









At 118-storeys, International Commerce Centre (ICC), Hong Kong, the newly completed mixed-use tower is the fourth tallest in the world and will redefine one of its most famous skylines. Rising 490 metres high from the peninsula of West Kowloon, the emergence of ICC reflects the rapidly developing financial district. It also works as a gateway into Hong Kong, along with the complementary International Finance Centre across the harbour.







Skyscraper design

New York-based architectural firm Kohn Pedersen Fox (KPF) was appointed by developers Sun Hung Kai Properties to lead the architectural design of ICC after submitting the winning entry in a limited international design competition in 2000. The firm provided an innovative plan for sustainable urban planning, particularly utilising its specific knowledge and proven expertise in designing super-tall buildings.

Outstanding architecture

The unique curtain wall is sculpted into a series of over-lapping panels for a 'shingled' effect, reminiscent of the scales of a dragon. The contoured tail is functional as well as aesthetically please, designed to deflect the downdrafts generated by the tall tower and to shelter pedestrians from tropical rains which pass through Hong Kong regularly. ICC is notable as much for its compelling design as for its soaring height. Embodying the mythical creature celebrated in Hong Kong and symbolic of its pairing with Kowloon Station, ICC is defined by its 'dragon tail'. Taking form at the north of the building, the





facade sweeps down in a dramatic gesture towards the center of the development, creating the 'dragon tail' atrium.

The building is also designed to combine the best possible structure with the most efficient floor plate. For instance, a tower geometry based on a circular floor plate would perform well in the wind, but would be undesirable to Hong Kong's financial tenants, who prefer the efficient layout of square floors. Conversely, a perfectly square floor plate would perform poorly in the wind and lead to an increase in steel and concrete use, and therefore not a sustainable approach. An analysis of preliminary wind tunnel studies indicated that a square with notched, or 're-entrant,' corners would exhibit nearly the same wind response as that of a circle.

From this initial form, the massing was refined by gradually widening the re-entrant

corners towards the top and inclining the upper third of the main facades by one degree to create the tower's elegant silhouette and improve its wind response. The tower's eight mega-columns splay out three degrees to widen the tower's dimension at its base, significantly reducing the tower's overturning moment, while providing longer clear spans for hotel and exhibition facilities.

The main facades are articulated as four planar elements, extending partially beyond the re-entrant corners, and rising above the tower roof as sheets of glass to form the tower crown. Initially designed as cantilevered curtain wall panels, the facade extensions later incorporated a triangular return to create enclosed bay windows in the corner offices with direct views of the harbour. At the tower base, the triangular returns split from the main facade to form distinctive markers framing the lobby entrances.

in Yokohama

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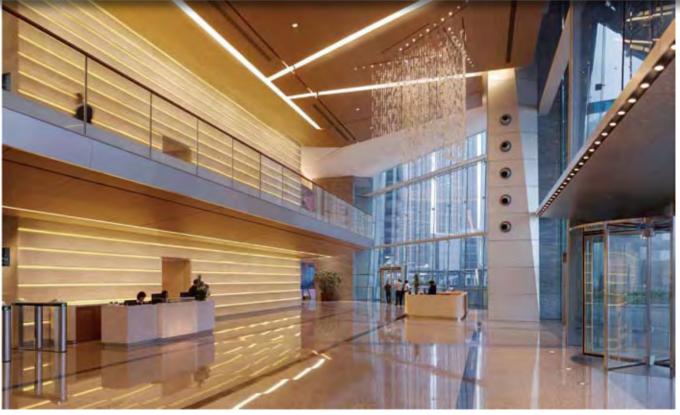
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Photo: Wong & Ouyang (HK) Limited







Leading West Kowloon's development

The completion of ICC will mark a major milestone in the emergence of West Kowloon as a financial hub, responding to the challenges stemming from a lack of office space in Central, Hong Kong's traditional Central Business District. The building will comprise grade-A office space above a vast retail podium, as well as The Ritz-Carlton Hong Kong, which, occupying the 102/F to 118/F, will be the highest hotel in the world. Providing over 250,000 square metres of commercial space at the centre of this new hub, ICC will materialise as a vertical city in itself. In its planning, KPF carefully considered the significance of the construction of ICC as a leading factor in West Kowloon's growth and in the sustainable urban development of Hong Kong in general.

ICC is designed to integrate the expansive infrastructure that surrounds it, providing means of transportation to Hong Kong International Airport, through Kowloon, across the harbour, and into mainland China. This extensive transport network will be further developed by



ito: Wong & Ouyang (HK) Limited



2015 to form the base for the Express Rail Link, which will transport tens of thousands of passengers from ICC to Shenzhen's Central Business District in 15 minutes, and further into China onto Guangzhou. The completion of this cross-border connection along the Pearl River Delta will culminate in a three-tier 'supercity' of 120 million people.

Sustainable design

The transport hub is a significant factor in the development of sustainable urban communities as well. ICC forms part of a larger ecosystem of vertical centres linked by this horizontal network. Vertical density allows for the preservation of land resources, which is an especially pressing issue surrounding the business centres in Hong Kong, and the overall reduction of energy usage.

Sustainability design for the building is geared towards the reduction of energy consumption and carbon emissions by maximising its self-efficiency. Sheathed in silver low-emissivity insulating glass,

ICC and Cullinan

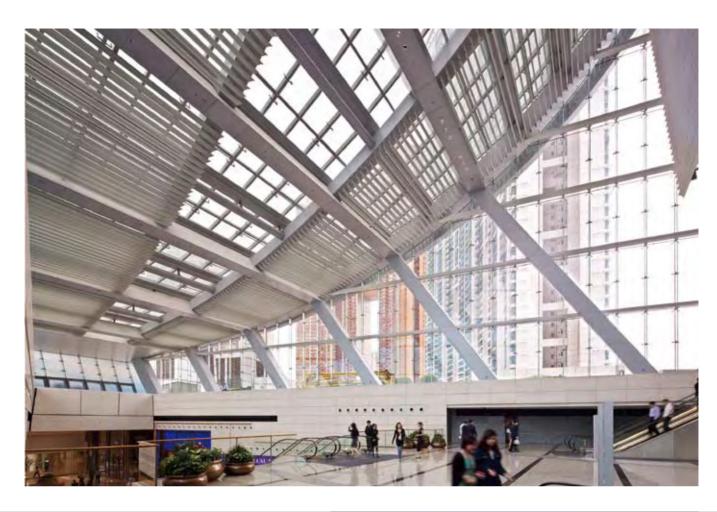
The initial master plan for the Kowloon Station Development prepared by MTRC and their consultants proposed 5 towers to accommodate the programme. Three towers were on the ICC and Cullinan sites and two in the centre, above the station box. The client, Sun Hung Kai Properties, wanted to eliminate the two towers above the station box, to create an enlarged open space and increased distance between buildings.

This required redistribution of the component areas so that all of the more than 231,000 sq m office areas would be housed in the ICC together with a 41,500 sq m 6 star hotel at the top. The remaining 145,000 sq m of residential and hotel content would be located in the Cullinan.

To achieve this redistribution, inherent

constraints would need to be overcome. The site for the Cullinan towers was initially designed for 40 storey buildings which partly relied on structure of the completed station box. To cater for the additional building content, the remaining areas of the site were saturated with maximum capacity piling. The new 70 storey towers were then designed with the tallest portion over the areas of highest loading capacity.

One of the key considerations was the overall image of the three towers. The ICC and Cullinan presented one of the prominent and very important fronts to the whole Kowloon Station Development. The client wanted to create a coherent identity for the 3 towers that would be driven by the modern, clean glass and steel language



of the ICC. This led to a different way of thinking about the residential component, steering away from the more traditional use of bay windows and balconies.

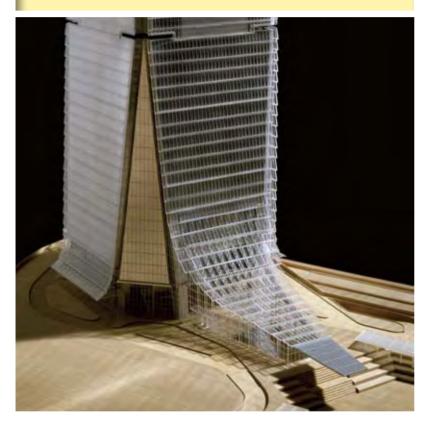
The mixed use nature of the towers and required seamless interconnections with the retail mall and the station, presented many challenges in planning of the access and circulation. The solution would require thinking about entrances to each building at a number of levels. Portions of the podium were set back to create drop-off areas compatible with the scale and prominence of the project which gave access and frontage to all the components.

Information provided by Wong & Ouyang (HK) Ltd



About KPF

KPF was the lead architect for China's tallest building, the 492-metre Shanghai World Financial Center, which had the highest occupied floor after its completion in 2008, as well as the recently-completed, 270-metre, 61-floor Wheelock Square off Shanghai's Jing An Park. The firm is also designing the 123-storey Lotte Super Tower in Seoul, the 480-metre American Commerce Center in Philadelphia, and The Pinnacle, which will reach 288 metres on the London skyline.



the tower's single layer skin provides the maximum protection from solar heat gain while deploying a minimum amount of facade material. The silver coating has the unique quality of reflecting the heat-generating spectrum of sunlight, while allowing the desirable visible light spectrum to transmit through the facade. The optical properties of the glass provide more than three times the protection of uncoated glass. The shingled panels provide self-shading of the main facades, with horizontal baffles in the re-entrant corners providing additional shading of the facade.

KPF also worked in collaboration with the Hong Kong Polytechnic University, who developed the 'Energy Optimizer' system that is featured within ICC. This comprises of integrated sensors and energy consumption monitors that analyses data for day-and-night and a seasonal variation, providing a baseline to adjust the building's operating system, in order to reduce energy consumption.

Sun Hung Kai Properties

architect

Wong & Ouyang (HK) Limited

design architect

Kohn Pedersen Fox Associates

landscape architect

Belt Collins International (HK) Ltd

structural engineer **Arup**









WT Partnership

Quantity Surveyor for ICC

n 2001, when the design of International Commerce Centre (ICC) was still at the conceptual stage, WT Partnership (WTP) was commissioned to provide full quantity surveying and cost management consultancy services for the project.

WTP's comprehensive service commenced from preliminary design stage through to practical completion and finalization of final accounts.

Due to the massive scale of the development, all major building elements including foundation, super structure, facade, building services and lift installation involved contracts amounting to substantial individual sums. In order to be in a position of providing active control cost in the most effective way, WTP played a pro-active role in all value engineering workshops conducted during the design stage. In addition to structured workshop environments, options for various systems of building construction in each element developed and designed by the project team were evaluated by WTP from a



International Commerce Centre, Hong Kong

commercial viewpoint. WTP submitted evaluation reports with vital information and data to the client for making the best decision.

Located on reclaimed land with bedrock more than 90 meters below ground level, traditional foundation system commonly used in Hong Kong such as bored piles and driven H-pile systems are not applicable to the requirement of the project. Through a number of value engineering sessions with the structural engineer, a *barrette* foundation system, utilizing rectangular shaped reinforced concrete friction piles, was adopted and successfully completed. This foundation system was relatively new to Hong Kong at the time of construction at ICC.

The 118-storey ICC stands 490 metres above ground is the tallest building in Hong Kong. The building provides a total gross floor area of approximately 450,000 sq m. Due to its height and scale; it was inevitable that a composite structural system would be used. The super structure is a combination of reinforced concrete and structural steel. The total structural steel tonnage of the building is over 30,000 tonnes.

During the design stage, WTP was involved in a number of studies on the structural system which included full evaluation of the *pros* and *cons* of using mega columns + outriggers system vs the tube-intube system; various grades of concrete supply and different combinations of structural element sizes versus reinforcement ratios in order to ensure maximum value for construction cost whilst also providing the client with maximum floor area.

The facade of the ICC is often referred to as a dragon skin not only because of the building shape with its tail which drapes onto the Kowloon Station podium below, but also the curtain wall panel system which resembles the over-lapping scales of a dragon. The total facade area of ICC is approximately 120,000 sq m. In addition to the high cost of low-e glazed panels, aluminum extrusions and steel frames are also significant cost component of the system. The unique curtain wall design makes the aluminum content of the facade higher than a traditional flat panel system. A number of cost studies were conducted at design stage in order to optimize the cost and WTP participated in the entire value engineering process up to the final facade design had been developed and executed.

It is estimated that, when fully occupied, ICC will accommodate over 20,000 people during normal working hours. Mass vertical transportation of occupants within acceptable time parameters is one of the key success factors of any super high rise building.

In order to cater for such heavy demand ICC has over 42 lifts, of which, more than 20 units are double-deck lifts. The fastest lift can travel at 9-metre per second. A number of value engineering studies on lift system and building core layout were conducted during design stage in order to reduce core size, maximize the usable area and optimize the cost.

Due to its complex nature, the construction schedule for ICC played an important factor in the cost planning and estimation process. Full analysis of labor, plant and material price trends were undertaken by WTP in order that the rise and fall of such costs over a long period of time could be fully understood and provisioned for. WTP in collaboration with the project engineers, established bespoke contractual mechanisms to monitor fluctuation adjustment of major building materials to be incorporated into the tendering and contract conditions.

YK Chan – a Director of WT Partnership and currently responsible for the operation of the Guangzhou and Shenzhen offices in parallel with a number of selected Hong Kong projects. With over 20 years of experience in Hong Kong and China in the provision of quantity surveying services, YK has developed an expertise in providing full pre and post contract services on large scale and complex mixed-use developments.

YK's recent prominent commissions include Union Square Package 5, 6 and 7 in Hong Kong (ICC & Cullinan) and West Tower in Guangzhou.

Ringo Lui – a Director of WT Partnership based in the Hong Kong office. He is responsible for private sector developers and major infrastructure providers. With over 18 years of experience in the quantity surveying industry in Hong Kong, Ringo has been involved in all aspects of both pre and post contract stages of major commissions including cost planning, tender documentation, procurement and post contract administration.





About WT Partnership

WT Partnership (WTP) is a professional practice specializing in the provisions of quantity surveying services. The firm offers a complete suite of cost management services delivered by expert teams to clients seeking world class skill sets. We protect our clients' financial interest in project development and construction cost, from project inception to completion.

WTP has over 60 years of experience worldwide, with over 1,000 professionals operating in 16 countries with 45 offices across the region. The group is a leading quantity surveying and construction cost consultancy in the property and construction sector. WTP offers pre & post contract services including cost planning & estimating, value engineering, feasibility studies, lifecycle costing, tender & contract documentation, change control advice, dispute resolution, claims management and overall project cost management.

As one of the largest international quantity surveying practices in the world, WTP's global network extends from Australia and New Zealand, throughout Asia to United Kingdom and Europe. The WTP Hong Kong office was established in 1976 and has grown to become one of the most prominent practices in the region. In China, WTP has offices in six locations including Beijing, Chengdu, Chongqing, Guangzhou, Shanghai and Shenzhen.

Other landmark projects undertaken by WTP in the region include: The West Tower in Guangzhou; China World Trade Centre Phase 3 in Beijing, Super high-rise project in Chongqing, TEDA Modern City in Tianjin, GT Land in Hangzhou and the ICC in Hong Kong.



GT Land, Hangzhou



Chongqing Super High Rise, Chongqing



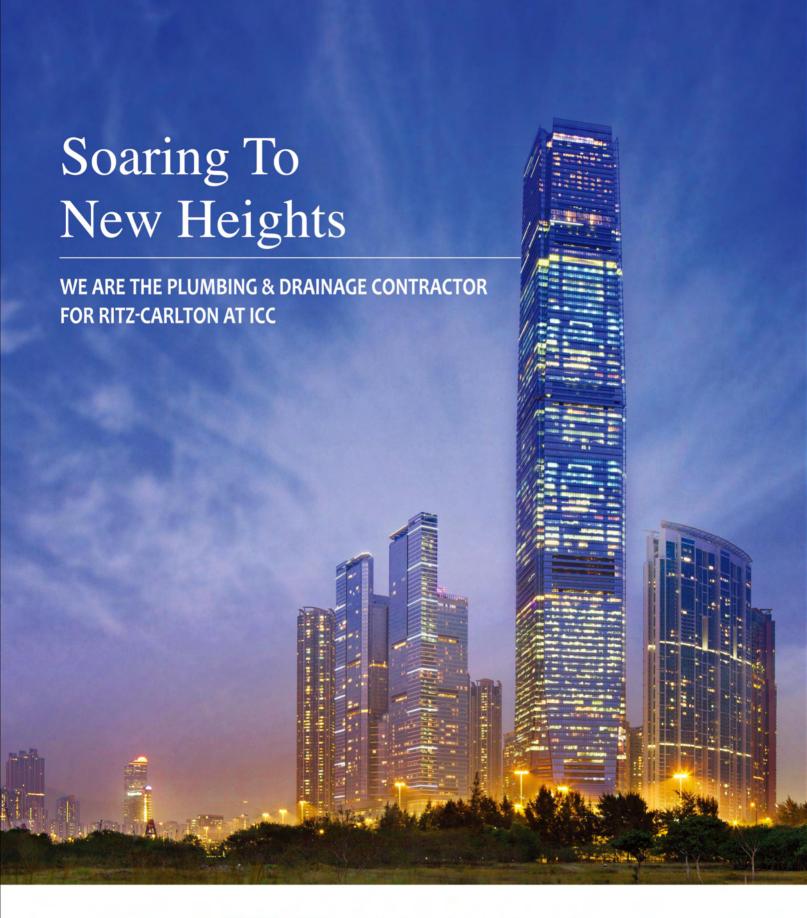
West Tower, Guangzhou



China World Trade Centre Phase 3, Beijing



TEDA Modern City, Tianjing



BUILDING SERVICES



The Ritz-Carlton, Hong Kong

The world's 'tallest' hotel

he Ritz-Carlton, Hong Kong, opened on March 29, 2011 as the world's 'tallest' hotel. The much anticipated new hotel occupies the 102/F to 118/F of International Commerce Centre (ICC) and it marks a new milestone in Asia's hotel industry. The Ritz-Carlton, Hong Kong is the newest addition to the brand's growing global portfolio of 75 luxury properties and its 16th hotel in Asia.

"The opening of this landmark hotel in Hong Kong is the culmination of many years of hard work and dedication to delivering the very best product, facilities and service in this international gateway city," said Herve Humler, president and chief operations officer of The Ritz-Carlton Hotel Company, LLC "The Ritz-Carlton Hotel Company and Hong Kong's premier developer, Sun Hung Kai Properties teamed up to create something truly spectacular to welcome our guests not just to the tallest hotel in the world, but also to one of the

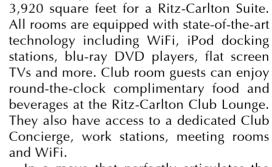




very best hotels in the world. We are taking luxury to new heights in every sense."

The stylish and contemporary interiors by Singapore's LTW Designworks set the scene for this thoroughly modern hotel located at the world's fourth tallest building ICC. Its main entrance faces the stunning Victoria Harbour and designated hotel elevators will take guests to the hotel lobby on the 103/F with a panoramic sea view.

The hotel's 312 guest rooms with spectacular city and harbour views range



from 540 square feet for a Deluxe Room to

In a move that perfectly articulates the brand's shift in design philosophy and service evolution, the hotel's dining venues were created by some of the biggest names in restaurant design, including Japan's Spin Design Studio and Wonderwall. The hotel offers three restaurants on the 102/ F, including Tin Lung Heen, a Chinese restaurant serving refined traditional Cantonese cuisine and dim sum, Tosca, an Italian restaurant serving southern Italian cuisine with an open kitchen and the very stylish The Lounge & Bar that features stunning crystal fire pits. In addition, there is a chocolate-themed lounge named The Chocolate Library on the 103rd floor and a stylish patisserie named Pastry Gems on the 9th floor.

Perhaps the jewel in the crown

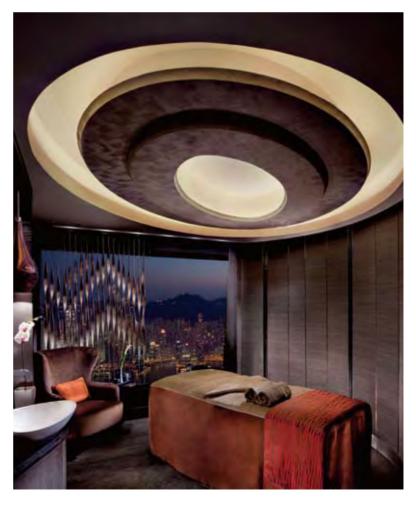




is Ozone on the hotel's 118/F at an impressive 490 metres above sea level. This sleek, stylish and contemporary restaurant and bar will set a new benchmark for Hong Kong's social and dining scene. Offering contemporary Asian tapas, signature cocktails and fine wine, Ozone has bar and restaurant seating in zoned sections and the world's highest al fresco terrace with incredible views of the city.

The Ritz-Carlton Spa by ESPA is the ultimate urban spa sanctuary experience. The spa is on the 116/F and has nine deluxe treatment rooms and two couple's suites offering panoramic harbour views with floor-to-ceiling windows. A world-class team of professional therapists will ensure a spa experience like no other. And the 118/F houses a fully-equipped fitness centre and an indoor infinity pool with LED ceiling displays.

The Ritz-Carlton, Hong Kong has one of the largest ballrooms in the city at around 10,000 square feet. The Diamond Ballroom with crystal chandeliers is ideal for weddings, meetings and gala events. There are also four meeting rooms totalling almost 14,000 square feet for various social events.





sky100 at ICC

Observation deck with 360-degree views



The first batch of sky100's visitors could not wait to start their unrivalled journey once they arrived the deck



sky100 Uniform Design Contest judge famous fashion designer Ms Johanna Ho and her family also visited sky100. They were greatly impressed by the deck's views and facilities







Sky100 is on the 100th floor of ICC, the tallest building in Hong Kong and the fourth tallest in the world. At 393 metres above sea level, it is the only observation deck in Hong Kong offering 360-degree views of the territory and its famous harbour. Covering 30,000 square feet, it is equipped with multi-media exhibits describing the history and culture of Hong Kong, and provides interactive devices

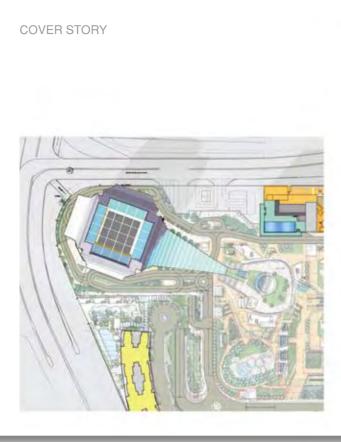
for tailor-made travel itinerary planning. The deck is part of the Kowloon Station development, along with grade-A offices, a high-end shopping mall, luxury residences and serviced apartments and international hotels. Kowloon Station is Hong Kong's new commercial, cultural and transportation hub, and sky100 is designed to complement the hospitality facilities in the area to enhance the experience of visitors.

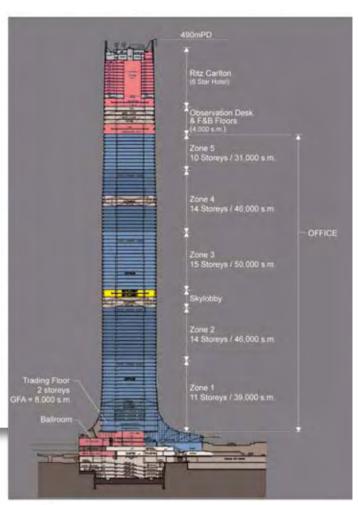


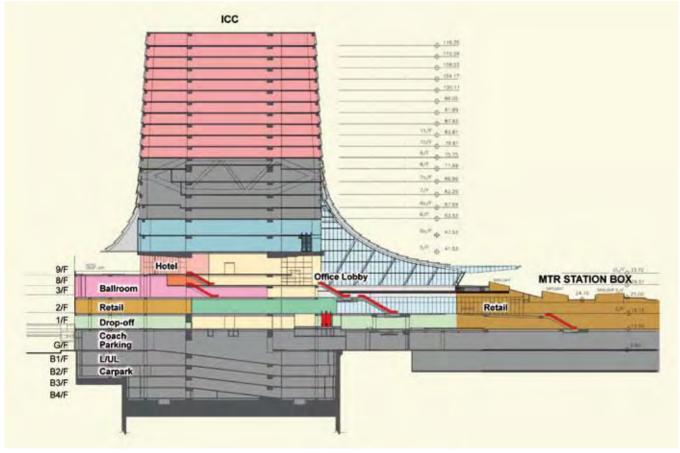




sky100's mascot "Family of sky100" were present at the deck to welcome visitors. "Tian", "Gentlemen" and "Bruce" helped commemorate this very special occasion by stamping visitors' complementary special limited-edition postcards with unique date chops. Kids as well as adults were all excited about seeing the mascot



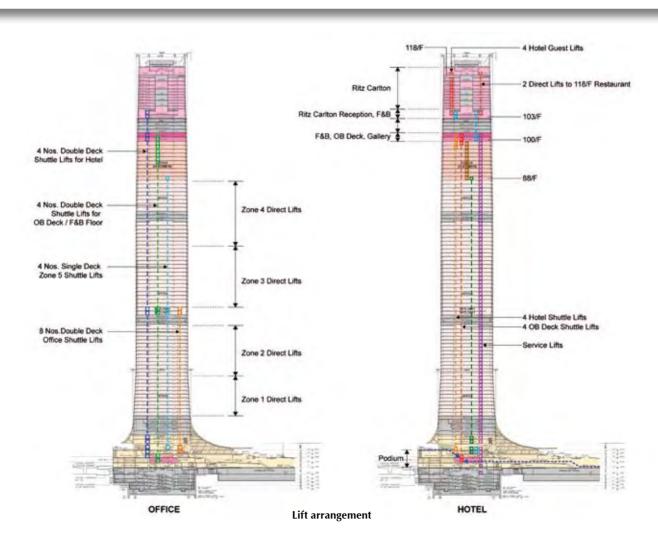


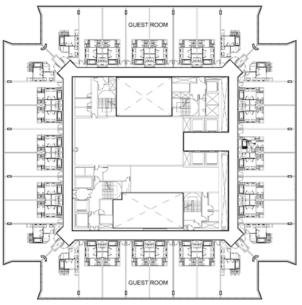


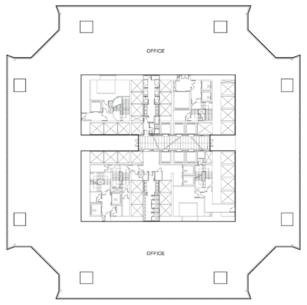
Five levels of access



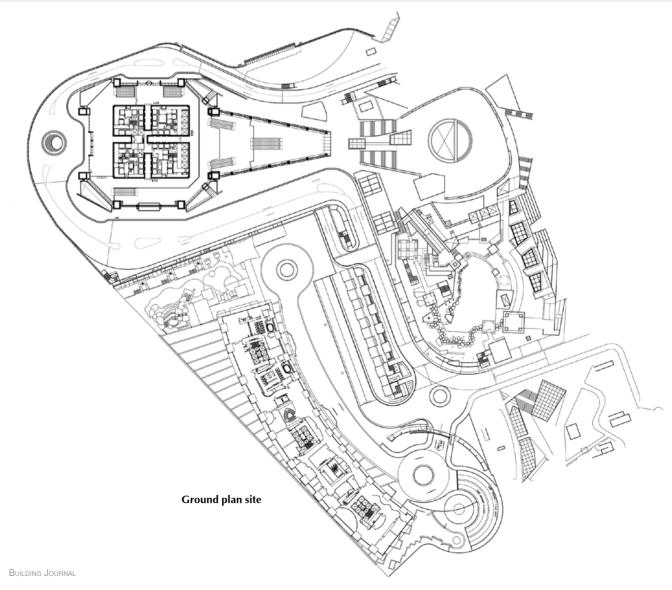
ICC drop offs

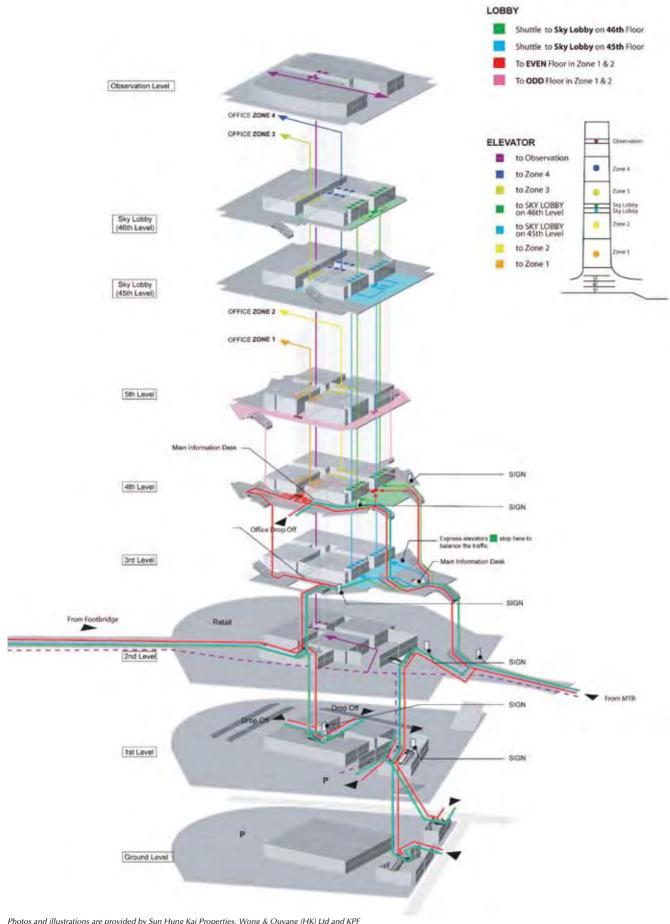






Hotel room L109-L103 **Typical office floor L009**







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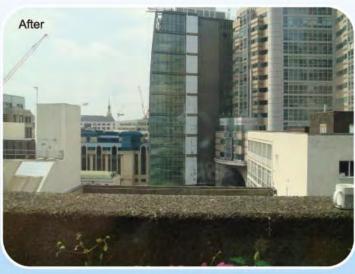


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