

JamesCookUniversity  
DaintreeRainforestObservatory  
Projecttype: Institutional

Location: CapeTribulation, QLD, Australia

Yearcompleted: May 2014

- x World rclassresearchfacility with a focus on the rainforest and low environmental impacts
- x Simple and efficient with careful consideration of spatial requirements and composition to maximise ambient benefits

## PLANNING AND MANAGEMENT

A thorough analysis of the space requirements located the research facility centrally with accommodation wings on either side. The site sensitive master planning strategy included working with the contours and cleared rainforest areas to create a collegiate environment with lush tropical and flexible courtyards for interaction. The strategy responds sustainably to the environment in a relaxed configuration that allows the tropical landscape to permeate through.

## SITE

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. The site is adjacent to the Daintree National Park. The Daintree rainforest has the highest biodiversity anywhere in Australia and has a unique Gondwanan flora.

The DRO also has a crane that sits above the rainforest canopy and is used to access and study the Wet Tropics World Heritage Area. This is one of the few areas in the world where the rainforest meets the World Heritage listed Great Lush study World to require this space. The DRO is located

The design has split the accommodation into modules which can be combined in a variety of ways, with covered breezeways which act as informal meeting and learning spaces.

The modules are designed to be naturally cooled and ventilated, and are raised off the ground to promote breeze paths and allow the intense tropical rainfall to flow undisturbed.

## MATERIALS

The structural framing to each building generally follows a common theme, comprising of a robust and durable galvanized steel frame over a system of discrete, bored and reinforced concrete piers.

Where appropriate, some building areas have reinforced concrete slabs and footings, bearing directly on the ground.

Light weight, internal and external wall infill panels are constructed in timber stud framing as well as covered, external walkways and roofed areas. They typically comprise of galvanized framing elements at both roof and floor levels.

This methodology allows for significant volumes of off site prefabrication of building elements, in controlled workshop environments.

Natural and sustainable materials are used extensively and the design emphasises the link with nature and the rainforest. Prefinished and low maintenance materials and finishes are used where appropriate. Timber is substituted with composite recycled plastic products to avoid future maintenance and yet provide a soft alternative to concrete.

Colour inspirations have been taken from the rainforest and bright colours have been used carefully as features.

## ENERGY

The Cape Tribulation and Daintree Rainforest region is not connected to the grid of main power electricity. Electrical energy use requires conservation management and the DRO demand can be as high as 600 kWh per day.

Existing battery capacity supports overnight demand from approximately 10pm to 6am without the need to run the generator. A new 75kVA acoustically rated genset generator runs daily outside these times. It provides primary supply during the day with the existing generator retained for backup use.

The generators normally require fossil fuels, and are very noisy and at odds with the perfection and quiet beauty of the ancient rainforests.

The current Photovoltaic array is producing about 20 kWh per day. Upgrading the PV array to completely offset demand is an ongoing project.

Solar hot water systems are installed with the combined kitchen and amenities hot water system being provided with LPG booster hot water units.

Smart design initiatives in the electrical system included occupancy sensors to control services on demand, switching them off by default and setting them back to safe levels during interim periods.

Air conditioned spaces are kept to a minimum and ceiling fans have been included to assist cooling and increase air movement. This allows a higher air conditioning temperature setpoint to provide an effective comfort condition.

Natural daylighting is sufficient and LED lighting is used at night.

of design into this project providing a well built, low maintenance, sustainable and compact facility. The interconnectedness of the different nodes for all weather movement is a particular bonus. This will help with maintenance and cleaning as well as