

3.2 Good Practice of TOD

1) Overview

3.12 TOD has long been a key concept for both transportation and urban development in many large cities in Japan. Nowadays, Tokyo is the largest metropolitan area in the world with a total population of over 30 million. Yet, Tokyo is known for being one of the most competitive, livable and environmental-friendly city in the world. Although Tokyo suffers from traffic congestions, people and visitors can travel relatively smoothly among various social and business activities. This is largely due to the fact that Tokyo has an extensive urban rail network, which has been developed both by the public and the private sectors for long in the process of rapid urbanization. Therefore, there are many cases and experiences of Tokyo that can be used as a good reference for the future development of Hanoi. Some representative examples are shown in the following sections.

2) Smart Growth of Cities Based on TOD

3.13 A key role of TOD is to promote expansion of urban areas and accommodate increasing population in a sustainable manner, meaning that the people are provided with affordable housing and improved living environment, while mobility and accessibility to work places, schools and other services are concurrently provided through high-quality public transport. Developments of compact urban areas are encouraged along the rail lines.

3.14 Integrated development of new towns and suburban railway is one of the most characteristic experiences during the time of rapid urban expansion of large-cities in Japan, especially Tokyo and Osaka metropolitan areas. There are many cases of this types of TODs with different scales of development, for different purposes and by different implementing organizations (public or private). A few representative cases are detailed below:

(i) Urban Development by the Public Sector in Tama New Town

3.15 Tama New Town is a large residential development, straddling the four municipalities of Tokyo (Hachioji, Tama, Inagi and Machida Cities), with an area of about 28,000 ha. It was designed as a new town in 1965 by the metropolitan government. It is approximately 14 kilometer- large, stretching from east to west, and 1km - 3 km wide. It is located in an expanse of hills known as the Tama Hills about 20 km west of the center of Tokyo. The railway lines running through the area include Keio Railway and Odakyu Line, with two lines and more than 10 stations, which connect with the sub-center of Tokyo, Shinjuku.

3.16 The area’s development has been conducted mainly by the public sector with only some small areas in which the residents who wanted to stay applied the land readjustment method.

Figure 3.2.1 Image of Tama New Town



Source: Urban Renaissance Agency

Figure 3.2.2 Backbone Structure of Tama New Town



(ii) Private sector urban development integrated with railway by Tokyu Corporation

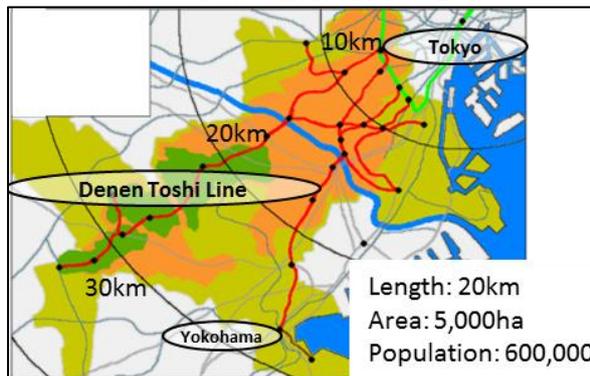
3.17 Tokyu Corporation, one of the largest railway and real estate private company, has developed the residential areas integrated with railway networks extending to the southwest suburban area of Tokyo Metropolitan Area. Besides railway and real estate development, Tokyu has been involved in various types of businesses such as the commercial and retail business (hotel, tour and resort business, etc.). The "Tama Denen Toshi" (Tama Garden City) along Tokyu's Den-en-toshi Line is one of the success examples of Tokyu's efforts to integrate rail and property development.

3.18 The 49,000 ha area along the railway line has a population of about 5 million and is one of the successful high-end suburban residential areas in Tokyo Metropolitan Area. There are bus networks run by Tokyu that act as feeders to connect the farther suburban development to the Den-en-toshi Line. At one of the stations on the Den-en-toshi Line, Tama-Plaza station, there is a good example of Tokyu's efforts to integrate commercial development with a railway station.

3.19 Tama Plaza Tokyu Shopping Center opened in the north of the railway station. It is the center area of the Tokyu Tama Garden City area. It meets the needs of the 21st century and it is based on the concept of attracting a wide range of customers in order to maintain the vitality of the surrounding area.

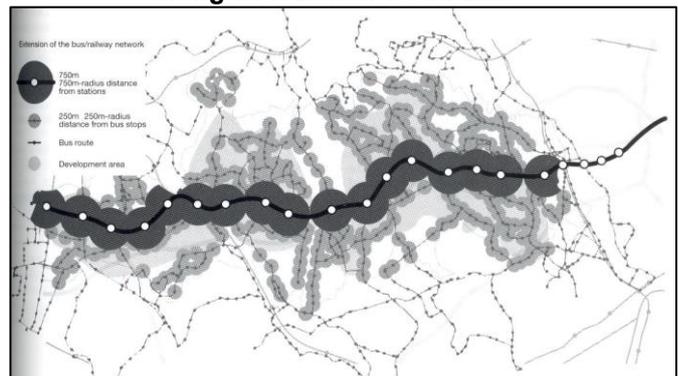
3.20 Tama Plaza Station Building: This station is the town center of the CBD of Tama Garden city which was developed by Tokyu Corporation in the suburban area of western Yokohama. It was renewed as an integrated UMRT station. Intermodal facilities and commercial facilities enabled to connect two communities of the north and of south of the station. The station is surrounded by kiosk-style commercial facilities for visitors and station users to enjoy rambling and shopping above the station. The redevelopment project includes an artificial ground over the station and its vicinity area, on which commercial facilities and a station plaza were recently developed.

Figure 3.2.3 Smart Growth of Urban Area based on UMRT and TOD



Source: JICA Project Team

Figure 3.2.4 Extension of the bus/railway network along with Denen Toshi Line



Source: Nikken Sekkei ISCD

Figure 3.2.5 Tama Plaza Station Area along with Denen Toshi Line

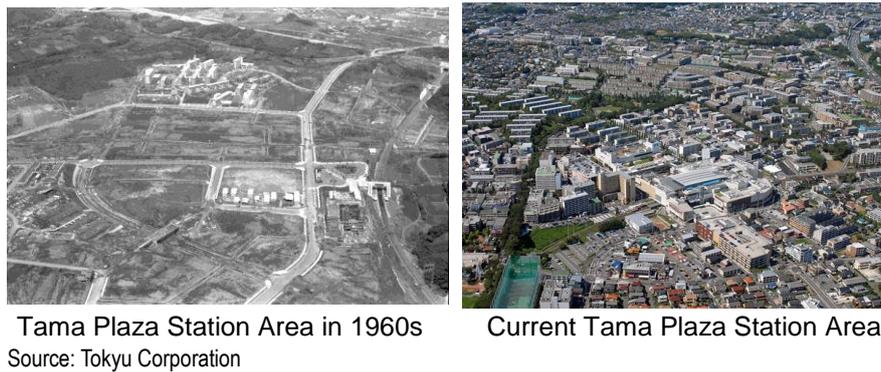
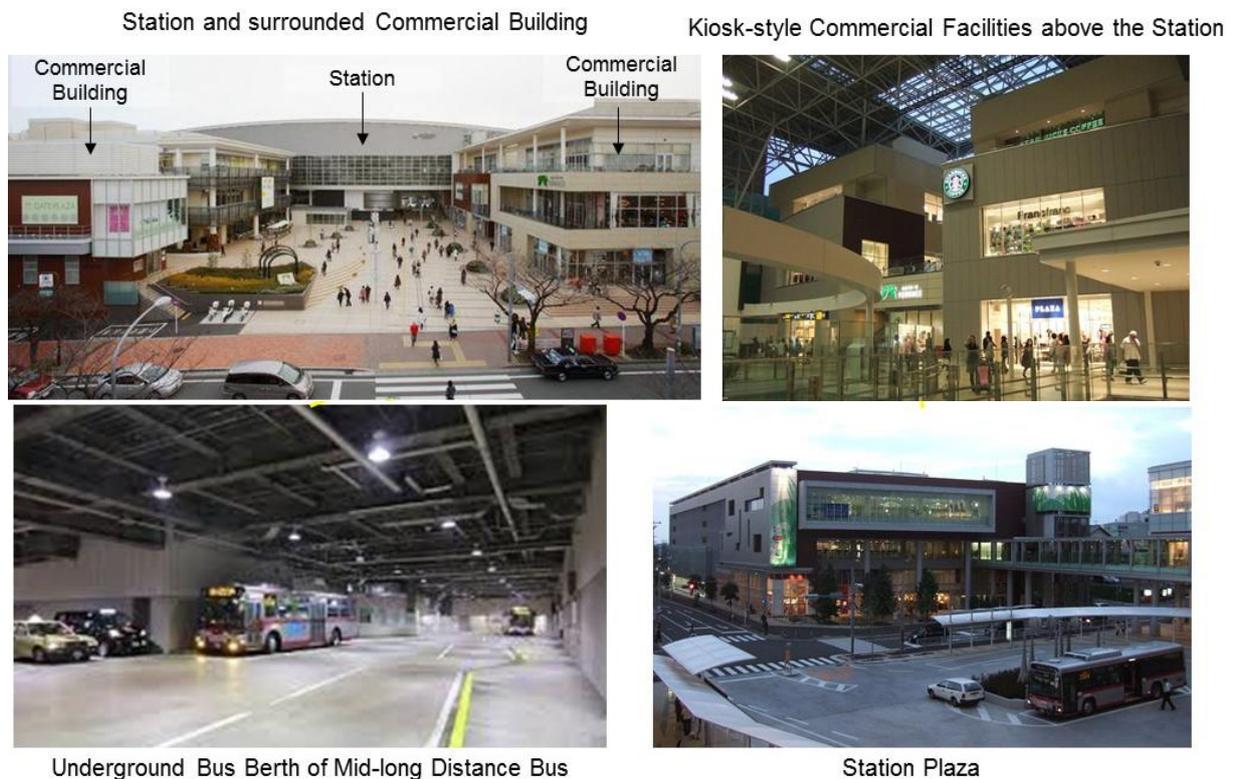


Figure 3.2.6 TOD of Tama-Plaza Station



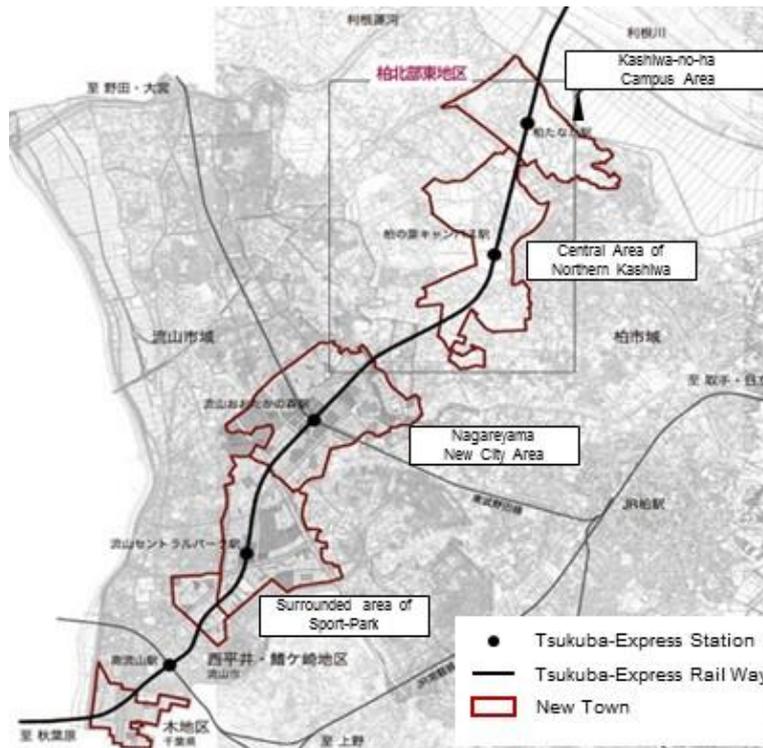
Source: Tokyu Corporation

(iii) Urban Development by the public sector along the Tsukuba Express Line

3.21 The urban railway line extending towards the east of Tokyo (Chiba, Saitama and Ibaraki Prefectures), Tsukuba Express (TX), has been in operation since 2005 with a total length of 58.3km and 20 stations in total. To develop suburban areas along the TX, “Integrated Land Readjustment (LR) Projects” were carried out by the public Urban Renaissance Agency (UR), Chiba Prefecture, and Nagareyama City, by integrating the development of the railway line, infrastructure and urban facilities.

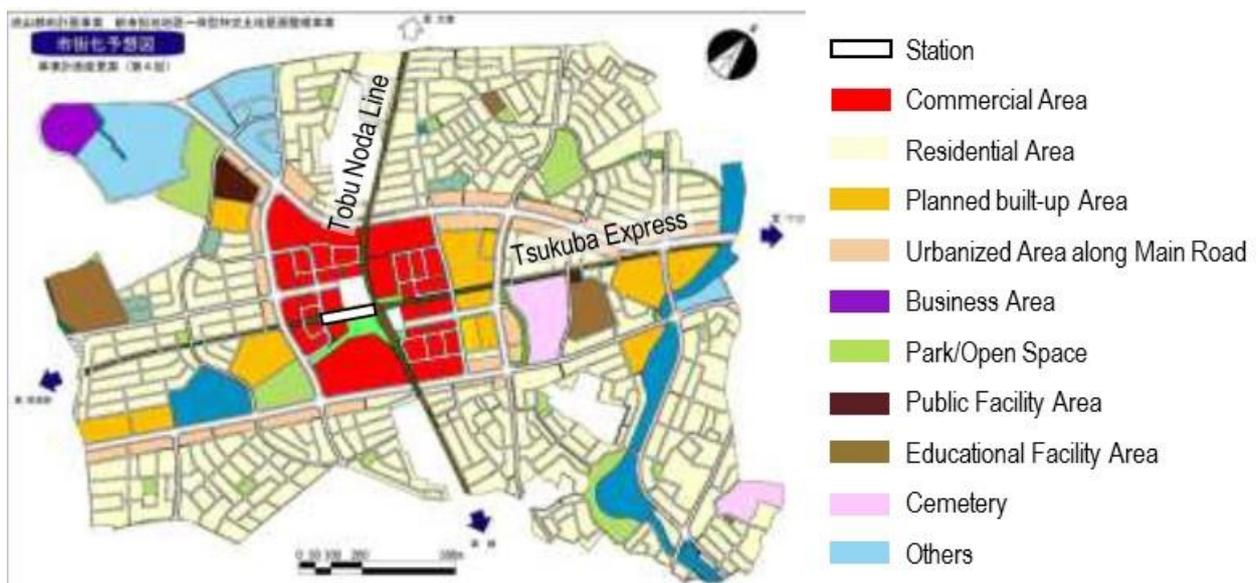
3.22 Among the urban development projects along the TX, the UR was in charge of 6 development zones, i.e. 1/3 of the total development zones along the line. When adding up the land area in the zones that the UR was in charge of, the UR was in charge of 1,400 ha, which is roughly half of the entire land area for urban development along the TX. The following Figure shows the details of UR's urban development efforts along the TX.

Figure 3.2.7 New Town along with Tsukuba Express



Source: JICA Study Team based on data of Urban Design Center Kashiwa-no-ha [UDCK]

Figure 3.2.8 New Town at Nagareyama Otakanomori Station Area along with Tsukuba Express



Source: Nagareyama City

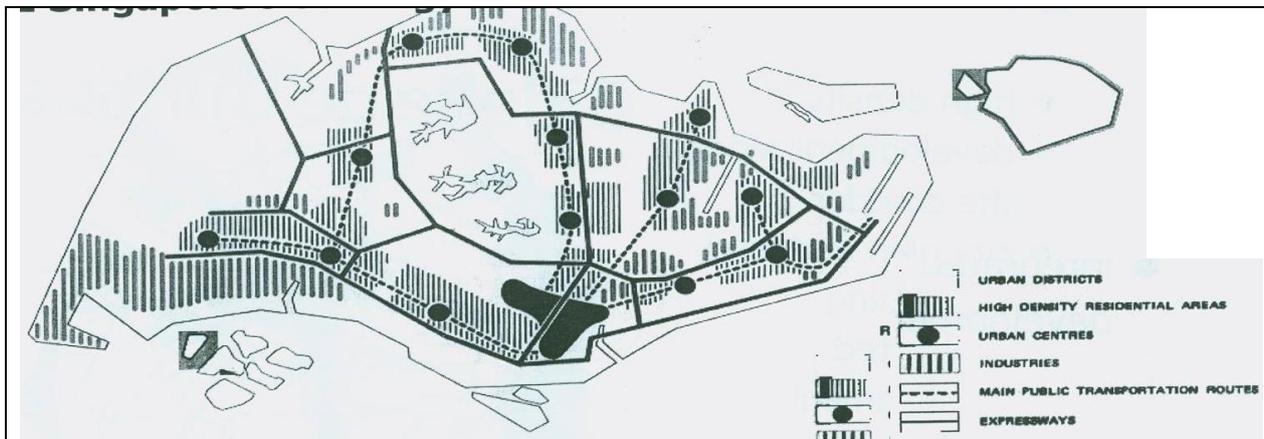
(iv) Experience of Singapore

3.23 Singapore is a good case of UMRT development following an extended TOD concept. At a limited scale of lands, a number of new towns have been developed. They are connected with CBD and other centres of the city in perfect integration with the UMRT network (See Figure 3.2.9).

3.24 New towns have been designed with a very compact form with high population density, high-rise affordable apartments and rich open space and basic urban amenities. UMRT stations

are located mostly in the centre of the new towns, which make them accessible to both public transport and urban services.

Figure 3.2.9 Basic Urban Structure of Singapore



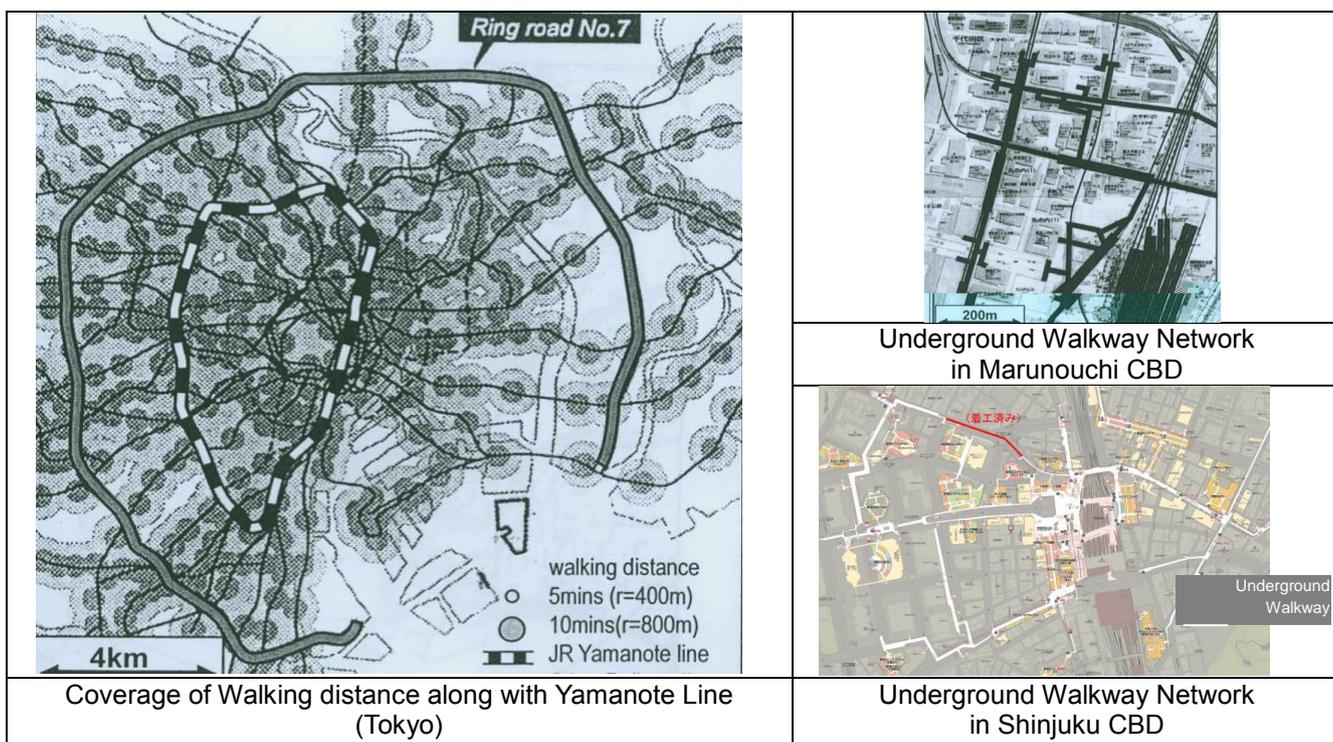
Source: JICA Project Team

3) CBD Traffic Management Improvement

3.25 Another important role of UMRT is to contribute to the improvement of the traffic situation in the CBD after UMRT is developed as an effective network. For example, CBDs in Tokyo are nearly entirely covered with UMRT stations within walking distance from each other (See Figure 3.2.10).

3.26 In busy CBDs, the stations of different lines are even connected with an air conditioned extensive underground walkway network, which provides UMRT users and pedestrians with an alternative walking environment usable in all walking and environmental conditions (See Figure 3.2.10)

Figure 3.2.10 UMRT Network in City Centre of Tokyo



Source: JICA Project Team

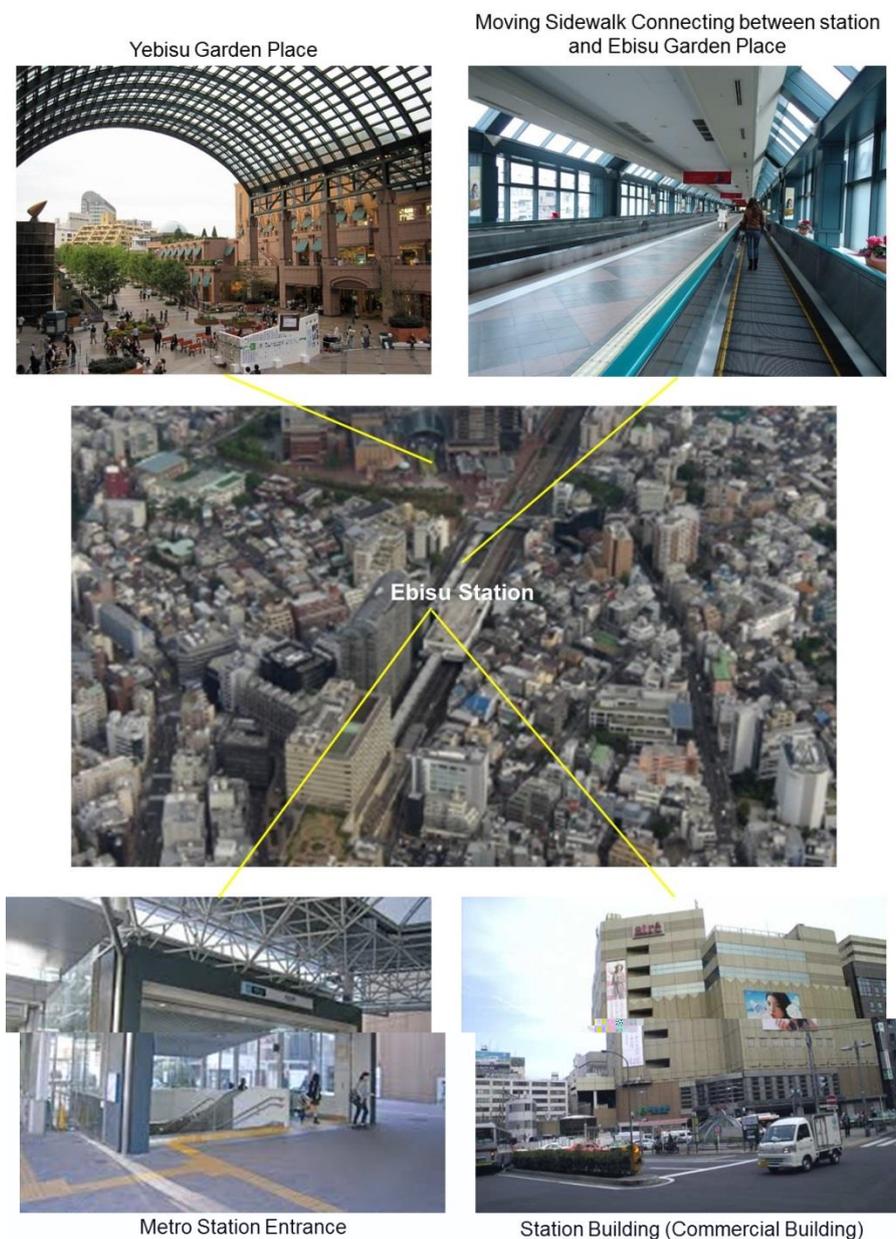
4) Fringe City TOD Development

(a) Ebisu Station Area Redevelopment

3.27 A good case study of a station area redevelopment in an urban fringe city is Ebisu Station area. Ebisu station is located close to urban central stations such as Shibuya and Shinjuku. It is operated by JR East Japan Railway Company (JR East) and Tokyo Metro Corporation, the subway operator. It is close to Shibuya, Shinjuku central of Tokyo.

3.28 “Yebisu Garden Place” is representative of the successful redevelopment of Ebisu station area. It is a comprehensive new town composed of commercial, business and residential buildings that were developed on the land of Ebisu Beer factory. Ebisu station and Yebisu Garden Place are connected directly by a sidewalk named “Ebisu Skywalk”, which is about 400 m long. The Ebisu Garden Place is famous, but also the commercial building above the station is popular for shopping as well.

Figure 3.2.11 Ebisu Station area Redevelopment



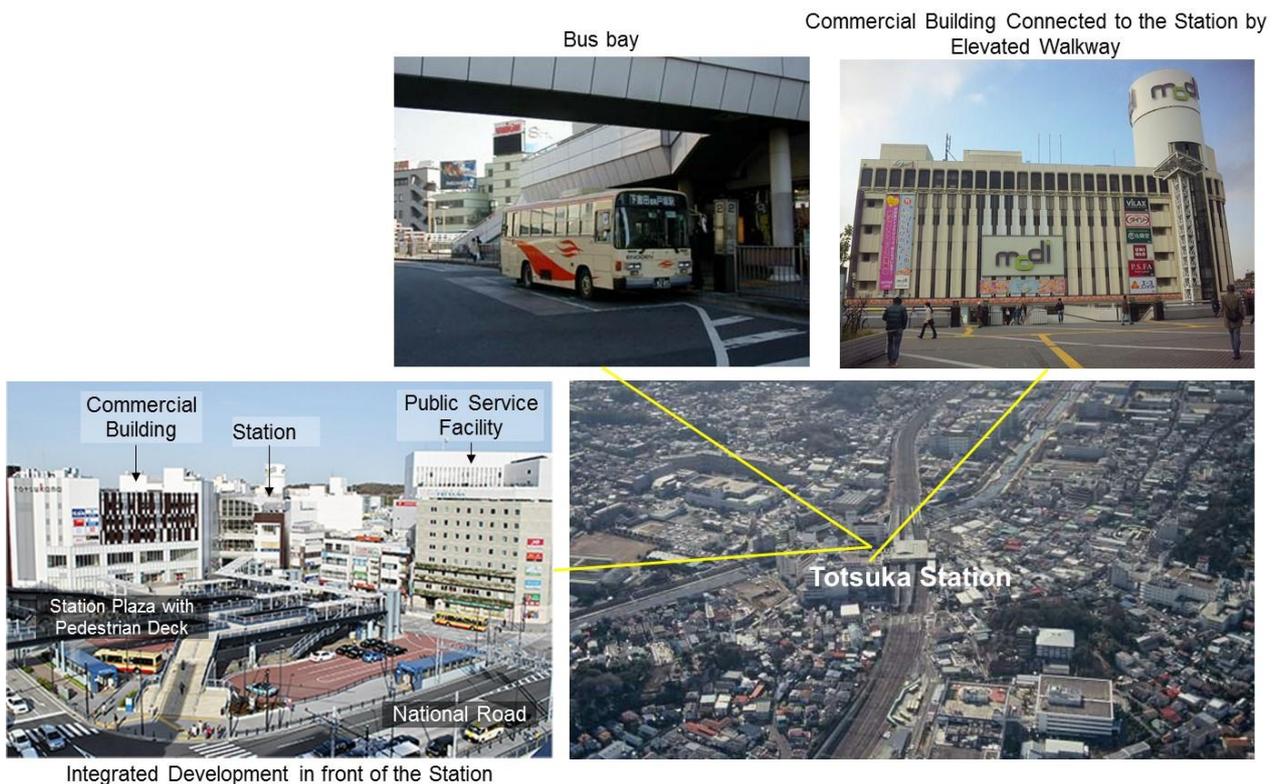
Source: JICA Project Team

(b) Totsuka Station Area Redevelopment Project

3.29 Totsuka station, connecting to JR East and Yokohama Metro (subway), is the second busiest station in Yokohama city, with some 290,000 passengers a day. The station area was not provided with good infrastructure. Particularly in the western area of the station, roads were narrow without parking space, many old wooden houses were crammed, and the location of bus stops was elusive. To improve this situation, a development project was approved as a city planning project in 1994 and completed in March 2013. The project, carried out by Yokohama City, followed both the “land readjustment scheme” and the “urban redevelopment scheme”.

3.30 The key concepts of the development project include: comfortable and convenient transportation terminal, pedestrian-friendly walking space and circulation, urban space considering historical and cultural heritage, public facilities and services for citizens, diverse commercial environment, attractive meeting and gathering square. Facilities included in the project are two Station Plazas to de-concentrate the traffic, one plaza for bus and taxi with bus rotary, taxi pool, and taxi berth, and the other for loading and unloading place of ordinary cars and taxi berth. A nine-storey building has been developed to house public facilities such as Totsuka ward government hall, culture center, and underground parking for cars and bicycles. Commercial buildings are also included in the project.

Figure 3.2.12 Examples of Totsuka Station Area Urban Redevelopment Project



Source: TOWNNEWS-SHA CO.,LTD. Web Page

5) Comprehensive Station Area Development in major CBDs

3.31 Tokyo has a number of locations where several UMRT Lines intersect. Their development often started with relatively small commercial/business hubs located around the stations, that were then transformed with high-density activities and high-rise buildings. Existing urban areas were redeveloped and publicly owned lands developed according to the TOD concept. As CBD develops, UMRT attracts more passengers, who in turn enjoy commercial/business activities in the CBD.

(a) Case of Shinjuku CBD

3.32 Shinjuku is one of the biggest CBD in Tokyo. It has the largest number of on and off passengers in all JR stations. An underground walkway connects the JR Shinjuku station and subway stations directly, and various types of buildings along the walkway are connected with it as well. Pedestrian can walk on that underground walkway safely and comfortably.

Figure 3.2.13 Development of CBD and UMRT in Shinjuku Station Area

Lumine Shinjuku, Shinjuku station building



Station Plaza separating Pedestrian and Vehicle



Underground Walkway Network



Underground Walkway connected several buildings, other stations

Source: JICA Study Team

(b) TOD using Former Train Depot in Tokyo

3.33 Shiodome Station area was developed at the 30.7ha train depot according to the “land readjustment scheme”. An approximately 2km- long elevated walkway is one of the main features of the area. It connects stations with businesses, commercial and residential buildings. Therefore pedestrians are provided with a safe walking environment away from vehicles.

Figure 3.2.14 Images of at and around Shiodome Station Area



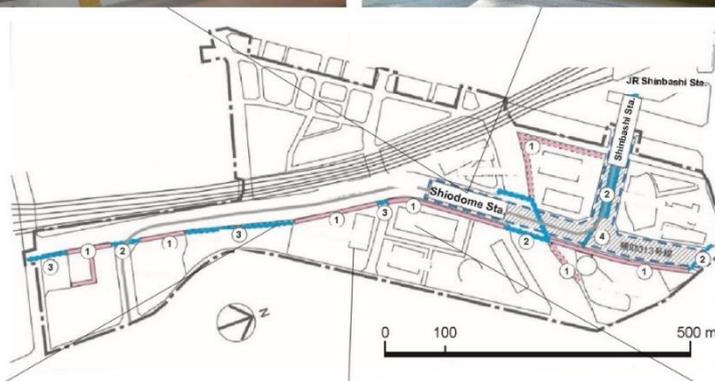
Before the Development
 Source: Shiodome SHIO SITE Town Management

After the Development

Entrance of Toei Oedo Line,
 Subway Line



Station Entrance of Yurikamome,
 New Transit Line



Elevated Walkway Connecting
 Buildings and Stations



Redevelopment Area,
 “Shiodome Shiosite”



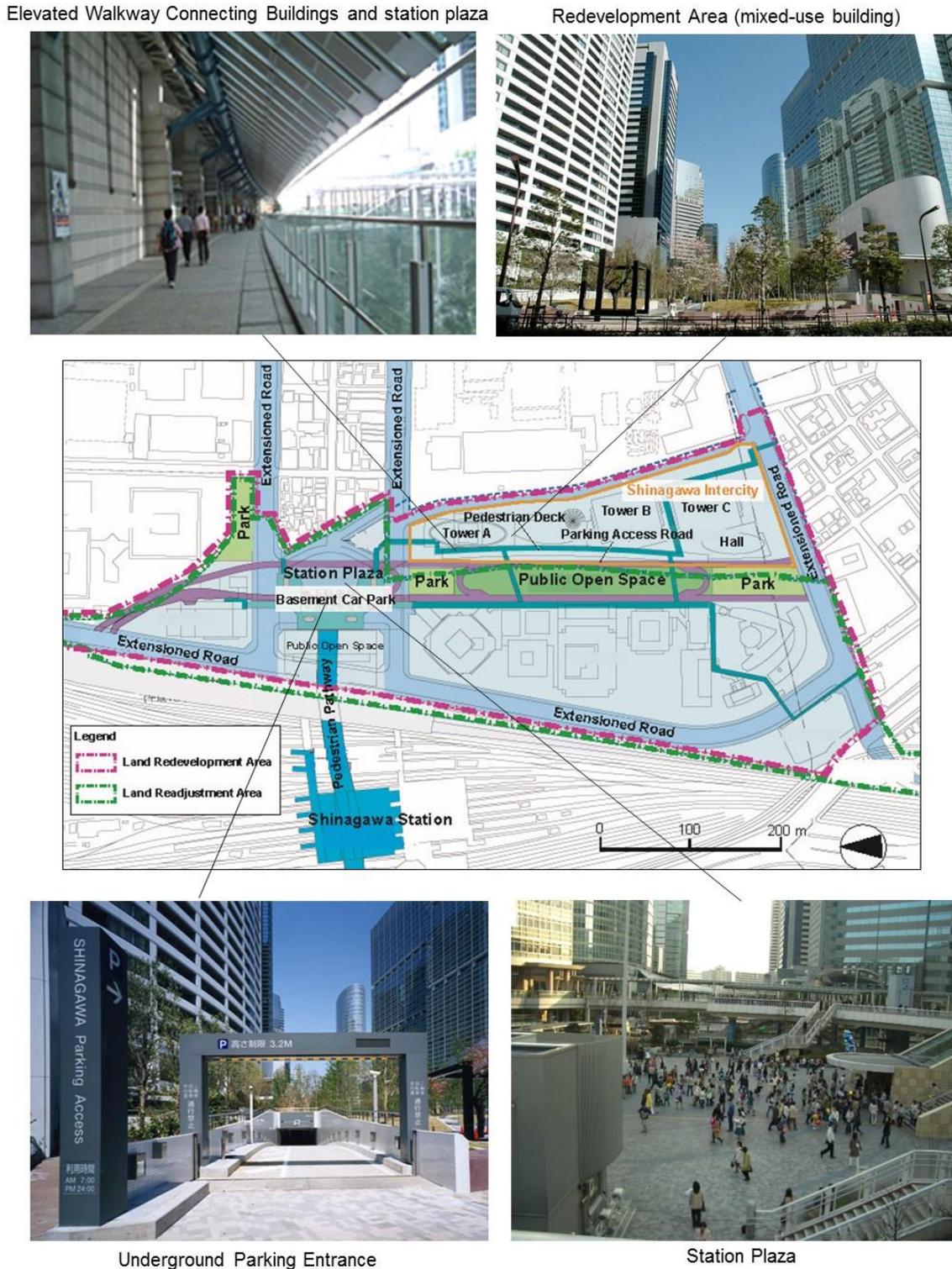
Aerial Image

Source: Compiled several source by JICA Project Team such as Shiodome SHIO SITE Town Management Web page

(c) Redevelopment in Shinagawa Station Area

3.34 Shinagawa Station is one of the successful integrated urban development areas that used the “land readjustment scheme” and the PPP arrangement. Through redevelopment, there have been road extensions and provision of park/open space, underground parking and elevated walkway.

Figure 3.2.15 Shinagawa Station Map



Source: Made by JICA Project Tem based on Shinagawa Intercity Management Co.TokyoLtd. website, Winriver Corporation website.

6) Station Building

3.35 A station building is a large house for a railway station with additional functions, such as commercial function, other than the primary function of a railway station. Usually, there are tenants such as retailers who run department stores, business offices, hotels, etc. Station buildings are a major source of increased revenue for the railway companies, and developing station buildings induces that suburban people along the railway come shop at the station buildings by using the railway. Station buildings, with enhanced functions of both intermodal transfer and commercial facilities, can play a central role to develop urban centers.

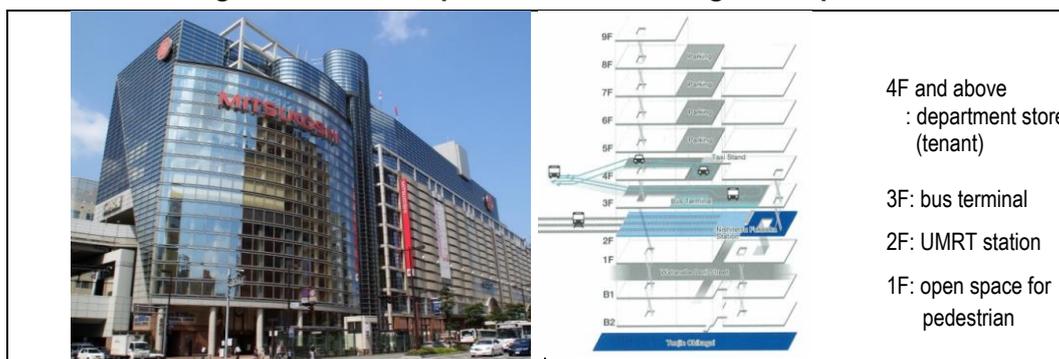
3.36 Usually in Japan, financing the station buildings comes from other sources than the railway companies themselves. For instance, station buildings at the former state-run Japan Railway premises were often constructed by private investment. There are cases when the private railway companies built stations themselves, and had retailers like department store as tenants. When developing station buildings, the “Urban Redevelopment Scheme” and Air Right Transfer are often adopted to facilitate the project implementation.

3.37 Tokyo Station Building: Tokyo Station is the central terminal in Tokyo. Its historical architecture has to be preserved. The preservation project of the station is integrated with urban redevelopment project of Marunouchi District CBD around Tokyo Station. In this project, unused Floor Area Ratio (FAR) above the station, or air rights, have been transferred for the redevelopment of land around Tokyo Station to construct high-rise buildings and raise funds for the restoration of Tokyo Station, which sold the unused air right for 50 billion yen. FAR reaches 1,604% by transferring unutilized floor area allowance above Tokyo Station.

3.38 JR Group Station Building: By leveraging development potential taking advantage of strategic location just above the station, JR (former National Railway) develops a commercial building targeting young women to change negative image of the station facility. Lumine and Atré are one of the popular commercial buildings competing with other department stores. Lumine Co., Ltd. is a company running a station-building type shopping center, which is a consolidated subsidiary of JR East Company that run more than 10 buildings of the same kind; Atré Co., Ltd. is also a consolidated subsidiary of JR East, and it develops and operates station buildings with JR East. It operates more than 20 stations buildings.

3.39 Nishitetsu Fukuoka Terminal Building: It is a mixed-use terminal of UMRT and buses and it has a shopping base featuring the urban-style department store. It is aimed to address issues such as the need to facilitate the use of longer trains to accommodate increasing railway passengers, to alleviate traffic congestion around the bus terminal and to improve pedestrian circulation routes. Nishitetsu (Nishi Nippon Railroad Co. Ltd.) group has a wide range of companies in the sectors of railway, bus, taxi, freight forwarder, real estate, hotel and leisure, with Nishi-Nippon Railroad Co., Ltd., as a core.

Figure 3.2.16 Example of Station Building Development



Source: Nishi Nippon Railroad Co.Ltd.

7) Intermodal Facilities

(a) Role and Functions of Intermodal Facilities

3.40 One of the most important advantages of the private transport mode is the provision of door-to-door travelling. Therefore, in order to achieve the modal shift from private to public transport modes, it is important to minimize the loss of intermodal transfer as much as possible. Accordingly, the role of intermodal facilities is to ensure convenience, safety and a pleasant experience for activities of railway users and non-users in the surroundings of the station.

3.41 The users' activities consist of three major types: (i) transfer between the railway and other modes of transport, (ii) parking of private car, motorcycle and bicycle, and (iii) circulation for walking, meeting and relaxation. These roles are detailed as follows:

- (i) **Transfer:** For the development of the urban public transport system in Hanoi, connecting the UMRT stations with other transport modes such as bus, taxi, car, M/C, bicycle, etc. is one of the most important strategies. To successfully realize this, it is necessary to ensure convenience and safety for many daily transit passengers. It is therefore necessary that intermodal facilities such as bus stops and station plazas, with bus berths, are constructed near the stations. Likewise, transfers from or to private vehicles and taxi should be planned well to avoid congestion and accidents in the surrounding areas. Pick-up and drop-off points and the vehicle pool should be secured near the station. In addition, access roads and pedestrian bridges should provide smooth and safe access to each facility. Thus, intermodal facilities have a significant role to provide appropriate spaces for the modal shift between the railway and other transport modes.
- (ii) **Parking:** Using private vehicles to access the railway station will result in a demand for parking spaces around the station. For the reduction of traffic congestion and accidents caused by roadside parking, adequate parking space should be allocated near the station. From the perspective of promoting railway use, convenient parking facilities near the station will promote Park and Ride (P&R)² behavior and will contribute to the increase in the number of railway passengers. It will decrease the environmental pressure accordingly.
- (iii) **Circulation:** In the station area, railway passengers create circulation activities such as walking, waiting and meeting. Thus, provision of convenience and amenities to these activities is also necessary to promote railway use. In particular, wide passage ways and open spaces are required for the convenience of pedestrians, and green scenery space, installation of a landmark and illumination in the station plaza will create a cityscape as an amenity for station visitors. In addition, retail shops such as supermarkets, kiosks and cafés will also add to the convenience of railway passengers.

3.42 For planning and design of facilities, it is necessary to take the following principles into consideration:

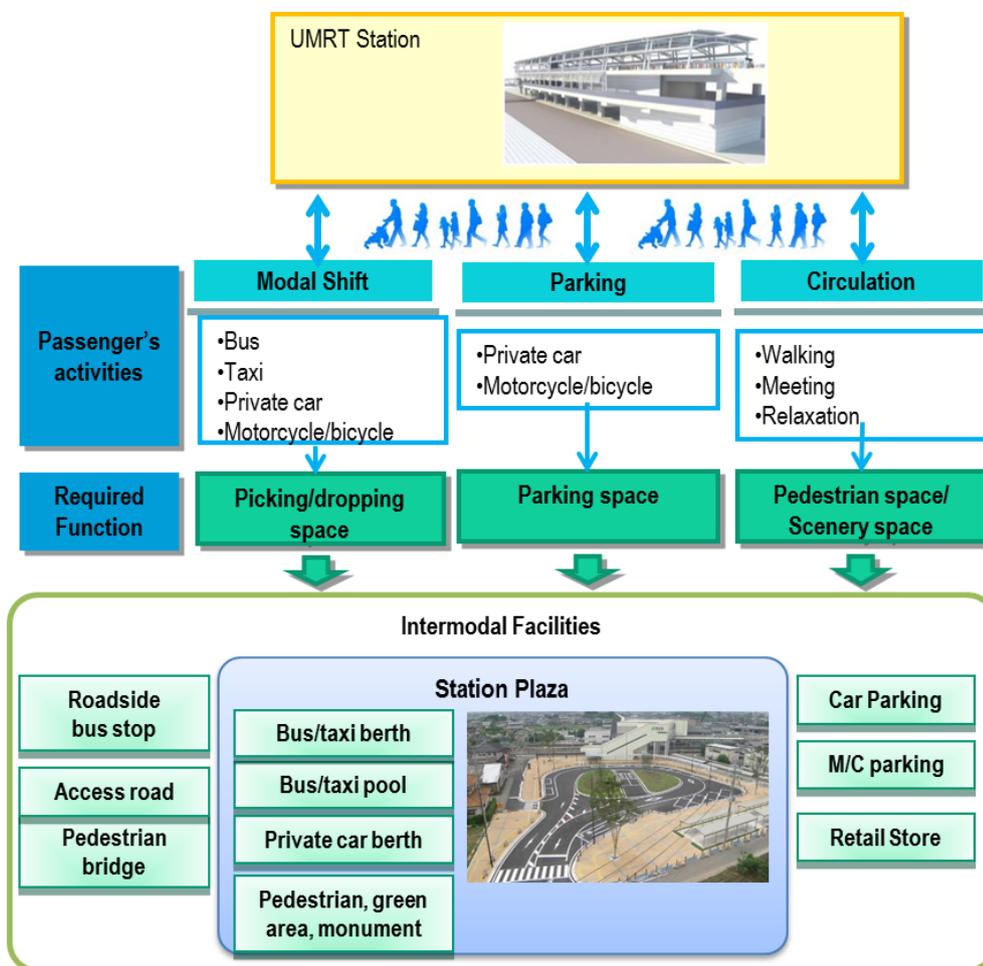
- (i) **Universal design:** Universal design, often inclusive design, refers to broad-spectrum ideas meant to produce buildings, products and environments that are inherently accessible to older people, people without disabilities, and people with disabilities.

² Park and ride (P&R) facilities are car parks with connections to public transport that allow commuters and other people headed to city centres to leave their vehicles and transfer to a bus, rail system (rapid transit, light rail, or commuter rail), or carpool for the remainder of the journey. The vehicle is stored in the car park during the day and retrieved when the owner returns. Park-and-rides are generally located in the suburbs of metropolitan areas or on the outer edges of large cities.

- (ii) **Smooth door-to-door movement:** Smooth door-to-door movement of the UMRT users should be facilitated: smooth movement is convenient, comfortable, safe, reliable, affordable one.
- (iii) **Walkable public space:** An attractive walking environment, or walkable space is essential to TOD related facilities and buildings. This concept must be always taken into account in planning and designing.

3.43 Intermodal facilities consist of transport facilities such as station plazas, bus stops, pedestrian bridges, access roads, car parking and motorcycle parking, and other service facilities such as open space, green space and retail shops. Among these, the station plaza is the central facility with multiple functions: it is both a traffic square and a public open space. Its components are (i) carriage way (one-way), (ii) bus berth and bus pool, (iii) taxi berths and taxi pool, (iv) berth for private vehicles, (v) pedestrian bridge, (vi) pedestrians’ circulation space, and (vii) open space.

Figure 3.2.17 Role and Function of Intermodal Facilities



Source: Final Report of “Special Assistance for Project Implementation (SAPI) for Ho Chi Minh City Urban Railway Project (Ben Thanh – Suoi Tien Section (Line 1))”, 2014, JICA

(b) Station Plaza

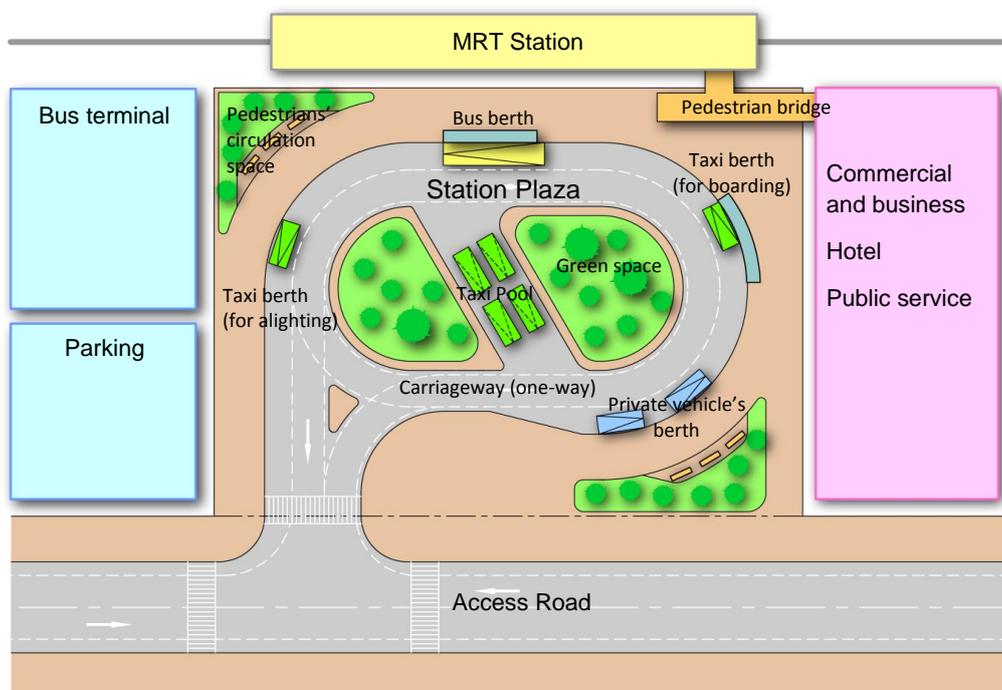
3.44 A station plaza has roughly two spatial functions. One is a transport spatial function, to handle traffic of railway users, and the other is an environmental spatial function for people walking, waiting and meeting, which requires comfortable space for users. In addition, the station plaza is important as a “Symbolic Image of a City or a district”. It should be planned as such (See Figure 3.2.18).

3.45 In the planning process of a station plaza, each component should be laid out taken into consideration safety, connectivity, accessibility and efficiency. Since it is a square with traffic, it is necessary to secure the users’ accessibility between the station gate and each transit berth and to avoid traffic congestion and accident. The capacity of the plaza for traffic should be ensured by facilities such as bus berths, taxi berths and taxi pools to be estimated based on the future railway demand and modal share.

3.46 As a public open space, amenities are required for the convenience of the railway passengers and pedestrians: comfortable areas, installation of a landmark and illumination. Finally, a universal design concept shall necessarily be adopted.

3.47 Station plazas should be developed and managed following an agreement between the railway operator and the road administrator according to their jurisdiction. Indeed, the station plaza includes road facility and other facilities. For instance, in Japan, railway companies and the concerned governments agree upon the areas of the station plaza that fall under their responsibility for construction cost, operation and maintenance, and other concerns. The station plaza is also recommended to be officially designated as a city planning facility (Figure 3.2.19 and Figure 3.2.20).

Figure 3.2.18 Basic Layout of the Station Plaza



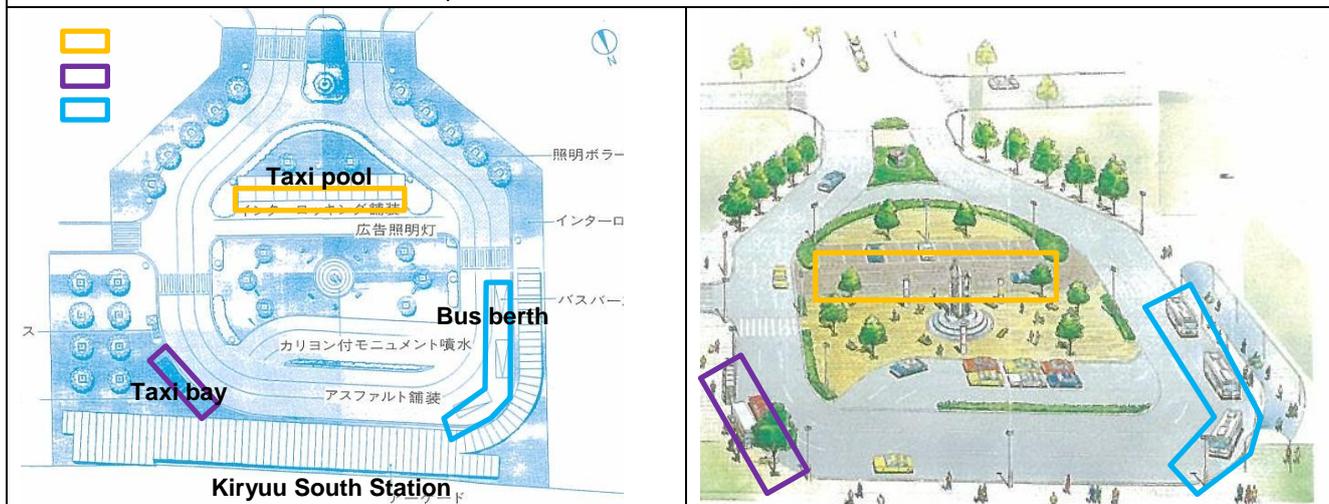
Source: Final Report of “Special Assistance for Project Implementation (SAPI) for Ho Chi Minh City Urban Railway Project (Ben Thanh – Suoi Tien Section (Line 1))”, 2014, JICA

Figure 3.2.19 Example of Small-scale Station Plaza

Kiryuu South Station Plaza (6,700m², 10,706 passengers/ day) : Kiryuu City, Gunma Pref. Japan

Loading and unloading spaces for buses, taxis and cars are separately located in the station plaza.

bus berths: 2 lots, taxi berth: 4 lots, taxi pool: 16 lots, car berth: 1 lot

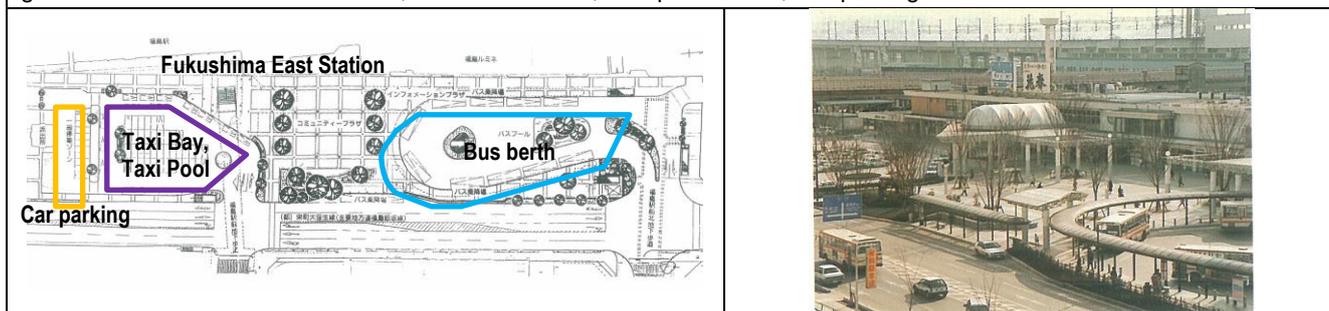


Source: "Station plaza planning guideline", Gihoudou Shuppan

Figure 3.2.20 Example of Medium-scale Station Plaza

Fukushima East Station Plaza (10,100m², 27,300 passengers/ day): Fukushima City, Japan

Bus rotary, taxi berth and pool, and car parking are separately located. The open space in the center connects to the main gate of the station. Bus berth: 8 lots, Taxi berth: 8 lots, Taxi pool 66 lots, Car parking: 10 lots



Source: "Station plaza planning guideline", Gihoudou Shuppan

Figure 3.2.21 Example of Medium-scale Station Plaza

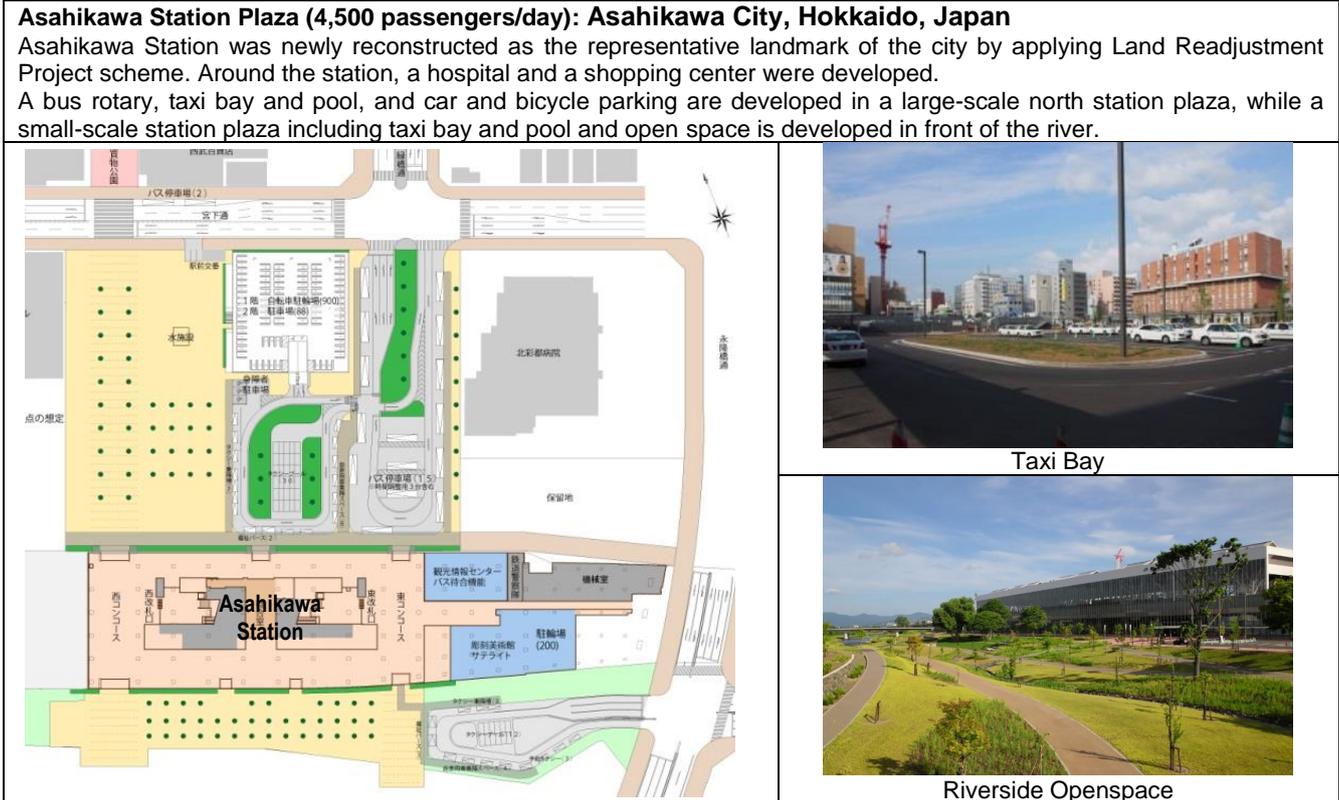
Aobadai Station Plaza (112,000 passengers/day), Yokohama City, Japan

Aobadai station was developed by a private railway company (Tokyu Corporation) concomitant with urban development in suburban area. Feeder bus service is provided to connect the new town to the station. A bus rotary was developed along the trunk road near the station, and a taxi bay and bicycle parking are developed under the elevated station. A pedestrian deck is connected to the commercial building in front of the station.



Source: "Station plaza planning guideline", Gihoudou Shuppan

Figure 3.2.22 Example of Large-scale Station Plaza

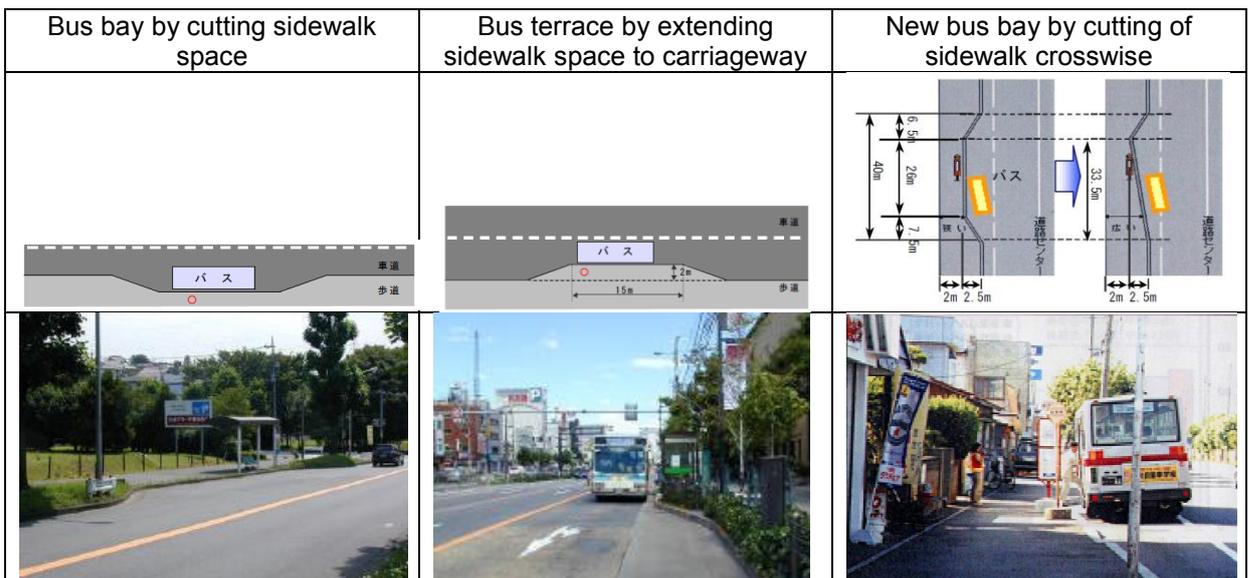


Source: "Station plaza planning guideline", Gihoudou Shuppan

(c) Bus and Taxi Facilities

3.48 Bus and taxi facilities are usually located in front of the station gate for smooth transfer of passengers. To improve waiting and transfer environment, roofs and shelters, benches, and bus location system (information of bus location and arrival time) are developed. If there are several bus stops in the station plaza, bus bays are located in parallel; accordingly it is necessary to secure a pedestrian crossing or pedestrian bridge for safety.

Figure 3.2.23 Types of Bus Bay in Japan



Source: "Road Guideline for Promotion of Smooth Transport for Elderly and Disabled Person", MLIT

3.49 In the CBD, the UMRT terminal station is integrated with a bus terminal and with commercial facilities. For example, Nishitetsu Company, a railway and bus operator, developed a station building, and a department store whose floors are rented out to tenants.

Figure 3.2.24 Examples of Bus Berth and Bus Terminal Building



Source: JICA Project Team

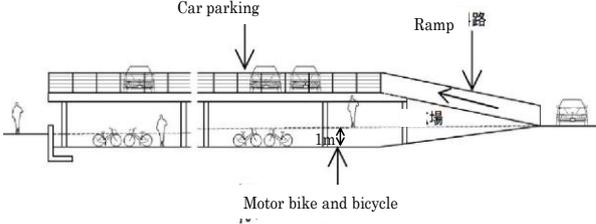
(d) Car Parking

3.50 Car parking should be designed and developed to ensure smooth and comfortable traffic environment, assuming that cars and motorcycles are indispensable transport modes for socio-economic activities. Parking spaces should be planned and developed in consistency with the land use, urban planning, and transportation plan from a long-term perspective. Purposes for parking are broadly business, intermodal transfer, shopping, commuting, and Park & Ride. This study focuses on intermodal transfer and Park & Ride purposes.

3.51 In Japan, car parking is a crucial type of urban transport facilities. Parking is necessary for intermodal transfer. Park & ride facilities are mostly developed by the public sector, as well as on-street parking, parking adjacent to streets within ROW, and in already urbanized area where developing parking facilities is important to maintain the urban function but the private sector does not develop them for financial reason. Parking development, operation and management are stipulated by various laws, including City Planning Law that officially designates parking as city planning facility, Road Law that stipulates that parking is part of road facility, Parking Law to provide parking area, on-street parking, and Road Transportation Law to control parking meters of on-street parking. City Planning Law can designate a parking development area when necessary to ensure smooth traffic in commercial area (See Figure 3.2.23).

3.52 In Hanoi, the number of car parking spaces is limited, especially in already urbanized areas. Car parking should be planned and developed efficiently and effectively within limited space available, including multi-storey and underground parking facilities as well as surface car parking.

Figure 3.2.25 Example of Car Parking

<p>Multi-story parking building, Hashimoto Station, Tokyo</p> 	<p>Semi-underground parking for bicycle, motorcycle and car</p> 
<p>Mechanical Parking tower, Shinjuku 3 chome, Tokyo</p> 	<p>Surface pay car parking, Yamato City</p> 

Source: JICA Project Team based on various sources

(e) Motorcycle and bicycle parking

3.53 Bicycle and motorcycle parking provides space to ensure smooth and comfortable traffic environment for all transport modes. Bicycle parking near stations is indispensable and serves as Park & Ride facility for UMRT users. The parking spaces should be planned and developed efficiently and effectively under the available space limitation, taking into consideration the following:

- (i) Parking space on sidewalk and under the viaduct: possible to develop with no additional costs for parking space acquisition and pavement work; however, careful attention should be paid not to disturb pedestrians when developing parking space on the sidewalk.
- (ii) Surface parking space: preferably close to the station, within 200 meters from the station for example, utilizing the station premises, or public owned land nearby.
- (iii) Underground parking space: Costly, but makes it possible to accommodate many units within the limits of land available.

3.54 Bicycle and motorcycle parking areas are mostly developed by the local government, both pay and free parking. Private businesses also operate pay parking facilities near the stations, most of which are of a couple of storeys.

Figure 3.2.26 Examples of Bicycle Parking



Source: JICA Project Team from various sources

8) Pedestrian Facilities and Walking Environment

(a) Pedestrian-friendly Walking Environment

3.55 It is preferable to secure walking space to separate pedestrians from cars, motorcycles, and bicycles for pedestrians' safety. Even if such space separation cannot be secured, such measures to protect pedestrians from vehicles should be taken, as so-called "shared street" where traffic of cars, motorcycles, bicycles, and pedestrians are all mixed to travel quietly.

3.56 In Vietnam, at least it should be prohibited for motorcycles to drive on the sidewalks for pedestrians' safety. The separation method below can be suggested in Vietnam

- (i) **Pedestrian-bicycle-vehicle separation: guardrail between bicycle and car lanes:** This is suitable for the primary road to secure the safety of bicycle and pedestrian, and to keep the smooth traffic flow by separating lanes physically.

- (ii) **Pedestrian-bicycle-vehicle separation: On-street markers for bicycle lane:** This is required for the secondary roads with middle traffic volume. This separation way secures the traffic flow and access as well. In this case, considerate driving habits are essential.
- (iii) **Pedestrian-Bicycle-Vehicle shared road: On-street markers for pedestrian lane:** This is adapted for tertiary roads/alleys with light traffic. This supplies easy access along the road. In this case, considerate driving habits are also essential for pedestrians, bicyclists and drivers.

Figure 3.2.27 Types of Separation of Walking Space

Pedestrian-bicycle-vehicle separation: guardrail between bicycle and car lanes	Pedestrian-bicycle-vehicle separation: On-street markers for bicycle lane	Pedestrian-Bicycle-Vehicle shared road: On-street markers for pedestrian lane
		
 <p data-bbox="240 1048 453 1077">Kunitachi City, Tokyo</p>	 <p data-bbox="684 1048 892 1077">Kunitachi City, Tokyo</p>	 <p data-bbox="1145 1048 1326 1077">Delft, Netherlands</p>
	 <p data-bbox="671 1406 903 1435">Copenhagen, Denmark</p>	 <p data-bbox="1161 1406 1310 1435">Ise City, Japan</p>

Source: JICA Project Team

3.57 Pedestrian-friendly environment should be created by ensuring the city at eye level. The table below summarizes 12 quality criteria for the city at eye level, defined by Jan Gehl (See Table 3.2.1).

Table 3.2.1 Criteria on Pedestrian Friendly Walking Environment

Protection	Protection against Traffic and Accidents – Feeling Safe	Protection against Crime and Violence – Feeling Secure	Protection against Unpleasant Sensory Experiences
	<ul style="list-style-type: none"> - Protection for pedestrians - Eliminating fear of traffic 	<ul style="list-style-type: none"> - Lively public realm - Eyes on the street - Overlapping functions day and night - Good lighting 	<ul style="list-style-type: none"> - Wind - Rain/snow - Cold/heat - Pollution - Dust, noise, glare
Comfort	Opportunities to Walk	Opportunities to Stand/Stay	Opportunities to Sit
	<ul style="list-style-type: none"> - Room for walking - No obstacles - Good surfaces - Accessibility for everyone - Interesting facades 	<ul style="list-style-type: none"> - Edge effect/attractive zones for standing /staying - Supports for standing 	<ul style="list-style-type: none"> - Zones for sitting - Utilizing advantages: view, sun, people - Good places to sit - Benches for resting
	Opportunities to See	Opportunities to Talk and Listen	Opportunities to for Plan and Exercise
	<ul style="list-style-type: none"> - Reasonable viewing distance - Unhindered sightlines - Interesting views - Lighting (when dark) 	<ul style="list-style-type: none"> - Low noise level - Street furniture that provides “talkscapes” 	<ul style="list-style-type: none"> - Invitations for creativity, physical activity, exercise and play - By day and night - In summer and winter
Delight	Scale	Opportunities to Enjoy the Positive Aspects of Climate	Positive Sensory Experiences
	<ul style="list-style-type: none"> - Buildings and spaces designed to human scale 	<ul style="list-style-type: none"> - Sun / shade - Heat / coolness - Breeze 	<ul style="list-style-type: none"> - Good design and detailing - Good materials - Fine views - Trees, plants, water

Source: Jan Gehl, *Cities for People*, Island Press, 2010, p.239

(b) Pedestrian Deck

3.58 Pedestrian decks are located at busy stations or skyscraper blocks to ensure safe and comfortable walking spaces for people by separating vehicles and pedestrians. In many cases, the pedestrian deck is constructed over the station plaza of big terminal stations, and developed to connect elevated stations and connects with buildings around it. There are also ring-shaped pedestrian decks over road intersections which enable pedestrians to go in all directions of the intersection. This facility plays an important role to form pedestrian-friendly walkways.

3.59 In Japan, development schemes and legal status of public walkways including pedestrian decks vary and there are no specific rules for their development and management. However, guidelines have been prepared by the government (MLIT) on development cost sharing and responsibility for operation and management between the urban facility administrators and railway operators, depending on the type of walkway.

Figure 3.2.28 Examples of Pedestrian Deck

<p>Station plaza elevated above the station, Mizonokuchi Station, Kawasaki City</p>	<p>Connect to commercial facility, Kawasaki Station, Kawasaki City</p>
	
<p>Crossing at an intersection, Shin Yokohama Station, Yokohama City</p>	<p>“Pearl Ring” pedestrian cross an intersection and create openspace, Shanghai City</p>
	

Source: JICA Project Team

9) Use of Underground Space

3.60 Underground walkways are basically developed by UMRT developers to connect to station gateways. In the CBD, private owners of commercial and business facilities along trunk roads often invest to connect the underground entrance of their facilities to the station.

3.61 Strict safety measures must be taken for underground walkways. In Japan, the building codes and other related laws and regulations stipulate the safety measures for disaster management against natural and man-caused disaster including fire and flood. Responsibility for development and management of the underground walkway should be decided between the railway operator and the road administrator, referring to the guideline prepared by the MLIT, Japan.

Figure 3.2.29 Examples of Underground Walkway in Shinjuku Sanchoume Station, Tokyo

<p>Metro Promenade connects between Shinjuku Station and Shinjuku Sanchoume Station at underground level. Underground floors of commercial facilities are faced to this promenade.</p>	<p>The underground entrance of a department store is directly connected to the underground walkway of UMRT.</p>
	
<p>Three metros are connected in Shinjuku Sanchoume Station, where there are totally 22 entrances most of which connect the underground floor of private buildings along the trunk roads in the station vicinity.</p>	<p>An underground walkway network covers about 500m radius from Shinjuku Station, including an underground shopping mall, by connecting commercial and business facilities along the trunk roads in the station vicinity.</p>

Source: JICA Project Team

10) Opportunities for Local Economic Development around UMRT Stations

(a) Local Commercial Street at and around Station

3.62 There are many commercial streets with small and local shops clustered on both sides of the street. These streets are used by local communities as the main access roads to the nearest station. To create an attractive and comfortable image of the commercial streets, various measures are taken such as local economic promotion activities, improvement of walking environment by building arcade, improving and coloring pavements, light and decorated street lamps, benches, restriction of traffic during commuting and shopping time. In Japan, to promote the commercial activities of these commercial streets, most of them organize a cooperative under Law on Local Commercial Street Promotion Cooperatives.

3.63 Motomachi Commercial Street in Yokohama: To create a traditional and modern image of international city of Yokohama, the townscape has been unified and shops aligned to provide space for pedestrians. These rules are regulated as the urban design guideline of Motomachi.

3.64 Koenji Commercial Street: This is a typical commercial street in a local residential area. By providing arcade to shelter from rain, sun heat, or wind, local people can enjoy shopping on their way to and from the station.

Figure 3.2.30 Examples of Local Commercial Street in front of Station



Source: JICA Project Team

(b) Utilization of Under Railway Viaduct

3.65 Spaces under railway viaducts are mostly utilized for car and bicycle parking, storage or park. At the same time, there are possibilities to utilize the space in limited urban areas for various purposes.

3.66 In Japanese CBDs, there are small shops and restaurants clustered to enjoy drinking and shopping after business hours for commuters. Recently, railway operators have reorganized space under viaducts as shopping malls with various types of facilities: nursery, restaurants, craft shops, library, community centers, etc. This meets the needs of both UMRT users and local communities. The railway companies, or companies entrusted by the railway companies like realtors, manage the space, mostly leasing out to tenants.

3.67 Artisan street between Akihabara and Okachimachi Station: Traditionally, there used to be many craft artisans clustered in this area as a wholesale district. To revitalize its tradition as well as to provide opportunities for young artists to exhibit and sell their works, this street was opened to craft shops.

3.68 Ecute Manseibashi: To preserve historical relic of the abandoned brick railway bridge, Mansei bridge, the space under the railway and the original station platform are used as a shopping mall with restaurants, cafes and shops.

Figure 3.2.31 Examples of Commercial Use under Railway Viaduct



Source: JICA Project Team

(c) Underground Mall

3.69 Around the UMRT station, many urban facilities such as commercial and business facilities, government offices, and parks are clustered. Underground space present possibilities to (i) increase the number of station users and expand catchment areas of the station by developing station entrances to various directions³, (ii) utilize lands around the station efficiently, and (iii) formulate exclusive, safe, comfortable pedestrian networks with lighting, air-conditioning, etc.

3.70 In Japan, an underground mall is defined as an integrated underground facility composed of a public underground walkway and shops and offices facing the walkways, which connects to roads or a train station plaza. The underground mall is legally approved by prefectural governor and controlled by City Planning Law to designate public facilities such as public underground walkway and public underground parking, Road Law to approve use of the space within ROW, Building Codes to permit construction and underground walkways, and Fire Service Act to stipulate firefighting equipment and firefighting management.

3.71 The following describes two examples. The one is Tenjin Underground town. It is developed under the trunk road (w=50m), with total length of 590m. B1F is used for its public underground walkway and shops, B2F is a public parking, and B3F is a machine room. The developer is a public-private joint enterprise including Fukuoka City, a power company, a railway company and department stores, etc.

3.72 The other example is Sapporo station-front road underground mall. It is developed by the public sector (a 160 meter-long section was subsidized by MLIT, a 300 meter-long section by Sapporo City) to connect existing underground shopping malls developed by the private sector to

³ According to the pedestrian count survey of Tenjin Underground Town, after extension of underground walkway, number of pedestrian underground increased 1.16~2.34 times. Before extension, number of pedestrian at-grade and underground are mostly equal (50%- 50%), but after extension of underground walkway, the share changed to 40%- 60%. (source: the article written by Fukuoka City)

the underground network. While the road management authority of Sapporo City manages the underground mall, the private company participates in the underground open space, which is used by local communities (NPO, commercial owners, local groups, etc.).

Figure 3.2.32 Examples of Underground Mall



Source: JICA Project Team

11) Urban Development Schemes in Japanese TOD

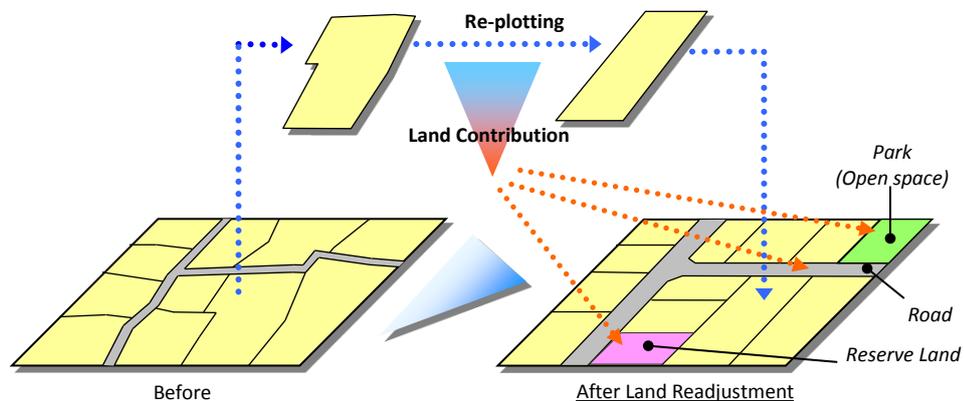
3.73 In Japan, for green field development, railway companies have often adopted the “Land Readjustment” method. The development scheme has a value capture mechanism to finance for project implementation; for already developed area, railway companies chose to implement Urban Redevelopment Projects. These projects aim to maximize land value captured through efficient land use in the TOD Area, which resulted in significant value increase by the transit development, by implementing land readjustment projects, or urban redevelopment projects with changing zoning code to introduce mixed land use and to increase FAR (floor area ratio).

(i) Land Readjustment (LR)

3.74 LR is an integrated urban development measure including land re-plotting and infrastructure construction (see Figure 3.2.33). It is a well-known urban development measure in Japan and the same or similar system is adapted in more than ten countries such as Thailand, Indonesia, Germany, Turkey and Nepal. Land re-plotting is a typical feature; it aims to consolidate land lots. Basically, land owners within the LR site can secure their own landuse rights during the project. In other words, LR is one of the urban renovation measures that involve citizens’ participation and building consensus.

3.75 There is the “Land Contribution System” to secure lands for infrastructure, public open space and/ or reserved land for urban development. The project implementation body can secure reserved lands to sell for project cost as a self-financial system.

Figure 3.2.33 Schematic Model of Land Readjustment (LR)

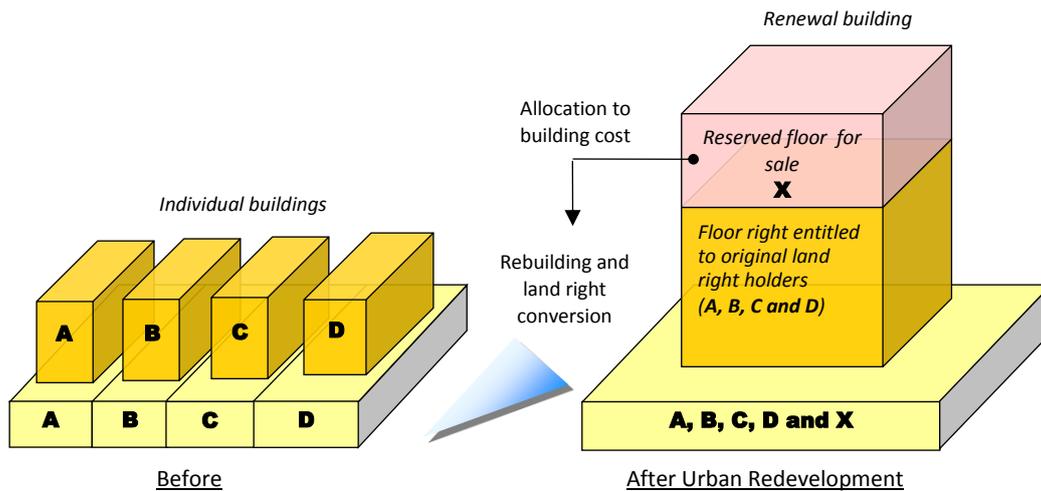


Source: JICA Project Team

(ii) Urban Redevelopment (UR)

3.76 UR is one of the reconstruction measures using the system of landuse right conversion. This measure is used to combine several individual plots of lands into a collective land to construct new apartments and large-scale buildings, in which existing owners can resettle (see Figure 3.2.34). Original landuse right holders secure their landuse right during the project implementation period, and their landuse rights will be distributed to sectional ownerships of the new building. There is also a self-finance system to secure reserved floor for sale to recover the construction cost.

Figure 3.2.34 Schematic Model of Urban Redevelopment (UR)



Source: JICA Project Team

(iii) Use of Air Right and Underground Space

3.77 In order to facilitate urban development with limited land available in the central area, intensive vertical development or underground development may be very useful. The old city area, which has historical and cultural value, is designated as a preservation area where building height, usage, and facade are strictly controlled. Accordingly, more efficient use of land requires underground development. In the other area, for more efficient land use, vertical intensive development should be considered as well as underground development, including underground parking, underground walkways, and underground mall/city.

3.3 Approach to TOD in Hanoi

1) Key Role of UMRT in Hanoi

(a) Smart Urban Growth

3.78 UMRT is a key strategic instrument to promote smart growth of large urban areas such as Hanoi, a city that has been compactly built with high population density in the city core, like most Vietnamese cities. In Hanoi, the population density is quite high in Hoan Kiem District (366 persons/ha), Dong Da District (422 persons/ha), Hai Ba Trung District (376 persons/ha), Ba Dinh District (277 persons/ha), whereas it is low in fringe areas such as Ba Vi District, Thach That District, Ung Hoa District, and My Duc District.

3.79 However, when the population began to increase along with economic growth and motorization, urban areas have started to quickly expand in outer areas and, at the same time population density in congested urban centre started to slow down or even decrease. This change was initiated during the last decade and has now accelerated in Hanoi. Many urban development projects are being implemented in outer areas to meet the demand. De-densification of the city core and promoting population growth in outer areas is a basic urban growth policy of the city, which is lead by development of roads and active developments of the private sector. As a result, urban areas with relatively low density have expanded, in a way mostly oriented towards private transport. It is important to bear in mind that UMRT and associated TOD involve tremendous opportunities to guide urban growth in a more sustainable manner.

3.80 UMRT can promote the development of convenient, livable, and affordable suburban areas along the route. It is convenient because the outer areas are connected to the CBD with UMRT, it is livable because environment in outer areas is better than in the city centre; it is more affordable because the cost of housing and infrastructure is lower in outer areas. There are many successful cases in the world. For example, many large cities in Japan have developed large new towns together with rail development.

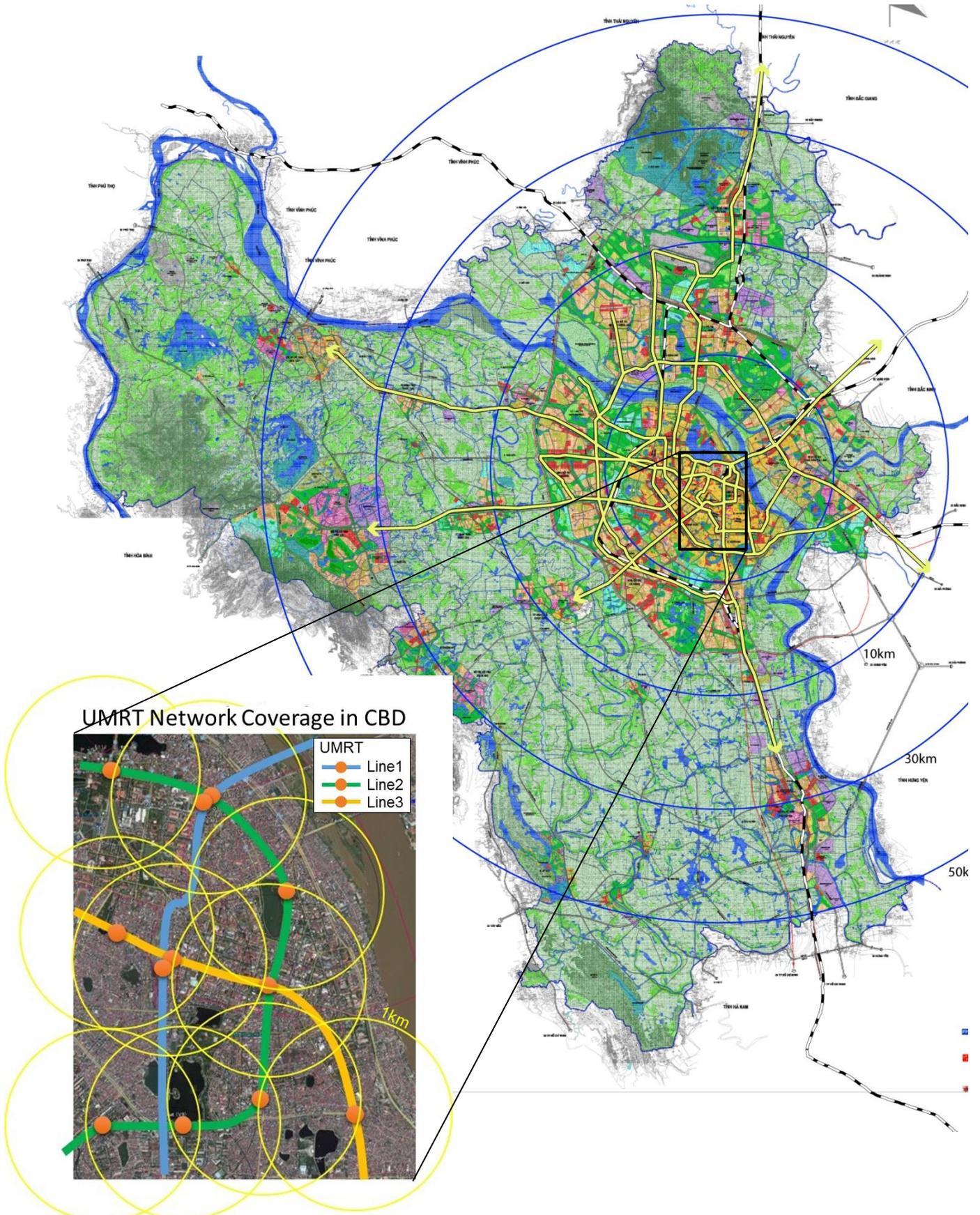
(b) Reorganization/Revitalization of CBD

3.81 UMRT and TOD can contribute to restructuring and improving the of CBD by reducing traffic congestions or entry of private cars, therefore improving transport conditions (safety, mitigation of noise and air pollution) and enhancing walkability. However, in order to achieve this, UMRT routes should be designed as an integrated network, i.e. people who reside in or visit to the city centre are provided with UMRT stations within walking distance from each other, or convenient feeder transport means.

(c) Enhancement of Urban Development/Redevelopment of Station Areas

3.82 UMRT and TOD can provide ample opportunities for competitive urban development at and around UMRT stations; UMRT stations generate extensive opportunities for urban development (residential, commercial, office/business, recreational, cultural, civic services, etc.) depending on the locational characteristic, and interests of communities, investors and other stakeholders.

Figure 3.3.1 Planned UMRT Network of Hanoi



Source: JICA Project Team

3.83 Interestingly, some private initiatives commonly taken by Hanoi city dwellers may be considered measures of urban redevelopment, which in a way creates a favorable environment for enhanced urban development/redevelopment. Significant upgrading of urban houses, or demolition for reconstruction of much higher buildings, are common initiatives that people take as their revenue increase, in order to take full advantage of the increasing value of land, and also to enhance the multi-purpose use of their private buildings. Traditional houses in Hanoi used to be composed of 2 to 3 floors only, usually arranged around a courtyard, with a commercial area on the ground floor and the living area above.

3.84 Along with increasing land value and progressive scarcity of land available, the urban landscape has progressively moved towards higher buildings, including higher private houses. Nowadays, the typical modern urban house in Hanoi (and in other Vietnamese cities) is the “tunnel house” with a narrow façade with windows on the street and then on each floor, a succession of rooms towards the back. It usually has at least 3 floors, and up to 6-8 floors. This common way of reconstructing private houses has considerably increased the average floor area even though the ground floor area has more or less remained the same: land plots are usually longitudinal, approximately 5-meter wide and 20-meter deep.

3.85 As a result, Hanoi city dwellers may be considered familiar with the practice of enhanced urban development/redevelopment since they have been initiating it individually, for their own benefits. Enhanced urban development/redevelopment at and around UMRT stations areas should be easily accepted and highly appreciated by Hanoi city dwellers, as long as it does not involve any involuntary resettlement.

2) Spatial Integration

3.86 In formulating TOD concept plans for each UMRT station, three levels of influence areas are considered as explained in chapter 3.1. The concept is further elaborated as follows;

- (i) Urban Cluster: Urban areas along the UMRT lines are broadly classified to a number of urban clusters which involve more or less homogeneous urban characteristics as follows (See Figure 3.3.2)
 - Cluster 1: North West Urban Cluster: North-west new urban core of commercial, public administration, residential and extension of transit toward Noi Bai: C1, C2, C3 and C4. The development of this area started in the 1990's, at the beginning of the market-oriented development and at the time of rapid urbanization of Hanoi. It is now a highly appreciated area by the middle class of Hanoi, because of its modern environment compared to other parts of the city: high-standard public amenities and services (schools, hospitals, green spaces), modern architecture, large roads, relatively low population density, paced urban development according to the city Master Plan, etc. This cluster encompasses one of the most significant urban development projects of Hanoi: the 300-ha urban area of Ciputra.
 - Cluster 2: South West Lake Urban Center: Existing dense urbanized area with public transport oriented development area: C5, C6, C7. This area was built under the centrally-planned economy, between the 1960's and the 1990's. A historical core institutional area is included in this cluster, with many governmental, educational, health- and other institutions occupying large buildings from the French period or the socialist period. Another characteristic of the cluster is the densely populated residential area located immediately to the South of the lakeshore, mostly composed

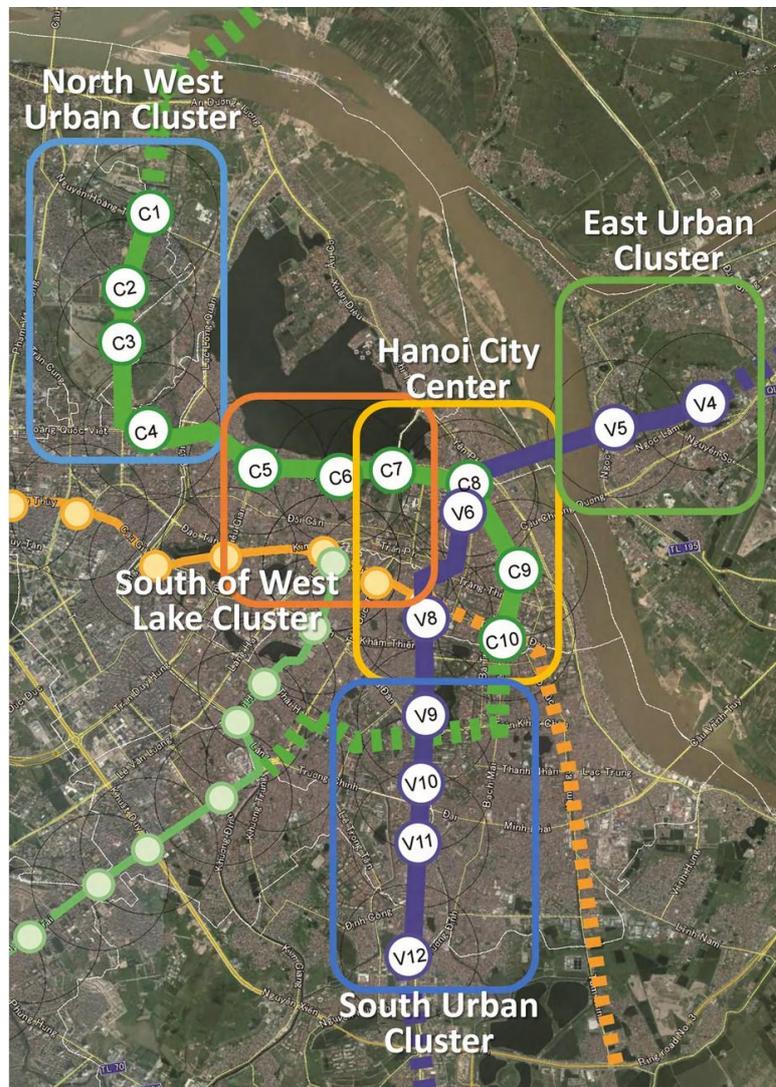
of private houses in a maze of alleys, and polluted lakes, ponds, and rivulets. Infrastructure is in shortage (water supply, sewerage, drainage system).

- Cluster 3: Hanoi City Centre: Old downtown, commercial, business district and pedestrian centered urban space: C8, C9, C10, V6, V8. This cluster encompasses both the Ancient Quarter and the French Quarter of Hanoi. The Ancient Quarter has been developed since the 15th century according to a corporate system (the 36 guilds). It is the most attractive quarter for tourists, but it also remains the most densely populated area with the highest density of residential and business buildings. The street density is high but most streets are narrow with small sidewalks, if any. The entire infrastructure system is insufficient with negative impacts on the living conditions. Included in the cluster, surrounding the Ancient Quarter, is the French quarter that was built during the French colonization period. Therefore the urban features of this area are strongly influenced by the Western design of urban planning, with detached villas and a grid network of wide avenues that has been well maintained and enhanced over time. This area has the largest share of green spaces. The environmental and living conditions are quite favorable compared to other parts of the city.
 - Cluster 4: South Urban Cluster: South urbanizing area and expansion area: V9, V10, V11, V12. Similarly to the Cluster 2, urban development of this area started in the 1960's, under the centrally-planned economy. It encompasses large industrial areas and residential areas, mostly composed of five-storeys apartments buildings that comply with the post Doi Moi formula of 7,000 to 12,000 inhabitants for each plots of 15 to 25 ha. Another characteristic of the cluster is the integration of villages such as Kim Lien or Bach Mai, that used to be located in the outskirts of the city. This partly explains the inadequacy and inconsistency of the road network, that was not developed in an integrated way. This urban cluster is currently going through dynamic urban development.
 - Cluster 5: East Urban Cluster: East urbanizing area and expansion area: V4, V5. This cluster is flanked with the Red River to the west. Officially, since the 1950's, construction is not legally permitted on and nearby the large floodable riverbanks. In fact, this area has progressively become one of the most populated one areas the city. Houses are usually small – 1 to 3 storeys on average – and the quality of construction is often cheap. People have in mind the different risks they take when they chose to settle in this area: inundations and eviction for illegal settlement in particular. The road network is unequal and not comprehensive. However, this area is still growing very fast.
- (ii) Area within Walking Distance: Though it varies depending on physical conditions of a city in general, and of a station in particular, there is a general consensus that tolerable walking distance is 500m to 800m. In this study, discussions are mainly held on the 500-meter basis, i.e. recommendations are basically made for the circle areas of 500m-radius with the stations for a center.
- (iii) Station Area and TOD Area: The area also varies for each station, depending on the specific physical conditions. The station area is generally defined as the necessary area to ensure provision of basic intermodal facilities of UMRT. This particular area is farther defined for each UMRT station to delineate the boundary specifically. In this study this

area is called the “TOD Area” and it should be incorporated in each Zone Plan.

3.87 The aforementioned three spatial levels should not be separated but integrated when formulating plans and projects.

Figure 3.3.2 Clusters of the Influence Area of Line1 and Line 2



Source: JICA Project Team

3) Sector Integration

3.88 TOD involves three important scopes of planning and development: (i) transportation access, (ii) integrated urban development and (iii) community improvement. Transportation access should not be limited to UMRT users; it should be coupled with community improvement and integrated urban development. Transportation access improvement should be planned in a way so it contributes to the inability and accessibility of the people, and so it facilitates the urban development in the UMRT influence area.

3.89 Urban development and redevelopment, which have been and will be undertaken, should also take into consideration the availability of UMRT to promote utilization of public transport. Station areas will also provide opportunities for local socio-economic development as well as to create a symbolic public space in the surrounding communities.

4) Institutional Integration

3.90 In order to implement TOD projects, it is also important to consider institutional aspects as explained below;

- (i) Compliance to Zone Plan: Zone Plan is an important tool to control and promote planned urban development. Proposed TOD plans should be properly reflected or included in the Zone Plan which have been currently finalized. HAUPA and HUPI have studied HAIMUD2 proposals and reflected some plans and projects into the draft Zone Plans (see Table3.3.1).

Table 3.3.1 Coordination between HAIMUD2 Proposal and Zone Plan

Zone ID	Station	Coordination with Line1 and Line2
N10*	Line1: V4 Gia Lam, V5 Long Bien Bac	<ul style="list-style-type: none"> Station location of V5 will be finalized and access roads will be studied though N10 Zone Plan has been approved.
A3(H1-1)	Line1: V6 Long Bien Nam, V8 Hanoi	<ul style="list-style-type: none"> Station location of V6 will be finalized. Underground parking plans will be studied and reflected. East and west road around V8 will be studied and reflected to Zone Plan. There are no major changes of landuse and road network in the city center.
A5(H1-1)	Line2: C8 Hang Dau	
A4(H1-1)	Line2: C9 Hoan Kiem	
A4(H1-1)	Line1: V8 Hanoi Line2: C10 Tran Hung Dao	<ul style="list-style-type: none"> East and west road around V8 will be studied and reflected to Zone Plan. There are no major changes of landuse and road network in the city center.
A7(H1-3)	Line1: V8 Hanoi, V9 C.V. Thong Nhat, V10 Bach Mai	<ul style="list-style-type: none"> East and west road around V8 will be studied and reflected to Zone Plan.
A7(H1-4)	Line1: V9 C.V. Thong Nhat	<ul style="list-style-type: none"> None
B3(H2-3)	Line1: V11 Phuong Liet, V12 Giap Bat	<ul style="list-style-type: none"> Landuse plan and development indicators around V12 will be studied.
B4(H2-4)	Line1: V11 Phuong Liet, V12 Giap Bat	
B1(H2-1)	Line2: C1 Nam Thang Long, C2 Ngoai Giao Doan, C3 Tay Ho Tay	<ul style="list-style-type: none"> Station plazas will be studied and reflected.
A6*	Line2: C5 Quan Ngua, C6 Bach Thao, C7 Ho Tay	<ul style="list-style-type: none"> Underground parking plans will be studied and reflected.
A7(H1-2)	Line2: C5 Quan Ngua, C6 Bach Thao	
A1, A2*	Line2: C7 Ho Tay	<ul style="list-style-type: none"> The Zone Plans of A1 and A2 were formulated by VIAP and approved by MOC. The Ba Dinh Area is a special area of national security and governmental facilities, and there are no proposals of HAIMUD2.

Source: JICA Project Team based on discussion with HUPI and HAUPA

- (ii) Coordination among Related Organizations; TOD plan is composed of various projects, which should be implemented by different bodies, including SOEs, private developers and communities. Without effective coordination, TOD cannot be successful.

5) Formulation of TOD Concept Plan

3.91 In formulating TOD concept plans for the stations located in phase1 section of UMRT 1 and 2, planning directions are made clear based on the discussion held comprehensively as explained in previous sections for the 500 meter radius areas of UMRT stations.

3.92 On this basis of planning directions, a TOD concept plan is prepared as follows, for each UMRT station;

- (i) TOD Area is designated to cover the UMRT ROW and the area wherein measures must be taken to ensure good accessibility to the station (See Box 3.3.1).
- (ii) Concept plan is formulated in compliance with current zone plan as well as other approved plans. When it necessary to ensure effective use of UMRT, the proposal is

shown in the concept plan.

- (iii) The concept plan is composed of measures on transport access improvement to and from the station as well as for improvement of existing communities. Access transport improvement plan is worked out for the area within a kilometer radius of the station in general, and for the TOD Area more specifically.

Box 3.3.1 Introduction of TOD Area

- It is proposed to introduce the concept of TOD Area to ensure provision of basic infrastructure and intermodal facilities at UMRT station area, for smooth access of UMRT users and efficient operation and management of UMRT system. TOD Area is basically defined as the area including the ROW of UMRT, section of Zone Plan roads at the station area and other critical areas for development of necessary intermodal facilities.
- The identified TOD Area should be reflected in Zone Plan and other related plans for timely implementation

Source: JICA Project Team

6) Action Oriented

3.93 TOD plans should be implemented, especially as the UMRT projects are already on-going. When the UMRT is opened, at least UMRT users must be provided with reasonable access and the UMRT should not cause traffic conflicts at and around the stations. While those minimum requirements should be met timely, it is also important to establish a basis to promote TOD even further, and to contribute to sustainable development.