

2.3.2. Supplementary Traffic Survey in Cat Hai Island

Since the traffic count in Cat Hai Island is not carried out in the F/S investigation, it is carried out by the Study Team and the transport demand forecasting is revised. The traffic count carried out in Cat Hai Island is as follows:

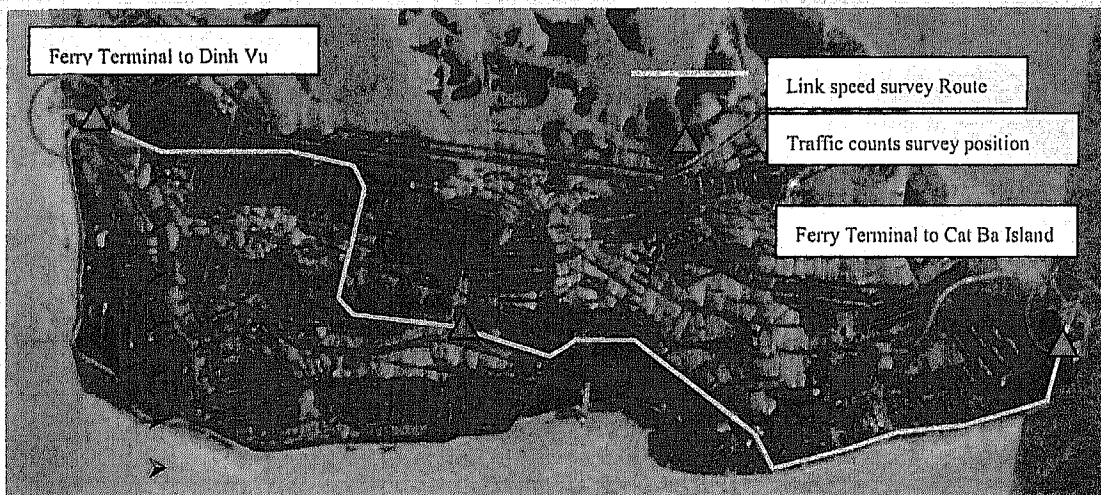
- Traffic count: three places in Cat Hai Island.
- Time-required investigation: Running time investigation between the ferry terminals at both ends of Cat Hai Island
- Ferry traffic: Investigate the ferry traffic for the past ten years from records of the operation company.

The traffic, which will mostly come from accommodation or living spaces and deduced from the distribution of population with the generated traffic in the F/S investigation, will range from 54% to 78% in 2020. The present traffic condition is investigated in the Study. Moreover, the F/S forecast traffic is verified based on the passage traffic from Hai Phong City to Cat Ba Island, and the intra district transport system of Cat Hai Island. In the time-required investigation in Cat Hai Island, the present condition of time required from Cat Hai Island to Dinh Vu area is checked together with the operation time of ferry service. Then, it is considered in the calculation of benefit by comparing it with the time required after the road is open to the public.

(1) Traffic Count Survey Location

The traffic count was carried out in the following three places shown in Figure 2.3-1.

- Ferry terminal to Dinh Vu
- Halfway point between the two ferry terminals
- Ferry terminal to Cai Ba Island



Source: Study Team

Figure 2.3-1 Location Map of Traffic Counts

(2) **Survey Method**

1) **Manual Classified Counts**

Vehicle classification in the F/S involves five types, namely: 2/3-Wheel, Car, Light Truck, Heavy Truck, and Bus. In this Study, the classification stipulated in the Vietnam standard (Section 3.3.2, TCVN4054-2005) was used.

Traffic count method is manual counting with traffic counter. Investigation time is 12 hours from 6:00 a.m. to 6:00 p.m. Investigation days were Tuesday, Wednesday, and Thursday.

Table 2.3-8 Investigation type of car

Number	Type-of-car	Passenger Car Unit Conversion Factors
1	Bicycle	0.2
2	Motorcycle	0.3
3	Car	1.0
4	Trucks with 2 axles and mini bus with less than 25 seats	2.0
5	Truck with more than 3 axles and large bus	2.5
6	Trailer and bus with trailer	4.0

Source: TCVN4054-2005 (Section 3.3.2)

2) **Link Speed Surveys**

The average vehicle travel speed between the two ferry terminals was surveyed using two methods, namely: 1) traveling by motorcycle along the route, and 2) static travel speed observations. Results of this survey were referred in the planning of next analysis (travel speed, reduction rate of traffic accident).

Survey based on motorcycle traveling is deemed the most effective because motorcycle is the predominant vehicle type in traffic. Therefore, this survey method would provide the most representative traveling speed.

3) **Ferry Traffic Track Record Survey**

Sightseeing ferries from Hai Phong City to Cat Ba Island pass through Cat Hai Island. This tourism traffic will be converted to land transport if Tan Vu - Lach Huyen Highway is opened. It is important to investigate the present ferry traffic for the traffic demand of the highway.

Operation record of the ferry company between 2002 and 2009 was collected with their transport records.

(3) **Result of Traffic Volume**

The traffic count survey was carried out on April 27, 2010. The following results were obtained.

1) **Manual Classified Counts**

Results of traffic manual classified counts are as follows:

Table 2.3-9 Results of Manual Classified Counts

Summary of Counted Vehicles Number

Unit: Vehicle

Time	Ninh Tiép			Cat Hai			Ben Got		
	To Cat Ba Direction	To Dinh Vu Direction	Total	To Cat Ba Direction	To Dinh Vu Direction	Total	To Cat Ba Direction	To Dinh Vu Direction	Total
6:00-7:00	12	89	101	66	76	142	47	72	119
7:00-8:00	85	53	138	84	44	128	62	21	83
8:00-9:00	31	21	52	42	40	82	36	35	71
9:00-10:00	53	16	69	72	34	106	45	31	76
10:00-11:00	31	11	42	47	21	68	19	18	37
11:00-12:00	23	21	44	32	19	51	24	39	63
12:00-13:00	0	15	15	28	34	62	9	0	9
13:00-14:00	46	28	74	56	79	135	26	53	79
14:00-15:00	28	35	63	45	35	80	18	19	37
15:00-16:00	27	28	55	69	47	116	53	24	77
16:00-17:00	23	40	63	67	61	128	32	38	70
17:00-18:00	86	0	86	76	54	130	24	30	54
12hr Total	445	357	802	684	544	1228	395	380	775

Summary of PCU Number

Unit: pcu

Time	Ninh Tiép			Cat Hai			Ben Got		
	To Cat Ba Direction	To Dinh Vu Direction	Total	To Cat Ba Direction	To Dinh Vu Direction	Total	To Cat Ba Direction	To Dinh Vu Direction	Total
6:00-7:00	3	24	27	22	31	53	12	31	43
7:00-8:00	55	33	88	53	10	63	39	7	46
8:00-9:00	20	6	26	29	12	41	17	10	27
9:00-10:00	18	5	23	30	11	41	15	9	24
10:00-11:00	25	5	30	27	10	37	8	7	15
11:00-12:00	11	21	32	11	12	23	20	30	50
12:00-13:00	0	9	9	7	11	18	3	0	3
13:00-14:00	23	18	41	25	26	51	13	26	39
14:00-15:00	27	17	44	19	12	31	5	7	12
15:00-16:00	14	21	35	30	27	57	34	20	54
16:00-17:00	15	29	44	21	25	46	8	18	26
17:00-18:00	23	0	23	31	14	45	17	8	25
12hr Total	234	188	422	305	201	506	191	173	364
D value	55.5%	44.5%		60.3%	39.7%		52.5%	47.5%	

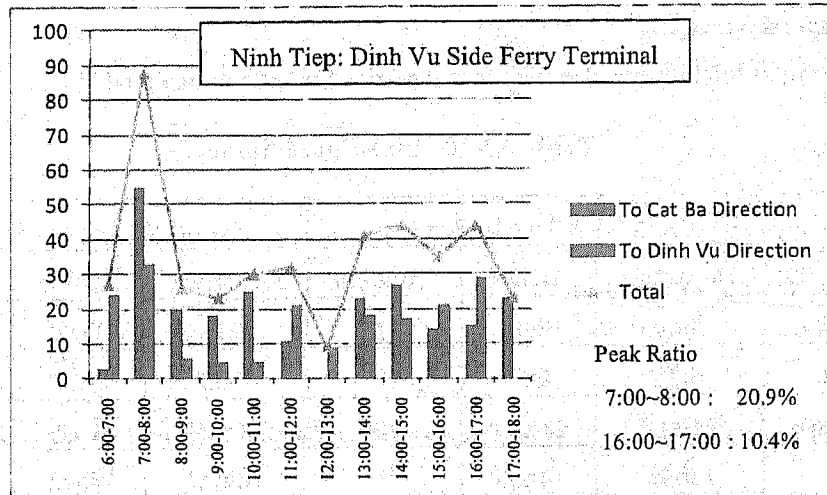
Source: Study Team

In summary, the following are observed:

- The peak hours at the Dinh Vu side were 7:00- 8:00 and 16:00-17:00.
- The peak hours at the Cat Ba side were 7:00-8:00 and 15:00-16:00.

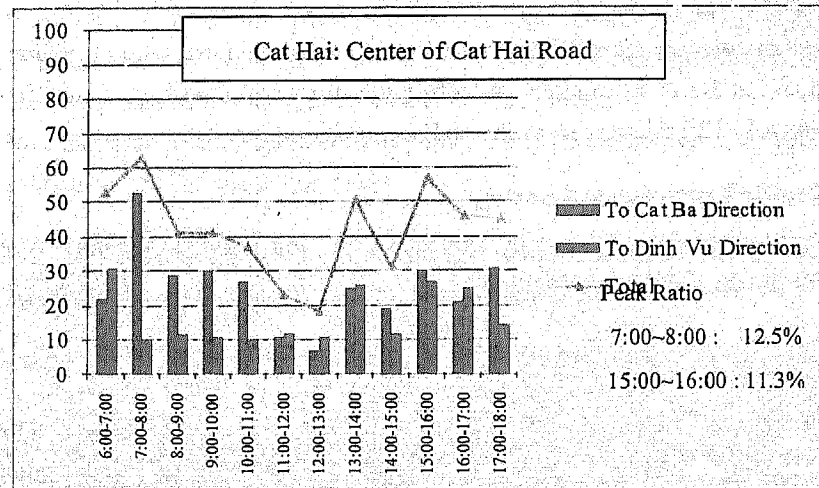
As for the proportion of peak-hour traffic in the peak direction of the three points, the direction to Cat Ba Island shares 55%. Refer to Appendix-2 "Traffic Data" for the details of the survey.

It was confirmed that 30% of travelers to Cat Ba Island pass through Cat Hai Island from the result of this traffic count survey.



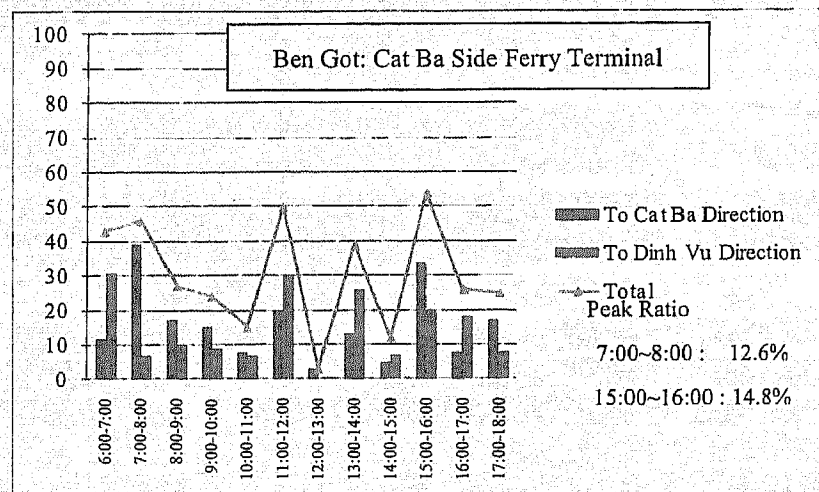
Source: Study Team

Figure 2.3-2 Result of Traffic Counts at Dinh Vu Side Ferry Terminal



Source: Study Team

Figure 2.3-3 Result of Traffic Counts at Center of Cat Hai Road



Source: Study Team

Figure 2.3-4 Result of Traffic Counts at Cat Ba Side Ferry Terminal

2) **Link Speed Survey**

The result of the link speed survey is summarized in the following table.

Table 2.3-10 Link Speed Survey

Time	From Ninh Tiep to Ben Got			From Ben Got to Ninh Tiep		
	Departure	Arrival	Duration	Departure	Arrival	Duration
AM 7:00	7h40'	8h01'	21'	7h11'	7h32'	21'
AM 9:00	8h35'	8h54'	19'	8h05'	8h27'	22'
AM 11:00	11h05'	11h25'	20'	11h40'	11h59'	19'
PM 1:00	13h45'	14h06'	21'	14h20'	14h42'	22'
PM 3:00	15h10'	15h30'	20'	16h15'	16h33'	18'
PM 5:00	17h05'	17h26'	21'	17h35'	17h55'	20'

Source: Study Team

The ferry travel time from Dinh Vu to Cat Hai is 75 minutes while the ferry travel time from Cat Hai to Cat Ba is 30 minutes. Accordingly, the travel time from Dinh Vu to Cat Ba will be approximately 125 minutes from the above-mentioned result.

3) **Ferry Traffic Track Record Survey**

The survey results are shown in Tables 3.2-11 and 3.2-13. (Refer to Appendix-2 "Traffic Data" for the details of investigation.)

Table 2.3-11 Transition of Monthly Average Traffic (Dinh Vu - Cat Hai)

Unit: pcu/month

Type of vehicles	2002	2003	2004	2005	2006	2007	2008	2009
Bicycle	705	577	504	370	303	246	246	220
Motorcycle	3,893	2,921	2,907	2,926	2,526	2,313	2,489	2,586
Car 4-6 seats	510	453	558	643	559	604	564	573
Bus	2,520	1,669	2,114	2,578	2,874	3,246	3,076	2,897
Truck	1,222	1,286	1,350	1,366	1,532	1,472	1,696	1,742
Total	8,850	6,905	7,434	7,884	7,794	7,882	8,071	8,018

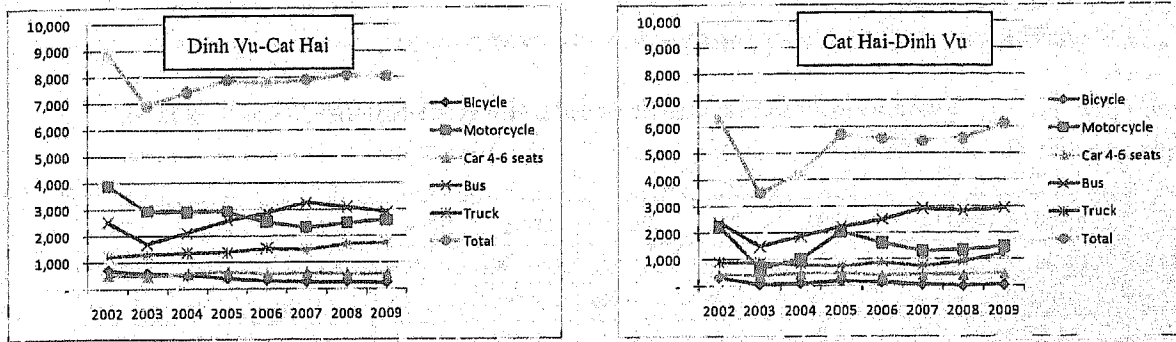
Source: Study Team

Table 2.3-12 Transition of Monthly Average Traffic (Cat Hai - Cat Ba)

Unit: pcu/month

Type of vehicles	2002	2003	2004	2005	2006	2007	2008	2009
Bicycle	334	63	102	196	145	49	14	46
Motorcycle	2,242	664	1,012	2,046	1,625	1,307	1,358	1,485
Car 4-6 seats	455	401	467	478	394	429	426	471
Bus	2,386	1,486	1,870	2,223	2,501	2,930	2,841	2,932
Truck	894	886	809	767	893	763	933	1,213
Total	6,309	3,500	4,261	5,709	5,556	5,479	5,572	6,147

Source: Study Team

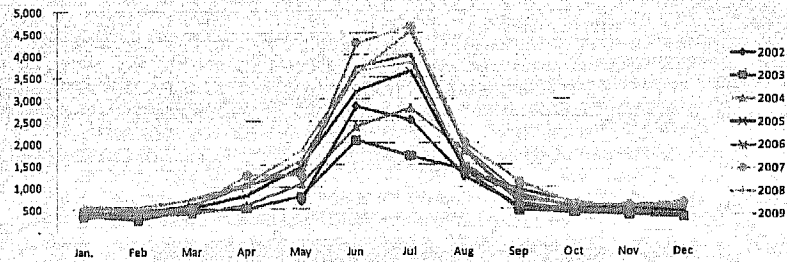


Source: Study Team

Figure 2.3-5 Transition of Monthly Average Traffic of Each Type of Vehicles

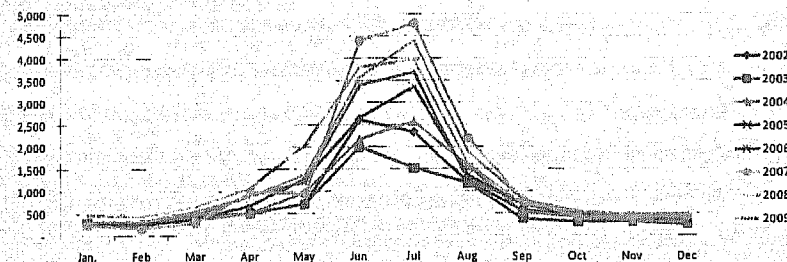
In summary, the following are observed:

- After 2003, traffic volume gradually increases.
- Taking the on site observation into consideration, the traffic capacity has reached its full limit. Thus, there is no further increase of traffic volume if the capacity is not increased.
- Traffic along the Dinh Vu – Cat Hai route is approximately 8,000 pcu/month. Along Cat Hai – Cat Ba route, it is approximately 6,000pcu/month.
- Bus traffic increases up to 5 to 10 times during summer season. This indicates that the tourists to Cat Ba Island use buses.
- Bus traffic along Dinh Vu – Cat Hai and along Cat Hai – Cat Ba are almost the same. Accordingly, all tourists by bus are bound for Cat Ba Island.



Source: Study Team

Figure 2.3-6 Annual Change of Bus Traffic (Dinh Vu-Cat Hai)



Source: Study Team

Figure 2.3-7 Annual Change of Bus Traffic (Cat Hai – Cat Ba)

4) **Ferry Traffic in July of Each Year**

The ferry traffic in July of each year is as follows.

Table 2.3-13 Ferry Traffic in July of Each Year (Dinh Vu - Cat Hai)

Unit: pcu/month

Type of vehicle	2002	2003	2004	2005	2006	2007	2008	2009	Average
Bicycle	842	420	472	370	329	363	259	168	403
Motorcycle	4,968	2,957	3,449	3,299	2,824	2,679	3,306	3,164	3,331
Car 4-6 seats	1,020	821	1,178	1,474	1,222	1,352	1,480	1,324	1,234
Bus	5,581	3,732	6,049	7,933	8,776	10,167	9,836	8,226	7,538
Truck	1,110	1,178	1,432	1,254	1,776	1,756	2,031	2,280	1,602
Total (month)	13,521	9,108	12,580	14,330	14,927	16,317	16,912	15,162	14,107
PCU/peak hour	1,352	911	1,258	1,433	1,493	1,632	1,691	1,516	1,411
Dinh Vu to Cat Hai PCU/peak hour	744	501	692	788	821	898	930	834	776
Cat Hai to Dinh Vu PCU/peak hour	608	410	566	645	672	734	761	682	635

Source: Study Team

Table 2.3-14 Ferry Traffic in July of Each Year (Cat Hai - Cat Ba)

Unit: pcu/month

Type of vehicle	2002	2003	2004	2005	2006	2007	2008	2009	Average
Bicycle	507	7	215	150	170	73	9	12	143
Motorcycle	3,126	384	2,301	2,676	1,729	1,673	1,806	1,871	1,946
Car 4-6 seats	918	799	1,116	1,234	996	1,190	1,326	1,255	1,104
Bus	5,151	3,315	5,604	7,331	8,056	10,492	9,532	8,560	7,255
Truck	634	615	879	730	1,045	1,146	1,138	1,569	970
Total (month)	10,336	5,120	10,115	12,121	11,996	14,574	13,811	13,267	11,418
PCU/peak hour	1,034	512	1,012	1,212	1,200	1,457	1,381	1,327	1,142
Dinh Vu to Cat Hai PCU/peak hour	569	282	557	667	660	801	760	730	628
Cat Hai to Dinh Vu PCU/peak hour	465	230	455	545	540	656	621	597	514

Source: Study Team

2.3.3. Current Implementation Plan of Dinh Vu IZ and Nam Dinh Vu IZ

(1) Current Development Situation of Dinh Vu IZ

Dinh Vu Industrial Zone is being developed by the Dinh Vu Industrial Zone Joint Stock Company. Dinh Vu Industrial Zone is included in the Development Master Plan of Dinh Vu – Cat Hai Economic Zone according to Socio-Economic Development Orientation Plan of Hai Phong City by 2020 and Announcement No. 304-TB/TU dated December 29, 2004 on the conclusion of Hai Phong City.

In the master plan of port development, general cargo, container, dry bulk and combined terminals are foreseen along a 3,000 m straight quay designed to accommodate up to 20,000 dead weight ton (DWT) vessels.

The first phase of Dinh Vu Port has been operational since May 2005 with two new berths for dry, bulk cargo and containers to accommodate vessels up to 20,000 DWT in the Dinh Vu IZ.

Phase 2 of the Port commenced construction in May 2006 for the four new general cargo and container berths. The four new berths shall be developed on an area of 47.5 ha. The new berths, operational in 2008, shall have total berthing length of 785 m.

Other terminals are in the feasibility study stage. In addition, 10 container and general cargo berths are being studied. The whole port development is expected to be fully completed in 2012.

Table 2.3-15 Land Balance at Dinh Vu IZ

No.	Type of Land	Area (ha)	Rate (%)
1	General Industrial Park	655.0	44.77
2	Port Area	130.0	8.89
3	Residential Zone	65.0	4.44
4	Utilities and Green Area	613.0	41.90
Total		1,463.0	100.0

Source: Master Plan of Dinh Vu IZ

(2) Future Development Plan

The development plan of Nam Dinh Vu Industrial Zone shows an industrial complex of 2,000 ha located at the river mouth of the Nam Trieu River, which is southern land of the Dinh Vu IZ.

Hai Phong People Committee issued two decisions in connection with Nam Dinh Vu IZ in 2009. Nam Dinh Vu IZ was divided into two areas by this decision. The details are described below.

1) Nam Dinh Vu IZ (Zone 1)

The details of this area were defined by Decision No. 795/QD-UBND dated May 5, 2009. According to this decision, this area is further divided into IZ area and non-tax zone. The investor of the assigned Zone 1 is Nam Dinh Vu Investment JSC (see Figure 2.3-8).

Non-tax Zone (448 ha)

Table 2.3-16 Land Allocation Plan of Non-tax Zone

No.	Type of Land	Area (ha)	Rate (%)
1	Producing Land	118.0	26.34
2	Warehouse	98.5	21.99
3	Service Trade	70.0	15.62
4	Land for Trees and Sports	73.5	16.40
5	Hub Technical Land	2.5	0.56
6	Land for Traffic and Parking	80.5	17.97
7	Military Land	5.0	1.12
Total		448.0	100.0

Source: Master Plan of Dinh Vu IZ

Industrial Zone (906ha)

Table 2.3-17 Land Allocation Plan of Industrial Zone

No.	Type of Land	Area (ha)	Rate (%)
1	Producing Land	307.0	33.88
2	Warehouse + Container	187.5	20.70
3	Port Zone	143.6	15.85
4	Operating Center + Port Service	56.0	6.18
5	Land for Trees and Sport	91.0	10.04
6	Hub Technical Land	7.0	0.77
7	Land for Traffic and Parking	113.9	12.58
Total		906.0	100.0

Source: Master plan of Dinh Vu IZ

2) Nam Dinh Vu IZ (Zone 2)

The details of this area were defined by Decision No. 644/QĐ-UBND dated April 16, 2009. The investor of the assigned Zone 2 is Hapaco Investment JSC (see Figure 2.3-8).

Table 2.3-18 Land Allocation Plan of Zone 2

No.	Type of Land	Area (ha)	Rate (%)
1	Producing Land	190.0	28.88
	Land for heavy industry zone	144.5	
	Land for light industry zone	75.5	
2	Warehouse	201.0	30.55
3	Operating Center + Port Service	29.0	4.41
4	Land for Trees and Sport	67.0	10.18
5	Isolated Tree Land	45.0	6.84
6	Hub Technical Land	8.0	1.22
7	Land for Traffic and Parking	118.0	17.92
Total		658.0	100.0

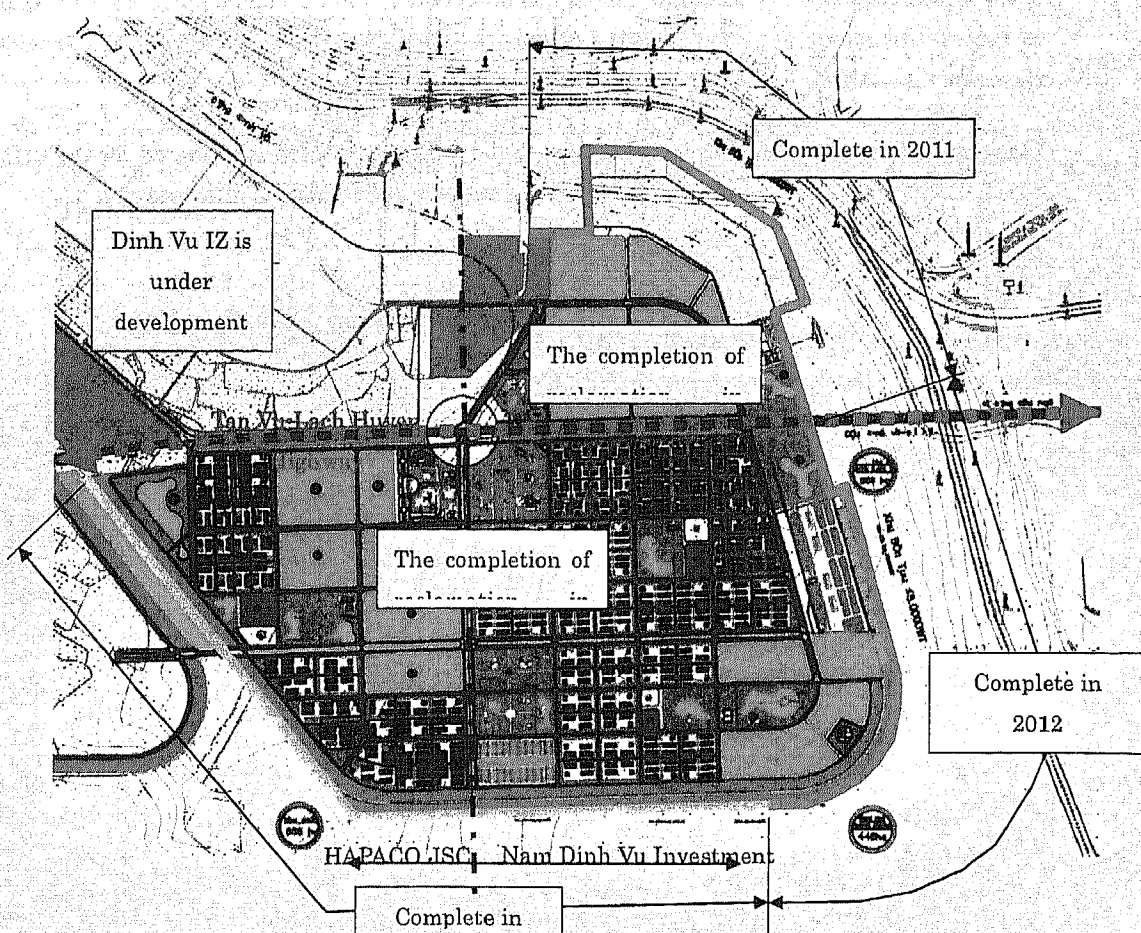
Source: Decision No.644/QĐ-BND dated 16 April 2009

3) Construction Schedule of Nam Dinh Vu IZ and Dinh Vu IZ

The development process of Nam Dinh Vu IZ was confirmed with the Planning Institute of Hai Phong City on May 7, 2010. The confirmed contents are as follows:

Table 2.3-19 Confirmation of Nam Dinh Vu IZ and Dinh Vu IZ

Question	Answer by Planning Institute of Hai Phong City
Existence of additional change about Decision No. 795 and No. 644.	No change
Development schedule of Nam Dinh Vu IZ	Shore protection works will be completed by 2011-2013. Then, reclamation will be completed in 2025.
Completion period of Dinh Vu IZ under present construction	It will be completed in 2025.
Amount of freight handling at Dinh Vu Port	The present amount of handling is 2,500,000 tons.
Number of workers at present Dinh Vu IZ	About 30,000 persons.



Source: Prepared by Study Team based on material provided by Hai Phong City

Figure 2.3-8 Development Program of Nam Dinh Vu IZ

2.3.4. Current Implementation Plan of Lach Huyen International Gateway Port

(1) Development Plan of Port

Lach Huyen Port consists of infrastructure improvement by ODA of Japan, and the harbor equipment, maintenance and operation by a PPP (Public Private Partnership) enterprise. About this project, the preparatory survey of JICA is being carried out and the draft final report was submitted in May 2010.

It is reported in the draft final report that the marine freight demand of northern Vietnam areas is extended 3.2 times by the data of 2004-2008, and it is forecast by 2020 that the amount of freight handling exceeds the total capacity of the Hai Phong Port and the Cai Lan Port. In order to handle these cargoes in the Lach Huyen Port in 2020, the five (5) container berths (L=375m x 5, D=14m CDL) for 50,000 DWT fully loaded vessel and 100,000 DWT partial loaded vessels and three (3) multi-purpose berths (L=250m x 3, D=13m CDL) for 50,000 DWT fully loaded vessels need to be constructed.

In the frame work of Medium Term Development Plan of the Lach Huyen Port for target year of 2020, the first two (2) container berths has been decided to be implemented by VINALINES as Project Owner by the Prime Minister Decision dated April 11, 2007 and MOT Decision on December 22, 2008.

Therefore, this initial development plan for the target year of 2015 is prepared for the first two (2) container berths development and other related port infrastructure development.

(2) Revised Cargo Volume

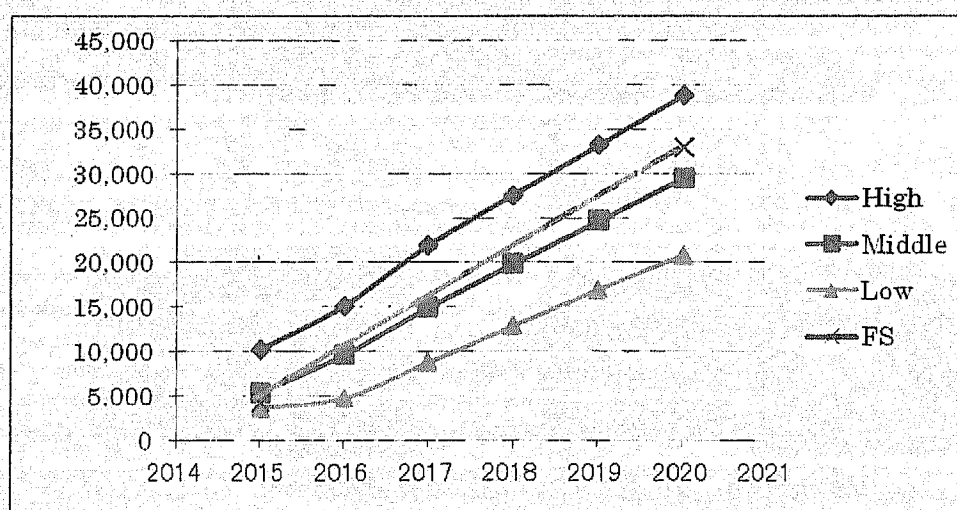
Yearly cargo volume of Lach Huyen Port is as follows:

Table 2.3-20 Forecast Cargo Volume of Lach Huyen Port

Cargo Type	Unit	2015	2016	2017	2018	2019	2020
High Growth Case							
Container	1,000 ton	10,182	15,077	20,000	24,951	29,930	34,937
	1,000 TEU	878	1,300	1,724	2,151	2,580	3,012
GC+Bulk	1,000 ton	-	-	1,947	2,610	3,246	3,853
Total	1,000 ton	10,182	15,077	21,947	27,561	33,176	38,790
Middle Growth Case							
Container	1,000 ton	5,394	9,607	13,843	18,102	22,385	26,691
	1,000 TEU	463	826	1,191	1,559	1,928	2,299
GC+Bulk	1,000 ton	-	-	1,119	1,714	2,286	2,834
Total	1,000 ton	5,394	9,607	14,962	19,817	24,671	29,525
Low Growth Case							
Container	1,000 ton	3,678	4,741	7,660	11,228	14,815	18,421
	1,000 TEU	317	409	658	966	1,275	1,586
GC+Bulk	1,000 ton	-	-	1,102	1,610	2,098	2,379
Total	1,000 ton	3,678	4,741	8,762	12,838	16,914	20,800

Source: Port Study Team

Compared with the forecast cargo volume in the F/S investigation, the port demand forecasting for the Lach Huyen Port is mostly equivalent to the middle growth case.



Source: Study Team

Figure 2.3-9 Forecast Cargo Volume of Lach Huyen Port

Cargo volume of the Lach Huyen Port used for transport demand forecasting is carried out as follows:

Table 2.3-21 Middle Growth Case

		2015	2016	2017	2018	2019	2020	2030
Container	1,000ton	5,394	9,607	13,843	18,102	22,385	26,691	
	1,000TEU	463	826	1,191	1,559	1,928	2,299	
GC+Bulk	1,000ton	-	-	1,119	1,714	2,286	2,834	
Total	1,000ton	5,394	9,607	14,962	19,817	24,671	29,525	120,000

Source: Port Study Team

Since the cargo volume in 2030 was not forecasted in the preparation investigation of the Lach Huyen Port, the predicted value of MOT was adopted.

2.3.5. Update of Traffic Demand Forecast

(1) Modified Part of Transport Demand Forecasting

Transport demand forecasting updated and carried out the following items:

Table 2.3-22 Updated Item and Contents

ITEM	F/S Study	Preparatory Study
Traffic forecasted method	➤ Use generation rate	<ul style="list-style-type: none"> ➤ Use generation rate ➤ Prediction using a GDP growth rate was carried out based on the traffic census from the above-mentioned verification.
Analysis fiscal year	➤ 2015-2032	<ul style="list-style-type: none"> ➤ 2015-2020(First target) ➤ 2020-2030(Second target)
Assumptions		
Conversion ratio of generating traffic	➤ Dinh Vu IZ:100%	<ul style="list-style-type: none"> ➤ Dinh Vu IZ:50% ➤ Nam Dinh Vu IZ:80%
Development process	<ul style="list-style-type: none"> ➤ Dinh Vu IZ: 2015(50% of 2020) 2020(100%) 2030(add 20%) 	<ul style="list-style-type: none"> ➤ Dinh Vu IZ: same as F/S ➤ Nam Dinh Vu IZ: 2015(0%) 2020(0%) 2030(50%)
Population	<ul style="list-style-type: none"> ➤ Cat Hai : 2015(31,000) 2020(33,000) 2030(38,500) ➤ Cat Ba : 2015(12,000) 2020(14,500) 2030(16,500) <p>Based on Statistical Yearbook 2006</p>	<ul style="list-style-type: none"> ➤ Cat Hai : 2015(19,000) 2020(19,300) 2030(20,100) ➤ Cat Ba : 2015(12,000) 2020(13,000) 2030(14,600) <p>Based on Statistical Yearbook 2008</p>
Lach Huyen Port	Based on MOT Decision No.501	Based on result of Lach Huyen Port Preparatory Study

Source: Study Team

In comparison with the above, it is observed that:

- **Conversion ratio was too high in the F/S:** How many people from the industrial zone are willing to use the project road? In the F/S, it was 100%. It is not realistic; people working in the northern area of Dinh Vu IZ will use TL356 and move to Hai Phong City. In this Study, the conversion rate was revised to 50% for Dinh Vu IZ and 80% for Nam Dinh Vu IZ.
- **Population in Cat Hai Island was counted twice:** In this Study, all socio-economic data were updated based on Statistical Yearbook 2008. It seems that the population of Cat Hai Island in the F/S was doubled.

(2) **Traffic Generated in Each Section**

The updated results of transport demand forecasting for Dinh Vu IZ, Cat Hai Island and Cat Ba Island are as follows:

Table 2.3-23 Result of Traffic Demand Forecast for Dinh Vu IZ, Cat Hai and Cat Ba Islands

Position	Year	AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
		(outbound)	(inbound)	(outbound)	(inbound)
Dinh Vu	2015	349	394	200	198
	2020	654	706	353	379
	2030	2,138	2,618	1,141	1,770
Cat Hai	2015	792	307	307	792
	2020	1,309	686	686	1,309
	2030	1,846	1,300	1,300	1,846
Cat Ba	2015	135	43	43	135
	2020	185	59	59	185
	2030	156	50	50	156

Source: Study Team

Refer to Appendix-2 "Traffic Data" for the details of each section.

(3) **Summary of Updated Traffic Demand Forecast**

The road section was divided into Tan Vu IC – Dinh Vu IZ and Dinh Vu – Cat Hai Island. Transport demand was summed up as follows: