SHAPING SUSTAINABLE CITIES – HIGH-RISE DEVELOPMENT, CONNECTIVITY, PHYSICAL AND SOCIAL FABRIC

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ABSTRACT

Increased population and scarcity of land for development in Hong Kong are fundamental factors which lead to the need to develop high-rise development to meet the demand of space for various kinds of usage. Through the use of case studies, the importance of high-rise development, connectivity, physical and social fabric in achieving a sustainable city model will be discussed. Building types that will be examined include the following:

1. Mixed-Use Residential and Commercial Building
   Case Study: Double Cove, a large scale mixed use development in the sub-urban area of Hong Kong in Lok Wo Sha. Based on “living in a park” concept, a residential neighbourhood is developed with 21 high-rise residential towers, a shopping mall and extensive clubhouse facilities near the Mass Transit Railway station. Extensive greenery, connectivity to efficient transportation system and walkability through the provision of a 24-hours covered walkway are important concepts of this development. (HK BEAM 4/04 – Provisional Platinum Rating, China Green Building Council Green Building Design Label - 3 Star Award, Green Building Award 2012 – Merit Award, MIPIM Asia Award 2012 – Best Innovative Green Building Bronze Award).

2. Mixed-use Office and Commercial Building
   Case Study: Hysan Place, a high-rise office and commercial development located in heart of Causeway Bay, a major commercial district in Hong Kong which is well known for its air pollution, density of development and traffic congestion. The provision of urban windows at various levels to help improve the air ventilation for the district, an energy efficient office tower, extensive vertical shopping mall and direct connection to the Mass Transit Railway station are important concepts of this development. (HK BEAM Plus – Provisional Platinum Rating, USGBC LEED® CS 2.0 Precertification Platinum Rating, Green Building Award 2012 – Merit Award, MIPIM Asia Award 2012 – Mixed Use Category Gold Award).

Keywords: High-rise; Residential; Commercial; Office; Cities.

1. INTRODUCTION

In cities with high population where land for development is limited, high density high-rise development becomes an evitable solution to meet the demand for space to live and work.

Hong Kong has been using the high density high-rise mixed-use development model to shape its urban and sub-urban development for many years. This has been a successful phenomenon. Such high-density, high-rise developments created neighbourhoods and communities developed with an efficient public mass transportation system are environmentally, socially and economically sustainable.

Two type of such mixed-use development in Hong Kong will be examined through the use of the following case study projects:

(1) Double Cove - a mixed-use residential and commercial development
(2) Hysan Place - a mixed-use office and commercial development
2. Case Study 1 – Double Cove, a Residential and Commercial Development

Double Cove is a mixed-use residential and commercial development located in the sub-urban area of Lok Wo Sha. 21 residential towers are built around a 2-storey high podium containing a shopping mall and a large clubhouse with extensive recreation facility. The underground parking facility has provision for electric vehicle charging for use by residents as well as for visitors. A 24-hour covered walkway connects the development to the mass transit railway system.
Sustainable Design:

- Double Cove is a mixed-use residential and commercial development based on the concept of “living in a park” in a walkable community.
- To create the “living in a park” setting, ample green space is created with about 50% of the site area being designated as “green area” including an existing woodland to be preserved and the creation of an extension of the woodland plus green roof, green walls, water features and other landscape amenity areas.
- An all-weather 24-hour public covered walkway is provided in the middle of the park at the podium roof level to provide connectivity to the retail centre and the mass transit railway (MTR) for the neighbourhood. Covered walkway from the residential tower entrance lobbies at podium level connects directly to this 24-hour public walkway which enables residents to walk to the retail centre and the MTR.
- View corridors are created to minimize view obstruction to the neighbours. The residential towers are designed to create a “stepped height” profile to enhance daylight access.
- Residential towers are generally organized in pairs allowing greater separation or sky views between paired tower and the creation of high headroom open entrances for each pair of towers. These enable greater permeability to enhance better air ventilation and better air quality.
- Hybrid ventilation is adopted for the shopping mall to reduce energy use.

Environmentally, Socially and Economically Sustainable Community:

- The Double Cove development is designed to meet high green building standards under the Hong Kong Green Building Council’s BEAM 4/04 certification standard (provisional platinum rating) and China Green Building Label (3-Star). It is also the first residential development in Hong Kong to conduct a site-wide heat island simulation.
- The high density development ensures that a large residential community is established.
- The provision of a shopping mall to meet the daily shopping needs of the residents is important. The large number of residents will create a large customer base for the shops making the shops economically viable. The shopping mall will also create job opportunity for residents who may want to work close to home.
- The large clubhouse with extensive recreational facilities including a large indoor pool, a large outdoor pool, a basketball court, fitness centre and gym, bowling facility and other function rooms provides space and facilities for the community to socialise and enjoy. As most units in the residential towers are small, the clubhouse provides a much needed extension of living space for people within this community to relax and enjoy in spite of the limited private space within their own homes.
- The large park created throughout the development with lush greenery, water features, sculpture and children play areas provide yet another living space extension which also promotes an environmentally friendly, healthy community.
- The provision of the 24-hour covered walkway to the mass transit railway enable the residents of this development to connect to the rest of Hong Kong easily for getting to work, to school, to visit other shopping areas or to visit friends and relatives. The convenience of mass transit railway brings this community in close connection with other parts of Hong Kong making it a socially and economically sustainable community.
Figure 2: Double Cove – Site Plan Showing View Corridors

Figure 3: Double Cove - Building Sections Showing Stepped Height Profile

Figure 4: Double Cove – 24-Hour Covered Walkway to Shopping Mall and Mass Transit Railway
3. Case Study 2 – Hysan Place, An Office and Commercial Development

Hysan Place is a mixed-use office and commercial development located in the heart of Causeway Bay, a major commercial district in Hong Kong well known for its air pollution, density of development and traffic congestion.
Sustainable Design

- The development is a 36-storey high-rise building with a multi-storey shopping mall at the bottom and a multi-storey office on top.
- Urban windows are introduced at various levels to enhance air ventilation for the neighbourhood based on air ventilation assessment using computational fluid dynamics (CFD) technique.
- Green roof, green walls and sky gardens are introduced to help reduce heat island effect.
- Hybrid ventilation is adopted at the shopping mall to reduce energy use.
- Office floors are provided with high performance curtain wall system with light-shelves, solar shading devices and low-emissivity double-glazing to allow sufficient visible light to enter while reducing unwanted solar heat gain and exterior noise. Operable vents are installed to facilitate the use of natural ventilation to reduce energy use.
- Express escalators are provided to the shopping mall to enhance efficient circulation to bring customers faster to the upper retail floors.
- The building is directly connected indoors at the basement to the mass transit railway station to enhance the use of public transportation.

Environmentally, Socially and Economically Sustainable Community

- The Hysan Place development is designed to meet high green building standards under the Hong Kong Green Building Council’s BEAM Plus certification standard (provisional platinum rating) and U.S. Green Building Council’s LEED® Core and Shell (precertification platinum rating). It is also the first attempt in Hong Kong to integrate low level urban windows and oasis at the most expensive commercial area to encourage urban ventilation and to alleviate pollution problem which help to enhance the environmental quality of the neighbourhood.
- The high density mixed-use development with office and commercial use ensures that the office community and the shopping mall community will thrive with synergy. Office workers will benefit from the convenience of shops and restaurants downstairs while the shopping mall will benefit from the patronage of the office workers for better business.
- Direct connection of the shopping mall to the mass transit railway station at the basement enhances the use public transportation and reduces reliance on use of private motor cars. This also enhances the operation and value of the office and shopping mall as they can be conveniently reached by customers from other parts of Hong Kong using the mass transit railway.
- The trend of creating vertical shopping spaces is becoming common in Hong Kong due to the scarcity of land and high cost of shop spaces at ground level. In many commercial districts, shops and restaurants have moved into the upper floors of older buildings previously built for residential purpose since the rent for higher floors in these buildings are more affordable. However, vertical circulation in terms of lifts in these older buildings is often not sufficient to meet the increased demand. The resulting vertical shopping mall being created as an organic growth of the city of Hong Kong is surviving but not optimized due to inefficient vertical circulation. In contrast, the vertical shopping mall in Hysan Place is purposely built with express escalators in addition to lifts to enhance more efficient vertical circulation, making the shops and restaurants at higher floors more accessible and economically sustainable.
- The Hysan Place’s green roof has been transformed into an urban farm for use by the community for the growth of organic vegetable and herbs. In partnership
with local non-profit organisations, this urban farm has become an education platform for young people to learn more about organic farming and develop greater awareness of a balance lifestyle and organic living. The social benefit brought about by the urban farm is priceless.