near Council workshop on school road
Supermarket (IBIS store and or other convenience store)	✓	Located at the rear of the Village on School Road
Banking facilities	✓	Located in the IBIS store
Custom Depot	✓	Located on the foreshore in front of Council offices
Police Station	✓	On School Road adjacent to Council

Table 9 Recreational Facilities

Facility	Provided ( ✓ = Yes; x = No)	Location
Picnic Grounds	✓	Seating facilities are provided in front of Council offices on the foreshore
Sports Oval	x	No oval is available though there is potential room at the school
	✓	New oval developed/improved at school in November 2008



### 5.4.3 Issues Overview

On Saibai, there are strong links between the physical environment, socio-economic issues and community health and wellbeing. Best practice planning and design of the built environment encourages physical activity and healthy lifestyle choices, provides a sense of community safety and assists in crime prevention. Communities that contain a broad mix of housing choices appropriate local support services, adequate social infrastructure and strong community networks tend to be safer communities. This makes it vital that planning policies for community facilities and open space encourage multiple use and flexible design to allow for changing needs.

In general, the residents of Saibai have access to a range of centralised convenience goods and services that meet their daily needs as well as recreational opportunities through the provision of both indoor and outdoor recreational facilities.

One of the significant issues for Saibai is the impact on Papua New Guinean “over stayers” and their impact on the island’s resources, services and infrastructure. This matter whilst consider to be an immigration issue which requires State and Commonwealth government involvement can be addressed on a temporary basis through the encouraging the construction of dual occupancies.

### 5.4.4 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Natural Environment, Cultural Heritage, Community and Infrastructure Best Practice and Sustainable Outcomes?
- Is the development part of multipurpose community facilities and services?
- Can the development respond to changing and emerging community needs?
- If the development is for a new residential area, is there adequate provision made for public spaces and places for community activities?





### 5.4.5 Sustainable Community Facilities & Services Outcomes

- Community facilities that recognise and reflect the needs of the resident population including people with special needs such as older people, children, low-income earners and people with disabilities.
- New and existing residential areas are provided with community and social facilities that are convenient and highly accessible to Saibai residents.
- Community is involved in the planning of community building and spaces to promote ownership and pride.
- Existing and new community facilities are multiple use buildings and not located in areas identified as impacted by natural hazards.
- Local sport and recreational opportunities continue to focus on natural and cultural activities.

### 5.4.6 Useful Resources

#### Websites

Australian Bureau of Statistics (Census data)

[www.nrw.qld.gov.au](http://www.nrw.qld.gov.au)



# Infrastructure



**Providing and managing infrastructure is a key issue facing the Torres Strait and Saibai is no exception. For sustainable land uses and a healthy community, a close and strong relationship between policies and strategies is required.**

Infrastructure plays a vital role in linking island communities within the region and mainland Australia. As a physical resource of strategic importance, infrastructure needs to be protected from any adverse effects (that may arise from land uses, natural hazards and climate change) that could affect the provision of an integrated, safe, responsive and sustainable infrastructure system. Similarly, negative environmental effects on land use activities resulting from infrastructure also need to be managed.

Infrastructure also has a significant role in the community and therefore land use and infrastructure planning whether for existing or future development must be provided in a way that is efficient, equitable, accessible and timely. On the other hand, demand and consumer behaviour must not be ignored to enable the maximisation of existing infrastructure and to minimise the need for additional infrastructure and services.

This Plan addresses the following with regard to infrastructure:

- water;
- sewer;
- waste;
- electricity;
- telecommunication;
- roads;
- drainage;
- air access; and
- sea access.





## 6.1 Water

### 6.1.1 Best Practice

- Water infrastructure is expensive to install and consideration must be given to the proximity of existing water infrastructure when planning future development.
- Protect and enhance the ecological health and water quality of surface and groundwater, including regional waterways, wetlands and estuaries.
- Development should not occur in water catchments
- Water use should avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, water logging, decline of native vegetation or, where appropriate, salinity and, where possible, land should be rehabilitated.
- Water planning is based on a total water cycle management, which is reflected in all policy and decision-making and provides assured supplies of water to meet the reasonable needs of development and Community.
- Promote efficient use of water by improving demand management and reusing and recycling water.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on Community by:
  - recognising the importance of climate change on Saibai's water infrastructure;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the islands water infrastructure.



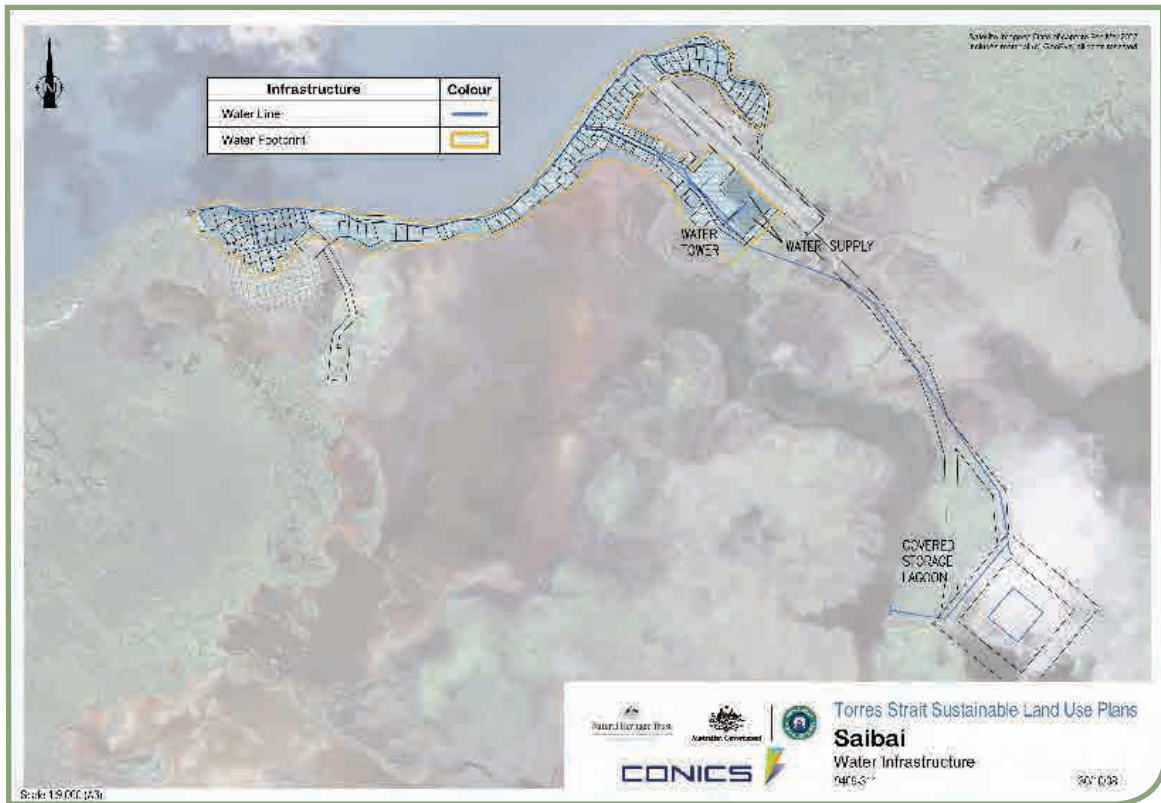
### 6.1.2 Overview of Current Situation

The existing water infrastructure has the following features:

<b>Source:</b>	<p>Water on Saibai is sourced from:</p> <ul style="list-style-type: none"> <li>• captured rainwater from the cover of a lagoon (known as “Lagoon 3”);</li> <li>• captured water from the surrounding clay-lined catchment areas which is screened from silt and pumped into the lagoon; and</li> <li>• supplementary household rainwater tanks.</li> </ul>
<b>Treatment:</b>	<p>Water is treated within the treatment plant building via:</p> <ul style="list-style-type: none"> <li>• filtration by dual media pressure sand/anthracite filters; and</li> <li>• disinfection through sodium hypochlorite dosing.</li> </ul>
<b>Storage:</b>	<p>Water from the lagoon is pumped to the water treatment plant and stored in a 120kL ground level reservoir.</p>
<b>Delivery:</b>	<p>Potable water is delivered to Community from the reservoir via 100mm underground mains with the pressure being maintained by variable speed drive (VSD) pumps. All facilities are connected to the mains via branch lines. The majority of household water tanks can be topped-up by the reticulation system. Small individual pressure pumps deliver the water from the rainwater tanks to a single internal tap isolated from the mains as an emergency.</p>
<b>Capacity:</b>	<p>The main source of water comes from the rainwater collected from the catchment area surrounding the storage lagoon and the rainwater collected directly from the covered area of the storage lagoon. The covered area of the lagoon is 17,000m<sup>2</sup>. Based on an average rainfall of 1,125mm/year, the average yield of the lagoon covers is around 19ML per annum. The rainwater catchment area surrounding the lagoon is 49,000m<sup>2</sup>. Allowing for 20% losses due to the clay lining, this equates to an additional average annual yield of approximately 44ML for a total of approximately 63ML average annual yield for the combined system.</p> <p>The covered lagoon storage volume is approximately 32ML. For the design population estimate of 420 persons and the adopted average daily consumption rate of 300L/person per day, there is approximately 250 days storage capacity, which is considered sufficient to meet water demand during the annual dry season.</p>
<b>Usage</b>	<p>The average water usage from the most recent data provided from the TSIRC Water and Sewerage Infrastructure Unit is around 327L/person/day. This is slightly higher than the target design consumption of 300L/person/day.</p>

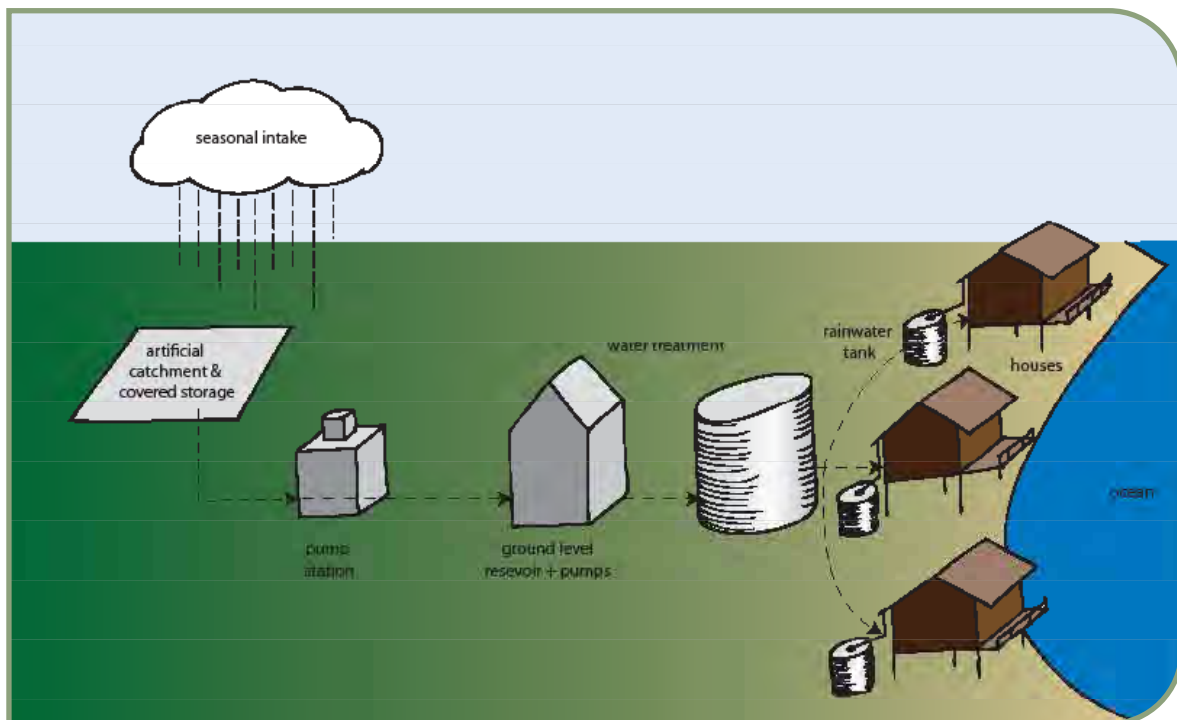
As with remote island communities, Saibai’s water is expensive to source and treat and water infrastructure is expensive to install and operate. At 2008 prices, the cost to supply barged water is \$14 per kilolitre (about 26 times the national average) and desalinated water is \$7 per kilolitre (about 10 times the national average).

Map 18 Water Infrastructure



For more detail, refer to Map No. 9409-311 contained in Volume 3 - Maps

Figure 11 Water Scheme



Map 18 shows the areas serviced by the existing water infrastructure.

Figure 11 shows the water scheme process.



### 6.1.3 Issues Overview

For the purposes of determining the existing and future capacity of the water infrastructure, the following population growth forecast is used:

Existing Population	2008	= 371 persons
Predicted Population	2017	(Low Growth Estimate of 1.0% = 413 persons)
Predicted Population	2017	(High Growth Estimate of 2.0% = 460 persons)

These population figures are considerably lower than the most recent design population of 420 and the TSIRC figure of 468 persons. The high population variation is probably attributed to the short-term fluctuation of people into Saibai because of cultural activities.

The existing water infrastructure has sufficient capacity to serve the current population at current consumption levels based on an average yearly rainfall.

Current average yield including wells and lagoon catchment	63.0ML per year
Achievable target consumption	300L per person per day
Population that existing water infrastructure can sustain	575 persons

It should be noted that this is based on an average yearly rainfall. Should the average rainfall be less than this, then a proportional reduction in the number of people that the infrastructure can sustain is required.

Any population increase above 575 persons will require an upgrade to the supply capacity. This can be achieved via the extension of the catchment area and associated storage area.

Any extension to the catchment and lagoon area will require an assessment of and allowance for appropriate road access. The existing lagoons become inaccessible for extended periods during the wet season as the access road becomes inundated. The reliability of supply then becomes an issue as maintenance staff are unable to undertake repairs and maintenance work.

An extension to the catchment and lagoon area will also require the upgrade of the treatment plant, as this plant is currently operating at capacity and generally in need of an upgrade.

### 6.1.4 Land Use Strategies

To minimise the impact of water infrastructure on the natural and man made environments and to ensure that the current and future efficiency and effectiveness of Saibai water infrastructure, the following strategies are recommended:

- Development is not to occur in water catchments.
- A target of 300 litres per person per day or less is achieved by using water efficiently and managing consumer behaviour and demand for water.
- On reaching a population of 575 persons and the target consumption of 300 litres per person per day or less is achieved on a regular basis, an upgrade to the water plant capacity is to be considered.

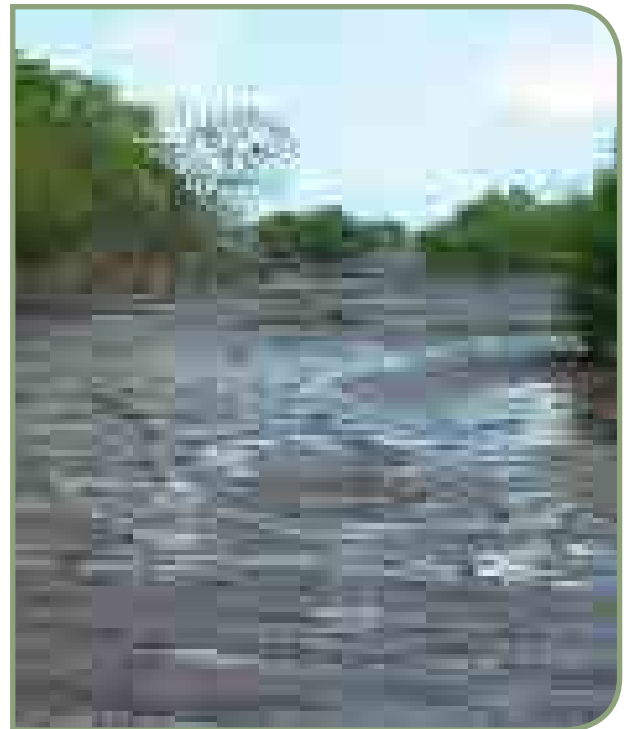
### 6.1.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Water Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development adopt best practice principles in the planning, design and construction of water cycle infrastructure (including water supply, sewerage, drainage and water quality)?
- Does the proposal address its impact and cumulative impact on the existing water infrastructure?
- If the development is for a residential or community building:
  - is there a total water cycle management system addressing demand, reuse and recycling including the use of rainwater tanks for use within the building; and
  - are water saving devices proposed?
- Is the water catchment area (if one exists) affected by the development?
- Is the development located within the area serviceable by current infrastructure? If not, is the required additional infrastructure adequately funded?

### 6.1.1 Sustainable Water Infrastructure Outcomes

- Achieve targeted reductions in water consumption by using water efficiently and managing consumer behaviour and demand for water.
- Protect the quality of water draining from urban development and water infrastructure.
- All water infrastructure is inspected regularly, maintained to ensure that it is in effective working order.



## 6.2 Sewer

### 6.2.1 Best Practice

- Sewerage infrastructure is expensive to install and consideration must be given to the proximity of existing sewerage infrastructure when planning future development.
- Sewerage treatment plant design must accommodate specific design capacities and the impact of additional loading from future development.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on the sewer infrastructure by:
  - recognising the importance of climate change on Saibai's sewer infrastructure;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Saibai's sewer infrastructure.

### 6.2.2 Overview of Current Situation

The existing sewerage infrastructure has the following features:

<b>Collection:</b>	Sewage is collected via a reticulated gravity sewage collection system serving the village.
<b>Transfer:</b>	Sewage from the reticulation system is collected in two pumps stations, one in the town area and the other adjacent to the Sewerage Treatment Plant. A lift station is included at the end of the airstrip.
<b>Treatment:</b>	Sewage is treated at the packaged Sewerage Treatment Plant located at the western end of the island. The treatment plant includes a biofilter as the main treatment component and has been designed to treat effluent to a secondary level.
<b>Discharge:</b>	Treated effluent is pumped from the Sewerage Treatment Plant to an ocean outfall at the north of the island. There are two emergency overflows from the pump stations which discharge to the adjacent beaches

The existing treatment plant has been designed for a capacity of 600 persons. The plant currently handles the existing effluent load comfortably and does not require any upgrade work at this stage.

Map 19 shows the areas serviced by the existing sewer lines and desalination plant.



## Map 19 Sewer Infrastructure



For more detail, refer to Map No. 9409-311 contained in Volume 3 – Maps.

### 6.2.3 Issues Overview

The existing treatment plant has the capacity to treat effluent for population of 600 persons. There have been major issues regarding the design of the plant and the ability of the plant to comply with the design requirements. However, it is understood that all issues have now been resolved and the plant has been formally commissioned and accepted. It is anticipated that the plant will have spare capacity to handle general increases over the next few years.

The sewerage design population of 600 persons is not predicted to be reached prior 2017, even allowing for the discrepancy in the estimated current population.

If future development is planned for the area southwest of the airstrip or the area south of the Telstra compound, the existing pump stations may require minor upgrades to handle an increase in load. Both areas should allow

gravity fed sewage to the existing pump stations; however, this would need to be confirmed. If development is planned further away from the town area at the eastern end of the airstrip, an additional pump station and rising main is likely to be required.

There is concern over the level of the sewer manhole covers. Many of the covers are below the 4.0 metres HAT. The top of the sea wall is 3.8 metres to 4.0 metres. Consequently, there is a high risk of salt water inundation of the sewers. For future development, consideration should be given to ensuring that future manhole covers and overflow relief gullies at the houses are above the HAT level.

### Effluent Re-use

Effluent from the treatment plant is treated to a secondary level only and as such, is unsuitable to be considered for potable use. The treatment plant as designed is not readily modifiable to enable effluent treatment to a tertiary level.

There may be an opportunity to use the secondary treated water to irrigate community areas during the dry season, however this would involve the provision of significant infrastructure and the need for strict environmental health management systems to be implemented.

### 6.2.4 Land Use Strategies

To minimise the impact of sewer infrastructure on the natural and man made environments and to ensure that the current and future efficiency and effectiveness of Saibai sewer infrastructure, the following strategies are recommended:

- Not encouraging development to occur in close proximity to a sewerage treatment plant.
- Where development occurs outside the area serviced by the existing sewer infrastructure, sewer infrastructure must be provided in accordance with the Queensland Plumbing and Wastewater Code and AS/NZS 1546:2008 On-site domestic wastewater treatment units – aerated wastewater treatment systems

### 6.2.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Sewerage Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development adopt best practice principles in the planning, design and construction of sewerage infrastructure (including water supply, sewerage, drainage and water quality)?
- Does the proposal address its impact and cumulative impact on the existing sewerage infrastructure?
- Is the development near or adjacent to an existing or proposed sewerage treatment plan?
- Is the development located within the area serviceable by the current infrastructure? If not, is the required additional infrastructure adequately funded?
- Are sewer manholes covered above 4.0 metres HAT?
- Where development is located within the Investigation Area, is a sewage lift station required and if so, has it been provided?



### 6.2.6 Land Use Projects

To maximise the use of secondary treated water, it is recommended that an investigation into the feasibility and costs of using the secondary treated water to irrigate the sports field or similar areas during the dry season be undertaken.

### 6.2.7 Sustainable Sewer Infrastructure Outcomes

- Waste water conservation should be practised and waste water production should be minimised.
- All sewer infrastructure is inspected regularly and maintained to ensure that they are in effective working order.

### 6.2.8 Useful Resources

#### Policies, Plans & Guidelines

Queensland Plumbing and Wastewater Code sets out the framework for Queensland's plumbing and drainage standards.

[www.dip.qld.gov.au/plumbing/2.html](http://www.dip.qld.gov.au/plumbing/2.html)

AS/NZS 1546:2008 is the Australian Standard for on-site wastewater treatment units.

[www.standards.org.au](http://www.standards.org.au)





## 6.3 Waste

### 6.3.1 Best Practice

- The siting and maintenance of waste disposal facilities (dump) must not have a detrimental impact on the natural environment.
- Removal of waste from Saibai is expensive and the minimisation of waste and associated environmental impacts and maximisation 'reduce, reuse, recycle' of waste generated occurs on a daily basis.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on Saibai's waste generation and disposal facilities by:
  - recognising the importance of climate change;
  - avoiding quick decisions now that will make it more difficult to manage Saibai's waste generation and disposal facilities; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Saibai's waste generation and disposal facilities.

### 6.3.2 Overview of Current Situation

Saibai currently has a waste depot located at the east end of the island near the Telstra Tower, just past the sports field and the sewage treatment plant.

The waste depot site is bounded on the east by mangroves and previously had occasional inundation from high tides. However, the build up of waste has now created a mound which, although unsightly, buffers the waste depot from the mangroves.

Waste is currently collected by a minipactor rubbish truck, tipped on the ground and burnt, where possible.

In 2005, the waste depot was fenced on the landward side and a concrete wash down slab constructed opposite the sewage treatment plant. Due to the limited space available in the depot, bulk waste such as cars, trucks, white goods & large metal objects were removed from Saibai in 2005 and sent to Cairns for recycling.

Proposed works are scheduled for November 2008 to improve the road leading out to the dump to provide all-weather access track to the dump. Additionally the dump will be bunded to prevent tidal inundation.

### 6.3.3 Issues Overview

There is no land available for expansion of the waste depot on Saibai. Land either is too steep, too rocky or covered in mangroves.

The current depot has no soil available for cover of waste and previous requests to source what little soil is available has been unsuccessful.

The long-term impact of the existing waste depot onto the adjoining mangroves is yet to be determined.

Alternative options are:

- the introduction of a waste transfer station and removal of waste from Saibai to another site (such as Cairns, Horn Island or a yet to be determined regional waste depot for the Torres Strait), or
- the creation of additional land by creating a bund wall through the adjoining mangroves immediately to the east of the existing dump, or
- find a new site for the disposal of waste on Saibai.

A significant issue for all Torres Strait Islands is the impact of disused vehicles once they have reached the end of their usable life. Typically, these vehicles are in poor condition when they reach the Torres Strait. Once broken down, they consume valuable space in the landfill sites. This space should be reserved for general domestic rubbish. Materials other than general domestic waste should be separated and stocked piled so that they can be re-used or transported off the island.

Quarantine restrictions imposed for the Torres Strait protected zones mean that any material transported between zones requires Australian Quarantine and Immigration Service clearance which usually involves removal of any dirt from old car bodies. This can be logistically difficult and expensive. Additional requirements of the Department of Primary Industries apply to the transfer of putrescible matter between islands.

Given the above, consideration should be given to imposing a levy on all vehicles brought onto the island. Such a levy could pay for the ultimate removal of the vehicle from the island.

A solution for the handling, sorting and disposal of waste needs to be found for Saibai.



### 6.3.4 Land Use Strategies

To minimise the impacts of waste infrastructure on Saibai's natural and man made environments, the following strategies are recommended:

- Future landfills are located in geologically stable areas, not flood prone or adjacent to areas of high ecological significance or in areas identified as affected by natural hazards.
- Waste generation is avoided in the first instance. Where waste generation cannot be avoided, practices are implemented to reuse, recycle or recover wastes and materials prior to disposal.
- A voluntary target of reducing waste through recycling.
- Waste disposal to landfill is minimised through applying waste recovery techniques that gain optimum recovery of reusable and recyclable materials.
- Materials other than general domestic waste should be separated and stocked piled to enable their re-use or transportation off Saibai.
- The waste depot should be operated on an "area-fill" method, where waste is spread out in sections or cells and progressively covered.

### 6.3.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Waste Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development encourage conservation, composting and recycling of waste?
- Has the development considered the impact it will have on the capacity of the landfill site?
- If the development involves demolition of an existing structure, is the removal of
  - material from the island or its reuse; and
  - contractor's vehicles from Saibai at the end of the project addressed?





### 6.3.6 Land Use Projects

The following projects are recommended to be undertaken:

- A study to quantify the need for waste management capacity for all waste streams until 2020.
- A study to determine a solution for the handling, sorting and disposal of waste.
- Consider the cost and feasibility of a 'vehicle disposal levy' to cover the cost of removing abandoned vehicles from Saibai.



### 6.3.7 Sustainable Waste Infrastructure Outcomes

- The development of an integrated and strategic approach to regional and local waste management.
- The volume of waste requiring disposal is reduced to a minimum, while maximising the economic value of resources during their life cycle through reuse, recycling, reprocessing and energy recovery.
- Any future landfills are located in geologically stable areas and are not flood prone or adjacent to areas of high ecological significance.
- Achieve targeted reductions in waste consumption by using waste efficiently and managing consumer behaviour and demand for waste.
- All waste infrastructure and landfill sites are inspected regularly and maintained to ensure that they are in effective working order.



## 6.4 Electricity

### 6.4.1 Best Practice

- Electric infrastructure is expensive to install and consideration must be given to the proximity of existing electricity infrastructure when planning future development.
- Provide energy generation production, transmission and distribution capacity to meet the needs of the population and support the use of viable alternative energy sources where appropriate.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on Saibai's electricity infrastructure by:
  - recognising the importance of climate change on Saibai's electricity infrastructure;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Saibai's electricity infrastructure.

### 6.4.2 Overview of Current Situation

Electricity is supplied to Saibai from a central power station located at the southeast area of the community near the disused water lagoons. The generation, distribution and supply of electricity is undertaken by Ergon Energy on behalf of the State government .

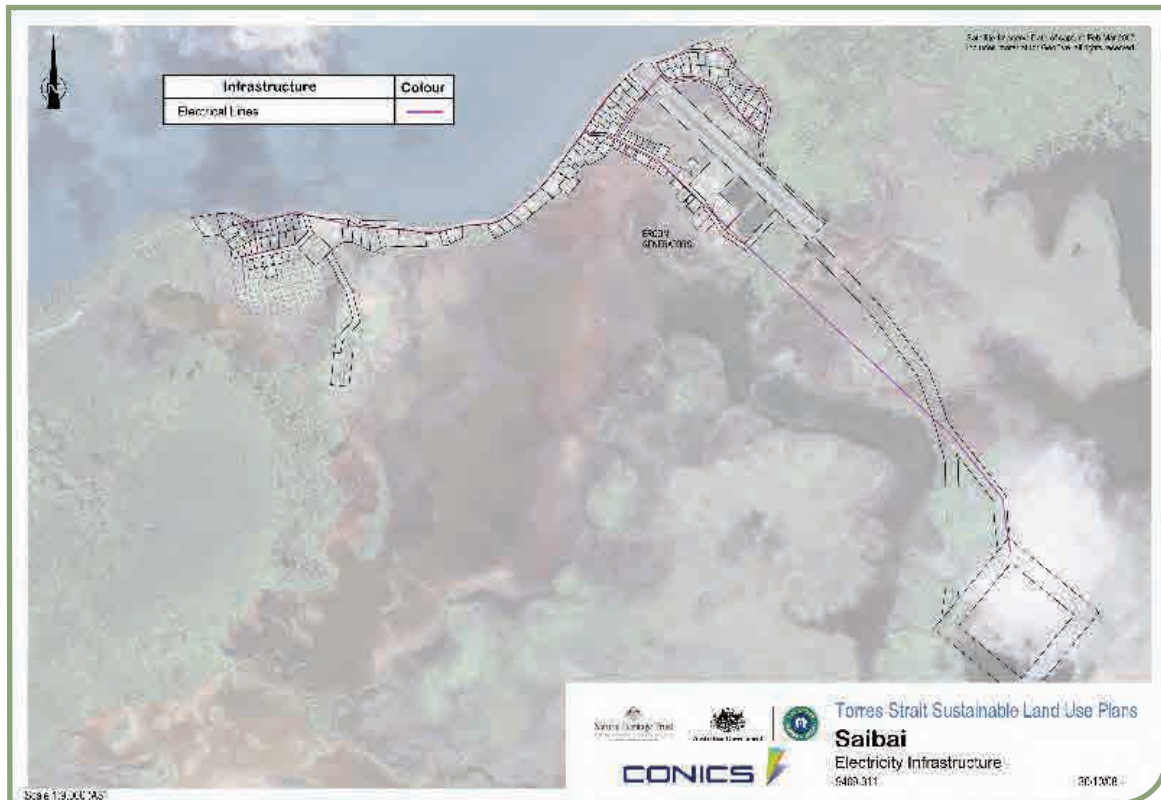
Electricity is generated through multiple diesel generator sets (gensets) which are sized to match the load as it fluctuates during the day. The gensets are modular and interchangeable and as such, are relatively easy to repair or relocate without disturbance to the continuity of electricity supply.

The cost to generate electricity on remote islands is significantly higher than the income received from the consumers, between factors of 5 to 10. The State Government Community Service Obligation as an equalised tariff covers the difference in generation costs and income.

Map 20 shows the areas serviced by the existing electricity infrastructure.



## Map 20 Electricity Infrastructure



For more detail, refer to Map No. 9409-311 contained in Volume 3 – Maps.

### 6.4.3 Issues Overview

Although the cost of electricity to consumers at Saibai is the same as for anywhere in Queensland, there is a pressing need for all people on the island to conserve electricity. Electricity generated by the combustion of diesel fuel causes significant greenhouse gas emissions and the burning of fossil fuels is not a sustainable practice.

There is limited opportunity for viable alternative sources of energy on Saibai. It may be feasible to use gas to fire the gensets, as gas is a lower emitter of greenhouse emissions. However, it is impractical and expensive to barge in large gas bottles for power generation.

Renewable energy sources such as wind and solar could be considered as a supplement to the base power supply.

However, any renewable resource would not be able to completely replace the existing base diesel generator sets as the demand on the island is too high for a renewable supply to support and there is no realistic method of storing generated electricity during periods of low generation (lack of wind or solar radiation).

From a land use perspective, gradual increase in population and the corresponding increase in demand is generally met by the inherited scalability in the system, i.e. the modular gensets can be reshuffled to suit. Large-scale increases in demand might require the upgrade of a switching and distribution infrastructure. Any new development away from the main powerlines may require a contribution to Ergon for the installation of powerlines/transformers etc, however this is generally considered on a case-by-case basis.



Any significant increase in generation capacity may require consideration of enlarging the power station site or relocating the site.

If a new site is required, an analysis of potential noise levels should be undertaken to avoid background diesel generator noise pollution in residential areas.

#### 6.4.4 Land Use Strategies

To ensure the effectiveness and efficiency of the electric infrastructure network, the following strategies are recommended:

- Development should not occur in areas in close proximity to the generators.
- If development occurs adjacent or nearby to the generators, noise retention, measures must be incorporated in the design of the development.
- Development must not impede the supply and access to the electric infrastructure network.
- The visual impact of electricity infrastructure on development and the natural environment is to be minimised through the provision of landscaping.
- Inappropriate land uses such as a school or a play area should not be located in an electricity easement or within close proximity of the generators.

#### 6.4.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Electricity Best Practice, Land Use Strategies and Sustainable Outcomes?
- Can the existing electric infrastructure cater for the development without requiring an upgrade of the system?
- If the development is adjacent to or near a generator, does it include noise attenuation measures?
- If the development is for a new system or an enlargement of the existing infrastructure, have noise and landscape studies being undertaken?
- Has an agreement with Ergon regarding the supply of electricity been reached?

#### 6.4.6 Sustainable Electricity Infrastructure Outcomes

- An efficient, sustainable and reliable electricity infrastructure.
- Energy efficient principles are included in the design and layout of new urban areas and developments.
- The visual and noise impact of electricity infrastructure on the natural and man made environments is minimised through landscaping and appropriate noise attenuation measures.
- All electricity infrastructure is inspected regularly, maintained to ensure that they are in effective working order.

## 6.5 Telecommunication Infrastructure

### 6.5.1 Best Practice

- Telecommunication facilities are expensive to install and consideration must be given to the proximity of existing telecommunication infrastructure when planning future development.
- The land around a telecommunication facility or service should be integrated and maintained to protect the land and marine environments.
- Planning around a telecommunication facility or service should aim to achieve and maintain a high standard of environmental quality and minimise noise to adjacent residential areas.
- All new infrastructure or modification to existing infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on Community by:
  - recognising the importance of climate change on existing and future telecommunication facilities or services;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the Islands natural environments.

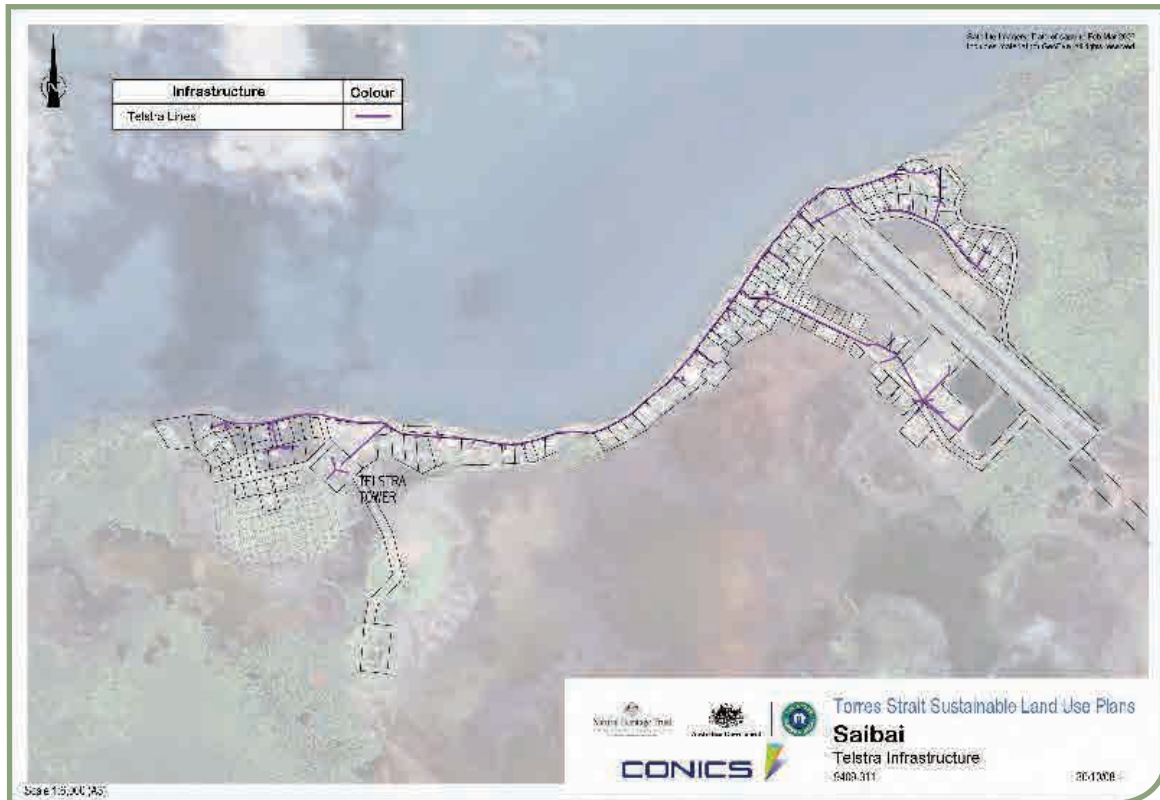
### 6.5.2 Overview of Current Situation

A Telstra Tower is located at the western end of the village, near the Council depot and barge ramp. There is limited mobile phone coverage in the village.

Map 21 shows the location of telecommunication infrastructure



Map 21 Telstra Infrastructure



For more detail, refer to Map No. 9409-311 contained in Volume 3 - Maps

### 6.5.3 Issues Overview

The only known issues regarding telecommunications on Saibai relates to the conversion of the CDMA system to the Next G system. The remote monitoring of the sewerage treatment plant was setup under the older CDMA system. Consequently, remote monitoring of the plant is now unavailable.

As there is limited mobile reception on Saibai, consideration needs to be given to improving reception, particularly in the village area.

### 6.5.4 Land Use Strategies

The following strategy is recommended:

- The Telstra Tower is protected from urban encroachment, including noise sensitive development and any other development that may impact on current or future operations.

### 6.5.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Telecommunication Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development provide affordable access to reliable telecommunication services?

### 6.5.6 Sustainable Telecommunication Outcomes

All telecommunications infrastructure is inspected regularly and maintained to ensure that they are in effective working order.



## 6.6 Roads

### 6.6.1 Best Practice

- Roads are expensive to construct and maintain so consideration must be given to the proximity of existing roads when planning future development.
- Foster investment in road improvements to ensure a high standard of road and adjoining environments.
- Encourage the use of walking and cycling rather than the use of vehicles.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on Saibai's road infrastructure by:
  - recognising the importance of climate change on the existing and future road infrastructure on Saibai;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Saibai's road infrastructure.

### 6.6.2 Overview of Current Situation

The majority of roads on Saibai are 4 metre wide concrete roads, constructed of 100 mm thick fibre reinforced concrete on a stabilised subgrade.

The 2006 Census indicates the following statistics:

- 79 privately owned vehicles;
- 52 households did not have a vehicle;
- 21 households had one vehicle; and
- three households had two vehicles.

Note: there are more vehicles on Saibai than the Census indicates as it does not include vehicles used by the Council or construction workers.

### 6.6.3 Issues Overview

A large proportion of the roads are badly cracked, particularly near the Ibis Store. This is a major issue for Saibai, as costs to correctly repair the roads are estimated to be in the order of several million dollars.

An all weather road is required to service the water supply (Lagoon 3) as the lagoon becomes inaccessible for extended periods during the wet season.



#### 6.6.4 Land Use Strategies

To minimise existing and future development on the natural environment of Saibai and the impacts of natural hazards, the following strategies are recommended to be implemented:

- All development proposals must include landscaping and/or revegetation plans that are in accordance with the Best Practice, Land Use Strategies and Sustainable Outcomes of Section 3.1 Plants, Animals and Birds.
- Transport planning considers the risk of natural hazards such as cyclones, tides, storm surges and acid sulfate soils with transport infrastructure located and designed to avoid or minimize the impact of such events.
- A network of functional, legible and convenient street signs is established.
- A safe and convenient network for pedestrians is provided along street networks, linking residences and providing access to points of attraction within and beyond the urban areas.
- Parking areas do not affect the unique characteristics of sites and are linked to more sensitive features of each site with safe pedestrian and cycle ways.
- Encourage alternative forms of transportation around the community such as bicycle, scooter or h to reduce the reliance on petrol driven vehicles. This would also improve the problem of disused and abandoned vehicles consuming valuable space in the dump.



#### 6.6.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Roads Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development integrate the land use, efficient movement of people and goods and growth for Saibai?
- If the development is in a natural hazard area, is the road located and designed to avoid or minimize the impact of such events?
- If a new street or road is proposed:
  - does it provide for vehicles, pedestrians and cyclists adequately;
  - is it highly connected within the development, with the surrounding area and between settlements; and
  - does it propose road signage in keeping with Saibai’s signage network?

#### 6.6.6 Sustainable Road Infrastructure Outcomes

- The integration of land use and an efficient, safe and sustainable road network that minimises adverse impacts on the environment and reflects the needs of Community.
- Development encourages lower impact modes of travel such as walking and cycling
- All vehicles bought onto Saibai are to be removed from the island after construction is completed.
- All road infrastructure is inspected regularly and maintained to ensure that it is in effective working order.

## 6.7 Drainage

### 6.7.1 Best Practice

- Protect drainage infrastructure and receiving waters from sedimentation and other contaminants.
- Ensure that streets operate adequately during major storm events and provide for public safety and minimise the drainage infrastructure cost of development.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Manage quality and quantity of urban runoff by using stormwater in the landscape by incorporating multiple-use corridors, which maximise the visual and recreational amenity of Saibai.
- Reduce the impacts of climate change Saibai's drainage system and infrastructure by:
  - recognising the importance of climate change on Saibai's drainage system and infrastructure;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Saibai's drainage system and infrastructure.

### 6.7.2 Overview of Current Situation

Residents on Saibai are generally situated less than one metre above the level of the surrounding swampy areas. Due to this low-lying nature, drainage is poor and many areas of the community are adversely affected by both stormwater and extreme tides. Where drainage is poor, ponding often occurs for extended periods, including under some high set homes.



### 6.7.3 Issues Overview

There are three main problem stormwater drainage areas, namely the:

- low-lying houses on the western side of the community, i.e. to the west of School Road extending to the western end of the community;
- low-lying area to the east of the airstrip, i.e. the area bounded by the airstrip to the west; and
- low-lying area to the immediate west of the airstrip, i.e. the area bounded by the airstrip to the east and School Road to the west.

Of these, the first two have recently been rectified and drainage has improved.

Drainage from the area west of the airstrip still requires attention.

### 6.7.4 Land Use Strategies

The following strategy is recommended:

- That development not is permitted in overland flow paths or drainage paths.



### 6.7.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must be amended or not be accepted.

- Is the development in accordance with the Drainage Best Practice, Land Use Strategies and Sustainable Outcomes?
- Is the development designed to minimise its impact on the existing drainage network, downstream catchment and adjoining properties?

### 6.7.6 Land Use Projects

To minimise flooding of properties caused by stormwater flows (as opposed to tidal inundation) it is recommended that a drainage study be undertaken.

### 6.8.1 Sustainable Drainage Infrastructure Outcomes

- Minimise damage to properties and inconvenience to residents from urban runoff by integrating stormwater treatment into the landscape.
- All drainage infrastructure is inspected regularly, maintained to ensure that it is in effective working order.



## 6.8 Air Access

### 6.8.1 Best Practice

- Efficient air transport to service both freight and passenger needs is provided
- Freight and passenger air access is integrated and maintained to protect the adjoining natural and man made environments.
- Adjoining land uses and development are compatible with the operation of airstrip with houses shielded from the impact of aircraft noise by requiring appropriate noise attenuation measures.
- All new infrastructure or modification to existing infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change and fuel costs on air access to and from Saibai by:
  - recognising the importance of climate change and fuel costs on air access to and from Saibai;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change and fuel costs on air access.

### 6.8.2 Overview of Current Situation

The aircraft facilities at Saibai comprise an airfield located at the northern end of the community and include a sealed airstrip approximately 750 metres long and 60 metres wide. Other facilities include an aircraft hardstand area. There is no terminal building.

Operation and maintenance of the airfield facilities is the responsibility of the Council.

Air services exist between Saibai and Boigu, Mabuiag, Ngurupai (Horn Island) and Iama with regulated passenger transport provided between Saibai and Ngurupai (Horn Island). These flights occur three times a day, morning, midday and late afternoon.

Emergency access is available via medivac rescues helicopter (day and night) if required.

### 6.8.3 Issues Overview

Lighting of the airstrip would assist in night time emergency and bad weather access to the island, although it may be cost prohibitive and contribute to increase in energy consumption of the island.

The airstrip and the land around it, is a sensitive and valuable resource. It is the what, where and how we build that can endanger an airstrip; therefore, it is critical that compatible land use planning receives particular consideration.

### 6.8.4 Land Use Strategies

The following strategy is recommended:

- The airstrip is protected from urban encroachment, including noise sensitive development and any other development that may impact on current or future operations.

### 6.8.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Air Access Best Practice, Land Use Strategies and Sustainable Outcomes?
- If the development is located near or adjacent to the airstrip is it:
  - a compatible land use with the airstrip; and
  - if so, does it incorporate noise attenuation measures?
- Does the development impact on the approach/take-off areas of the runway?

### 6.8.6 Sustainable Air Infrastructure Outcomes

- Recognise the importance of the airstrip to Community and the Torres Strait Islands.
- The integration of land use and air access purposes to ensure that there is minimal adverse impact on the development.
- All air infrastructure is inspected regularly and maintained to ensure that it is in effective working order.





## 6.9 Sea Access

### 6.9.1 Best Practice

- Planning around a barge ramp and jetty should aim:
  - to achieve and maintain a high standard of environmental quality
  - minimise noise to adjacent village areas
  - to protect land around a barge ramp and jetty to preserve their value for uses which depend upon proximity to the sea for access to services and facilities
  - to integrated and maintained sea access infrastructure to protect the land and marine environments.
- Provide efficient sea transport to service both freight and passenger needs.
- All new infrastructure or modification to existing infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change and fuel costs on sea access to and from Saibai by:
  - recognising the importance of climate change and fuel costs on sea access to and from Saibai;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change and fuel costs on sea access.

### 6.9.2 Overview of Current Situation

The marine facilities at Saibai consist of a precast concrete barge ramp, a timber finger pier and a rock seawall. The barge ramp and finger facilities are accessed from the deep water by a dredged channel, which is marked by navigational buoys.

The barge ramp and associated rock walls provide access for all goods transported to the island and are an essential part of the community's infrastructure.

There is currently an adequate hardstand area formed from natural materials adjacent to the barge ramp. The facility also incorporates a shed and fenced area.

Saibai is serviced weekly by a barge service from Port Kennedy.

### 6.9.3 Issues Overview

The entry channel to the barge ramp needs to be dredged to remove the silt build up. The sea wall has gradually deteriorated over the past few years and requires reconstruction.

### 6.9.4 Land Use Strategies

The following strategy is recommended:

- Land use and barge ramp purposes are to be integrated to ensure that development is compatible with adjacent village development.

### 6.9.5 Land Use Considerations

When assessing the impacts of future development on Saibai, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Sea Access Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development provide efficient access to the barge ramp and jetty?
- If the development is located near or adjacent to the barge ramp and jetty is it a compatible land use for port activities and the adjacent village?

### 6.9.6 Sustainable Sea Access Outcomes

- Recognise the importance of sea access to Community and the Torres Strait.
- Develop and implement an integrated management plan for land uses around the barge ramp and jetty.
- All sea infrastructure on or abutting Saibai is inspected regularly and maintained to ensure that they are in effective working order.





Please contact Conics, Cairns Office on 07 4031 1336 for all enquiries

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