dauan

Sustainable Land Use Plan

PART 2

dauan

Abai, a women who lived in the village of Buli on Dauan Island, received a baby pig from friends on the northern mainland, together with the message that she should look after it until it grew up. This she did and it grew big and fat, so fat that it could not walk, so she told people of Buli to kill the pig, which they did and then ate. When the friends, who owned the pig, heard that their pig had been killed and eaten at Dauan, they were exceedingly angry.

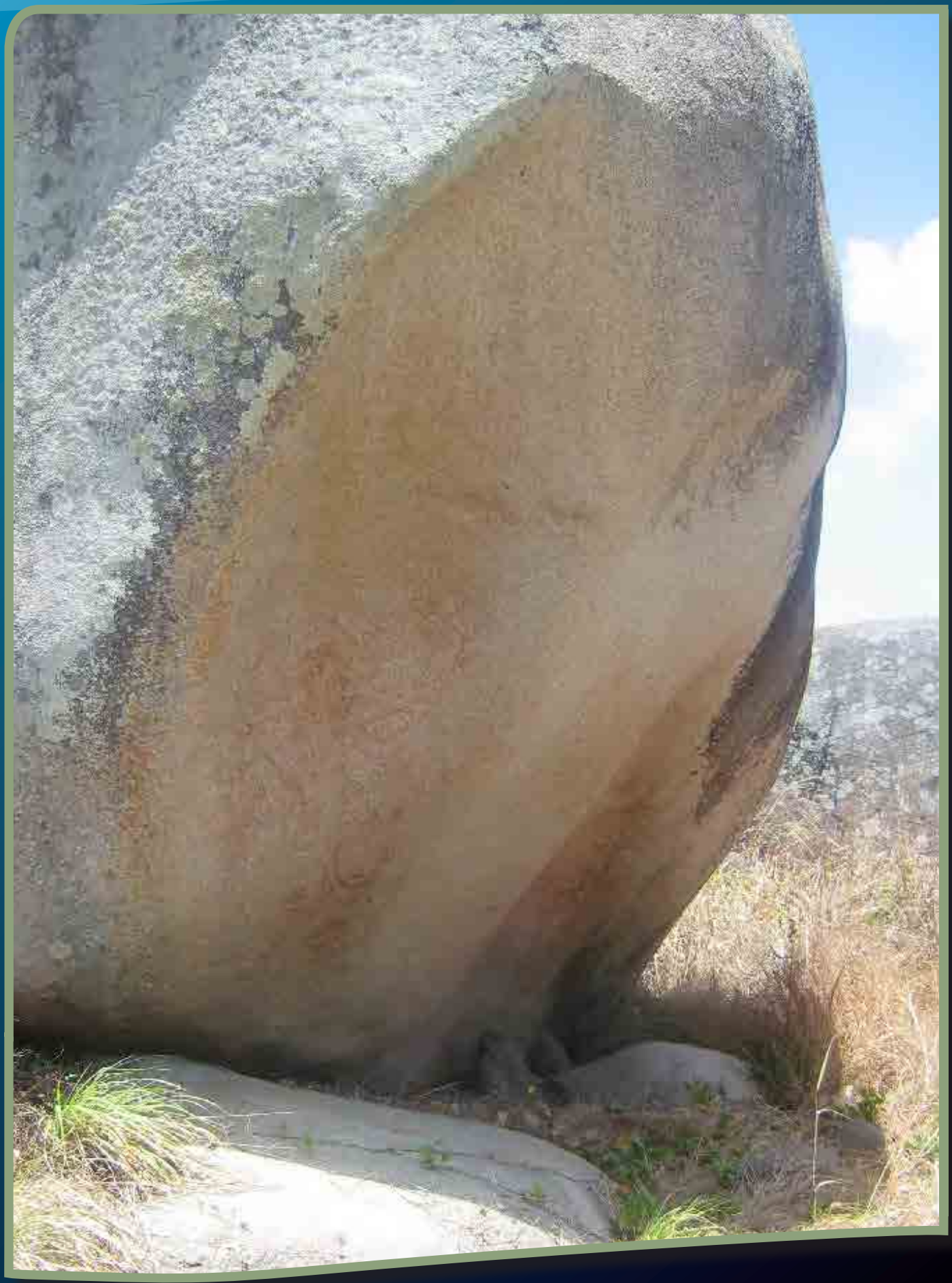
They sent a message to Kiwai saying that they wanted the people of Dauan to be punished for their offence. The Kupamal, the fighting people of Kiwai in the Fly River delta, immediately got together their fighting gear, clubs, bows and arrows and bamboo, beheading knives and loaded their canoes for the journey.

They set out late in the afternoon and being Naigai time, the season of the north-east wind they were helped by a steady breeze all the way to Dauan where they arrived late that night. They landed at Sigain Kup, a small cove, armed themselves and climbed up the rocks at the back of the beach to an enormous boulder. They believed that if they could roll the bounder down into the sea than their combined strength would be sufficient to overcome the people of Dauan. They could not budge it. From there they went down and drew pictures with parma (orche or red clay) on the under surface of a high rock further back from the shore as they waited for the right time to commence their attack.

The Kupamal set out for the village while it was still dark, some men remained in the bushes and their rest sneaked into every house and laid down beside a sleeping occupant. Just before daybreak, a Dauan women got up and went to the bushes where the Kupamani were hiding, they shot arrows at her and she cried ‘people of Dauan there are enemies here either Gumulgal (men from Mabuiag) or Kupama, I don’t know which”. Wakened by her cries the people of Dauan tried to dash from their homes, but every Kupam was read to seize and club the victim he had marked and few escaped. The Kupamal cut off the heads of the dead.

Those men of Dauan who had escaped hid on either side of the path through the scrub and stoned and killed many of the Kupmal as they were returning to their canoes with the strung heads of their victims. Those that reached their canoes sailed away, but as they were going past the western side for Saibai two men, Iamaru and Karigas put a canoe in the water and went out to question them about where they were coming from. The Kupamal replied that they were on their way home from Dauan, they then looked under a mat of one of the canoes and recognised the heads. They killed the men in the canoe but the other canoes sailed away, however they were also seen at Mawat and the same happened again, but with only one single canoe managing to escape, the only one from the many canoes which sailed from Kiwait for the punitive raid on Dauan.

Source: Museum Horn Island April 2008



Land Use **Plan Structure**

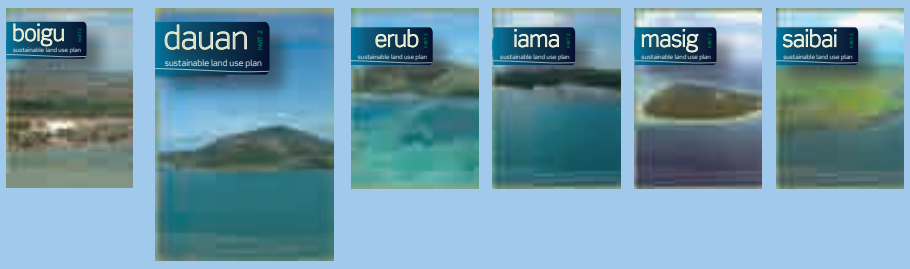
PART 1

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 asessing 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 lead 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.

Source: Torres Strait Regional Authority

The primary objective of reviewing land uses on Dauan 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.

Dauan 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.

Dauan is approximately 10km south of the Papua New Guinea coastline and is reached by a 10km boat ride west of Saibai.

Dauan is a granite island that rises sharply on all sides to a peak of approximately 295 metres above sea level known as Mt Cornwallis. Mt Cornwallis is the most northern mountain of Australia's Great Dividing Range, which in the Torres Strait, became a sunken chain of islands that once extended as a bridge to the northern landmass.

The island is approximately three kilometres long by three kilometres wide with the village located along a narrow coastal strip on the northern shoreline of the island, backed by steep hills. Rocky outcrops occur through the elevated vine forests and along the shoreline, with the most noticeable outcrop in the village near the barge ramp. Sandy beaches are also scattered along the coastline.

The **key environmental assets** of Dauan are:

- vine forest vegetated hill slopes;
- habitat of the Eclectus Parrot and Sheath-tail Bat;
- habitat linkages and corridors in the southern area of the island; and
- coastal, beach and mangroves areas which include rare wader bird habitat.

Identified **land issues** are:

- steep topography which, limits the location and expansion of the village;
- largely undeveloped, relatively pristine condition of the southern half of the island as it is largely inaccessible;
- changing system of land tenure;
- increasing tide and storm surge levels;
- degradation of vegetation along existing water courses;
- potential acid sulfate soils;
- potential erosion;
- bushfire hazards; and
- cultural heritage of Dauan.

Identified **Infrastructure issues** are:

- sufficient capacity of the existing water and sewerage infrastructure to serve the current population and the predicated population in the next ten years;
- the need to find a solution for the handling, sorting and disposal of waste;
- inability of a mobile desalination unit to pump treated water to the storage lagoon;
- future extended use of the temporary desalination unit;
- required installation of the feed line from the plant to the storage lagoon;
- lack of a reticulated sewerage system;
- limited opportunity for viable alternative sources of energy; and
- lack of sea tide data to enable accurate mapping of tidal inundation on Dauan.

Identified **housing issues** are:

- steep topography of the island and the narrow strip of coastal land suitable for urban development;
- existing 22 vacant, serviced lots cater which, can cater for an additional 9-31 dwellings;
- the existing lots are sufficient to cater for the predicted population increase to past 2017;
- existing vacant lots should be developed with either dual occupancies (duplex) or townhouses or units to maximise land availability;
- the need to supply diverse, affordable and sustainable housing to meet population changes and move towards a sustainable environment; and
- single area suitable for future development, being east of the village, providing for approximately 12 houses.

Identified **population issues** are:

- current population is 290 persons;
- there is significant population growth forecast for Dauan, particularly under a high growth scenario which will see the population Dauan nearly double over the next ten years;
- 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 **growth issues** are:

- a low growth rate of 2.3% which will generate:
  - an extra 43 persons over ten years;
  - an additional housing need of 1 house per year; and
  - an additional 9 houses over a ten years;
- a high growth rate of 6.6% which will generate:
  - an extra 157 persons over ten years;
  - an additional housing need of 3.1 houses per year; and
  - an additional 31.4 houses over ten years;
- by adopting either, the low or high growth rates, growth pressure on Dauan will be generated which will mean a significant need for new homes, being approximately 9-31 dwellings,
- different options available to manage growth on Dauan, namely:
  - utilise existing serviced lots prior to encouraging development in the investigation area;
  - increase residential density; and
  - expanding the residential area; and
- studies are required to determine whether or not the identified investigation area is suitable for development.

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:

- vacant land will be consumed in ten years or more;
- Dauan's current infrastructure will limit Dauan population growth after 2017;
- Community must decide how they are going to adjust development on Dauan 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; and
    - adjacent to areas identified as subject to high prone erosion;
  - 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.

Table of Contents

Appendices

Maps

Tables

Figures

Island **Overview**

1.1 Location

Dauan is located in the top western group islands in the Torres Strait, approximately 120 km north of Horn Island.

Dauan is approximately 10km south of the Papua New Guinea coastline and is reached by a 10 km boat ride west of Saibai.

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

Map 1 Regional Location

"approximately latitude 142°32" east and longitude 9°25" south."

Map 2 Satellite Image of Dauan

For more detail, refer to Map No. 9409-200 contained in Volume 3 - Maps

1.2 Physical Characteristics

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

1.2.1 Topography

Dauan rises sharply on all sides to a peak of approximately 295 metres above sea level. The peak is known as Mt Cornwallis. The island is approximately three kilometres long by three kilometres wide with an area of approximately 365 hectares.

The village is located along a narrow coastal strip on the northern shoreline of the island, backed by steep hills.

Map 2 shows a satellite image of the Dauan.

1.2.2 Geology

Dauan is a granite island and is the most northern mountain of Australia's Great Dividing Range, which in the Torres Strait, became a sunken chain of islands that once extended as a bridge to the northern landmass.

Rocky outcrops occur through the elevated vine forests and along the shoreline, with the most noticeable outcrop in the village near the barge ramp. Sandy beaches are also scattered along the coastline.

1.2.3 Vegetation

Dauan is mainly a vegetated island, with vine forests covering much of the steep terrain. Grassland areas are located around the foothills of the island and behind the village, with mangroves and wetlands along the shoreline.

1.2.4 Waterways, Wetlands and Coasts

There are a number of high value waterways on Dauan, located in the lower land areas, which are mainly supplied with water from groundwater sources during the dry season.

Numerous small creeks drain the mountain slopes into valleys from which the current water supply is drawn. Several creeks are found through the village.

1.3 The Village

The village is located on the full length of the northern shoreline of the island. The southern half of the island is uninhabited. On the western side of the island are the water storage area, rubbish dump and sports playing fields.

The residential areas consists of residential dwellings, supported by Council offices, a church, primary school, two convenience stores, health centre and community hall and outdoor sports courts. The cemetery is located just on the fringe the main village area to the east.

Map 3 shows a satellite image of Dauan Village.

1.4 Population

In 2006, the total population of Dauan was 165 persons, a 6.6% increase from the 2001 Census.

Map 3 Satellite Image of Dauan Village

For more detail, refer to Map No. 9409-200 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

Dauan legal land tenure consists of a Deed of Grant in Trust (DOGIT) shown as Lot 9 on TS169, 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 areas 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 extract 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 Dauan 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 is 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

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

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

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

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

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

Websites

Department of Natural Resources and Water

www.nrw.qld.gov.au

2.2 Native Title

2.2.1 Best Practice

- Native title should respect, protect and identify Dauan'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 respective fully of deaths in communities and cultural events.

2.2.2 Overview of Current Situation

Native title rights are held by the Dauan People as determined by a consent determination on 06 July 2000 [1]. Native title rights exist in the entire determination area being Dauan (one of the Murray Islands) in the Torres Strait. Native title is managed by the Dauanalgaw (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 were three Indigenous Land Use Agreements (ILUA's):

- Dauan Island ILUA (No. QI2003/038 – Infrastructure);
- Dauanalgaw/Ergon Energy Electricity ILUA (No. QI01/67 – Access Infrastructure); and
- Dauan Island ILUA (No. QIA2000/008 – 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.

1. Dauan People v Queensland [2000] FCA 1064

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 Dauan.

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

Indigenous Land Use Agreements

National Native Title Tribunal

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

Websites

Department of Natural Resources and Water

www.nrw.qld.gov.au

National Native Title Tribunal

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 Dauan 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 Dauan 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 Dauan's natural environment. The report is written for the Dauan Community, the TSIRC and the TSRA. The Fauna and Habitat Assessment of Dauan, 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 & 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 Dauan recognises the importance of plants, animals and birds, natural resources and their fundamental relationship to the quality of life and viability of Dauan 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 Dauan;
  - 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.

3.1.2 Overview of Current Situation

The land and sea of Dauan 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 Dauan. The preliminary fieldwork undertaken by Natural Solutions is part of the ongoing process of recording and identifying significant habitat, plants, birds and animals on Dauan. The notable ecological and habitat features of Dauan are the:

- notophyll vine forest habitat has high habitat value; and
- mangroves and coastal vegetation are important habitat for rare and threatened birds.

Notable rare and threatened fauna observed on Dauan include:

- Eclectus Parrot (*Exlectus roratus macgillivrayl*)
  - rare under the *Nature Conservation Act 1992* (NCA);
- Papuan Sheathtail Bat (*Saccolaimus mixtus*)
  - rare under the NCA;
- Coastal Sheathail Bat (*Taphozous australis*)
  - vulnerable under the NCA; and
- Little Tern (*Sternula albifrons*)
  - endangered under the NCA.

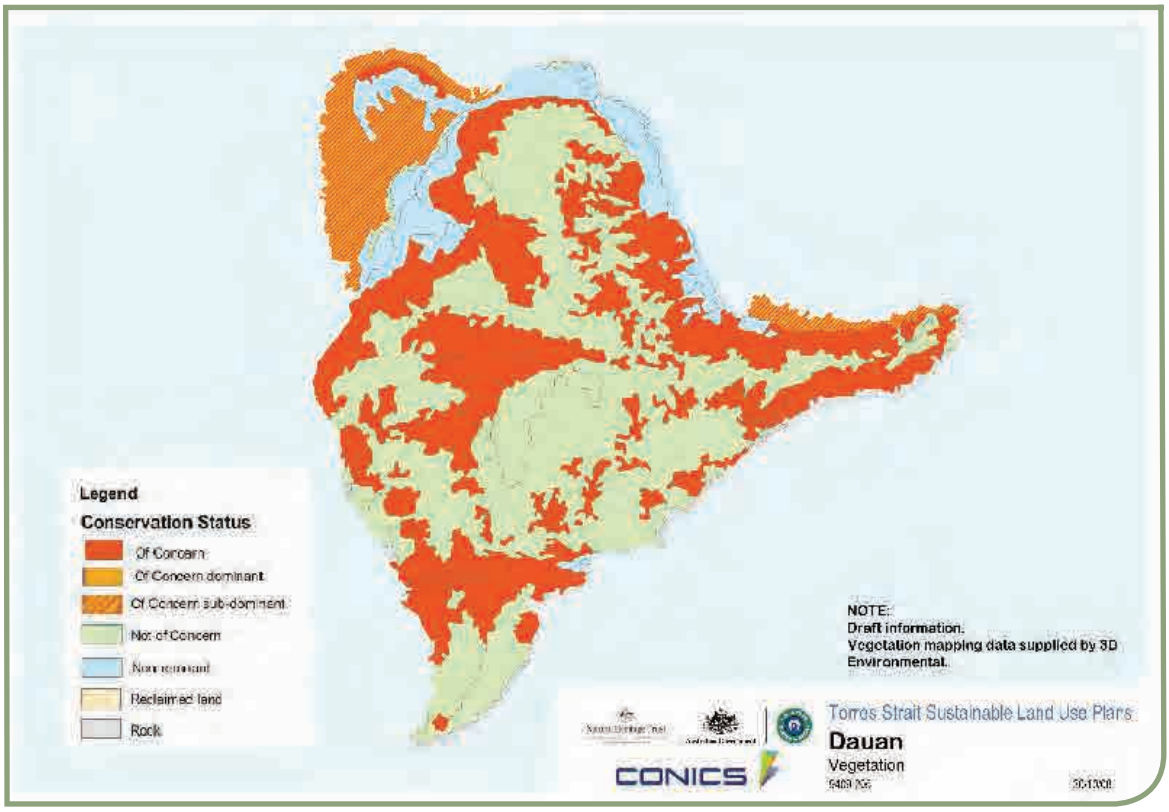
First records and collection made on Dauan of land fauna include:

- Skink species (*Emoia longicauda*);
- Major Skink (*Egernia frerei*);
- Burton's Legless Lizard (*Lialis burtonis*); and
- Green Tree Snake (*Dendrelaphis punctulata*).

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

Map 4 shows the significant vegetation communities on Dauan.

Map 4 Vegetation



For more detail, refer to Map No. 9409-205 contained in Volume 3 – Maps.

"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."

Four habitat types were identified on Dauan, including:

Notohyll Vine Forest

Semi-deciduous notophyll vine forest habitat is generally confined to elevated areas on Dauan. Rock outcrops occur throughout this habitat type and provide niches for fauna such as bats and reptiles. Six species of bats were identified in the field. Of these, the Coastal Sheathtail Bat is listed as vulnerable and the Papuan Sheathtail Bat is listed as rare under the *Nature Conservation Act 1992*. The Papuan Sheathtail Bat is also listed as vulnerable in the International Union for Conservation of Nature (IUCN) Red List of globally threatened fauna.

Three reptiles were identified and included the Northern Tree Snake, Amethystine Python and the Major Skink (*Egernia frerei*). Birds that were sighted during the field survey of this habitat included the Yellow-bellied Sunbird and the Channel-billed Cuckoo. An Eclectus Parrot was observed flying overhead and is likely to use notophyll vine forest as habitat. This species is listed as vulnerable under the *Nature Conservation Act 1992*.

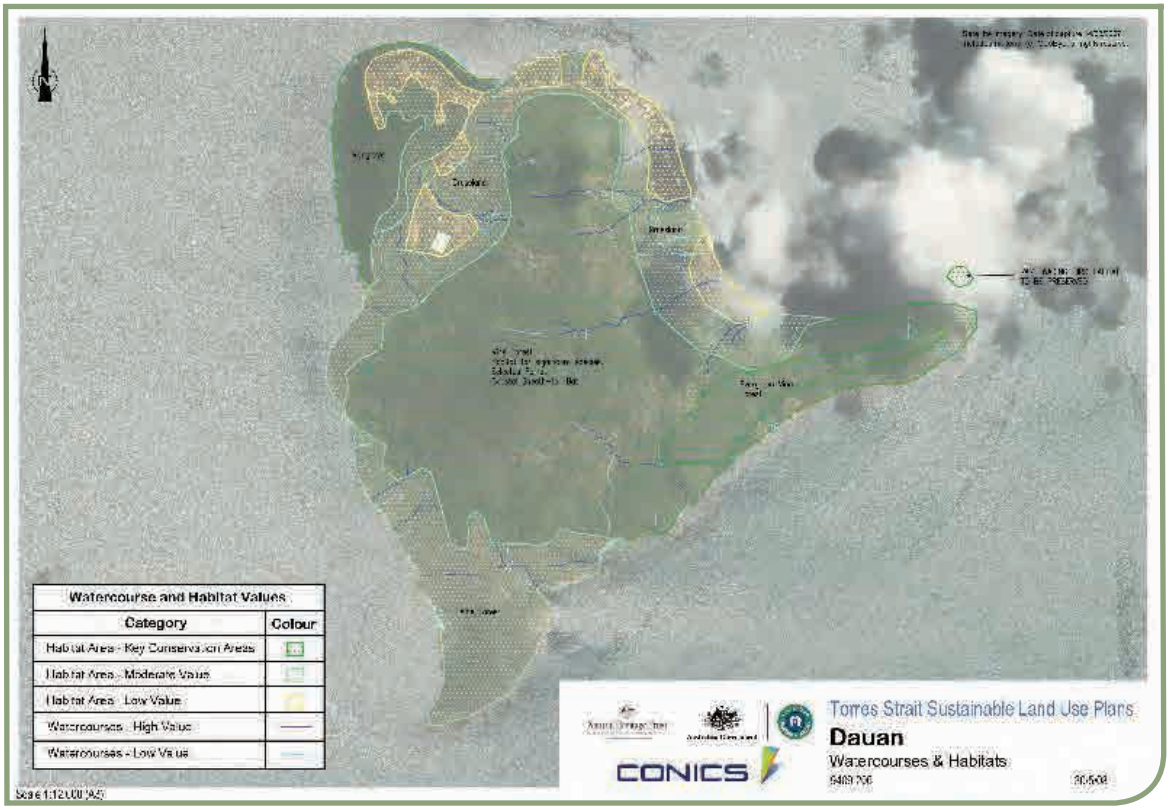
Grassland

Birds that were sighted during the field survey of this habitat included the Yellow-bellied Sunbird and the Channel-billed Cuckoo. An Eclectus Parrot was observed flying overhead and is likely to use notophyll vine forest as habitat. This species is listed as vulnerable under the *Nature Conservation Act 1992*.

Native rodents (Melomys spp.) were found to be common in grassland and frequently observed reptiles included skinks such as Eugongylus rufescens, Gehyra dubia and the Major Skink (*Egernia frerei*).

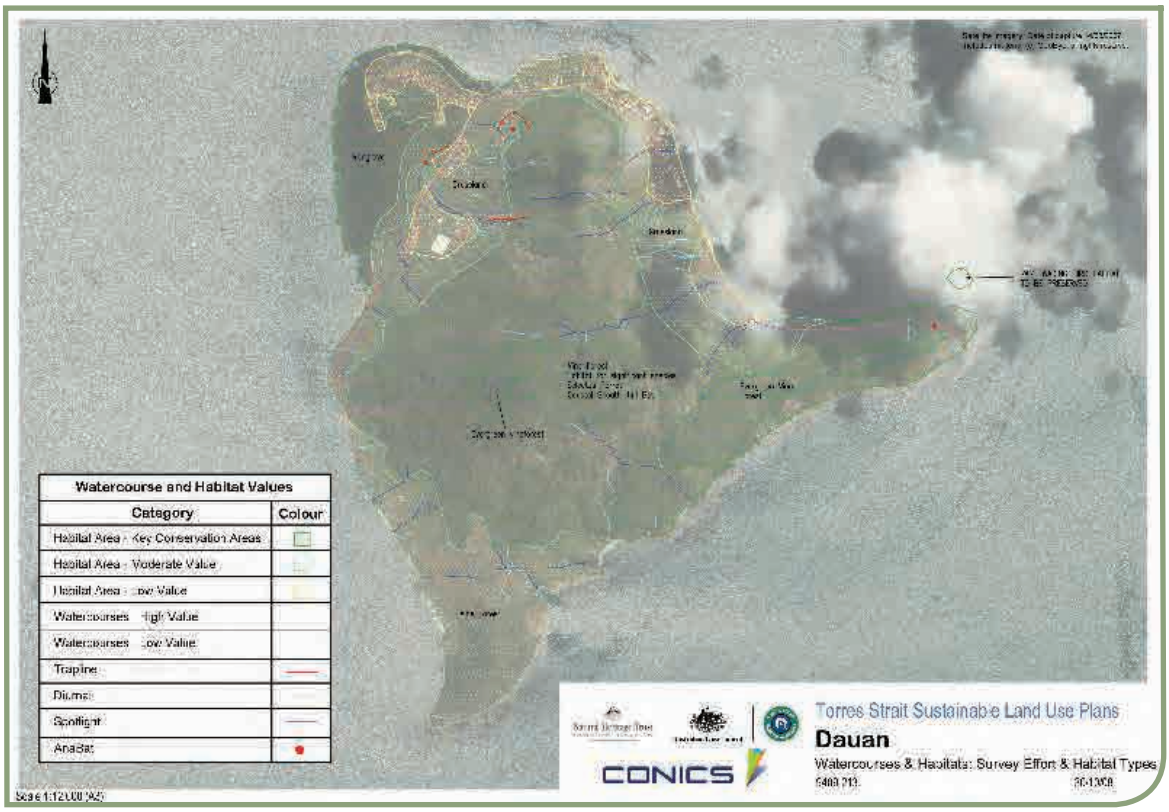
The ground-dwelling Red Backed Button Quail was one of the few birds observed in this habitat.

Map 5 Habitat Areas



For more detail, refer to Map No. 9409-206 contained in Volume 3 – Maps.

Map 6 Ecologically Significant Watercourses and Habitats



For more detail, refer to Map No.9409-213 contained in Volume 3 – Maps.

Mangroves and Coastal

Mangrove communities occur as small, dense stands of structurally sound forest mostly on muddy substrates and consist of trees such as Avicenna marina and *Rhizophora stylosa*. Sections of rocky shoreline are home to plants that have adapted to a very harsh environment of wind shearing, salt-laden spray from the ocean and aridness. Plants in these locations form densely structured groups with a closed canopy and adjoin elevated rocky headlands, as well as intergrading in some areas with the mudflats of the inland reaches of mangroves and along beaches.

As well as providing a protective buffer from ocean elements, mangroves and the coastal (littoral) zone vegetation are important for a variety of fauna including sea birds, waders and reptiles.

Developed Areas

The developed areas of Dauan are isolated to small, intensively modified sections on the north-eastern end of the island. Some less intensive development has spread to the north-west.

Habitat for wildlife in developed localities is sparsely vegetated and often reduced to microhabitat and niche environments around buildings, the rubbish tip and in water wells. Generally this habitat is of low quality due to human alteration and disturbance to natural features, as well as impacts caused by localised pollution.

Many of the species of fauna identified around developed sections of the island inhabit a zone that blends into surrounding, less impacted environments. Some of the species observed included Burton's Snake Lizard, Bar-shouldered Dove and the Yellow-bellied Sunbird.

Map 5 shows the habitat areas of Dauan.

Map 6 shows the identified ecologically significant watercourse and habitat areas.

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

3.1.3 Issues Overview

There is limited separation of habitats on Dauan, however there is also limited connectivity between forested areas due to clearing of grassland habitat and removal of waterway vegetation. Re-establishment of waterway vegetation would enhance the connectiveness of habitats areas from the vine forest slopes to mangrove forests, however is likely to provide limited ecological value. The vine forests and waterways are entirely connected to the coastal areas in the southern areas of the island.

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

"Fragmentation is caused when vegetation and habitat areas are cleared resulting in these areas being divided into smaller, isolated patched"

The distinct vegetated character of Dauan relies on the retention of biodiversity and ecosystems. In addition, many of the fauna species identified on Dauan 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 Dauan to provide high quality habitat and long-term safe refuge for species of conservation importance. Many of these areas also provide distinct views and vistas.

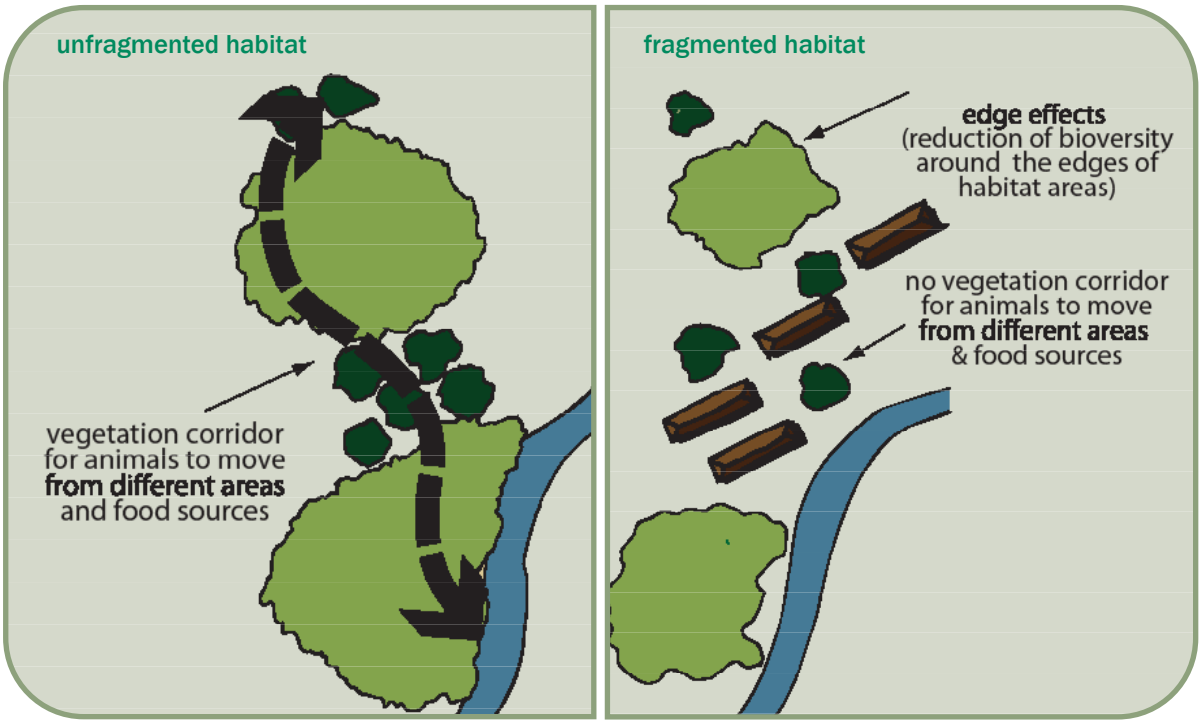
For these reasons, it is vital that land must be protected for conservation purposes. Ideally, these areas will represent the full range of habitats and species found across the island and from corridors for the safe movement and successful breeding of wildlife within the island. Such areas include the:

- vine forest vegetated hill slopes;
- habitat of the Eclectus Parrot and Sheathtail Bat;
- habitat linkages and corridors in the southern area of the island; and
- coastal, beach and mangroves areas which include rare wader bird habitat.

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. 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.

Figure 1 **Vegetation Fragmentation**



3.1.4 Land Use Strategy

To minimise existing and future development on Dauan'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.

3.1.5 Land Use Considerations

When assessing the impacts of future development on Dauan, 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 Dauan?
- Has a minimum of 40 metres buffer being provided between the development and mangrove habitat, creeks, wading bird habitats and coastal vegetation (the buffer area should consists of native vegetation)?
- Is the development outside of areas identified for conservation particularly in areas such as the vine forests?
- 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;
  - 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 Dauan;
  - 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 Dauan plants, animals and birds, the following projects are recommended:

- Regulate indiscriminate dumping of rubbish and protect against local pollution;
- Maintain current extent of mangrove and coastal vegetation;
- Regulate indiscriminate clearing and thinning of native vegetation, particularly mangroves;
- Implement a weed management plan; and
- Implement a cat and dog management plan.

3.1.7 Sustainable Plants, Animals and Bird Outcomes

- The unique environmental values of Dauan 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 Dauan's plants, animals and birds.
- Encourage community participation in planning, restoring and protecting Dauan'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 significances, 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

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

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

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

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

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

Websites

Caring for our Country

www.nrm.gov.au

Environmental Protection Agency

www.nrw.qld.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

Due to the steep topography of Dauan, the village wraps around the northern coastline of the island. The southern half of the island, which is largely inaccessible is dominantly undeveloped and is in relatively pristine condition.

The planning and management of the coastal and marine environment of Dauan 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 Dauan coastline.

Map 7 shows the areas of Dauan impacted by coastal inundation and sea level rise.

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.

"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."

3.2.3 Issues Overview

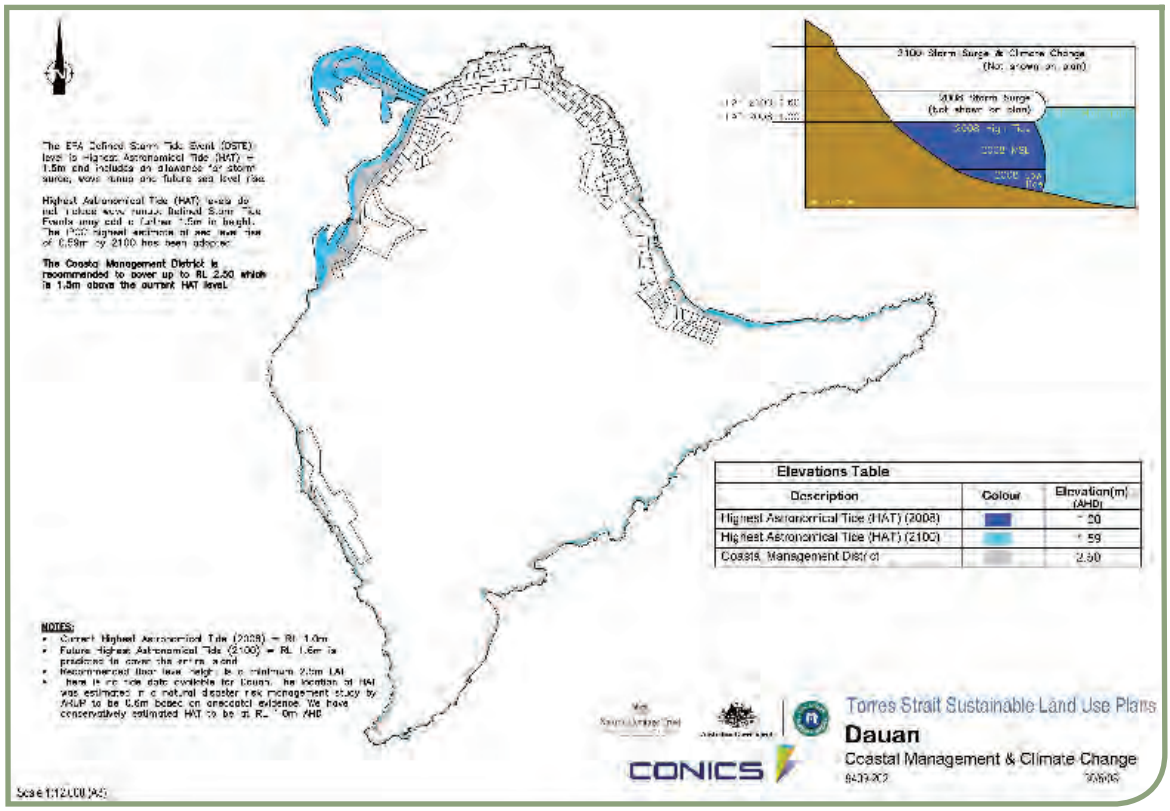
The primary consideration for Dauan coastline is the conservation and protection of its coastal environments, which are subjected to urban pressure, increasing weeds and pest infestation, recreational use and the expansion of the village along the coast. The coastal expansion of the village could have a harmful impact on the existing landscape character of Dauan. The protection of the pristine natural environment along Dauan's coastline should be addressed in all planning documents and processes relating to Dauan.

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'.

Map 7 Coastal Management & Climate Change



For more detail, refer to Map No. 9409-202 contained in Volume 3 – Maps.

3.2.4 Land Use Strategies

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

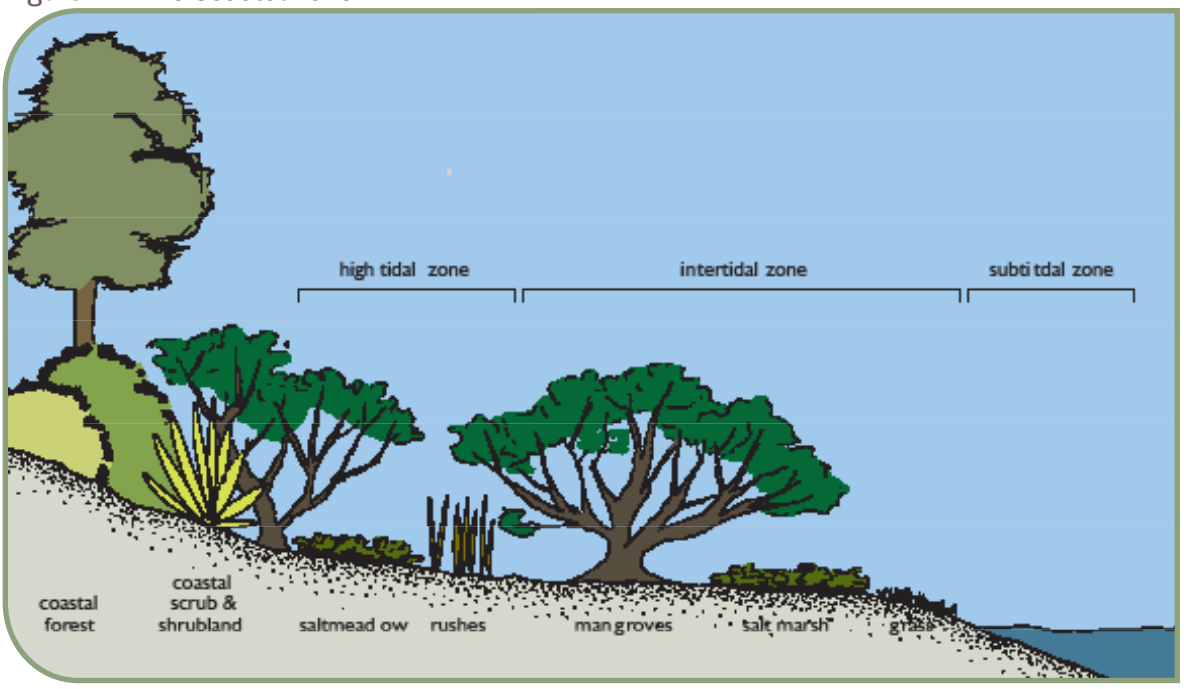
- Not permit urban development and infrastructure along the southern coasts of Dauan and inaccessible parts of the coast.
- New development is contained with the village and the identified investigation areas.
- All development proposals must:
  - include landscaping and/or revegetation plans that are 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 Dauan, 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, infrastructure and population capacity; and
  - identify and protect important coastal assets of ecological, visual and cultural significance?

Figure 2 The Coastal Zone



"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"

3.2.6 Sustainable Coastline Outcomes

- Protect and maintain Dauan's coast, including the foreshore, coastal wetlands, dunes, marine ecosystems, coastal marine waters, 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 Dauan'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

Policies, Guidelines and Fact Sheets

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

www.amcs.org.au

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

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

Websites

Environmental Protection Agency

www.epa.qld.gov.au

Australian Maritime Conservation Society

www.amcs.org.au

CoastCare

www.coastcare.com.au

OzCoasts

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 Dauan to the impacts of climate change by:
  - recognising the importance of climate change on the sea and land environments of Dauan;
  - 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 no published tidal information available for Dauan. Previous reports have used a RL0.6 but in discussions with Community, a RL1.0 is adopted for this Plan.

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 on the village.

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

Figure 3 Storm Surge Area

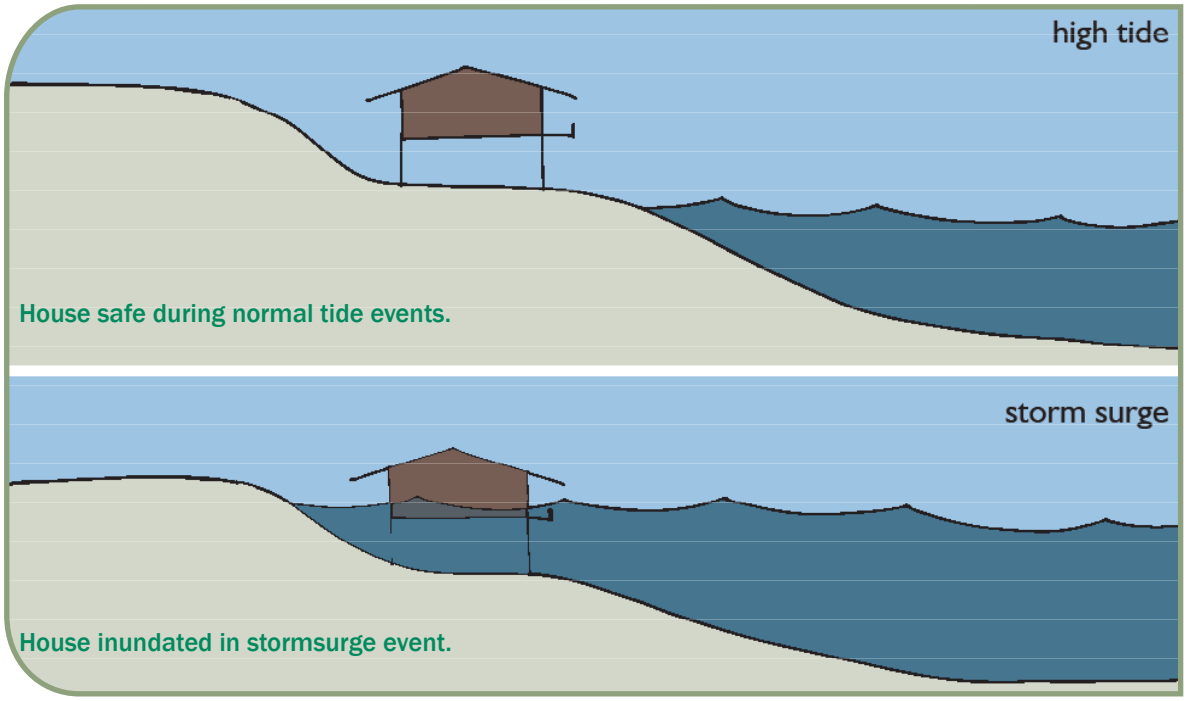
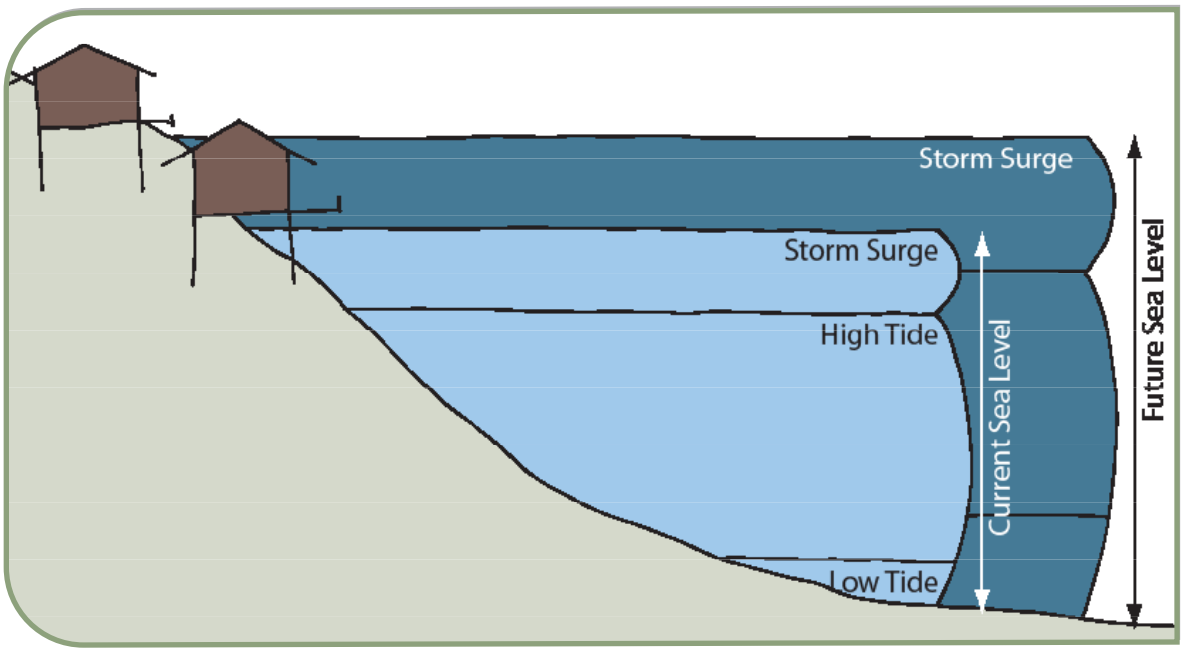


Figure 4 Climate Change and Sea Level Rise



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.

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
- increased and more severe coastal flooding and storm damage.

Dauan coastal ecosystems landforms — among them, mangroves, coastal flood plains and beaches 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 Dauan'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 Dauan, this includes a combination of strategies that are addressed in Section 3.4.4.

3.3.4 Land Use Strategies

Dauan's steep topography means that this island is not significantly impacted by tidal inundation, however it is important to discourage future development from being located in low-lying coastal flood plains or in high hazard areas.

The location of new development should generally be in line with State government coastal planning which is a 40 metre setback. Over time, the area within the setback would be used for general community purposes. This strategy would result in development and infrastructure being setback 40 metres from the top of the coastline to provide a buffer between the shoreline and the village, to minimise the impacts of tide inundation and storm surge.

On Dauan, moving away from sea level rises and storm surges may not be an all inclusive option due to a lack of suitable land for development; therefore a combination of strategies is required. These include but are not limited to:

- 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.
- 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 a minimum of 3.75 metres AHD; and
  - mechanical and electrical works (e.g. pump stations) are above predicted 2100HAT.

3.3.5 Land Use Considerations

When assessing the impacts of future development on Dauan, 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 that changes the current predicted se 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?

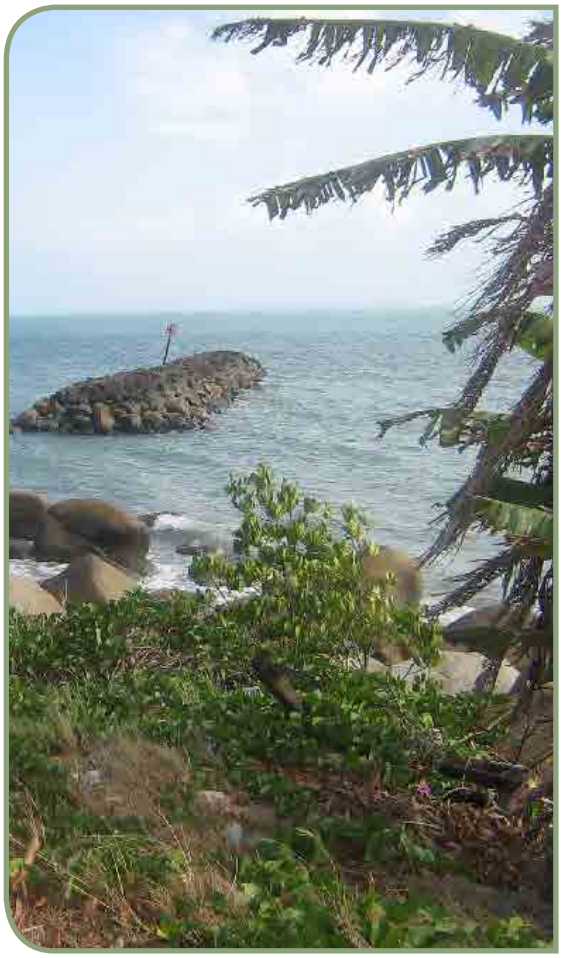
3.3.6 Land Use Projects

Two land use projects are required to be undertaken:

- To enable accurate mapping of tidal inundation on Dauan, a study that determines sea tide levels on Dauan should be undertaken.
- To protect the environments on Dauan, 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.

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.



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

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

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

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

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

Websites

Environmental Protection Agency

www.epa.qld.gov.au

National Tidal Centr

www.bom.gov.au

OzCoasts

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 Dauan to the impacts of climate change by:
  - recognising the importance of climate change on the waterways and wetlands environments of Dauan;
  - 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 Dauan's waterways and wetlands.

3.4.2 Overview of Current Situation

The main waterways on Dauan are located in the lowland areas and are mainly supplied by groundwater sources during the dry season. Most of the waterways on the island have lost their riparian vegetation or it has been replaced with introduced plants and trees such as mango trees. As such, the waterways on Dauan are of relatively low ecological value.

Stormwater which drains to the bottom of the boulder slopes provides an important water source supporting many species between wet seasons. Waterways have been highly disturbed by fire and human occupation with many, almost solely comprising a canopy of mango trees.

Maps 5 and 6 shows the significant watercourse and habitat areas.

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 sand for building materials, ecological linkages, scenic amenity and recreational opportunities.

"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"

The importance of waterways on Dauan cannot be underestimated as groundwater associated with these natural drainage lines is an importance source of fresh drinking water for residents and are likely to be an importance source of water for the island's animals and birds.

The general impacts to waterways on Dauan include –

- chocking by weed infestation from grasses due to light penetration;
- water quality impacts from housing being built in waterway catchments; and
- degradation from fire.

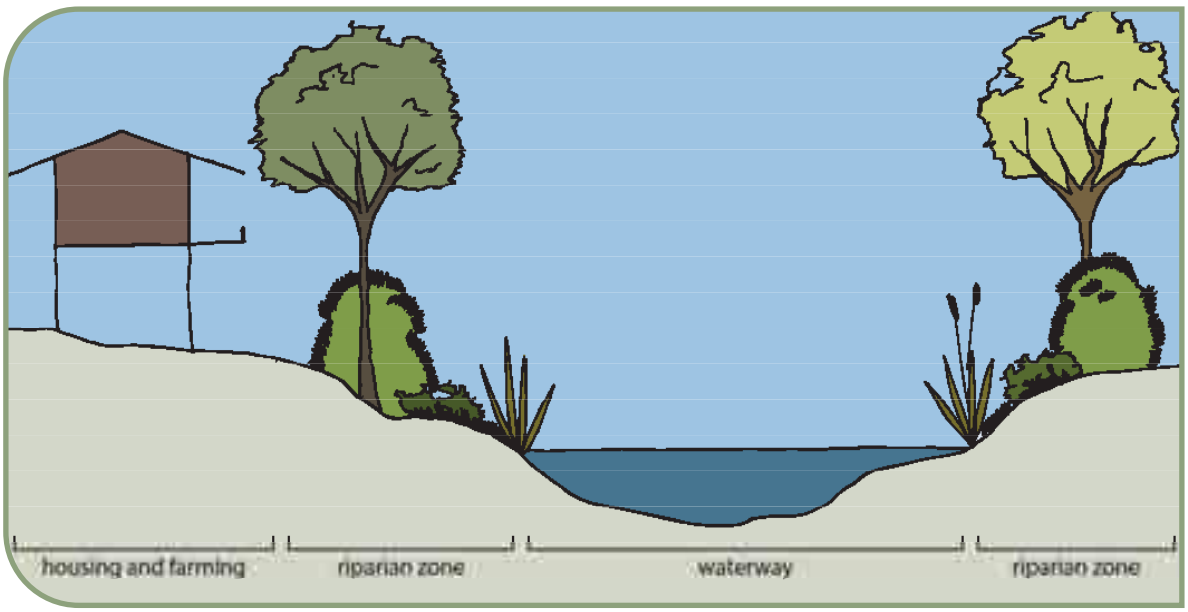
Conflict is likely to continue in areas where waterways are present. The continued encroachment and degradation of these areas is likely to be unproductive as vital water supplies can potentially be impacted through degraded water quality. As such, recommendations for land use management in these areas are made including providing for adequate setbacks and measures to improve ecological integrity and water quality.

The coastal mangrove habitat is relatively restricted and is most threatened by land use activities from infrastructure and human activities such as fire wood collection.

Figure 5 shows how if buffer areas are left between waterways and wetlands, it provides protection to the waterways and wetlands from the impacts of development.

"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"

Figure 5 Waterway and Wetland Buffer



3.4.4 Land Use Strategies

To minimise existing and future development impacts on Dauan'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.

"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."

3.4.5 Land Use Considerations

When assessing the impacts of future development on Dauan, 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 Dauan 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

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

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

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

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

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

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

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

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

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

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

www.nrw.qld.gov.au/factsheets

Websites

Department of Natural Resources and Water

www.nrw.qld.gov.au

Environmental Protection Agency

www.epa.qld.gov.au

WetlandCare Australia

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 Dauan to the impacts of climate change by:
  - recognising the importance of climate change on Dauan's land, soil and slopes;
  - 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 Dauan's land, soils and slopes.

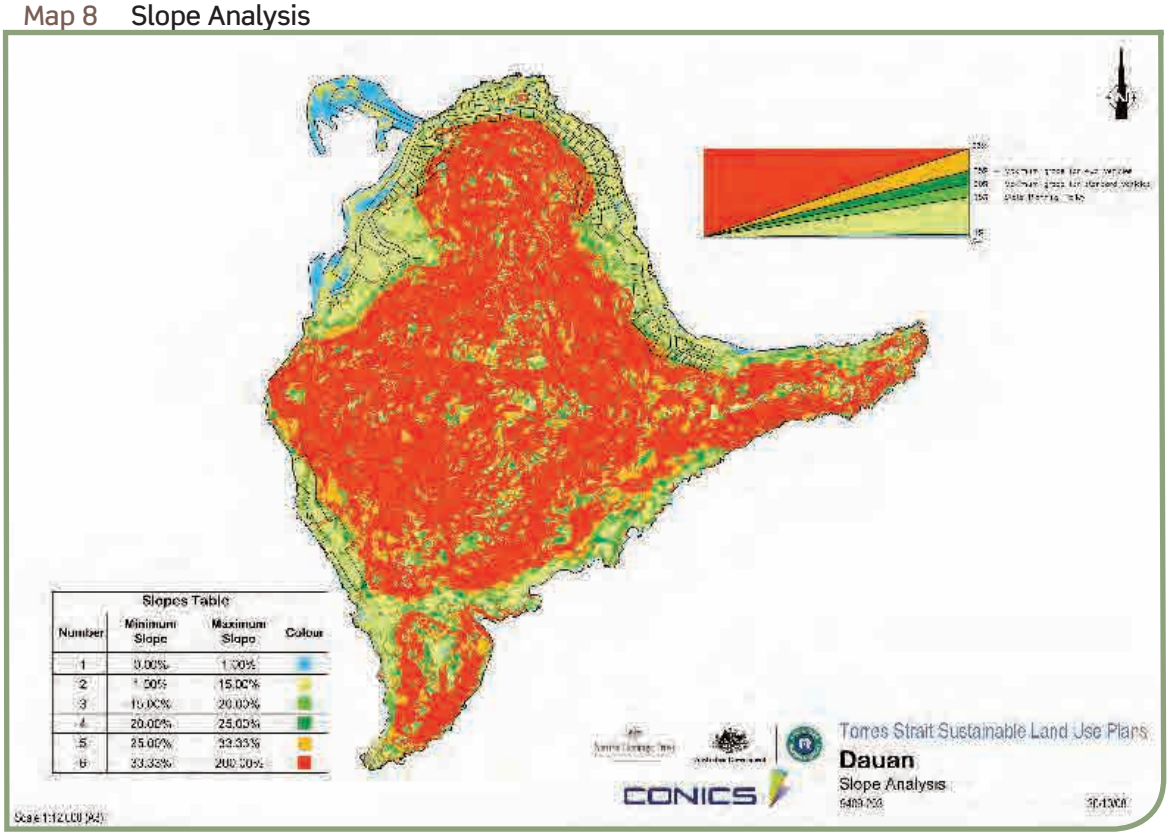
3.5.2 Overview of Current Situation

Dauan's topography is very steep and is composed of granite and acid volcanic rocks. Due to the extensive vegetation cover over the steep slopes, land erosion is not major issue.

However, if the vegetation is cleared for development or garden plots, then the potential for land erosion to occur is increased significantly.

Map 8 shows the level of degree of the slopes of Dauan.

Map 8 Slope Analysis



For more detail, refer to Map No. 9409-203 contained in Volume 3 – Maps.

The coastal fringes are subject to coastal erosion due to natural forces, development and increasing tide levels. However, these areas provide a buffer between the inland areas and the coast, which allows for the natural variations of the coast to occur without the need for intervention to protect human life and property.

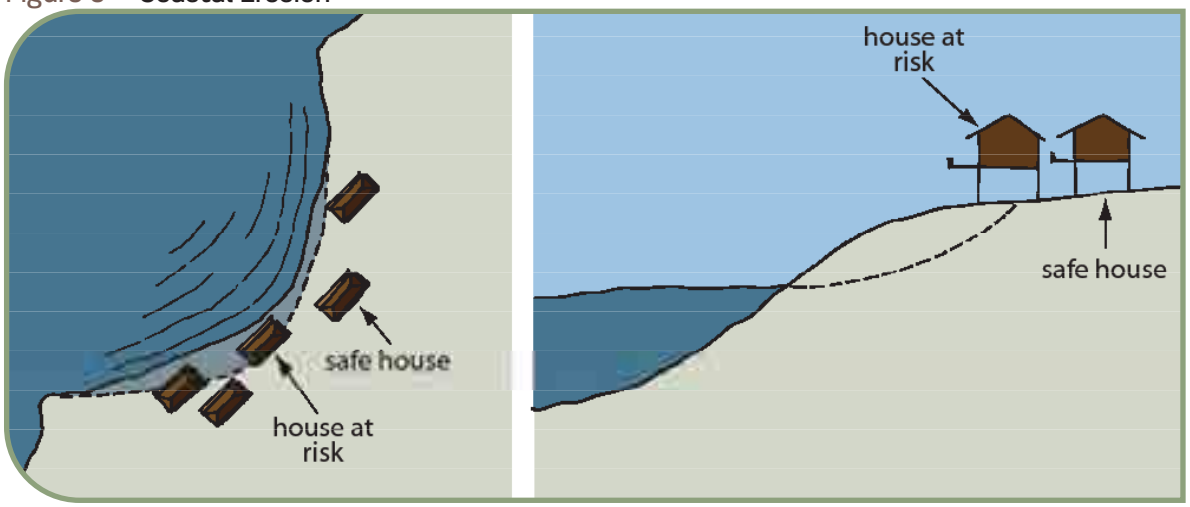
Figure 6 shows where the 'coastal erosion zone' can occur when there is no seawall.

There is a lack of data available on soil types on Dauan. As parts of Dauan are below the 5m AHD, acid sulfate soils are possible.

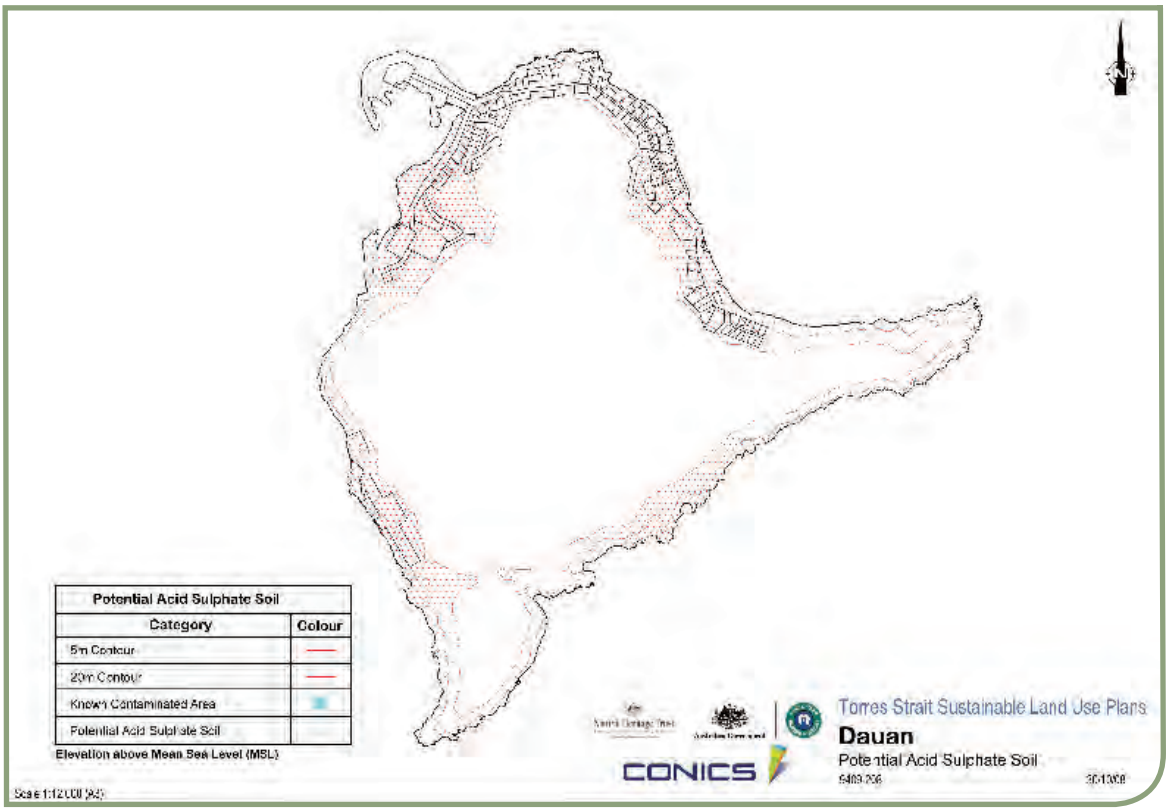
Map 9 shows the potential location of acid sulfate soils.

Figure 7 shows where acid sulfate soils are located within the soil layers.

Figure 6 Coastal Erosion

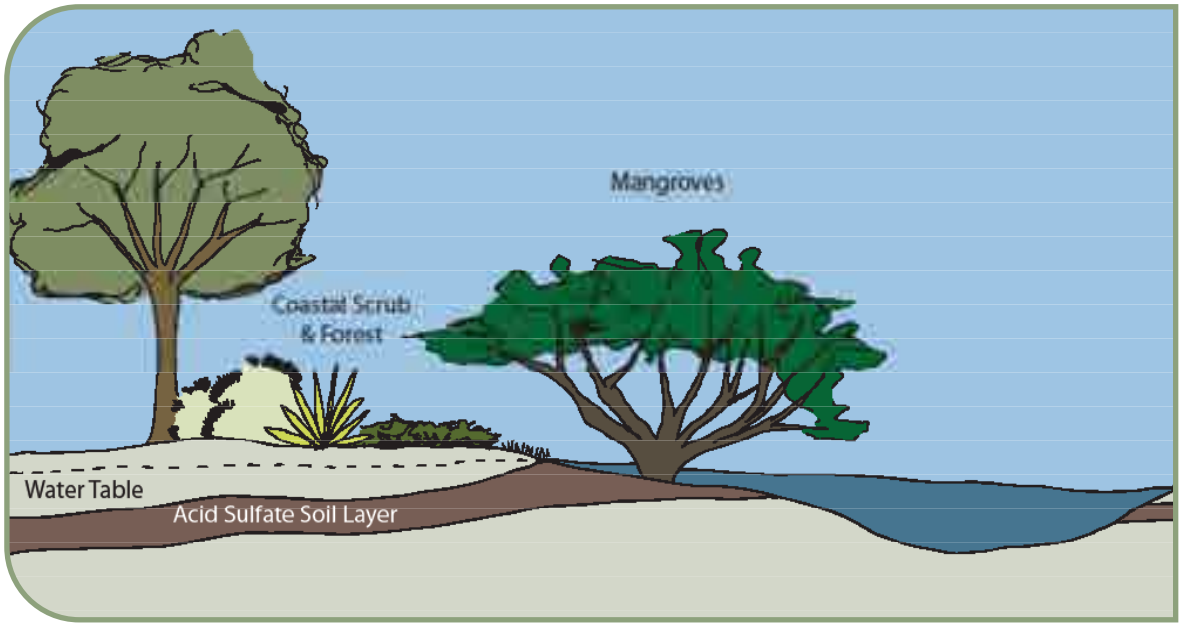


Map 9 Potential Acid Sulfate Soils



For more detail, refer to Map No. 9409-208 contained in Volume 3 – Maps.

Figure 7 Acid Sulfate Soils



"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."

3.5.3 Issues Overview

Dauan's landform constrains any significant expansion of the existing urban area in all directions except on the lower slopes fronting the foreshore. Land use planning should promote development to complement the existing landform.

Given that much of the village and associated community facilities and infrastructure are located on the Dauan's lower lying areas, there is the potential for acid sulfate soils to be exposed. 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.

Land erosion usually occurs where vegetation has been cleared. Whilst this has not been a significant issue on Dauan, although vegetation loss due to bushfires has occurred, the need to expand the village along the edge of the island makes it a potential issue. New development along the lower slopes which may result in the potential for land erosion and subsequent runoff needs to be effectively management or be avoided.

" 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 pope 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"

3.5.4 Land Use Strategies

To minimise existing and future development on Dauan 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.
- Limit development encroachment on slopes covered by grassland habitat.
- Adequate services and access must be provided where development is located on steep slopes.
- Roads and driveways must take advantage and complement the existing landform and vegetation.
- Building on slopes is to minimise excavation/ cut and fills works.
- 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 Dauan, 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?
- If development occurs on a slope does it :
  - retain the existing landform or is the finished landform sensitive to the existing surrounding natural landform;
  - retain existing vegetation especially the native canopy trees;
  - integrate or protect unique or special natural features of the site such as landforms, rock outcroppings, mature trees and vegetation, drainage courses, hilltops and ridgelines; and
  - respect the existing views, privacy, access to light and safety of neighbouring properties?
- Where development occurs on slopes greater than ten percent (10%), are pier construction or multiple split-level building pads provided?
- Where development occurs on land below 5m 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, steep slopes, erosion and landslides.
- 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

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

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

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

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

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

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

www.nrw.qld.gov.au/factsheets

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

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

Websites

Department of Natural Resources and Water

www.nrw.qld.gov.au

Environmental Protection Agency

www.epa.qld.gov.au

OzCoasts

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 Dauan to the impacts of climate change by:
  - recognising the importance of climate change on Dauan'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 Dauan's bushfire environment.

3.6.2 Overview of Current Situation

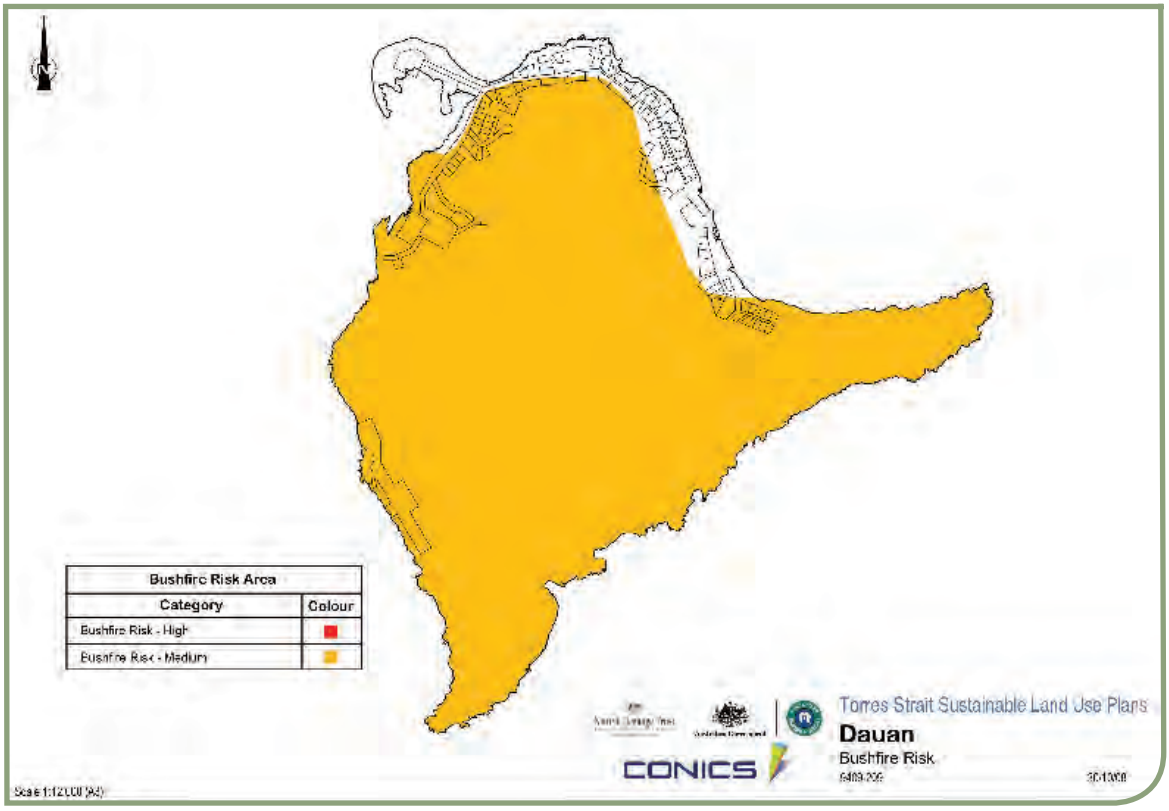
Dauan is extensively covered in vine forests with a steep terrain making the island subject to a medium bushfire risk. While uncontrolled fires provide a threat to the fringes of the vine forests, the rock terrain means that fires are typically mosaic fires rather than catastrophic sheet burring fires which destroy large areas of habitat and property.

The grassland areas are at threat from uncontrolled burning, with evidence of periodic burning at the northern end of the island. While the area is able to adequately recover from periodic burning, it is likely the degraded waterways are a direct result of a continued uncontrolled fire regime.

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

Map 11 shows the location of bushfire hazard areas.

Map 11 Bushfire Risk



For more detail, refer to Map No. 9409-209 contained in Volume 3 – Maps.

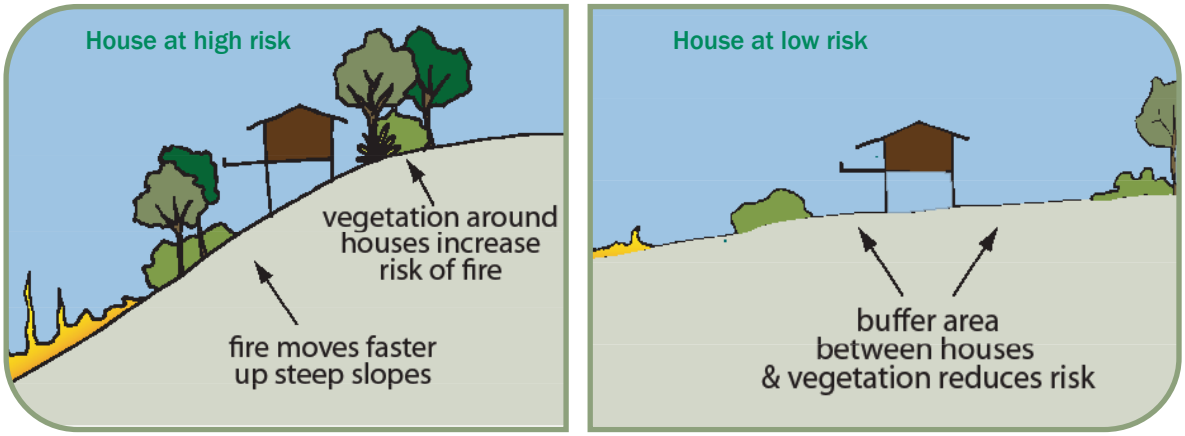
3.6.3 Issues Overview

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 Dauan will inform future generations and guide where development should or should not occur at the beginning of the planning process.

Figure 8 shows how by providing a fire break between dwellings and bushfire hazard areas assists in reducing the threat of bushfire.

Figure 8 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 Dauan'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

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.

http://www.fire.qld.gov.au

Websites

Queensland Fire & Rescue Service

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 to Dauan'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 and heritage.

4.2 Overview of Current Situation

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

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;
- stone artefacts;
- stone tool and quartz quarry sites;
- grinding grooves;
- a rock shelter;
- rock art sites;
- kod sites;
- a sago tree; and
- horticulture and coconut grove sites.

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

Further details on Dauan's culturally significant places and sites is included in Appendix 3.

The cemetery is located at the western end of the village. Its capacity is extremely limited in area and there is restricted potential for increasing its current capacity. Further, as there is no sea wall at this end of the village, the cemetery is susceptible to tidal inundation during king tides and storm surges.

"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"

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 Dauan, 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 Dauan'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 Dauan'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 is 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 Dauan'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 the 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 man made environments must incorporate cultural values and beliefs and the role of Traditional Owners in Dauan's cultural heritage.

4.5 Land Use Considerations

When assessing the impacts of future development on Dauan, 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?
- Dauan is a significant area of cultural heritage to Community, so have all appropriate persons and State agencies being 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 Dauan'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 Dauan's areas of cultural significance.

4.7 Sustainable Indigenous Cultural and Heritage Outcomes

- Development is planned and managed to ensure impact on the culture and heritage of Dauan is avoided, mitigated or remedied.
- The impact of climate change on Dauan 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

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

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

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

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

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

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

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

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 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.

5.1.2 Overview of Current Situation

The resident population of Dauan has increased in the past ten years as indicated in the Table 1.

While population growth of Dauan has substantially increased over the past five years, there is insufficient data to say that this trend will continue.

The 2006 Census indicates the following population characteristics:

- an average age of 20 years;
- 42.2% of the population is under the age of 15 years;
- 13.6% of the population is between the age of 15 and 24 years;
- 10.4% of the population is between the ages of 25 and 34 years;
- 22.1% of the population is between the ages of 35 and 54 years; and
- 11.7% 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 Dauan, 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

Table 1 Population Growth

Year	Population	Growth / Year (%)	Population Density: persons/km2
1996	132	NA	NA
2001	120	-1.9	NA
2006	165	6.6	45.4

Source: ABS, 1996, 2001 and 2006

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 Dauan'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

Dauan's housing stock varies in size, architectural style, height and age. Given the nature of the island, the village is contained to a definable narrow arrow extending the full length of the northern shoreline. Houses located in the village are generally one storey and either built as a slab-on-ground house or as a house on elevated stumps and are of timber construction. Dwellings are generally in good condition.

Housing density varies throughout the village with no distinct area of higher density.

The village also contains visitor accommodation, both dongas and guest accommodation which are self-sufficient, with common bathroom and kitchen facilities. Visitors who wish to use the accommodation must book through the local council office.

There are currently 22 vacant serviced lots within the village.

Family Composition

The 2006 Census indicates the following characteristics on family composition on Dauan:

- no couples with no children;
- 16 families with children under 15 years;
- thee families with children over 15 years;
- eight, one parent families with children under 15 years; and
- no, one parent families with children over 15 years.

Household Composition

The 2006 Census indicates the following characteristics about Dauan households:

- 33 households of which 6 consist of two people, 5 consist of three people and 5 consist of six or more people;
- eight lone person households; and
- an average household size of 3.7 persons per dwelling.

Housing Rental and Ownership

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

- 30 households are paying rent to housing co-operative, community or church group;
- three households paying rent to a State or Territory housing authority;
- three households paying rent to a non-stated landlord;
- no household paying a housing loan repayment;
- no privately owned dwellings (either fully owned or being purchased); and
- an average rent is $75 per week.

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

From the 2006 Census data, Dauan has an average household size of 3.7 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

Based on the past five years, there has been a substantial population growth on Dauan and it can be expected that the population will continue to increase. It is expected that new housings will be constructed either side of the existing village, either continuing around to the sports fields in the west or past the cemetery in the east.

Refer to Section 5.3 Sustainable Community Expansion for more information.

As such, as part of meeting longer term population pressures and preserving the land and sea relationship, is to provide diverse, sustainable, affordable housing options. Providing a range of housing choice assists in creating diverse communities as well as minimising impact on the environment.

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

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 Dauan, 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, 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
  - is responsive to climate, landscape and the changing population structure of Dauan 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

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

Websites

Australian Bureau of Statistics (Census data)
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 rate of an additional 4 persons/year, being an additional 43 people between 2007-2017 and a high rate of 13 persons/year, being an additional 157 people between 2007-2017. In summary, in 2017, the population of Dauan is predicted to be between 212-333 people.

Table 2 shows the estimate population growth and housing demand for Dauan over the next 10 years.

This Plan considers two growth scenarios based on a low growth rate of 2.3% and a high growth of 6.6 % for the next ten years.

- A low growth rate of 2.3% which will generate:
  - an extra 43 persons over ten years;
  - 9 houses over a ten year period; and
  - additional housing need of 1 house per year at an average of 5 person per household).
- A high growth rate of 6.6% which will generate:
  - an extra 157 persons over ten years;
  - 31.4 houses over a ten year period; and
  - additional housing need of 3.1 houses per year at an average of 5 person per household).

Table 2 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 (2.3%)	165	169	173	177	181	185	189	193	198	202	207	212	43 persons over ten years	9 houses over ten years
High Growth (6.6%)	165	176	187	200	213	227	242	258	275	293	313	333	157 persons over ten years	31 houses over ten years

Source: ABS 2006

5.3.2 Issues Overview

There is significant population growth forecast for Dauan, particularly under a high growth scenario which will see the population Dauan nearly double over the next ten years. As such, there will be significant need for new homes, being approximately 9-31 dwellings.

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

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

These options are outlined in detail.

Village Infill Development

There are currently 22 vacant serviced lots within the village. As such, there is sufficient infill development opportunities within the village to accommodate any short to medium term housing demand.

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 Dauan; and
- more sustainable housing patterns.

Expansion of the Residential Areas

While the topography of Dauan limits the scope for future village expansion, the grassland on the lower slopes of the island are suitable for future development, particularly as they considered being of lower ecological value. One village expansion area has been identified, being east of the village, providing for approximately 12 houses.

Both of these areas will require the provision of services and as such, development should not occur within these expansion areas until all infill development opportunities on services lots have been exhausted. The development of these expansion areas will accommodate of long term housing demand under the high growth scenario.

5.3.3 Land Use Strategies

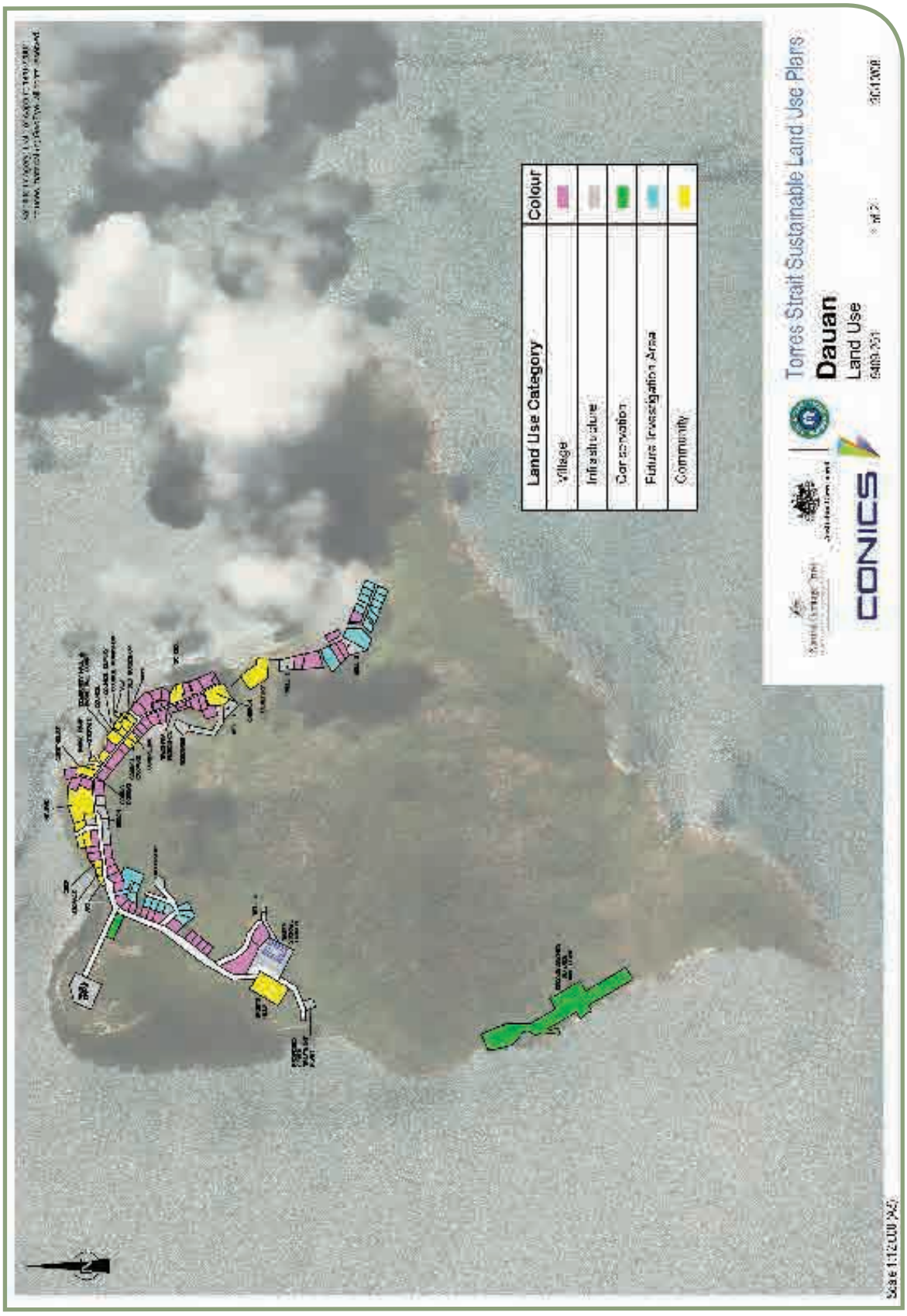
The population trends, profiles and infrastructure limitations mean that the land use strategies must be developed to:

- 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. Areas 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.

Maps 11 & 12 shows the future land use intent for lots within the village.

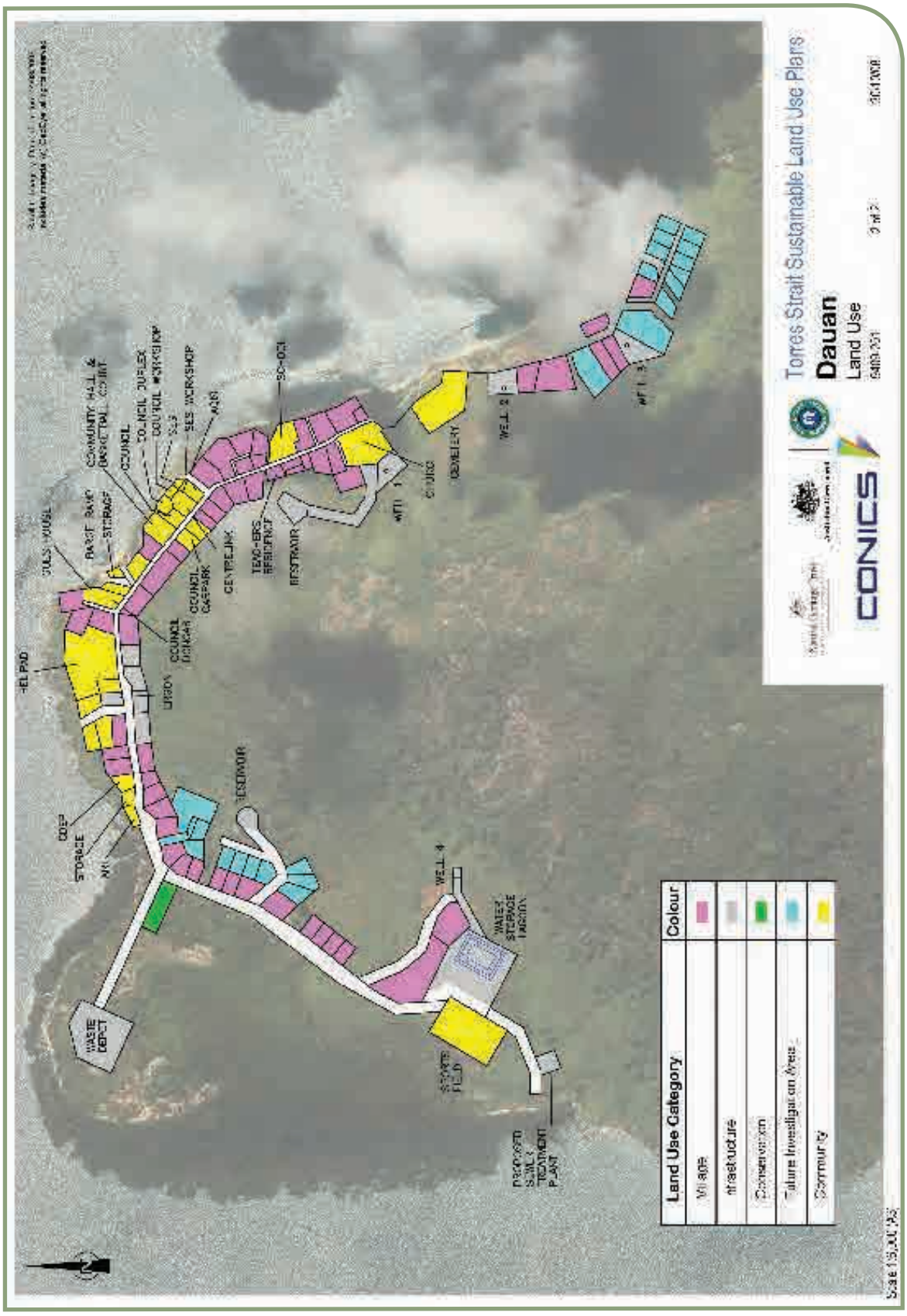
Map 13 shows the lots which are presently suitable for development due to access to services. These lots are shown as “Village”. Areas that may be suitable for future development future and subject to further investigation and/or the provision of services are shown as “Investigation Area”.

Map 11a Land Use



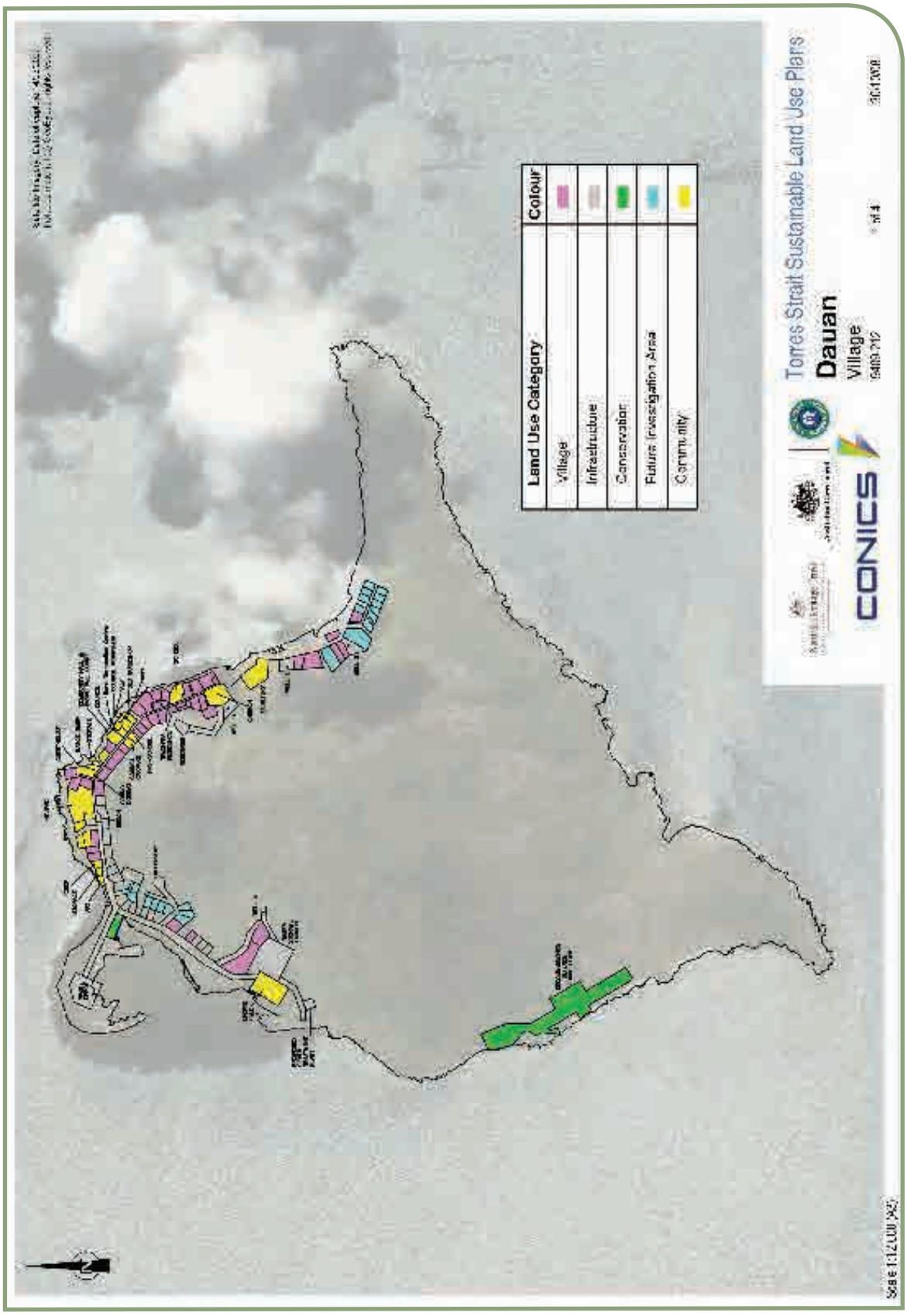
For more detail, refer to Map No. 9409-201 contained in Volume 3 – Maps.

Map 11b Land Use (Village)



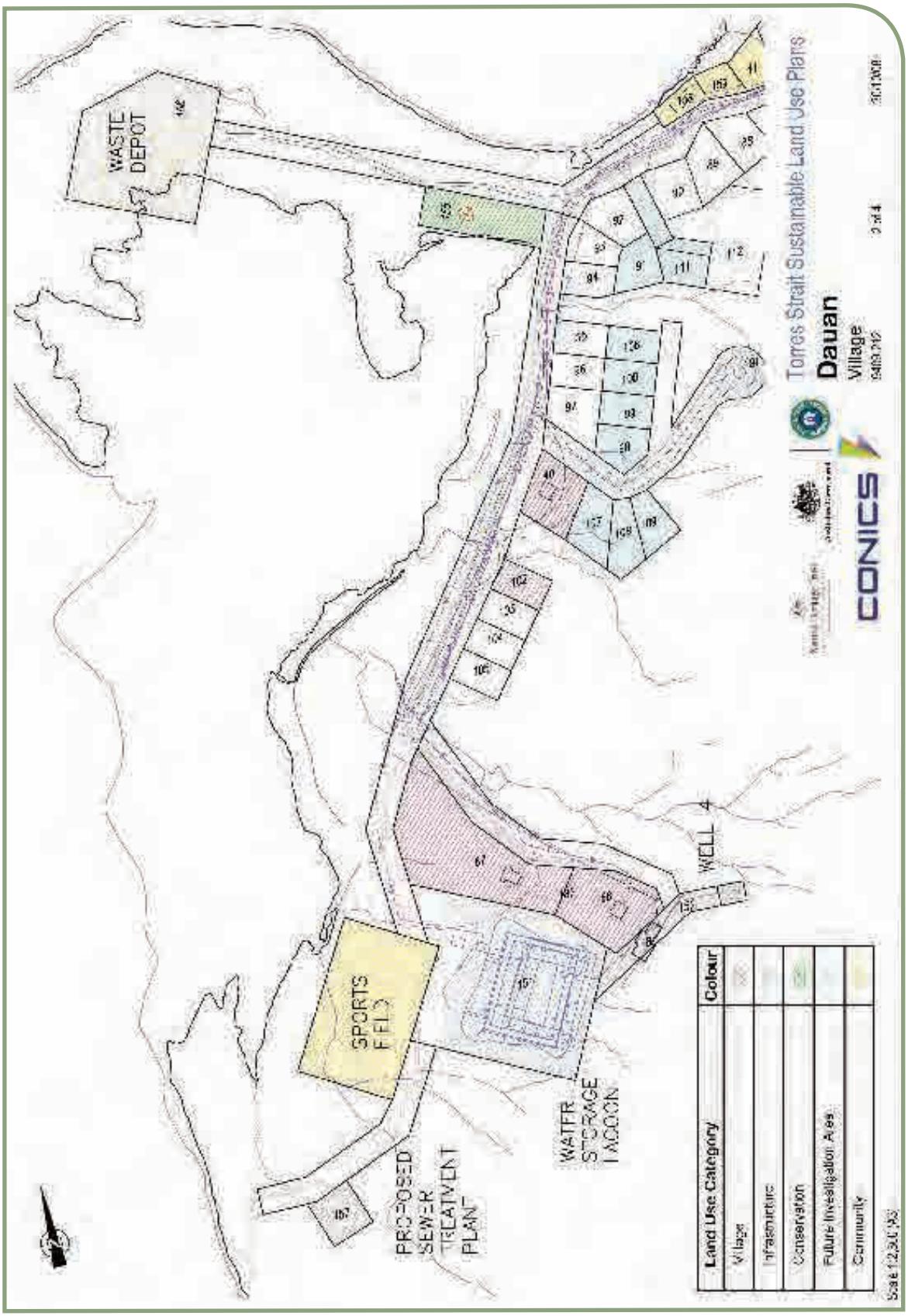
For more detail, refer to Map No. 9409-201 contained in Volume 3 - Maps

Map 12a Village



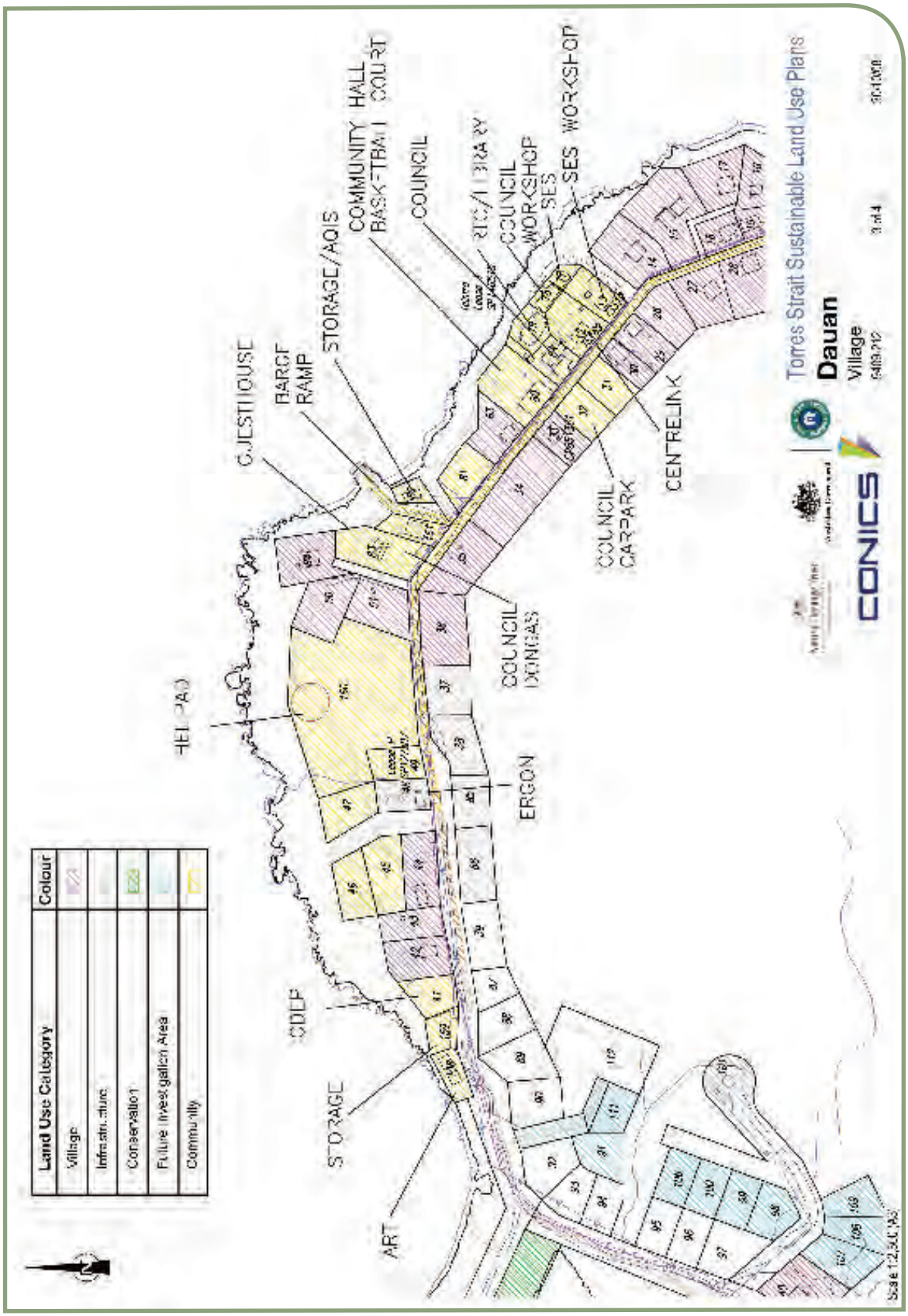
For more detail, refer to Map No. 9409-212 contained in Volume 3 - Maps

Map 12b Village



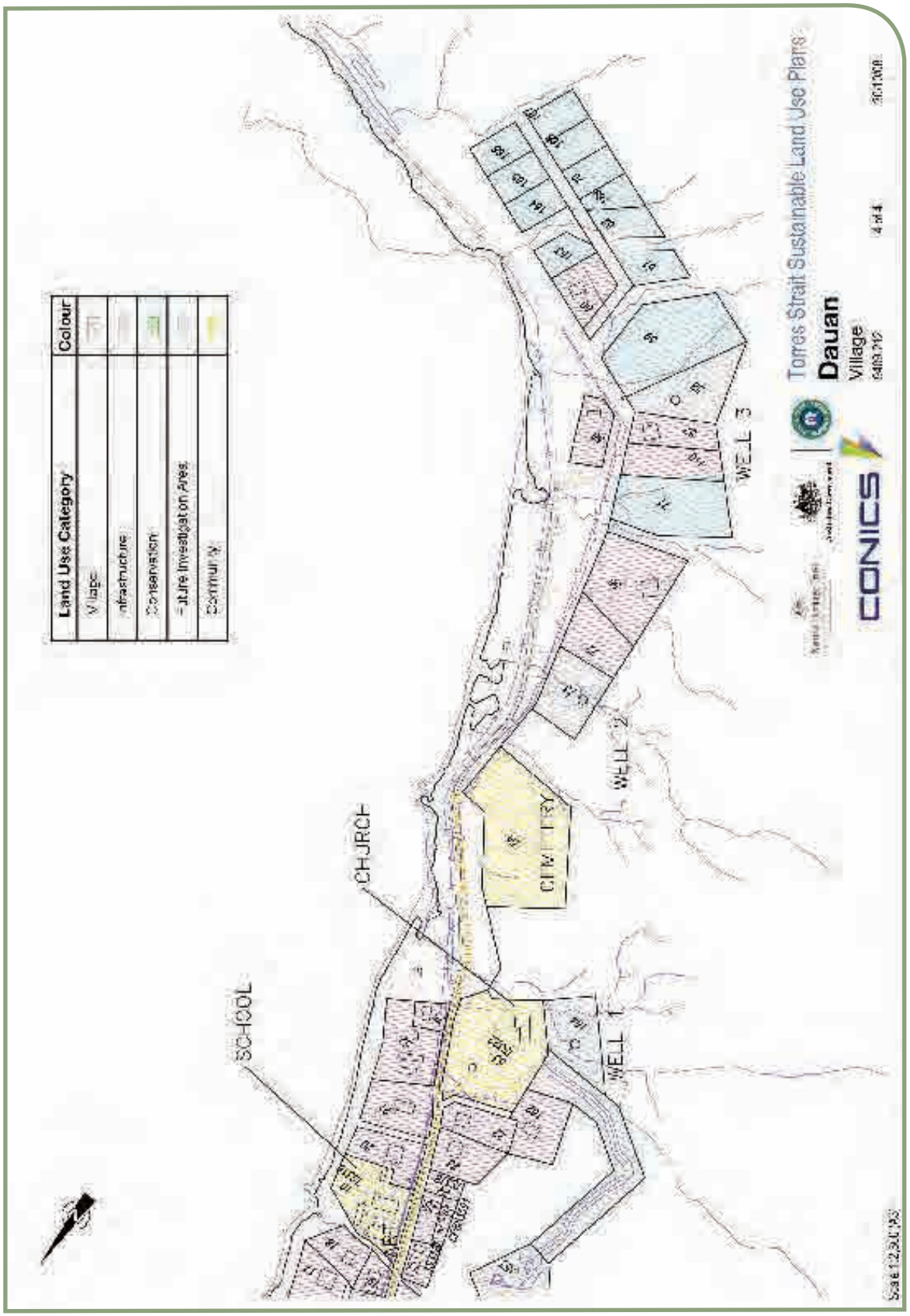
For more detail, refer to Map No. 9409-212 contained in Volume 3 - Maps

Map 12c Village



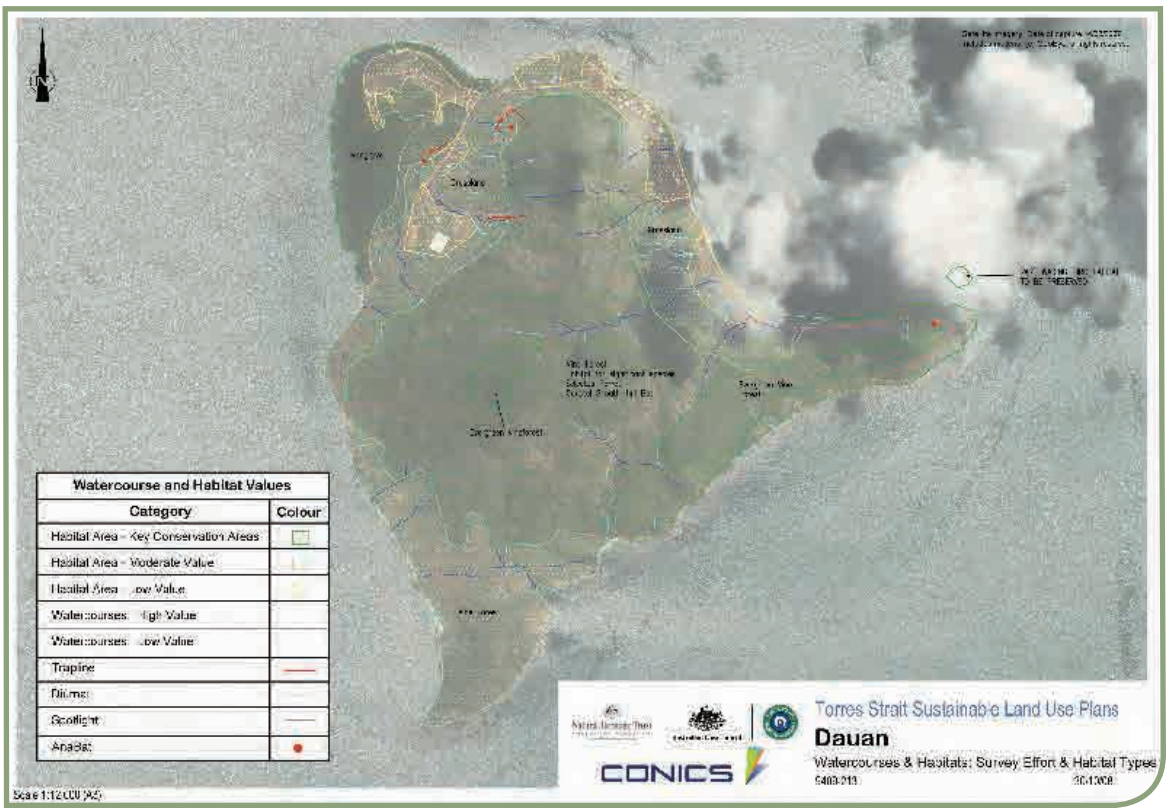
For more detail, refer to Map No. 9409-212 contained in Volume 3 - Maps

Map 12d Village



For more detail, refer to Map No. 9409-212 contained in Volume 3 - Maps

Map 13 Survey Efforts



For more detail, refer to Map No. 9409-213 contained in Volume 3 – Maps.

Any investigation must take into account, the infrastructure capacity. The timeline on the next page shows how Dauan's current infrastructure will limit Dauan's population gowth and influence residential expansion.

5.3.4 Land Use Considerations

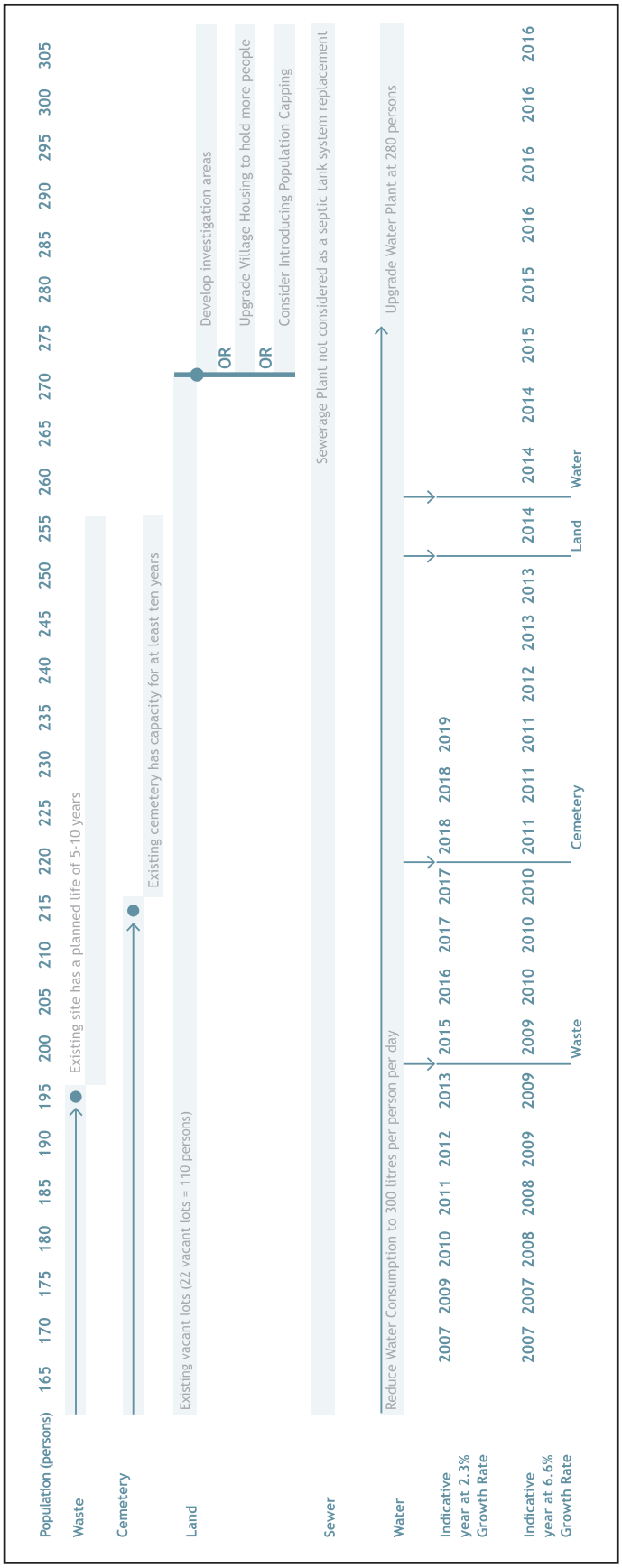
When assessing the impacts of future development on Dauan, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- 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 Dauan?
- 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 9 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 of employment and volunteering:

- 60 people living on Dauan are employed;
- an average household weekly income of $837.00;
- an average individual weekly income of $394.00;
- 15.0% of those working were between the ages of 15 to 24 years;
- 75.0% of those working were between the ages of 25 to 54 years;
- 43.5% of Community on Dauan 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;
- 10.8% of those undertaking volunteer work were between the ages of 15 and 24 years; and
- 70.3% of those undertaking volunteer work were between the ages of 25 and 54 years.

Table 3 shows that types of employment sectors people work in.

Table 3 Employment Sectors

Employment Industry	Construction	Public Administration & Safety	Education & Training	Health Care & Social Assistance	Wholesale Trade	Retail Trade	Other	Not Stated
People	0	48	0	3	3	3	0	0

Source: ABS 2006

Educational Attainment

From the 2006 Census, 61 people were studying or undertaking some form of further education program or training. This is 39.6% of the total population. Of those undertaking education:

- 13.1% were attending pre school;
- 63.9% were attending primary school;
- 6.6% were attending secondary school;
- 4.9% were attending a technical or further educational institutional;
- none were attending university; and
- 11.5% 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, 42.7% left after completing Year 12 with another 23.6 % leaving after completing Year 10. This means that 66.3% completed schooling after the age of 15 years.

Table 4 shows the community facilities that are available on Dauan.

Table 5 shows the retail and public office facilities and services that are available on Dauan.

Table 6 shows the recreational facilities that area available on Dauan.

Table 4 Community Facilities

Facility	Provided (✓ = Yes; ✗ = No)	Location
Pre school	✓	Located next to Council offices
Primary School	✓	Located on gthe eastern side of the village
Health Care Centre	✓	The existing Health Care Centre will be temporarily moved whilst a new one is constructed
High school	✗	Students board on Thursday Island

Table 5 Retail and Public Office Facilities and Services

Facility	Provided (✓ = Yes; ✗ = No)		Location
Administration Offices/Workshop	✓		Located in the centre of the village
Community Hall	✗		
Guest House	✓		Located west of the barge ramp
Contractor Accommodation	✗		
Church	✓	(two)	Located in the east of the village
SES depot	✓		Located next to Council Workshop
Supermarket (IBIS store and or convenience store)	✓		Located next to Council offices
Banking facilities	✓	(in the IBSI Store)	-
Custom Depot	✗		Located next to Council offices
Police Station	✗		-

Table 6 Recreational Facilities

Facility	Provided (✓ = Yes; ✗ = No)	Location
Picnic Grounds	✓	Located along the shoreline
Sports Oval	✓	Located to the west of the village near the water storage lagoon
Sports Courts	✓	Located on the shoreline behind the community hall

5.4.3 Issues Overview

On Dauan, 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 Dauan have access to a range of convenience goods and services that meet their daily needs as well as recreational opportunities, through the provision of both indoor and outdoor recreational facilities. In large, the majority of community services and facilities are located in the centre of the village near the Council offices. This has in effect created a village "heart". Further the limited size of the village encourages residents to walk to those services they require.

10.2.2 Land Use Considerations

When assessing the impacts of future development on Dauan, 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 and 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 Dauan 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

Providing and managing infrastructure is a key issue facing the Torres Strait and Dauan 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 regards 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 Dauan'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 island s water infrastructure.

6.1.2 Overview of Current Situation

The existing water infrastructure has the following features:

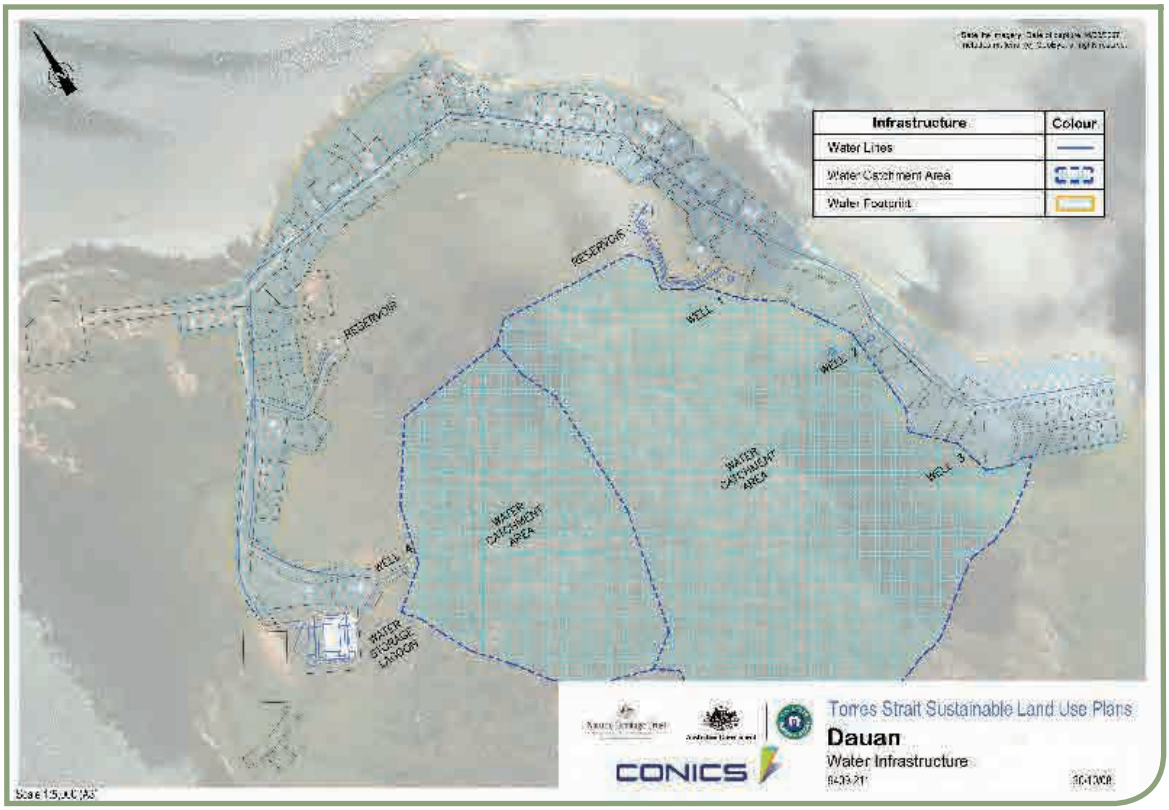
Source:	Water on Dauan is sourced from: • captured rainwater from the cover of a lined lagoon and from the surrounding lined catchment area; • a well located near the lagoon on the western side of the community ('western system'); • three wells located on the eastern side of the community ('eastern system'); and • supplementary household rainwater tanks.
Treatment:	Water is treated within two treatment plant buildings via: • filtration by duel media pressure sand/anthracite filters; and • disinfection through sodium hypochlorite dosing.
Storage:	Treated water is stored in: • a 250kL concrete reservoir located in the west of the town and supplied by the western treatment plant; and • two 60kL fibreglass tanks (one elevated) located in the east of the village and supplied by the eastern treatment plant. The western and eastern systems are hydraulically connected so that they both supply water to the village mains.
Delivery:	Potable water is delivered to the community from the header tank via 100mm and 80mm underground mains. All facilities are connected to the main 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 the internal plumbing which are isolated from the main as an emergency.
Capacity:	The main source of water comes from the four (4) wells and from the rainwater collected from the covered area of the lagoon and the surrounding lined catchment area. The catchment area of the lagoon is approximately 4,125m2. Based on an average rainfall of 1,125mm per year, the average yield of the lagoon covers is around 4.6ML per year. The total average annual water supply combing the wells and lagoon catchment is approximately 30.6ML. The covered lagoon storage volume is approximately 6.4ML. For the current population estimate of 176 persons and the adopted average daily consumption rate of 300 Litres (L) per person per day, there is approximately 121 days storage capacity, which is considered sufficient to meet water demand during periods of well breakdown or maintenance.
Usage:	The average water usage from the most recent data provides from the Torres Strait Island Regional Council Water Sewerage and Infrastructure Unit is around 370L per person per day. This is higher than the target design consumption of 300L per person per day.

As with remote island communities, Dauan'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 14 shows the areas serviced by the existing water infrastructure.

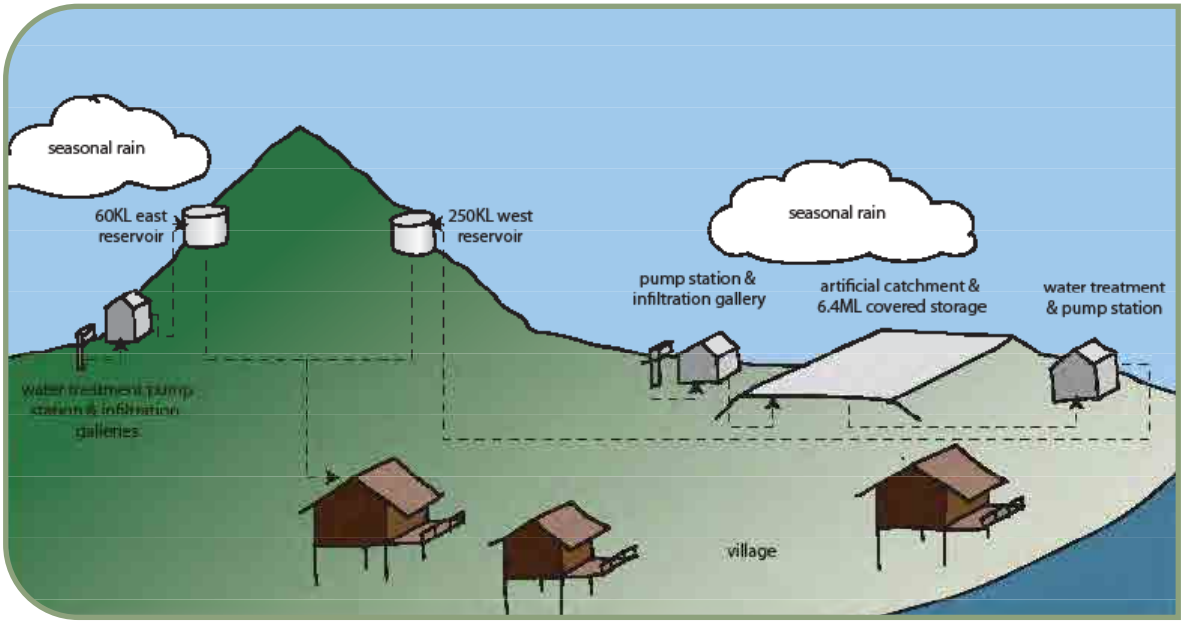
Figure 10 shows the water scheme process.

Map 14 Water Infrastructure



For more detail, refer to Map No. 9409-211 contained in Volume 3 – Maps.

Figure 10 Water Scheme



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	= 176 persons
Predicted Population	2017	(Low Growth Estimate of 2.30% = 212 persons)
Predicted Population	2017	(High Growth Estimate of 6.6% = 333 persons)

The existing water infrastructure has sufficient capacity to serve the current population and the predicated population in the next ten years at the target consumption levels based on an average yearly rainfall, an average population growth and assumption that all wells remain operational.

Current average yield including wells and lagoon catchment	30.6ML per year
Achievable target consumption	300L per person per day
Population that existing water infrastructure can sustain	279 persons

It should be noted that this is based on an average yearly rainfall. Should the average rainfall be less than this, then the population that the water infrastructure sustains is reduced. Dauan has previously required a temporary desalination unit after a lower than average rainfall (2003) and subsequent water shortage. It is not clear whether the water shortage was entirely due to the low rainfall or because of excessive water consumption prior to the shortage.

There is currently an issue with the production capacity of Well No. 4. The problem appears to be associated with the ingress of silt, however it is understood that this issue is being addressed.

Another deficiency in the water infrastructure involves the inability of a mobile desalination unit to pump treated water to the storage lagoon. Currently, desalinated water can only be pumped to the reservoirs which have limited storage capacity. If the extended use of the temporary desalination unit is anticipated in the future, consideration of the installation of the feed line from the plant to the storage lagoon is required.

As with remote island communities, Dauan'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 a kilolitre (about 26 times the national average) and desalinated water is $7 a kilolitre (about 10 times the national average).

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 Dauan 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.

6.1.5 Land Use Considerations

When assessing the impacts of future development on Dauan, 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
  - 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?

6.1.6 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 and 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 Dauan'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 Dauan's sewer infrastructure.

6.2.2 Overview of Current Situation

Dauan is not serviced by a reticulated sewerage system. All community sewage is treated via septic tanks and underground absorption techniques.

6.2.3 Issues Overview

The existing septic tank and absorption trench system is considered appropriate for Dauan. Dauan's population is relatively small, underground effluent disposal appears to function appropriately and there is minimal risk of contamination to the water supply due to the topography.

Accordingly, the retention of the septic tank disposal system is considered appropriate on the ground that it is the most economical solution, there are no known operational issues and they are accepted by the community.

It is not clear if septic tank sludge disposal occurs at a regulated site and in accordance with health guidelines.

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 Dauan sewer infrastructure, the following strategies are recommended:

- New houses should be sited to ensure an adequate disposal area is available for the underground absorption trenches.
- Absorption trenches should not be located in areas where vehicles can be driven over.
- Houses should not be constructed above the identified water catchment areas.
- The installation of septic tank systems 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 Dauan, 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?

6.2.6 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.

6.2.7 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

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

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 Dauan 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 Dauan'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 Dauan's waste generation and disposal facilities; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Dauan's waste generation and disposal facilities.

6.3.2 Overview of Current Situation

Dauan currently has a waste depot (dump) located at the north western end of the village, on a coastal flood plain, access via a service road off the main village road.

Waste is currently collected by a minipactor rubbish truck and deposited in within a fenced compound. The method of disposal is by Trench-and-cover although a high water table is evident.

In December 2005, the waste depot was fenced and an initial trench dug and left for the community to manage.

6.3.3 Issues Overview

Management:	The dump needs to be better managed to sort and segregate non-putrescible materials (such as cars, timber, building demolition waste etc). This would allow the trenches to only contain household rubbish.
Vehicles:	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 that 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 putrescibles 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.
Future Expansion:	The existing dump has a planned life of 5-10 years, depending on the amount of management and separation of materials that is undertaken. There is land available for expansion of the waste depot on Dauan immediately east of the new existing waste depot. This is the most suitable location on Dauan however it requires the further destruction of vegetation and habitat of the western half of the island. At this stage it is premature to investigate the impacts of this expansion, but the effect upon vegetation, habitat, Cultural Heritage and traditional ownership will need to be addressed when the expansion becomes necessary.

Alternative options such as the introduction of a waste transfer station and removal of waste from Dauan to another site (such as Cairns, Horn Island or a yet to be determined regional waste depot) for the Torres Strait.

6.3.4 Land Use Strategies

To minimise the impacts of waste infrastructure on Dauan'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 Dauan.

6.3.5 Land Use Considerations

When assessing the impacts of future development on Dauan, 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 Dauan 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 Dauan.

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 Dauan's electricity infrastructure by:
  - recognising the importance of climate change on Dauan'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 Dauan's electricity infrastructure.

6.4.2 Overview of Current Situation

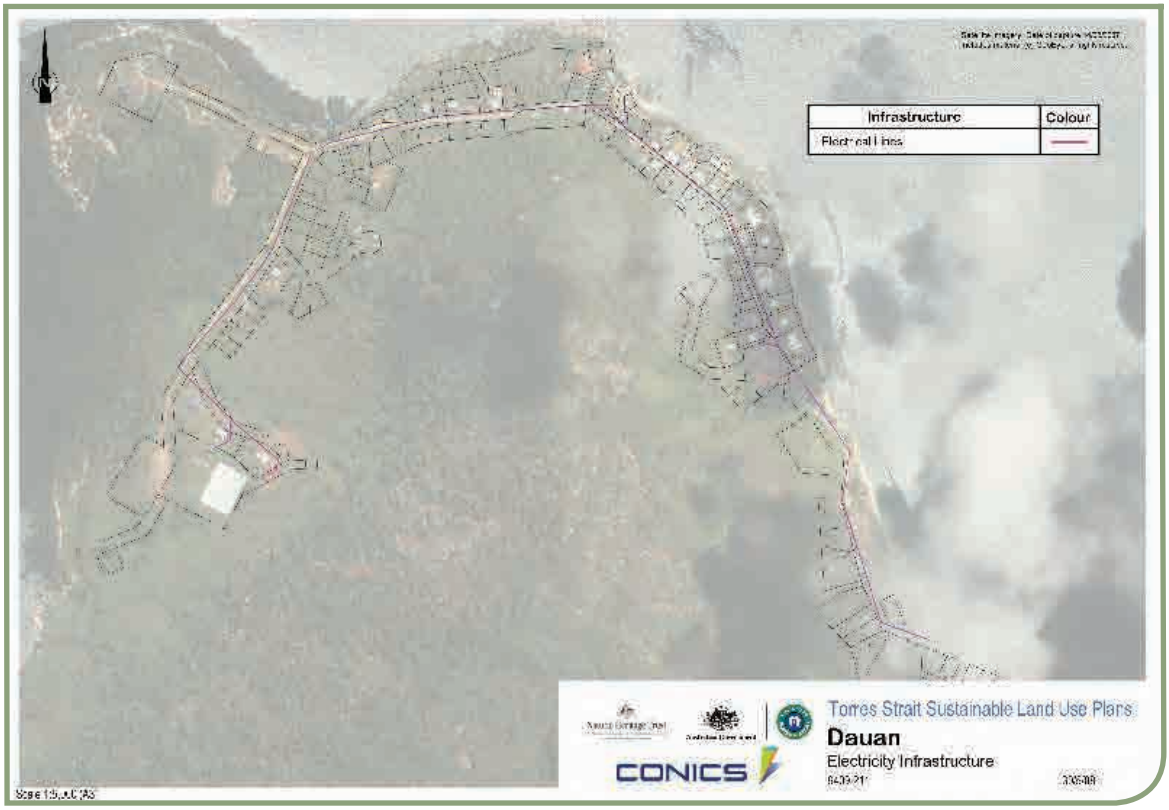
Electricity is supplied to Dauan from a central power station located at the west of the village adjacent to the beach. The generation, distribution and supply of electricity is undertaken by Ergon Energy on behalf of the State government.

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 a factor of 5-10. The State Government Community Service Obligation, as an equalised tariff, covers the difference in generation costs and income.

Map 15 shows are the areas serviced by existing electricity infrastructure.

Map 15 Electricity Infrastructure



For more detail, refer to Map No. 9409-211 contained in Volume 3 – Maps.

6.4.3 Issues Overview

Although the cost of electricity to consumers at Dauan 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 Dauan. 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 large gas bottles for power generation.

Renewable energy sources such as wind and solar could be considered to supplement the base power supply. However, any renewable resources 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 Dauan, 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 and 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 Island s natural environments.

6.5.2 Overview of Current Situation

A Telstra Tower is located on nearby Saibai which provides telecommunication coverage over Dauan.

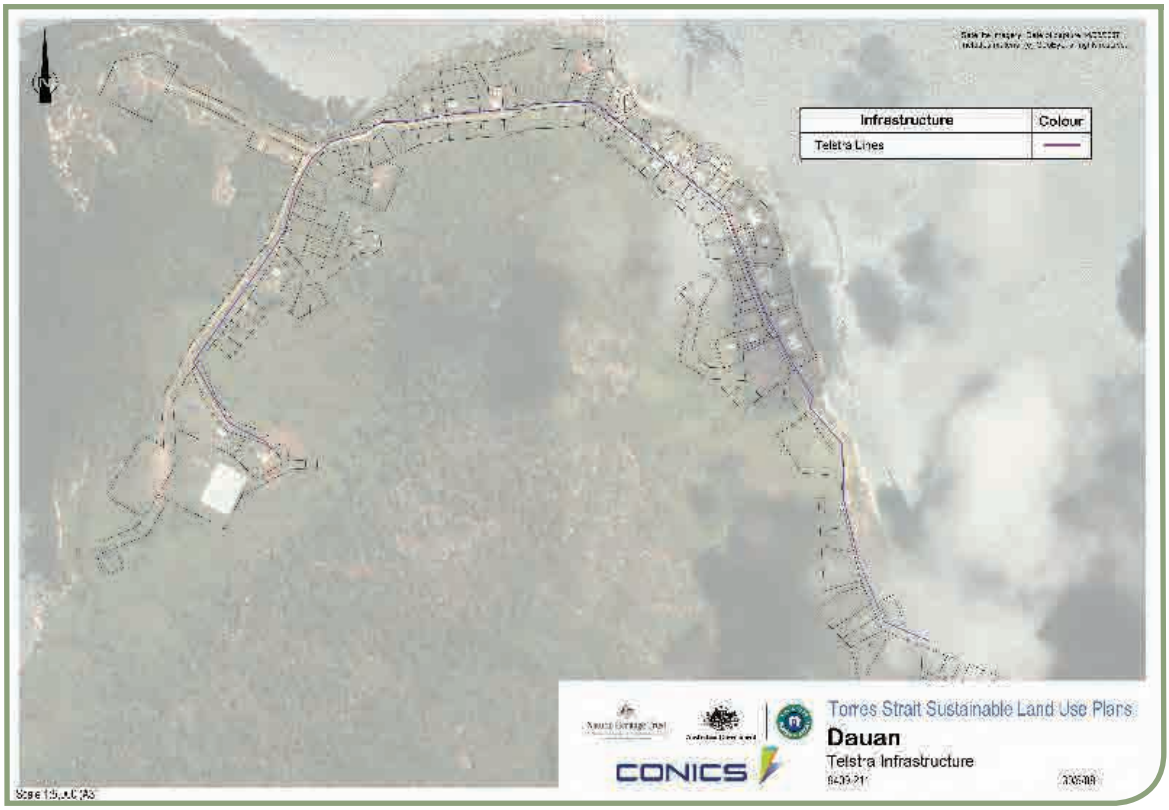
Map 16 shows the location of telecommunications infrastructure.

6.5.3 Issues Overview

There are no known issues regarding telecommunications on Dauan.

It is sound land use planning practice to ensure that compatible development occurs near telecommunication infrastructure. Residential development should not be permitted near the Telstra Tower.

Map 16 Telstra Infrastructure



For more detail, refer to Map No. 9409-211 contained in Volume 3 – Maps.

6.5.4 Land Use Considerations

When assessing the impacts of future development on Dauan, 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?

6.5.5 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 Dauan's road infrastructure by:
  - recognising the importance of climate change on the existing and future road infrastructure on Dauan;
  - 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 Dauan's road infrastructure.

6.6.2 Overview of Current Situation

Due to the narrowness of the village, there is one primary road which runs through the village, with a few internal roads. This road is sealed through the main village area between the cemetery and CDEP. The remainder of the road is unsealed, although in relatively good condition. The road to the waste depot is also unsealed. The unsealed roads require continual maintenance to ensure that the roads are kept in a serviceable condition.

The 2006 Census indicates the following statistics:

- 35 privately owned vehicles;
- 24 households did not have a vehicle;
- 11 households had one vehicle; and
- no households had two vehicles.

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

6.6.3 Issues Overview

No road issues are known.

6.6.4 Land Use Strategies

To minimise existing and future development on the natural environment of Dauan 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 alterative forms of transportation around the community such as bicycle, scooter or golf buggies 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 Dauan, 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 Dauan?
- 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 Dauan’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 Dauan 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 that maximise the visual and recreational amenity of Dauan.
- Reduce the impacts of climate change Dauan's drainage system and infrastructure by:
  - recognising the importance of climate change on Dauan'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 Dauan's drainage system and infrastructure.

6.7.2 Overview of Current Situation

There are no defined stormwater pipe systems on Dauan, apart from drainage crossings of the sealed roads.

6.7.3 Issues Overview

Drainage is generally not an issue on the island due to the natural fall to the shoreline.

6.7.4 Land Use Strategies

The following strategy is recommended:

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

6.7.5 Land Use Considerations

When assessing the impacts of future development on Dauan, 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?

6.7.6 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 and 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 Dauan by:
  - recognising the importance of climate change and fuel costs on air access to and from Dauan;
  - 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

There is no aircraft landing facilities at Dauan as the topography of the island prevents the construction of an airstrip. Residents and visitors catch the ferry to Saibai in order to fly to other islands.

A helipad is located to the west of the village which provides emergency access by medivac rescue helicopter (day & night) if required.

6.8.3 Issues Overview

Council has indicated that it wishes to undertake a study into the feasibility of seaplane access to Dauan.

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; and
  - 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 plus 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 Dauan by:
  - recognising the importance of climate change and fuel costs on sea access to and from Dauan;
  - 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 Dauan consist of a precast concrete barge ramp and a narrow timber-decked, timber piles finger pier.
The barge ramp is located on the western side of the village, with the jetty located to the east of the barge ramp. Other facilities include a storage compound and hardstand.

The barge ramp is accessed via a dredged entry channel marked by navigational buoys.

The barge ramp and jetty provide access for all goods transported to the island and are an essential part of the community's infrastructure. Dauan is serviced weekly by a barge service from Port Kennedy. Small barges are small; enabling them to manoeuvre is relative shallow channels.

As there is no air access to Dauan, a ferry operates between Dauan and Saibai numerous times a day, with a taxi services provided on Saibai to take people between the jetty and the airstrip.

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

6.9.3 Issues Overview

The finger pier is a narrow timber deck that is supported on steel foundations. The structure is suitable for the mooring of small vessels, however it is understood that there is limited mooring space at certain periods.

The entry channel to the barge ramp needs to be dredged to remove the silt build up.

Council has expressed its concern about safety during night time operations and it is their desire to have the channel markers fitted with beacon lights.

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 Dauan, 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 Dauan is inspected regularly and maintained to ensure that they are in effective working order.

CONICS

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

www.conics.com.au

Australian Government

TORRES STRAIT REGIONAL AUTHORITY

Natural Heritage Trust

Helping Communities Helping Australia

An Australian Government Initiative