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COOLmob

***Report for the Parliamentary Standing Committee on Public Works***

**Construction of housing for the Department of Defence at  
Muirhead, Darwin, Northern Territory**

*Proposed Redevelopment of Muirhead Point, Darwin, NT*

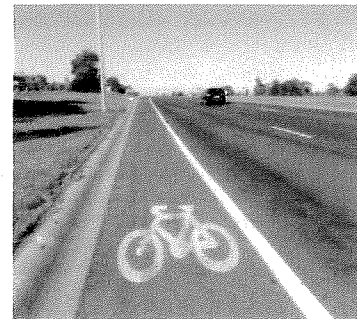
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COOLmob is a community based organisation that promotes sustainable living and reducing greenhouse gas emissions. Its activities include sustainable household audits, publication production, education, research and lobbying. COOLmob has many volunteers and some employed staff and is a project of the Environment Centre Northern Territory.

**Department of Defence's First Sustainable Housing Suburb**

This new development represents an opportunity for Defence Housing Corporation to build their first Sustainable Housing Suburb. All houses can be fitted with photo voltaic panels and aim for the majority of their power to be generated from renewable energy. Grey water recycling can be incorporated into the development for use in parks and gardens and include facilities for a community food garden area. Arterial roads can include bicycle lanes for safer commuting. Street lighting can be the most energy efficient available.



COOLmob is concerned that many homes being constructed in the Top End of the Northern Territory are not the most appropriate designs for the tropical weather experienced here. Nor are homes fitted with the most energy efficient hardware. Consequently, householders are receiving very high power bills and producing above average household Green House Gas (GHG) emissions in order to live comfortably in their homes. Such homes are difficult to modify or to live in comfortably without relying on air

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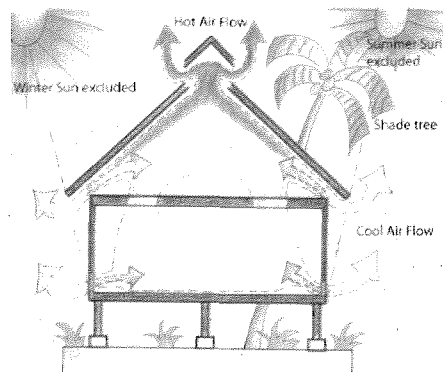
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conditioners, and therefore will always be high energy consumption homes for the life of the building. Such building construction leaves a legacy of ongoing high living costs that many families cannot afford.

Building design that incorporates features appropriate for tropical living allows easy adaptation of the home to changing environmental requirements. As the majority of people work or attend school during the day, many homes are often uninhabited during the hottest part of the day. Although consideration needs to be given for comfort during the middle of the day, home design should not be designed only to cater for these hours of extreme temperature when many houses are unoccupied. It is acknowledged that new residents to the tropics need new knowledge and some adjustment time to learn the best ways of living in a tropical environment.

Points to consider when designing energy efficient housing for the tropics:-

1. Catching breezes - Muirhead Point is a naturally breezy location so houses built here should be designed to catch the breezes and take advantage of the coastal conditions. Outdoor living areas need to be protected from the NW monsoon.
2. Windows – louvers allow twice as much air flow as sliding windows and do not require closing during moderate rains.
3. Security and fly screens – screens stop a large percentage of airflow. In appropriate locations with few insects and where possible, use retractable fly screens. Similarly, security screens and mesh stop the majority of the air flow and restrict night time cooling whereas louvre security bars have little effect on air flow.
4. Verandas – All homes to have an outdoor living area that allows cross breezes to flow through and be fitted with ceiling fans. This is more important than large interior living areas and can be used for outdoor cooking and living. If households do not have appropriate outdoor living furniture, Defence Housing could consider assistance or rental of appropriate furniture. The southern storing of inappropriate furniture could be offered to families who are moved to live in the tropics temporarily.

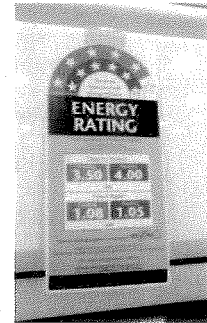


5. Cooking appliances – Gas stoves and ovens are more efficient than electric ones. Defence Housing have said that they do not want the responsibility of managing gas bottles. The general real estate rental market do not refuse to rent houses with gas bottles so COOLmob recommends that Defence Housing specify gas stoves and ovens in homes and manage the gas bottle refills as necessary.



6. Placement of power switches - consideration be given to the location of power points so that the occupants can easily access them to turn off "stand-by power" eg microwave ovens, home entertainment units

7. Energy efficient appliances – All appliances fitted to homes should be the most energy efficient available. High star rated appliances can save significant amounts of electricity and GHG emissions.



8. Clothes drying – All home need to include an area for drying clothes in the wet season, preferably under a fan. This would reduce the need for clothes driers that heat the home and are energy guzzlers.

9. Solar hot water – All homes be fitted with solar hot water services with a time sensitive booster switch. These switches are cheaper than one shot booster switches and can be set for a shorter time. If households want additional hot water, they simply press the switch as many times as needed. When only a small amount of hot water is required it is not necessary to heat the whole 300 litre tank, as occurs with a hot water booster switch.

10. Lighting - All homes be fitted with energy efficient lights which produce less heat than other lighting systems.



11. Sky lights – incorporate sky lights in appropriate areas such as bathrooms and kitchens.

12. Air conditioners placed appropriately – install air conditioner compressors in appropriate shaded locations where they are drawing in cool air, thus reducing the demand on the cooling process.

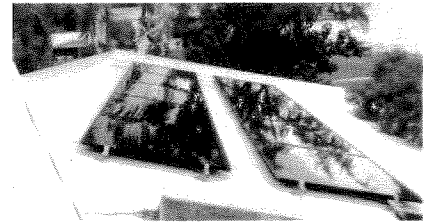
13. Separate switches – Air conditioners to have a separate power board switch to turn them off when not needed so that they are not left on standby for long periods.



14. Cross ventilation - Design buildings that have a long narrow shape and one room wide, to allow

cross ventilation. Such ventilation is not possible when square building designs are used which are more than one room wide.

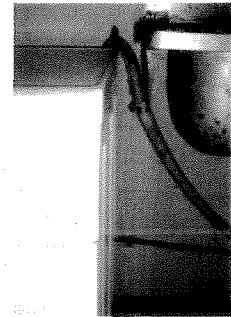
15. Roof ventilation – incorporate roof space ventilation systems such as eave vents, ventable manhole covers, and solar ventilators to assist with air movement.



16. Roof pitch – roofs pitched at low angles are more appropriate for installation of photovoltaic solar panels.

17. Building design – Consideration should be given to the features of the very livable and popular Commonwealth Government tropical designed houses commonly referred to as C19's or D3's.

18. Light Weight Construction – buildings built of light weight materials do not hold heat through the night. They cool down very quickly after the sun has gone down, unlike block materials that radiate the heat throughout the whole night, necessitating the use of air conditioners. As many people are not home during the day, it is particularly important to design for evening comfort.



19. Water collection – when designing the building, give consideration to installing some guttering for the collection of water into water tanks and water tank location.

20. Grey water – Installation of plumbing facilities clear of the slab to facilitate easy connection of grey water systems or for use on site. Laundries can be located in areas where grey water can easily be diverted to the garden.

21. Concrete and paving - Paved surfaces that are not shaded heat up and become heat banks. These heat banks reflect heat as well as heating air and breezes that pass over them. This all contributes to the heating of a home and outdoor areas. The raised air temperatures continue throughout the night.



22. Orientation and shade - Orientate buildings in an east west orientation so that the long northern wall receives the least amount of direct morning and afternoon sun.

23. Vegetation and trellises - Encourage vegetation around the property to create a cool envelope of air surrounding the property. Trellises for



creepers can be used to shade east and west walls. If necessary, leaf guards can be fitted to guttering (if fitted) to prevent gutters clogging up.

24. Fencing – use non solid fencing to allow breezes through, particularly if the living area is on ground level.
25. Vegetation grown on fencing can provide privacy and still allow breezes to penetrate.
26. Setback of homes from the front of the property - Ensure that buildings are set back far enough from the front footpath to allow sufficient vegetation to provide privacy. If there is no privacy curtains must be closed for privacy, thus preventing the opportunity for natural breezes to enter the building.
27. Learning to live in the tropics – If you have lived in a non humid environment it cannot be assumed that you know how to keep yourself comfortable in the tropics. People need to be educated in ways of feeling comfortable in a climate where you may need to do the opposite to what you do in temperate climates. Eg On a 'dry' season day you open all the windows to let in as much breeze as possible, while on a hot summer day in southern Australia you keep your house closed up. The *COOLmob Greenhouse Friendly Habits* Book is full of tips for living in the tropics.
28. Pools and spas – these should be supplied with covers to reduce both evaporation and the water quality maintenance needs. Products such as the highly efficient Hurlcon Viron pump should be installed for all pools.

