



拓建未來 優質生活

Building for
Better Living



Growing from strength to strength was a critical challenge for the Housing Authority's (HA's) construction activities in 2012/13. Following the Chief Executive's announcement in his 2013 Policy Address of new initiatives to increase and expedite the supply of subsidised housing, we faced the question of how to lift the speed and efficiency with which we build while not compromising on quality or safety. To address this, in February 2013, the HA hosted a Workshop on Measures to Expedite Construction, with participants from all major Hong Kong stakeholders. The event identified several measures which included speeding up the planning process for certain types of land, using pre-casting more extensively, reducing some labour-intensive activities, and streamlining a range of administration processes.

Overall, in 2012/13 we completed construction of around 13 100 public rental housing (PRH) flats, meeting our target for the year and putting us on course for achieving the production goal of around 79 000 PRH flats under our five-year plan beginning 2012/13. A total of seven projects were completed during the year, including Cheung Sha Wan Estate, Lung Yat Estate, Lower Ngau Tau Kok Estate, Kai Ching Estate (Phases 1 and 2), Mei Tin Estate (Phase 4) and Fung Wo Estate. We also completed 46 000 square metres of retail facilities, and 600 parking spaces for cars and commercial vehicles. We plan to increase our production target to at least 100 000 PRH units for the five years starting from 2017/18, and will also build about 17 000 Home Ownership Scheme (HOS) flats over the four years from 2016/17, and around 5 000 HOS flats each year thereafter.

Designing for people

The HA is committed to creating sustainable communities by building safe, comfortable homes using sustainable and environmentally friendly construction materials and methods, in a cost-effective manner.

Flat designs need to be modified in response to the changing needs of tenants and to site constraints, as well as to new statutory provisions that come into force from time to time. We are always exploring and testing new flat designs for inclusion in our library of modular flats.

In 2012/13, we introduced a new cooking bench design with three adjustable heights, which gives tenants greater flexibility in their choice of stoves. We also increased the width of flat entrance doors in new projects in accordance with Universal Design principles, making wheelchair access easier. Further, we prepared a complete range of notional partition

layouts for family flats in a move to make it simpler for PRH tenants and HOS owners to install block wall partitions and floor screeds under the Building (Minor Works) (Amendment) Regulation 2012. We also addressed noise issues at some PRH sites exposed to high levels of traffic noise, by introducing a new window arrangement. The main front window of a family flat is fixed (although for cleaning and repairs, it can be opened with an Allen key), while the side windows can be opened for ventilation. We estimate that the new window type will reduce noise levels by 2 to 3 dBA.

Over the year, we continued our practice of commissioning an independent agency to conduct surveys of residents' views on newly completed projects, both to ascertain satisfaction levels and to obtain feedback on our flat designs. In 2012/13, surveys were conducted at nine estates covering 16 454 flats, and a total of 3 036 interviews were carried out. The overall average satisfaction rating was 91.99%, well above the Key Performance Indicator of 80%. Feedback from the interviewees included valuable comments on issues such as flat layouts, provision of various building services, levels of lighting in public areas, and arrangements for recycling food waste. These surveys were followed up by Post Completion Review Workshops, where customer views about the new estates were gone through in detail and the findings incorporated into the regular review process for our Model Client Brief and Modular Flat Design.

We also continued to organise community engagement workshops during the planning and design stages of our projects. These typically involved us presenting our development proposals to representatives from communities around our sites and listening to their views, to be taken into account at the project design stage.

During the year, we gained the full score of 5.00 in the HKQAA-HSBC CSR Index annual performance assessment, based on the criteria set out in ISO 26000. This achievement clearly reflects the maturity of the practices we have adopted to meet our corporate social responsibilities.

Reducing emissions at the design stage

The HA is committed to contributing fully to the Government's goal of reducing Hong Kong's greenhouse gas emissions by 50% to 60% in the period from 2005 to 2020. We are using the latest technologies to implement greener designs and systems, which will reduce carbon emissions from our buildings throughout their entire lifecycle.

Since 2004 we have been conducting micro-climate studies to help us design buildings and external spaces in ways that will optimise their environmental performance. Adopting the "passive design" principle, we harness the unique characteristics of individual sites to enhance natural ventilation and maximise natural lighting for interior spaces, while also minimising heat gain and thus reducing reliance on mechanical cooling and artificial lighting. Based on careful research on the path of the sun at different times of the year and the patterns of shade cast by buildings, we have been able to enhance air-flow through our sites and situate outdoor activity spaces for maximum comfort. We are also committed to greening in the design of our new estates. We provide a green area of at least 20% of the total site area, and up to 30% for larger sites of over two hectares, and we plant at least one tree for every 15 flats.

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Key to our success in the goal of reducing emissions is our ability to gauge holistically how public housing in Hong Kong emits carbon. We have therefore devised a carbon emission estimation methodology to suit local conditions. This takes into account the carbon emission impact of major construction and building operation activities, including carbon emissions due to materials consumed during construction, materials used for building structures, the operation of communal building services systems and building demolition, as well as reductions in emissions due to the adoption of renewable energy resources and tree planting. We apply this methodology to new projects at the design stage, giving us a good indication of each project's overall lifecycle performance in terms of carbon emission. From its implementation in 2011 up to the end of March 2013, we had applied this methodology to 19 projects.

Building Environmental Assessment Method Plus (BEAM Plus) is Hong Kong's green building assessment method. To ensure that all our new developments are BEAM Plus compliant, in 2011/12 and 2012/13 we promulgated new specifications for our construction work. At this stage, all new HA projects are capable of scoring a "Gold" rating under BEAM Plus, while certain selected projects are able to achieve a higher "Platinum" rating. For example, in 2012/13, we obtained the first ever "Provisional Platinum" rating under BEAM Plus Version 1.2 in Hong Kong for the Ex-Yuen Long Estate. We also obtained "Provisional Platinum" rating under BEAM Version 4/04 for Kai Tak Development Site 1A. Projects achieving "Platinum" rating are also expected to be ready for 3-Star certification under the China Green Building Evaluation Label System.



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Energy management

Communal building services systems such as lighting, lifts, and water pumps consume a great deal of energy during the life cycle of a building, and are major contributors to carbon emissions. For this reason, we have adopted many measures to reduce electricity consumption at PRH estates. For example, we have installed grid-connected photovoltaic systems to meet part of the communal demand for electricity, and added motion sensors for two-level lighting control to reduce the amount of electricity used by public area lighting. Recently, we also began harnessing regenerative power from those of our lift systems with motors of 18kW and above.

In December 2011 we rolled out our Energy Management System (EnMS), based on the best practice framework of the new ISO 50001. This has strengthened our ability to control and reduce PRH energy consumption. In June 2012, our EnMS was awarded the first ever ISO 50001 certificate for residential building design in Hong Kong. The ISO 50001 EnMS provides a systemic framework for verifying the energy performance of the designs of communal building services systems at our new domestic blocks. Up to March 2013, we had conducted energy baseline comparisons for 13 projects at the design stage.

Quality certification

The HA has a long tradition of gaining ISO certification to demonstrate and maintain the quality and efficiency of its various management systems. After achieving ISO 9001 certification back in 1993, the HA went on to acquire ISO 14001 environmental management certification in 2009, followed by ISO 31000 risk management and ISO 26000 corporate social responsibility in 2010. Over recent years we have also been adopting the European Foundation for Quality Management Excellence Model, which helps us see where our management systems stand and how to improve them.

We also require our contractors to be ISO 9000 and ISO 14001 certified, as well as to be certified with OHSAS 18001 (OHSAS – Occupational Health and Safety Advisory Services) for occupational health and safety management. Since March 2012, we have been implementing Product Conformity Certification Schemes (PCCS) which require product certification for seven building products – fire resistant timber doors, panel wall partitions, packed cement for architectural use, tile adhesives, ceramic tiles, repair mortar, and aluminium windows. We are progressively extending PCCS to other building products, and in 2012/13 began preparing schemes for uPVC drainage pipes and fittings, close-coupled water closet suites, and mesh reinforcement, which will be implemented shortly.

Quality through building control

Buildings constructed by the HA are not subject to the provisions of the Buildings Ordinance before being sold or divested. However, we ensure that third-party checking is carried out for safety and compliance reasons through the work of the Independent Checking Unit (ICU), which is directly under the control of the Office of the Permanent Secretary for Housing. The ICU checks all the building plans and structural plans submitted by the HA for new development projects, as

well as all plans submitted for alterations and additions to existing building projects, in a process that parallels that of the Buildings Department for private properties. The ICU is also responsible, under powers delegated by the Building Authority, for exercising the statutory building controls over existing buildings in Home Ownership Scheme courts, Tenant Purchase Scheme estates, and public housing estates with commercial and carparking facilities divested to The Link REIT.

Until the end of 2012, a separate Lift Ordinance Enforcement Unit (LOEU) carried out third-party checking and control to ensure the safety and compliance of lifts and escalators managed by the HA. A new lift ordinance that came into effect then, however, has unified the statutory control of all lifts and escalators under the Electrical and Mechanical Services Department. The function of the LOEU has therefore been changed to an auditing and training one, to help reduce the risk of accidents in lifts and escalators managed by the HA.



- 1 HA staff discussing the application of BEAM Plus.
- 2 Staff from ICU (in orange helmets) conducting a site inspection for slope upgrading works.

Quality through extended use of IT

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Four of the key IT resources we use in designing and constructing new projects are Building Information Modelling (BIM), the Geographic Information System (GIS), the Housing Construction Management Enterprise System (HOMES), and Radio Frequency Identification (RFID).

We have been using BIM since 2006, and constantly upgrading its scope. BIM generates 3-dimensional (3-D) data to high levels of accuracy, making for better visualisation and planning. In May 2012, we developed the latest 5-D BIM model, which adds to the conventional 3-D model two important extra factors: time and contract pricing. The 5-D model has been applied to our Sha Tin Area 52 Phase 1 Project, giving us the ability to make more accurate cost estimates and assessments of interim payments throughout the construction process.

GIS gives us search and enquiry functions which interact efficiently with the Lands Department's comprehensive base plans. In October 2012, we rolled out a newly expanded version of GIS, which has been custom-designed for use in developing and managing housing estates. It also includes 3-D analysis capabilities which integrate well with BIM.

HOMES is a valuable on-line collaboration and knowledge management platform for HA construction projects. It provides a common information backbone for the construction industry, storing over 700 construction projects accessible to more than 2 000 users. This makes it possible for project teams and construction operators working on our projects to access essential information on issues such as planning, programme management, contract and site management, budgeting, payments, and knowledge management.

RFID is a system that uses a radio-frequency technology chip with a sensor to record and embed crucial manufacture information in four core building products – timber doors, metal gate sets, aluminium windows, and precast concrete façades. RFID allows us to check the background and history of each individual component, giving us assurance that these components meet all quality standards.

The HA Drawing Management System (DrgMS) was launched in 2012, as the first cross-divisional IT project linking the HA's Development and Construction Division, Estate Management Division, and Independent Checking Unit. DrgMS provides a common platform for drawing management that can be used by various divisions across the life cycle of a housing development. It also makes handover of drawings after project completion a much simpler affair than in the past. Already, more than 2.8 million drawings are stored in the system.



Site safety and construction quality

One way we ensure our housing stock is durable is through extensive use of prefabricated components and precast elements. We have used elements such as precast façades, precast staircases and panel wall partitions in our buildings for many years now. More recently we have introduced volumetric precast elements, including whole bathrooms and kitchens in 3-D form. In 2012/13 we piloted the construction of a precast roof water tank, and are now reviewing and refining its design for use in future projects. We also began exploring the possibility of precasting lift machine rooms, roof parapets, manholes and drainage channels, as well as prefabricating electrical trunking. Extensive prefabrication and precasting not only improve built quality, but also cut down the generation of on-site waste, leading to a cleaner site environment. Worker safety is also improved significantly since complex and labour-intensive construction processes on site are reduced.

Our safety goal, based on the HA Site Safety Strategy 2012 and implemented at all our new works sites, maintenance works sites, and by our property service agents and cleansing services contractors, is to record no more than 12 accidents per 1 000 workers. We achieved this goal in 2012/13, with accident rates of 7.4 per 1 000 for new works contracts and 4.8 per 1 000 for maintenance contracts; this compares well with the average industry accident rate in Hong Kong of 44.3 per 1 000 workers.

During the year we enhanced our Integrated Pay for Safety, Environment and Hygiene Scheme, an incentive scheme applied to new works construction contracts to motivate contractors' performance in these areas. We also refined the HA Safety Audit Scheme (HASAS) and extended our safety audit

to lift and escalator work by introducing the HA Lift and Escalator Nominated Sub-contracts Safety Auditing System. To complement the regular audits under these schemes, we introduced the Surprise Safety Inspection Programme. Safety is also an important aspect of our work in existing estates. This year we implemented the HA Safety Auditing System (Maintenance and Improvement) (HASAS(M&I)) in district term contracts, and in contracts for redecoration, lift addition, lift modernisation and lift maintenance.

Procuring innovation

Our aim is to deliver continuous improvement in areas such as sustainability, safety, health and hygiene, environmental friendliness, quality and durability, cost effectiveness and value for money. We are now encouraging innovation in our procurement practices through the use of the Integrated Procurement Approach (IPA) which is particularly suitable for complex and large-scale housing projects, and gives tenderers scope to include unique and innovative design features in their submissions. By integrating design and construction expertise at an early stage, tenderers are often able to deliver better value and higher quality products with improved productivity. Innovations delivered under IPA can also be transferred to future projects, and passed on to the construction industry as a whole. During 2012/13, we adopted the IPA approach for the integrated Contract for Construction of PRH Development at Anderson Road Sites A and B Phases 1 and 2.

1 The volumetric precast bathrooms.

Public Housing in the City – Connected and Accessible

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When the HA begins thinking about new public housing developments, one of the key issues in our minds is how to integrate new housing blocks with each other and with the surrounding community and services. Given Hong Kong's difficult terrain and its extremely dense urban environment, this can be a major challenge. Two recent HA developments provide a vivid glimpse of how these issues are being tackled and overcome.

The recently completed Un Chau Estate Phase 5 project.



The footbridge offers a directly accessible link to the local MTR entrance from Un Chau Estate.

Un Chau Estate Phase 5

The first of these is the completed project at Un Chau Estate Phase 5. Originally separated from Un Chau Estate Phases 2 and 4 by a busy public road full of heavy vehicles loading and unloading, we reclaimed part of the street for pedestrians and established a pleasant pedestrian precinct at ground level. The precinct, including attractive community artworks and landscaping features, gives easy and safe access to the local MTR entrance.

We paid much attention to linking Un Chau Estate Phase 5 conveniently with public transport and shopping facilities. For example, we retrofitted external lifts to the Cheung Sha Wan MTR station, providing directly accessible links to the station from both Un Chau Estate and the nearby Cheung Sha Wan Estate.

Un Chau Estate Phase 5 involved a comprehensive rethinking of local connectivity that put the principles of accessibility and pedestrian priority at the forefront. The result is a vibrant, people-friendly environment that brings the community together in valuable new ways.

Anderson Road Development

A quite different challenge faced designers at the Anderson Road Development, which is currently under construction. This development is the first part of the comprehensive redevelopment of the Anderson Quarry, which will be closed down in 2013. The challenge is to turn an abandoned quarry into a vibrant, attractive and people-oriented public housing development, one which is fully accessible and well linked with the community in which it is situated.

The new Anderson Road Development will be well connected with nearby estates such as Sau Mau Ping Estate.



We carry out community engagement when planning new estates to ensure that insights from residents and users are taken into account, and this can sometimes result in unexpected value-added outcomes. For instance, during the engagement exercise for the Anderson Road Development, residents of Sau Mau Ping Estate noted that their local community hall on Sau Ming Road was old and no longer adequate for the needs of the community. Fortunately, the community hall was situated at a location suitable for use as a connection point for the pedestrian network linking Anderson Road with Kwun Tong further down the hill. We therefore took the opportunity to redevelop this site to include not only a new community hall with improved facilities, but also a PRH block and various lifts and footbridges connecting existing facilities both uphill and downhill from the site.

We took a holistic approach to the problem, resolving to design access ways to the new Anderson Road Development that would connect its community facilities and public open spaces, by a series of uninterrupted pedestrian links with nearby HA estates, including Shun On, Shun Tin, Sau Mau Ping and Po Tat Estates, as well as to the city further down the hill. The result will give a new dynamism to the entire area, as the separate estates are linked together into a unified and revitalised whole. The pedestrian network will also connect the domestic blocks to transport networks and retail and community facilities, with the ultimate purpose of providing safe, convenient and barrier-free access to residents of all ages and abilities. Included in the design are covered activity areas along the pedestrian network that offer places to rest, facilities such as playgrounds and exercise equipment, and heritage displays.

A model of the Anderson Road Development project.

