Hot Tips for Cool Homes in the Tropics

'Passive design techniques to reduce reliance on air-conditioning and create a cool and comfortable home in the tropics'

1. Minimise heat gain

a. Avoid placing living spaces or frequently used bedrooms on the western side of your home. Utility spaces like storage rooms, bathrooms and carports are best located on the hotter western side of your home.

b. Keep the sun off glass windows and doors. For north and south facing glazing horizontal overhangs are generally sufficient eg eaves/horizontal overhangs. For west (afternoon sun) and east (morning sun) facing glazing because of the lower sun angle, vertical shading will be necessary eg external slats/ louvres, trees or 2.5m plus wide overhangs like a verandah or carport.

c. Keep the sun off concrete especially concrete walls (block or rendered). Concrete is a high thermal mass material and will absorb and hold heat, continuing to heat your home long after the sun has gone down.

d. Use light colours for external surfaces – paint the roof and walls a light colour, white solar roof paints are excellent.

e. Ensure excellent ventilation of the roof space. Excellent ventilation requires both effective removal of hot air from the apex of the roof and assurance that there is sufficient openings around the eaves for air to come in and replace the exhausted air.

f. Fit insulation in the roof and walls. Roof insulation is best when installed underneath the roof sheeting – aim to install the highest R-value (insulation rating) that you can afford, ensure that the insulation type that you choose has a reflective layer as this is highly effective at reflecting heat in the tropics eg reflective foil; and although it will slightly slow the cooling of your home at night, choosing an insulation with both a reflective and thermal component eg anticon blanket, 'aircell' type insulation, or other will reduce the heat in your house during the day time.

g. Shade walls following similar guidance to windows above.

h. Fit insulation to walls exposed to the sun.

i. Create a cooler microclimate around your home by using plants, trees and awnings to create a cool, shady environment around your home. A microclimate up to 3ºC cooler can typically be achieved which is a substantial temperature difference in a tropical climate.

j. Reduce glare and heat radiation by minimising the use of concrete and reflective surfaces in areas that receive direct sunshine and reflective surfaces.

k. Use energy efficient lighting. Hot to the touch lighting is wasting energy and heating up the interior of your home.

2. Maximise access to prevailing breezes

a. Create living and dining areas outside to make the most of breezes and cooler night air (eg under a roof, a tree or even the night sky)

b. Maximise openings that allow prevailing breezes into your home. Prevailing breezes in Townsville in the warmer months come from the south east in the mornings and the north-east in the afternoons. Maximise openings to channel air into your home from north through east to south east. Choose casement and louvre style windows if you can afford them.

3. Maximise airflow through your home

a. Maximise the ability for breezes to flow through your home. Remove parts of internal walls, create internal openings by removing parts of walls, fit internal windows or fanlights and use permeable screens and partitions to divide spaces whilst maximising airflow.

b. Ensure that sufficient openings are provided on the downwind side of your home. Airflow through a space will be limited by the smallest opening up or downwind.

c. For good natural ventilation of interior spaces, seek to create at least three openings in every room, ideally two of which are to the outside. Position yourself and activity spaces in a direct line between the openings so that breezes flow over you whilst you are sitting, working, sleeping.

d. Use mechanical fans eg ceiling fans to supplement air-movement.

This information sheet prepared by Sandy McCathie of ecoSAVVY (www.ecosavvy.com.au), 2007

Useful Tool #1: Sun Path Diagram for Townsville

A sun path diagram is a tool that helps you read the movement of the sun throughout the day and during the seasons.

The path of the sun changes gradually throughout the year between summer and winter and also differs depending on the region that you live in.

This means that people who live on the Gold Coast will have a different sun path to people who live at the top of Cape York.

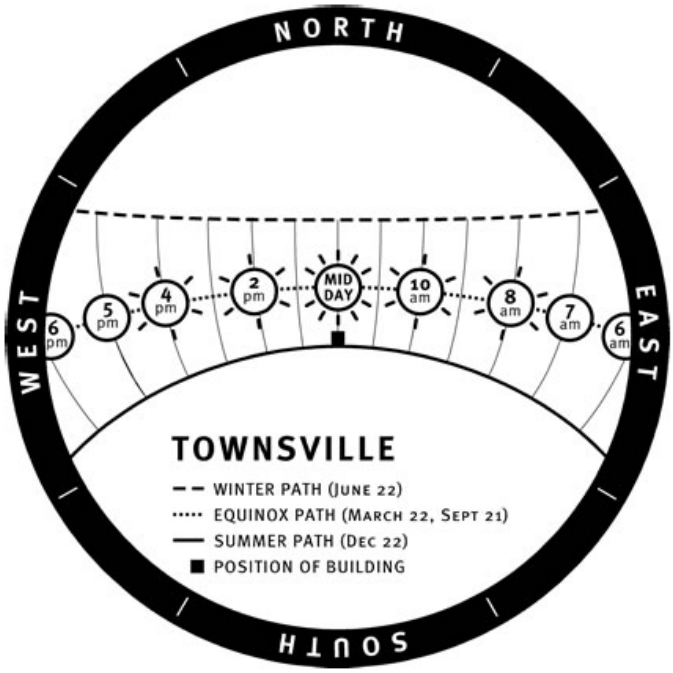
Sun path diagrams are easy to use. A building is positioned on the centre of a compass, and the path of the sun in the sky is drawn for summer and winter. The sun path gradually moves between the summer and winter paths throughout the year and twice a year (in March and September) it crosses the Equinox sun path.

1. Find the black square at the centre of the diagram. This symbolises your house.

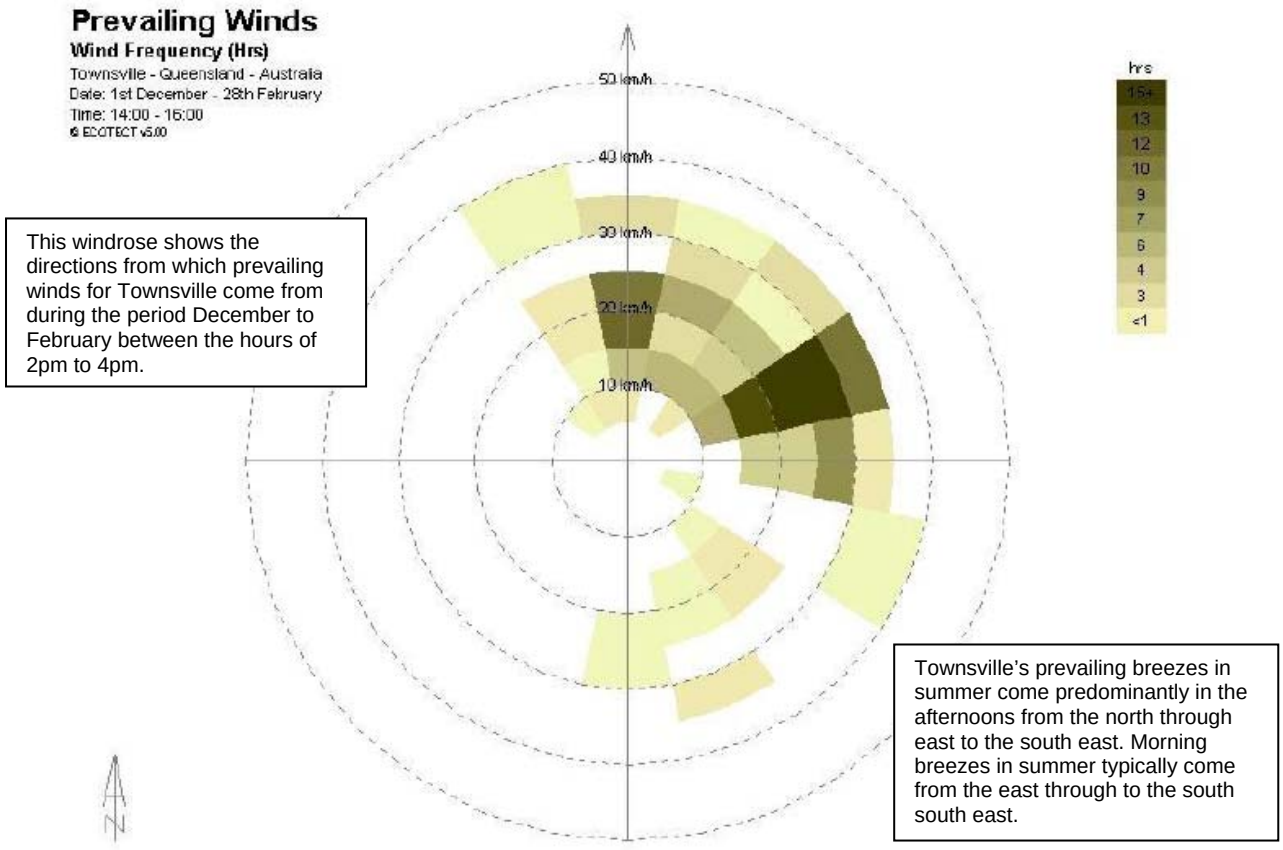
2. To find where the sun will be at 6am in summer, locate 6am on the diagram.

3. Follow the curved line down until it meets the darker line (the summer path).

4. Next draw an imaginary line from this point to the house. (This will show where the sun will be shining on your home at 6am in summer.)



Useful Tool #2: Prevailing Wind Directions for Townsville



This windrose shows the directions from which prevailing winds for Townsville come from during the period December to February between the hours of 2pm to 4pm.

Townsville's prevailing breezes in summer come predominantly in the afternoons from the north through east to the south east. Morning breezes in summer typically come from the east through to the south south east.

Note on windrose above (from Martin Clark, Design for Climate, Residential Design in the Tropics): A north-easterly wind at 30km per hour (black shading) represents around 8m per second. It should be noted that these wind speeds, probabilities and directions are based on average readings at the weather station located at Townsville airport. The values are fairly reliable for the coastal plains, but may be varied further inland by obstructions and topography. In the Upper Ross (Rasmussen, Keslo) for example, the north-easterlies tend to be more northerly, due to the airflow being 'turned' by the Mount Louisa range, and the effect of Mount Stuart.