



THE UNIVERSITY
OF QUEENSLAND

HERON ISLAND RESEARCH STATION
SITE DEVELOPMENT PLAN 2002

HERON ISLAND SITE DEVELOPMENT PLAN 2002

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1 INTRODUCTION

The mission of The University of Queensland Heron Island Research Station is to provide the best possible service for the advancement of research and teaching in a coral cay environment.

The University has operated the Research Station at Heron Island since the 1950's to facilitate a range of studies dealing with the environment and the Great Barrier Reef. It is now globally recognised as a location for the study of coral bleaching attracting international researchers.

Planning and development of teaching/research must respond to the program related facility requirements. At Heron Island it is critical that a development plan for the site be a document that is sensitive to the natural environment. The installation and maintenance of facilities must be approached with preservation and enhancement of the natural environment as the main priority. The plan must respond to the environment and respect the natural characteristics whilst at the same time provide a sense of place for people living at the station.

The University leases the site at Heron Island under the Provisions of the Nature Conservation Act 1992 administered by the Queensland Government Department of Environment. A comprehensive Management Plan for the Capricornia Cays National Park, in which Heron Island is situated, sets out the management obligations for the University as a lessee. The Management Plan is administered by the Queensland Parks and Wildlife Service.



2 CONTEXT

Physical

Heron Island is one of 16 coral cays in a distinct group of 22 reefs spanning the Tropic of Capricorn, at the southern end of the Great Barrier Reef. In 1974 the importance of the Heron and Wistari reef system was recognised when it became the first coral reef in Australia to be declared a Marine National Park.

The island has a total area of approximately 18 hectares with a large part of this land occupied by a tourist resort, research station and national park quarters. The Research Station occupies 2.226 hectares at the south western side of the island close to the boat harbour and has about 30 buildings.

Site

The site is approximately 3 to 3.5 metres above high water line. Land rises to the resort lease along the northern boundary. The dense natural vegetation is cleared only for building, aquaria space and access.

Academic/Research

The principal purpose for the establishment of the station is to facilitate scientific investigations on the Great Barrier Reef. The research effort is co-ordinated through the Centre for Marine Studies and forms part of a network of marine research stations along the Queensland coast.

Historical

The island was first surveyed in 1843 and a resort was established on the island in 1932. Heron was declared a National Park in 1943.

Climate

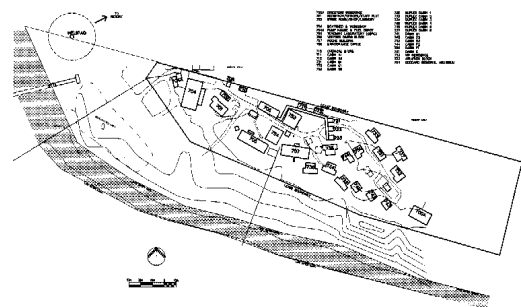
Climatic data is available from the Research Station. High humidity coupled with high temperatures and little or no breeze at certain times of the year need to be taken into consideration in the development.



Location Map



Aerial view of island



Existing site layout

Fauna

The island is part of a major sea bird nesting area with the black noddy *Anous minutus*, wedge-tailed shearwater *Puffinus pacificus*, black-naped tern *Sterna sumatrana* and bridled tern *Sterna anaethetus* prolificating. The majority of seabird nesting occurs in summer between the 30 September and 20 May. The shearwaters have created a maze of burrows under the ground, throughout the island and it is common to find nests close to and beneath paving and ground slabs.

The island is part of a unique breeding ground for loggerhead *Caretta caretta* and green *Chelonia mydas* turtles. The cays areas are of major international significance to the conservation of these turtles.

Turtles come up on the island beaches from October to February to lay eggs and hatchings occur from late December to the end of April.

Turtles have been known to run into man made facilities and become distressed and exhausted. Care is required to design a turtle friendly environment.

Nesting activity on any site for proposed work shall be thoroughly investigated and impacts assessed.

Generally the following limitations apply:

Black Noddies and other tree nesting species

- vegetation clearing and site preparation during the period 30th April to 1st October

Wedge-tailed Shearwaters and other ground nesting bird species

- footing or 'ground works' during the period 21st May to 30th September

Turtle Nesting

- no construction activity that will cause additional noise, light and storage of materials between 30th April and 1st October.



Beach edge has extensive turtle egg chambers



Pisonia Forest is home to thousands of Noddy Terns

Flora

Heron Island is part of a significant group of coral cays with unique natural vegetation recognised as globally important coral cay species. The island has a significant Australian *Pisonia grandis* rainforest, which is concentrated in the capricornia cays region. The substantial development of a resort and research station has resulted in a high human impact and it is important to mitigate this impact with careful siting of facilities and an active revegetation program.



Mature pisonia grandis within original station site



Revegetated area south of boat shed

3. PLANNING AND DESIGN

A substantial part of Heron Island has been zoned in the Calliope Shire Plan for Resort and Research Station purposes over the National Park zoning. The Research Station lease is still subject to National Park conditions.

Planning of the Research Station is intended to provide facilities that accommodate the academic, research and social requirements of the users. The plan shall be targeted to improve quality of life, work places and preserve the natural environment. Impact of human habitation shall be kept to a minimum.

The original site layout concept was a quadrangle with the aquaria, laboratories and support facilities on two sides. Cabins linked by a covered way formed the other two sides. Remnants of this original layout remain.

The site development has expanded incrementally outwards from the original core with boating and support infrastructure moving westward toward the harbour and accommodation spreading to the east.

The aquaria, research and teaching facilities remain generally in their original locations.

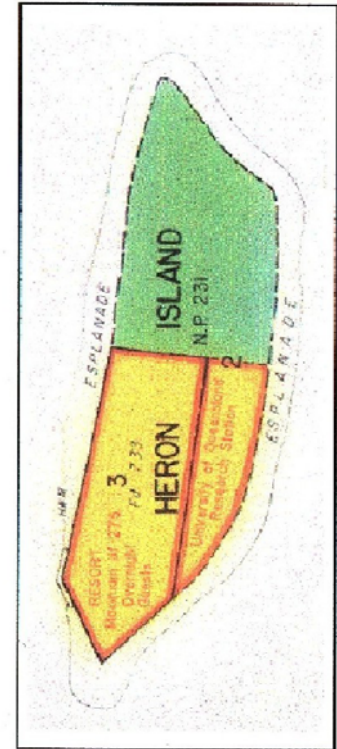
Expansion of resort amenities up to the lease boundary has imposed upon the accommodation cabins near the boundary.

Site Planning Structure

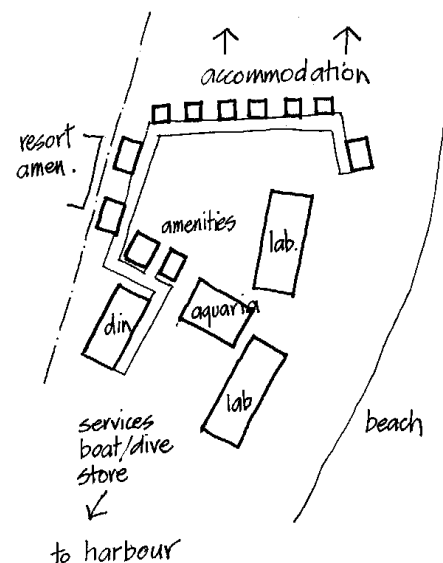
The arrangement of the Station's facilities in general is adequate and there is no need for any large scale change. Improvement is proposed by way of refining layout details mitigating impact and incorporating sustainable development principles.

The planning principles for the station are therefore stated as follows:

1. Protect the existing natural flora and fauna and re-establish areas where degradation has occurred.



Calliope Shire Zoning Map



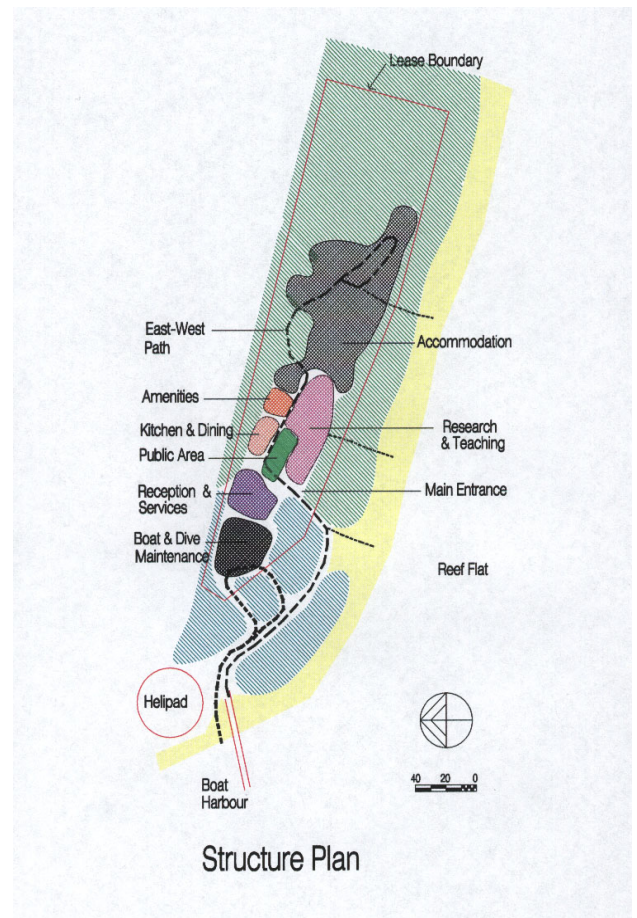
Original station layout

2. Develop and maintain the layout structure with the following key components:

- Main entrance path to south beach connecting to path from boat harbour.
- Public arrival area at intersection of main entrance path and east west spine path.
- Reception and administrative support to west of entrance path.
- Research and teaching to the east of entrance path and south of spine path.
- Accommodation to the east of station connected to the spine path.
- Boat, dive and maintenance facilities confined to the west of the site with a vegetated buffer to the south, west and north.

Goals

- Limit the site uses in accordance with the Concept Plan.
- Develop an eco sensitive environment with a sense of place that relates to the natural characteristics.
- Develop the architectural vocabulary in context with the recent Seminar building.
- Maintain a building height restriction below the vegetation when viewed from the beach and reef flat.
- No new buildings shall be built within 30 metres of the near high water mark and replacement buildings shall not be farther seaward than existing buildings.
- Construction work shall be programmed so as not to adversely impact on nesting activities of the Island's various wildlife species.



View from beach to new Seminar Building

Access

A main circulation path links from the west to east and connect the major activities with accommodation movement is to be concentrated onto this path.

Beach access shall be restricted to 3 locations as shown in the Site Development Plan.



Main entrance path under pisonia grandis trees



Mature pisonia grandis on path near kitchen



Main access path and aquaria

4. SERVICES

The Resort supplies the Research station with water, power and sewerage treatment including effluent secondary water. Underground service distribution is extensive and lacks co-ordination. A concept to establish main service corridors generally along paths is proposed.

Electricity

Supply is from the resort on 240v underground distribution. Capacity is 100amp

Solar Energy

Solar power is used for water heating. Use of solar energy shall be expanded.

Water supply

Potable water is provided by the Resort desalination unit and fed from a header tank as a gravity supply at a nominal pressure of 100 kpa. The daily supply limit is 11,000 litres. The average daily consumption at present is 8000 litres.

Effluent Water

The Research Station is permitted to use up to a nominal average maximum volume of 7 cubic metres per day of filtered effluent.

Stormwater

An underground storage tank in front of the GBRC Building collects rainwater and has a capacity of 130,000 litres. This water is used mainly for washing down.

Some stormwater discharges onto the surface and soaks into the sand.

Rainwater discharge from the boat shed discharges to transpiration trenches.

Sewerage

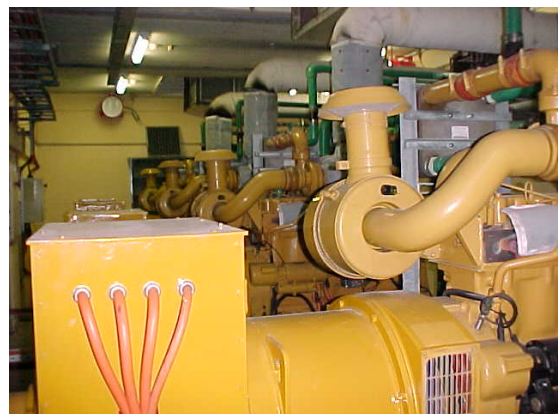
The island sewerage treatment plant operated by P&O resort has a capacity of 105,000 litres. The Research station is permitted to deliver up to 18 cubic metres of waste per day.

There are two underground pumpwells located on the Research Station which are the end point of the Station responsibility. The Resort maintains the

treatment plant and infrastructure up to the research station pump wells.



Resort Desalination Unit



Resort Generators.



Solar collectors on Amenities Building

Design Guidelines

Design guidelines for the Research Station includes guidelines for the architecture, landscape, natural environment, sustainability and energy efficiency.

The overall character is composed of a cluster of varying sized simple buildings of 1 and 2 stories. Recent redevelopments including of boat shed, staff cabins and a seminar building have established a new theme.

Architectural

Lightweight construction using timber framing and cladding

Colourbond roofs

Generous overhanging eaves

Floors raised above ground

Maximum openable window area in walls with both low and high level ventilation. Louvres preferred.

High or raking ceilings with natural hot air ventilation at ceiling or fan light level.

Sustainability

The opportunity exists to utilise solar power to reduce electricity feeding from the Resort. This could be adapted to the residential buildings in particular the 'Green Globe' concept of design should be utilised incorporating a holistic approach to energy efficiency, environmental awareness and optimum awareness and optimum design for climate.

Acoustic Treatment

The Resort Recreation Room (wobbily bar) abuts the site boundary approximately 3 metres from cabin A2. Undesirable noise from this staff amenity needs to be ameliorated. Moving the new accommodation away from the boundary will assist. However noise readings of 65-70 dba have been recorded up to 15 metres from the source.



Upper level balcony of new Seminar Building - 2001



Looking across new Seminar Building from Roche Lab - 2001

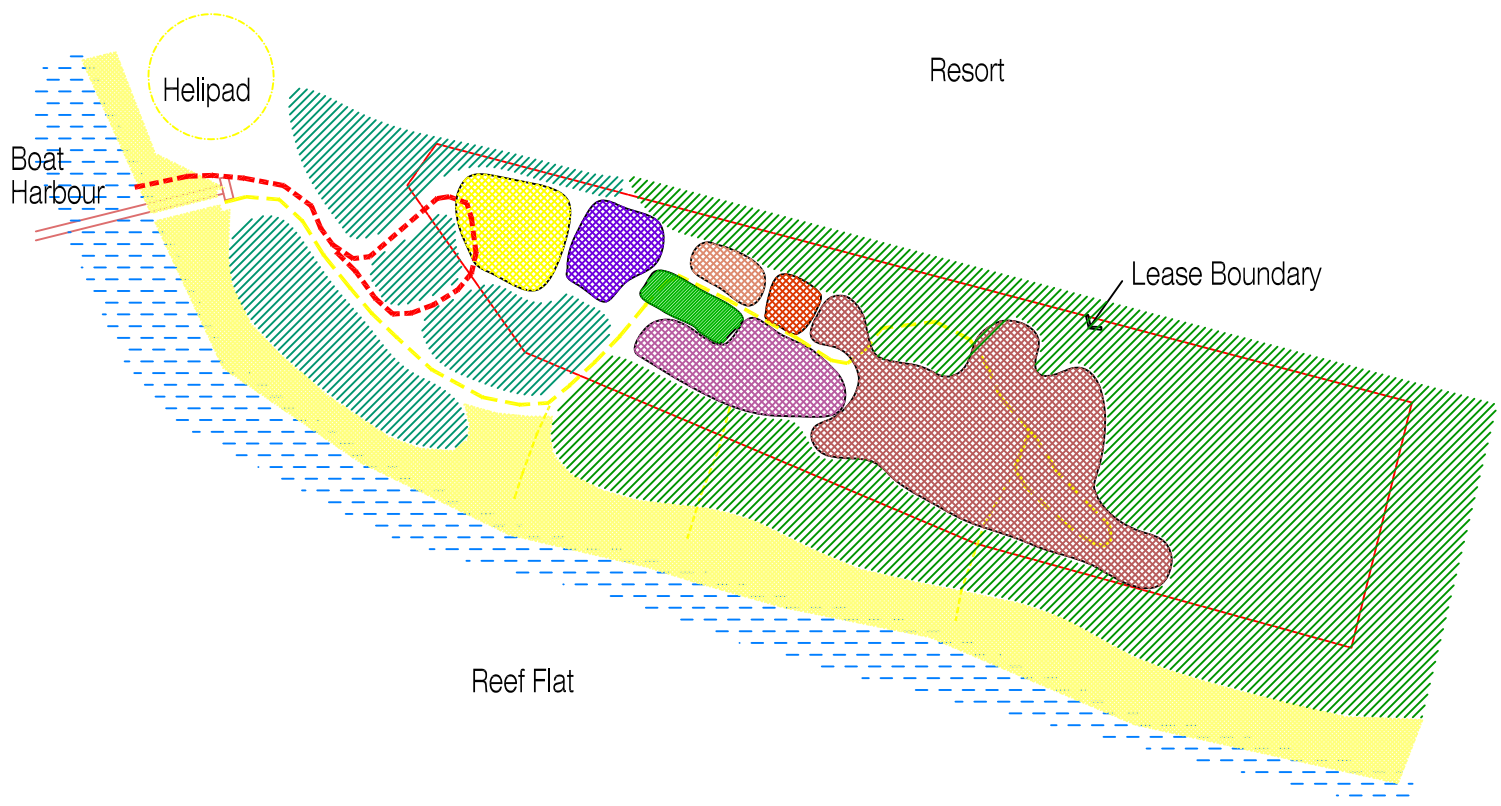


Staff Cabins - 1996

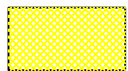


**lease
boundary**

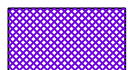
**The University of Queensland
Heron Island Research Station**



Natural vegetation



Boat and Dive Store and Workshop



Reception, Office and Stores



Kitchen/Dining



Central Lawn



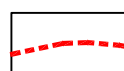
Laboratories & Aquaria



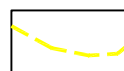
Amenities



Accommodation



Boat trailer access



Main pedestrian path



Beach access



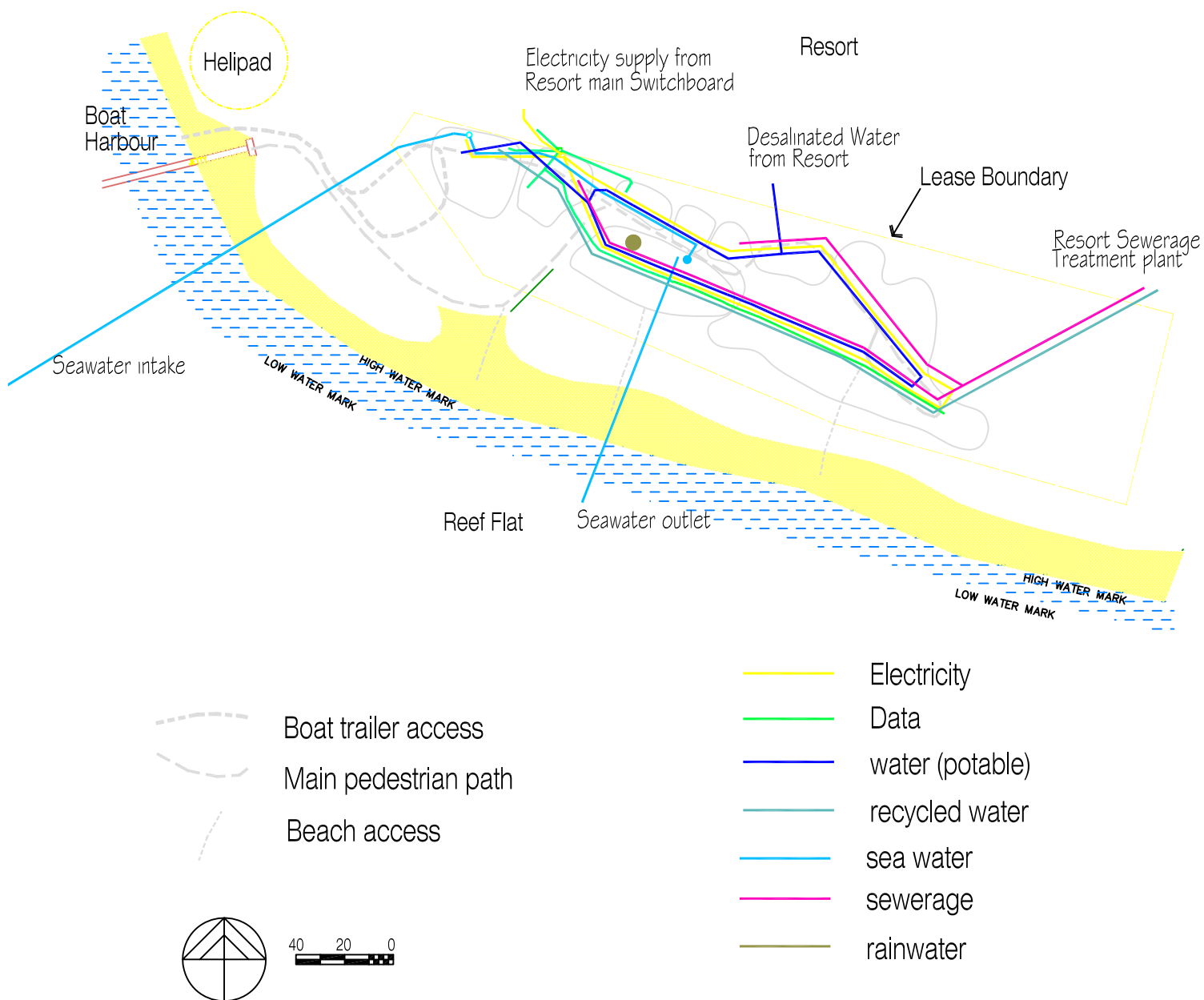
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StructurePlan

Heron Island Research Station
Site Development Plan



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Note:- This layout is concept only and represents the preferred location of service mains.
For detailed services information refer to detailed survey plan

Services Concept Plan

Heron Island Research Station
Site Development Plan



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- | | | | |
|---|---------------------------------|---|-------------------------------|
|  | New Student Accommodation |  | New Researcher Accommodation |
|  | Scuba Wash Room |  | Refurbish Researcher Cabins |
|  | Kitchen Extension |  | New Laboratory building |
|  | Refurbish Research Laboratories |  | New VIP/Staff Cabins |
|  | Refurbish Aquaria Space |  | Restore Natural Vegetation |
| | |  | Preserved Natural Vegetation |
| | |  | Single <i>Pisonia grandis</i> |

TO RESORT

HELIPAD

BOAT HARBOUR

REVEGETATED AREA

Resort Noise

arrival area

Main entry path

Upgrade Seawater supply

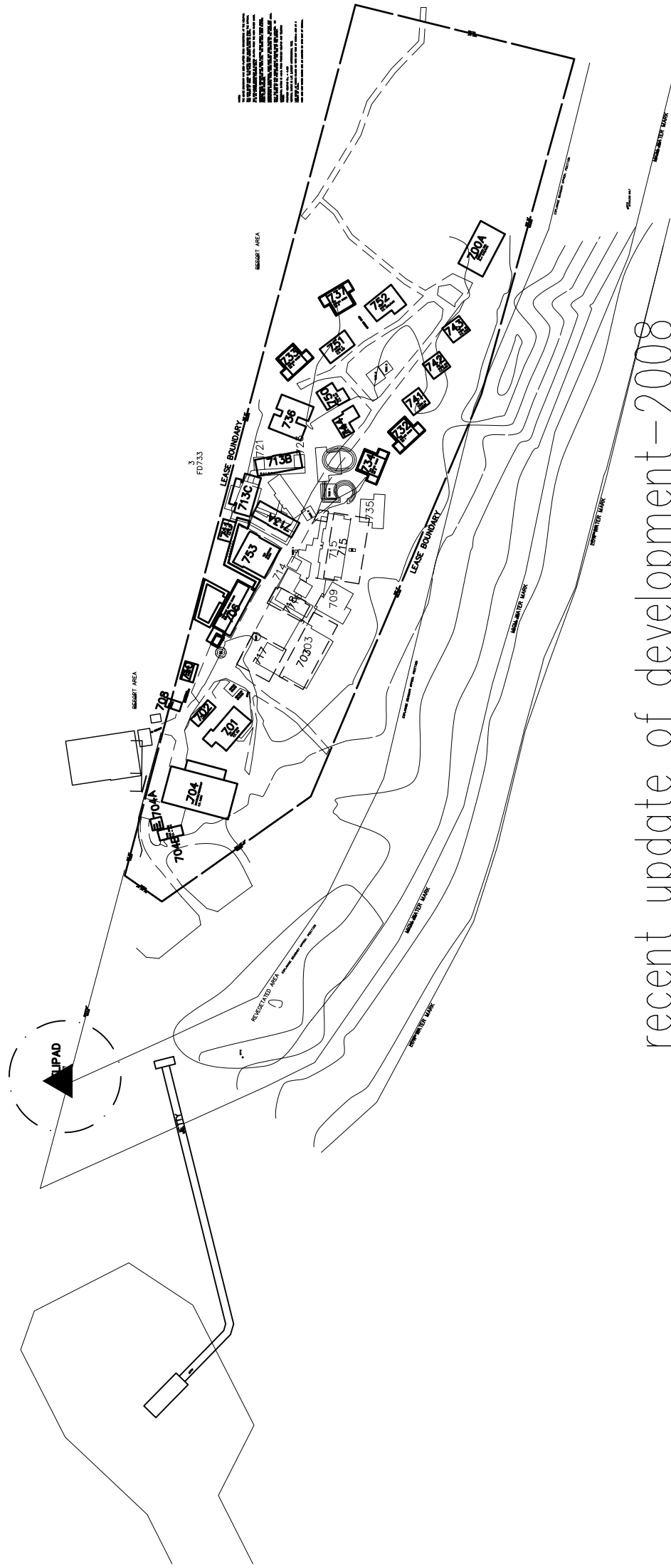
Limited beach access with protection from erosion



HERON ISLAND RESEARCH STATION

SITE DEVELOPMENT PLAN 2002

SCALE: 1 : 500
 DATE: 14/01/02
 DRAWN: GJ/RL CROD. RM
 DRAWING NO. SDP-25-500-02



recent update of development-2008