DESIGN OF AN ENVIRONMENTALLY SUSTAINABLE BUSINESS AND CULTURAL CENTRE FOR INDIGENOUS PEOPLE IN YARRABAH COMMUNITY, AUSTRALIA

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Summary

Yarrabah is a community in Queensland, Australia, comprising 2,700 people of whom 97 % are Indigenous. The Yarrabah Council is considering constructing a multi-purpose business and cultural centre, with a view to enhancing economic, cultural, and environmental sustainability in the area. The author's proposed design for the building incorporates design/construction elements and operational performance that meet recognised Australian environmental standards and ratings. Environmental aspects of the design include elements of passive solar energy utilisation and control, the use of natural sources of ventilation and light, solar-based power generation, an energy management system, and a self-sufficient water supply. Life cycle analysis is considered for all materials, systems, and processes.

The proposed design also incorporates culturally responsive elements as a result of applying Indigenous knowledge and cultural values. Consultation with Indigenous groups and examination of historical documents indicated that local tribes practiced sustainability and used natural materials to construct huts and shelters that were domed and circular in shape. Conceptually, the building is presented as a creative and innovative sustainable design, encapsulating the essence of an Indigenous spiritual entity by taking on the shape of a sea eagle and also containing domed and circular elements. Due consideration is given to both internal and external spaces.

The proposed building represents a fusion of modern materials/methods and Indigenous knowledge/culture in an ethnoscientific approach to design, meaning that the centre will possess both environmental integrity and cultural significance.

Keywords: environmentally sustainable building, indigenous people, culturally responsive design, enthnoscientific approach, Australia.

1 Introduction

Yarrabah is a remote, indigenous community in northern Queensland, Australia, comprising around 2,700 people. Currently, the Yarrabah Council is planning the construction of a 1500 m^2 multi-purpose business and cultural centre, with a view to enhancing economic, cultural, and environmental sustainability in the area. The centre will be a mixed-use facility, hosting government agencies and services, providing retail space, promoting employment opportunities, providing training and business start-ups, and acting as a social and cultural focus for the community.

This paper presents the author's design and associated concepts for the proposed business and cultural centre. The design incorporates advanced environmental features and Indigenous elements to produce a modern, innovative, sustainable building that has cultural integrity and incorporates the ethos of community.

2 Background

The council intends that the new centre would create an economic, social and cultural focal point at Yarrabah. A multi-purpose centre would house and integrate business, government, community and social activities, and would meet demand for more commercial leasing space at Yarrabah. The centre's local linkages and broader regional significance will be derived in two ways. First, it should create a platform to stimulate the Yarrabah economy and social connectedness, supporting the overall wellbeing of the community. Second, the building would demonstrate leadership in economic, social, cultural and environmental sustainability, and could become a flagship for similar community reinvigoration projects in the region and beyond.

This community building should enable the development of people's skills and resources, building enterprise confidence in Yarrabah as well as establishing much-needed new infrastructure and buildings designed to grow with the community. The building will host and support government agencies, micro-enterprises, housing services, training schemes, community interests, and social interaction.

3 Design of the proposed centre

3.1 Layout of the building

The centre consists of a single-level building with a north-facing aspect with west and east wings (Figure 1). From above, the building takes the shape of a sea eagle, a bird of cultural and spiritual significance to local Indigenous tribes. The building uses various geometric shapes including circular features and domes.

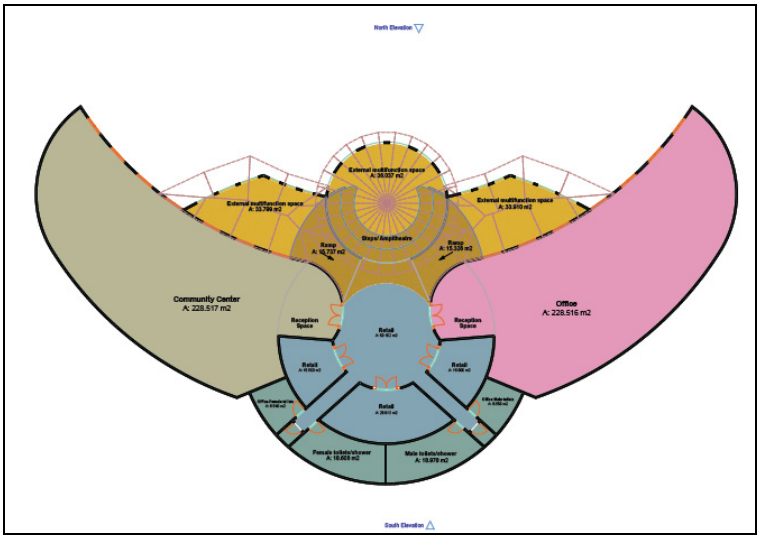

Fig. 1 *Plan view of the proposed Yarrabah Business Centre, with sea-eagle shape.*

The centre's gross floor area is about 1400 m^2, comprising 800 m^2 on the ground floor and 600 m^2 of covered veranda level. Some 25 % of the gross ground floor space would be available for retail tenancies. The western wing has been designed as a multipurpose facility, library, and community centre, which would be available for community use, training, and for hire to external agencies including government departments and agencies. The eastern wing ground level has been designed as a commercial office area, including a business services centre and conference and training facilities. The main reception area in the centre of the building will house proposed retail outlets. A facility will also provide fax, phone, photo-copying, and internet access for community members. The large covered area at the front of the building will provide general gathering areas for citizens to meet and sit under shade. The centre would be used in case of natural emergency (e.g., cyclone) as a collecting and/or clearing facility.

3.2 Environmental sustainability of the building

The emphasis on environmental performance is reflected in the design of the building, including the construction materials to be used, the layout in both the horizontal and vertical dimensions, and the environmental features incorporated.

3.2.1 Sustainability Elements

The building is designed to be very efficient to operate. Specific environmental sustainable elements considered in the design for the proposed centre include: (1) Passive design including building orientation and use of daylight and natural ventilation to reduce energy consumption and control indoor climate; (2) Energy consumption: a range of energy control systems for the building's services; (3) Waste management: strategies including recycling; (4) Consideration of alternative energy source, such as solar cells. (5) Sub-metering for the ongoing measurement and management of energy consumption. (6) Plant commissioning and facilities management strategies for the ongoing efficient operation of the building and systems. (7) Optimising the thermal performance of facades and roofs.

3.2.2 Environmental Features and Initiatives

Environmental initiatives incorporated in the building's design include the following:

(1) Lighting and power: a state-of-the-art, efficient power lighting system will be installed with the capacity to control lighting for individual work stations in the west wing for government tenants. Occupancy sensors will control lights. Open planning and large windows allowing natural light will optimize electrical lighting.
(2) Cooling system: A thermostat-controlled, zoned cooling system will be installed in the building. The system/s will be designed to mitigate the need for individual areas, thus the air-conditioning operates in two zones in each section allowing more flexibility and greater efficiency, especially after-hours when no air-conditioning is required.
(3) Water: The centre will be fitted with several rain-water tanks for harvesting of water to be used for toilets and gardens. Water metering will enable close examination of usage. The building is expected to be 100% self-sufficient for drinking water and wastewater.
(4) Waste: To reduce waste generation, facilities will be provided for the recycling of paper, cardboard, comingled recyclable waste, and organic waste.

(5) Energy rating: The building is designed to achieve a NABERS (National Australian Built Environment Rating System) rating of 4/4.5 stars. This rating would meet the Government's Energy Efficiency in Government Operations Policy that all government agencies are required to consider when leasing premises.
(6) Power: The proposed installation of a solar power generation system would mean that the building is self-sufficient for power. Any surplus power could either be sold to generate an additional income stream for the centre.

3.2.3 Environmental performance assessment

The NABERS scheme (**www.nabers.gov.au**) gives a rating (1 to 6 stars) based on the projected or measured operational environmental performance and impact of a building. The NABERS tools include energy (which rates a building according to its energy use and emissions performance), water, and waste. The NABERS website provides online calculators for interested persons to informally estimate ratings by inputting data concerning their building's features and anticipated or actual energy use. To obtain an official NABERS rating demands that an independent accredited assessor makes the rating.

The Yarrabah business centre building has been designed with the intention of achieving a 4/4.5 star NABERS rating, anticipated based on various features including those outlined above. The building is about to be initially assessed for NABERS. Estimates of energy use and emissions for the extent and intensity of activities anticipated to take place in the centre when occupied will provide the initial NABERS rating.

4 Cultural Responsiveness

During the scoping study for the proposed centre, an initial cultural survey was undertaken to record traditional knowledge about the aboriginal cultural values of sites in the project area, including any connections between these sites and neighbouring ones. In addition, local inhabitants were interviewed about their use of the land and its recent history.

A feasibility study for the project, conducted by the author, included consulting with various Indigenous organisations and examining historical documents and photographs. These investigations indicated that local tribal groups practiced sustainability and used natural materials to construct huts and shelters that were domed and circular in shape. On that basis, Indigenous knowledge and cultural values have been included into the building's design. Conceptually, the building is presented as a creative and innovative sustainable design, encapsulating the essence of an Indigenous spiritual entity by taking on the shape of a sea eagle and also containing domed and circular elements.

5 Conclusion

The proposed building represents a fusion of Indigenous knowledge/culture and modern materials/methods in an ethnoscientific approach to design, meaning that the centre will possess both cultural significance and environmental integrity. As a developing local government area, Yarrabah is establishing a long-term strategic plan for its development, and a physical structure plan for the community. The proposed business centre should provide a focus for the community in economic, social, and cultural terms, and the building should become a flagship for environmentally sustainable design and operation in the setting of a remote Indigenous community.