

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT
SOCIALIST REPUBLIC OF VIETNAM

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

FINAL REPORT

SUMMARY

MARCH 1998

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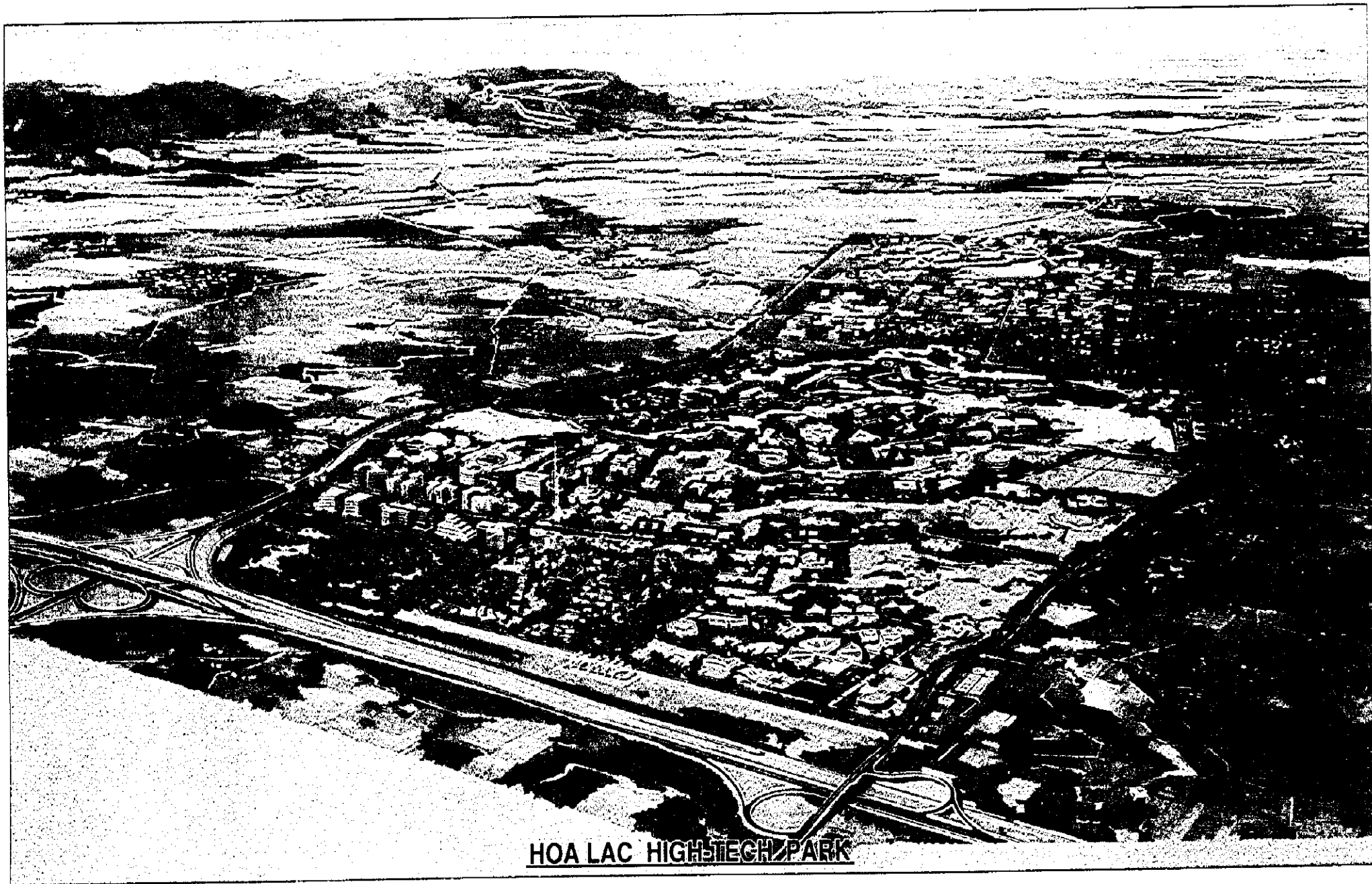
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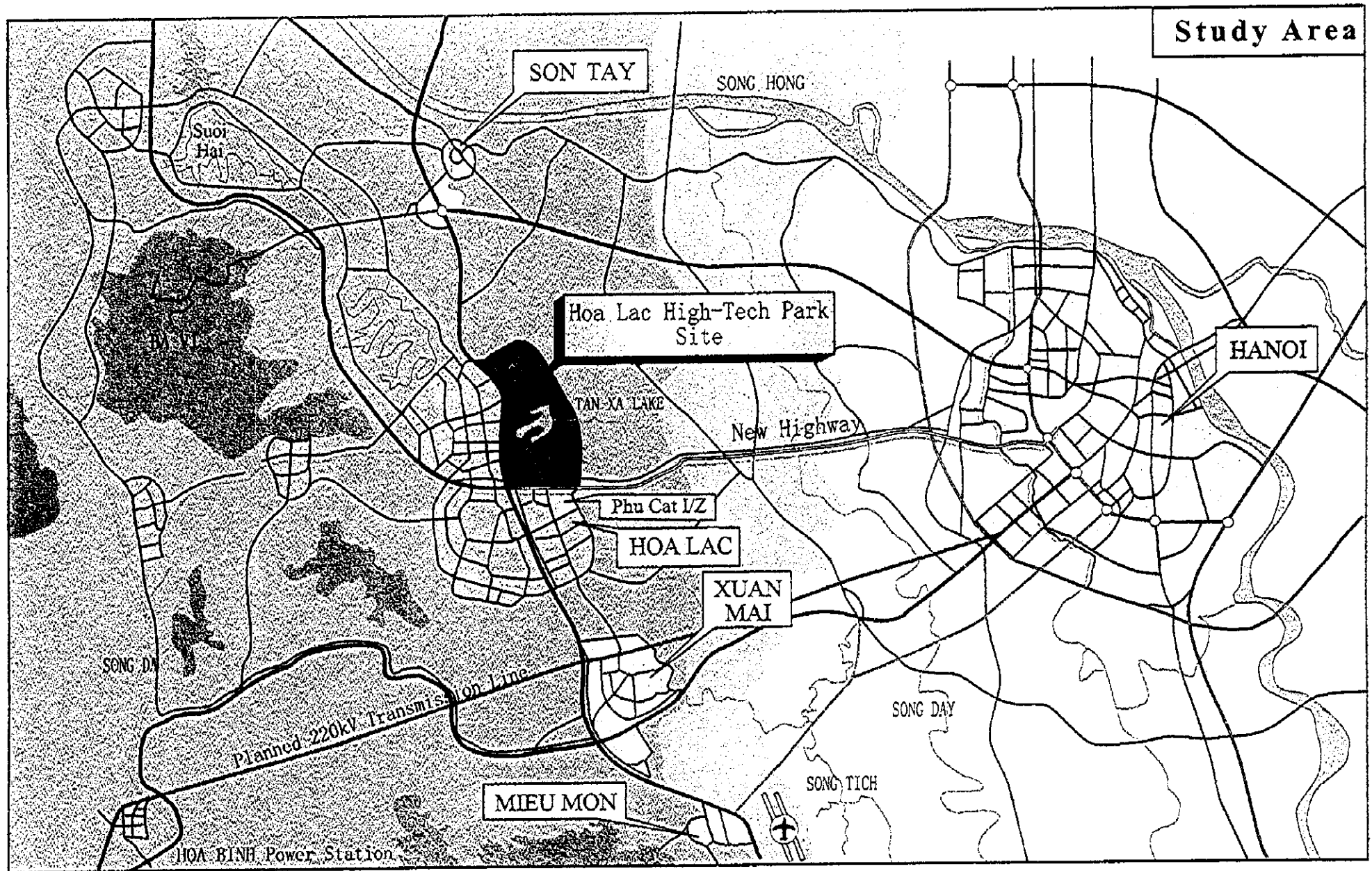


ESTIMATE OF PROJECT COST

Estimate of Base Cost : As of October 1997 Price Level
Currency Exchange Rate : USD1 = VND11,700 = Yen 120



HOA LAC HIGHTECH PARK



LOCATION MAP

PREFACE

In response to a request from the Government of the Socialist Republic of Vietnam, the Government of Japan decided to conduct a development study on the Master Plan and Feasibility Study on the Hoa Lac High-Tech Park Project in the Socialist Republic of Vietnam and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Vietnam a study team twice headed by Mr. Akagawa, Nippon Koei Co., Ltd. and constituted by members of Nippon Koei Co., Ltd., Japan Industrial Location Center and Pacific Consultants International from December 1996 to September 1997.

The team held discussions with the officials concerned of the Government of Vietnam, and conducted a field study. After the team returned to Japan, further studies were made. Then, a mission was sent to Vietnam in order to discuss a draft report and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Socialist Republic of Vietnam for their close cooperation extended to the team.

Mar, 1998



Kimio Fujita

President

Japan International Cooperation Agency

March 1998

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

LETTER OF TRANSMITTAL

Dear Sir,

We have the pleasure of submitting to you the Final Report of "The Master Plan and Feasibility Study on the Hoa Lac High-Tech Park Project in the Socialist Republic of Vietnam".

This report presents the results of the study that was carried out for a total period of 16 months from December 1996 to March 1998, by the Study Team composed of Nippon Koei Co., Ltd., Japan Industrial Location Center and Pacific Consultants International in accordance with the contract concluded with your Agency.

The report consists of (1) a master plan for high-tech industry promotion policy, and (2) a master plan on the Hoa Lac High-Tech Park and a feasibility study focused on its initial development.

On this occasion, we would like to express our deep appreciation and sincere gratitude to all those who extended their kind assistance and cooperation to the Study Team, in particular the officials concerned from the Ministry of Science, Technology and Environment of the Government of Vietnam and Steering Committee. We also would like to extend our acknowledgements to the officials of your Agency, the Ministry of Foreign Affairs, the Ministry of International Trade and Industry, and the Embassy of Japan in Vietnam. We cordially appreciate the cooperation of Professor. T. Yoshimi (Kobe-Gakuin Univ.) and Professor. Y. Okamoto (Hosei Univ.).

We hope the report will realistically contribute to the future high-tech industrial development in Vietnam.

Sincerely yours,



Masatoshi AKAGAWA
Team Leader for
The Master Plan and Feasibility Study on
the Hoa Lac High-Tech Park Project in
the Socialist Republic of Vietnam

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ABBREVIATIONS

Government of Vietnam/Public Institutions

CD	: Customs Department
CEPD	: Committee for Economic Planning and Development
DGPT	: Department General of Posts and Telecommunications
DOSTE	: Department of Science, Technology and Environment
DUT	: Da Nang University of Technology
EPC	: Environmental Protection Center
EVN	: Electricity of Vietnam
FCC	: Field Clearance Committee
FPT	: Financing and Promoting Technology Corporation
FZ-IDC	: Functional Zone Infrastructure Development Company
GDLA	: General Department of Land Administration
HCM-HTP	: Ho Chi Minh High Tech Park
HCMP	: Ho Chi Minh People's Committee
HCMPT	: Ho Chi Minh Posts and Telecommunications
HCMUT	: Ho Chi Minh University of Technology
HHTP	: Hoa Lac High-Tech Park
HHTP-BOM	: Hoa Lac High-Tech Park Board of Management
HHTP-IDC	: Hoa Lac High-Tech Park Infrastructure Development Company
HHTP-SC	: Hoa Lac High-Tech Park Steering Committee
HIU	: Hanoi International University
HN-PC	: Ha Noi People's Committee
HPT	: Hanoi Posts and Telecommunications
HT-P	: Ha Tay Province
HT-PC	: Ha Tay People's Committee
HTPC	: High-Tech Park Center
HUT	: Hanoi University of Technology
IMI	: Institute for Machinery and Industrial Instruments
IOE	: Institute of Energy
ITRI	: Industrial Technology Research Institute
MOC	: Ministry of Construction
MOET	: Ministry of Education and Training
MOF	: Ministry of Finance
MOFA	: Ministry of Foreign Affairs

MOI	: Ministry of Industry
MOLISA	: Ministry of Labor, Invalids and Social Affairs
MOSTE	: Ministry of Science, Technology and Environment
MOT	: Ministry of Trade
MOTC	: Ministry of Transport and Communications
MPI	: Ministry of Planning and Investment
NACENTEC	: National Center for Technical Progress
NCIA	: National Committee of Industrial Areas
NCSS	: National Center of Social Science
NCST	: National Center for Science and Technology
NEA	: National Environmental Agency
NISTPASS	: National Institute for Science and Technology Policy and Strategy Studies
NOIP	: National Office of Industrial Property
NUH	: National University Hanoi
NUHCM	: National University Ho Chi Minh
OOG	: Office of Government
PB	: Project Bureau
PC	: People's Committee
PM	: Prime Minister
PMU	: Project Management Unit
QUATEST	: Technical Centers for Quality Assurance-Testing-Measurement
RDC	: Regional Development Committee
SC	: Steering Committee
SCCI	: State Committee for Cooperation and Investment
SPC	: State Planning Committee
STAMEG	: Directorate for Standards and Quality
VDC	: Vietnam Data Company
VNPT	: Vietnam Posts and Telecommunications
VNUH	: Vietnam National University - Hanoi
VTI	: Vietnam Telecoms International
VTN	: Vietnam Telecoms National

International Organizations/Foreign Organizations

AFTA	: ASEAN Free Trade Area
AIT-CV	: Asian Institute of Technology - Vietnam Campus

APEC	: Asia-Pacific Economic Caucus
ASEAN	: Association of Southeast Asian Nations
CEPD	: Committee for Economic Planning and Development (Taiwan)
IEAT	: Industrial Estate Authority of Thailand
IUCN	: International Union for the Conservation of Nature
JETRO	: Japan External Trade Organization
JICA	: Japan International Cooperation Agency
MBC	: Malaysia Business Council
MIDA	: Malaysian Industrial Development Authority
ODA	: Official Development Assistance
OECD	: Organization for Economic Cooperation and Development
OECF	: Overseas Economic Cooperation Fund (Japan)
SIDA	: Swedish International Development Program
UNDP	United Nations Development Program
UNIDO	: United Nations Industrial Development Organization
WTO	: World Trade Organization

Others

APITD	: Action Plan for Industrial Technology Development
ASIC	: Applied Specific Integrated Circuit
BAW	: Business/Administration Wing
BCC	: Business Cooperation Contract
BI	: Brain-Intensive Industry
BLT	: Build Lease Transfer
BOD	: Biological Oxygen Demand
BOT	: Build Operate Transfer
CAD	: Computer Aided Design
CAE	: Computer Aided Education
CAM	: Computer Aided Manufacturing
CBR	: California Bearing Ratio
CKD	: Complete Knock Down
CNC	: Computer Numerical Control
COD	: Chemical Oxygen Demand
COE	: Center of Excellence
CP	: Cleaner Production
CRTs	: Cathode-Ray Tubes

DAWD	: Daily Average Water Demand
DAWW	: Daily Average Wastewater
DMWW	: Daily Maximum Wastewater
EIA	: Environmental Impact Assessment
EIRR	: Economic Internal Rate of Return
EOP	: End-of-Pipe
EPE	: Export Processing Enterprise
EPZ	: Export Processing Zone
FC	: Foreign Companies
FDI	: Foreign Direct Investment
FIRR	: Fiscal Internal Rate of Return
F/S	: Feasibility Study
GDP	: Gross Domestic Product
GIS	: Geographic Information System
GRP	: Gross Regional Product
GVA	: Gross Value Added
HMWC	: Hourly Maximum Water Consumption
HMWW	: Hourly Maximum Wastewater
HTIZ	: High-Tech Industrial Zone
IAA	: Industrial Adjustment Allowance
ICA	: Industry Coordination Act
IKD	: Incomplete Knock Dawn
INTECH	: Initiative in New Technologies
IT	: Information Technology
ITA	: Investment Tax Allowance
ITRI	: Industrial Technology Research Institute
IZ	: Industrial Zone
JEIB	: Japan Export-Import Bank
JV	: Joint Venture
KLSE	: Kuala Lumpur Stock Exchange
LASER	: Light Amplification by Stimulated Emission of Radiation
LSI	: Large Scale Integration
MDAS	: Manpower Development Assistance Scheme
MPU	: Microprocessor Unit
MSL	: Mean Sea Level
NC	: Numeric Control
NH	: National Highway

NIC	: North Industrial Corridor
NIES	: Newly Industrialized Economies
NPESD	: National Plan for Environment and Sustainable Development
NRI	: National Research Institute
NSC	: National Software Center
NTP	: National Technology Plan
OCR	: Optical Character Recognition
OJT	: On the Job Training
PCB	: Printed Circuit Board
PCU	: Passenger Car Unit
PFI	: Productive Factor Intensiveness
R&D	: Research and Development
RDAS	: Research and Development Assistance Scheme
RDIL	: Research and Development Input Level
RISC	: Research Incentive Scheme for Companies
RIZ	: Red River Delta Industrial Development Zone
S&T	: Science and Technology
SDAS	: Software Development Assistance Scheme
SDF	: Skills Development Fund
SEP	: Strategic Economic Plan
SMEs	: Small and Medium-sized Enterprises
SOEs	: State-Owned Enterprises
SPM	: Suspended Particulate Matter
SS	: Suspended Solids
STC	: Science Technology Corridor
STP	: Scientific Technology Project
TPW	: Techno-Partnership Wing
TQM	: Total Quality Management
TW	: Township Wing
VA	: Value Added
VC	: Vietnamese Company
VCIE	: Venture Capital Investment Enterprises
VLSI	: Very Large Scale Integration
VOCs	: Volatile Organic Compounds

I. BACKGROUND AND OBJECTIVES OF THE STUDY

1.1 Background

Aiming at narrowing the economic gap between Vietnam and the other ASEAN countries, Government of Vietnam has established the policy framework, emphasizing ①Human resources development, ②High-tech industry development, ③Infrastructure development, ④Institutional and administrative reforms. For the development of the high-tech industries, electronics, telecommunications, bio-technology and new material are selected as target fields which should be placed priority for the development for the coming 5 years till the beginning of 21st century.

Though currently Vietnamese Government is strongly promoting the introduction of the foreign direct investment (FDI) as a part of the development efforts for the growth of industries, FDI has been relatively concentrated in the southern region including Ho Chi Minh city.

In order to expand the industrial activities in the northern region, in particular in and around the capital city of Hanoi while avoiding the over-concentration of population and industries within the city, Vietnamese Government has set up a policy of establishing satellite cities, around 30 km to the west of Hanoi, Hoa Lac city being the biggest one. A high-tech park should be constructed within the city, inviting the high-tech industries and research institutes.

Under these circumstances, the Government of Vietnam made a request for conducting a master plan and feasibility study on the high-tech park to the Government of Japan in March, 1996. In response, Japan International Cooperation Agency (JICA) sent a mission to Vietnam and the Scope of Work for the Study was agreed and signed between JICA and the Ministry of Science, Technology and Environment in October, 1996.

1.2 Objectives of the Study

The objectives of the Study are;

- 1) To prepare a policy master plan which should include the recommendations on high-tech industry promotion, science and technology development and investment promotion after reviewing the existing policies and relevant development plans,

- 2) In line with the direction of the above policy master plan, to prepare a development master plan for the Hanoi (Ha Tay) High-Tech Park, having the tract of about 1,800 ha with the target year of 2020, and
- 3) To conduct a feasibility study on the initial development area of the Hoa Lac High-Tech Park.

II. DEVELOPMENT POLICIES FOR THE HIGH-TECH INDUSTRIES

2.1 Necessity and Potential of the High-Tech Development

2.1.1 Necessity of High-Tech Industry Development

High-tech industries being typical high value-added ones, development of high-tech industries directly leads to the growth of GDP (growth domestic product) and generation of employments. Developed hi-technologies will be applied to other industries and upgrade the international competitiveness of the Vietnamese products. The introduction of hi-technologies requires strong legal and institutional frameworks for their protection while high-tech production necessitates high level production control and quality control. All these will bring about the beneficial effects to the improvement of the other industries.

As a member of ASEAN, Vietnam is scheduled to lower sharply the import custom duties including the industrial products by the year 2006. Consequently, Vietnamese products will be forced to compete with the imported products of various origins inside the country.

Major beneficial effects of the development of hi-technologies and high-tech industries are shown below:

(1) Direct Effects

- 1) GDP growth,
- 2) Increase of exports, import substitution and resulting improvement of the trade balance, and
- 3) Employment generation

(2) Indirect Effects

- 1) Improvement of the legal framework including the protection of intellectual property right and technology transfer,
- 2) Development of the institutional framework including the administrative setup for the registration and utilization of the industrial property right and licenses and financial assistance for the small and venture enterprises,

- 3) Strengthening of organizational structure for the research and development including the cooperation among the universities, state research institutes and enterprises,
- 4) Various spillover effects over the whole economy of the country, applying the developed hi-technologies and making use of high-tech products, and
- 5) Promotion of the FDI and participation into the international division-of-labor system.

2.1.2 Potential of the Development of High-Tech Industries in Vietnam

Generally, high-tech industrialization starts after reaching the full growth as an industrial nation. Vietnam should run the high hurdles to achieve the objective, lacking developed hi-technologies, capital accumulation, management know-how and others. On the other hand, high-tech industries can be said as fit for the development in Vietnam, considering the followings and the objective could be met, if appropriate policies be formulated and measures be taken with utmost efforts.

1) Weight of R&D and high quality labor

R&D (research and development) is given the largest weight in the development of the high-tech industries. With relatively big number of research institutes, higher education institutes and researchers as well as relatively high quality labor with high literacy rate, industriousness and intellectual capacity as a non-industrialized country, Vietnam is deemed to be fit for high-tech industry development.

2) "Compact industries"

High-tech industries are these of compactness and flexibility rather than those emphasizing sheer scale, transport cost of which is relatively small. Inland location of the major cities without large-scale international trading ports at present and north-to-south long extension of land, therefore, may not be a big hindrance to the high-tech industry development.

3) Resource and energy saving industries

High-tech industries are relatively resource and energy saving industries and the resource endowment is not an essential condition for the high-tech industry development.

4) Globalization of production

Currently, globalization is rapidly in progress in almost every aspect, including production, design and research activities. Vietnam has a chance to be integrated into the global structure of division-of-labor in the production and research for high-tech industries.

5) Smaller fund requirement

Certain high-tech industries including computer software and certain categories of bio-technology industry, do not necessitate large fund requirement which is most lacking in Vietnam now.

6) New technology horizons

In some cases, high-tech industry could be developed in new technology horizons rather than on the extension of the established technology or industry. For these cases, newcomers also can afford the chance for entering the new business.

2.2 Priority High-Tech Fields and Industries

2.2.1 Priority Fields

High-tech is considered as the most advanced technologies at each moment and quickly changes as time passes. Aiming at rearing the high-tech industries in the country, however, it is important to select the priority fields in order to work out the appropriate policies and strategies for the investment promotion, human resource development, R&D and fostering of the enterprises. Selection was made based on the following criteria.

- 1) Contribution to the industrialization of the country as a whole,
- 2) Comparative advantages and disadvantages of Vietnam with regard to the field,
- 3) Trend of production and FDI of the high-tech advanced nations,
- 4) Various linkages and multiplier effects among the selected fields, and
- 5) Policy of the Vietnamese Government about the priority

The selected priority fields are;

- 1) Information Technology/Telecommunications/Electronics
(IT; including computer software),

- 2) Bio-technology
- 3) Mechatronics/Machinery
- 4) New Material
- 5) New Energy

It is noted that environmental viewpoint is increasing its importance and will continue to be significant. Environmentally-friendly technologies and products as well as production process are of vital importance. Though it can not be classified into a single field, environment-conservation-oriented technologies will be among the high-tech in the foreseeable future including cleaner production technology, resource and energy-saving technologies and pollution control technologies. These technologies should, therefore, be considered as priority ones.

2.2.2 Priority Categories of High-Tech Industries

For selecting the priority categories of high-tech industries, R&D inputs are taken into account. In particular, data for the R&D expenditure in each category in the advanced countries are analyzed and these categories with 2 % or bigger R&D expenditure ratio relative to the total sales, are selected as priority categories of high-tech industries. The selected categories total 24 as given in Table 2-1.

With 2 more categories of non-manufacturing industries, i.e. , computer software and new energy, the total will be 26.

2.3 Scenario for the Development of the High-Tech Industries

2.3.1 Phased Development

It should be noted that the phasing is simplified one and the end part of one phase may be overlapping the beginning of the following phase.

High-tech industries should be reared and developed by 3 phases;

1) Phase 1; Laying foundations

Technologies should rapidly be imported. FDI should vigorously be promoted. Meanwhile, foundations of all sorts should be laid. Among the manufacturing industries, assembly types will be the major ones. Activities of software industry will be intensified.

2) Phase 2; Absorption and localization

Technologies should be absorbed and disseminated. Reform of the transferred technologies will be made. Development of the supporting industries should be started.

3) Phase 3; Development of original hi-technologies and products

Original and innovative hi-technologies will be developed by the Vietnamese institutes and enterprises. New high-tech products will be developed.

2.3.2 Evolution of R&D Activities

R&D activities should be evolved through 3 stages.

1) Ph.1; Technology transfer

Hi-technologies and relevant ones should rigorously be imported and technology transfer should be sought from the foreign enterprises invested in the country.

2) Ph.2; Dissemination and reform

Transferred technologies should be disseminated to the Vietnamese institutes and enterprises. Reform of imported technologies should be developed.

3) Ph.3; Original and innovative high-tech

Original hi-technologies as well as innovative ones should be developed.

Evolution process and main players for the high-tech development at each phase are shown below.

Evolution of R&D Activities and Main Players						
Main Players in R&D Activities	Phase 1		Phase 2		Phase 3	
	1998	2005		2010		2020
Technology transfer	FC	FDI	FC	FDI	FC	
Development in Vietnam		FDI	FDI	VC	FDI	VC
Industrial technology						
Product development						
- Improvement	FDI	FDI	VC	FDI	VC	
- Innovative/new products					VC	
Applied research	SRI	SRI	FDI	VC	FDI	VC SRI
Basic research	SRI		SRI		UNI	SRI

Note : FC : Foreign Companies FDI : Foreign Direct Investment VC : Vietnamese Companies
SRI : State Research Institutes UNI : Universities

2.3.3 Priority Order of High-Tech Fields

Based on the above-mentioned criteria, priority order of the selected fields are determined with computer software being counted as one field.

First Priority: Computer Software

Computer software should precede the other priority sectors considering;

- 1) Fitness of the quality of labor of the Vietnamese, endorsed by the high appreciation of the foreign enterprises invested in Vietnam and the consistent achievement in the World Mathematics Contest,
- 2) Small fund requirement for the investment,
- 3) Close industrial linkage with IT field,
- 4) Possibility of inland location provided that the adequate telecommunication infrastructure be installed,
- 5) World investment trend, in particular FDI, and
- 6) Example of the achievement in India, development stage of which is not so much different from that of Vietnam

Second Priority: IT (Information Technology/ Telecommunications/Computer)

IT should follow, considering;

- 1) Trend of FDI of the high-tech advanced countries,
- 2) Close linkage with the basic industry of machinery as well as computer software, and
- 3) Possibility of inland location due to its compactness

Third Priority: Bio-technology

Bio-technology should follow, considering;

- 1) Accumulated knowledge and technologies through the activities in the agriculture and food processing and pharmaceutical industries,
- 2) Contribution to the modernization and raising the productivity of the current mainstay industry of agriculture, fisheries and forestry, and
- 3) Raising the value-added of the food and pharmaceutical industries which are currently the key manufacturing industries in Vietnam.

Third Priority: Mechatronics

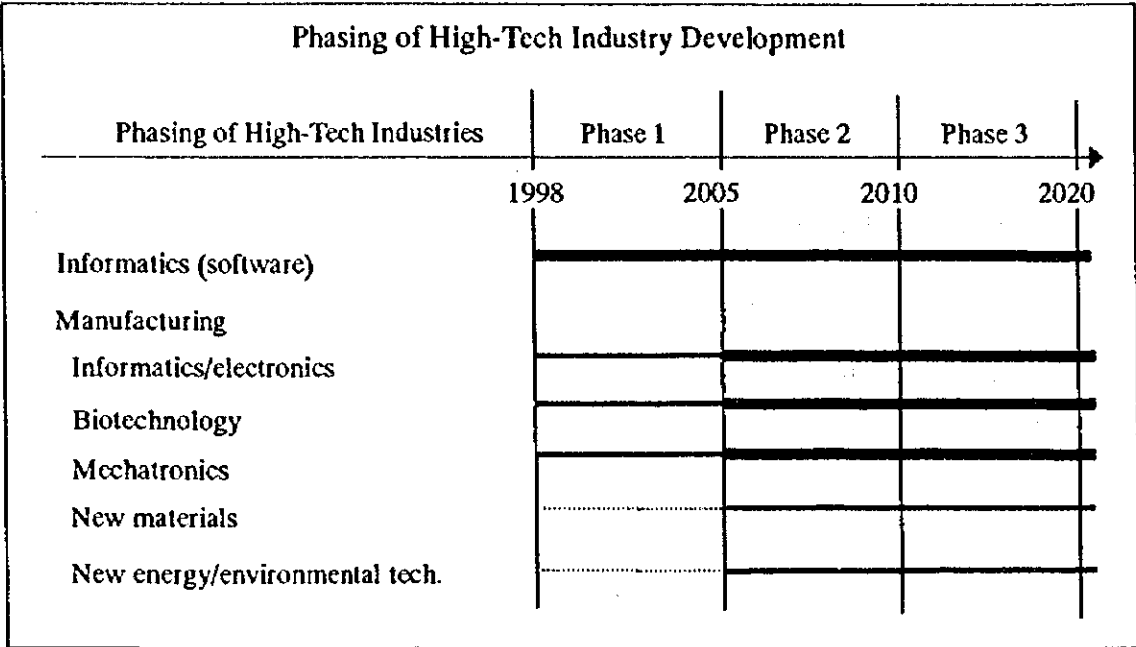
Mechatronics should be ranked third, equal to the bio-technology because of;

- 1) Important role and function of mechatronics industry for raising the precision and performance as well as productivity of machinery industry, and
- 2) Close linkage with IT field

Fifth Priority: New Material and New Energy

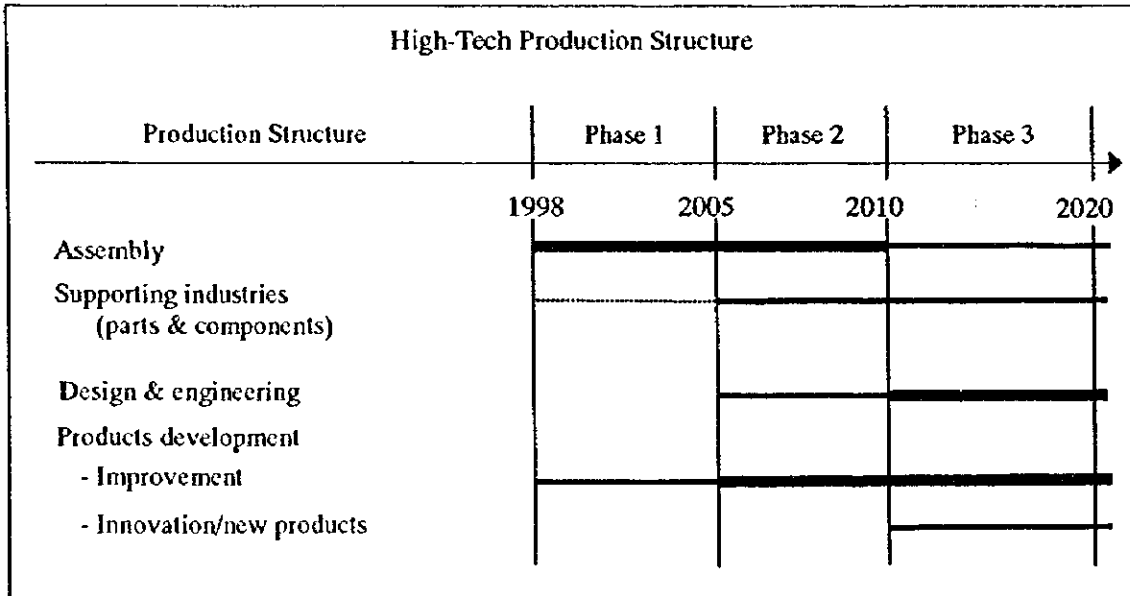
These two fields have close relevance with the wide range of the high-tech industries and would give big positive impacts. However, Vietnam has no clear comparative advantage in these fields. Besides, they require sizable investment and lengthy time for development. These two fields should, therefore, be reared in longer perspective among the priority fields.

Level of the development of the priority fields are shown below.



2.3.4 High-Tech Industrial Structure

In the short-term, assembly type high-tech industries will be prevailing with FDI. Manufacture of parts and components will follow in the medium-term. Product development should be started in the medium-term in the form of improved products. Original high-tech products, either utilizing the transferred technologies or original ones, should be made in the long-term. Development of the high-tech industrial structure in the time frame is shown below.



2.3.5 Main Players in High-Tech Production

In the high-tech manufacturing, FDI and its JV (joint venture) with the Vietnamese will be the principal players in the short-term and continue to be one of the main players in the foreseeable future. In the medium-term, state-owned enterprises (SOEs) will come onstage, utilizing their experience as JV partners. In the long-term, Vietnamese private enterprises will enter the stage. In the software production, Vietnamese organizations, either SOEs, state research or academic institutes or the private, should be the main players from the short-term. Main players in the high-tech production in the time-frame is shown below.

Main Players in High-Tech Production				
Main Players in High-Tech Production	Phase 1	Phase 2	Phase 3	
	1998	2005	2010	2020
Software				
- FDI 100%/JV	[Horizontal bar from 1998 to 2020]			
- Vietnamese private sector	[Horizontal bar from 1998 to 2020]			
Manufacturing				
- FDI 100%/JV	[Horizontal bar from 1998 to 2020]			
- State owned enterprises		[Horizontal bar from 2005 to 2020]		
- Private sector		[Horizontal bar from 2005 to 2020]		

2.4 Strategies and Policy Measures for High-Tech Industry Development

2.4.1 Lessons of Asian Countries

(1) Lessons

High-tech policies and policy measures adopted in Taiwan, Malaysia and Singapore are reviewed in the Study and preceding examples of high-tech parks in Taiwan, India, Malaysia, China and Japan were studied in the light of possible application to Vietnam. The major lessons to be derived from these experiences are:

- 1) Clear targets were set and appropriate and consistent policies were adopted for the development of high-tech industries.

- 2) Though in most of the cases, high-tech industry development started after the full realization of the labor-intensive/export oriented industries, high-tech industry development started earlier in some cases including the cases of India for IT and software in Bangalore and China in the special economic zones of "High-Tech Industrial Development Zones".
- 3) FDI was the key tool for the high-tech industry development for all the cases at least at the initial stage.
- 4) Strong preferential measures were worked out and provided to the parties and enterprises involved in the high-technology and high-tech industry development, both in financial and non-financial terms.
- 5) Deregulation and protection of intellectual property right were practiced.
- 6) In many cases including Taiwan and China, R&D promotion was made by the Government initiative.
- 7) Strategic fields rather than detailed categories were determined from the beginning and various incentives were given for their development.
- 8) Various policy measures were taken for reinforcing the interaction and cooperation between the academic, public research institutes and the private sector, including the promotion measures for the academic to materialize their research achievements into high-tech products.
- 9) High quality infrastructures and special zones for the high-tech related enterprises and entities were developed and offered. In all the studied cases, they are complexes having the functional zones of production, R&D, residential, supporting centers, etc.

Though currently, some of the ASEAN and NIES countries are suffering financial and economic hardship, the ASEAN model which emphasize the active introduction of FDI is not inappropriate from the economic viewpoint, provided that some improvement should be made including the strengthening of the financial system and early reinforcement of the domestic resources including human resource, domestic enterprises, R&D capacity building, etc.

(2) Possible Impacts of Asian Financial Hardship on the Vietnamese Economy

Though the current financial crisis and economic hardship in some of the ASEAN and NIES countries is affecting the Vietnamese economy at present and will continue to give impacts on the economy, the degree and the nature of the impacts is uncertain,

depending on the various factors of these countries and Vietnam including their macroeconomic policies, political decisions and others. Possible impacts, however, may include the followings.

1) Negative impacts

- (i) More severe competition of exports among these countries is expected, resulting in the reduction of the price competitive power of the Vietnamese products overseas as well as in the domestic market, and
- (ii) Sharp decrease of the foreign direct investment from the ASEAN and some NIES countries is expected.

2) Positive impact

- (i) In the short range, foreign direct investment of the advanced countries might be diverted to Vietnam.

In any case, it is wise and recommended that Vietnam should accelerate its industrialization process including the development of the high-tech industries in order to minimize the possible adverse impacts.

2.4.2 Basic Strategies

To develop the high-tech industries before full development of industrialization is considered possible if appropriate policies are adopted and implemented timely.

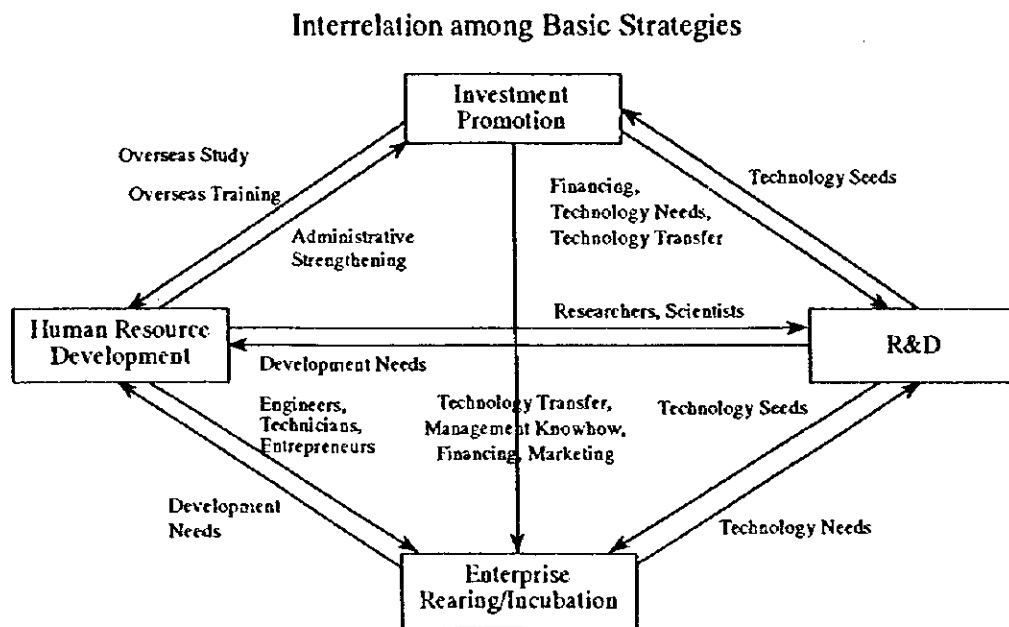
- 1) It is possible to utilize the capacity of the foreign hi-tech enterprises, having the high-technologies and management knowhow as well as the marketing channels by attracting FDI.
- 2) Though limited in number, there exist some examples of early realization of high-tech industries in some fields including that of Bangalore in India for IT and computer software and high-tech industry development zones in China.
- 3) Vietnam is endowed with the key resource of high quality manpower which is prerequisite to the high-tech industry development.

Considering the lessons of the Asian countries including ASEAN, India and China, it is noted that the reinforcement of the domestic resources of manpower, R&D capacity and Vietnamese enterprises, which would take time, should be started as early as possible.

Aiming at developing the high-tech industries in Vietnam, the following 4 program packages are recommended to be implemented.

- 1) Investment promotion,
- 2) Human resource development,
- 3) R&D, and
- 4) Incubation and upgrading of the enterprises

Inter-relation and inter-dependence among the 4 should duly be taken into account for working out the program packages as shown below.



The above measures can be categorized into;

- 1) Deregulation and strengthening of the Governmental services,
- 2) Establishment and reform of the existing legal and administrative frameworks and improvement of the infrastructures, and
- 3) Provision of preferential treatments

Above all, deregulation is the most important and urgent including application and approval procedures, free access to the information and should be placed the first priority. As for the legal and administrative framework, contents and time schedule should be clearly planned and announced. Consistency should be maintained for the preferential treatments and the period of the effectiveness should clearly be set from the beginning.

2.4.3 Investment Promotion

The Government of Vietnam has been making ceaseless efforts for improving the institutional and legal frameworks in order to attract foreign direct investment by amending laws and regulations. In consequence, the investment environment has been much improved. To compete with other countries, however, further efforts are desirous to be made to meet the requirements of the investors more fully. Special attention should be paid to further upgrading the practices and application of the laws and regulations which should be in line with the objectives of the legal framework.

In order to attract FDI and enhance the domestic investment, the following policy measures are recommended to be taken.

(1) Deregulation

- 1) Provision of long-term visas to the foreign employees and management for the high-tech production and research,
- 2) Acknowledgement of the transfer of the land use right and its use as collateral,
- 3) Protection of intellectual property right including industrial property and copy rights,
- 4) Simplification, shortening and transparency of application and approval procedure and provision of the one-stop-service for the investors,
- 5) Guarantee of the free access to the information,
- 6) Lifting the regulation of the estimation of the royalty value, and
- 7) Reporting rather than permission for the imports/exports

(2) Development of the infrastructures

- 1) Development of high quality and high reliability infrastructures,
- 2) Provision of the land lots with adequate infrastructure and utilities for the investors and research institutes,

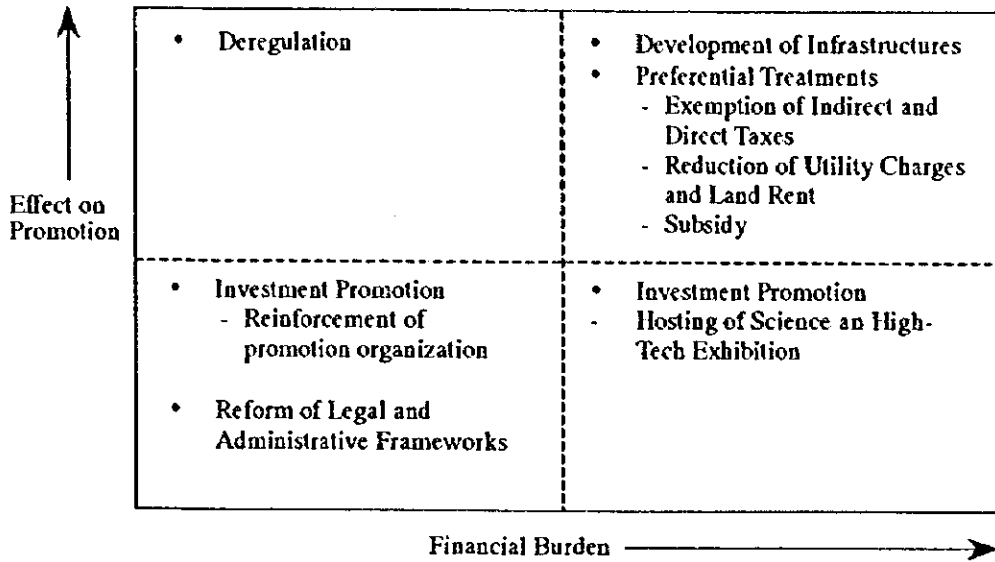
(3) Preferential treatments

- 1) Exemption or reduction of the corporate income tax of the high-tech enterprises,
- 2) Accelerated depreciation of the facilities and equipment for the high-tech production and high-tech R&D,

- 3) Exemption or reduction of the personal income tax for foreign personnel,
 - 4) Reduction of the land rent and compensation cost,
 - 5) Lowering of the utility charges, particularly telecommunication charge,
 - 6) Reduction of tax on foreign remittance with regard to the royalty income,
 - 7) Deduction of a part of high-tech royalty expenditure from the amount of tax,
 - 8) Deduction of a part of high-tech R&D expenditure from the amount of tax,
 - 9) Subsidy for the joint research with the state research institutes,
 - 10) Subsidy to the Vietnamese entities for high-tech R&D,
 - 11) Subsidy for the vocational training, and
 - 12) Reduction of land lease charge for the private high-tech research institutes
- (4) Investment promotion activities
- 1) Strengthening of administrative framework for the promotional activities including sending investment missions and establishment of overseas offices, and
 - 2) Hosting of science and high-tech exhibition in Vietnam,
- (5) Strengthening of institutional framework
- 1) Strengthening of commercial banking system,
 - 2) Establishment of stock market, and
 - 3) Establishment of markets for technology transaction

Among all, deregulation which is the most urgent and most effective for high-tech investment promotion while requiring the smallest finance burden to the Vietnamese Government, should be placed first priority. The magnitude of impacts on the investment promotion and scale of financial burden to the Government are shown below.

Effect and Financial Burden



Desirable implementation schedule is shown below.

Promotion Measures	Phase 1	Phase 2	Phase 3
	1998	2005	2010
Deregulation	1998-2005	2005-2010	2010-2020
Infrastructure Development	1998-2005	2005-2010	2010-2020
Preferential Treatments	1998-2005	2005-2010	2010-2020
Promotion Organization	1998-2005	2005-2010	2010-2020
Strengthening of Institutional Framework	1998-2005	2005-2010	2010-2020

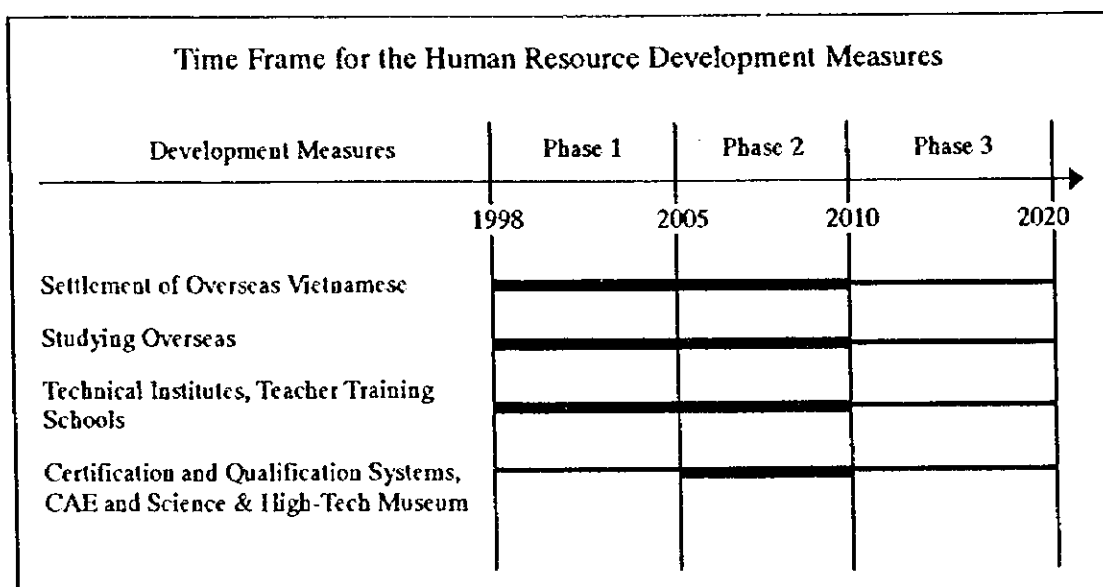
2.4.4 Human Resource Development

To provide the appropriate pool of high quality labor is the life for promoting high-tech industries. In order to bring up the required labor force, the following measures are recommended to be taken.

- 1) To promote the return and settlement of the overseas Vietnamese,
- 2) To promote the overseas study,

- 3) To establish the technical institutes for bring up technicians and teacher training schools for teaching staff of the technical institutes,
- 4) To set up the system for high-tech extension service and OJT type training,
- 5) To set up the certification system for technical skills and qualifications for the high-tech engineers, technicians and skilled labor,
- 6) To extend subsidy or tax reduction for the training of high-tech labor,
- 7) To establish CAE (computer-aided education) for high school education, and
- 8) Construction of science and high-tech museum

Among the measures, the first and second take effect quickly while the rest needs some time for developing the system and therefore, are recommended to be placed priority in the short-term. The following time frame is recommended for the implementation of the measures.



With the assumed figures for the value-added of the high-tech industries and the labor productivity of the high-tech labor which are derived from the assumed figures for the future GDP and the share of the high-tech industries in GDP, the required number of the high-tech labor could be estimated. Proportion of labor among the engineers, technicians, skilled and semi-skilled as well as un-skilled could be estimated assuming that the proportion is similar to that of electronic industry of Thailand in 1995, i.e., 5 % for engineers, 10 % for technicians, 25 % for skilled and semi-skilled and the rest of 60 % for unskilled as shown below.

Required Number of High-Tech Labor

Classification	Phase 1 2005	Phase 2 2010	Phase 3 2020
Engineers	2,830	6,460	18,455
Technicians	5,660	12,920	36,910
Skilled & Semi-skilled	14,150	32,300	92,275
Un-skilled	33,960	77,520	221,460
Total	56,600	129,200	369,100

In the short-term, assembly type industries will be prevailing, requiring large number of technicians and skilled labor which is in short supply in the country. Taking this into account, the following time frame is recommended for enhancing the human resource at various levels.

Time Frame for the Human Resource Development					
Classification	Phase 1	Phase 2	Phase 3		
	1998	2005	2010	2020	→
Skilled Labor	[Timeline bar from 1998 to 2020]				
Technicians	[Timeline bar from 1998 to 2020]				
Engineers	[Timeline bar from 1998 to 2020]				
Researchers and Scientists	[Timeline bar from 1998 to 2020]				

Until the full establishment of the high-tech education in Vietnam, sending the students abroad for studying high technologies is the most efficient way for rearing high-tech engineers and researchers. Assuming that 50 students for the master course and 50 for the Ph.D should newly be sent for studying abroad every year over 10 years, the required fund is estimated at about US\$ 100 million, including tuition, travel expenses, meals and accommodation and others. By this program, altogether high-tech human resource of 1,000 strength will be produced.

2.4.5 R&D Development

To accelerate the R&D activities for high-tech, legal and organizational structure should be reinforced. To be specific, the following measures are recommended to be taken.

- 1) To promote the re-structuring of the state research institutes and to establish a National High-Tech R&D Center,
- 2) Deregulation and clear stipulation of the procedure for the transfer of high-tech in the legal document,
- 3) To strengthen the capacity and staff of the NOIP: National Office of Industrial Property, and Copy Right Authority and to reinforce the enforcement system for the protection of the intellectual property right,
- 4) To strengthen administrative system for providing good access to the high-tech information, and
- 5) To strengthen the testing and certification system for the industrial standards

The recommended time frame for these measures are shown below.

Development Measures	Phase 1	Phase 2	Phase 3
	1998	2005	2010
Restructuring of State Research Institutes & Establishment of National High-Tech R&D Center			
Deregulation and Clear Stipulation of Procedures			
Reinforcement of Protection of Intellectual Property Right			
Strengthening of Testing and Certification of Industrial Standards			

2.4.6 Rearing of High-Tech Enterprises

Target groups of enterprises can be classified into two; small-to-medium private enterprises and SOEs. For the former, the following measures are recommended to be taken.

- 1) To establish concessionary loan system for the small-to-medium size private enterprises for high-tech production and R&D,

- 2) To establish supporting system for venture business, including the consultation of management, providing good access to the high-tech information and technologies,
- 3) To provide preferential treatment for the venture capitals, including deduction of a part of investment expenditure from the tax value, exemption of income tax on the dividend income and capital gain, and
- 4) To permit and strongly encourage the participation of the universities, state research institutes, public corporations as well as their employees, in particular research staffs, in the commercialization of their high-technologies to produce the high-tech products including:
 - To possess the ownership of intellectual property right including the industrial property right obtained through their research works,
 - To receive the royalty,
 - To conduct joint research works with enterprises including the foreign and to conduct research works entrusted by the enterprises,
 - To establish the enterprises as the owner or a member of the board of directors,
 - To hold a post in a university or state research institute and director of an enterprise, concurrently

Referring to the experiences in the high-tech countries, the small-to-medium sized enterprises and the joint venture companies are the key to the success of the development of the high-tech industries. The above measures for rearing and incubating the small and venture enterprises should, therefore, be placed priority.

For the latter, the following measures are recommended so that SOEs become more fit as partners for the foreign high-tech investors.

- 1) Stronger autonomy for the SOEs from the Government,
- 2) Abolishment of the practice of unanimous voting in the board of directors meeting,
- 3) Maintaining the transparency and releasing data and information with regard to the enterprise operation including financial ones and adopting company accounting system of international standard, and

- 4) To adopt fully the market economy system, including procurement, marketing and division-of-labor

Desirable time frame for these measures are given below.

Rearing Measures	Phase 1	Phase 2	Phase 3	
	1998	2005	2010	2020
Establishment of Concessionary Loan System				
Supporting System for Venture Business				
Supporting System for Venture Capital				
Reform of State Owned Enterprises				

2.5 Targets for High-Tech Industry Development

Two indices are proposed to be adopted to set the targets for the high-tech industry development, i.e., ratio of employees engaged in research activities to the total employees and ratio of R&D expenditures to GDP. Currently, the former is comparable to these of ASEAN forerunners whereas the latter remains at low level.

Considering these, the target countries are set for each index as follows.

Target Countries

Hi-Tech Indicators	Phase 1 2005	Phase 2 2010	Phase 3 2020
R&D Expenditure Ratio to GDP	Malaysia in 2000	Korea	Advanced Countries
Number of Researchers & Scientists per 10,000 Workers	Korea	Half of Advanced Countries	Advanced Countries

Consequently, the following target figures are set.

Target Figures

Hi-Tech Indicators	Phase 1 2005	Phase 2 2010	Phase 3 2020
R&D Expenditure Ratio To GDP	1.5%	2.0%	3.0%
Number of Researchers & Scientists per 10,000 Workers	20	30	50

Assuming that the working population ratio is 50 % and that ratio of the number of the researchers in each sector is proportional to its share of the value-added in GDP, total number of researchers and high-tech related researchers could be estimated as shown below.

Number of Researchers

Number of Researchers	Phase 1 2005	Phase 2 2010	Phase 3 2020
Total Number	84,780	133,660	246,080
High-Tech Related			
Share of VA of high-tech industry	3.0 %	6.3 %	12.0 %
Number of researchers	2,540	8,420	29,530

2.6 Necessity of the Establishment of High-Tech Parks

The proposed policies and policy measures for the development of the high-tech industry should be practiced to assess their effectiveness and feedback should be sent to the policy-makers. The foregoing policy recommendations including these for investment promotion, human resources development, R&D and business incubation as well as other basic policy recommendations should be checked and improved.

With under-developed high-tech industries at present, Vietnam is required to quickly develop high-tech industries and catch up with the other ASEAN countries considering the expected severer competition as well as division-of-labor among the countries. To meet these requirements, Vietnam should concentrate its resources including the financial and human resources, in limited number of sites for high-tech production and R&D activities as well as for inviting the foreign high-tech enterprises.

Securing interface among the varied high-tech industries as well as among the research institutes, universities and the enterprises are pre-condition for the fast growth of the competitive high-tech industries.

Namely, Vietnam is required to quickly establish high-tech parks to provide the places to satisfy all these requirements. More specifically, high-tech parks are recommended to be established because of the following reasons.

- 1) Feedback and improvement of high-tech promotion policies and policy measures,
- 2) Introduction, accumulation and utilization, dissemination of high-tech information and data,
- 3) Interface for technology development and product development,
- 4) Cooperative production and division-of-labor among the enterprises and sharing of common facilities and infrastructures,
- 5) Field of incubation through the interaction between the technology seeds and product needs,
- 6) Special zone for the accelerated deregulation for information, investment, labor employment and other industrial activities and for the preferential treatments, and
- 7) Well-facilitated site for inviting the competent foreign investors who possess high technologies, know-hows for production and quality control, business administration and marketing

It is recommended that the first high-tech park should be established in Hanoi where the capital city is located because of the following reasons.

- 1) The Government administrative function can fully be utilized and the feedback of the trials of policy measures are easier.
- 2) 3/4 of the state research institutes being located with abundant and the biggest number of scientists and researchers in the country, R&D capacity is presumed to be the biggest in the country. Also biggest number of universities are located which will provide high quality human resource including these in the science and engineering field for the high-tech industries.
- 3) Though located inland, the area possesses good access to the international airport. If adequate infrastructure should be developed including for the information and telecommunications, competitive environment would be provided.

In addition, the following benefits are expected.

- 1) High-tech park development could be a trigger for the development of the northern region which is lagging behind the growth of the south.
- 2) High-tech park development would generate sizable number of employments and would form a satellite city of Hanoi and thereby contribute to the alleviation of the over-concentration in the capital city.

Subsequently, another high-tech park should be constructed in Ho Chi Minh City due to the following reasons.

- 1) Ho Chi Minh City is the biggest center for industrial and trading activities with the biggest number of the foreign direct investment.
- 2) The city population has the experience and know-how of market economy and biggest domestic saving.

Considering the peculiar configuration of the country, extending long to the north-south direction for more than 2,000 km, it may be reasonable to construct another high-tech park in the central region.

All the high-tech parks share similar functions. By comparison, Hoa Lac High-Tech Park should be characterized as R&D oriented and foreign investment oriented for production at least at the initial period, while Ho Chi Minh High-Tech Park should be production and export oriented with relatively stronger participation of the domestic investors. High-tech park in the central region should be characterized as regional-development oriented one.

Table 2-1 Selected Priority Categories of High-Tech Industries

Categorization by R&D Input Level (RDIL) /Productive Factor Intensity (PFI)	High-Tech Manufacturing Industries	R&D Expenditure Ratio	R&D Staff-Factory Worker Ratio	Workers per Fixed Assets (Prs. per US\$ mil.)
	Manufacturing Total (Average)	2.9%	9.3%	755
Highest RDIL/ Brain-Intensive	• Pharmaceuticals • Medical Equipment, etc. • Detergents, Surfactants, etc.	9.8% 6.8% 4.0%	58.2% 30.0% 32.1%	855 1,250 595
Higher RDIL/ Engineering-Intensive	• Office/Service Industry Use Equip. - Copier, Word Processor, etc. - Air conditioner, etc.	4.0%	22.3%	976
Higher RDIL/ Capital-Intensive	• Organic Chemicals - Petrochemicals	4.5%	22.2%	318
High RDIL/ Skilled Labor-Intensive	• Communication Equipment - Telecommunications Equipment - TV, Tape player, Audio equip. • Industrial Electrical Machinery/Equip. - Motor, Connector, Switch, etc. • Other Electrical/Electronic Products - Tester, Disc Drive, Battery, etc. • Other Precision Instruments - Measuring Instrument • Electronic Parts/Devices, etc. - Integrated Circuit (IC) - Electronic Ceramics, etc. • Optical Equipment & Lenses • Watches/Clocks & Parts	5.6% 4.4% 3.8% 3.7% 3.6% 3.1% 2.1%	12.8% 7.5% 11.3% 10.6% 7.9% 11.3% 4.3%	1,516 1,473 1,489 1,570 1,133 1,802 1,186
High RDIL/ Engineering-Intensive	• Electronic Equipment - Computers, X Ray Equip. VTR, - Multimedia equip., Laser Equip. etc. - Information Terminal • Electrical Home Appliances • Rubber Tires & Tubes • Motor Vehicles & Parts, etc. • Special Industrial Machinery (for food/wood processing, weaving, sewing, plastics, agriculture, etc.) • Other Chemical Products - Cosmetics, Pesticide, Gule, etc. • Other General Machinery/Equip. - Pump, Compressor, Bearing, etc. - Industrial robot, Mold/Die, etc. • Metal Processing Machinery/Equip. - Machining Center, NCN, Tool, etc. • Glass and Glass Products - New Glass, etc.	6.8% 6.1% 3.5% 3.3% 3.1% 2.5% 2.1% 2.0% 1.9%	10.9% 13.0% 15.2% 11.2% 8.9% 28.7% 6.9% 8.9% 4.5%	965 710 728 815 986 808 1,023 998 609
High RDIL/ Capital-Intensive	• Synthetic Fibers • Fertilizers & Inorganic Chemicals • Iron & Steel Products	3.9% 2.6% 2.1%	9.1% 18.1% 4.8%	494 458 242

Note: Enterprises with 50 or more employees

1 dollar = 100 Japanese Yen

Source: The 1995 Basic Survey of Business Structure and Activity (The Ministry of International Trade and Industry, Japan)

III. MASTER PLAN FOR THE HOA LAC HIGH-TECH PARK

3.1 Present Conditions of the Project Area and Relevant Projects

3.1.1 Present Conditions of the Area

(1) Present Conditions of the Region

The Red river encompasses 5 provinces including the Ha Tay province and Hanoi within its catchment area. The land area of the Ha Tay province is 2,192 km² and that of the Hanoi is 927 km². Their populations are 2.38 million and 2.33 million, respectively, together accounting for about 6% of the country's total population.

Agriculture is the main stay of the Ha Tay province with agricultural land accounting for about 57% of the province's land area while industrialization is in progress in Hanoi which is the capital of the country. Industrial gross output of Hanoi accounts for about 7% of the country's total while its FDI value accounts for about one fourth of the total.

Besides the administration center of the country, Hanoi city is characterized as the national center of science and technology. Biggest number of universities and colleges including the Vietnam National University-Hanoi, Hanoi University of Technology and the Vietnam campus of the Asian Institute of Technology (AIT), are located in the city. Number of the teaching staff of these accounts for about 36 % of the national total while number of students accounts for about 38 %. About 80 % of the state research institutes of science and technology fields and 13 of the 17 institutes of NCST (National Center for Science and Technology) are also located in and around the city. With growing activities including industries and public and service sectors, population has been increasing rapidly with annual average of 2.53% which is 0.4% higher than the national average.

With these advantages together with the location of the Government administration, as well as the international airport, 7 major industrial areas are located in and around Hanoi, including these under construction and planning.

(2) Present Conditions of the Project Site

The project site of the Hoa Lac High-Tech Park (HHTP) is located within the Ha Tay province, about 30 km to the west of the Hanoi city. The site is bounded by the 21A road to the west and the planned Hanoi-Hoa Lac expressway to the south with the planned area of 1,800 ha of which about 1,650 ha will be developed. The site extends in

5 districts of the province with the topography of low hills. The current size of the population is estimated at around 11 thousand. Infrastructures are yet to be developed. The foundation of the site is rather firm with the N value ranging 12 to 30 which is considered to be fit for the location of high-tech research institutes and high-tech factories.

3.1.2 Relevant Projects

(1) Urban Conurbation and Hoa Lac City

Oriental plan for the development of the four cities of Son Mai, Hoa Lac, Xuan Mai and Mieu Mon along 21A road has been approved by the Prime Minister in 1997 with the target population of about 1 million in 2020. Among these, Hoa Lac is the biggest one with the planned population of about 0.67 million.

Within the Hoa Lac city, 5 areas or components with varied functions are envisaged as given below.

- 1) Hoa Lac High-Tech Park (HHTP)
- 2) Vietnam National University-Hanoi area
- 3) Phu Cat industrial area
- 4) Don Xuan residential area
- 5) Don Mo tourism area

Vietnam National University-Hanoi area is planned to be developed to the west of HHTP across the 21A road. All the existing colleges of the Vietnam National University-Hanoi will be relocated together with AIT and 5 new colleges including of technology and management fields, will be established as well as 5 new research institutes. Number of students in the area is planned at 100 thousand in 2020. These academic and research facilities and functions as well as the human resource will be a great help for the activities of HHTP and will provide a big incentive for the investors and enterprises to be attracted to HHTP.

Phu Cat industrial area will be located to the south of HHTP across the planned expressway with the tract of about 1,200 ha. Clean industries are to be attracted. Being adjacent each other, close industrial linkage can be expected.

Don Xuan area will provide housing facilities for about 400 thousand population. A part of the population which should be generated through the implementation of HHTP project, will be accommodated in this area. Don Mo tourism area is expected to

provide beautiful natural environment of mountains and lakes as well as recreation facilities for the employees and city residents including these in HHTP.

(2) Planned Infrastructures

A two lane highway is under construction to connect the Hoa Lac city with the Hanoi city to be completed around the end of 1998. This highway is planned to be extended further up to Ba Vi and to be widened and upgraded to 6 lane expressway, allowing vehicles to drive 100 km per hour. Once completed, HHTP will be reached from the capital city in only half an hour. To meet the increasing demand in the conurbation and in the Hanoi city, water transmission project is envisaged to supply about 930 thousand m³ per day in 2020, extracting raw water at the Da river. Besides these 2 key projects, the following infrastructure projects are contemplated.

- 1) Upgrading of the 21A road
- 2) Hanoi-Hoa Lac-Ba Vi Railway
- 3) Mieu Mon International Airport
- 4) Hoa Lac Heliport

3.2 Development Principles and Concepts for Hoa Lac High-Tech Park

3.2.1 Development Principles

Hoa Lac High-Tech Park should be developed in line with the following principles.

1) National Center for Science and Technology

In and around Hanoi, one third of the universities and 80 % of the state research institutes are concentrated. Considering the growing demand for the academic and research facilities and increasing economic activities and population as well as limited land area of the capital city, it is desirable that a new area be developed to establish the national center for science and technology. With spacious land and good access to Hanoi, Hoa Lac city should assume the role of the national center for science and technology, accommodating the universities and research institutes. Locally, Hoa Lac should extend the helping hand to the northern region and internationally, it should become a center of excellence in ASEAN for specific high-tech fields.

2) Special Zone Meeting Global Standards

In order to quickly catch up with the high-tech advanced countries, it is essential to invite the foreign investors to utilize their capacity of technology, capital, management, marketing and others. To achieve this objective, it is requisite to prepare special zones with high grade infrastructures and institutional and legal framework meeting global standards.

3) Heart of Hoa Lac City

HHTP should be the heart of the Hoa Lac new satellite city, possessing both production and research functions and close linkage with the other components, in particular university and industrial areas. Hoa Lac city, in bigger perspective, should be the heart of the growth corridor of the new conurbation of the 4 cities.

4) Recognition as a National Project

HHTP project is a front-runner of promoting high-tech industries and its successful implementation holds the key to the success of the high-tech industries as well as the industries in Vietnam as a whole. Its success will give big impact on the growth of the 4 city conurbation which, in turn, will benefit the growth of the northern region, centering on Hanoi. Considering the significance of the project, HHTP project should officially be acknowledged and publicly announced as a national project and full support should be given by the Government including financing, infrastructure development and the relocation and establishment of the state research institutes.

3.2.2 Development Concepts and Development Scale

(1) Development Concepts

In compliance with the development principles, HHTP should be developed following the concepts given below.

1) Deregulation for Meeting Global Standards

Deregulation should fully be made particularly in relation to the relevant application and approval procedures. Free access to the information should fully be guaranteed within HHTP.

2) Provision of High Grade Infrastructures

Reliable and high quality infrastructures should be provided with adequate volume. Rapid and large capacity telecommunication network should be installed inside HHTP and Hoa Lac city and with the major cities in the country as well as with overseas.

3) Location of State Research Institutes

Location of the state research institutes should be the nucleus of HHTP project with the multiple objectives including;

- To fulfill the principal objective of assuming the role of Science and Technology Capital,
- To support the R&D activities of the high-tech industries,
- To provide the seeds for high-tech products,
- To interface universities with high-tech enterprises,

4) Multi-functional Town

To meet the development principles, HHTP should be developed as a town with multiple functions with R&D and production functions as the principal ones. Comfortable residential area should be provided together with convenient commercial facility. Space and facility for amenity should also be provided.

5) Multiple Supporting Functions

HHTP should provide varied services to support the activities, including provision of basic services of testing and verification, provision of high-tech information, technical education and training, incubation of high-tech enterprises and interfacing between the academic, state institutes and enterprises. Plural number of centers should be set up within HHTP for this purpose.

6) Priority Categories of Enterprises and Preferential Treatments

Priority categories or characteristics of enterprises for promoting their location into HHTP will be determined based mainly on the ratio of R&D expenditure and that of the employees engaged in R&D activities. Most favorable conditions and preferential treatment should be given to these enterprises.

7) Cooperation with the Other Components

Cooperation with the other components of the city should be sought, in particular basic research function of the university area and applied research and commercialization function of HHTP and industrial linkage between Phu Cat industrial zone and HHTP. Transport and telecommunication infrastructures will be designed to reinforce the cooperation.

8) Open and Friendly Town

HHTP should live together with the existing communities and tradition and culture, leaving as much as possible the existing villages within the project site or about 150 ha out of 1,800 ha.

The development should be environment-friendly, leaving the natural topography, vegetation and landscape as well as the present land use as much as possible.

(2) Scale of Development

Based on the locational conditions of the site after the implementation of the planned infrastructures and the development concepts of HHTP, preceding large scale industrial and research complexes developed in the world including high-tech parks are reviewed. These can be classified into 1) Industrial new towns (Tukuba in Japan, Shinchu in Taiwan ,etc.) , 2) Research parks (Stanford in US, etc.) , 3) Software parks (Bangalore in India, etc.).HHTP should possess all the functions of these 3 types. Development areas of these range from 1,000 ha to 3,000 ha and the planned area of HHTP of about 1,800 ha is deemed appropriate.

3.3 Development Framework

3.3.1 Demand for the Land

Demands for the major land uses comprising high-tech industrial park and R&D area are estimated both from macro viewpoint and micro viewpoint.

(1) High-Tech Industrial Park

From macro viewpoint, demand for the high-tech industrial lots is estimated based on the following assumptions, taking into account the data of Vietnam and achievements of the high-tech advanced countries and preceding ASEAN countries.

- 1) Population growth rate of Vietnam should be 1.0 % to 1.5 % per annum on the average until 2020 and per capita GDP should be US\$ 2,500 (in 1997 constant price) in 2020.
- 2) Ratio of the VA (value-added) of the manufacturing industry to GDP should be 30 % and ratio of the VA of high-tech industry to that of manufacturing industry should be 40 %.
- 3) Labor productivity of high-tech industry in Vietnam in 2020 should be half of that in Japan in 1995.

4) Number of high-tech industry employees per ha of industrial lot should be 150 persons based on 2 shift work operation.

5) Share of the high-tech factory lots of the Red river delta in the national total should be 40 % and that of HHTP in the Red river delta should be 40 %.

Demand for the high-tech industrial lots in HHTP is estimated at 170 ha in 2005, 237 ha in 2010 and 394 ha in 2020.

From micro viewpoint, demand for high-tech lots in HHTP in 2005 is estimated based on the followings.

1) Selection of appropriate high-tech categories fit for the location in HHTP, 18 in number and,

2) Investment demand of the high-tech industries which are categorized in the above 18, found through the investment demand survey carried out by the Study in 1997, results of which are shown in Tables 3-1 and 3-2.

Short-term demand in 2005 for high-tech industrial park is estimated at 54 ha.

In the investment demand survey, only 5 Vietnamese enterprises and none of the foreign enterprises have shown their interest in investing in HHTP in the field of computer software. However, total demand is presumed to be much bigger, considering the fitness of the Vietnamese labor, small investment requirement and the trend of FDI in this field.

(2) High-Tech Research Institutes

From macro viewpoint, land demand for the location of high-tech research institutes is estimated, including the state research institutes and private institutes. As for the latter, only separated institutes or independent ones which are attached neither to the headquarters which seem to be located in the capital city of Hanoi nor to the factories are estimated with the following assumptions.

1) Labor force ratio to the total national population should be 50 % and number of researchers in 10,000 of labor should be 50 in the year 2020.

2) Ratio of the number of the research staff of the state research institutes to the total number of research staff except these in the universities, should be 15 % and that of the independent private institutes should be 23 % in 2020.

3) Number of research staff of state research institutes per ha should be 40 and that of the private be 60 in the same year.

- 4) Share of the Red river delta in the total of the country should be 50 % for the state research institutes and that of the private should be 40 % and the share of HHTP in the delta should be 70 % for the state and 40 % for the private.

Incremental land demand for research institutes is estimated at 115 ha by 2005, 150 ha by 2010 and 188 ha by 2020.

Short-range land demand for research institutes in 2005 is analyzed also from micro viewpoint. With no land demand for independent institutes by private enterprises observed by the investment demand survey by this Study, land demand is estimated, assuming the relocation or establishment of state research institutes to HHTP by 2005 as follows.

- 1) With the target of increasing the number of the research staff to 20 in 10,000 of labor, researchers should increase by 7.1 % per annum till the year 2005, and
- 2) Number of research staff per ha of land should be 40.

Required land area is estimated at 92.8 ha.

3.3.2 Land Use Plan for HHTP

Land use of HHTP is planned based on the 3 primary aspects as follows.

- 1) Demand for the land,
- 2) Size of available land for each purpose, considering the locational conditions, and
- 3) Concepts of the development of HHTP

Besides the two key components of R&D area and high-tech industrial park, supporting center zone and residential areas to accommodate about half of the population of HHTP will be set up together with commercial area. The process of land use planning is shown in Figure 3-1. Development will be phased in 3 stages, with the initial development starting from the area around the Tan Sa lake, extending to the planned expressway with about 800 ha of tract as shown below.

Land Use Plan for HHTP

	Phase 1		Phase 2		Phase 3		Total	
	Area (ha)	(%)	Area (ha)	(%)	Area (ha)	Ratio(%)	Area (ha)	(%)
1. R & D Zone	118	14.8	0	0.0	47	8.8	165	10.0
2. Center Area	16	2.0	0	0.0	32	6.0	48	2.9
3. High-Tech Industrial Zone	71	8.9	22	6.9	117	21.8	210	12.7
4. Urban/Business Zone	26	3.2	8	2.5	47	8.8	81	4.9
5. High Grade Residential Zone	76	9.5	56	17.7	0	0.0	132	8.0
6. New Town Zone	74	9.3	23	7.3	150	27.9	247	15.0
7. Infrastructure	142	17.8	18	5.7	108	20.1	268	16.2
8. Tan Xa lake	120	15.1	180	56.8	0	0.0	300	18.2
9. Green, river, reserve area	153	19.2	10	3.2	36	6.7	199	12.1
10. Total	796	100.0	317	100.0	537	100.0	1,650	100.0

Planned land use is figured in Figure 3-2.

3.3.3 Employment and Population Framework

Based on the land area by use and number of employees per ha of land by use, total number of employees to be generated in HHTP is estimated. Residential population in HHTP is estimated, assuming the average size of family, ratio of population to be accommodated in HHTP and population density as shown below.

Employment Framework of HHTP

Land Use	Number (Cumulative)		
	2005	2010	2020
1. R&D Zone	3,900	3,900	5,400
2. Center Area	300	300	900
3. High Tech Industrial Zone	8,600	11,200	25,200
4. Urban/Business Zone	1,300	1,900	5,400
5. High Grade Residential Zone	100	200	200
6. New Town Zone	100	100	200
7. Total	14,300	17,600	37,300
8. Population	28,600	35,200	74,600
9. Population in HHTP	12,800 (44.8%)	15,000 (42.6%)	31,000 (41.6%)

3.4 Infrastructure Development Plan

3.4.1 Dimensions of Infrastructures

In order to provide the necessary services for the enterprises and organizations as well as the residents in HHTP and to upgrade its accessibility, infrastructures will be constructed, keeping step with the progress of the occupancy. By the year 2020, the following infrastructures will be constructed, the details of which are given in Table 3-3.

Regional Trunk Road	11.8 km
Water Supply Facility	100,000 m ³ /day
Sewerage Facility	100,000 m ³ /day
Drainage Facility (Drainage channels)	30 km
Electricity Supply Facility (Substation)	250 MVA
Telecommunication Facility	65,000 lines
Central Park	46 ha

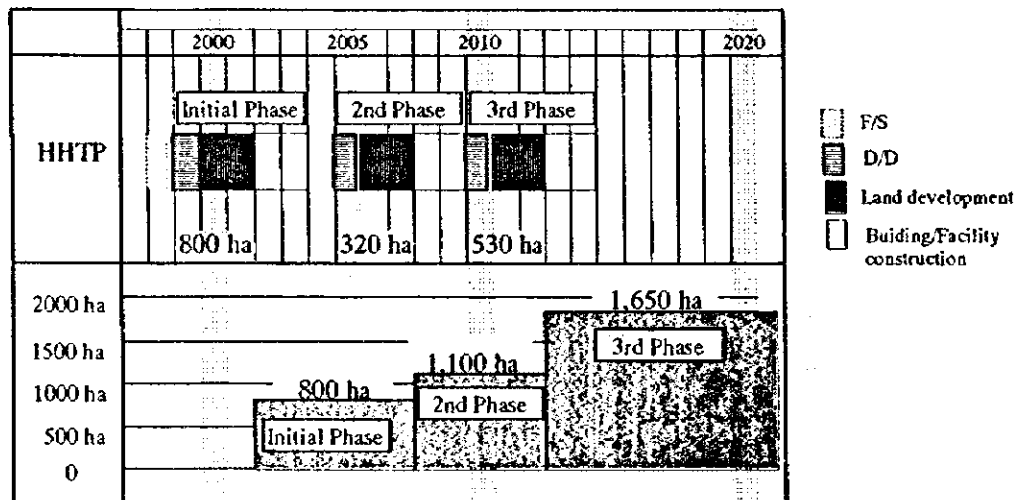
3.4.2 Schedule of Development

HHTP is planned to be implemented in three phases in line with the target years set for the national high-tech industry development. Initial development is planned with the possible fastest schedule, considering its urgency. Construction of the second and the third is planned to be started in the following years of the target years of the preceding phases in order to:

- 1) Confirm the progress of the occupancy of the lots in the preceding phases in order to avoid the over-investment, and
- 2) Enable to mobilize the revenue obtained during the previous phases for financing the construction cost of the following phases.

Development schedule of HHTP is shown below.

Development Schedule of HHTP



3.4.3 External Infrastructure Cost

HHTP is a component of the Hoa Lac city which is characterized as satellite city of the capital city of Hanoi. Taking these into account, the infrastructure is planned with special emphasis on the communication between HHTP and university component as well as HHTP and Hanoi city. Hanoi-Hoa Lac highway is assumed to be common infrastructure for the two cities while trunk facilities including water supply, drainage and electricity are planned for the common use of the two components of HHTP and university area. These facilities together with the facilities to serve for the regional development and for the public interest, are defined as external infrastructure and their costs are excluded from the project cost of HHTP. Development schedule of the major external infrastructure is shown below.

Construction cost of the external infrastructure is estimated at USD 255 million as shown below.

External Infrastructure Cost

Item	(unit: USD million)			
	2005	2010	2020	Total
1. Road	57.8	6.5	36.9	101.2
2. Water Supply	75.8	18.2	20.6	114.6
3. Sewerage	26.6	19.3	11.6	57.5
4. Drainage	3.9	2.0	1.9	7.8
5. Electric Supply	44.2	2.2	10.1	56.5
6. Telecommunication	46.5	18.9	61.4	126.8
Total	254.8	67.1	142.5	464.4

Note: /1 Land acquisition cost nor compensation cost is not included.
/2 Price escalation is not included.
/3 Engineering service cost and physical contingency are assumed 12% and 10%.
/4 Any building/housing construction cost is not included.

3.4.4 Internal Infrastructure Cost

Construction cost of the internal infrastructure is estimated at USD 224 million including the land preparation cost and excluding the building cost as shown below.

Internal Infrastructure Cost

(unit:USD million)				
Item	2005	2010	2020	Total
1. Earth Work	3.2	5.4	2.7	11.3
2. Road	13.3	11.7	26.2	51.1
3. Water Supply	5.1	1.5	9.8	16.4
4. Sewerage	2.5	0.7	5.6	8.8
5. Drainage	7.5	2.3	16.3	26.1
6. Electric Supply	13.7	3.1	14.9	31.7
7. Telecommunication	3.3	0.8	4.2	8.3
8. Park & Sport Facilities	26.0	0.7	1.0	27.7
Sub-total	74.6	26.2	80.6	181.4
9. Engineering Service Cost	9.0	3.1	9.7	21.8
10. Physical Contingency	8.4	2.9	9.0	20.3
Total	92.0	32.3	99.3	223.6

Note: /1 Land acquisition cost nor compensation cost is not included.
 /2 Price escalation is not included.
 /3 Engineering service cost and physical contingency are assumed 12% and 10%.
 /4 Any building/housing construction cost is not included.
 /5 External infrastructure cost is not included.
 /6 Temporary water treatment plant is planned and included till the development of the external infrastructure

3.5 Impacts of HHTP Project

Besides the substantial ripple effects to be brought by spearheading the hi-tech industry development in the country, HHTP project would generate sizable value-added by high-tech production. Based on the GDP of the country and the share of the high-tech industry and that of HHTP in the total value-added of high-tech industry assumed in the Study, the share of HHTP in GDP could be estimated. Meanwhile, the value-added to be generated in HHTP could also be calculated by assuming the unit value-added of a high-tech employee and the total number of the employees in the High-Tech Industrial Zone. As shown below, the share of the value-added of HHTP will grow to reach 1.2 ~ 1.9 % in 2020, which is indicative of the noticeable direct economic impact of HHTP project on the national economy.

Economic Impact of HHTP Project

	2005	2010	2020
I. Estimation by Macro Approach			
1) GDP in Vietnam (USD million)	56,212	91,960	246,080
2) High-Tech Industry VA in Vietnam (USD million)	1,697	5,814	29,530
3) VA in HHTP (USD million)	764	1,599	4,725
	(1.4%)	(1.7%)	(1.9%)
II. Estimation by Micro Approach			
1) VA in HHTP (USD million)	(0.7%)	(0.8%)	(1.2%)
III. GDP Share in HHTP	0.7 ~ 1.4 %	0.8 ~ 1.7 %	1.2 ~ 1.9 %

Table 3-1 Number of Foreign Prospective Enterprises by Country

Nos. of Foreign Prospective Enterprises by Country	
1. Developed Countries	
1) Japan	4
2) U.K.	2
3) France	1
4) Germany	1
5) U.S.A.	3
2. NIES	
6) South Korea	6
7) Hong Kong	2
8) Taiwan	1
3. ASEAN	
9) Singapore	0
10) Thailand	0
11) Malaysia	3
Total	23

Table 3-2 Number of Foreign Prospective Enterprises by Category of Industry

ISIC Code	Description of ISIC	Nos. of Foreign Prospective Enterprises
154	Manufacture of other food products	1
223	Reproduction of recorded media	1
242	Manufacture of other chemical products	2
252	Manufacture of plastic products	3
281	Manufacture of structural metal products	2
289	Manufacture of other fabricated metal products	1
292	Manufacture of special purpose machinery	1
300	Manufacture of office, accounting and computing machinery	1
319	Manufacture of other electrical equipment	5
322	Manufacture of communication equipment	2
331	Manufacture of medical appliances and instruments	2
343	Manufacture of parts and accessories for motor vehicles	2
Total		23

Table 3-3 Development Plan of External Infrastructure

		HHTP		
Facilities		Ph.1 (~2005)	Ph.2 (2006~2010)	Ph.3 (2011~2020)
1 Road	Expressway	28km	-	-
	Interchange	1	-	-
	Main Road in HHTP	6.4 km	1.0 km	4.4 km
	Sub-main Road in HHTP	7.6 m	-	2.0 km
	Bus Terminal	2,000 m ²	-	10,000 m ²
2 Water Supply Facility	Water Intake System	50,000 m ³ /day	25,000 m ³ /day	25,000 m ³ /day
	Water Treatment Plant at Da Chong	50,000 m ³ /day	25,000 m ³ /day	25,000 m ³ /day
	Temporary Water Treatment Plant in HHTP	2,800 m ³ /day	-	-
	Water Conveyance Pipes	27 km x 1	27 km x 1	-
	Main Pipeline in HHTP	4.9 km	4.7 km	7.9 km
	Water Service Reservoir	16,000 m ³	9,000 m ³	16,000 m ³
	Repair of the Spillway of Tan Xa Lake	Whole	-	-
3 Sewerage Facility	Sewage Treatment Plant	40,000 m ³ /day	40,000 m ³ /day	20,000 m ³ /day
	Main Sewer	13.9 km	2.0 km	2.1 km
4 Drainage Facility	Retention Ponds	475,000 m ³	-	298,000 m ³
	Drainage Canal pipe	15 km	7.5 km	7.5 km
5 Electricity Supply Facility	Xuan Mai Substation (220/110kV)	2 x 125 MVA	-	-
	Substation in HHTP (110/22kV)	2 x 40 MVA	-	2 x 40 MVA
	Transmission Lines (220kV, Hoa Binh-Xuan Mai)	70 km		
	Transmission Lines (110kV, Xuan Mai-HHTP)	20 km	-	26 km
	Sub-Transmission Lines (22kV)	27.6 km	9.5 km	16.0 km
6 Telecommunication Facility	Optical Fiber Cable (Main)	15,000 Lines	10,000 Lines	40,000 Lines
	Switching Station	ditto		
	Remote Terminals	ditto		
	Mobile System	Full Set	-	-
7 Park & Sport Facilities	Central Park	46 ha	-	-
	Science Museum	5,000 m ²	-	-
	Gymnasium	3,000 m ²		
	Sport Courts	8 tennis courts, etc.		

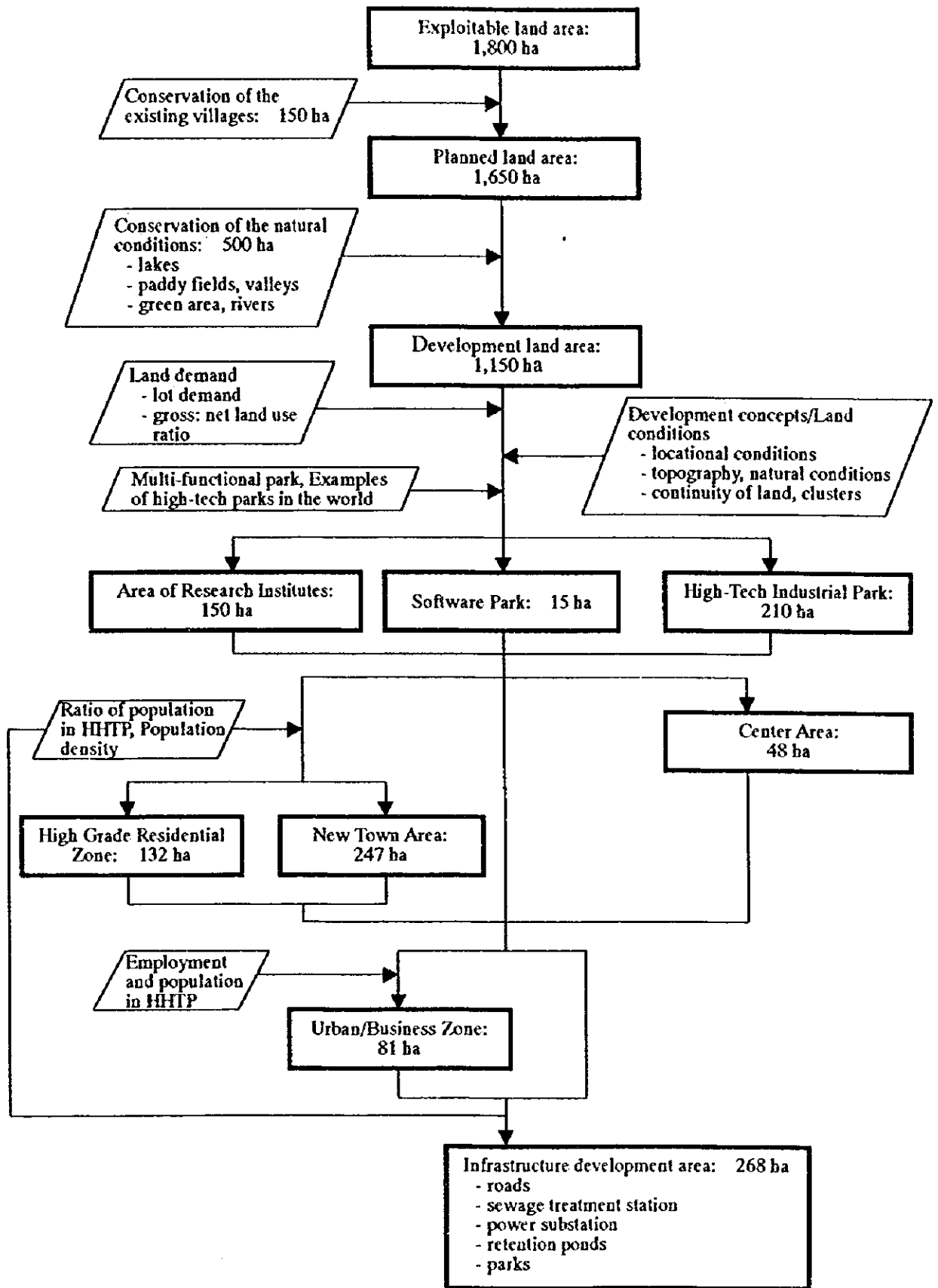
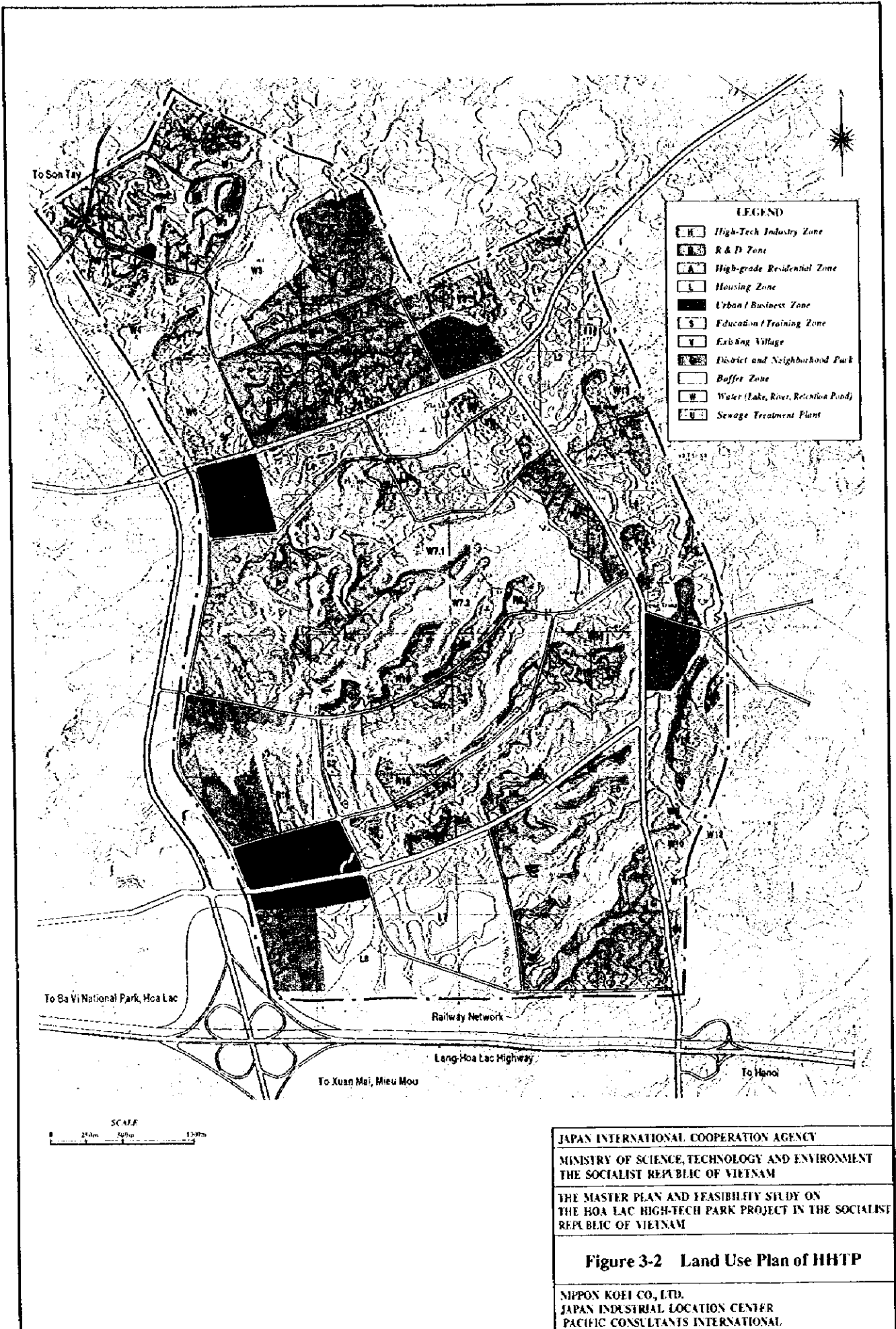


Figure 3-1 Planning of the Land Use of HHTP

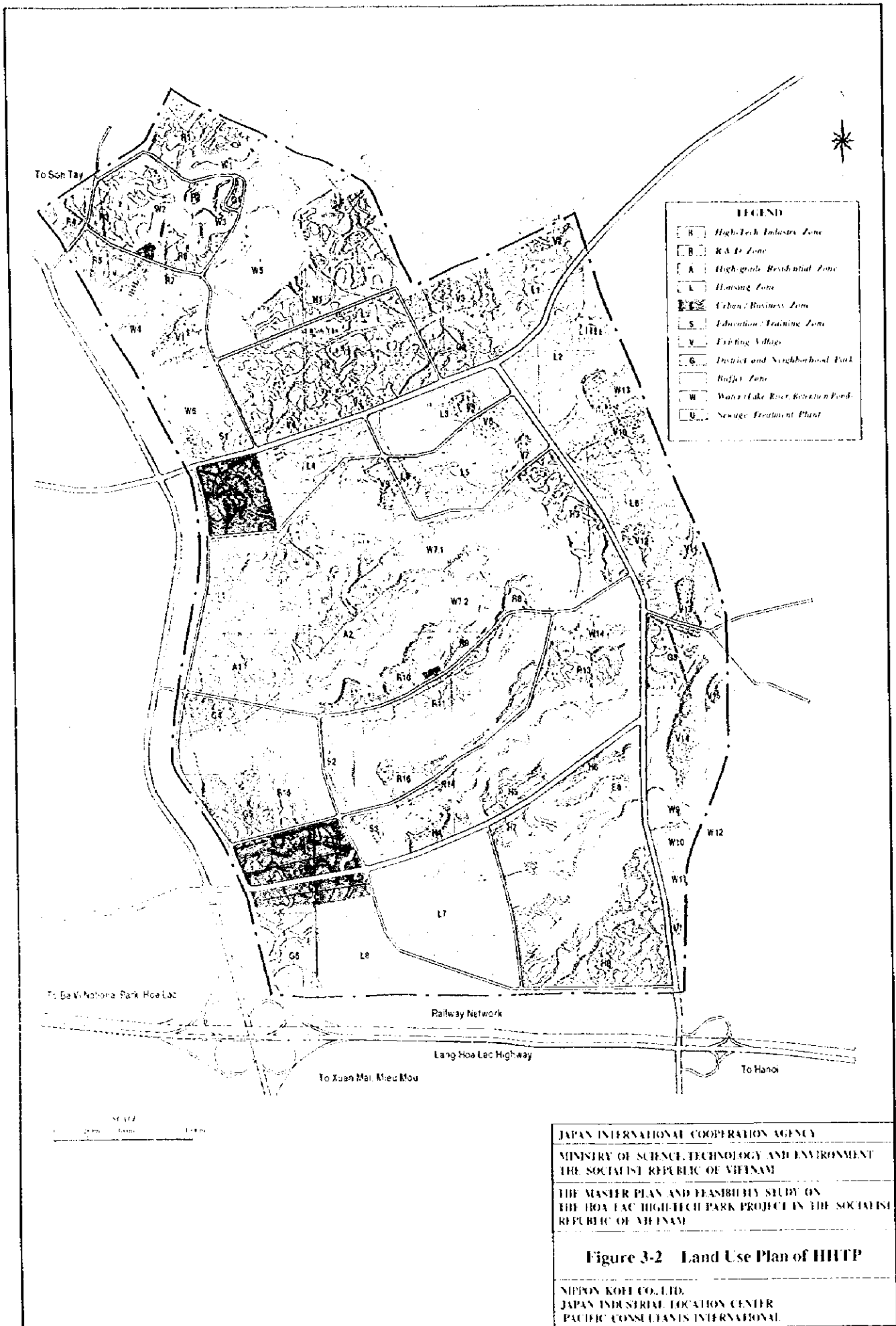


JAPAN INTERNATIONAL COOPERATION AGENCY
 MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT
 THE SOCIALIST REPUBLIC OF VIETNAM

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

Figure 3-2 Land Use Plan of HHTP

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 MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT
 THE SOCIALIST REPUBLIC OF VIETNAM

THE MASTER PLAN AND FEASIBILITY STUDY ON
 THE JICA-HAC HIGH-TECH PARK PROJECT IN THE SOCIALIST
 REPUBLIC OF VIETNAM

Figure 3-2 Land Use Plan of HHTP

NIPPON KOFI CO., LTD.
 JAPAN INDUSTRIAL LOCATION CENTER
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IV. FEASIBILITY STUDY ON THE INITIAL DEVELOPMENT OF HHTP

4.1 Selection of the Initial Development Site

Out of the total development area of 1,650 ha, about half of 800 ha is selected for the initial development site, which extends from the Tan Sa lake to the area along the planned expressway, considering the followings.

- 1) To include the low productivity land,
- 2) To include the Tan Sa lake and its surroundings to exploit its landscape and calm atmosphere fit for R&D activities, and
- 3) To include the areas having good access to the major transport facilities including the areas along the expressway and 21A road

The area of the initial development site is planned around 800 ha in order to accommodate the multiple functions of HHTP and supporting functions to be developed at the initial stage of development.

4.2 Land Use Plan for the Initial Development Site

4.2.1 Basic Plan for Land Use

Allocation of the functions and land use planning is conducted going through the process as given below.

1) R&D Zone

The establishment or relocation of the state research institutes should be given priority and their location should be the southern lake side area of the Tan Sa lake. The lot area should be 83.3 ha. Together with the lot area of 15 ha of software park, total of R&D Zone should be 98.3 ha or 117.5 ha including infrastructure area.

2) High-Tech Industrial Park

High-tech industrial park should be located in the south-eastern part of HHTP, adjacent to the planned interchange of the expressway. Lot area should be 61.6 ha in net and 70.7 ha in gross.

3) Center Area

Center Area where supporting centers will be established, will be located in the midst of the zones. The gross area should be 16.3 ha.

4) Residential areas

To accommodate about half of the population, two residential areas will be constructed, High Grade Residential Zone and New Town Zone. The former is planned to be located just to the north of the lake in order to provide low density residential area equipped with golf course for the senior staff of the state research institutes and management of the high-tech enterprises. Gross area will be 75.6 ha. The latter is planned to be located in the southern part next to the high-tech industrial park to provide medium density housing area for the population accounting for about 90 % of the total in HHTP, comprising employees and workers and their families, to give good access for commuting. Gross area will be 74.3 ha.

It should be noted that schools including secondary and primary as well as kindergarten and health center will be constructed in New Town Zone in order to upgrade the social infrastructure and enhance the living environment of HHTP. It should also be noted that 9 hole golf course will be constructed as an integral part of the High Grade Residential Zone to offer amenity for the foreign investors and employees.

5) Urban/Business Zone

Urban/Business Zone will be located along the regional trunk road with good access from the new town area. Gross area will be 25.7 ha.

Land use plan for the initial development site is shown below. Together with the lake, parks and green area, infrastructure tract and the reserve land, area of the initial site totals 794.2 ha.

Land Use for the Initial Development Site

Item	Area (ha)	(%)	Remarks
1. R&D Zone	117.5	14.8	
2. Center Area	16.3	2.1	
3. High-Tech Industrial Zone	70.7	8.9	
4. Urban/Business Zone	25.7	3.2	
5. High Grade Residential Zone	75.6	9.5	inclusive of golf course
6. New Town Zone	74.3	9.4	
7. Main road, sewage plant, etc.	94.0	11.8	inclusive of retention ponds
8. Park & green	153.5	19.3	
9. Tan Xa Lake	120.3	15.1	
10. Reserve Area	46.3	5.8	
Total	794.2	100.0	

Detailed land use is tabulated in Table 4-1 and figured in Figure 4-1.

4.2.2 Alternative Land Use Plan

Various alternative land use plans could be envisaged, among which a option can be formulated by replacing the new town area by the expansion of the high-tech industrial park, about double of that of the basic plan. Both plans have merits and demerits as compared below.

Merit of Option

- 1) Due to the higher feasibility of the High-Tech Industrial Zone than that of the New Town Zone, the overall feasibility of the option is higher than that of the basic.

Merit of Basic Plan

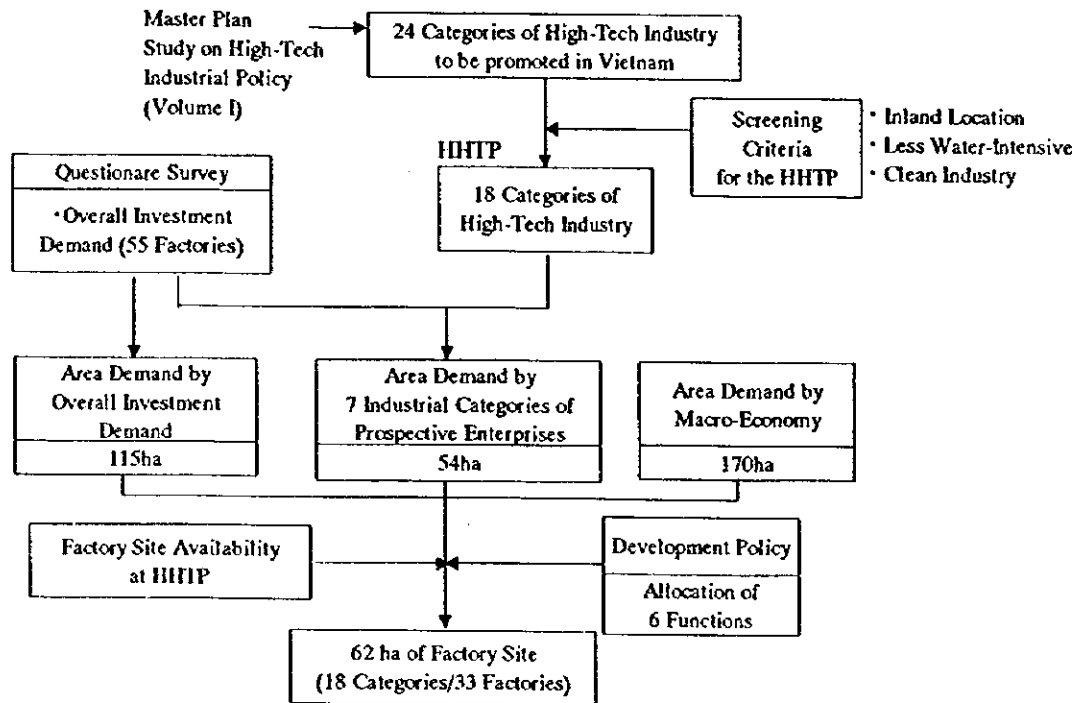
- 1) Basic plan complies more with the development concepts of HHTP encompassing all the functions and the requirements of the Government of the Vietnam, while the option is lacking the function of the accommodation for the residents of HHTP.
- 2) Basic plan conforms more to the examples of the high-tech parks developed in the world.
- 3) There exists uncertainty for the sizable additional demand for the High-Tech Industrial Zone.
- 4) Inclusion of the New Town Zone which aims at providing the accommodation for the middle class workers and the younger researchers, that is located close to their working places, would give strong incentive.

Based on the comparison, it is recommended that the basic plan should be adopted.

4.3 High-Tech Industrial Zone

The area of High-Tech Industrial Zone in the initial development stage is estimated based on the lot demand, availability of suitable land and concepts for HHTP development as shown below. The area is estimated at 61.6 ha in net and 70.7 ha in gross.

Planning Process for the High-Tech Industrial Park in the Initial Development



Besides the lots for the 15 enterprises of 7 categories who have shown interest in investing in HHTP, 18 lots are allocated for the categories which have potential to be developed and are desirable to be located in HHTP including pharmaceutical and computer industries. In total, 33 lots for 18 categories are allocated in the High-Tech Industrial Zone with the lot sizes ranging from below 0.5 ha up to 10 ha.

4.4 R&D Zone

4.4.1 State Research Institute Sub-Zone

Two sub-zones, i.e., state research institute sub-zone and software park, will be established within the R&D Zone, considering the characteristics of the activities and requirement for the land. Based on the land demand estimated through micro and macro approaches as well as the availability of suitable land, 83.3 ha of lots are planned for the state research institute sub-zone.

4.4.2 Software Park and National Software Center

A few tens of medium-to-large sized computer software enterprises will be located in the software park with the lot size of around 0.5 ha. A national software center will be located for accommodating a couple of tens of small and venture software enterprises.

4.5 Centers

Five (5) centers will be established for supporting the high-tech production and R&D activities in HHTP as given below.

- 1) High-Tech Park Center
- 2) Technopartnership Center
- 3) Technical Institute
- 4) OJT Technical Support Center
- 5) National Software Center

Out of the five, four except the National Software Center will be located in the Center Area. In HTPC (High-Tech Park Center), Managing Board of HHTP and relevant agencies and committees as well as HHTP-IDC (HHTP infrastructure development company) will be housed and extend one-stop service including application and approval of various licenses to the investors and enterprises to be located in HHTP. Technopartnership Center will provide the services of testing and certification of standards and high-tech related information as well as the function of interfacing the state research institutes enterprises and universities and support the small and venture enterprises by extending consulting services including management, technology and marketing. Technical Institute will provide 2 years of technical education and half a year on-the-job training to the high school graduates and 3 years of education and half a year of training to the junior high school graduates. About 120 students per grade with around 50 teaching staff are given technical education. OJT Technical Support Center with the capacity for training of about 200 with about 20 to 30 instructors, will provide short-term on-the-job training to the freshmen and retraining of workers for the small-to-medium size enterprises. The total floor area of the four centers will be around 28,000 m² within the center area of 16.3 ha.

The major roles of the 5 centers which correspond to the basic strategies worked out in the Study for the high-tech industry development in the country as a whole, are summarized below.

Centers	Roles / Meeting Basic Strategies
High-Tech Park Center	Investment Promotion / Attracting FDI
Technopartnership Center	R&D Support, Incubation / Enterprise Rearing
Technical Institute	Human Resource Development (Technicians)
OJT Technical Support Center	Human Resource Development (Skilled, semi-skilled workers for small to medium enterprises)
National Software Center	Incubation / Enterprise Rearing, Promotion fo the highest priority field

Assuming the labor proportion of the electronic industry in Thailand to be applicable for the future of high-tech industries in Vietnam, about 10 % of the total labor force in the high-tech industries will be required for technicians and one fourth for skilled and semi-skilled workers. In the case of HHTP, 860 technicians and 2,150 skilled and semi-skilled workers will be required by the year 2005 for High-Tech Industrial Zone alone. The capacity of the Technical Institute and that of OJT Technical Support Center seem to be of appropriate level.

4.6 Organization and Legal Framework for the Implementation and Management of HHTP

4.6.1 Enactment of High-Tech Park Law

Law should be enacted for backing up the expeditious and coordinated implementation and management of HHTP. Law firstly, should be enacted for the high-tech parks to be set up in Vietnam and secondly, law for HHTP should be enacted. Alternatively, one law could govern all the high-tech parks with detailed regulation for each park. The following issues should be stipulated in the law.

- 1) Purpose and characteristics of the park,
- 2) Designation of the land for the park and regulation of land use and landscaping,
- 3) Power and responsibilities of the Board of Management for the park, Ministries, People's Committees, agencies of the Government concerned with the development of the park,
- 4) Qualification and status of infrastructure development companies for the development and management,
- 5) Rights for the land rent, lease of land and lots within the park and transfer thereof,
- 6) Environmental conservation, standards and monitoring, and

- 7) Preferential treatments for the investors/developer for the park and research institutes and enterprises for high-tech industry.

In place of the laws, decrees or decisions may be issued. However, it may be advisable to enact a law for more expeditious implementation and effective management of HHTP project.

4.6.2 Implementation and Management Structure for HHTP Project

Overall structure of the implementation and management of HHTP should be decided considering the following aspects.

- 1) Basic development policy of the Government for HHTP should be guaranteed.
- 2) Smooth implementation of the public sector projects of basic infrastructures, state research institute zone, Center Area and New Town Zone in HHTP should be guaranteed.
- 3) Private sector investment including the foreign investment for the profitable projects should be promoted.

In this context, the following framework for the implementation and management of HHTP is advisable.

- 1) National level steering committee (HHTP-SC) may be advised to be set up with a Deputy Prime Minister as chairman with the concerned ministries, agencies, people's committee for securing efficient coordination among the concerned and the relevant projects including infrastructure projects.
- 2) Board of Management for HHTP should be established according to the Decree 36 CP.
- 3) State owned enterprise (SOE) should be the body for the implementation and management of HHTP (HHTP-IDC).
- 4) Key infrastructures to serve for the regional development including Hoa Lac city should be implemented and maintained by the agencies in charge.
- 5) Area located outside of the functional zones including the central park may be managed by the Ha Tay People's Committee.
- 6) The zones of public interest comprising R&D Zone (Institute Sub-Zone), Center Area and New Town Zone, should be implemented by ministries or state agencies. Options may be MOSTE for Center Area, MOC for New

Town Zone and the proposed National High-Tech R&D Center for R&D Zone (Institute Sub-Zone). HHTP-IDC may be the alternative for the Center Area.

- 7) SOE/foreign joint venture(s) should be invited for the development of the profitable zones of High-Tech Industrial Zone, R&D Zone (software park), High Grade Residential Zone and Urban/Business Zone. SOE to form the joint venture(s) could be the subsidiary company of the HHTP-IDC.
- 8) Centers to be established within HHTP should be managed by the ministries or SOEs under the ministries. Options may be MOSTE for High-Tech Park Center, Technopartnership Center and National Software Center and MOET for Technical Institute and OJT Technical Support Center. Alternatively, HHTP-IDC for High-Tech Park Center and MOI for OJT Technical Support Center may be conceivable. Depending on the profitability of the centers, SOEs under the ministries may be the managing bodies.

Alternatively, all the 5 centers may be managed by one ministry or a SOE under the same ministry, considering their close relationship and the need for coordination. Option is MOSTE or a SOE under MOSTE.

Recommended structure is shown in Figure 4-2.

4.6.3 Priority Categories of Enterprises and Preferential Treatments

(1) Guideline for the Priority Categories of Enterprises

Priority categories of enterprises for the promotion for inviting into HHTP are selected based mainly on their intensity of R&D. Enterprises classified into R&D type (private institutes) and production type (enterprises) including manufacturing and computer software, regardless of their type of capital; Vietnamese, foreign or joint venture. These enterprises who meet the conditions for the priority enterprises should be given the most preferential treatments among these applied in the industrial zones in Vietnam. Hereunder, the conditions are shown with the possible figures to be applicable. It should be noted that with regard to the conditions 4), 5) and 7), meeting either one of these suffices to be acknowledged as priority enterprises.

- 1) Enterprises or institutes should be engaged in either research, development or production in the one or more of priority high-tech fields.
- 2) Enterprises should be self-financing ones.

- 3) Sizes of the capitals of the enterprises should exceed certain level and their office space and facility should be of appropriate sizes for their R&D and production.
- 4) R&D expenditure ratio to the total sales of the enterprises should exceed certain level (3 %).
- 5) Sum of the royalty revenue and high-tech production value in the total revenue of the enterprises should exceed certain level (50 %).
- 6) Operation period of the enterprises or institutes should be 8 years (10 years) or longer.
- 7) In the case of the R&D type enterprises (institutes), share of the employees with bachelor's degrees or the higher engaged in the scientific or engineering works in the total employees should exceed certain level (30 %) and share of these engaged in R&D works should exceed certain level (10 %). In the case of the production type enterprises (enterprises), share of the employees with bachelor's degree or the higher in the scientific or engineering works should exceed certain level (20 %).
- 8) Enterprises and institutes should be "clean types " meeting at least one of the followings.
 - i) They should be classified as clean industry/enterprise acknowledged by the Board of Management of HHTP in compliance with the relevant environmental law in Vietnam.
 - ii) They should discharge no toxic waste in any form.

The priority screening criteria should be set up by the concerned board and agencies with reference to the above and also paying attention to the followings.

- 1) The criteria should be realistic considering the level of comparative and locational advantages of HHTP observed by the investors and should not be prohibitive nor too strict.
- 2) If deemed appropriate, a group of enterprises, comprising high-tech enterprises and their supporting ones which might include these that do not fall under high-tech enterprises, should be treated as an enterprise for the evaluation in the screening of priority enterprises.

- 3) It might be worth considering to set a couple of priority levels for the enterprises to be promoted, applying corresponding levels of preferential treatment.

(2) Preferential Treatments for Enterprises and Institutes

Special preferential treatments should be given to the enterprises and private institutes to be located in HHTP. Free access to the domestic and international information required for the high-tech related activities should fully be guaranteed. Long-term visas should be provided to the foreign personnel. Preferential treatment should also be extended in monetary terms which can be divided into ;

- 1) Exemption or reduction of indirect and direct taxes including custom duties and corporate income tax and accelerated depreciation,
- 2) Subsidies for research and training activities,
- 3) Exemption or reduction of lot lease rates, and
- 4) Personal income tax reduction for the foreign personnel

It should be noted that the rates given in the table are only to indicate the desirable levels for reference and should be decided by the Vietnamese authorities concerned. These treatments should legally be guaranteed for fixed duration of time in order to attract the long-term investment of high-tech production and research. The details of these treatments are given in the Table 4-2. It should be noted that the incentive figures given in the table are indicative for the desirable levels and final figures should be set by the Government.

(3) Preferential Treatments for the Researchers and Overseas Vietnamese

In order to promote the relocation or establishment of the state research institutes in HHTP, it is advisable that priority should be given for the researchers of the state research institutes and overseas Vietnamese for allocating the houses in the New Town Zone. These houses should be rent at favorable rates. As a part of the incentives for researchers, entrusted and cooperative researchers with the enterprises, the foreign ones in particular, should be encouraged. Co-ownership of the patents and intellectual property right should be allowed for the researchers.

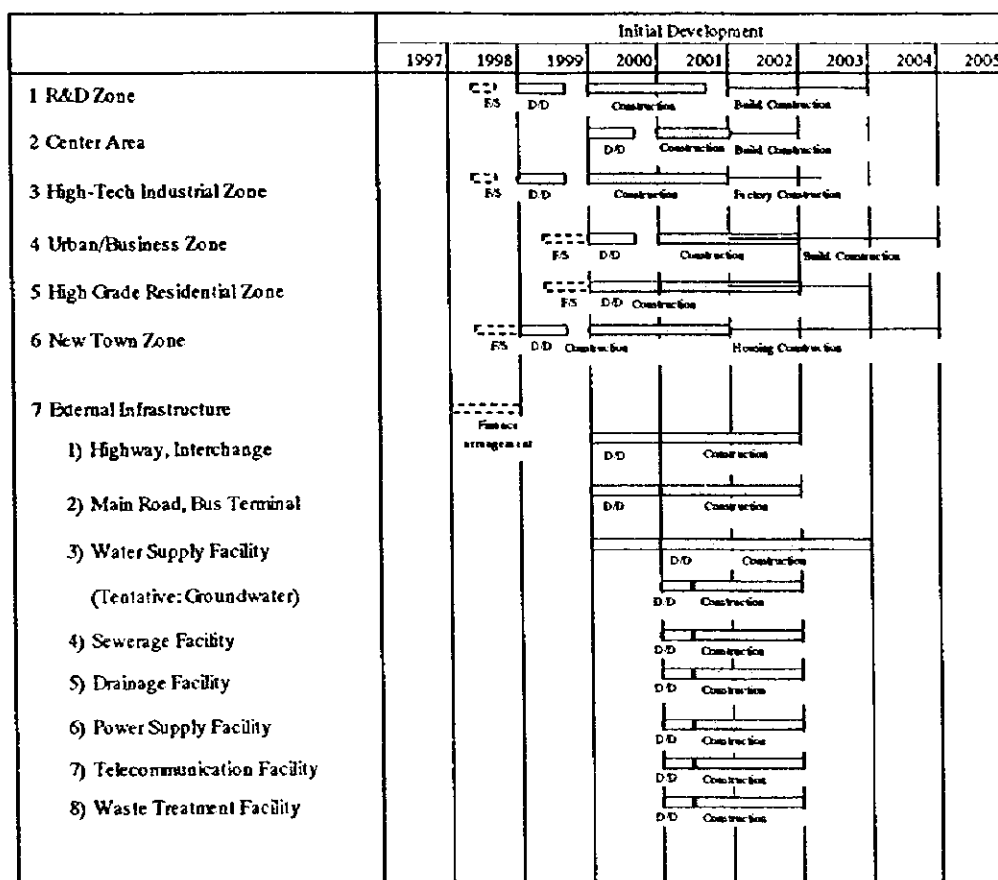
4.7 Construction Schedule and Financing

4.7.1 Construction Schedule

Infrastructures facilities in the initial phase should be developed emphasizing;

- 1) Communication with the Vietnam National University-Hanoi, and
- 2) Communication with Hanoi both through transport and telecommunication facilities including the Hanoi-Hoa Lac expressway,

Considering its importance and urgency, the initial phase is recommended to be implemented as early as possible. Most of the infrastructures for the phase should be completed before 2003 and architectural works should be started in 2002 as shown below.



4.7.2 Construction Cost and Financing

(1) Construction Cost

Total construction cost of all the facilities comprising the external and internal infrastructures and buildings comprising the centers and these in the New Town Zone, High Grade Residential Zone and Urban/Business Zone, amounts to about US\$ 688 million, of which the foreign currency component is US\$ 249 million (36.2 %) and the local component is US\$ 439 million (63.8 %). It should be noted that the cost of the 6 lane expressway connecting Hoa Lac with Hanoi is about US\$ 138 million including the

cost of interchange to enter HHTP of US\$ 12 million, which should be considered as the cost attributable to the implementation of the whole of Hoa Lac new satellite city encompassing HHTP and not included in the cost for HHTP.

(2) Financing

Out of the total cost of US\$ 688 million for HHTP project, construction cost for the self-financing zones of US\$ 160 million should be financed by the private sector. The housing cost for the New Town Zone of US\$ 181 million may also be financed by non-public sector, either by the foreign, joint venture between the foreign and SOEs or SOEs alone. The telecommunication facilities may be financed by means of either BOT, BLT or BCC, the cost of which is US\$ 47 million. Together, the private or non-public sector should finance about US\$ 388 million out of US\$ 688 million, or about 56 % of the total for HHTP. The remaining US\$ 300 million (44%) should be financed by the public sector, including the possible bi-lateral or multi-lateral ODA (official development aid).

4.8 Project Evaluation

HHTP project is evaluated from the following 4 viewpoints.

- 1) Financial viability
- 2) Economic viability
- 3) Social impacts
- 4) Environmental impacts

4.8.1 Financial Evaluation

Financial evaluation is made based on the following assumptions.

- 1) Considering their characteristics to serve for the public interest, external infrastructures, state research institute area, New Town Zone, Center Area and the 5 proposed centers should be constructed as public undertaking.
- 2) The rest of the areas of High-Tech Industrial Zone, software park, High Grade Residential Zone and Urban/Business Zone should be implemented by enterprises including the foreign and the state owned enterprises.
- 3) All the indirect taxes including import duties on the equipment to be installed in HHTP and value-added tax should be exempted.
- 4) Land rent for the tract for HHTP before developing infrastructures should be set at USD 0.375 per m² without multiplying by the coefficient for the

infrastructures, rather than US\$ 0.5625 per m². More preferably, land rent should be set at US\$ 0.10 or less considering the importance of the HHTP project and the rents to be applicable for other industrial zones around Hanoi.

- 5) According to the data and information provided by the Vietnamese Government, compensation cost and relocation cost for the Ph. 1 tract are assumed to be US\$ 8.3 and US\$ 4.7 excluding the price escalation, respectively, for the purpose of the Study.
- 6) Lot lease rate of High-Tech Industrial Zone and software park is set at USD 45 per m² which is lower than these of the existing industrial zones in Vietnam to be internationally competitive to attract the foreign investors, considering the rates of these located around their capitals of Asian countries as shown in Table 4-4.

The results of financial evaluation in terms of FIRR (financial internal rate of return) for the self-financing zones to be implemented by enterprises is shown below.

FIRR (%) for the Developers

	Land Rent (US\$/m ² /y)	
	0.375	0.100
1. R&D Zone (Software Park)	16.5	20.6
2. Hi-Tech Industrial Zone	14.5	20.6
3. Urban / Business Area	17.1	17.3
4. High Grade Residential Zone	12.0	12.4
5. HHTP (4 Self-Financing Zones)	14.4	14.9
6. HHTP (7 Zones Total)	9.3	10.0

In both cases of the land rent levels, all the FIRR figures are well over the presumed level of the opportunity cost of the capital in Vietnam, i.e., 8 to 10 %. For the whole of the self-financing zones, FIRR is estimated to exceed 14 %. Even for the whole HHTP project comprising all the 7 zones including the public zones but excluding the external infrastructures, FIRR is estimated at more than 9 %. HHTP project is, thus, evaluated financially viable.

4.8.2 Economic Evaluation

Besides the various intangible benefits including the indirect effects for the high-tech industrial development in the country as a whole and regional development, economic benefit attributable to the implementation of High-Tech Industrial Zone of HHTP, is estimated based on the value-added to be generated by its implementation.

With the total project cost of HHTP, EIRR of HHTP project is estimated at 25.9 %, taking into account the value-added which would be produced without HHTP project. The figure is high enough to economically justify HHTP project.

4.8.3 Social Assessment

In planning the land use for the initial development of HHTP, major settlement areas are excluded from the development area as much as possible. The resulting number of households to be resettled is 668. Though detailed study is required, land located adjacent to but outside of the Phase 3 area may be allocated for their relocation. As for the alternative work opportunities for the work force among these resettled which is presumed to be around 1,350, employment opportunities can be given in HHTP where 14,300 jobs will be created. In the High-Tech Industrial Zone, biggest number of 8,600 employment opportunities will be generated by the year 2005. Assuming the proportion of engineers, technicians, skilled and semi-skilled workers and unskilled in the electronic industry in Thailand as possible proportion of labor in the High-Tech Industrial Zone, number of workers excluding engineers and technicians is estimated at about 7,300 which far exceeds 1,350. Taking into account the other public and commercial service employment opportunities, alternative job opportunities for the labor to be resettled seem to be adequate. From the flood risk, the planned residential area will be protected from the floods with 100 year return period.

4.8.4 Environmental Assessment

Clean industries should be located in the High-Tech Industrial Zone and no hazardous waste should be discharged to environment. Monitoring system should be set up to maintain the existing clean environment with relevant agencies of the central and local governments with the cooperation of the entities to be located in HHTP. Environmental Conservation Council should be set up with concerned agencies and committees as well as the enterprises as members. Agreement should be reached among the concerned parties which stipulates the followings.

- 1) Establishment of the Environmental Conservation Council,
- 2) Preparation of environmental conservation plan and reporting to the responsible agencies,
- 3) Management of hazardous and toxic wastes,
- 4) Measures for preventing water and air pollution,
- 5) Solid waste management,

- 6) Measures for the prevention of disasters and accidents, and
- 7) Establishment of environmental monitoring system and organization, including on-the-spot inspection

4.8.5 Overall Evaluation

HHTP project is evaluated financially feasible provided that land rent should be USD 0.375 per m² or lower and that custom duties and indirect taxes should be exempted for the equipment and facility for HHTP project. HHTP project is quite viable from the economic viewpoint even without the various intangible benefits for the country, due mainly to the difference of value-added of industry and that of the current land use. Social and environmental impacts can be considered as not serious or remedial measures can be taken. HHTP project, therefore, is evaluated as feasible for implementation.

Table 4-1 Land Use Plan of Phase 1 (Basic Plan)

	Area (ha)	Ratio (%)	Remarks
I R & D Zone	217.5	14.8	
1 R & D institutes	83.3		} 98.3
2 Software park (inclusive of national software center: 1.4ha)	15.0		
3 Park	5.7		
4 Internal main road	11.6		width=26m, length=4,450m
5 Internal sub-main road	2.0		width=14m, length=1,400m
II Center Area	16.3	2.1	
1 Technical institute	4.7		
2 Hi-Tech park center	6.1		
3 OJT technical support center	1.4		
4 Techno-partnership center	4.1		
III High-Tech Industrial Zone	70.7	8.9	
1 Factory lot	61.6		
2 Park	2.1		
3 Internal main road	0.5		width=26m, length=200m
4 Internal sub-main road	6.5		width=20m, length=3,225m
IV Urban/Business Zone	25.7	3.2	
1 Business/commercial lot	13.6		
2 Park in urban/business area	10.3		
3 Bus terminal	1.8		
V High Grade Residential Zone	75.6	9.5	
1 Golf course	52.0		9 holes for Phase I
2 High grade residences	23.6		
1) Housing lots	10.1		
- Detached houses	4.9		
- Apartments	5.2		
2) International school	1.4		
3) Road	4.3		
Type1	1.6		width=12m, length=1,350m
Type2	0.6		width=14m, length=450m
Type3	2.1		width=22m, length=950m
4) Park	1.0		inclusive of swimming pool, sport ground, tennis court
5) Green area	6.8		
VI New Town Zone	74.3	9.4	
1 Housing lots	30.9		
1) Detached housing lots	9.6		
2) Row housing lots	7.5		
3) Apartments (medium-rise)	13.4		
4) Apartments (high-rise)	0.5		
2 Neighboring commercial lots	1.9		Shop house
3 Health center/Community center	0.3		
4 School	6.9		
1) Kindergartens	2.1		2 kindergartens
2) Primary School	2.5		
3) Secondary School	2.3		
5 Road	10.4		
1) Main road in new town zone	4.0		width=22m, length=1,820m
2) Feeder road	4.2		width=14m, length=2,990m
3) Collector road	2.3		width=7.5m, length=3,000m
6 Park	13.7		
7 Green area	10.2		
VII Skeleton Road of High-Tech Park	49.8	6.3	
1 Main road	29.8		width=50m, length=5,950m
2 Sub-main road	16.3		width=26m, length=6,260m
3 Road in urban/business zone	1.2		width=14m, length=850m
4 Connection road with Expressway & R.21	2.6		width=50m, length=410m, width=26m, length=200m
VIII Others	364.3	45.9	
1 Central park	45.8		
2 Reservoir(Tan Xa Lake)	120.3		
3 Sewage treatment plant	10.0		
4 Retention pond	34.2		
5 Green area	107.7		
6 Reserve area	46.3		net area of plant site is app. 4 ha
IX Total	794.2	100.0	

Table 4-2 Investment Promotion in Hoa Lac High-Tech Park

1) High Quality Environment

- Good infrastructure,
- Free access to worldwide information,
- Establishment of technology market including patents and other industrial property right,
- Co-ownership of patents by cooperative researches,
- Good access to engineers and skilled/semi-skilled labor,
- Proximity to Vietnam National University-Hanoi,
- Proximity to state research institutes, in particular National Center for Science and Technology,
- Permission to issue permanent visa or long stay visa,
- Good residential environment together with urban facilities,
- Facilities and support service for human resource development,
- Intelligent building,
- One-stop service,
- Facilities and support service for incubation,
- Open laboratory and rental laboratory, and
- Exchange of information and interface service among industry, academic and governmental organizations

2) Incentives

Indirect Income Tax

- | | |
|--|------------------------------------|
| • Import duty on facilities and equipment for production and R&D | Exemption |
| • Amount-of-tax deduction according to royalty payment expenditure | Partly or wholly |
| • Amount-of-tax deduction according to R&D expenditure | Partly or wholly |
| • Tax on remitting royalty income abroad | 2.5 % or 5 % (half of usual cases) |

Direct Income Tax

- | | |
|----------------------------|---|
| • Corporate income tax | Exemption for 10 years and reduction to 10 % in the following 5 years |
| • Accelerated depreciation | |
| Factory | 100% in 2 years |
| Institutes | 100% in 1 year |
| • Expenditure for R&D | Double deduction |
| • Tax on royalty income | Exemption |

Subsidies

- | | |
|--|--|
| • Subsidy to cooperative research with State Research Institutes | Certain amount below half of the expenditure |
| • Subsidy to R&D activities by private enterprises | Certain amount below half of the expenditure |
| • Subsidy to vocational and technical training | 50% |

Lease Rates

- | | |
|--|-----------------------|
| • Land ownership fee (lease rate of lots)* | Exemption for 5 years |
| • Land ownership fee for the factory with R&D institutes | 40% reduction |
| • Land ownership fee for R&D institutes | 50% reduction |

* Applicable for particular companies which are recognized as contributing greatly to the success of HHTP including bringing in and transferring hi-technology and stimulate and accelerate the location of hi-tech enterprises into HHTP.

Table 4-3 Development Cost of Phase 1 of HHTP Project and Possible Financial Arrangement

Project	Development										Source of Public Fund				Source of Private Fund												
	Total					Cost					/1		/2		JV		SOE		BOT		Total		Foreign Fund				
	Total	Foreign Portion	Local Portion	Total	Foreign Portion	Local Portion	Total	Foreign Portion	Local Portion	Total	Foreign Portion	Local Portion	Government Budget	Technical Aid	Total	JV	SOE	BOT	Total	Foreign Fund							
1.External Infrastructures																											
1.1 Road	57.79	8.67	49.12	57.79	8.67	49.12	49.12	8.67	49.12	-	-	0	-	57.79													
(1) Bus Terminal	(0.37)	(0.06)	(0.31)	(0.37)	(0.06)	(0.31)	(0.31)	(0.06)	(0.31)	-	-	-	-	(0.37)													
(2) Main Road	(57.42)	(8.61)	(48.81)	(57.42)	(8.61)	(48.81)	(48.81)	(8.61)	(57.42)	-	-	-	-	(57.42)													
1.2 Water Supply Facilities	75.83	48.01	27.82	75.83	48.01	27.82	27.82	48.01	75.83	-	-	0	-	75.83													
1.3 Sewerage Facilities	26.59	8.87	17.72	26.59	8.87	17.72	17.72	8.87	26.59	-	-	0	-	26.59													
1.4 Drainage Facilities	3.89	1.35	2.54	3.89	1.35	2.54	2.54	1.35	3.89	-	-	0	-	3.89													
1.5 Power Supply Facilities	44.15	28.68	15.47	44.15	28.68	15.47	15.47	28.68	44.15	-	-	0	-	44.15													
1.6 Telecommunication Facilities	46.51	44.67	1.84	46.51	44.67	1.84	1.84	44.67	46.51	-	-	0	-	46.51													
Sub-Total	254.76	140.25	114.51	254.76	140.25	114.51	114.51	140.25	254.76	-	-	-	-	208.25													
2.Public Zones																											
2.1 R&D Zone (Institute Sub-Zone)	15.29	6.39	8.91	15.29	6.39	8.91	8.91	6.39	15.29	-	-	0	-	15.29													
2.2 Center Area (Infrastructure)	0.89	0.21	0.68	0.89	0.21	0.68	0.68	0.21	0.89	-	-	0	-	0.89													
2.3 Center Area (Building)	44.72	13.41	31.31	44.72	13.41	31.31	31.31	13.41	44.72	-	-	0	-	44.72													
(1) National Software Center	(8.14)	(2.44)	(5.70)	(8.14)	(2.44)	(5.70)	(5.70)	(2.44)	(8.14)	-	-	0	-	(8.14)													
(2) High-Tech Park Center	(9.43)	(2.83)	(6.60)	(9.43)	(2.83)	(6.60)	(6.60)	(2.83)	(9.43)	-	-	0	-	(9.43)													
(3) Technology/Innovation Center	(13.77)	(4.13)	(9.64)	(13.77)	(4.13)	(9.64)	(9.64)	(4.13)	(13.77)	-	-	0	-	(13.77)													
(4) Technical Institute	(6.84)	(2.05)	(4.79)	(6.84)	(2.05)	(4.79)	(4.79)	(2.05)	(6.84)	-	-	0	-	(6.84)													
(5) IOT Training Center	(6.54)	(1.96)	(4.58)	(6.54)	(1.96)	(4.58)	(4.58)	(1.96)	(6.54)	-	-	0	-	(6.54)													
2.4 New Town Zone(Infrastructure)	18.12	6.75	11.37	18.12	6.75	11.37	11.37	6.75	18.12	-	-	0	-	18.12													
2.5 New Town Zone(Building)	181.19	27.18	154.01	181.19	27.18	154.01	154.01	27.18	181.19	-	-	0	-	181.19													
2.6 Park, Green Area	12.97	5.15	7.82	12.97	5.15	7.82	7.82	5.15	12.97	-	-	0	-	12.97													
Sub-Total	273.19	59.11	214.08	47.28	18.52	28.76	225.91	40.59	185.32	-	-	0	-	92.00													
3.Self-financing Zone																											
3.1 High-Tech Industrial Zone	15.96	6.83	9.13	15.96	6.83	9.13	9.13	6.83	15.96	-	-	0	-	15.96													
3.2 R&D Zone (Software Park)	2.75	1.15	1.60	2.75	1.15	1.60	1.60	1.15	2.75	-	-	0	-	2.75													
3.3 High Grade Residential Zone	80.81	22.69	58.12	23.09	5.37	17.72	57.72	17.32	40.40	-	-	0	-	80.81													
3.4 Urban/Business Zone	60.56	18.53	42.03	2.90	1.23	1.67	57.66	17.30	40.36	-	-	0	-	60.56													
Sub-Total	160.08	49.20	110.88	44.70	14.58	30.12	115.38	34.62	80.76	-	-	0	-	160.08													
Total	688.03	248.56	439.47	346.74	173.35	173.39	341.29	75.21	266.08	-	-	0	-	300.25													

①: Proposed Source of Fund
 ○: Alternative Source of Fund
 /1 Including bilateral and multilateral official development aid.
 /2 Including BOT, BLT and BCC.
 *1) Engineering service cost and physical contingency are included.
 *2) Price escalation is not included.

Table 4-4 Selling and Leasing Prices of Industrial Estates in Metropolitan Areas of Other Asian Countries

Name of GIE, EPZ	Country	Distance from Major City (km)	Total Area (ha)	Factory Lot Area (ha)	(1995 price)	
					Sales Price (US\$/m ²)	Lease Price (US\$/m ² /y)
East Jakarta I.P.	Indonesia	40km(Jakarta)	320	306	60-65	-
MM2100 I.P.	Indonesia	30km(Jakarta)	500	307	65-80	-
Bukit Indah City (SBI Area)	Indonesia	65km(Jakarta)	1,300	1,300	55	5-5.5
Karawang Int'l Industrial City	Indonesia	6km(Karawang)	1,200	296	53-57	0.5
Pasir Gudang Tambahan	Malaysia	36km(Johor Baru)	-	383	-	4.3-5.2
Masjid Tanah I.E.	Malaysia	32km(Malacca)	-	71	-	2.4
Pulau Indah I.P.	Malaysia	43km(Kuala Lumpur)	-	1,680	-	6.8
Selat Kelang Utara Peringkat III	Malaysia	47km(Kuala Lumpur)	-	418	-	5.6
Holy Angel I.E.	Philippines	80km(Metro Manila)	52	32	-	2.4
Luisita Industrial Park	Philippines	120km(Metro Manila)	120	-	-	2.4
First Cavite I.E.	Philippines	30km(Makati)	272	-	65	-
Gateway Business Park	Philippines	38km(Metro Manila)	120	-	100	-
Canlubang I.E.	Philippines	40km(International Airport)	170	-	56	-
Laguna International I.E.	Philippines	25km(Makati)	117	-	64	-
Kranji	Singapore	25km(Changi Airport)	101	97	-	13-22
Sungei Kadut	Singapore	28km(Changi Airport)	226	-	-	13-15
Woodland East	Singapore	24km(Changi Airport)	193	133	-	13-17
Kallang Basin	Singapore	22km(Changi Airport)	74	-	-	56-62
Loyang	Singapore	2.5km(Changi Airport)	119	-	-	16-23
Siam Cement Industrial Land	Thailand	86km(Bangkok)	277	-	59.7	-
Bangpakong I.P.	Thailand	57km(Bangkok)	260	-	72.5	-
Dalian I.E (Phase II)	China	30km(Dalian)	200	140	85	-
Qingdao I.E.	China	3km(Qingdao)	660	-	37	-



JAPAN INTERNATIONAL COOPERATION AGENCY
 MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT
 THE SOCIALIST REPUBLIC OF VIETNAM

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

Figure 4-1
Land Use Plan of Phase I

NIPPON KOEI CO., LTD.
 JAPAN INDUSTRIAL LOCATION CENTER
 PACIFIC CONSULTANTS INTERNATIONAL

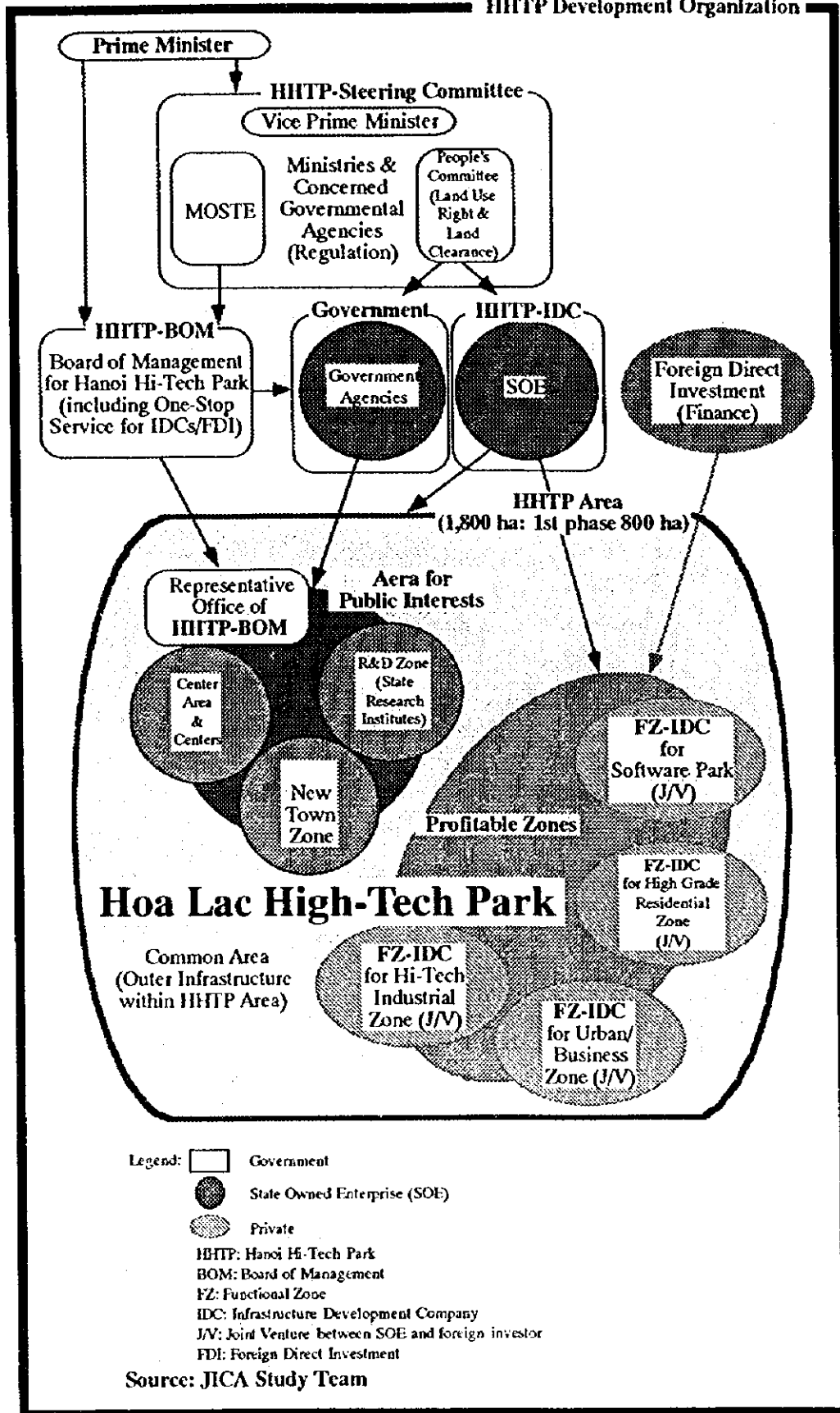


Figure 4-2 Hoa Lac High-Tech Park Development Organization

V. RECOMMENDATIONS TOWARD THE MATERIALIZATION OF HOA LAC HIGH-TECH PARK

Hoia Lac High-Tech Park (HHTP) is a project of national importance. If materialized, it would bring huge benefits for the national economy and social welfare of the people. Instead, it would require vigorous efforts of all the sectors and parties of Vietnam. Vietnam has just entered the era of industrialization. To reach the most advanced stage of industrialization, high-tech industrialization, there are numerous hurdles on the road. Success of HHTP is the key to clearing these hurdles.

Various legal and institutional measures as well as structural ones should be taken. Above all, careful consideration should be given to the following issues for the success of HHTP.

(1) Determination and Recognition of the Government as National Project

HHTP project should be recognized as a project of national importance, which would bring about the multiple benefits of promotion of high-tech industries, regional economy of the Ha Tay province and alleviation of the over-concentration in the capital city of Hanoi. In other words, it should be considered as a springboard to the growth of the Vietnamese economy for catching up the forerunners in the 21st century.

Bearing these in mind, it is recommended that HHTP project be strongly announced by the Government as a national project to all the concerned parties, including Governmental bodies and enterprises as well as the international societies. HHTP project should be given priority for the allocation of the financial resources for the construction. Strong supporting system should be set up within the Government organization, involving minister level ranking officials.

(2) Prior Investment for Infrastructure

The project site is located about 30 km to the west of Hanoi in the countryside of the Ha Tay province where agriculture is the mainstay and the principal infrastructures are yet to be developed. It is recommended that prior investment be made on the basic infrastructures of road, electricity, telecommunications, water supply in order to upgrade the environment for the investors. In particular, construction of road which would connect the project site with the capital city of Hanoi should be placed the top priority that would drastically shorten the travelling time to about 30 minutes. If completed, the accumulation of the urban functions at Hanoi would be utilized, including administration, information, industrial and commercial ones, for the

scheduled development of HHTP project. The new road connection would renew the rural image of the project site for the investors in particular foreign ones.

It is, therefore, strongly recommended that an expressway allowing high-speed passage of vehicles with adequate transport capacity be constructed at the initial stage of the HHTP development. It should be noted that the road would promote not only the development of HHTP but also the formation and growth of the new satellite city of Hao Lac.

(3) Establishment and the Relocation of the State Research Institutes

The development of high-tech industries necessitate the highest input of R&D activities among all the industries. Namely, its success depends on the development of new advanced technologies and their commercialization. Close location of R&D institutes and laboratories, therefore, would create a good locational conditions for the high-tech industries.

It is recommended that the location of state research institutes in HHTP be deeply considered, either in the form of new establishment or relocation of the existing ones. The location of state research institutes into HHTP under the initiative of the Government would be a clear signal of the firm determination of the Government toward the materialization of HHTP to the concerned parties and entities, both domestically and overseas.

Possible location of NCST or state research institutes under the Ministries would promote the introduction of high-technologies into HHTP in the short range and the development of improved and innovative ones in the long run. These institutes would assume the role of linking the basic research activities and achievements of the Vietnam National University, Hanoi and AIT to be located next to HHTP, with commercialization into products by the high-tech enterprises in HHTP through their principal function of applied research.

(4) Provision of Good Access to High-Technologies and Promotion of Cooperation among the Participants

As nucleus of HHTP development, a center, "Technopartnership Center" is recommended to be set up in HHTP. The Center should provide the easy access to the high-tech information as well as act as a catalyst for the cooperation and division-of-labor among the participants. Firstly, it should provide the basic supporting services of measurement, certification of industrial standards and others. Secondly, it should be a center for collecting, accumulating and disseminating the high-tech related information

in various forms including the industrial property right and licenses. Thirdly, it should be an organizer and supporter for the interaction and cooperation among the key players for high-tech R&D and production. As an integral part of these functions, it should also extend the support to the small and venture business for administration, marketing, etc. To serve these objectives, it is also recommended that the offices of the Government agencies, either headquarters or branches in charge of industrial standards and standardization, technology transfer, industrial property right and other relevant intellectual property right should be relocated or established in HHTP.

(5) Provision of Human Resource Training Centers

Efficient production control and strict quality control are required in the production of high-tech products. R&D for high-technologies also needs capable researchers and assistants. To meet the requirements, adequate supply of capable technicians and skilled labor which is insufficient in Vietnam, is urgent.

It is recommended that an Technical Institute be set up in HHTP for providing technical education for the high school graduates for the period of 2 years and half a year of on-the-job training and for providing 3 year technical education and half a year of on-the-job training for junior high school graduates in order to bring up technicians. It is also recommended that an OJT Technical Support Center be set up for on-the-job training of small and medium sized enterprise employees for bringing up skilled labor for high-tech industries. At the initial stage of the development of high-tech industries, high quality labor will be the strongest advantage of HHTP. These projects should, therefore, be placed priority.

(6) Establishment of National Software Center

Judged by the high assessment by the foreign investors located in Vietnam and the high marks of the Vietnamese participants in the international mathematics competitions and considering relatively small requirement of the initial investment, computer software is evaluated the most promising field in the high-tech industries to be developed in Vietnam.

HHTP as the first high-tech park in the country, it is recommended that a national software center be established in HHTP, located in the proposed software park of the R&D Zone, under the Government initiative. Several tens of software enterprises will be housed in the center, receiving basic business and secretarial services from the center. Computer facilities will be installed for the common use by the housed enterprises. Training opportunities will also be provided for the software manpower. Easy access is made available to the high-tech information as well as to the needs for software

development of the industrial and the public sectors. Among the housed enterprises, cooperative and division-of-labor are also expectable.

(7) Realization of Environment and Society Friendly Park

Environment-friendly and society-friendly park should be aimed at for the implementation of HHTP. Villages with relatively large population should be left as they are, in order to minimize the social impact as well as to create a society friendly town living together with the existing society and culture. Within the development area, the existing topography and landscape will be left untouched as much as possible including the lakes and rivers to minimize the environmental impact including the change of vegetation and earthworks and preserve peaceful environment for the researchers and other employees. In the production site, cleaner industries should be located. Wastes of every kind and form should properly treated and recycle should be practiced wherever possible.

(8) Implementation and Management of HHTP Project

It is recommended that the responsible ministries, agencies and people's committees as well as board of management for the implementation and management of HHTP should be designated at the earliest opportunity, aiming at the early realization of the project. It should be noted that a national level committee should desirably be established with the chairmanship of Deputy Prime Minister for the effective coordination among these concerned and among the relevant projects, in particular the university relocation project and the overall Hoa Lac satellite city project which encompasses HHTP and university project.

(9) Enactment of the Law of High-Tech Park

Law should be enacted for extending the legal support for the efficient and coordinated implementation of the projects of high-tech parks in Vietnam including HHTP. Firstly, law for the establishment and management of high-tech parks as a whole should be enacted. Secondly, separate law for HHTP should be enacted. Alternatively, special chapter or articles for HHTP may be included in the law applicable for the high-tech parks. The law should stipulate legal controls over the land use in the demarcated area of high-tech parks. It should also stipulate the power and responsibilities of the Board of Management and other Ministries, agencies and local government body responsible for the development and management of the parks as well as the special incentives to be endowed for the investors and enterprises to be located in the parks.

(10) Application of Lower Land Rent and Exemption of Custom Duties

In order to invite the foreign investors as developers for the functional zones including the High-Tech Industrial Zone, it is recommended that land rent for the investors should be set at lower rate than US\$ 0.5625/m²/year which might be applicable to HHTP under the current regulation. Considering the national importance of HHTP project and land rents applied for the industrial zone projects in the country, Land rent for HHTP should, more preferably, be US\$ 0.10/m²/year or lower. Custom duties and other indirect taxes should also be exempted for the equipment and facility to be used and installed for the implementation of HHTP. These measures would enhance the feasibility of the functional zone development which in turn make it possible to offer lower lot lease rates of internationally competitive level.

(11) Keeping Close Coordination with Relevant Projects and Agencies/Organizations

Coordination and cooperation with the relocation project of the National University of Hanoi is of the vital importance for the development of high-technologies and their commercialization into products. The enterprises to be located in the planned industrial zone of Phu Cat to be located next to HHTP can assume the role of supporting industries for the high-tech industries in HHTP. Don Xuan residential zone would accommodate a part of incremental population to be generated by HHTP project. Some infrastructures should be planned to serve for the common benefit of all these components of the new city.

Thus, close coordination among the roles and functions of these components and required infrastructures are key to the efficiency of each component as well as of the city as a whole. The concerned agencies and bodies should establish coordination committee(s) for this purpose. Considering the special importance of the cooperation between HHTP and the University, it is recommended to set up a standing committee for the coordination and cooperation between the two.

(12) Seeking for the International Cooperation

At present, level of high-technology and high-tech industry in Vietnam remains low and the experience and know-how to plan, construct and manage high-tech parks are yet to be accumulated. Though, the project requires sizable amount of investment, financial resource of the country is quite limited.

It is advisable that international cooperation be sought from both technical and financial viewpoints, including official development aid for the planning and

implementation as well as management of HHTP including the proposed centers. Various financial facilities including BOT, BLT, BCC seem worth consideration.

(13) Prompt Actions Subsequent to the Completion of this Master Plan

Among the ASEAN members, Vietnam is lagging behind the development of high-tech industries. With the limited time allowance until the agreed deadline of lowering custom duties of industrial products, it is desirous that the actions be taken for the implementation of HHTP immediately after the completion of this master plan, i.e., approval of this master plan by the Prime Minister for the official acknowledgment as a national project and preparation of detailed plans for the center projects and feasibility study for each functional zone.







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