Sustainable Housing for Resilient Communities: The Challenges of Affordability

The Hong Kong Housing Authority’s Experience

“Smart and Healthy within the 1.5 Degrees”

Ar Prof Ada YS FUNG, BBS, FHKIA, FCIOB
Sustainable Housing for Resilient Communities: The Challenges of Affordability
The Hong Kong Housing Authority’s Experience

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Chairperson, Committee on BIM, Construction Industry Council
Director, Logistics and Supply Chain Multi-Tech R&D Centre
Member, HKSAR Advisory Council on the Environment
Member, HKSAR Green Tech Fund Assessment Committee
Member, HKSAR Panel of Advisors for Land Sharing Pilot Scheme
Member, Sustainable Development Committee, Hong Kong Green Building Council
Member, HKSAR Occupational Safety and Health Council

Past Chairperson, Architects Registration Board (2011-2012)
Past President, Hong Kong Institute of Architects (2013 & 2014)
Former Director, Hong Kong Green Building Council (2014-2019)
Former Director and Board Secretary, World Green Building Council (2018-2020)
Hong Kong Special Administrative Region: Where are we?

Population 7.5M

Land 1,100 km²

Built up area 25%

High-rise
High density
Compact city
Subtropical climate
Hilly terrain

Hong Kong
Let’s Build a Collaborative Future for Sustainability.

World Trend for Green Buildings in 2018:
• Affordable housing as an opportunity for sustainability
• Incorporation of green building practices into social housing

Findings based on Green Building Council data from Sept 2017 to Sept 2018.)

In making cities safe, sustainable and resilient, citizens need to gain access to sustainable and affordable quality housing. Hong Kong Housing Authority (HKHA) has been creating resilient communities in a high rise, high density compact city in sub-tropical climate.

HKHA has always been striving to make rational use of resources, overcoming challenges, bringing passive and low carbon design, total quality, safety & health, sustainability from dreams to fruition. These cover process, products and people aspects.
Public Rental Housing in Hong Kong

With a population of around 7.4 million in Hong Kong Special Administrative Region (HKSAR), the Hong Kong Housing Authority (HKHA) as a public sector client / developer has been providing affordable public rental housing to around 30% of the population, and subsidised sale flats to around 16% of the population.

• HKHA has an existing stock of about 804,878 public rental flats in 1,309 PRH blocks.

• HKHA has to build about 100,000 units in the first 5-year period according to Long Term Housing Strategy.

(Source: HKHA, Annual Report 2020/21 & HA Housing Stock Statistics)

Note: According to Hong Kong Census and Statistics Department in 2021, the total number of permanent living quarters is 2,960,000, comprising 842,000 public rental housing units, 435,000 subsidized sale flats, and 1,682,000 private permanent quarters. Total number of domestic households is 2,670,000.
Our Vision
To help low-income families with housing need gain access to affordable housing.

Our Mission
• To provide affordable quality housing, management, maintenance and other housing related services to meet the needs of our customers in a proactive and caring manner;
• To ensure cost-effective and rational use of public resources in service delivery and allocation of housing assistance in an open and equitable manner; and
• To maintain a competent, dedicated and performance-oriented TEAM.
History of Public Housing in Hong Kong

The early 50s
Masses of people surged into Hong Kong due to political turmoil on the mainland. This led to a drastic increase in the number of squatters. Fires were common in these unhygienic and cramped make-shift homes.

1953
A tragic fire that broke out on Christmas night devastated the squatter area in Shek Kip Mei, making more than 50,000 people homeless overnight.

Source: Hong Kong Housing Authority > About Us > Public Housing Heritage > Public Housing Development
1954

The government immediately built two-storey bungalows on the site to provide temporary shelter to the victims.

The government set up a fund for constructing multi-storey resettlement buildings and appointed a Commissioner for Resettlement to coordinate the task.

A semi-independent organisation, the former Housing Authority was also set up to provide lower middle income families low-cost housing with self-contained flats.

**Eight six-storey Mark I resettlement blocks were completed in Shek Kip Mei to rehouse the fire victims.**

The government decided to implement a systematic resettlement programme.

Source: Hong Kong Housing Authority >About Us >Public Housing Heritage >Public Housing Development
1991
Redevelopment of the Mark I and Mark II buildings and the related rehousing programme were completed.

1992
The first series of Harmony blocks, which marked a new generation of public housing, were completed.

Source: Hong Kong Housing Authority >About Us >Public Housing Heritage >Public Housing Development
Redevelopment of the Mark I and Mark II buildings and the related rehousing programme were completed.
UIA Merit Award for Improvement of the Quality of Human Settlements 1993

Major Achievements

Permanent housing at a low rent, with secure tenure for half the population of Hong Kong, has provided the spring board for the Territory’s dramatic economic growth and its pivotal position as a key financial centre within the international market place.

Modern housing estates with educational, recreational, social, and welfare facilities immediately to hand have raised the quality and development of family life to the benefit of the community at large.

Rent arrears in public housing are less than 1% and vandalism and other measures of anti-social behaviour are almost totally absent compared with world standards.

As a result of its integrated developments incorporating commercial facilities such as shops, markets and restaurants, and the selling of flats to qualified applicants, the Housing Authority is able to fund its US$1.000 million a year capital works programme from its own income. This affords protection from Government budgetary fluctuations.

Improving the Quality of Human Settlements

Upon successful completion of Hong Kong’s Long Term Housing Strategy, including the comprehensive redevelopment of older obsolescent dwellings, the Territory will have a modern public housing stock of some 900,000 units, three quarters of which will be 15 or less years old. A remarkable step towards improving the quality of life for the people of Hong Kong.
2000

The HA undertook a series of reforms on public housing quality to restore public confidence after the sub-standard piling incidents in 1999/2000.

Source: Hong Kong Housing Authority >About Us >Public Housing Heritage >Public Housing Development
“Quality Housing : Partnering For Change”
After extensive consultation, HKHA launched a Quality Reform in 2000 with 50 Quality Housing Initiatives.
Planning & Design

Since 2000, we adopt “People-centric approach”.

Site Specific Design

- Land supply and site constraints
- Optimization of development potentials
- Planning for people; enhancing social cohesion
- Adaptive to community needs and flexibility
- Enhancing quality
- Adopting mechanized construction
Sustainable Development in Public Housing

• Since 2000, we adopt People-centric Approach
• We deliver the public housing -
  from Macro level: City planning and Urban design to maximize site potential while designing for people with nature in mind
  to Micro level: Interior space and furniture layout of the domestic flats bringing care and attention to details for quality living space and services; and applying lean design and sustainable construction
Caring for People
Caring for Environment
Planning & Design for Sustainability and Healthy Living in Public Housing in Hong Kong with a Caring Culture

Green Buildings for Everyone, Everywhere: Smart and Healthy within the 1.5 Degrees

1. Bringing Breeze and Daylight: Passive Design & Micro-climate Studies
2. Noise Mitigation to Create Quiet Living Environment
3. Universal Design for People of All Ages and Abilities
4. Improving Habitable Space; Enhancing Usability & Buildability
5. Enhancing Healthy Living, Saving Water & Improving Energy Efficiency
6. Greening for Healthy Living and Avoiding Urban Heat Island Effect
(a) Planning for People

- **Baseline performance** - Hong Kong Planning Standards and Guidelines & Statutory
- **Consult Stakeholders** - other Government Departments, District Councils and Local community
- **Comprehensive approach** – transport, car parking, community centre, social welfare, educational and retail facilities, pedestrian circulation, local open spaces and landscaping etc.

Public transport terminus and pick-up areas linked up with covered walkways and lift towers ....

Tactile Guide Path System at strategic locations of housing estates to lead people to domestic blocks
(b) Designing for People with Nature in Mind

1. Ensure public health and safety, living in comfort and convenience
2. Host of Technical studies helping designers to integrate passive design elements holistically and refine the estate layout and building disposition
3. A balanced design assuring social, economic and environmental sustainability, maximizing development potential, fast tracking the delivery of public housing
• Technical Studies for Potential/New Housing Sites

1. Air Ventilation Assessment
2. Microclimate Studies
3. Retail Viability Study
4. Project Feasibility Studies
5. Architectural Feasibility Studies
6. Site Potential Studies
7. Visual Impact Assessment
8. Heritage Impact Assessment
9. Ecological Assessment
10. Land Use Studies
11. Planning and Engineering Study
12. Environmental Assessment Study
13. Air Quality Objectives Assessment
14. Odour Assessment
15. Chimney Emission Impact Assessment
16. Traffic Impact Assessment
17. Drainage Impact Assessment
18. Sewerage Impact Assessment
19. Land Decontamination Study
20. Ground Assessment
21. Natural Terrain Hazardous Study
22. Potentially Hazardous Installations Assessment
23. Tree Survey
24. Condition Survey for Existing Building
25. Land Surveying
26. Archeological Study
Noise Mitigation to Create Quiet Living Environment

At Source
- Low noise road surfacing
- Noise Enclosure

At Propagation Path
- Noise Barrier
- Non noise sensitive building
- Acoustic Balcony

At Receiver End
- Building setback
- Flat configuration & Disposition
- Acoustic Windows

Compliance Considerations
- Value for Money
- Site & technical constraints
- Urban Design Aspect

A Balanced Solution
Barrier Free Access (Inside Flat)

- Power socket at 1m from ground
- Lever or D-type door handle
- Large lighting switch and door bell
- Appropriate height for lighting switch, door bell and power socket
- Lever type sink mixer
- Leveled entrance

Widen door width – 800mm (flat entrance) 750mm (kitchen and bathroom)
Since 2000, due to limited availability of land resources, the topography, size and configuration of housing sites, we change from Standard Block Design to Site Specific Design with Modular Flat Design.

**(d) Improving Habitable Space & Enhancing Buildability**

Functional & Cost Effective Design

(Quality Housing Initiatives)

1. Enhanced Buildability, Consistency and Economy of Scale
2. Better Healthy Living, Safety and Easy Maintenance
3. Focus on Customer Needs & continuous enhancement
4. Reinforcing Universal Design

**4 Types of Modular Flat Design**

developed in 2008 with reference to the allocation standard
(e) Improving Energy Efficiency, Saving Water & Enhancing Healthy Living

- **Renewable Energy Installation** –
  Grid Connected Photovoltaic System
  - Where feasible, we install at the upper roof and roof on lift machine room floor, generating about 2.5% energy for the communal areas.

- **Energy Saving Initiative** –
  Two level lighting design in Common Area
  - Enable high efficiency lighting and saving in electricity
  - Implemented since 2008, we maintain a minimum lighting level for safety and security; while the manual switch integrated with the door phone handset in each domestic flat and the provision at strategic positions at the lift lobby and corridors enable the required illumination level up to 85 lux
Greening offers **better air quality** and avoids **urban heat island effect**, aside from ecological and amenity value. We -

- **maximize** greening in new estates
- **planting at least one tree for every 15 flats**
- greening ratio: at least **20%** (up to **30%** for larger sites)
- providing “**Community Farm**” in every new estate

The Kai Tak Development in Kowloon City has adopted the green and healthy environment as one of the key features in the design theme of “Homes in the Park” with an overall greening ratio over 30%.
ACHIEVE SUSTAINABILITY... THINK LONG-TERM!
A Sustainable Community & Management Systems

To meet present social, economical and environmental needs but NOT at the expense of future generations.

Through the European Foundation for Quality Management (EFQM) Model, we seamlessly integrate various management principles and practices into our daily operations (deployed since 2008).

- Implementing carbon emission estimation (CEE) for buildings with life cycle of 100 years
- Annual Sustainability Reporting according to Global Reporting Initiative (GRI)
HKHA has developed Carbon Emission Estimation tool. In estimating CO₂ emission of buildings, we focus on the CO₂ emission associated with major construction materials and building operations for a building life of 100 years.

CO₂ emission of Hung Fuk Estate is compared against a BEAM Platinum Benchmark Estate (Kai Tak Site 1A), none of the aspects are exceeded.
Design for Safety: Caring for Workers & End Users

An Integrated Example – Safe Access to Upper Roof

- Upper Roof with Safe Access
- Steel Stair
- Cat Ladder - provided and located away from edge of building
- Suspended Steel Service Platform

Permanent anchorage to access lift pit
Strengthened Parapets to fix gondola

Easy maintenance for A/C
Provide railing to all roof
Space for BS maintenance
Healthy Living for People, Easy to Build & Easy to Maintain

Precast Fabrication

• **30% by volume of concrete is precast components** including volumetric bathroom, façade, staircase, semi-precast slab and additional precast elements proposed by Contractor

Standard Fittings and Design for Easy Maintenance

• **Concrete Staircase** to provide safe access to upper roof
• **Twin Water Tank System** to provide **uninterrupted** water supply to tenants when one of the compartments is being cleaned
• **W-Trap System** to avoid drying up water seal to prevent the spread of disease, waste water from wash basin/shower is directed to replenish the common W-trap connected to the floor drain
• **Stainless Steel Water Pipes** are used in common areas
**Smart Use of Materials**

**Transfer of C&D Waste Materials**
- Established an inventory on quantities of C&D materials available from each site.
- Facilitate bulk transfer between HA’s contracts.
- Over 80,000 tonnes of C&D waste have since been reduced.

**Use of Recycle Materials**
- Marine mud
- recycled glass & aggregates
- bore-logs
- GGBS
- recycled excavation rock materials

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3R Principle

- **Planning & Design**
- **Demolition**
- **Construction**
- **Property Management**
- **Recycle**
- **Reuse**
- **Reduce**
ENGAGE PEOPLE FOR RESULTS
Sharing Knowledge in Community

Community Engagement

- HA Exhibition Centre
- Website & publications
- Eco-Expo
- Community educational activities
- Community engagement workshops
Sharing Knowledge with Residents

Green Delight in Estates community educational programme
- “All About Waste” Campaign
- Waste Reduction in Estates Photo Competition
- Green Living Carnivals
- Eco-workshops, Green Days, Organic Farming Days

- We initiate Green Groups to educate our residents

Housing Channel for publicity of environmental issues
- Smart Meter - Display of communal gas, water and electricity consumption data
- Action Seedling to engage contractors and estate tenants
Sharing Knowledge in Office: Corporate Achievement

Staff Training
- We have >200 BEAM practitioners
- Direct involvement in community environmental projects
- Environmental activities – organic farming, donate used goods; reduce energy, water, paper consumption, green corner display;
- Environmental training – DCD Academy
Green Building Leadership

Our Core Values: Caring, Customer-focused, Creative, Committed

We Care
• We care for the environment
• We care for the people:

Safety Health Security
Well-being Comfort Convenience

• Together we build a sustainable and harmonious community

Key Performance Indices
• 34% less costly than private sector
• 30% less construction waste
• 75% lower accident rates

Customer satisfaction index rises, with max. of 98.1%

Please take a look at our sustainability video
http://www.housingauthority.gov.hk/hdw/video/videoshell_Environmental_corporate_Cnt.html

Please read our Sustainability Report

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Exemplary Project
Hong Kong Housing Authority’s
Hung Fuk Estate
(Quality Building Award 2018; Green Building Award 2016)
HUNG FUK ESTATE is located in a low density rural area of Yuen Long district. It is about 327m from Hung Shui Kiu Light Rail Station.

The Site and the Neighbourhood
Restaurants, banks, clinic, pharmacy, supermarket, convenience stores, schools, laundry, retail shops, post box, temporary wet market are within 500m walking distance (shown yellow on the location map).
Smart Site Planning

An Identity for a New Vibrant Community

With Considerations on
- Complicated Geotechnical Ground Profiles
- Visual Impacts to the surrounding
- Wind Direction and Sun Path
- Noise Mitigation Measures
- Pedestrian Circulation and Traffic Connection
RESPOND TO ENVIRONMENT

All Round Noise Mitigation - 99% Noise Compliance

- Noise screening structures
- Gable end walls facing main road
- Existing Noise Barrier
- Truncated building height
- Noise Screening PTI Cover
- Single Aspect Block with noise screening building form
- Noise Barrier Fin
- Noise Screening Structure with 3 m high Noise Barrier
Corridors for the WIND

To Enhance Wind:
- Two wind corridors
- Large building separation
- Orientation of blocks in parallel with prevailing wind direction
- Ground floor empty bays

Average wind speed at pedestrian level:
- ranges from 1.2 to 3.1 m/s under summer South-west wind.
- around 2.5 m/s under annual East wind.

Comparing with a baseline scheme, the design results **37.8% improvement** in wind velocity ratio within the development.
Let’s play with the Sun

Planning of Activity Space

- One basketball court is on the East and the other one on the West, both are orientated along North-south axis to minimize glare effect.
- Children Play Areas are planned on the East, as most kids play in the afternoon.
- Community Lawn Area are Community Farm planned on the West, as plants enjoy strong sunshine.
- Entrance Plaza and Courtyard are planned in the middle where community activities are always under shade most of the day.

Analysis on Sun Path and Shadowing Pattern

Photo taken at 3:30pm in Summer
Comfortable Shopping under Verandah with Natural Light and Breeze

Retail Facilities:
- 3 Restaurants
- 10 Retail Shops
- Clinic
- Supermarket
- Wet Market

Gap between buildings and street helps to make the leeward side of the area adequately ventilated at ground level.

Large canopy along the street
- No air-conditioning required for public area
- No direct sunlight exposure to the shop fronts
- Comfortable shopping experience along the STREET
The courtyard & plaza are cleverly created by linking up the covered walkway and the shopping verandah.

- It brings breeze (wind speed of 3.8m/s)
- It brings a sense of arrival
- It brings an identity to the estate
A Weather-proof Open Air Public Transport Interchange

**Courtyard design** not only brings breeze effectively, it also enhances air movement downstream helping the dispersal of pollutant from buses by natural means.

Roof cover design allows natural ventilation, penetration of natural lighting and provides shelter in wet weather.
Design of the PTI cover effectively kicks off noise impact to sensitive receivers. The solid and transparent roof pieces are cleverly tilted at an angle, and each them is not more than 230m² such that

- No installation of mechanical ventilation system is required.
- No installation of sprinkler system or any other fire services system is required.
- No artificial lighting is required in the day time.
- No energy is required for the operation of the PTI (except for lighting at night).

The cover also kick noise for future development. Upon completion, noise performance was verified by on-site measurement and the result was satisfactory.
PASSIVE DESIGN: BRING BREEZE & LIGHT
...AND ASSURING SAFE ACCESS FOR MAINTENANCE!
80% of the carpark perimeter wall is open parapet, allows for natural cross ventilation which is sufficient to remove pollutant, without any mechanical means.

8 Nos. of Solar tubes are installed at soffit of carpark to bring in natural sunlight. Photo sensors to control operation of artificial lightings are provided.

30% of the parking spaces are equipped with elec. charging facilities, conduit is allowed for 100% elec. charging parking space in the future.
Comprehensive Social Welfare and Recreational Facilities

- Integrated Children and Youth Services Centre
- Neighbourhood Elderly Centre
- Hostel for the Moderate Mentally Handicapped
- Integrated Vocational Rehabilitation Services Centre
- Kindergarten

Active Recreation Facilities
- Basketball Courts
- Badminton Courts
- Table Tennis
- Community Play Areas

Passive Recreation Facilities
- Community Farm & Lawn
- Mini-woodland
- Recycle garden
- Leisure & Cultural Activity Areas

Transport Facilities
- Public Transport Interchange
- Carpark
- Taxi & bus Lay-bys
- Signalized junction for pedestrian crossing
Passive Design Performance

Typical Lift Lobbies & Common Corridors
- Minimum air change rate at typical lift lobby under annual wind is 44.6 ACH
- Minimum air change rate at G/F entrance lobby under annual wind is 22 ACH

Domestic Flats
- Ventilation performance of every domestic flat and all common areas are carefully analyzed by computational fluid dynamic simulations
- The ventilation rates of habitable rooms and kitchens, range from 10 to 150 ACH which is well above the min. statutory requirement of 1.5 ACH

- Vertical Daylight Factor of each habitable room and kitchen for each domestic flat are in average ~50% & ~40% respectively which are well beyond requirements in APP-130 (i.e. 8% for habitable room and 4% for kitchen)
Enhanced Ecological Value
Number and varieties of wildlife species...... butterflies, birds and insects are attracted by fruits and nectars of the native trees and shrubs in the area.

Total Green Coverage Area 31%

Constraints
• Low diversity of wildlife
• Limited suitable habitats around to support diverse wildlife
• High disturbance by traffic

Opportunities
• Planting of native trees and vegetation to enhance ecological value
• 675 Nos. trees, 54% natives
• 182,708 Nos. shrubs, 34% natives
• Green roof to provide habitats for wildlife.
• Landscape design to incorporate conservation and education elements.
• Provision of Mini-Woodland, Nature Walk & Butterfly Garden
Greening Opportunities & Low Maintenance

• **Total Green Roof areas**
  ~5,000m², with native species of ground cover

• **Total Vertical Greening**
  ~400m² provided at trellis over sitting areas and basketball fencing.

• **Automated dripline irrigation system** is provided for green roofs, planters along building perimeter
"All-sand" Rootzone Profile Design for Lawn

全沙根質種植方法設計

- The sand layer provides **excellent drainage** and is resistant to compaction.
- The perched water table created at the interface of the sand/aggregate layers can **retain water** in the rootzone.
- This design facilitates the establishment of grass
- It improves the durability of lawn and reduce the need for frequent maintenance.
Reuse Demolished Materials

[1] All of the granites (1565 nos.) from demolished street planters were reused as finishes material for planter wall, fence wall and landscape paving, reducing landfill burden

[2] Building materials such as concrete tiles, steel frames, precast volumetric bathroom & precast façade mock-up were reused as educational displays in Recycle Garden
Save Every Drop of Water......

- Study on Irrigation Systems:
  1. Zero Irrigation System (ZIS),
  2. Modular ZIS,
  3. Rootzone Irrigation System,
  4. Dripline Irrigation System were carried out.

- Rain Water Harvesting System is adopted at roofs of domestic blocks 5 to 7.
- AC Condensation Water recycling for irrigation for green roof.
- Automatic irrigation with timer for plants at height.

Warm reminder in every flat.
Reduce Construction Wastes

1. **Pay for environmental and site hygiene scheme** was allowed in the Main Contract encouraging the implementation of environmental protection measures.

2. Use of precast concrete components, mechanized construction, steel hoarding to reduce construction waste.

3. **Site offices** were built by reusable components.

4. **5,365m² precast concrete slab** was reused as haul road hard paving in construction sites.

5. **Concrete batching plant** was installed on site for supplying concrete.

6. The use of metal formworks was maximized and timber formworks were reused as far as possible.

7. Existing plants from demolished street planters were transplanted to site office and hoarding for greening purpose.
Pilot Program to Recycle Felled Tree at Construction Stage

1. 200 no. existing trees were felled

2. Felled trees were cut and shredded into wood chips

3. Building contractor worked in collaboration with neighboring school, to promote environmental awareness on recycling food waste and garden waste.

4. Wood chips were used as bulking agent to mix with food/garden waste and decomposed into soil conditioner

5. 2,623 kg of compost was produced for community farming and soil conditioner

App. 2500kg Wood Chips

Reduction of 157.5 kg CO₂ emission by Tree Recycle
• **Standard flat modules** were adopted in the block design facilitating pre-fabricated products, reducing construction waste and pollution.

• **Rotational symmetry** in the layout of typical domestic floors was adopted for easier construction.

• **BIM** was used for clash detection prior to construction for minimizing abortive works and maximizing accuracy in material ordering.

• **Fair face off-form finishes** with paint to exterior and with tile/paint to interior.

• **Minimize wet trades** on site by prefabrication.
Flexible Domestic Flat Layout

Open Plan Design in domestic unit allowing flexibility to suit tenant’s need

Adjustable cooking bench with 3 different height to suit tenants’ need and to reduce wastage for demolishment

Flexible Market Stall

Open & Semi-Open Types Stall Design in wet market equipped with storage racks, hangers, light trough and signage plates creating unified impression and allowing flexibility use of space for tenants of different trades
Green Facilities for Green Living

Our Environmental Policy is to promote healthy living in a green environment.

- Educational and publicity programmes to raise PRH tenants’ and estate management staff’s environmental awareness and encourage them to join hands in building a green community are to be organized.

- Resident Satisfaction Survey (RSS) will be conducted to gauge the users’ satisfaction level and enhance the design of future estates.

Positive comments are received and reflected in Facebook page which is established by local residents.
WE ARE Caring, Committed, Creative, Customer-focused

Forerunner of the future Hung Shui Kiu new town

Building green for healthy community

Provide all the convenience of modern community living

Environmental advances and sustainable initiatives for lively estate
Enhanced social value from revitalising the last H-shape factory into a residential development

**Eco-wells:** to enhance natural ventilation and introduce daylight into residential units

**Greenery:** Over 40% soft landscaping coverage

Two-level lighting control in common corridors and lift lobbies – reduce energy consumption

Fire resistance test for existing concrete slabs – to retain the original H-shape appearance, and reduce the demolition and re-construction of floor slabs
Outcome: Happy, Healthy, Satisfied Residents

A balanced design assuring social, economic and environmental sustainability of public housing
CARING CULTURE

Human x Nature x Technology

Caring for People
Caring for Environment
Building a Collaborative Future
Sustainable, Affordable, Quality Housing for Resilient Communities

THANK YOU!
Webinar Description
Sustainable Housing for Resilient Communities: The Challenges of Affordability
UIA’s Working Programme on Community Architecture and Human Rights (CA + HR) focuses on the 11th UN SDG, namely the one aiming at “Sustainable Cities”. CA + HR, more specifically targets the objectives of providing safe and affordable housing, caring for an inclusive and sustainable urbanization, protecting the world’s cultural and natural heritage and ensuring access to safe and inclusive green and public spaces. At the same time, the issue of resilience has been, somehow operating as a great contemporary global concern, when faced with the great challenges presented by a period of continuous crises, such as the fiscal, the environmental (climate change), COVID-19 pandemic and, energy, migration et.al. It seems that the overall positive agenda of sustainability may even be compromised by the sense of urgency presented by our communities’ struggle for survival. This condition may not necessarily ameliorate without collective work on a new set of principles, methods and tools.
Considering the above, CA + HR, focuses on the issue of affordable housing, as a key to addressing this holistic agenda, and invites a set of 9 prominent speakers to share their regional and local experience in defining the current challenges and sharing innovative out-of-the-box ideas and projects. A series of three webinars will host a lively, and much needed, dialogue mapping the field and balancing the need for tactical immediate action with the planning of future strategies. This forum is designed in order to channel proved professional knowledge to young architects and students of architecture. Beyond presenting an array of successful case studies, the intention is to stimulate an inclusive and future-proof channel of communication on local action on global priorities and risks.
Average energy consumption of building services installations in communal areas designed within the year (i.e. energy estimation). These figures are:

2013/14 25.1 kWh/m²/Annum (target: 30)
2014/15 24.3 kWh/m²/Annum (target: 27)
2015/16 24.1 kWh/m²/Annum (target: 27)
2016/17 22.8 kWh/m²/Annum (target: 24)
2017/18 22.04 kWh/m²/Annum (target: 24)
Sustainable Development in Public Housing

• HKHA has introduced a series of initiatives to achieve sustainability in terms of environmental, social and economic aspects

• We have been taking an active role in improving our environmental performance with regards to energy conservation, resource conversation, air quality, and green estate and office operations

(Source: HKHA, Sustainability Report 2019/20)
HKHA has developed Carbon Emission Estimation tool. In estimating CO$_2$ emission of buildings, we focus on the CO$_2$ emission associated with major construction materials and building operations for a **building life of 100 years**.

**Green Initiatives**

- Total green planting area over **14,000 m$^2$** to reduce heat island effect.
- **327 bicycle parking** spaces are provided in the estate to encourage green living.
- **Green Corners** are provided at G/F Entrance Lobby of every domestic block and Estate Management Office.

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### CO$_2$ Emission

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<thead>
<tr>
<th>CO$_2$ Emission of Hung Fuk Estate</th>
<th>Benchmark Kai Tak Site 1A</th>
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<tbody>
<tr>
<td>% of CO$_2$ Emission</td>
<td>98%</td>
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<tr>
<td></td>
<td>100%</td>
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<td></td>
<td>95%</td>
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- **per Flat**
- **per GFA**
- **per CFA**
- **per Site Area**

CO$_2$ emission of Hung Fuk Estate is compared against a BEAM Platinum Benchmark Estate (Kai Tak Site 1A), none of the aspects are exceeded.