Chapter 6 HHTP DEVELOPMENT ISSUES

6.1 Slow Progress of HHTP Development

6.1.1 Land Acquisition

After the original Master Plan and investment program were approved in October 1998 by Prime Minister Decision 198/QD-TTg, the project encountered difficulty in land acquisition. The land acquisition of Stage 1 (200 ha) of Phase I (800 ha) was only completed in 2005, 7 years after the approval. At present, 270 ha of land have been acquired for Phase 1 development and the remaining 530 ha is scheduled to be acquired by June 2008.

The land acquisition and resettlement has been the most critical issue which caused a delay in project implementation.

6.1.2 Infrastructure Development

Development of internal infrastructure has been delayed mainly due to the low progress of land acquisition. VINACONEX was selected as an EPC (Engineering, Procurement and Construction) contractor for infrastructure of Stage 1 in January 2003. However, this contract was terminated in March 2007.

At present, construction work on some roads and bridges is left unfinished and land grading work has not been carried out in some areas of Stage 1.

Adequate timing of infrastructure development in the industrial park is a controversial issue. If investment for infrastructure development is committed too early, it will have an adverse financial impact on the owner of the project. In contrast, if timing of infrastructure development is too late, the project owner might miss an opportunity to attract potential tenants. The HHTP's case falls under the latter situation. The present infrastructure development status is considered to be insufficient to attract such tenants as State Research Institutes and High-Tech industries to HHTP.

- 6.1.3 Relocation of State Research Institutes
 - (1) Slow Progress Caused by Infrastructure Construction

In spite of the strenuous promotion efforts that the HHTP-MB and MOST has made until now, no State Research Institute has come to HHTP yet.

Slow progress of infrastructure development, which is described above, is one of the potential causes of slow relocation of State Research Institutes.

(2) Causes of Slow Progress Attracting State Research Institutes

Nearly two years after the infrastructure development was completed no State Research Institute has located in HHTP. Based on the interview surveys of State institutes and relevant officials, possible reasons for the delay are analyzed as follows;

- 1) Financial burden for establishment of institutes is too heavy for the relevant institutions and ministries. The financial feasibility of relocation is not justified.
- 2) Without the strong initiative of the Government, it is difficult to establish research institutions.
- 3) The State institutes can not find any reasons or motivation to be relocated. In other words, they are satisfied with present conditions.
- 4) The researchers and staff are reluctant to move to Hoa Lac, because of inconvenience in commuting from Hanoi and lack of adequate living facilities in Hoa Lac.
- 6.1.4 Attraction of High-Tech Industries
 - (1) Slow Progress Caused by Infrastructure Construction

Slow progress of infrastructure development, which is described above, is one of the potential causes for slow investment by high-tech industries.

(2) Causes of Slow Progress Attracting High-Tech Industries

Nearly two years has already passed since the infrastructure development was completed. The first tenant (Nobel Electronics Vietnam Co., Ltd) started his operation in High-Tech Industrial Zone in June 2006. Although some land in Stage 1 is ready for lease, there are only three investors located in HHTP at present.

Many potential investors and tenants have visited the HHTP-MB office and also the HHTP site, however, most of them did not select HHTP.

The following would be possible reasons for the stagnant status of attracting tenants to HHTP:

1) Late Entry of High-Tech Industries into Northern Vietnam

The first group of high-tech industries came into Northern Vietnam in 2001, this being later than their arrival into Southern Vietnam. Only recently, high-tech industries started to enter into Northern Vietnam. The Stage 1 project was launched, under such circumstance.

2) Complicated Application Procedure for Obtaining Investment Approval

According to some potential investors that visited HHTP, they have impressions that the HHTP application procedure was not clear enough.

3) Uncertainty on Future Infrastructure Construction

Potential investors feel uncertainty on future infrastructure construction in HHTP, due to a large difference between the contents of the existing pamphlet and present status.

4) Shape of available land in Stage-1

The shape of available land in Stage-1 is indented shape with irregular border lines (i.e. border line of lot is not straight or smooth curve.) in some portions and it might

not match with investor's needs. In particular, the land more than 15 ha in quadrangular shape is difficult to be blocked out under the present situation.

5) Poor Appearance of HHTP Site due to Incomplete Construction

When potential investors and tenants visit the HHTP site, their first impression on HHTP appearance might be not so good due to the following site status;

- The entrance of HHTP facing the Lang Hoa Lac Highway is a temporary one, and it is difficult for the first visitor to identify that this is the entrance and to imagine the existence of a large High-Tech Park behind this entrance.
- The start-up center is also difficult to find without any direction signs to show the way.
- The project boundary and functional zone boundaries are not very clear due to existence of housing of local people and cultivation areas in the site.
- No active construction work for infrastructure or land grading is seen in HHTP at present. The construction of some roads and bridge seems to have been suspended for a long time from the visitor's view.
- 6) Lack of Strategic Marketing

It seems difficult to actively carry out sales promotion at present. Lack of strategic marketing is one of the possible causes of slow progress of attracting high-tech industries.

7) Uneasy Feeling regarding Recruitment of employees

Potential investors have an uneasy feeling regarding recruitment of factory workers.

8) Lack of Convenient Access to and from the Ports and Airport

Compared with other industrial parks in Northern Vietnam, HHTP lacks convenient access to and from the ports and airport.

9) Lack of Staff at HHTP Site

When potential investors and tenants visit the HHTP site, they could not communicate with site staff due to lack of English or Japanese speaking staff.

10) Small Number of Existing Investors

According to some potential investors that visited HHTP, they are worried about the small number of existing investors and a pump-priming effect has not been realized yet.

11) Insufficient Supporting Service

Sufficient and assured supporting service provided by the project owner is one of the most important elements for the potential tenants to select the location of their factories and offices. The present supporting services may not be good enough to satisfy the prospective investors and tenants. Such examples are:

- Lengthy procedure for construction approval
- Occurrence of power black-outs sometimes with short notice
- Low-speed Internet access and data transfer service
- Non availability of customs clearance service in timely manner in HHTP

• Delay in taking action for customer's claims such as completion of the street lighting system

6.2 **Project Organization**

After careful analysis of the present organization of the HHTP project, the JICA Study Team has clarified the following problems and issues on project organization.

- 1) Reformation of HHTP project organization started in the last half of 2006, but it has not been completed yet. The HHTP project organization is, therefore, in a state of transition.
- 2) The key player for constructing technical infrastructure financed under the State budget is PMU, which is a part of the HHTP-MB. It is important to get PMU ready to start construction well before the project implementation.
- 3) At the same time, the HHTP-DC is a key player for constructing technical infrastructure from non-State budget sources. However, with the exception of FPT Hoa Lac High-Tech Park Development Company Ltd., they have not been selected or approved yet for future development work other than the stage-1 high-tech industrial zone (34.5 ha). FPT Hoa Lac High-Tech Park Development Company Ltd. will organize the construction of technical infrastructure in the Software Zone including the Software Park, FPT University and IT Training Center. HHTP-MB is required to select potential companies as the HHTP-DC and make an agreement with them. In addition to this, VINACONEX is still involved in the stage-1 development for the high-tech industrial zone (34.5 ha) as a development company. It is recommended to unify the development company for the future development and the remaining work of stage-1 in order to remove obstacles foreseen in the process of project.
- 4) It is likely that responsibility of investment promotion will be vague among the HHTP-MB and HHTP-DC. Establishing clear line of responsibility is important.
- 5) There are no provisions for stipulating what services the HHTP-MB is required to provide to investors or potential investors at the moment. It is necessary for the HHTP-MB to define services for investors or potential investors. Additionally, the HHTP-MB is required to investigate how to organize and manage such services.
- 6) HHTP is neither a simple industrial park nor a simple software park. HHTP is a Hi-Tech City that has multiple functions comprising of residential, academic, manufacturing, science and technology, commercial, amenities, etc. It is therefore necessary to have autonomy after the completion of construction. Although HHTP is being constructed through the initiative of the Central Government and is isolated from Ha Tay province in terms of governance at present, the HHTP-MB is required to keep in mind the future autonomy of HHTP.

6.3 Strategic Marketing

JICA Study Team has clarified the following problems and issues on strategic marketing.

- 1) It seems difficult to actively carry out sales promotion at present. Lack of strategic marketing is one of the possible causes of slow progress of attracting high-tech industries. Priority should be given to sales promotion of Phase I at this stage of development.
- 2) Even if HHTP is a national project, sales promotion activities of HHTP are far from bureaucratic activities but commercial activities. The present sales promotion staffs are deemed unfamiliar with commercial negotiation and the high-tech industry.
- 3) Giving a welcome to potential investors is an important task of sales promotion staffs. It should be noted that it is very important to follow up with the potential investors who visited HHTP. However, the HHTP-MB has done nothing more than list the names of the visitors after potential investors' visit to HHTP. Required follow-up actions for sales promotion are to call the past visitors frequently and visit them when necessary.
- 4) The fundamental activity of sales promotion is sending out information to potential investors by various means such as newspapers, magazines, news letters, mail magazines, websites, and holding seminars. These activities are aimed at getting HHTP known widely by potential investors; and at getting information to market for selecting the target investors to whom priority of sales promotion is given. Such strategic marketing is not seen in activities that the HHTP-MB has carried out until now.
- 5) HHTP has provided pamphlets written in Vietnamese, Japanese, and English. However, these pamphlets have the following problems:
 - There is not enough description of the initial information and data that potential investors need most.
 - It is not a good enough eye catching design.
- 6) HHTP has prepared presentation materials in English and Japanese. However, the materials do not clearly show the selling points of HHTP. The Japanese translation needs some improvement.
- 7) If the HHTP-MB takes good care of the existing investors in HHTP, the existing investors will speak well of HHTP to other potential investors. Accordingly, it is necessary for the HHTP-MB to take good care of them.
- 8) There is a preferable investment incentive for high-tech industries as ruled by Decision No. 53-2004-QD-TTg (refer to the abstract shown below). However, there is no incentive limited to HHTP. A lot of FDIs have already moved into industrial parks in Northern Vietnam. Having no locational advantage over such industrial

parks, HHTP is required to provide a strong incentive to the investors so that HHTP to compensate for such weakness.

Abstract of Decision No. 53-2004-QD-TTg

Article 3 Preferential taxes

- 1. Corporate Income Tax:
- Investors shall be entitled to the corporate income tax rate of ten (10) per cent for the whole duration of project implementation; and they shall be exempt from corporate income tax for four years as from when they have taxable income and shall be entitled to a reduction of fifty (50) per cent of the amount of tax payable for the following nine (9) years.
- 2. Income tax of high income earners:

Individuals being Vietnamese and Vietnamese residing overseas as stipulated in article 2.2 of this Decision shall be entitled to exemption, reduction of income tax applicable to high income earners so that [their tax] equals the level payable which is applicable to foreigners with the same level of income.

Article 4 Preferential land use

- 1. The one price policy shall apply to investors who lease land directly from a High-Tech Zone Management Board, without distinguishing between domestic and foreign investors.
- 2. Investors shall be permitted to mortgage land use rights and assets attached to land during the term of lease or sub-lease of land with credit institutions operating in Vietnam in accordance with law.
- 3. Investors implementing a project on research and development of technology or on high level skills training in science and technology shall be exempt from land rent in accordance with regulations of the Government.

Article 5 *Capital, credit and guarantee*

- 1. Applicable to an investor with an investment project for manufacturing in a high-tech zone operating pursuant to the *Law on Promotion of Domestic Investment*, the Development Assistance Fund shall consider providing medium or long term credit with a preferential interest rate, [such investor] shall be provided with a loan guarantee, and shall be entitled to assistance with interest after the investment in accordance with current regulations.
- 2. An investor shall be entitled to preferences of the State regarding credit assistance for export when it directly exports products and the regime on export awards shall apply to such investor in accordance with law.

Article 6 Entry and exit, residence

- 1. Foreigners and Vietnamese residing overseas within the category stipulated in article 2 of this Decision and members of their families shall be issued with multiple entry visas with a term compatible with the duration of their work and operation in the high-tech zone.
- 2. Applicable to entities stipulated in article 2 of this Decision, favourable conditions shall be created for their residence, for renting houses, and for purchasing houses in high-tech zones in accordance with law.

Article 7 Other provisions

- 1. The one price policy for public services as stipulated by the State shall apply to the entities stipulated in article 2 of this Decision.
- 2. With respect to specially important projects, investors shall be entitled to additional preferences in accordance with decisions of the Prime Minister of the Government.
- 3. The Ministry of Science and Technology shall preside over co-ordination with the relevant agencies to formulate and submit to the Prime Minister of the Government for promulgation policies on encouragement applicable to entities who come to Vietnam to work in enterprise nursery gardens in high-tech zones, [as] scientists, and in organizations for research and development of technology operating in high-tech zones.

4. In addition to the provisions set out in this Decision, investors shall be entitled to other preferential policies at the highest level stipulated in relevant legal instruments and in international treaties to which Vietnam is a participant or signatory. If the international treaty contains different provisions, implementation shall be in accordance with such international treaty.

6.4 Environmental Consideration

- 6.4.1 Environmental related Issues
 - (1) Necessity of SEA/EIA in accordance with Vietnamese Law on Environmental Protection 2006
 - 1) General on Environmental Regulatory Framework

Before 2002 the Ministry of Science, Technology and Environment (MOSTE) was in charge of authorization for environmental issues including approval of Environmental Impact Assessment (EIA) report. In August 2002 the ministry was divided into two ministries that are i) Ministry of Science and Technology (MOST) and ii) Ministry of Natural Resources and Environment (MONRE). Currently MONRE manages the environmental matter.

A new law on environmental protection prepared by MONRE was passed on November 29, 2005, by the XIth National Assembly of the Socialist Republic of Vietnam at its 8th session and enforced from July 2006. The law specifies all the legal requirements on environmental issues and mentions the necessity of preparing Strategic Environmental Assessment (SEA) for mainly national and inter-provincial level strategies and Environmental Impact Assessment (EIA) for most of the individual development projects. Both reports should be appraised by MONRE in case of big projects such as HHTP Project.

2) Strategic Environmental Assessment (SEA)

SEA is required for nation-wide/inter-provincial strategies and plans according to the new law on environmental protection 2006. SEA is performed at the stage of planning of development policy and programme that is more upstream of project implementation, compared to EIA that is performed in the project implementation. Feasibility study (F/S) and EIA reports of the individual projects under the strategies are not approved without approval of SEA report as an upstream level for the following type of strategies/plans that environmental law requires to prepare the SEA report.

- 1. National socio-economic development strategies, plannings and plans.
- 2. Strategies, plannings and plans for development of branches or domains on a national scale.
- 3. Socio-economic development strategies, plannings and plans of provinces, centrally run cities (hereinafter collectively referred to as provinces or provincial level) or regions.
- 4. Plannings for land use, forest protection and development; exploitation and utilization of other natural resources in inter-provincial or inter-regional areas.
- 5. Plannings for development of key economic regions.
- 6. General plannings of inter-provincial river watersheds.

According to HHTP-MB and the confirmation to MONRE, the HHTP project does not require the preparation of SEA report since the target area is limited to Hoa Lac area as a small part of Ha Tay Province. However, since some F/S and EIA reports in parallel will be prepared after this report on update of master plan, it is recommended for HHTP-MB to prepare a SEA report or at least a master EIA report of the individual EIA reports that will be prepared for each construction phase.

3) Environmental Impact Assessment (EIA)

According to the law on environmental protection, generally the following types of projects require the preparation of EIA report.

- 1. Nationally important projects
- 2. Projects utilizing the national reserve areas, national parks, historical relics, cultural relics, natural relics and landscapes or affecting them
- 3. Projects affecting the river basins, coastal areas, protection areas of ecosystem
- 4. Projects on constructing infrastructures in economy area, industrial park, new technological industrial area, export processing zone, and craft villages
- 5. Construction projects in new urban center and congested residential areas
- 6. Projects with large scale use of groundwater and natural resources
- 7. Other projects with potential risks and affects on environment

Since the HHTP development belongs to the category 4 above, the EIA report shall be prepared.

And the more detailed list with 102 types of projects requiring the EIA is tabulated in Decree No. 80/2006/ND-CP Appendix I. Since the HHTP development belongs to the type in "industrial area, new technological industrial area, export processing zone, industrial cluster and craft villages" that requires the EIA report for all projects, the requirement of preparing EIA report for HHTP development can be confirmed from the decree also.

- (2) Status of EIA Preparation in HHTP Development
- 1) Un-approval of Past EIA Report based on former Master Plan

The JICA Study Team has made the interview survey and communications by the official letter with HHTP-MB on the status of past EIA report preparation. After the series of study, it was clarified that past EIA report on HHTP development prepared in 1998 just after the completion of former master plan was not approved by MOSTE. According to the interview survey for HHTP-MB and the letter from HHTP-MB to JICA Study Team issued on 28th June, 2007, the background and reasons of preparation and un-approval of EIA report are as follows:

- Pursuant to Article 9 Decree 175/ND-CP on 18th Oct 1994 on instruction to implement the 1993 Environmental Protection Law (in 1998 this Law was still valid) HHTP should have the EIA at the time of 1998.
- In April 1998 Environmental Processing Technology Center under Ministry

of Defense (MoD) prepared the EIA Report for the total area of HHTP (1650 ha at that time) based on former master plan. However, at that time the management board submitted the former JICA master plan report including environmental part through MOSTE to the National Appraisal Committee under prime minister, for approval of Phase-I Stage-1 investment project (200 ha) only but not of the investment of total HHTP development (1650 ha) (Submitting letter No. 1162/BKHCNMT on 14th May 1998).

- Since in 5th August, 1998 (Letter No. 5494/HDTD) the master plan of HHTP development was officially approved by National Appraisal Committee that means upper organization than MOSTE resulting in the initiation of construction work in Phase-I Stage-1 area, the HHTP-MB misunderstood that EIA report is not necessary to be approved by MOSTE and it was left without appraisal.

As above, the EIA report for total HHTP area made in 1998 was not appraised and approved by MOSTE. The reasons of no revision of EIA report for Phase-I Stage-1 development and un-appraisal after 1998 of even the prepared EIA report can be guessed as follows from the discussion with HHTP-MB.

- Since the HHTP project was supervised by MOSTE itself which was former regulatory agency for EIA and under the circumstance the management board thought that EIA report could be approved in any time if required, the board did not rush to revise the EIA report and put priority on other urgent implementation works. However, MOSTE was segregated into MOST and MONRE in August 2002 and the appraisal became more difficult for management board than before.
- The management board was lack of budget for re-conducting the EIA Study for Phase-I Stage-1 area only.
- Furthermore, the construction work for the area had been already started and the board did not feel strong necessity to prepare the EIA report afterward.

Therefore, in fact, any EIA for the project has not been officially approved by MOSTE and MONRE. Since the construction works in the Phase-I Stage-1 area has been much progressed, HHTP-MB does not have to prepare EIA report for the work from now.

2) Necessity of Preparing EIA Report(s) in accordance with New Law on Environmental Protection

According to the 2006 Environment Protection Law the HHTP-MB has to prepare the EIA Report(s) along with each F/S, and JICA Study Team recommends HHTP-MB to prepare the SEA report or Master EIA Report with simpler contents of SEA report also for total HHTP area before preparing the individual EIA reports. Since the HHTP development was approved by prime minister, the EIA report(s) would be appraised by Appraisal Council under MONRE.

According to HHTP-MB, pursuant to Circular No. 10/2000/TT-BXD on 8th Aug

2000 of MOC on instruction to prepare EIA report for construction planning projects and based on references of comments from Department of Architecture Planning Management – MOC, the project of general planning revision of HHTP (meaning this study on update of master plan) must have an EIA report. The report is presented as one chapter in the general explanation report of the planning and submitted for approval together with the revision project and should be prepared by HHTP-MB after the completion of this report. Although the preparation of SEA report and the approval by MONRE is recommended, the role of master EIA report could be somehow substituted by the short EIA report for MOC with more volume on environmental status and management plan than the least required contents for the report.

- (3) Issues on Preparation of SEA/EIA Reports
- 1) SEA Report

As mentioned above, the short EIA report for approval of MOC shall be prepared after completion of this study on update of master plan and at present HHTP-MB plans to prepare it and not to prepare the SEA report. However, due to the short contents with one chapter of the EIA report it is not sure if the report being prepared by HHTP-MB can be substituted to SEA report or have meaning of master EIA report. HHTP-MB is recommended to prepare the report as close as possible to the required contents of SEA report or rather it can be prepared following the required contents of SEA report for approvals of both of MOC and MONRE even if it is not officially required by MONRE.

2) Study on Status of Storks come flying to Tan Xa Lake

It is unofficially reported by a Japanese government official that a kind of storks come flying to Tan Xa Lake in the project area. The study of birds should be conducted before and during EIA study carefully. If the designated storks coming to Tan Xa Lake would be confirmed at the initial stage, the further careful assessment following the internationally recognized methods for assessing the ecosystem would be required.

However, it is not certain whether there are any organizations in Viet Nam with the technical know-how to conduct such a study.

3) Collaboration or Reflection of Resettlement Action Plan (RAP) and Clear Explanation of Mitigation Measures for EIA Report

As a part of environmental related issues, the significant number of residents in the HHTP area are planned to be resettled (6,500-7,000 people in total) and the land owners should be compensated enough for their land and production. Although preparation of EIA report and RAP is separate matter, the contents of RAP should be reflected on EIA report and the mitigation measure of the resettlement should be discussed in each report. The discussions on mitigation measures have not discussed so much yet by both of Ha Tay Provincial People's Committee (or Thach That District Land Acquisition Board) and HHTP-MB. Since the mitigation measures are quite important for the appraisal by JICA and JBIC on environmental

related documents the past and future discussion and plan of mitigation should be clearly mentioned in the report and plan.

4) Reflection of Public Opinions

As can be recognized from required table of contents for EIA report, the reflection of public opinions is to be mentioned as an independent chapter. From the study on environment and social consideration so far, it can be said that concerned agencies have been lack of awareness on public opinions. Although several meetings with residents and land owners have been held for explanation of resettlement and compensation even the minutes of meeting have not been prepared. In order to fill up this chapter of EIA report and further prepare the beneficial environmental plan with the reflection of public opinions, the executing agencies should enhance the awareness for public opinions and respect the opinions.

- 6.4.2 Recommendation for Eco-Friendly development
 - (1) Tree plantation in the park

So far the tree plantation in the park is planned for only the center divider of the roads in HHTP. In order to reduce the impacts for the global warming more plantation of the trees are recommended. Following the good examples of other industrial areas, the companies coming to the HHTP should be obliged to plants and trees as many as possible in the land.

(2) Reduction of landfill for Tan Xa Lake

There is information that a kind of storks comes flying to Tan Xa Lake. In the red data book in Vietnam 1) milky storks, 2) painted storks and 3) woolly-necked storks are listed as vulnerable or rare storks.

The law on environmental protection in Vietnam does not urge to abort the development works in the area with the species in the red data book but just prohibit the hunting activities. Although the law does not mention more special care than the hunting, the protection of eco-system in Tan Xa Lake should be attempted as much as possible. Therefore before much expansion of the developed area, the landfill in Tan Xa Lake should be avoided and the eco-system of Tan Xa Lake should be monitored carefully.

(3) Reduction of the impact during construction

As nominated in the attached environmental checklist in Supporting Report II, the following issues should be properly planned and managed in order to reduce the impact during construction of HHTP. The concept of the plan would be clarified in the feasibility study / EIA stage and the detailed methodologies would be discussed in the detailed design stage. It is also recommended that the established plan will be adapted to the ongoing stage-1 work as soon as possible.

1. Adequate measures should be considered to reduce impacts during construction (e.g., noises, vibrations, turbid water, dust, exhaust gases, and wastes). The concrete measures should be developed in the feasibility study

along with EIA study and the more detailed methodologies should be in detailed design.

- 2. If construction activities adversely affect the natural environment (ecosystem), the adequate measures should be considered to reduce impacts. With regard to the issue, the proper plan such as the awareness of ecosystem in Tan Xa Lake with the least landfill of the lake should be established.
- 3. If construction activities adversely affect the social environment, the adequate measures should be considered to reduce impacts. The affected social environment should be confirmed and the countermeasures should be setup in EIA study.
- 4. If necessary, the health and safety education (e.g., traffic safety, public health) should be provided for project personnel, including workers. The contents of education should be clarified in the detailed design.
- (4) Setup of environmental monitoring system

As nominated in the attached environmental checklist in Supporting Report II, the following issues should be properly planned and managed with regard to environmental monitoring system. The concept of the plan would be clarified in the feasibility study along with the EIA study or the previous SEA or master EIA study if possible, and the detailed methodologies would be discussed in the detailed design stage. It is also recommended that the proposed plan will be adapted to the ongoing Stage-1 work also as soon as possible.

- 1. The executing agency (HHTP-MB) should develop and implement monitoring program for the environmental items that are considered to have potential impacts. The items with potential impacts are supposed to be the effluent water quality from wastewater treatment plant and the water quality of Tich River as discharged body and so on at this stage. However, HHTP-MB is recommended to monitor other factors once other possible ones would be found.
- 2. The items, methods and frequencies included in the monitoring program are to be appropriate. The factors above also should be specified in the feasibility study report and EIA report.
- 3. The HHTP-MB should establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework). It should be also proposed in feasibility study report and EIA report.
- 4. Any regulatory requirements pertaining to the framework of monitoring reports should be identified, such as the format and frequency of reports from the HHTP-MB to the regulatory authorities. It should be also planned in feasibility study report and EIA report.

6.5 Lessons-Learned from Other High-Tech Parks

Information from other high-tech parks has been analyzed to learn from their good practices. Table 6.5-1 shows the overview of 5 high-tech parks, of which 2 parks are located in Vietnam and the other 3 are located in other Asian countries.

In terms of the year of establishment, the first one is Tsukuba Science City (Tsukuba) - 1963, followed by Hsinchu Science Park (Hsinchu) - 1980, Kulim Hi-Tech Park (KHTP) - 1996, Quang Trung Software City (QTSC) - 2001, and Saigon Hi-Tech Park (SHTP) - 2002. In terms of development area, Tsukuba is the largest (28,400 ha), followed by

Hsinchu (2,100 ha), KHTP (1,450 ha), SHTP (913 ha), and QTSC (43 ha).

Table 6.5-2 shows the development progress of the high-tech parks. SHTP has investors belonging mainly to electronics, and has an R&D center composed of 5 labs. QTSC has investors belonging to the IT industry, and has IT training centers and other supporting facilities financed by private companies. KHTP's target industry is similar to HHTP except that KHTP has no software park. KHTP has a multi-functional Techno Center and IT Center in the park. A total of 382 manufacturing companies invested in Hsinchu as shown in the table. Hsinchu has the National Research Institution in the park. Major investors in Tsukuba are State institutes of R&D and education and private research institutes, but investment by the manufacturing industry is very limited.

Name & Location	Established	Development Area	Land Use	
Saigon Hi-Tech Park (SHTP) (HCM City, Vietnam)	October 2002	Total913 haPhase-1300 haPhase-2613 ha	Hi-Tech Industry316 haR&D/Training96 haHi-Tech Support19 haFree Trade55 haManagement Center34 haResidential62 haLandscape Architecture176 haParking & Transport104 haOther51 haTotal913 ha(Based on the Master Plan)	
Quang Trung Software City (QTSC) (HCM City, Vietnam)	2001	Total 43 ha	Temporary Building Management Area IT training Commerce and Exhibition Center Villas Kindergarten Car Parking Entertainment	
Kulim Hi-Tech Park (KHTP) (Kulim, Kedah State, Malaysia)	Officially opened in 1996	Total 1,450 ha	Hi-Tech Industry405 haR&D157 haUrban113 haHousing470 haAmenities248 haInstitutional55 haTotal1,448 ha(Based on the Master Plan)	
Hsinchu Science Park (Hshinchu, Miaoli, Taiwan)	December 1980	Total 2,100 ha	Temporary Building Management Area IT training Commerce and Exhibition Center Villas Kindergarten Car Parking Entertainment	
Tsukuba Science City (Tsukuba, Ibaraki Prefecture, Japan)	September 1963 (Cabinet decision for construction)	Total 28,400 ha (2,700 ha of Research & Education District and 25,700 ha of Education District)	Research & Education1,465 haResidential665 haRoads, parks, etc.449 haOthers121 haTotal2,700 ha(Research & Education District)	

Source: JICA Study Team

	Industry		ſ
Name & Location	Industry	R&D, Education	Supporting Facility
Saigon Hi-Tech Park (SHTP) (HCM City, Vietnam)	Major industries • Electronics (INTEL, NIDEC, Allied Technology)	<u>R&D Center:</u> composed of 5 labs: wafer fabrication, nano technology, biotechnology, precision mechanics & automation, and IT labs.	Incubation center (located in downtown at present)
Quang Trung Software City (QTSC) (HCM City, Vietnam)	Major industries • IT companies (35- Vietnamese, 17- Asian, 10-EU, 7- USA)	<u>6-IT Training Centers:</u> Cisco Networking Academy, NIIT(India), Houston Community College Systems (USA), HCMC IT Training Center, SDE, and Hoa Sen College	30 investors have invested for various fields such as R&D facilities, training centers, incubation centers, bank, insurance service, etc.)
Kulim Hi-Tech Park (KHTP) (Kulim, Kedah State, Malaysia)	Targeting technology- related industries primarily in the fields of : Advanced Electronics, Mechatronics, Telecommunications, Semiconductors, Optoelectronics, Biotechnology, Advanced materials,	<u>SIRIM Berhad:</u> Advanced Material Research Center (AMREC) <u>Mimos</u> : Electronics Center and as northern branch office for MIMOS	KHTP Techno Center: (Robotics & PLC lab, CNC programming lab, CNC engineering center, etc.)KHTP IT Center: (Network security center, network operating center, etc.)Kulim Hospital 27-hole championship golf course combined with apartments, and bungalow lots
Hsinchu Science Park (Hshinchu, Miaoli, Taiwan) Tsukuba Science City (Tsukuba, Ubavali	No. of Investors (as of December 2005)IC169PC/peripherals56Telecomm.47Optoelectronics65Precision mach.21Biotechnology24Total382	National research institution (in HSP): (National Center for High Performance Computing, National Synchrotron Radiation Research Center, National Space Program Office, Precision Instrument Development Center, Chip Implementation Center and National Nano Device Laboratories.) 33 State institutes (R&D and Education) at present. More than 130 private R&D facilities are	
Ibaraki Prefecture, Japan)		R&D facilities are located in the industrial parks developed in the Suburban District.	

Table 6 5-2	Development	Progress o	of High-Tech Parks
1abic 0.5-2	Development	110510350	n mgn-reen raiks

Source: JICA Study Team

Table 6.5-3 summarizes the lessons learned from other high-tech parks from viewpoints of location, institutional measures, and infrastructure. The factors listed below are considered to be the chief reasons for the success of each high-tech park:

- 1. SHTP:
 - Good location for material transportation
 - Strong initiative of HCM City
 - Prompt action to satisfy the investors' requests for sales promotion
 - Mechanism for attracting capable staffs
 - Stable power supply
- 2. QTSC:
 - Good access from downtown
 - Strong initiative of HCM City
 - Attracting overseas Vietnamese
 - Public-private partnership
 - Good telecommunication infrastructure
- 3. KHTP:
 - Strong initiative of Central Government
 - · Excellent infrastructure for telecommunication and power generation
 - Customer-friendly support centers
 - Amenity space
- 4. Hsinchu:
 - Good location adjacent to Taiwan's largest and most prestigious research institute, the Industrial Technology Research Institute (ITRI)
 - Good location adjacent to Taiwan's best universities, National Tsing Hua University, and National Chiao Tung University
 - Strong initiative of Government
 - Attracting overseas Taiwanese
- 5. Tsukuba:
 - Strong initiative of Government
 - A large-scale relocation of State research institutes as trigger of development
 - Urban and infrastructure development led by Tsukuba Expo 1980
 - Convenient traffic system between Tokyo and Tsukuba (Highway and Railway)
 - Gentle landscape for R&D

Table 6.5-4 compares investment incentives currently applied in the 9 countries in Asia.

Name & Location Institutional Infrastructure					
Saigon Hi-Tech Park (SHTP) (HCM City, Vietnam)	 15 km from downtown 18 km from airport 12 km from port Adjacent to VNU-MCMC 	 Strong initiative of HCM City Prompt action to satisfy the investors' requests for attracting investors JV company for infrastructure construction Attracting capable staffs by paying higher salaries than those paid by State companies 	 Connected to two national substations Gas turbine power plant (75 MW) is under feasibility study 		
Quang Trung Software City (QTSC) (HCM City, Vietnam)	 30 minutes from downtown 15 minutes from airport 	 Strong initiative of HCM City Public-private partnership Attracting Overseas Vietnamese 	 Three parallel optic fiber lines for communication (One line connecting directly to the international gateway (100 Mbps), and another 2 lines of 45 Mbps) Power is supplied via 4 lines connecting to the national grid. 		
Kulim Hi-Tech Park (KHTP) (Kulim, Kedah State, Malaysia)	 27 km from the North- Butterworth Container Terminal 45 km from Bayan Lepas International Air Port 	Strong initiative of Central Government	 Communication: 24 core optical fiber lines (3 loops in the Hi-tech Industrial Zone) Two independent sources of power – national utility grid and captive use power station (220 MW Combined Cycle Gas Turbine) 		
Hsinchu Science Park (Hshinchu, Miaoli, Taiwan)	 70 km from the Taipei 40 minutes from airport 90 minutes from ports Adjacent to Industrial Technology Research Institute (ITRI) Adjacent to National Tsing Hua University, and National Chiao Tung University 	 Strong initiative of Government Attracting Overseas Taiwanese by canceling martial law, upgrading residential conditions The Science Park Administration is under the direction of the National Science Council. 	 Access to Hsinchu: the freeway bus (Hsinchu-Taipei, Taichung, Baqiao, and Chunan) Free shuttle bus routes around the Park 		
Tsukuba Science City (Tsukuba, Japan)	• 60 km from the Tokyo	 Strong initiative of Government Tsukuba Expo in 1980	HighwayRailwayLandscape		

Table 6.5-3	Lessons-Learned from High-Tech Parks

Source: JICA Study Team

	Taiwan	Korea	Singapore	Malaysia	Thailand	Philippines	Indonesia	Vietnam	China
Corporate income tax	0-25%	13-25%	18%	28%	30%	35%	10%, 15%, 30%	28%	25%
Corporate tax Exemption	5 years in Science park	3-5 years	5-10 years	5 years	3-8 years	3-6 years	1 year	2-4 years	2-5 yeas
Tax on royalty	15%	15%	10%	10%	15%	20%	20%	10%, 15%, 20%	10%
Tax on overseas remittances	None	None	0%	10%	10%	15%	None	None	0-10%
Double deduction	None	None	R&D expense	R&D or HRD expense	None	None	None	None	None
Accelerated depreciation	R&D instruments	None	100% One year	None	None	None	50%	None	None
Personnel income tax	6-50%	8-35%	3.75-21%	0-28%	0-37%	0-35%	5-35%	0 -40%	5-45%
Value added tax	5%	10%	5%	5-15%	7%	12%	10%	5%, 10%	0-17%

Table 6.5-4 Investment Incentive in Asian Countries

6.6 Expectation for HHTP Development

- 6.6.1 Result of Questionnaire Survey to Japanese Investor
 - (1) General

With a collaboration of Ministry of Planning and Investment, the JICA Study Team conducted a questionnaire survey from June 9 to June 22, 2007, with 96 Japanese manufacturing or software companies who participated in the investment seminar of Ha Tay province (February 27, 2007 in Tokyo), or who have visited HHTP. Effective answers were obtained from 16 out of 96 companies for a 17% effective respondent ratio.

Numbers of respondents are shown in Table 6.6-1 by industrial category.

Table 6.6-1 Respondents by Industrial Category from Japanese Investors

Industrial Category	No.	Industrial Category	No.
Software	4	Electric and Electronics	4
Machinery & Precision Machinery	3	Iron and Steel	1
Metalworking	1	Chemical	1
Plastics	1	Textile & Garments	1
Total	16		

(2) Analysis of Results

- 1) Respondents mostly desired the following conditions, if they set up facilities in HHTP.
 - Services, especially rapid procedures, care after investment, fast customs clearance, safe industrial zone, one stop service, and support of recruiting staff.
 - Infrastructure, especially, transportation, cheap land, stable and high-speed telecommunications, stable power supply, and adequate power supply.
 - Manpower, especially, high capability of engineers and technicians, high capability of workers, easy access to workers, and easy access to engineers and technicians.
 - Living conditions, especially, safety for foreigners, good residential conditions, and existence of a hospital.

If HHTP can satisfy the conditions of infrastructure, living, HRD, permanent tax incentives, and service, FDI will make serious investigations (written by one respondent).

- 2) Respondents mostly expected that HHTP would need to have the following functions, if they set up facilities in HHTP.
 - An employment service, and human resource development in the mechanical, electronic, and software design fields.
 - Testing and analysis functions for mechanical and electronics fields.

- · Subcontractors for mechanical processing and software development.
- 3) Respondents envisaged the following as merits of HHTP:
 - HHTP is relatively close to Hanoi, and transportation will be improved.
 - HHTP has an extensive site.
 - Tax incentives are available. In addition, compared with Hanoi, lower fixed cost is expected in HHTP.
 - The Prime Minister of Vietnam called for FDI to HHTP.
- 4) Respondents envisaged the following as demerits of HHTP:
 - HHTP is not a good location at present, compared with industrial parks located along the road connecting the air port and Hanoi, and another road connecting the China Border and Hanoi.
 - HHTP is an inconvenient place at present. There is only a small number of investors at present.
 - Infrastructure is not developed well, especially for power, telecommunications, and transportation.
 - Investment approval procedures are not clear.
 - Future plan of infrastructure development is not clear at present.
 - HHTP has a disadvantage for recruiting workers
- 6.6.2 Result of Questionnaire Survey to Local and Foreign Investor (other than Japan)
 - (1) General

The JICA Study Team conducted a questionnaire survey from July 20 to August 3, 2007, with 30 manufacturing or software companies which are operating in Vietnam. They are local companies and foreign companies other than Japanese companies. Effective answers were obtained from 15 out of 30 companies for a 50% effective respondent ratio.

Numbers of respondents are shown in Table 6.6-2 by industrial category.

Table 6.6-2 Respondents by Industrial Category from Local and Foreign Investors

Industrial Category	No.	Industrial Category	No.
Software	4	Electric and Electronics	4
Machinery & Precision Machinery	3	Chemical	1
Metalworking	1	Others	2
Total	15		

(2) Analysis of Results

- 1) Respondents mostly desired the following conditions, if they set up facilities in HHTP.
 - · Services : especially rapid investment procedures, safe and security and support

for recruiting staff.

- Infrastructure : especially, transportation, cheap land, stable and high-speed telecommunications and stable power supply.
- Manpower : especially, highly capable engineers, technicians and workers, and easy access to engineers and technicians.
- Living conditions : especially, safety, good residential conditions, and existence of restaurants.
- Accumulation of Science and Technology institutions : especially, accumulation of related industries, existence of science and technology university and existence of science and technology research institutions.
- 2) Respondents mostly expected that HHTP would need to have the following functions, if they set up facilities in HHTP.
 - An employment service, and human resource development in the mechanical, electronic, and software design fields.
 - Testing and analysis functions for mechanical and electronics fields.
 - · Subcontractors for mechanical processing and software development.
- 3) Respondents had the following impression about HHTP:
 - HHTP will be in good location if transportation system is well developed to make access to Hanoi and Noi Bai airport.
 - The design and size of HHTP is good.
 - The development of HHTP is too slow.
 - The service for investment procedure and support by HHTP-MB is not enough.
- 6.6.3 Questionnaire Survey to State Research Institutes
 - (1) General

With the collaboration of the HHTP-MB, the JICA Study Team conducted a questionnaire survey from August 9 to August 31, 2007.

The HHTP-MB and JICA Study Team jointly selected the 70 State research institutes for the questionnaire survey. By August 31, 2007, the JICA Study Team received answers from 32 State research institutes, and the response rate was 46%.

Among 32 respondents, 10 respondents had establishing/relocating plans to HHTP at the time of reply, while 18 had interests in HHTP.

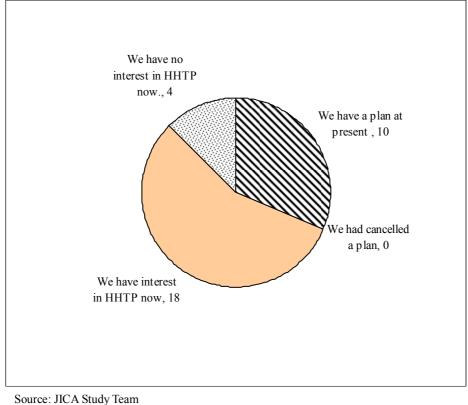


Figure 6.6-1 Establishment or Relocation Plan of Research Institutes

(2) State Research Institutes with Establishment/Relocation Plan

The 10 respondents with establishment/relocation plans are assessed, in view of fund raising, approval of land use rights, and employees' agreement for moving to HHTP.

As the result of assessment, it is envisaged that the following six institutes have relatively matured establishment/relocation plans.

- 1) Institute of Research and Applied Technology
- 2) Space Technology Institute
- 3) Ship Building Science and Technology Institute
- 4) National Institute of Hygiene and Epidemiology (NIHE)
- 5) Vietnam Metrology Institute (VMI)
- 6) National Center for Testing of Plant Variety, Crop Products, and Fertilizer

Fund raising is envisaged as the critical issue for the above institutes except the Ship Building Science and Technology Institute, since they are under request of State fund and/or an international financial cooperation.

(3) State Research Institutes with Interests on Establishment/Relocation to HHTP

The 18 research institutes with interests on establishment/relocation to HHTP are assessed, in view of fund raising, approval of land use right, and employees' agreement.

As the results of assessment, it is envisaged that some of the 18 institutes will possibly have own establishment/relocation plans to HHTP if there is adequate information, guidance, and funds, although they do not have any specific plans at present.

6.7 Expectation for Investment Incentives

6.7.1 Japan Business Association in Vietnam

Discussion of the incentives was initiated jointly by GOV and the Embassy of Japan, in late June 2007 in Hanoi. In the meeting, the Japan Business Association in Vietnam (JBA) explained some examples of incentives desired for attracting foreign investors as follows;

- to keep the Corporate Income Tax at the present level: i.e. 4 years tax exemption and 9 years tax reduction to 5%
- 2) to reduce the maximum rate of Personal Income Tax, for example, to 10%
- 3) to eliminate import tax on all commodities used by investors in HHTP and to liberalize import of used machinery
- 4) to ease regulations of the supporting industries to open the market for various service industries such as restaurants, serviced apartments for foreigners, and supermarkets for foreigners
- 5) to provide high grade infrastructure suitable for high-tech industry including:
 - Data communications services: high-speed service with reliable operation and maintenance
 - Electricity: uninterruptible power supply with allowable voltage fluctuation for the high-tech industry
 - Liberalization of domestic sales for high-tech goods manufactured in HHTP
 - Water: high quality water to the standards of Japan
 - Waste water: Waste water treatment plant should be capable of treating waster water discharged from the high-tech industry at the level in Japan
 - Logistics: raw materials

The HHTP-MB stated that the GOV was discussing modifying the high-tech park regulations so that high-tech parks could offer better incentives.

6.7.2 Japan Business Federation

A workshop was held on 31 July 2007 in JICA Tokyo office, inviting member companies of the Japan Business Federation which is the largest comprehensive economic organization in Japan as well as companies who responded to the questionnaire survey described in Chapter 6.6.1. The purpose of the workshop is to absorb the opinions on desired investment incentives and/or attractive measures which will be effective to induce investors to HHTP. The numbers of participants are 12 persons from 10 companies as shown below;

Industrial Category	Company	Participants
Electric and Electronics	3	4
Fabricated metal	1	1
Precision machinery	1	1
Telecommunication	2	2
Others	3	4
Total	10	12

 Table 6.7-1 Attendants by Industrial Category from Japanese Business Federation

For the companies who could not attend the workshop, individual hearing survey was made in order to increase number of respondents to this survey

The following investment incentives or attractive measures were proposed in the workshop and the hearing survey;

- 1) Tax incentives
 - The tax incentive currently applied to the tenants in HHTP is not exclusive treatment, but also applicable to high-tech companies eligible under the guideline regardless of its location. The special tax incentive only applicable to tenants located in HHTP is desired.
 - It takes long time to train workers and high-tech companies bear substantial cost for the training of staff and workers in general. If a subsidy for the training people is available to the tenants located in HHTP it would be very attractive.
- 2) Service
 - It is desired that HHTP would supply human resources who have some knowledge about advanced technology.
 - HHTP is expected to be a center of education/training and provision of human resources under appropriate collaboration between industry and academy.
 - Testing and analysis service for environmental measurement, electronic devices and mechanical products is desired to be available in HHTP.
 - A commuting bus service between Hanoi and HHTP should be provided.
- 3) Infrastructure
 - Installation of international telecommunication lines connected with Japan is most desirable.
 - A quality electricity power supply without any power interruption is essential for high-tech industries. It is the best that HHTP is provided with its own power plant for this purpose.
 - HHTP should have a training center where education of Japanese language and training of fundamental knowledge and working attitude required by Japanese manufactures are provided to the factory workers.
 - It is expected that HHTP provides small sized lots and/or rental factories for small and medium sized companies.

- 4) Others
 - Universities (VNUH and FPT) are expected to be relocated as scheduled so that the tenants in HHTP have opportunities to employ capable students in sufficient numbers in future.

6.8 SWOT Analysis

SWOT Analysis is a strategic planning tool used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in a project. Based on the findings described in the previous chapters, SWOT of HHTP was examined for each functional area where tenants are to be located, and summarized as follows;

(1) R&D Zone

Strengths:

- 1) HHTP can provide the state research institutes with the land free of charge.
- 2) The state research institutes can use a much larger space for research in HHTP than in Hanoi.
- 3) HHTP provides research and laboratory staff with good working environments, i.e. broad green areas and beautiful natural scenes.

Weaknesses:

- 1) The commuting from Hanoi is not easy due to absence of appropriate commuting services at present.
- 2) Dwelling facilities are not available in HHTP at present.
- 3) The initiative to relocate state research institutes is insufficient.

Opportunities:

- 1) Land demand increase is foreseen, as advancement of R&D is identified as one of the important state policies.
- 2) HHTP is a national project so that various state supports would be available.
- 3) Vietnam National University, which will be relocated adjacent to HHTP in the future, could provide research institutes with opportunities of linkage. It is difficult to find adequate land in Hanoi because of congestion.
- 4) Most State research institutes are located in Hanoi so that relocation would be easy.
- 5) Opportunity of joint research with industries and/or academia might be available.

Threats:

- 1) Financial burden for establishment of institutes in HHTP might be too heavy.
- 2) The number of financially stable institutes having an adequate number of high-level researchers is limited in the country.

(2) Educational and Training Zone

Strengths:

1) Relocation of FPT University to HHTP is determined. It demands a large parcel of land.

- 2) HHTP can provide the investors with the land at competitive prices.
- 3) HHTP provides a good environment for the student in leaning and studying.

Weaknesses:

- 1) The commuting from Hanoi for professors and university staff is not easy due to absence of appropriate commuting services at present.
- 2) Dwelling facilities are not available in HHTP at present.
- 3) Amenities and entertainment facilities are not available in HHTP at present

Opportunities:

- 1) Advancement of IT is identified as one of the important state policies. Large numbers of IT engineers are required to satisfy the demands of the IT industry.
- 2) HHTP is a national project so that various state supports would be available.

(3) Software Industry

Strengths:

- 1) FPT, which is the largest IT company in Vietnam, and has strong connections with a lot of foreign companies and is the development company and investor of the software park.
- 2) HHTP can provide the investors with land at competitive prices.
- 3) HHTP provides a good working environment to knowledgeable workers.
- 4) Relocation of FPT University to HHTP is determined. This can provide young IT engineers to meet demands of potential investors in HHTP.
- 5) Investment incentives for High-Tech industries are available to the tenants.
- 6) VITEC under HHTP-MB has experience in IT qualification examination and training services.

Weaknesses:

- 1) More reliable and higher capacity electric power supply systems and telecommunications systems are required.
- 2) The commuting from Hanoi is not easy due to absence of appropriate commuting services at present.
- 3) Dwelling facilities are not available in HHTP at present.
- 4) Living environment has not been provided sufficiently in HHTP at present.

Opportunities:

- 1) Places like the software park with good infrastructure are in demand as the IT industry is growing in Vietnam fueled by foreign and Vietnamese investors
- 2) Advancement of IT is identified as one of the important state policies.
- 3) HHTP is the national project so that various state supports would be available.
- 4) The market for software outsourcing businesses is increasing.
- 5) Vietnam National University will be relocated adjacent to HHTP in the future. It will provide young IT engineers to meet the demands of potential investors in HHTP.

6) Opportunities for joint research with state research institutes and/or academia might be available.

Threats:

1) There is a possibility of decreasing investment in software businesses through tough competition with India and China.

(4) High-Tech Industry

Strengths:

- 1) HHTP can provide the investors with land at competitive prices
- 2) There is ample land and large allotments available for manufacturing industries.
- 3) HHTP provides a good working environment to the factory workers.
- 4) Investment incentives for High-Tech industries are available to the tenants.
- 5) FPT University is scheduled to be relocated. It can provide tenants such as electronics and optoelectronics with well-educated IT engineers.

Weaknesses:

- 1) Development of basic infrastructure has not been accomplished satisfactorily.
- 2) Currently power supply is sometimes interrupted, and telecommunications speed is not high enough for data transmission.
- 3) Distant location from sea ports.
- 4) The commuting from Hanoi is not easy due to absence of appropriate commuting services.
- 5) Dwelling facilities are not available for staff or workers in HHTP at present.
- 6) Strategic marketing and promotion activities are still lacking.
- 7) Customer oriented supporting service to tenants is not yet adequate.

Opportunities:

- 1) Advancement of high-tech industry is identified as one of the important state policies.
- 2) HHTP is a national project so that various state supports would be available.
- 3) FDI and arrival of foreign companies into Vietnam are increasing.
- 4) Relocation of FPT University to HHTP is determined.
- 5) Vietnam National University will be relocated adjacent to HHTP in the future. It could provide tenants with knowledgeable workers.
- 6) Phu Cat Industrial Zone is located nearby, which provides investment opportunities for the supporting industries.
- 7) Opportunity for joint research with state research institutes and/or academia might be available.

Threats:

- 1) Establishment of new industrial estates in Northern Vietnam is increasing
- 2) Recruitment of quality factory staff and workers might become difficult in the future.

6.9 Key Success Factors

Based on the observation of present conditions of HHTP, questionnaire survey to the industries and State research institute, bench mark-analysis and SWOT analysis, the following 10 key factors are identified for successful implementation of HHTP.

- 1) Timely achievement of land acquisition and resettlement
- 2) Strong initiative and support of central government
- 3) The HHTP-MB with higher authority and capabilities
- 4) Completion of internal infrastructure
- 5) High-grade power supply and telecommunication systems
- 6) Human resource development
- 7) Strategic marketing
- 8) Provision of attractive investment incentives and one-stop service
- 9) Generation of synergy effect among R&D institutes, education & training and hightech industries
- 10) Development of urban function

Chapter 7 MISSION AND STRATEGIES OF HHTP

7.1 Approach

Since submission of the original HHTP Master Plan in 1998, especially in the last several years, the economic and investment conditions in Vietnam have drastically changed. Based on the analysis stated in the previous chapters, the original master plan has been updated by the following approach:

- 1) Consideration of the function of HHTP as the national center of science and technology development
- 2) Consideration of changes after the original master plan was formulated, especially changes in the economic development trends and newly issued relevant legal documents
- 3) Consideration of progress in the development of HHTP and similar projects in the surrounding areas
- 4) Consideration of the investment trend in HHTP by both R&D and high-tech industries
- 5) Consideration of regional development, especially the position of HHTP in the Hanoi Metropolitan Area

7.2 Update of Missions

7.2.1 Role of HHTP

With the current global trend of intensifying international competition, Vietnam's sustainable socioeconomic development can only be achieved by building a knowledge-based socioeconomic system that is based on the country's comparative advantages. The current status of Vietnam's various development units, such as its science and technology (S&T), research and development (R&D), and higher education, as well as high-tech industries, is yet to match global standards. Improvement of the situation is imperative. Under the direct initiative and leadership of the Prime Minister, the establishment of the HHTP addresses this important national issue and positions HHTP to play a leading role. The expected role of an internationally competitive HHTP in the coming generations will be critical in ensuring the country's survival amidst the fierce economic competition which has already started to take place in the region.

7.2.2 Target and Mission

The target of the HHTP is stated as follows:

"To provide and sustain a level and competitive playing field aimed at promoting science and technology, the innovations of which will be promoted extensively throughout the country, thereby stimulating the development of high-tech industries to help to attain the envisioned socioeconomic development of Vietnam."

This target is reflected in the following six missions:

1) Provide an appropriate venue to strengthen the competitiveness of industries, education, and R&D institutes through the principle of synergy.

- 2) Provide an attractive and competitive location that will help create new added value in science and technology innovations mainly by State research institutes which will be disseminated to industries, learning institutes, and researchers throughout the country.
- 3) Attract eminent international high-tech industries by ensuring a desirable investment climate and venue for fair competition which will be realized through state-of the-art infrastructures and superlative management methods.
- 4) Provide an attractive and competitive location that will nurture young talents who will, in turn, teach the next generation of S&T leaders and innovators through higher education of a global standard.
- 5) Provide a central place that will popularize science and technology to the nation to contribute to sustainable development.
- 6) Provide a high-grade environment for living, as well as other activities, for its residents and visitors and which is integrated with adjoining areas and communities.

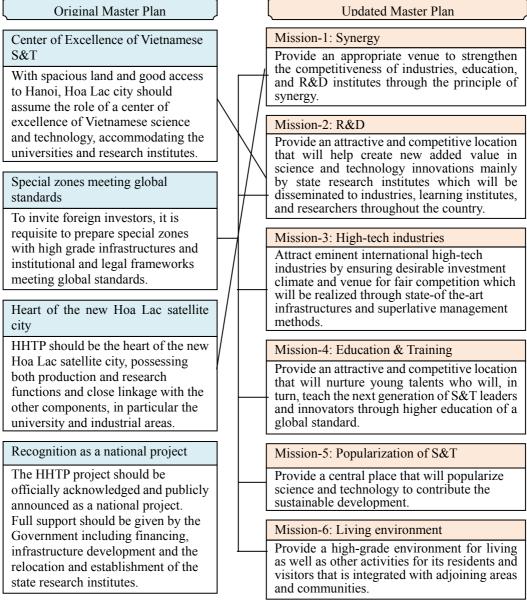


Figure 7.2-1 Missions and Development Principles of the Original Master Plan

Figure 7.2-1 shows the comparison between the current and original master plans for the above missions and development principles.

Taking the importance of "education and training" and "living condition" into consideration, mission 2 and 5 have been added to the original master plan, while "recognition of a national project" has not been taken up as a mission.

7.3 Development Framework

7.3.1 Industrial Economic Framework

Vietnam has set a goal of becoming an industrialized country by 2020. The experience of the Asian Tigers indicates that the most important step in the industrialization process is to identify and educate competent planners and managers to compete well against the sophisticated elite leaders of advanced industrial countries and NICs. Compared with the last quarter of the 20th century, the first quarter of the 21st century will have even more rapid technological advances and transformations, stiff world-market competition, and extensive globalization. As noted, adaptability, flexibility, and innovativeness will be extremely important virtues for Vietnam's next generation of government officials and business leaders. Although such well-qualified leaders may emerge through on-the-job training and trial-and-error practices, a lesson from the experience of the Asian Tigers is that Vietnam would be well advised to systematically approach the development of a new generation of leaders.

In this point of view, the most critical technical skills gap in Vietnam lies in applied systems engineering. These are not the skills that go with big science and technological breakthroughs but the full range of applied and management skills required making technologies work to full advantage - or in other words, the ability to apply technologies. Therefore, the education of the top and middle manager classes is imperative.

The intention of establishment of high-tech parks is to try to locate research institutes, universities, and high-tech enterprises in an environment that promote interaction and leads to science and technology innovations. To fulfill this intention as well as the vision, it is necessary to establish an advanced global information network (telecommunications) system; and to provide specialized training and a technology incubator, business development centers and MICE (Meetings, Incentives, Conferences, and Exhibitions) facilities within an designated area for generating the synergies through collaboration of different activities.

Figure 7.3-1 illustrates, conceptually, the linkage of functions and roles of players to supply competitive high-tech products and software for the world markets from Hoa Lac High-Tech Park in parallel with proper human resource development aiming to create leaders and techno-management personnel in the next generation of Vietnam. A close linkage among the high-tech industries, the higher education system, and research and development activities need to be emphasized to achieve the goal set out for the industrialization of Vietnam by 2020.

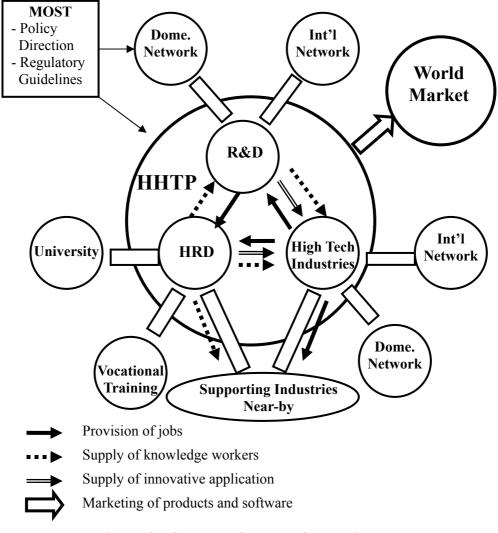


Figure 7.3-1 Conceptual Structure of Players in HHTP

7.3.2 Spatial Framework

HHTP is located with strategic importance at three levels of spatial hierarchy in Vienam; one at regional/international, two at metropolitan Hanoi and three at provincial/local levels, as briefly explained as follow:

(1) HHTP at Regional/International Level

To ensure effective linkage through telecommunications and transportation between HHTP and the world as well as major growth centres in the country is critical for smooth interchange of information, knowledge, people and goods. While telecommunication link is assured through national and local network, physical links are provided through effective connection with international gateways including Noi Bai International Airport, Hai Phong/Cai Lan Ports and cross border transport. Connections with other regions in the country are made through the above international gateways, national roads, expressways and railways. Main important links of HHTP at regional/international level include following:

1) Airport link: HHTP-Hoa Lac Highway-Hanoi Ring Road 3-Noi Bai which will

be shortened when Hanoi Ring Road 4 is completed

- 2) Port-link: HHTP-NH 5/NH 8- Hai Phong/Cai Lan which will be shortened when Hanoi Ring Road 4 is completed.
- 3) Railway link: At present there is no direct regional railway connection to HHTP but possible access points exist in Hanoi when and where necessary.
- 4) Cross border link: Two main routes to link HTTP with China exist. One through Lao Cai with Kung Minh, and two through Lang Son with Nang Ninh. On-going Hanoi-Lao Cai expressway and NH 18 provide good opportunities.
- 5) National link: National highways including Ho Chi Minh Highway also provide good connections with the rest of growth centres in the country.
- (2) HHTP at metropolitan Hanoi Level

In order for HHTP to function competitively, HHTP must be effectively integrated physically and functionally with Hanoi. This is also important for Hanoi to be benefited from HHTP's strategic function. Spatial structure must be designed in a way to enhance synergy of HHTP function and those of Hanoi and other nearby provinces. For this following measures are contemplated.

- Development of Lang-Hoa Lac Highway with high design standard to provide commuters and visitors with efficient and high quality services. When Hanoi UMRT Line 3 is extended to Hoa Lac via Lang-Hoa Lac Highway, both areas will be connected within half and hour through expressway and urban mass transit services.
- 2) Improvement of main roads including NH21 to strengthen linkages HHTP and fast industrializing Ving Phuc and other provinces.
- Development of Hanoi Ring Road 4 which will further strengthen connections between HHTP and various parts of Hanoi and nearby provinces by bypassing congested urban areas in Hanoi.
- (3) HHTP at Provincial/Local Level

HHTP's impacts on socio-economic development in Ha Tay province and surrounding areas will be significant. Spatial structure must be designed in a way that Hoa Lac can promote sustainable development of the province and its neighboring areas. Proposed spatial development orientations at this level are as follows:

- Development of HHTP as a core of urban chain which is composed of Son Tay, Hoa Lac, Xuan Mai and Mien Mon. While the concept of the urban chain has been clearly mentioned in the Hanoi Metropolitan Area (HMA) plan currently being finalized under MOC, HTTP is expected to play a role as key driver in the development. For this, upgrading of NH 21 which function as a backbone together with Lang- Hoa Lac Highway is necessary. (see Figure 7.3.2)
- 2) This urban chain is expected to function as a new growth centre of Ha Tay with a

vision to realize environmental friendly urban communities supported with knowledge-based economy, modernized agriculture, cultural and ecological tourism and new way of living for the people in Ha Tay province as well as those from Hanoi and other provinces. For this, more detailed plan must be prepared for proper infrastructure development as well as land use and environment control.

 HHTP development must be open for neighboring areas for effective integration of functions and enhance sense of togetherness between HHTP and neighbors across its boundary.

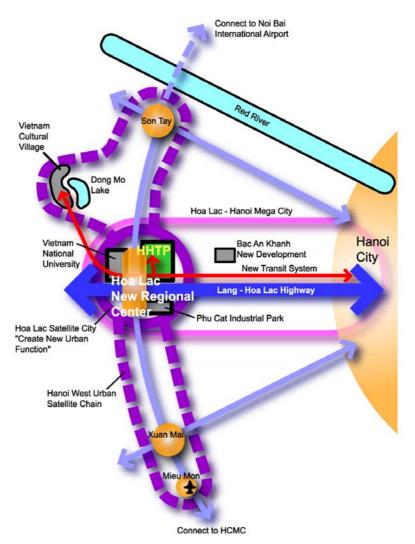


Figure 7.3-2 Regional Development Framework

7.4 Development Strategies

7.4.1 Structure of Development Strategies

Figure 7.4-1 illustrates the structure of development strategies to accomplish the missions. The bottom portion of the figure shows the four strategies for infrastructure and institutional measures, which provide a platform for accomplishing the missions. The middle portion shows the five functions of HHTP: urban, R&D, high-tech industry, education & training, and popularization of science and technology for the nation. The

top portion shows the synergy among the R&D, high-tech industry, education, and training functions.

Ten strategies in total are required to be worked out, taking the development issues described in the previous chapters into consideration.

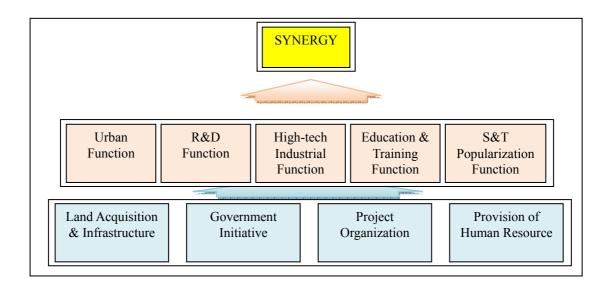


Figure 7.4-1 Structure of Development Strategies

- 7.4.2 Formulation of Development Strategies
 - (1) Land Acquisition and Infrastructure

Delay in land acquisition is the most critical cause of the slow progress of the HHTP development. Investors' negative impression due to insufficient infrastructure development and uncertainty regarding the future infrastructure construction are also cited as the possible causes in the previous chapters. It is required to execute the land acquisition and infrastructure development in line with a carefully worked-out plan so that HHTP can be developed without further delay and recover the trust of potential investors.

In addition to the basic infrastructure in HHTP, advanced infrastructure both high-level telecommunication and an uninterruptible power source is highly required by the Japanese investors. It is required to develop high grade infrastructure so as to ensure HHTP's role as the country's premier industrial gateway.

In Chapter 6, the SWOT analysis revealed a weakness of HHTP in physical distribution. In order to overcome this weakness to become competitive with other industrial parks in Northern Vietnam, transportation access to and from international gateways will be the most important infrastructure.

(2) Government Initiatives

As is clear from the good practices of other high-tech parks mentioned in Chapter 6,

political initiatives are vital for high-tech park development.

In order to develop the HHTP into an internationally competitive high-tech park cum science city in the face of fierce competition in the region, it is crucial not only to mobilize the available intellectual, infrastructural and financial resources in the country but also to make an extra effort to overtake the corresponding developments in other countries in Asia and elsewhere. This will require the government initiatives and leadership of no less than the Prime Minister himself as well as the institutionalization of an effective coordination system among related ministries and stakeholders including local governments units, universities, R&D institutes, and various industries. Under this concerted government effort, a concrete long-term Master Plan, and other related development programs must be formulated with supporting institutional arrangements including the provision of updated rules.

In particular for attracting State research institutes to HHTP, organizational and financial supports are required as a strong initiative of the government.

(3) Project Organization

As is described in Chapter 6, the roles of HHTP Management Board and HHTP Development Company are crucial for HHTP development. However, the project organization is still in a state of transition. Accordingly, it is required to finalize the organizations for operation and maintenance as well as infrastructure construction as early as possible. It is recommended that HHTP employ highly capable staff by providing special treatment in the same way as Saigon High-Tech Park.

The HHTP cannot be developed overnight. It will require time and effort from the government, the HHTP Management Board, and HHTP Development Company. Under a long-term policy commitment of the government, the HHTP must efficiently create jobs in the process of planning, marketing, development, operational, management and monitoring, as well as ensure a fair competitive environment for all players.

(4) Provision of Human Resource

An employment service was required by many respondents to the questionnaire survey, which has been conducted for Japanese high-tech industries in the study. HHTP is required to provide investors with employment service and to establish an appropriate place where young talent want to work.

It is recommended to provide talents, engineers, technicians and skilled workers to the institutes and investors.

(5) Provision of Urban Function

According to the SWOT analysis for R&D in Chapter 6, HHTP has weaknesses regarding commuting and residence. According to the questionnaire survey for Japanese high-tech industries, HHTP is required to have a safe and comfortable living

environment for foreigners.

The provision of quality living conditions with modern urban amenities will certainly attract people to reside in and around the HHTP which will include residential pavilions for domestic and international visitors as well as for hosting meetings, conferences, and various other purposes.

It is recommended to develop high-grade urban amenities and living environment to ensure quality of life for residents and to provide a superb environment for visitors.

(6) Attraction of R&D Function

State research institutes will play an important role in Vietnamese industrial development through catching-up to industrially advanced countries, improvement of product quality, development of new products and production technologies, etc, in addition to progress in Vietnamese science and technology.

However, as described in the previous chapters, lack of research funds or a strong initiative by the State government are critical causes of slow relocation/establishment of State research institutes. Thus, relocation/establishment of State research institutes in HHTP needs strong initiative and financial support from the State government. It will take a long time to develop advanced technology, and furthermore a longer time to generate synergistic effects with education and training institutions and the high-tech industries.

The State government is required to take strong initiative in making arrangements to put appropriate State research institutes into HHTP as early as possible. As part of such arrangements, looking for international financial support may be necessary for research funds in cases where State financial resources will be insufficient.

(7) Attraction of High-tech Industrial Function

In addition to competitive infrastructure services, investors are often concerned with a conducive investment climate, especially one that offers lucrative incentives over a certain period.

Providing both hard and soft infrastructures is particularly important for foreign investors who always have the prerogative of locating their businesses and investments in other regions.

It is recommended to provide the best investment incentive, which is not limited to financial and procurement issues. In addition to such incentives for high-tech industries, HHTP is required to provide highly capable human resources with motivations to work in HHTP for education, research, and production.

Additionally, as is shown in the previous chapters, lack of strategic marketing is one of the possible causes of the slow progress in attracting high-tech industries to HHTP. Saigon High-Tech Park was successful in attracting a large investor from Japan by emphasizing customer-friendly sales promotion.

Important issues regarding attracting high-tech industries to HHTP are to thoroughly understand the markets and the needs and desires of customers; and to effectively provide incentives and services to the investors. The investors will evaluate the value of the HHTP comprehensively from various points of view generally including incentives (financial and institutional), infrastructures (quality, quantity and cost), human resources (quality and quantity), and living environment (safety, comfort, amenities and amusements).

(8) Attraction of Education and Training Function

As is shown in Chapter 6, presence of the education and training function characterizes high-tech parks in the world, for example, National Tsing Hua University and National Chiao Tung University located adjacent to Hsinchu Science Park in Taiwan, and Tsukuba University in Tsukuba Science City in Japan.

Nurturing of highly capable human resource is crucial function of HHTP where innovation will be created through linkages among the high-tech industries, universities, and research institutes, and can differentiate HHTP from industrial parks in the areas surrounding Hanoi.

It is necessary to attract education and training institutes in and around HHTP for nurturing various kinds of occupation.

(9) Popularization of Science and Technology

For the benefit of the well being of the nation, science and technology (S&T) must contribute to national development over a long period of time. It is important to enhance the nation's understanding and interests in S&T so that society can appropriately judge the progress of S&T and respond to it.

However, it is difficult for the nation to understand the state-of-the-art S&T, because it increasingly becomes a black box due to ever greater sophistication and complexity. In addition, it is often said that the S&T literacy of the nation is dependent upon the interests and experience of S&T in childhood.

Under such circumstances, it is recommended that researchers and parties concerned with HHTP disseminate easy-to-understand information regarding S&T and hold events for the nation to observe, listen, and touch the activities and outputs of S&T. The nation can create its own dreams and imagine the progress in S&T by enhancing the own understanding and interests in S&T through such information and experiences.

Meanwhile, the Hoa Lac "brand" will be born of such activities by the researchers and parties concerned with HHTP. Once the brand is built, many young people will wish to come to Hoa Lac to learn and work there. They will contribute to the progress in S&T in the next generation.

(10) Generation of Synergy Effect

The HHTP will be designed as more than just a high-tech park. It will follow an integrated development that will encourage the relocation or establishment of R&D institutes and universities as well as high-tech industries. The synergy from comprehensive development is expected to further enhance HHTP's importance and attraction to investors and players.

However, it will not be sufficient just to locate all physical functions in one area. Of equal importance will be the establishment of an efficient mechanism for the exchange of information as well as the manpower component, mutual dependence relationship, and cooperative venture.

Chapter 8 LAND USE PLAN

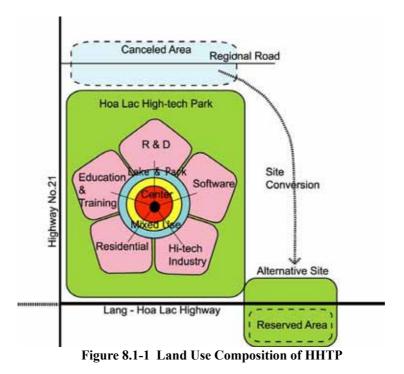
8.1 Planning Basis

(1) Requests by the Management Board

During preparation of the land use plan, the HHTP-MB asked the JICA Study Team to ensure that the following aspects be reflected in the plan as much as possible:

- a. Land acquisition carried out until now should be respected and it should be considered as a given condition for planning of the Phase-1 development area. Moreover, the same considerations should be given to the land acquisition plan that is being prepared and will be conducted by Ha Tay Province.
- b. Existing and on-going infrastructures such as roads, power and water supply should be fully utilized.
- c. Existing facilities in HHTP such as the Start-up Center, IT Support Center and three high-tech industrial factories should be located in the up-dated land use plan as they currently are.
- (2) Total Development Area

Total development area was decreased from 1,650 ha in the original Master Plan to 1,610 ha. The reason for this is the difficulties in land acquisition and resettlement of the northern development area along regional road No.419, where houses are already densely developed. As an alternative site, land to the southeast of HHTP along Lang - Hoa Lac Highway is planned to be utilized. This site conversion is illustrated in Figure 8.1-1.



(3) Zoning of HHTP

The land use plan has been elaborated to maximize the performance that will be

achieved by each zone as much as possible. As a consequence, the following changes in the zone planning have been made to the original Master Plan.

- The **Software Park** is allocated separate from the **Research and Development Zone** in due consideration of the differences in characteristics between the two zones.
- The **Amenity Zone** is separated from the **Amusement Zone** considering the different atmospheres that will be provided to fulfill the needs and entertain the lifestyle in the Park. The Amenity Zone will provide exclusive facilities than the Amusement zone.
- The **Education and Training Zone** is newly allocated due to the necessity of education and training functions to reach the target of HHTP development, which is to create advanced national technology and science.
- The residential area is divided into two zones, which are **the Residential Zone** and the **Housing Complex**. The Housing Complex consists of residences and supporting facilities (e.g. hospital, market and school) with reasonable and affordable prices for the workers and employees of HHTP.
- The **Reserved Area** is newly allocated to ensure the smooth implementation of later development phases. The function of this zone can be adjusted based on the future economic conditions and market needs.

As a result, HHTP is composed of 12 functional zones as shown in the following table.

Zones		Candidate Facilities		
Software Park		Software firms		
Research and Development Zone		State research Institute, High-tech enterprise laboratories		
High-tech In	dustrial Zone	Factories of high-tech manufacturers, Bonded warehouses for imports and exports		
Education and Training Zone		University, Technical Training School, Vocational School, and Dormitories		
Center of Hi	gh-tech City	High-tech transaction and services function		
Residential Zone		Wealthy residential environment and facilities for staff and employees working in the Park		
Dwellings	Housing Complex	Flats with necessary living facilities for employees working in the Park		
Mixed Use Z	Zone	Commercial and Business Facilities, Residential Facilities		
Amusement	Zone	Sports, health and recreational facilities		
Amenity Zone		Recreation and social facilities including a residential area for executives		
Infrastructure Zone		Roads, water treatment plant and other utility service facilities		
Lake and Buffer Zone		Preserved area as a core for an eco-friendly environment		

 Table 8.1-1
 Land Use Concepts for the Various Zones

(4) Linkage with HHTP's function

The relationships between the five functions necessary to accomplish HHTP's mission and the functional zones allotted in the land use plan are shown in the following table.

	HHTP Function	Functional Zone		
1	Urban function	Center of High-tech City		
		Mixed Use Zone		
		Residential Zone		
		Housing Complex		
		Amusement Zone		
		Amenity Zone		
		Infrastructure Area		
		Lake and Buffer Zone		
2	Research and Development function	Research and Development Zone		
3 High-Tech Industry function		High-tech Industrial Zone		
		Software Park		
4	Education and Training function	Education and Training Zone		
5	Popularization of Science and	Center of High-tech City (i.e. Science Museum)		
	Technology			

Table 8.1-2 Required HHTP Functions and Functional Zones

8.2 Land Use Plan

- 8.2.1 Concept and Description of the Functional Zones
 - (1) Software Park

In the original Master Plan, the area for the Software Park was not clearly delineated and its area was a part of the R&D zone. However, in this study, the area for the software park is allocated separately from the R&D zone, because these two areas have different functions. Furthermore, the R&D zone will be developed by HHTP-MB and the Software Park will be developed by the Development Company.

The area planned for the Software Park is surrounded by Tan Xa Lake so as to provide a superior working environment to the educated workers in the software industries.

The total area allotted to the Software Park is 75 ha which corresponds to about 5% of the entire area of HHTP and 45 ha will be developed in Phase-1. This area of 45 ha is almost the same as the development area of Quang Trung Software City in HCMC (43 ha).

(2) Research and Development Zone

Research and development is one of the most important functions of HHTP to realize its mission as stated in Chapter 7.2. In the R&D zone, the State Research Institute will be established or relocated, in principle. A private research institute might be also established in this area in the future.

The R&D zone has been arranged opposite the Software Park with a view of Tan Xa Lake for the same considerations as given to the Software Park.

The total area allotted to the R&D zone is 145 ha and 70 ha will be developed in Phase-1. This 145 ha of the land can accommodate about 30 institutes, assuming average land required for an institute is 5 ha.

(3) High-Tech Industrial Zone

The High-Tech Industrial Zone, which accommodates high-tech factories, is a production center of high-tech products and directly contributes to the economic development of Vietnam.

The High-Tech Industrial Zone is planned to be located in the south-east block of HHTP distant from Tan Xa Lake.

The total area allotted to the High-Tech Industrial Zone is 340 ha and 140 ha will be developed in Phase-1. The total area of 340 ha accounts for about 20% of the whole development area of HHTP, which is 7% more than the allocation in the original Master Plan of 13% with due consideration of the rapidly increasing trend of FDI into Northern Vietnam as well as HHTP-MB's intention to provide much more area than in the original plan. The area can be extended into the reserved area if the demand increases more in the future and additional land would be required.

(4) Education and Training Zone

The original Master Plan did not delineate the Education and Training area independently. Although VNUH (Vietnam National University of Hanoi) has a plan to relocate to Hoa Lac, HHTP is required to have its own Education and Training function for different educational fields than VNUH offers to realize its mission as stated in Chapter 7.2. FPT University, which opened its campus in Hanoi in January 2007, has a concrete plan to relocate to HHTP with a target opening year of 2008. Besides, training entities including a technical training center and vocational training school are proposed to be located in this area for education and training of engineers, technicians and skilled workers.

The Education and Training area is allocated along Highway No. 21 and nearby there exists the planned VNUH site. It is considered that this will provide synergistic effects through the academic linkage.

The total area allotted to the Education and Training area is 95 ha, and 55 ha will be developed in Phase-1.

(5) Center of the High-Tech City

The Center of the High-Tech City provides necessary urban facilities and services for all the tenants, research institutes and educational and training organizations established in HHTP. The candidate facilities in the Center of the High-Tech City include an information center, convention hall, high-tech showcase, post office, police station, fire station, library, and science museum. The existing Start-up center is located in this area.

The total area allotted to the Center of the High-Tech City is 50 ha and 40 ha will be developed in Phase-1. This total area of 50 ha is almost the same as the area in the original Master Plan (47 ha).

(6) Mixed Use Zone

The Mixed Use Zone is a multi-functional zone having commercial, business and also residential functions. Mixed Use Zones are planned to be developed in two areas. One is the area surrounding the Center of the High-Tech City and another is near the Educational and Training Zone. The Mixed Use Zone located near the Educational and Training Zone can be accessible not only by people studying or working in the Educational Zone and Software Park but also local people living outside HHTP.

The total area allotted to the Mixed Use Zone is 100 ha and 75 ha will be developed in Phase-1. This total area of 100 ha is about 20% larger than the area in the original Master Plan (81 ha).

(7) Residential Zone

A wealthy residential environment is planned with better than middle class housing and supporting facilities such as a market, hospital and school, which can also suit foreigners. This area is plotted in the southwest corner of HHTP. This aims at eventually unifying the area with the developing urban area centered on the intersection of Lang-Hoa Lac Highway and Highway No.21 in the future.

The total area allotted to this area is 50 ha and 15 ha will be developed in Phase-1.

(8) Housing Complex

The Housing area mainly will consist of flats with reasonable and affordable prices along with necessary middle class supporting facilities for the employees working in the Park and public officers. It is located in the southeast end of the HHTP, with total allotted area of 20 ha.

(9) Reserved Area

The land located south of Lang - Hoa Lac Highway having a 180 ha area is a reserved area for future expansion. This land will be developed in Phase-2. The land use will be determined before development of Phase-2 based on actual demand of the market at that time. For example, if demand for hi-tech industries is high at that time, this land will be used for a High-tech industrial area.

(10) Amusement Zone

The Amusement Zone is allocated to an area near the Center of the High-Tech City and the Mixed Use Zone for which the same concept of the original Master Plan is applied. This area will create innovative urban functions harmonized with green and open space in sufficient balance.

The total area allotted to this area is 60 ha and 20 ha will be developed in Phase-1.

(11) Amenity Zone

Recreation and social facilities which include a residential area for executives will be provided. The area for the amenity zone is allocated to the northeast end of HHTP. The

area allotted to the amenity zone is 110 ha.

(12) Infrastructure Area

A total of 16% of the whole development area is secured for infrastructure as in the original Master Plan.

(13) Lake and Buffer Zone

Some small ponds and a hill are included in the area of the functional zones. This is to provide optimal elements for landscape, open space (to satisfy Building Coverage Ratio and Floor-Area Ratio requirements) and retention ponds (for flood control). A part of Tan Xa Lake is also included in the Amenity Zone and R&D area for the same reasons.

8.2.2 Zone Layout

The zone layout has been elaborated considering the sequence of and accessibility between the related zones, differences of the user levels and safety. Moreover, to make it easier to create the synergy between the functions, the functions having similar characteristics were located close together.

The following changes in the zone layout have been made to the original Master Plan.

- Considering the market needs, ease of sales and traffic safety, the High-Tech Industrial Zone is combined into one huge block and located in the site with the best access to the Lang – Hoa Lac Highway.
- Considering convenience and better accessibility by users, the **Center of the High-Tech City** and the **Mixed Use Zone** are located in the center of HHTP.
- To strengthen the linkage between the R&D and the high-tech industries, the **Research and Development Zone** is located adjacent to both the **High-Tech Industrial Zone** and the **Software Park**. Besides, to popularize science and technology, the location of the **Research and Development Zone** needs to be close to the **Center of the High-Tech City**.
- To have a sense of identity between HHTP and the Vietnam National University of Hanoi (VNUH) developments, the **Education and Training Zone** is expected to have linkage with the Vietnam National University of Hanoi (VNU); therefore, the **Education and Training Zone** is located close to VNU across National Road No.21. Besides, this way a large number of students can safely access educational institutions without passing through the heavy traffic areas in HHTP.
- To maximize the function and performance of the common infrastructure and facilities, the zones with similar characteristics must be located close together, such as the **Software Park** and the **Education and Training Zone**, which both require facilities for information technology.

8.2.3 Development Phases

The common infrastructure development of HHTP is planned to be implemented in two phases. The target years for completion of the internal infrastructure are 2012 for Phase-1 and 2020 for Phase-2.

The three phase development adopted in the original Master Plan was reviewed in due consideration of the implementation delay and necessity of the creation and popularization of advanced science and technology to add value to the present Vietnamese industrial ability.

Target year for Phase-1 development is set as early as possible, considering the needs to develop national science and technology, and industrial market needs. The target year for Phase-2 is synchronized with the regional economic development plan to make it easier to share the future vision.

8.2.4 Land Use Plan

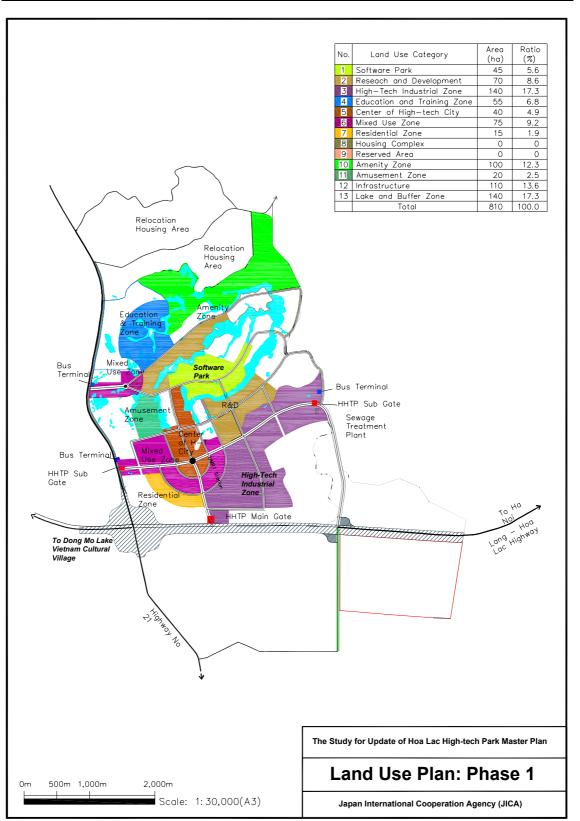
Land use areas for both Phase-1 and Phase-2 are summarized in Table 8.2-1, and the layout plans are shown in Figures 8.2-1 and 8.2-2 below.

Land Use Category		Previous	Updated MP		
		MP	Phase-1	Overall	
1	Software Park	165	45	75	
2	Research and Development Zone	105	70	145	
3	High-tech Industrial Zone	210	140	340	
4	Education and Training Zone	-	55	95	
5	Center of High-tech City	47	40	50	
6	Mixed Use Zone	81	75	100	
7	Residential Zone	247	15	50	
8	Housing Complex	-	0	20	
9	Reserved Area	-	0	180	
10	Amenity Zone		100	110	
11	Amusement Zone	199	20	60	
12	Infrastructure	268	110	245	
13	Lake and Buffer Zone	300	140	140	
	TOTAL	1,650	810	1,610	

Table 8.2-1 Land Use (ha)

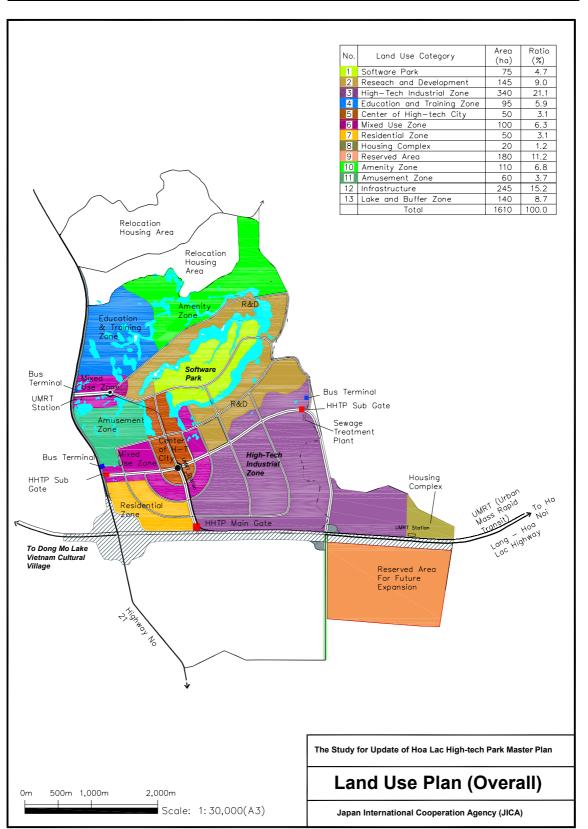
8.2.5 Planning Criteria for the Functional Zones

Planning criteria for each functional zone is defined as: i) to create an eco-friendly atmosphere, ii) to maintain a good living environment, iii) to originate international level working space for the scientists and technologists, moreover iv) to estimate infrastructure demand. The criteria consist of: i) floor area, ii) population (daytime and residents), iii) maximum building coverage ratio, iv) maximum floor area ratio, v) maximum number of stories. The criteria determined for each zone is shown in Table 8.2-2 below.



Source: JICA Study Team

Figure 8.2-1 Land Use Plan for Phase-1 Development



Source: JICA Study Team

Figure 8.2-2 Land Use Plan for Overall Development

Land Use Category		Phase-1		At completion of Phase-2					
		Area Total Floor Area		Population*5		Area	Total Floor Area	Population*5	
	Lund Ose Category	(ha) *1	(ha) *2	Daytime *3	Residents *4	(ha) *1	(ha) *2	Daytime *3	Residents *4
1	Software Park	45	25	2,250		75	42	3,750	
2	Research and Development	70	39	4,200		145	81	7,800	1,500
3	High-Tech Industrial Zone	140	98	14,000		340	238	34,000	
4	Education and Training Zone	55	58	22,000		95	100	38,000	28,500
5	Center of High-tech City	40	140	10,000		50	175	12,500	8,750
6	Mixed Use Zone	75	158	11,250	15,000	100	210	15,000	20,000
7	Residential Zone	15	16	0	4,500	50	53	0	15,000
8	Housing Complex	0	0	0	0	20	42	0	8,000
9	Reserved Area	0	0	0		180	126	18,000	
10	Amenity Zone	100	0.1	200	0	110	6	200	1,000
11	Amusement Zone	20	0.1	2,000		60	0.4	6,000	
12	Infrastructure	110				245			
13	Lake and Buffer Zone	140				140			
	Total	810	534	65,900	19,500	1,610	1,073	135,250	82,750
	Remarks: *1 Area of Phase-2 is the sum of areas added in Phase-1 and								

 Table 8.2-2
 Floor Area and Population Framework (Planned)

*1 Phase-2.

Site Area x Average Floor Area Ratio (Average Floor Area Ratio=Maximum Floor Area Ratio x

*2 0.7)

Remarks:

*3 Total Floor Area x Daytime population Density per Hectare

*4 Total Floor Area x Resident population Density per Hectare

The population density in each category is assumed in Chapter 1.4 of Supporting Report Volume I. *5

Source: JICA Study Team

8.3 Infrastructure Development Plan

In this section, the outline of the infrastructure development plan is presented. The detailed consideration is described in the Supporting Report, except for the telecommunications system which is will be carried out by a private company as decided by the Government of Vietnam.

- 8.3.1 Land Preparation and Drainage System
 - (1) Sector Development Missions, Strategies and Goals

Mission, strategy and goals for land preparation and the drainage plan are set forth as stated below:

	Land Preparation	Drainage System
Mission	and housing be developed.	 To enhance investment activities without any interruption throughout the year. To complete a systematic drainage network covering the entire HHTP area.
Strategies	 To be able to access the developed area smoothly without any difficulty. To prepare the land in conjunction with the drainage plan. To consider the existing elevations of the road projects. 	 To minimize inundation areas by constructing proper drainage facilities. To install a drainage network in conjunction with the road development plan. To reinforce the O&M system of HHTP.
Goals	- To prepare the land by filling and cutting by 2020.	-To install drainage facilities in the developed area by 2020.

Table 8.3-1 Missions, Strategies and Goals for Land Preparation and Drainage System

(2) Planning Framework

The elevations of the existing roads which were constructed in stage-1 shall be kept as they are. The grading elevations for the area that will be developed in Phase-1 are to be decided in consideration of the road and drainage development plan. Minimum grading elevation shall be higher than 10.0 m above MSL to minimize the flood risk.

According to the original JICA M/P and F/S, water levels of Tich River are estimated at +8.0 m, +8.5 m, +9.5 m and 10.0 m for the return periods of 5 years, 10 years, 50 years and 100 years respectively. Serious inundation by the overflow from the Tich River is rare since the average ground level of HHTP is higher than 10.0m.

(3) Sector Development Plan

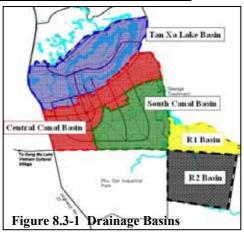
The land preparation plan is formulated on the basis of the road and the drainage development plans. The land grading volume is estimated on the assumption that the land grading elevations are the same as the planned road elevations. As a result, the work volume summarized in table below was estimated.

Item	Phase-1	Phase-2
1. Land filling	4.4 mill. m^3	8.9 mill. M ³
2. Land fill and cut	4.9 mill. m ³	5.9 mill. M^3

 Table 8.3-2
 Earth Work Volume of HHTP Development

In this study, the entire HHTP area is divided into 5 basins, the Tan Xa Lake basin, Central Canal basin, South Canal basin, and R1 and R2 basins as shown in Figure 8.3-1. Storm water which is collected by drainage facilities in each basin in the HHTP area is discharged into Tich River in the east side of HHTP.

According to the brief site investigation of the study area, it is difficult to find the boundary of the water sheds, especially for



the undeveloped area. However, at least, it is necessary that the discharge points such as at Tan Xa Lake, Central Canal, South Canal and Tich River should be maintained in order that the storm water can be discharged to the outside of the HHTP project boundary even after the land preparation is completed. The drainage system for each basin is shown in Figures 8.3-2, 8.3-3, 8.3-4.

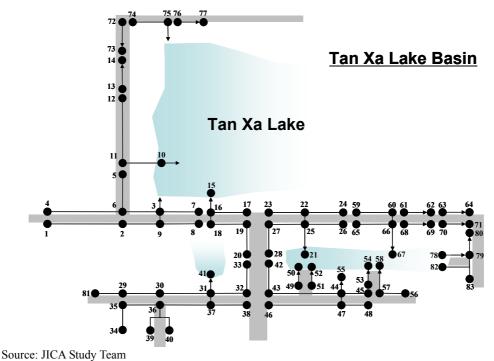
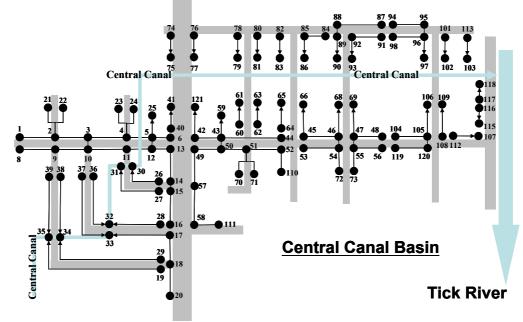
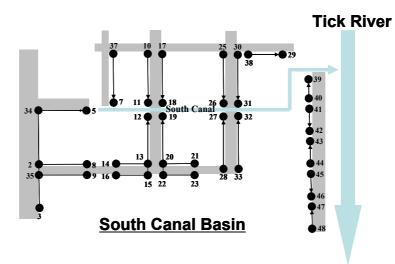


Figure 8.3-2 Drainage System of Tan Xa Lake Basin



Source: JICA Study Team

Figure 8.3-3 Drainage System of Central Canal Basin



Source: JICA Study Team Figure 8.3-4 Drainage System of South Canal Basin

An outline of the required drainage system is given in the table below.

Table 8.3-3 Outline of Drainage System

Item	Phase-1	Phase-2 only
1. Drainage System	46.7 km	13.7 km

(4) Development Issues

Land preparation has been completed for 31.5 ha of land of Stage-1 together with the infrastructure such as drainage. However, the capacity of the drainage system is too small based on the Original Master Plan and also on the Updated Master Plan. To avoid inland flooding, the existing drainage ditches must be demolished and replaced with ones of sufficient capacity.

8.3.2 Road and Transportation System

(1) Sector Development Missions, Strategies and Goals

Mission, strategy and goals for the road and transportation system are as stated below:

Missions	 To provide transportation functions to support various kinds of activities in the HHTP To provide spatial functions for other infrastructures including water, sewerage, drainage, electricity, and communications
Strategies	 To design roads and lanes leaving enough space and flexibility for later adjustment and redevelopment. To separate traffic flow of different types of users for safer, more comfortable transportation. To include some roads located outside the HHTP gates for comprehensive road development. To reinforce connectivity with external transportation infrastructure, especially, Lang-Hoa Lac Highway To provide enough space under the roads for utilities leaving flexibility for future development and maintenance. To develop some important zonal roads along with the internal roads for reasonable, comprehensive utility infrastructure networks.
Goals	-To complete the development of road and transportation as the most basic infrastructure of the HHTP by 2012 for Phase-1 and by 2020 for Phase-2.

Table 8.3-4 Missions, Strategies and Goals for Road and Transportation System

(2) Planning Framework

For planning purposes, transportation can be classified into external and internal transportation infrastructures. For the HHTP, it is important to be linked with the external transportation infrastructure, which consists of the existing Lang-Hoa Lac highway and future Urban Mass Rapid Transit Line 3.

Travel demand has been projected for the gateway trunk roads which will connect two interchanges and three HHTP gates. Projection of the traffic volume is based on the planned population of the HHTP. In addition, future characteristics of travel in the Hanoi Metropolitan Area projected in HAIDEP including trip rates, mode shares, and occupancy rates are taken into consideration as shown in Table 3.3-2. Excluding public transport, future daily traffic volume on the gateway trunk roads is estimated at around 34,000 PCU per day for 2015 and around 74,000 PCU per day for 2020.

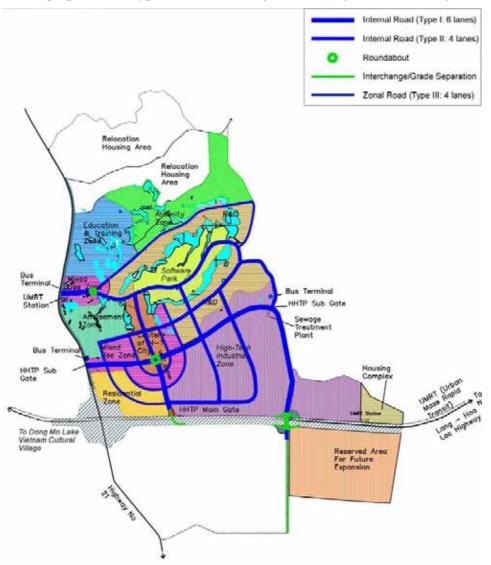
The following criteria have been used to define the internal road infrastructure of the HHTP:

- Main roads in the HHTP that traverse and connect different zones of land use (except for residential zones);
- Roads in the HHTP that are expected to serve major traffic to and from outside the HHTP; or
- Roads that are outside the HHTP boundary but are dedicated mainly to the traffic to and from the HHTP.

In the HHTP master plan, it is important to make safe, comfortable road and transportation plans for all users including residents, visitors, workers, students, and

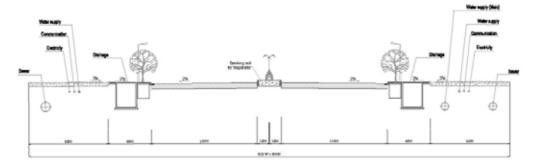
heavy vehicles. In line with their major means of transport and their major destinations in the HHTP, proper separation of those different types of traffic should be considered. As such, it is preferable to limit the use of the main gate to only passenger cars that are used by visitors to and residents in the HHTP. Trucks and trailers should use only the eastern sub-gate which is the closest to the High-tech Industrial Zone.

A layout plan for the internal road system for HHTP is shown in Figure 8.3-5 and typical sections of proposed road types are shown in Figure 8.3-6, Figure 8.3-7 and Figure 8.3-8.



Source: JICA Study Team

Figure 8.3-5 Layout Plan for Road System



Source: JICA Study Team

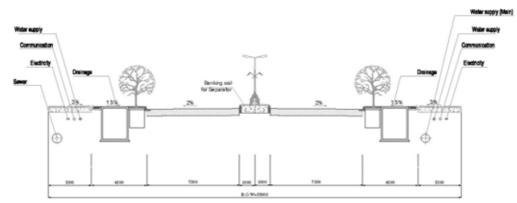
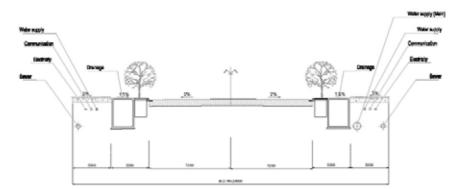


Figure 8.3-6 Typical Cross Section of Road Type I

Figure 8.3-7 Typical Cross Section of Road Type II



Source: JICA Study Team

Figure 8.3-8 Typical Cross Section of Road Type III

An interchange/grade separation which directly connects the frontage roads of Lang-Hoa Lac Highway and the gates to the HHTP could also be included as internal road infrastructure because most trips between Hanoi and the HHTP are planned to be made through the interchange/grade separation dedicated for the HHTP.¹ There are two possible locations: one (KM28+971) in front of the HHTP main gate and the other (KM27+000) connecting with the eastern sub-gate of the HHTP. The former is a simple grade separation providing a ramp from the HHTP toward the direction of Hanoi.

As for public transport, conventional bus services (except for company buses) should end at one of the three bus terminals that are planned beside the gates, and the passengers should take shuttle buses that are provided by the HHTP. For this, at least three shuttle bus routes are proposed. Each route should connect two of the three bus terminals and the routes should eventually cover most of the areas in the HHTP. Those shuttle buses should also serve as feeder bus services for future UMRT lines connecting with Hanoi.

An outline of the road system is shown in the table below.

Source: JICA Study Team

¹ The interchange(s) can also be shared with the Phu Cat Industrial Park.

Item	Phase-1	Phase-2 only
1. Road type I	4.2 km	-
2. Road type II	7.0 km	2.0 km
3. Road type III	8.0 km	1.4 km
4. Bridge	12 units	2 units
5. Grade Separation (overpass)	1 unit	-
6. Interchange (underpass)	1 unit	-

 Table 8.3-5
 Outline of Road and Transportation System

(4) Development Issues

Further study is necessary to determine the structure and design of interchange and grade separation. It should also be noted that the structure and design should have only a marginal influence on UMRT Line 3, which may be designed and constructed later as a road or rail-based transport system using the reserved zone within the right-of-way of the Lang-Hoa Lac Highway.

8.3.3 Water Supply System

(1) Sector Development Missions, Strategies and Goals

Mission, strategy and goals for the water supply system are as stated below:

Missions	To maintain excellent water quality, which meets the Vietnamese standards. To supply sufficient quantity, which meets the demands of end users.
	To provide adequate water pressure, which meets the demands of end users.
Strategies	To plan a flexible system, which can continue to supply water in case of internal (inside HHTP) or external (outside HHTP) accidents in order to provide sufficient water quantity even in case of accident. To plan a strong and durable system, which can provide excellent water quality
	 and sufficient water quantity. To plan a hydraulically effective system, which can utilize the water pressure of DWSP in order to provide adequate water pressure. To plan a simple system, which can facilitate the operation and minimize the maintenance work in order to provide stability of water quantity and pressure.
Goals	-To complete the development of the HHTP water supply system by 2012 for Phase-1 and by 2020 for Phase-2.

Table 8.3-6 Missions, Strategies and Goals for Water Supply System

(2) Planning Framework

Unit demands were primarily determined based on Vietnamese standard [TCXDVN-33-2006], which is the latest Vietnamese standard for water supply works. However, unit demands not indicated in TCXDVN-33-2006 were determined referring to TCVN-4513-1988 and Japanese standards. As a result, water demand for Phase-1 is calculated to be 19,300 m³/day and Phase-2 is 45,200 m³/day, for a total of 64,500 m³/day that will be required for overall development.

Water quality was determined by the Da River Water Supply Project (DWSP), which is the treated water supplier to HHTP. It was planned to follow Vietnamese standard [TCXDVN-33-2006], which meets the WTO Guideline for Drinking Water Quality.

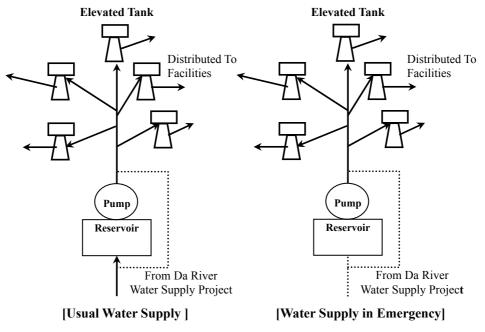
For the planning of the water supply system, water pressure of DWSP at the branch for

HHTP is an important factor, which will be about 3.98 kgf/cm². Reservoirs and elevated tanks will be arranged to maximize this water pressure and to maintain a minimum pressure of 1.50 kgf/cm².

Total capacities of the reservoirs are planned to be equivalent to 12 hours of daily maximum water consumption, which is described in the Japanese standard in order to protect the stability of supply in case of accidents. Capacity of the elevated tanks is defined to be about 30 minutes' volume at the hourly maximum water consumption rate based on the Japanese Standard for the elevated tanks.

(3) Sector Development Plan

Water from DWSP will usually be distributed via the reservoirs, pump stations and elevated tanks. If DWSP fails to supply water, water will be supplied from the reservoirs. And if there are some troubles with the reservoir or pump stations, direct water supply from DWSP is possible.



Source: JICA Study Team

Figure 8.3-9 Distribution Concept of HHTP

The layout plan for the water supply distribution system for HHTP is shown in Figure 8.3-10 and an outline of the system is given in Table 8.3-6.

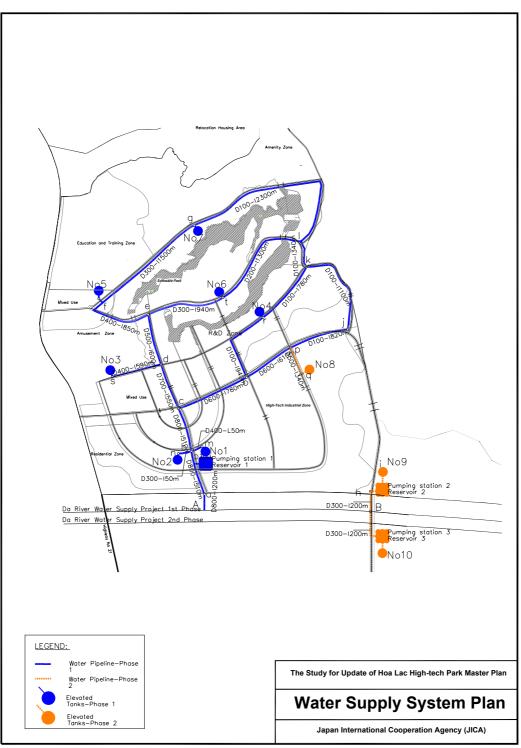




Figure 8.3-10 Water Supply Distribution Plan

Outline of the water suppy system is given in the table below.

Item	Phase-1	Phase-2 only
1. Water Supply Pipeline	16.7 km	0.9 km
2. Reservoirs	1 unit	2 unit
3. Pumping Facilities	1 unit	2 unit
4. Elevated Water Tanks	7 units	3 units

(4) Development Issues

Water demand for Phase-1 (19,300 m^3/day) is larger than the amount of planned supply volume from DWSP (12,000 m^3/day). Moreover, the branch pipe from the main water transmission pipeline is shared with Phu Cat Industrial Zone; therefore available water quantity for HHTP will be less than 12,000 m^3/day . To ensure the quantity and the security of the water supply, it is necessary to request a separate branch pipe with sufficient pipe size to carry the required water volume to DWSP.

The size of the existing pipeline can not supply the future Phase-1 demand; therefore it is necessary to replace it with a pipe of sufficient size to meet the estimated consumption.

- 8.3.4 Power Supply System
 - (1) Sector Development Missions, Strategies and Goals

Missions, strategy and goals for the power supply system are as stated below:

Missions	-To enable the tenants to fully utilize computers and other sensitive electrical equipment. -To provide a non-interrupted power supply.
Strategies	 To establish a reliable power supply network including the whole system from power station to distribution line. To request that EVN provide a 220kV Transmission Line as a power source for the HHTP power supply. To request that EVN provide a direct power supply from the power plant.
Goals	-To complete the development of the power supply system for the HHTP by 2012 for Phase-1 and by 2020 for Phase-2.

Table 8.3-8 Missions, Strategies and Goals for Power Supply System

(2) Planning Framework

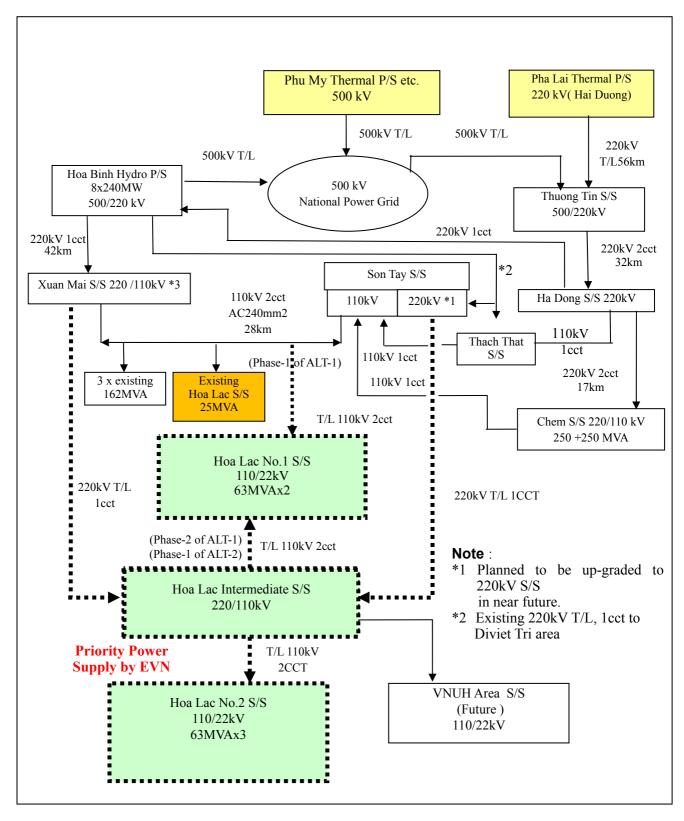
Based on the nature of various categories of demands in the High-Tech Park, maximum demands are estimated to be 60 MVA for Phase-1 and 197 MVA after Phase-2. Considering the necessity of a 33% capacity margin for the operation of the transformers, the required capacity of the transformers will be 79 MVA for Phase-1 and 263 MVA after Phase-2.

Hoa Binh Hydro Power Station will generally be supplying power to HHTP, however during power generation shortages in the dry season, Pha Lai Coal Thermal Power Station will cover and supply the power through the national power grid line. The reliability of the current power supply system is not bad even though a "non-interrupted power supply" can not be guaranteed.

(3) Sector Development Plan

For Phase-1 development, based on the estimated demand and practical methods of transformer load sharing in Vietnam, two (2) 63 MVA 110 kV transformers will be installed according to EVN recommendations at Hoa Lac No.1 sub-station (S/S). One transformer can be a stand-by. This S/S is supplied through an existing 110 kV 2cct transmission line (T/L) from Xuan Mai S/S and Son Tai S/S. From this line, a new 110 kV branch line will be constructed to Hoa Lac No.1 S/S. The substation should be equipped with double BUS-BARs for the 110 kV and 22 kV systems for changing over

for maintenance work.



Source: JICA Study Team Figure 8.3-11 HHTP Power Supply Network Scheme Including National Power Grid

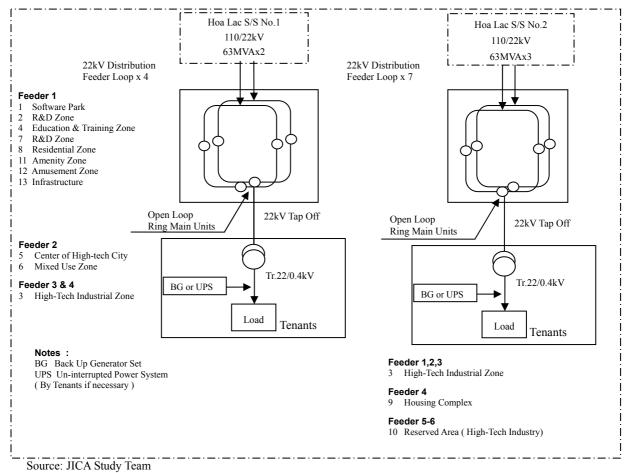
For Phase-2 development, to accommodate the estimated huge demand, Hoa Lac No.2 S/S of 110/22 kV is to be constructed together with an intermediate substation of 220/110 kV. Estimated increase of 137 MVA after Phase-1 is to be shared with three 63 MVA transformers in Hoa Lac No.2 S/S.

A new 220/110 kV intermediate substation for regional power supply together with a 220 kV T/L to Xuan Mai S/S and Son Tai S/S are also to be constructed. The existing Phu Cat industrial estate and VNUH to be relocated in the adjacent area will receive electric power from this intermediate substation as well. The 110 kV T/L which is connected to Hoa Lac No.1 S/S may be changed over to this regional substation and will function as a back-up for the 220 kV lines to the regional substation.

The internal power supply system of HHTP will consist of 22 kV switching stations named the "Ring-Main Units" and 22kV cables connected to 110/22 kV Hoa Lac substations No.1 and No.2.

Steel wire armored and polyethylene sheathed (non-flammable) underground cables are recommended for the 22 kV distribution system considering appearance and safety in HHTP.

For the low voltage distribution lines in the Residential Zone and Housing Complex overhead cables are recommended for easy tapping for the small consumers. Use of colored concrete poles is recommended for such low voltage lines in view of environmental harmony.





The Study for Update of Hoa Lac High-Tech Park Master Plan Final Report, Main Report

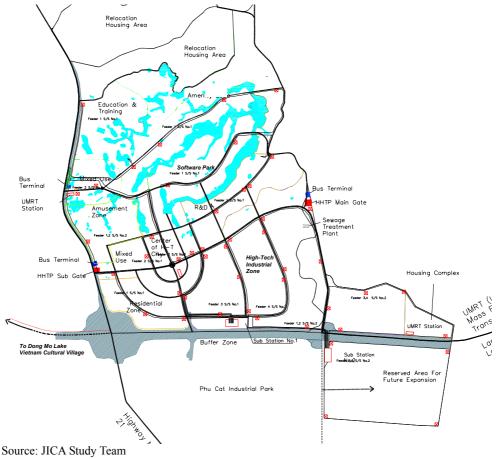


Figure 8.3-13 Plan of Power Distribution Network

Outline of road system is given in the table below.

Table 8.3-9 Outline of Power Supply System

Item	Phase-1	Phase-2
1. Power Distribution Cable	126.7 km	152.6 km
2. Sub-Station (110/35/22 kV)	1 unit (2x 63 MVA)	1 unit (3x 63 MVA)
3. Ring Main Unit	30 units	18 units

(4) Development Issues

The current 110 kV power supply line can only supply 80 MVA as a maximum. Considering the reliability and maximum capacity of the current system, it is recommended to have a 220 kV power supply with construction of a 220/110 kV substation in Phase-1 stage as described in detail in Section 5 of the Supporting Report Volume-I.

The existing sub-station of 25 MVA will need to have power cut during its expansion work due to lack of a "double bus or transfer bus system" which can connect the additional transformer without stoppage of the present transformer. Considering the system composition, capacity and space of the existing sub-station, it is necessary to construct a new sub-station to avoid a power cut during expansion works to meet future demand. Therefore, it is recommended that the existing Hoa Lac sub-station with 25MVA transformer should be used as it is without any expansion or up-grading as long as the power demand can be covered with this transformer and then to utilize it as a back-up system in the future.

8.3.5 Telecommunication System

(1) Sector Development Missions, Strategies and Goals

Mission, strategy and goals for telecommunications system are set forth as stated below:

Table 8.3-10 Missions, Strategies and Goals fo	r Telecommunication System
--	----------------------------

Missions	-To enable the tenants to fully utilize current world class internet services. -To provide a next generation telecommunications system.	
Strategies	-To provide underground space for the communication system ready for installation.	
	-To request that the provider appointed by the Government install a sufficient communication system for HHTP to.	
	-To request that the Ministry of Post and Telecommunications upgrade the capacity of the international communication (fiber-optic cable) network.	
Goals	-To complete the development of the telecommunications system of the HHTP by 2012 for Phase-1 and by 2020 for Phase-2.	

(2) Planning Framework

Installation of the telecommunications system is under the responsibility of the provider appointed by the Government. The first appointed provider is VDC, who constructed the Internet Gateway Building and planned to install a radio transmission system. However, the installation was not completed due to low demand, and the provider was replaced by VIETTEL. And within few months, VIETTEL was replaced and currently VNPT was appointed as a provider to install the telecommunications system for HHTP.

Therefore, HHTP-MB only can provide telecommunications conduits, which are now planned for nine conduits on each side of the road. Industries and businesses will mainly utilize fiber-optic cable. Domestic and other users will mainly utilize copper cable. The system design will be carried out by the provider based on the actual needs. Preliminary demand estimations are shown below.

	Phase-1		Total at end of Phase-2			
Zone	unit	unit	total line	unit d	unit	total line
		demand	demand		demand	demand
1. Software Park	25 ha	50	1,250	42 ha	50	2,100
2. R&D Zone	39 ha	50	1,950	81 ha	50	4,050
3. High-Tech IZ	140 ha	2	280	340 ha	2	680
4. E&T Zone	58 ha	4	232	100 ha	4	400
5. Center of HT City	140 ha	50	7,000	175 ha	50	8,750
6. Mixed Use Zone	158 ha	50	7,900	210 ha	50	10,500
7. Residential Zone	4,500	1/5	900	15,000	1/5	3,000
	pop			pop		
8. Housing Complex	-	1/5	-	8,000	1/5	1,600
				рор		
9. Reserved Area	-	2	-	180 ha	2	360
10. Amenity Zone	200	1/5	40	1,200	1/5	240
	рор			рор		
11. Amusement Zone	2,000	1/5	400	6,000	1/5	1,200
	рор			рор		
TOTAL			19,952			32,880

 Table 8.3-11
 Demand Estimation for Telecommunications Lines

Outline of the telecommunications system which will be carried out by HHTP-MB is

summarized in table below.

Item	Phase-1	Phase-2 only
1. Telecommunications Conduits	46.7 km	13.7 km

(3) Development Issues

To secure the activities in HHTP, the current world class internet services listed below are required.

- Fiber-optic cable with 100 Mbps speed, e.g. FTTH, for down and up-loading and ADSL (copper cable) with 50 Mbps speed for down-loading and 12 Mbps for up-loading are minimum requirement for a while.
- It is necessary to consider future expansion to 1 Gbps FTTH together with reinforcement of international telecommunication lines.
- It is desirable to introduce a next generation wireless broadband system such as 3G and/or WiMAX for a complementary use to cable network.
- Information, database and security system services.
- System solution services for the tenants as requested.

8.3.6 Sewerage System

(1) Sector Development Missions, Strategies and Goals

Missions, strategies and goals for the sewerage system plan are set forth as stated below:

Missions	To create a sanitary urban environment which enables people in HHTP to work creatively and live healthy lives.To protect the natural environment surrounding HHTP from the impact of various activities in HHTP.
Strategies	 To plan a collection system with sufficient capacity that can remove waste water efficiently and reliably from the urban area in order to maintain a sanitary living and working environment. To plan a strong and durable water treatment system that can ensure proper discharge water quality in order to conserve the environment. To plan a simple system that can facilitate the operation and minimize the maintenance work in order to secure the reliability of the entire sewerage system.
Goals	- To complete the development of sewerage system of the HHTP by 2012 for Phase-1 and by 2020 for Phase-2.

Table 8.3-13 Missions, Strategies and Goals for Sewerage System

(2) Planning Framework

In the Original Master Plan, the sewerage system including the sewage collection system and sewage treatment plant was planned to be used for both HHTP and VNUH from the view point of economical infrastructural development. However, since VNUH was planned to develop their infrastructure independently, the Updated Master Plan only considered the demand of HHTP.

Daily maximum sewage volume which will determine the capacity of the sewage treatment plant is estimated to be $13,600 \text{ m}^3$ for Phase-1 and $48,400 \text{ m}^3$ at the end of Phase-2. An hourly maximum factor is adopted for design of the collection system including sewer pipes and pump stations.

It is not economical for HHTP to provide high-grade treatment processes to remove specific substances that could be discharged into the sewage by each enterprise within the park. Therefore, if a tenant enterprise generates sewage that contains metal, hazardous or toxic substances at higher concentrations than the discharge water quality standard (TCVN 5945-2005) Class A, it is obligated to have its own treatment plant. Water quality examinations should be implemented at the discharge point of each enterprise in the High-Tech Industrial Zone and Research and Development Zone periodically.

(3) Sector Development Plan

The currently operating Sewage Treatment Plant No. 1 (STP1) will cover the area on the north side of the Lang – Hoa Lac Highway and the proposed Sewage Treatment Plant No. 2 (STP2) will cover the area on the south side of the Lang – Hoa Lac Highway. STP2 is planned in order to avoid sewer pipes crossing the 140 m wide Lang-Hoa Lac Highway, considering the time and cost for construction and maintenance works.

A layout plan of the collection systems is shown in Figure 8.3-15. The pipelines at the river and lake crossing points will be put on planned bridges. However, at the point of the existing bridges, additional new aqueduct bridges should be considered because the existing bridges may not be able to endure the load of the pipes and water.

An outline of sewerage system is given in the table below.

Item	Phase-1	Phase-2 only
1. Sewer Lines	25.3 km	6.1 km
2. Pumping Stations	6 units	8 units
3. Sewage Treatment Plants	Expansion of STP1	Expansion of STP1
	(8,500 m3/d)	(25,500 m3/d) &
		New STP2
		(9,000 m3/d)

 Table 8.3-14
 Outline of Sewerage System

(4) Development Issues

Capacity and depth of the sewer lines that have already been installed for the 200 ha of Stage-1 can not cover the overall HHTP development demand, due to lack of consideration on the final figure of overall development during their design. Therefore, it will be required to replace all existing sewer pipes.

