



Sutherland Home (New Home)

With a concrete slab and concrete block walls on a relatively compact 468 sqm of land, this newly built modern tropical home is an excellent example of how concrete materials can be used to advantage to create a truly tropical home that is a very long way from being a hot box! This entertaining oriented family home is quite possibly Townsville's most effective use of concrete block for tropical design and is a window to how concrete block homes will be designed in this region in the future. A cool home with loads of appeal for those desiring a tropical lifestyle and fabulous interaction with the outdoors. Come and see how Townsvillians could be living tomorrow!

Practical energy efficiency with a teenage family is also achieved.

Owners: David and Donna Sutherland

Address: 171 A Harold Street, West End (Townsville) QLD 4810

Climate Zone: Townsville is located in the Dry Tropics – there are two seasons: a hot and humid (November to April) wet season, and a warm to hot dry season with low humidity for the other half of the year.

Construction type:

Key construction features of the home include:

- effective use of concrete in a tropical climate;
- externally insulated concrete walls when not shaded;
- high ceilings and sloping skillion roof;
- timber efficient, LVL rafters with exposed feature hardwood rafter tails for species durability and conservation of precious timbers;
- rendered concrete internal walls;
- very well considered floor plan to maximise orientation of all internal spaces for access to breezes;
- U-shaped floor plan;
- focus on creating indoor/outdoor living areas – lounge, kitchen, studio;
- central atrium/outdoor lounge;
- burnished concrete floors;
- use of atrium, atrium overhang and carport to shade external walls;
- polycarbonate windows at height under eaves for natural day-lighting;
- swinging, tilt up and tilt out polycarbonate walls;
- extensive use of full length louvres;
- disconnected roof over atrium for maximum airflow;
- oversized tropical guttering; compact tropical garden integrated with home design;
- ply joinery and ceiling linings.



Sustainable elements featured at this home

Landuse

A very good example of a naturally ventilated tropical home built on a moderately compact 468 sqm block.

Tropical Design Features

High ceilings and sloping skillion galvanised metal roof, fitted with reflective foil and R 2.2 fibreglass insulation.

Concrete block walls kept fully shaded avoiding the hot box syndrome commonly experienced by homes in the tropics where concrete walls receive sun and heat up and then reradiate that heat inside the home. External walls are shaded by atrium roof overhangs and an elongated carport and where walls are not shaded they are externally clad with timber framing and fibre-cement sheeting and fitted externally with reflective foil and fibreglass bulk insulation fitted to prevent heat gain to the concrete.

Internal concrete walls are rendered and cool to the touch.

Burnished concrete slab floor, fully shaded is cool to the touch year round.

A key design focus was on creating indoor/outdoor 'rooms' particularly for the living areas i.e. atrium/lounge, kitchen, and studio.

The home truly does interact with its environment and this creates a distinctly different feeling to an enclosed home. The building promotes a lifestyle that's more connected to nature – promoting a heightened experiences of daily fluctuations in the weather, of soft breezes,, to the experience of rain, and like it or not to frogs – very loud!

A very well considered U-shaped floor plan to maximise orientation of all internal spaces for access to breezes. Central atrium / lounge room maximises airflow through the home.

Ideal orientation of the open "U" side of the house to the east, with offset room configurations to very effectively captures all of Townsville's prevailing breezes (i.e. from north through east to south easterly breezes).

Open balustrade "wall" to atrium / lounge, which allows the house to breathe whilst also providing security.



Large expanses of internal walls are oversized 2.4m tall hardwood framed, polycarbonate 'light' windows which provide privacy and separation yet swing to enable abundant cross ventilation to bedrooms when rotated at night. These windows/walls are inspired by a combination of the paper walls of Japanese homes which light up and glow at night and also the ventilation achieved by contemporary casement windows of traditional Queenslanders, albeit enlarged to achieve even better airflow.

Polycarbonate is used extensively under the eaves as a clear gable to provide natural day lighting of internal spaces. In the studio, the rear polycarbonate wall is also a sliding wall, providing extensive natural daylight and when opened, also excellent ventilation. In the kitchen, a tilt up steel framed polycarbonate wall and tilt out timber framed polycarbonate awning open up the internal areas of the kitchen to the outside environment embracing the creation of an indoor/outdoor space and maximising natural ventilation to the kitchen.



2.4m tall louvers with either dark grey glass or aluminium blades are used extensively throughout.

Disconnected skillion roof with oversized tropical gutters over atrium / outdoor lounge whilst maximising airflow and preventing water ingress.

Partition walls provided between kitchen and library to facilitate air-movement between these rooms.



Landscaping

The garden was designed concurrently as a key part of the tropical design of the home. The lush tropical garden area is compact but brings substantial cooling and visual benefits to the adjacent living spaces and is a key component of creating an indoor/outdoor experience even when inside the home.

Grass pavers utilised for water efficient, hardy yet green surface that hopefully won't need mowing.

Timber decking and gravel paths are also utilised as external surfaces.

The plunge pool is small and shaded and upwind of the house. It's small size limits energy used for pumping/filtering and reduces water use.



Energy Efficiency

Household energy use is typically \$300-\$350 a quarter including a pool, which is half that used by this family in their previous house. Key differences between the houses are: significantly reduced reliance on air-conditioning, good natural day-lighting reducing need for electric lighting in daytime (note home is used as a home based office), heat pump rather than electric hot water and gas cooking.

Cooling of the house is primarily achieved through excellent use of thermal mass, insulation and cross ventilation.

Four blade grade stainless steel ceiling fans are fitted throughout. Ceiling fans are not left on in unoccupied rooms.

Energy efficient inverter air-conditioning connected to Tariff 33 (controlled supply) has been fitted and is used 4 weeks a year at night in two bedrooms. An air-conditioner is installed in one lounge, but it's use wasn't necessary last summer at all!

Appliances throughout are energy efficient including the fridge, freezer, dishwasher, washing machine and dryer (used during the wet season for quick turnaround of sports clothes).

The family is also very careful with standby power consumption. Entertainment, office equipment is fully turned off when not being used.

Excellent natural day-lighting has been achieved in living areas through extensive use of polycarbonate sheeting as a walling /window material.

Atrium / Lounge has a large skylight.

Electric lighting is exclusively fluorescent - compact and linear globes.

Hot Water Heating

Heat pump hot water system.



Water Efficiency

A water efficient showerhead and tap fittings (as per regulations).