



Daintree Rainforest Observatory

## **GENERAL INFORMATION PACKAGE**

**An information package about the  
Daintree Rainforest Observatory**

Last updated May 2011

## Contents

### I

#### Introduction

### II

#### Site Description: The Physical Environment

### III

#### Operational Characteristics of the Canopy Crane

### IV

#### Site Management: The Research Environment

### I

#### Introduction

This package is designed to provide potential researchers and visitors to the Daintree Rainforest Observatory (DRO) with essential information on the characteristics of the site, the operational capabilities of the crane and management of the research facility.

The package is divided into three sections. The first section provides a broad physical description of the site including information on the site location, climate and flora and fauna. This information will assist potential researchers and other visitors in assessing the suitability of the site for the purpose of their visit.

The second section gives an outline of the operational characteristics of the crane. As well as providing a physical description of the crane itself, this section outlines the extent to which the crane offers enhanced access to the rainforest canopy.

The third section provides an outline of the way in which the Daintree Rainforest Observatory (DRO) operates. The three major objectives DRO staff have in managing the facility are to:

- Provide a safe working environment;
- Ensure the long term ecological integrity of the site; and
- Ensure high quality research outcomes.

To achieve these objectives requires that we not only restrict access to the site, but that we also regulate the activities of people who are granted access to the site. These restrictions on access and activities at the facility should be taken into consideration when you are visiting or planning to undertake research at the site.

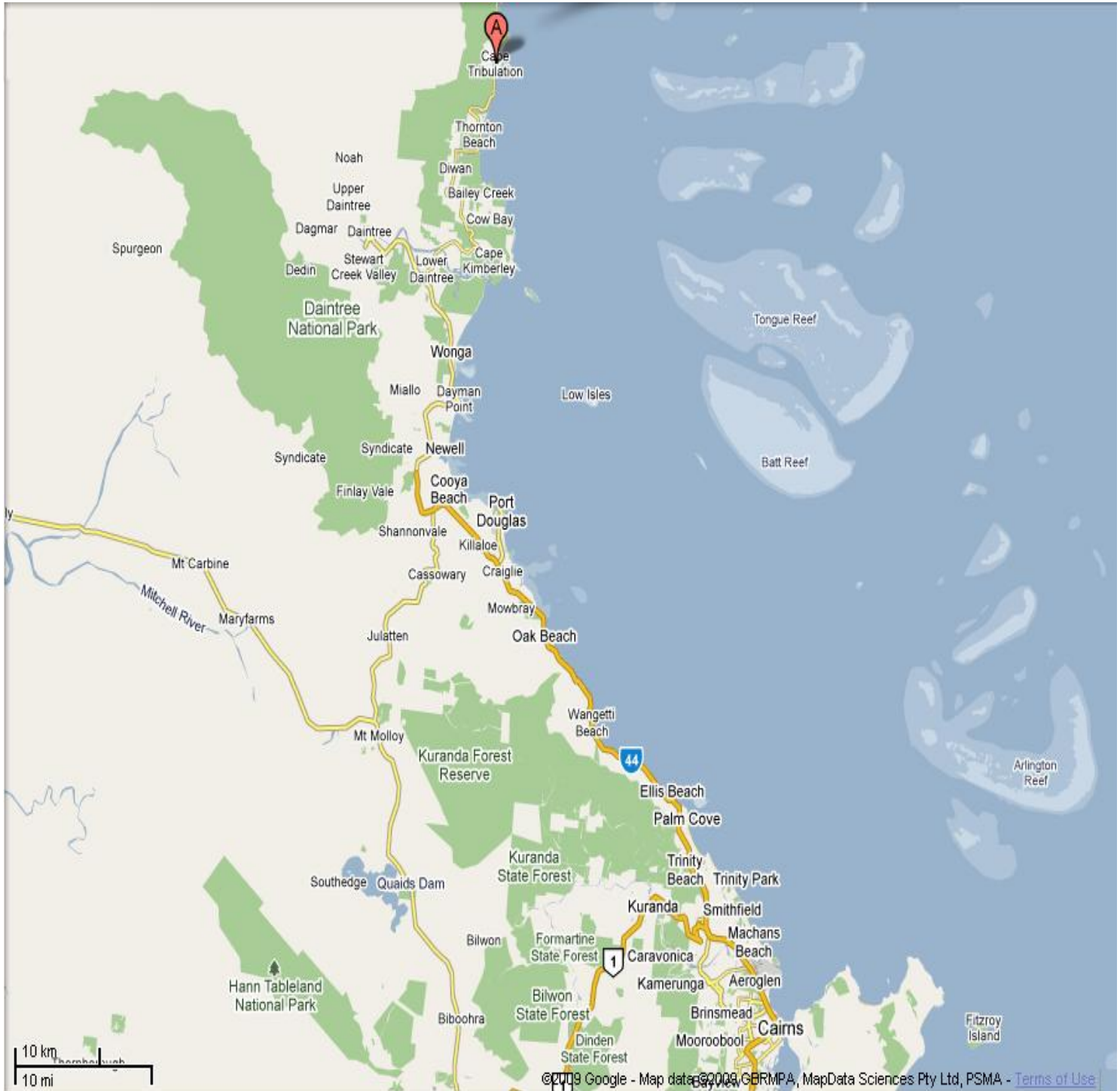
### II

#### Site Description: The Physical Environment

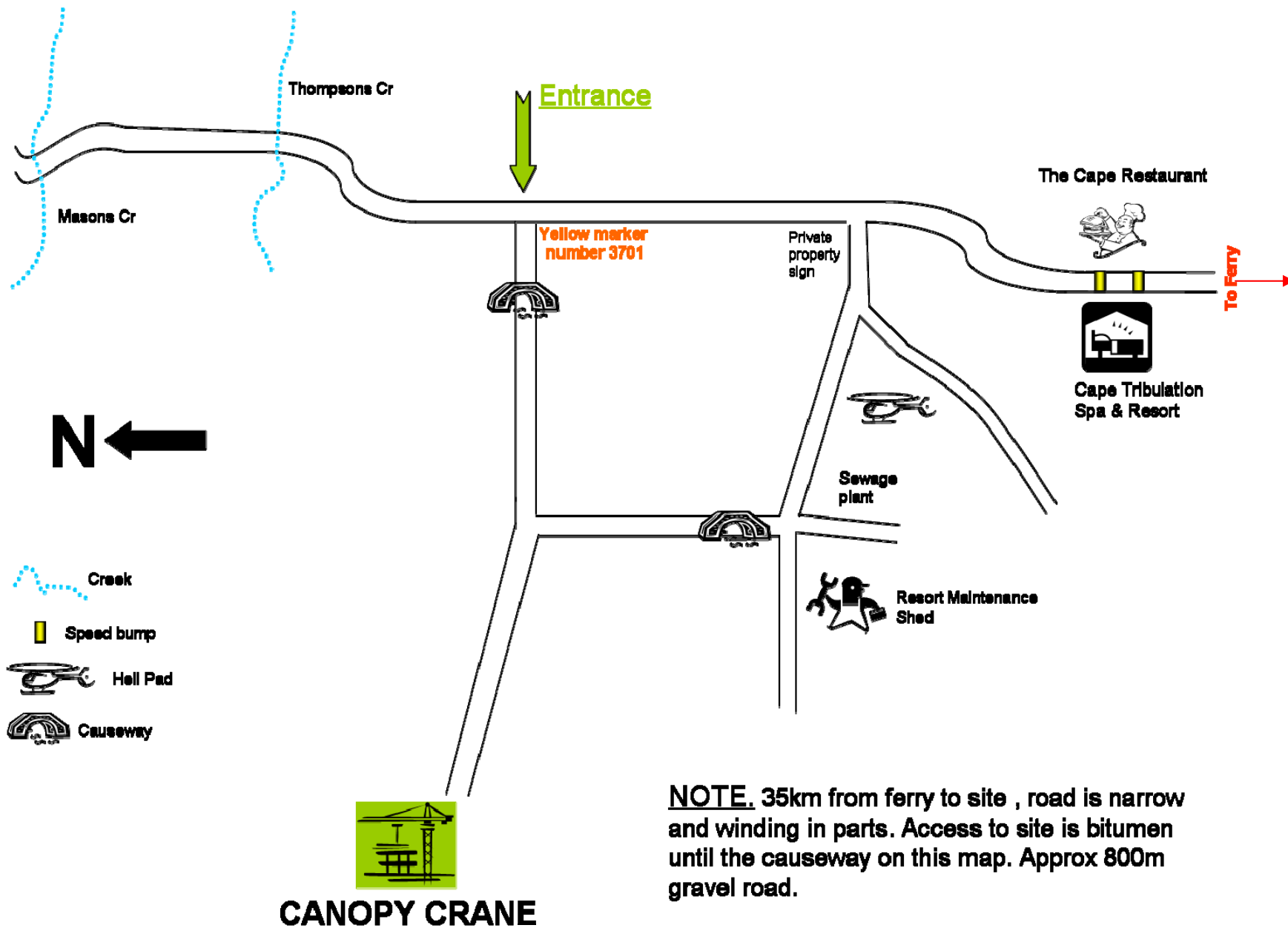
- **Location**
- **Wet Tropics World Heritage Area**
- **Geology**
- **Climate**
- **Tropical Cyclone Impacts**
- **Flora**
- **Fauna**
- **DRO site access and track to crane base**
- **Additional on-site facilities**

#### Location

The Daintree Rainforest Observatory is located at 40 m elevation in lowland, tropical rainforest at Cape Tribulation, 140 kilometres north of Cairns in Queensland, Australia (16° 17' S, 145° 29' E). (See maps 1 to 2 below). The site is flanked to the west by coastal ranges rising to more than 1400m and by the Coral Sea to the east.



Map 1: Cape Tribulation from Cairns



Map 2: DRO within the Cape Tribulation Area

## Wet Tropics World Heritage Area

The crane is located on land purchased from The Cape Tribulation Resort and Spa. This land is adjacent to Daintree National Park, which is part of the Wet Tropics World Heritage Area (WTWHA). To be selected for the World Heritage List for natural values an area must meet one of the following criteria:

- represent a stage of the earth's evolutionary history;
- provide an outstanding example of ongoing ecological and biological processes;
- contain superlative natural phenomena or areas of natural beauty; or
- contain the most important natural habitats for the conservation of biological diversity.

The WTWHA met all of these criteria and was declared in 1988.

## Geology

Extensive Quaternary alluvia underlie the area. The red clay loam podzolic soils are of metamorphic origin and have good drainage characteristics. The metamorphic rocks grade into granite boulders along Thompson Creek which runs along the northern boundary of the site.

## Climate

Annual average rainfall at the site is approximately 3500mm and is strongly seasonal, with 70% falling during the wet season which runs from December to April. Summers are often hot and humid with the mean daily temperature in January being around 28°C. However, temperatures up to 36°C are not unusual during the summer months. Winters are mild and dry with the mean daily temperature in July being around 22°C.

## Tropical Cyclone Impacts

Tropical cyclones occur frequently in Far North Queensland between November and April, inclusive. The impact of these severe tropical storm systems are regarded as a natural phenomenon and a key evolutionary factor in shaping the ecology of Queensland's tropical lowland rainforests. On the 11<sup>th</sup> of February 1999, tropical cyclone Rona (category 3) passed over the Cape Tribulation area causing widespread, major damage. Wind gusts of up to 170 km/hr, local flooding and storm surges of up to 1.4m were recorded in the area. The DRO site was severely damaged, with approximately 10% of the trees in the research plot being felled and 50% suffering complete crown loss.

This presented a unique opportunity to study the processes by which these forests recover from the intermittent disturbance caused by cyclones. Only a few months after cyclone Rona, a vigorous stand of rainforest seedlings had developed in large sunlit gaps created from tree falls. Those trees which had been stripped of their leaves began to recover almost immediately, with some developing leaf covered shoots up to a metre long. One fortunate consequence of the damage caused by Cyclone Rona was that the canopy gaps provided greater access for researchers into the canopy and understorey. However, in the preceding years many of these gaps have slowly closed up as the forest canopy recovers from the damage.

## Flora

The vegetation at the crane facility is complex mesophyll vine forest. There are a large range of botanical structural features present, including buttress and spur roots, a tall but irregular canopy (varying from 25 to 33 metres) with indistinct stratification of the sub-canopy (saplings/seedlings/ground cover layers) and irregular stem diameters. A variety of robust woody lianas, vascular epiphytes, palms (both feather and fan), zingibers and aroids are prominent at the site. The dominant canopy trees belong to the Proteaceae, Meliaceae, Sapindaceae, Apocynaceae, Lauraceae and Myrtaceae families. The number of trees (>10 cm DBH) under the crane arc totals 680 individuals, comprising 82 species in 33 families. These trees have been identified, labeled and recorded in a GIS database.

## Fauna

Numerous species of fauna have been observed at the ACCRS. Mammals found include Bennett's tree-kangaroo, giant white-tailed rat, fawn-footed melomys, prehensile-tailed rat, Cape York rat, bush rat, long-tailed pygmy possum, striped possum and a variety of bats. A range of smaller birds including several dove species, five species of honeyeaters, Victoria's riflebird, orange-footed scrub fowl, spotted catbirds, owls and parrots have also been recorded at the site. There are also several

frog species and a variety of reptiles, including Boyd's forest dragon and eastern water dragon, carpet and amethystine pythons and two Colubrid snake species (red-bellied black snake and small-eyed snake) found at the site.

### DRO site access and track to crane base

The journey from Cairns to the DRO takes approximately 2.5 hours and involves a ferry crossing (cost \$21 return). The road from Cairns to Cape Tribulation is sealed, however many small creeks cross the road to the north of the Daintree River and these often flash-flood in the peak of the wet season. The road may be closed for several hours at a time while these waters subside, however a recent upgrade of one of the larger crossings has resulted in fewer road closures. The DRO access road (1.5 km) is unsealed but passable to conventional vehicles.

A 20-hectare area around the canopy crane is closed to public access. There is a sealed area outside the forest which can be used as a carpark. All equipment must be carried from the carpark to the crane base using the footpath which has been specially designed to reduce environmental impact. The distance from the carpark area to the crane base is approximately 300 metres. Caution should be taken on this track to avoid tripping on any roots or rocks, and to avoid slipping when wet.

### Additional on-site facilities

The following facilities are located at the site:

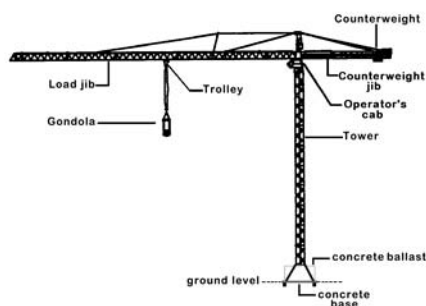
- A field research station including laboratory, researcher accommodation, kitchen and laundry and stand alone self contained staff quarters.

## III Operational Characteristics of the Canopy Crane

- Crane type
- Operating the crane

### Crane type

The crane is a Liebherr 91 EC, freestanding construction tower crane (see figure below). The crane is 47 metres tall, with a radius of 55 metres, enabling access to 1 hectare of rainforest. A suspended personnel basket (gondola or dogbox) is attached at the hook to carry personnel into the canopy.



### Operating the crane

The canopy crane is operated by a qualified crane driver who is responsible for the safe operation of the crane. The driver has the overall authority to make decisions relating to the safe use of the crane and the conduct of research and researchers when in the crane. This includes determining when weather conditions would compromise the safety of crane users and suspending operations in unsafe conditions.

The Gondola has a maximum capacity of 300 kg, and can carry a maximum of four passengers. By law a qualified Dogger must be in the gondola during operation. Therefore, the crane operator drives from within the gondola. Consequently, a maximum of three researchers can ride in the gondola while accompanied by the driver. All individuals in the gondola **must** wear a full body harness and lanyard (attached to the safety rail in the gondola). This equipment is provided by the DRO and users

will be briefed on fitting the harness before using the crane. There is a small shed at the base of the crane for users to gear-up and prepare any equipment needed for use in the gondola.

Potential users need to be aware of the fact that there are some limitations on the performance of the crane, i.e. speed of travel, movement of gondola:

- As the gondola is suspended on a cable there is likely to be some swaying movement as the gondola is maneuvered above the canopy. If you suffer from motion sickness, please make the driver aware of this before going up in the crane;
- To avoid excessive movements of this type (which could result in damage to the canopy of the forest) the crane is generally driven at low speed;
- The crane driver will generally be able to position the gondola in any position within or above the canopy. However, users should be aware that consideration of safety and avoiding damage to the forest may restrict the positioning of the gondola.

Researchers and other crane users should also keep in mind the fact that the crane driver is required to perform a number of safety checks before operating the crane. This has the effect of slightly reducing the time during which the crane is operational each day. In general however crane users can expect a minimum of seven operational hours per day.

#### **IV Site Management: The Research Environment**

- **Providing a safe working environment**
- **Ensuring the ecological integrity of the site**
- **Ensuring high quality research outcomes**

This section provides an outline of the way in which the DRO manages the research facility. The three major objectives we have in managing the facility are to:

- Provide a safe working environment;
- Ensure the long term ecological integrity of the site; and
- Ensure high quality research outcomes.

To achieve these objectives requires that we not only restrict access to the site, but also that we regulate the activities of those people who are granted access to the site. These restrictions on access and activities at the facility should be taken into consideration when planning research or a visit to the site.

#### **Providing a safe working environment**

The DRO is a registered workplace (Registered Workplace No. 185078). As such Queensland law requires that the management of the facility complies with the Workplace Health and Safety Act 1995. This Act in turn requires compliance with a number of other Acts and regulations and a number of Australian Standards. These include:

- Workplace Health and Safety Act 1995;
- Workplace Health and Safety Regulation 1997;
- Electrical Safety Act 2002;
- Electrical Safety Regulation 2002;
- Risk Management Code of Practice 2000;
- Fatigue Management Guide 2005;
- Tower Crane Code of Practice 2006;
- Australian Standard (AS) 1418.1 - 2002 Cranes, hoists and winches – General Requirements;
- AS 1418.4 – 2004 Cranes, hoists and winches – Tower Cranes;
- AS 2550.1 – 2002 Cranes, hoists and winches – Safe Use – General Requirements;
- AS 2550.4 – 2004 Cranes, hoists and winches – Safe Use – Tower Cranes;
- AS 1418.17 – 1996 Cranes (including hoists and winches) – Design and construction of workboxes;
- AS 1891.1 – 1995 Industrial fall-arrest systems and devices;
- AS/NZS (New Zealand Standard) 2243.1 - 2005 Safety in laboratories planning and operational aspects;
- AS/NZS 2243.2 - 2005 Safety in laboratories chemical aspects;

- AS/NZS 2243.3 – 2002 Safety in laboratories - Part 3 Microbiological aspects and containment facilities;
  - AS/NZS 2243.7 – 2002 Safety in laboratories electrical aspects;
  - AS/NZS 2243.10 - 2004 Storage of chemicals;
  - AS 1940 – 2004 The storage and handling of flammable and combustible liquids;
  - AS/NZS 2982.1 - 1997 Laboratory design and construction;
  - AS 3745 - 2002 Emergency control organization and procedures for buildings , structures and workplaces; and
  - AS 1319 -1194 Safety signs for the occupational environment.
- (Copies of these documents and all relevant amendments are kept in the ACCRS office and are available for examination)

Managing the facility within this framework has a number of important consequences for the DRO and for site users.

In the first instance, the DRO is responsible for the maintenance of a safe working environment. This is achieved through our maintenance program for the crane, the research site and other infrastructure such as the generator. The DRO is also responsible for ensuring that all site users are aware of potential safety hazards at the research facility and the standard procedures adopted to avoid these hazards and deal with any emergencies. This responsibility is met by restricting access to the facility to individuals who have signed a site declaration form. This form is signed only after a compulsory safety briefing from DRO staff.

In an effort to keep this process as simple as possible for users of the facility, we have designed a flexible permission system. This system recognises that there are different hazards associated with different activities. For example, if a researcher simply wanted to study the soil seed bank on the site, they may not require any access to the crane itself and therefore, their safety briefing would not cover hazards associated with the use of the crane. On the basis of the hazards associated with different activities, the research facility has been divided into a number of permit zones. These zones and those permitted to access them are illustrated on the last page of this package.

In general, obtaining permission to access a particular zone only requires that an individual has received a safety briefing concerning the associated hazards. Three important exceptions to this rule are zones A, B and G (see page 11 of this document for details of these zones). Access to zones A, B and G is severely restricted under the legislation cited above. Researchers and other site visitors should therefore not expect to be given permission to access these areas.

Another important consequence of the framework in which the facility is managed is that all site users share some responsibility for safety. These responsibilities are such that all individuals who visit or work on the site are held responsible for their own safety. All individuals must also ensure that their own activities do not compromise the safety of others working on the site. Finally, all individuals on the site are responsible to some extent for the safety of others on the site. In practical terms this means that an individual who becomes aware a particular hazard, e.g. a broken piece of equipment, is required to warn others of the hazard and to report the hazard so that it can be dealt with appropriately.

Any chemicals brought to the site must be registered with the site manager who will give advice on storage and use regulations. No chemical waste is to be disposed of at the research station and it is the responsibility of the user to take away any chemical waste. Overseas users should be aware that the purchase of some chemicals (e.g. ethanol, certain acids, etc.) is restricted and arrangements to obtain such goods should be made well beforehand. Neither the DRO nor James Cook University (JCU) are responsible for supplies of any chemicals or other goods.

As a final note, with regard to safety while working at this research facility, the DRO strongly recommends that at least one individual (and ideally all individuals) in a research team should hold a current first aid certificate. All research teams working at the site must also carry a portable first aid kit.

Any accidents sustained at the site **must** be immediately reported to a DRO staff member.



### **Ensuring the ecological integrity of the site**

An important objective of the DRO is to ensure that research and other activities do not compromise the ecological integrity of the site. The main strategy used in meeting this objective is a critical review of research proposals in which potential ecological impacts are evaluated. Researchers should therefore keep this in mind when submitting research proposals.

Ecological impacts of several forms are of concern in this context. These include:

- activities which involve the removal of plants, plant parts, animals and other materials from the site;
- activities with the potential to disrupt important ecological processes; and
- activities which might preclude subsequent studies or interfere with current studies on the site.

In exceptional circumstances the scientific review committee, which examines research proposals, may ask a research applicant to redesign their project to avoid some of these ecological impacts.

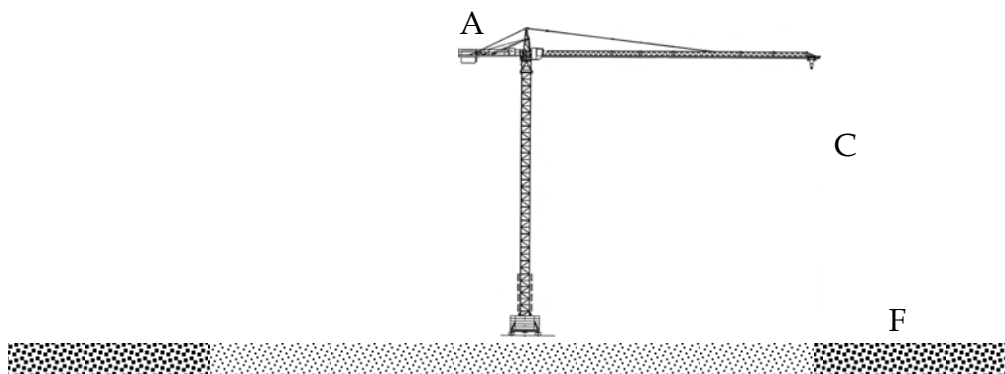
### **Ensuring high quality research outcomes**

The third major objective of the DRO is to maximise the quality of the research on the site and the resulting publications.

One step in achieving this objective occurs in the review process for research proposals. Members of a scientific review committee are drawn from senior academic staff at James Cook University. This review committee is asked to assess whether or not the results of a proposed project might reasonably be expected to warrant publication. Members of the committee may subsequently suggest improvements in research design to some applicants.

Another important means of enhancing the quality of research outcomes from the facility is to encourage collaboration and cooperation between researchers.

**Permit Zones within the  
Daintree Rainforest Observatory**



Zone D- Generator Shed  
Zone H- Research Facilities

**Permitted Personnel  
Permit Zone**

	PERMIT ZONE	PERSONNEL ALLOWED ACCESS TO ZONE
A	Counterweight jib and operator's cabin	Persons with Permit Zone "A" which would be expected to include the crane driver, maintenance personnel, JCU safety officer and inspectors, DRO officials.
B	Crane base, compound area and tower section	Persons with Permit Zone "B" which would be expected to include the crane driver, maintenance personnel, JCU safety officer, inspectors, researchers, DRO officials.
C	Gondola (dog-box)	Persons with Permit Zone "C" which would be expected to include the crane driver, researchers, visitors, maintenance personnel, JCU safety officer and inspectors, DRO officials.
D	Generator shed	Persons with Permit Zone "D" which would be expected to include the crane driver, maintenance personnel, JCU safety officer & inspectors, DRO officials.
E	Area of forest within the working arc of the crane jib	Persons with Permit Zone "E" which would be expected to include the crane driver, researchers, visitors, maintenance personnel, JCU safety officer and inspectors, DRO officials.
F	Area of forest within lease area but outside the working arc of the crane jib	Persons with Permit Zone "F" which would be expected to include the crane driver, researchers, visitors, maintenance personnel, JCU safety officer and inspectors, DRO officials.
G	Load jib	Persons with Permit Zone "G" which would be expected to include crane maintenance personnel.
H	Research Facilities (kitchen, laboratory, general accommodation and facility house)	Persons with Permit Zone "H" which would be expected to include the crane driver, researchers, visitors, maintenance personnel, JCU safety officer and inspectors, DRO officials.