



Hong Kong Housing Authority

# Far More Than Just Pretty Pictures

**Project:** Towards Customization with Standard Modular Flats in Mass Housing Design

**Location:** Hong Kong

**Type:** Public Rental Housing

**Scheduled for completion:** 2009



There are increasing numbers of housing projects being built with demanded quality from the public. There are new projects being designed by using BIM models which have helped optimising the living environment in Hong Kong.

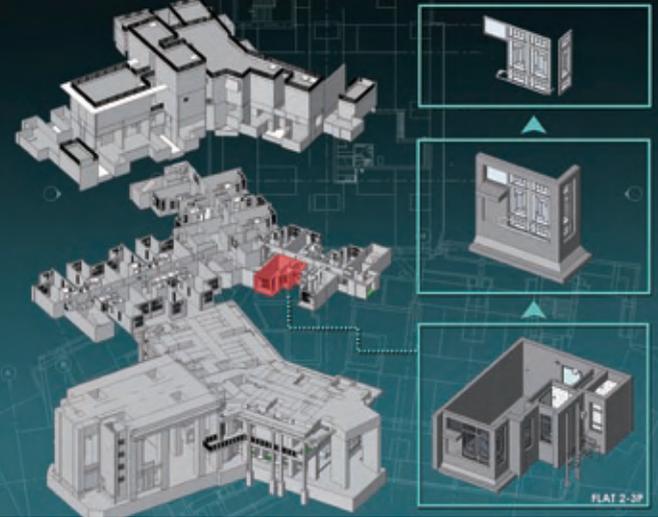
### **More user friendly**

The Housing Department is by no means a newcomer to using 3D software in building design. As early as 1993 the Department began using 3D graphical solutions. The feedback was good, especially from architects, who could visualise designs on computer screens. The software was quite versatile at that time but lack of the intelligent modeling features of BIM nowadays; required strong technical and typing ability, and was not Y2K compliance. Hence, the Department has sought a different solution in recent years.

BIM has started to boom three to four years ago, and the Department tried various software available in the market, including Autodesk Revit, to see if it could be applied in the office. The technology is more affordable now, making it readily available to build models. The hardware, software and ease of use have been improved since then.

Autodesk Revit is considered more user friendly for architects, who can use it on their own. They usually start by producing models used for visualizations – it is possible to walk through a building, assess perception views, and





**BIM models can quickly be built and evaluated in accordance with site specific requirements.**

conduct design studies. The software is intuitive and capable of showing changes almost instantly.

### **Standardization**

The Department designs and constructs domestic blocks using standard modular flats to safeguard building quality and standard. BIM models help to assemble modular flats of different sizes, mixing and matching them to suit site conditions and requirements.

To allow more flexibility and achieve efficiency and effectiveness in building design, standard modular flats had been developed for project teams to customize flat types, layout and storey height to meet their configuration requirements and project needs.

Apart from developing modular flats, the Department developed BIM standard

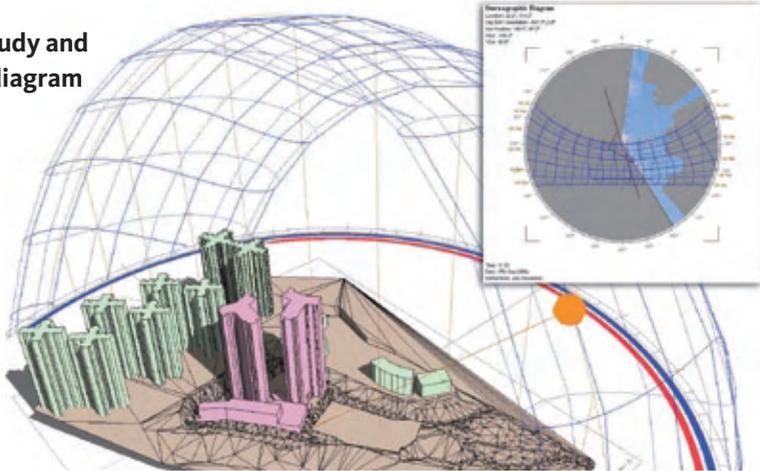
component library and compiled the “BIM Design Guide” and “BIM User Guide” as standards and reference manuals to be followed by project teams. BIM models can be easily and quickly built, and evaluated in accordance with specific site requirements.

Project teams followed in-house developed BIM manuals to assemble “site specific” domestic blocks using standard modular flats as well as components, such as stairs, lifts from the BIM component library.

### **Sustainable Design**

The Department used to design buildings using 2D software which made it difficult to visualise the context relationship, such as topography and surrounding buildings. With the help of BIM, it is easy to conduct environmental studies such as lighting, ventilation, energy

## Shadow Study and Sun-path diagram



consumption, carbon emission, green design, etc.

Using Autodesk Revit building information models, the Department can assess micro-climates for planned buildings in a more scientific manner, like design options with enhanced ventilation can reduce the need for air conditioning. It is also possible to design landscaping – such as providing sunny sitting out areas for residents during winter, whilst seeking to ensure these areas are mostly naturally ventilated and under shade during summer.

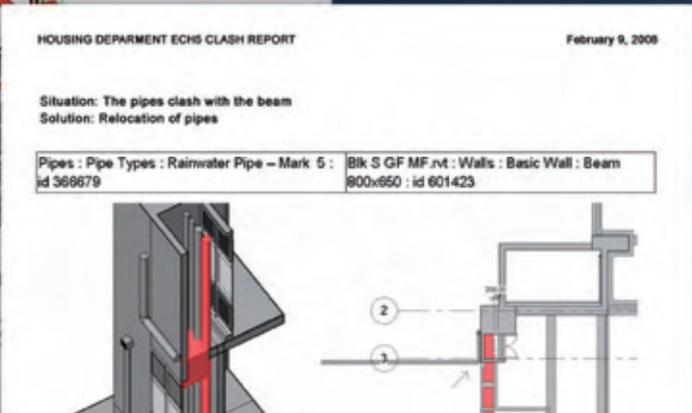
### **Environmental Friendly Construction**

The BIM models also help the Department to detect clash in design. This is important in fitting together the modular flats. The design team can check that building services such as fire protection, plumbing and drainage are

put together without conflict. By using Autodesk Revit in the design stage, it is possible to minimise contractual claims, save time and effort, and eliminate the need for reworking and hence reducing construction waste and be more environmental friendly.

There is also potential for using BIM models after construction, such as for estate and facility management. Though people are not yet used to using the models for such purposes.

The Department has not just used virtual 3D models developed with Autodesk Revit, but also used the models for 3D printouts, such as typical flats, cross sections of domestic blocks, and even for comprehensive housing development in its setting.



A terrain model from the Lands Department was imported to the BIM model to show an accurate 3D model of the proposed redevelopment using 3D printing for presentations of improved landscaping and living environment.

### Partnering & Teamwork

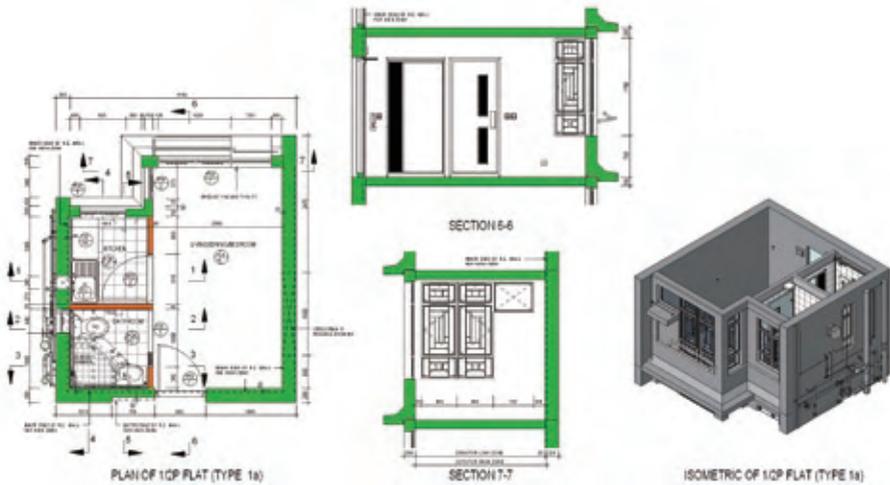
Partnering & teamwork is important for project using BIM. Ideally, architects, structural engineers and building services engineers should work together closely. This is possible within the Department, project members of various disciplines can work on the same set of BIM models. Contractors are sometimes hesitant to use BIM since the technology is relatively new to most of them.

As part of the Department's change management programme, the introduction of BIM has led to formation of a BIM Centre and BIM Service Team.

The project team can sit and work together, discuss and resolve any design issue in front of computer screens which saves a lot of effort and time in writing e-mails.

The Centre includes a training room as well as a lab equipped with a smart board and BIM workstations. The BIM Service Team will work here for about two-years during which they can focus on BIM. This will facilitate regaining skills, and they can then move onto projects, and hence transferring skills. In the long run, staff in the Department can use and handle BIM.

Apart from training in-house staff, the Department has also brought in external BIM consultants to meet the housing development programme as well as enhancing the BIM skills.



### Bright future for BIM

There are increasing numbers of housing projects using BIM, including a project to be constructed on a multi-level site. Civil and geotechnical engineers found this difficult to visualize the site conditions in 2D drawings. There is a need to cut sections on different slopes, and to assess whether design of permanent and temporary works, the cut and fill of the site are optimised. BIM can greatly assist in the optimisation, hence better the design, lowering cutting costs and reducing waste.

It is foreseeable that BIM will continue to contribute to the construction industry, and more people will realise its benefits. Changes in the industry are needed for successful implementation of BIM. The clients are playing an important role to take the lead by specifying the use of BIM. For an effective change

management programme, training is one of the critical success factors for BIM implementation. The Department is promoting BIM development in Hong Kong through a joint working group with the Hong Kong Contractors Association, and has developed its own BIM standards and guidelines to be followed by the staff and business partners.



# Hong Kong Housing Authority



## About Hong Kong Housing Authority

The Housing Department (HD) supports the Transport and Housing Bureau (THB) in dealing with all housing-related policies and matters.

The HD also acts as the executive arm of the Hong Kong Housing Authority (HA), which is a statutory organization tasked to develop and implement a public housing programme to help the Government achieve its policy objective on public housing.

The HD provides affordable and sustainable public rental housing for those in genuine need, provides subsidized quality housing to about 30% of the HK population. To meet the Government's pledge of maintaining an average waiting time of about three years for eligible applicants, The HD has a steady construction programme of producing about 15,000 new flats per year, plus recovering about 16,000 refurbished flats from the existing stock of about 680,000 flats.