

Legislative Council Panel on Housing
Design of the New Public Housing Flats
by the Hong Kong Housing Authority

PURPOSE

This paper briefs and updates Members on the design of the new public housing flats by the Hong Kong Housing Authority (HA).

BACKGROUND

2. In the past decades, HA had adopted a standard-block design approach in public housing developments. Starting from 2000, due to limited availability of land resources, the topography, size and configuration of public rental housing (PRH) sites have become more complicated. To better utilise land resources, HA had gradually shifted from the standard-block design approach to a site-specific design approach for effective response to site constraints and optimisation of site development potentials. Annex A shows the development from the standard-block design approach to the site-specific design approach. In July 2013, we briefed Members on the Modular Flat Design (MFD) for public housing developments by HA (vide Legislative Council (LegCo) Paper No. CB(1)1391/12-13(01) at Annex B).

SITE-SPECIFIC DESIGN APPROACH AND MODULAR FLAT DESIGN

3. The development and relevant details about the site-specific design approach and the MFD are set out below –

(a) Site-specific design approach with non-MFD

Since 2000, HA adopted the site-specific design approach and the internal floor area (IFA) of non-modular flats followed the range set for New Harmony modular flats¹. Since 2004, HA had applied micro-climate studies for every new development at early planning stage to study the site environment and assess air ventilation so as

¹ The IFA of 1-or-2-person (1P/2P) flat was not more than 18m², that of 2-or-3-person (2P/3P) flat was not more than 22m², that of one-bedroom flat was not more than 31m²; and that of two-bedroom flat was not more than 40m².

to improve overall planning as well as the interior and exterior design.

(b) Site-specific design approach with small flats design

In 2006, HA explored and put on trial the new small flats design i.e. 1-or-2-person (1P/2P) and 2-or-3-person (2P/3P) flats². The new small flats design rationalised the ratio between kitchen and bathroom against living and sleeping areas, enhanced the universal design details and better utilised natural lighting and ventilation. The first batch of projects adopting the small flats design included Kwai Luen Estate, Shin Ming Estate and Yau Lai Estate. They were the predecessors of MFD.

(c) Site-specific design approach with MFD

In 2008, making reference to the experience of adopting non-standard flat design, HA developed a series of MFD as a production strategy for PRH. In addition to small flats design, MFD covers 3-or-4-person (3P/4P) and 4-or-5-person (4P/5P) flats. In line with the design principle of "Functional and Cost Effective", MFD further enhanced construction efficiency and progressively improve natural ventilation and lighting inside the domestic flats. Since October 2008, HA has applied MFD to all domestic blocks in public housing developments.

(d) MFD for Home Ownership Scheme (HOS) developments

In response to the resumption of the construction of HOS as announced in the 2011-12 Policy Address and with HA's objective of providing quality home, HA developed another line of MFD for HOS development in late 2011. MFD for the new HOS³ was mainly based on flat with an IFA of about 35m². Subsequently, HA standardised the IFA for this type of modular flats under both PRH and HOS developments. Since mid-2012, the said new MFD has been applied to all new public housing development.

² The IFA of 1P/2P flat was about 14 m²; and that of 2P/3P flat remained about 22m².

³ The resumption of the construction of HOS aims to assist low-income families in achieving home ownership. Having considered the affordability of families with a monthly household income under \$30,000, the first batch of newly constructed HOS flats mainly consisted of flats with a saleable floor area of 40 m² (or an IFA of about 35 m²).

MODULAR FLAT DESIGN

4. There are currently four types of MFD, including 1-or-2-person flat with an IFA⁴ of 14.1 to 14.5m², 2-or-3-person flat with an IFA of 21.4 to 22.0m², 3-or-4-person flat with an IFA of 30.2 to 31.0 m², and 4-to-5-person flat with an IFA of 35.0 to 36.1m². The relevant designs are at Annex C. On the premise of providing quality home, the flat layout, size and dimensions provide tenants with flexibility in utilising the living space. The design also adopts standardised dimensions, spatial configuration and components. Compared with previous designs, it provides internal living space of better utility.

5. All along, the design principle of public housing is meeting the basic needs of tenants with a simple and environmentally friendly approach. Except for the tiled wall and floor in both the kitchen and the bathroom, there is no other partitioning and floor furnish in a modular flat. Tenants can decide on internal partitioning and furniture layout to cater for their families' needs.

6. In addition, HA has been enhancing the overall design and details with an aim to providing a better living environment for tenants, including:

(a) On overall design

- (i) the ratio between kitchen and bathroom against living and sleeping areas is rationalised to cater for various family combinations to allow flexibility for partitioning and placing of furniture; and cross-ventilating windows are provided to enhance natural ventilation and lighting;
- (ii) although the Design Manual: Barrier Free Access 2008 is only applicable to non-domestic area, HA also makes reference to its requirement and adopts universal design comprehensively by increasing the door width of flat entrance from 750 mm to 800 mm, and provides a sunken shower area and installs power sockets at one metre above floor level to cater for tenants of all ages and different physical conditions;
- (iii) according to a research conducted after 2003 about the Severe Acute Respiratory Syndrome, a deep re-entrant of a building envelope could create inadequate ventilation. Hence, the ratio of width to depth of the re-entrant area is maintained at 1:3 or below;

⁴ The IFA of modular flats has taken into consideration the variance of the thickness of structural envelope at different levels.

- (iv) to prevent transmission of virus, W-trap System is installed in all domestic flats to ensure that the water traps will not dry up;
- (b) On detailed design
- (v) the electrical consumer unit is installed at living area for convenient use and maintenance; and more twin sockets are provided inside the flats in response to tenants' demand;
- (vi) water taps and shower head with Water Services Department's Water Efficiency Labelling are provided to reduce water consumption;
- (vii) synthetic resin kitchen counter-top is provided. Tenants can make request for adjusting its height to cater for their needs after moving in. Wastage arising from disposal of unwanted fittings could be avoided; and
- (viii) laundry rack is provided at the external façade for better exposure to sunlight; and overhang is provided to avoid nuisance from water dripping.

7. For those public housing developments which are exposed to severe noise impact, HA has explored a number of noise abatement measures to address the problem. Wing Cheong Estate in Sham Shui Po, which was completed in 2013, adopted an acoustic balcony design that could effectively reduce noise by about 2 to 6 dBA. Please refer to **Annex D** for details.

8. HA has enhanced MFD in 2015. With further standardisation of shower design, use of volumetric precast components, wider application of mechanised construction technology and precast of parts and components, the quality, cost-effectiveness, construction efficiency and productivity have been further improved.

IMPROVING THE LIVING QUALITY FOR TENANTS OF PUBLIC HOUSING DEVELOPMENTS

9. HA puts great emphasis on the harmony between the public housing developments and the environment. Whilst fully utilising the development potential of each public housing development, HA will make the best use of natural resources. HA adopts the most optimal master planning and design solution in each public housing development to cater for the micro-

climatic condition, makes good use of natural ventilation and lighting, mitigates solar heat absorption and reduces energy consumption. We build sustainable communities with comfortable, healthy and safe living environment for our tenants.

10. In recent years, HA has put more weight on environmental protection in planning for housing developments, such as reducing energy consumption and adopting renewable energy to reduce carbon emission. Since 2008, we have adopted twin-tank system which secures an uninterrupted supply of water and reduces water consumption from cleansing the water tank. We install grid connected photovoltaic system at the upper roof to generate electricity and harvest rainwater for irrigation with a view to saving water, etc.

11. In the design and planning of greening in estates, we provide tenants of each public housing development at least one square metre of local open space per person in accordance with the Hong Kong Planning Standards and Guidelines. For all new developments planned after 2010, we provide an overall greening ratio of at least 30% for sites over two hectares and at least 20% for sites below two hectares. It will help mitigating urban heat island effect and improving air quality. As a result, tenants can enjoy a healthier living environment.

WAY FORWARD

12. MFD enhances the flexibility and quality of living space and has been generally supported by PRH tenants. Lower Ngan Tau Kok Estate, which was completed in 2012, is the first PRH project adopting MFD. The customer satisfaction index for the Residents Survey conducted in 2013-14 is about 95%. The satisfaction rating for a newly completed estate in early 2014 reaches 98%. This demonstrates that our tenants are generally satisfied with the overall planning and design of the estates and individual flats.

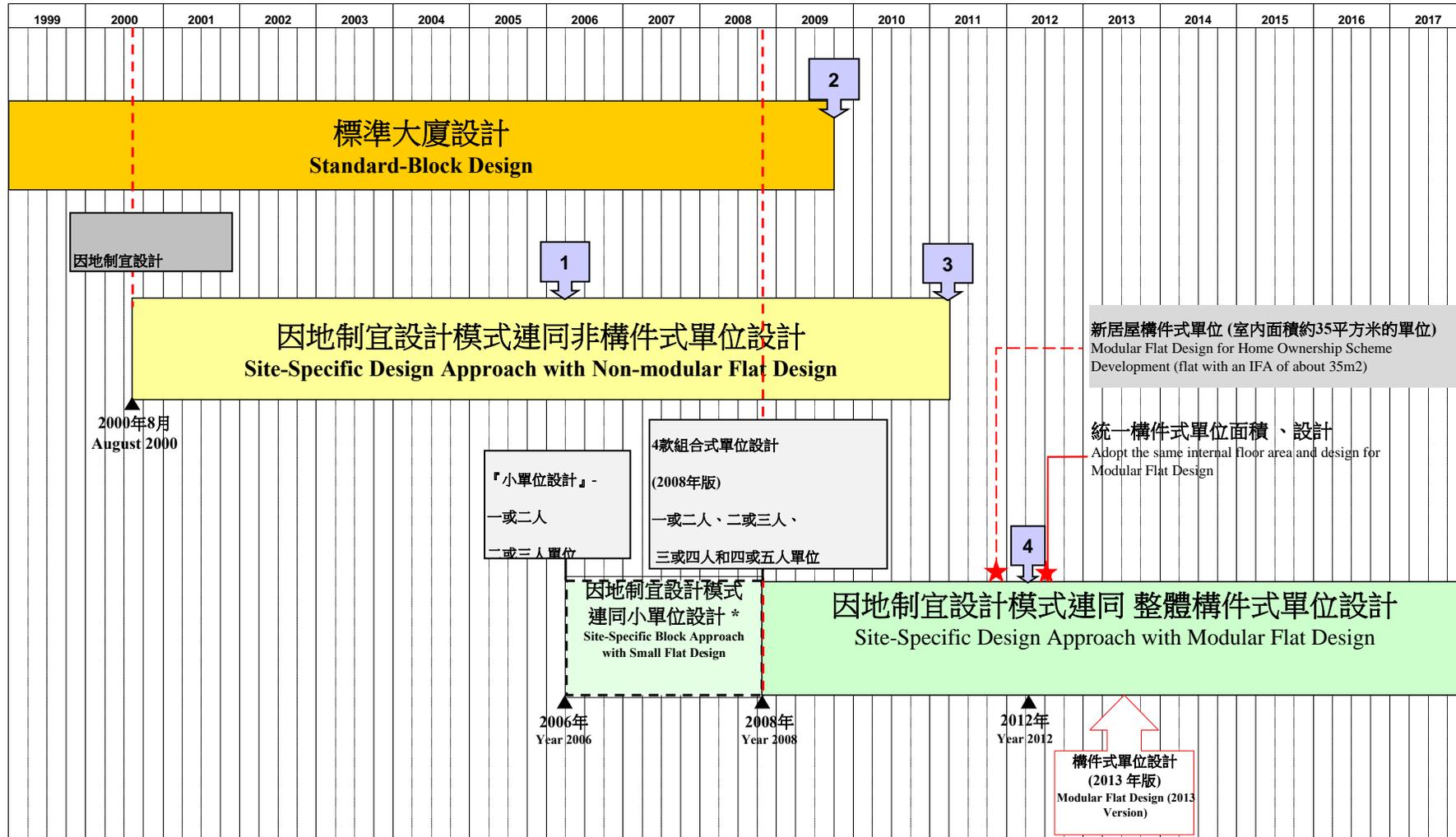
13. HA will continue to collect tenants' feedback through Residents Surveys and take on board views from the stakeholders in the construction industry in relation to design and construction of public housing in order to pursue continuous improvement of MFD. Whilst meeting the production target, HA will also put emphasis on harmonising the public housing developments and the environment, with due regards to social, economic and environmental needs as well as planning and related legal requirements.

ADVICE SOUGHT

14. Members are invited to note the content of this paper.

**Transport and Housing Bureau
June 2015**

由標準大廈設計轉為因地制宜設計模式的發展
The development from the standard-block design approach to the site-specific design approach



* 小單位設計 Small Flat Design

葵聯邨、善明邨和油麗邨為首批採用此『小單位設計』的項目
Kwai Luen Estate, Shin Ming Estate and Yau Lai Estate are the first batch estates adopting the small flat design

註1 2006年3月 - 最早落成的石硤尾邨 (第一期)

Note March 2006 - First Completed Project - Shek Kip Mei Estate Phase 1

註2 2009年5月至10月 - 最後落成的秀茂坪邨重建項目 (第十三、十四及十六期) (秀茂坪南邨)

Note May-Oct 2009 - Last Completed Project - redevelopment of Sau Mau Ping Estate (Phases 13, 14 & 16) (Sau Mau Ping (South) Estate)

註3 2011年3月 - 最後落成的沙田坳邨

Note March 2011 - Last Completed Project - Shatin Pass Estate

註4 2012年 - 最早落成牛頭角下邨 (第一期)

Note 2012 - First Completed Project - Lower Ngau Tau Kok Phase 1

Legislative Council Panel on Housing**Modular Flat Design for public housing development
of the Hong Kong Housing Authority****PURPOSE**

This paper briefs Members on the Modular Flat Design (MFD) for public housing developments by the Hong Kong Housing Authority (HA).

BACKGROUND

2. In the past decades, HA has been providing affordable public housing through standard block design. This proved to be an optimum design solution at that time. However, with limited land resources and more complex sites being used for public rental housing (PRH) developments, the HA has gradually changed from standard block designs to site specific block design since 2000.

Public Rental Housing (PRH)**(a) Site Specific Design with Non-modular Flat Design**

In 2000, HA adopted the site-specific design approach as the development strategy of PRH to enable better response to site constraints and to allow full optimization of site development potential;

(b) Site Specific Design with Small Flats Design

In 2006, HA explored and piloted 1-Person / 2-Person (1P/2P) and 2-Person / 3-Person (2P/3P) “small flats design”. The first batch of projects adopting the “small flats design” were Kwai Luen Estate, Sin Ming Estate and Yau Lai Estate. They were the predecessors of MFD; and

(c) Site Specific Design with Modular Flat Design

In 2008, making reference to a series of non-standard flat designs evolved over the years and in line with the principles on “Functional and Cost Effective” design, HA developed a library of MFD as a production strategy for PRH. Since October 2008, HA

has adopted MFD to all public housing domestic blocks specifically designed to maximize development potentials.

3. The last project adopting standard block design was Sau Mau Ping (South) Estate completed in October 2009. The last site specific block with non-MFD was Shatin Pass Estate completed in March 2011. The chronological development of the shift from standard block design to MFD is shown in **Annex 1**.

Home Ownership Scheme (HOS)

4. In line with the resumption of HOS announced by the former term of the Government in the 2011/12 Policy Address and HA's objective in providing quality homes, HA developed another line of modular flats for new HOS developments in late 2011.

MODULAR FLAT DESIGN

5. We have developed four types of MFD comprising 1P/2P, 2P/3P, 1-Bedroom (1B) and 2-Bedroom (2B) flats (**Annex 2** refers). To cater for the variance of the structural envelope at higher zones, we have rationalized the IFA range¹ for modular flats. The modular flats have been enhanced and further refined to strike a better balance amongst several factors, including the optimum use of valuable land resources, building efficiency, cost effectiveness, as well as the needs and views of PRH tenants as disclosed in the findings of the Residents Surveys. Under the Quality Housing Initiatives, the use of MFD is cost-effective and could achieve greater efficiency and productivity in housing design and construction through wider use of mechanized building process.

6. For some PRH sites which are severely affected by noise, a number of noise abatement measures have been explored to address the issue. With a view to reduce noise by about 2 to 3 dBA, we have also introduced a new family flat type with side windows under the library of MFD (**Annex 2** refers). This type of window design was first piloted in Cheung Sha Wan Estate.

¹ IFA ranges for MFD are 1P/2P (14.1 – 14.5m²), 2P/3P (21.4 – 22.0m²), 1B (30.2 – 31.0m²) and 2B (35.0 – 36.1m²).

DETAILED DESIGN ENHANCEMENTS

7. HA has been refining the MFD and exploring new potential flat designs and provisions for inclusion in the library of MFD, so as to address new statutory requirements, tenants' needs and specific site conditions. Major enhancements and features over the years include -

(a) Facilitating residents' decoration with Notional Partition Layout

We have prepared a complete range of notional partition layouts for the family flats to facilitate PRH tenants and HOS owners to install block wall partitions and laying floor screeds under the Building (Minor Works) (Amendment) Regulation 2012. We would inform tenants of relevant requirements and restrictions after they move-in.

(b) Reinforcing Universal Design for better living environment and convenience

Although the requirements stipulated in the Design Manual: Barrier Free Access 2008 only cover non-domestic flat area, we make reference to the manual and have increased the clear width of flat entrance from 750 mm to 800 mm to enhance the living environment and convenience of residents. Other enhancements measures include the provision of a sunken shower design and more power sockets at one metre above floor level to make them more easily accessible by the elderly and disabled.

(c) Enhancing design of plumbing, drainage and electrical installations for healthy living and easy maintenance

We have adopted a new design of a Common W-trap System in all domestic flats to prevent transmission of disease through dried-up floor traps. Furthermore, we have relocated the electrical consumer unit from kitchen to the living area for better access for maintenance; we have also provided more twin sockets to address users' needs.

WAY FORWARD

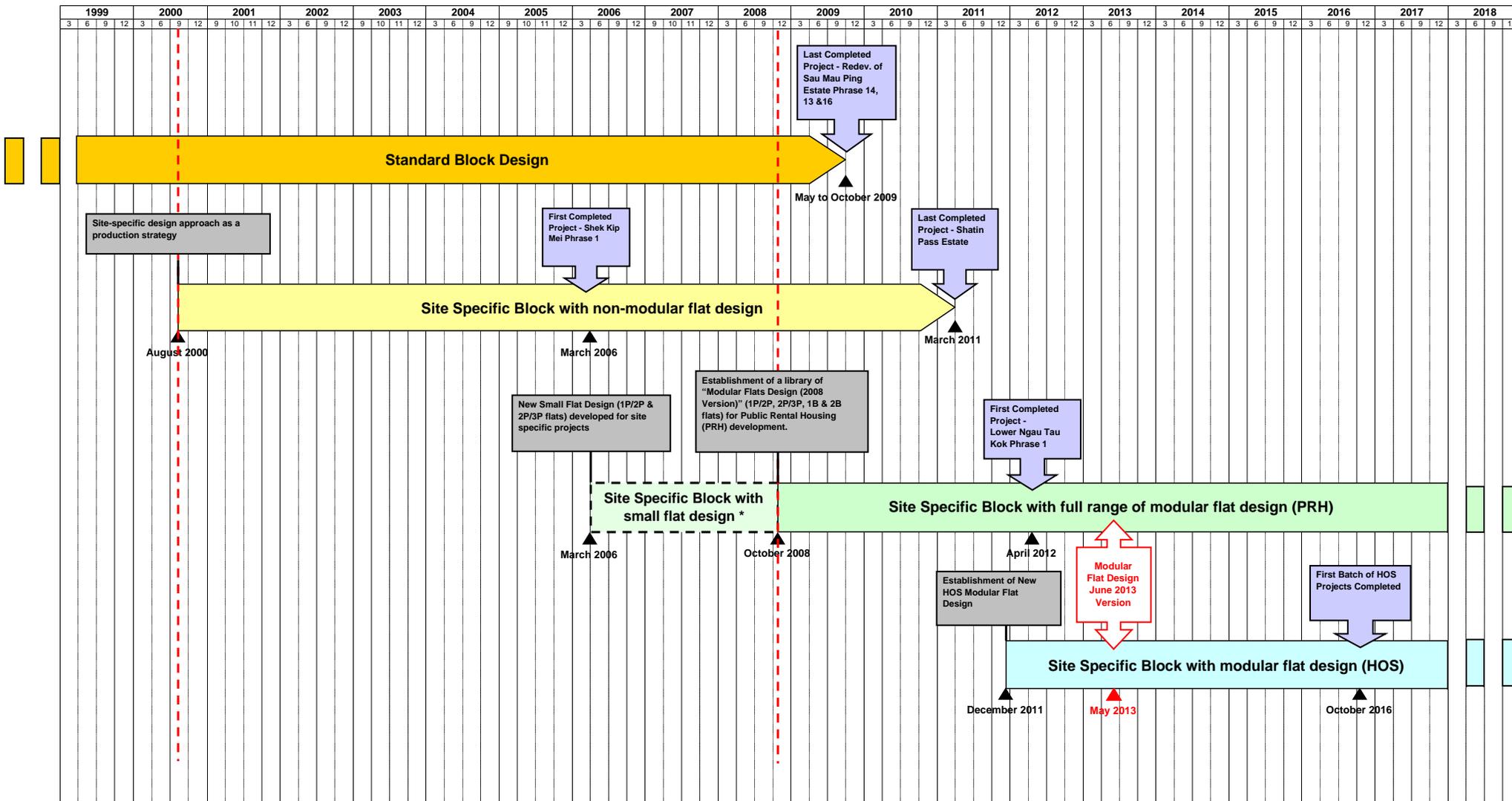
8. Given the resulting enhancement in living space and quality, the use of the modular flats is widely welcomed by PRH tenants. We will continue to collect feedback through Residents Surveys, so as to facilitate continuous improvement in the design of MFD. We also welcome views from the stakeholders in the construction industry in relation to the standardization and modularization in achieving better building efficiency and management on site.

ADVICE SOUGHT

9. Members are invited to note the content of this paper.

Transport and Housing Bureau
June 2013

Change in Hong Kong Public Housing Developments from Standard Block to Modular Flat Design



* **Small Flat Design**

The first batch - Kwai Luen Road (Kwai Luen Estate), TKO 73B (Sin Ming Estate) and East Harbour Crossing Phase 5 (Yau Lai Estate)

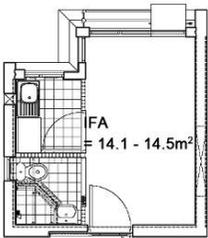
Modular Flat Design

1-Person/2-Person

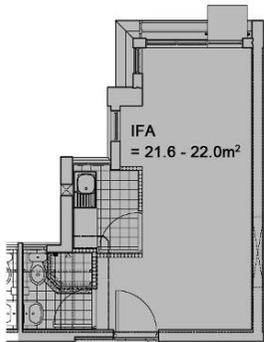
2-Person/3-Person

1-Bedroom Flat

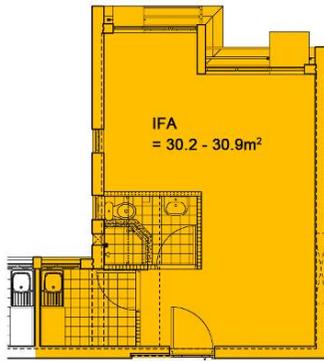
2-Bedroom Flat



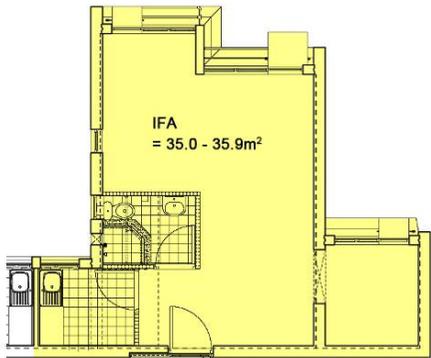
1/2P FLAT TYPE 1a



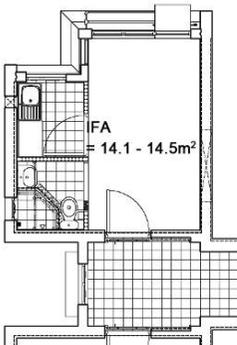
2/3P FLAT TYPE 1



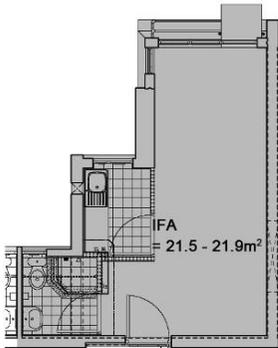
1B FLAT TYPE 1



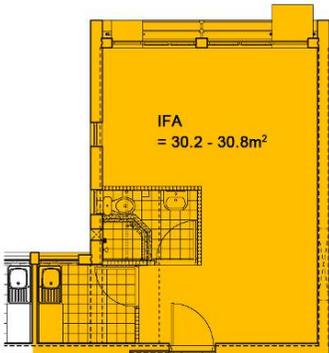
2B FLAT TYPE 1



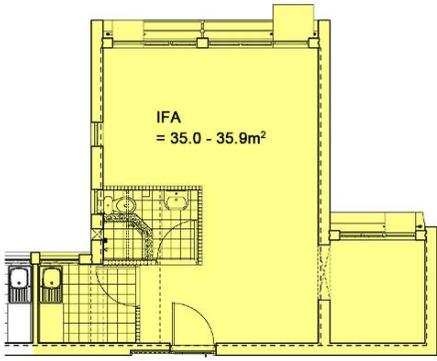
1/2P FLAT TYPE 1b



2/3P FLAT TYPE 2

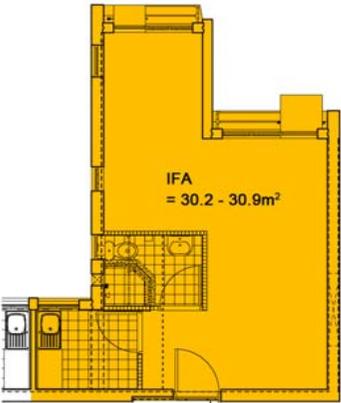


1B FLAT TYPE 2

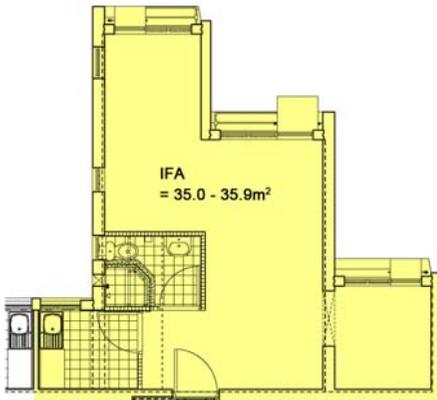


2B FLAT TYPE 2

To address severe noise abatement requirements in some public rental housing (PRH) sites, we have introduced a new family flat type with side window under the library of Modular Flat Design to reduce the noise by about 2 to 3 dBA.



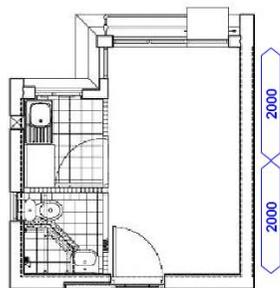
1B FLAT TYPE 3



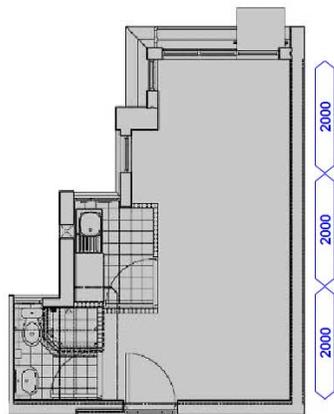
2B FLAT TYPE 3

構件式單位設計 Modular Flat Design (2015) 註 Note

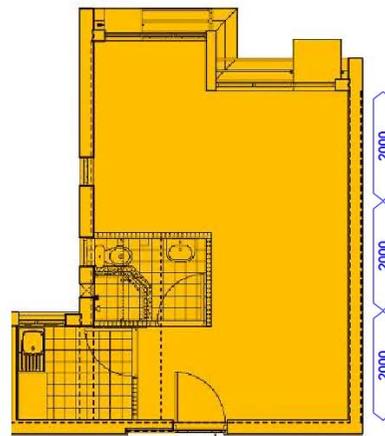
| 一人或二人單位 1-or-2-person(1P/2P) flat | 二人或三人單位 2-or-3-person(2P/3P) flat | 三人或四人單位 3-or-4-person(3P/4P) flat | 四人或五人單位 4-or-5-person(4P/5P) flat |
|---|---|---|---|
| 室內面積 (IFA) - 14.1 - 14.5平方米(m ²) | 室內面積 (IFA) - 21.4 - 22.0平方米(m ²) | 室內面積 (IFA) - 30.2 - 31.0平方米(m ²) | 室內面積 (IFA) - 35.0 - 36.1平方米(m ²) |



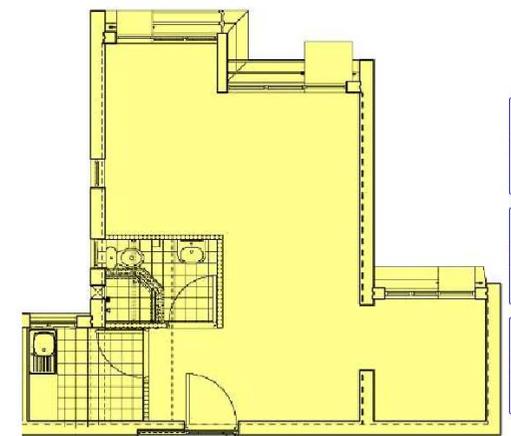
1P/2P FLAT TYPE 1a



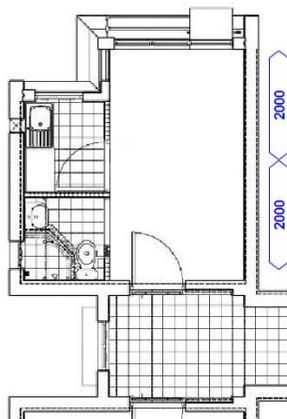
2P/3P FLAT TYPE 1



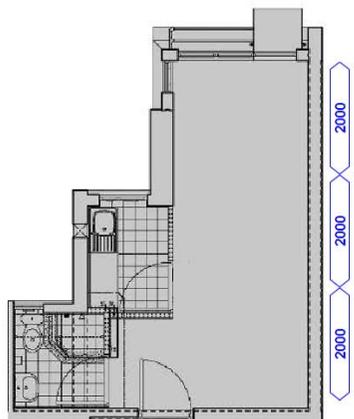
3P/4P FLAT TYPE 1



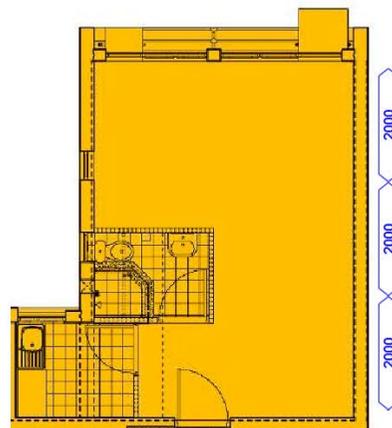
4P/5P FLAT TYPE 1



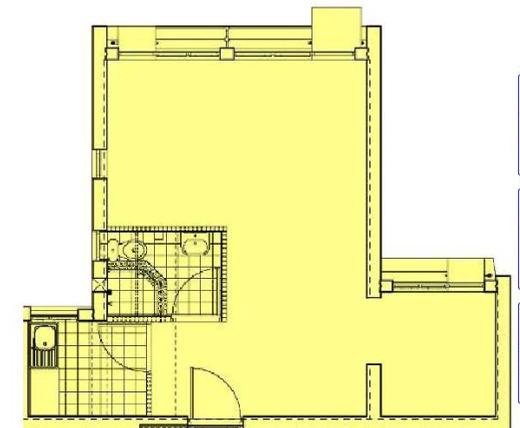
1P/2P FLAT TYPE 1b



2P/3P FLAT TYPE 2



3P/4P FLAT TYPE 2



4P/5P FLAT TYPE 2

IFA = Internal Floor Area

註 - 各單位室內面積與 2013 版保持不變。
Note - The IFA of all flat types are same as the 2013 edition.

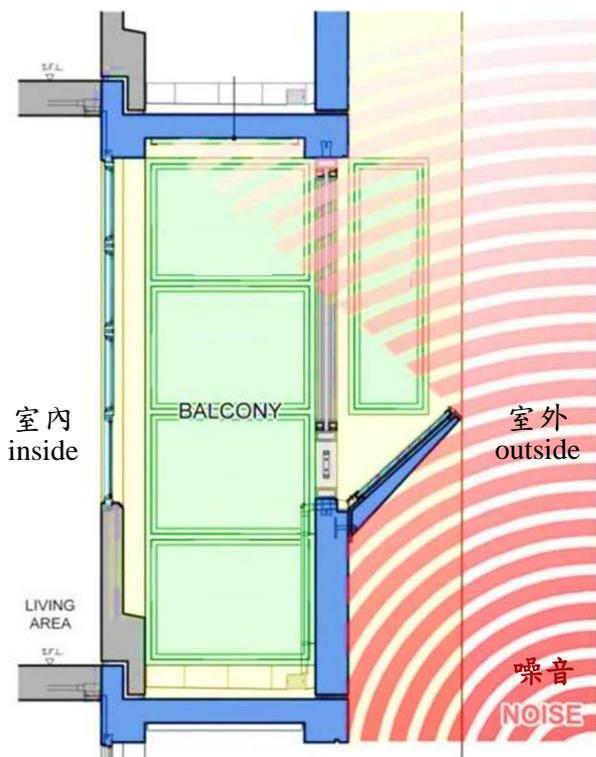
深水埗榮昌邨的「隔音陽台設計」
Acoustic Balcony Design for Wing Cheong Estate, Sham Shui Po



位置圖 Location Plan



隔音陽台 Acoustic Balcony



剖面圖 Section