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Green Communal Spaces at Height In a High-Density City

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Edwin (Chi Wai) Chan is the senior project director of New World Development Company. Chan has over 22 years' experience in the building industry, including more than 16 years in the private property development sector. He specializes in enhancing and optimizing the investment potential of developments, while promoting the best bespoke artisanal built environment for various communities. As a developer with world vision, New World has been implementing one-step forward solutions with innovative professional consultants to improve the community through designing various outstanding projects.

Janette Chan joined P&T in 1988 and became director in 1998. She directs various stages of projects, from design to project management, and has an extensive portfolio of projects including offices, luxury and low-cost residential, commercial complexes, hotels and institutional projects. She believes this diverse wealth of experience provides her with the ability and confidence to provide the best solutions to new challenges. Chan has always devoted her energy and competency to designing the highest-quality built environment, and to enhancing quality of life. She is also committed to community service programs for people in need.

Abstract

In contrast to the typically generic design of mixed-use developments in Hong Kong, SKYPARK is an exploration of the potential of "com-living" (communal living) in a densely-populated city. SKYPARK is an innovative mixed-use development in Mong Kok, one of the densest urban areas in Hong Kong. Featuring 439 residential units and a shopping mall. The development was targeted to build a community for young singles and couples attracted by the vibrant lifestyle of this iconic Hong Kong neighborhood. The project offers a new template for tall building design by strategically positioning a residential clubhouse and landscaped gardens on the top floor and the roof – an innovative response to high population density and lack of communal areas.

Keywords: Skygardens, Mixed Use, High Density, Residential, Communal Living

Project Background

SKYPARK is located along Sai Yee Street, Nelson Street and the world-famous Fa Yuen Street, nicknamed "Sneaker Street" due to its proliferation of sports-shoe shops (see Figure 1). It is a mixed-use urban redevelopment project created by New World Development Company Limited and the Urban Renewal Authority (URA).

The project occupies an urban site with an area of about 2,500 square meters, constrained by a 100-meters-above-principal-datum (mPD) restriction imposed by the government. The mixed-use redevelopment features a three-story shopping mall of about 5,000 square meters and a 20-story residential tower with 439 units, covering a total of about 17,000 square meters. With an average unit size of about 32 square meters, the flats are designed for young singles and couples who are attracted by the vibrant, energetic and fascinating lifestyle of the neighborhood. The tower is crowned by a green space, in which is set a clubhouse for residents (see Figure 2).

At the base of the tower, the FOREST shopping mall enhances the quality of urban space by breaking down a large podium into smaller blocks, echoing the intimately human scale of neighboring shopping streets, and enhancing and extending the existing street shopping experience to the mall's upper levels.

The Challenges and New Visions

Mong Kok is a district of old and run-down buildings, over 50% of which are at least 50 years old (URA 2018). There have been many urban redevelopment projects within

Figure 1. The SKYPARK project is a combination shopping mall and high-rise residential tower along Hong Kong's "Sneaker Street."

Figure 2. The roof of SKYPARK is exploited to its full potential, providing green recreation space to residents of small units in a crowded city.

the district. The typical result has been that sites were surrounded by old buildings up to 90 meters in height, so that only a few of the topmost floors could enjoy the skyline of Hong Kong Island and sea views of Victoria Harbour. A common pattern of urban redevelopment, with expensive and prestigious penthouse units on top of residential towers sitting on enclosed and bulky commercial malls, was exploited to deliver maximum profits in the property market. The density of the area allows very little opportunity to provide open space and communal areas, calling into question

> “Mong Kok is one of the most crowded urban districts in the world, with a population density reaching 44,000 people per square kilometer. This affords just 23 square meters of living space per person.”

whether the primary objective of urban redevelopment – to provide better living quality for residents – has been satisfied. But the developer and architect of SKYPARK took on the challenge of providing a new vision for sustainable and enhanced urban living environments in spite of the constraints.

Mong Kok is one of the most crowded urban districts in the world, with a population density reaching 44,000 people per square kilometer (Hong Kong Planning Department 2018). This affords just 23 square meters of living space per person. The open-space ratio is only 0.6 square meters per person, far less than the Hong Kong planning standard of 22 square meters per person (Hong Kong Planning Department 2015). The provision of usable open spaces for community and leisure were key concerns for this redevelopment.

The site's location on "Sneaker Street," places it next to a very popular retail destination for shoppers and tourists. Every year, 42 million visitors or shoppers will pass through the Sneaker Street area (C & SD 2017). Because of the area's high cultural and commercial value, an enhanced street shopping experience, balanced by the provision of advertising opportunities, open space and greenery at the podium level, were key factors in determining the financial and cultural sustainability of the project.

Given the challenges, SKYPARK was designed with a vision of building a sustainable community with enhanced living quality, a commitment to respecting and enhancing existing culture and the urban context, and a determination to redefine the concept of urban living by building a green space for communal living in the sky above Mong Kok (see Figure 3).

The "Com-Living" Concept

Given the high population density and property prices in Hong Kong, the typical residential unit has evolved from one- or two-bedroom units to affordable studio flats offering a kitchen, bathroom, bedroom, and living/dining area, all in just 30 square meters of space. The quality of living could easily be seriously affected by these limitations. To tackle the problem, a communal living space is provided for the small family, so that people are not restricted to their own tiny cells, surrounded by concrete buildings; they also have the opportunity to expand into an additional communal living space. The "com-living" concept was thus incorporated at the heart of the project's vision.

This communal living space was placed at the top-most level, devoting the most expensive floor area and the best view to the enjoyment of all residents. It includes a clubhouse with communal facilities and a rooftop garden, inter-connected and integrated with an iconic sky-stair. It realizes the dream of creating a "picnic-space in the sky," high above one of the busiest streets in the world.

Landscaped Roof Garden

The roofs of tower blocks are normally cluttered with mechanical and ventilation equipment, leaving little space at the building perimeter for communal areas and activities. At SKYPARK, the infrastructural features were broken down into four strategic cores, so that available area could be maximized to form pockets of space for a range of activities to be enjoyed by different groups of residents.

The landscaped roof gardens provide an integrated, communal and family-inspired

Figure 3. The planted roof deck comprises a key component of the communal-living offer of the project.

Figure 4. Social activities are programmed at the Sky Stair.

environment promoting the values of living in a green, healthy and hygienic urban setting. Residents and visitors can now gather, picnic and even barbeque in the sky. For residents of Mong Kok's traditional 30 square-meter units, the roof garden, with its spectacular city views, can provide space and leisure activities that were previously beyond the realm of possibility.

The soothing landscape of the garden is enriched by a diverse range of plant species with year-round seasonal interest, focusing primarily on evergreen varieties. Approximately 50 plant species were used throughout the external areas of the development, with an emphasis on color, texture and movement in breezes. Various herbs feature in the roof planters for educational purposes, fragrance and home consumption. Signage with QR codes for 20 different plant species were added at the roof garden so that residents can understand more about the characteristics of these plants through mobile app.

The beautiful green roof gardens are seamlessly connected by a flight of sky-stairs to the clubhouse and its social spaces below. The sky-stair is not only a circulation feature, with a fascinating city view; it is also a great social gathering place where entertainment and other programming is provided (see Figure 4).

Clubhouse

The residential clubhouse with its communal facilities is on the two top floors and covers about 800 square meters. The conventional "boxes within a box" approach for clubhouse design places different functions in separate rooms around a centrally located core. The design variation for this project was to adopt an open plan to match with the com-living concept, enabling residents to share the spaces more flexibly as they interact and connect (see Figure 5).

The four cores for circulation and mechanical infrastructure have been consolidated, leaving all other spaces free for social facilities such as a living area with TV, a library, a dining area, a bar, a gym, and a 22-meter swimming pool with showers and changing facilities.

The integration of a residents' clubhouse and landscaped roof garden reinforces the relationship between the interior and external environments, creating spaces which expand the vibrant visual, physical and ambient aesthetic for both residents and visitors. It provides a great communal living space for gathering, bonding and building a socially sustainable community.

The FOREST

At ground level, Sneaker Street is a very busy destination for tourists and local shoppers. The street is narrow and lined with shops. The concept of SKYPARK's podium – the FOREST – is to respect the existing culture and enhance the street shopping experience with sensitive urban design elements that reflect and extend the local scene.

In the typical approach to podium mall design, the mall is an enclosed, inward-looking space with a fully air-conditioned central atrium. In contrast, the concept of the FOREST mall was to subvert the centralization of retail space in order to create an internal street, thereby increasing frontage for ground floor shops as well as pockets of space for plantings. Most importantly, the design brings the outdoor shopping-street experience into the mall. With direct access from the plaza to the mall

> "To bring the trees up to the roof, two layers of heavy-duty stainless-steel cables were used to tie the roots of the trees to the building structure, and to tie the tree trunks to the soil."

Figure 5. Dining room at the clubhouse, which features an open plan to enhance views and reinforce the sense of connectivity.

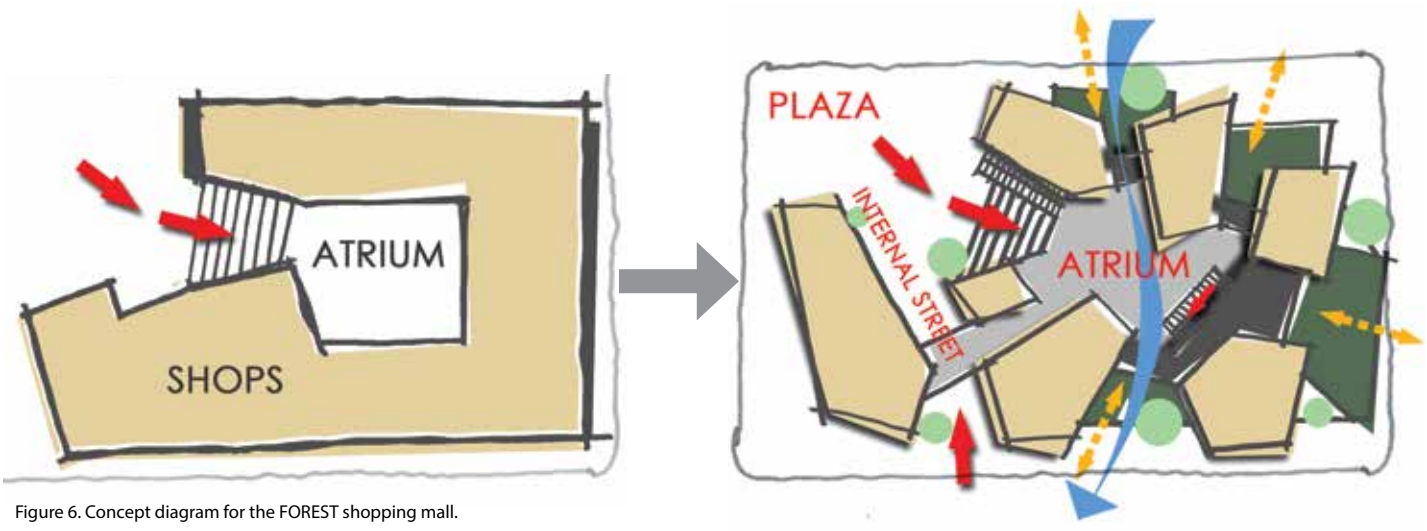

Figure 6. Concept diagram for the FOREST shopping mall.

Figure 7. Section diagram of extended street experience.

at the upper level, together with natural lighting and ventilation, its outward-looking orientation provides a strong visual connection to the street. Shoppers can therefore feel that they are in a seamless extension of the street as they move to the upper levels of the mall.

The open plaza and the internal street expand at the junction of one of the busiest pedestrian areas in Mong Kok. The grand steps provide a strong and direct connection between the plaza in front of the entrance and the mall itself, and bring the street up to the level of the mall without doors or other physical barriers to impede access (see Figures 6 and 7).

On the upper level "street", there is a green, sky-lit atrium, supplemented by the cooling shade of lush foliage. Seating areas, trees, planters and vertical green walls are subtly placed to create an outdoor street environment. This new approach to open urban spaces provides green buffers in the otherwise crowded district and enhances air flow, eases pedestrian traffic and improves the quality of the built environment.

Green and Sustainable Strategies

Located in the dense "concrete jungle" at the heart of Hong Kong, the positioning of green gardens on the roof of the residential tower helps to mitigate urban heat effects and enhances the surrounding environment. Covered with lush vegetation, the garden reduces carbon emissions, provides shade and removes heat from the surrounding air through evapotranspiration. By preventing excessive heat absorption by the floors below, the need for air-conditioning, and its associated energy consumption and carbon emissions, is reduced significantly, helping to mitigate climate change in the broader context.

Benefitting from the height of the building in the densest part of the surrounding city, environmentally friendly and sustainable green features have been incorporated into the communal green spaces (see Figure 12). Lighting in the rooftop garden is powered by electricity generated in part by solar photovoltaic (PV) panels and wind turbines. Another source of clean energy is the solar hot water system, with back-up electric heaters to generate hot water for the clubhouse showers, adjacent to the swimming pool. In addition, the rainwater collection system stores and reuses rainwater for irrigation in the rooftop and podium gardens. Meanwhile, a greywater system has also been designed to clean and recycle water from the shopping mall's toilet facilities (see Figure 8). A monitoring and real-time display system for the performance of these environmental features had been developed and showcased in prominent locations for both operators and users, so that ongoing evaluation and development

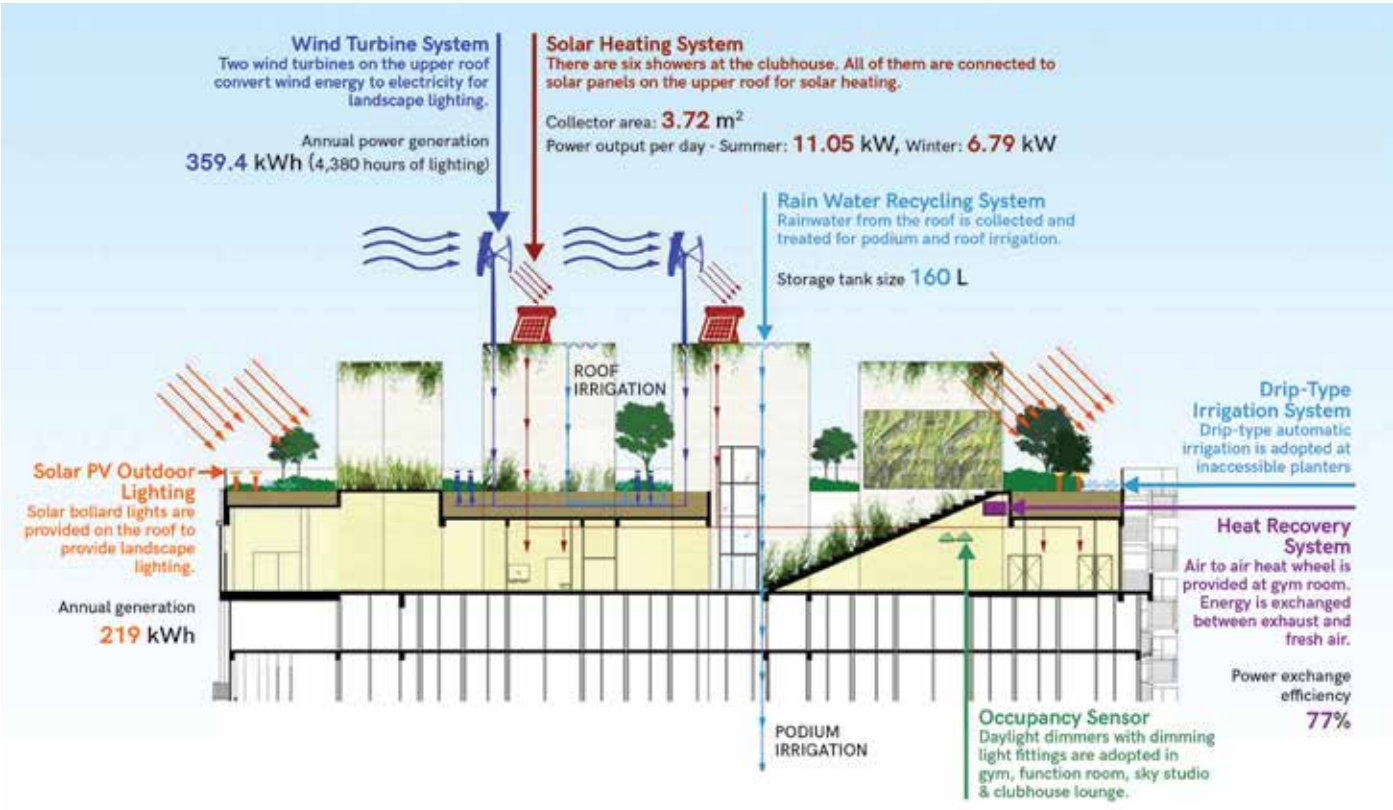

Figure 8. Diagram of sustainable features at roof garden and clubhouse. The planted roof and efficient core distribution are used to support resource regeneration as well as human recreation.

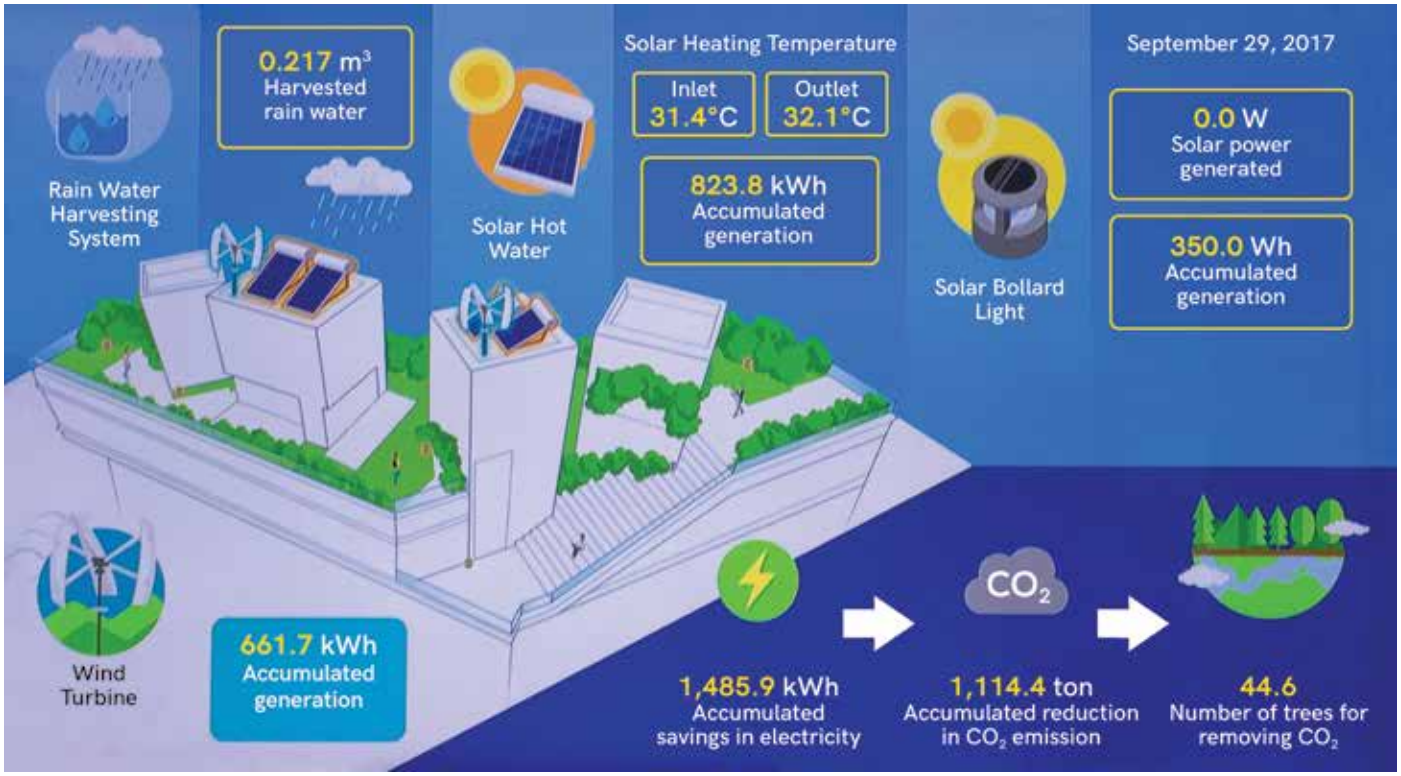

Figure 9. The performance of the tower's green features is tracked by a real-time monitoring system.

Figure 10. Every horizontal surface, and numerous vertical surfaces, support greenery.

Figure 11. The mall interior is naturally ventilated and can be fully opened to the street.

may be carried out to ensure high levels of energy efficiency and management (see Figure 9).

Three-dimensional green spaces, including planters and vertical green walls, have been strategically placed at different levels and locations in SKYPARK, enhancing not only the development's visual attractiveness, but also the air quality of the surrounding neighborhood (see Figure 10).

One of the biggest challenges of the project was the objective of planting trees on the roof in a typhoon-prone city like Hong Kong. The species of trees and plants had to be carefully chosen to make sure that they could survive at an altitude of 100 meters above principal datum, and would not become a burden to maintain in the future. To bring the trees up to the roof, two layers of heavy-duty stainless-steel cables were used to tie the roots of the trees to the building structure, and to tie the tree trunks to the soil. The fortitude of the trees was soon proven, as they withstood two "signal-10" typhoons, with wind speeds over 220 kilometers per hour, in 2017 and 2018.

> "Air conditioning is switched off when the temperature is less than 21°C and humidity is below 70%. The FOREST is the first mall in Hong Kong that does not need permanently active air conditioning."

The open plaza and open-air internal street were created at the valuable ground level of the podium shopping mall. They were designed to become buffer spaces in the crowded district and enhance air flow in the surrounding area. Within the FOREST podium mall, the use of full-height glass doors along the arcade facing the street, in combination with a cross-ventilated layout and lack of a physical door at the entrance, allows natural ventilation within the mall during winter's cooler weather (see Figure 11). Air conditioning is switched off when the temperature is less than 21°C and humidity is below 70%. For four of the past 12 months, the FOREST operated in this energy-efficient winter mode. It is the first mall in Hong Kong that does not need permanently active air conditioning. The full-height glass doors on both sides of the façade and the door-free entrance are air-friendly on an urban scale,

allowing natural ventilation across the building and enhancing air movement at street level (see Figure 12).

Conclusions

SKYPARK has explored and optimized the potential of rooftop gardens and integrated this with the concept of "com-living". It is an exceptional example of communal green space at height in dense city environments, given the fact that top-floor units with exclusive private roof spaces are the default in other Hong Kong high-rise residential projects. The technology for green roof construction may be common and replicable, but what makes SKYPARK distinctive and original is the insight and desire to integrate it with a vision for sustainable sky-communities, and to make it environmentally beneficial. This was the key driving force that made this project a successful and viable template for change in a profit-driven development culture.

The image of lush vegetation on the roof garden and in the podium mall is visible from both street and sky. The enhanced street shopping experience within the mall, with no air conditioning in winter, is also a pioneering innovation in Hong Kong. SKYPARK shows that the vision of a real "urban forest" is achievable if similar green strategies are applied to future urban redevelopment projects in dense cities. In fact, given that many buildings are scheduled for phased demolition in the Mong Kok district, the hope is that that there will be many more "SKYPARKs" in Hong Kong's future. ■

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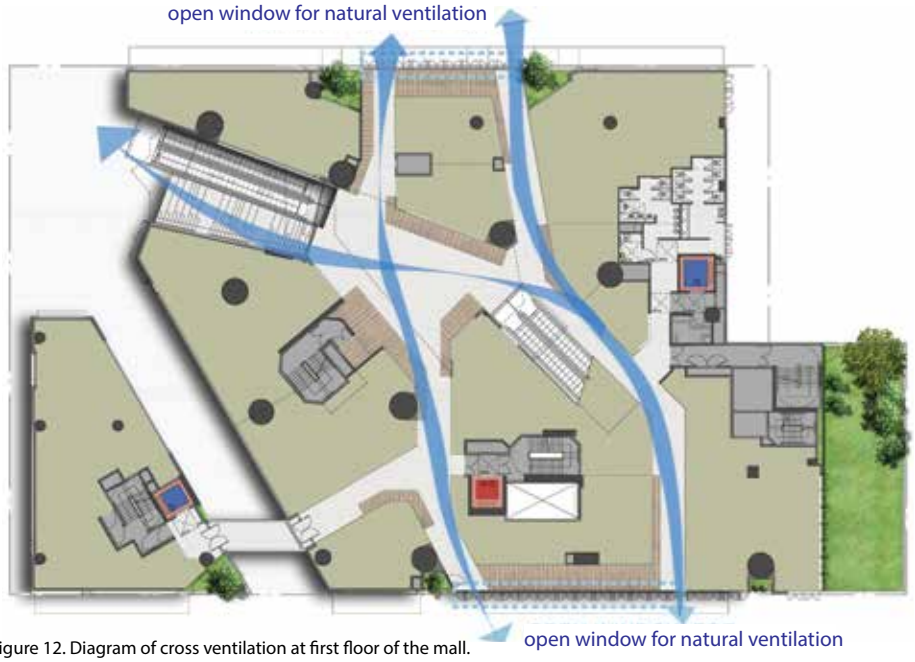

Figure 12. Diagram of cross ventilation at first floor of the mall.

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Project Data

Completion Date: 2016
Height: 104 meters
Stories: 25
Area: 17,346 square meters
Use: Residential/Retail
Owner: Urban Renewal Authority (URA)
Developer: New World Development Company Limited
Architect: Palmer & Turner (design)
Structural Engineer: CM Wong & Associates Limited (design)
MEP Engineers: WSP (design); WSP Hong Kong Ltd. (design, engineer of record)
Project Manager: New World Development Company Limited
Main Contractor: New World Construction Company Limited
Other CTBUH Member Consultant: P & T Group (interiors)