Kai Tak Development – Migrating Towards Vision

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ABSTRACT

Kai Tak Development (KTD) is a major harbourfront development at the heart of Hong Kong adopting sustainable development and environmentally-friendly concepts. Its land use and development planning have gone through extensive public engagement exercises leading to a blueprint for the vision being "A distinguished, vibrant, attractive and people-oriented community by Victoria Harbour". KTD is also the catalyst for re-energising the surrounding older districts and creating a new Central Business District for Hong Kong.

With the implementation timeframe spanning over a decade, KTD has already witnessed the completion of its first package of public works projects starting from 2013. These projects include bio-remediation at the Kai Tak Approach Channel and Kwun Tong Typhoon Shelter together with associated drainage works which have notably improved the water quality and mitigated the odour issues associated with the water bodies. Additional footbridges and revamp of existing pedestrian subways have enhanced the walking experience and connectivity between KTD and its neighbourhood. New buildings at KTD comprising the Trade and Industry Tower, Energizing Kowloon East Office building, schools and sewage pumping stations have met the Building Environmental Assessment Method Plus, or BEAM Plus, green building ratings. Kwun Tong Promenade and Runway Park Phase 1 at the former runway tip have become favourable rendezvous for the public to enjoy the waterfront. In addition, continual efforts are maintained with a view to promoting sustainable built environment through application of District Cooling System, development of extensive green web with signature open spaces, revitalisation of heritage discovery, and opening up harbourfront area for public enjoyment. This paper attempts to elucidate how KTD is planned and implemented in the quest for sustainability being the impetus of Hong Kong's economic growth.

Keywords: *Kai Tak development, public engagement, sustainability*

1. INTRODUCTION

The transformation of Kai Tak from a former airport to Hong Kong's single largest urban development of about 323 hectares has opened a new opportunity to showcase Hong Kong's "World City" qualities. Under the planning vision for Kai Tak Development (KTD), Kai Tak is intended to be a "distinguished, vibrant, attractive and people-oriented community by the Victoria Harbour." It also bears a strategic role in stimulating the regeneration of older districts in its vicinity. The location of Kai Tak is shown in Appendix A.

In recent years, increasing attention is being paid to enhancing the urban design aspects of strategic projects in Hong Kong. With its array of projects of different nature and its prominent harbourfront location, KTD has exceptional potential to be developed into a high-quality community. A holistic implementation approach has been adopted with emphasis on sustainability and quality urban design under a focused brand, instead of the conventional project-by-project approach driven primarily by functional considerations, to ensure that Hong Kong is further developed on a par with other competing cities around the world.

2. PLANNING WITH THE COMMUNITY

Kai Tak is located in southeast Kowloon with the former runway projecting over 2 kilometres (km) into the harbour. On 6 July 1998, the former Kai Tak Airport retired after 77-year of service as Hong Kong's gateway to the world. Being the largest available site at the harbourfront, Kai Tak offers a good opportunity to create a quality living environment in the urban area, and its interplay with the Victoria Harbour will cultivate a unique sense of place. Given its size and prominent location by the Victoria Harbour, the scope of redevelopment and planning intention for KTD had been the subject of a decade-long public deliberation.

To take heed of public aspirations to protect the Victoria Harbour as natural heritage of Hong Kong, the Government conducted an extensive public engagement exercise between 2004 and 2006. After three rounds of large-scale

public participation, general consensus was reached on the development scheme for KTD based on the principle of "zero reclamation". Details of the scheme were eventually incorporated into the Kai Tak Outline Zoning Plan (OZP) approved under the statutory planning process in November 2007.

In terms of built development, KTD is intended under the approved OZP to provide about 2.9 million square metres (m2) and 2.3 million m2 of domestic and non-domestic gross floor area respectively. It will accommodate an estimated total population of about 130,000 with population intake starting from 2013. The broad land uses under the approved Kai Tak OZP is summarised in Table 1 and shown in Appendix B.

Uses	Approximate Area and Percentage	
	Area (Hectares)	Percentage (%)
Commercial	14.00	4.33
Comprehensive Development Area	9.62	2.98
Residential	34.69	10.74
Government, Institution or Community	37.85	11.71
Open Space and Amenity Area	102.89	31.84
Other Specified Uses	54.21	16.77
Major Road etc.	69.94	21.63
Total Area	323.20	100.00

Table1: Schedule of land uses and areas

3. EVOLUTION AND SYNERGY WITH SURROUNDING DISTRICTS

Adjacent to Kai Tak are several built-up districts including Kowloon City, Wong Tai Sin and Kwun Tong within Kowloon East. All of them are mature urban development areas mainly for residential and industrial use with a wide range of community and recreational facilities. Following the economic restructuring in recent decades and Government's policy initiatives to hasten the redevelopment/conversion process, the Kowloon Bay and Kwun Tong areas within Kowloon East has been gradually transformed into a distinct office node with a critical mass of offices further to the traditional "Central Business District" in Central. Under the current strategic planning, the office clusters and government node in Kai Tak will create noticeable synergy with the office belt transformed from the former industrial areas in Kowloon Bay and Kwun Tong, and provide an excellent opportunity for their evolution into a modern and premier business district in Kowloon East.

4. KEY URBAN DESIGN FEATURES

4.1. distinguished and attractive urban form

KTD is mainly surrounded by major trunk roads generating heavy traffic noise. In this regard, land uses with non-noise sensitive receivers, such as commercial and government, institution/community sites are located along the periphery of KTD, providing a shield to the inner residential sites. In principle, residential, office, retail and hotel developments are planned to mix with the sports and leisure activity nodes to ensure sustainable development and minimize cross-district traffic. The "podium-free" design concept has been adopted to enhance air ventilation, visual penetration and street level activities. Also, residential developments of suitable density are laid out in parcels with an average size of about 1 hectare each to create more intimately scaled urban street blocks.

4.2. A comprehensive green web

KTD seeks to improve the quality of living for the local population and cultivate a sense of belonging. Serving as a green web for sustainable development, KTD is characterized by a continuum of interconnected green spaces within KTD and its adjoining districts, and an extensive framework of tree and shrub planting. About 100 hectares of the land, which is about one third of the Kai Tak area, will be developed into green area and open space. This includes the 24-hectare Metro Park on former runway to become the prominent harbourfront park in Hong Kong. Other signature open spaces within KTD include the Station Square, Sung Wong Toi Park and Runway Park.

Moreover, KTD with about 11 km of continuous waterfront promenade will open up the harbour for public enjoyment. The scale of the promenade, occupying almost one-seventh of the waterfront of the Victoria Harbour, offers endless opportunities in the landscape design, with direct interface with the Kai Tak Cruise Terminal, Metro Park, Kai Tak Sport Park and a variety of other developments.

4.3. Connecting the neighbourhood

KTD is bounded by existing major road infrastructures such as the Prince Edward Road East and Kwun Tong Bypass. In addition, as a legacy of the former airport where security considerations took priority over pedestrian accessibility, there are limited connections with the surrounding districts. Through redevelopment of the former airport site, pedestrian circulations through an integrated network of open space, at-grade connections, footbridges and subways have been designed to maximize accessibility and mobility within KTD and further enhance connectivity with the surrounding districts and accessibility to the waterfront. A total of 25 numbers of new and enhanced connection points (Appendix C) will be provided between KTD and surrounding districts. For those existing pedestrian links subject to enhancement, thematic designs such as aviation history, street scene and etc., are adopted to highlight the culture and heritage of particular localities and to strengthen their function as welcoming entrances to KTD.

4.4. Preserving the heritage

KTD is dedicated to embracing not only its aviation history of being an ex-airport site but also the cultural and socio-economical significance of the neighbourhood districts in the development of Hong Kong. In this connection, the Kai Tak OZP was amended in 2012 to cater for the in-situ preservation of the remnants of Lung Tsun Stone Bridge (the Bridge) which was unearthed after the Kai Tak OZP had been formulated and approved in 2007. The historical significance of the Bridge remnants is attributable to its function as a pier for Qing Dynasty officials and garrison deployed at the Kowloon Walled City arriving on marine transport from 1875 until 1910s. Land parcels adjoining the preservation corridor were also rezoned to Comprehensive Development Areas for which the future developers would be mandated to submit master layout plans to demonstrate the relationship of their proposed developments with the preservation corridor.

Several signature open spaces (Appendix D) are also intended to preserve the unique “heritage” of Kai Tak as far as possible. With a nod to the aviation history of Hong Kong, part of the original Kai Tak Runway is retained and integrated into the planning of the parks. Substantial steel works with rustic finishes are used in the Kwun Tong Promenade to acknowledge the cargo handling area once established thereat. The drainage channel serving as a major flood relief path passing through the ex-airport site will be revamped to form the adorable Kai Tak River with extensive riverside hard and soft landscaping works. To date, the Kwun Tong Promenade and Runway Park Phase 1 have been completed and open for public enjoyment.

5. SUSTAINABLE INFRASTRUCTURES Environmentally friendly transport

The sustainable railway transport is planned as the backbone of public transport service for KTD (Appendix E). In this regard, the main developments in KTD are located in the former north apron area which will be served by the Shatin-to-Central Link (SCL) railway where two of its stations will be situated within Kai Tak. Subject to further study and consultation, an Environmentally Friendly Linkage System (EFLS) linking up the SCL stations and different areas/activity nodes of KTD is reserved in the OZP. As an essential component of the integrated multi-modal linkage system, the proposed EFLS would provide efficient intra-district connectivity services within Kowloon East, especially for those areas not served by the existing or planned MTR networks, and facilitate inter-district travelling through interchanges with the existing MTR Kwun Tong Line.

The section of the strategic Route 6 passing through KTD is planned in the form of depressed road or tunnel to significantly reduce noise, air and visual impact to the developments in the vicinity. In addition, local roads within KTD are all non-through roads (Appendix F) that can minimise the amount of through traffic and hence the traffic and environmental impacts.

5.2. Breeze through the grid

To promote natural ventilation in Kai Tak and to allow wind to penetrate the existing built-up areas in the hinterland, the new development area in KTD is laid out in a grid with breezeways (Appendix G) to capture the prevailing wind from the southeast. The development sites are divided in a manner to avoid wall effect. The space between the residential neighbourhoods will be mainly pedestrian streets with a width of 10 metres (m) to allow better air circulation and improve the townscape. Where necessary, set back of building lines from the site boundaries and building separation will be mandated to improve townscape and air circulation. These requirements are incorporated into the Kai Tak OZP for statutory control and under conditions of land lease and Government land allocations for mandatory enforcement.

5.3. High efficiency cooling

The District Cooling System (DCS) (Appendix H) is one of the major infrastructure facilities in support of the sustainable and environmentally-friendly development at Kai Tak. To promote energy efficiency and conservation, the Government is constructing a first-of-its-kind DCS in KTD to serve a planned total of about 1.73 million m2 of non-domestic air-conditioned gross floor areas. The DCS is an energy-efficient air-conditioning system, consuming 35% and 20% less electricity as compared with traditional air-cooled air-conditioning systems and individual water-cooled air-conditioning systems using cooling towers respectively.

Implementation of the DCS in KTD will bring about significant environmental benefits. Due to better energy efficiency, the maximum annual saving in electricity consumption upon completion of the entire DCS project is estimated to be 85 million kilowatt-hour, with a corresponding reduction of 59 500 tonnes of carbon dioxide emission per annum. Apart from energy saving, as chiller plants and the associated electrical equipment will no longer be necessary, each individual user building subscribing to the district cooling services will gain further benefits such as reduction in total building cost by about 5-10%, more flexible building designs and a more adaptable air-conditioning system to the varying demand.

5.4. Sustainable waterways

Given the considerable length of a continuous harbourfront, Kai Tak should be a suitable location for the provision of water-land interface to facilitate waterborne activities within particularly the two adjoining water bodies, namely the Kai Tak Approach Channel (KTAC) and the Kwun Tong Typhoon Shelter (KTTS), embayed by the former runway and the adjoining breakwaters. Nevertheless, poor water circulation within these two water bodies and continuous inflow of polluted water for decades due to expedient connections had caused water pollution and contaminated sediments deposited at the seabed, resulting in odour nuisance and other environmental problems. Upon the implementation of KTD, a 3-pronged approach has been adopted to mitigate the environmental problems by means of rectifying the expedient connections in the hinterland, bioremediation treatment of the contaminated sediments, and creation of a 600 m opening at the former runway to enhance tidal flushing effect within KTAC and KTTS.

Bioremediation treatment (Appendix I) is a cost-effective engineering solution to tackle the contaminated sediments. Basically, dredging was limited to localized pollution hotspots, followed by injection of calcium nitrate solution as an oxidant into the seabed to accelerate degrading the odorous substances into mainly odourless and harmless gases, thus reducing the offensive smells and improving the water quality. As a result, the burden on the reception sites for disposal of dredged materials can be substantially reduced. Recent field monitoring results indicates that the water quality within KTAC and KTTS has been improving significantly since the completion of the rectification of expedient connections and bioremediation treatment. There is more to be done. In lieu of the originally proposal to create a 600 m opening at the former runway which would result in the generation of huge construction waste, a recent study on other possible sustainable alternatives has revealed that further interception of the inflow at the immediate upstream of KTAC and creation of mechanical flushing by means of pumping seawater from the KTAC into the harbour side of the runway could achieve similar environmental performance as the originally proposed 600 m opening. Further development and design of this alternative inception and pumping scheme are underway.

6. GREEN BUILDING DESIGN

In Hong Kong, more than half of the total annual energy use is in the form of electricity consumption, with buildings accounting for about 90% of the city's electricity use. Promoting green buildings and enhancing building energy saving are priority considerations of KTD. Employment of low carbon and sustainable design is a mandatory requirement in all government and private buildings projects in Kai Tak, which is required to achieve at least Gold ratings under the Hong Kong Building Environmental Assessment Method (BEAM) Plus.

6.1. Government, Institute and Community (G/IC) building projects

As the first completed government offices building in Kai Tak, the Trade and Industry (TI) Tower project located at former north apron is set for demonstration purpose. Emphasis of the project has been placed on greening and energy conservation. With the energy efficient features and renewable energy technologies adopted in the building, the total electricity consumption of the building is anticipated to be approximately 25% less than normal office building. Major sustainable features in the project include double glazing and sunshades, integrated photovoltaic panels and photovoltaic panel, solar hot water system, solar chimney system, daylight sun-tube, solar tracking optic fibre light pipe and anidolic light pipe, lift regenerative power, automatic refuse storage system, drip irrigation system, water saving sanitary devices, use of material with recycled contents as well as adaptive and modular design for office area. In addition, the rectangular office tower is articulated with vertical greening. A “green ribbon” is formed through a series of vertical terraces on the façade as it extends up to the office tower and the roof garden. By achieving credits in various sustainable aspects, the TI Tower has achieved provisional Platinum rating under BEAM Plus as well as Platinum level under LEED® accreditation.

The Kai Tak Cruise Terminal Building at the tip of former runway is an iconic, highly functional and efficient terminal. The 42-m wide span column-free layout of the terminal building allows for maximum flexibility in the utilization of space, which can be configured in various layouts during non-peak season, optimizing the usage of the building. Design of the Cruise Terminal Building adopts a sustainable construction approach incorporating a large number of precast components and post-tensioning structures that extend beyond low energy consumption to the overall long term sustainability performance of the building. The project has also achieved provisional Platinum rating under BEAM Plus. Appendix J shows the overview of the major green buildings mentioned above.

The temporary building structure accommodating the Energizing Kowloon East Office (EKEO) is also a champion of sustainability by using a raft of integrated green building technologies and features, lean construction methods and low embodied energy materials to become Hong Kong's first low carbon temporary office. It revitalises a piece of unattractive land on a site under the Kwun Tong Bypass. This innovative and green EKEO building is the first temporary office building which is given final Platinum rating under BEAM Plus.

Through building disposition to bring in natural lighting and enhance ventilation while reducing heat gain, adoption of various green features and energy saving measures, many other G/IC buildings include Kowloon City No. 1 and No. 2 Sewage Pumping Stations have accredited with the final Platinum rating, Kai Tak Fire Station and Kai Tak Nullah No. 1 and No. 2 Desilting Compounds with the provisional Platinum rating, and Po Leung Kuk Stanley Ho Sau Nan Primary School and S.K.H. Holy Cross Primary School with the provisional Gold rating under BEAM Plus.

6.2. Residential and commercial building projects

In 2015, new greening clauses were formulated for incorporation into land sale conditions to mandate the requirement for private residential and commercial building projects within Kai Tak to secure provisional Gold rating or above under BEAM Plus as well as to provide smart water meter systems, electric vehicle charging facilities and additional greenery. To take further steps in building Kai Tak into a more sustainable and liveable community, there are also mandatory requirements on provision of real-time parking information in commercial car parks at appropriate sites.

In 2016, “De Novo” was completed as the first residential building project within Kai Tak, with provisional Platinum rating granted under BEAM Plus for its sustainable building design. This project is also renowned for being a pilot Flat-for-Flat scheme introduced under the prevailing Urban Renewal Strategy as an alternative choice to compensate domestic owner-occupiers affected by the Urban Renewal Authority’s redevelopment projects. It has been an exemplar demonstrating the application of green building design concepts in private development projects.

7. CONCLUSION

With its unique background and history as a well-known former international airport of Hong Kong, Kai Tak is in no doubt a huge, highly diversified and complex redevelopment project with various challenges. Built on its blueprint formulated by accommodating public aspirations through extensive community engagement programmes, KTD showcases the success in consensus building for a mega size development project. Given the holistic implementation approach, which has been supported by orchestrated development with measures focusing on environmentally friendly infrastructure, green buildings and heritage conservation, KTD is now on the move to realise its planning vision through shaping a distinguished, vibrant, attractive and people-oriented community by the Victoria Harbour.

8. APPENDIX

A – Location Plan

B – Kai Tak Outline Zoning Plan

C – Pedestrian Connectivity with Hinterland

D – Signature Open Spaces

E – Transportation Network

F – Road Network

G – Breezeways at KTD

H – District Cooling System (DCS)

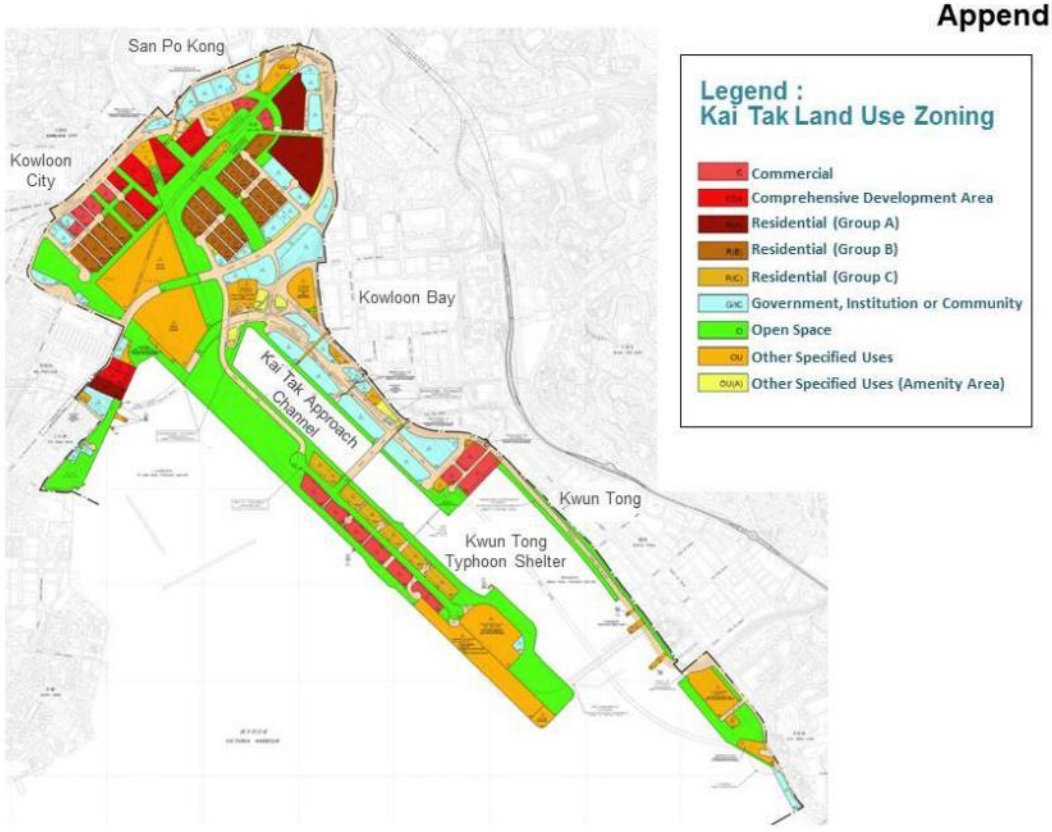
I – Bioremediation Treatment

J – Green Government, Institute and Community Building Projects

Appendix A

Location Plan

Appendix B



Kai Tak Outline Zoning Plan

Appendix C

Pedestrian Connectivity with Hinterland

Appendix D

Signature Open Spaces

Appendix E

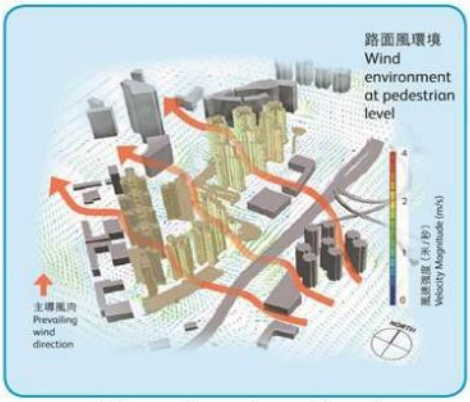
Transportation Network

Appendix F

Local Roads in Kai Tak

Appendix G

Capturing southeast prevailing winds



Managing micro-climate

Breezeway and Air Ventilation at Kai Tak

Appendix H

South Plant chillers

North Plant

District Cooling System

Appendix I

Before Treatment at KTAC

After Treatment at KTAC

Bioremediation Treatment

Appendix J

Kai Tak Cruise Terminal Building

Trade and Industry Tower

Energizing Kowloon East Office Building

Kowloon City No.1 and No.2 Sewage Pumping Stations

Green Government, Institute and Community Building Projects