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To build a coordinated and sustainable world-class city-region is a complex and all-encompassing strategic proposition. It relies on a good spatial structure as the development framework, enhanced accessibility as safeguard to development efficiency, and a high-quality environment as safeguard to coordinated and sustainable development. As such, this study proposed the strategies for spatial structure optimization, high accessibility and quality environment for achieving coordinated development of the Greater PRD City-region.

3.1 Strategy for Optimizing Spatial Structure

Spatial structure is an important factor in the development of a region. The purpose of optimizing spatial structure is to improve the linkages of various elements in the region in order to improve the efficiency in investment and utilization of resources for promoting economic growth and optimizing of industrial structure in the region1.

On the basis of the "National Urban System Planning (2005–2020)", "Urban System Planning of Guangdong Province (2007–2020)", "Planning of the Pearl River Delta Townships (2004–2020)", and "Hong Kong 2030: Planning Vision and Strategy", and according to the objective of "developing a coordinated and sustainable world-class city-region", this chapter proposes that the optimization of spatial structure of the Greater PRD City-region should be launched in six aspects, namely a centralized "Bay Area", "Metropolitan Areas" with global functions, "Development Axes" oriented towards hinterland, "Development Tiers" for radiating function, integrated "Sub-regions" and "poly-centric network" of cities/towns. The strategy for optimizing spatial structure for the Greater PRD City-region could be generalized in one statement, "focusing at the Bay Area and three Metropolitan Areas, development of three Axes and four Tiers, and development of three Sub-regions in a poly-centric pattern" (Figure 3-1).

3.1.1 "Focusing at the Bay Area and three Metropolitan Areas"

(1) The "Bay Area" refers to the Bay Area of Pearl River Estuary. It broadly covers the whole of Hong Kong and Macao, the main parts of six cities including Guangzhou, Shenzhen, Zhuhai, Dongguan, Foshan and Zhongshan, and the main airports, ports and functional waterfront areas surrounding Pearl River Estuary. Because of its well-known position of being the regional industrial, ecological, political and cultural centres as well as a transportation hub, the Bay Area presents the core development space for the Greater PRD City-region. Guangdong, Hong Kong and Macao should make concerted efforts to develop the area into a region of innovations, high-end industries, transportation hub, quality environment, scenic attractions and cultural vibrancy so as to become a renowned liveable area in the world in the 21st century.

(2) The "Three Metropolitan Areas" refer to the Hong Kong-Shenzhen, Guangzhou-Foshan and Macao-Zhuhai Metropolitan Areas. The details are as follows.

The **Hong Kong-Shenzhen Metropolitan Area** should aim to consolidate Hong Kong's status as an Asia's World City and Shenzhen as one of China's economic centres. The Metropolitan Area's functions of promoting the development of the PRD, "Circum-PRD", "Pan-PRD"\(^1\), other parts of China as well as the overseas should be strengthened. The Metropolitan Area should also develop as one of the most important centres of modern service industries in the world. Such collaborative platforms as the "Shenzhen/Hong Kong Innovation Circle" and "Shenzhen-Hong Kong Cooperation Agreement" should be fully utilized to further strengthen coordinated development within the area.

The **Guangzhou-Foshan Metropolitan Area** should aim at strengthening Guangzhou's status as a key city, an integrated gateway and a regional centre of culture and education of China. Guangzhou should be developed as the best liveable area of Guangdong and an international metropolis oriented towards the world and serving the whole of China. The integration of Guangzhou and Foshan should be promoted. New methods for integration should be explored in such aspects as integration of infrastructure, industrial cooperation and integration of public services, making the Metropolitan Area one of the most competitive production centres and influential integrated service centres in the world.

The **Macao-Zhuhai Metropolitan Area** should make full use of Macao's status as an international leisure and tourism centre, and a regional trading and commercial service platform. Zhuhai's position as the key city on
the west bank of PRD should be reinforced. Strengthening the Macao-Zhuhai Metropolitan Area will increase the influence of the two cities on the west bank of PRD, capitalize on the area's advantages of the abundance of resources and good environment, promote the development of large-scale industries and form a new economic growth pole.

(3) "Focusing at the Bay Area and three Metropolitan Areas": this strategy is to ensure that the Bay Area and the three Metropolitan Areas, via coordination or cooperation actions, will surmount the constraints set by administrative divisions and inadequate transport infrastructure for efficient distribution of economic factors, and form an enhanced spatial structure to consolidate economic development. Externally, the Bay Area and the three Metropolitan Areas would participate in international competition and cooperation "on behalf" of the Greater PRD, targeting to exercise the consolidation functions of global cities like New York, London and Tokyo. Internally, it should take a pivotal role in promoting the overall economic development of PRD and "Circum-PRD", and serving as an economic centre of China (Figure 3-2).

3.1.2 "Development of Three Axes and Four Tiers"

(1) The "Three Axes" refer to the three major development axes in the region, namely the roughly north-south running "Guangzhou/Shenzhen/Hong Kong Development Axis" (connecting Guangzhou, Dongguan, Shenzhen and Hong Kong) and "Guangzhou/Zhuhai/Macao Development Axis" (connecting Guangzhou, Foshan, Zhongshan, Zhuhai and Macao), and the east-west running "Coastal Development Axis" (connecting Shenzhen and Hong Kong on the east bank with Zhongshan, Zhuhai and Macao on the west bank, via the Hong Kong-Zhuhai-Macao Bridge, Shenzhen-Zhongshan Bridge and, in the long term, the railway bridge crossing Pearl River).
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The idea of "Three Axes" is developed on the basis of the "regional development backbone" set out in the "Planning for the PRD Townships" for strengthening Guangzhou and Shenzhen as the regional centres and integrating the functions of the areas along the Guangzhou-Hong Kong axis to improve the overall competitiveness of the region. From an internal perspective, the upgrading of the Guangzhou/Zhuhai/Macao Development Axis and the establishment of Coastal Development Axis, combined with the strengthening of the Macao-Zhuhai Metropolitan Area as the new pivot of the Bay Area, will help the Hong Kong-Shenzhen Metropolitan Area to radiate its influences onto the west bank of PRD, promoting the west bank as the region's new growth pole. From an external perspective, the extension of Coastal Development Axis to its eastern and western flanks will bestow the region, currently at a peripheral position of China's land transport network, with a stronger pivotal status. With the strengthening of Guangzhou/Zhuhai/Macao and Guangzhou/Shenzhen/Hong Kong Development Axes, the region will be linked with the Mainland along the "Beijing/Guangdong artery" to the north, and along the coastal rapid railway to the east and west. From the perspective of Hong Kong and Macao, the three major development axes mark the first time that both cities are included in the PRD transportation hub at the Bay Area. The ability of Guangdong, Hong Kong and Macao to connect with a greater hinterland will be improved.

(2) The "Four Tiers" refer to the multi-tier development space formed by the Bay Area, the outer Greater PRD, the "Circum-PRD" (including the eastern, western and northern Guangdong and the adjoining peripheral areas) and the "Pan-PRD" (including nine provinces, i.e. Guangdong, Fujian, Jiangxi, Guangxi, Hainan, Hunan, Sichuan, Yunnan and Guizhou).

The "Circum-PRD" and "Pan-PRD" form the principal hinterland that connects Greater PRD with the other regions in China. Their function is to consolidate and expand the influences of the Greater PRD, notably the Bay Area. On one hand, the Bay Area would provide impetus for the "Circum-PRD" to participate in the coordinated development of Guangdong. On the other hand, the development of "Circum-PRD" would strengthen the linkages between the Greater PRD and the economic hinterland of the "Pan-PRD" (Figure 3-3).
From the perspective of regional development, the development of four Tiers should be considered in a scope covering a larger area in the Mainland as well as overseas. Efforts should be made to engage with the major markets in China such as the Yangtze River Delta and the Beijing-Tianjin-Hebei region to form a great development axis in the east. Efforts should also be made to engage with the overseas markets for enhancing global connections. The advantages of export-oriented economy of the Greater PRD should be fully utilized to explore new overseas markets, consolidate the traditional markets like Europe, USA and Japan, further strengthen the cooperation with Southeast Asia in the "10+1" free trade framework, and reinforce the position as a gateway for connecting the markets in China and overseas (Figure 3-4).

3.1.3 "Development of Three Sub-regions in a Poly-centric Pattern"

(1) The "Three Sub-regions" refer to the Eastern Sub-region comprising Hong Kong, Shenzhen, Dongguan and Huizhou; Central Sub-region comprising Guangzhou, Foshan and Zhaoqing; and Western Sub-region comprising Macao, Zhuhai, Jiangmen and Zhongshan. In this study, the development of the three Sub-regions is proposed to highlight the importance of balanced development and allowing resource allocation and spatial development in the approach which is specific to the need of individual cities/towns. The Sub-regions will serve as the spatial units for integration of economic development in the Greater PRD region.

The formation of the three Sub-regions signifies the end of a situation that each city in the PRD does things in its own way. The potential of economy of scale and economic agglomeration will then be realized. The development of Sub-regions will be conducive to the mutual complementation and functional integration among the Bay Area, the Metropolitan Areas and the Outer Greater
PRD. It will also help integrate the infrastructure within the region and promote the development of integrated and specialized centres at the peripheral areas. In turn, it will boost urbanization (not only the development of towns driven by industrialization and integration of towns and villages, which is characterized with low-quality social and economic development). The functional integration of the Sub-regions will inevitably bring about reforms in the modes of economic development and resource allocation. The problems that exist in the previously uncontrolled economy and scatter land uses and town development will be rectified. A platform for the resolution of certain sub-regional environmental problems, such as the control of water quality of rivers with small catchment area, will become available.

**Eastern Sub-region:** the key objective is that Hong Kong and Shenzhen should work together to build a global centre of finance, logistics, trading, innovation, and innovative culture. Based on the "Shenzhen/Hong Kong Innovation Circle" and the "Framework Agreement on Promoting Close
Cooperation in the East Bank of the Pearl River Estuary", comprehensive cooperation on areas such as development planning, industrial development, regional innovation, transportation, safeguard of energy supply, water resources and flood control, information network, environment and ecology, and public administration should be encouraged.

Central Sub-region: Guangzhou should make full use of its advantages as a provincial capital and a major city in the Greater PRD City-region. Building on the integration of Guangzhou and Foshan, Guangzhou, Foshan and Zhaoqing should join hands to implement their consensus in building a "Guangzhou-Foshan-Zhaoqing economic zone". They should first make breakthroughs in areas such as planning, transportation infrastructure, industrial development, ecology protection, education, culture, healthcare, tourism, public safety and cooperation in the "double shift" process to set an exemplar role in promoting integration in the PRD. Priority should be given to the development of high-end service industry, construction of advanced manufacturing base, advancement of the capabilities in innovation and establishment of a modern industrial system. Guangzhou should also amass greater cultural strengths, increase its competitiveness, underpin its status as a major city of China, an integrated gateway city and a regional cultural and educational centre, and enhance its radiating and driving power. The ecology in Zhaoqing should be protected and the tourism resources there should be properly developed, coupling with the industrial resources in the Guangzhou-Foshan Metropolitan Area, to promote overall economical growth in the Sub-region.

Western Sub-region: on the basis of the protection of ecology, the cities in this Sub-region should work towards closer cooperation in areas such as planning, transportation, industry, environmental protection, technology, contingency management, Hong Kong – Macao cooperation, and servicing the western Guangdong in order to enhance the overall development level and competitiveness of the Sub-region. The Zhuhai-Macao Metropolitan Area should serve as the centre of the Sub-region to take full advantages of Macao as "an international tourism and leisure centre and a regional trading and commercial service platform", and solidify the status of Zhuhai as a key city in the west bank of Pearl River. Zhuhai should play an important role similar to Guangzhou and Shenzhen to lift the development level of the west bank of PRD.

(2) "Poly-centric pattern" refers to the multi-node network of cities and towns in the Greater PRD City-region, which are of different scales and are arranged in clearly defined hierarchy. It includes:

The Centres of the city-region: comprising the six regional centres forming the Hong Kong-Shenzhen, Guangzhou-Foshan and Macao-Zhuhai Metropolitan Areas. They carry out the most comprehensive and highest level of functions in the city-region, including division of labour on the regional, national and international levels, and the radiating, driving and servicing functions within the city-region.
The integrated centres in sub-region level: comprising the other five prefecture-level cities in the PRD. Through strengthening the integrated servicing functions of these cities, the servicing capacity of the three Sub-regions will be improved and the competitiveness of the Greater PRD City-region will be enhanced.

The specialized centres in sub-region level: comprising those relatively developed industrial parks and specialized towns in the Bay Area and along the three major Development Axes. Through institutional arrangements and industrial integration, they will form new sub-regional centres. Through spatial and functional integration and optimization, these centres will achieve economy of scale and economic integration to enhance the industrial competitiveness of the Greater PRD City-region.

The specialized towns: comprising the various specialized towns which are of different industrial advantages and development characteristics. Through spatial integration of land use and industries, the urbanization process of these specialized towns will be enhanced leading to the formation of local manufacturing centres with industrial agglomeration.

(3) The "development of three Sub-regions in a poly-centric pattern" underpins the distinctive functional framework of the Greater PRD City-region for co-ordinated development of the region. The formation of the three Sub-regions will bring Hong Kong and Macao into the framework in which the cities in PRD have been working towards closer relationships (for example, the integration of Guangzhou and Foshan). While promoting the functional integration of Hong Kong, Macao and PRD, the gap between the development levels of the east and west banks of the Pearl River should be narrowed to achieve a more balanced regional development. The "poly-centric" strategy aims at developing a rational structure of cities/towns in the city-region, encouraging the cities/towns to make full use of their local advantages for specialized development to achieve an integrated development and "smart growth" of the region (Figure 3-5).

3.1.4 The internal relationship within the spatial structure

The concepts of "Bay Area", "Metropolitan Area", "Development Axis", "Development Tier", "Sub-region" and "poly-centre pattern" have their own distinctive meanings but are also correlated. They will jointly reinforce the various functions of the Greater PRD City-region, forming the region into a spatial entity to attain the objective of developing into a world-class city-region. The interrelationship of the concepts is as follows:

(1) The Bay Area is the major spatial unit in the Greater PRD City-region carrying out global functions. The three "Metropolitan Areas" will collectively fulfil their roles as "global cities" on the basis of cooperation across administrative boundaries. The "consolidation-radiation" functions of the Bay Area (including the three Metropolitan Areas) can only be achieved by
strengthening the Development Axes and Development Tiers. The three Sub-regions will directly support the three Metropolitan Areas and will also form the direct hinterland of the Bay Area.

(2) The concepts of "Sub-region" and "poly-centric pattern" are not only related to the different functions of individual sub-regions and cities/towns. They also represent the complementation and integration of these spatial entities. Each city would have its own development agenda but they should cooperate on the sub-regional level to narrow the gap between the development levels of the east and west banks of Pearl River and attain a closer integration among Guangdong, Hong Kong and Macao. In each Sub-region, the driving role of the "Metropolitan Area" in the establishment of integrated service centres and specialized industrial centres should be emphasized. The integration of functions should be achieved through the institutional integration in the Bay Area and the linkage of the "Development Axes".

(3) The Bay Area is the core of the four "Development Tiers". Further away from the core, the economic influences of the Bay Area will decrease. The postulation of "tier" development is to "expand" the Bay Area's influences. The effectiveness of expansion would depend on such factors as the industrial and institutional setup, manpower and infrastructure in each tier. The "Development Axes" provide the direct driving force of tier development. The development of the tiers of "Circum-PRD" and "Pan-PRD" will be in form of the development of new cities/towns and a poly-centric network of cities/towns.

3.2 Strategy for High Accessibility

As an essential factor of mobility, well-developed transportation
infrastructure is one of the prerequisites for economic development. A world-class transportation hub connecting with other areas within the local country as well as the overseas is a necessary condition for a coordinated and sustainable world-class city-region. The importance of transport accessibility is also demonstrated in the success of the well-established city-regions and the globalization of economic systems which is characterized with high mobility of human and resources. For this reason, a Strategy for High Accessibility should be applied to build the Greater PRD into a world-class city-region (Column 3-1). Based on the status-quo and development trend of the Greater PRD City-region, the Strategy should be implemented through further optimizing the overall transportation network, the regional transportation hubs and the intercity transportation systems as well as their respective connecting infrastructures, including the cross-boundary facilities.

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Column 3-1: The Meaning of Accessibility

Accessibility means the degree of convenience of travelling from one place to another via a specific transportation system. It reflects the ease or difficulty for two places to overcome the communication constraints caused by physical separation and can be interpreted as a measurement of the relationship between two places. Accessibility is usually measured in terms of time (e.g. "one-hour commuting circle"), which is a fundamental consideration in travelling. Thus, accessibility does not only concern the use of traffic infrastructure to shorten the distance between two places but also the use of transportation modes and traffic management means, the latter in particular, to achieve connection and integration of transportation facilities to minimize the time for travelling and cargo transportation.

The Greater PRD City-region is characterized as a "gateway-type" integrated transportation hub. It is a navigation centre that connects with overseas countries and a transportation hub that connects with all areas within China. It also comprises cross-boundary transportation. From the consensus reached among Guangdong, Hong Kong and Macao in all levels of planning and taking into account the existing transportation problems in the region, the transportation development in the region should proceed towards the objectives of being more integrative, convenient, pivotal and environment-friendly. On this basis, this chapter sets forth the Strategy for High Accessibility for the Greater PRD City-region, which includes the establishment of a systematic transportation network comprising the Bay Area as the hub of external linkages, a "one-hour intercity commuting circle" (Figure 3-6) and "seamless connections" in cross-boundary traffic.

3.2.1 The Bay Area as the transportation hub of external linkages

Due to the existence of administrative boundaries, no single city in the Greater PRD City-region can play the important role of transportation hub of external linkages without the support of other cities. In the circumstance, the Bay Area as a whole should be made the hub of the external transportation system of the Greater PRD City-region. All concerned cities should co-ordinate amongst themselves in transportation planning through effective cooperation mechanisms, and set up convenient connections between major transportation nodes to help establish an integrated transportation hub.
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In making the Bay Area the transportation hub, all cities within the area should abandon the idea of acting as an independent transportation hub, and should work together to establish a "multi-airport system" and an "integrated port system" in the region which run across the administrative boundaries. The overall position of the Bay Area as a transportation hub of external linkages should be reinforced when planning the regional expressway and railway networks, and the connections between the important facilities such as airports and ports should be strengthened to increase the integrity of the external transportation system.

3.2.2 The "one-hour intercity commuting circle"

The "one-hour intercity commuting circle" involves the establishment of express transportation networks of mainly railways and expressways which link up major transportation nodes in the Greater PRD City-region. It comprises mainly the following three components:

(1) a "one-hour commuting circle within the Bay Area", which would enable the transportation from one major node to another between any two cities in the Bay Area to complete in less than one hour;

(2) "one-hour commuting circle within Sub-regions", which would enable the transportation from one major node to another between any two cities in each of the three Sub-regions to complete in less than one hour;

(3) "one-hour commuting circle in Metropolitan Areas", which would enable rapid commuting across the boundary between the cities in each of the three Metropolitan Areas.

Apart from the implementation of the intercity rail links, the railway network within each city should also be improved. The stations of intercity rail links should be taken as the nodes for connecting to the railway networks of individual cities.
The "one-hour intercity commuting circle" of the Greater PRD City-region is established to enhance the mobility of passengers and cargo within the city-region so as to make the urban functions like transportation, land use, employment and living more convenient and to create a more efficient form of spatial organization.

3.2.3 "Seamless Connections" in cross-boundary traffic

Achieving "seamless connections" in cross-boundary traffic between Hong Kong, Macao and the PRD would help ease the traffic congestion caused by administrative boundaries, reduce the time and cost on CIQ clearance, and enhance the overall transportation efficiency within the Greater PRD City-region. Focus should be put on the coordination in the improvement of cross-boundary transportation routes and boundary crossing facilities.

(1) As regards the improvement of cross-boundary transportation routes, the implementation of the major cross-boundary infrastructure projects as agreed among the State, Hong Kong/Macao and Guangdong Province should be expedited. Connections of the major transportation routes among Guangdong, Hong Kong and Macao should be enhanced, and express routes linking up the airports and ports in the region should be established. By means of expressways and intercity express railways, special routes connecting the airports should be established.

(2) Regarding the boundary crossing facilities, the BCPs connecting the "adjoining areas", such as those between Hong Kong and Shenzhen, Hong Kong and Macao, Hong Kong and Zhuhai, and Macao and Zhuhai, as well as those connecting the "non-adjoining areas", such as those between Hong Kong/Macao and the inland areas of PRD region, should be enhanced. The boundary control facilities should be expanded to enhance the CIQ clearance efficiency. Furthermore, the boundary-crossing facilities for the "non-adjoining areas" should be enhanced to help satisfy the cross-boundary transportation needs between different areas in the Mainland and Hong Kong/Macao. On the basis of optimizing the spatial arrangement of boundary crossing infrastructure, studies on the improvement of cross-boundary transportation management should be undertaken. By introducing hi-tech methods and innovative management practices and the enhancement of "soft environments", it is expected that the effectiveness and efficiency of cross-boundary infrastructure can be optimized to achieve "seamless connections".

3.3 Strategy for Quality Environment

While the PRD manages to make great strides in its social and economic development by means of extraordinarily rapid industrialization and urbanization, it pays the price by having its ecology and environment deteriorated. Ecology, atmospheric environment and aquatic environment should be considered as a whole and form the basic components of quality environment of the Greater PRD City-region to safeguard a quality living area...
for the region. For this purpose, this chapter proposes a Strategy for Quality Environment for the Greater PRD City-region, which is set out "to establish a comprehensive eco-security system in the region with emphasis on protecting the ecologically sensitive areas; to promote the control over atmospheric and aquatic environments and intensify the comprehensive control over major polluting sources and polluted areas; and to ascertain the environmental protection responsibilities of each city through effective cooperation".

3.3.1 To establish a comprehensive eco-security system in the region with emphasis on protecting the ecologically sensitive areas

The comprehensive eco-security system of the Greater PRD City-region should comprise the three major rivers (as river-based ecological corridors), seven mountain ranges (as natural ecological corridors), three vertical and three horizontal trunk routes (as traffic ecological corridors), and nine major eco-functional zones in the region (see Column 3-2) to form a "tree-form" network of green areas and water systems providing adequate safeguard to the ecosystem. The functional origins and nodes of ecological significance should be identified and protected as part of an integrated ecosystem comprising clean water and green hills, and with green belts as an important landscape element. Efforts should also be made to protect the ecologically sensitive areas such as the Pearl River Estuary, Shenzhen Bay, Mirs Bay, Wugui Mountain-Fenghuang Mountain-Hengqin Island, Wanshan Islands and so on (Figure 3-7).

Column 3-2: The Eco-security System

"Three Rivers" : Xi Jiang, Bei Jiang and Dong Jiang in the Pearl River system;
"Seven Mountains": the hilly areas comprising Lianhua Mountain and its residual range, Maluan Mountain, Wutong Mountain, Pat Sin Leng–Tai Lam Country Park; the hilly areas comprising Baipenzhu Reservoir-Gutian Nature Reserve–Xiangtou Mountain; the hilly areas comprising Luofu Mountain–Liuxihe Reservoir in Chonghua; the hilly areas comprising Dinghu Mountain area–Liantang; the hilly areas comprising Genghe–Zhaiwu–the western hilly area of Enping; the hilly areas comprising Guda Mountain–Liangmo Mountain; and the hilly areas comprising Hengqin–Fenghuang Mountain–Wugui Mountain;
"Three Vertical and Three Horizontal Trunk Routes": the "Three Vertical Trunk Routes" refer to the routes along Beijing-Kowloon Railway – National Expressway 205 – Huizhou-Heyuan and Huizhou-Yantian Expressways; Beijing-Guangzhou Railway – Beijing-Zhuhai Expressway – National Expressways 105 & 106 – Guangzhou-Shenzhen and Guangzhou-Qingyuan Expressways and South China Expressway; and Xinhui-Taishan and Foshan-Kaiping Expressways – National Expressway 325. The "Three Horizontal Trunk Routes" refer to the northern route which runs along National Expressway 321 & 324, Guangzhou-Zhaoping, Guangzhou-Shanshui and Guangzhou-Huizhou Expressways, Guangzhou-Zhaoping/Dongguan Railway; the central route that links Huizhou-Jiangmen, Jihe and Shenzhen-Huizhou Expressways; and the coastal route that runs along the West Coastal Expressway, Yantian-Bagang and Shenzhen-Shantou Expressways.
"Nine eco-functional zones": refer to Column 6-1.
3.3.2 To promote the control over atmospheric and aquatic environments and intensify the comprehensive control over major polluting sources and polluted areas

For the improvement of air quality in the Greater PRD region, the concerned cities should coordinate among themselves in setting regional environmental standards and air quality objectives. Focus should be put on the prevention and control of air pollution in the Hong Kong-Shenzhen, Guangzhou-Foshan and Macao-Zhuhai Metropolitan Areas, and tightening the control over automobile exhaust emissions. Regarding the management of water quality, based on the principle of balancing between duties, rights and benefits, the concerned cities in the Greater PRD City-region as well as the entire catchment area of Pearl River should strive together for stronger cooperation in the control of water pollution of Pearl River and tackling the problem of water shortage induced by deterioration of water quality. All concerned cities should jointly protect the eco-security of Pearl River Estuary and establish quality ecology/environment for a liveable Bay Area.

3.3.3 To ascertain the environmental protection responsibilities of each city through effective cooperation

All cities should observe closely their respective responsibilities in the protection of environment and the comprehensive eco-security system. The relevant authorities should protect the major ecological nodes under their jurisdictions according to the comprehensive eco-security system. They should also strive together for the control over the regional ecology/environment and the implementation of relevant technical measures to raise the standard of environmental protection in the region. Furthermore, they
should work together on the implementation of common environmental objectives to protect the regional ecology and environment. Specific tasks include:

(1) To establish ecological zones with clear demarcation of protection responsibilities: to facilitate implementation of the comprehensive eco-security system, the Greater PRD City-region should be divided into three ecological zones, namely the East Bank, West Bank and Central Ecological Zones, each with distinctive focus of protection and clear demarcation of protection responsibilities among the concerned cities. The East Bank Ecological Zone comprises Hong Kong, Shenzhen, Dongguan and Huizhou. The focus is to protect the eco-functional origins such as the mountain ranges stretching from eastern Huizhou (Lianghua Mountain) to Shenzhen (Maluan Mountain and Wutong Mountain) and northern Hong Kong (Pat Sin Leng and Tai Lam Country Parks). The West Bank Ecological Zone comprises Macao, Zhuhai, Zhongshan and Jiangmen. The focus is to protect the eco-functional origins such as Wugui Mountain in Zhongshan and Fenghuang Mountain in Zhuhai. The Central Ecological Zone comprises Guangzhou, Foshan and Zhaoqing. The focus of protection is the eco-functional origins such as the Dinghu Mountain in northern Zhaoqing and the hills surrounding the Liuxihe Reservoir in northern Conghua.

(2) To strive together for the control over regional ecology and environment and the implementation of relevant technical measures to raise the standard of environmental protection: cities located in the Greater PRD City-region should focus on comprehensive control and prevention of the pollution caused by acid-rain, sulfur dioxide, nitrogen oxides, tiny particles, volatile organic compounds, industrial emissions, urban sewage, agricultural activities, etc. to raise the standard of environmental protection in the region.

(3) To implement common environmental objectives to protect the regional ecology and environment: all concerned authorities should fully implement the regional environmental objectives set forth in their respective environmental plans (such as the "Environmental Protection Plan for the Pearl River Delta") and those agreed between the governments to safeguard environmental protection in the Greater PRD City-region.