Reshaping the urban quality of Hong Kong Using Mass Transit Railway Networks

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Abstract
Before 2007, Hong Kong’s railway networks were operated under two railway operators, namely the Mass Transit Railway (MTR) and the Kowloon Canton Railway Corporation (KCRC). The system was merged into the Mass Transit Railway Corporation (MTRC) with an aim to centralize public resources and to enhance the entire operation of the network, which include altogether 10 railway lines with a total servicing length of about 180 km.

Except for the East Rail previously operated by KCRC opened in early 20th Century linking Kowloon to Mainland China, the early generation of the railway network including the Island Line, Kwun Tong Line and Tsuen Wan Line, are all located inside the built-up downtown area and constructed underground. These lines were opened for operation from 1979 to 1982. With the introduction of these lines, the metro areas were extended substantially toward the outstretch districts, forming the various population clusters and extending the urban development patterns of Hong Kong.
The railway system has expanded rapidly since early 2000 as an outcome of the Railway Development Strategy introduced in mid 1990s. A total of three new lines, namely the West Rail, Tseung Kwan O Extension Line, and Ma On Shan Line, were put into operation from 2001 onward. These lines aim to serve the less developed zones at the northern part of the metro areas.

Besides providing more efficient transportation services to these newly developing zones, the planning features of these new lines also targeted to achieve other urban quality upgrading functions according to the master plans under the Territorial Development Strategy. The alignment of these new lines mainly runs through new town strips, majority of which were designed and developed between 1970s to early 1980s. As one of the original design objectives, these new lines also planned to facilitate re-structuring of the new town layout to fit for the up-to-date urban needs in terms of better utilization of space, catering for rapid growth in population, provision to improve urban environment with better landscape, green areas, open space, public and other pedestrian facilities.

This paper tries to highlight the planning principles and achievements in these areas as a result of the development of these MTR lines.

1 Introduction

With a population of 7.2 million within a hilly territory of less than 1100 sq km, the need to provide an efficient mass-transit system as the key transportation network for Hong Kong is unquestionable. Taking this target as one of the planning strategies for territorial development, the government of Hong Kong had established the Mass Transport Provisional Authority in 1975 to oversee the design and construction of the mass-transit railway projects. Upon completion of the first 3 lines, namely the Island Line, Kwun Tong Line and Tsuen Wan Line, the system was entrusted to the Mass Transit Railway, a government-owned body for operation.

The first territorial planning guideline, known as the “Hong Kong Outline Planning”, was released in 1972, which formed one of the keystones for planning of the new mass-transit railway network. The proposal to develop a series of new towns was also introduced under this Outline Planning guideline.

Within a development period of more than 35 years from 1975 to 2012, the mass transit network has expanded from 42 km to 180 km, serving a commuter group of about 3.9 million passenger-trips per day. The system also accounts for about 37 per cent of domestic public transport and some 61 per cent of the land-based cross-boundary passenger trips. This paper will focus on how the mass-transit network has contributed to the urban quality of the community during the various stages of its development.

2 Mass Transit Railway development between 1970s to 1980s

The first 3 lines including the Island Line, Tsuen Wan Line and Kwun Tong Line were put into operation from 1979 to 1982 in stages to fit the construction programs. By then the population in Hong Kong was about 5.2 millions.
The Island, Tsuen Wan and Kwun Tong Lines run inside the built-up areas of the city almost without any open space for locating the tracks. As a result, with a very limited exception, the entire alignment was constructed underground at the servicing roadway to avoid clashing with foundation of buildings. Besides, passenger entrances were situated in awkward locations, rendering their accessibility and uses of space hardly in a user-convenient position. Networks of pedestrian subway provided with elevators were thus constructed to improve accessibility. Similarly, the provision of more open space and other associated spatial upgrading design was also limited.

Some areas in particular those near the terminal points along the three lines where spaces were abundant during the 1970s, the rail networks were constructed on elevated tracks. These include the tracks from Kowloon Bay to Kwun Tong Stations in the Kwun Tong Line, from Lai King to Tsuen Wan Stations for the Tsuen Wan Line. The track for the Island Line was constructed at grade from Heng Fa Chuen to Chai Wan Station. This design was considered environmental unfriendly as it could create noise problems, visual impact, as well as isolating urban spaces.

To make the operation of the rail system more efficient, a service depot was provided for each MTR line. The average size of each depot is around 8 hectare to accommodate the regulating, parking, maintenance and other logistic backup of the rail services. The depot was so designed to locate in areas near the terminal point where they were less built-up during the 1970s. At the same time, these valuable land sectors would also be used for other property development purpose, generating funding for the construction projects.

The development of the depot usually adopts an elevated platform design. Underneath is the depot area where public access is restricted. The platform level and the superstructure on top are used for mixed purposes, with a significant amount of residential units supported with other commercial facilities like shopping mall, food market, restaurants, public spaces, landscape areas, schools and other required community facilities etc. (see photo 1). Such provisions are supposed to support a self-sufficed functional community. At the same time, this forms a nucleus for a mini township or urban centre supplementing the urban composition of the district.

For the Island, Tsuen Wan and Kwun Tong Lines, new development zones based on the rail depots namely the Luk Yeung Sun Chuen, Telford Gardens and Heng Fa Chuen respectively, were constructed in the early 1980s that have gradually become notable urban focus after a development period of 30 years.
3 Mass Transit Railway development during 1990s

The only railway line constructed during the 1990s was the rail line leading from the city centre to the new airport at Chek Lap Kok. This new network was separated into two lines; except for the separated station platforms due to toll difference, majority of the track lines are common. These two lines are the Tung Chung Line and the Airport Express Line.

The Airport Express Line consists of 5 stations (the Hong Kong, Kowloon, Tsing Yi and Airport and Aisa World Expo Stations), majority of which with air-flight check-in counter services. The Tung Chung Line consists of 8 stations (the Hong Kong, Kowloon, Olympic, Nam Chong, Lai King, Tsing Yi, Sunny Bay and Tung Chung Stations). These lines run mainly on newly formed land in order to obtain extra spaces to support the construction of the new airport and the associated developments.

Along the alignment of these two railway lines, all stations were so designed with significant amount of development to serve specific purposes meeting a 30-year planning target. The Airport Express and Tung Chung Line were the first two lines designed to meet with the master plan of Hong Kong under the Territorial Development Strategy. Under which, it serves a few distinctive targets including the development of the West Kowloon Reclamation District, the forming of a new town at Tung Chung, provision of the required infrastructure facilities to develop the Lantau Island into a district to facilitate logistic supporting services, leisure and recreation, and other cross-boundary transportation. These planning targets are important to enable the onward upgrading of the urban quality.

4 Mass Transit Railway development after late-1990s up to mid 2000s

The decade within 2000s was a high-yield period for Hong Kong’s railway development. Four major lines including the Tseung Kwan O Extension Line (2002), West Rail (2003), Ma On Shan Line (2004) and the Lok Ma Chau Spur Line (2007), were completed and put into operation respectively. Three other linking lines including the Tsim Sha Tsui Extension Line (2004), Disney Resort Line (2005), and the Kowloon Southern Link (2009), were also put into operation to line-up with the existing network. Below are the highlight of these lines and the targets of the development.

- Tseung Kwan O Extension Line – Tuen Kwan O is a new town developed in the early 1980s to support a population of about 0.45 million. The new line forming an extension from the Kwun Tong Line serves the targeted population and provides development potential for the new town.
- West Rail – The line consists of 9 stations with 3 situated in the metro zone and 6 in the north-western part of the New Territory. The NW New Territory with an area around 25 sq km will support a population target up to 1.2 million before 2020. This area belongs to the rural zone with villages and farmland which can be dated back to mid-1850s. The line cuts through a 10 km new-town strip stretching averaged 2.5 km wide from the Tuen Mun new town up to Yuen Long. Integrating with the Light Rail System, the West Rail provides a convenient link within the districts and the metro areas.
- Ma On Shan Line – The line is an extension to the East Rail from the Tai Wai Station. It consists of eight stations running on a narrow land strip along the eastern side of Tolo Harbour. Ma On Shan is
part of the Shatin New Town developments. Before 2004, the area was only served by public buses which limited its development potential. The new line can much improve the development pattern of the area after its operation. However, due to the confinement of the physical environment in the district, the new town is designed to support a small local community without too much opportunity for large-scale expansion.

- Lok Ma Chau Spur Line – Large amount of passengers crossing the boundary between Hong Kong and the Mainland imposed huge pressure for transportation since 1960s. As a major transportation strategy, railway is the major means for such services. As a result, rail transportation served more than 85% of the passenger flow for cross-boundary traffic, reaching an average of 280,000 passengers daily during the 2000s. Before the opening of the Lok Ma Chau Spur Line in 2007, the East Rail only terminated at Lo Wu Station providing the cross-boundary facility. The 7.5km new line provides an alternative route for passengers that link more conveniently to the western part of Shenzhen in China. The line will also provide an intermediate station at Kwu Tung which will be opened when needed to serve the north New Territory development in the mid-term planning.

- Tsim Sha Tsui Extension Line and the Kowloon Southern Link – The East Rail linking downtown in Hung Hom with the border of China and the West Rail linking Western Kowloon and the north-western part of New Territory are the two major rail lines that served the entire New Territory before 2007. However the two lines cannot be connected using direct rail link. To make the connection run in a more efficient manner serving two major population zones on the east and west side of the New Territory and to satisfy passenger demands, a new connecting line was constructed in two stages from 2000 to 2007 accordingly. An immediate station, the Austin Station, is introduced in between to serve the future West Kowloon Cultural District and the associated development, including the Express Rail linking to China network terminated in the adjacent reserved land.

- Disney Resort Line – Besides serving the Disney Theme Park, the line is also part of the inputs to develop north Lantau Island into a leisure and recreational zone.

5 Mass Transit Railway development starting from late 2000s

To cope with the Railway Development Strategy 2000, a series of new rail lines were also launched through a formal process from consultation, legislation, and detailed design till construction since 2004. These lines include the West Island Line, South Island Line, the Express Rail and the Shatin to Central Link. These lines will be put into operation from 2014 onwards. Below is the highlight of these lines and the targets for the development.

- West and South Island Line – The Island Line started operation in 1982 running from Sheung Wan to Chai Wan along a 13.5km strip on the northern shore of the Hong Kong Island. The western end and the southern populated zones of the Island cannot enjoy the MTR service until 2014. The introduction of these lines is to uplift the urban pace and development potentials of the districts after a lapse of more than 20 years.
The West Island Line runs through a densely populated old zone almost without any open space for locating the required station facilities (see photo 2). To cope with this limitation, all stations and rail tunnels are constructed underground. Networks of pedestrian subway, some with escalators linking up to elevated levels, are provided as entrances to the stations. Temporary work spaces are also reinstated with new greenery and landscaping provisions to compensate and upgrade the nearby urban quality when project completed.

The South Island Line links the built-up area on the Island north to the south-western shore where it is relatively less populated. Under the master plan, this district is designated to be a mixed zone with medium population density supported with tourism trades making use of the natural seashores and a theme park nearby (the Ocean Park). The new line will enhance the traffic condition and improve the potentials of development to help transforming the area from a relatively isolated zone to line up with the strategic development targets of the territory.

Photo 2 – It is quite unimaginable that the West Island Line will cut through this kind of congested urban environment so densely populated and under such a hilly topography.

- The Express Rail – The purpose of constructing the Express Rail is to link Hong Kong finally with the entire 15000km express rail system of mainland China in the coming future. The track within Hong Kong is about 26km in length without any immediate station until it reaches the interchanging station in Shenzhen, China. Other than its long term benefit in railway development, the terminal station of the rail at West Kowloon is one of the major planning targets that turns the area into a new city function centre (see Photo 3).

The terminal station is located in the new development zone of West Kowloon. Within its vicinity, there is the Kowloon Station of the Airport Express and 2 other local railway interchanging stations. The entire area is a high-end commercial, tourist, community and residential mixed zone. On the south side is the West Kowloon Cultural District which is targeted to open before 2018. The station is an underground structure. The ground level on top will be a public space with landscaping and pedestrian provision
linking to the nearby facilities. It also serves as a transitional space where the old city districts nearby can be seamed up harmoniously to the new development zone of West Kowloon.

**Photo 3 – The station main entrance for the Express Rail on the side of the world-famous Victoria Harbour**

**Photo 4 – The old districts from previous Kai Tak Airfield to Hung Hom where the Shatin to Central Link will cut through**

- **The Shatin to Central Link** – The main purpose of this new line is to provide rail service to an urban old zone running through Kai Tak, Kowloon City, To Kwa Wan and Hung Hom, which has been lagged behind in the overall planning development of Hong Kong since 1970s. The area of Kai Tak was the international airport of Hong Kong for more than 70 years until its removal to Chek Lap Kok in 1998. The other areas along the new alignment in South East Kowloon was previous a poorly maintained zone with low-income residence and industrial mixed layout (see Photo 4). Old industrial facilities within the district were relocated since 1970s due to the drifting of Hong Kong’s industries and high land price. Due to the lack of a definite planning without the input of mass transit, the district is lack of large-scale long term investment. The introduction of this new line will cope with the planning of the Kai Tak redevelopment as well as to set a permanent target for developers, thus materializing the upgrading potentials of the entire area.

### 6 General improvement that recent railway development brings toward urban environment

Improvements to the urban quality that a railway line brings to the community are different project by project due to differences in development background, government planning policy, physical environments, existing urban conditions or social structure of the district etc. Below are some of the common results that Mass Transit Railway has contributed.

- **Develop new local centre to achieve special development functions**

Making use of the railway stations or the depot vicinity the MTR serves to uplift or transform the area into a local centre with the infrastructure and community facilities it provided. During the process it can attract inputs by involved parties resulted to the upgrading of the existing social conditions and attracting further developments. This becomes one of the prime objectives for railway development especially for lines designed after 1980s. The Hong Kong and Kowloon Station of the Airport Express Line,
the Hang Hau Station of the Tseung Kwan O Line, Olympic Station of the Tung Chung Line (see Photo 5 and 6) and the Ma On Shan Station of the Ma On Shan Line, are some of these representative examples.

Photo 5 – The flagship of MTR development, the Kowloon Station of the Airport Express near the harbourfront with the ICC Tower and other world-class commercial/residential developments.

Photo 6 – The Olympic Station seaming up the new West Kowloon reclamation with the old districts nearby

Photo 7 – The entrance plaza of Lok Fu Station of the Kwun Tong Line provide a user friendly environment to the residence living in the public estates nearby

• Improve the urban layout around the station areas between different adjacent zones using the station as a seaming point

Majority of the Mass Transit Railway is served by 8 to 9-wagon trains and runs in a 2.5 to 3-minute frequency during peak hours. These underground stations stretch averaged 180m in length with pedestrian subway networks extending further outwards covering the entire station neighborhood. With a well-design layout, each station is able to re-align the local pedestrian flow efficiently and create an improved urban environment by seaming-up various awkward corners that are not convenient to reach without the station outreaches.
• Provide better connectivity between buildings nearby the station

During the past decades, the urban environments nearby many of the MTR stations within the metro areas have been uplifted drastically. The commercial potentials of the surrounding properties have increased a lot that attracts more collaboration between property owners and the MTR Corporation. As a usual practice, many of the new buildings have incorporated linking facilities in the planning that teeth-up with the pedestrian flow between each other to achieve a mutual benefit in property development.

• Improve the urban layout around the station accesses

Each MTR station can have an average 6 to 8 entrance/exit points. Besides serving as an access point, some of these points are so designed as an open space in miniature-scale for public gathering or other minor community functions (see Photo 7). This provision is extremely beneficial in congested urban environment within the metro centre.

• Provide additional high-quality public space along the rail alignment

The reserved land space within the MTR lines in particularly the strip along individual station in the new town zones are often so designed as public space provided with facilities like park and playground, landscaping and green belt, promenade, bicycle and pedestrian footpath or the alike (see Photo 8). This kind of facilities is for sure urgently needed by new township forming a long term composition in the town planning of these new zones.

Photo 8 – The reserved land along the West Rail between Shiu Hong and Tuen Mun Stations become a promenade strip with green belt, traffic interchange, bicycle path and other pedestrian facilities

• Uplifting of the urban images and cityscape

One of the design objectives of the MTR facilities also serves to improve the urban images, cityscape and living comfort of Hong Kong in response to the Green Master Planning introduced since early 2000s. This applies to old and new facilities in which the former will be done in Alteration & Addition (A & A)
packages teething in the overall layout of the environment at appropriate stages. The implementation process is quite efficiently established as the government will input various resources and carry out all works under the coordination of a few key parties including the Planning Department, Civil Engineering and Development Department, Highways Department, Traffic Department and the District Councils. In the process, public consultations will often be included through which the expectation of public groups can be collected and incorporated.

7 Conclusion

The MTR service celebrates her 33rd anniversary this year. It provides an efficient public means of mass transportation and she has achieved this target as expected. In this development period, she also achieves other functions remarkably making her a very useful instrument that helps shape the urban pattern and uplift the city quality of Hong Kong. The MTR is just arriving at her early adulthood. She can contribute more for sure in the coming future.

Before 2007, the Mass Transit Railway was a statutory corporation solely owned by the government. After the merging with the Kowloon Canton Railway Corporation, she runs with a stronger drive based on solely commercial/market operating principles. This provides a strong motivation for her to improve her services both on public transportation or other property developments, in which, the provision of a quality urban environment is of course one of the market niches. The commercial operating concept in particularly setting high-end outputs as an objective can bring in improvement and at the same time create unavoidable evils such as the escalating of property price that repels local economy and traditional way of life. This is an issue that worth further attention by planners and sociologists. Anyway, the experience that MTR learnt through the past 3 decades at the same pace with the urban growth of modern Hong Kong, she will for sure able to contribute more to the community in the years to come.

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