MINISTRY OF INDUSTRY AND COMMERCE (MOIC) JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PREPARATORY SURVEY ON INDUSTRIAL ZONE DEVELOPMENT IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

FINAL REPORT

EXECUTIVE SUMMARY



JUNE 2010

NIPPON KOEI CO., LTD. INTERNATIONAL DEVELOPMENT CENTER OF JAPAN MINTECH CONSULTANTS INC.



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THE EXCHANGE RATES USED IN THE REPORT ARE: USD 1 = JPY 90.52 LAK 1 = JPY 0.01



Survey Area for a Basic Plan (Whole of the Lao PDR)

PREFACE

Based on an agreement with the Government of the Lao People's Democratic Republic (Lao PDR), Japan International Corporation Agency (JICA) decided to conduct the "Preparatory Survey on Industrial Zone Development in the Lao PDR", aiming at the enhancement of the industrial sector in the country.

JICA dispatched a survey team which was headed by Mr. Nobuhiro OSHIMA, Nippon Koei Co., Ltd., to the Lao PDR between February 2009 and April 2010.

In cooperation with the Laotian counterpart, JICA Survey Team conducted the survey which consists of (1) formulating a basic plan for the integrated industrial development at national level, (2) formulating a conceptual design for each of the three industrial parks in Vientiane, Savannakhet, and Pakse, and (3) conducting a feasibility study (F/S) for the industrial park in Vientiane, through discussions with the relevant officials of the Government of the Lao PDR. Upon returning to Japan, JICA survey team finalized all the survey tasks, and then prepared and delivered the present report.

I hope that the this report will contribute to the promotion of the industrial development in the Lao PDR and to the enhancement of friendship between the two countries.

Finally, I wish to express my sincere appreciation to those who participated in and cooperated to the survey.

June 2010

Atsuro KURODA Vice President Japan International Corporation Agency June 2010

Mr. Atsuro KURODA

Vice President Japan International Corporation Agency Tokyo

Letter of Transmittal

Dear Sir,

We are pleased to formally submit herewith the final report of the "Preparatory Survey on Industrial Zone Development in the Lao PDR".

This report includes the whole results of the survey which was conducted in the Lao PDR, in Japan, and in the third countries which are Thailand and Vietnam between February 2009 and June 2010 by a consortium consisting of Nippon Koei Co., Ltd. International Development Center of Japan, and Mintech Consultants Inc.

We would like to express our sincere appreciation and deep gratitude to your agency, the Government of the Lao PDR including the main Laotian counterpart, Ministry of Industry and Commerce (MoIC), and all other organizations and private persons who extended their extensive assistance to JICA Survey Team throughout the survey period. Thanks to the close cooperation and kind attention we benefited from these organizations and persons, we believe firmly that we could be rewarded with fruitful results which are mainly composed of (1) a basic plan for the integrated industrial development at national level, (2) a conceptual design for each of the three industrial parks in Vientiane Capital, Savannakhet, and Pakse, and (3) a feasibility study (F/S) for the industrial park in Vientiane Capital

We hope that the present report will contribute to promoting the industrial development in the Lao PDR and to the enhancement of friendly relations between the two countries.

Very truly yours,

Nobuhiro OSHIMA

Team Leader The Survey Team for The "Preparatory Survey on Industrial Zone Development in the Lao PDR"

Preparatory Survey on Industrial Zone Development in the Lao People's Democratic Republic

Final Report

EXECUTIVE SUMMARY

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List of Abbreviations

450-YR	450 Year Road
ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
AISP	ASEAN Integrated System of Preferences
ASEAN	Association of Southeast Asian Nations
BOI	Board of Investment
BPS	Bit Per Second
BRICs	Brazil, Russia, India, China
CA	Concession Agreement
CBR	California Bearing Ratio
CBTA	Cross Boarder Transport Agreements
CCA	Common Control Area
CDR	Crude Death Rate
CEPT	Common Effective Preferential Tariff
CIQ	Customs, Immigration and Quarantine
CLMV	the four newer ASEAN members consisting of Cambodia, Laos, Myanmar and
	Vietnam
CPI	Consumer Price Index
CPMI	Committee for Promotion and Management of Investment
D/D	Detailed Design
DDFI	Department for Promotion and Management of Domestic and Foreign Investment
DHUP	Department of Hosing and Urban Planning
DMS	Detailed Measurement Survey
DOF	Department of Forestry, Ministry of Agriculture and Forestry
DoIC	Division of Industry and Commerce
DoS	Department of Statistics, Ministry of Planning and Investment
DPI	Department for Planning and Investment
DPRA	Development Project Responsible Agency
DR	District Road Number
EA	Environmental Assessment
ECC	Environmental Compliance Certificate
EDL	Electricité du Laos
EIA	Environmental Impact Assessment
EMDP	Ethnic Minority Development Plan
EMP	Environmental Monitoring Plan

EPZ	Export Processing Zone
ESCC	Environmental and Social Compliance Certificate
ESIA	Environmental and Social Impact Assessment
ESIAD	Department of Environmental and Social Impact Assessment
ETL	Enterprise of Telecommunications Lao
EU	European Union
F/S	Feasibility Study
FDI	Foreign Direct Investment
FIA	Foreign Investment Agency
FTZ	Free Trade Zone
FY	Fiscal Year
GDP	Gross Domestic Product
GEL	General Exception List
GMS	Greater Mekong Sub-region
GPS	Global Positing System
GRDP	Gross Regional Domestic Product
GSP	General System of Preference
HQO	Head Quarter's Office
HS	Harmonized System
IE	Industrial Estate
IEAT	Industrial Estate Authority of Thailand
IEE	Initial Environmental Evaluation
IEZ	Industrial Estate Zone
IL	Inclusion List
IMF	International Monetary Fund
IP	Industrial Park
IPZ	Import Processing Zone
ISA	Initial Social Assessment
ISO	International Organization for Standardization
JBIC	Japan Bank for International Cooperation
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JIT	Just-In-Time
JST	JICA Survey Team
LACR	Land Acquisition and Compensation Report
Lao PDR	Lao People's Democratic Republic
LCL	Less Container Load

LDC	Least Development Country
LIEPDA	Laos Industrial Estate Promotion and Development Authority
LMA	Land Management Authority
LNCCI	Lao National Chamber of Commerce and Industry
LPCD	Liter Per Capita Day
MAF	Ministry of Agriculture and Forestry
M/M	Minutes of Meeting
MDGs	Millennium Development Goals
MLW	Ministry of Labor and Social Welfare
MoF	Ministry of Finance
MoIC	Ministry of Industry and Commerce
MoPI	Ministry of Planning and Investment
MOU	Memorandum of Understanding
M/P	Master plan
MPI	Ministry of Planning and Investment
MPWT	Ministry of Public Works and Transport
MSL	Mean Sea Level
NEC	National Environmental Committee
NEM	New Economic Mechanism
NGPES	National Growth and Poverty Eradication Strategy
NPC	Nam Papa UAD
NPS	Nam Papa Savannakhet
NPSEs	Nam Papa State Owned Enterprises
NPVC	Nam Papa Vientiane Capital
NR-	National Road Number
NSEDP	National Socio-Economic Development Plan
NTFPs	Non-Timber forest Products
O&M	Operation and Maintenance
O&M	Operation & Maintenance
OBOI	Office of the Board of Investment
ODA	Official Development Assistance
OSU	One-Stop-Service Unit
PAHs	Project Affected Households
PAPs	Project-affected peoples
PD	Project owner must submit project Description
PDA	Project Development Agreement
PI	Public Involvement

PIs	Public Involvements
PM	Prime Minister
РМО	Prime Minister's Office
PMU	Project Management Unit
PPA	Power Purchase Agreement
PPP	Public Private Partnership
R&D	Research and Development
RAP	Resettlement Action Plan
S/W	Scope of Work
SA	Social Assessment
SASEZ	Savan-Seno Special Economic Zone
SC	Steering Committee
SDH	Synchronous Digital Hierarchy
SED	Social and Environment Division
SEMC	Social and Environment Management Committee
SEZ	Special Economic Zone
SEZA	Savan-Seno Special Economic Zone Authority
SIDA	Swedish International Development Cooperation Agency
SL	Sensitive List
SOG	Secretariat of Government
SPT	Standard Penetration Test
STEA	Science, Technology and Environment Agency
STM	Synchronous Transport Module
ТА	Technical Assistance
TEL	Temporary Exclusion List
TFR	Total Fertility Rate
TOR	Term of Reference
UDAA	Urban Development and Administration Authority
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization
USD	United States Dollar
UXO	Unexploded Ordinance
VAT	Value-Added Tax
VEPZ	Vientiane EPZ
VIP	Vientiane Industrial Park
VIPA	Vientiane Industrial Park Authority
VIZ	Vientiane Industrial Zone

VLP	Vientiane Logistics Park
VMI	Vendor Management Inventory
VUDAA	Vientiane Urban Development and Administration Authority
WASA	Water Supply Authority
WREA	Water Resources and Environment Agency
WREO	Office of Water Resources and Environment Administration
WSD	Water Supply Division
WSRC	Water Supply Regulatory Committee
WSRO	Water Supply Regulatory Office
WTO	World Trade Organization
WTPs	Water Treatment Plants

INTRODUCTION

Background

Being a landlocked country and confronted with a lot of geographical difficulties, the Lao People's Democratic Republic (hereinafter referred to as "the Lao PDR") is quite disadvantaged in terms of international economic activities. Moreover, natural resources exploitation and human resources development are retarded in the Lao PDR, which is a main reason why it remains one of the most underdeveloped countries in Asia when it comes to developing industry sector. However, thanks to the transportation networking of the east-west and the north-south economic corridors which is ongoing under the Greater Mekong Sub-region (GMS) design, the Lao PDR have just begun to succeed in changing disadvantages into advantages, metamorphosing from an "isolated landlocked country" to an "important crossroads of regional transportation".

The Government of the Lao PDR focuses on importance of economic competitiveness, improvement of economic infrastructure, enhancement of market economy, industrial build-up, and, making the most of the nation's opportunities and comparative advantages within the framework of the existing international organizations, such as Association of Southeast Asian Nations (ASEAN), World Trade Organization (WTO), etc. Though the existence of industrial parks is considered important for economic development, there are no integrated industrial laws or organizations in charge of industrial development at national level which are necessary for balanced economic advancement.

In this context, it is important to formulate a basic plan for the integrated development of industry at national level. At the same time, the conceptual design for an industrial park is needed in main cities such as Vientiane Capital, Savannakhet and Pakse, according to the basic plan for industrial development. With a view to realizing the scheme in the capital city, a feasibility study (F/S) shall be also carried out, as a part of the Survey, for the industrial park in Vientiane Capital.

Objectives

The main objectives of the Survey are as follows:

- (1) To formulate a basic plan for the integrated development of industry at national level,
- (2) To formulate a conceptual design for each of the three industrial parks in Vientiane Capital, Savannakhet and Pakse, and
- (3) To execute a Feasibility Study (F/S) for the industrial park in Vientiane Capital to be implemented by a potential fund of Official Development Assistance (ODA) scheme.

Survey Area

The Survey area for a basic plan covers the whole of the Lao PDR. The basic plan aims at providing a general policy and essential features for industrialization of the country (See Figure on the next page). Then, the conceptual design for an industrial park will be formulated in Vientiane Capital, in Savannakhet, and in Pakse. Finally, a feasibility study (F/S) will be carried out for the industrial park in Vientiane Capital.



Survey Area for a Basic Plan (Whole of the Lao PDR)

Structure of the Draft Final Report

The Draft Final Report consists of three parts as follows.

- Part-I National Industrial Development

The integrated development of industry at national level is planned in this part. This part also includes a socioeconomic projection, the aspect of legal & institutional system, and the result of an investment demand survey.

- Part-II Industrial Estate Development in Vientiane Capital, Savannakhet and Champasak

Priority regions for industrial estate development are selected. A basic industrial estate development plan is formulated for each of the three (3) selected regions, which are Vientiane Capital, Savannakhet and Champasak (Pakse).

- Part-III Feasibility Study for Vientiane Industrial Park

In Vientiane Capital, which is considered as the area with the first priority for industrial estate development, a feasibility study is conducted for the 1st stage of VIP (Vientiane Industrial Park).

PART I NATIONAL INDUSTRIAL DEVELOPMENT

1 NATIONAL ECONOMY AND INDUSTRIAL SECTOR

1.1 National Economy

The Lao economy has grown rapidly in recent years. The growth rate of the real GDP was 6.9% per annum on the average during 2000 and 2006. In this period, GDP per capita increased from USD 342 to USD 613. This growth was brought mainly by the industrial sector.

As shown in Table 1.1.1, during the period of 2000-2006, average growth rate of real GDP was 5.5% for the agricultural sector, 6.4% for the service sector, and 12.3% for the industrial sector. Compared with other sectors, the industrial sector has been sustaining high GDP growth rate.

Table 1.1.1. GDT Growth by Sector					
Saator	Growth Rate	GDP at Constant 1990 Price(Million Kip)			
Sector	2000-2006	2000	Estimate 2006		
Agriculture	5.5%	583,591	702,242	42.3%	
Industry	12.3%	254,283	525,050	31.7%	
Services	6.4%	281,491	415,497	25.0%	
Import Duties	14.1%	7,749	16,114	1.0%	
GDP at Market Price	6.9%	1,127,114	1,658,903	100.0%	

Table 1.1.1: GDP Growth by Sector

Note: Agriculture includes crops, livestock & fishery, and forestry. Industry includes mining & quarrying, manufacturing, construction, and electricity.

Sources: National Statistics Center, CPI

1.2 Industrial Sector

The GDP share of each industrial sector in 1990 and 2006 is as shown in Table 1.2.1. The mining and quarrying industries show a remarkable growth. The ratio of "mining & quarrying" to the total industrial sector significantly increased from 1.0% to 16.8% during the period from 1990 to 2006. This remarkable increase is attributed to the copper and gold exploitation at Sepon Mine in Savannakhet Province, which started in 2003.

	Sector	1990	2006
Industry		100.0%	100.0%
	Mining & Quarrying	1.0%	16.8%
	Manufacturing	68.6%	64.8%
	Construction	20.3%	10.2%
	Electricity	10.0%	8.1%

Table 1.2.1: GDP Share in the Industrial Sector in 1990 and 2006

Sources: National Statistics Center, CPI

(1) Manufacturing Industry

Table 1.2.2 shows the factory classification in the Lao PDR. The number of Level 3 (small-scale) factories accounted for 94.4% of the total. About 66% of the Level 1 (large-scale) factories are located in Vientiane Capital.

Iubic In	Tuble 1.2.2. I detory Develo in the Duo I DR					
Sector	Level 1	Level 2	Level 3			
Total Labor Force	> 200	51-200	10-50			
Machines' Horse Power	> 200	51-200	5-50			
Environmental Impact	Large	Middle	Small			
0 I I D '	T 1 .					

Table 1.2.2: Factory Levels in the Lao PDR

Source: Law on the Processing Industry

Figure 1.2.1 shows the number of factory employees by region. As of 2008, Vientiane Capital has the largest number of factory employees in the nation, accounting for 41% of the total number. The second largest is the Central Region (30%), followed by the Northern Region (17%) and the Southern Region (12%).



Figure 1.2.1: Number of Factory Employees by Region (2008)

(2) Mining and Quarrying Industry

The Lao PDR has rich but underexploited mineral resources such as tin, coal, zinc, copper, gold, silver, gypsum, sulfur, and sapphire.

Table 1.2.3 shows the changes in the mineral production volume during the period of 2000 - 2007. The Government of the Lao PDR has been encouraging mining exploitation of the country, giving concessions to a number of foreign companies.

	Table 1.2.5. While at Resource 1 founction during 2000-2007								
Product	Unit	2000	2001	2002	2003	2004	2005	2006	2007
Lead	Tons	470	816	615	840	668	787	809	1,109
Barite	1000 tons	3	4	6	4	14	14	7	1
Coal Lignite	1000 tons	300	210	270	250	300	320	319	682
Stink Coal	Tons	253	230	100	41				
Gypsum	1000 tons	190	150	99	98	236	239	206	232
Gravel	1000.m ³	460	640	665	690	850	900	900	943
Sand	$1000.m^{3}$	300	483	520	535	800	850	700	920
Coal Anthracite	1000 tons	-	-	31	41	46	51	62	80
Zinc	Tons	-	-	4,000	6,000	11,000	10,000	4,000	12,116
Limestone	Tons	-	-	100	100	410	420	430	450,000
Gold	kg	-	-	-	8,900	7,000	10,134	11,915	8,207
Copper	Tons	-	-	-	-	-	31,000	60,758	62,621
Tin	Tons	-	-	-	-	-	2,571	2,249	2,350

Table 1.2.3: Mineral Resource Production during 2000-2007

Source: Ministry of Industry and Handicrafts

2 INDUSTRIAL DEVELOPMENT FRAMEWORK

2.1 Demographic Framework

Table 2.1.1 and Figure 2.1.1 show population projections re-calculated by the JICA Survey Team (JST), based on two scenarios, one is the "normal scenario of the Steering Committee (SC scenario)" and the other is the "medium variant of UN Population Division (UN scenario)".

Table 2.1.1. Topulation Trojection until 2025						
	Scenarios	2005	2010	2015	2020	2025
Population (000 persons)	SC	5,622	6,231	6,802	7,262	7,586
	UN	5,622	6,133	6,696	7,286	7,874
Annual average population	SC		2.1	1.8	1.3	0.9
growth rate (%)	UN		1.8	1.8	1.7	1.6

 Table 2.1.1: Population Projection until 2025

Source: JICA Survey Team



Figure 2.1.1: Population Projection Scenarios

In the UN medium scenario, the total fertility rate (TFR) will drop by 0.8 point, from 3.5 in 2005-10 to 2.7 in 2020-25. Annual growth rate is also estimated to drop from 1.8 to 1.6 percent, and population will be 7.8 million in 2025. In the SC scenario, annual growth rate will drop rapidly from 2.1% in

2010 to 0.9% in 2025 due to the rapid decrease of the TFR, which will be 2.1 in 2020. Estimated population is larger than in the UN scenario until 2020 but loses the lead after that. Population in 2025 is 7.6 million in this scenario.

In the two population growth scenarios, JST selects the UN scenario as the optimum. Considering the stage of economic development of the Lao PDR in 2025, the assumption of the SC scenario that TFR drops to 2.1 in 2020 seems to be a premature assumption, and the slowdown of the growth ratio after 2020 seems to be drastic. On the other hand, the pace of drop of the population growth rate and the population growth observed in Figure 2.1.1 of the UN scenario looks natural and the most likely outcome.

2.2 Economic Development Framework

2.2.1 Three Development Scenarios

In order to set the GDP growth projection, JST prepared the following three GDP development scenarios: (i) high growth, (ii) moderate growth, and (iii) low growth as indicated in Table 2.2.1 and Figure 2.2.1. In the high growth scenario, GDP growth rate will accelerate and record higher growth rate than in recent years; in the moderate growth scenario, it will follow the current growth rate, and in the low growth scenario, GDP growth rate will slow down and record lower growth rate than in recent years.

Growth rate of each scenario changes among 2009-10, 2011-2020 and 2021-2025. Due to the global financial crisis since October 2008, it is expected that the world GDP growth will be limited in 2009 and 2010. After 2011, most countries, including the Lao PDR, are expected to return to the original economic growth pass.

In general, the GDP growth rate will be saturated in accordance with maturation of economic activities. Thus, the GDP growth rate forecast in 2021-25 will be more moderate than the growth rate in 2011-2020.

				(Unit: percent)
	2009	2010	2011-20	2021-25
High Growth Scenario	5.5	6.0	9.0	8.5
Moderate Growth Scenario	5.5	6.0	7.5	7.0
Low Growth Scenario	5.5	6.0	6.0	5.5
Comment HCA Comment Terror				

Source: JICA Survey Team

In the low growth scenario in Table 2.2.1, GDP growth rates will record 6.0% in 2011-20, and slow down to 5.5% in 2021-2025. The growth rates in this scenario is at the lowest level of economic performance after 1990, and the possibility to follow this scenario is not high; however, it would occur in case the Lao government does not implement any reform to invite foreign direct investment (FDI) and stimulate economic activity, or if there will be limited FDI because of extensive and prolonged stagnation of the economy.

Even if the Lao PDR follows the low growth scenario, it can still achieve its target of the national vision 2020, and graduate from its least developing country (LDC) status in terms of income per capita. As indicated in Figure 2.2.1, GDP per capita of the minimum scenario will reach USD 1,450 in 2020.

The values from the high growth and moderate growth scenarios are USD 1,920 and USD 1,671, respectively. In order to graduate from LDC, GNI^1 per capita have to exceed USD 900.



Source: JICA Survey Team Figure 2.2.1: Change of GDP per Capita in the Three Scenarios

2.2.2 Selection of the Optimum Scenario

The JST selects the moderate growth scenario based on past performance, consistency of GDP growth projections by donors, and the necessary investment amount to achieve each GDP growth target.

2.2.3 Industrial Composition and Growth Rates of Sectors

In 2008, the percentage share of each economic sector was 32% for agriculture, 28% for industry and 40% for service². In line with the accelerated economic development, agriculture is expected to lose its share. On the other hand, industry and service will generally increase their shares. Experiences of the surrounding countries show the same trend. Based on observed growth rate of each industry and the performance of the surrounding countries, JST set the percentage share of the sectors to change to 20% agriculture, 41% industry and 39% service in 2020, and 20.0%, 35.0 and 45.0% respectively, in 2025 (Table 2.2.2).

		0		•	(Unit: percent
	GDP at Factor Cost (billion LAK)	GDP Growth Rate	Agriculture	Industry	Service
2008	43,125	7.8	32	28	40
2015	69,236	7.5	24	34	39
2020	99,397	7.5	20	41	39
2025	139,409	7.0	17	45	38

 Table 2.2.2: Change of Industrial Component

Source: Statistical Yearbook 2008; JST

¹ Gross National Income (GNI) is calculated as Gross Domestic Product plus net income from foreign countries. In case of Lao PDR, money remittance by foreign labors is plus factor, and dividend and interest to foreign investors and financial institutions are minus factor for GNI. According to the World Development Indicators (WDI) 2009, GNI per capita (Atlas method) of Lao PDR was USD 740 in 2008. Considering the gap between GDP and GNI per capita, the GNI per capita would be over USD 900 even if the GDP growth would follow the low growth scenario.

² Classification of industries is based on ISIC Rev3. For example, agricultural processing industry is classified as 15 "Manufacture of food and beverage" under manufacturing.

Table 2.2.3 indicates the annual growth rates of agriculture, industry and service.

			(Unit: percent)		
	Agriculture	Industry	Service		
2009-10	1.6	9.0	5.5		
2011-20	3.3	10.8	7.3		
2021-25	3.6	9.6	6.4		
ource: IICA Survey Team					

Tabla	2 2 3.	Crowth	Pates	പ	Industrias
Table	2.2.3:	Growin	Kates	oı	industries

Source: JICA Survey Team

2.3 **Industrial Development Framework**

Bases of the development framework are listed below:

- Target year of 2015 for short-term and 2025 for mid-long term. 1)
- Required industrial area development is estimated based on the demographic framework 2) (number of employment) and the Japanese Guideline for Industrial Estate Planning (JGIEP) prepared by the Regional Development Corporation, 1980.
- Direction of industrial sector development is decided based on labor productivity. 3)

According to JGIEP, the average required employee per hectare is 81.7 persons. As a result, the required industrial area to be developed after 2010 was estimated as presented in Table 2.3.1.

Table 2.3.1: Required Industrial Development Area (ha; rounded figure)

	<u> </u>	~			
2015	2025				
1,370	5,120				
Source: JICA Survey Team					

To achieve the above target, it is necessary to improve the industrial sector, which is currently focused on the garment/apparel industry, through the following two methods:

- (i) Enhance the value-added on the garment/apparel industry; and
- (ii) Diversify the industrial sector to value-added industries, such as electricity parts and precision equipment.

3 **BASIC PLAN OF INDUSTRIAL DEVELOPMENT**

Formulation of Basic Plan 3.1

The basic plan for industrial development is formulated by the flow shown in Figure 3.1.1.

The current situations of national economy and the industrial sector are analyzed in Chapter 1 (Part I). Then, the industrial development framework is set up for various aspects as described in Chapter 2 (Part I). Investment demand based on a questionnaire survey is analyzed as presented in Chapter 3 (Part I).

The potential industries for the country are discussed hereunder in light of its strengths and weaknesses for industrial development as well as other factors previously discussed.



Figure 3.1.1: Flow for Formulating the Industrial Development Basic Plan

3.2 Strengths and Weaknesses of the Lao PDR

The strengths and the weaknesses of the Lao PDR are as summarized in Table 3.2.1.

Table 3.2.1: Strengths and Weaknesses of the Lao PDR					
Strengths	Weaknesses and Measures				
1. Political Stability and Well-Maintained Public Order	1. Small Domestic Market				
2. Gentle Character of Lao People	2. Difficult Recruitment				
3. Low Labor Cost	3. Complicated and Unclear Procedure for Export and				
4. Inexpensive Electricity	Import				
5. Abundant Mineral Resources	4. Expensive Transportation Costs				
6. Abundant Crops	5. Insufficient Financial Infrastructure				
7. Similarity in Language and Culture to Thailand	6. Weak Export Competitiveness Due to Appreciation of				
8. Close Relations with Vietnam	Кір				
9. Trade Preference Systems	-				

Source: JICA Survey Team

3.3 Potential Industries

Potential industries in the Lao PDR are as follows:

- Labor-Intensive Industries
- Power-Consuming Industries
- Mineral Resource-Based Industries
- Environment-Related Industries
- Food and Beverage Industries
- Wood and Furniture Industries
- Airport Site-Oriented Industries
- Handicraft Industries

3.4 Strategic Industrial Location

From the standpoint of strategic location, industrial estate development is considered in three major industrialization centers in the Lao PDR: Vientiane Capital, Savannakhet and Champasak (See Figure 3.4.1.



Figure 3.4.1: Strategic Industrial Location

PART II INDUSTRIAL ESTATE DEVELOPMENT IN VIENTIANE CAPITAL, SAVANNAKHET AND CHAMPASAK

4 INDUSTRIAL ESTATE DEVELOPMENT

4.1 Necessity of Industrial Estate Development in the Lao PDR

In Japan, industrial estates or parks have been developed in the past for the purpose of allocating only production facilities. At present, however, supporting facilities for factories, such as those for logistics, operation, and R&D, are also planned with a view to improving the efficiency of production activities. In addition, some industrial parks have been provided with residential and commercial areas for those who work in the park.

A single generic term "industrial estate" is given to all industrial parks specified by types of industry, scale and activity concept. In other words, there are various types of specialized estates: "food processing estate", "machinery and metal estate", "toy industrial estate", "SME (small and medium enterprise) estate", "wholesale estate", "techno park", "soft park", "high-tech park", and so on. Export processing zones (EPZ) and special economic zones (SEZ) are also regarded as different types of specialized estate in terms of production system and policy. To sum up, an industrial estate can be defined as a cluster of land development project equipped with requisite infrastructure to facilitate effective daily production activities.

An industrial park will bring benefits to related stakeholders, especially to the region and investors, as summarized below:

- (1) Effects on Local Communities:
 - Efficient infrastructure development is expected at an early stage;
 - The ripple effects such as creation of the supporting industries as well as services outside of the industrial estate is expected through the formulation of industrial clusters;
 - Improvement of fiscal balance via incremental tax revenue, as well as creation of employment is expected; and
 - Balanced land use is expected by preventing mixed development of factory and housing areas.
- (2) Effects on Investors:
 - Commencement of operation is committed (reliable business plan);
 - Procedures and negotiations for land acquisition, which are the huge burden for independent location, are not required:
 - Negotiations for land acquisition as well as public meetings with local residents regarding land development are not necessary;
 - Preparation period prior to operation is much shorter due to the equipped infrastructure; and
 - Miscellaneous cost and problems that generally occur when infrastructure is developed independently are not assumed.

- Increased profits via industrial clustering as well as the possibility for the establishment of support industries are expected;
- Common facilities and amenities are available in the industrial estate;
- Creation of service industries is expected in the surrounding areas; and
- Minimal problems or troubles with the local residents are anticipated.

Fundamentally, the above-mentioned benefits can also be expected in other developing countries. The construction of an industrial estate contributes to the reduction of both cost and time needed for infrastructure development, which is beneficial for regional authorities and the local community. Moreover, for the investing companies, especially FDI, it is expected that the various risks in developing infrastructure by themselves are alleviated, and a definite business plan can be prepared since the start of operation is assured. In some countries, supporting policies for business operation by the government like one-stop services are also available, and such policies are indispensable for speedy procedures of import/ export as well as transparency of customs.

4.2 Potential Regions for Industrial Estate Development

As described in Section 3.4 (Executive Summary), the Lao PDR has several potential regions for industrial estate development. These are all mainly urbanized areas in the Lao PDR, with comparatively large populations: Vientiane, Savannakhet, Pakse, Thakek, Luang Prabang, and Luang Namtha.

Furthermore, the "Sixth Five-Year Industry and Commerce Development Plan (2006-2010)" clearly states that among these urbanized areas, priority should be especially given to three areas; Vientiane, Savannakhet and Pakse, in order to introduce industrial zones and enhance FDI promotion.

In this context, it can be concluded that the three focal points, namely, Vientiane, Savannakhet and Pakse, should be developed strategically by priority of selection with the view to making the best use of local advantages.

It is therefore recommended for the government of the Lao PDR to ensure that industrial estates to be developed have distinct advantages compared with those of the neighboring countries that have better access to seaports.

All of the following conditions are necessary to attract foreign investors:

- Low land lease price
- Sufficient infrastructure such as electricity, water supply, roads, telecommunication, and rental factories, warehouses, and machinery
- Formulated regulations for business establishment
- High quality service for import-export
- Labor and services to support business such as customs office, banking, insurance, logistic transport, advertising, raw materials, supply equipment, food, living environment, healthcare and welfare.

Highly competitive industrial bases need to be developed in the three economic centers with the view to accelerate the industrialization of the whole country.

5 CONCEPTUAL PLAN FOR INDUSTRIAL ESTATE DEVELOPMENT IN VIENTIANE CAPITAL

5.1 Development Framework

The bases of the development framework are listed below:

- 1) Target year of 2015 for short-term and 2025 for mid-long term;
- 2) The required industrial estate area based on the macro economic framework, particularly the number of employment, as confirmed by the result of the demand survey; and
- 3) Japanese Guideline for Industrial Estate Planning (JGIEP).

5.2 Other Planned Industrial Estate Development

A Taiwanese developer is planning to construct an industrial estate in the village of Nonthong, Xaythany District, which is located to the east of the Vientiane Industrial Zone (VIZ). A joint agreement on the development was signed between the Ministry of Planning and Investment (MPI) and Nam Wei Development Co. Ltd. on October 30, 2009.

The industrial estate, with a total area of 110 ha, will consist of factories, a shopping center, trade buildings, vocational institutions, schools, a hospital and a hotel. The project is named "Vientiane Capital Industrial and Trade Area (VITA Park)" and expected to be a model of an "industrial and trade area" in the Lao PDR.

Details of the project contents, including the exact development area, are not clear yet. A feasibility study will be conducted at the next stage.

5.3 Infrastructure Development Plan

Public infrastructure demands for the industrial zone development in Vientiane are estimated based on the determined development framework (required industrial zone area) and interested industrial sector (investment demand survey result). The preliminary estimation results are as summarized in Table 5.3.1 below.

Iau	Table 5.5.1. Demand Estimation for the vientiane industrial Zone Development					
	Demands	2015	2025			
Ind	ustrial Zone Development Area	130 ha	690 ha			
1. Water Supply (m ³ /d)		7,000	58,000			
2. Wastewater (m^3/d)		5,600	46,400			
3. Solid Waste (ton/d)		175	1,500			
4. Power Supply (MW)		28	148			
5.	Communication (Mbps)	72	1,010			

Table 5.3.1: Demand Estimation for the Vientiane Industrial Zone Development

Source: JICA Survey Team

Infrastructure development concepts to supply the above demands are as proposed in Table 5.3.2.

-	Sector	2015	2025			
1.	Water Supply	The demand of 7,000 m^3/d will be supplied by	Necessary to construct a new treatment plant to			
		the new treatment plant in Nam Papa.	supply the additional $51,000 \text{ m}^3/\text{d}$ demand.			
		However, it is necessary to expand the pipeline	Vietnamese developers are looking forward to			
		from the Sea Game Stadium for about 12 km.	expand their business based on the actual			
			consumption demand.			
2.	Wastewater	Considering the cost impact and O&M	In case public a wastewater system is			
		experience, the wastewater is currently	established, it is recommended to connect the			
		proposed to be treated by each factory.	sewer lines of the further development areas to			
			the public system.			
3.	Solid Waste	Effluence of 175 ton/d solid waste can be	Additional 1,325 ton/d solid waste also can be			
		treated by UDAA at the current disposal site.	treated by UDAA at current disposal site.			
		Toxic waste should be preliminary treated by	Incase of UDAA develop toxicity waste			
		the individual factory's own facility.	treatment plant, the factory can discuss and			
			made a contract directly.			
4.	Power Supply	Initial demand of 28 MW can be supplied from	It is recommended to install an internal			
		the external sub-station located within VIZ by	sub-station operated and managed by EDL			
		installing an additional transformer. However,	which will supply only to the Vientiane			
		considering the security of the power quantity	Industrial Zone.			
		and quality for the investor, it is recommended				
		to construct the zone's own sub-station.				
5.	Communication	The factory/investor will make a contract	directly with its own service provider. A			
		communication switching station already exists w	vithin the Vientiane Industrial Zone.			

Table 5.3.2: Infrastructure Development Concepts

Source: JICA Survey Team

5.4 Development Roadmap

(1) Key Success Factors

Based on observation of the present conditions, the following key factors are identified for successful implementation of industrial estate development in Vientiane:

(a) Establishment of the Project Management Organization

Specific organization or department for VIZ implementation and management, including sales marketing, should be established under MoIC to accelerate the industrial zone development.

(b) Prompt Implementation of the Industrial Estate Development

Development planning, feasibility study, land acquisition, detailed design and construction works shall be conducted for the industrial estate implementation.

Selection of the strategic location for the stage-wise development of VIZ is also a major factor for the success launching of the development. The trend of urban development, relevant infrastructures project and land acquisition issues are necessary to be considered during the selection.

(c) Determination and Recognition by the LAO PDR of the Vientiane Industrial Park (VIP) as a National Project

To accelerate the implementation and provide the best incentives to the investors, the project is suggested to be determined and recognized as a national project. Moreover, development target of VIP should also be determined to make it different from the private project.

(d) Secure Sufficient Labor Force for the Investors

To promote foreign investment, adequate qualified labor should be secured by providing training facilities or services and housing/living environment to the labor force for their comfortable living standards.

Currently, the number of the working age population in Vientiane Capital and surrounding areas is enough for the planned industrialization. However, it is necessary to provide education to cope with the industrialization needs. It is thus required to change their way of life from agricultural/nature-based to industrial/organization-based, e.g.; to keep the time schedule.

(e) Provide the Best Public Infrastructure Services in the Country

In order to create an attractive investment environment, excellent services, competitive land prices, and public services such as water supply and sewerage treatment, should be provided with higher priority by relevant government authorities.

(2) Roadmap

The roadmap to achieve successful implementation of the VIZ development and its investor attractions is summarized in Figure 5.4.1.



Source: JICA Survey Team

Figure 5.4.1: Roadmap for Successful Implementation of Industrial Development in Vientiane Capital

6 INDUSTRIAL ESTATE DEVELOPMENT IN SAVANNAKHET

6.1 Infrastructure Development Plan

Public infrastructure demands for the industrial zone development in Savannakhet are estimated based on the determined development framework (required industrial zone area) and interested industrial sector (investment demand survey result). The preliminary estimation results are summarized in Table 6.1.1.

	Demands	2015	2025
Industrial Zone Development Area		100 ha	490 ha
1.	Water Supply (m ³ /d)	8,890	43,560
2.	Wastewater (m^3/d)	6,220	30,490
3.	Solid Waste (ton/d)	250	1,230
4.	Power Supply (MW)	21	103
5.	Communication (Mbps)	56	272

 Table 6.1.1: Estimated Demand for the Savannakhet Industrial Zone Development

Source: JICA Survey Team

Estimated demand above was confirmed with Savan Park's developer. The proposed infrastructure development concepts to supply these demands are presented in Table 6.1.2 below.

	Sector	2015	2025
1.	Water Supply	Demand of 8,890 m^3/d will be supplied by up-rating the existing treatment plant of Nam Papa. Nam Papa already pledged to the developer to supply for the Phase-1 development.	Necessary to construct a new treatment plant utilizing water from the Mekong River to supply an additional $34,670 \text{ m}^3/\text{d}$ demand. Currently, a private firm offered to establish a new company with Nam Papa for the water supply expansion business.
2.	Wastewater	Considering the cost impact and O&M experience, wastewater is currently proposed to be treated by each factory. It is recommended for SEZA to establish the effluent water monitoring system.	In case a public wastewater system is established, it is recommended to connect the sewer line of further development areas to the public system.
3.	Solid Waste	Effluence of 250 ton/d solid waste can be treated by UDAA at the current disposal site. Toxic waste should be preliminary treated by factory itself.	Additional 1,230 ton/d solid waste can also be treated by UDAA at the current disposal site. In case UDAA will develop a toxic waste treatment plant, the individual factories can discuss and directly sign a contract.
4.	Power Supply	Initial demand of 21 MW is planned to be supplied from external sub-station. EDL ready to make a contract with the factories individually. Power line installation space for EDL already secured by the developer.	It is recommended to install an internal sub-station operated and managed by EDL which will supply power to only Savan Park.
5.	Communication	The factory/investor will make a contract dir Communication line installation space already se	ectly with its own preferred service provider. cured by the developer.

 Table 6.1.2: Infrastructure Development Concepts

Source: JICA Survey Team

6.2 Development Roadmap

(1) Key Success Factors

Based on the observation of present conditions, the following key factors are identified for successful implementation of industrial estate development in Savannakhet.

(a) Concentration on Savan Park for Industrial Estate Development

The total area of Savan Park is more than enough to cover the industrialization demand for the short term (year 2015) target. Other industry-related developments in surrounding areas without any countermeasure will bring about deterioration of the investment climate such as price war among the industrial estate due to the over demand. Consequently, the government of Savannakhet Province is recommended to regulate other similar development projects in the surrounding area and concentrate to give priority to Savan Park development to accelerate attraction of investors.

(b) Governmental Support to Savan Park Project

Savan Park is also one of the national projects under the Prime Minister Office (PMO). Therefore, supporting activities to make this project successful are obligations of all relevant government authorities. These government support activities are not limited to public infrastructure services such as water supply, etc., but should include taxation and customs incentives.

(c) Coordination among Other Special Economic Zone Projects

The Savan-Seno SEZ consists of Site A (Savan City for housing and urban functions), Site B (as logistics center), Site C (Savan Park for industrial and commercial functions) and Site D (as resettlement area for Site A). To achieve the harmonious development of the city, coordination and cooperation among the projects are necessary inline to create interaction on investor's attraction.

(d) Maximization of the Developer's Experience on Sales Marketing and Operation

One of the key factors for the success of industrial development is the prompt and earnest investment promotion to investors. Investor coordination does not end after conclusion of the MOU or contract agreement; it is necessary to support investors until their factories and activities are fully operational.

Savan Park has been managed by a joint venture company between the government and a Malaysian developer who has experience on industrial estate development and operation. Therefore, it is suggested to maximize their past experiences to provide better services to the investors.

(e) Secure Quantity of Qualified Labor

The labor issue is the one of the important factors for investment decisions, especially for FDI. To accelerate FDI promotion, it is necessary to relieve their fears by presenting labor problem countermeasures such as employment support services, and development of housing and supporting functions for the betterment of their living standards.

(f) Implementation of the East-West Economic Corridor Improvement Project

By implementation of the East-West Economic Corridor Improvement Project, it is expected that the physical accessibility to Danang as the nearest seaport will be improved, mainly through road upgrading. Customs procedure time should likewise be shortened.

(2) Roadmap

The roadmap to achieve successful implementation of the Savan Park development and is summarized in Figure 6.2.1.



Source: JICA Survey Team

Figure 6.2.1: Roadmap for Successful Implementation of Industrial Development in Savannakhet

7 CONCEPTUAL PLAN FOR INDUSTRIAL ESTATE DEVELOPMENT IN CHAMPASAK

7.1 Infrastructure Development Plan

Public infrastructure demands for the industrial estate development in Champasak (Pakse) are estimated based on the development framework (required industrial zone area) and interested industrial sector (investment demand survey result). The preliminary estimation results are summarized in Table 7.1.1 below.

Table 7.1.1: Demand Estimation for the Champasak (Pakse) Industrial Zone Development

	Demands	2015	2025
Ind	ustrial Estate Development Area	70 ha	330 ha
1.	Water Supply (m^3/d)	7,450	35,110
2.	Wastewater (m^3/d)	5,210	24,580
3.	Solid Waste (ton/d)	67	314
4.	Power Supply (MW)	8	35
5.	Communication (Mbps)	39	183

Source: JICA Survey Team

Infrastructure development concepts to supply above demands are as proposed in Table 7.1.2.

		Table 7.1.2: Infrastructure Develo	pment Concepts
	Sector	2015	2025
1.	Water Supply	Overall water supply demand can be cover	ered by groundwater resources. To minimize the
		financial impact both for the investors and d	eveloper, a private well is most preferable. In this
		case, maximum conservation of existing	trees and installation of monitoring well are
		recommended. Moreover, it may be no	ecessary to regulate the maximum groundwater
		abstraction volume per area in the industrial	estate by law or construction guideline.
2.	Wastewater	Considering cost impact and O&M experies	nce, wastewater is currently proposed to be treated
		by each factory. DoIC is recommended to es	stablish the effluent water monitoring system.
3.	Solid Waste	Solid waste from the industrial can be treated	ed by UDAA at current disposal site. Toxic waste
		should be preliminary treated by each factor	у.
4.	Power Supply	Initial demand is planned to be supplied	It is recommended to install an internal
		from the external sub-station. EDL	sub-station operated and managed by EDL, which
		already have a contract with all existing	will supply power only to the
		factories individually. Power line was	Bachiang/Pathoumphon Industrial Estate.
		and will be installed by EDL.	
5.	Communication	The factory/investor will make a con	tract directly with its own service provider.
		Communication line installation space alread	dy secured by the developer.

Table 7.1.2: Infrastructure Development Concepts

Source: JICA Survey Team

7.2 Development Roadmap

(1) Key Success Factor

Based on the observation of present conditions, the following key factors are identified for the successful implementation of industrial estate development in Champasak.

(a) Concentration on Bachiang/Pathoumphon Industrial Zone (BPIZ) Development

The area of BPIZ is more than enough to cover the industrialization demand for the short term (year 2015) target. Similar development in surrounding area without any countermeasures will bring about deterioration of the investment climate and a price war among the industrial estates due to the over demand. Consequently, it is recommended for the Government of Champasak Province to concentrate on its support to private development to accelerate industrial estate development and attract investors

(b) Revision of the Industrial Zone Development Plan Based on the Existing and Future Investors' Needs

It is necessary to conduct a demand survey for infrastructure improvement and cost-sharing of the existing investors. Based on the survey result and the feasibility study done by a Vietnamese developer for an area of 500 ha, the infrastructure development policy for occupied and vacant areas should be arranged to meet investment demand.

(c) Secure Quantity of Qualify Labor

The labor issue is the one of the important factor for investment decision, especially for FDI. To accelerate FDI promotion, it is necessary to allay the labor sector's fears by presenting countermeasures, such as employment support services, development of housing and other supporting social amenities for better labor living standards.

(d) Improvement of Investor Supporting Services

Coordination among related government agencies is necessary to create a better investment climate, in terms of approved investments and information management related to the factory operation.

(2) Roadmap

The roadmap to achieve successful implementation of the Vietnamese industrial estate development and promote investor attraction is summarized in Figure 7.2.1.



Source: JICA Survey Team

Figure 7.2.1: Roadmap for Successful Implementation of Industrial Development in Champasak

8 SELECTION PROCESS OF THE PRIORITY REGION FOR THE FIRST INDUSTRIAL ESTATE IN THE LAO PDR

The analyses discussed in the preceding sections can be summarized as shown in Table 8.1.1. It is Vientiane which ranks above the other two regions for all the valuation bases. Hence, it is concluded that Vientiane is selected as the priority region for the implementation of an industrial park.

	14310 011110 5 41111141 5 0			
**	Valuation Basis	Vientiane *	Savannakhet	Pakse (Champasak)
1	Population	3	2	1
2	Investment Trend	3	2	1
3	Air Route Accessibility	3	1	2
4	Basic Social Services	3	1	1
	Total	12 points	6 points	5 points

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* "Vientiane" = "Vientiane Capital" + "Vientiane Province"

** Rating

Note:

1 Population: In order of demographic size, 3 points, 2 points, and 1 point

2 Investment Trend: In order of attractiveness to foreign investors, 3 points, 2 points, and 1 point

3 Air Route Accessibility: In order of convenience, 3 points, 2 points, and 1 point

4 Basic Social Services: Best in the country = 3 points, Much less adequate when compared with the "Best" = 1 point

Source: JICA Survey Team

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PART III FEASIBILITY STUDY FOR VIENTIANE INDUSTRIAL PARK

9 RATIONALE FOR INDUSTRIAL PARK DEVELOPMENT IN VIENTIANE

9.1 Development Framework

The industrial estate development target figures were settled by JST based on the comparison between two records: the macro framework estimation (labor population) and results from the investment demand survey conducted through the study. The larger figure was taken for both target years. As a result, the target figure for year 2015 was determined based on the result of the demand survey, and the target figure for year 2025 was determined based on the macro framework estimation. In summary, the industrial estate areas to be developed are as shown in Figure 9.1.1.

Table 9.1.1: Industrial Estates Areas to Be Develo	oped by 2015 and 2025
--	-----------------------

2015	2	2025
130 ha	690 ha	(+560 ha)

The necessity to develop an overall Vientiane Industrial Zone with total area of 2,000 ha will be after year 2025.

9.2 **Position of a Feasibility Study Site**

The location of the VIZ, which has an area of 2,000 hectares is shown in Figure 9.2.1. The VIZ area was officially zoned as 'industrial' by the government of the Lao PDR when the Vientiane Master Plan for 2010 was elaborated.



Figure 9.2.1: Location of the Vientiane Industrial Zone



Through the valuation process, the south side was selected as the site for Stage-1, as shown in Figure 1.4.4. A feasibility study for this first stage development was carried out.

Figure 9.2.2: Location of the F/S Site

10 BASIC CONCEPT FOR THE VIP DEVELOPMENT

10.1 Key to Success

Beneficial effects such as employment creation and industrialization are not realized by only designating the land as an industrial estate. Unless the industrial estate is attractive to manufacturers, it has a little chance of success.

The key to successful industrial estate projects is customer satisfaction. Customer satisfaction requires a lot of efforts to be exerted by the project implementation body. In order to achieve customer satisfaction, it is essential that the industrial estate meet the five conditions illustrated in Figure 2.1.1.



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Executive Summary - 20

10.1.1 Location

Good location is the most important condition for the industrial estate development.

Vientiane Capital has been selected as the industrial estate site for the feasibility study, in consideration of good access to fresh air, good living environment for foreign experts, and proximity to the central government for facilitating procedures.

10.1.2 Incentive

The government needs to grant incentives for encouraging manufacturing sectors to invest to the industrial estate. Such incentives, which include profit tax, import customs duty, various subsidies, and preferential treatment for various procedures, should be better than those offered by the neighboring countries. It is crucially important for the government to stipulate the concrete incentives in the decree for the specific industrial estate.

10.1.3 Infrastructure

Manufacturers need various infrastructures such as roads, power supply, water supply, sewerage, drainage and solid waste facilities. Industrial estate needs to provide all the required infrastructures, although important infrastructures depend on the tenants. Such infrastructures in the industrial estate need to be connected with public infrastructures. Public infrastructures are required to be developed together with the internal infrastructures in the case of VIP, because it is not available in its adjacent area.

10.1.4 Labor Force

Manufacturers emphasize the existence of labor force satisfying quality, quantity, and labor cost conditions.

In the case of VIP, a considerable labor force is needed to be employed from outside the commuting distance. It is recommended that the project implementation body should develop a residential site and invite investors to build apartments for laborers traveling from outside the commuting distance.

It is also recommended that the project implementation body should build and operate a training center to educate laborers regarding the way of living in the city, factory rules, and skills at the tenants' request.

10.1.5 Organization of Project Implementation

The investors, especially foreign investors, face many problems in order to construct factories and keep them in operation. Management organization of industrial estate needs to satisfy the investors by providing guidance and assistance to keep the investors' business running smoothly.

Besides, the management organization needs to conduct overseas marketing actively, because they cannot draw so much FDI by just waiting for foreign investors' site visit.

10.2 Zoning Concept for VIP

VIP consists of two areas that have different functions from each other as illustrated in Figure 10.1.1.



Source: JICA Survey Team

Figure 10.2.1: Zoning Concept for the VIP

10.3 Functions and Zoning Policy for Vientiane Industrial Park

Judging from the fact that the Vientiane Industrial Park is planned to cover an area of no less than 845 ha by 2025, different functions will be needed to support investors' activities and the park operation on a daily basis as shown in Table 10.2.1.

	ie 10.3.1. Zohning Categories Necessary for vientia	ille filluusti fai f al K
Zoning Category	Function	Permitted Buildings/ Uses
1. Industrial Area	"Industrial" is the main function of Vientiane Industrial	Factory
	Park. Investors will construct factories and/or	Infrastructure that will be commonly
	warehouses together with their offices in the industrial	used among investors' factories/
	area.	warehouses
		Industrial Park Management office
2. Residential Area	"Residential" is the second important function after	House
	"Industrial", as more and more workers will live in the	Apartment
	industrial park in the future. The residential area will	Social infrastructure (clinics, schools,
	provide those who live in the industrial park with good	etc)
	living environment together with the necessary social	Limited number of small stores
	services.	
3. Commercial Area	"Commercial" is a function that meets the shopping	Commercial building (stores, shopping
	demand of those who live inside and outside the	centers, restaurants, etc)
	industrial park. Office buildings and research &	Office
	development institutions can also be constructed in the	Research & development institution
	commercial area.	Conference hall
Logistics Area	"Logistics" is a function necessary for shipment of	Logistics center
	products that are manufactured in the industrial park. A	Bus terminal
	bus terminal can also be constructed in this area for	
	commuters' or residents' movement convenience.	
5. Amenity Area	"Amenity" is a function necessary to create	Park
	comfortable living conditions for those who work	Waterways
	and/or live in the industrial park. Amenity areas, which	Buffer greenery
	include parks, waterways, greenery, etc., will be	
	properly positioned in or between other zoning areas. A	
	part of the amenity areas can be a reserved space for	
	internal main road extension in the future.	

Table 10.3.1: Zoning Categories Necessary for Vientiane Industrial Park

Source: JICA Survey Team

10.4 Stage-wise Vientiane Industrial Park Development Plan

The recommended development phasing and framework for Vientiane Industrial Park are shown in Figure 10.3.1.

The first and second target years are set to be 2015 and 2025, respectively. The development area for each target year was figured out based on the result of the investment demand survey: 140.0 ha for 2015, and 705.0 ha for 2025. In total, an area of 845.0 ha will be developed by 2025.



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10.5 Investments for Promotion in VIP

(1) Inducible Manufacturers

The following manufacturers are the preference as locators to the VIP:

- Manufacturing companies that generate employment and contribute to the industrialization of the country are the preferred locators inducible in VIP.
- Manufacturers are taken in by VIP without regard to capital structure (foreign, domestic or joint venture), product market (export or domestic), and raw material supply (imported or local materials).

Among other possible industries in Vientiane Capital, the following manufacturing industries have potentials as tenants in VIP as described in Part II, Section 2.4.2.

- Manufacture of parts for electrical and electronic machines and apparatus
- Metalworking and non-ferrous metal
- Food and miscellaneous daily goods
- Textile and apparel

(2) Limitation of Foreign Workers Employment

According to Article 25 of the Labor Law (No.06/NA, December 7, 2006), employment of foreign workers are limited to as follows:

- In terms of foreign blue-collar workers, the number is limited to up to 10% of the total number of workers in each establishment.
- In terms of foreign white-collar workers, the number is limited to up to 20% of the total number of workers in each establishment.

Because VIP is established for the purpose of creating employment for Lao people, the limitation of foreign workers employment should be strictly followed by the establishments.

11 VIP DEVELOPMENT PLAN

11.1 Land Use Plan

Total land area for the VIP is 140.14 ha, calculated based on the authorized land boundary. The land use plan prepared based on the above planning basis is shown in the Figure 11.1.1.



Figure 11.1.1: Land Use Plan for the VIP

The lot allocation plan for the VIP is as shown in Figure 11.1.2.



Source: JICA Survey Team

Figure 11.1.2: Lot Allocation Plan for the VIP

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Road Plan 11.2

(1) Proposed Road Alignment

The proposed road alignment based on the factory layout plan is shown in Figure 11.2.1. Total road length by type is shown in Table 11.2.1.



Source: JICA Survey Team

Figure 11.2.1: Proposed Road Alignment

From the viewpoint of traffic volume, routes A7 and A8 can be covered by road cross section Type B.

	Т	able 11	.2.1: Summa	ary of t	he Road Pla	n	
Т	YPE A	Т	YPE B	T	YPE C	T	YPE D
RO	W=52m	RO	W=32m	RO	W=20m	RO	W=15m
Road	Length (m)	Road	Length (m)	Road	Length (m)	Road	Length (m)
A1	191	B1	242	C1	60	D1	216
A2	367	B2	252	C2	95	D2	117
A3	508	B3	552	C3	60	D3	117
A4	717	B4	242	C4	95	D4	95
A5	542			C5	216		
A6	542						
A7	252						
A8	220						
total	3,339	total	1,288	total	526	total	545
					groun	d total	5 698

Source: JICA Survey Team

(2) Traffic Controls

To manage traffic, especially for the industrial area, it is proposed to have a gate and control station/post for vehicles coming in and going out of the VIP. The proposed location of the gate is shown in Figure 11.2.2. The perspective of main south gate is as shown in Figure 11.2.3.



Source: JICA Survey Team

Figure 11.2.2: Location and Elevation Plan of the Gate



Source: JICA Survey Team

Figure 11.2.3: Perspective of the Main South Gate

11.3 Storm Water Drainage Plan

Storm water in the VIP is discharged to the Mak Hiao River through the existing culverts installed at the 450 Years Road after development of the drainage system and finally discharged to the Mekong River. The proposed storm water drainage plan should cope well with the various public facilities and services, industrial lots and environmental requirements particular to the VIP. The overall storm water discharge flow diagram of VIP is presented in Figure 11.3.1.



Figure 11.3.1: Storm Water Discharge Flow Diagram

11.4 Water Supply Plan

From results of the hydraulic analysis for the water supply system, the water supply plan is proposed as shown in Figure 11.4.1. The water supply plan consists of the i) outer distribution main, ii) reservoir and water tower, iii) water supply pipeline for the industrial area, and iv) water supply pipeline for the residential area.



Source: JICA Survey Team

Figure 11.4.1: Overall Water Supply Plan

11.5 Sewerage Plan

The individual treatment system is a private self-management model consisting of industrial wastewater treatment plants with pretreatment, combined-type septic tanks (Gappei Johkaso), effluent sewers with inspection pits and treated wastewater is discharged to the planned storm water collection sewer. Finally, the treated wastewater is collected with storm water and transported to the retention ponds functioning for both flood control and inspection of water quality. This system is generally suitable for tenants with large-scale industrial estates in the case of an undeveloped area for a public sewerage system with final WWTP. VIP shall establish the monitoring system of treated wastewater quality to ensure the reliability of the individual treatment system of each tenant.

11.6 Power Supply Plan

The existing transformer capacity of the 115/22kV Khoksaad substation is not sufficient in the future. In consideration of reliability and flexibility at the time of extension, the VIP shall develop a 115/22kV substation at its time of commencement. The power supply from this new 115/22kV VIP substation shall use 22kV distribution lines. The power grid system surrounding the VIP is shown in Figure 11.6.1.



Figure 11.6.1: Power Grid System Surrounding the VIP

11.7 Telecommunication Plan

Since telecommunication demand is estimated to be 76.43 Mbps, one (1) switch station of STM1 (capacity is 155Mbps) is installed in the VIP and the trunk line is connected with STM1 under the telecommunication companies. Each tenant will be connected to the STM-1 station. The tenant will select its transmission channel, whether optical fiber cable, metallic cable or wireless LAN. The method of cable connection between the switch station and tenants is shown in Figure 11.7.1.



Source: JICA Survey Team

Figure 11.7.1: Method of Cable Connection between the Switch Station and Tenants

11.8 Solid Waste Management Plan

To ensure adequate solid waste management in the VIP, solid waste generators should enter into contracts with VUDAA, which is responsible for solid waste collection, transportation, treatment and disposal services in Vientiane Capital. An appropriate solid waste management system could be applied by VUDAA, considering the characteristics of each kind of waste. The following solid waste management enterprises are registered and trusted to collect garbage/sludge and transport to the KM32 landfill site (See Table 11.8.1).

	Lusie Litelle Hegisteren Liter prises for Sona (fuste filmingeniene		
Туре	Enterprises		
Garbage	 Waste Transport Company, 2) Cleaning and Waste Transport Company, 3) Lao Garbage Co, Ltd., Chanthabuly Cleaning Co., Ltd, 5) Saysetha District Service Center Enterprise 		
Sludge/Night Soil	1) Laphathmmavong, 2) Kob, 3) Phouviang, 4) Somyot-Phonthong, 5) Say, 6) Xuaug, 7) Somyot-Dondang, 8) Thongtoum, 9) Le		
Courses HCA Courses			

Table 11.8.1: Registered Enterprises for Solid Waste Management

Source: JICA Survey Team

11.9 Building Plan

11.9.1 Industrial Park Center (IPC)

The Industrial Park Center (IPC) is planned to be constructed at the most convenient site for users (tenants) and management of the VIP. The proposed location is on the front side, beside the main gate where all visitors will pass. The layout plan of the IPC is as shown in Figure 11.9.1. The perspectives of the IPC main and annex buildings are shown in Figures 11.9.2 and 11.9.3, respectively.



Source: JICA Survey Team

Figure 11.9.1: Layout Plan of the IPC



Source: JICA Survey Team Figure 11.9.2: Perspective of the IPC Main Building



Figure 11.9.3: Perspective of the IPC Annex Building

11.9.2 Technical Training Center (TTC)

A Technical Training Center (TTC) will be located in the residential area, at the most convenient site for the trainee and/or commuters. The layout plan of the TTC is shown in Figure 11.9.4, while the perspective is shown in Figure 11.9.5.



Source: JICA Survey Team Figure 11.9.4: Layout Plan of the TTC



Source: JICA Survey Team

Figure 11.9.5: General Perspective of the TTC

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12 OPERATION AND MANAGEMENT

The proposed organizational structure for the operation and management of the VIP is shown in Figure 12.1.1.



Source: JICA Survey Team

Figure 12.1.1: Proposed Organizational Structure for the VIP Operation and Management

At the development phase, a VIP Establishment Committee will be formed after the proposal for the VIP development has been approved by the government. This committee will be primarily responsible for completion of physical works for VIP. Under the VIP Establishment Committee, the VIP Project Management Unit (VIP-PMU) is proposed to be set up as an organization to actually carry out the responsibilities of the Committee which would function as the executive and supervisory body. At the operational phase, the establishment of a Vientiane Industrial Park Authority (VIPA) is proposed. The VIPA will consist of a Management Committee and a Management Office. The Management Committee will serve as the board of directors of VIPA while the Management Office will execute the responsibilities of the Management Committee.

Since the tasks in development phase and operational phase will be consecutive and overlapping, it is practical that the functions and personnel of VIP-PMU would seamlessly be succeeded by the VIPA Management Office.

13 PROJECT COST ESTIMATE

13.1 Procurement Plan

The contract package (CP) plan is formulated based on the: (i) present ability of the contractors, (ii) characteristics and volume of the works, (iii) minimization of the implementation period, and (iv) optimum number of the packages to reduce burden and responsibility of VIP-PMU. Based on the preliminary criteria above, the following three contract packages for the Project are proposed according to priority of construction works and arranged into the following components:

a) CP-1: Land Reclamation under International Competitive Bidding (ICB)

Cutting work	: 1,316,000 m ³
Filling work	$: 1,317,000 \text{ m}^3$

b) CP-2: Major Infrastructure Development under International Competitive Bidding (ICB)

Road length	: 5.7 km					
Drainage channel/ditch line	: 16.1 km with 2 retention ponds					
Water supply line	: 12.8 km with 2 reservoirs and a towe					
Monitoring pits for individual sewerage	: 206 units with collection sewer					
treatment system						
Telecommunication line	: 45.7 km					

c) CP-3: Power Supply System under International Competitive Bidding (ICB)

Relocation of overhead transmission line	: 4.8 km
115/22 kV substation	: 1 unit
22 kV distribution line	: 11.0 km

It is recommended that all the contract packages for the Project should be carried out through international competitive bidding (ICB) in order to ensure a reasonable price for the implementation and keep an appropriate construction period under strict and effective quality control. It is also proposed that the power supply works be separated from the other works, which are mainly civil works. This is to be package CP-3, since the characteristics of power supply works are very different from that of CP-1 and CP-2.

13.2 Project Implementation Schedule

The tentative implementation schedule is presented in Figure 13.2.1.

FAST TRACK SCHEDULE				ear	r 2	2 nd	Ye	ar	3 rd	Ye	ar	4^{th}	Ye	ar	5^{th}	Ye	ar	6^{th}	Ye	ear	7 ^t	th Y	Zear	8	th }	Yea	r 9	th Y	Tear
Application of ODA																								Τ	Π		Τ		
Establishment of VIP-PMU			Ï																					Τ	П				
EN and LA for ODA		Π				Ĩ																			Π		Τ		
Establishment of Fund Flow inside LAO PDR		П			T																				Π				
Consultant Short List & Selection of Consulta	nt						Γ										Π							Т	Π		Т		
Design Stage(1year incl. surveys)																								Τ	Π				
Land Acquisition (after FS, before DD finis	h)	П																							Π		T		
Selection (Pre-Qualification) of Contractor					Τ		Γ										Π							Т	Π		Т		
Tender Procedure (Bidding) for Constructi	on Work																							Т	Π		Τ		
Construction Stage (1.5years)	Contract Terms	Π																			Γ			Т	Π		Т		
CP-1: Land Reclamation	LCB																		Τ					Т	Π		Т		
CP-2: Major Infrastructure Development	ICB	П																						Т	Π		Τ		
CP-3: Power Supply System	ICB																				Γ			Т	Π		Т		
Establishment of VIPA Management Office		Π																	Τ					Т	Π		Т		
Marketing for the tenant/factory (after earth work)																													
Commencement of Operation																					Γ			Т	Π		Τ		
Demand (infrastructures and manpower)																		3	30%	<i>6</i>		30	%		20	%		20	%
	Legend: work					or (DD.	A	v	vor	ks b	y L	ao	PE	R		w	orks	s fo	or d	lesi	gn	, bio	ddi	ng	& (con	str	uctio

Source: JICA Survey Team

Figure 13.2.1: Implementation Schedule of the VIP Project

13.3 Project Cost Estimate

13.3.1 Composition of the Project Implementation Cost

The project cost is composed of an eligible portion and non-eligible portion as shown in Figure 13.3.1. The eligible portion consists of the construction cost and consulting service expenses, and non-eligible portion is made up of land acquisition and compensation expenses, administration cost, value added tax (VAT) and import tax.



Figure 13.3.1: Composition of Project Cost

13.3.2 Estimated Direct Construction Cost

The estimated direct construction costs for the respective contract packages are summarized in Table 13.3.1.

Contract		Direct Con	struction Cost	Total		
Package	Infrastructure	FC (JPY)	LC (LAK)	(Equivalent: JPY)		
CP-1	Land reclamation					
	I. Preparatory woks	0	4,332,000,000	43,316,000		
	II. Land reclamation	0	69,970,000,000	699,703,000		
	III. Boundary Fencing	0	8,603,000,000	86,028,000		
	IV. Gate	0	8,060,000,000	80,598,000		
	Sub-total CP-1	0	90,965,000,000	909,645,000		
CP-2	Major infrastructure development					
	I. Preparatory Works	8,245,000	4,472,000,000	52,966,000		
	II. Road and transportation system	178,977,000	41,770,000,000	596,674,000		
	III. Drainage system	170,141,000	39,694,000,000	567,079,000		
	IV. Water supply	88,649,000	20,684,000,000	295,492,000		
	V. Individual sewerage treatment system	7,582,000	1,303,000,000	20,608,000		
	VI. Telecommunication line	41,859,000	9,764,000,000	139,499,000		
	VII. Building	62,408,000	14,561,000,000	208,019,000		
	Sub-total CP-2	557,861,000	132,248,000,000	1,880,337,000		
CP-3	Power supply					
	I. Preparatory woks	9,943,000	664,000,000	16,582,000		
	II. Power supply	662,868,000	18,968,000,000	852,551,000		
	Sub-total CP-3	672,811,000	19,632,000,000	869,133,000		
	Total (CP-1, 2 and 3)	1,230,672,000	242,845,000,000	3,659,115,000		

Table 13.3.1: Direct Construction Cost

Source: JICA Survey Team

13.3.3 Estimated Consulting Service Fee

Based on the above assumption of required engineers' input, the total consulting service fee during the implementation period is estimated at JPY572 million, which consists of engineering service fee of JPY496 million and soft-component service fee of JPY76 million. The total consulting service fee corresponds to about 15.6% of the total direct construction cost.

13.3.4 Estimated Project Implementation Cost

Except for interests during implementation, the project cost is tentatively estimated through an iterative process. The estimated project implementation cost is summarized in Table 13.3.2. The total project implementation cost is estimated at about JPY7.03 billion. The project implementation cost is largely divided into two portions, namely: eligible cost for the ODA scheme portion and non-eligible cost for the Laotian government portion as shown in Table 13.3.2. The eligible and non-eligible costs are estimated at JPY5.75 billion and JPY1.28 billion, respectively.

Table 15.5.2: Project Implementation Cost								
	Proje	ect Implementation	Cost					
Component	FC	LC	TOTAL					
	(JPY 1,000)	(LAK million)	(JPY 1,000)					
I. Eligible Cost: ODA Scheme Portion	1,956,641	379,095	5,747,592					
1. Construction Cost (a+b+c)	1,437,041	360,967	5,046,715					
a. Direct Construction Cost	1,230,671	242,844	3,659,112					
b. Price Escalation	75,730	85,308	928,810					
c. Physical Contingency	130,640	32,815	458,792					
2. Consulting Service Cost (d+e+f)	519,599	18,128	700,877					
d. Direct Consulting Service Fee	448,020	12,385	571,867					
e. Price Escalation	24,343	4,095	65,294					
f. Physical Contingency	47,236	1,648	63,716					
II. Non Eligible Cost: Laotian Government Portion	0	128,161	1,281,609					
1. Land Acquisition & Compensation Cost (a+b+c)	0	57,233	572,332					
a. Direct Land Acquisition & Compensation Fee	0	47,600	476,000					
b. Price Escalation	0	4,430	44,301					
c. Physical Contingency	0	5,203	52,030					
2. Administration Cost	0	11,495	114,952					
3. VAT	0	57,476	574,759					
4. Import Tax	0	1,957	19,566					
TOTAL PROJECT COST (I + II)	1,956,641	507,256	7,029,201					

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Source: JICA Survey Team

14 FINANCIAL AND ECONOMIC EVALUATION

14.1 Financial Analysis

Table 14.1.1 indicates the calculation of NPV and FIRR for a land rate of USD1.59/m²/year. The discount rate, which is calculated from the policy interest rate of the Bank of Lao PDR (more than one week) and the rate of increase of consumer price index (CPI) from March 2009 to February 2010, is $0.29\%^3$. An NPV of JPY979 million and FIRR of 0.9% are calculated from Table 14.1.1.

					(Unit: JPY000)
Year	Cost	Revenue	Net Cash	Weight (0.29% of	Discounted Net Cash
			FIOW	discount rate)	Flow
2010	130,900		-130,900	1.00	-130,900
2011	261,800		-261,800	1.00	-261,043
2012	325,379		-325,379	0.99	-323,500
2013	2,864,634		-2,864,634	0.99	-2,839,855
2014	1,571,523		-1,571,523	0.99	-1,553,425
2015	600,400	42,979	-557,421	0.99	-549,408
2016		85,957	85,957	0.98	84,477
2017		114,610	114,610	0.98	112,310
2018		143,262	143,262	0.98	139,982
2019		143,262	143,262	0.97	139,577

Table 14.1.1: Calculation of NPV and FIRR for a Land Rent of USD1.59/m²/year

³ Policy interest rate of the Bank of Lao PDR is 5.00% as of March 2010 (<u>http://www.bol.gov.la/english/interestrate.html</u>), and rate of increase of CPI from March 2009 to February 2010 is 4.71% (<u>http://www.bol.gov.la/english/index1.php</u>). Real discount rate is calculated from 5.00% minus 4.71%.

				Weight	Discounted
Year	Cost	Revenue	Net Cash	(0.29% of	Net Cash
			Flow	discount rate)	Flow
2020		143,262	143,262	0.97	139,173
2021		143,262	143,262	0.97	138,771
2022		143,262	143,262	0.97	138,369
2023		143,262	143,262	0.96	137,969
2024		143,262	143,262	0.96	137,570
2025		143,262	143,262	0.96	137,173
2026		143.262	143.262	0.95	136,776
2027		143.262	143.262	0.95	136.380
2028		143.262	143.262	0.95	135,986
2029		143.262	143.262	0.95	135,593
2030		143,262	143.262	0.94	135,201
2031		143 262	143 262	0.94	134 810
2032		143 262	143 262	0.94	134 420
2032		143 262	143 262	0.94	134,031
2035		143,262	143,262	0.93	133,644
2035		143 262	143 262	0.93	133,011
2036		143 262	143 262	0.93	132,872
2030		143,262	143,262	0.93	132,072
2038		143,262	143,262	0.92	132,400
2030		143,262	143,262	0.92	132,103
2035		143,262	1/3 262	0.92	131,723
2040		143,262	143,202	0.92	131,342
2041		143,262	143,202	0.91	130,502
2042		143,262	143,202	0.91	130,385
2043		143,262	143,202	0.91	120,200
2044		143,262	143,202	0.91	129,829
2045		143,262	143,262	0.90	129,434
2040		143,262	143,262	0.90	129,079
2047		143,262	143,202	0.90	128,700
2048		143,262	143,202	0.90	120,554
2049		143,202	143,202	0.89	127,903
2050		143,202	143,202	0.89	127,393
2051		143,262	143,202	0.89	127,224
2052		143,202	143,202	0.89	126,050
2053		143,202	143,202	0.88	126,489
2055		143,202	143,202	0.88	120,124
2055		143,202	143,202	0.88	125,759
2050		143,202	143,202	0.88	125,393
2037		143,202	143,202	0.87	123,033
2038		143,202	143,202	0.87	124,071
2039		143,202	143,202	0.87	124,311
2000		143,202	143,202	0.8/	123,931
2001		143,262	143,262	0.86	123,393
2002		143,202	143,202	0.80	123,233
2003		143,262	143,262	0.86	122,879
2004		143,262	143,262	0.86	122,524
2005		143,262	143,262	0.85	122,169
2066		100,284	100,284	0.85	85,2/1
2007		57,505	57,305	0.85	48,586
2068		28,652	28,652	0.85	24,223
		FIRR	0.9%	NPV	978,867

Source: JICA Survey Team

In reality, land rent should be set at competitive level with potential competitors. The potential competitors in this case are industrial estates in Thailand, particularly in the north and northeast parts. As described in Appendix I 4.3, the typical land price in Thailand is indicated in Table 14.1.2.

	Sales Price (General	Estimation of Land				
Area	Industrial Estate,	Rent (50 years,	Remarks			
	USD)	USD/m ² /year)				
	25 to 60	0.70 ± 1.20	Pathum Thani, Ayutthaya, Saraburi,			
Central and west	55 10 00	0.70 to 1.20	Singburi and Ratchaburi			
East	35 to 60	0.70 to 1.20	Chonburi, Rayong and Prachiburi			
Northeast and South	25 to 27	0.50 to 0.54	Nakhon Ratchasima and Songkhla			

Fable 14.1.2	: Typical	Land Price	at Industrial	Estates in	Thailand
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Source: Compiled by JICA Survey Team based on Table I.1.8 of Appendix I 4.3 (p. Appendix I-1-14)

Since the rental period at the VIP is set at 50 years, the estimated land rents for these industrial estates are calculated by dividing the land prices by 50. The estimated rents are indicated in the 3^{rd} column of Table 14.1.2. The land rent of industrial estates in the central and eastern parts of Thailand is USD0.70 to $1.20/m^2/year$. The rent in industrial estates in the northeast and south parts of Thailand is USD0.50 to USD0.54/m²/year.

The land rent at the Savan-Seno Special Economic Zone Site C is cheaper. It is USD0.3 to USD0.7/m²/year. In light of these situations, it is necessary to set the land rent at the VIP at USD0.50/m²/year (JPY47/m²/year). Table 14.1.3 indicates the calculation of NPV and FIRR when the land rent is set at USD0.50/m²/year (JPY47/m²/year). FIRR is -2.9% and NPV amounts to -3.6 billion yen. In order to implement the VIP Project under this condition, the public sector has to disburse money from the general budget.

				Weight	Discounted
Year	Cost	Revenue	Net Cash	(0.29% of	Net Cash
			discount rate)		Flow
2010	130,900		-130,900	1.00	-130,900
2011	261,800		-261,800	1.00	-261,043
2012	325,379		-325,379	0.99	-323,500
2013	2,864,634		-2,864,634	0.99	-2,839,855
2014	1,571,523		-1,571,523	0.99	-1,553,425
2015	600,400	13,515	-586,885	0.99	-578,448
2016		27,031	27,031	0.98	26,565
2017		36,041	36,041	0.98	35,318
2018		45,051	45,051	0.98	44,019
2019		45,051	45,051	0.97	43,892
2020		45,051	45,051	0.97	43,765
2021		45,051	45,051	0.97	43,639
2022		45,051	45,051	0.97	43,512
2023		45,051	45,051	0.96	43,387
2024		45,051	45,051	0.96	43,261
2025		45,051	45,051	0.96	43,136
2026		45,051	45,051	0.95	43,011
2027		45,051	45,051	0.95	42,887
2028		45,051	45,051	0.95	42,763
2029		45,051	45,051	0.95	42,639
2030		45,051	45,051	0.94	42,516
2031		45,051	45,051	0.94	42,393
2032		45,051	45,051	0.94	42,270
2033		45,051	45,051	0.94	42,148
2034		45,051	45,051	0.93	42,026
2035		45,051	45,051	0.93	41,905
2036		45,051	45,051	0.93	41,784
2037		45,051	45,051	0.92	41,663
2038		45,051	45,051	0.92	41,542
2039		45,051	45,051	0.92	41,422

 Table 14.1.3: Calculation of NPV and FIRR for a Land Rent of USD0.50/m²/year

 (Unit: IPY 000)

Year	Cost	Revenue	Net Cash Flow Weight (0.29% of discount rate)		Discounted Net Cash Flow
2040		45,051	45,051 0.9		41,302
2041		45,051	45,051	0.91	41,183
2042		45,051	45,051	0.91	41,064
2043		45,051	45,051	0.91	40,945
2044		45,051	45,051	0.91	40,827
2045		45,051	45,051	0.90	40,709
2046		45,051	45,051	0.90	40,591
2047		45,051	45,051	0.90	40,474
2048		45,051	45,051	0.90	40,357
2049		45,051	45,051	0.89	40,240
2050		45,051	45,051	0.89	40,124
2051		45,051	45,051	0.89	40,008
2052		45,051	45,051	0.89	39,892
2053		45,051	45,051	0.88	39,776
2054		45,051	45,051	0.88	39,661
2055		45,051	45,051	0.88	39,547
2056		45,051	45,051	0.88	39,432
2057		45,051	45,051	0.87	39,318
2058		45,051	45,051	0.87	39,205
2059		45,051	45,051	0.87	39,091
2060		45,051	45,051	0.87	38,978
2061		45,051	45,051	0.86	38,866
2062		45,051	45,051	0.86	38,753
2063		45,051	45,051	0.86	38,641
2064		45,051	45,051	0.86	38,529
2065		45,051	45,051	0.85	38,418
2066		31,536	31,536	0.85	26,815
2067		18,020	18,020	0.85	15,278
2068		9,010	9,010	0.85	7,617
		FIRR	-2.9%	NPV	-3,600,065

Source: JICA Survey Team

14.2 **Economic Evaluation**

14.2.1 Methodology of Economic Analysis

Economic benefits and costs are computed as illustrated in Figure 14.2.1.





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14.2.2 Economic Benefits

(1) Economic effects of the VIP Project

The following items are identified as the economic effects of the VIP Project.

- Value added generated from factories located at the VIP,
- Increase of workers' income through increase of value added described above,
- Increase in tax revenue through increase in the pace of economic activities,
- Industrial advances such as development of modernized factories and introduction of capital-intensive manufacturing industries,
- Development of support industries, including small and medium enterprises,
- Enhancement of policy and institutional aspects of industrial development through development, marketing and operation activities of VIP.
- Mitigation of traffic jams for manufacturing factories, and
- Mitigation of pollution problem.

For these economic effects, the increase of value added from factories at VIP is the most direct, comprehensive and easy to measure in numerical terms. Therefore, the increase of value added is considered as the economic benefit of the VIP Project.

(2) Value added from factories at VIP

Value added from factories is calculated through the following process:

- Calculation of current value added per employee in manufacturing and estimation of the future increase, which is described in (3),
- Calculation of the number of employees at factories, which is described in (4),
- Calculation of gross value added from the factory per employee, which is described in (5).
- (3) Economic Cost

Economic cost consists of the investment cost for VIP, opportunity cost of land, and opportunity cost of labor. Economic investment cost is calculated from the financial investment cost.

(4) Calculation of the Economic Internal Rate of Return (EIRR)

Table 14.2.1 indicates the cash flow of the VIP Project (Alternative 1, which includes all contract packages/components) and tabulates the economic investment cost, land opportunity cost, labor opportunity cost, and the economic benefit. The EIRR calculated from the net cash flow is 13.3%.

					(Unit: JF	Y 000)
		Economic Cost				
V	Economic	Investment	Opportunity	Opportunity	Economic	Net Cash
rear	Investment	Cost of	Cost of	Cost of	Benefit	Flow
	Cost	Factories	Land	Labor		
2010	0		6,369		0	-6,369
2011	0		19,107		0	-19,107
2012	159,769		25,477		0	-185,246
2013	2,313,860		25,477		0	-2,339,336
2014	1,268,310		25,477		0	-1,293,786
2015	484,501	9,508,246	25,477	165,550	1,116,280	-9,067,494
2016		9,508,246	25,477	331,100	2,350,810	-7,514,013
2017		6,340,171	25,477	441,490	3,298,561	-3,508,576
2018		6,340,171	25,477	551,880	4,336,200	-2,581,327
2019			25,477	551,880	4,564,836	3,987,479
2020			25,477	551,880	4,801,356	4,223,999
2021			25,477	551,880	4,959,036	4,381,679
2022			25,477	551,880	5,124,600	4,547,243
2023			25,477	551,880	5,290,164	4,712,807
2024			25,477	551,880	5,463,612	4,886,255
2025			25,477	551,880	5,644,944	5,067,587
2026			25,477	551,880	5,834,160	5,256,803
2027			25,477	551,880	6,023,376	5,446,019
2028			25,477	551,880	6,220,476	5,643,119
2029			25,477	551,880	6,425,460	5,848,103
2030	555,420	4,754,123	25,477	551,880	6,638,328	751,428
2031	555,420	4,754,123	25,477	551,880	6,859,080	972,180
2032		3,170,085	25,477	551,880	7,087,716	3,340,274
2033		3,170,085	25,477	551,880	7,324,236	3,576,794
2034			25,477	551,880	7,568,640	6,991,283
2035			25,477	551,880	7,820,928	7,243,571
2036			25,477	551,880	8,081,100	7,503,743
2037			25,477	551,880	8,349,156	7,771,799
2038			25,477	551,880	8,625,096	8,047,739
2039			25,477	551,880	8,908,920	8,331,563
2040			25,477	551,880	9,200,628	8,623,271
2041			25,477	551,880	9,508,104	8,930,747
2042			25,477	551,880	9,823,464	9,246,107
2043			25,477	551,880	10,146,708	9,569,351
2044			25,477	551,880	10,477,836	9,900,479
2045			25,477	551,880	10,824,732	10,247,375
2046	582,619		25,477	551,880	11,179,512	10,046,735
+2047	582,619		25,477	551,880	11,550,060	10,417,283
2048			25,477	551,880	11,928,492	11,351,135
2049			25,477	551,880	12,322,692	11,745,335
					EIRR	13.3%

Table 14.2.1: Cash Flow of the VIP Project (Alternative	1)
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Source: JICA Survey Team

15 CONCLUSION AND RECOMMENDATIONS

15.1 Conclusion on VIP Development Project

15.1.1 Outline of the Infrastructure Development

It is recommended that the following projects proceed smoothly to the implementation stage and that the proposed schedule be strictly followed to minimize issues and problems arising from the VIP development. The proposed projects are summarized below:

- 1) Land reclamation works with earthwork volume of $1,316,000 \text{ m}^3$ of excavation and $1,317,000 \text{ m}^3$ of embankment to meet a return period of more than 10 years.
- 2) Road network development with 5.7 km in length.
- 3) Drainage system with sewer lines consisting of channels and ditches with 16.1 km in length and retention ponds with capacity of 100,000 m³.
- 4) Water supply system consisting of pipelines with 12.8 km in length, reservoirs with capacity of 4,200 m³ and a water tower 26 m in height.
- 5) Individual sewerage treatment system with 206 units of inspection and water sampling pits for collection of the treated wastewater of tenants.
- 6) Power supply system with cables 11.0 km in length and a substation with 115/22kV, and relocation of overhead transmission lines 4.8 km in length.
- 7) Telecommunication system with telecommunication conduits of 45.7 km and 228 hand holes.
- 8) Construction of buildings for the industrial park center with floor area of 3,015 m² and a technical training center with floor area of 3,822 m².

15.1.2 Project Implementation Plan

(1) Procurement Package Plan

The procurement package plan is formulated based on: (i) the present ability of the contractors, (ii) characteristic and volume of the works, (iii) minimization of implementation period, and (iv) minimum number of the packages to reduce burden and responsibility of the VIP-PMU. The following three contract packages (CP) are proposed according to priority for carrying out the works:

- 1) CP-1: Land reclamation (earthwork, two main gates and boundary fencing)
- 2) CP-2: Major infrastructure development (road, drainage, water supply, monitoring pits for individual sewerage treatment system, telecommunication and buildings)
- 3) CP-3: Power supply system (power line and 115/22kV sub station)

The following features of the procurement package plan are recommended:

- All the contract packages should be conducted through international competitive bidding (ICB) in order to ensure a reasonable price for the project implementation and keep a proper construction period under strict and effective quality control.
- CP-1 should be given high priority for construction since it is required to secure access to the infrastructure site for early commencement of infrastructural development works.

• Power supply work should be separated from the other works, which are mainly civil works, as CP-3, since the power supply work activities are very different from that of the CP-1 and CP-2.

(2) Implementation Schedule

Duration of the project is set at three years, starting with detailed design from the Second Quarter of the 3^{rd} Year, considering the requirements of project loan procedures, the process of the selection of consultant and contractors, and more than 2.6 million m³ of earthmoving works for land reclamation. The recommended project implementation schedule is shown in Figure 15.1.1.

Work Itom for VID		1 st	^t Ye	ar	2 nd Year		r	3 rd Year		ar	4 th Year			r	5 th Year			·	6 th Year				
	WOIK ICHIIIOF VIF		I	п	I IV	I	Π	ш	IV	II	ш	IV	I	Π	ш	IV	I	п	ш	v	I II	ш	IV
R	Preparation and Approval of Necessary Docum	nents				П																	
PD	(FS-Report, EIA, Implementation Plan, Financ	ial Plan, etc.)			1																		
itat ao	Establishment of VIP-PMU and Preparatory W	/orks		Ш		Ш	Ш			Ш	Ū												
mer oy L	Land Acquisition			Π			Ш	\prod			Γ												
ple ss b	EN and ODA Loan Agreement				Ξ	Ш																	
lm /orl	Consultant Short List & Consultant Procureme	nt								Π													
5	Management (Establishment of VIPA, Marketi	ng, Operation)														ļ		Ш	Щ	П			П
	Detailed Design Work Including Field Investig	ations																					
n &	Selection (Pre-Qualification) of Contractor																						
sign	Tender/Procurement of Contractor																						
De	Construction Works	Contract Term																					
for nstr	1) CP-1: Land Reclamation	ICB																					
rks Co	2) CP-2: Major Infrastructure Development	ICB																					ľ
Wo	3) CP-3: Power Supply System	ICB																					
	Soft Component																						
T 1																							

Legend: IIII Implementation Works by Lao PDR Works for Design & Construction Source: JICA Survey Team

Figure 15.1.1: Project Implementation Schedule

15.1.3 Financial and Economic Evaluation

The results of the financial evaluation and the economic evaluation are as summarized below.

(1) Financial Evaluation

In order to achieve financial feasibility, land rent must be set as USD1.59/m²/year (JPY148/m²/year). Repayment capacity (repayment of a soft loan) would be fulfilled at that level. Such land rent is equivalent to a land price of USD80/m² (JPY7,423/m²) if factory lots will be sold to tenants.

However, a land rent of USD0.50/m²/year (JPY47/m²/year) is needed to compete with other industrial estates in the northeast part of Thailand and Savannakhet. If land rent is set at USD0.50/m²/year, the public sector needs to disburse JPY3.6 billion (LAK340 trillion) to fulfill the balance of the cash flow.

Even if a component is excluded from the VIP project, the results are basically the same. In Alternative 2 (excluding power supply), the land rent to fulfill the repayment capacity is $USD1.23/m^2/year$ (JPY115/m²/year). In Alterative 3 (excluding power supply and water supply), the rent is $USD1.11/m^2/year$ (JPY104/m²/year).

If cost for land tenure increases from current $USD3/m^2$ to $USD25/m^2$, land rent have to be set as $USD2.10/m^2/year$ (equivalent to $USD105/m^2$ of land price) to enable positive NPV (Alternative 4).

On the other hand, land rent will drop to USD1.55/m²/year (equivalent to USD78/m² of land price) if land for VIP is obtained by Lao PDR government and provided to project implementation body.

(2) Economic Evaluation

The calculated EIRR is 13.3% for Alternative 1, 13.7% for Alternative 2 and 13.9% for Alternative 3. These figures are higher than the opportunity cost of capital (12%). The VIP project is thus feasible from the standpoint of national economy.

The EIRR figures are calculated under severe condition in which the fixed asset per employee is much higher than the current level. Even so, the project has enough economic feasibility. If the fixed asset per employee drops toward the current level, the EIRR of the three alternatives of the VIP project would improve further. In this case, the EIRR improves to 18.3% in Alternative 1, 19.1% in Alternative 2 and 19.6% in Alternative 3.

The following points are also identified as economic benefits although these were not considered in the calculations:

- Mitigation of traffic jam for manufacturing factories, and
- Mitigation of pollution problem.

The VIP project contributes to the industrialization, economic development and organized urban development of Vientiane Capital.

15.2 Recommendations for Smooth Implementation of the Project

15.2.1 Approval of FS and EIA Reports

The Ministry of Industry and Commerce (MoIC) needs to start the VIP development project by getting approval of the FS report immediately after its submission by JICA. At the same time, the Environmental Impact Assessment (EIA) report is required to be approved by the Water Resource and Environment Administration (WREA).

Required Action		Responsible Organization	Schedule
1	Obtain the approval for FS Report after coordination and consultation with related ministries and agencies	MoIC	Immediately after submission of the Final Report Part III
2	Obtain the approval for EIA from WREA	MoIC	Immediately after submission of the Final Deliverable (Draft ESIA) of the Environmental and Social Study

Table 15.2.1: Recommend	ations on Approval of	f FS and EIA Reports

Source: JICA Survey Team

15.2.2 Land Acquisition and Resettlement

Land acquisition and resettlement are critical tasks for a timely project implementation schedule. Delays in these tasks have adverse effects on many succeeding works for the project. Therefore, MoIC needs to immediately launch the activities for land acquisition and resettlement, including the establishment of a Social and Environmental Management Committee (SEMC), finalization of the Resettlement Action Plan (RAP), provision of compensation to all Project Affected Peoples (PAPs) and acquisition of land.

Required Action		Responsible Organization	Schedule
1	Establishment of SEMC	MoIC	As soon as possible
2	Finalization of RAP	MoIC	Complete by the end of 2010
3	Payment/provision of compensation to all PAPs	MoIC	Complete by the end of the 2 nd Quarter
	and acquisition of land		of 2012

 Table 15.2.2: Recommendations on Land Acquisition and Resettlement Activity Schedules

Source: JICA Survey Team

15.2.3 Legal Arrangements and Institutional Set-up

After obtaining approval for the establishment of the Vientiane Industrial Park (VIP), including the FS Report, a decree on the its development needs to be drafted by the Ministry of Industry and Commerce (MoIC) and issued by the Prime Minister as soon as possible. The draft decree has been already prepared by JICA Survey Team and attached as Appendix III.2.

As for institutional arrangement, MoIC should establish the VIP Project Management Unit (VIP-PMU) under the VIP Establishment Committee as the project implementing body for the development. Similarly, the Vientiane Industrial Park Authority (VIPA) is needed to be set up for the operation and maintenance of VIP. Moreover, in order to enable VIPA to function as a one-stop service office for tenants, the current business authorization procedure should be restructured. This task should be undertaken by MoIC as soon as possible.

	Required Action	Responsible Organization	Schedule
1	Drafting and obtaining the approval of the decree on development and management of VIP	MoIC	As soon as possible
2	Establishment of VIP-PMU under the VIP Establishment Committee	MoIC	As soon as possible
3	Building a prototype of the one-stop service system for the specific	MoIC	As soon as possible
	economic zone		
4	Establishment of VIPA (VIPA Management Committee &	MoIC	By the end of 2013
	Management Office)		

 Table 15.2.3: Recommendations on Legal Arrangements and Institutional Set-up

Source: JICA Survey Team

15.2.4 Funding Schedule

Upon request of a borrower, the Exchange of Notes (EN) and Loan Agreement (LA) are required for the release of funds from a loan under Official Development Assistance (ODA), in conformity with the criteria of the regulatory agency of the donor country.

Table 15.2.4: Recommendation	on on Funding

	Required Action	Responsible Organization	Schedule
1	EN and LA of ODA loan	MoIC	4 th Quarter in 2010 to 1 st Quarter in 2011

Source: JICA Survey Team

15.2.5 Procurement of Consultant and Contractor

Assuming that the VIP development project is implemented by taking out an ODA loan, the VIP-PMU needs to procure the consultant consisting of experts who will be engaged in detailed design,

assistance for contractor procurement, assistance for construction management, and soft components such as assistance for operation and maintenance. The VIP-PMU also needs to procure the contractor for the construction works based on the procurement package plan.

Required Action		Responsible Organization	Schedule
1	Procurement of consultant to be engaged in detailed	VIP-PMU	4 th Quarter of 2011 to
	design, assistance for contractor procurement, assistance		1 st Quarter of 2012
	for construction management, and soft components		
2	Procurement (including pre-qualification) of contractor	VIP-PMU, with	4 th Quarter of 2012 to
	for construction works	support of consultant	3 rd Quarter of 2013

Source: JICA Survey Team

Recommendations for Outstanding Issues 15.3

15.3.1 Technical Training Center

It is important for MoIC to develop a Technical Training Center (TTC) adjacent to the VIP to supply capable labor resources to the tenants in VIP. It is recommended that MoIC to separately conduct the study on the TTC development project.

	Table 13.3.1. Accommendations on 11C								
Required Action		Responsible	Schedule						
		Organization							
1	Study on TTC development project	MoIC	As soon as possible						
2	Construction of TTC, including building, equipment and	VIP-PMU	To be investigated in the study on						
	materials for training		the TTC development project						
3	Coordination with TTC, including the understanding of the	VIPA	To be investigated in the study on						
	tenants' needs and transfer to TTC operation organization,		the TTC development project						
	gathering the trainees, recruitment of TTC graduate trainees								
4	Operation of TTC, including training works,	TTC operation	To be investigated in the study on						
	development/revision of training program based on the	organization	the TTC development project						
	tenant needs, employment of lecturers								

Table 15.2.1. Decommondations on TTC

Source: JICA Survey Team

15.3.2 Housing

Housing is needed for tenant/factory workers, especially those from the remote areas. VIP-PMU needs to develop a residential area to invite investors for housing construction.

Table 15.5.2: Recommendations on Housing						
Required Action		Responsible Organization	Schedule			
1	Development of the residential area	VIP-PMU	As part of the VIP			
2	Investment promotion into housing in the residential area by	MoIC	To be investigated and decided			
	public and/or private investor		by MoIC			
3	Construction of housing	Public and/or	During operation period of VIP,			
		Private Investor	when the demand for housing			
			arises			

Table 15.3.2:	Recommendations	on	Housing

Source: JICA Survey Team

15.3.3 Agreement for External Infrastructure

It is recommended that the project for VIP development be harmonized with the infrastructures outside of the VIP (external infrastructure). The following actions for external infrastructure are recommended to be implemented on time by the responsible agencies.

Required Action		Responsible Organization	Schedule
1	Conclusion of agreement with the Ministry of Public Work and	VIP-PMU	After completion of DR-108
	Transportation (MPWT) to improve DR-108 with a drainage		improvement project
	system located on the east boundary in order to secure the		
	accessibility between the inside and outside road networks of VIP		
2	Conclude agreement with Nam Papa Vientiane Capital (NPVC) to	VIP-PMU	2 nd Quarter in 2012
	expand the distribution main with DN400mm along DR-108 from		
	NR-13S to secure stable supply of water for VIP		
3	Conclude agreement with EDL to improve the existing power	VIP-PMU	2 nd Quarter in 2012
	supply system, including the network for securing the power		
	supply to VIP and the relocation of overhead transmission lines		
	inside the VIP area		
4	Conclude agreement with a main provider to be selected by	VIP-PMU	By the end of 2014
	VIP-PMU to install telecommunication cables in order to		
	introduce the appropriate telecommunication system in VIP		

Table 15.3.3: Recommendation	ns on External Infrastructu	ıre
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Source: JICA Survey Team

15.4 Capacity Building

Considering that MoIC is new in industrial estate development project as well as in implementing ODA loan project, it is therefore required to have a capacity building program for MoIC for the smooth implementation of the VIP project.

Given that there are no governmental agencies in the Lao PDR with experience in industrial estate development, it is recommended for the government to request for the Technical Assistance (TA) program from an international donor based on the assistance items and schedule shown in Figure 9.4.1 below.

Technical Assistance	1 st Year	2 nd Year
1. Formulating and executing the capacity building program		
2. Establishment of related law/regulation to ensure international competitiveness		
3. Procurement procedures for ODA project		
- workflow of ODA project procedures		
- request procedure for ODA funding arrangement		
- correspondence on appraisal procedure for ODA funding		
4. Engineering procedures		
- workflow of engineering procedures on construction work		
- preparation of form and document necessary for the consultant procurement		
5. Resettlement and land acquisition procedures		
- Support for EIA & RAP approval		
- Support for land acquisition		
Legend: Major tasks of TA program Breakdown of TA tasks		

Legend: Major tasks of TA program Source: JICA Survey Team

Breakdown of TA tasks

Figure 15.4.1: Technical Assistance Program Schedule

It is suggested that a TA team, consisting of the following experts, be engaged for the preparatory work of the VIP development project.

- 1) Capacity Building Expert (5 person-months, Team Leader); who has experiences in formulating capacity building programs for the organization of similar projects.
- 2) Institutional Expert (6 person-months); who has knowledge and experiences in institutional and organizational aspects of similar projects.
- 3) Legal Expert (3 person-months); who is capable in legal matters, especially for industrial estates.
- 4) Engineering Procedure Expert (6 person-months); who has experiences in implementing similar projects, and in negotiating with governmental authorities to acquire the necessary approvals or to conclude agreements on infrastructure development.
- 5) Land Acquisition Expert (4 person-months); who has experiences in executing resettlement and land acquisition for similar projects.