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for a Better
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Building for a Better Future



The Hong Kong Housing Authority (HA) currently has over 160 public rental housing (PRH) estates under its care across Hong Kong, built in different eras. Still, the number is insufficient to support the number of people who need low-cost accommodation in Hong Kong. It is essential that we build for the future; quickly, efficiently, and in ways that optimise the space available and are fully sustainable. At the same time, many of the older estates we have inherited from the past require redevelopment or modernisation, and this has been another important aspect of our work over the year.



In terms of new building, in 2013/14 we completed construction of around 14 100 PRH flats, meeting our target for the year. A total of seven projects were completed during the year, including Tak Long Estate Phases 1 to 3, Wing Cheong Estate, Yee Ming Estate, Kwai Yat House and Kwai Yuet House in Kwai Luen Estate, and Shek Foon House in Shek Lei (II) Estate. We also completed 13 200 square metres of commercial facilities, and 470 parking spaces for cars and commercial vehicles.

Apart from these new developments, we have also been active in exploring options for redeveloping older PRH estates, with a view to optimising the plot ratio so that we can better utilise our valuable land resources and lift PRH production. During the year, we completed a review of the redevelopment potential of 22 non-divested aged PRH estates, giving us a clear idea of which sites are best suited for redevelopment. Some redevelopment work has already begun, for example at Lower Ngau Tau Kok Estate Phase 2 (the last phase of the Comprehensive Redevelopment Programme), and So Uk Estate Phases 1 and 2. Meanwhile, Tung Tau Estate Phase 8 is currently being demolished in readiness for redevelopment, and redevelopment at Pak Tin Estate will begin shortly. The Chief Executive announced in his 2014 Policy Address that the Pok Fu Lam Moratorium will be partially lifted for future development of Wah Fu Estate.

A people-centred design for better living

When designing estates, the HA builds for the future by taking into account safety and comfort, sustainability and environmental friendliness, as well as efficiency and cost-effectiveness. Both comfort and cost-effectiveness, for instance, have been achieved through the constant refinement of our library of Modular Flat Designs. With the recent resumption of the Home Ownership Scheme, we have also developed a new line of Modular Flat Designs specifically for the scheme. Our library of Modular Flat Designs currently includes a range of four flat types: flats of 14.0 to 14.5 square metres, 21.0 to 22.0 square metres, 28.0 to 31.0 square metres, and 35.0 to 38.0 square metres.

One of the refinements added to our Modular Flat Design library during the year was a new cooking bench design, which offers three adjustable heights and gives tenants a greater choice of stoves. We also increased the window area in the front façade of living areas in new projects, enhancing natural lighting. Further, we continued working with the Environmental Protection Department and academic institutions to refine design details for reducing noise at PRH sites exposed to high levels of traffic noise.



Our regular surveys of residents' responses to newly completed projects took place again in 2013/14, with surveys conducted at five estates covering 11 111 flats. A total of 1 773 interviews were carried out, revealing an average satisfaction rate of 94.58%, as compared to the Key Performance Indicator of 80%. In addition to the surveys, we held Post Completion Review Workshops in which the views of users were studied closely, and suggestions were added to our regular review for our Model Client Brief and Modular Flat Design. We also continued to hold community engagement activities during the planning and design stages of our projects, at which we listened closely to views from the community and took them into consideration in our designs. During the year, we again gained the full score of 5.00 in the HKQAA-HSBC CSR Index annual performance assessment, which clearly reflects our effectiveness in meeting our corporate social responsibilities.

1 The recently completed Yee Ming Estate in Tseung Kwan O.

2 Wing Cheong Estate in Sham Shui Po.

Designing for the environment

The Government aims to reduce Hong Kong's greenhouse gas emissions by 50% to 60% in the period from 2005 to 2020. The HA has been playing its part by using new technologies to implement green designs and systems that reduce carbon emissions from our buildings across their entire life cycle. These include the use of micro-climate studies to help optimise the environmental performance of newly designed buildings, and the implementation of the “passive design” principle, by which we harness the unique characteristics of individual sites to optimise natural ventilation and daylight. Greening is another area of importance: we provide an overall greening coverage of at least 20% of the total site area, and up to 30% for larger sites of over two hectares, and plant at least one tree for every 15 flats. We have also introduced integrated water sensitive urban design features to slow down run-off and enhance the water retention capacity of sloping sites at the Shui Chuen O and Au Tau projects. Each of our new projects is also subjected to carbon emission estimation at the design stage, which enables us to gauge the carbon emission impact of major construction and building operation activities associated with the project. Up to the end of March 2014, this important methodology had been applied to 32 projects across Hong Kong.



In 2013, we began incorporating Ground Granular Blast-furance Slag (GGBS) into our specifications for new building contracts. GGBS is a by-product of steel making, and can be used to partially replace the cement in concrete, thus reducing the carbon emission associated with cement making. From 2013 onwards, we require that GGBS should replace 35% of the cement in concrete for the construction of precast concrete façades. In addition, we are currently running a pilot project for replacing 65% of the cement in concrete with GGBS in the construction of pile caps. We are also studying the possibility of using GGBS in other concrete elements, such as precast beams, precast staircases, and precast refuse chutes.

The HA is committed to ensuring that all its new buildings comply with Hong Kong's green building assessment certification, Building Environmental Assessment Method Plus (BEAM Plus). We promulgated new specifications for our construction work in 2013/14 to make certain of this. Currently, our specifications mean that all new HA projects are capable of achieving a “Gold” rating under BEAM Plus, while selected projects even achieve the higher “Platinum” rating. For example, we obtained “Provisional Platinum” rating under BEAM Plus Version 1.2 for the developments at Ex-Au Tau Departmental Quarters, Tung Chung Area 56, Ex-Yuen Long Estate and the conversion of Chai Wan Factory Estate to PRH. In addition, we obtained “Platinum” rating under BEAM Version 4/04 for Domain and Kai Ching Estate. We also submitted some estates for assessment under the Chinese Green Building Evaluation Label. Kai Ching Estate and Ex-Yuen Long Estate are two that attained the highest (three-star) level under this evaluation system.

Managing energy consumption

One of the areas we focus most closely on for energy conservation is the range of communal building services systems at estates, which include lighting, lifts and water pumps. We regularly test and adopt new technologies and materials that can save energy and reduce carbon emissions from these facilities. Installations like grid-connected photovoltaic systems that generate electricity for communal areas, motion sensors cum manual control buttons for two-level lighting control systems, and variable speed drive controls to reduce the energy consumed by fresh water booster pumping systems, have all been introduced at our estates over the past few years.

We have also begun to install more energy efficient gearless lift motors for all our lifts, as well as harnessing regenerative power from those of our lift systems with motors of 18 kW and above. Kai Ching Estate, completed in early 2013, is the first project at which we have been able to fully adopt gearless permanent magnet synchronous (PMS) motors coupled with regenerative power technology in the lift systems of domestic blocks. The amount of energy used by these new lift systems is being monitored to see if this state-of-the-art technology can be used in all our PRH estates.

Quality certification

The HA's quality certifications include ISO 9001 certification (since 1993), ISO 14001 environmental management certification (since 2009), ISO 31000 risk management and ISO 26000 corporate social responsibility (since 2010), as well as ISO 50001 energy management system (since 2012). In September 2013, our Materials Testing Laboratory was certified with OHSAS 18001 for its occupational health and safety management system, and we plan to extend this certification to our other operations. We have also been adopting the European Foundation for Quality Management (EFQM) Excellence Model to help us make continuous improvements across our operations. Our contractors must be ISO 9001, ISO 14001 and OHSAS 18001 certified and, from January 2014, we have also required our building and piling contractors to be certified according to the ISO 50001 Energy Management System.

Since March 2012, we have been implementing product certification as a method of upstream quality control, applied to seven building products – fire resistant timber doors, panel wall partitions, packed cement for architectural use, tile adhesives, ceramic tiles, repair mortars and aluminium windows. In mid-2013, we extended the product certification requirement to three more building products: uPVC drainage pipes and fittings, close-coupled water closet suites, and mesh reinforcement. Multi-layer acrylic paint is the next building material targeted for product certification, for 2014/15.

Quality through building control

Buildings constructed by the HA are not subject to the provisions of the Buildings Ordinance before being sold or divested. The Independent Checking Unit (ICU), which is directly under the Office of the Permanent Secretary for Housing, continues to provide third-party checking of the building and structural plans submitted for the HA's new development projects. It also handles submissions for alterations and additions, and applications for minor works in the HA's existing buildings, in a process that parallels the Buildings Department's practices. Besides, the ICU is responsible for exercising statutory building control, under the powers delegated by the Building Authority, over former HA buildings, such as Home Ownership Scheme courts, Tenant Purchase Scheme estates, and estates with commercial and car parking facilities divested to The Link REIT.

Transformed from its previous role since the end of 2012, the Lift Inspection Focus Team (LIFT) continues to implement an audit inspection system to enhance safety and to reduce the risk of accidents in lifts and escalators managed by the HA.

The ICU is committed to continually improving the services it provides to the public. To this end, it has been developing its quality and environmental management systems, and anticipates obtaining ISO 9001 and ISO 14001 certification respectively in mid-2014. At the same time, the ICU has been implementing IT systems to enhance efficiency of the services provided to the public and enhancing environmental friendliness of its operation. The Housing Electronic Building Records Online System (HeBROS) and the Electronic Submission & Processing System (ESPS) are two key IT systems that have been developed during the year. HeBROS will provide building record inspection and copying services for the public by late 2014, while ESPS will enable e-submission and e-processing of the HA's new developments, as well as alteration and addition projects by 2016.



The role of IT in building design and construction

We use IT for efficient management of our design and construction operations. Our key IT resources include the Building Information Modelling (BIM), the Geographic Information System (GIS), the Housing Construction Management Enterprise System (HOMES), and the Radio Frequency Identification (RFID).

BIM generates 3-dimensional (3-D) data with high levels of accuracy, resulting in better visualisation and planning. The latest 5-D BIM model has been in use since 2012, and this model has so far been applied to our Sha Tin Area 52 Phase 1 Project. To ensure project teams can make the best possible use of BIM technology, we have also developed a comprehensive BIM Project Execution Guide and arranged a range of BIM training courses for 1 300 staff of different levels and disciplines.

For users, GIS facilitates search and enquiry for a range of spatial and textual data needed for conducting feasibility studies and identifying potential building sites. Launched in January 2013, GIS consists of three main applications: Web-based GIS, Tree Management, and 3-D Analysis functions integrated with BIM. In 2013, we implemented 15 new changes in two phases; among other enhancements, we have improved map printing,

added new searching and calculation functions, and strengthened 3-D Analysis functions. The integrated use of GIS together with BIM for civil works studies has been implemented in several projects, including Tai Po Area 9, Shek Kip Mei Phase 6, Lai Chi Kok Road – Tonkin Street, and Queen's Hill. Other 3-D models in GIS have been used to carry out visual impact studies for projects in Cheung Pei Shan Road, Tai Wo Hau and Fo Tan.

HOMES is our on-line collaboration and knowledge management platform for HA construction projects. During the year, HOMES was further enhanced with the addition of extra features such as the HOMES Mobile Site Inspection System (HMIS) and the Construction Mobile Inspection System (CMIS).

RFID uses a chip with a sensor to record and embed information in timber doors, metal gate sets, aluminium windows and precast concrete façades; enabling us to check the background and history of individual components. We have also carried out pilot projects in which RFID has been applied to monitor the disposal of inert construction and demolition material, and these have proved feasible. A tag with a unique ID is stuck on the windscreen of dump trucks, which tracks their movement from construction site to public landfill. The ability to cross-check the truck load at the site with the truck load details at the landfill has added a useful safeguard against illegal dumping.

Our Construction Mobile Inspection System (CMIS) uses the latest mobile technology to streamline the existing piling works inspection process. Site staff use a tablet with internet connection to capture and transmit inspection data and other records to a centralised server where it is stored, and various kinds of inspection reports are generated, without the need for the input of written data. Another mobile system, the Construction Mobile System for Building Works (CMSBW), is currently being developed to streamline the management of safety, quality and productivity at our building sites. Like CMIS, CMSBW allows site staff to use a mobile phone to capture and send inspection data and records to a centralised server. Mobile Apps are also being developed for other purposes, including safety alert Apps and site alert Apps. With the pre-installation of RFID tags, site staff can identify flat numbers, machinery, plant, precast components and more, in a way that streamlines their daily inspection work and boosts productivity.

Site safety

The HA's Site Safety Strategy 2013, implemented at all our new works sites, maintenance works sites, and by our property service agents, cleansing services contractors and security contractors, sets a safety goal of no more than 12 accidents per 1 000 workers. This was achieved in 2013/14, with accident rates of 7.3 per 1 000 for new works contracts and 4.1 per 1 000 for maintenance works contracts, against an average industry accident rate of 40.8 per 1 000 workers in Hong Kong.

Other safety measures introduced during the year included enhancement of our specification requirements for protecting workers from heat stroke, the roll-out of new site safety measures for storage and maintenance of large panel formwork and working platforms, and the provision of safety helmet accessories for both our works staff and contractors' site personnel, along with reflective vests for our site staff. In addition, we revised the site safety training requirements for our works colleagues and contractors' site staff to align with the training course structure adopted by the Construction Industry Council. We have recently implemented measures to enhance safety related to major construction plant at HA sites. These include strengthening the tender assessment system and the Performance Assessment Scoring System (PASS), as well as adding new overhaul requirements into tender specifications.

Safety is also an important aspect of our work in existing estates. This year we incorporated the revised Pay for Safety items for Maintenance and Improvement (M&I) contracts, revised the Housing Authority Safety Auditing System (HASAS) (M&I) to suit the characteristics of the lift industry, and reviewed and enhanced the existing Pay for Safety System to better manage the safety performance of all building services (M&I) works. We also published a Safety Guide Book illustrating both good and bad practices in work connected with lift addition and lift modernisation. For our property services agents, we included “Safety Audits” as a new element of the scoring system in tender assessments, and reviewed the tender assessment mechanism in the light of a few serious workplace safety incidents.

Procuring innovation

During the year, we successfully completed Tak Long Estate, our first project developed using what is known as the Integrated Procurement Approach (IPA), which is based on a three-envelope tendering system comprising price, technical and innovation submissions. IPA encourages collaboration among stakeholders in delivering innovative design and construction approaches. It reaps the benefits of the “Design-Tender-Build” and “Design and Build” modes of procurement, and is particularly suitable for complex and large scale housing projects. Among other benefits, IPA enables design and construction expertise to be integrated earlier and more effectively, improving productivity and quality, and promoting holistic and environmentally friendly designs and innovative solutions that can be reused in future projects. Our second IPA project, Anderson Road Site A and Site B Phases 1 & 2, is currently in progress. We are now identifying other suitable sites of sufficient scale for the implementation of IPA.





Airport transformation: Kai Ching and Tak Long Estates at Kai Tak

In 1998, Hong Kong's famous airport, Kai Tak, was decommissioned. With air travel operations moved to the gleaming new airport at Chep Lap Kok, a master plan was developed for this site of stunning potential. Since then the HA has been instrumental in its gradual transformation into a new, vibrant community space.

Under the master plan, the HA undertook two major development projects, Kai Tak Sites 1A and 1B, which involve the building of 15 high-rise domestic blocks to provide over 13 300 flats for around 34 000 residents. Both projects were developed according to the theme “Homes in the Park”, with the entire development focused on creating a sustainable community that is people-oriented and highly functional, while still remaining cost-effective.

The “Homes in the Park” estates have now been completed: Kai Ching Estate (Site 1A), with first intake in August 2013 and Tak Long Estate (Site 1B), with first intake in December 2013. Both estates include state-of-the-art elements. Many of these are sustainability features, such as the use of excavated marine mud for backfilling and paving materials, and the adoption of new green initiatives such as electric vehicle charging facilities, lift regenerative power installations, a district cooling system, and a rainwater harvesting cum root zone irrigation system. The result is that Kai Ching and Tak Long Estates are some of the most technologically advanced – and some of the greenest – in Hong Kong.

The overall planning of the development is based on a “Park Centre” concept, which involves a complete segregation of vehicular and pedestrian traffic, and a large open space with tree-lined avenues. There are also intimate Neighbourhood Gardens next to domestic blocks to encourage social interaction among residents. The laughter of children playing in the gardens is certainly a far cry from the days of jet engine roar!



Connecting communities: Kwai Shing Circuit development

Lying between Kwai Shing East Estate to the east, Kwai Shing West Estate to the west, and the two completed blocks of Kwai Luen Estate to the north, is Kwai Shing Circuit. The site is an awkward one, combining an upper platform on which sat the Kwai Shing East Interim Housing (Block 12) and a school, and a lower platform used as an open-air car park.

When redeveloping this site we had to take into account the large difference in levels between the two platforms: a 25-metre vertical jump. HA architects and planners undertook to link these levels intelligently in a way that improved pedestrian connections for the whole district, while also creating new PRH blocks and making available precious land for recreation and open space.



The decision was made to build two domestic blocks, of 39 and 41 storeys, on the lower level only, using site-specific design. The upper platform was reserved for extensive and creative transformation, including integrating the existing school into the new urban fabric. Once the old temporary housing block had been demolished, the space available was developed into a multi-purpose community area containing a community garden with a performance stage, two preserved heritage units of the old Block 12, a basketball court, a children's playground, along with fitness equipment, public toilets, a community farm and a running track.

- 1 The newly completed Tak Long Estate.
- 2 The “Park Centre” concept is incorporated into the Kai Tak development.
- 3 The Kwai Shing Circuit Development improves pedestrian connections for the whole district.

To link this new community area with the two residential blocks, a lift tower and a footbridge were built. These are open to the public 24 hours, and have done more than providing access for Kwai Shing Circuit residents to the community garden, for the walkways have opened up the route from Kwai Luen Road down to the levels below, all the way to the MTR station, benefiting everyone living in the upper district.

The decision not to build residential blocks at the upper platform has reduced the impact of new development along Kwai Luen Road, and the community garden developed instead provides a pleasant space for recreational activities for the entire neighbourhood. The Kwai Shing Circuit development thus is an ideal showcase of how the HA strives to balance the need for more PRH flats with the wider needs of local communities, and a commitment to providing good living environments and convenient pedestrian connectivity.



- 1 The Kwai Shing Circuit – covering Kwai Shing East Estate, Kwai Luen Estate and Kwai Shing West Estate.
- 2 The old Chai Wan Factory Estate building.
- 3 An artist's impression for conversion of Chai Wan Factory Estate to PRH.



From factory to flats: Chai Wan Factory Estate redevelopment

With the theme of this year's Annual Report being "Inherit the Past, Build for the Future", it is especially appropriate to highlight the HA's conservation and adaptive re-use of the old Chai Wan Factory Estate here.

This project originated as one of the 10 short- to medium-term housing and land supply measures announced by the Chief Executive as part of the drive to increase Hong Kong's PRH supply in as short a period of time as possible. Among other initiatives, historic but under-utilised buildings were identified for potential use for housing. The old Chai Wan Factory Estate building was a perfect candidate, a striking piece of architecture from its era. And yet the building was unique, the last of the old H-type factory buildings left in Hong Kong.

The HA's task was to explore the possibility of converting this historic building into a modern, comfortable PRH block. Similar to our other projects, at the earliest possible stage, we held community engagement activities to gauge the local community's wishes and expectations. It quickly became clear that the best way forward was to conserve the structure by converting it partly into premises for commercial use on the ground floor, while turning the upper floors into PRH units.

Adaptations were designed to maintain the unique character of the building with minimal intervention. "Character Defining Elements" – such as the building's H-shape and its strong, defining horizontal lines – were identified as an essence in the redesign process. Many challenges were involved in modernising the building to meet the expectations of today's tenants without significantly altering its appearance or structure. After much hard work and creative thinking, each successive problem was ticked off, and the building eventually unveiled in its sleek new format. The outcome is a building that addresses Hong Kong's housing needs for the future, and yet beautifully preserves part of its historic heritage for future generations to enjoy.

