

**THE MASTER PLAN AND FEASIBILITY STUDY
ON
THE HOA LAC HIGH-TECH PARK PROJECT
IN
THE SOCIALIST REPUBLIC OF VIETNAM**

(FINAL REPORT)

APPENDICES

(VOLUME II)

MASTER PLAN ON THE HOA LAC HIGH-TECH PARK PROJECT

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APPENDIX I ANALYSIS OF INVESTMENT DEMAND

I.1 Investment Demand Survey in Eleven Foreign Countries

I.1.1 Outline of Investment Demand Survey

(1) Selection of Samples

This survey was aimed at assessing the investment demand of foreign investors in eleven foreign countries for the planned Hoa Lac High-Tech Park (HHTP) as well as their requirements. The survey on the investment demand was carried out not only in Japan but also in ASEAN countries (Thailand, Malaysia, Singapore), NIES (South Korea, Hong Kong, Taiwan) and other developed nations (U.S.A., France, Germany, U.K.), by means of questionnaire survey sublet to a Japanese consultant. The surveyed enterprises with the possibility of high-tech industry development have been provided with adequate information on the overall investment environment in Vietnam and Hanoi/Ha Tay area as well as the characteristics of the planned HHTP in the Ha Tay area.

The questionnaire survey has been conducted during the period from the end of January 1997 through the end of March 1997.

More than 500 enterprises in each developed nation and NIES countries and more than 300 enterprises in each of the ASEAN countries mentioned above, i.e. about 7,500 enterprises in total, were selected from the following inventories:

- Census of Manufactures Directory --- Japan
- Kompass U.K. Directory --- U.K.
- Kompass France Directory --- France
- Kompass Germany Directory --- Germany
- Kompass U.S.A. Directory --- U.S.A.
- Kompass South Korea Directory --- South Korea
- Hong Kong Industries Directory --- Hong Kong
- Kompass Taiwan Directory --- Taiwan
- Kompass Singapore Directory --- Singapore
- Kompass Thailand Directory --- Thailand
- Kompass Malaysia Directory --- Malaysia

In the investment demand survey in eleven foreign countries, questions including the following items were asked in the mail questionnaire.

Investment demand

- (a) Interest in investment in Vietnam
- (b) Interest in locating factories /research laboratories within HHTP
- (c) Current and expected activities of enterprises (manufacturing, R&D)
- (d) Kinds of products to be produced
- (e) Investment schedule
- (f) Requests for joint ventures with local partners
- (g) Expected markets
- (h) Required area of factory lots or laboratories
- (i) Required incentives
- (j) Desirable rental fees of land
- (k) Number of workers to be employed
- (l) Requirements for water, electricity, etc.

Required services, functions and facilities for supporting high-tech industries

- (a) Supporting services for R&D
- (b) Entrepreneur development
- (c) Seminar and training
- (d) Information services
- (e) Recreation services
- (f) Trading services
- (g) Housing services, etc.

(2) Number of Respondents

The results of the investment demand survey in eleven foreign countries are shown below. Of the 7,588 enterprises approached in total, 1,549 firms replied, i.e. at a response rate of 20.4%.

Number of Respondents to Investment Demand Survey in Eleven Countries

	No. of Samples	No. of Respondents	(%)
I. Developed Nations			
1. Japan	1,552	314	(20.2)
2. U.K.	647	101	(15.6)
3. France	658	108	(16.4)
4. Germany	598	109	(18.2)
5. U.S.A.	700	110	(15.7)
II. NIES			
6. South Korea	920	111	(12.1)
7. Hong Kong	688	141	(20.5)
8. Taiwan	806	275	(34.1)
III. ASEAN			
9. Singapore	419	154	(36.8)
10. Thailand	300	58	(19.3)
11. Malaysia	300	68	(22.7)
Total	7,588	1,549	(20.4)

I.1.2 Analysis of the Questionnaire Survey Results on Investment Demand

(1) Foreign Enterprises Interested in Investment in HHTP

Of the 1,549 respondents, 209 firms showed interest in overseas investment. Of these 209, 74 firms (about 35 %) showed interest in investment in Vietnam.

Of these 74, 40 enterprises (called "interested enterprises") showed interest in investment in HHTP, with six indicating "Likely to invest" and 34 "Possible to invest", as shown below.

Results of Investment Demand Survey in Eleven Foreign Countries

	No. of Respondents	No. of Interested Enterprises		
		Likely	Possibly	Total
I. Developed Nations				
1. Japan	314	0	5	5
2. U.K.	101	0	2	2
3. France	108	0	1	1
4. Germany	109	0	1	1
5. U.S.A.	110	1	2	3
II. NIES				
6. South Korea	111	3	12	15
7. Hong Kong	141	0	2	2
8. Taiwan	275	1	2	3
III. ASEAN				
9. Singapore	154	0	0	0
10. Thailand	58	0	1	1
11. Malaysia	68	1	6	7
Total	1,549	6	34	40

Among the target countries of the investment demand survey, South Korea was dominant among those interested in investment in HHTP, followed by Malaysia.

(2) Objectives and Expected Activities of Investment in HHTP

In reply to the question on objectives of investment, all but one of the interested enterprises answered they would establish a productive base, and 3 firms intended to establish both a productive base and a transit base for materials/products. None of the interested enterprises showed an intention to create a R&D activity base.

Objectives of Investment in HHTP

		To Create Productive Base	To Create R&D Act. Base	To Create Transit Base	(Plural answer) Total (No. of Interested Enterprises)
I. Developed Nations					
1.	Japan	5	0	0	5 (5)
2.	U.K	2	0	1	3 (2)
3.	France	1	0	0	1 (1)
4.	Germany	1	0	0	1 (1)
5.	U.S.A.	3	0	0	3 (3)
II. NIES					
6.	South Korea	15	0	0	15 (15)
7.	Hong Kong	2	0	1	3 (2)
8.	Taiwan	3	0	1	4 (3)
III. ASEAN					
9.	Singapore	0	0	0	0 (0)
10.	Thailand	1	0	0	1 (1)
11.	Malaysia	6*	0	0	6 (6)
Total		39	0	3	42 (39)

Note: * 1 Malaysian enterprise did not answer.

With regard to the expected activities, only one Taiwanese firm of the interested enterprises intended to conduct R&D activities in the institute to be located in HHTP.

(3) Required Investment Conditions/Facilities for Location of Manufacturing Facilities

The interested enterprises required mainly the following investment conditions/facilities for location of manufacturing facilities:

- Highly skilled workers, unskilled workers, engineers
- Adequate infrastructure (road, water, electricity, telecommunication)
- Cheap land for factory lot
- Good accessibility to transportation

- Attractive incentives including tax incentives for investment
- Transparency of procedures relating to foreign investment

**Required Investment Conditions / Facilities for Factory Location
by Foreign Enterprises**

	Total Number of Foreign Enterprises	(%)
(1) Cheap land for factory or institute	31	81.6%
(2) High quality skilled workers, unskilled workers, engineers	33	86.8%
(3) High quality managers at cheap price	16	42.1%
(4) High quality researchers at cheap price	4	10.5%
(5) Adequate infrastructure (road, water, electricity, telecommunications)	33	86.8%
(6) Good accessibility to transportation	28	73.7%
(7) Local resources/materials	17	44.7%
(8) Supporting industries and/or downstream industries	22	57.9%
(9) Amenities (restaurant, clinic, nursery, etc.)	4	10.5%
(10) Housing facilities	14	36.8%
(11) Social facilities such as recreational sports facilities	6	15.8%
(12) Supporting facilities such as public laboratory/institutional organizations, etc.	5	13.2%
(13) Attractive incentives including tax incentives for investment	26	68.4%
(14) Availability of J/V partner	22	57.9%
(15) Transparency of procedures relating to foreign investment	26	68.4%
(16) Advanced banking systems	16	42.1%
(17) Others	1	2.6%
Total	304	
No. of no answers	2	
No. of answering enterprises	38	100.0%

(4) Required Investment Conditions/Facilities for Location of Research Laboratories

Foreign investment demand for research laboratories seemed to be nil. Nine interested enterprises, however, answered the question on required investment conditions/facilities for location of research laboratories. Major required investment conditions/facilities were the following:

- High quality researchers at cheap price
- High quality managers at cheap price
- Supporting facilities such as public laboratory/institutional organizations

**Required Investment Conditions / Facilities for Institution Location
by Foreign Enterprises**

	Total Number of Foreign Enterprises	(%)
(1) Cheap land for factory or institute	3	33.3%
(2) High quality skilled workers, unskilled workers, engineers	1	11.1%
(3) High quality managers at cheap price	4	44.4%
(4) High quality researchers at cheap price	6	66.7%
(5) Adequate infrastructure (road, water, electricity, telecommunications)	2	22.2%
(6) Good accessibility to transportation	1	11.1%
(7) Local resources/materials	2	22.2%
(8) Supporting industries and/or downstream industries	2	22.2%
(9) Amenities (restaurant, clinic, nursery, etc.)	3	33.3%
(10) Housing facilities	2	22.2%
(11) Social facilities such as recreational sports facilities	3	33.3%
(12) Supporting facilities such as public laboratory/institutional organizations, etc.	4	44.4%
(13) Attractive incentives including tax incentives for investment	1	11.1%
(14) Availability of J/V partner	3	33.3%
(15) Transparency of procedures relating to foreign investment	1	11.1%
(16) Advanced banking systems	1	11.1%
(17) Others	0	0.0%
Total	39	
No. of no answers	31	
No. of answering enterprises	9	100.0%

(5) Requirements for HHTP by Foreign Enterprises

1) Services/functions, infrastructure/utilities to be installed in HHTP

- The interested enterprises expected the following required services to be installed in HHTP:
- Information services
- Consulting services
- Trading services

Required Services from HHTP by Foreign Enterprises

	Total Number of Foreign Enterprises	(%)
(1) Measurement services	3	9.4%
(2) Testing services	7	21.9%
(3) Consulting services	17	53.1%
(4) Secretary services	4	12.5%
(5) Seminar & Training services	5	15.6%
(6) Exhibition services	3	9.4%
(7) Information services	18	56.3%
(8) Recreation services	8	25.0%
(9) Trading services	17	53.1%
(10) Accommodation services	7	21.9%
(11) Housing services	8	25.0%
(12) Other services	0	0.0%
Total	97	
No. of no answers	8	
No. of answering enterprises	32	100.0%

About 21% of 23 answerers required 1.0 to 1.9 ha for the factory lot area. About 17% required 2.0 to 4.9 ha and another 17% required 0.5 to 0.9 ha.

In terms of water requirement, about 43 % of 7 answerers required 100 ~ 499 m³/day and about 29% required 10 ~ 99 m³/day.

As for electricity requirements, about 50% of 10 answerers required 100 - 999 kW and about 40% required 1,000 - 4,999 kW.

About 35% of 34 answerers expected to hire 100 ~ 499 employees and about 32% expected to hire 50 ~ 99 employees.

Thirty interested firms favored unskilled and skilled workers rather than managers and researchers.

2) Required incentives

The interested enterprises expected the following incentives to be provided in HHTP:

- Profit tax exemption/reduction
- Export and import duties exemption/reduction

Required Incentives of HHTP by Foreign Enterprises

	Total Number of Foreign Enterprises	(%)
(1) Profit tax exemption/reduction	21	70.0%
(2) Tax exemption/reduction for R&D investment	8	26.7%
(3) Turn-over tax exemption/reduction	10	33.3%
(4) Property tax exemption/reduction	11	36.7%
(5) Export and import duties exemption/reduction	21	70.0%
(6) Capital tax reduction/exemption	11	36.7%
(7) Easy access to loans	9	30.0%
(8) Credit guarantee	7	23.3%
(9) Others	0	0.0%
Total	98	
No. of no answers	10	
No. of answering enterprises	30	100.0%

(6) Expected Activities of Foreign Enterprises in HHTP

With regard to R&D activities, about 44% of 18 answerers had an intention to conduct R&D activities at a 5 ~ 9% cost share of the sales amount, and about 33% at a less than 5% cost share.

About 55% of 20 answerers expected to conduct human resources development activities at a 1 ~ 5% cost share of the sales amount, and about 30% at a 5 ~ 9% cost share.

About 56% of 39 answerers wanted to establish factories with their own capital and about 33% desired to form joint ventures with Vietnamese partners.

In terms of export, about 44% of 32 answerers intended to export more than 80% of their produce.

About 77% of the enterprises that answered said they would use ship for transporting more than 80% of their products.

1.2 Investment Demand Survey in Vietnam

1.2.1 Outline of Investment Demand Survey

(1) Selection of Samples

The Study Team selected a Vietnamese consultant as the implementing body for the survey on the investment demand for HHTP in Vietnam, among three candidate local consultants through the evaluation of their financial proposals. The survey on the

investment demand in Vietnam was carried out by the Vietnamese consultant by means of direct interview and mailing of questionnaires to a total of 378 enterprises which show a possibility of high-tech industry development and have more than 100 workers. These enterprises were selected from those listed in the "Vietnam Business Directory 1995 - 1996" issued by the Chamber of Commerce and Industry of Vietnam. Of the 378 enterprises, 225 located in Hanoi, Ha Tay and Hai Phong areas were interviewed and the remaining 153 located in and around Ho Chi Minh City were surveyed by mailing questionnaires. The survey questionnaire included not only the questions on the investment demand but also on the needs for functions and facilities of HHTP for supporting high-tech industries. The questionnaire survey was carried out during the period from the middle of February to the end of March 1997.

(2) Number of Respondents

The results of the investment demand surveys in Vietnam are shown below. Of the 378 enterprises approached, 201 firms replied, i.e. at a response rate of 53%. The response rate in the Northern area (Hanoi, Ha Tay and Hai Phong), 69%, was largely higher than that in the Southern area (Ho Chi Minh City), 29%, because the interview survey method was adopted in the Northern area.

Number of Respondents to Investment Demand Survey in Vietnam

	No. of Samples	No. of Respondents	(%)
1. Northern Area	225	156	(69.3)
2. Southern Area	153	45	(29.4)
Total	378	201	(53.2)

I.2.2 Analysis of the Questionnaire Survey Results on Investment Demand in Vietnam

(1) Vietnamese Enterprises Interested in Investment in HHTP

Of the 201 answerers, 140 enterprises (called "interested enterprises") showed interest in investment in HHTP. Of these 140, 62 marked "Likely to invest" and the other 78 enterprises marked "Possible to invest" as shown below.

Results of Investment Demand Survey in Vietnam

	No. of Respondents	No. of Interested Enterprises		
		Likely	Possibly	Total
1. Northern Area	156	59	56	115
2. Southern Area	45	3	22	25
Total	201	62	78	140

(2) Objectives and Expected Activities of Investment in HHTP

In reply to the question on objectives of investment, about 78% of the 135 interested enterprises showed their intention to establish a productive base for the Vietnamese market and 58% expected to create a productive base for export to other countries. 44% indicated they would establish a R&D activity base.

Objectives of Investment in HHTP

	(Plural answer)				
	To Create Productive Base for Vietnamese Market	To Create Productive Base	To Create R&D Activity Base	To Create Transit Base for Materials /Products	Total (No. of Interested Enterprises)
1. Northern Area	84	67	52	9	212 (110)
2. Southern Area	21	11	8	0	40 (25)
Total	105 (78%)	78 (58%)	60 (44%)	9 (7%)	252 (135*) (100%)

Note: * 5 enterprises did not answer.

Judging from assumed activities in HHTP, investment demand for factories was considered to be much bigger than that for research laboratories.

(3) Required Investment Conditions/Facilities for Location of Manufacturing Facilities

The interested enterprises required mainly the following investment conditions/facilities for location of manufacturing facilities:

- Adequate infrastructure (road, water, electricity, telecommunications)
- Cheap land for factory lot
- Highly skilled workers, unskilled workers, engineers
- Good accessibility to transportation

**Required Investment Conditions/Facilities for Factory Location
by Vietnamese Enterprises**

		No. of Enterprises in Northern Area		No. of Enterprises in Southern Area		Total No. of	
		Sub-total	(%)	Sub-total	(%)	Enterprises	(%)
(1)	Cheap land for factory or institute	72	66.1%	16	64.0%	88	65.7%
(2)	High quality skilled workers, unskilled workers, engineers	73	67.0%	8	32.0%	81	60.4%
(3)	High quality managers at cheap price	36	33.0%	16	64.0%	52	38.8%
(4)	High quality researchers at cheap price	27	24.8%	8	32.0%	35	26.1%
(5)	Adequate infrastructure (road, water, electricity, telecommunication)	82	75.2%	11	44.0%	93	69.4%
(6)	Good accessibility to transportation	71	65.1%	9	36.0%	80	59.7%
(7)	Local resources/materials	26	23.9%	8	32.0%	34	25.4%
(8)	Supporting industries and/or down-stream industries	31	28.4%	9	36.0%	40	29.9%
(9)	Amenities (restaurant, clinic, nursery, etc.)	41	37.6%	1	4.0%	42	31.3%
(10)	Housing facilities	40	36.7%	4	16.0%	44	32.8%
(11)	Social facilities such as recreational sports facilities	29	26.6%	3	12.0%	32	23.9%
(12)	Supporting facilities such as public laboratory/institutional organizations, etc.	18	16.5%	0	0.0%	18	13.4%
(13)	Attractive incentives including tax incentives for investment	66	60.6%	4	16.0%	70	52.2%
(14)	Availability of J/V partner	52	47.7%	13	52.0%	65	48.5%
(15)	Transparency of procedures relating to foreign investment	52	47.7%	5	20.0%	57	42.5%
(16)	Advanced banking systems	50	45.9%	3	12.0%	53	39.6%
(17)	Others	1	0.9%	0	0.0%	1	0.7%
	Total	767		118		885	
	No. of no answers	6		0		6	
	Ns. of answering enterprises	109	100.0%	25	100.0%	134	100.0%

(4) Required Investment Conditions/Facilities for Location of Research Laboratories

The interested enterprises required mainly the following investment conditions/facilities for location of research laboratories:

- High quality researchers at cheap price
- Good accessibility to transportation
- Adequate infrastructure (road, water, electricity, telecommunications)
- Supporting facilities such as public laboratory/institutional organizations

**Required Investment Conditions / Facilities for Institution Location
by Vietnamese Enterprises**

		No. of Enterprises in Northern Area		No. of Enterprises in Southern Area		Total No. of Enterprises	
		Sub-total	(%)	Sub-total	(%)	Enterprises	(%)
(1)	Cheap land for factory or institute	11	10.9%	2	11.8%	13	11.0%
(2)	High quality skilled workers, unskilled workers, engineers	8	7.9%	2	11.8%	10	8.5%
(3)	High quality managers at cheap price	3	3.0%	3	17.6%	6	5.1%
(4)	High quality researchers at cheap price	13	12.9%	6	35.3%	19	16.1%
(5)	Adequate infrastructure(road, water, electricity, telecommunication)	15	14.9%	2	11.8%	17	14.4%
(6)	Good accessibility to transportation	15	14.9%	4	23.5%	19	16.1%
(7)	Local resources/materials	0	0.0%	1	5.9%	1	0.8%
(8)	Supporting industries and/or down-stream industries	4	4.0%	1	5.9%	5	4.2%
(9)	Amenities (restaurant, clinic, nursery, etc.)	8	7.9%	1	5.9%	9	7.6%
(10)	Housing facilities	6	5.9%	1	5.9%	7	5.9%
(11)	Social facilities such as recreational sports facilities	10	9.9%	2	11.8%	12	10.2%
(12)	Supporting facilities such as public laboratory/institutional organizations, etc.	14	13.9%	3	17.6%	17	14.4%
(13)	Attractive incentives including tax incentives for investment	13	12.9%	1	5.9%	14	11.9%
(14)	Availability of J/V partner	9	8.9%	0	0.0%	9	7.6%
(15)	Transparency of procedures relating to foreign investment	11	10.9%	1	5.9%	12	10.2%
(16)	Advanced banking systems	8	7.9%	1	5.9%	9	7.6%
(17)	Others	1	1.0%	0	0.0%	1	0.8%
Total		149		31		180	
No. of no answers		14		8		22	
Ns. of answering enterprises		101	100.0%	17	100.0%	118	100.0%

(5) Requirements for HHTP by Vietnamese Enterprises

1) Services/functions, infrastructure/utilities to be installed in HHTP

The interested enterprises expected the following required services to be installed in HHTP:

- Information services
- Trading services
- Consulting services
- Testing services
- Measurement services

Required Services from HHTP by Vietnamese Enterprises

	No. of Enterprises in Northern Area		No. of Enterprises in Southern Area		Total Nos. of Enterprises	
	Sub-total	(%)	Sub-total	(%)	Enterprises	(%)
(1) Measurement services	52	52.0%	19	79.2%	71	57.3%
(2) Testing services	55	55.0%	19	79.2%	74	59.7%
(3) Consulting services	58	58.0%	17	70.8%	75	60.5%
(4) Secretary services	8	8.0%	3	12.5%	11	8.9%
(5) Seminar & Training services	51	51.0%	7	29.2%	58	46.8%
(6) Exhibition services	35	35.0%	12	50.0%	47	37.9%
(7) Information services	63	63.0%	15	62.5%	78	62.9%
(8) Recreation services	25	25.0%	3	12.5%	28	22.6%
(9) Trading services	60	60.0%	17	70.8%	77	62.1%
(10) Accommodation services	34	34.0%	4	16.7%	38	30.6%
(11) Housing services	31	31.0%	5	20.8%	36	29.0%
(12) Other services	5	5.0%	0	0.0%	5	4.0%
Total	477		121		598	
No. of no answers	15		1		16	
No. of answering enterprises	100	100.0%	24	100.0%	124	100.0%

With regard to required factory lot area, about 32% of 93 answerers required 1.0 to 1.9 ha, about 24% required 2.0 to 4.9 ha, and 18% required 0.5 to 0.9 ha.

Concerning required research laboratory lot area, about 50% of 26 answerers required more than 1.0 ha, and about 23% required 0.5 ~ 1.0 ha.

In terms of water requirement, about 39% of 52 answerers required 10 ~ 99 m³/day, and about 35% required 100 ~ 499 m³/day.

As for electricity requirements, about 42% of 41 answerers required 100 - 999 kW, and about 32% required 1,000 - 4,999 kW.

About 39% of 103 answerers expected to hire 100 ~ 499 employees, and about 26% expected to hire 50 ~ 99 employees.

The interested firms favored skilled workers rather than unskilled workers, managers and researchers.

2) Required incentives

The interested enterprises expected the following incentives to be provided in HHTP:

- Profit tax exemption/reduction
- Turn-over tax exemption/reduction
- Tax exemption/reduction for R&D investment
- Easy access to loans

Required Incentives of HHTP by Vietnamese Enterprises

	No. of Enterprises in Northern Area		No. of Enterprises in Southern Area		Total No. of Enterprises	
	Sub-total	(%)	Sub-total	(%)	Enterprises	(%)
(1) Profit tax exemption/reduction	71	65.7%	15	75.0%	86	67.2%
(2) Tax exemption/reduction for R&D investment	63	58.3%	8	40.0%	71	55.5%
(3) Turn over tax exemption/reduction	61	56.5%	18	90.0%	79	61.7%
(4) Property tax exemption/reduction	52	48.1%	9	45.0%	61	47.7%
(5) Export and import duties exemption/reduction	45	41.7%	8	40.0%	53	41.4%
(6) Capital tax reduction/exemption	39	36.1%	12	60.0%	51	39.8%
(7) Easy access to loans	53	49.1%	18	90.0%	71	55.5%
(8) Credit guarantee	32	29.6%	16	80.0%	48	37.5%
(9) Others	7	6.5%	1	5.0%	8	6.3%
Total	423		105		528	
No. of no answers	7		5		12	
No. of answering enterprises	108	100.0%	20	100.0%	128	100.0%

(6) Expected Activities of Vietnamese Enterprises in HHTP

With regard to R&D activities, about 38% of 99 answerers indicated they would conduct R&D activities at a 5.0 ~ 9.9% cost share of the sales amount, and about 26% at a more than 10% cost share.

About 36% of 97 answerers intended to conduct human resources development activities at a 2 ~ 5% cost share of the sales amount, and about 33% at a 0.5 ~ 2% cost share.

Concerning investment style, about 80% of 129 answerers wanted to form joint ventures with foreign partners.

In terms of export, about 76% of 113 answerers expressed an intention to export their produce to foreign countries. However, the expected share of export was not so high. For instance, a small percentage (15%) of 55 answerers expected to export more than 80% of their produce.

1.3 Overall Investment Demand for HHTP

1.3.1 Selection of Prospective Enterprises

The enterprises that replied "Likely to invest" or "Possible to invest" to the questionnaire survey on investment demand were considered as those interested in investment in HHTP. To evaluate the overall investment demand for HHTP,

"prospective enterprises" should be selected on the basis of both degrees of interest and their capability for investment.

(1) Selection of Prospective Foreign Enterprises

The 40 interested enterprises in eleven foreign countries were screened to determine those with a high possibility of investment in HHTP by the following criteria:

- 1) Degree of interest: Enterprises that replied "Likely to invest" or "Possible to invest" to the questionnaire survey on investment demand.
- 2) Preference for the Northern area (Hanoi/Ha Tay area): Enterprises that preferred to invest in the Northern area than in other parts of Vietnam.
- 3) Detailed investment plan: Enterprises that studied the detailed investment plans including expected investment scale, required lot area and utilities, etc.
- 4) Appropriate industries for HHTP: Enterprises that were categorized in high-tech industrial categories for HHTP.

As a result of selection, 23 enterprises that satisfied all of the above criteria were selected as those with a high possibility of investment in HHTP. These 23 enterprises are defined as "Foreign Prospective Enterprises" as shown below.

Number of Foreign Prospective Enterprises for Investment in HHTP

	No. of Foreign Interested Enterprises in Questionnaire Survey	No. of Foreign Prospective Enterprises for Investment in Manufacturing Activities in HHTP
I. Developed Nations		
1. Japan	5	4
2. U.K.	2	2
3. France	1	1
4. Germany	1	1
5. U.S.A.	3	3
II. NIES		
6. South Korea	15	6
7. Hong Kong	2	2
8. Taiwan	3	1
III. ASEAN		
9. Singapore	0	0
10. Thailand	1	0
11. Malaysia	7	3
Total	40	23

A list of foreign prospective enterprises is shown in Table I-3-1. Among industrial categories, manufacture of electrical equipment is dominant, followed by manufacture of plastic products.

The following table shows the expected activities of the foreign prospective enterprises in HHTP. All of the foreign prospective enterprises wished to invest in manufacturing activities and none of them showed a desire to make investment only in R&D activities. Though 3 enterprises wished to invest in both manufacturing and R&D activities, investment demand for R&D activities seemed to be quite weak, considering the fact that R&D activities could be regarded as supplementary to manufacturing activities.

Foreign Prospective Enterprises by Activity in HHTP

	Manufacturing Activity	R&D Activity	Both Activities	Total
I. Developed Nations				
1. Japan	3	0	1	4
2. U.K	2	0	0	0
3. France	1	0	0	1
4. Germany	1	0	0	1
5. U.S.A.	2	0	1	3
II. NIES				
6. South Korea	6	0	0	6
7. Hong Kong	1	0	1	2
8. Taiwan	1	0	0	1
III. ASEAN				
9. Singapore	0	0	0	0
10. Thailand	0	0	0	0
11. Malaysia	3	0	0	3
Total	20	0	3	23

(2) Selection of Prospective Vietnamese Enterprises

The 140 Vietnamese interested enterprises were screened to determine those with a high possibility of investment in HHTP by the following criteria:

- 1) Degree of interest: Enterprises that replied "Likely to invest" to the questionnaire survey on investment demand.
- 2) Investment capability: Enterprises that wanted to establish factories/research laboratories with their own capital. (Investment capability of those enterprises

was considered to be high compared with the enterprises that wanted to form joint ventures with foreign partners.)

- 3) Detailed investment plan: Enterprises that investigated detailed investment plans including expected investment scale, required lot area and utilities, etc.
- 4) Appropriate industries for HHTP: Enterprises that were categorized in high-tech industrial categories for HHTP.
- 5) Software enterprises were considered to have a high possibility of investment in HHTP.

As a result of selection, 4 manufacturing enterprises that satisfied the criteria 1) – 4) above and 5 software enterprises that satisfied the criteria 1) and 5) were selected as those with a high possibility of investment in HHTP. These 9 enterprises are defined as “Vietnamese Prospective Enterprises” as shown below.

Number of Vietnamese Prospective Enterprises for Investment in HHTP

	No. of Vietnamese Interested Enterprises in Questionnaire Survey	No. of Vietnamese Prospective Enterprises for Investment in Manufacturing Activities in HHTP
1. Northern Area	115	9
2. Southern Area	25	0
Total	140	9

A list of Vietnamese prospective enterprises is shown in Table I-3-2. The Vietnamese prospective enterprises included 5 software, 2 electrical apparatus, 1 plastic, and 1 machinery enterprises.

The following table shows the expected activities of the Vietnamese prospective enterprises in HHTP. Three of the Vietnamese prospective enterprises wished to invest in manufacturing activities and one wished to invest in R&D activities. The remaining 5 firms wished to invest in software development activities.

Vietnamese Prospective Enterprises by Activity in HHTP

	Manufacturing Activity	R&D Activity	Software Development Activity	Total
1. Northern Area	3	1	5	9
2. Southern Area	0	0	0	0
Total	3	1	5	9

I.3.2 Estimate of Overall Investment Demand for HHTP

(1) Estimate of Overall Investment Demand for Manufacturing Facilities

1) Overall investment demand of foreign enterprises

For the survey on enterprises in eleven foreign countries, the random sampling method was adopted. As such, there is a possibility that some other enterprises also have investment demand but were not selected by this method.

The overall investment demand of foreign enterprises can be estimated by applying the interval estimate of population parameters with a 95% confidence coefficient using the sampling ratio and population in each foreign country. The interval estimate of population parameters with a certain percentage of confidence coefficient is one of the authorized statistical methods.

In the Study, the overall investment demand was estimated on the basis of the average of both upper and lower confidence limits and an implementation ratio as follows:

$$\text{Implementation ratio} = (\text{No. of investments implementation} / \text{No. of approvals}) \times (\text{No. of approvals} / \text{No. of applications}) \times (\text{No. of applications} / \text{No. of prospective enterprises})$$

In the Study, the implementation ratio was assumed to be 0.1 (0.4×0.5×0.5). The estimated total number of foreign firms that have overall foreign investment demand for manufacturing facilities is 55.

2) Overall investment demand of Vietnamese enterprises

For the survey on enterprises in Vietnam, the random sampling method was adopted. 378 manufacturing enterprises that showed a possibility of high-tech industrial development and employed more than 100 workers were selected as targets of the investment demand survey. Taking into account the fact that Vietnam has a few enterprises with large scale and high-tech industries, it is unlikely that some other enterprises have investment demand but were not selected by the random sampling method.

In the Study, the overall investment demand of Vietnamese enterprises can be estimated on the basis of actual investment demand (3 firms) and an implementation ratio (0.1). The estimated total number of Vietnamese enterprises having overall investment demand for manufacturing facilities is nil.

3) Total overall investment demand for manufacturing facilities

According to the above results, the estimated total number of enterprises that have overall investment demand for manufacturing facilities is 55.

(2) Estimate of Overall Investment Demand for Research Laboratories

1) Overall investment demand of foreign enterprises

As described before, none of the foreign prospective enterprises wished to invest only in R&D activities. Though 3 enterprises wished to make investment in both manufacturing and R&D activities, investment demand for R&D activities seemed to be quite weak due to the fact that R&D activities could be considered as supplementary to manufacturing activities.

Therefore, the overall investment demand for research laboratories of foreign enterprises was considered to be nil in the foreseeable future.

2) Overall investment demand of Vietnamese enterprises

As only one firm of the Vietnamese prospective enterprises wished to invest in R&D activities, the overall investment demand for research laboratories of Vietnamese enterprises was considered to be nil (1×0.1) in the foreseeable future.

3) Total overall investment demand for research laboratories

For the above-mentioned reasons, the total number of enterprises that have overall investment demand for research laboratories was estimated to be nil in the foreseeable future.

(3) Estimate of Overall Investment Demand for Software Industry

1) Overall investment demand of foreign enterprises

None of the foreign prospective enterprises wished to invest for software industry.

Therefore, overall investment demand for software industry of foreign enterprises was considered to be none.

2) Overall investment demand of Vietnamese enterprises

Five of the Vietnamese prospective enterprises wished to invest in software development activities.

3) Total overall investment demand for software industry

It is in a sense reasonable that the questionnaire survey could not identify potential foreign investors in the HHTP site, since software enterprises are in general aligned with local enterprises when they do business in foreign countries. In the case of package software, the maker consigns the system/claim solution relevant to the localization of software and manpower training to the local enterprise. This is likely the case of Vietnam. Custom software programming is also consigned to foreign enterprises. This consignment has become popular, as exemplified in Bangalore, India, while utilizing international telecommunications/information system.

In other words, this suggests that wishes of foreign software enterprises to locate in the HHTP site have been reflected in the answers by Vietnamese enterprises to the questionnaire survey. A seminar was held in October 1997 in Vietnam to promote expansion of business and tie-up between software makers in both Vietnam and foreign countries. In addition, incubation of software development is considered to have a high possibility for the following reasons.

- (a) Vietnamese have the good qualities for software development.
- (b) Initial investment costs of software development are much lower than those of manufacturing and R&D activities.
- (c) Investment on software development is encouraged by strong political support.

In the Study, the investment demand for software is considered to be several enterprises, taking into consideration that incubation of software development seems to be encouraged in the foreseeable future.

Table I-3-1 Foreign Prospective Enterprises for Investment in HHTP

Ser. No.	ISIC Code	Description of ISIC	Products Description	Enterprise Nationality	Interest in Investment in HHTP	Nationality of Desired J/V Partners	Required Area of Factory Lot (ha)	Required Area of Institute Lot (ha)	Required Floor Area of Institute Lot (m ²)
J72	319	Manufacture of other electrical equipment	Electric, electronic equipment	Japan	Possible to invest	(100% own)	5.0-9.9		
J62	289	Manufacture of other fabricated metal products	Metal part (stamping spring)	Japan	Possible to invest	(100% own)	No answer		
J37	292	Manufacture of special purpose machinery	Machinery, equipment	Japan	Possible to invest	Vietnam	No answer		
J82	331	Manufacture of medical appliances and instruments	X-ray equipment	Japan	Possible to invest	Vietnam	1.0-1.9	0.5-0.99	
K14	319	Manufacture of other electrical equipment	Photoelectric sensor, timer, temp. controller	Korea	Likely to invest	(100% own)	0.2-0.4		
K48	319	Manufacture of other electrical equipment	Electric, electronic equipment	Korea	Likely to invest	(consignment processing)	Less than 0.2		
K90	319	Manufacture of other electrical equipment	Electric, electronic equipment	Korea	Possible to invest	(100% own)	0.2-0.4		
K105	331	Manufacture of medical appliances and instruments	Humen, Gentriderm	Korea	Possible to invest	Vietnam	No answer		
K107	343	Manufacture of parts and accessories for motor vehicles	Parts for motor vehicle	Korea	Possible to invest	(100% own)	0.2-0.4		
K109	223	Reproduction of recorded media	CD, CD-ROM	Korea	Possible to invest	(100% own)	No answer		
UK11	242	Manufacture of other chemical products	Prepreg materials	U.K.	Possible to invest	(100% own) or Vietnam	0.5-0.9		
UK2	281	Manufacture of structural metal products	Pipe support equipment	U.K.	Possible to invest	Vietnam	0.2-0.4		
F003	281	Manufacture of structural metal products	Stainless, Nickel	France	Possible to invest	Vietnam	1.0-1.9		
G17	252	Manufacture of plastic products	Plastic products	Germany	Possible to invest	-			
A1	252	Manufacture of plastic products	Plastic resin	U.S.A.	Possible to invest	(100% own)	1.0-1.9		
A2	252	Manufacture of plastic products	Plastic products	U.S.A.	Likely to invest	(100% own)	More than 10		
A3	300	Manufacture of office, accounting and computing machinery	Office machinery	U.S.A.	Possible to invest	(100% own)	5.0-9.9		More than 2,000
M23	154	Manufacture of other food products	Food	Malaysia	Possible to invest	(100% own)	No answer		
M77	242	Manufacture of other chemical products	Chemical products	Malaysia	Possible to invest	Vietnam	2.0-4.9		
M261	343	Manufacture of parts and accessories for motor vehicles	Swichgear	Malaysia	Likely to invest	Vietnam	More than 10		
H8	322	Manufacture of apparatus for line telephony	Telecommunications	Hong Kong	Possible to invest	(consignment processing)	Less than 0.2	Less than 0.1	
H1	319	Manufacture of other electrical equipment	Magnetic heads	Hong Kong	Possible to invest	(100% own)	2.0-4.9		
T18	243	Manufacture of man-made fibres	Man-made fibres	Taiwan	Likely to invest	(100% own)	More than 10		

Table I-3-2 Vietnamese Prospective Enterprises for Investment in HHTP

Ser. No.	ISIC Code	Description of ISIC	Products Description	Enterprise Nationality	Interest in Investment in HHTP	Nationality of Desired J/V Partners	Required Area of Factory Lot (ha)	Required Area of Insulate Lot (ha)	Required Floor Area of Insulate Lot (m2)
57	252	Manufacture of plastic products	Plastic	Vietnam (Hai Phong)	Likely to invest	(100% own)	1.0-1.9		
90	292	Manufacture of special purpose machinery	Equipment for construction	Vietnam (Hai Phong)	Likely to invest	(100% own) or Japan	1.0-1.9		500-999
234	312	Manufacture of electricity distribution and control apparatus	Switches	Vietnam (Hanoi)	Likely to invest	(100% own)			500-999
195	322	Manufacture of television and radio transmitters and apparatus	Telecommunication assembly	Vietnam (Hanoi)	Likely to invest	(100% own)	1.0-1.9		
221	722	Software consultancy and supply	Softwares	Vietnam (Hanoi)	Likely to invest	U.S.A.	0.2-0.4	0.10-0.19	
224	722	Software consultancy and supply	Softwares	Vietnam (Hanoi)	Likely to invest	-	Less Than 0.2		200-499
227	722	Software consultancy and supply	Softwares	Vietnam (Hanoi)	Likely to invest	No answer	No answer		
229	722	Software consultancy and supply	Softwares	Vietnam (Hanoi)	Likely to invest	No answer	0.2-0.4		200-499
230	722	Software consultancy and supply	Softwares	Vietnam (Hanoi)	Likely to invest	Japan, China, Korea		No answer	

APPENDIX II HIGH-TECH PARK DEVELOPMENT

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APPENDIX II HIGH-TECH PARK DEVELOPMENT

II.1 Lessons from High-Tech Park in Other Countries

II.1.1 India - Bangalore

The Bangalore city, which locates in hi-land of Decan of more than 900m above sea level in Karnataka state, attracts the high-tech industries including the software industry. Since the electronics industries locates in the industrial estate prepared in the outskirts of the city and the software in the city, the Bangalore is often called as the "Silicon Valley in India".

(1) Background

The Indian Government adopted the open door policy which included the economic liberalization and deregulation of FDI since 1991. Along with this policy, the Government planed the high-tech park developments in whole countries. The Bangalore which is one of seven high-tech parks attracted more than 450 high-tech companies such as software, computer and its related industries, telecommunication, etc. The success of the Bangalore was carried by the following factors:

- To adopt the keen promotion policy in the USA and EU,
- To recall the Indian engineers from abroad,

Since in the state of Karnartaka there are 51 of institutes for science and technologies, 35 of engineering training centers, and 102 of R&D institutes and the supply capacity of engineers are rich, the foreign companies have invested in the Bangalore from the adoption of open door policy. The Government focused on the development of software industries as the export industry and prepared the Software Technology Park (STP) including satellite-communication facilities, super computer, customs office, etc. in the outskirts of Bangalore. The Electronics City where the STP locates is the industrial estate attracted more than 100 electronics-related companies.

(2) Concept

The Information Technology Park Limited (ITPL) was established as the joint venture among the Tata Group in India, Singaporean, and the State Government aiming the construction of Information Technology Park (ITP) in the White Field District, outskirts of Bangalore, in 1994. The ITP which targeted the IT industries including the software industry planned to be developed the total area of 265 ha and to be invested USD 250 million. The first phase of development completed in 1996.

(3) Functions

The rapid growth of Bangalore was caused by the integration of human resources, technologies, and information network. The main players in Bangalore are Indian engineers studied abroad and have channels with the engineers such as in Silicon Valley. These well worked human networks provide the real-time information to the Bangalore from USA. The Software Technology Park (STP) located in the Electronics City was established by the Government to aim the support of software export via a satellite. The STP, therefore, has the ground station of satellite, the customs office, main frame, etc.

(4) Others

The Bangalore faces serious problems on the infrastructure such as traffic congestion, shortage of electricity, skyrocketing rental fee of the office, etc. since the population grew three times comparing with 2.1 million in 1981. The experience of Bangalore suggested that the shortage of ordinary infrastructure is not crucial to development at the information society. The key issue is to integrate with foreign countries through such as satellite communication.

II.1.2 Taiwan - Hsinchu Science-based Industrial Park

(1) Background

Industrialization in Taiwan began after the World War II using the surplus labor force generated by the agricultural land reform. At the beginning, the industrialization was carried by the labor intensive industries which contributed to the rapid economic growth through the export. In the late 80's, since the huge trade surplus generated by above labor intensive industries caused the trade conflict and the revaluation of NT dollar to US dollar, the international competitiveness has been losing and the economic growth was slightly down. To overcome the difficulties, the Taiwanese Government enacted the high-tech industrialization promotion act aiming the restructuring the existing industries and offered the various incentives. The development of the Hsinchu Science-based Industrial Park (HSIP) was one of the essentials of the high-tech industrialization.

(2) Concept

In 1976, Taiwan National Science Committee started to study on the Hsinchu Science-based Industrial Park development in 60 minutes south of Taipei through the motorway. The concept of the Park was to integrate the science which is the result of

R&D activities, the industries which produced the high-tech products, and the park which secured the quality of life.

The feature of HSIP is that the government recalled the overseas' Taiwanese high-tech engineers by the preparation of the infrastructure which attracted them.

(3) Functions

The HSIP consists of 3 zones; industrial zone of 296 ha, R&D zone of 94 ha, and residential zone of 87 ha.

1) Industrial zone

The site of this zone is basically leasing of 20 years. The standard factories are prepared for the startup firms and SME. The companies can build own facilities. There are some examples that starting business from the standard factories the companies, then, established their own factories in the prepared lots.

In this zone the urban facilities such as the recreation zone, restaurant, shopping center, movie theater etc. are prepared.

2) R&D zone

The National Institutes such as chemicals, machinery, material, energy, and mining locate in this zone. The open laboratories such as synchrotron center, precision machinery center are established for the supporting the researchers. Tow national universities and industries are well linkage.

3) Residential zone

The houses including the apartments are prepared for the recalled engineers to guarantee the quality of life. This zone also provides the urban and recreation facilities such as tennis courts, theaters, restaurants, banks, post office, etc.

The education systems and facilities for the employees' children should be highlighted in the HSIP. Not only the modeled high school but the lower education including the kindergarten are prepared to them and provide the bilingual education.

II.1.3 Japan - Tsukuba Science City

(1) Background

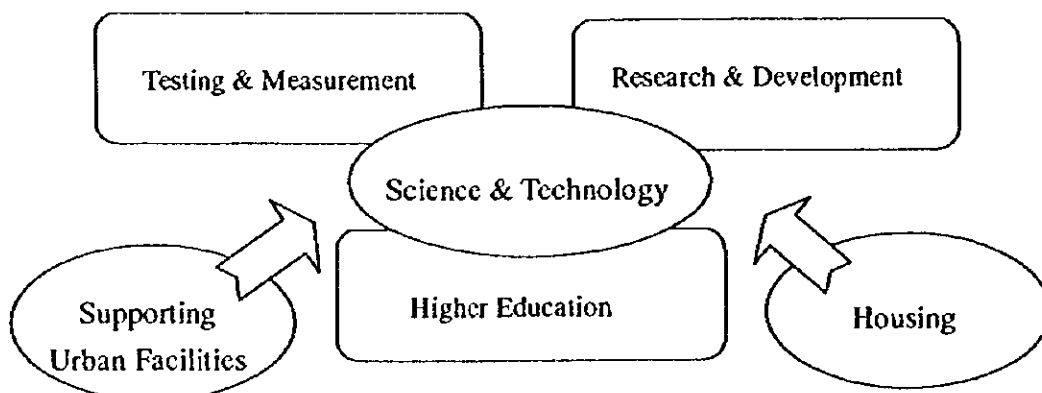
There are more than one hundred high-tech parks or research parks in Japan. One of the typical high-tech park in Japan is Tsukuba Science City (hereinafter called TSC). The TSC, which locates southern part of Ibaraki prefecture or 60 km north east

to the center of the Tokyo, covered the 28,560 ha of the total area and was developed around 2,700 ha as the R&D/education zone and the rest as the suburban zone. The R&D/education zone, 6km of west to east and 18 km of north to south, included the National R&D institutes, education facilities, commercial zone, office district, and the residential zone. The suburban zone which was the rest of the R&D and education zone includes the industrial or research parks.

In 1963 the Cabinet decided to establish the science city in Tsukuba area and submitted the conceptual land use plan of the science city. The land acquisition was begun by the Japan Housing Corporation from 1967. The Conceptual Plan was modified through the discussion with the expected relocation organizations and the possibility of actual land acquisition. After the four times of revision, the Master Plan was conducted and the official land breaking was held in 1969. In 1970 the Tsukuba Science City Construction Act was enacted. The National Institute Research in Inorganic Materials began to operate as the first relocation organization in 1972, and in the next year the University of Tsukuba was opened. In 1980 all the R&D and education organizations decided to be relocated started to operate. The urban facilities including the houses were also developed in parallel to the development of them. In the suburban zone the research parks or high-tech parks were developed from the late of 1970's. The seven parks have been developed until now.

(2) Concept

The objectives of the development of TSC were to decentralize of population and the central governmental facilities over concentrated in Tokyo and to establish the core of the R&D activities. To achieve these objectives TSC should be the place preparing the rich environment to be able to integrate the testing, research, and education.



(3) Functions & Land Use

The TSC is divided into two districts; one is the R&D and education the other the suburban. In the R&D and education area, the National Institutes of 47 organizations are established. The R&D fields covered by these institutions extend wide range, such as Electronics, Biotechnology, New materials, Mechatronics, Information, Environment technology, Biochemistry, Space technology, etc. The three universities and one technology college are located. The University of Tsukuba established in 1978 is the university of new concept, and she has several independent master courses (in existing universities the master course is set up the under graduate). The TSC has the commercial facilities, housing both prepared by the public sector and private, bus terminal, and industrial or research parks. The population of 60,000 reside in the housing zone of around 1,000 ha and total population of the TSC are around 180,000 in 1995. In the suburban zone 7 industrial or research parks are constructed: Tokodai Research park of 39 ha, Tsukuba West of 102 ha, Tsukuba North of 128 ha, Tsukuba Technopark Hanari of 5.4 ha, Tsukuba Technopark O-ho of 41 ha, Tsukuba Technopark Toyosato of 69 ha, and Tsukuba Technopark Sakura of 66 ha in which the 115 companies locate and operate. The most tenants in them are the private R&D institutes.

(4) Technoparks in the TSC

Tsukuba West Industrial Park

In 1985 the World Exposition of Science & Technology was held in TSC gathering the 20 million and more visitors. The ground of the Exposition was developed as the Tsukuba West Industrial Park of which the total land area is 105.5 ha and sites for industries are 15 lots or 74.9 ha. In 1996, there are 15 companies locating in the Park and the types of industries are fine chemicals, biotechnology, special precision, electronics, etc. The 7 to the total tenants are R&D institutes and the rest of them development-oriented firms or prototype factories.

Tsukuba North Industrial Park

The Tsukuba North Industrial Park located in the place of 10 km north to the TSC. The 19 lots or 102.2 ha to the total development are of 127.8 ha are completion to be occupied by the companies of which functions are mainly the R&D as same as that of the West. In the both industrial parks the tenants are required to conclude the landscape agreement.

II.1.4 Malaysia - Kulim High-Tech Park

The Kulim High-Tech Park has been developed in Kedah State, northern part of the Peninsula Malaysia, since 1990. The both Federal and State Governments cooperated to promote the project in order to foster the domestic industries using the high-tech.

(1) Background

The Malaysian Government adopted the industrialization policy through the keen promotion of the FDI as the main measures to develop the economy. The political stability, low wages, and easy communication through English caused to attract the foreign investors, especially labor intensive and export oriented industries. The expansion of world trade and the deterioration of the competitiveness in the factories in the advanced countries are the reason to rush to invest into the developing countries, especially in ASEAN countries in the late 80's. Thanks to the FDI, the Malaysian economy achieved rapid growth, however, on the other hand the these economic growth caused to the serious problems such as the shortage of engineers and skilled labor, skyrocketing the labor wages, etc. The labor intensive industries located in the Malaysia are losing the competitiveness and tend to relocate the other countries providing the better conditions. The Malaysian Government, under this difficulties, adopted the policy to restructure of her industrial structure from labor intensive to technology intensive. The high-tech park was planned as one of the solutions for the difficulties.

(2) Concept

The Kulim High-Tech Park (KHTP) was planned as the northern center for technological development and the high-tech manufacturers. The KHTP, in order to achieve the objectives, was planned as the multifunctional development consisted of the R&D institutes, high-tech industries, universities, housings, and recreation facilities.

(3) Function and Land Use Plan

The KHTP, total area of 1,448 ha, consists of six zones such as high-tech industrial zone, urban zone, R&D zone, housing zone, amenity zone, and education zone. The land use of the KHTP is shown as following table.

Land Use Plan in KHTP	
Land Use	Area (ha.)
High-Tech Industrial Zone	405
Urban Zone	113
Housing Zone	470
Amenity Zone	248
R&D Zone	157
Education Zone	55
Total	1,448

The development area of first stage consists of the high-tech industry zone, R&D zone for public institutes such as MIMOS, Advanced Material Research Center of SIRIM, and IT Center and for software park, and business zone. In the business zone the KHTP Corporation was established as the management body of the whole KHTP. In the High-Tech Industrial Zone, the high quality utilities such as water purification system, hazardous solid waste storage, substation, etc. are prepared to attract the high-tech industries. The Techno Center which consists of the testing and measurement institutes was planned. The housing zone are composed of the several types of houses; bungalow, semi-detached, apartment, etc. The sports and amusement facilities are also planned and the golf course is operating.

(4) Others

Since the KHTP was the joint venture project with Federal Government and State Government, the promotion of the high-tech industries have been mainly carried by the MIDA(Malaysia Industrial Development Agency). To select the high-tech industries the MIDA prepared the criteria such as the number of the graduated personnel and the ratio of R&D expenditure to the total sales amount.

The types of tenanted companies approved to locate in the KHTP are 1) four Wafer Fabrications, 2) CAD/CAM Software, 3) two R&D institutes, 4) three Electronics equipment companies, and 5) Ceramic Capacitor.

II.1.5 China - High-Tech Industrial Development Zone

(1) Background

Since the reformation and open-door policy was adopted in 1979, the Chinese economy has been growing dramatically leaded by the special economic zone and the economic and technology development districts. The industrialization through the attracting the FDI in the coastal region was highlighted, however, on the other hand,

mainly in the major inland cities the new challenges began from the mid of 80's: they were called as the High-Tech Industry Development Zone or Science & Technology Development Zone. The National Committee for Science and Technology began to study on the concept of the High-Tech Industry Development Zone (HTIDZ) in 1984. It was said to follow the Technopolis Concept submitted by the Japanese Government as the new concept of the regional development through the high-tech. The major reason to establish the HTIDZ are as follows;

- The Chinese Government searched the break-through of the situation in which the fruits from the S&T by the National Institutes were unused in the manufacturing sector.
- Since the world trend in the late 80's was the boom of the high-tech led by the micro-electronics, the Chinese Government tended to catch this to strengthen the Economy.

In 1986, Beijing New Technology & Industry Development Zone began to be constructed as a model of High-Tech Park. The experiences from the Beijing have been transferred to the State Government and High-Tech Development Zones of 27 in whole country were designated up to 1991.

(2) Objectives

The major objective of the HTIDZ is to establish the knowledge base which would be the prime motor to lead the National Economy by the industrialization through the usage of the fruits from the R&D activities. In case of the Beijing, in addition to this objective, the submission of the development manuals and the nurturing experts for the high-tech park development were required.

(3) Concept

The Academic Town Zone is designated centered by the existing university in despite of the new town. The total area of the zone is mainly covered from two to three thousand hectares. Although the special economic zone attracted the single function of the production by the provision of incentives only for the FDI the HTIDZ, on the other hand, shall be the production base with R&D function to provide the incentives not only for FDI but for the domestic investors. The roles of the universities and R&D institutes are to develop the results of the S&T to be the manufactured goods.

The categories of the high-tech include the IT, aerospace technology, optical technology, life science, mechatronics, new materials, energy, environmental technology, geoscience, marine engineering, radiation technology, pharmaceuticals, and

the new technologies to apply for the traditional industries. The High-Tech Companies are defined as the companies of which activities should be included in above high-tech categories and they should satisfy the certain conditions.

(4) Function

The functions introduced in the HTIDZ are summarized as follows:

1) R&D Function

The universities carry the R&D activities mainly. The incubated companies also carry the development activities. The teaching staff of the university are encouraged to join the high-tech companies.

2) Incubation

The High-Tech Companies tenanted in the incubator are provided the services such as the financial support, consulting services, employer service, etc. The applied companies are required the qualification by the management body in order to be provided the support.

3) Production Function

The factories of producing the high-tech products are promoted. In case of Beijing, although the qualification as the high-tech company is severe there are 150 and more foreign investors and 1,100 and more domestic investors operated in the zone.

4) Technology Exchange and Amenity Function

There is the park aiming the spread and education of the science and technology, scientific exchange both domestic and international, sports, etc.

5) Commercial Function

The 'science, technology and electronics street' provide the exhibition, sales, and marketing of the results of the R&D activities.

(5) Incentives

In the HTIDZ the approved companies called as the high-tech companies composed of R&D-oriented companies and high-tech-products production companies enjoy the incentives. The criteria of the approval are as follows.

- 1) The business carried by the companies should be research, development, and production and be included at least one of the above high-tech field.

- 2) The company should have the self-supporting accounting system.
- 3) The president of the company should be full-time and have capabilities of the research, development, and management.
- 4) In the R&D-oriented companies, the rate of the university-graduate employers to the total employers should exceed 30% and the rate of the R&D staff to the total 10% and more. In high-tech-products production companies, the rate of the university-graduate employers to the total employers should exceed 20%.
- 5) The company should own the funds of more than 100,000 yuan and the suitable land and equipment for the operation.
- 6) The rate of the R&D expenditure to the total amount of annual revenue should exceed 3%.
- 7) The rate of the sum of technology related turnover and sales of the high-tech products to the total amount of the sales should exceed 50%.
- 8) The experience of the business should exceed 10years.

The companies which satisfy the criteria are specified as the high-tech companies and enjoy the following incentives.

- 1) The rate of income tax is 15% from the day of approval.
- 2) The rate of income tax is reduced to 10% when the export-ratio exceeds 70%.
- 3) The income tax exempts tow years from the year to start operation.
- 4) The high-tech company of joint venture enjoys the income tax exemption of two years from the profited year when the period of the joint venture exceeds ten years.

II.2 High-Tech Parks Classification and Application to Vietnam

(1) High-Tech Parks Classification

High-tech parks of each country various places are different, therefore, it is difficult for us to divide this into group. They have various forms by high-tech industry required location condition and urban function surroundings. The Study Team has dared to classify high-tech parks according to characteristics of an introduction function, it is as following table in consequence.

Classification Table of High-Tech Parks

	Classification	Maintenance function							Content and characteristic of maintenance	Maintenance case
		Factory	Laboratory	University	House	Software industry	Distribution	Business support function		
A-Type Multiple functional type	(A-1) Development of housing zone and industry zone	○			○				At the aims for the factory location in a local city, the developer maintained the employee house area. It is the first step of multiple functional development of an industrial estate.	Subic Techno Park (Philippines), Kawagoe, Sayama industrial estate (Saitama Pref. in 1960's in Japan).
	(A-2) Industrial park	○			○			○ ○	The developer maintained a various large-scale function in a local city for the industrial estate maintenance, added to the A-1 type.	Klim Techno-Park in Malaysia Yonezawa Industrial Park (Yamagata Pref.: Japan Regional Development Corp.)
	(A-3) Industrial new town	○	○	○	○	○		○ ○	This is a large multiple functional development in a new area. There are many cases, which is accompanied by the location of university and science and technology laboratory.	Hsinchu Science-based industrial park in Taiwan, Tsukuba institution Gakuen Toshi and two techno-parks.
B-Type Production support type	(B-1) Industrial estate for the small & medium-sized enterprise relocation	○					○	○	- In case of the house and the factory existing together on a narrow urban area, developer maintained an industrial estate in suburbs to relocate the factory. - Companies use to cooperate with their company in developing the various business chances, using many facilities.	Mibu exports toy industrial estate, etc. in Totigi pref. In Japan, - Subcontract industrial estate
	(B-2) Factory apartment	○					○		- The aim of the maintenance is same at the B-1 type. - This factory apartment takes the style of a joint factory and is pursuit of the merit of accumulation (welfare facilities, distribution, and business, etc. for using jointly).	After 1960 maintaining the 1800 or more factory apartments in Tokyo and the Kobe-city, etc. and continuously at present.
C-Type Industrial Support and Service Type	(C-1) Software Park		○			○		○	- Developer maintains this C-1 type of industrial estate to promote the technological advance by the software industry, the information service industry, and the information communication industry, etc. - In this industrial estate there is various type of center facility for the business support and skill-labor promotion support, etc.	ITP (Indian country Bangalore City), Sapporo Techno-Park in Hokkaido pref. In Japan, Oita Software Park in Oita pref. in Japan)
	(C-2) Research Park (Science Park)		○	○				○	- At the aim of the institutions and the R&D enterprise locations, a developer maintains this type, thinking a grate deal of location conditions for the movement by the institution (R&D) function. - The center facility is the same to the above C-1 type.	The Stanford researches Park (US), The Triangular Research Park (US), etc. Eniwa Research Park (Hokkaido pref. in Japan)
	(C-3) Office Park					○		○ ○	- Developer uses to maintain office parks for all an industrial business functions except the production facilities in suburbs. - In this area there are various center buildings maintained and the multiple urban function for the business support and living.	Arvida parkway center Fair Lakes Center

Source: JICA Study Team

- A-Type

Developer has used to maintain an industrial estate with set of housing zone for employee and industrial zone for production (two functions only; A1-type), in an out-of-the-way from urban area. This type was the first method of an arrangement plan of urban and industrial function.

Next, developer has used to maintain an industrial park (A2-type) by convenience facilities: sports and recreation facilities, green belts, traffic facilities, and shopping

center, etc. adding more to the A1-type and giving priority to life environment maintenance. An industrial new town (A3-type) is large-scale more by regional community and a part of regional political development by urban planning.

- B-Type

B-type is one of an industrial estate consolidating and relocating small and medium-size factory that generated naturally on a town by housing and factory coexistence.

- C-Type

A software park (C1-type) is one of political promotions to induce software industries of small and medium-sized enterprises. This type has various facilities for encouragement of enterprises; open laboratory, training facilities for human skill development, and incubation room, living room, convenience facilities. It is urban location type and takes a narrow site.

A science park and a research park (C2-type) have precise maintenance purpose of locating R&D enterprise and laboratory. In Europe and America, universities use to become development bodies and maintain this parks.

(2) Application of High-Tech Parks to Vietnam

To encourage high-tech industries by Vietnam has just started, but there are no urban functions in this planning site. Therefore, development of a proper high-tech park is basically different from methods using current facilities, like Bangalore City, China cities, and Kulim in Malaysia. On the other hands, Tsukuba research Gakuen Toshi in Japan and Hsinchu High-Tech Park in Taiwan is very large-scale case in a new place to relocate high-tech industries and laboratories and this case becomes a reference of high-tech parks planning in Vietnam.

<Maintenance method of high-tech parks>

High-tech industries dominate parks type with their location conditions. Each high-tech industry values location conditions as shown in the table below.

Required Location Conditions by High-Tech Factory and Laboratory (Japanese Case)

Function	Function Classification	Facility (example)	Characteristics of function	Traffic Condition			Land Use		Labor		Market		Urban Function		
				Expressway	Airport	Peripheral road	Office in urban	City	Local	Skilled Labor in	User	Supporting	University/laboratory	Information	Life culture
Factory	① Mass production function	Manufacturing factory	An ordinary factory type that mass-produces are produced with a scarcely type.	○	—	●	—	●	●	—	—	●	—	○	○
	② Many varieties & mass production function	High-Tech factory	High-tech factory type that mass-produces are produced with many types.	○	—	●	—	●	●	—	—	○	—	○	●
	③ R&D functions and factory functions	High-tech factory + R&D institutions	R&D institutions attached to High-tech factory type in the united area.	○	●	●	—	●	—	●	—	○	●	●	●
Institution	④ R&D of headquarters function in an enterprise	-Office building of headquarters adjacent -Center of laboratory Basic laboratory	-Laboratory of the generalization type which the basic researches field of the headquarters directs control. -Up-to-date technological information and the skilled researcher is very important for their activities.	○	○	●	—	●	—	●	—	●	●	○	○
	⑤ Special R&D function	-Office type (research branch) -Special laboratory in section	Special laboratory section that values the environment of the R&D and the skilled researcher at the selection of regional location site.	○	○	●	—	●	—	●	—	●	●	○	○
	⑥ Product style and design R&D function	-Office type (research branch) -R&D facility attached to a high-tech factory	-Special laboratory for the production development and design style adjusted to the mother factory. -It values the regional skilled researcher when they select the new location site.	○	—	●	—	●	●	○	—	●	●	○	○
	⑦ Software development	-Software Center -System development center	-It values the market for the software production. -It values the regional skilled software worker when they move onto the new location site.	○	—	●	—	●	●	○	○	●	●	○	○

● = Most important, ○ = Important, — = Not important

Source: JICA Study Team

When high-tech factory, laboratory, and software industry locates in a rural or provincial area, it values location conditions from a. to d. below according to above-mentioned table ; a. access road around, b. skilled worker, c. information service, d. life environment

It is necessary to maintain various functions to a high-tech park to fill these conditions of location in a region. Therefore, high-tech park making should maintain a city function and industrial facility like as an industrial park (A3-type) in Vietnam. And, it is necessary to take combined maintenance form named "Park within parks" prepares involving plural industrial zones with a clear purpose such as a software park (C1 type) and a science park and a research parks (C2 type).

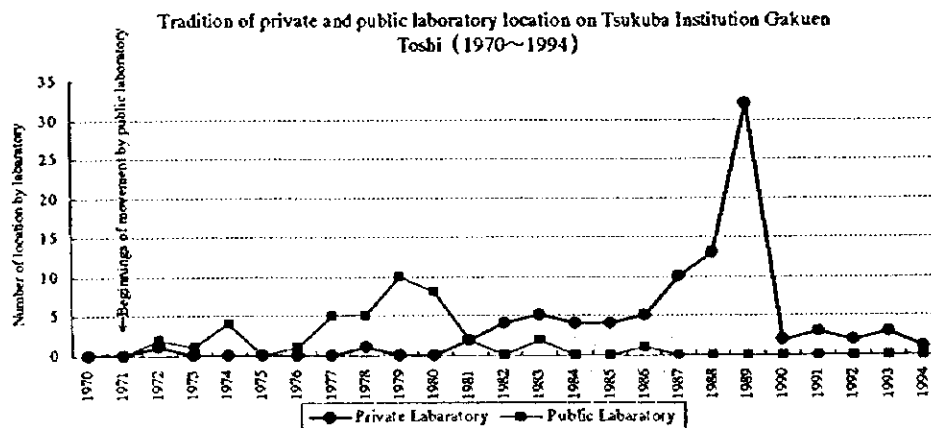
<High-tech laboratory as location target>

Hoa Lac High-Tech Park assumes relocation plan of Hanoi National University to be a big opportunity. Developer should make various key intelligent sites by not only a national university but also moving a public laboratory ahead for inducing private R&D institutions. In Japan, private laboratory located in Tsukuba institution Gakuen Toshi assumed movement to Tsukuba of public R&D institutions to be "Joining to Japan of the key facility", and evaluated proper Gakuen Toshi highly. This movement by public laboratories had following five reasons.

- Improving an image-up of enterprise.
- Speed-up of R&D schedule.
- To be easy to get latest technological information
- To be easy to get skilled researcher
- To be easy to approach to Tokyo metropolitan area

<Expectation for location schedule>

When thinking about a research institute location schedule in new Hoa Lac High-Tech Park, developer gets a law according to an experience of Tsukuba institution Gakuen Toshi. Figure below is a transition of private and public research facilities located in Tsukuba institution Gakuen Toshi. Private research institute had really delayed to move from 1981 in Tsukuba about as many as 10 years from 1971 when a public laboratory had begun to relocate in this Tsukuba. Especially, a private laboratory begins to move to Tsukuba actively later in 1986 about Tsukuba International Science Exposition (TISE) in 1985.



This reason is that the TISE has enhanced various infrastructures by urban function and road network around Tsukuba. 56 private laboratory every four years has located in this Tsukuba from 1986 until 1989, 100 or more in total located in Tsukuba. As the results, Tsukuba has taken them 30 years or more to complete "Tsukuba institution Gakuen Toshi" . According to this case, to induce a research function with high-tech enterprises, people can get knowledge to prioritize getting urban convenience and road networking. This Master Plan said that, at first, people should move public laboratory, maintain urban convenience, and road networking among all of functions, but inducing and moving a private R&D sector will become a long-term work and effort by Vietnam.

When maintaining Hoa Lac High-Tech Park, developer should refer to such an experience side and to schedule of each country in those past years.



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APPENDIX III ALTERNATIVE PLAN OF PHASE 1 AND FEASIBILITY STUDY

III.1 Alternative Plan of Phase 1

III.1.1 Development Principles of Alternative Plan

Alternative plan of Phase 1 is planned based on the development principles that the residential area will not be included in the tract of HHTP site, while the basic development plan is conceived to include New Town Zone in HHTP. The residential function necessary for the development of HHTP will depend on the Dong Xuan residential area which is planned to locate outside the HHTP beyond the highway interchange. The site designated for New Town Zone in the basic plan will be converted to High-Tech Industrial Zone in the alternative plan and the total area of High-Tech Industrial Zone will expand twofold.

The High Grade Residential Zone is planned to be expanded to cope with the increase of executive households number in relation to the enlargement of High-Tech Industrial Zone. The elimination of golf course planned in the basic plan is eliminated to designate the site for the expansion of residential area. The population in the High Grade Residential Zone is estimated at 2,200 or 5 % of the 46,000 population induced by Phase 1 of HHTP. Estimated number of employee and population are summarized below and presented in Table III-1-1 detailedly.

Work Opportunity in HHTP

Land Use	Work	
	Alternative	Basic Plan
1. R&D Zone	4,000	4,000
2. Center Area	200	200
3. High-Tech Industrial Zone	17,700	8,600
4. Urban/Business Zone	1,300	1,300
5. High Grade Residential Zone (commercial job)	100	100
6. New Town Zone (commercial job)	0	100
7. Total	23,300	14,300

Population

Land Use	Work	
	Alternative	Basic Plan
1. Induced Population	46,600	28,600
2. Population resided in HHTP	2,200	12,800
3. Ratio (2/1)	5%	45%

III.1.2 Land Use Plan

The land use plan of Phase 1 is tabulated in the table below and Table III-1-2. Figure III-1-1 presents detailed land use of the alternative plan.

Item	Area (ha)	(%)	Remarks
1) R&D Zone	121.6	15.3	
2) Center Area	12.2	1.5	
3) High-Tech Industrial Zone	141.2	17.8	
4) Urban/Business Zone	25.7	3.2	
5) High Grade Residential Zone	75.6	9.5	
6) New Town Zone	0.0	0.0	
7) Main road, sewage plant, etc.	91.2	11.5	Inclusive of retention pond
8) Park & green	160.1	20.2	
9) Tan Xa Lake	120.3	15.1	
10) Reserve Area	46.3	5.8	
Total	794.2	100.0	

III.1.3 Development Plan of Infrastructure

(1) Road

The total road length of alternative plan will be 29,700m as shown below, which is 3,800m shorter in comparison with the 33,500m of the basic plan. The reason of the shortening is the elimination of internal road designed in the New Town and main road running between the High-Tech industrial Zone and the New Town planned in the basic plan.

		Type by Road (ROW)							Total
		50 m	26 m	22 m	20 m	14 m	12 m	7.5 m	
I	Internal Road								
	1. R&D Zone		4,450			1,400			5,850
	2. Center Area								0
	3. High-Tech Industrial Park			2,445	4,080				6,525
	4. Urban/Business Zone								0
	5. High Grade Residential Zone			1,500	320	1,230	1,760		4,810
	6. New Town Zone								0
	7. Sub-Total	0	4,450	3,945	4,400	2,630	1,760	0	17,185
II	External Road	6,360	5,310			850 ^{/1}			12,520
III	Others	Expansion of Hanoi-Hoa Lac Highway (L=28.27 km, W=12 m→35.5 m), etc.							
IV	Total	6,360	9,760	3,945	4,400	3,480	1,760	0	29,705

Note: /1 Back yard road in Urban/Business Zone

/2 Service roads to the apartments in residential area are not included.

(2) Water Supply Facility

1) Design conditions

The water supply facilities for Phase 1 are comprised of distribution pumps, elevated tanks and water distribution pipes. The design flow rate for Phase 1 is assumed based on the water demand projection shown in Table III-1-3:

Design Conditions of the Water Supply Facilities in Phase 1
(Alternative Plan)

Items	Water Flow	Remarks
Daily average water demand (DAWD)	16,000 m ³ /day	
Daily average water consumption (DAWC)	19,200 m ³ /day	Unaccounted water ratio = 20 %
Daily maximum water consumption (DMWC)	23,040 m ³ /day	Daily fluctuation factor = 1.2
Hourly maximum water consumption (HMWC)	2,400 m ³ /hr	Hourly fluctuation factor = 2.5

The capacity of distribution pumps and distribution pipes in the respective zone is designed under the consideration for the fire-fighting water of 1.0 to 1.5 m³/min in addition to the ordinary water consumption.

The design criteria applicable for the alternative plan are the same as that for the selected plan.

2) Outline of the water supply facilities for Phase 1

The hydraulic design results, the layout plan and the main specifications of the water supply facilities for Phase 1 are shown in Table III-1-4 and XI-1-5, Figure III-1-2 and the table below, respectively:

**Main Specifications of the Water Supply Facilities in Phase 1
(Alternative Plan)**

Items	Specifications
1. High-Tech Industrial Zone	
Distribution pumps	10 m ³ /min x 90 kw x 5 sets (including 1 standby)
Distribution pipes	DIP 300 - 700mmDia x Total 8240mLength
2. Urban/Business Zone	
Distribution pumps	2.7 m ³ /min x 30 kw x 2 sets (including 1 standby)
Distribution pipes	DIP 100mmDia x Total 1860mLength
3. Center Area	DIP 100 - 200mmDia x Total 620mLength
4. R & D Zone	
Distribution pumps	5.4 m ³ /min x 55 kw x 3 sets (including 1 standby) (The pumps are commonly used for the R & D Zone, the HHTP Center and the High Grade Residential Zone)
Elevated tanks	100 m ³ x 1 set, 120 m ³ x 1 set (The 100m ³ elevated tank is commonly used for the R & D Zone and the HHTP Center Zone)
Distribution pipes	DIP 100 - 300mmDia x Total 8530mLength
5. High Grade Residential Zone	
Elevated tank	90 m ³ x 1 set
Distribution pipes	DIP 100 - 200mmDia x Total 3040mLength VP 75 mmDia x Total 970 mLength

(3) Sewerage and Drainage Facilities (Alternative)

1) Sewerage facilities (Alternative)

a) Design conditions

The sewerage facilities for Phase 1 are comprised of sewage pipes. Based on the water demand projection, design sewage flow is assumed as follows:

**Design Conditions of Sewerage Facilities in Phase 1
(Alternative Plan)**

Items	Water Flow	Remarks
Daily average wastewater (DAWW)	16,000 m ³ /day	
Daily maximum wastewater (DMWW)	23,040 m ³ /day	Groundwater infiltration = 20%
Hourly maximum wastewater (HMWM)	2,400 m ³ /hr	Daily fluctuation factor = 1.2 Hourly fluctuation factor = 2.5

The design criteria applicable for the alternative plan are the same as that for the selected plan.

b) Outline of the sewage facilities for Phase 1

The hydraulic design results, the layout plan and the main specifications of the sewerage facilities for Phase 1 are shown in Table III-1-6 and III-1-7, Figure III-1-3 and the table below, respectively:

**Main Specifications of Sewerage facilities in Phase 1
(Alternative Plan)**

Items	Specifications
1. High-Tech Industrial Zone Sewers	HCP 200 - 700mmDia x Total 8240mLength
2. Urban/Business Zone Sewers	HCP 200mmDia x Total 2040mLength
3. Center Area Sewers	HCP 200mmDia x Total 1250mLength
4. R & D Zone Sewers	HCP 200 - 500mmDia x Total 5840mLength
5. High Grade Residential Zone Relay pumps Sewers	HCP 200 - 300mmDia x Total 650mLength VP 150mmDia x Total 2290mLength

2) Drainage Facilities (Alternative)

a) Design conditions

The planning conditions and design criteria applicable are the same as that of the selected plan described in the section 7.6.3 (2) of Volume II.

b) Outline of the facilities for Phase 1

The hydraulic design results, the layout plan and the main specifications of the sewerage facilities for Phase 1 are shown in Table III-1-8 to Table III-1-11, Figure III-1-4 and the table below, respectively:

**Main Specifications of Drainage facilities in Phase 1
(Alternative Plan)**

Items	Specifications
1. High-Tech Industrial Zone Drains	U-Channel 400 - 1800mmWidth x Total 17510mLength
2. Urban/Business Zone Drains	HCP 600 - 1200mmDia x Total 2010mLength
3. Center Area Drains	U-Channel 400 - 1000mmWidth x Total 3380mLength
4. R & D Zone Drains	U-Channel 300 - 1200mmWidth x Total 10350mLength
5. High Grade Residential Zone Drains	HCP 400 - 1200mmDia x Total 4960mLength

(4) Electricity

1) Power demand

The power demand for Phase 1 of HHTP was estimated at 48.3MW for the basic plan and 69.3MW for the alternative plan, as shown below.

Power Demand Projection of Phase 1

	Basic plan				Alternative plan			
	Area (ha) Net Floor	House- hold	Unit Demand (MW/unit)	Electric Demand (MW)	Area (ha) Net Floor	House- hold	Unit Demand (MW/unit)	Electric Demand (MW)
1. R&D Zone	102			7.2	102			7.2
2.Center Area	12	1.2	0.6	0.7	12	1.2	0.6	0.7
3.High-Tech Industrial Zone	62			28.6	115			53.8
4.Urban/Business Zone	14	5.2	0.6	3.1	14	5.2	0.6	3.1
5.High Grade Residential Zone	10	265	0.003	0.8	25	545	0.003	1.6
6.New Town Zone	40	2,520	0.002	5.0	0			0
7.Water purification plant				0.4				0.4
8.Sewerage treatment plant				2.3				2.3
9.Drainage plant				0.2				0.2
Total				48.3				69.3

2) Power supply system

Electric power for HHTP will be supplied from the projected Xuan Mai substation (220/110kV, 2×125MVA) of EVN at a 110kV. The power supply

system for HHTP consists of a 110kV power transmission line, an on-site substation and the underground distribution facilities as mentioned below.

(a) Transmission line between the projected Xuan Mai substation and the new substation

- a) Line voltage : 110kV
- b) No. of circuit : 2 circuits
- c) Line length : Approximately 20 km, overheadline line
- d) Conductors : AC185 • (standard of EVN)

(b) New substation

- a) Location : At the southern border of HHTP
- b) Type : Conventional type
- c) Power Transformers : 2 × 40MVA (110/22kV) with on-load automatic tap changing equipment for line voltage drop compensation
- d) 22kV switchinggears : Indoor metal-clad type

(c) Underground distribution facilities

- a) Sub-transmission line between the new substation and switching stations : 24kV XLPE cable (95~300 mm)
- b) Switching station to be installed at each zone : Indoor metal-clad 22kV switchgear with housing
- c) Distribution line between the switching station and ring main switching units : 24kV XLPE cable (50~300 mm)
- d) Ring main switching unit to be constructed at the service entrance point of each consumer : Indoor metal-clad 22kV switchgear with housing
- e) Operation system : Automatic line sectionalize control system to secure a reliable power supply

The distribution plan for power supply is shown in Figure III-1-5.

(5) Telecommunications

1) Telecommunication demand

The telephone demand for Phase 1 of HHTP is estimated at 8840 lines for the basic plan and 5620 lines for the alternative plan, as shown below.

Telephone Demand Projection of Phase 1

	Basic plan				Alternative plan			
	Population (Employee)	House- hold	Unit Demand (Line/unit)	Telephone Demand (Line)	Population (Employee)	House- hold	Unit Demand (Line/unit)	Telephone Demand (Line)
1. R&D Zone	4,000		0.5	2,000	4,000		0.5	2,000
2.Center Area	200		0.5	100	200		0.5	100
3.High-Tech Industrial Zone	8,600		0.1	860	17,700		0.1	1,770
4.Urban/Business Zone	1,300		0.5	650	1,300		0.5	650
5.High Grade Residential Zone	1,100	(265)	0.5	550	2,200	545	0.5	1,100
6.New Town Zone	11,700	(2520)	0.4	4,680	0	0		0
Total				8,840				5,620

2) Telecommunication system1

The target of conceptual plan for the telecommunication system is to provide not only ordinary telephone service but also advanced services such as high speed digital data-communication.

In order to realize these services in the projected area, construction of a trunk line, a digital switching station and an access network will be required as follows.

(a) Trunk line interconnecting a new switching center of HHTP with main exchanges of Ha Dong and Hanoi City

- a) Transmission line : Optical fiber transmission system
- b) Trunk network : Ring network
- c) Line route and distance : Hanoi - Ha Dong - HHTP - Hanoi (approx. 90km)

(b) New switching station

- a) Location : In HHTP Center
- b) Required from space : Air conditioned room with 100 m² floor area
- c) Exchange capacity : 5620 lines for alternative plan

(c) Access network

- a) Provided service : Telephone , Fax., hi-speed data, and computer telecommunication
- b) Access network : Loop network by optical fiber cable
- c) Switching equipment : Remote terminal system in each zone
- d) Distribution network : Underground optical fiber cable and copper cable

The distribution plan for the telecommunication system is shown in Figure III-1-6.

III.1.4 Development Cost

The development cost of the alternative plan of Phase 1 is estimated at USD 558 million. The external portion for the main road in HHTP, water purification plant, sewage treatment plant, etc. costs USD 265 million. The portion for public zones and profitable zones including housing and building will amount to USD 74 million and USD 219 million, respectively. The detailed estimation of the development cost by the development area is shown in Table III-1-12.

Development Cost of Phase 1 (Alternative Plan)

	(unit: USD million)								
	Total			Infrastructures			Building		
	Total	Foreign Currency	Local Currency	Total	Foreign Currency	Local Currency	Total	Foreign Currency	Local Currency
1. External Infrastructure	265.09	143.96	121.13	265.09	143.96	121.13	-	-	-
2. Public Zones	73.89	25.19	48.71	29.16	11.77	17.40	44.73	13.42	31.31
3. Profitable Zones	218.82	70.69	148.13	45.41	18.67	26.75	173.40	52.02	121.38
Total	557.80	239.83	317.97	339.66	174.39	165.27	218.14	65.44	152.70

Note: /1 Inclusive of engineering service cost and physical contingency
/2 Exclusive of price contingency

III.2 Project Evaluation

III.2.1 Financial Evaluation

In this Study, the discussion is focused on the financial evaluation for the development plan of the Basic Plan and the Alternative Plan in Phase 1 of HHTP.

The financial evaluation in this Study aims at assessing the financial viability of the investments in the construction of Phase 1 of HHTP, from the viewpoint of the Developer of R&D Zone (Software Park), High-Tech Industrial Zone, Urban/Business Zone, High Grade Residential Zone and the whole HHTP (4 Zones in total).

The projects of R&D Zone (Institute Sub-Zone), Center Area, New Town Zone and Central Park shall be developed as public works, because these projects are considered to be non-profitable and high public benefit.

The financial evaluation of the project of New Town Zone is made, because the project has a possibility of profitable.

In addition to the above mentioned analysis, the financial viability of the investments in the construction of Phase 1 of HHTP, is evaluated from the viewpoint of the Project (7 Zones in total).

(1) Concept of Financial Evaluation Method

The Project is evaluated in terms of "Financial Internal Rate of Return (FIRR)" based on the cashflow streams of revenues and expenses/costs. The internal rate of return is the discount rate at which the present value of cash inflows is equal to the present value of cash outflows. In other words, it is the discount rate at which the present value of the net receipts from the Project is equal to the present value of the investments. All inputs and outputs are valued at the market prices (current prices).

The construction cost and building cost of each zone in HHTP is supposed to be financed through equities and/or long-term debts. The loan repayability is evaluated on the basis of the sources and uses-of-funds statements.

1) Viability for the Developer

Viability for the Developer of R&D Zone (Software Park)

The construction cost of R&D Zone (Software Park) in HHTP is the main financial outflow from the point of view of the Developer. The income from software park lot sales is the main financial inflow for the Developer.

Viability for the Developer of High-Tech Industrial Zone

The construction cost of High-Tech Industrial Zone in HHTP is the main financial outflow from the point of view of the Developer. The income from factory lot sales is the main financial inflow for the Developer.

Viability for the Developer of Urban/Business Zone

The construction and building cost of Urban/Business Zone in HHTP is the main financial outflow from the point of view of the Developer. The income from floor rents of commercial building in Urban/Business Zone is the main financial inflow for the Developer.

Viability for the Developer of New Town Zone

The construction cost and building cost of houses such as detached house, row house, medium rise apartment, high rise apartment and shop house in New Town Zone are the main financial outflow from the point of view of the Developer. The income from sales of various houses is the main financial inflow for the Developer.

Viability for the Development Project of High Grade Residential Zone

The construction cost and building cost of high grade houses such as detached house, and apartment in HHTP are the main financial outflow from the point of view of the Developer. The income from rents of high grade houses is the main financial inflow for the Developer.

Viability for the Developer of HHTP (4 or 5 Zones in total)

The construction cost and building cost of 4 or 5 Zones in total is the main financial outflow from the point of view of the Developer. The cumulative income of 4 or 5 Zones is the main financial inflow for the Developer.

2) Viability for the Development Project

Viability for the Development Project of HHTP (7 Zones in total)

The construction cost and building cost of 7 Zones in total is the main financial outflow from the point of view of the Project. The cumulative income of 5 Zones (R&D Zone (Software Park), High-Tech Industrial Zone, Urban/Business Zone, New Town Zone and High Grade Residential Zone) is the main financial inflow for the Project.

(2) Preconditions for Financial Analysis

(a) Construction cost of external infrastructure

The scope and construction cost of external infrastructure is described in the previous chapter. The cost is assumed to be borne by the State Budget or the Provincial Budget. It may be inevitable to raise fund from the international financial institutions.

(b) Construction cost of internal infrastructure of each zone in HHTP

The construction cost of R&D Zone (Software Park), High-Tech Industrial Zone, Urban/Business Zone, and High Grade Residential Zone in Phase 1 of HHTP is to be borne by the Developer.

This cost is inclusive of direct construction cost as a major financial outflow from the viewpoint of the Project. In this Study, the administrative cost and O&M cost are assumed to be offset by collecting other fee for administrative and O&M.

(c) Replacement Cost

The replacement is considered for the water supply facilities, sewerage facilities and drainage facilities of internal infrastructure of R&D Zone (Software Park), High-Tech Industrial Zone, Urban/Business Zone and High Grade Residential Zone in Phase 1 of HHTP once in 20 years and for the electric facilities and telecommunication facilities of internal infrastructure of these zones once in 30 years, taking the length of their economic life into consideration.

(d) Land rents cost of 1st Phase of HHTP

The land rents cost of R&D Zone, High-Tech Industrial Zone, Urban/Business Zone, and High Grade Residential Zone in Phase 1 of HHTP can be calculated by setting up unit cost of land rents. In case of foreign investment project, the unit cost of land rents is set at 0.5625 USD/m²/year* based on "Regulations on Rent of Land, Water, and Sea Surfaces for Foreign Investment Projects issued in conjunction with Decision No.1417 TC/TCDN dated 31 December 1994 of the Minister of Finance".

$$\begin{aligned} \text{*(Land rent)} &= (\text{Basic rate}) \times (\text{Coefficient of location}) \times (\text{Coefficient of} \\ &\quad \text{infrastructure}) \times (\text{Coefficient of industrial sector}) \\ &= 0.375 \times 1.0 \times 1.5 \times 1.0 = 0.5625(\text{USD/m}^2/\text{year}) \end{aligned}$$

Taking that the HHTP project is a national project into consideration, the unit cost of land rents will be set at less than 0.5625 USD/m²/year under the approval of the Prime Minister in fact through the discussion between the JICA Study Team and the General Department of Land Administration.

On the other hand, the land rents of the existing industrial zones located in the Northern Area are shown as follows:

IZ	Land Rents (USD/m ² /year)	Remark
Nomura IZ	0.2	(Permitted by GOV)
North Thang Long IZ	0.13	(Required by HPC)

Source: MOSTE

Considering above, it is proposed to be set the following 2 cases as the basic rate in this Study.

Case	Land Rents (USD/m ² /year)
Case 1	0.375
Case 2	0.100

(e) Compensation and relocation cost

The compensation and relocation cost of Phase 1 area (794.2 ha) of HHTP is estimated on the basis of "The Investigations and Calculations for the Cost of Compensation and Relocation" conducted by the NISTPASS and is estimated at approximately 8.3 million USD and 4.7 million USD in total, respectively. The detailed compensation and relocation cost of each zone is shown in Table III-2-1-Table III-2-12.

(f) Taxation

Several taxes, such as corporate tax, import duties, property tax, value-added tax in association with the transactions traded during the period of the infrastructure construction in and outside HHTP and during the period of the HHTP project operation, are supposed to be imposed on the Developers.

On the other hand, according to General Tax Department, the Developers has a possibility of tax exemption from import fees, customs duty and other taxes and fees on conditions of the approval of Prime Minister, because the HHTP project is a national project.

In this Study, they are assumed to be subject to tax exemption at this stage of the Study, taking a possibility of totally tax exemption and uncertainties of taxation related to this kind of infrastructure construction into consideration.

(g) Lot sales/lease price and facility sales/lease price in HHTP

Sales price of factory lot to enterprises/investors in High-Tech Industrial Zone

The sales price of factory lot to enterprises/investors will be assumed at a reasonable price, being well competitive compared with that in Vietnam and other Asian countries (Table III-2-13 and III-2-14), is the most influential factor which affects the financial viability of the Project, fully depending on the market conditions. The price of lot sales to enterprises/investors located in the industrial estates in Vietnam is ranged from 42 USD/m² to 120 USD/m². Besides the average price of lot sales to enterprises/investors located at the industrial estates in and around metropolitan area of other ASEAN countries is ranged from 50 USD/m² to 60 USD/m².

Considering competitiveness with other industrial estates based on the circumstances mentioned above, the sales price of factory lot is set at 45 USD/m² at current price in this Study.

Sales price of institute lot to enterprises/investors in R&D Zone (Software Park)

The sales price of software park lot to enterprises/investors is generally same as that of factory lot. Therefore, the sales price of institute lot in R&D Zone (Software Park) is set at 45 USD/m² in this Study.

Space rental price of business office in Urban/Business Zone

Taking that the rental price of existing business office, which is located in the suburbs of Hanoi City, is ranged from about 20 to 30 USD/m²/month into consideration, the space rental price of business office in Urban/Business Zone is set at 20 USD/m²/month in this Study.

Rental price of detached house and apartment in High Grade Residential Zone

According to Japan External Trade Organization (JETRO), the average rental price of detached house with a floor area of 150 m² for foreigners located in Hanoi is 3,200 USD/unit/month (21 USD/m²/month). Based on the price per area, the rental price of detached house with a floor area of 200 m² for foreigners in High Grade Residential Zone is set at 50,400 (=21 × 200 × 12) USD/unit/year.

The rental price of apartment with a floor area of 150 m² can be assumed at 36,000 USD/unit/year by means of a ratio of the construction cost per unit of detached house to that of apartment.

Sales price of houses in New Town Zone

The average sales price of apartment (medium-rise) with a floor area of about 60 m² located in Hanoi is approximately 50,000USD/unit. Based on the price, the sales price of apartment (medium-rise) with a floor area of about 72 m² in New Town Zone is set at the same price as the existing apartment (medium-rise), that is 50,000 USD/unit.

The sales price of the other houses can be assumed on the basis of a ratio of the construction cost per unit of apartment (medium-rise) to that of each house. The sales prices of the detached house, row house, apartment (high-rise), and shop house are set at 117,000USD/unit, 93,000USD/unit, 61,000USD/unit, and 111,000USD/unit, respectively.

(h) Levy for administrative and utility services

The levy for administrative and utility services is assumed to be equal to administrative cost and O&M cost for utility operation.

(i) Lots or facilities sales/lease projection of Phase 1 of HHTP

① Basic Plan

The lots or facilities sales/lease projection of Phase 1 in Basic Plan is assumed as below. The lots or facilities sales/lease in four zones exclusive of R&D Zone (Software Park) is assumed to take 5 years. The sales of software park lot in R&D Zone (Software Park) is projected to take 10 years due to the results of the investment demand survey.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
R&D Zone (Software Park)	5%	15%	10%	10%	10%	10%	10%	10%	10%	10%
High-Tech Industrial Zone	5%	35%	30%	20%	10%	-	-	-	-	-
Urban/Business Zone	-	5%	35%	30%	20%	10%	-	-	-	-
High Grade Residential Zone	-	5%	35%	30%	20%	10%	-	-	-	-
New Town Zone	-	5%	35%	30%	20%	10%	-	-	-	-

② Alternative Plan

The factory lots area in High-Tech Industrial Zone in Alternative Plan is expanded to be about twice as large as that in Basic Plan. The factory lot sales in Alternative Plan is assumed to take 7 years.

The High Grade Residential Zone in Alternative Plan has no golf course and about twice the houses units of Basic Plan. It is advantage for sales

promotion that the detached houses and apartment with the golf course can be promoted to sell in Basic Plan. However, it is disadvantage for sales promotion of houses without golf course in Alternative Plan. Therefore, the detached houses and apartment lease in Alternative Plan is assumed to take 10 years as shown below.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
R&D Zone (Software Park)	5%	15%	10%	10%	10%	10%	10%	10%	10%	10%
High-Tech Industrial Zone	5%	25%	20%	15%	15%	10%	10%	-	-	-
Urban / Business Zone	-	5%	35%	30%	20%	10%	-	-	-	-
High Grade Residential Zone	-	-	5%	5%	10%	15%	20%	20%	15%	10%

(j) Funds Arrangement

The sources of funds will be composed of own equity of the Developer (J/V between SOEs and J/V partner (FDI)), external soft loan and private bank loan. The amount allocated to each source of funds is assumed as follows:

- Own finance of SOEs --- Equivalent to land rent cost, compensation and relocation cost
- Own finance of FDI --- 30% of construction cost
- External soft loan --- $60\% \times (70\% \text{ of construction cost})$
- Private bank loan --- $40\% \times (70\% \text{ of construction cost})$

(k) Loan Conditions

The condition of external soft loan is assumed as follows:

- Interest rate --- 3.0%
- Repayment periods --- 25 years
- Grace periods --- 10 years
- The repayment of interest shall be made during the construction periods.

The condition of private bank loan is assumed as follows based on SIBOR (Singapore Inter Bank Official Rate):

- Interest rate --- 9%
- Repayment periods --- 10 years
- Grace periods --- 3 years
- The repayment of interest shall be made during the construction periods.

(l) Escalation

All the costs are assumed to escalate at an annual rate of 2% for the foreign currency portion and 3% for the local currency portion. All the revenues are assumed to escalate at an annual rate of 2.7%, which is the weighted average between all the costs of the foreign currency portion and the local currency portion.

(3) Results of Financial Analysis

1) Financial Internal Rate of Return (FIRR)

Under the preconditions mentioned above, the FIRR is calculated as shown in the following tables and summarized below.

① Basic Plan

(a) Viability for the Developer

Viability for the Developer of R&D Zone (Software Park)

The resulting FIRR of 16.5% in Case 1 and 20.6% in Case 2 indicates that the development project of R&D Zone (Software Park) is financially viable.

Viability for the Developer of High-Tech Industrial Zone

The development project of High-Tech Industrial Zone has a FIRR of 14.5% in Case 1 and 20.6% in Case 2 and is financially viable. The FIRRs are calculated as shown in Table III-2-15 and Table III-2-16.

Viability for the Developer of Urban/Business Zone

The development project of Urban/Business Zone with a FIRR of 17.1% in Case 1 and 17.3% in Case 2 is financially viable.

Viability for the Developer of High Grade Residential Zone

The resulting FIRR of 12.0% in Case 1 and 12.4% in Case 2 indicates that the development project of High Grade Residential Zone is financially viable.

Viability for the Developer of New Town Zone

The result of computation shows that the FIRR for any cases is not available to be computed, which shows that the development project of New Town Zone is not financially viable with its currently planned conditions.

Viability for the Developer of HHTP (4 Zones in total)

The whole development project of HHTP (4 Zones in total: R&D Zone (Software Park), High-Tech Industrial Zone, Urban/Business Zone, High Grade Residential Zone) with a FIRR of 14.4% in Case 1 and 14.9% in Case 2, is financially viable. The FIRRs are calculated as shown in Table III-2-17 and Table III-2-18.

For reference, the whole development project of HHTP (5 Zones in total) has a FIRR of 10.6%, 10.8% and 10.9% in Case 1 and a FIRR of 11.0%, 11.1% and 11.3% in Case 2, which corresponds to three alternative cases for the development project of New Town Zone and is deemed financially viable.

(b) Viability for the Development Project

Viability for the Development Project of HHTP (7 Zones in total)

The whole development project of HHTP (7 Zones in total: R&D Zone (Institute Sub-Zone), R&D Zone (Software Park), Center Zone, High-Tech Industrial Zone, Urban/Business Zone, High Grade Residential Zone, New Town Zone) has a FIRR of 9.3% in Case 1 and 10.0% in Case 2 as shown in Table III-2-19 and Table III-2-20 and is deemed financially viable because of nearly 10%.

Results of FIRR Computation (Basic Plan: Case 1 (Land Rent; 0.375 USD/m²/y))

1 Viability for the Developer

1-1 FIRR of Each Zone

		Compensation Cost Bearing		Land Rents (0.375 USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	R&D Zone (Software Park)	○		○		○		45.0 USD/m ²	Case RD-S	16.5%
2	High-Tech Industrial Zone	○		○		○		45.0 USD/m ²	Case IP	14.5%
3	Urban/Business Zone	○		○		○		20.0 USD/m ² /month	Case UB	17.1%
4	High Grade Residential Zone	○		○		○		50,400 USD/Unit/y (Detached House)	Case HGR	12.0%
5	New Town Zone	○		○		○		50,000 USD/Unit (Apart. Medium)	Case NT-1	N.A.
		○			○	○		50,000 USD/Unit (Apart. Medium)	Case NT-2	N.A.
			○		○	○		50,000 USD/Unit (Apart. Medium)	Case NT-3	N.A.

1-2 FIRR of Whole HHTP

			Sales/Lease Conditions	Cases	FIRR (%)
1	HHTP(4 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year	Case ZT	14.4%
2	HHTP(5 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)X(Case NT-1)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-1	10.6%
		(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)X(Case NT-2)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-2	10.8%
		(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)X(Case NT-3)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-3	10.9%

2 Viability for the Project

2-1 FIRR of Whole HHTP

		Compensation Cost Bearing		Land Rents (0.375 USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	HHTP(7 Zones Total)	○		○		○		R&D(Institute Lot):0USD/m ² , R&D(SW):45USD/m ² , HHTP Center:0USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-a	9.3%

Results of FIRR Computation (Basic Plan: Case 2 (Land Rent; 0.100 USD/m²/y))

1 Viability for the Developer

1-1 FIRR of Each Zone

		Compensation Cost Bearing		Land Rents (0.100 USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	R&D Zone (Software Park)	○		○		○		45.0 USD/m ²	Case RD-S	20.6%
2	High-Tech Industrial Zone	○		○		○		45.0 USD/m ²	Case IP	20.6%
3	Urban/Business Zone	○		○		○		20.0 USD/m ² /month	Case UB	17.3%
4	High Grade Residential Zone	○		○		○		50,400 USD/Unit/y (Detached House)	Case HGR	12.4%
		○		○		○		50,000 USD/Unit (Apartment Medium)	Case NT-1	N.A.
5	New Town Zone	○			○	○		50,000 USD/Unit (Apartment Medium)	Case NT-2	N.A.
			○		○	○		50,000 USD/Unit (Apartment Medium)	Case NT-3	N.A.

1-2 FIRR of Whole HHTP

			Sales/Lease Conditions	Cases	FIRR (%)
1	HHTP(4 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year	Case ZT	14.9%
		(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)X(Case NT-1)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apartment):50,000USD/Unit	Case ZT-1	11.0%
2	HHTP(5 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)X(Case NT-2)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apartment):50,000USD/Unit	Case ZT-2	11.1%
		(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)X(Case NT-3)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apartment):50,000USD/Unit	Case ZT-3	11.3%

2 Viability for the Project

2-1 FIRR of Whole HHTP

		Compensation Cost Bearing		Land Rents (0.100 USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	HHTP(7 Zones Total)	○		○		○		R&D(Institute Lot):0USD/m ² , R&D(SW):45USD/m ² , HHTP Center:0USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apartment):50,000USD/Unit	Case ZT-a	10.0%

② Alternative Plan

(a) Viability for the Developer

Because the Alternative Plan has the different land use and facilities plans in High-Tech Industrial Zone and High Grade Residential Zone compared with the Basic Plan, the viability concerned with these zones has been changed as follows.

Viability for the Developer of High-Tech Industrial Zone

The result of computation shows that the FIRR in Case 1 is not available to be computed, which shows that the development project of High-Tech Industrial Zone is not financially viable. The resulting FIRR of 12.6% in Case 2 indicates that the project is financially viable.

Viability for the Developer of High Grade Residential Zone

The resulting FIRR of 11.5% in Case 1 and 11.7% in Case 2 indicates that the development project of High Grade Residential Zone is financially viable.

Viability for the Developer of HHTP (4 Zones in total)

The whole development project of HHTP (4 Zones in total: R&D Zone (Software Park), High-Tech Industrial Zone, Urban/Business Zone, High Grade Residential Zone) with a FIRR of 12.9% in Case 1 and a FIRR of 13.4% in Case 2 is financially viable.

(b) Viability for the Development Project

Viability for the Development Project of HHTP (6 Zones in total)

The whole development project of HHTP (6 Zones in total: R&D Zone (Institute Sub-Zone), R&D Zone (Software Park), Center Zone, High-Tech Industrial Zone, Urban/Business Zone, High Grade Residential Zone) has a FIRR of 11.6% in Case 1 and 12.2% in Case 2 and is deemed financially viable.

Results of FIRR Computation (Alternative Plan: Case 1 (Land Rent; 0.375USD/m2/y))

1 Viability for the Developer

1-1 FIRR of Each Zone

		Compensation Cost Bearing		Land Rents (0.375 USD/m2/y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	R&D Zone (Software Park)	○		○		○		45.0 USD/m2	Case RD-S	16.5%
2	High-Tech Industrial Zone	○		○		○		45.0 USD/m2	Case IP	N.A
3	Urban / Business Zone	○		○		○		20.0 USD/m2/month	Case UB	17.1%
4	High Grade Residential Zone	○		○		○		50,400 USD/Unit/y (Detached House)	Case HGR	11.5%

1-2 FIRR of Whole HIIP

				Sales/Lease Conditions	Cases	FIRR (%)
1	HIIP(4 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)		R&D(SW):45 USD/m2, IE:45 USD/m2, UB:20 USD/m2/month, HGR(Detached HL):50,400 USD/Unit/year	Case ZT	12.9%

2 Viability for the Project

2-1 FIRR of Whole HIIP

		Compensation Cost Bearing		Land Rents (0.375USD/m2/y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	HIIP(6 Zones Total)	○		○		○		R&D(Institute Lot):0 USD/m2, R&D(SW):45 USD/m2, HIIP Center:0 USD/m2, IE:45 USD/m2, UB:20 USD/m2/month, HGR(Detached HL): 50,400 USD/Unit/year	Case ZT-a	11.6%

Results of FIRR Computation (Alternative Plan: Case 2 (Land Rent; 0.100USUSD/m2/y))

1 Viability for the Developer

1-1 FIRR of Each Zone

		Compensation Cost Bearing		Land Rents (0.100 USD/m2/y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	R&D Zone (Software Park)	○		○		○		45.0 USD/m2	Case RD-S	20.6%
2	High-Tech Industrial Zone	○		○		○		45.0 USD/m2	Case IP	12.6%
3	Urban / Business Zone	○		○		○		20.0 USD/m2/month	Case UB	17.3%
4	High Grade Residential Zone	○		○		○		50,400 USD/Unit/y (Detached House)	Case HGR	11.7%

1-2 FIRR of Whole IHFTP

					Sales/Lease Conditions	Cases	FIRR (%)
1	IHFTP(4 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)			R&D(SW):45 USD/m2, IE:45 USD/m2, UB:20 USD/m2/month, HGR(Detached H):50,400 USD/Unit/year	Case ZT	13.4%

2 Viability for the Project

2-1 FIRR of Whole IHFTP

		Compensation Cost Bearing		Land Rents (0.100 USD/m2/y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	IHFTP(6 Zones Total)	○		○		○		R&D(Institute Lot):0 USD/m2, R&D(SW):45 USD/m2, IHFTP Center:0 USD/m2, IE:45 USD/m2, UB:20 USD/m2/month, HGR(Detached H): 50,400 USD/Unit/year	Case ZT-a	12.2%

2) Repayability

The sources and uses-of-funds statements of the development project of High-Tech Industrial Zone and the whole development project of HHTP (4 Zones in total) in Basic Plan (Case 1) are prepared as shown in Table III-2-21 and Table III-2-22 for the examination of loan repayability, respectively.

According to the table of the statements of the development project of High-Tech Industrial Zone, the annual loan repayment can be done from the factory lot sales revenue. The repayment of the external soft loan and the private bank loan will be finished in 2023 and in 2008, respectively. As the statement shows in the column of cumulative net cashflow, it is expected that the Developer can afford to repay both the external soft loan and the private bank loan.

According to the table of the statements of the whole development project of HHTP (4 Zones in total), the repayment of the external soft loan and the private bank loan will be finished in 2023 and in 2008, respectively. As the statement shows in the column of current surplus, it is expected that there will be no years of deficit to the Developer caused by the whole development project of HHTP (4 Zones in total). This means that the Developer can afford to repay both the external soft loan and the private bank loan.

3) Results of Sensitivity Analysis

A sensitivity test is conducted the following two cases in Basic Plan and Alternative Plan.

(a) Sensitivity of viability for the Developer (increasing cost: 10-20%)

This case corresponds to the case that several taxes, such as corporate tax, import duties, property tax, value-added tax in association with the transactions traded during the period of the infrastructure construction in and outside HHTP, are supposed to be imposed on the Developers.

(b) Sensitivity for the Developer (delay case of investment schedule of High-Tech Industrial Zone)

	2001	2002	2003	2004	2005	2006	2007
High Tech Industrial Zone (Normal Case)	5%	35%	30%	20%	10%	-	-
High Tech Industrial Zone (Delay Case)	5%	25%	20%	15%	15%	10%	10%

The results of FIRR computation are as shown below.

Sensitivity Analysis of FIRR Computation (Basic Plan: Case 1 (Land Rent; 0.375 USD/m²/y))

1 Sensitivity of Viability for the Developer (Increasing Cost)

1-1 FIRR of Each Zone (Increasing Cost)

		Compensation Cost Bearing		Land Rents (0.375USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
		IDCs	Public	IDCs	Public	IDCs	Public			FIRR (%)	FIRR (%)
1	R&D Zone (Software Park)	○		○		○		45.0USD/m ²	Case RD-S	13.5%	10.4%
2	High-Tech Industrial Zone	○		○		○		45.0USD/m ²	Case IP	N.A.	N.A.
3	Urban / Business Zone	○		○		○		20.0USD/m ² /month	Case UB	15.8%	14.6%
4	High Grade Residential Zone	○		○		○		50,400USD/Unit (Detached House)	Case HGR	11.0%	10.1%
5	New Town Zone	○		○		○		50,000USD/Unit (Apart. Medium)	Case NT-1	N.A.	N.A.
		○			○	○		50,000USD/Unit (Apart. Medium)	Case NT-2	N.A.	N.A.
			○		○	○		50,000USD/Unit (Apart. Medium)	Case NT-3	N.A.	N.A.

1-2 FIRR of Whole HHTP (Increasing Cost)

		Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
				FIRR (%)	FIRR (%)
1	HHTP(4 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year	Case ZT	13.1% 11.9%
2	HHTP(5 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-1)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-1	9.1% 7.9%
		(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-2)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-2	9.2% 8.0%
		(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-3)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-3	9.4% 8.1%

2 Viability for the Project (Increasing Cost)

2-1 FIRR of Whole HHTP (Increasing Cost)

		Compensation Cost Bearing		Land Rents (0.375USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	Cost +10%	Cost +20%
		IDCs	Public	IDCs	Public	IDCs	Public			FIRR (%)	FIRR (%)
1	HHTP(7 Zones Total)	○		○		○		R&D(Institute Lot):0USD/m ² , R&D(SW):45USD/m ² , HHTP Center:0USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-a	8.0%	6.9%

Note: IDCs means Infrastructure Development Companies.

Sensitivity Analysis of FIRR Computation (Basic Plan: Case 1 (Land Rent; 0.375 USD/m²/y))

3 Viability for the Developer (Investment Schedule of High-Tech Industrial Zone: Delay Case)

3-1 FIRR of Each Zone (Investment Schedule of High-Tech Industrial Zone: Delay Case)

		Compensation Cost Bearing		Land Rents (0.375 USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	R&D Zone (Software Park)	○		○		○		45.0 USD/m ²	Case RD-S	16.5%
2	High-Tech Industrial Zone	○		○		○		47.0 USD/m ²	Case IP	10.0%
3	Urban/Business Zone	○		○		○		20.0 USD/m ² /month	Case UB	17.1%
4	High Grade Residential Zone	○		○		○		50,400 USD/Unit/y (Detached House)	Case HGR	12.0%
		○		○		○		50,000 USD/Unit (Apart. Medium)	Case NT-1	N.A.
5	New Town Zone	○			○	○		50,000 USD/Unit (Apart. Medium)	Case NT-2	N.A.
			○		○	○		50,000 USD/Unit (Apart. Medium)	Case NT-3	N.A.

3-2 FIRR of Whole HHTP (Investment Schedule of High-Tech Industrial Zone: Delay Case)

			Sales/Lease Conditions	Cases	FIRR (%)
1	HHTP(4 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)	R&D(SW):445USD/m ² , IE:47USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year	Case ZT	14.3%
		(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-1)	R&D(SW):45USD/m ² , IE:47USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-1	10.5%
2	HHTP(5 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-2)	R&D(SW):45USD/m ² , IE:47USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-2	10.7%
		(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-3)	R&D(SW):45USD/m ² , IE:47USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-3	10.9%

4 Viability for the Project (Investment Schedule of High-Tech Industrial Zone: Delay Case)

4-1 FIRR of Whole HHTP (Investment Schedule of High-Tech Industrial Zone: Delay Case)

		Compensation Cost Bearing		Land Rents (0.375 USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	HHTP(7 Zones Total)	○		○		○		R&D(Institute Lot):0USD/m ² , R&D(SW):45USD/m ² , HHTP Center:0USD/m ² , IE:47USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-a	9.3%

Sensitivity Analysis of FIRR Computation (Basic Plan: Case 2 (Land Rent; 0.100 USD/m²/y))

1 Sensitivity of Viability for the Developer (Increasing Cost)

1-1 FIRR of Each Zone (Increasing Cost)

		Compensation Cost Bearing		Land Rents (0.375USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
		IDCs	Public	IDCs	Public	IDCs	Public			FIRR (%)	FIRR (%)
1	R&D Zone (Software Park)	○		○		○		45.0USD/m ²	Case RD-S	17.6%	14.9%
2	High-Tech Industrial Zone	○		○		○		45.0USD/m ²	Case IP	15.5%	N.A.
3	Urban / Business Zone	○		○		○		20.0USD/m ² /month	Case UB	15.9%	14.7%
4	High Grade Residential Zone	○		○		○		50,400USD/Unit (Detached House)	Case HGR	11.3%	10.4%
5	New Town Zone	○		○		○		50,000USD/Unit (Apart. Medium)	Case NT-1	N.A.	N.A.
		○			○	○		50,000USD/Unit (Apart. Medium)	Case NT-2	N.A.	N.A.
			○		○	○		50,000USD/Unit (Apart. Medium)	Case NT-3	N.A.	N.A.

1-2 FIRR of Whole HHTP (Increasing Cost)

		Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
				FIRR (%)	FIRR (%)
1	HHTP(4 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year	Case ZT	13.5% 12.3%
2	HHTP(5 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-1)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-1	9.5% 8.2%
		(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-2)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-2	9.5% 8.3%
		(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-3)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-3	9.7% 8.4%

2 Viability for the Project (Increasing Cost)

2-1 FIRR of Whole HHTP (Increasing Cost)

		Compensation Cost Bearing		Land Rents (0.100USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	Cost +10%	Cost +20%
		IDCs	Public	IDCs	Public	IDCs	Public			FIRR (%)	FIRR (%)
1	HHTP(7 Zones Total)	○		○		○		R&D(Institute Lot):0USD/m ² , R&D(SW):45USD/m ² , HHTP Center:0USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-a	8.6%	7.4%

Note: IDCs means Infrastructure Development Companies.

Sensitivity Analysis of FIRR Computation (Basic Plan: Case 2 (Land Rent; 0.100 USD/m²/y))

3 Viability for the Developer (Investment Schedule of High-Tech Industrial Zone: Delay Case)

3-1 FIRR of Each Zone (Investment Schedule of High-Tech Industrial Zone: Delay Case)

		Compensation Cost Bearing		Land Rents (0.100 USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	R&D Zone (Software Park)	○		○		○		45.0 USD/m ²	Case RD-S	20.6%
2	High-Tech Industrial Zone	○		○		○		45.0 USD/m ²	Case IP	14.5%
3	Urban/Business Zone	○		○		○		20.0 USD/m ² /month	Case UB	17.3%
4	High Grade Residential Zone	○		○		○		50,400 USD/Unit/y (Detached House)	Case HGR	12.4%
		○		○		○		50,000 USD/Unit (Apart. Medium)	Case NT-1	N.A.
5	New Town Zone	○			○	○		50,000 USD/Unit (Apart. Medium)	Case NT-2	N.A.
			○		○	○		50,000 USD/Unit (Apart. Medium)	Case NT-3	N.A.

3-2 FIRR of Whole HHTP (Investment Schedule of High-Tech Industrial Zone: Delay Case)

		Sales/Lease Conditions	Cases	FIRR (%)
1	HHTP(4 Zones Total) (Case RD-S)X(Case IP)X(Case UB)X(Case HGR)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year	Case ZT	14.7%
	(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-1)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-1	10.9%
2	HHTP(5 Zones Total) (Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-2)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-2	11.0%
	(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)X(Case NT-3)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-3	11.2%

4 Viability for the Project (Investment Schedule of High-Tech Industrial Zone: Delay Case)

4-1 FIRR of Whole HHTP (Investment Schedule of High-Tech Industrial Zone: Delay Case)

		Compensation Cost Bearing		Land Rents (0.100 USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	FIRR (%)
		IDCs	Public	IDCs	Public	IDCs	Public			
1	HHTP(7 Zones Total)	○		○		○		R&D(Institute Lot):0USD/m ² , R&D(SW):45USD/m ² , HHTP Center:0USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H.):50,400USD/Unit/year, NT (Apart-m):50,000USD/Unit	Case ZT-a	9.9%

Sensitivity Analysis of FIRR Computation (Alternative Plan: Case 1 (Land Rent; 0.375 USD/m²/y))

1 Sensitivity of Viability for the Developer (Increasing Cost)

1-1 FIRR of Each Zone (Increasing Cost)

		Compensation Cost Bearing		Land Rents (0.375USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
		IDCs	Public	IDCs	Public	IDCs	Public			FIRR (%)	FIRR (%)
1	R&D Zone (Software Park)	○		○		○		45.0 USD/m ²	Case RD-S	13.5%	10.4%
2	High-Tech Industrial Zone	○		○		○		45.0 USD/m ²	Case IP	N.A.	N.A.
3	Urban / Business Zone	○		○		○		20.0 USD/m ² /month	Case UB	15.8%	14.6%
4	High Grade Residential Zone	○		○		○		50,400 USD/Unit/y (Detached House)	Case HGR	10.7%	10.0%

1-2 FIRR of Whole HHTP (Increasing Cost)

			Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
					FIRR (%)	FIRR (%)
1	HHTP (4 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X(Case HGR)	R&D(SW):45USD/m ² , IE:45USD/m ² , UB:20USD/m ² /month, HGR(Detached H):50,400USD/Unit/year	Case ZT	11.9%	10.9%

2 Viability for the Project (Increasing Cost)

2-1 FIRR of Whole HHTP (Increasing Cost)

		Compensation Cost Bearing		Land Rents (0.375USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
		IDCs	Public	IDCs	Public	IDCs	Public			FIRR (%)	FIRR (%)
1	HHTP (7 Zones Total)	○		○		○		R&D(Institute Lot):0 USD/m ² , R&D(SW):45 USD/m ² , HHTP Center:0 USD/m ² , IE:45 USD/m ² , UB:20 USD/m ² /month, HGR(Detached H):50,400 USD/Unit/year, NT (Apartment):50,000USD/Unit/year	Case ZT-a	10.7%	9.8%

Note: IDCs means Infrastructure Development Companies.

Sensitivity Analysis of FIRR Computation (Alternative Plan: Case 2 (Land Rent; 0.100 USD/m²/y))

1 Sensitivity of Viability for the Developer (Increasing Cost)

1-1 FIRR of Each Zone (Increasing Cost)

		Compensation Cost Bearing		Land Rents (0.100USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
		IDCs	Public	IDCs	Public	IDCs	Public			FIRR (%)	FIRR (%)
1	R&D Zone (Software Park)	○		○		○		45.0 USD/m ²	Case RD-S	17.6%	14.9%
2	High-Tech Industries Zone	○		○		○		45.0 USD/m ²	Case IP	N.A.	N.A.
3	Urban / Business Zone	○		○		○		20.0 USD/m ² /month	Case UB	15.9%	14.7%
4	High Grade Residential Zone	○		○		○		50,400 USD/Unit/y (Detached House)	Case HGR	10.8%	10.1%

1-2 FIRR of Whole IBITP (Increasing Cost)

FIRR of Work Item (Increasing Cost)						
			Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
					FIRR (%)	FIRR (%)
1	IBITP(4 Zones Total)	(Case RD-S)X(Case IP)X(Case UB)X (Case HGR)	R&D(SW):45USD/m2, IE:45USD/m2, UB:20USD/m2/month, HGR(Detached H):50,400USD/Unit/year	Case ZT	12.3%	11.3%

2 Viability for the Project (Increasing Cost)

2-1 FIRR of Whole IBITP (Increasing Cost)

		Compensation Cost Bearing		Land Rents (0.100USD/m ² /y) Bearing		Construction Cost Bearing		Sales/Lease Conditions	Cases	Cost+10%	Cost+20%
		IDCs	Public	IDCs	Public	IDCs	Public			FIRR (%)	FIRR (%)
1	IBITP (7 Zones Total)	○		○		○		R&D(Institute Lot): 0 USD/m ² , R&D(SW): 45 USD/m ² , IBITP Center: 0 USD/m ² , IE: 45 USD/m ² , UB: 20 USD/m ² /month, HGR(Detached H): 50,400 USD/Unit/year, NT (Apartment): 50,000USD/Unit/year	Case ZT-a	11.2%	10.3%

Note: IDCs means Infrastructure Development Companies.

(4) Conclusion of Financial Evaluation

As presented in this section, each three zone such as R&D Zone (Software Park), Urban / Business Zone, High Grade Residential Zone from the viewpoint of the Developer have the FIRR of more than 10% in both Basic Plan and Alternative Plan. Concerned with High-Tech Industrial Zone, the FIRR is calculated to be more than 10% in case of less than 0.375 USD/m²/year of land rent in Basic Plan. Judging from the FIRR of HHTP (4 Zones Total) of more than 10% in both Basic Plan and Alternative Plan, it can be said to prove the financial feasibility of this project from the viewpoint of the Developer.

Besides it is not considered to be feasible for the Developer to develop the project of New Town Zone, because the project is not financially viable with its currently planned conditions.

The whole project of the Phase 1 of HHTP has the FIRR of nearly 10% in Basic Plan and more than 10% in Alternative Plan from the viewpoint of the project. Therefore, it can be said to prove the financial feasibility of the whole project of HHTP.

III.2.2 Economic Evaluation

(1) Economic Impact

The development project of HHTP will generate many economic effects, which will enhance socio-economic conditions not only Hoa Lac Area but also whole Vietnam.

1) Classification of economic impact/effect

The economic impact/effect can be classified as follows:

- (a) Direct effects caused by the construction of HHTP and related external infrastructure,
- (b) Effect caused by establishment of legal system on high-tech industrial promotion and organizations for HHTP,
- (c) Influence of high technology and industrial promotion upon other industries,
- (d) Impact for regional development.
 - ① Effect for economic development caused by industrial linkage among Hoa Lac, surrounding four cities and Ha Tay Province

- ② Relaxation of congestion in Hanoi caused by establishment of a newly developed city center

2) Characteristics of economic impact/effect and benefit

The economic benefit is defined to convert the effect into currency. The characteristics of economic impact/effect and benefit are summarized below.

- ① There are direct and indirect benefit.
- ② A majority of benefit has high uncertainty. (The economic impact/effect is greatly influenced by the external factor such as the policy of the Vietnamese Government and the trends of world economy.)
- ③ It is difficult to convert the amount of the economic impact/effect into currency.

3) Concept of economic impact/effect and benefit

The concept of the economic impact/effect and benefit is mentioned as follows.

(a) Direct effects caused by the construction of HHTP and related external infrastructure

- ① Sales of industrial production
- ② Net incremental production values
- ③ Increase of employment
- ④ Benefit caused by integration of high-tech industries
- ⑤ Interface function among industry-university-government

In this Study, net incremental production values approach is adopted for the economic evaluation in the next section.

(b) Impact/Effect caused by establishment of legal system on high-tech industrial promotion and organizations for HHTP

- ① Impact/Effect caused by establishment of legal system on high-tech industrial promotion
 - Strengthening of legal protection of intellectual property such as industrial property, copyright, designs and trademark rights

- Promotion of technology transfer (introduction, safekeeping, utilizing and transmission of technology)
 - Promotion of commercialization through R&D activity
 - Installation of investment incentives for high-tech enterprises
 - Establishment of soft loans funds for small and medium industries
 - Strengthening of assistance of venture business and tax incentives for venture capital
- ② Impact/Effect caused by establishment of organizations for HHTP
- Strengthening of R&D organizations (unification of organizations, strengthening of coordination of organizations)
 - Rationalization of registration, management and utilization system for intellectual property
- (c) Influence of high technology and industrial promotion upon other industries
- ① Influence of high technology upon other industries
 - ② Strengthening of international competitiveness of overall industries caused by installation of high-tech machinery and equipment
 - ③ Creation of newly private enterprises
 - ④ Creation of job opportunity caused by creation of newly high-tech industries
 - ⑤ Increase of export of high-tech products
 - ⑥ Improvement of performance, quality, international competitiveness of industrial products in whole Vietnam caused by influence of high technology
- (d) Impact for regional development.
- ① Increase of gross regional product (GRP) and employment caused by industrial linkage among Hoa Lac, surrounding four cities and Ha Tay Province

- ② Relaxation of congestion in Hanoi caused by establishment of a newly developed city center

(2) Economic Evaluation (EIRR)

In this Study, the discussion is focused on the economic evaluation of the development plan of the Basic Plan and the Alternative Plan in the Phase 1 of HHTP.

In this Study, the economic evaluation aims at assessing the economic feasibility of the project from the viewpoint of the regional/national economy, in which the high-tech industrial (production) output to be generated in High-Tech Industrial Zone in Phase 1 of HHTP will be a dominant factor for the analysis.

In principle, the economic feasibility is evaluated in terms of economic internal rate of return (EIRR).

1) Concept of Economic Evaluation Method

The benefit of the High-Tech Industrial Zone development could be evaluated by comparison of productivity between the current VA, mainly, agricultural production ("without Project") and VA, the high-tech industrial production ("with Project").

EIRR is calculated on a cashflow basis, consisting of the following;

Economic Cost

- (+) Construction cost of internal infrastructure of 1st Phase of High-Tech Industrial Zone
- (+) Construction cost of external infrastructure of HHTP
- (+) Construction cost of factory building by investors
- (+) Investment cost of machinery and equipment by investors

Economic Benefit

- (+) VA in Phase 1 of HHTP
- (-) VA (Agricultural production) in Phase 1 of HHTP

(2) Preconditions for Economic Cost

Economic cost which is the cost for the country as a whole rather than the Developer, will be obtained by deducting transfer payment comprising net indirect taxes and profit, from the financial cost. No escalation shall be considered for economic cost.

(a) Construction Cost of Internal Infrastructure of Phase 1 of HHTP and External Infrastructure

The construction cost of internal infrastructure of Phase 1 of HHTP and external infrastructure can be obtained by conversion of the financial cost.

(b) Construction Cost of Factory Building by Investors

Based on "Asia Pacific Construction Costs Handbook edited by Davis Langdon & Seah International", the cost of the factory building for high-tech industries per building floor area is assumed to be 1,000 USD/m².

Assuming 40% for a coverage ratio of the building site, the construction cost of the factory buildings is estimated 246.4 million USD in Basic Plan and 460.0 million USD in Alternative Plan, respectively.

(c) Investment Cost of Machinery and Equipment Asset

The capital investment by sector to be required to induce such high-tech industrial production can be estimated based on the past historical performance in other Asian countries, that is, the trend of "machine/equipment asset per employee". The value of "machine/equipment asset per employee" is tentatively estimated at 100,000 USD/employee.

As the number of employees in High-Tech Industrial Zone is estimated to be about 8,634 persons in Basic Plan and 17,764 persons in Alternative Plan, the investment cost of machine/equipment asset buildings is estimated 863.4 million USD in Basic Plan and 1776.4 million USD in Alternative Plan, respectively.

(d) Replacement Cost

The replacement is considered for the water supply facilities, sewerage facilities, drainage facilities of internal infrastructure of Phase 1 of HHTP and external infrastructure once in 20 years.

The replacement of the factory buildings and machinery/equipment is considered once in 20 years and once in 10 years, respectively.

The other replacement is, due to the length of their economic life, not considered during the evaluation period of 30 years.

(3) Preconditions for Economic Benefit of High-Tech Industrial Zone Development

(a) Estimate of GDP (mainly Agricultural Production)

According to "The Socio-Economic Survey Report" prepared by the National Institute of Science Technology Policy Strategy (NISTPASS) in May 1997, the agriculture and forestry land area in the Phase 1 of HHTP amounts to approximately 600 ha.

Taking that the productivity in Thach That District which covers 5 communes of the project site is VND 18.4 million/ha into consideration, the current GDP in Phase 1 of HHTP is estimated to be VND 10,920 million as shown in Table III-2-23.

As a results of estimation of the GDP in the future based on the growth rate during the past 10 years, the GDP in Phase 1 of HHTP is estimated to be 1.64 million USD in 2010 and 2.62 million USD in 2020 as shown in Table III-2-24.

(b) Estimation of Industrial Production

The high-tech industrial productivity in Basic Plan and Alternative Plan is assumed to grow in terms of "net product per numbers of employees" as shown in Table III-2-25 and Table III-2-26.

VA in Basic Plan and Alternative Plan is estimated to be 394.0 million USD in 2005 and 697.6 million USD in 2007. For the generation of benefit, it is assumed that the factory lots will be fully sold out within 5 years in Basic Plan and within 7 years in Alternative Plan as the same conditions of financial evaluation.

Taking the growth of labor productivity of high-tech industries mentioned in section 6.1.5 of Volume II into consideration, the annual growth rate of VA (high-tech industrial production) is assumed as below.

Basic Plan	2005-2010	2010-2020	2020-
Annual Growth Rate of VA (Industrial Production)	1.084	1.059	1.033

Alternative Plan	2007-2010	2010-2020	2020-
Annual Growth Rate of VA (Industrial Production)	1.084	1.059	1.033

(c) Comparison between Agricultural Production and Industrial Production

The ratio of productivity will further increase to more than 1:360 in 2010 in Basic Plan when the factories in Phase 1 of High-Tech Industrial Zone of HHTP are in full operation.

	2010	2020
VA (Agricultural production) (million USD/year)	1.64	2.62
VA (High-tech industrial production) (million USD/year)	591.00	1,047.21
Ratio	1:360	1:400

(4) Results of Economic Analysis

1) EIRR

① Basic Plan

Nevertheless the whole cost concerned with the HHTP project is considered for the economic evaluation, the EIRR is calculated to be 25.9% as shown in Table III-2-27 and is economically viable. This indicates that the development project of High-Tech Industrial Zone in Phase 1 of HHTP in Basic Plan will have a significant impact in whole Vietnam.

② Alternative Plan

The resulting EIRR of 28.0 % indicates that the development project of High-Tech Industrial Zone in Phase 1 of HHTP in Alternative Plan is economically viable as shown in Table III-2-28.

2) Results of Sensitivity Analysis

A sensitivity test is conducted the following two cases in Basic Plan and Alternative Plan.

- (a) Varying both the construction cost and benefit (high-tech industrial production)
- (b) Varying the unit investment cost of machinery and equipment

The results of EIRR computation are as shown below.

① Sensitivity of EIRR of Basic Plan

	Cost (Normal Case)	Cost (+10%)	Cost (+20%)
High-tech Industrial Production (Normal Case)	25.9	24.8	23.8
High-tech Industrial Production (-10%)	13.8	12.7	11.6
Investment Cost of Machinery and Equipment per Employees (200,000 USD/Person)	17.9	17.4	16.8

② Sensitivity of EIRR of Alternative Plan

	Cost (Normal Case)	Cost (+10%)	Cost (+20%)
High-tech Industrial Production (Normal Case)	28.0	27.2	26.4
High-tech Industrial Production (-10%)	18.2	17.3	16.5
Investment Cost of Machinery and Equipment per Employees (200,000 USD/Person)	16.8	16.5	16.2

(5) Conclusion of Economic Evaluation

Nevertheless the whole cost concerned with the HHTP project is considered for the economic evaluation, the EIRRs of more than 10% of the opportunity cost are derived through the EIRR computation in both Basic Plan and Alternative Plan. This indicates that the development project of the Phase 1 of HHTP including High-Tech Industrial Zone will have a significant impact in whole Vietnam.

Even if the construction cost, benefit, or the investment cost of machinery and equipment have been varied to the worth case for the analysis, the EIRRs are calculated to be more than 10%. Therefore, it can be said to prove the economic feasibility of the development project of the Phase 1 of HHTP including High-Tech Industrial Zone.