Impacts of high-density development on the built environment in Hong Kong

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Negative Impacts Generated from High-Density Development

Hong Kong:

- Commercial developments mainly concentrate around Victoria Harbour
- Residential developments are scattered over the territory
- Citizen commuting between home and work
- Traffic congestion
- The air pollution and noise pollution are other direct results of traffic and heavy transportation
Negative Impacts Generated from High-Density Development

This type of development changes significantly the microclimate of urban areas.

The high-rise and high-density residential developments:

- Form barriers to wind flow that inhibit natural cooling by convection
- Worsen heat island effect
- Cause contamination of pollutants like dust and car exhaust between buildings and wind-tunnel effects on streets and in public spaces
Negative Impacts Generated from High-Density Development

Dense development of buildings reduces the penetration of natural lighting into the roads, streets, pedestrian walkways, and other common areas.

Public places at lower and ground level are usually darker.
Negative Impacts Generated from High-Density Development

- Traffic congestion
- Pollution problems
- Heat island effect
- Distortion of micro-climate
Traffic congestion

High density development leads to a heavy concentration of people living and working in certain urban areas.

Many people have to commute between home and work frequently, which overloads the transport system.

When the carrying capacity of the transportation network is beyond its limit, traffic congestion results.

The additional traffic creates air and noise pollutions and causes health hazards to pedestrians.
Traffic congestion

Except the railway transportation systems, nobody can predict the traffic time accurately especially when they run into congested zones like Mongkok and Causeway Bay during rush hour.

Even though there are 3 cross harbour tunnels, severe traffic congestion still exists and the congestion even extends to the inner streets of Wanchai, Causeway Bay, Yau Ma Tei and Hunghom that causes further traffic delay.

This also explains why many Hong Kong citizens have to take over 2 h commuting from home to work and vice versa everyday.
Pollution problems

Most urban areas and roadsides experience higher levels of air pollution caused by vehicle emissions. The air pollutant index always stands at high level/extremely high level in Hong Kong.
Pollution problems

Hong Kong has limited spaces, buildings, roads and/railways are situated closely together and the citizens have to face another problem—traffic noise.

Residents living next to busy roads or railways are exposed to noise levels over 75 decibels throughout the day, and they are under a lot of stress and their psychological health is also adversely affected.
Pollution problems

Apart from air and noise pollution, Hong Kong also suffers **light pollution** that is induced from residential lights, streets and advertisement signs in the street.
Heat island effect

Urban areas can easily be heated up in several ways.

Concrete, the most commonly used building material in urban areas, generates heat during hydration process and has high heat capacity, causing the urban area to reach higher temperature. The tall buildings in urban areas provide multiple surfaces for the reflection and absorption of sunlight, increasing the efficiency with which urban areas are heated.

As high density cities are often densely populated, heat generation by human activities e.g. cooking, and operation of automobiles and air conditioning units also contributes to the heat island.
Distortion of micro-climate

Form of development can significantly changes the micro-climate of the urban areas in terms of temperature, relative humidity, ventilation flow, air quality, and lighting level, which greatly influence the human comfort of the occupants.

High rise and high density residential developments form barriers to wind flow that inhibit natural cooling by convection, worsen heat island effect, and cause contamination of pollutants like dust and car exhaust between buildings and wind-tunnel effects on streets and in public spaces.

The public places at lower and ground level turn dark earlier than before because dense development of buildings has reduced the penetration of natural lighting into the roads, streets, pedestrian walkway and other common areas.
Urban renewal

Hong Kong Government attempted to adopt urban renewal to rectify the negative impacts of high-density development on the built environment.

The effectiveness of the renewal programs was not noticeable as many of them were uncoordinated, sporadic, and profit based.

To ensure that urban renewal projects can effectively improve the built environment, researchers and the Government highly recommend integrating sustainability concepts into urban renewal process.
Sustainable (Re)development in Hong Kong

In recent years, the Hong Kong Government has been increasingly interested in merging the sustainability concept into urban development policies.

The Government has clearly stated in its urban renewal strategy that sustainable development is one of the major objectives of local urban renewal plans.

However, the Urban Renewal Authority and private developers, two major parties actively involved in local urban redevelopment projects, mainly attempt to achieve economic objectives.

To ensure that environmental and social aspects are not overlooked, critical design considerations for sustaining different dimensions of the community should be highlighted.
Urban design considerations for sustaining built environment:

**Land use planning**

Factors related to zoning and land-use distribution:

- Availability and accessibility of employment and business establishments
- Provision of accommodation
- Mixed development
- Good infrastructure
Urban design considerations for sustaining built environment:

**Quality of life**

Feeling of psychological well-being of the public through urban design:

- sense of belongings of the citizens to preserve community ties
- reduce crime
- promote local distinctiveness
- facilitate public participation in policymaking
Urban design considerations for sustaining built environment: 

**Integrated design**

Integration of public and private spaces in a physical environment.

- Layout of building and streets
- Building and open space design
- Transportation modes
- Compatibility with neighborhood
- Efficient use of land & space
Urban design considerations for sustaining built environment:

**Provision of welfare facilities**

- Availability of accessible open spaces
- Public facilities
- Provisions for the vulnerable groups (disabled, elderly or children).
Urban design considerations for sustaining built environment: Conservation of existing properties

The importance of **building rehabilitation** and **heritage preservation** in improving environmental sustainability of urban renewal projects.
Conclusion

In order to establish a vibrant living, business and leisure environment, and to secure an efficient and effective uses of land resources, it is recommended having a **proper mix of uses** including office, residence, retail, welfare service, entertainment, etc. performing in mutually supportive manner.

**Quality of the built environment** should not be sacrificed for efficient land use and high density development.

**Natural lighting and ventilation assessments** should be conducted before finalizing the renewal schemes.

**Traffic impact assessment** should be carried out for large scale renewal projects to assess additional traffic generated by the renewal project.

To encourage the construction industry to contribute towards environmental sustainability, **government can consider providing various forms of incentives** e.g., tax reduction, bonus development potential, direct subsidy, etc.