

# **The Environmental Elephant**

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## **Abstract**

The Housing Authority is tasked with constructing half a million homes by the year 2007. It already houses half the population of Hong Kong. In 1999 the Housing Authority approved an environmental policy and a strategic framework for implementing an environmental management system. The paper traces the evolution of public housing, the need for the housing programme, and the impact it will have on the lives of the people of Hong Kong and on the environment. Against a backcloth of conflicting demands, the response to environmental issues is explored, as the Housing Authority has initiated the transformation from a re-active approach towards the environment to a pro-active one.

## **Background**

In 1946 the population of Hong Kong was 600 000. It is now 6 million, and with this growth has come rapid economic development that has been based on Hong Kong's one natural resource, its people. By removing concern over the fundamental need for housing, and by making it affordable, a stable backcloth has been created for economic development. A fire in a shanty town on Christmas eve 1954 left 53 000 people homeless. For the first time the Hong Kong Government was goaded into providing housing, which had until then been considered as the domain of the private sector.

## **Living communities**

In the year 2000 the Hong Kong Housing Authority will be producing over 90 000 flats. An average of one every 5½ minutes day and night. Production will average 50 000 flats a year for the next decade. Over 180 000 flats are under construction at any point in time. Over the next five years \$130 billion will be spent on housing construction. The Housing Authority budget represents 3% of GDP.

With an existing stock of 880 000 rental and home ownership flats housing 3.2 million people, the Authority claims to be 'one of the world's largest home-makers'. It creates and develops communities. It sells flats and it rents them. The Authority owns shopping centres, schools, sports and community halls, factories, and multi-storey car parks. Facilities range from kindergartens and youth centres, through to old aged people homes, and medical clinics. Banks, restaurants, markets, playgrounds, tennis courts, post offices, supermarkets all contribute to the estate community.

Housing management and maintenance is taken seriously. Estates are living communities functioning round the clock 365 days a year. Over 9 000 staff are employed on the management of the estate. Housing estates age, family patterns change as children grow up. Facilities need to match the demographic shifts. Estate improvement programmes are needed. Older estates become obsolete as social patterns change, and as designs and facilities of new estates evolve.

## **The Evolution of Public Housing**

As the population in the 1950's exploded, the priority was to produce homes that were secure from fires, typhoons and landslides. Homes had to be built quickly and in large numbers. The solution was the mark I/II blocks. Seven stories in height, a typical block contained 300 flats 11 sq. m. in size. The space allowance was 2.4m<sup>2</sup> per adult, and half that for children. Shops on the ground floors, schools on the rooftops. Facilities were basic, toilets and bathrooms were communal, cooking was carried out on the public access balconies. Power was limited to 2 Amp per flat. There were no lifts or refuse chutes.

The sixties was a time of economic prosperity and turbulence. Growth of Gross Domestic Product (GDP) was in double digits, as the economy expanded. By the mid 1960's, population densities in public housing estates had increased to 4 000 persons per hectare. Between 1964 and 1967, there was a building boom. In the space of three years, public and private housing production tripled and hit a peak of 50 000 flats a year.

The sixteen storey Mark III-V public housing block designs had evolved. Buildings usually contained 650 flats housing 2 600 people. A corridor with flats on each side ran down the spine of the building, and replaced the balcony access of earlier designs. From 1965 flats were self-contained comprising one room, a shower/toilet; and a utility balcony that was used as a kitchen. With increases in building height came the need to provide lifts and pumped water supplies. There were separate fresh water and salt water (for toilets) supplies. Provision of power to flats increased to 4-6 Amp.

If the 1950s and 60s provided the platform for future prosperity, the 1970s was the economic springboard that propelled Hong Kong into the world arena. This wealth continued to fund the Government led housing initiative. In 1973, the Housing Authority was formed. It was tasked with building homes for a further one million people

within ten years. The initiative was to provide public housing development with a second wind. There were considerable challenges. In the 1950s and 60s public housing replaced many of the squatter areas that ringed urban Kowloon. By the 1980s three new towns weaned from the sea became the focus for development.

The twenty-two storey twin tower, 'H' and cruciform blocks were the standard. There was another major change. In providing public housing, the needs of the community were not just limited to homes. From seeds sown in the 1960s, shopping centres were provided in each estate. Community and welfare facilities, multi-storey car parks, sports centres and secondary schools all started to appear.

The decade had been marred by a series of disastrous landslides that resulted in considerable loss of life. Roofs at that time had a life expectancy of only eight years. Standards of thermal insulation to roofs were improved in response to pressure from early public housing interest groups. The use of asbestos cement tiles to solve the problem was to backlash a decade later and led to a comprehensive asbestos management programme.

Another concern was that of power failures. The insatiable thirst for power was to plague housing management until the 1990s. Surveys indicated that increased ownership of electric fans, radios, sewing machines and rice cookers were driving demand. The demand attributable to ownership of washing machines and air conditioners was still a decade away. Television necessitated installing communal serials to 60 000 homes a year. Thousands of asiatic squatting pans were replaced with pedestal toilet pans.

The real issues were, however, related to the emergence of social obsolescence in buildings not yet a decade old. Flats were not self-contained. In 1972, it was decided to start redeveloping the Mark I/II blocks. They were obsolete. In parallel, a rehabilitation programme was also initiated, some 2 000 flats a year were modernized as kitchens and toilets were added. Even this was not fast enough, a 'toilet and tap' scheme provided an interim solution by converting communal toilets into one per family.

By the 1980s, the problem of struggling to increase housing production had eased, and quality control improved. The fledgling Housing Authority was growing up. A new range of professional skills became available within the Authority, town planners, landscape architects, civil and geotechnical engineers being examples. The Trident block was the design that responded to the 1980s. At 32 stories, it was designed for rent or sale, the first building to do so. By changing the end flat configuration of block wings the range of flats sizes could be varied. Structural durability of the older estates had by now become a serious consideration. Quality control was imposed with increasing vigor. Power supplies increased to 12-16 Amp per flat.

A major change to estate layouts took place. The space between buildings were designed with increasing care. There was vehicular and pedestrian segregation. By now, estates catered for a wide range of needs. Education facilities ranged from kindergartens, and primary schools through to secondary schools. Housing included sheltered, and homes for the elderly. Special facilities including drug addictions, and handicapped were provided.

Recreation ranged from the toddlers playgrounds to multi-purpose sports facilities. There were signs of distinct demographic shifts, from housing large nuclear families to couples and singletons. There was a clear downward trend in family and household sizes. The trend required more flats and land to house the same number of people. The learning process continued. Some new towns suffered from mismatches in the timing of provision of educational transport and commercial facilities with the provision of housing.

Environmental initiatives started to evolve. In 1984, a full time energy management team was established. energy data was collected and targets set each year. Payback periods drove the programs for reducing energy use. The motivation was economic. Even in 1984 the energy bill for stairs and corridors was \$114 million. In the same year use of all types of asbestos were banned. Working together with government and consultants, the Authority spearheaded asbestos management systems and asbestos encapsulation and removal techniques. Air quality was paramount, and sound maintenance practices were stepped up in the wake of the threat of Legionaries disease. Check meters were installed to detect water leakage. The Authority was the first to introduce television drainage surveys on a wide scale in the late 1970s, and by 1980 they had become routine. The 1980s saw the application of the first environmental impact assessments to public housing.

Structural repairs dominated maintenance in the 1980s. The trigger came unexpectedly. In 1980, Kwai Fong Estate was only seven years old. Part of a floor slab collapsed during repairs. The incident was to launch what was arguably the world's most extensive structural repair programme of buildings. In 1986, it was decided to demolish 26 blocks housing over 70 000 people. A further 374 blocks required repairs. The structural problems were to have a profound effect. Durability and life expectancy of buildings became a real issue. In 1987, a 15 year Long Term Housing Strategy was announced. One million flats were to be built, 600 000 by the public sector. 500 buildings were to be redeveloped comprising almost all flats constructed prior to 1972.

The 1990s is a period of political evolution and change. In 1997, the sovereignty of Hong Kong reverted to China. Half the population of Hong Kong live in public housing. They form a major voice in the community. With increasing wealth has come much higher expectations. Residents Associates (known as EMAC), District

Boards and the evolution of the Legislative Council all have an interest in the evolution of housing.

The design of the standard 36 storey Harmony block shifted the focus to quality, reliability and buildability. It went back to basics. In addition to dimensional coordination, one, two and three bedroom flats can be stacked into a variety of building shapes and heights. Power supplies increased to 22-24 Amp per flat. In designing the Harmony block, a deliberate attempt was made to reduce construction waste. Dimensional coordination, modular design, use of precast facades and dry wall partitioning, as well as factory produced components such as doors, all facilitate waste reduction. Timber was targeted. Although studies indicated that the Housing Authority used less than 5% of the timber imported into Hong Kong, large panel formwork replaced timber, and timber hoarding of sites was eliminated. OTTV calculations were used to develop the design of the building envelope. Window areas were reduced. The 42 storey Concorde block will straddle the next century.

In response to the Noise control Ordinance, a Noise Control Team was established tasked with noise reduction in existing estates. With land at a premium, single aspect blocks were developed to shield estates from the noise impact of roads surrounding estates. The Authority took an early lead in the investigation of the impact of radon in public housing estates. It also eliminated the use of CFCs, HCFC's and halons.

### **Hong Kong in Transition**

In 1997 the Chief Executive set two targets. Produce an average of 50,000 public sector flats for the next decade, and at the end of that decade 70% of families in Hong Kong should own their own houses. The same year the Long-Term Housing Strategy was rolled forward. It provided the vehicle to reduce targets waiting times for public housing from 7 years to 3½ years. There would be an increasing emphasis on the aged and those in need. The environment was on the political agenda.

During a debate a Member of the Housing Authority once described the Authority's approach to the environment as similar to an elephant 'slow and ponderous', but he added that like an elephant 'once on the move it is unstoppable'. In 1999 the Housing Authority approved an environmental policy and has agreed a strategic framework for an environmental management system. The Authority's commitment to the environment is on the move, and it is unstoppable.

Environmental impacts have been identified, strategic goals and performance indicators have been identified. A decision-making framework has been put into place, and the Authority will publish an annual environmental report. Training and awareness has been stepped up, an example being the environmental component in all induction training. The Authority is about to target procurement practices, information systems and audit.

It is, however, the 'sharp end' that is really important. Through careful design, Housing Authority buildings use 24% less concrete and 17% less steel per square metre than comparable private sector designs. There has been a substantial reduction in the use of timber through the use of large panel formwork, precast components and metal fencing. Segregation of material on our demolition sites means that 97% of materials can be used for reclamation or recycling, rather than being dumped in precious landfill sites. Buildings are designed for thermal efficiency, and automated refuse collection systems have a standard provision on most new estates. Water wastage is being reduced through water saving devices and leakage surveys.

The Authority is taking a lead role in increasing the community awareness of the environment. A 'healthy living' campaign targets cleanliness in estates and markets. There is an annual waste recycling campaign. Recycling bins are a feature of all estates. New building designs will facilitate segregation of waste on each floor. The green environment campaign draws in the community in planting trees and shrubs.

A number of issues need serious attention, including waste reduction emanating from the construction process, and from tenants decoration. Construction noise is a major target. The Authority has assisted in the development of the environmental assessment system, HK-BEAM for residential buildings. Two estates have been used in the pilot assessments, and it is Authority policy to rate all estates in future. The assessments drive the 'sharp end' they drive improvement on a project by project basis.

### **Conclusion**

In the first four decades of public housing, over one million homes have been built. 53% of the population lives in public sector constructed housing. It has been at a price. Building heights have increased at a rate of ten stories a decade. Power supplies have doubled each decade. Early estates scarred the hillsides surrounding the urban areas. Later new towns filled the sea. Improved living standards means we need twice as much land to house the same number of people. Without public housing the quality of life for most of the population would have declined. Public Housing has provided decent homes at affordable rents. It has controlled the rampant spread of the shantytown.

It is not possible to detail all initiatives taken by the Housing Authority. It is fair to say that many of the Housing Authority initiatives have been driven by economic, health or legislation. It is also fair to say that Public Housing responds to the social and economic needs of Hong Kong. These aspirations change over time and so too does

Public Housing.

The Housing Authority is a responsible developer. The Authority mirrors the social aspirations of the times, it does care. It is sometimes easy to forget the hundreds of thousands of people patiently waiting for a decent home. It is sometimes easy to forget those in need. Providing for that need will inevitably destroy part of our environment. It is essential that this impact is reduced.

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