

PROJECT BRIEF

Title of the proposal: GREEN CAMPUS ON THE WETLANDS
University: Ho Chi Minh city University of Architecture
Country: Vietnam
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INTRODUCTION

Ho Chi Minh City (HCM City) is the most crowded city in Vietnam, and it is also an important economic center, cultural center and educational center. Although Ho Chi Minh City comprise of a small fraction of Vietnam's over all land mass, it contributes about 20% of the country's GDP and 30% industrial output. Like other cities in Southeast Asia, the city is experiencing numerous problems caused by recent climate change such as flooding. Mechanical air conditioning in Vietnam is proliferating rapidly with the economic development. It is prerequisite and can be seen everywhere in the city that make the energy consumption increasing sharply.

The Royal Melbourne Institute of Technology (RMIT) is an Australian-based university operating in Vietnam, with two campuses located in Ho Chi Minh City and in Hanoi. RMIT's "Saigon South" campus is located in District 7, on a tropical peninsula with a complex canal system, approximately 7 km from the city center.

In order to cope with the the rapid development of RMIT, a new proposal building for Faculty of Biology and Enviroment will be built near the recent campus. Under these circumstances, the new campus will be designed for sustainable design.

SITE ANALYSIS

With the river flows on two sides, the construction site has hot and humid climate with a lot of rain. Its vegetation is typical of the southern areas of Vietnam (coconut, lotus, water lilies...). The construction site has a complex canal system which is heavily affected by the tides of the Saigon River. Because of the ineffective drainage system, this area suffers heavy floods on days of high tides.

The city has a tropical climate, specifically a tropical wet and dry climate, with an average humidity of 75%. The year is divided into two distinct seasons. The rainy season, with an average rainfall of about 1,800 millimetres annually (about 150 rainy days per year), usually begins in May and ends in late November. The dry season lasts from December to April. The average temperature is 28 °C. There are two main prevailing winds : Southeast in summer and Southwest in winter.

CONCEPT

“Dừa nước” in Vietnam or Attap palm in Singapore is the distinctive plant grow in soft mud and slow-moving tidal and river waters that bring in nutrients. This tropical plant grow quickly and strongly, bring the green to the wetlands and contribute an important part of Vietnamese culture.

Its shapes inspired us to the structures and shapes of the building, which have an important part to the existing construction site. The campus and the surrounding system of lakes blend into a unified space with vivid colors of life next to a busy river in Ho Chi Minh city.

SUSTAINABLE STRATEGIES

1. COLLECTION OF RAIN WATER

Ho Chi Minh City has a large amount of rainfall every year. Rainwater is collected in the water collection system placed on the roof. Rainwater is led down to the lower level to water trees and the vegetation on the facades of the building.

2. PHOTOVOLTAIC

Using of photovoltaic panels to capture daylight energy to pump up water from central courtyard to the roof in sunny day for irrigation. This energy is also be used for the photosynthesis process of vegetation in the campus building. This overcome the problem of lacking sunlight for plants in some places in the building

3. SOLAR WATER HEATER

Solar energy is used for heating the water which is used in canteen, classrooms and laboratories

4. GARBAGE DISPOSAL

Installment of garbage collection system at all labs and classrooms. This will make the campus building more convenience for students in disposing waste, and at the same time collect the paper, water cans, plastic bottles... for recycling.

5. GREEN LAYER ON THE FACADES

The vines and vegetation growing on the facade used to reduce the temperature and the effects of solar radiation. During the day, through the process of photosynthesis, the vines will release water vapor and by doing so, they lower their surrounding temperature up to 5 degree Celsius, cooling the building facades. It also provides a refreshing look for the building, make the building blends more into its surrounding landscape.

6. WIND FLOW FOR NATURAL VENTILATION

Thanks to the shaped, building volume with opening on both side the wind flow into the building throughout. The wind flow of campus was checked by Computational fluid dynamic simulations, based on the prevailing winds of the site for case-study campus.

7. THE USE SAIGON RIVER TIDAL WATER

Taking advantage of the Saigon River tidal cycle, a system of moats built to supply water for the ponds in the building. When the tide is high, water comes in to fill the ponds and effectively change the water in the ponds automatically; water can also fill in the lower area in the courtyard, leaving only the higher walking paths visible, creating a large area of water surface which will help regulate the microclimate of the campus. It also helps to ensure irrigation for the surrounding aquatic vegetation, and reduce flooding in the surrounding area on days of high tides. The campus and the surrounding system of lakes blend into a unified space with vivid colors of life next to a busy river in Ho Chi Minh City.

8. SELF-SUPPLIED FOOD SYSTEM (VEGETABLES)

The green roof and vertical garden of louvers are also profitable to improve the internal environment of the building. For the campus, vegetables can be irrigated by rainwater on the roof top where students and staffs can grow their own vegetables for meals in the canteen and ensure food hygiene and safety.

9. SUSTAINABLE LOCAL MATERIAL

The building façade is made by bamboo and mangrove. The main structure is a reinforced concrete post-and-beam structure with non-fired brick walls. Wood and bamboo is the prefer local material by its sustainable features. Non-fired brick is used for reducing the CO₂ gases which is emitted during the traditional brick making process.

CONSTRUCTION TECHNIQUE

The plan is to be constructed on soft soil not with bearing piles but with friction stakes, since it is a low rise project with a maximum of 4 storey. The construction method is cast-in-place concrete. The new building campus is a prototype of public school typology.

The structure of farming campus is composed of reinforced concrete frame with brick wall, which is the most typical construction method in Vietnam without using special technology, nor skilled workers.