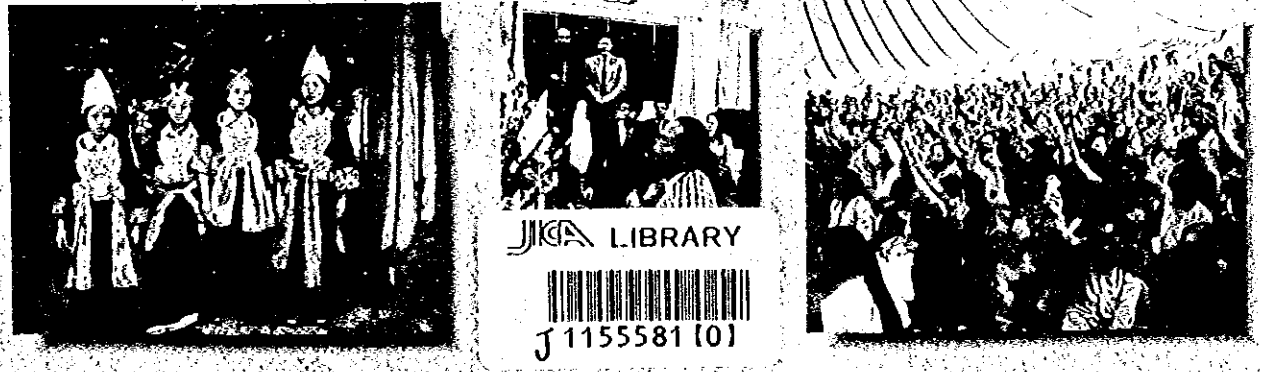
JAPAN INTERNATIONAL COOPERATION AGENCY

MINISTRY OF INDUSTRY AND HANDICRAFTS OF
THE GOVERNMENT OF LAO P.D.R.

FEASIBILITY STUDY
ON
THE NAM NGIEP-I HYDROELECTRIC POWER PROJECT
IN
THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

FINAL REPORT : VOLUME 5

SUPPORTING REPORT (III)
PRELIMINARY
RESETTLEMENT PLAN



FEBRUARY 2000

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FINAL REPORT

COMPOSITION OF REPORTS

Volume 1	Main Report		
Volume 2	Executive Summary Report		
Volume 3	Supporting Report (I)	:	First Environmental Impact Assessment Report
Volume 4	Supporting Report (II)	:	Preliminary Environmental Management Plan
Volume 5	Supporting Report (III)	:	Preliminary Resettlement Plan
Volume 6	Supporting Report (IV)	:	Sub-Contractor's Field Investigation Report
Volume 7	Supporting Report (V)	:	Records during Field Investigations

Front Cover Photos

Downstream Scenery of the Nam Ngiep River	Site Workshop under the Lao & Japanese National Flags	Vegetable Gardens along lower banks of the Nam Ngiep River
Hmong's National Costume at Site Workshop	Ceremony "Bassii" at General Workshop	Site Workshop at Thaviang Sub-district

VOLUME 5 : SUPPORTING REPORT (III)

PRELIMINARY RESETTLEMENT PLAN

TABLE OF CONTENTS

LIST OF ANNEXES

LIST OF TABLES

LIST OF FIGURES

MAIN ABBREVIATIONS AND ACRONYMS

LAO PDR AGENCIES

CPAWM	Center for Protected Areas and Watershed Management
DiF	Division of Fisheries (MAF)
DOF	Department of Forests (MAF)
EDL	Electricite du Laos
GOL	Government of Lao PDR
HPO	Hydropower Office (MIH)
LWU	Lao Women's Union
MAF	Ministry of Agriculture and Forestry
MIC	Ministry of Information and Culture
MOF	Ministry of Finance
MIH	Ministry of Industry and Handicrafts
MOH	Ministry of Health
STENO	Science, Technology and Environment Organization (MAF)
UXO LAO	Lao National UXO Programme

FOREIGN ORGANIZATIONS

ADB	Asian Development Bank
AsuAid	Australian Agency for International Development
ESCAP	UN Economic and Social Commission for Asia and the Pacific
JICA	Japan International Cooperation Agency
NTEC	Nam Theun 2 Electricity Consortium
OECF	Overseas Economic and Cooperation Fund (Japan)
IUCN	World Conservation Union (Switzerland)
UNDP	United Nations Development Program
WB	World Bank
WCS	The Wildlife Conservation Society (New-York)
WHO	World Health Organization

OTHERS

DRWG	District Resettlement Working Group
EIA	Environmental Impact Assessment
EM	Environmental Manager (Project side)
EMP	Environmental Management Plan
EO	Environmental Officer (Contractor side)
FARD	Focal Area for Rural Development
FSL	Full Supply Level
HEP	Hydroelectric Project
IEE	Initial Environmental Examination
IPDP	Indigenous Peoples Development Plan
K.	Kip
MOL	Minimum Operation Level
MOU	Memorandum of Understanding
NBCA	National Biodiversity Conservation Area
NGO	Non Governmental Organization
NLHP	Nam Leuk Hydropower Project
NNHP	Nam Ngiep 1 Hydroelectric Power Project
NT2	Nam Theun 2 Hydroelectric Project
NTEC	Nam Theun 2 Electricity Consortium
NTFP	Non-Timber Forest Products
OC	The Project's Ownership Company

ODA	Official Development Assistance
PGC	Project Grievance Committee
PI	Public Involvement
PRP	Preliminary Resettlement Plan
RAP	Resettlement Action Plan
RC	Resettlement Committee
RMU	Resettlement Management Unit
RO	Resettlement Office (of the Project's Ownership Company)
SEIA	Summary Environmental Impact Assessment
STD	Sexually transmitted diseases
TOR	Terms of Reference
ton/ha	Metric ton per hectare
UXO	Unexploded Ordnance
MASL	Meters above sea level
US$	US dollar
VRC	Village Resettlement Committee

INTRODUCTION

RAP without Final Design of Project

The JICA Nam Ngiep 1 Hydroelectric Power Project (NNHP) Feasibility Study Team is carrying out the social and natural environmental impacts studies at an earlier stage in the project design cycle than is usually the case. As a result, and perhaps for the first time in the Lao PDR, natural environmental and social considerations will directly influence the conceptual design of the project and allow for, as much as possible, the reduction of impacts by design adaptation.

This report, the Preliminary Resettlement Plan (PRP), is prepared without the final design of the NNHP having been decided. In particular, the dam height will determine the resettlement task. In March 2000, the decision whether to go ahead with a Second Phase of the Feasibility Studies – focusing more on technical, financial, and economic factors – will be made as well as the decision to build the dam at FSL.360m or at a lower height. This lower height has been till now thought to be FSL.320m. However, taking a safety margin for sedimentation and backwater effects, given the low altitude of agricultural land in the Upper Reservoir, the lower dam could be FSL.318m.

The identified magnitude of impacts from the initial design, moving resettlement requirements from an expected 1,400 people up to more than 5,000 people should lead the JICA Study Team to consider alternative options having less impacts. This increase in the population affected by inundation is the primary and major direct environmental and social effect resulting from the Project as currently conceived.

Policy of Resettlement

The objectives of the ADB's policy (1995) on involuntary resettlement are;

(i) to avoid involuntary resettlement wherever feasible, and

(ii) to minimize resettlement where population displacement is unavoidable, and ensure that displaced people receive assistance, preferably under the Project, so that they would be at least as well-off as they would have been in the absence of the Project, as contemplated in the following paragraphs.

In the absence of its own policy, the Lao PDR currently follows the World Bank's OD 4.30 on involuntary resettlement matters. The first objective of the World Bank's OD 4.30 on Involuntary Resettlement reads;

"Involuntary resettlement should be avoided or minimized where feasible, exploring all viable alternative project designs. For example, realignment of roads or reductions in dam height

may significantly reduce resettlement needs (World Bank, 1990)."

The draft "Resettlement Policy for all Projects in Lao PDR" also states as one of its objectives that "The project design must endeavor to avoid or minimize resettlement or negative effects to the environment, social and economic condition of people (Lao PDR, 1997)".

From the above, it is self evident that a first consideration will be given to alternative Project designs to minimize resettlement, hopefully to avoid altogether resettlement in the built up Upper Reservoir Impact Zone. The *Feasibility Study* is taking place early enough in the Project's design to assess the impacts of more than just the currently proposed high dam.

Resettlement Plan based on Worse Case Scenario

The Feasibility Study will, nevertheless, prepare a draft resettlement plan based on a worse case scenario of full resettlement impacts being recognized. The currently proposed high dam would affect a total present population of around 5,500 people in just less than 850 households, with not quite 450ha of paddy riceland and more than 800ha of land overall.

Whether resettlement is minimized or the NNHP's impacts are those of the currently proposed high dam of FSL.360m, the World Bank's OD 4.30, provides a standard for preparing a draft resettlement plan. This guideline has been adhered to by the ADB's policies as well as in the current draft Lao PDR policy on involuntary resettlement:

Where displacement is unavoidable, resettlement plans should be developed. All involuntary resettlement should be conceived and executed as development programs, with resettlers provided sufficient investment resources and opportunities to share in project benefits. Displaced persons should be;

(i) compensated for their losses at full replacement cost prior to the actual move,

(ii) assisted with the move and supported during the transition period in the resettlement site, and

(iii) assisted in their efforts to improve their former living standards, income earning capacity, and production levels, or at least to restore them.

Particular attention should be paid to the needs of the poorest groups to be resettled.

Assessment of Resettlement Impacts

The Feasibility Study surveys will provide a means of assessing the resettlement impacts of alternative Project designs. They will also establish baseline data for incomes and expenditures, occupational and livelihood patterns, use of resources, arrangements for use of common property, arrangements for systems of production and local resource use, social organization, leadership patterns, community organizations, and cultural parameters. This data will provide a basis for eventual evaluation and monitoring of the project impacts, should the Project be implemented.

The recommended mitigation at this time is to consider a lower design alternative. The initial

thinking was that lowering FSL to EL.320m would reduce the number of affected villages down to 5 villages. However, consideration of back water effect indicates that EL.318m might be necessary to protect the majority of irrigated paddy land in belonging to the Upper Reservoir villages, nearly 300ha of the total reservoir paddy land. The FSL.318m dam would reduce the affected population down to 260 households and about 1,600 people.

The catchment area is presently almost devoted of all-weather roads. Creation of the reservoir will provide 90km long transportation axis for boats linking the dam site to the upper reservoir area. However, the positive effects may be partly cancelled if the Upper Reservoir population is resettled far away. If the lower dam alternative is chosen, the impact may be very positive, linking the Upper Reservoir villages to the proposed dam site by boat and Pakxan by road. Berthing facilities will need to be implemented according to the seasonal draw-down of the reservoir.

The Upper Reservoir communities will also become strategically placed at a national level, as plans go forward to upgrade National Road 1 from Boten on the Chinese border southward through the middle of the Lao PDR to the Cambodian border. This new highway will run parallel to the North South National Road 13 along the Mekong.[1] In the Upper Reservoir Area, the new highway will be along the alignment of the old National Route 4, which runs through the communities that would be inundated by the FSL.360m dam. With the building of National Road 5, which will be an East-West highway connecting Vientiane with Vietnam, the Upper Reservoir communities will be literally at a cross roads for national development. The ADB-financed Power Transmission and Distribution Project is bringing rural electrification to the Upper Reservoir Area as well.

[1] From Lao PDR. 1997. Ministry of Communication Transport Post and Construction (MCTPC). *Decision on Numbering and Referencing System of the Road Network and the Numbering of National Roads.* No. 1311. June 2.

CHAPTER - 1

PROJECT DESCRIPTION

1. PROJECT DESCRIPTION

1.1 GENERAL LAYOUT

As the result of the alternative studies, two dam-scales have eventually been considered, as a Medium-scheme having its FSL.at 320m (called FSL320 alternative in this report) and a Large-scheme with FSL at 360m (called FSL360).

The NNHP is located on the Nam Ngiep River, a tributary of the Mekong River. The proposed Project consists of a rockfill dam with upstream concrete facing, impounding a 70 to 90km long reservoir depending on the alternative. Water will be turbined through a power plant located at the foot of the dam.

General layouts of dam components are shown in Figure 1.1 and Figure 1.2 for the two (2) alternatives FSL320 and FSL360. Preliminary main features for the two alternative schemes are as given in Table 1.1.

Table 1.1 Preliminary Salient Features of Promising Schemes (Nam Ngiep-1 HEPP)

	Parameter	Unit	FSL320 option	FSL360 option
Reservoir	Catchment area at dam site	km^2	3,700	3,700
	Annual basin rainfall	mm	2,470	2,470
	Annual mean runoff	m^3/s	162.3	162.3
	Annual mean runoff	mill. m^3	5,118	5,118
	Average run-off coefficient	-	0.56	0.56
	Probable max. flood, PMF	m^3/s	15,900	15,900
	Mean annual sediment flow	$t/km^2/yr$	413.4	413.4
	Reservoir area at FSL	km^2	73.9	148.2
	Gross reservoir capacity	10^6m^3	2,279	6,782
	Min. operation level (MOL)	EL.m	284	335
	Draw-down	m	36	25
	Effective storage volume	10^6m^3	1,779	3,092
Dam	Dam type	-	CFRD	CFRD
	Dam height	m	157	197
	Dam crest length	m	524	662
	Dam volume	10^6m^3	6.9	12.7
	Dam crest level	EL.m	325	365
Spillway	Spillway crest level	EL.m	306.5	346.5
	Design flood capacity	m^3/s	8,730 (Q=10,000yr)	8,730 (Q=10,000yr)
Waterway	Design discharge	m^3/s	221	224
	Headrace tunnel diameter	m	9.0	9.0
	Headrace tunnel length	m	420	490
Power Plant	Powerhouse type	-	Surface type	Surface type
	Size of powerhouse	m	58(L) 31(W) 58(H)	81(L) 29(W) 52(H)
	Design flood discharge	m^3/s	4,519 (Q=100yr)	4,519 (Q=100yr)
	Rated head	m	131.8	176.8
	Type of turbine	-	Vertical Francis	Vertical Francis
	Number of unit	No.	2	4
	Plant capacity	MW	240	360
	Annual energy	GWh	1,349	1,905
Reregulation Structure	Max. pond level	EL.m	173	173
	Required storage capacity	mill. m^3	4.7	4.7
	Design flood discharge	m^3/s	4,519 (Q=100yr)	4,519 (Q=100yr)

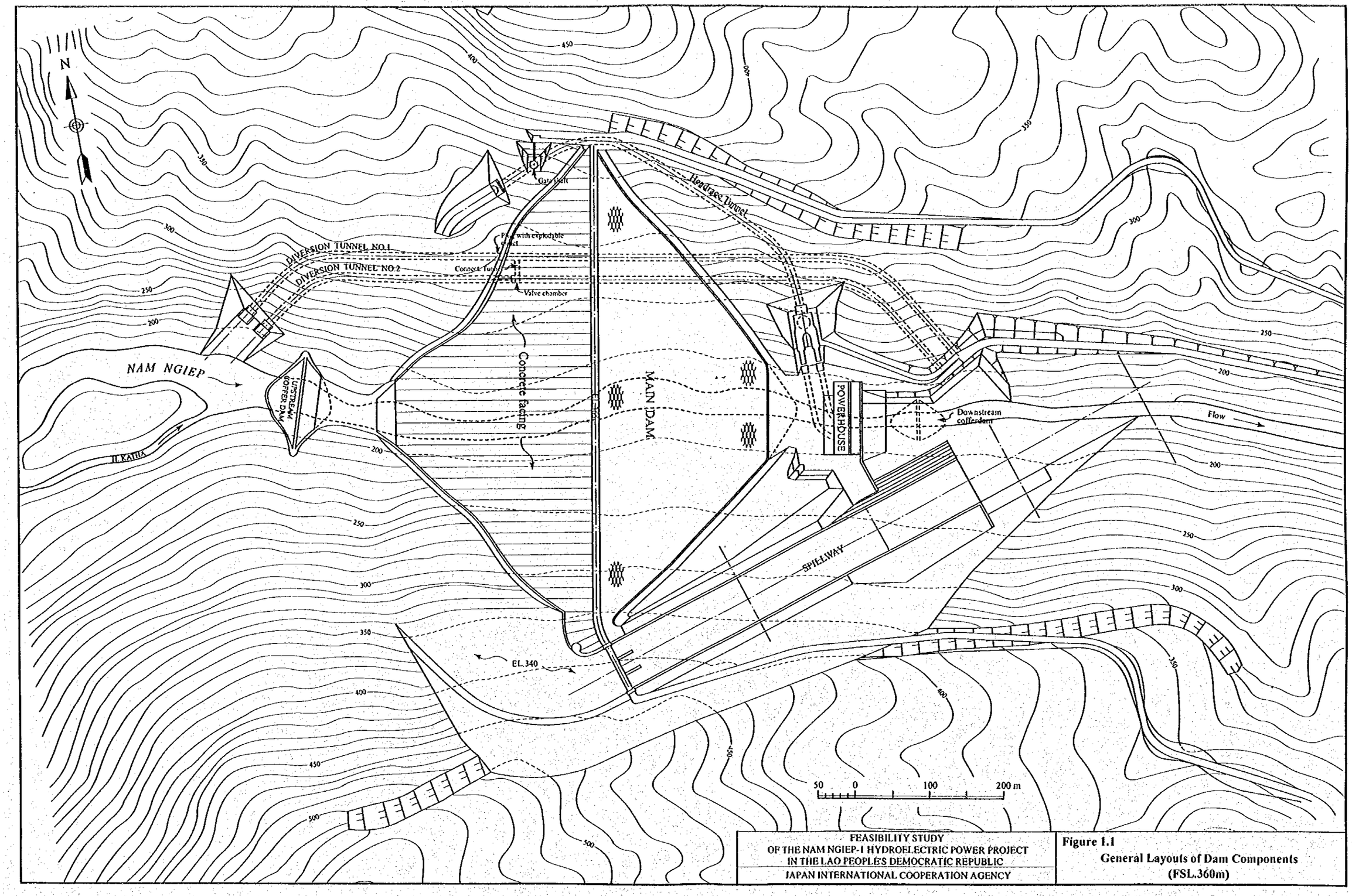

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Figure 1.1
General Layouts of Dam Components (FSL.360m)

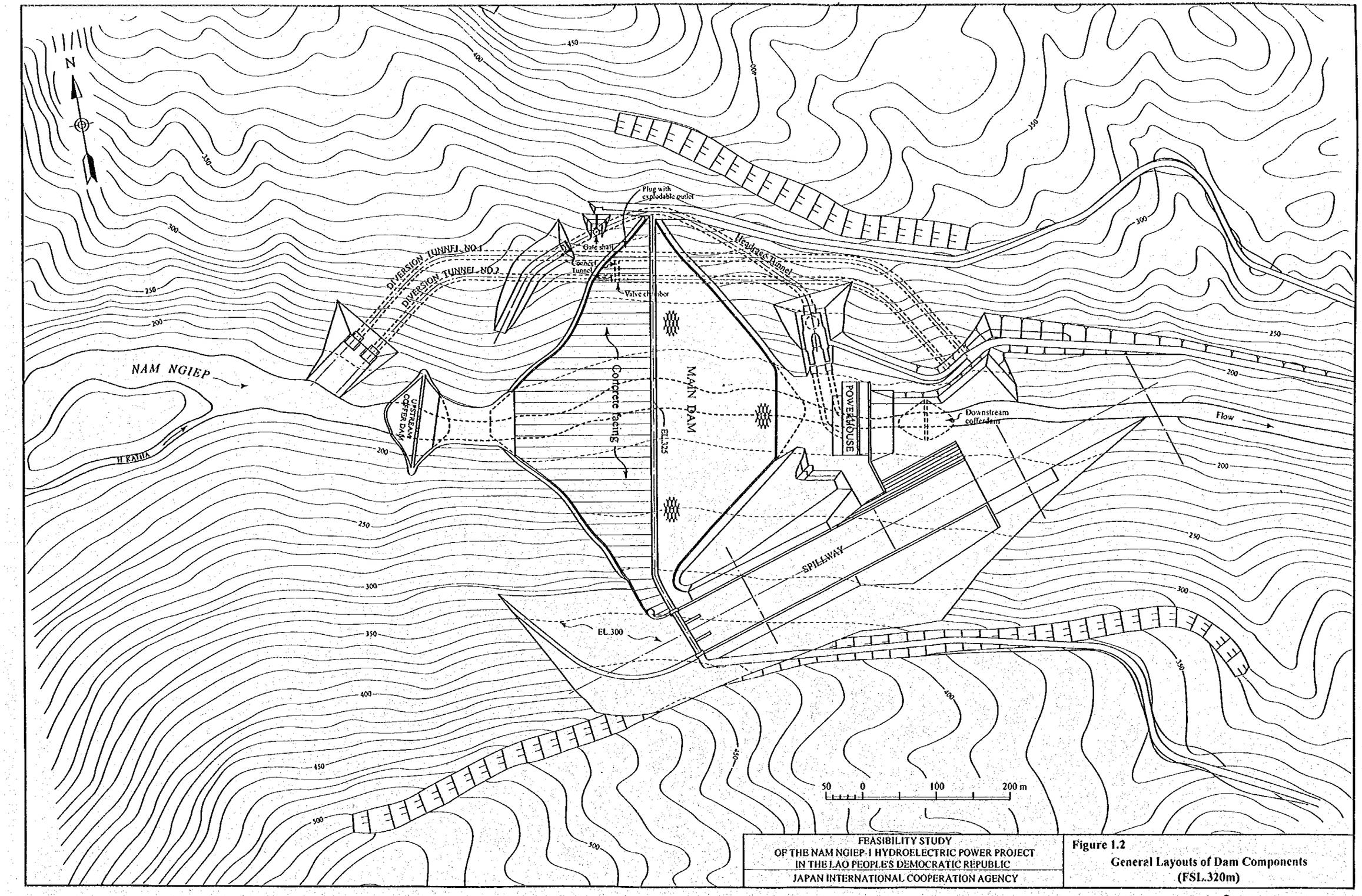

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Figure 1.2
General Layouts of Dam Components (FSL.320m)

1.2 PROJECT BACKGROUND

Sogreah Ingenierie first studied the Nam Ngiep Hydroelectric Power Project (NNHP) at Pre-feasibility level in 1991. The Prefeasibility study was then complemented and up-dated successively in 1992 and 1995. As a result, the recommended option is a 185-m high rockfill dam located on the Nam Ngiep river, about 54-km upstream from its confluence with the Mekong river. The dam will create a 156km² large reservoir (at Full Supply Level) with a maximum capacity of 7,200 millions m³. The proposed power plant should be equipped with 4 vertical Francis turbines, providing 440MW installed capacity. Initial project includes an 80km long transmission line to Pakxan.

From the standpoint of logistics, the Project is ideally located. Access roads for construction will require only the creation of 10km of new road, in a forested area, and rehabilitation of an existing 43km of road from Pakxan.

1.3 AREAS AFFECTED AND SERVED BY THE PROJECT

There is little habitation near the proposed dam site. B.Hatieun, a small settlement of *Lao Soung* around 9-10km downstream from the dam site, has been established for only about four years is slated for resettlement in the near future away from the Nam Ngiep by Bolikhan District. The villages of B.Namyouk and B.Sopyouk are even further away, approximately 15km upstream from the dam site. Therefore, it is likely that human habitation, paddy fields and so forth will not be affected by construction installations and areas for the present location of the dam, such as operator's villages, quarries, and so forth.

Some 10km of new road will be required to reach the dam site. Surveys will indicate the cultivated areas likely impacted by this road's RoW, although it is expected that most of the alignment will be through forested areas. Some minor land impacts are expected from transmission line towers, and the extent of this will be further determined through surveys as well.

A reconnaissance field visit August 25-28, 1998 for the IEE found the reservoir area population to be more built up than anticipated. Instead of around an expected 2,000 people, it found the overall reservoir area population to be more than double this figure, at somewhat less 5,500. While some highland *Lao Soung* in the lower reaches of the reservoir would be impacted by inundation, in the Upper Reservoir far more lowland Lao majority population categorized by the Government as *Lao Loum*, would be affected, as well as *Lao Theung*, a middle hills peoples.[1]

Based on the reconnaissance visit, it was possible so far as socioeconomic aspect are

[1] The Lao PDR is officially a multiethnic nation with more than forty ethnic groups, classified into three general families: *Lao Soung* (upland Lao) 10 percent of population in 1993; *Lao Theung* (midland Lao) 24 percent; and *Lao Loum* (lowland Lao), 66 percent. The term Laotian is used for the national population; Lao for the ethnic group. Andrea Matles Savada, ed. 1994. *Laos: A Country Study.* Washington, DC: Federal Research Division, Library of Congress.

concerned to see the Nam Ngiep as having three Impact Zones: the Upper Reservoir; the Lower Reservoir; and the Downstream Villages.

The reconnaissance team also found considerable government-supported irrigation development in the reservoir. The extent of this was confirmed by a socioeconomic survey, carried out December 1998-January 1999. This survey found about 650ha of irrigated rice paddy, with 150ha more planned by GOL instead of, as was originally assumed, only dry evergreen tropical forest, temporary or permanent agricultural areas, degraded forest, old re-growth and fallow resulting from shifting cultivation in the reservoir area. In addition, the Upper Reservoir Area is a national Focal Area for Rural Development (FARD), making it a resettlement receiving area for highland populations, and the Lower Reservoir Area has been under a UNDP development project for a couple of decades.

The socioeconomic survey was extended to the downstream area in March 1999. According to the socioeconomic survey of the Project Area, overall, including both Upstream and Downstream Affected Areas, nearly 2,000 households and 12,000 persons may be affected to one degree or another by the NNHP. About 660 households and 5,000 persons in 14 villages are in the Upper Reservoir and another 200 households and 1,200 persons in 4 villages the Lower Reservoir could potentially be affected by involuntary resettlement. For Downstream Villages, about 1,300 households and 6,800 people in 15 villages would be affected through changes in the Nam Ngiep river flow and water.

At FSL.360m, the reservoir will flood 17 villages consisting of some 853 households with a population of 5,204. More than 800ha of irrigated paddy land built through GOL or UNDP aid schemes would be inundated. Mitigation includes minimizing resettlement to the extent possible, carrying out resettlement if unavoidable and compensation for the displaced population. A village and population summary are in the following two (2) tables:

Table 1.2 Upper and Lower Reservoir Villages: Households & Population

Upper Reservoir:		Households	Population
1	B. Phonehom	67	375
2	B. Namlong	17	107
3	B. Xiangkhong	39	247
4	B. Nakang	25	132
5	B. Nahong	75	446
6	B. Viengthong	46	273
7	B. Naxay	22	125
8	B. Naxong	81	522
9	B. Phonyeng	63	349
10	B. Dong	82	509
11	B. Hatsamkhone	27	174
12	B. Phiangta	49	322
13	B. Pou	66	416
Upper Reservoir Sub Total:		*659*	*3,997*
Lower Reservoir:			
1	B. Houaypamon	18	127
2	B. Namyouk	86	540
3	B. Sopphouh	23	132
4	B. Sopyouk	67	408
Lower Reservoir Sub Total:		*194*	*1,207*
TOTAL:		853	5,204

Table 1.3 Downstream Villages: Households and Population

Bolikhan District		Households	Population
	Hat Kham	88	533
	Tahua	55	252
	Somseum	185	1,136
	Nam Pa	71	427
	Houay Koun	281	1,632
Bolikhan District Sub Total :		*680*	*3,980*
Pakxan District			
	Nong – Deng	19	112
	Thong –Noi	50	329
	Thong – Gnai	62	340
	Song Khon	42	239
	Phonsi	48	276
	Thakokkhen	58	349
	Nam Tek	39	203
	Nam Ngiep	67	331
	Sen – Oudom	67	314
	Komsipchet (Military Village)	147	363
Pakxan District Sub Total :		*599*	*2,856*
	TOTAL	1,279	6,836

Access to the dam site from Pakxan will involve rehabilitation and improvement of the existing road to B. Muang Mai, B. Borikhan and B. Hathieun, and the construction of 10km of new road from B. Hatieun to Dam Site. This will improve access to B. Hatieun, hardly accessible by car today during the rainy season.

During reservoir filling and operation, the reduction of flows downstream may affect the existing use of the river for the transportation of persons and goods. Mitigation consists in assessing the minimum riparian discharge necessary for allowing boat transportation all year long on the river. Regulation of flow through appropriate reservoir management and/or the use of a re-regulating pond should preserve the safety of navigation on the river.

Increasing traffic of trucks for the transport of equipment or gravel in Pakxan and in villages along the road may result in noise, dust and a higher accident risk level for the population, particularly children. Contractor's obligations will need to include appropriate maintenance of trucks, installation of speed limit signs, a program of driver education, and dust control.

There will be a high risk of epidemic diseases in the workers' population if camps are inappropriately managed. The Contractor's obligations will need to include appropriate lodging and food supply to Lao workers, with adequate water supply, sanitation system, garbage management and camps cleaning.

The increased population in malaria endemic areas and likely increase in malaria mosquito vector populations will require a number of mitigatory measures. These might include, *inter alia*, improved diagnosis and treatment services at government health facilities; provision of mosquito nets to construction workers and the population around the NNHP reservoir; and the establishment of insecticide treatment services for surrounding communities.

HIV/AIDS is likely to be more problematic, as the influx of staff and construction workers will greatly increase the potential for HIV transmission. Mitigation efforts will need to include, *inter alia*, education programs, provision of condoms, and possibly

coordination with Thai counterparts to develop a strategy for reducing transmission via truck drivers. Resources that have already been used by the Nam Leuk Hydroelectric Power Project are the UNDP/Lao PDR's recently established AIDS Trust Program Population Services International (PSI), an NGO with international expertise in this area, for provision of condoms and educational content under its UN-funded national condom social marketing project.[2]

Other communicable diseases, including shistosomiasis,[3] opisthorchis, cholera, dengue hemorhagic fever, and the vaccine preventable diseases of measles and diphtheria may also be a threat, but these be may possibly not be on the scale of Malaria or HIV. Pre employment medical screening will need to be made compulsory, and screening for communicable diseases will necessarily be done through a Recruitment Center. Public health issues will be assessed more carefully during the course of the EIA.

The Lao People's Democratic Republic suffered intense ground battles as well as extensive bombing during the Indo-China War era, especially during the period from 1964 to 1973. Such fighting left a legacy of widespread contamination by unexploded ordnance (UXO), that still cause death and injury more than 20 years after the war ended. Much of this contamination is located in areas of possible resettlement or even conceivably project construction. The national survey carried out by Handicap International for UXO LAO made clear recommendations that UXO reconnaissance, clearance and public education be carried out for any resettlement activity, and this will also be part of the Project mitigation strategy.[4]

[2] Trust Management Unit, National Committee for the Control of AIDS. 1999. *HIV/AIDS Country Profile*. February. Lao PDR; Lao PDR. *National HIV/AIDS/STD Plan*, 1997-2001.

[3] Fortunately, schistosomiasis or bilharziasis, a disease often associated with impoundments in other tropical countries, is not found in the Lao PDR with the exception of Kong Island, in the Mekong near the Cambodian border.

[4] Handicap International. 1997. *Province and District Report – Province of Xieng Khouang*: National Survey on the Socio-Economic Impact of UXO in Lao PDR. Report prepared for the Lao National UXO Programme (UXO Lao), Ministry of Labour and Social Welfare. Vientiane: UXO LAO. pp. 41-42, 59.