27.4 New North Port

Development direction of New North Port is proposed as follows:

- New North Port shall handle bulk and non-bulk cargoes, and serve mainly for Dong Anh and Soc Son Districts in order to contribute to urban and industrial development expected in these districts.
- Required length of berth shall be 760m.
- Development area for port facilities shall be allocated at the left bank of the Red River, and between Thang Long Bridge and future Nhat Tan Bridge (Hai Boi Commune, upstream of the existing groin KT-1)(see **Table 27.4.1**, **Figure 27.4.1** and **Figure 27.4.2**).

Table 27.4.1 Evaluation of Alternatives on New North Port

Evaluating Items	Alternative-1 (Vinh Ngoc Commune, upstream of Nhat Tan Bridge)	Alternative-2 (Hai Boi Commune, upstream of existing groin KT-1)
Current land use of future port site	Farm area Brickyard	Farm area
Current land use of future access road site	Farm area	Farm area Less Populated area
Easiness in keeping water depth	Good	Fair
Required length of access road	Longer	Shorter
Environmental impact on populated are	Negligible	acceptable
Impact on existing groin system	Negligible	Negligible
Impact on the future city view	Considerable	Inconsiderable
Relation with old channel from groin KT1	Blocking	No relation
Overall evaluation	Inferior	Superior

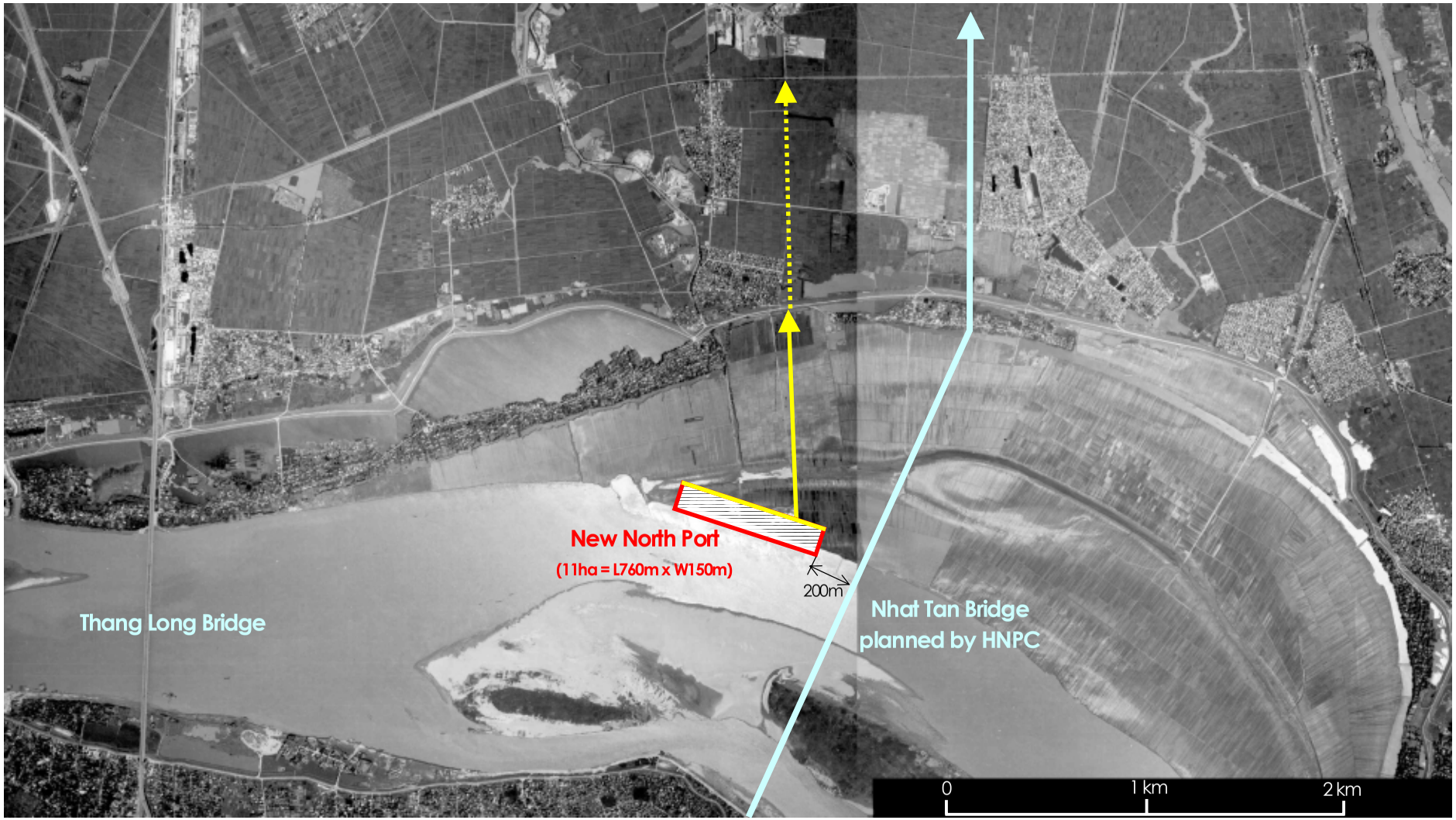
Source) JICA Study Team

Master plan of New North Port is shown in **Table 27.4.2** and **Figure 27.4.3**.

Table 27.4.2 Master Plan of New North Port (2020)

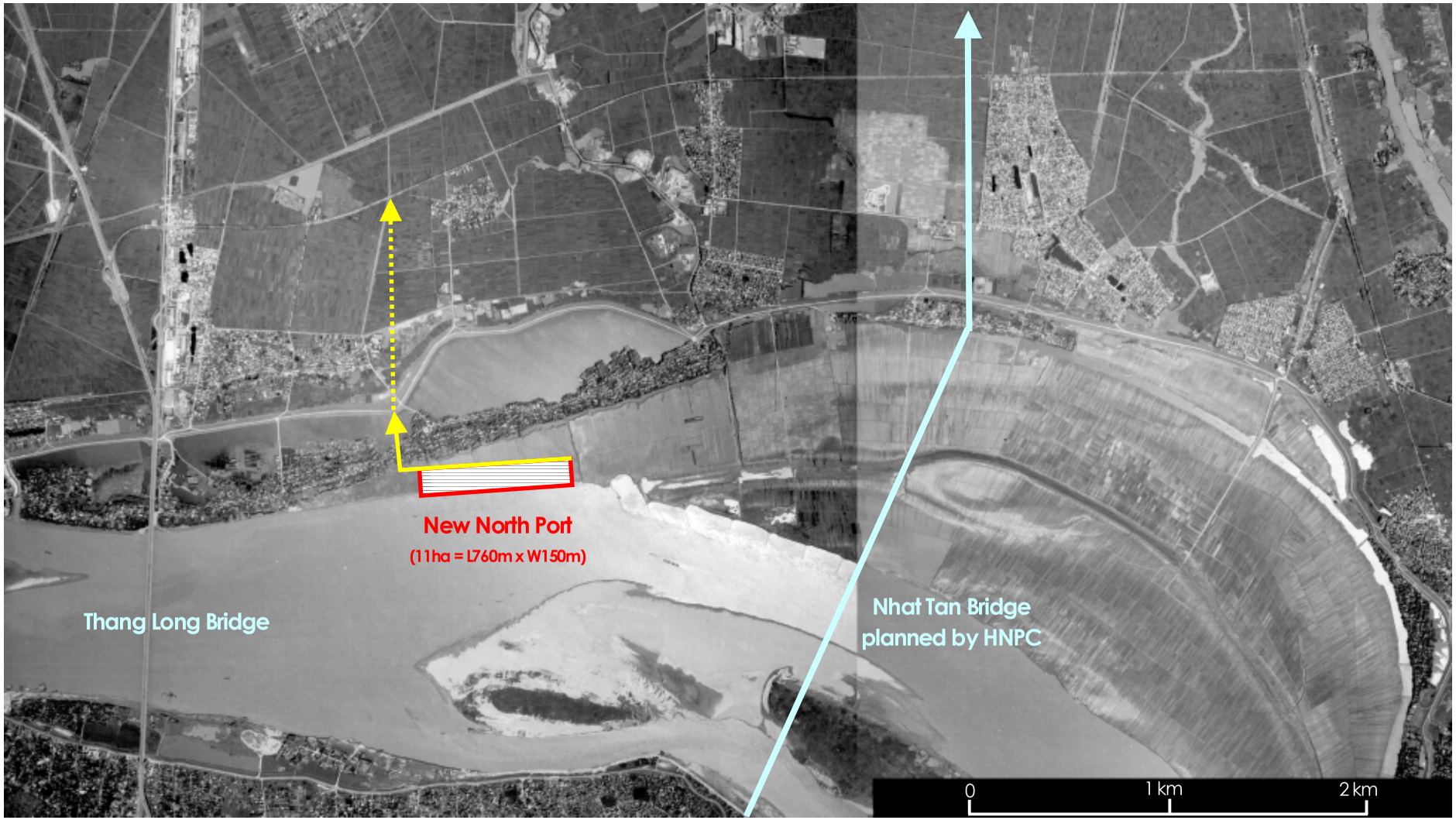
Item	Description
Port Owner/Investor	MOT (small-scale investment: port operator)
Port Operator	Company (Not yet decided)
Facing IW Corridor	Corridor 1 (Quang Ninh - Hai Phong - Hanoi - Viet Tri)
Hinterland	Primary: Dong Anh and Soc Son Districts Secondary: Gia Lam District
Design Capacity	3.2 million tons (Bulk: 2.8, Non-bulk: 0.4)
Length of Waterfront	0.8km
Berth Property	760m@-2.5m, Crown elevation: +12.3m
Land Area	11ha (Storage yard: 4.3ha, Warehouse: 0.6ha)
Handling Equipment	Quayside mobile crane: 15 units (8tons) Grab bucket: 12 units (3cu.m), Forklift: 9 units (3tons) Shovel loader: 9 units (2cu.m), Bulldozer: 3 units (5tons) Dump Truck: 24 units (10tons), Truck: 6 units (7tons) Pallet: 1,100 units (1.2mx1.8m)
Access Road	2 lanes to be linked to the Connecting Road between Thang Long Bridge North Exit and Highway No.3

Source) JICA Study Team



Source) JICA Study Team

Figure 27.4.1 Location of New North Port (2020, Alternative-1)



Source) JICA Study Team

Figure 27.4.2 Location of New North Port (2020, Alternative-2)

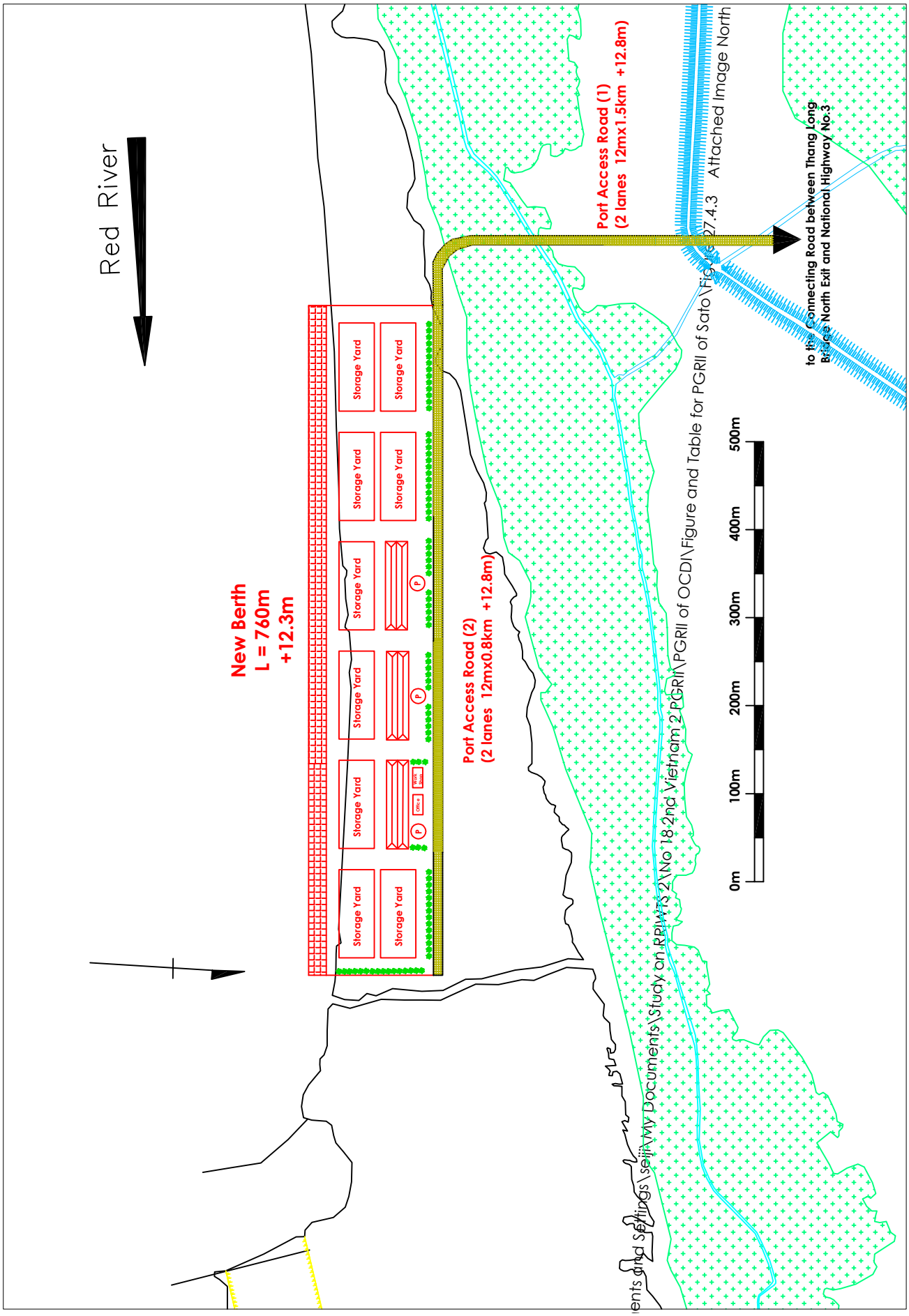


Figure 27.4.3 Master Plan of New North Port (2020)

27.5 New East Port

Development direction of New East Port is proposed as follows:

- New East Port shall handle non-bulk and bulk cargoes as well as container from the Northern seaports of Cai Lan and Hai Phong, and serve mainly for Gia Lam District (container: for whole city) making full use of its excellent location as a primary gateway of Hanoi from the Northern seaports of Cai Lan and Hai Phong.
- Required length of berth shall be 720m.
- Development area for port facilities shall be allocated at the right bank of the Duong River, and downstream of Phu Dong Bridge.

Master plan of New East Port is shown in **Table 27.5.1** and **Figure 27.5.1**.

Table 27.5.1 Master Plan of New East Port (2020)

Item	Description
Port Owner/Investor	MOT (small-scale investment: port operator)
Port Operator	Not yet decided (candidate: VINALINES+NOWATRANCO)
Facing IW Corridor	Corridor 1 (Quang Ninh - Hai Phong - Hanoi - Viet Tri)
Hinterland	Primary: Gia Lam District Secondary: Soc Son, Dong Anh and Thanh Tri Districts Container: whole city
Design Capacity	2.2 million tons (Bulk: 1.1, Non-bulk: 1.1) Container: 67 thousand TEUs
Length of Waterfront	0.8km
Berth Property	720m@-2.5m, Crown Elevation: +11.0m
Land Area	18ha (Storage yard: 1.8ha, Warehouse: 1.9ha, ICD (CY+CFS+DC): 6.7ha)
Handling Equipment	Quayside mobile crane: 15 units (2@30tons+13@8tons) Grab bucket: 5 units (3cu.m) Forklift: 32 units (4@37tons+28@3tons) Shovel loader: 3 units (2cu.m), Bulldozer: 2 units (5tons) Dump Truck: 9 units (10tons), Truck: 19Units (7tons) Tractor & Trailer: 6 units Pallet: 3,400 units (1.2mx1.8m)
Access Road	2 lanes to be linked to Highway No.1 and Dyke road

Source) JICA Study Team

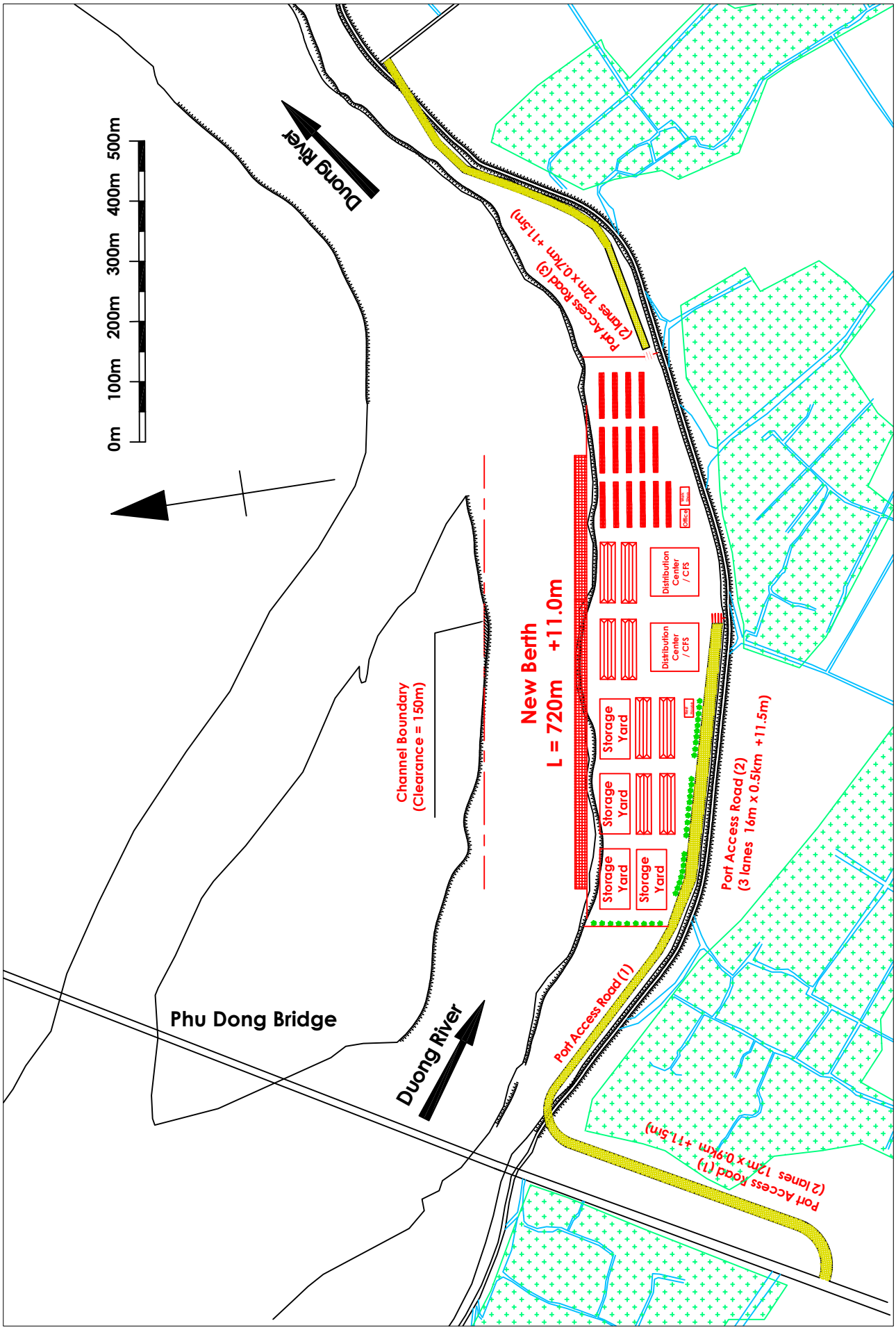


Figure 27.5.1 Master Plan of New East Port (2020)

27.6 New passenger berth

27.6.1 Service schedule and required passenger boats

As to passenger traffic, the following service routes have potential to be realized. In order to attract passengers on these service routes, it is indispensable to provide a service almost the same as that of bus service in terms of transit time and fare (see **Table 27.6.1** through **Table 27.6.3** and **Figure 27.6.1**).

Hanoi - Hung Yen - Thai Binh route (Hanoi - downstream of Red River)
Hanoi - Viet Tri - Phu Tho route (Hanoi - upstream of Red River)

It should be noted, however, that current bus fares are set at a low level since vehicles in service are old and uncomfortable in general. According to HNPC, these old and uncomfortable vehicles will be replaced by new and comfortable one by 2007. Once vehicles are replaced, it is quite natural that bus fares will considerably be raised.

Table 27.6.1 Potential Passenger Demand from Hanoi

Direction	Section	Distance(Km)		Travel Time(hr)		IWT Demand ('000)	
		Road	IW	Bus	IW	2010	2020
To South	Ha Noi <--> Hung Yen	64	60	2.1	2.1	210	309
	Ha Noi <--> Thai Binh	109	101	3.4	3.5	159	224
	Hung Yen <--> Thai Binh	45	41	1.3	1.6	32	64
	subtotal					402	597
To West	Ha Noi <--> Viet Tri	84	75	2.5	2.6	135	189
	Ha Noi <--> Phu Tho	123	115	3.8	4.0	101	141
	Viet Tri <--> Phu Tho	39	40	1.4	1.4	3	5
	subtotal					239	335
Total						641	932

Source) JICA Study Team

Table 27.6.2 Sensitivity Analysis on Passenger Demand from Hanoi

(%)

		Waiting Time Difference(IW-Bus)				
		0	0.5	1	1.5	2
Fare Difference (IW-Bus)	0	-	-29.6	-51.6	-67.2	-77.9
	5,000	-27.6	-50.1	-66.0	-77.2	-84.8
	10,000	-48.6	-65.0	-76.4	-84.3	-89.4
	15,000	-64.0	-75.7	-83.8	-89.1	-92.8
	20,000	-74.9	-83.2	-88.8	-92.6	-95.1

Source) JICA Study Team

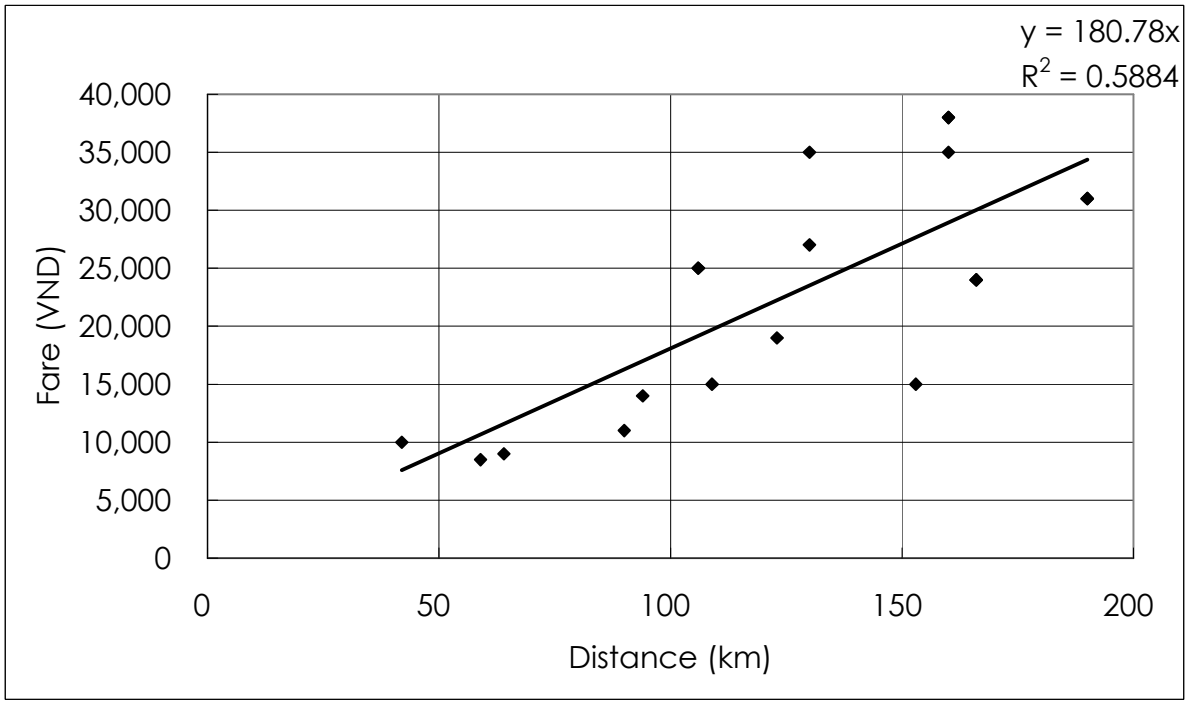
Table 27.6.3 Existing Bus Transport Service

Terminal in Hanoi	Route (for)	Departure Time	Service Frequency (departures)	Transit Time (h)	Distance (km)	Average Speed (km/h)	Fare (VND)	(VND/km)
Giap Bat	HCMC	10:00, 15:00	2	43.0	1,719	40.0	185,000	108
Giap Bat	Da Nang	5:30, 7:00	2	16.0	759	47.4	84,000	111
Kim Ma	Yen Bai	6:00 - 15:00	10	5.0	190	38.0	31,000	163
Gia Lam	Yen Bai	5:00, 8:00	2	5.0	190	38.0	31,000	163
Kim Ma	Tuyen Quan	5:30 - 13:30	15	4.0	166	41.5	24,000	145
Gia Lam	Tuyen Quan	6:00 - 14:00	8	4.0	166	41.5	24,000	145
Kim Ma	Cam Pha	6:30 - 13:00	12	4.0	160	40.0	38,000	238
Gia Lam	Cua Ong	6:00 - 8:40	5	4.0	160	40.0	35,000	219
Gia Lam	Cam Pha	6:30, 8:30	2	4.0	160	40.0	38,000	238
Giap Bat	Thanh Hoa	6:00 - 16:30	15	3.5	153	43.7	15,000	98
Kim Ma	Bai Chay	5:30 - 17:30	36	3.5	130	37.1	35,000	269
Gia Lam	Hong Gai	6:00 - 15:00	25	3.5	130	37.1	27,000	208
Kim Ma	Phu Tho	6:00 - 16:30	14	3.0	123	41.0	19,000	154
Giap Bat	Thai Binh	5:00 - 16:30	15	2.5	109	43.6	15,000	138
Kim Ma	Hai Phong	5:00 - 18:45	80	2.5	106	42.4	25,000	236
Gia Lam	Hai Phong	6:00 - 16:30	18	2.5	106	42.4	25,000	236
Giap Bat	Ninh Binh	7:00 - 17:30	12	2.5	94	37.6	14,000	149
Giap Bat	Nam Dinh	5:30 - 17:30	15	2.5	90	36.0	11,000	122
Gia Lam	Hun Yen	6:00 - 16:00	12	1.5	64	42.7	9,000	141
Giap Bat	Phu Ly	5:00 - 17:00	10	1.5	59	39.3	8,500	144
Kim Ma	Son Tay	5:30 - 16:30	24	1.0	42	42.0	10,000	238

Note) There are some route where premium fares (VND3,000 to VND9,000 more expensive than normal fare) are set.

Source) Survey at 3 bus terminals in Hanoi by JICA Study Team in June 2002.

Source) Japanese travel guide book 2002



Note) see Table 27.6.3

Source) Analyzed by JICA Study Team

Figure 27.6.1 Bus Fare (Service Distance: 40 - 200km)

Tentative service schedule for Hanoi - Hung Yen - Thai Binh route are set taking into account current bus service.

Hanoi - Hung Yen - Thai Binh route (see **Table 27.6.4**)

Departure time: 6:30 - 17:00
Service Frequency: 11 services
Required boat: 10 vessels

Hanoi - Viet Tri - Phu Tho route (see **Table 27.6.8**)

Departure time: 6:30 - 17:00
Service Frequency: 11 services
Required boat: 11 vessels

Since the passenger transport is one of public transport service, it is necessary to set passenger fare at a lower level as far as viability of operating business is kept. Tentative passenger fares are conceived as follows:

Case-1: IWT fare = Bus fare
Case-2: IWT fare = Bus fare + VND10,000
Case-3: IWT fare = Bus fare with 50% raised

Among 3 alternatives, case-3 is considered to be most likely level taking into account vehicle replacement plan of HNPC and the following information is derived:

Hanoi - Hung Yen - Thai Binh route (see **table 27.6.5** through **Table 27.6.7**)

Require seats of boat: 70seats
Passenger volume: 0.3 million PAX (2010), 0.5 million PAX (2020)
Revenue by fare: US$0.4million (2010), US$0.6 million (2020)

Hanoi - Viet Tri - Phu Tho route (see **table 27.6.9** through **Table 27.6.11**)

Require seats of boat: 50seats
Passenger volume: 0.2 million PAX (2010), 0.3 million PAX (2020)
Revenue by fare: US$0.3million (2010), US$0.5 million (2020)

Before starting operation of passenger boat service, promotion activity of a large scale in order to make passengers shift from bus transport to IWT is recommended since passengers tend to hesitate to change transport mode in general.

Table 27.6.4 Tentative Service Schedule of Passenger Boat (HN-HY-TB)

Vessel Name	Hanoi	Hun Yen		Thai Binh	(stay)	Vessel Name	Thai Binh	Hun Yen		Hanoi	(stay)
Vessel 1			7.1	8.5		Vessel 2			6.9	9.0	
Vessel 3			8.1	9.5		Vessel 4			7.9	10.0	
Vessel 5	6.5	8.6	9.1	10.5		Vessel 6	7.0	8.4	8.9	11.0	
Vessel 7	7.5	9.6	10.1	11.5		Vessel 8	8.0	9.4	9.9	12.0	
Vessel 9	8.5	10.6	11.1	12.5		Vessel 1	9.0	10.4	10.9	13.0	
Vessel 2	9.5	11.6	12.1	13.5		Vessel 3	10.0	11.4	11.9	14.0	
Vessel 4	10.5	12.6	13.1	14.5		Vessel 5	11.0	12.4	12.9	15.0	
Vessel 6	11.5	13.6	14.1	15.5		Vessel 7	12.0	13.4	13.9	16.0	
Vessel 8	12.5	14.6	15.1	16.5		Vessel 9	13.0	14.4	14.9	17.0	Hanoi
Vessel 1	13.5	15.6	16.1	17.5	Thai Binh	Vessel 2	14.0	15.4	15.9	18.0	Hanoi
Vessel 3	14.5	16.6	17.1	18.5	Thai Binh	Vessel 4	15.0	16.4	16.9	19.0	Hanoi
Vessel 5	15.5	17.6			Hung Yen	Vessel 6	16.0	17.4			Hung Yen
Vessel 7	16.5	18.6			Hung Yen	Vessel 8	17.0	18.4			Hung Yen
No. of Service	11		11			No. of Service	11		11		

Note) Required number of boat = 9 + 1(for dock) = 10

Note) Cruising speed = 30 km/h, average speed = 29 km/h

Note) Transit Time (hr):

HN-HY	Waiting	HY-TB
2.1	0.5	1.4

Source) JICA Study Team

Table 27.6.5 Required Seats of Passenger Boat and Estimated Revenue (HN-HY-TB, Case-1: IWT fare = Bus fare)

Year	O-D	Passenger Demand				Section				Total Transport			Revenue (US$)	
		Yearly	Sensitivity	Hourly	One way	HN to HY	HY to TB	TB to HY	HY to HN	PAX	km	PAX-km	Fare	Revenue
2010	Hanoi - Hung Yen	210,000	0.0%	48	24	24			24	175,000	60	10,500,000	0.8	135,147
	Hanoi - Thai Binh	159,000	0.0%	36	18	18	18	18	18	106,000	101	10,706,000	1.3	139,418
	Hung Yen - Thai Binh	32,000	0.0%	7	4		4	4		29,333	41	1,202,667	0.5	15,928
	Total	401,000	0.0%	92	46	42	22	22	42	310,333		22,408,667		290,493
	Seats			50	Load Factor	84%	44%	44%	84%					
				60		70%	36%	36%	70%					
				70		60%	31%	31%	60%					
				80		53%	27%	27%	53%					
2020	Hanoi - Hung Yen	309,000	0.0%	71	35	35			35	257,500	60	15,450,000	0.8	198,859
	Hanoi - Thai Binh	224,000	0.0%	51	26	26	26	26	26	149,333	101	15,082,667	1.3	196,413
	Hung Yen - Thai Binh	64,000	0.0%	15	7		7	7		58,667	41	2,405,333	0.5	31,856
	Total	597,000	0.0%	136	68	61	33	33	61	465,500		32,938,000		427,128
	Seats			50	Load Factor	122%	66%	66%	122%					
				60		101%	55%	55%	101%					
				70		87%	47%	47%	87%					
				80		76%	41%	41%	76%					

Note) Fares are set at a level as same as that of bus. Fare (US$) = ((181 X (Road Distance) + 0) x 1.0) + 0)/15,000

Source) JICA Study Team

Table 27.6.6 Required Seats of Passenger Boat and Estimated Revenue (HN-HY-TB, Case-2: IWT fare = Bus fare + VND 10,000)

Year	O-D	Passenger Demand				Section				Total Transport			Revenue (US$)	
		Yearly	Sensitivity	Hourly	One way	HN to HY	HY to TB	TB to HY	HY to HN	PAX	km	PAX-km	Fare	Revenue
2010	Hanoi - Hung Yen	210,000	-48.6%	25	12	12			12	89,950	60	5,397,000	1.4	129,432
	Hanoi - Thai Binh	159,000	-48.6%	19	9	9	9	9	9	54,484	101	5,502,884	2.0	107,984
	Hung Yen - Thai Binh	32,000	-48.6%	4	2		2	2		15,077	41	618,171	1.2	18,239
	Total	401,000	-48.6%	47	24	22	11	11	22	159,511		11,518,055		255,654
	Seats			20	Load Factor	108%	56%	56%	108%					
				30		72%	37%	37%	72%					
				40		54%	28%	28%	54%					
				50		43%	22%	22%	43%					
2020	Hanoi - Hung Yen	309,000	-48.6%	36	18	18			18	132,355	60	7,941,300	1.4	190,450
	Hanoi - Thai Binh	224,000	-48.6%	26	13	13	13	13	13	76,757	101	7,752,491	2.0	152,128
	Hung Yen - Thai Binh	64,000	-48.6%	8	4		4	4		30,155	41	1,236,341	1.2	36,477
	Total	597,000	-48.6%	70	35	31	17	17	31	239,267		16,930,132		379,055
	Seats			20	Load Factor	156%	84%	84%	156%					
				30		104%	56%	56%	104%					
				40		78%	42%	42%	78%					
				50		63%	34%	34%	63%					

Note) Fares are set at VND10,000 higher level than that of bus. Fare (US$) = ((181 X (Road Distance) + 0) x 1.0) + 10,000)/15,000

Source) JICA Study Team

Table 27.6.7 Required Seats of Passenger Boat and Estimated Revenue (HN-HY-TB, Case-3: IWT fare = Bus fare with 50% raised)

Year	O-D	Passenger Demand				Section				Total Transport			Revenue (US$)	
		Yearly	Sensitivity	Hourly	One way	HN to HY	HY to TB	TB to HY	HY to HN	PAX	km	PAX-km	Fare	Revenue
2010	Hanoi - Hung Yen	210,000	0.0%	48	24	24			24	175,000	60	10,500,000	1.2	202,720
	Hanoi - Thai Binh	159,000	0.0%	36	18	18	18	18	18	106,000	101	10,706,000	2.0	209,127
	Hung Yen - Thai Binh	32,000	0.0%	7	4		4	4		29,333	41	1,202,667	0.8	23,892
	Total	401,000	0.0%	92	46	42	22	22	42	310,333		22,408,667		435,739
	Seats			50	Load Factor	84%	44%	44%	84%					
				60		70%	36%	36%	70%					
				70		60%	31%	31%	60%					
				80		53%	27%	27%	53%					
2020	Hanoi - Hung Yen	309,000	0.0%	71	35	35			35	257,500	60	15,450,000	1.2	298,288
	Hanoi - Thai Binh	224,000	0.0%	51	26	26	26	26	26	149,333	101	15,082,667	2.0	294,620
	Hung Yen - Thai Binh	64,000	0.0%	15	7		7	7		58,667	41	2,405,333	0.8	47,784
	Total	597,000	0.0%	136	68	61	33	33	61	465,500		32,938,000		640,692
	Seats			50	Load Factor	122%	66%	66%	122%					
				60		101%	55%	55%	101%					
				70		87%	47%	47%	87%					
				80		76%	41%	41%	76%					

Note) Fares are set at a level as same as that of bus (50% increa Fare (US$) = ((181 X (Road Distance) + 0) x 1.5) + 0)/15,000

Source) JICA Study Team

Table 27.6.8 Tentative Service Schedule of Passenger Boat (HN-VT-PT)

Vessel Name	Hanoi	Viet Tri		Phu Tho	(stay)	Vessel Name	Phu Tho	Viet Tri		Hanoi	(stay)
Vessel 1			7.6	9.0		Vessel 2			6.4	9.0	
Vessel 3			8.6	10.0		Vessel 4			7.4	10.0	
Vessel 5	6.5	9.1	9.6	11.0		Vessel 6	6.5	7.9	8.4	11.0	
Vessel 7	7.5	10.1	10.6	12.0		Vessel 8	7.5	8.9	9.4	12.0	
Vessel 9	8.5	11.1	11.6	13.0		Vessel 10	8.5	9.9	10.4	13.0	
Vessel 2	9.5	12.1	12.6	14.0		Vessel 1	9.5	10.9	11.4	14.0	
Vessel 4	10.5	13.1	13.6	15.0		Vessel 3	10.5	11.9	12.4	15.0	
Vessel 6	11.5	14.1	14.6	16.0		Vessel 5	11.5	12.9	13.4	16.0	
Vessel 8	12.5	15.1	15.6	17.0	Phu Tho	Vessel 7	12.5	13.9	14.4	17.0	Hanoi
Vessel 10	13.5	16.1	16.6	18.0	Phu Tho	Vessel 9	13.5	14.9	15.4	18.0	Hanoi
Vessel 1	14.5	17.1	17.6	19.0	Phu Tho	Vessel 2	14.5	15.9	16.4	19.0	Hanoi
Vessel 3	15.5	18.1			Viet Tri	Vessel 4	15.5	16.9			Viet Tri
Vessel 5	16.5	19.1			Viet Tri	Vessel 6	16.5	17.9			Viet Tri
No. of Service	11		11			No. of Service	11		11		

Note) Required number of boat = 10 + 1(for dock) = 11

Note) Cruising speed = 30 km/h, average speed = 29 km/h

Note) Transit Time (hr):

HN-VT	Waiting	VT-PT
2.6	0.5	1.4

Source) JICA Study Team

Table 27.6.9 Required Seats of Passenger Boat and Estimated Revenue (HN-VT-PT, Case-1: IWT fare = Bus fare)

Year	O-D	Passenger Demand				Section				Total Transport			Revenue (US$)	
		Yearly	Sensitivity	Hourly	One way	HN to VT	VT to PT	PT to VT	VT to HN	PAX	km	PAX-km	Fare	Revenue
2010	Hanoi - Viet Tri	135,000	0.0%	31	15	15			15	112,500	75	8,437,500	1.0	114,030
	Hanoi - Phu Tho	101,000	0.0%	23	12	12	12	12	12	67,333	115	7,743,333	1.5	99,936
	Viet Tri - Phu Tho	3,000	0.0%	1	0		0	0		2,750	40	110,000	0.5	1,294
	Total	239,000	0.0%	55	27	27	12	12	27	182,583		16,290,833		215,260
	Seats			30	Load Factor	90%	40%	40%	90%					
				40		67%	30%	30%	67%					
				50		54%	24%	24%	54%					
				60		45%	20%	20%	45%					
2020	Hanoi - Viet Tri	189,000	0.0%	43	22	22			22	157,500	75	11,812,500	1.0	159,642
	Hanoi - Phu Tho	141,000	0.0%	32	16	16	16	16	16	94,000	115	10,810,000	1.5	139,515
	Viet Tri - Phu Tho	5,000	0.0%	1	1		1	1		4,583	40	183,333	0.5	2,157
	Total	335,000	0.0%	76	38	38	17	17	38	256,083		22,805,833		301,314
	Seats			30	Load Factor	126%	56%	56%	126%					
				40		94%	42%	42%	94%					
				50		75%	33%	33%	75%					
				60		63%	28%	28%	63%					

Note) Fares are set at a level as same as that of bus. Fare (US$) = ((181 X (Road Distance) + 0) x 1.0) + 0)/15,000

Source) JICA Study Team

Table 27.6.10 Required Seats of Passenger Boat and Estimated Revenue (HN-VT-PT, Case-2: IWT fare = Bus fare + VND 10,000)

Year	O-D	Passenger Demand				Section				Total Transport			Revenue (US$)	
		Yearly	Sensitivity	Hourly	One way	HN to VT	VT to PT	PT to VT	VT to HN	PAX	km	PAX-km	Fare	Revenue
2010	Hanoi - Viet Tri	135,000	-48.6%	16	8	8			8	57,825	75	4,336,875	1.7	97,161
	Hanoi - Phu Tho	101,000	-48.6%	12	6	6	6	6	6	34,609	115	3,980,073	2.2	74,440
	Viet Tri - Phu Tho	3,000	-48.6%	0	0		0	0		1,414	40	56,540	1.1	1,608
	Total	239,000	-48.6%	28	14	14	6	6	14	93,848		8,373,488		173,209
	Seats			15	Load Factor	92%	41%	41%	92%					
				20		69%	31%	31%	69%					
				25		55%	24%	24%	55%					
				30		46%	20%	20%	46%					
2020	Hanoi - Viet Tri	189,000	-48.6%	22	11	11			11	80,955	75	6,071,625	1.7	136,026
	Hanoi - Phu Tho	141,000	-48.6%	17	8	8	8	8	8	48,316	115	5,556,340	2.2	103,921
	Viet Tri - Phu Tho	5,000	-48.6%	1	0		0	0		2,356	40	94,233	1.1	2,679
	Total	335,000	-48.6%	39	20	19	9	9	19	131,627		11,722,198		242,626
	Seats			15	Load Factor	129%	57%	57%	129%					
				20		97%	43%	43%	97%					
				25		77%	34%	34%	77%					
				30		65%	29%	29%	65%					

Note) Fares are set at VND10,000 higher level than that of bus. Fare (US$) = ((181 X (Road Distance) + 0) x 1.0) + 10,000)/15,000

Source) JICA Study Team

Table 27.6.11 Required Seats of Passenger Boat and Estimated Revenue (HN-VT-PT, Case-3: IWT fare = Bus fare with 50% raised)

Year	O-D	Passenger Demand				Section				Total Transport			Revenue (US$)	
		Yearly	Sensitivity	Hourly	One way	HN to VT	VT to PT	PT to VT	VT to HN	PAX	km	PAX-km	Fare	Revenue
2010	Hanoi - Viet Tri	135,000	0.0%	31	15	15			15	112,500	75	8,437,500	1.5	171,045
	Hanoi - Phu Tho	101,000	0.0%	23	12	12	12	12	12	67,333	115	7,743,333	2.2	149,904
	Viet Tri - Phu Tho	3,000	0.0%	1	0		0	0		2,750	40	110,000	0.7	1,941
	Total	239,000	0.0%	55	27	27	12	12	27	182,583		16,290,833		322,890
	Seats			30	Load Factor	90%	40%	40%	90%					
				40		67%	30%	30%	67%					
				50		54%	24%	24%	54%					
				60		45%	20%	20%	45%					
2020	Hanoi - Viet Tri	189,000	0.0%	43	22	22			22	157,500	75	11,812,500	1.5	239,463
	Hanoi - Phu Tho	141,000	0.0%	32	16	16	16	16	16	94,000	115	10,810,000	2.2	209,272
	Viet Tri - Phu Tho	5,000	0.0%	1	1		1	1		4,583	40	183,333	0.7	3,235
	Total	335,000	0.0%	76	38	38	17	17	38	256,083		22,805,833		451,971
	Seats			30	Load Factor	126%	56%	56%	126%					
				40		94%	42%	42%	94%					
				50		75%	33%	33%	75%					
				60		63%	28%	28%	63%					

Note) Fares are set at a level as same as that of bus (50% increa Fare (US$) = ((181 X (Road Distance) + 0) x 1.5) + 0)/15,000

Source) JICA Study Team

27.6.2 Passenger Terminal

Development direction of new main passenger terminal is proposed as follows:

- New passenger terminal shall serve for passenger boats and their passengers plying Hanoi - Hun Yen - Thai Binh and Hanoi - Viet Tri - Phu Tho as well as cruising boats and their passengers.
- Development area for new passenger terminal shall be allocated at northern part of Hanoi Port.

Master plan of new passenger terminal is shown in **Table 27.6.12** and **Figure 27.6.2**.

Table 27.6.12 Master Plan of New Passenger Terminal (2020)

Item	Description
Port Operator	Not yet decided (candidate: HNPC)
Location	Northern part of Hanoi Port
Designed Capacity	0.8 million PAX (+ 0.3 million PAX for tourism)
Length of Waterfront	100m
Length of Berth	100m (2 pontoon)
Total Area	0.7ha
Passenger Terminal Building	0.1ha (see **Table 27.6.13**)
Parking	0.3ha for bus, car and motorbike
Park & Open Space	0.3ha for passenger and others
Access to the Berth	Bus

Source) JICA Study Team

Table 27.6.13 Conceptual Dimensions of Passenger Terminal Building

Facility	Parameter			Liner Service		Tour Cruise			Total
				HN-HY-TB	HN-VT-PT	(1)	(2)	(3)	
Waiting space	a	sq.m/PAX	Required space per person	1.5	1.5	1.2	1.2	1.2	
	S	seat	Seats of boat	70	50	150	40	40	
	u		Waiting space use ratio	1	1	0.7	0.7	0.7	
	d		Simultanious departing ratio	1	1	0.5	0.5	0.5	
	c		Concentrating ratio within a day	1	1	1	1	1	
	f		Fluctuating ratio within a year	1	1	1	1	1	
	A	sq.m	=aSudcf	105	75	63	17	17	277
Ticketing counter		sq.m							20
Tour & information desk		sq.m							10
Office		sq.m							200
Shop		sq.m							50
Restaurant		sq.m							100
Other utilities		sq.m							50
Ground total		sq.m							700

Source) JICA Study Team

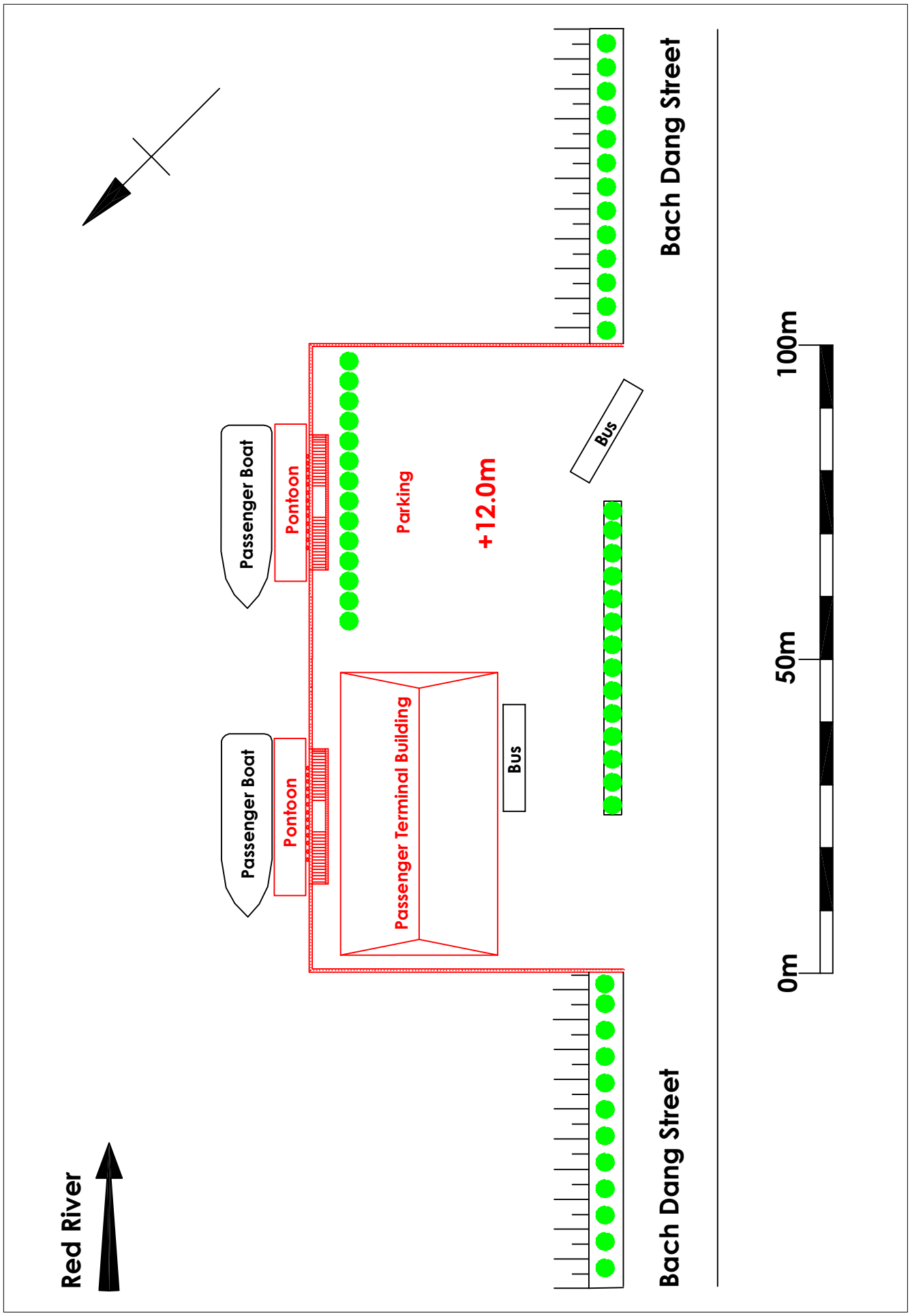


Figure 27.6.2 Layout Image of New Passenger Terminal (2020)

In addition to the main passenger terminal, the following satellite passenger berths provided with small pontoons at major tourist spots in the Hanoi segment are proposed for tourist purpose (see **Table 27.6.14**).

- Chem (Red km+6 Right bank)
- Bo De (Red km+20 Left bank)
- Bat Trang (Red km+30 Left bank)
- Phu Dong (Duong km+16 Left bank)

Table 27.6.14 Major Tourist Attractions in and around Hanoi Segment

Alternative	River Km+ Bank	Description
Chem Communal House (100m from bank)	Red +6 R	Chem Communal House dedicated to worshipping Ly Than, a commander of An Duong Vuong living in the 2nd century B.C., with wooden sculptures and status dating back to 18th century. Festival held in middle of summer participated by several villages along the Red river with many traditional ritual activities.
Bo De pagoda (50m from bank)	Red +20 L	Built at the end of Tran Dynasty (15th century). Beautiful view and unique architecture.
Bat Trang ceramic village (next to bank)	Red +30 L	Traditional ceramic producing village (dating back from earlier than 15th century), with household objects, votive objects and ornaments on sale.
Dai Lo Temple and Dam Temple (500m from bank)	Red +43 R	Dai Lo Temple and Dam Temple, renown all over the Southern area of Hanoi, dedicated to the cult of "Four beautiful Ladies" (members of the Song Royal family in 13th century), Lieu Hanh and other Holy Mothers. Festival held in February of lunar year with "lên dông" (mediumistic communication with deities) being its unique particularities attracting many people.
Tu Nhien Alluvial Ground (river bank)	Red +50 R	Immense sand ground in Tu Nhien village. Merry festival re-enacting the story of Saint Chu Dong Tu (living in the dynasty of Kinh Hung Vuong XVIII) held in April of lunar year.
Da Hoa Temple (next to bank)	Red +50 R	Temple worshipping love, dedicated to Chu Dong Tu and his 2 wives (Tien Dung and Tay Sa), fine architectural structure restored late 19th century with beautiful scenery. Festival held in January of lunar year with procession in the river and dragon dance.

Kien So pagoda in Phu Dong village (1km from bank)	Duong +16 L	Kien So pagoda, an antique religious building, established in 9th century when Buddhism was propagated to Vietnam. Here kept the statues of Vo Ngon Thong (who founded Vietnamese Zen) and King Ly Thai To (founder of Thang Long capital).
Giong Temple and Mau Temple in Phu Dong village (1km from bank)	Duong +16 L	Giong Temple built in 1010 by Kinh Ly Thai To, spacious and beautiful view with many statues and objects of feudal dynasties. Mau Temple built in 1693 dedicated to the mother of Saint Giong. Festival held in April of lunar year, re-enacting Giong's victory over the An enemy.
But Thap Pagoda	Duong +28 R	Beauty spot with panoramic view, ancient architectures, statues (Kwan-Yin: 3.7 m high, 11 heads, thousand hands and eyes – made in 17th century) and ornaments.

Source) Historical & cultural sites around Hanoi, The Gioi Publishers, 2000

27.7 Chem Berths

Although owner/operator of Chem Berths is not MOT/company under MOT but the Construction Material Trading and Exploitation Company under Red River Construction Corporation under MOC as well as private companies, the Study Team proposes preliminary desirable features of Chem Berths taking into account their importance in terms mainly of bulk cargo handling for Tu Liem District (see **Table 27.7.1**). Since the area of Chem Berths is limited to some 4ha, the area use ratio of cargo which is linked to required numbers of handling equipment will also be limited, namely a large part of cargoes will have to be delivered directly to the hinterland without storage.

Table 27.7.1 Preliminary Desirable Features of Chem Berths (2020)

Item	Description
Port Owner/Investor	Construction Material Trading and Exploitation Company under Red River Construction Corporation under MOC as well as private companies
Port Operator	ditto
Facing IW Corridor	Corridor 1 (Quang Ninh - Hai Phong - Hanoi - Viet Tri)
Hinterland	Tu Liem District
Design Capacity	2.5 million tons (Bulk: 2.1, Non-bulk: 0.4)
Length of Waterfront	0.8km
Berth Property	0.8km
Land Area	about 4ha (Storage yard: 2 - 3ha)
Handling Equipment	Quay-side mobile crane: 15 units (8tons) Grab bucket: 12 units (3cu.m), Forklift: 4 units (3tons) Shovel loader: 4 units (2cu.m), Bulldozer: 2 units (5tons) Dump Truck: 11 units (10tons), Truck 4 units (7tons)
Access Road	Linked to Dyke road

Source) JICA Study Team

Suppose that the improvement of Chem Berths is conducted with almost the same way as New North Port, the direct cost is preliminarily estimated to some US$ 21 million (cargo berth: US$ 13 million, cargo terminal: US$ 1 million, cargo handling equipment: US$ 7 million). Even if the investment scale for the improvement of Chem Berths is limited in reality, the safety in vessel navigation and mooring as well as cargo handling, crane operation in particular, shall be made sure.

The improvement of Chem Berths is desirable to be conducted before 2010. In addition, since plural port operators exist in Chem Berths, regular meeting within port operators is proposed in order to realize safe operation and to avoid any negative environmental impact.