

5 PRE-FEASIBILITY STUDY ON UNDERGROUND PARKING DEVELOPMENT AT TRAN HUNG DAO STATION

5.1 Introduction

1) Background

5.1 Hanoi city centre and main transport corridors in Hanoi suffer from increasingly serious traffic congestions, due to different factors are such as the increasing private vehicles, lack of roads capacity, lack of public transport (bus) services, inadequate traffic management, undisciplined traffic behaviour of road users, among others. The lack of parking facilities space is one of the main causes.

2) Objective

5.2 This chapter aims at conducting an analysis of the following aspects:

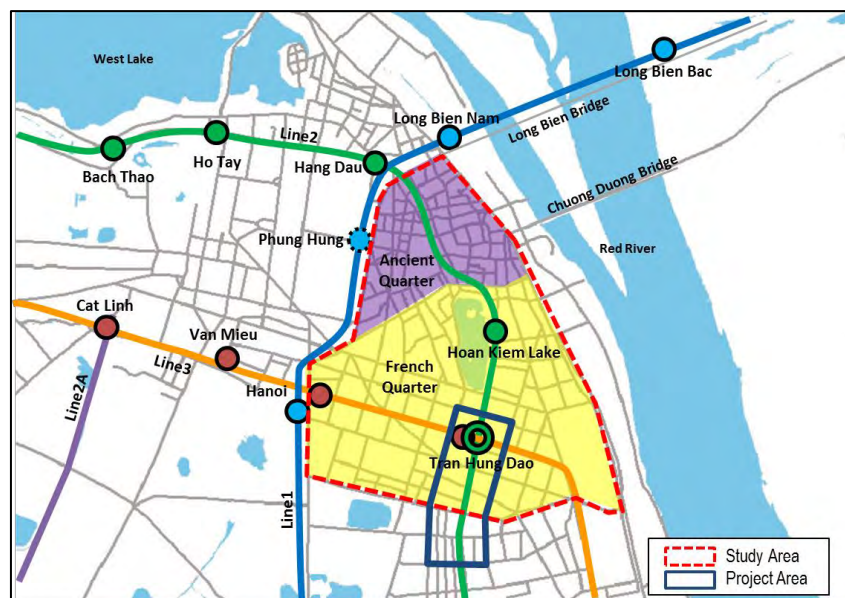
- (i) A preliminary analysis on supply demand gap in parking facilities in the central part of Hanoi (Ancient Quarter and French Quarter)
- (ii) A pre-feasibility study on the development of integrated underground parking at Tran Hung Dao Station (C10).
- (iii) Preliminary recommendations on parking policy toward the development of parking facilities in the city centre.

3) Location and Profile of the Study Area / Project Area

(a) The Study Area

5.3 While the project area is limited to a number of street blocks surrounding the proposed underground parking area at Tran Hung Dao UMRT Station, the study area covers the areas in Ancient Quarter (AQ) and French Quarter (FQ) to study issues and opportunities related to parking in the city centre (see Figure 5.1.1).

Figure 5.1.1 Location of the Study Area and the Project Area



Source: JICA Project Team

5.4 The Study area is the traditional urban core where people reside, commercial and business establishments concentrate, government offices and public services such as hospitals, schools, museums are located. Population density is high with nearly 600 persons/ha in the AQ and 214 persons / ha in the FQ. As the centre and socio-economic hub, a large number of people flows into the area, thus population density is even higher in the daytime (See Table 5.1.1).

Table 5.1.1 Socio – Economic Profiles in the Study Area

		Ancient Quarter	French Quarter	Total
Area		80	217	297
Night-Time population (000)		47	46	93
Day- Time (000)	Employment	55	54	109
	Student	11	11	22
	Population	77	76	153
Population Density (no/ ha)	Night - time	585	214	314
	Day - time	958	351	514
Day - Night Ratio		1.87	1.64	1.64

Source: Worked out by JICA Project Team, based on JICA METROS Study Team

5.5 However the population in the study area has started to decrease gradually due to a number of reasons such as degrading living conditions, increase in property price, worsening traffic congestions, traditional settlements being replaced by commercial facilities such as hotels, shops, apartments and so on. Therefore, the function and landscape of the Study Area has been changing accordingly. It is expected that the total floor area of the FQ will increase substantially in the future.

5.2 Current Situation on Traffic and Parking

1) Current Parking Supply Policy of Hanoi City

(a) Current Situation of Parking in Hanoi City

5.6 According to the Institute of Transportation Science and Technology, the number of private transport vehicles is increasing rapidly at a rate of approximately 10-15% per year. In 2020, there should be 36 million motorbikes and 3 million cars in Hanoi. Correspondingly, a statistic of the Department of Transportation mentioned that Hanoi has 1,178 parking points with the total area of 42ha (see Table 5.2.1). However, this number of parking spots accommodated for about 8-10% of Hanoi parking demand only. Therefore, sidewalks are often used for parking purposes.

5.7 Despite the existing parking ban in this area, many streets are occupied by cars parking (e.g. Giai Phong, Xa Dan, Dai Co Viet, Tran Khac Chan, etc.). Most of the parking spots of residences and offices in the city centre are overloaded and this also occurs in the new urban areas.

5.8 The quantitative and qualitative deficit of parking spots is now affecting the operation management and disturbing the surrounding areas. Besides, these parking points are slowing the traffic down in the city. In order to solve this problem, Hanoi needs to review entirely the transportation planning, transportation modes, operation and management.

Table 5.2.1 Current Situation of Parking in Hanoi by District (2011)

District	Car		MC		Total	
	Point	Area (m ²)	Point	Area (m ²)	Point	Area (m ²)
Hoan Kiem	144	18,317	177	12,547	321	30,864
Ba Dinh	121	71,320	102	5,417	223	76,737
Hai Ba Trung	106	22,304	137	4,762	243	27,066
Dong Da	77	11,656	82	3,034	159	14,690
Hoang Mai	18	72,572	8	2,700	26	75,272
Long Bien	9	13,353	18	2,095	27	15,448
Cau Giay	32	55,874	22	11,639	54	67,513
Thanh Xuan	15	679	61	8,815	76	9,494
Tay Ho	20	1,551	11	515	31	2,066
Ha Dong	6	378	7	594	13	972
Tu Liem	5	95,147	0	0	5	95,147
Total	553	363,153	625	52,118	1,178	415,271

Source: Doc. No.81/KH-UBND "Plan for developing transportation infrastructure of Hanoi, period 2011-2015"

Note: Data for Parking administrated by DOT, including On-Street and Off – Street Facilities

(b) Review on Related Plans in Hanoi City

5.9 Decision No.81/KH-UBND: Plan for developing transportation infrastructure of Hanoi, period 2011-2015" indicates the following priorities:

- (i) Focus on developing parking spots in the urban area, suburban, multi-modal hubs, and key hubs.

- (ii) Spare the land fund to put the parking points for the zone of RR 2 & RR 3.
- (iii) Invest in priority in elevated parking, mechanical parking, and underground parking;
- (iv) Develop 50 parking points included elevated, mechanical, underground parking in urban area;
- (v) Sketch strict plans to operate these parking facilities. Review, re-evaluate the current parking network to rearrange the parking points in the whole transportation development plan and master plan of Hanoi. Such work could lead to clear options to maximize the use of all the public area by applying new mechanical system for parking.

(c) Operation Body and Parking Fees

5.10 There are several parking operators in Hanoi City. The Hanoi Parking and Management Company under DOT is one of the largest semi-public parking companies. TRANSECO, the largest bus operation company also operates parking facilities. Furthermore, District PC owns parking companies such as Dong Xuan Joint Stock Company under Hoan Kiem District PC.

5.11 The parking fee is 40,000 VND for 2hours for car, and 3,000 VND/time for motorcycle. The parking fee of motorbike operated by private company costs 5,000 VND/time, which is more expensive than the public ones. For cars, there is a monthly ticket (1,500,000 VND/month).

5.12 In case of public parking facilities, the fees are the same for all areas including the city center and suburban areas, though parking capacity is seriously limited in the city center. It is noted that in many cities in the world, parking fees in the city center are more expensive the ones in suburban areas, which contributes to restrict car entry to the city center.

(d) Major On-going & Planned Parking Development Projects

5.13 In order to meet the parking demand in the centre, the city has prepared a plan to develop multi-level and underground parking facilities. A four-storey mechanized parking facility has been developed on Tran Nhat Duat Street as a showcase.

5.14 Furthermore, HPC has requested project proposals to develop an underground parking facility at the Vietnam–Russia Friendship Palace and Thong Nhat Park, which will also serve as fringe parking facilities for the city centre.

5.15 In addition to off-road parking facilities, a plan is also under preparation to use the roadside space for public parking space. On-road public parking was implemented at Ly Thuong Kiet and Tran Hung Dao streets in July 2014.

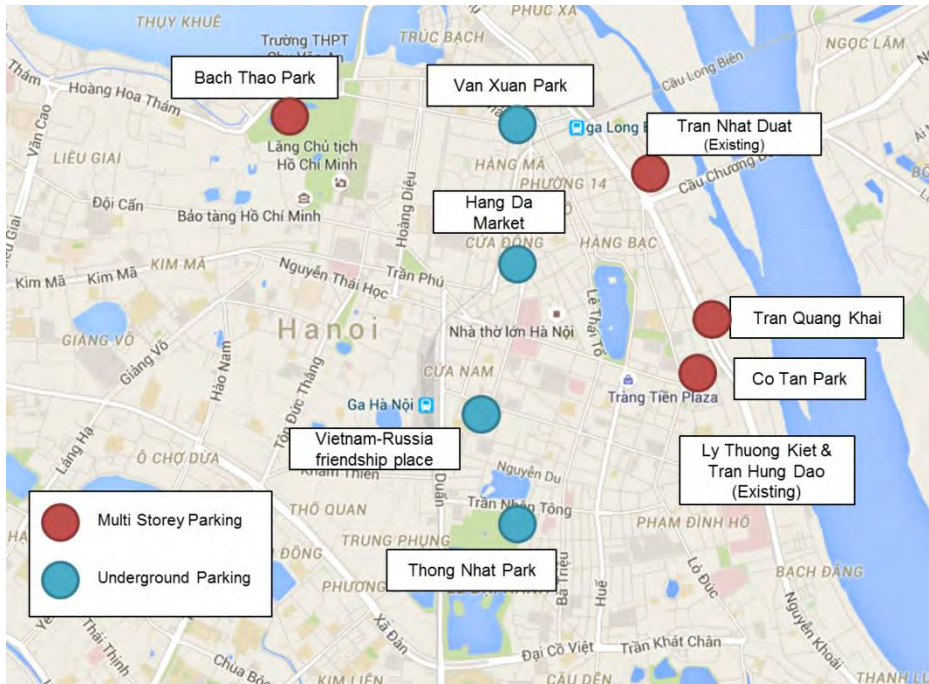
5.16 Major Planned / On-going Parking Development Projects around Hanoi city centre are shown in the Figure 5.2.2, based on an interview with DOT. Detail information has not been approved yet for these projects.

Figure 5.2.1 Multi-Storey Parking on Tran Nhat Duat Street



Source: JICA Project Team

Figure 5.2.2 Planned / On-going Parking Development Project around Central Hanoi



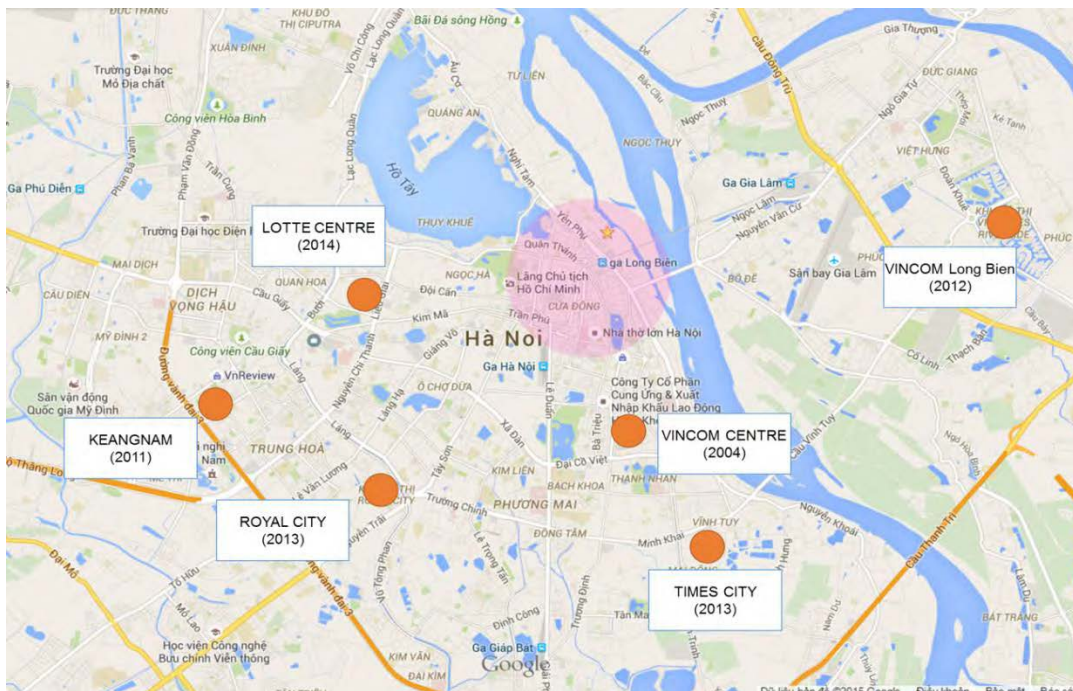
Source: JICA Project Team

5.17 Hanoi is currently formulating a “2030 Master plan for parking and bus station with orientations to 2050”. More details will be provided on parking.

(e) Parking Supply in Large Urban Developments

5.18 The expansion of urban areas is accompanied by a fast development of large new towns and commercial complexes, which include parking facilities and space to meet the demand (see Figure5.2.3 and Table 5.2.2).

Figure 5.2.3 Major Large Commercial Developments in Hanoi City



Source: JICA Project Team

Table 5.2.2 Large Scale Commercial Development in Hanoi City (Mainly suburbs)

Name of Building		LOTTE Centre Hanoi	Vincom Megamall Royal City	Vincom Megamall Times City	Vincom Centre Long Bien
Floor Area (m ²)		247,077	229,604	121,976	38,060
Parking	Area (m ²)	40,789	208,209	106,844	7,398
	Capacity	Over 1,000 Cars and hundreds of MCs	Over 2,600 Cars and Over 36,000 MCs	Over 2,600 Cars and Over 17,500 MCs	n/a

Source: JICA Project Team

2) Traffic Condition in the Study Area

5.19 At present, total traffic demand of the AQ and the FQ is estimated at 237,200 and 490,300 trips/day, respectively. The characteristics of the traffic demand are quite different as between the two areas though (see Table 5.2.3).

- (i) Proportion of Walk trip in the AQ is high, while car trips in the FQ is high, due to availability of roads,. Bicycle is still used in both areas.
- (ii) Motorcycle is the most popular mode both for the AQ and the FQ; its share is 58.7% and 63.6% respectively.

Table 5.2.3 Travel Demand by Mode for the Study Area, 2005 ¹⁾

Mode		Ancient Quarter		French Quarter		Total	
		000 / day	%	000 / day	%	000 / day	%
Walking		44.4	18.7	58.0	11.8	102	14.0
Private	Bicycle	19.4	8.2	38.0	7.7	57	7.8
	MC	139.1	58.7	312.0	63.6	451	62.0
	Car	9.1	3.8	31.9	6.5	41	5.6
Public	Taxi	7.9	3.3	17.5	3.6	25	3.4
	Bus	15.9	6.7	31.2	6.4	47	6.5
Others		1.4	0.6	1.8	0.4	3	3
Total	Incl. Walking	237.2	100.0	490.3	100.0	727	100

Source: Based on HAIDEP HIS

1) Average of Trig Generation and Trip Attraction

5.20 Traffic congestions in the area have been worsening due to various reasons such as an increase in demand while road space has not expanded, and the percentage of cars in road traffic has increased. There is rising conflicting use of road space among vehicles, pedestrians and roadside vendors are mixed, enforcement of traffic rule is rather lax, while the discipline of road users is low, traffic management facilities are not sufficiently provided, etc. The increasing number of motorcycles and cars will aggravate the situation.

3) Parking Condition in the Study Area

5.21 According to the result of field survey, around the walking distance (500m- 1km radius) from stations of the City Center (C8 Hang Dau & V6 Long Bien Nam, C9 Hoan Kiem Lake, C10 Tran Hung Dao, V8 Hanoi), many sidewalks are utilized for parking of motorcycles and cars (see Table 5.2.2 and Figure 5.2.4).

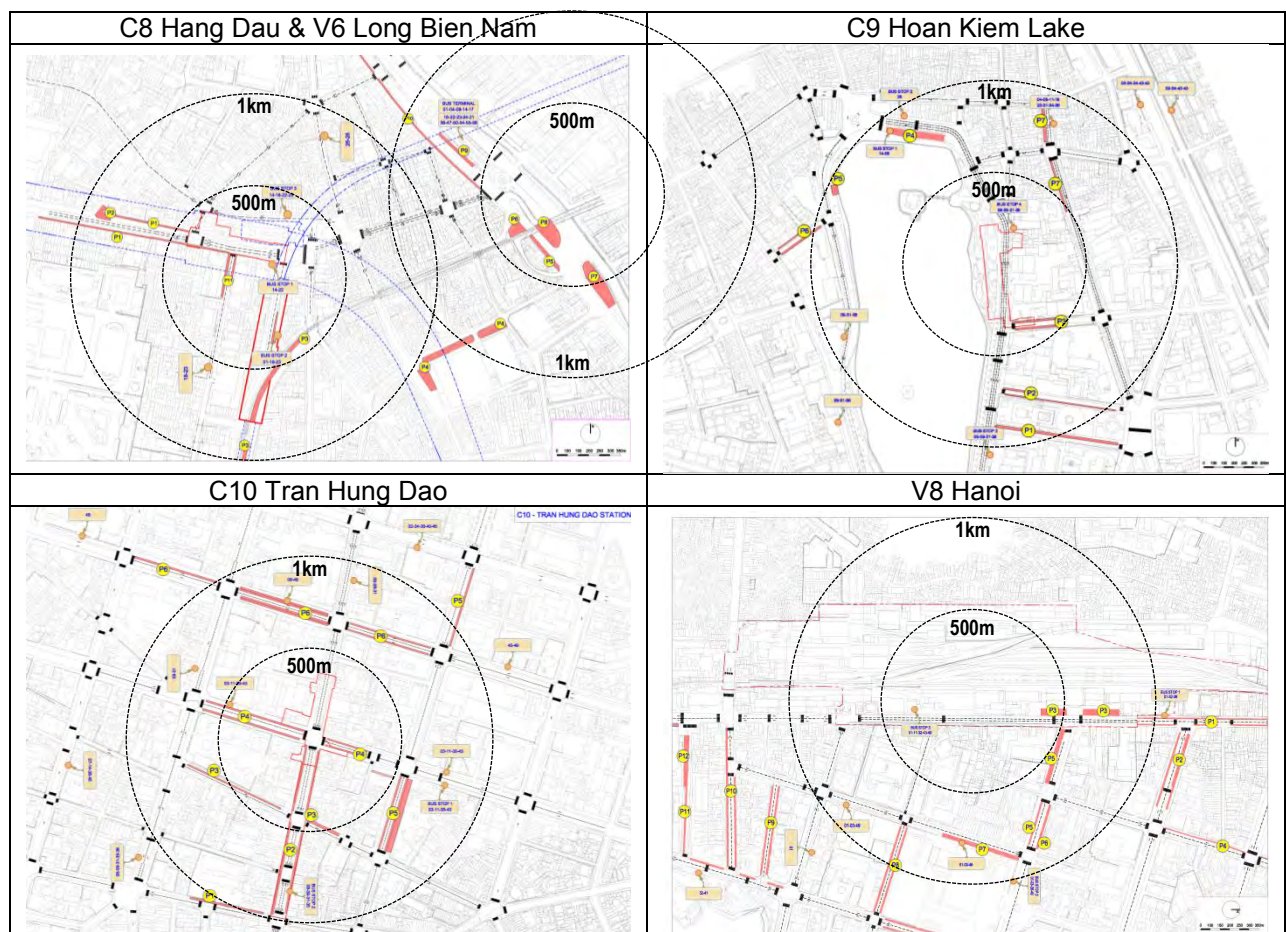
5.22 Though sidewalks are developed especially in the FQ, most of pedestrian spaces are occupied by parking of cars, which will be obstacles for comfortable and safe access to the stations (see Figure 5.2.5).

Table 5.2.4 Number of Parking Lots in Station Areas of City Center

Parking space	Area (m ²)	No. of Lots		
		Bicycle	Motorcycle	Car
Parking space	3,948	20	500	308
Roadside	1,778	0	0	320
Sidewalk	4,836	70	450	390
Roadside+ Sidewalk	17,125	140	880	1,431

Source: Result of Transport Survey, JICA Project Team

Figure 5.2.4 Location of Parking Spaces in Station Areas of City Center



Source: Result of Transport Survey, JICA Project Team

Figure 5.2.5 Parking Situation and Problems in the Study Area

<p style="text-align: center;">Tran Xuan Soan</p> 	<p style="text-align: center;">Trieu Viet Vuong</p> 	
<p style="text-align: center;">Carriageway occupied by car for parking</p>	<p style="text-align: center;">Excessive M/C Parking on Sidewalk</p>	
<p style="text-align: center;">Vong Duc</p>	<p style="text-align: center;">Pho Hue</p>	<p style="text-align: center;">Ngo Quyen</p>
		
<p style="text-align: center;">Car Parking on Narrow Road</p>	<p style="text-align: center;">Parking demand exceeds the capacity of the facility</p>	<p style="text-align: center;">Car Parking in intersection Space</p>
<p style="text-align: center;">Tran Hung Dao</p>	<p style="text-align: center;">Ham Long</p>	<p style="text-align: center;">Vong Duc</p>
		
<p style="text-align: center;">Car Parking on Sidewalk</p>	<p style="text-align: center;">Parking on Both sides of carriageway</p>	<p style="text-align: center;">Car and MC Parking on the roadside and sidewalk</p>

Source: JICA Project Team

5.3 Estimate of Parking Demand Supply Gap in the Study Area

1) Estimate of Parking Demand

5.23 At present, there is no reliable data to estimate parking demand in AQ and FQ. Parking facilities and space are required both at origins and destinations of their trips. Residence needs to store their own vehicles, offices need to provide parking space for companies, employees and visitors as shops and commercial facilities need to do so. On the basis of limited data the estimate was made as follows;

- (i) Traffic demand is estimated by vehicle type (bicycle, motorcycle and car) which enter the AQ and the FQ for different purposes (See Table 5.3.1). Due to a decrease in the population density in the city centre, the overall traffic demand in the city center will slow down in the future. However, the demand for cars will increase while it will decrease for motorcycles and bicycles.

Table 5.3.1 Estimate of Travel Demand in the Study Area ¹⁾

Area	Mode	Person Trip by Private Modes 000 / day (%)		
		2005	2020	2020/2005
Ancient Quarter	Bicycle	10.3 (9.7)	75.4 (75.0)	0.76
	MC	89.2 (83.9)		
	Car	6.9 (6.4)	25.1 (25.0)	3.66
French Quarter	Bicycle	31.4 (9.7)	216.1 (70.0)	0.74
	MC	260.9 (81.0)		
	Car	29.7 (9.2)	92.6 (30.0)	3.11
Total	Bicycle	41.7 (9.7)	291.4 (71.2)	0.74
	MC	350.1 (81.7)		
	Car	36.6 (8.5)	117.7 (28.8)	3.22

Source: Worked out by JICA Project Team, based on the HAIDEP

1) The number of trips by private vehicles are based on traffic demand analysis by HAIDEP.

And the future modal share among private modes are estimated.

- (ii) Percentage of the demand that requires parking space in the AQ and the FQ has been assumed;
- (iii) Turnover rate of parking space by vehicle type and trip purpose has been estimated. Turnover rate is defined as the number of times a parking space is occupied a day.
- (iv) Parking space demand has been estimated by multiplying (i), (ii) and (iii) above (See Table 5.3.2). At present, parking demand in the study area represents a total of 118,000 lots of which motorcycles share 82%, while cars only account for 5%. Future total demand should remain steady but the modal shift from motorcycle to car will require more space for parking. The current demand for parking space of 269,000m²; it should increase to 500,000m² in the future.

Table 5.3.2 Estimate of Parking Demand in the Study Area

	Area	Mode	Vehicle Trips (000 / day)	Parking Factor ¹⁾	Parking Demand	
					No of Lots (000)	000 m ² ²⁾
Present	AQ	Bicycle	10.3	0.30	3.1	6.3
		MC	68.6	0.31	21.0	52.5
		Car	3.6	0.32	1.2	17.5
		Subtotal	73.2	-	25.3	76.2
	FQ	Bicycle	31.4	0.40	12.5	25.1
		MC	200.7	0.38	76.0	189.9
		Car	15.6	0.30	4.6	69.5
		Subtotal	247.8	-	93.1	284.5
	Total	Bicycle	41.7	0.38	15.7	31.4
		MC	269.3	0.36	97.0	242.4
		Car	19.3	0.30	5.8	87.0
		Total	330.3	-	118.4	360.8
Future	AQ	Bicycle / MC	62.8	0.31	19.2	48
		Car	13.2	0.32	4.3	64
		Subtotal	76.0	-	23	112
	FQ	Bicycle / MC	180.1	0.38	68.4	171
		Car	48.7	0.30	14.4	217
		Subtotal	228.8	-	81	388
	Total	Bicycle / MC	242.8	0.36	87.6	219
		Car	61.9	0.3	18.7	280
		Total	304.8	-	106.3	500

Source: Worked out by JICA Project Team, based on the HAIDEP

1) Estimated from the share by trip purpose and assumed turnover rate by trip purpose (to Work, to School, Business, Private and Others)

2) Space per parking lot: for bicycle /MC (2.5 m²) and car (15 m²)

2) Current Parking Supply Capacity in the Study Area

5.24 Data is not available on supply of parking facilities and space in the AQ and the FQ. Below is an attempt to estimate the current availability based on some assumptions and on the results of the parking survey conducted during the study. A total of 19,868 m² of parking space are provided in 25.3ha of the project Area (see Table 5.3.3).

Table 5.3.3 Results of Parking Survey in Project Area

	No of Vehicles		Parking Area (m ²)			PCU (No of Cars)
	MC	Car	MC	Car	Total	
Off Street Parking	840	158	2,100	948	3,048	203
On road Parking ¹⁾	5,000	720	12,500	4,320	16,820	1,121
Total	5,840	878	14,600	5,268	19,868	1,325

Source: JICA Project Team

1) For MC: It is assumed that a 50 % of total walkway area can be used for parking

For Car: it is assumed that a 80 % of roadside can be used for parking

5.25 Based on Table 5.3.4, parking capacity of the entire FQ was estimated in proportion of the surface area. For the AQ it has been assumed that availability of parking space for car is 1/5 for car and 1/2 for MC.

Table 5.3.4 Estimated Parking Capacity in the Study Area

			Off - Road	On - Road	Total
FQ (217.1 ha)	No of Vehicles	MC	7,208	42,905	50,113
		Car	1,356	6,178	7,534
	Area (m ²)	MC	18,020	107,263	125,283
		Car	20,337	92,675	113,012
		Total	38,357	199,938	238,295
	Car Equivalent (PCU)		2,557	13,329	15,886
AQ (80 ha)	No of Vehicles	MC	1,328	7,905	9,233
		Car	100	455	555
	Area (m ²)	MC	3,320	19,763	23,083
		Car	1,499	6,830	8,329
		Total	4,819	26,593	31,412
	Car Equivalent (PCU)		321	1,773	2,094
Total (297.1 ha)	No of Vehicles	MC	8,536	50,810	59,346
		Car	1,456	6,634	8,089
	Area (m ²)	MC	21,340	127,026	148,366
		Car	21,836	99,505	121,341
		Total	43,176	226,531	269,707
	Car Equivalent (PCU)		2,878	15,102	17,980

Source: JICA Project Team

- 1) Potential Parking Capacity, is the number for parking vehicles when the roadside and street are utilized as the parking space
- 2) For Ancient Quarter, parking provision per land area is assumed a half for French Quarter South

3) Estimation of Parking Demand Supply Gap

5.26 Parking supply demand gap is estimated by comparing the parking demand and supply capability at present and in the future situation in the study area (see Table 5.3.5). Main findings are as follows;

- (i) At present, a total of 148,500m² equivalent to 6,600 car parking spots is in short. As the road space for parking is fully utilized, the demand should be met with off-road parking facilities.
- (ii) In the future, the gap will increase to 346,000m² (approximately 15,300 car spots). The total deficit will be 121,000m² in the AQ and 225,000m² in the FQ, representing respectively 16% and 10% of the areas. This shows that it is almost impossible to meet the parking demand in the AQ unless underground space is extensively allotted for parking or unless parking is restrained. In the FQ, the situation is also critical but there are opportunities to expand off-road parking by developing multi-level elevated or underground parking areas integrated with urban redevelopment projects by both the private and the public sector.
- (iii) In the city centre, the expansion of off-road parking should be promoted given that on-road parking is becoming problematic both for smooth traffic circulation, amenity of road users and urban landscape. It is also necessary to introduce demand management measures to discourage the use of private vehicles in the city centre.

Table 5.3.5 Estimated Parking Demand Supply Gap in the Study Area

Indicators				AQ	FQ	Total	
Area (ha)				80	217.1	297.1	
Present	Demand	Vehicle Trips per day (000)	Bicycle	10.3	31.4	41.7	
			MC	68.6	200.7	269.3	
			Car	3.6	15.6	19.2	
		Car Equivalent (000) ¹⁾			16.8	54.3	71.0
	Supply	Area (000 m ²)	Off - Road	7.2	57.5	64.7	
			On - Road	26.6	199.9	226.5	
			Total	33.8	257.4	291.2	
	Car Equivalent (000) ²⁾			2.1	15.9	18.0	
	Gap (Supply - Demand)	Parking Factor ³⁾			0.31	0.36	0.35
		Parking Demand (000 Car Equivalent)			5.2	19.4	24.6
Gap (000 Car Equivalent)			-3.1	-3.5	-6.6		
Area (000 m ²) ⁴⁾			-69.9	-78.7	-148.5		
Future	Demand	Vehicle Trips per day (000)	Bicycle / MC	62.8	180.1	242.9	
			Car	13.2	48.7	61.9	
		Car Equivalent (000) ¹⁾			23.7	78.7	102.4
	Supply	The same as present above					
	Gap (Supply - Demand)	Parking Factor ³⁾			0.32	0.33	0.33
		Parking Demand (000 Car Equivalent)			7.5	25.9	33.3
		Gap (000 Car Equivalent)			-5.4	-10.0	-15.3
Area (000 m ²) ⁴⁾			-120.9	-225.0	-345.9		

Source: JICA Project Team

1) Space per parking lot: for bicycle /MC (2.5 m²) and car (15 m²) , and 6 Bicycles / MCs are equal to 1 car.

2) Space per parking lot: for Off-road (22.5 m²/car). for On-road (15 m²/car).

3) Estimated from the share by trip purpose and assumed turnover rate by trip purpose (to Work, to School, Business, Private and Others) and mode

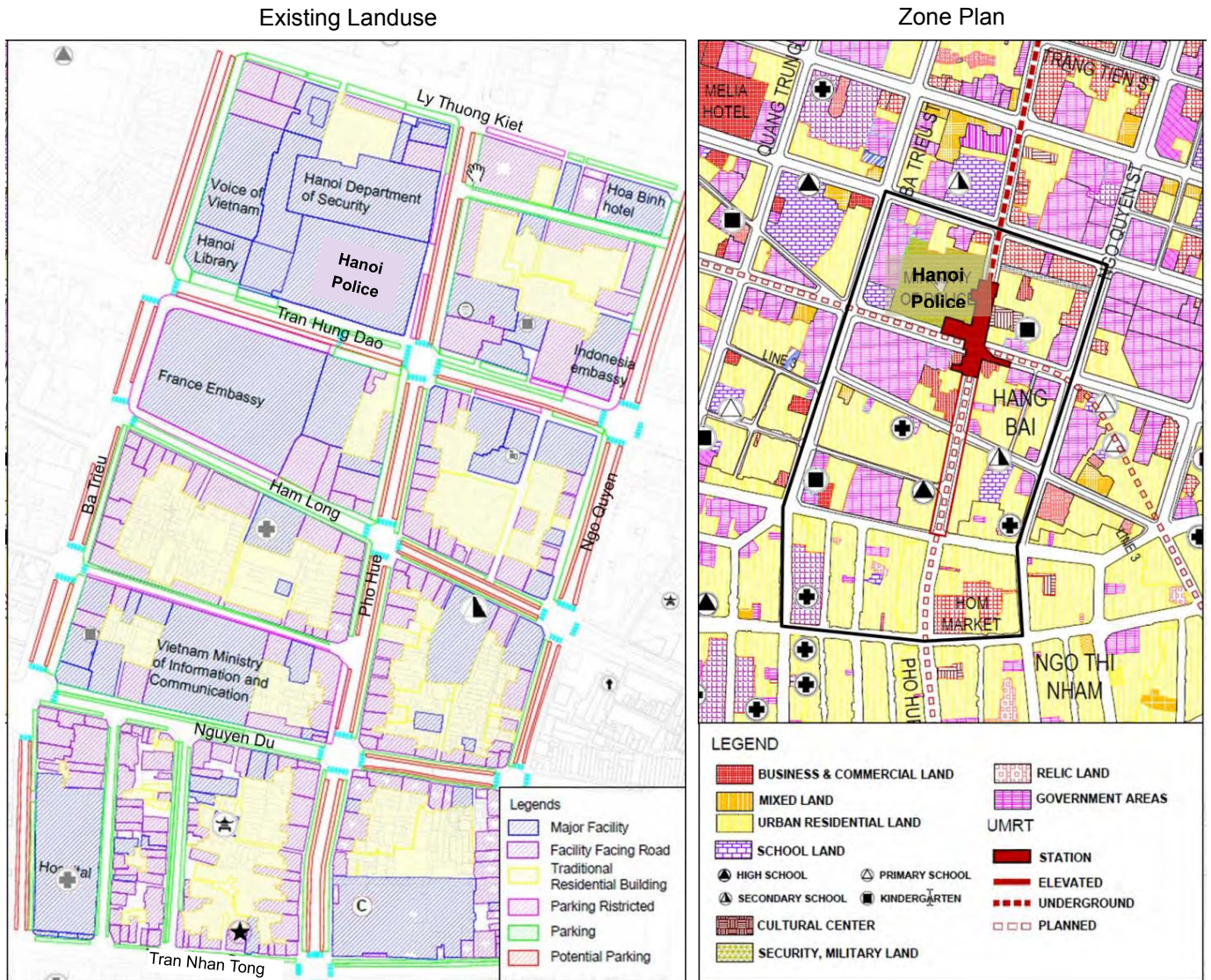
4) Required space to provide off-street parking facilities.

5.4 Pre-Feasibility Study on Tran Hung Dao Underground Parking

1) General

5.27 After the overall parking demand and supply in the city centre (AQ and FQ) has been preliminary studied, this chapter aims to analyse in more detail the feasibility of construction and operation of a planned underground parking at Tran Hung Dao Station. In conducting a pre F/S on the project, a supplemental survey on current building conditions, parking facilities and utilization has been carried out in the area in between Ba Trieu Street to the north and Nguyen Du Street to the south (See Figure 5.4.1).

Figure 5.4.1 Existing Landuse and Zone Plan in Study Area



Source: Worked out by JICA Project Team, Based on the data from HAUPA

2) Current Urban Development and Building Conditions

5.28 The project area is composed of two different areas; the northern half is characterized by mid- to high-rise mixed-use buildings, whereas the southern half is the transitional zone between traditional urban areas. The UMRT station is surrounded by large urban facilities such as embassies, Hanoi Police, the Department of Immigration, Voice of Vietnam, among others.

5.29 According to the Zone Plan, the land use is not expected to change significantly, but some buildings have potential for redevelopment. The maximum height is limited to 15 floors.

Table 5.4.1 Floor Area by Type of Facility and Use in Project Area

Type		Major Facility	Facility facing Road	Traditional Residential Buildings		Total
No of Building		57	175	486		718
No of Floors	Min	1	1	n/a		n/a
	Max	10	8	n/a		n/a
	Average	4	4	4		4
Total Site Area (000 m ²)		79	47	44		170
Total Building Area (000 m ²)		38	47	44		128
Average Floor Area Ratio (%)		196	346	301		213
Floor Area by Use (000 m ²)	Hotel	16.5 (10.7)	6.2 (3.8)	0 (0)		22.6 (5.0)
	School	10.2 (6.6)	0.9 (0.6)	0 (0)		11.1 (2.5)
	Hospital	26.8 (17.3)	0.3 (0.2)	0 (0)		27 (6.0)
	Office	45.4 (29.3)	31.2 (19.3)	0 (0)		76.5 (17.0)
	Government / Embassy	48.3 (31.2)	0 (0)	0 (0)		48.3 (10.8)
	Commercial	3.3 (2.1)	46.3 (28.7)	0 (0)		49.6 (11.1)
	Residential	4.5 (2.9)	64.6 (40.0)	132.4	100	201.5 (44.9)
	Others	0.1 (0.1)	11.7 (7.2)	0 (0)		11.7 (2.6)
	Total	154.9 (100.0)	161.4 (100.0)	132.4 (100.0)		448.7 (100.0)

Source: JICA Project Team

1) Including vacant

2) Total floor area are divided by total site area

3) Current Parking Facilities and Management

(a) Supplemental Survey on Parking Facilities and Operations

5.30 In order to obtain basic information on current conditions on parking facilities and their utilization, a supplemental survey was conducted in the project area both for off-street and on road parking.

- (i) Off-street Parking Facilities: There are 232 facilities/buildings representing a total of 6,700 m² of off-street parking space, out of which 28 buildings have off-street parking and only four buildings have their own underground parking facilities. The space available can accommodate approximately 300 cars (See Table 5.4.2).

Table 5.4.2 Off-Street Parking Facility in Project Area

		Major Facility	Facility facing Road	Total
Total No of Buildings		57	175	172
Buildings with Parking Facilities	No of Buildings	Off- Street	11	28
		Under Ground	0	4
	No. of Parking Lots	Bicycle / MC	0	840
		Car	53	158
	Total Areas (m ²) of Parking Lots	Bicycle / MC	0	3,150
		Car	1,193	3,555
		Total	1,193	6,705
Parking Capacity (No. of Lots; car equivalent)		245	53	298

Source: JICA Project Team

1) Based on interview with the security. For some facilities, the capacities were not obtained and values of similar facilities were applied

- (ii) On Street Parking Facilities: On-road space provides the majority of parking spots in the project area. A total of 4,454m of curbside of main roads are allocated for parking and managed by the public and the private sector. The roadside space can accommodate 2,140 motorcycles and 222 cars.

Table 5.4.3 On-Street Parking Facility in Project Area

Section	Length (m)	Area (m ²)	Capacity by Vehicle Type ¹⁾		Car Equivalent ²⁾
			Bicycle/ MC	Car	
Allocated for Bicycle/ MC	3,462	8,054	2,005	0	334
Allocated for Car	820	2,416	0	199	199
Allocated for Both	172	767	135	23	46
Total	4,454	11,237	2,140	222	579

Source: JICA Project Team

1) Based on interview with the security and estimation by surveyors

2) 1 car slot is equal to 6 MCs/ Bicycles.

Figure 5.4.2 Figure Location Parking Facility Administrated by Public Authorities



Source: JICA Project Team

Table 5.4.4 List of Parking Facility Administrated by Public Authorities

No	Road Name	Type	Vehicle	Administrator
1	Nguyen Du	Sidewalk+roadside	Car	Governmental organization
2	Ham Long	Roadside + sidewalk	Car & MC	Hoan Kiem District
3	Tran Hung Dao	Sidewalk+roadside	Car	DOT
4	Ngo Guyen	Sidewalk+roadside	Car	DOT
5	Tran Xuan Soan	Roadside + sidewalk	Car	DOT
6	Bui Thi Xuan	Roadside	Car & MC	DOT
7	Trieu Viet Vuong	Roadside	Car	DOT
8	Pho Hue	Roadside	Car	DOT

Source: JICA Project Team

- (iii) **Current Parking Management:** There are parking facilities managed by the local government. The parking fee is 3,000 VND for motorcycle, and 30,000 VND for car. In case of car parking, VND30,000 are charged for the first 2 hours, and another 30,000 VND are charged for extra time (for example, the parking fee for 3 hours costs 60,000 VND).

4) Supply Demand Gap

5.31 To address the supply-demand issue in the city centre, including in the project area, an analysis was conducted to provide indicative figures on the optimum level of supply in parking facilities in the city centre, based on the example of other Asian cities. Each city has its own guidelines for different types of floor use. Based on these guidelines, one car parking spot seems to be necessary every 200m² of floor area (See Table 5.4.5).

Table 5.4.5 Estimated Parking Space Requirement

Floor Use	Parking Provision Standards Floor Area (m ²) requiring a Car Lot				Assumed for Hanoi	
	Philippines	Singapore	Bangkok	Tokyo	Old Urban Area	New Urban Area
Residential	200	100	100	350	200	100
Office	100	250	60	300	200	100
Commercial	100	200	100	250	200	100
Government / Embassy	100	250	60	300	200	100
Hospital	200	150	120	300	200	100
School	200	200	240	300	200	100
Hotel	200	250	150	300	200	100
Others	400	500	250	300	200	100

Source: Worked out by JICA Project Team, based on the following sources,
 Philippines - National Building Code of Philippines
 Bangkok - Metropolitan Ordinance
 Singapore - Singapore Land Transport Authority
 Tokyo - Tokyo Metropolitan Parking Ordinance

5.32 In accordance to the assumed standard, required parking is estimated to be 2,185 car spots equivalence, or 1,311 spots for cars and 5,244 for motorcycles based on the assumption that 60% and 40% of the total parking space are allocated for cars and motorcycles, respectively. (See Table 5.4.6).

Table 5.4.6 Estimated Parking Demand in the Future

	Assumed Floor Use							Total		
	Residential	Office	Commercial	Government / Embassy	School	Hospital	Hotel			
Floor Area Ratio (%)	453	202	150	158	199	322	641	267		
Floor Area (000 m ²)	202	77	50	48	11	27	23	437		
Parking Factor	200	200	200	200	200	200	200	-		
Parking Demand (000) ¹⁾	Total PCU	1,008	383	248	242	56	135	113	2,185	
	By mode	Car	605	230	149	145	34	81	68	1,311
		MC	2,419	919	595	581	134	324	271	5,244

Source: JICA Study Team

1) For overall parking area, share of the car and MCs are assumed as 60% and 40 %, respectively. 1 car slot is equal to 6 MCs.

5.33 When the assumed guideline is applied to current land use and building conditions, parking demand is estimated to be 2,185 car lots in total. According to the additional survey, the project area provides for 298 off-road car lots and 579 on-road car equivalent space. This clearly indicates that the project area will significantly lack parking space and facilities, especially off-road parking because it is getting more and more difficult and inappropriate to use the road space for parking.

5) Basic Plan on Proposed Underground Parking

(a) Planning Concept

5.34 Tran Hung Dao (C10) Station is located under the intersection of Tran Hung Dao Street and Hue Street in French Quarter area. Tran Hung Dao Street is connected to Hanoi Station, and Tran Hung Dao Station is a transfer station between Line2 and Line3 (Phase -2 section). The station area covers the French Quarter, characterized by its wide and grid road network with trees and sidewalks, and its traditional French-style buildings.

5.35 An parking area will be developed underground, above the space where the railway will make a U-turn. This space will be the railway terminal after completion of Phase1; it will be built according to the cut and cover method, hence the opportunity to develop an underground parking area with limited additional works.

(b) Facility Plan

5.36 The Underground Parking Area is planned to be 255m- long and 21.4m- wide (see Figure 5.4.3). It will be located in the underground space, above the space where the railway will make a U-turn i.e. the terminal of the Phase1 section which will be constructed according to the cut and cover method, above Line2.

5.37 The Underground Parking Area will be a self-propelled 2-floor structure with a capacity of about (i) 200 cars for 2floors, or (ii) 560 lots for motorbikes on the -1 floor and 100 lots for cars on the -2 floor. Each floor will be 4,900m² and the total floor area will be 9,800 m² including toilets, machine rooms and others.

5.38 The underground walkway from the -1 floor will directly connect to the concourse of Tran Hung Dao Station. Two emergency exits to Hue Street will be designed.

(c) Estimated Cost

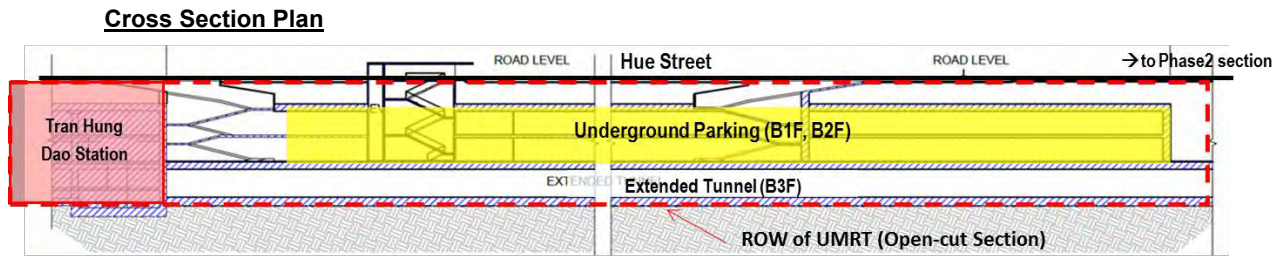
5.39 Based on the facility plan, the construction and maintenance costs for the underground parking project were estimated about VND 200 billion (see Table 5.4.7):

Table 5.4.7 Construction and Maintenance Cost for C10 Underground Parking

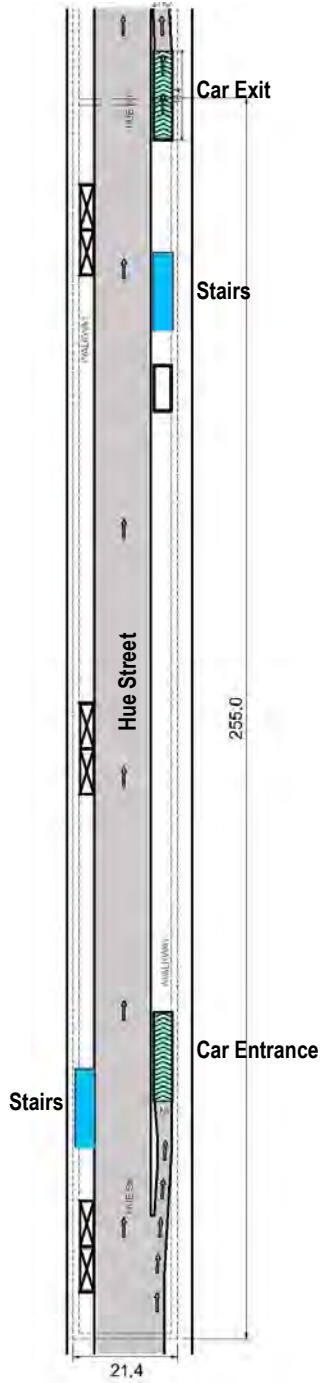
Type of Facility	Underground	Adjoining to the Station
Number of Floors	2	The 1 st floor is for MC, 2 nd floor is for Car
Land Area (m ²)	4,900	Without Land Acquisition
Construction Cost (million VND)	201,528	20.6 (million VND / m ²) * 4,900 (m ²)*2 floors
Maintenance Costs (million VND/ year)	Labour	48 (million VND / year / Person) * 6
	Power	0.123 (million VND / m ²)* 4,900 (m ²)*2 floors
	Water	0.053 (million VND / m ²) * 4,900 (m ²)*2 floors
	Others	10 % of all other maintenance Costs
	Total	2,473

Source: JICA Project Team, based on the Report of Hanoi City Urban Railway Construction Project Line 2

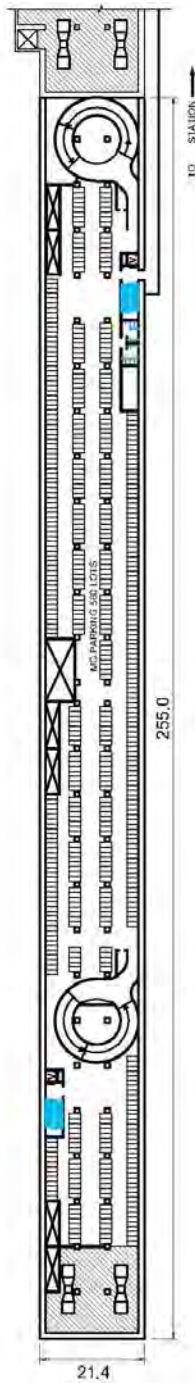
Figure 5.4.3 Facility Plan for Tran Hung Dao Underground Parking



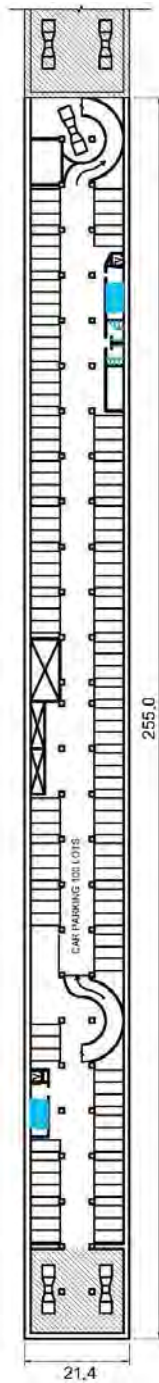
Layout Plan



B1 Floor Plan



B2 Floor Plan



Source: JICA Project Team

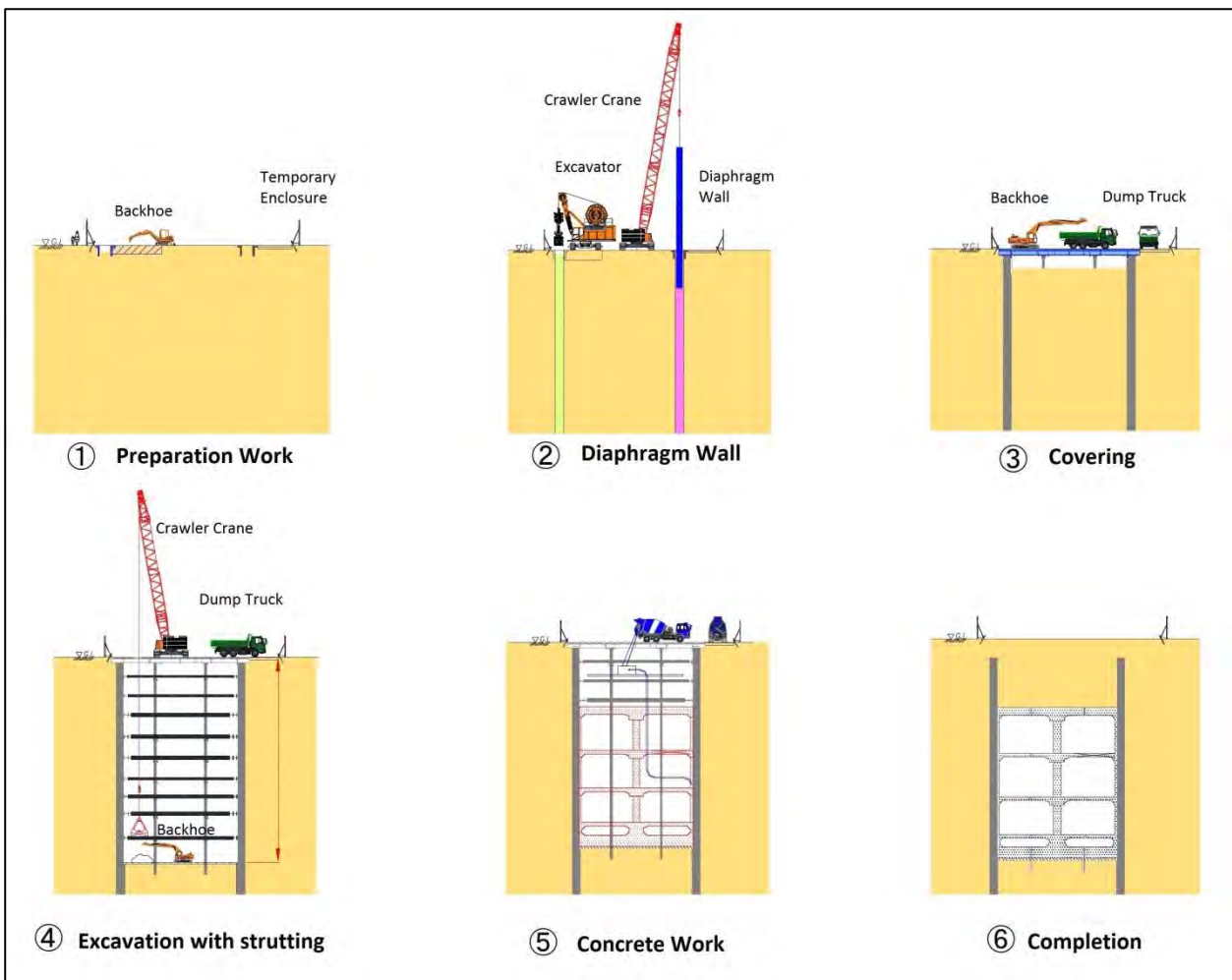
6) Proposal on Underground Parking Development integrated with UMRT

(a) Construction Method and Cost of Underground Parking

5.40 In general, the open-cut method is applied for construction of underground facility, including UMRT underground station and underground parking. There are several steps for construction, namely; (i) preparation work, (ii) instalment of diaphragm wall, (iii) covering, (iv) excavation with strutting,, (v) concrete work and (vi) completion (see Figure5.4.4).

5.41 The process of covering can be alleviated in case of park and openspace, where it is not necessary to take into consideration of loading of the structure.

Figure 5.4.4 Construction Process of Open-Cut Method



Source: JICA Project Team

(b) Comparison of Construction Cost

5.42 The construction costs of underground parking are compared in case of the parking (a) under road, (b) integrated with UMRT station, (c) under road space and above the shield tunnel of UMRT, (d) under park and (e) under building (as a part of building facility).

5.43 Construction costs of the parking facility (width=22m, length=225m) are estimated with several types of parking (see Table 5.4.8).

Table 5.4.8 Breakdown of Construction Cost of Underground Parking under Road

Type of Underground Parking	Floor Area (m ²)	No. of Floor	Total Floor Area (m ²)	Box Height (m)	Total Spatial Area (cum)	Car Parking	Total Construction Cost (million VND)	per m ² (million VND)	per cum (million VND)	per Vehicle (million VND)
1 Under Road	4,950	3	14,850	17	84,150	300	1,443,000	97.2	17.2	4,810
2 UMRT Integrated	4,950	2	9,900	11.33	56,100	200	221,000	22.3	3.9	1,103
2 Under Road (Above Tunnel)	4,950	2	9,900	12	59,400	200	1,143,000	115.5	19.2	5,715
4 Under Park	4,950	1	4,950	5	24,750	100	355,000	71.7	14.4	3,551
5 Under building	4,950	3	14,850	N/A	N/A	300	226,000	15.3	N/A	755

Source: JICA Project Team

5.44 It shows that the underground parking integrated with UMRT can be constructed one-fourth of the cost of underground parking under the road. Because most of construction costs including (i) preparation work, (ii) instalment of diaphragm wall, (iii) covering, (iv) excavation with strutting, will be covered by UMRT Construction Project for U-turn space of UMRT. It means the construction cost for underground parking with the UMRT station is (v) concrete work m². It is also significant that this parking facility will be developed under the ROW of Line 2, the land acquisition is not required additionally.

5.45 In Hanoi City Urban Railway Construction Project (Nam Thang Long - Tran Hung Dao Section), underground parking project for other stations were also proposed to be developed (see Table 5.4.9).

5.46 In sum, it is proposed to develop underground parking integrated with UMRT station construction especially the terminal station which U-turn space will be excavated, and inside of ROW of UMRT and/or road and public spaces.

Table 5.4.9 Financial Analysis of Underground Parking Project, for Line 2 Stations

Items		C10	C5	C4	C9
		Tran Hung Dao	Quan Ngua	Buoi	Hoan Kiem Lake
Number of Storey		2	3	2	3
Land Area (m ²)		4,900	7,889	5,310	1,454
Construction Cost (million VND)		201,528	1,884,324	731,034	347,295
Total Project Cost (million VND)		201,528	1,884,324	731,034	347,295
Capacity	a. Motorcycles / Bicycles	560	1,270	800	240
	b. Cars	100	312	122	20
Operating and Maintenance Costs	a. Labour	288	384	288	384
	b. Power	1,441	3,479	1,561	641
	c. Water	519	1,254	563	231
	e. Others	225	512	241	126
	f. Total	2,473	5,629	2,653	1,382
Parameters / Assumptions:					
Construction Cost (million VND per m ²)		20.6	79.6	68.8	68.8
Personnel Cost	Required Personnel	6	8	6	6
	Average Monthly Salary (million VND / MM)	4.0	4.0	4.0	4.0
Energy Cost (VND per m ²)	Underground	123,000			
	Elevated	147,000			
Water Cost (million VND per m ²)		53,000			
Other Operating Expenses (%)		10.0%			
Inflation Rate (%)		5.0%			

Source: JICA Project Team, based on the data from Hanoi City Urban Railway Construction Project (2011)

7) Project Evaluation

(a) Economic Analysis

5.47 **Approach:** A cost-benefit analysis has been conducted to determine whether the proposed public infrastructure project justifies a public investment. The concept is to analyse if the benefits generated by the project is worth the investment from the viewpoint of the national economy.

5.48 The roles of underground parking are to reduce on-street parking and thus traffic, as less vehicles would be driving around to look for parking space. Another role is to promote the use of UMRT by providing Park and Ride (P&R) lots. Therefore, the underground parking development is expected to partly solve the problems related to on-street parking, such as traffic congestion, whilst also increasing accessibility and safety for pedestrians. These effects were measured by a “with and without” comparison, that is, comparison of road traffic and walking environment with the underground parking and without the project (Baseline case).

5.49 Such effects are not necessarily recognized as quantitative benefits but there is no doubt that they represent positive externalities. A precise quantitative valuation of these externalities was not possible, due to the lack of data. Therefore, the analysis will be conducted based on qualitative descriptions.

5.50 **Economic Benefits:** As stated above, the development of underground parking is expected to reduce parking habits on the streets and sidewalks. This means that the project will improve the road traffic and walking environment in the station area. In addition, it will provide parking space (P&R lots) for UMRT users and thus it may promote use of UMRT.

5.51 Based on these assumptions, the economic benefits related to the development of such project fall into four categories: (i) travel time saving, (ii) improvement of accessibility, (iii) enhancement of comfort and safety, and (iv) improvement of local environment.

5.52 The beneficiaries will mainly be the people who work and reside in the project area as well as UMRT users. However, general traffic conditions in the area will also be improved due to reduction in traffic congestions and conflict on roads.

5.53 The economic benefits of an underground parking facility project are summarized in the following table.

Table 5.4.10 Economic Benefits

Benefit	Without project (Baseline)	With project	Specific effects (difference between with and without)	Beneficiaries
Travel time saving (travel speed increase)	-Traffic congestions and narrow streets caused by on-street parking	-Increase of traffic capacity and relief of traffic congestion	-Reduced travel time of pedestrians, cars, MC by travel speed increase	UMRT users Local residents
Improvement of accessibility	- Parking on the streets and sidewalks blocks the entrance of and roads to commercial buildings and public facilities (e.g. community centres).	-No on-street parking blocks the entrance of and roads to commercial buildings and public facilities	-Local people can get access commercial buildings and public facilities (e.g. community centres).	Local residents
	-Parking space for UMRT users is located far from the station or no parking.	-Fringe parking is provided.	-UMRT users can use parking for P&R. -Increased users of UMRT station	UMRT users
Enhancement of comfort and safety	-Parking on the streets and sidewalks make pedestrians feel uncomfortable and cause road accidents	-No parking on streets and sidewalks obstruct traffic -Pedestrian can walk on sidewalks without car parking	-Increased feeling of comfort and security in walking -Decrease in road accidents	UMRT users Local residents
Improvement of local environment	-Townscape is unattractive and city image is not good due to the roads with the on-street parking -Community space on sidewalks is little due to the on-street parking -Vehicles can drive inside CBD -Air pollution and noise due to the heavy traffic	-Decrease in on-street parking -Community space is provided with local residents on sidewalks -Many vehicles are removed from CBD by fringe parking -Little heavy traffic to cause air pollution and noise	-Town looks more beautiful and city image is better -Local people can use sidewalks for communication with neighbors such as playground for kids -Relieved air pollution and noise by the decrease in vehicles in CBD and heavy traffic.	Local residents

Source: JICA Project Team

5.54 **Result of Analysis:** As the table above indicates, development of underground parking with the underground station is expected to generate a large amount of economic benefits to the station area as well as UMRT users.

5.55 A significant advantage of this particular project is the reduced investment cost as the underground parking facility and the UMRT station/terminal will be constructed simultaneously.

(b) Financial Analysis

5.56 **Approach:** This section evaluates the project's financial viability. In order to ascertain the financial feasibility, discount cash-flow analysis was adopted and the viability is measured by the following three (3) Indicators including B/C (Cost Benefit Ratio), NPV (Net Present Value) and FIRR (Financial Internal Rate of Return)

5.57 Basic assumptions of the analysis are as follows.

- (i) **Period for Analysis:** the period of analysis is 30 years. It is planned that the construction will start in 2018 and the underground parking will start to operate in 2020. Therefore, this analysis covers the construction period from 2018 to 2019 and the operation period from 2020 to 2047.
- (ii) **Estimated Project Cost:** Project cost consists of construction cost and operational and maintenance (O&M) cost as previous section 5.2 explains. The amount of each cost is as follows.
 - Construction cost: 201,528 million VND
 - O&M Cost: VND 2,473 million per year, which includes labour, power, water, and others.
- (iii) **Assumed Parking Fee:** The parking fees of car and motorcycle in 2020 are set based on the current rate in Vietnam as follows (See Table 5.4.11).

Table 5.4.11 Assumed Parking Fee

	2020
MC	5,000/use
Car	55,000/use (up to 2 hours)

Source: JICA Project Team

- (iv) **Assumed Parking Utilization Performance:** Utilization of parking facilities is assumed below (see Table 5.4.12).

Table 5.4.12 Assumed Parking Facility Utilization Performance

	Parking capacity (No. of lots)	Utilization rate	Turnover rate (No. of vehicle per day)
MC	560	80%	6
Car	100	80%	6

Source: JICA Project Team

- (v) **Evaluation Result:** The result of cash-flow analysis is summarized in the following table. FIRR is 3.76% which is much lower than 12% and it shows that the project is not financially viable.

Table 5.4.13 Cash Flow of Financial Analysis

Indicator	
FIRR	3.76 %
B/C (at discounted rate of 12%)	0.50
NPV (million VND at discounted rate of 12%)	-89,925

Source: JICA Study Team

- (vi) **Sensitivity Analysis:** Sensitivity analysis by changing utilization rate and parking fee rate and the number of car parking lot is conducted. Even when the parking fee increases by 1.5 times of base scenario and utilization rate is assumed as 100%, FIRR is below 12% and the project is not viable. However, when parking fee is two times the value of the base scenario, FIRR goes up to 12.1% and it reaches 15.7% if utilization rate is 100% (see Table 5.4.14).

Table 5.4.14 Sensitivity Analysis by Level of Parking Fee and Utilization Rate

Case	Mode	Parking Fee	No. of Lots	Utilization Rate (%)	Turnover Rate (No/ day)	FIRR (%)
Base Scenario	MC	5,000 VND / time	560	80	6	3.8%
	Car	55,000 VND / time	100	80	6	
Base Scenario ×1.5	MC	7,500 VND / time	560	80	6	8.3%
	Car	82,500 VND / time	100	80	6	
Base Scenario ×1.5 Utilization rate 100%	MC	7,500 VND / time	560	100	6	11.2%
	Car	82,500 VND / time	100	100	6	
Base Scenario ×2.0	MC	10,000 VND / time	560	80	6	12.1%
	Car	110,000 VND / time	100	80	6	
Base Scenario ×2.0 utilization rate 100%	MC	10,000 VND / time	560	100	6	15.7%
	Car	110,000 VND / time	100	100	6	

Source: JICA Project Team

5.58 If more parking space are used for cars, FIRR is over 12% except for the combination of 1.5 times parking fee and 50 additional car lots.

Table 5.4.15: Sensitivity Analysis by Level of Parking Fee and No. of Car Parking Lot

Case	Mode	Parking Fee	Lots	Utilization Rate (%)	Turnover Rate (/ day)	FIRR (%)
Base Scenario ×1.5 No. of car lot +50	MC	7,500 VND / time	280	80	6	10.19%
	Car	82,500 VND / time	150	80	6	
Base Scenario ×1.5 No. of car lot +100	MC	7,500 VND / time	0	80	6	12.0%
	Car	82,500 VND / time	200	80	6	
Base Scenario ×2.0 No. of car lot +50	MC	10,000 VND / time	280	80	6	14.4%
	Car	110,000 VND / time	150	80	6	
Base Scenario ×2.0 No. of car lot +100	MC	10,000 VND / time	0	80	6	16.7%
	Car	110,000 VND / time	200	80	6	

Source: JICA Project Team

8) Conclusion

5.59 It will be financially viable in case if underground parking spaces are used for cars with increased parking fees. For this, the parking facilities can be operated on commercial basis without financial burden to the government.

5.60 If the underground facility is constructed together with UMRT underground station, the construction cost becomes 1/3- 1/4 of new construction, because the cost of excavation and temporary works are implemented by station construction. At the terminal stations, an open-cut underground space inside of ROW of UMRT will be generated above the extended tunnel for U-turn, so it is proposed to utilize this vacant space for parking and/ or commercial facilities.

6 PRE FEASIBILITY STUDY ON TOD AT GIAP BAT STATION AREA

6.1 Introduction and Planning Framework

1) Background

6.1 One of the key components to successful railway operation is the TOD approach to enhance the ridership of the UMRT system and to contribute to generate non-rail revenue which can cross-subsidize costly infrastructure investment. A successful TOD can also generate extensive economic benefits at and around the station such as: smooth and safe traffic circulation of vehicles and pedestrians, increase in the value of urban space, creating a new symbolic space for communities through opportunities and types of development depend on locational characteristics of respective stations.

6.2 As Hanoi has already been urbanized extensively with some developments bordering green field areas in the suburbs, a UMRT system has been planned to run through the existing built-up area. The TOD approach has become urgent to adopt in Hanoi, as it is more challenging to do it in existing built-up area than the green-field development area. An integrated TOD development in an already built-up area is arduous in particular because it should be implemented in such a way that all right holders, who are involved and participate in planning process, understand the importance of the project. To facilitate such participation and understanding of the project, all their rights must be protected.

6.3 Giap Bat station has been selected because the strategic location of the station both in terms of urban and transportation aspects. The station is characterized by large underutilized plots of lands in the VNR property and adjacent areas:

- (i) The southern area of the city has been growing rapidly to meet increasing demand for housing, mainly through initiatives of different scale of the private sector. However, this area does not have a competitive multi-functioned CBD to provide diversified services and employment opportunities, as an alternative to the city centre. If the area is properly developed based on the TOD concept, it will become highly possible to create a new competitive CBD truly integrated with public transport. Giap Bat TOD will also become a catalyst to reorganize the adjoining areas where many new towns are developed in a rather in disintegrated manner.
- (ii) Giap Bat station is located at the intersection of the Ring Roads and the North-South Corridor. Given that urban developments have been expanding along the RR3, which also connects both sides of Red River, the role of Giap Bat station as a multi-modal transport hub will become more and more significant. It is unlikely that this role will be diminished after the UMRT Line is extended to the south, to Ngoc Hoi for reference.

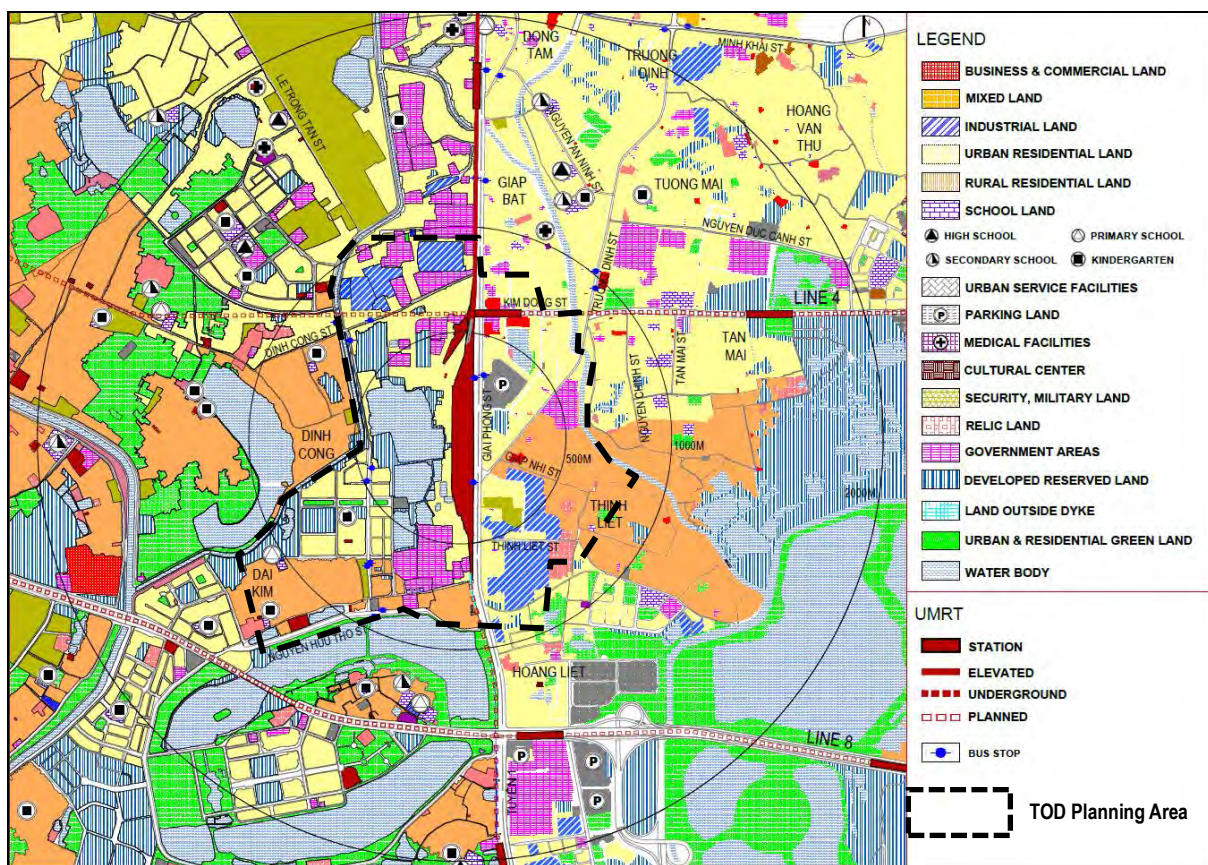
2) Objectives

6.4 To formulate a competitive urban core (CBD) in the south of the City for balanced urban structure, it is significant to create employment opportunities to reduce travel distance for commuting to City Center and to provide opportunities for resettlement of the people living in overcrowded city center such as the Ancient Quarter. This prefeasibility study intends to look into development potentials of Giap Bat Station area, to verify following objectives:

- (i) To formulate a comprehensive concept plan showing compact and competitive multi-functional urban core based on TOD concept in basic compliance with Zone Plan
- (ii) To assess viability such development from economic, financial, socio-environmental viewpoints and implementability of the plan and projects.
- (iii) To preliminary study possible application of a new development mechanism such as “land readjustment” and “urban renewal” system which are widely practiced in Japan

6.5 TOD planning area is selected about 500m-1km radius of the station, with boundaries of RR2.5 at north, Zone Plan road at east, Nguyen Huu Tho St. at south, and Set River at west.

Figure 6.1.1 Present Landuse of Giap Bat TOD Planning Area



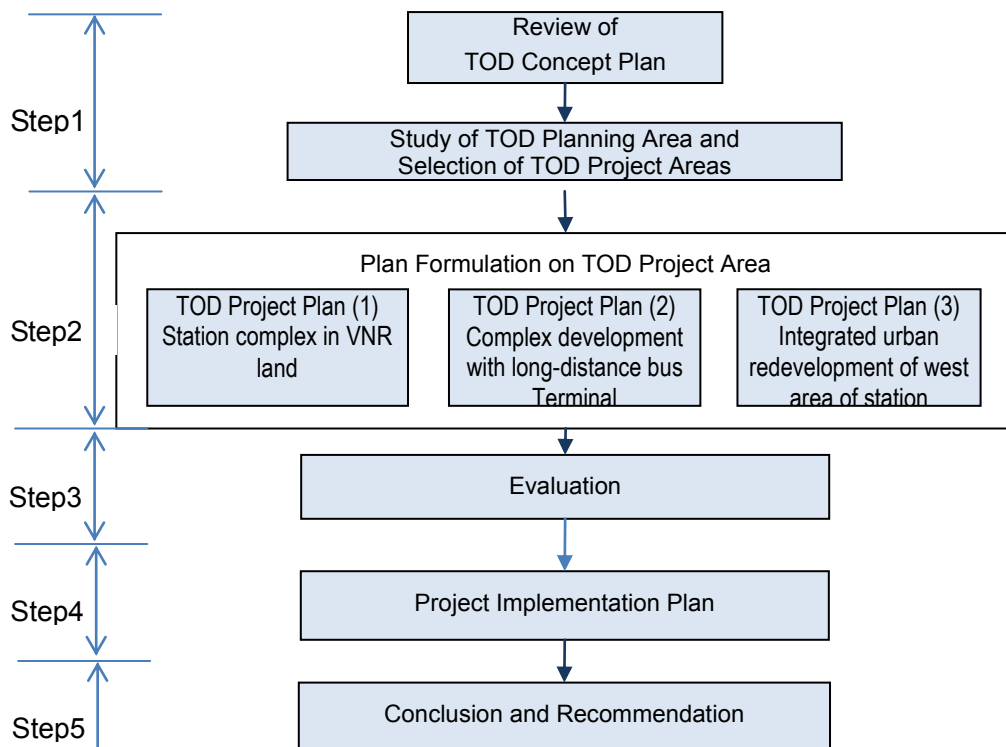
Source: JICA Project Team

3) Approach

6.6 The study follows five steps (See Figure 6.1.2):

- (i) Review of TOD Concept Plan and Supplemental Study on TOD Planning Area: Concept plan was reviewed and supplemental study was conducted in TOD planning area where are influenced by UMRT development and TOD impact, which is necessary to select a TOD project area and specify development directions.
- (ii) Formulation of TOD Plan on Selected Projects: Inside the TOD Planning Area, TOD Project Areas are elaborated and selected where development impacts will be increased by implementing an integrated transport and urban development projects. Necessary plans were formulated for selected project areas, including overall site layout plans including landuse, road network, inter-modal facilities.
- (iii) Project Evaluation: The project is evaluated comprehensively from economic, financial and socio-environmental aspects. The results of the evaluation provide a second basis to determine, more specifically, the roles of stakeholders more specifically. In addition to the above, the project is evaluated from the viewpoints of provision of public infrastructure, consensus building among stakeholders and impact on current institution and development practice.
- (iv) Project Implementation Plan: The projects must be implemented. However, there are constraints affecting the effective implementation of the project under the current institutional arrangements. Therefore the project implementation will not only be focused on funding, organization, implementation schedule, but also on alternative implementation methods.
- (v) Conclusion and Recommendation: Conclusion and recommendations are made on the implementation of TOD project at Giap Bat station, and farther on the application of the concept to other stations in Hanoi.

Figure 6.1.2 Approach to Giap Bat TOD Pre F/S



Source: JICA Project Team

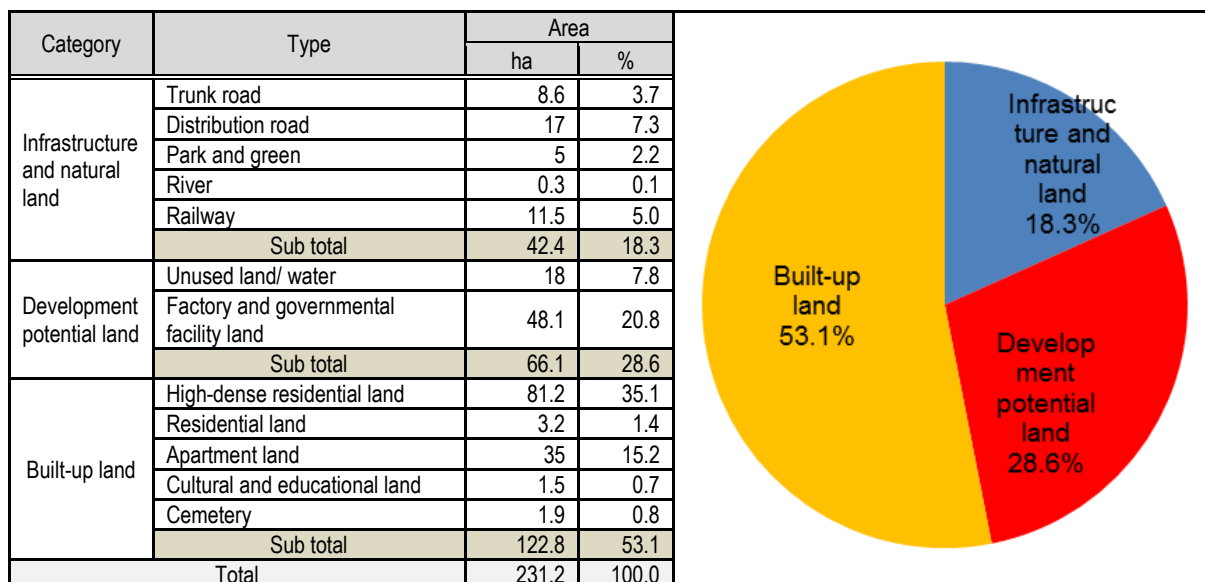
6.2 Present Condition TOD Planning Area

(a) Land use

6.7 The whole TOD Planning Area covers a total area of 231.2ha. More than one-fourth of land is categorized as development potential land including unused land, water, factory and governmental facility land which will be relocated. Road coverage is about 10%, but there are limited road network at the west of the station. In the built-up area, there are various types of buildings such as high-dense residential land, apartment in the new town, etc.

6.8 The congested build-up residential area requires improvement of the living environment and provision of public facilities such as schools and parks. With the opening of Line 1 and Giap Bat station traffic conditions should become better in the area, especially around the station area where primary and secondary roads will be developed, as designated in the Zone Plan, as well as access roads to the station and pedestrian friendly facilities.

Figure 6.2.1 Composition of Existing Landuse in TOD Planning Area



Source: JICA Project Team

(b) Transport Condition

6.9 There are 3 regional trunk roads in the Giap Bat area, including Giai Phong Street (NH-1) running north-south, and Kim Dong Street (Ring Road 2.5) running east-west under construction, and Ring Road 3 at the south of TOD Planning Area.

6.10 Main distribution roads in residential areas such as Dinh Cong St., Tan Mai St., Dai Tu St., etc. are not well organized, so traffic jams are often occurred because of congestion around intersection of NH-1 and VNR crossing.

6.11 Access roads are seriously limited in the west of the station, because of VNR land, water and unused land, and built-up residential areas along VNR land. So people in the west of NH-1 are able to access to NH-1 only from Dinh Cong St. at north, Phu Dai Tu St. and Nguyen Huu Tho St. at south which there are no sidewalks.

6.12 Only long-distance trains stop at VNR Giap Bat station, five times a day. There is also Giap Bat bus terminal on NH1 to the east, that 1,150 long-distance buses use every day. This bus terminal is expected to play an important role as a regional transportation hub together with Giap Bat station on Line 1, whose development will trigger concentration of urban functions in Giap Bat area as a sub-center in the South of Hanoi.

(c) Socio-Economic Condition

6.13 In general, buildings and houses in the area are disordered and degraded. Apart from only few newly-built condominiums 15 floors in Dai Kim new area, the rest of buildings and houses are low-rise of under 5 stories. Housing condition are varied, half of them are in acceptable condition, while another half are in poor condition, some 13% are temporal structures on illegal encroached land. Results of a rapid household interview survey and field survey in TOD Project Areas reveals socio-economic condition as follows:

- Population: At present, there are about 7,500 people (2,000 households) living in the TOD planning area, except for VNR land where residential use is limited.
- Characteristic of households: Residents living here mostly are 2 generations families with 3-5 members (about 81.2%).
- Age and occupation: 59.5% of population is at working age (from 18 to under 55-60 years old). About 50% of the population has a fulltime job; retired people covers 14.4% and students or pupils (including university/college students) cover 26%.
- Educational level: There is about 28% of the population hold a graduate degree, about 15% of the population hold a college/vocational degree and 56.4% of the population hold the high school degree or under.
- Residents mainly work in inner districts, with 60% of surveyed people go to work nearby (Hoang Mai and Hai Ba Trung Districts), 17% go to work in Dong Da & Thanh Xuan districts, there are only 7.3% go to suburban districts. Because of that, two third of the residents (77.6%) take within 30 minutes for travelling to work from home.
- Transport mode: Most of the survey families using motorbike or electricity bike (about 70%) for travelling to work. There is only 1.4% of survey people go to work by car, 2.8% use public transport. There is about 10% of them walk to work on foot.
- House-land ownership: Overall, the rate of home land ownership is quite high. 64% of surveyed people have the right to use land and 7.5% has to rent house from private owner, 22.6% live on the state land leased. The majority of surveyed people (87%) have the ownership of the house, the rest are rented (with 11% of private rent, and 2% of the state rent).
- Building condition and type of community: Residents in TOD planning area are diversified including many small communities with different characteristics. Major community groups and their housing types are summarized in Table 6.2.1 and Figure 6.2.1.

Table 6.2.1 Building Condition and Types of Community of Giap Bat TOD Project Area

(1) Residential area near Dinh Cong Street	<ul style="list-style-type: none"> The residential areas along Dinh Cong Street are mainly people from outside coming here to live and work so they do not know each other well as well as are not interested in each other's lives. These people cannot shape a strong social relationship in their community. The houses facing the road Dinh Cong are temporary shop house with 1-2 floors, of which, the 1st floor is mainly used for trading – service. Meanwhile, houses in the back of Dinh Cong Street mainly for residential purposes. They range from 1 to 5 floors. Built form of houses which facing to lanes are quite synchronous while inner houses' are more free and diverse.
(2) Collective Housing area of Ministry of Police	<ul style="list-style-type: none"> The collective housing area has been formed since 1992 – after the relocation of a prison, the remained land was divided and subsidized for officers and employers of Ministry of Police. At the present, there is about more than 90% of families are staffs working for governmental agencies, most of them are in Police professional. This area has a grid road network (big lane – small lane). Houses are 3-5 story lot houses with the uniform of construction boundary and similarity in architectural form.
(3) Collective housing area of Giap Bat station and Vietnam Railway Corporation	<ul style="list-style-type: none"> The collective housing area has been formed since 1960s -1970s when Giap Bat station located here. Up until now, most of families living here have members working for Giap Bat station or Vietnam Railway Corporation. Just a small amount of people from outside came here to rent house to live and work here. The community has been established for decades hence its member knows each other well. This community is recognized as a tight and solidary one. There are two typical kinds of house locating here. The first one is lot houses with 3-5 floors. These houses are in good conditions and have modern look. They cover the majority of local houses. The second one is 3-storey collective apartments which are now very old and downgraded. These collective apartments face to the west while lot houses have various directions.
(4) Residential area in Dai Kim new urban area & Housing blocks of Dai Kim ward	<ul style="list-style-type: none"> The community in this area is among the latest one in TOD planning area and actually it has 2 small different communities. The first are people living in apartments of Dai Kim new urban area - which had been formed since 2009. These people knows each other quite well and they mostly care about living conditions in their apartment more than public facilities and green open spaces outside the buildings. The second communities are people living in lot houses since 2002. These people don't know each well and they also do not concern about social relationship with other communities. There are 2 types of house. The first are high rise apartments. Despite the young age, these apartments have been downgraded especially in terms of infrastructure (elevator, clean water supply, garbage and hygiene). The second type is tradition tube house with 3-5 stories.
(5) Housing blocks in Dai Kim ward and along Dai Tu Street	<ul style="list-style-type: none"> (This area has been developed since 2002 when new urban areas started to develop nearby. There is about 30% of the population is governmental officer or retired officer. A large number of percentage was people running their own business at home. There is also other group of population such as workers, students renting house here. The community is table, the neighboring and social relationships are tight and harmonious. Houses mainly are shop house facing big or small roads; they have the similarity in height (4-5storeys) and modern architectural form.
(6) Collective housing area of Giap Bat station and residential area on encroached land	<ul style="list-style-type: none"> This area was formed since about 1969. Initially, this area was the collective housing area for officers and employees working for Giap Bat station. Gradually, there were more people from outside come here to settle, they built their houses on encroached land, forming a pretty complicated community there. The demographic of this area is not homogenous, including state employees, universities students to porters, junk merchants etc. Because of such characteristic, the community here has loose cohesion. Houses in the area are of low quality and uneven, they have spontaneous form and high density. Housing at the outermost zone mostly are newly built lot houses with 3-5 stories, while there are a lot of temporary house, 1st floor house etc in the inner zone.
(7) Houses near Giap Bat station along Giai Phong Street (NH-1)	<ul style="list-style-type: none"> This residential area was formed during 1990s. Because of the fact that these houses have business at home and because of the proximity to Giap Bat station, people living there are very open. However, the neighboring and social relationships are not as tight as it should be since they based much on economic benefit. Residents use social infrastructure of Tam village. These houses are block of street house facing to Giai Phong road. The 1st floor is for business purposes (restaurant, convenient store). Some houses have been changed into motels, hotels.

Source: JICA Project Team

Figure 6.2.2 Building Condition of Giap Bat TOD Project Areas



Source: JICA Project Team

(d) Technical Infrastructure

6.14 In general, technical infrastructure condition of this area is very poor, except for electricity, lighting system and water supply system which work well. Sewerage system weak performance in residential areas and dormitories. When heavy rains and local flooding occurs for 1-2 hours. Sanitation condition in the area is uneven and generally low quality with many landfills, dusty, noisy and damp sites, local flooding.

(e) Social Infrastructure

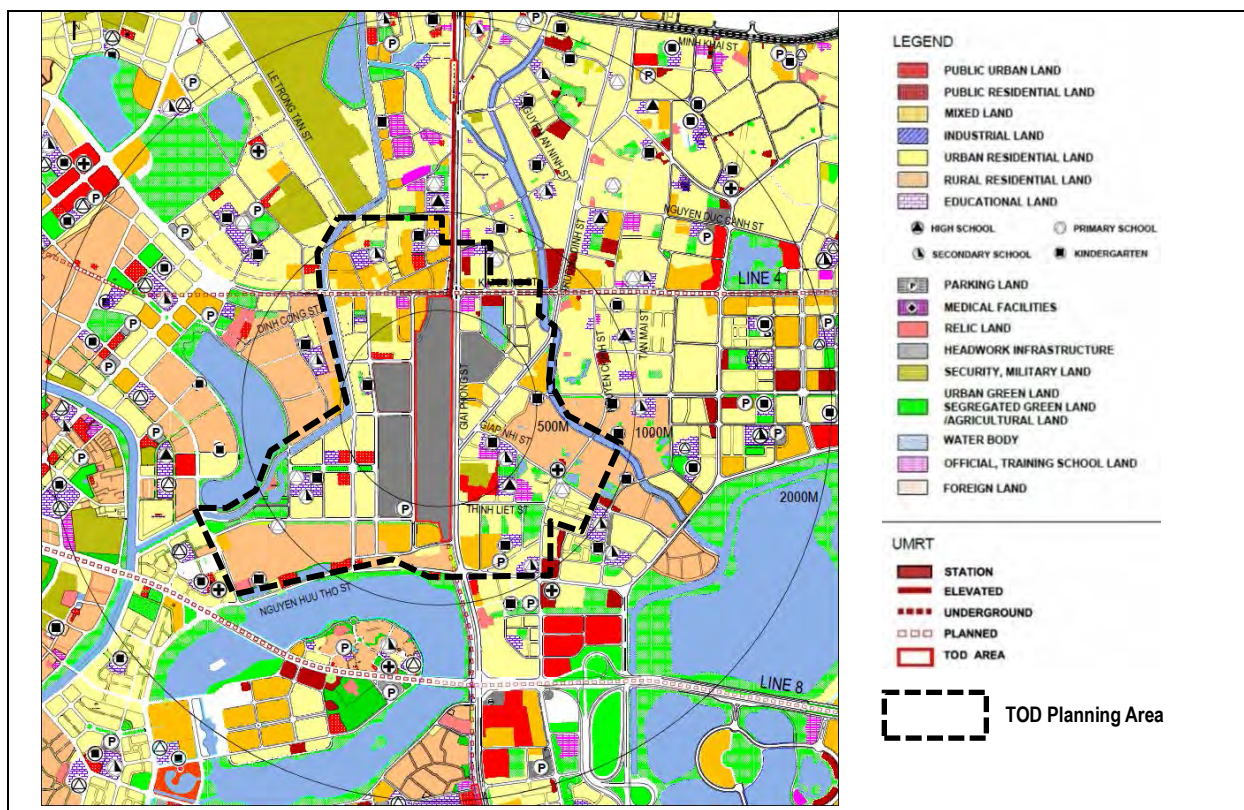
6.15 Social infrastructure in the area is poor in both quality and quantity. There is no public schools and kindergarten in the area except 4 private kindergartens operating in small, ordinary private houses. Children must go to schools which are 500 – 1000m away. There are no health care center or community facility, public markets and large-scale

supermarkets. So local people rely on only the small commercial activities and social services along roads. Green space and public open space are also limited. All leisure activities, rest, social exchanges, and sport of the people are limited only along the road. There are 1 mini football ground, 2 tennis courts for commercial purposes, but not for local communities.

(f) Future Orientation of Zone Plan

6.16 The Zone Plan designates most of the area in front of Giap Bat Station for transport use, and has no plan to develop commercial functions in the area to form the sub-center of South Hanoi. Only some of scattered factories and government (public) lands have been planned to be converted to other urban public land, and the Zone Plan has not sufficiently reflected any impacts on land use that the development of UMRT Line 1 would bring about.

Figure 6.2.3 TOD Planning Area in Zone Plan



Source: JICA Project Team based on the Zone Plan

4) Selection of TOD Project Areas

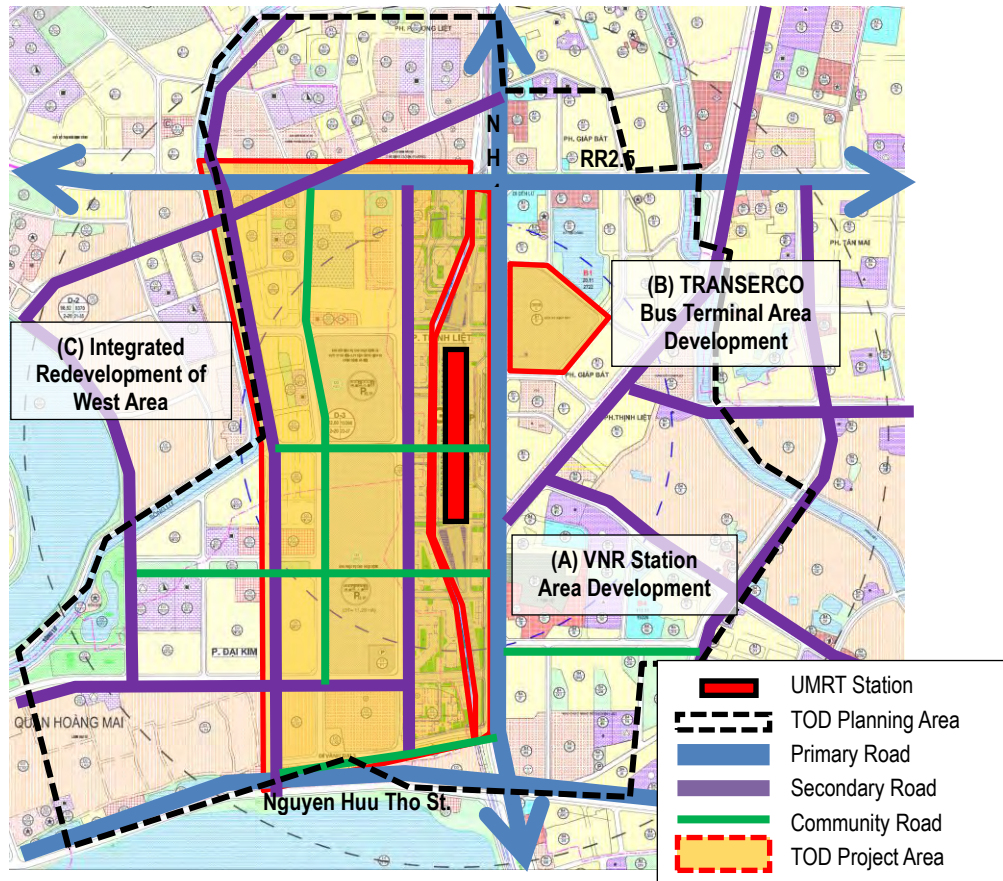
6.17 Inside of TOD planning area, three specific project areas have been selected to be part of this pre-feasibility study, even though many other locations could be suitable for developing TOD. Each selected project area has its own characteristics that must be clarified in Hanoi urban development context. They are briefly summarized as follows:

6.18 **TOD Project A “Station complex development using VNR land” (11.1ha):** VNR land is readily available for integrated development with UMRT Line 1 that can offer ideal modal of TOD for other VNR areas such as Gia Lam station, Hanoi station, and others. To enhance development potential at station, to increase values of VNR land and to formulate a landmark of new CBD, station complex will be developed using VNR land.

6.19 TOD Project B “Complex development with long-distance bus terminal” (3.5ha): Existing bus terminal (owned and operated by TRANSERCO) is also readily available for integrated development which can enhance the values of both bus terminal, and UMRT operation. It is also possible that the bus terminal redevelopment could also include adjoining high-density residential areas to improve their living environment. After relocating the inner-city bus terminal in front of the UMRT station, a terminal to accommodate long-distance buses will be redeveloped to utilize land most efficiently and to provide convenient services for long-distance bus users and local communities.

6.20 TOD Project C “Integrated urban redevelopment of west area of station” (65.2ha): The area is approximately 65.2 ha including the lands used both by public and private sectors as well as a small lake and settlements. By taking advantage of unused lands and factory areas as well as degraded residential areas, integrated urban redevelopment project will be implemented to provide appropriate road and infrastructure network and to formulate a new south CBD which attract UMRT users, local communities as well as citizens of the south of Hanoi.

Figure 6.2.4 Development Orientation of Giap Bat TOD Project Areas



Source: JICA Project Team

6.3 TOD Project A: Station Complex Development on VNR Land

1) Present condition

6.21 Land for Giap Bat Station covers 11.1 ha of land stretching 2 km north-south, including 2 ha of land for the station facility. At present, there is no access between the western area and the station with the railway land lying over 2 km in the north-south direction being used for freight car depot and workshops as well as the VNR station.

6.22 The facilities inside this land are only VNR station and VNR related facilities such as storage, rail yard, etc. The estimated value of present VNR land is 112.9 million USD.

Table 6.3.1 Present Condition of VNR Land

Area (m ²)	Total Floors (m ²)	Building value		Land value		Total Asset Value (mil. USD)	No. of right holders
		(USD/m ²)	Total (mil. USD)	(USD/m ²)	Total (mil. USD)		
111,100	3,500	500	1.8	1,000	111.1	112.9	1 (VNR)

Note: Based on market information around this area, unit price of building and land is set.

Source: JICA Project Team

2) Development objectives

6.23 This project aims to propose to maximize the development potential of VNR land stretching along VNR railway, and will be restructured when UMRT Line1 will be constructed. Objectives are summarized as follows:

- (i) To strengthen development capacity of UMRT station as a center of new CBD of south of the city
- (ii) To increase marketability of VNR land
- (iii) To utilize air right of the station and railway land

6.24 The proposed project will be assessed from an economic, financial and environmental point of view to understand how non-rail activities could contribute to the overall development of VNR using VNR land for comprehensive development. If the proposed project is feasible, this scheme will be applicable to others stations of Line 1 where VNR owns lands, such as Hanoi, Gia Lam, Ngoc Hoi, etc.

3) Project area

6.25 Roads and a station plaza to the east of the station will be developed within VNR land to provide accessibility to Giap Bat Station from all directions and to facilitate traffic flow of various transport modes. The landuse of VNR land is shown in Table 6.3.2.

6.26 After completion of UMRT along with roads and transport facilities, more than half of VNR land (6.27ha, 56% of total land) will be used for mixed-use urban development, including the station facility.

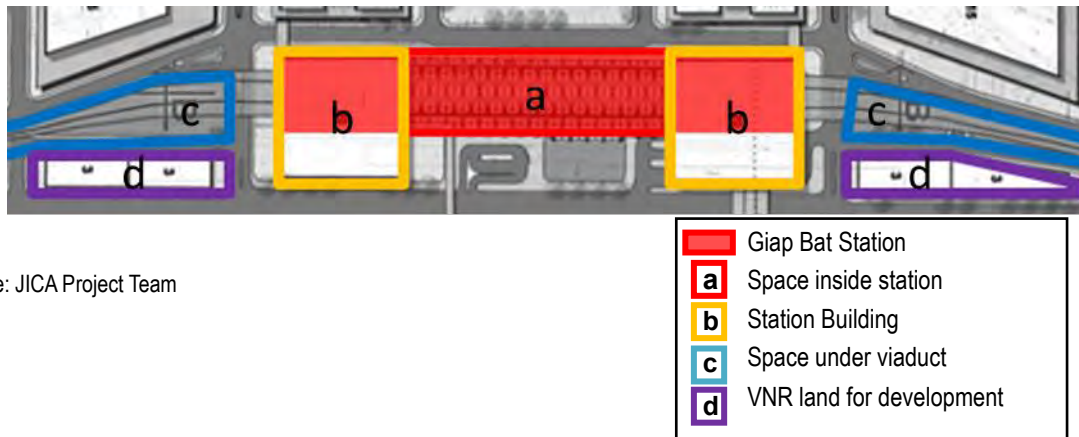
Table 6.3.2 Landuse Plan of VNR Land

Category		Present (m ²)	Future	
			(m ²)	(%)
Transport	Station	3,500	-	-
	Transport related facility and others	107,500	-	-
	Road	-	33,600	30.2
	East Station plaza	-	14,800	13.3
Mixed use	VND land including station		62,700	56.4
Total		111,000	111,000	100.0

Source: JICA Project Team

6.27 The project for VNR land is to use this available land for integrated development with UMRT, including (1) space inside station, (2) station building above the station facility, (3) space under viaduct and (4) VNR land for development.

Figure 6.3.1 Potential Area for Station Complex Development



Source: JICA Project Team

4) Project concept

6.28 VNR land is the most convenient space for station users who can directly access this space from the station. The station building will be a landmark of Giap Bat station area in terms of urban landscape. Since there will be a wide diversity among the station users, it is necessary to provide various urban services and functions by various tenants including competitive private organizations, local companies and communities.

Table 6.3.3 Floor Area Created in VNR Station Area

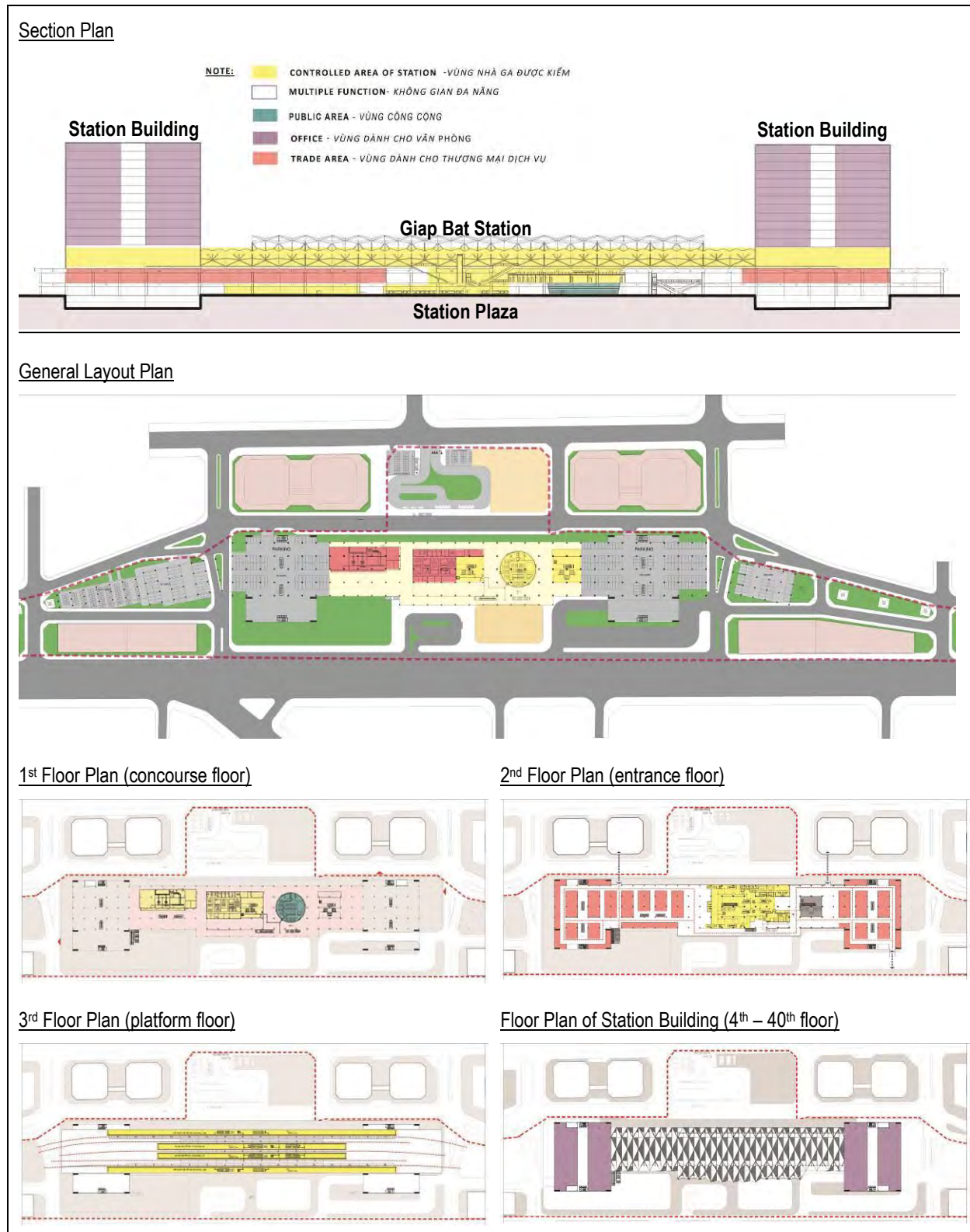
Potential Area	Total Floor area (m ²)	Facility plan	Possible Floor Use
(a) Space inside station	16,200	1 floor inside and outside of concourse of UMRT station	Local companies, local communities
(b) Station building	328,000	2 buildings, 30th floors (8,500m ² of 1-4F, 5,000m ² of 5-30F)	Hotel, office, shopping mall, department
(c) Space under viaduct	10,900	1 floor under railway viaduct	Local companies, local communities
(d) Buildings in VNR land	121,500	2 buildings (north: 5,200m ² of 15F, south: 7,500m ² of 15F)	Local companies
Total	476,600		Multifunctional

Source: JICA Project Team

6.29 The concepts of each potential area are as follows:

- (a) Space inside the station: The 3 floors of the UMRT station will include free concourse on the 1st floor, free concourse and ticket gates on the 2nd floor, and the platform on the 3rd floor. Free concourse will be open to the public; people can freely go through between the eastern and the western parts of the station. There are various opportunities to provide commercial and services inside the station such as cafes, restaurants, bookstore, and public service facilities (ex. exhibition space, administrative service center), etc., which can be used by both UMRT users and local communities.
- (b) Station building: There is potential to develop a multi-storey station building including the UMRT station (concourse and platform) and commercial facilities above the station by utilizing air rights above the station. A station building, generally developed in the space over the platforms and station facility, hosts commercial and cultural facilities and generate profit from leasing the space to tenants, or by having subsidiary companies run the building floor space.
- (c) Development of Space under Viaduct: The space under the viaduct can form a shopping street with a variety of local shops and therefore benefit the local communities. Also, the space can be used for parking lots for motorcycles and bicycles to provide smooth access from residential areas to the station.
- (d) Development of VNR Land: By using land plots along NH-1 inside VNR land, commercial and business facilities can be built. The façade and building height will be unified with the image of Giap Bat Station and station buildings to create a modern image of a new landmark of this area.

Figure 6.3.2 Facility Plans of Giap Bat Station Buildings



Source: JICA Project Team

5) Financial Analysis

6.30 The estimated total project cost (excluding UMRT station) is 542.0 million USD including road and station plaza (13.42 million USD), and proposed development facilities of VNR land (528.5 million USD).

Table 6.3.4 Project Cost of Integrated Development of VNR Land

Item		Construction Unit Cost (USD/m ²)	Floor Area (m ²)	Project Cost (million USD)
Public facility	Road	276	33,600	9.27
	East station plaza	280	14,800	4.14
	Sub Total		48,400	13.42
Integrated development facilities	Facilities inside station	500	16,200	8.10
	Station building	1,560	328,000	511.68
	Facilities under viaduct	800	10,900	8.72
	Other buildings	1,440	121,500	174.96
	Sub Total		476,600	528.50
Total				541.92

Source: JICA Project Team

6.31 To recover project investment costs including construction, operation and management, the developed floors will be rented to tenants. The developer (VNR or other) will operate businesses inside the leased floors.

Table 6.3.5 Estimated Revenue of Integrated Development of VNR Land

Facility	Leasing Fee (USD/m ² /month)	Total Floor Area (m ²)	Leasable Floor Area Ratio (%)	Lease Revenue (mil. USD/yr)	O&M Cost (mil. USD/year)	Net Revenue (mil. USD/year)
	A	B	C	D= AxBx12months	E = D x 30% / 15% ¹⁾	F = D - C
(a) Facilities inside station	50	16,200	100	8.1	2.0	6.1
(b) Station building	50	328,000	70	137.8	20.7	117.1
(c) Facilities under viaduct	35	10,900	100	4.6	1.4	3.2
(d) Buildings in VNR land	50	121,500	70	51.0	7.7	43.4
Total	-	476,600	-	201.5	31.8	169.8

Source: JICA Project Team

1) The share of O&M costs for facilities inside station and facilities under viaduct is 30% of annual revenue, and for station building and other buildings is 15%, respectively.

6.32 The results of project evaluation are summarized as follows:

- There will be 47.7ha of surface floor area build within the 11ha- VNR land. The condition is transportland must be utilized as mixed-use land and the air rights must be utilized at the maximum of what is allowed, including air rights transfer above the UMRT station.
- Total investment costs have been estimated at 643.6 million USD and O&M costs at 31.8 million USD. These costs will be recovered through the revenue of floor lease, estimated at 201.5 million USD per year. The annual net revenue is expected to be 170 million USD per year.
- The project periods are set by each project accordingly (5, 7 and 15years). FIRR at the project completion year is high enough to recover investment costs and to generate profits.

Table 6.3.6 Financial Profile of VNR Station Area Development Project

Facility	Floor Area (m ²)	Expenditure		Income	Net Profit (mil. USD/yr)	Evaluation	
		Construction Cost (mil. USD)	O&M Cost (mil. %/yr)	Lease Revenue (mil. USD/yr)		Project Period (year)	FIRR (%)
(a) Facilities inside station	16,200	8.1	2.0	8.1	6.1	5	51.4%
(b) Station building	328,000	426.4	20.7	137.8	117.1	15	21.4%
(c) Facilities under viaduct	10,900	8.72	1.4	4.6	3.2	7	31.3%
(d) Buildings in VNR land	121,500	175.0	7.7	51.0	43.3	15	17.4%
Total	476,600	643.58	30.97	195.07	164.10	-	-

Source: JICA Project Team

After integrated development, the total asset value will be increased by 8.5 times, which will contribute to increase tax revenue and investment opportunities.

Table 6.3.7 Comparison of Asset Value of VNR Land Before and After Project

Before Project		After Project			
Item	Value (mil. USD)	Item	Floor (m ²)	Unit price (USD/m ²)	Value (mil. USD)
VNR Area	112.9	Facilities inside station	16,200	2,500	40.5
		Station building	328,000	2,000	656.0
		Facilities under viaduct	10,900	2,000	21.8
		Other buildings	121,500	2,000	243.0
Total	112.9		476,600	-	961.3

Source: JICA Project Team

Figure 6.3.3 Development Image of Integrated VNR Station Complex



Source: JICA Project Team

6.4 TOD Project B: Bus Terminal Complex Development Project

1) Present Condition

6.33 The bus terminal (3.5 ha) is equipped with 11 berths for intra-city buses on the side of NH1. Across the ticket booth and the waiting space from there, there is parking space for 200 long distance buses. There is Kim Dong Lake on the north from the terminal, separated by the adjacent residential area. At present, there is a small terminal building and a 2-floor motorbike parking facility, but most of the land is used for bus pooling. Since there is limited road space around the terminal, the entrance is crowded with buses, taxis, motorbikes and passengers.

6.34 At west and north of the bus terminal, there are residential blocks (1.0ha). For effective landuse and connectivity to NH-1 and distribution road as well as the pond, these residential lands will be a part of new development land.

6.35 The asset value of the project area is estimated at 56.0 million USD, including the bus terminal and the residential areas.

Table 6.4.1 Present Condition of Project Area

	Area (m ²)	Building Condition			Building value		Land value		Total asset value
		No. of building	No. of HH	Floor area (m ²) ¹⁾	Unit price (USD/m ²)	Total (mil. USD)	Unit price (USD/m ²)	Total (mil. USD)	Whole area (mil. USD)
Bus terminal	34,800			7,000	500	3.5	1,000	34.8	38.3
Residential area	10,300	91	140	14,000	525	7.4	1,000	10.3	17.7
Total	45,100	-	-	-	-	10.9	-	45.1	56.0

Source: JICA Project Team

1) It is assumed that the floor area of each household is 100m²/HH.

2) Development Objectives

6.36 This project aims to boost the potential for an integrated transport hub and other urban facilities to maximize development potential of the land and to provide added value to the public transport services for UMRT and bus users. The objectives of the project are summarized as follows:

- (i) Reorganize and modernize services and facilities of bus terminal to improve traffic flow, accessibility and convenience of users
- (ii) Enhance socio-economic development capacity to provide various urban services and facilities at the complex
- (iii) Promote participation of right holders to the project by protecting their rights
- (iv) Boost profitability of the project through the construction, operation and management of the complex including the bus terminal

6.37 The proposed project will be evaluated and assessed from an economic, financial and environmental perspective to assess how public transport will be diversified and strengthened by integrating it with other services and facilities, and how the bus operators will be able to expand business functions to non-transport services which private

developers also participate in. If the proposed project is feasible, this scheme will be applicable to other bus terminals such as Gia Lam, Nam Thang Long, etc.

3) Project Area

6.38 The project area is 4.5ha. It includes the present Giap Bat Bus Terminal (3.5ha) and adjacent residential areas (1.0ha) (see Table 6.4.2).

Table 6.4.2 Land Use of the Potential Area for Development at Giap Bat Station

Land use	Area (ha)	Share (%)
Bus Terminal	3.5	77.1
Residential Area	1.0	22.9
Total	4.5	100.0

Source: JICA Project Team

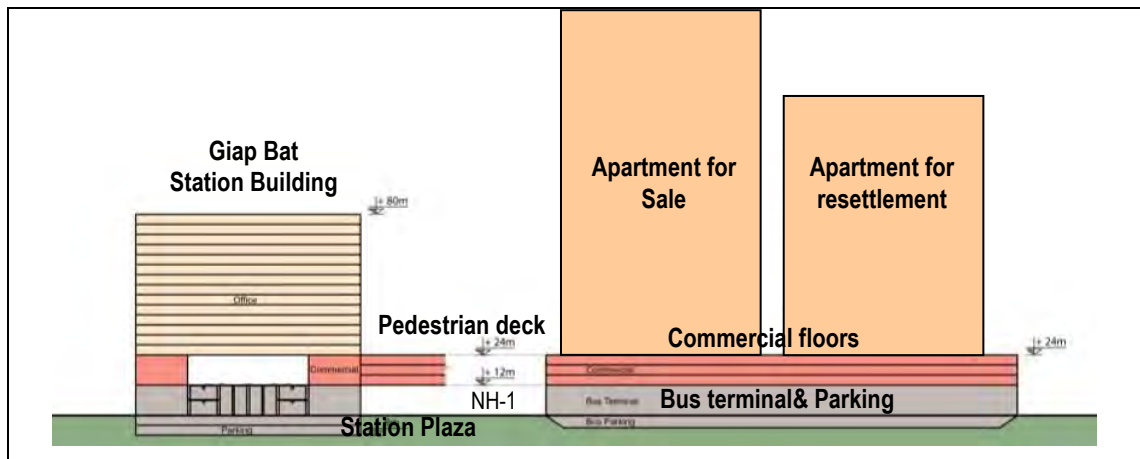
4) Project Concept

6.39 Providing various urban services will enhance the value of the bus terminal area. Therefore the proposition is to develop a multi-purpose complex to accommodate a long-distance bus terminal, commercial floors and apartments. Pedestrian space and open space will be provided inside the project area to improve livelihoods around the bus terminal.

6.40 Giap Bat area is to be a center of services in the south of Hanoi and in the south-western suburbs; therefore commercial facilities (shopping mall) and amusement facilities (roof-top playgrounds, movie theater) should be considered. It is proposed to redevelop a complex building including long-distance bus terminal (bus pool in B1F and ticketing and loading space in 1F), commercial floors in 2F-4F, and 2 residential apartments including flats for original households inside the project area, and for sale.

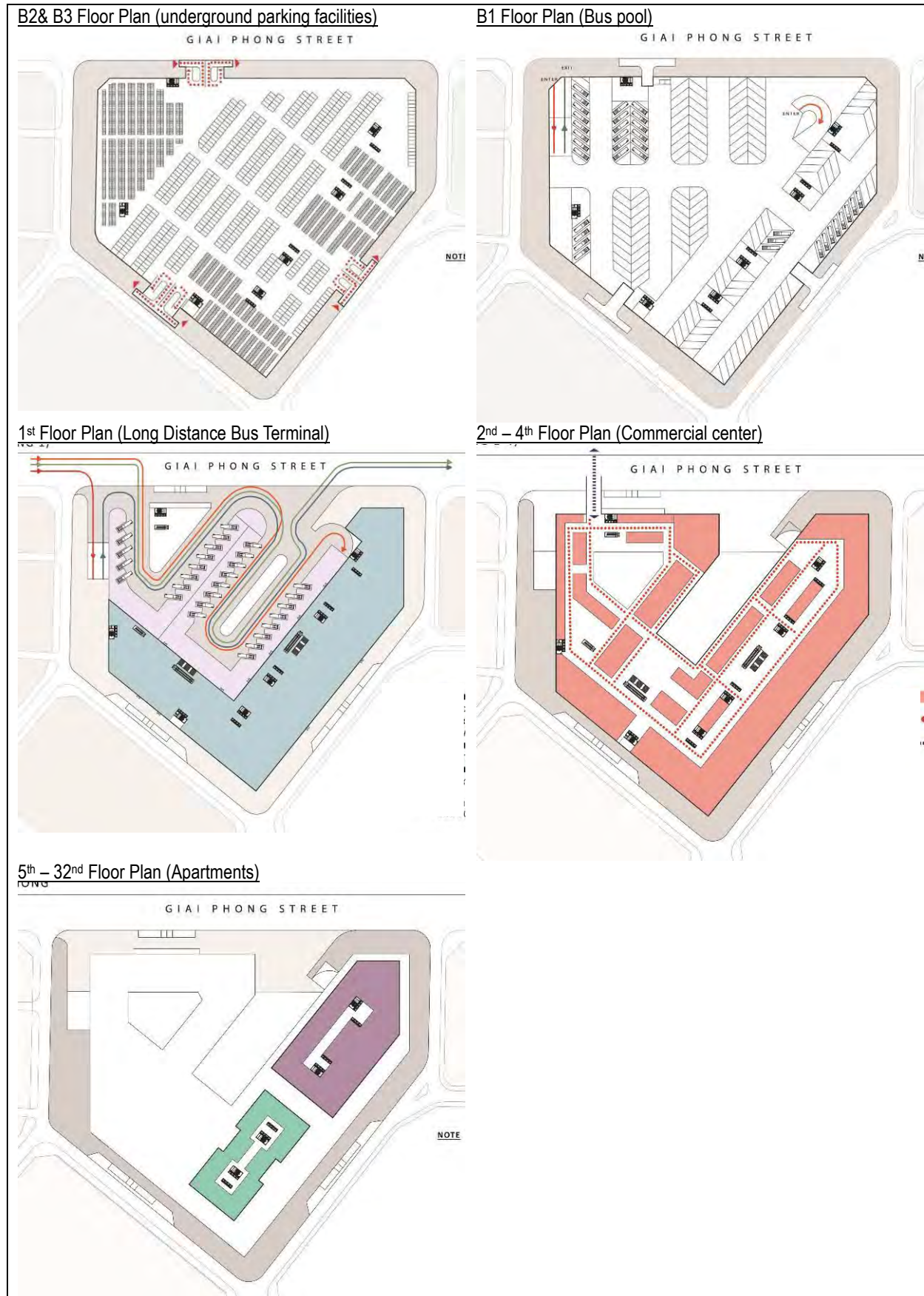
6.41 To improve accessibility around the complex, a pedestrian deck will be developed to connect the UMRT station and the station plaza, including the city bus terminal to the west of NH-1 and the long-distance bus terminal to the east of NH-1, for convenient access for bus users as well as local communities in the eastern area. The boundary of land will be utilized to ensure pedestrian space and motorbike space, so that the traffic flow around the terminal will be improved by separating spaces for pedestrian and motorbikes.

Figure 6.4.1 Section Plan of Bus Terminal Complex



Source: JICA Project Team

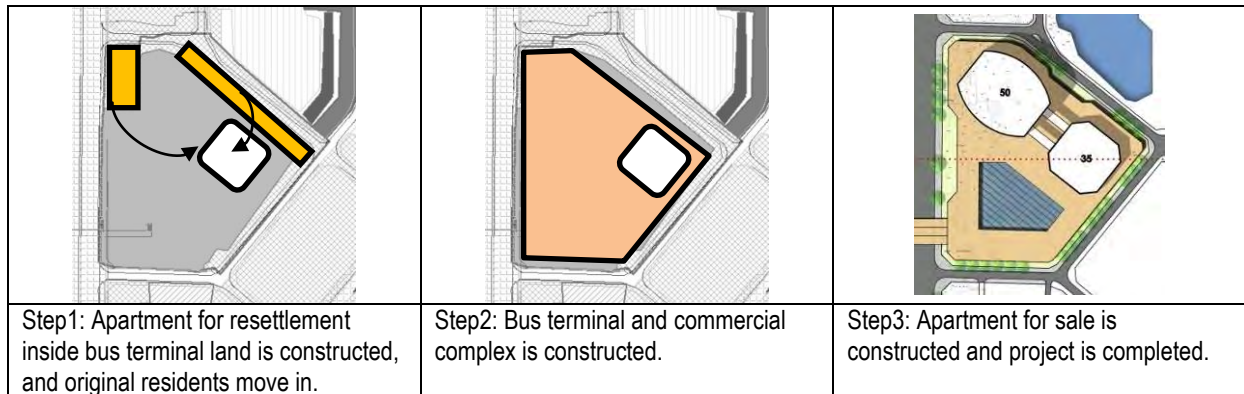
Figure 6.4.2 Floor Plans of Bus Terminal Complex



Source: JICA Project Team

6.42 The development of apartments is aimed to provide some of flats to current residents of the project area, and to sell other flats to recover investment costs and generate profits. By providing new apartment to current households (app. 140) of the project area, their property rights are protected during the whole project implementation process. In other words, the original right holders will have options to receive compensation to move out, or to participate in the project and move in the new apartment flats inside the project area.

Figure 6.4.3 Stepwise Project Implementation of Bus Terminal Complex Development



Source: JICA Project Team

5) Financial Scheme

(a) Project cost estimate

6.43 The total project costs are estimated at 114 million USD including costs for the construction of the complex : bus terminal, commercial and 2 high-rise apartment buildings.

Table 6.4.3 Project Cost of Bus Terminal Complex Development

Item	Construction Unit Cost (USD/m ²)	Floor Area (m ²)	Project Cost (million USD)	Remarks
Bus terminal	800	30,000	24.0	B1F and 1F
Commercial facility	700	30,000	21.0	2F to 4F
Apartment for resettlement	700	11,100	7.8	20F, 140HH for resettlement
Apartment for sale	700	50,000	35.0	32F, 500 HH for sale
Overhead cost	-	-	26.3	30% of construction cost
Total	-	121,000	114.1	

Source: JICA Project Team

(b) Annual revenue

6.44 To recover construction costs of the low-rise building with bus terminal and commercial facilities, there will be fares charged by bus operators (2USD/time for loading and unloading passengers, 2USD/time to use the bus pool) and rental fees for commercial floors (40USD/m²).

Table 6.4.4 Estimated Revenue of Bus Complex Development

	Charge of bus operator (USD/time)	Revenue (mil. USD/year)	O&M cost (mil. USD/year)	Net Revenue (mil. USD/year)
Bus terminal	2	1.4	0.4	1.0
	Lease fee (USD/m ² /month)	Revenue (mil. USD/year)	O&M cost (mil. USD/year)	Net Revenue (mil. USD/year)
Commercial floor	40	10.1	3.0	7.0

Source: JICA Project Team

1) The share of O&M cost is 30% of annual revenue.

6.45 The financial analysis of the project showed that it is not viable financially (FIRR is 12% after 20 years, which is lower than market rate) if only the conditions mentioned above apply. To achieve cost recovery, it is proposed to construct high-rise apartments, including flats for resettlement of 140HH.

6.46 The construction schedule for financial analysis is as follows:

- (i) The 500 units of apartment housing for sale will be constructed on halves in two years, year 1 and year 2, costing 22.8mil USD each year.
- (ii) It is assumed that the first half of the units will be sold in year 1 and the other half will be in year 3, with 50 million USD sales each year.
- (iii) The bus terminal complex is also constructed in two years of years 2 and 3, costing 34.3 million USD each year.
- (iv) The operation of the bus terminal starts in year 4, after the complex is completed.

6.47 If apartments for 500 households are to be developed, the profit generated by sales (100 million USD) can recover the investment cost, and FIRR reaches 20%.

Table 6.4.5 Financial Profile of Bus Terminal Complex Project

Expenditure	Revenue	
	Apartment sales (mil. USD)	Debt (mil. USD) ¹⁾
Construction cost (mil. USD)	100.0	14.1
114.1		

Source: JICA Project Team

1) Debts are repaid by charges of bus terminal and lease revenue of commercial floors.

(c) Right conversion plan for right holders

6.48 The households in the project areas will have 2 options; (i) move out with compensation, or (ii) resettle in the new apartments within the project area, based on right conversion of same value.

6.49 In case they choose the second option, their property is appraised to convert property rights of the same value before and after the project.

- (i) The present asset value of each household is estimated at 126,000 USD /household (in case the average floor area of each HH is 100m²).
- (ii) The market price of the new apartments will be 2,000 USD/m² based on the market conditions in this area. As preferential treatment for project participation, the unit

price of new flats for resettlement is offered at 1,600USD /m² (80% of the market price).

- (iii) The existing house of 100m² will be converted into a new apartment of 79m², so asset value will remain the same as before.
- (iv) For resettle all the households, it is necessary to build apartment flats on 11,000m² (79m²/household x 140 households).

(d) Comparison of asset value before and after the project

6.50 After completion of the bus terminal complex, the total asset value will be increased by 5.3 times: from 56.0 million USD before the project to 297.7 million USD after the project.

Table 6.4.6 Comparison of Asset Value of VNR Land Before and After Project

Before Project			After Project				
Item	Building value (mil. USD)	Land value (mil. USD) ¹⁾	Item	Floor (m ²)	Unit price (USD/m ²)	Building Value (mil. USD)	Land value (mil. USD) ¹⁾
Bus terminal	3.5	34.8	Bus terminal	30,000	1,500	45.0	76.5
			Commercial floors	30,000	1,800	54.0	
Residential land	7.4	10.3	Apartment for resettlement	11,100	2,000	22.2	
			Apartment for sale	50,000	2,000	100.0	
Sub total	10.9	45.1		121,100	-	221.2	76.5
Total		56.0					297.7

Source: JICA Project Team

1) Land value is estimated based on the condition that unit price is 1,000USD/m² before project (for 1ha of residential area), and 1,700USD/m² after the project (for 4.5ha of whole project area).

Figure 6.4.4 Development Image of Bus Terminal Complex



Source: JICA Project Team

6.5 TOD Project C: Integrated Redevelopment Project of West Area

1) Present Condition

6.51 There is a poor road network and little infrastructure in the west area of the station. Within a 500m-radius around the station, there is a new town to the west, and the Lu river running north-south and thus is a barrier to access the station. Furthermore, there are no access roads within VNR land (1km length along NH-1), so most of the traffic concentrates on the east-west roads that are more farther than 500m away from VNR station.

6.52 There are plots of land that are likely and relatively easy to be developed: the water reservoir, unused land, and tree land (13.8ha, 21.2%). Redeveloping such plots would not involve any displacement of population. There is also some developable land (2.4ha, 3.6%) and the land of the factory (10.3ha, 15.8%) that better be relocated in order to use land more efficiently. Finally, there is government land (5.4ha, 8.3%) that also has potential for redevelopment (without resettlement). These areas can be redeveloped into a mixed-use urban sub-center with appropriate infrastructure.

2) Development Objective

6.53 This project aims to formulate the new CBD in the south of Hanoi integrated with road, public infrastructure and various urban facilities by applying of the Land Readjustment Scheme. Objectives of the project are summarized as follows:

- (i) Develop road and public infrastructure as part of the integrated urban redevelopment project with minimum public investment ;
- (ii) Share costs and profits of the project equally among stakeholders including public sector, private developers and right holders. The latter will participate in the project through their contributions in land and property rights for public infrastructure development and sales to market. In return they will have the benefits of improved infrastructure and urban facilities.
- (iii) To apply land readjustment project implementation scheme

6.54 The proposed project will be evaluated and assessed from an economic, financial and environmental point of view to assess the applicability of the land readjustment scheme (property assessment, right conversion, land contribution, etc.). If the proposed project is feasible, this scheme will be applicable to both built-up areas and agricultural areas to develop public infrastructure in conjunction with a comprehensive development/ redevelopment project.

3) Project Area

6.55 The total project area is 65.2ha, bordered by the planned Ring Road 2.5 to the north, Nguyen Canh Di Street to the west, the planned east-west road to the south, and the boundary of VNR land to the east. It includes part of a new town, existing built-up areas, Dong Lake (a drainage reservoir pond), government and factory land, residential area, etc. Land use is not consolidated.

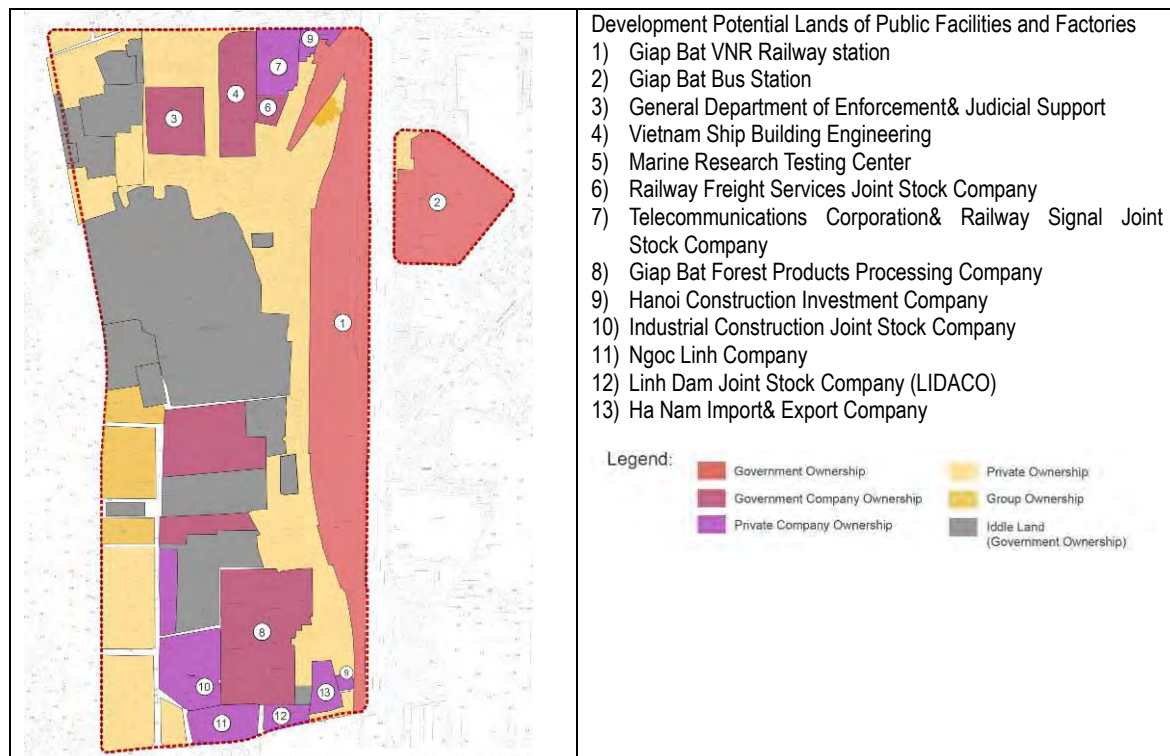
6.56 The asset value of the whole area is estimated at 915.2 million USD including 634 million USD for the land and 301.2 million USD for the buildings.

Table 6.5.1 Present Condition of Project Area

Item	Land		Building condition			Building value		Land value		Total asset value (mil. USD)	No. of right holders	
	(m ²)	(%)	No. of building	No. of HH	Floor area (m ²)	(USD/m ²)	(mil. USD)	(USD/m ²)	(mil. USD)			
Road	76,600	11.7	0	0							1	
Public land total	76,600	11.7	0	0			0.0		0.0	0.0	2	
Government land	Government	54,000	8.3	3	7	27,000	400	10.8	1,000	54.0	64.8	5
	Water Body, Unused Land	138,300	21.2						700	96.8	96.8	1
	Cultural Facility	700	0.1	0	1	840	600	0.5	1,000	0.7	1.2	1
	Educational Facility	2,500	0.4	0	1	3,000	600	1.8	1,000	2.5	4.3	1
	Military Land	5,700	0.9	0	1	6,840	600	4.1	1,000	5.7	9.8	1
	VNR Land, Commercial	7,700	1.2	0	0	0	0	0.0	800	6.2	6.2	4
	Sub-Total	208,900	32.0	3	10	37,680	2,200	17	5,500	165.9	183.1	13
Private Land	Developable Land	23,500	3.6	3	5	6,000	400	2.4	900	21.2	23.6	3
	High Dense Built-Up Area	165,900	25.4	1,659	1,958	254,500	525	133.6	1,000	165.9	299.5	1,958
	New town	33,900	5.2	339	400	52,000	525	27.3	1,800	61.0	88.3	400
	High-Rise housing	40,200	6.2	4	960	96,000	1,000	96.0	1,900	76.4	172.4	960
	Factory	103,000	15.8	8	25	61,800	400	24.7	1,200	123.6	148.3	8
	Sub-Total	366,500	56.2	2,013	3,348	470,300		284.0		448.1	732.1	3,329
Sub-total	575,400	88.3			507,980		301.2	1,067	613.9	915.2	3,341	
Total	652,000	100.0					301.2		613.9	915.2	3,343	

Source: JICA Project Team based on field survey and market information

Figure 6.5.1 Land Ownership Map of TOD Project Areas



Source: JICA Project Team

4) Project Concept

6.57 The TOD concept of Giap Bat Station Area is to formulate a public transport oriented compact CBD. Through integrated urban redevelopment, roads and infrastructures will be developed in compliance with the Zone Plan, and urban facilities will have the capacity to accommodate about 20,000 inhabitants (including 7,500 original residents (2,000HH) inside TOD Project Areas, 4,500 resettled residents (1,500HH) from the city center and 7,500 new residents (2,000HH) who buy new apartments) and 60,000 new employees.

6.58 After these developments are completed, and after conversion of reserved land for the development of the CBD, the land use will be significantly changed and reorganized. One third of whole land will be road and other public land by using reserved land after land replotting. For achieve it, following steps are taken for implementation:

(i) **Road and Infrastructure Development by Land Replotting and Land Contribution Scheme (“Land Readjustment”)**

- To ensure lands for roads, infrastructure and public facilities, rights developable lands are replotted to new land plots.
- All the stakeholders within the project area will benefit from the project. Therefore the properties that will not directly participate in the project (will not be developed such as new town and high rise apartment areas) are also required to contribute to public infrastructure development through the provision of land by providing some lands for roads and public facilities or money for public facilities.
- In this project area, factory lands, public facility lands, water reservoir and unused lands will be replotted as a first step and the vacant lands after replotting will be converted to public lands for roads and social housing areas.
- In compliance with the Zone Plan, a network of trunk roads is formulated by consolidating lands of public and unused land and converting to road and infrastructure land. After land replotting, one-third of total land (21.9ha) will be utilized for roads and public infrastructure.

(ii) **Apartment for Resettlement and Social Housing Development**

- The lands for resettlement apartments and social housings are secured from factories public facilities where will be resettled (C7 and C12 blocks, 4.2ha in total).
- The social housing areas include (a) high-rise apartments for 3,000 households (12,000 population) who settle in TOD Project Areas at present, (b) social housings for resettlement and low-income households, (c) public facilities such as elementary school, hospital and nursery.
- Furthermore, apartments for sale will be additionally developed to recover construction costs of social housings. So the social housing construction project can be profitable for both public and private sectors.

(iii) **CBD development**

- After readjustment of land plots and development of road and infrastructure, vacant lands after resettlement of factory, public facilities and water reservoir and the reserved land which is newly developed will be used to develop the mixed-use CBD with multi-purpose facilities as well as public facilities (30.2ha, 46.4% of total area).

- The regulation of building height (number of floors) will be reduced in mixed-use land area inside TOD Project Areas to consolidate development projects around the station, to ensure public spaces around the buildings, and to ensure development profits for private investors.

6.59 All stakeholders need to share costs as beneficiary of the project. “Land contribution” is a responsibility of beneficiaries, including right holders inside the project area who will not participate in the project to contribute land plots for public infrastructure development. The average rate of land contribution is 26.9% in the project area, which will be used for road and infrastructure development.

6.60 After land replotting and land contribution, 42.1% of whole project area (31.0% of development land for CBD and 12.1% of reserved land) will be converted to the potential lands for CBD development.

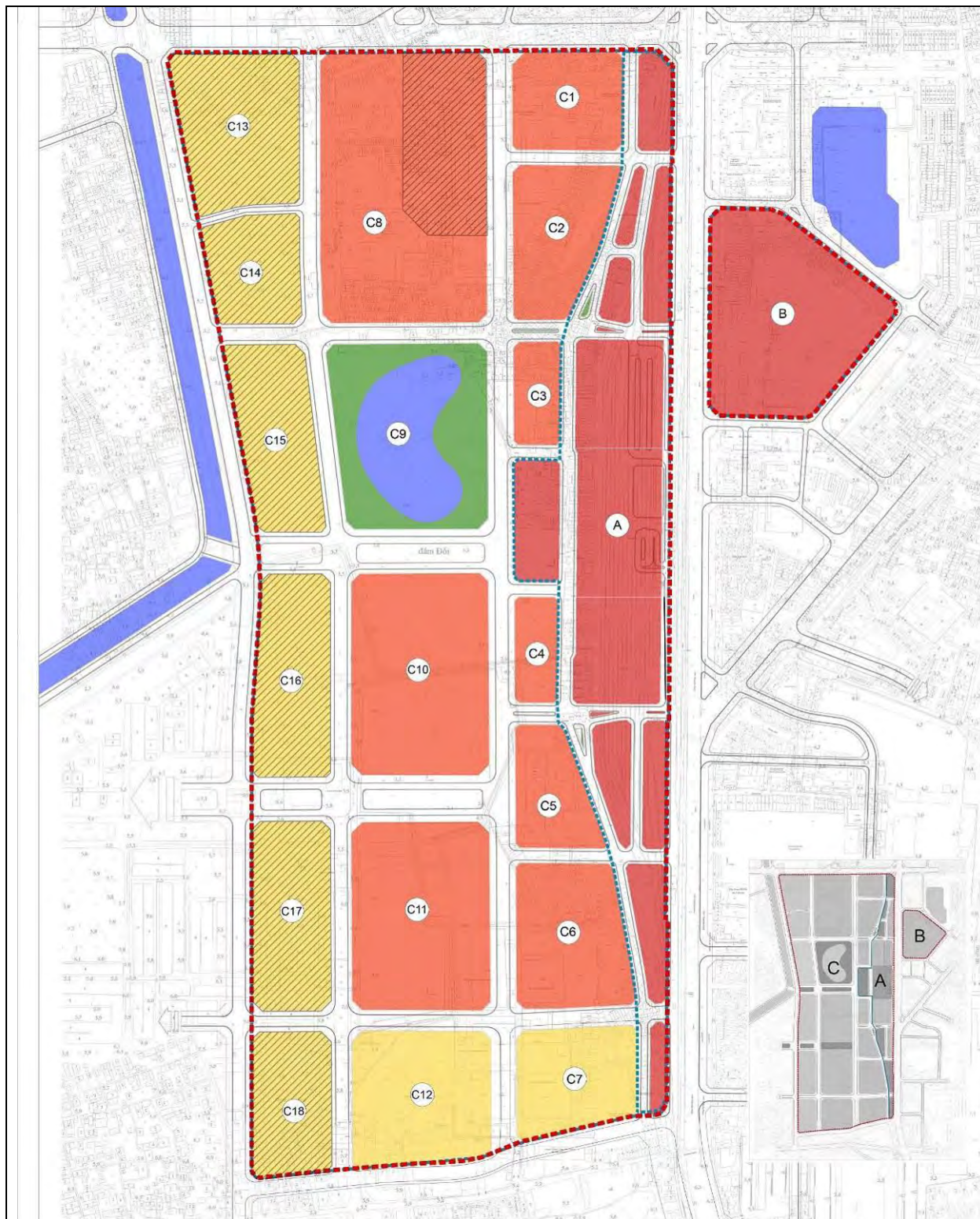
Table 6.5.2 Landuse Plan Before and After Project

Before Project				After Project				
Type of land		(m ²)	(%)	Type of land		(m ²)	(%)	Block ID
Public Land	Distribution Road	76,600	11.7	Trunk Road and Distribution Road	161,300	24.7		
				Station plaza	10,600	1.6		
				Park	47,000	7.2		
	Sub total	76,600	11.7	Sub total	218,900	33.6		
Private Land	Water reservoir	138,300	21.2	Development Land for CBD	202,500 ¹⁾	31.0	C1-C6, C8-C11	
	Unused land, tree land	7,700	1.2					
	Developable land	23,500	3.6					
	Government land	54,000	8.3					
	Factory land	103,000	15.8					
	High dense residential land	165,900	25.4	Apartment area	39,500	23.8		
				Apartment for resettlement, social housing with public facilities	41,700	6.4	C7, C12	
	New town	33,900	5.2	New town	28,800	4.4	C13-C18	
	High rise apartment	40,200	6.2	High rise apartment	34,200	5.2		
	Army land, public facility	8,900	1.4	Army land, public facility	7,500	1.2		
Sub total	575,400	88.3	Sub total	354,200	54.3			
			Reserved land (for CBD development)	78,900 ¹⁾	12.1	C1-C6, C8-C11		
Total	652,000	100.0		652,000	100.0			

Source: JICA Project Team

1)The lands for CBD development.

Figure 6.5.2 Future Land Use Plan (Proposed)



Source: JICA Project Team

5) Financial analysis

(a) Project cost estimate

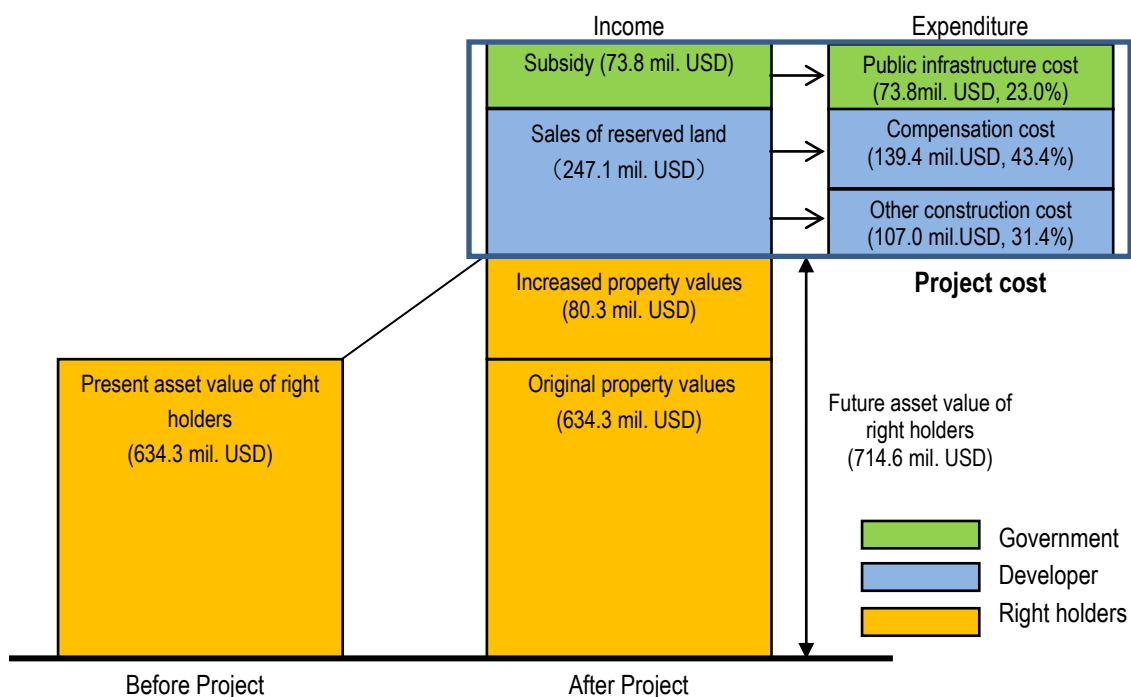
6.61 The total project cost is estimated at 320.9 million USD including construction cost of road and public infrastructure (73.8 million USD), compensation cost (139.4 million USD) including compensation for the people affected by road development and construction cost for resettlement apartments – and other construction-related costs such as land reclamation, utility development, survey and design, etc. (107.8 million USD).

Table 6.5.3 Project Cost of Land Readjustment Project in West Area

Item		Area (m ²)	Amount (million USD)
Public infrastructure cost	Road	Trunk Road	4,566
		Access Road	2,524
	Sub-total		7,090
	Park & Green	47,000	7.99
	Station Plaza	10,600	3.10
Sub- total			73.81
Compensation cost	Compensation affected by trunk road development		88,500
	Apartment construction for resettlement		
	Sub-total		
Other costs	Land reclamation and preparation		6.99
	Utility	Drainage work	0
		Water supply	4,566
		Electric	9,132
		Sub-total	
	Overheads cost		
	Survey and Design fee		
	Repayment of interest		
	Operation cost		
	Sub-Total		
Total			320.94

Source: JICA Project Team

Figure 6.5.3 Structure of Project Costs and Profits Shared among Stakeholders



(b) Sales of reserved land for cost recovery

6.62 As shown in Figure 6.5.1, compensation costs and other construction costs can be recovered by selling reserved land. The size of reserved land is calculated based on the required amount to achieve cost recovery (247.1 million USD) and the land price of reserved land (for example, assumption of 3,133 USD/m², which is 40% higher than average of land price). In this case, necessary reserved land is 78,900m².

Table 6.5.4 Income and Expenditure of Land Readjustment Project

Item		Amount (mil. USD)	Share (%)	
Income	Sales of Reserved Land	247.13	77.0	
	Arterial Road Cost sharing from Road Authority	73.81	23.0	
	Total	320.94	100.0	
Expenditure	Public Use	Road	62.72	19.5
		Park & Green	7.99	2.5
		Station Plaza	3.10	1.0
		Sub-Total	73.81	23.0
	Compensation related cost		139.39	43.4
	Other Cost	Land arrangement (reclamation)	6.99	2.2
		Infrastructure (drainage, electricity, water)	27.25	8.5
		Others	73.51	22.9
		Sub-Total	107.75	31.4
	Total		320.94	100.0

Source: JICA Project Team

Note: "others" includes Overhead, survey & design, repayment of interest, and operation cost.

(c) Project cost structure for CBD Development

6.63 Though the principle of land readjustment project is to develop lands with road and infrastructure as non-profitable project, the profits are generated by development and leasing of commercial and business facilities. If the regulation of building height is 30F at maximum, 521.0ha of floors are newly created inside 65.2ha land (see Table 6.5.5).

Table 6.5.5 Project Cost of CBD Development

Area	Facility	Development Indicators	Floor Area (m ²)	Construction Cost (million USD)	Remarks
Apartment for social housing (Block C7 and C12)	Apartment for resettlement and social housing	Land area: 41,700m ² BCR: 70% Building area: 29,200m ² Number of floor: 25F	280,000	196	3,500HH (80m ² /HH at average)
	Apartment for sale	Total floor area: 730,000m ² Construction unit cost: 700USD/m ²	200,000	140	2,000HH (100m ² /HH at average)
	Public facilities and commercial facilities		200,000	140	School, hospital, nursery, park, supermarket, etc.
CBD (Block C1-C6, C8-C11)	Commercial and office building	Land area: 216,000m ² BCR: 70% Building area: 151,000m ² Number of floor: 30F Construction unit cost: 700USD/m ²	4,530,000	3,171	CBD area
Total			5,210,000	4,046	

Source: JICA Project Team

(d) Comparison of Asset Value

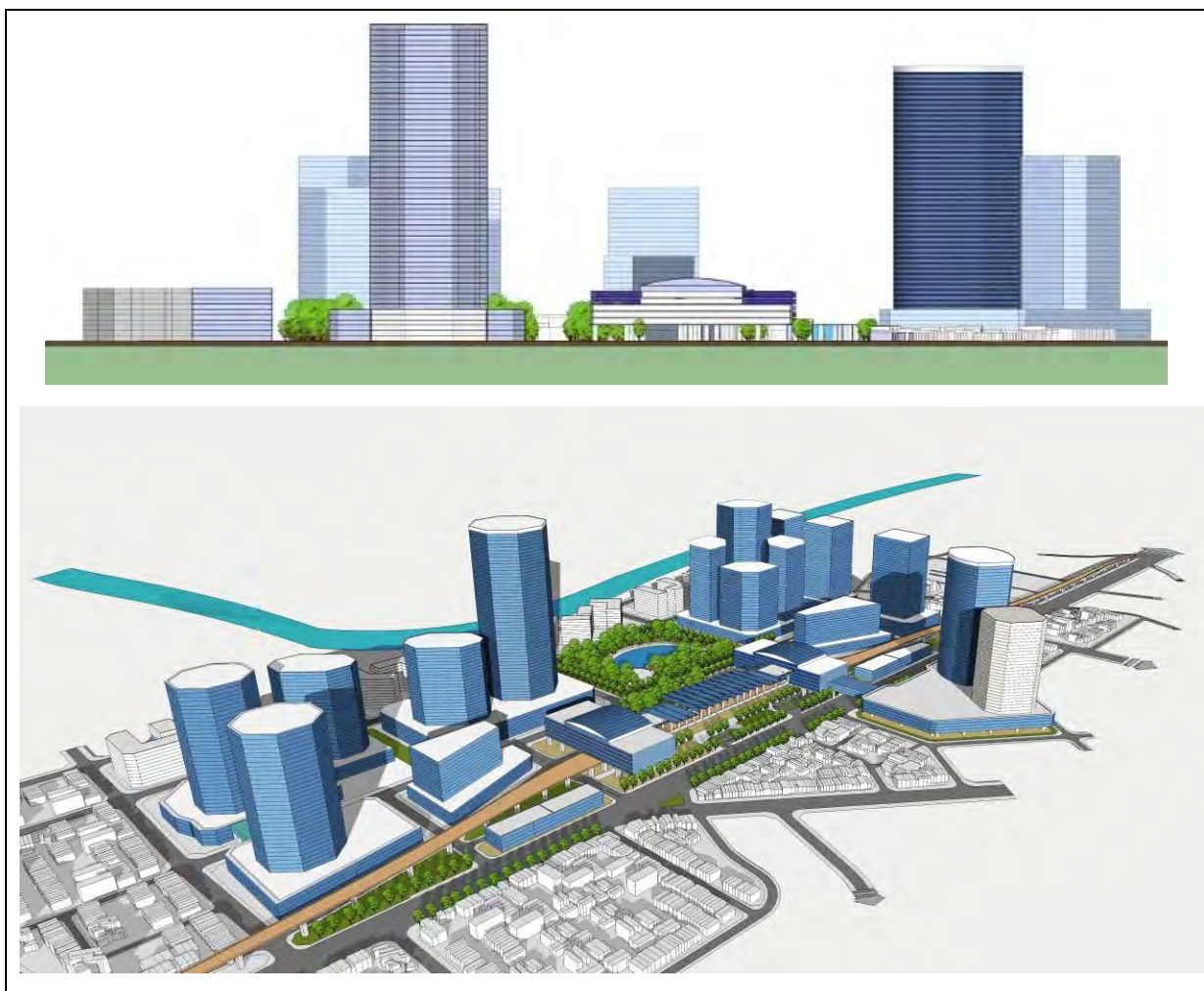
6.64 After integrated development, the total asset value will significantly increase (by 6.1 times), which will promote the development of a CBD with involvement of the private sector (see Table 6.5.6).

Table 6.5.6 Comparison of Asset Value Before and After Project

	Before Project (mil. USD)	After Project (mil. USD)	Increase rate (%)
Land value	613.9	958.0	1.6
Building value	301.2	4,596.8	15.3
Total	915.0	5,555.0	6.1

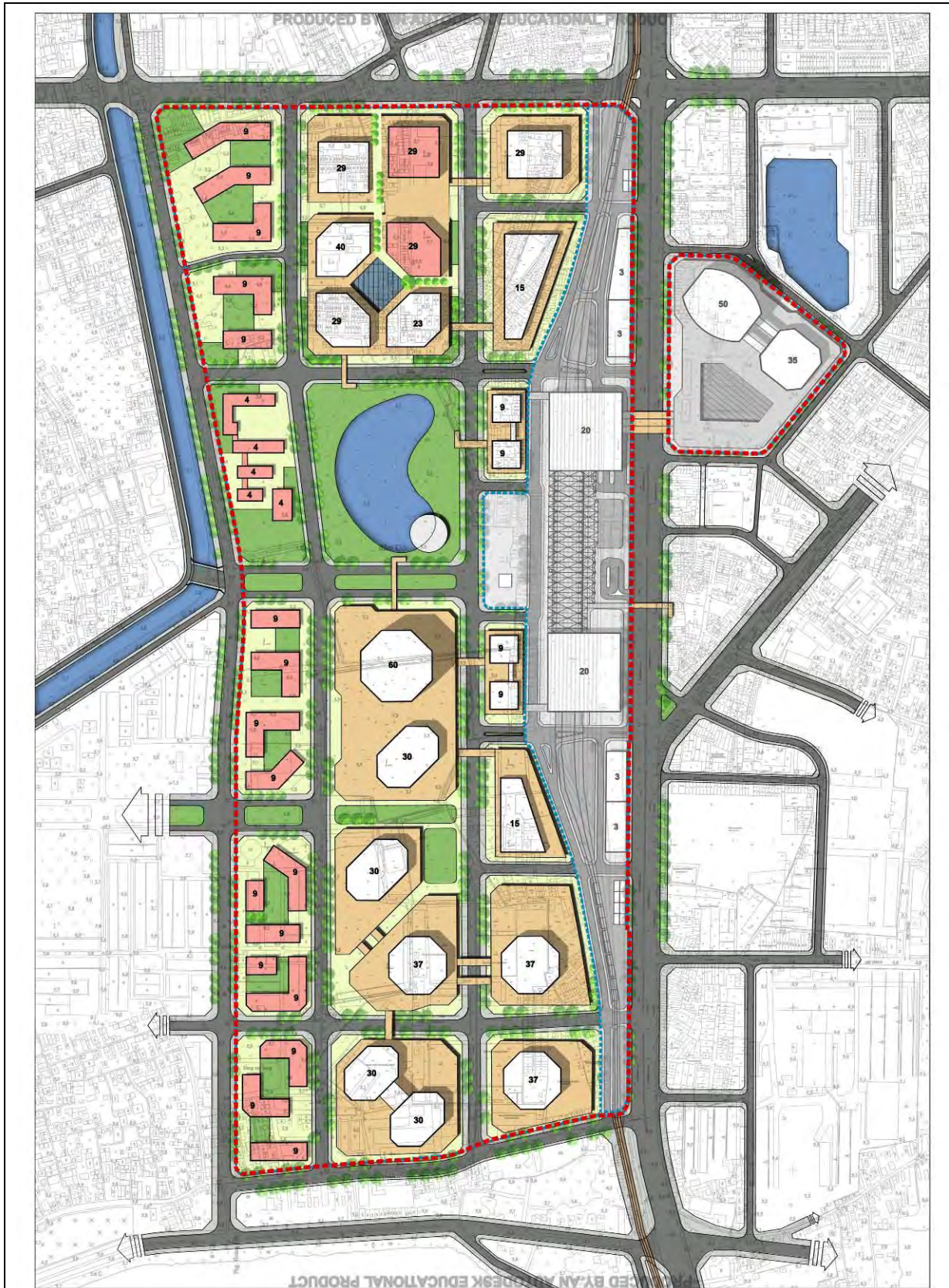
Source: JICA Project Team

Figure 6.5.4 Image of Integrated Redevelopment Project of West Area



Source: JICA Project Team

Figure 6.5.5 Image of Integrated Redevelopment Project of West Area



Source: JICA Project Team

6.6 Implementation Mechanism

1) Principle of Integrated Development for TOD

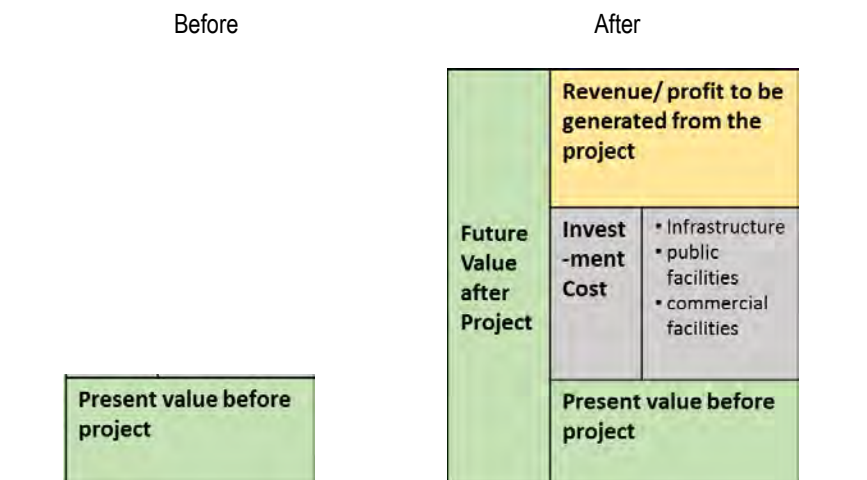
(a) Principle of Capital Gain

6.65 At present, BT methods are often applied to develop both profitable facilities (commercial, residential, etc.) and public infrastructure by private developers, based on negotiation between the government and developers. In return to develop public infrastructure in the urban development project, the developer is provided landuse rights of another location (in suburban areas). Since the urban development project in urban areas is difficult to implement because of consensus building among stakeholders and land acquisition, the developers encounter difficulties for smooth implementation rather than in suburban areas. Furthermore, local communities are difficult to participate in the project implementation process and to get profits from the project.

6.66 The proposed integrated development project is aimed to share costs and profits of the project equitably among stakeholders including existing property owners, new investors and governments, based on the principle of “Capital Gain”. The capital gain of a project can be used to recover the investment costs including for public facilities through an increased asset value. By using this increased value, all stakeholders including the government, private developers, and right holders, will benefit from the projects, as follows:

- (i) The government can develop public infrastructure and facilities as part of an integrated project, and thereby raise profits through increased property tax;
- (ii) The developer can recover the investment costs by selling reserved land (or reserved floor);
- (iii) The right holders can participate in the project with their property asset and be provided with new properties (apartments) ;
- (iv) Existing local communities benefit from improved transport and infrastructure and attractive urban facilities, and increased asset value as external economy.

Figure 6.6.1 Capital Gain Concept of Integrated Development



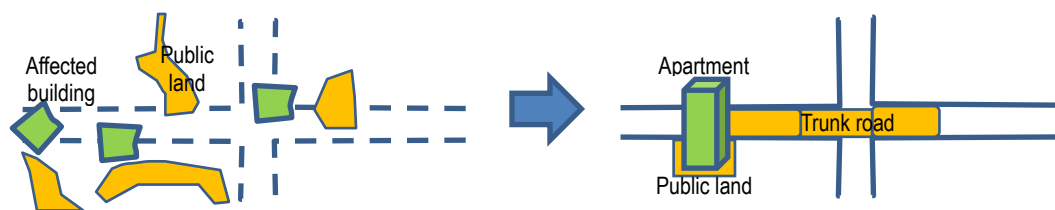
Source: JICA Project Team

(a) Land Replotting and Consolidation for Public Land for Road and Infrastructure

6.67 Based on this principle of right conversion, it should be possible to consolidate developable land near the station. Land in the vicinity of the station could be converted as well as developable land a little away from the station (factories, public land, etc.). This process is called “consolidated land replotting”; it facilitates complex urban developments at and around the station area. The mechanism of right conversion and land replotting should be accepted by Hanoi citizens.

6.68 For example, the existing facilities inside lands for planned roads must be relocated to make land vacant. To provide land and facilities for resettlement of affected households, the government will readjust public lands and unused lands to make land available for road and resettlement apartments, as shown in Figure 6.5.2. After consolidation of public land, and after development of roads, the government will sell the remained public lands, or build public apartment buildings for resettlement of the relocated households and low-income groups, and for sale, in order to recover the project costs.

Figure 6.6.2 Replotting and Consolidating of Public Land for Public Infrastructure Development



Source: JICA Project Team

(b) Mechanism of Integrated Urban Development

6.69 At present, BT (Build- Transfer) method is applied in Vietnam to get project approval with condition of public infrastructure development in the project area with incentives of receiving rights for development approval in the land of suburban areas. The issues of BT method is that developers need large amount of prior investment to cover costs of public infrastructure and compensation for right holders inside development land before starting construction. Furthermore, before selling developed lands to recover investments, investors need to pay annual interests of these prior project costs which are increased during project implementation which require several years.

6.70 Right conversion system is proposed as an option which is to swap (exchange) properties of land and buildings to other land and buildings inside the project area after development project, without necessity of land acquisition with compensation and resettlement. By applying this method, prior investments are much reduced compared to BT method, since land replotting is agreed based on contract with right holders, without payment of compensation. For investors, they can acquire reserved land for sales or development to recover project investment cost. It is also significant for right holders that they can choose preferable conditions from some options including exchanging properties to other area inside the project area by participating in the project, or receiving compensation or lands in other area for resettlement as usual.

6.71 Right conversion development scheme such as Land Readjustment or Urban Redevelopment projects are proposed. By these mechanisms, a cumbersome negotiation procedure of land acquisition and resettlement could be eased; an option of resettlement within the project area could be offered; and efficient land use could be realized by integral urban development.

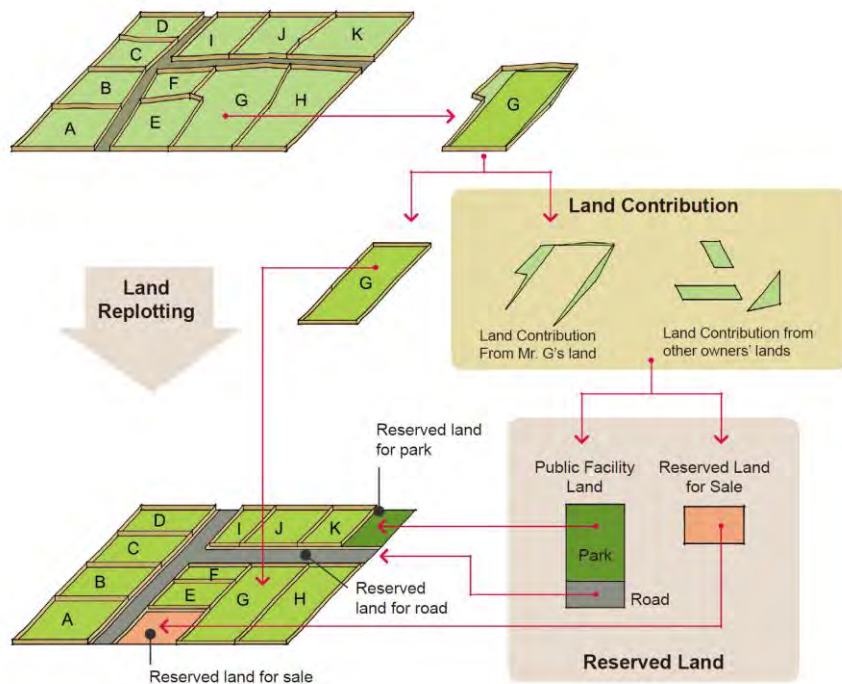
6.72 As these mechanisms raise fund for the project by selling “Reserved land” for Land Readjustment project, or “reserved floor” for Urban Redevelopment Projects, the project stand-alone accounting system should be adopted. Such an accounting system should be practiced for the project implementation in Hanoi.

Box 6.6.1 Characteristics and Principle of Land Readjustment Project

The characteristics of a land readjustment project are as follows:

- (i) It operates by adjusting the boundaries of land plots to make way for building roads, parks, utility service facilities, etc.
- (ii) The constructed urban facilities increase the value of residential property in the project area, although each right holder’s land area is reduced; the deducted land is pooled into a reserved land area.
- (iii) The reserved land shall be sold at market prices to cover the project cost.

To apply this principle, right holders will participate in the project process, and owe responsibilities to contribute to the public interest. They benefit from the project after it is completed.



Source: JICA Project Team

2) Coordination with relevant plans and institutional arrangements

(a) Designation of TOD Planning Area for Integrated Urban Development

6.73 In addition to designation of “TOD Area” in the Zone Plan to ensure development access roads and facilities at and around the station, “TOD Planning Area” should be incorporated in the Zone Plan to promote an integrated TOD development adjacent to or in

the vicinity of the UMRT stations, where a TOD project will be implemented on the basis of public-private partnership.

6.74 TOD Planning Area supposes more efficient land use and improvement of livelihoods. Development issues can be addressed through integrated development with the UMRT station, from an economic, social, and environmental perspective.

6.75 It can not be planned by the public sector alone, but it may be proposed to HPC by the private sector. However, the limits of the TOD planning area can only be stipulated and decided by the public sector and the designated in the Zone Plan (a rigorously authorized plan) for appropriate urban development management.

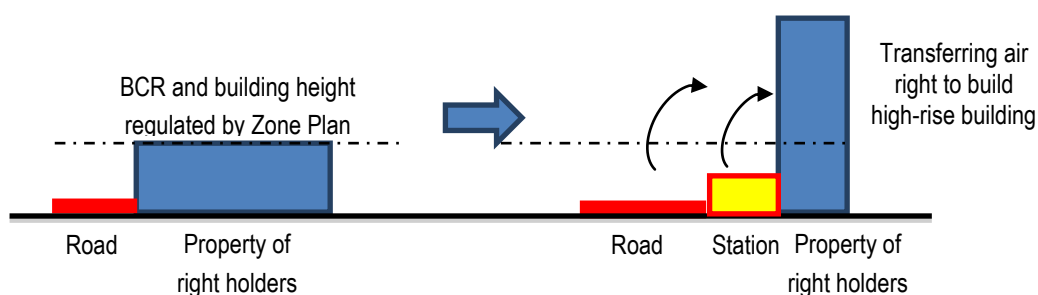
6.76 The TOD planning area proposed by the private sector must be deliberated by the evaluation council composed of the representatives of the relevant governmental agencies, and academic experts and experienced persons. Criteria for appraisal include :

- (i) More efficient land use, especially for public land and land occupied by factories
- (ii) Improved livelihoods in currently congested built-up areas;
- (iii) Possibly, changes in land uses, BCR and building height limits designated in the Zone Plan (as incentives to promote TOD);
- (iv) The private sector should provide some infrastructure required in Zone Plan as the priority projects
- (v) To ensure better living environment and employment opportunities along UMRT lines, social housings are obliged to develop inside TOD planning area to accommodate resettled households in the TOD project areas and other resettlements affected UMRT and public infrastructure projects, and resettlements from the city center;
- (vi) Individual (small-scale) development is limited to realize a comprehensive urban development in a consolidated (large-scale) land.

(b) Incentives of Air Right Transfer to Maximize Development Impacts

6.77 For an integrated development covering a broad area, the road network and public infrastructure must be developed to comply with the Zone Plan, Building Code and other legal bases. As an incentive for developers, providing supplemental air rights to recover infrastructure cost will be preferable to develop consolidated TOD area with public facilities so as to utilize the space in the project area more intensively.

Figure 6.6.3 Concept of Air Right Transfer



Source: JICA Project Team

3) Participation of Stakeholders

(a) Roles and Responsibilities of Stakeholders

6.78 It is noted that TOD project is a project with public benefit, private initiative and community participation. For this, all stakeholders own their benefits and responsibilities based on the beneficiary to pay principle (see Table 6.6.1).

Table 6.6.1 Benefits and Responsibilities of Right Holders

	Benefits	Responsibilities
Government	<ul style="list-style-type: none"> to increase public benefits by improvement of overall living and transport environment to increase public revenue (tax income, landuse levy, etc.) to reduce land acquisition with compensation 	<ul style="list-style-type: none"> to establish TOD project implementation committee to protect rights of right holders during project implementation process (based on contract among three parties of government, investor and right holders) to provide social housings in TOD project area
Investors	<ul style="list-style-type: none"> to acquire development approval and landuse rights for comprehensive urban development around the station to enjoy development incentives in TOD project (reduction of regulation of number of floors, exemption of land-related tax, soft loan, etc.) to ensure stable and sustainable customers and profits in line with increased ridership of UMRT and increased employees to promote urban development projects with endorsement and support by governments 	<ul style="list-style-type: none"> to participate in TOD project implementation committee. to develop road and public infrastructure in compliance with the Zone Plan to develop social housings including resettlements inside TOD project area and other areas to ensure temporal housing during construction to procure funds for project implementation to negotiate with right holders for consensus building
Right holders	<ul style="list-style-type: none"> to be ensured property rights during the project implementation process based on contracts agreed between the developer and the right holders (with endorsement by the government is preferable) to acquire new apartment flats of the same value as their original property before the project, based on right conversion to ensure employment opportunities in TOD project area to sustain livelihoods to have opportunities to participate in the planning process and voice on new apartments as well as the whole project to get profits from reserved lands if land price will be increased after the project 	<ul style="list-style-type: none"> to contribute a part of lands as land contribution for public infrastructure development, and/or reserved land for sale to reduce floor size of apartment flats based on property appraisal, maintaining the same value before and after the project to resettle in temporal housings in other areas during the construction period to take a long time for project formulation, consensus building and construction

Source: JICA Project Team

(b) Establishment of TOD project implementation committee

6.79 To promote TOD projects, it is necessary to set up the organizational structure which all relevant stakeholders participate in whole process of the project planning, implementation and management. The project implementation committee for Giap Bat TOD will be established led by District PC, with participation of MOT-PMU, VNR, HAUPA, DOT, DOC, DONRE, DOF, TRANSERCO, Ward PCs and representatives of local communities.

6.80 The PMU conducts the competition to select a private developer (or JV consortium) which formulates the whole TOD plan, facilitates and invests projects. The developer formulates the project implementation plan including physical plan, financial plan and right conversion plan, by discussing with PMU or Steering Committee and public consultation with local communities.

6.81 The role of HPC is to monitor the project and provide technical and financial supports if required. The PMU must protect rights of right holders during the project implementation process. At the end of the project, increased property value will be shared equitably among stakeholders.

(c) Guidance for and Control on the Private Sector

6.82 A Major purpose of TOD, as an integrated development concept, is to develop infrastructure. For this purpose, HPC should take the initiative to involve the private sector in its implementation.

6.83 The Build-Transfer (BT) method is commonly used in Vietnam. With this method, developers are given permission to develop other areas whose value is equivalent to the cost of public infrastructure that they are obliged to develop within the project area. With this method, however, sometimes the developer does not develop infrastructure as agreed, but only invests in the permitted other development areas. There are no written standards for BTs about role and responsibility sharing between the public and the private sector, and the terms and conditions depend on the negotiation and agreement between the government and the developer, based on the content of the project.

6.84 Some guidelines should be established to provide guidance on TOD to ensure a certain level of service. They should apply to all the station areas.

(d) Participation of Right Holders

6.85 As mentioned above, original right holders can choose between two options: (i) participate in the project and settle in new apartments within the project area, and (ii) move out from the project area, with compensation.

6.86 Social housings are developed in TOD project area for resettlement of original property owners, and employment opportunities are ensured to sustain livelihoods and improve socio-economic activities for local communities.

6.87 Right holders who participate in the project can raise opinions for project contents not only housing issues but also overall project concept how to improve station area for new and original communities, since original residents know well issues of area and necessity for living environment improvement.

6.7 Conclusion and Recommendations

(1) Conclusion

6.88 After verification of proposed TOD projects of the Pre F/S, it is found project objectives are achieved as follows:

- (a) Formulation of comprehensive concept plan in compliance with Zone Plan
 - Zone plan can be realized with TOD concept to formulate a compact and competitive multi-functional urban core.
 - For this, road transport facility project should be implemented as soon as possible for accessibility to station and for appropriate land use with road network.
 - Landuse around the station should be mixed-use together with transport facilities to provide attractive functions and facilities for UMRT users, employees and communities.
- (b) Project viability
 - In case of VNR station area development, expected FIRR is from 17% to 51% which is highly viable to utilize VNR land and space above the station (air right) efficiently.
 - Integrated bus terminal development project is also feasible with 25.5% of FIRR by ensuring financial profits of apartment and commercial facility development with the bus terminal. It is said that utilization of transport land for mixed-use is viable in terms of transport service improvement and socio-economic development.
 - Integrated redevelopment project of west area realizes basic infrastructure on self-financing basis including roads, park and public facilities land. By reducing regulation of number of floors in the Zone Plan to utilize air rights, new floors are generated around the station which will raise profits for investors.
 - Though each TOD project can be implemented independently, overall management of these TOD projects is significant in synergy. Implementation of TOD projects in VNR land and bus terminal land should be promoted at first in line with UMRT construction project. These TOD projects at the station and bus terminal will farther promote integrated development of west area in terms of promotion of UMRT ridership and understanding of TOD, provision of social housings, promotion of private investment, etc.

(2) Recommendations

6.89 Participation of various stakeholders to the project is the basis for success by providing resettlement housings inside the project area, and opinions and needs of stakeholders are properly reflected to the project.

6.90 Core investors must be found who are interested in proposed TOD concept plan and capable in terms of financial and technical capacity to realize the comprehensive and consolidated urban development around the station.

6.91 Capable project implementation body with coordinating capacity should be established to implement integrated development project involving various stakeholders,

6.92 Proposed right conversion system has advantages compared to the land acquisition method with compensation and resettlement at present. It protects rights of residents by converting of present property rights into new apartment flats without compensation and resettlement to other areas. For developers, they can reduce initial compensation costs which are the burden at present. To apply new methods including right conversion system, “Land Readjustment” method which is popular in Japan will be studied farther for appropriate application to Hanoi City.

7 CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

1) Importance of TOD

7.1 While UMRT projects in Hanoi have been making progress including Line 1, Line 2, Line 2A and Line 3 at different stages of development, it is becoming an increasingly important concern on planning and implementation of TOD related to UMRT. The HAIMUD2 Study confirmed the roles of TOD in Hanoi are as follows:

- (i) **TOD will affect the ridership of UMRT:** The ridership of UMRT will be significantly affected by the conditions of access to the stations. Particular importance should be given on the improvement of walking conditions and environment in the area within walking distance of UMRT station (500-800 meter radius area), improvement of roads and provision of facilities for smooth access by other modes of transport including bicycle, motorcycle, taxi and bus.
- (ii) **TOD will contribute to economic development at and around the stations:** UMRT will enhance economic development opportunities at and around the stations when the urban developments are planned and implemented adequately. The urban and transit integrated development (TOD) will also contribute farther enhancement of UMRT ridership and convenience of UMRT users.
- (iii) **TOD will contribute to enhancement of social and environmental conditions in the influence area of UMRT:** Improvement of walking conditions within the station catchment area (500-800 m radius), access roads, intermodal facilities at the station area, and integrated urban development will provide extensive opportunities for improvement of local communities.

7.2 While the impact of UMRT is extensive, TOD should be planned at three spatial hierarchy as follows:

- (i) **TOD at Regional Scale:** UMRT in Hanoi is planned as an integrated network to cover the urban area so extensively future urban growth and landuse will be affected significantly. At this level main focus should be placed on integration of long-scale urban development such as new urban development around the West Lake, Hoa Lac High-tech Park, other large-scale potential new town developments along UMRT Lines.
- (ii) **TOD at UMRT Corridor and Cluster Level:** As UMRT is to serve accessibility and mobility along UMRT line; TOD should focus on the opportunities of traffic improvement and urban development opportunities along UMRT corridor and urban cluster. Development of Line 1, Line 2 and Line 3 which covers Hanoi city centre area is the most important in this context.
- (iii) **TOD at and around UMRT Station:** Planning and development of TOD at this level will directly affect the performance of UMRT in terms of ridership and socio-economic development and environmental management in the localities.

2) Main Outputs of TOD

7.3 HAMUD2 covers a total of 18 stations included in the phase 1 of UMRT Line 1 and Line 2. In order to maximize the impacts of UMRT in the most effective manner as in

aforementioned manner, main measures and interventions that have been planned in the Study include followings:

- (i) **Improvement and Development of Main Roads included in Zone Plan:** Main roads included in Zone Plan which connect UMRT stations should be given priority in improvement and development, especially in the areas at and around the stations in integration with UMRT development. This will not only facilitate efficient implementation of both projects but also provide more effective opportunities in resettlement of affected households and land acquisition.
- (ii) **Improvement of Local Roads and Alleys:** Main mode of access to UMRT is walking as is experienced in many other transit cities in the world. The improvement of walking conditions and environment is so important that level of improvement affects the spatial coverage of UMRT influence area. In Hanoi, access to UMRT station by bicycle and motorcycle should also be duly considered. The improvement of local roads and alleys including pavement, drainage, traffic signage and control, street lighting, tree planting, safety facilities, among others, should not only focus on the improvement of access to UMRT but also the overall improvement of mobility and living environment of local communities.
- (iii) **Enhanced Traffic Management of Hanoi City Centre:** Development of UMRT Line 1, Line 2 and Line 3 will provide a significant opportunity for Hanoi City to improve traffic situation in the city centre. The city centre will be provided with UMRT stations including Hang Dau, Long Bien Nam, Hoan Kiem Lake, Tran Hung Dao and Hanoi Stations (Phung Hung Station could be added due to decision on 75 meter option alignment). Almost entire areas in AQ and FQ are covered within the walking distance of UMRT. Together with provision of parking facilities at the periphery, special circulation bus and restrain measures against the entry of car, there is a high possibility of improving traffic situation in the city centre dramatically.
- (iv) **Promotion of UMRT Integrated Parking Facilities:** Although UMRT station must be provided with adequate parking facilities to strengthen intermodal connectivity, there are many stations which lack proper space for provision of parking facilities especially in the city centre. Therefore considerations must be given on the use of space under the viaduct and integrated development of underground space which will be made available during the construction of UMRT¹.
- (v) **Provision of New Bus Services:** In addition to reorganization of existing city bus services (rerouting and adjustment of bus frequencies) it is advisable to add new bus services in integration with UMRT services. One is UMRT relay bus which provide high quality services along planned extension route of UMRT. The relay bus is directly connected at the end or near end stations of phase 1 section such as Tay Ho Tay of Line 2 and Giap Bat and Gia Lam of Line 1 based on common fare. This will complement relatively short phase 1 section of UMRT with seamless services to attract passenger of outer areas². Circulation services using smaller capacity buses in the city centre and specific areas will also be feasible.

¹ For example, as is in the case of Tran Hung Dao station underground parking facilities can be constructed at much lower cost when it is constructed together with UMRT.

² When Phase 2 sections are completed, the relay bus services will be farther moved to outer areas.

- (vi) **Creation of Integrated Urban Development Opportunities:** UMRT can create ample opportunities for integrated urban development/redevelopment which will be benefited through improved accessibility. They include, but not limited to, (i) public facilities such as hospitals, universities, factories, government facilities, etc., (ii) old public apartment areas, (iii) VNR lands, (iv) underutilized bus terminal areas, (v) planned new town areas, and (vi) underground space.
- (vii) **Comprehensive TOD at Main UMRT Stations:** Among the stations, there are a number of potential stations which can serve as key inter-modal nodes and, at the same time, as a new urban core. They include Hanoi station, Giap Bat station and Gia Lam station, and are provided with ample underutilized land and space. With implementation of comprehensive TOD, concentrated CBD function in the city centre can more adequately be dispersed to outer areas. Promotion of development of new sub CBD in outer areas in integration with UMRT will not only improve traffic situation but also contribute to urban growth management and effective landuse of the city.

3) Pre Feasibility Studies

7.4 In order to verify the aforementioned TOD opportunities, pre-feasibility studies were conducted on three projects, including (i) Transport Access Improvement of UMRT, (ii) Underground Parking Facilities at Tran Hung Dao Station and (iii) TOD at Giap Bat Station Area. Findings and conclusions are as follows:

(a) Pre-FS on Transport Access Improvement of UMRT

- (i) **Objective:** This is identify necessary projects to ensure the smooth access to UMRT stations in the 500 meter radius areas of the entire 18 stations included in the Phase 1 of Line 1 and Line 2.
- (ii) **Project Grouping by Implementation Stage:** Identified projects were grouped into short-term projects, minimum projects and basic projects. Short-term projects refer to those that must be completed before the opening of UMRT. Minimum projects are those included in short-term projects and require no land acquisition. Basic projects include those which UMRT station must be essentially provided with such as station plaza and other intermodal facilities.
- (iii) **Project Cost:** Total project cost required for 18 stations is VND 7,980 billion or USD 372 million, of which, VND 2,275 billion or 29%, and VND 5,685 billion or 71% for Line 1 and Line 2, respectively. Minimum projects share VND 3,170 billion or about 40% of the total.
- (iv) **Possible Funding Sources:** Possible funding sources include HDOT, MOT-PMU (Line 1), MRB (Line 2), District PC, private sector and their combinations. Roads included in Zone Plan will be covered by HDOT, while local roads and alleys by District PC. UMRT related projects will be covered by UMRT project implementing body while those related to integrated urban development will be by private sector.
- (v) **Project Management:** As many of the projects are either within ROW of UMRT or closely related to UMRT, UMRT implementing body should be the overall project management body, on those outside ROW of UMRT close coordination with relevant organizations is necessary, especially HDOT.
- (vi) **Project Evaluation:** While the project is economically viable with EIRR of 17.8%, it is not financially viable simply because many projects cannot generate revenue.

Considering positive social and environmental impacts of the project on localities, the project can be justified and implemented with public sector initiatives.

(b) Pre-FS Tran Hung Dao Underground Parking

- (i) **Objective:** The Study is to define demand supply gap of parking facilities in the city centre and assess feasibility of underground facilities at Tran Hung Dao Station.
- (ii) **Project Cost:** The project can take advantage of reducing construction cost of underground parking at 1/3 – 1/4 by constructing the facilities simultaneously with UMRT. Normally underground parking construction cost is VND 70-80 million/m², while the project cost is VND 20 million/m².
- (iii) **Project Evaluation:** Project is economically feasible due to reduction in on-road parking space, improved traffic flow and safety. When the underground parking mainly serves car, it is also financially viable with FIRR of more than 12%.
- (iv) **Need for Underground Parking Development Integrated with UMRT:** It is desirable to study development of underground parking facilities for other UMRT stations.

(c) Pre-FS on Giap Bat TOD

- (i) **Objective:** This is to assess feasibility of developing Giap Bat station area as a comprehensive intermodal node and new urban core to promote sustainable development of rapidly growing urban areas in the south of Hanoi.
- (ii) **TOD Project Concept and Components:** While overall project concept is to assess opportunity to create a new competitive urban centre, it will comprise three project components including (i) Redevelopment of VNR land including UMRT station, (ii) Redevelopment of bus terminal, and (iii) Development of west areas of the station. Because of the provision of competitive mass-transit service of Line 1 and planned Ring Roads, the areas have very high opportunities for more value added and high density developments to transform the suburban areas to competitive urban centre.
- (iii) **Project Evaluation:** It is expected that aforementioned TOD through three project components will enhance the value of the space, land and facilities dramatically. However, in order to implement the concept, a new approach is necessary including, among others, land readjustment, right conversion, air right, which require institutional arrangements.

7.2 Recommendations

7.5 In order to move to the next step of implementing TOD, main recommendations of the study include following:

(a) Inclusion of TOD Plan in Zone Plan

As Zone Plan is the official urban plan with legal binding, proposed TOD plan should be included in Zone Plan. While this has been attended in HAIMUD2 through coordination with HAUPA, it must be applied to other UMRT stations as well.

(b) Strengthening of Coordinating Function in TOD Planning and Implementation

TOD involves wide range of projects and require cross sector attention at different spatial scale and by different stakeholders. Projects include transportation (roads, traffic control and management, bus operation, etc.), urban development (commercial facilities, housing, various public facilities) and environmental management (street trees, street lighting, drainage, etc.). TOD involves various government organizations and departments as well as private sector and communities. In order to facilitate effective planning and implementation of TOD, there is a need for designating main coordinating body in planning and implementation. While HAIMUD2 is implemented through HAPI for coordinated planning, a main body for implementation of TOD projects in coordinated manner should be identified.

(c) Expansion of UMRT Project Coverage

At present, UMRT projects are limited to those which are directly related to UMRT construction and operation. UMRT ROW is also limited to the area to include the facilities required for operation of UMRT itself. As TOD at the station area will directly affect the performance of UMRT, it is necessary to expand the responsible area and scope of UMRT.

(d) Promotion of Private Sector Participation

There are ample opportunities in TOD where private sector can effectively participate, especially through integrated urban development and operation and management of public facilities. However, in order to guide and manage initiatives and capacities of private sector, it is necessary for government to provide a set of rules and guidelines to ensure the balance between public and private sector benefits.

(e) Considerations on Institutional Arrangements

In order to implement proposed TOD in the most effective manner, it is also necessary to provide adequate institutional framework with particular regard to the following:

(i) Designation of TOD Area and Provision of Development Guideline

In order to farther ensure integrated development of proper infrastructure and facilities the coverage of TOD area should be clearly delineated. The TOD area should not only included in Zone Plan but also will be provided with a set of rules and guidance for implementation of the identified projects. For example, the projects located in TOD area should be given priority for their completion in time of UMRT operation.

(ii) Establishment of TOD Planning and Projects Coordination Mechanism

Necessary institutional arrangements should be considered on effective planning and implementation of TOD based on farther study.

(iii) Introduction of Alternative Urban Development Methods

While TOD is mostly practiced in existing urban areas, land acquisition, resettlement and adjustment of various rights of different stakeholders cannot be avoided. As is practiced in many other developed cities, there are useful references that can be introduced in Hanoi as alternative to currently practiced methods. Those which are found effective in TOD include “land readjustment” and “urban renewal” that have been widely experienced in Japan’s cities.