

The image shows a row of modern, two-story marine apartments built on stilts over a body of water. The buildings have light-colored siding and dark wood accents. Each unit features a balcony with white railings. The structure is supported by a complex network of dark wooden beams and posts. The water is calm, and the sky is blue with some clouds. In the background, other buildings and a pier are visible across the water.

MRTFC
CASE STUDY

Couran Cove Resort

MARINE APARTMENTS

A National Timber Development Council Publication

MRTFC CASE STUDY

Introduction

This Case Study examines Couran Cove Resort, an outstanding example of the use of timber and timber based products in general, and in particular Multi Residential Timber Framed Construction (MRTFC).

Couran Cove Resort

The Couran Cove Resort is a \$150 million ecotourism development on South Stradbroke Island, a 15 minute water taxi ride from Queensland's Gold Coast.

The resort will ultimately contain 192 apartments, 50 lodges, 25 villas, 300 forest "eco-cabins", hotel complex, convention centre, gymnasium, environmental interpretive and research centre, "Total Living" natural therapies centre, as well as relaxation, leisure and sporting facilities, unparalleled by any other Australian resort.

The resort has been designed using "best practice" environmentally friendly and energy efficient criteria, and aims to be a world leader in environmentally sound and ecologically sustainable management and operations.

All of the buildings and connecting boardwalks are constructed almost entirely from timber or wood based products.

Stage 1, comprising the hotel and convention

complexes, the first 60 apartments, 70 ecocabins and recreation facilities was opened in June 1998.

A further 132 apartments will be completed by September 1998 with the remaining accommodation and facilities staged over the next few years.

The Site

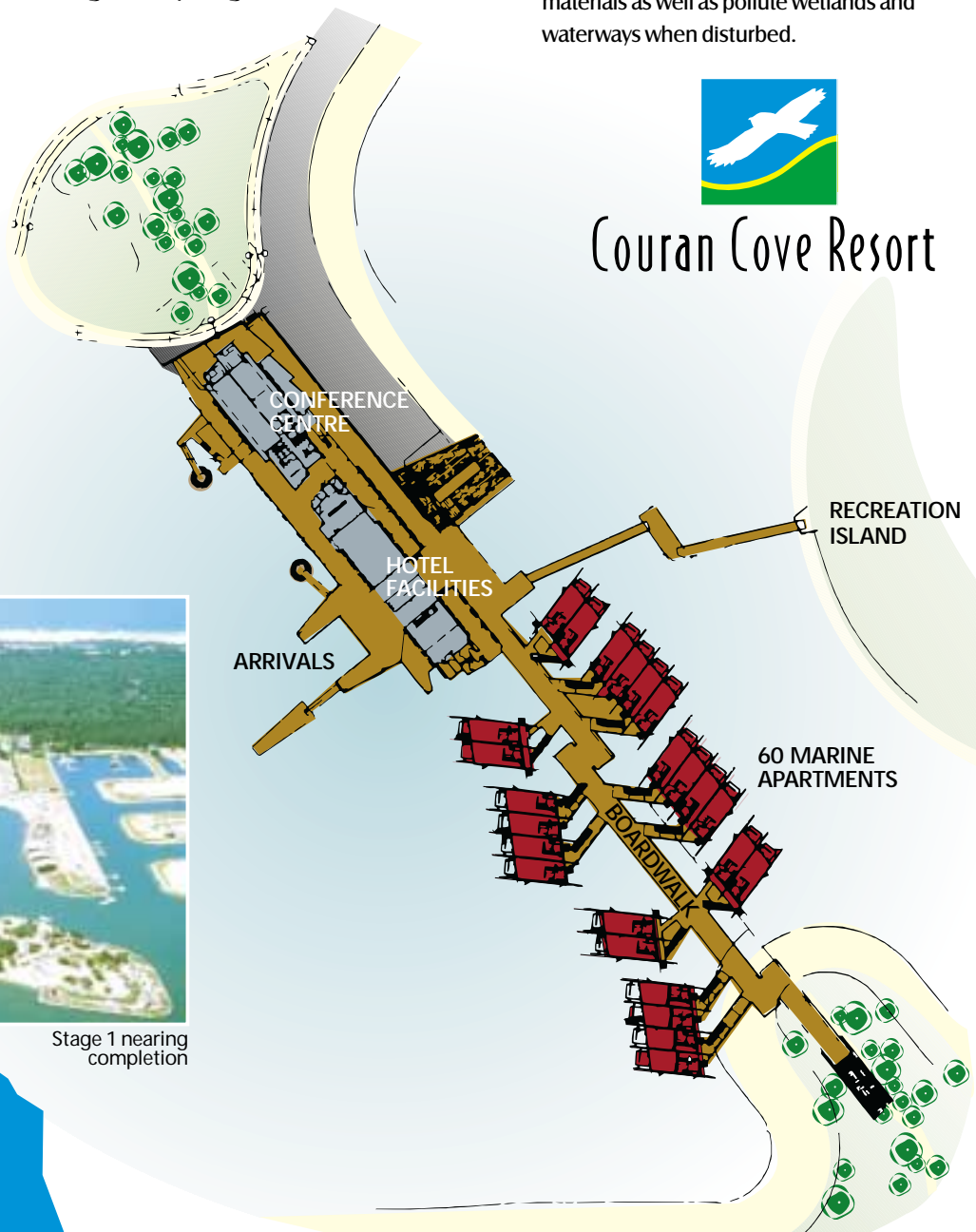
The resort occupies 151 hectares, stretching from the tranquil waters of the Broadwater, through Livistona rainforest and coastal woodlands, across rolling sand dunes to a 25 km long surf beach.

Most of the site is in pristine condition. A small area had been disturbed by earlier farming and an abandoned tourism proposal for which a deepwater harbour and canal development had been created.

The site contains acid sulphate soils with the potential to reduce the service life of building materials as well as pollute wetlands and waterways when disturbed.



Couran Cove Resort



Stage 1 nearing completion



The Developer's Vision

The Chief Executive of Couran Cove Resort's developer, Interpacific Resorts (Aust) Pty Ltd, is sporting legend Ron Clarke MBE.

The resort evolved from a combination of Ron Clarke's memories of his childhood holidays (fishing, walking barefoot on the beach, jogging in the bush, lying in a hammock) as well as his "Total Living" concept of life, with a balance between family, work, hobby and health.

To achieve his vision, Ron Clarke has installed 5 star luxury accommodation, as well as the best in modern leisure and sporting facilities, with access to the untouched natural environment.

"All the resort buildings are raised off the ground on timber piers and piles to have minimum impact. Also the idea was to give the resort a rustic, harbourside village appearance rather than make it look like brick and concrete dwellings."



"the idea was to give the resort a rustic harbourside village appearance"



MARINE APARTMENTS DESIGN AND CONSTRUCTION

Building Design

The hotel and convention complex with its associated 192 marine apartments were designed by Architects Daryl Jackson Pty Ltd.

The buildings as well as the 200 metre long, 4.8 metre wide boardwalk, are constructed almost entirely from timber and are suspended on timber piles over or surrounding a man made harbour and tidal lagoon.

Daryl Jackson said, "All buildings are designed to either infiltrate the natural bush or to hover over the water to give a waterfront village appearance and to complement the island environment. Timber was chosen as the ideal building material in a saltwater environment. Timber also mirrored traditional Queensland building construction techniques which we wanted to reflect in the resort development."

The apartments are designed with high ceilings and skylights to maximise natural light and ventilation, and provided with balconies and orientated to take advantage of the spectacular views.

To achieve the required fire and sound ratings, walls and floor/ceilings between units utilise Multi Residential Timber Framed Construction.

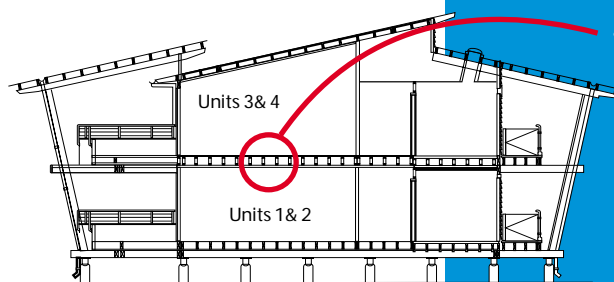


Multi Residential Timber Framed Construction

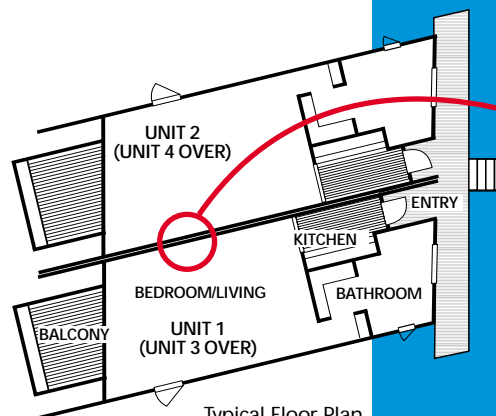
BCA Requirements

The Couran Cove marine apartments (for the purpose of building approval) were regarded as two storey, class 3 buildings requiring type C construction. The Building Code of Australia requirements were therefore:

- Floors separating storeys (between units) to have a fire resistance level (FRL) of 30/30/30 or have a fire protective covering on the underside.
- Walls between units to be FRL 60/60/60 extending up to the underside of the floor above, the roof sheeting, or to a ceiling with a 60 minute resistance to the incipient spread of fire.
- External walls and columns were all greater than 1.5 metres from any fire source feature and therefore did not require to be fire-rated.
- Walls and floors between units required a minimum Sound Transmission Class (STC) of 45. Walls between a habitable room in one unit and the bathroom or kitchen in the adjoining unit required an STC not less than 50 and a satisfactory level of insulation against impact sound.



- Floors between units FRL 30/30/30 STC 45



- Walls between units FRL 60/60/60 STC 45

Typical Floor Plan and Section

MARINE APARTMENTS FIRE RESISTANCE AND SOUND CONTROL



Fire Resistance and Sound Control

Stage 1 of the resort contains 60 one bedroom apartments. The MRTFC systems adopted in this first stage are as follows:

- Walls between Units were double stud walls using 70 x 45 mm pine studs separated by a 25 mm cavity. Linings were one layer of 16 mm fire grade plasterboard each side. One leaf contained 50 mm thick insulation.

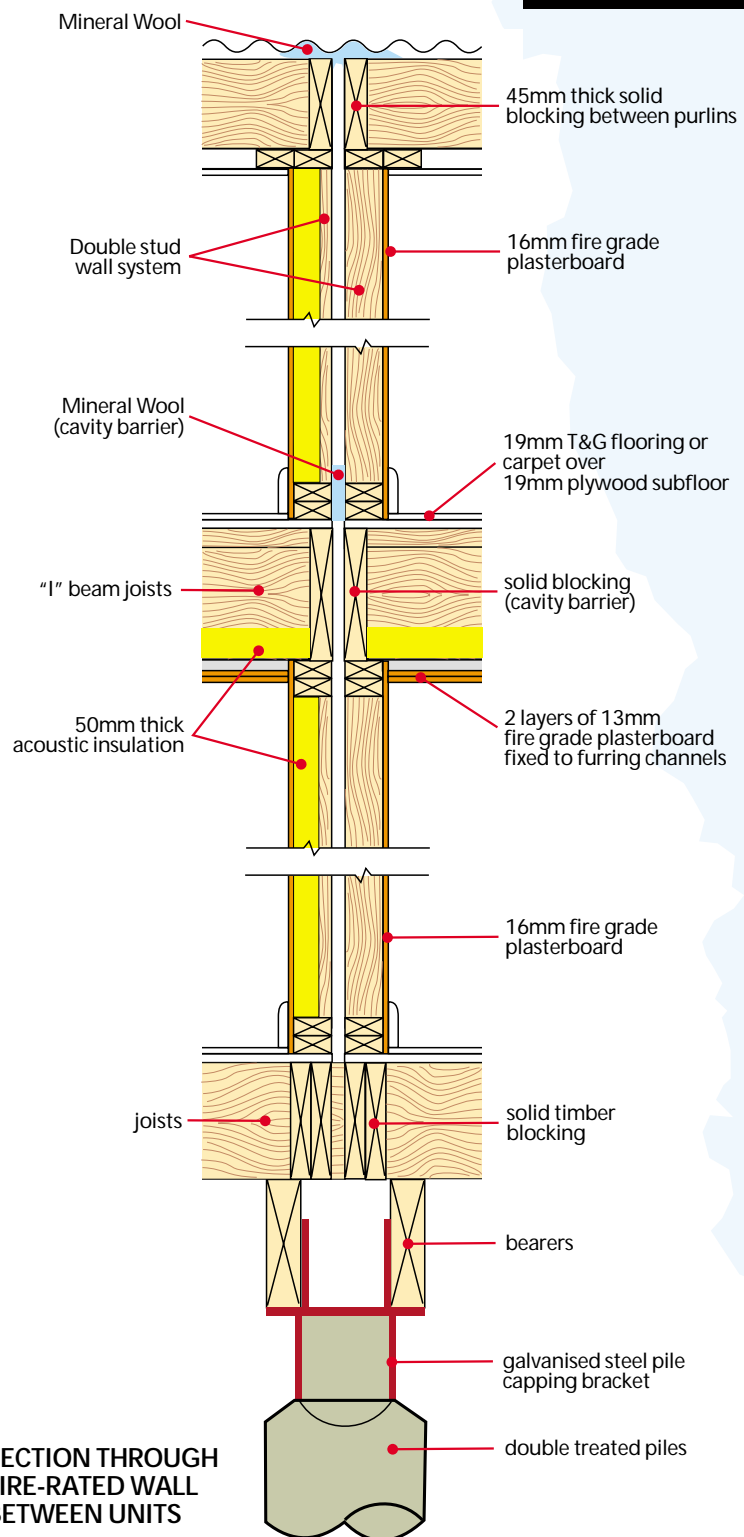
This system achieved the required FRL 60/60/60 and exceeded STC 45 and STC 50 as necessary.

- Floor/Ceiling Systems between Units had two layers of 13 mm thick fire-rated plasterboard fixed to steel furring channels on the underside of "1" beam joists. These joists spanned between separating walls without internal support.

The ceiling cavity contained 50 mm thick insulation and the system therefore attained the FRL 30/30/30 and exceeded the STC 45 required.

- Fire resistant ceilings were not required. Fire-rated walls between units were effectively carried up to the underside of the non-combustible roof sheeting.
- External Walls of all buildings were greater than 1.5 apart and therefore fire-rating was not necessary for external walls. The external 90 x 35 pine stud frame walls were sheathed with rough sawn hardwood (spotted gum) weatherboards, and lined internally with standard plasterboard.

All 60 units in Stage 1 are built over water, supported on double treated (CCA and PEC) hardwood piles. The hardwood bearer and joist system and plywood flooring were not required to be fire or sound rated.



SECTION THROUGH
FIRE-RATED WALL
BETWEEN UNITS



SPECIFICATION AND QUALITY CONTROL

To meet the environmental, durability and aesthetic objectives of the project, special attention was necessary in the selection, specification and use of timber and timber based products.

Queensland's timber advisory organisation (TRADAC) was consulted by Architects Daryl Jackson Pty Ltd at the early schematic design stage to ensure that timber could meet the design and environmental objectives, and that the timber industry could supply the quantity and quality of timber that would be required (Stage 1 contains around 3500 m3 of timber).

Once these initial concerns had been satisfied, and timber was accepted as the dominant material, TRADAC was regularly consulted during the detailed documentation by the Architects Daryl Jackson Pty Ltd and Engineers Sinclair Knight Merz, to ensure the correct species, durability, moisture content, detailing, fixings, finishes etc were specified.

As a requirement of the building contract, TRADAC was engaged to carry out a third party audit of timber supplied to Stage 1 of the project, to ensure that it met the stringent specification requirements.

DURABILITY

The life expectancy for materials used to construct the resort was targeted at around 50 years.

The acid sulphate soils and saltwater environment demanded a careful choice of building products and systems. Timber framed buildings on timber piles was basically the only method of construction that could meet the durability requirements, in such a corrosive environment.

The site has a medium to high termite risk. Physical barriers (metal stump caps) were provided which will be regularly inspected and maintained.

The species selection and protection systems used were critical. The following is a summary of timbers and treatments used in Stage 1.



Timber selection and specification to meet environmental, durability and aesthetic requirements

Application	Timber/Product	Durability Class	Treatment/Finish
Marine Piles	spotted gum, blackbutt, ironbark	1 & 2	Double treated to H6 (CCA & PEC)
Land Piles	plantation pine (slash)	4	CCA treated to H5
Bearers	blackbutt	2	CCA treated to H3
Joists	blackbutt, spotted gum	2	CCA treated to H3
Decking	spotted gum	2	CCA treated to H3 (with water proofing additive finished with decking oil)
Flooring	brush box over plywood underlay	3	water based polyurethane over "non bonding" sealer
Stud Framing	plantation softwood	4	untreated
External Framing (posts etc)	new and recycled hardwood	1 & 2	painted
Weatherboards (rebated)	tallowwood	1	painted

ENVIRONMENTAL SOLUTIONS

In building the resort every effort was made to protect the existing environment and to bring disturbed areas back to their original biodiversity. The resort aims to be a world leader in environmentally sound and ecologically sustainable management and operations. Some of the environmental solutions are:

- Landscaping: 300 000 native trees planted (species sourced from the island).
- Sewage: Worlds best practice collection treatment and disposal systems with treated effluent used to maintain vegetation and create fire breaks.
- Energy: LP gas generators supplemented by a large wind turbine.
- Site Management: Acid sulphate soils in the marina and lagoon were dredged, washed and returned under 500 mm of clean sand.
- Buildings: On piles/piers for minimum impact on site and minimum disturbance of acid soils.
- Rainwater: Run off from the roofs is distributed through agricultural drains underneath the buildings with the water drained back into the island sands.
- Timber: The building material with the best environmental credentials. Nature's own resource from sustainably managed forests and plantations. Timber is renewable, recyclable and biodegradable. It has the lowest embodied energy of all building materials, with the lowest greenhouse gas emissions from its manufacturing processes.



CONCLUSIONS

Multi Residential Timber Framed Construction (MRTFC) has become widely accepted throughout Australia. Developers, designers and builders are recognising the substantial time and cost savings that can be achieved.

The construction of Couran Cove Resort has not only demonstrated the time and cost advantages, but has also highlighted many other benefits of using timber framing systems.

- Design Flexibility: MRTFC allowed the architect to suspend the buildings over water.
- Durability: Timber was the only material that gave the required 50 year service life in a corrosive saltwater environment and in acid sulphate soils.
- Environmentally Friendly: Timber has environmental credentials far superior to alternative construction materials.
- Transportation: With all materials requiring transportation from the mainland, timbers high strength to weight ratio and ease of fabrication simplified and reduced the cost of transportation.

Multi Residential Timber Framed Construction was the only system that allowed the developer to achieve his vision, and the Architect to create his innovative design. Timber was the only building material that could achieve the required service life in the extreme corrosive environment, as well as satisfy the environmental criteria.

Timber the natural choice.

Couran Cove Resort

LOCATION:
South Stradbroke Island,
Queensland

DEVELOPER:
Interpacific Resorts (Australia)
Pty Ltd

ARCHITECT:
Daryl Jackson Pty Ltd

ENGINEERS:
Sinclair Knight Merz

BUILDER:
Watpac Australia Pty Ltd

TIMBER QUALITY AUDIT:
Timber Research And
Development Advisory
Council of Qld (TRADAC)

For further information
on MRTFC contact:

Timber Development Association NSW Ltd
13-29 Nichols Street, SURRY HILLS NSW 2010
Tel: (02) 9360 3088 • Fax: (02) 9360 3464

**Timber Research And Development Advisory
Council of Queensland (TRADAC)**
PO Box 2014, FORTITUDE VALLEY BC Q 4006.
Tel: (07) 3358 1400 • Fax: (07) 3358 1411

Timber Development Association of SA
113 Anzac Highway, ASHFORD SA 5035
Tel: (08) 8297 0044 • Fax: (08) 8297 2772

Tasmanian Timber Promotion Board
Suite 22/11 Morrison Street, HOBART TAS 7000
Tel: (03) 6224 1033 • Fax: (03) 6224 1030

Timber Promotion Council (WA)
PO Box 4002, WEMBLEY WA 6014
Tel: (08) 9380 4411 • Fax: (08) 9380 4477

Pine Australia
830 High Street, KEW EAST VIC 3000
Tel: (03) 9859 4411 • Fax: (03) 9859 4477

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- TDA (NSW)
Timber Development Association (NSW)
- FPA
Forest Products Association (NSW)
- VAFI
Victoria Association of Forest Industries
- TPC (Vic)
Timber Promotion Council of Victoria
- PAA
Plywood Association of Australia
- FIAT
Forest Industries Association of Tasmania
- TTPB
Tasmanian Timber Promotion Board
- NAFI
National Association of Forest Industries
- TRADAC
Timber Research And Development
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Queensland Timber Board
- TDA (SA)
Timber Development Association (SA)
- Pine Australia
- FIFWA
Forest Industries Federation (WA)
- TPC (WA)
Timber Promotion Council (WA)



This case study was produced with support from
the Forest and Wood Products Research and
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BACKGROUND OF MRTFC IN AUSTRALIA

In November 1994, Amendment 7 to the
Building Code of Australia (BCA) permitted the
use of full timber framing (including walls and
floors between units) for:

- All Class 1 buildings
- Class 2 buildings to three storeys
(four storeys permitted where ground
floor is a concrete or masonry carpark)
and
- Class 3 buildings to two storeys.

These amendments to the building
regulations, were only achieved after many
years of research and testing by the various
National and State timber associations to
show that timber framing systems, with
appropriate fire resistant linings and sound
insulation could provide an equivalent level of
safety and amenity to concrete and masonry.
The timber framing alternatives are now
incorporated into the "deemed to satisfy
provisions" of the new performance based
BCA.



The first Australian MRTFC project under
construction in 1995. The Lutwyche 3 Storey,
Class 2 Project was the beginning of timber
framed multi-residential construction.

Multi Residential Timber Framed Construction
(MRTFC) is the name given to the fire and
sound rated timber framed wall and
floor/ceiling systems, and associated
construction detailing, which have been
developed to satisfy the BCA requirements.

MRTFC SUPPORT DOCUMENTATION MATERIAL

A comprehensive three part suite of manuals
(3 manuals) has been produced by the timber
industry.

These manuals include substantial
information on the approved timber wall and
floor/ceiling systems, and the methods of
designing and constructing MRTFC buildings
to comply with the Building Code of Australia.

The MRTFC manuals provide a complete
guide that enables designers, local
authorities, developers and builders to
pursue economical solutions for multi-
residential projects.

The various lining manufacturers have also
produced literature with specific information
about their own products.

These manuals can be obtained from the
State timber associations.

