

## **Small Footprint Community Housing**

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### **Social aspects – the need of small houses**

- Small House Policy was implemented since 1972, which allows an indigenous villager to apply for permission to erect a small house on a suitable site within his own village. The small house must not exceed 700 sq ft and three storeys.
- There are 240,000 qualified indigenous villagers, while the government approves only 2500 applications each year. However, over half of the land for building small houses has been occupied. Land resource is limited, while the demand for small houses is unlimited. The housing problem of the indigenous villagers is still unresolved.

### **The choking village**

- The site is in Yuen Long, New Territories, Hong Kong, where you can find many old villages situated around the city center. The traditional thinking of having low-rise village houses is the most sustainable living does not apply here. The lack of layout planning for small houses in Hong Kong results in blockage of wind and sunlight to the streets.

### **High density and Sustainable approach**

- This thesis aims to provide an alternative solution to small house issue, in terms of shortening the waiting queue through more efficient use of resources. Also, it aims to enhance living standard of the villagers and encourage sustainable village design, while having a high-density, compact & energy efficient development. The design will act as a prototype that can apply in other recognized village sites.
- This site is a vacant land located right in front of several old villages in Yuen Long, New Territories, Hong Kong. There are no regulations to guide the overall layout planning inside villages. According to the current situation, the site will be developed into 140 small houses that are packed closely together. In order to shorten the queue for small houses, a double amount of small houses will be built on the site. However, this will only worsen the environmental problems found in the existing villages. Therefore, the way of developing the site has to be reconsidered.

### **Sustainable configurations assessment**

- First, from a test of varying building height and density, towers between 112m and 16m configurations are not suitable for the site as they cast long shadows on nearby buildings. Also, very tall towers are not financially and socially possible for this community and neighborhood. Therefore, having separate towers built on the site is not a wise approach.
- Instead, a block form was considered. Through testing on envelop to volume ratio, which affects the heating and cooling during life-cycle, the right proportion of the building could be found. For the specified volume, the building form of 45m height gives the lowest E/V ratio, where lower E/V ratio building tends to have higher energy efficiency.
- Second, building is oriented towards south to reduce direct solar heat gain whilst benefiting from diffuse day light. In order to obtain the best solar angle for installing the PV panel, the roof is inclined 20 degree towards south.
- Third, the building block is sliced in north-south direction, limiting the thickness of each block by 15 m for cross ventilation inside the building and leaving 6 m gaps in between for emergency vehicle access. This also allows the prevailing wind to pass through the site.
- Forth, sunlight at specific time in the morning and noon of a year is introduced to the ground level of the building. Shading device is added to diffuse the sunlight.
- Finally, building envelope is insulated by creating a "breathable envelope" through greenroofs and greenwalls

### **End-user Respond**

- A sustainable architecture should be timeless, ageless, continuing throughout the design stage, construction stage and also the operational stage. How end-users can continue to develop behaviors or actions that will keep the buildings and the community green is considered very important.
- Following measures are facilitated in this project
- Waste sorting facilities are provided in towers, waste that cannot be recycled will be selected to the flea market.
- Users are free to install the standard shading components to their units.

- Users are encourage to plant in the public area of the community
- The ownership of the roof top is rent to the residents for growing vegetables, the vegetable will be sell to the residents and restaurants inside the tower. The food waste will be collected and uses as fertilizer of the farmland.
- Spaces can be altered temporarily by the end-users to meet the functional requirement for festival activities. This help to sustain and reunion the clan village.
- flea market where used items will be recycled, sold and utilize collected money for community benefit
- Zoning in towers are done according to usage patterns throughout the day in order to reduce energy wastage by reducing public area energy consumption
- e.g. towers where youth live will not require public area lighting during the day

#### **Other environmental features**

- landscape consists of native plants that are not water intensive
- Landscape and public area lighting consist of LED lighting

#### **Cultural Sustainability – the continuity of clan living**

- With better living environment, and improved sense of ownership created through architectural intervention to allow traditional activities, villagers are more willing to stay and live in their own village. Hence, help the clanship sustain.