

VOLUME 2 – CHAPTER 10

RESETTLEMENT SITE SELECTION, LAND USE PLANNING, AND LAND TENURE

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10 RESETTLEMENT SITE SELECTION, LAND USE PLANNING AND LAND TENURE

10.1 INTRODUCTION

This chapter describes how the general resettlement areas were selected, the preferences and requirements of the villages to be resettled, and how the actual new village site location will be finalized in a participatory manner with those affected. It also describes how land tenure will be developed for the housing and agricultural lands, and how villagers have, and will continue to be involved in the design and construction of their own houses in their new village location.

10.2 INITIAL IDENTIFICATION OF POTENTIAL RESETTLEMENT ZONES

Following field surveys carried out in 1995, seven general potential resettlement areas were identified for further review. These general areas were numbered and located as follows:

- General area No.1, located in Nakai District, Khammouane Province, southeast of Ban Oudomsouk, the boundaries of this area being adjacent to the proposed reservoir and escarpment;
- General area No. 2, located in Nakai District southeast of Site 1 near the villages of Ban Done and Ban Khone Khen;
- General area No. 3, also situated in Nakai District, northwest of the villages of Ban Oudomsouk, on the proposed reservoir shoreline;
- General area No. 4A, located in Nakai District, southwest of the Site No.3;
- General area No. 4B, situated in Gnommalat District, Khammouane Province, east of the village of Ban Pha Toung;
- General area No. 5A, situated north of the village of Ban Nam Nian, Khamkeut District, Bolikhamxay Province;
- General area No. 5B, located on road No 8 to Ban Lak Sao, about 12 km north of Site 5A, in Khamkeut District, Bolikhamxay Province. This area includes Ban Pakkatan and its periphery.

After further study, four of these seven areas were assessed as suitable for resettlement. These were general areas 1, 2 and 3 on the Nakai Plateau (referred to later as the Plateau Resettlement Area) and general area 4B in the Gnommalat District (referred to as the downstream Resettlement Area). The other three areas were rejected on economic and/or environmental grounds.

Public consultations and participatory resettlement studies demonstrated a very strong villager preference to remain on the Plateau rather than moving to the lowland areas, except for the three Tai families from Sophia and Namnian villages who chose to return to their former home in the Lak Sao area. The relocation of these two villages is explained in detail in Section 10.11.

Although General Area 4B had obvious potential, it was not on the plateau, and, as was pointed out by the Panel of Experts (POE), the area may better be reserved for use by voluntary settlers from the Nakai-Nam Theun NPA in the medium term or potential replacement land for communities affected along the Downstream Channel or otherwise affected by project construction. For that reason it was not considered further in the Plateau Resettlement Plan, which turned its focus to areas on the Nakai Plateau.

In response to villager preference for the plateau, focus turned to the Plateau Resettlement Area and 25 blocks were delineated as suitable for potential resettlement (see Figure 10-1). These 25 zones are located on the western edge of the Nakai Plateau, and generally fall within the existing Plateau village boundaries.

10.3 PLATEAU RESETTLEMENT SITE SELECTION

A variety of factors are important to the Project planners (NTPC and GOL) and to villagers when deciding on their resettlement site preferences and these presented in Table 10-1.

Table 10-1: Factors Considered in the Selection of Prospective Resettlement Sites

Social considerations	1.	The resettlement sites should be as near as possible to the old village location .
	2.	The resettlement site should not infringe on land or resources of other villages, but if it does then resolutions and agreements should be amicably developed.
	3.	Social and cultural factors must be taken into account including the village spiritual areas and customary boundaries .
Agricultural considerations	4.	Access to water: Water supply must be accessible from the reservoir, along with an elevated site for the header tank to allow gravity irrigation to farm plots.
	5.	Topography: Slope for the farm plot area(s) should be as gentle as possible and ideally not exceed 15%.
	6.	Soils: The soils selected must be capable of providing adequate returns with a potential for the production of wetland paddy rice wherever possible.
	7.	Layout: All farm plots should form a contiguous land area, wherever possible.
	8.	Land availability: the area of land available for cultivation, preferably contiguous.
Access	9.	Roads or other transportation infrastructure must be sufficiently accessible to ensure access to markets and other support services.
	10.	Access to the reservoir, drawdown zone, forest and grazing areas should be convenient.

All these factors are investigated and considered thru the village consultation process (see Chapter 4), and the participation of affected villages has and continues to be an underlying theme of the resettlement area selection process.

10.3.1 Traditional Village Boundaries

Initial assessments of village boundaries indicate that it will be possible to relocate the majority of households within their existing village and administrative boundaries. For those relocating into the current boundaries of other villages, they are familiar with the proposed resettlement sites.

Two classifications exist with regard to the administrative and political status of the existing villages on the Plateau. Administrative villages are those with over 50 households. These are formally recognized as villages with defined boundaries and associated responsibilities and obligations to the respective district in which they lie. Figure 10-2 shows these existing village boundaries, as assessed in 1997.

The second type concerns hamlets, which tend to be small and scattered throughout the village boundary of the major administratively recognized village in which they occur. Often these hamlets form either (a) when villagers have moved into the boundary area from elsewhere and have requested permission of the resident administratively-recognized village headmen to establish their households, (b) families of a village decide to establish dwelling closer to their (newly opened, or shifting) agricultural fields, or when villages split and a number of families relocate due to a shortage of land or resources in a particular area.

Traditional village territories tend to follow natural features of the landscape, and may correspond to the customary land use patterns of the villagers. In addition, these boundaries often have a cosmological dimension. Many villages have guardian spirits (*phi muang*) whose territory corresponds to the traditional boundaries for larger, more established villages. Other villages or hamlets that are established later are included within these spirit boundaries.

However, traditional village boundaries are, especially on the plateau, somewhat dynamic, reflecting the change on village locations and establishment of new villages over the last 20 to 30 years. The following describes the existing village boundaries in the Resettlement Area, and the way that other villages may be accommodated in these areas.

Ban Thalang village boundaries

This village had no clear border in 1998 as it is a relatively new immigrant village. Previously the area was part of the administrative area of the Ban Nakai Tai. The boundary to the north is generally recognized as the Nam Theun, although the villages of Sop Hia and Ban Nam Nian also utilize this northern area for swidden cultivation.

- Ban Talang will be relocated within its current village boundaries. Some villagers of Ban Sop Hia, and the village of Ban Sophene will move into this area

Ban Nong Boua Kham boundaries:

This is also a new immigrant village without clear boundaries.

- Ban Nong BouaKham will be relocated within its current village boundaries. Some villagers of Ban Sop Ma will move into this area

Ban Nakai Tai village boundaries

The southern boundary of Ban Nakai Tai borders with Ban Nakai Neua. It follows the Huoui Nakai west to the Sayphou Ak Range and the tributary of the Huoui Paduk. The western edge is the escarpment to the Nam Malou, to the Nam Gnalong, and then to the Nam Theun. From here the boundary is the Nam Theun upstream to Ban Thalang. The eastern boundary is along the Nam Theun from Ban Thalang to the track which leads to Ban Sop Phene.

- Ban Nakai Tai will be relocated a very short distance, and within the current village boundaries. No other villagers will be relocated into these current village boundaries.

Ban Nakai Neua village boundaries

The northern border of Ban Nakai Neua is Ban Nakai Tai along the Huoui Nakai to the boundary of Ban Sop On. In the south, the border is the tributary of the Huoui Hai up to the Range and over to the Huoui Paduk. The western boundary borders Ban Van Giem along a ridgeline going north to the Huoui Paduk. The village of Ban Nakai Neua is one of the largest villages in the proposed Resettlement Area. This village contains 67 families and 303 inhabitants and is centered near the old district headquarters at Nakai Kang.

- Ban Nakai Neua will be relocated a short distance within the current village boundaries. No other villagers will be relocated into these current village boundaries.

Ban Boua Ma village boundaries

This village is bordered in the north by Ban Nong Boua, and the boundary is determined by Huoui Samkha and the Huoui Arak towards the watershed of the Huoui Khuang. The south is bordered by Gnommalat District and the Nam Kathang Gnai towards Nam Nong Boua Nyai and to the Nam Theun. The eastern boundary is Ban Phonsavang on the Nam Theun from the Huoui Arak to the Nong Tai Khuang pond. The western boundary is Ban Oudomsouk and the Huoui Ta Bot and Nam Kathang Gnai, which commences from the watershed of the Huoui Khwang to Huoui Ta Bot until the tributary of the Huoui Kathang.

- Ban Boua will be relocated within its current village boundaries, and no other villagers will be relocated into these current village boundaries, except that some families from Keng Yao and Sopma hamlets may join the families of Boua in its new village site.

Ban Sop On village boundaries

The northern boundary is Ban Sop Ma and Ban Phonsavang. The boundary runs from the Na Hao hill to Nong Tai Khuang pond, across the Nam Theun and the feeder road to Ban Nong Boua across Nam Theun to Nong Phong towards the farming areas. It follows across the Khok Kwang and road to Huoui Tao and the Nam Kathang. The southern boundary is with Ban Done, which commences from the tributary of the Huoui Chicho (which drains into the Nam Theun) and then to the Sayphou Ak Range to the Nam On and along the Nam On to the tributary of the Huoui Swing, along the Huoui Swing and finally to the road to the Nam Kathang Gnai. The eastern border is with Ban Ka Oy commencing from the Phu Hao southward along the Huoui Xang Tay, Huoui Tong and to the tributary of the Huoui

Chicho. Gnommalat District forms the western boundary where the Nam Kathang Gnai is the border. The boundary starts from the tributary of the Huoui Tao and follows the Huoui Kathang to Ban Done.

- ❖ Ban SopOn will be relocated within its current village boundaries. Bna Phonsvang, and possibly some families from Ban Kaoy, will be relocated into these current village boundaries.

Ban Done village boundaries

In the north, Ban Done is bordered by Ban Sop On, with the Nam Swing as the border from the Huoui Swing to the Nam On. The boundary follows along the Huoui Swing across the feeder road to the Nam Kathang Gnai. The opposite side of the Nam On is the boundary from the tributary of the Huoui Ta Long to the Sayphou Xoy Range towards the Huoui Yai where it drains to the Huoui Mun Tun. The eastern boundary is Ban Ka Oy from the Huoui Mum Tun to the old road towards the watershed of the Huoui Kheng Sun that drains to the Nam On until it reaches the Huoui Khone Khen. The border to the south is from the tributary of the Huoui Khone Khen to the feeder road towards Huoui Lao Yai and into the Nam Kathang Gnai. The western boundary is from the Huoui Lao Yai to the Nam Kathang towards the track to Ban Gnommalat Neua across the Nam Kathang Gnai.

Ban Khone Khen village boundaries

The village is bordered in the north by Ban Done with the Huoui Khone Khen as the border from the tributary of the Huoui Kathang Gnai and the Huoui Lao Yai which drains to the Huoui Khone Khen towards the Nam Theun. From here the boundary runs on the opposite side of the Nam Theun along the Huoui Mun Turn. In the south the boundary is the Gnommalat District, with the border on the Huoui Leak and then from the watershed of the Huoui Leak to the Nam on. The eastern boundary is the tributary of the Huoui Leak and Nam on and then to the watershed of the Huoui Theun. The western boundary is Gnommalat District (Sayphou Xoy Range) with the Nam Kathang Gnai as the border.

- ❖ The villages of Ban Done and Ban Khon Khen will both be relocated within their current village boundaries, and no other village will be relocated there, although they may be joined by some families from Ban Kaoy.

These above village boundaries were described by the villagers themselves and correspond to a combination of administrative, customary land-use and spiritual boundaries. It should be noted that some areas of the Plateau which are not identified as belonging to a particular village, although villagers do make use of them for hunting, fishing, harvesting NTFPs, and for grazing.

In summary, nine of the seventeen villages will be moved relatively short distances and within cultural, land-use and administrative boundaries. Another six villages will be relocated within these boundaries, while two village Sop Hia and Nam Nian, will be relocated back close to their original areas in Khamkerd District.

Prior to and after relocation, new village boundaries will be reviewed, surveyed, and if required, negotiated, as described in Section 10.8 on FLUPAM.

Figure 10-1: Map of 25 Possible Plateau Resettlement Blocks as delineated in 1998

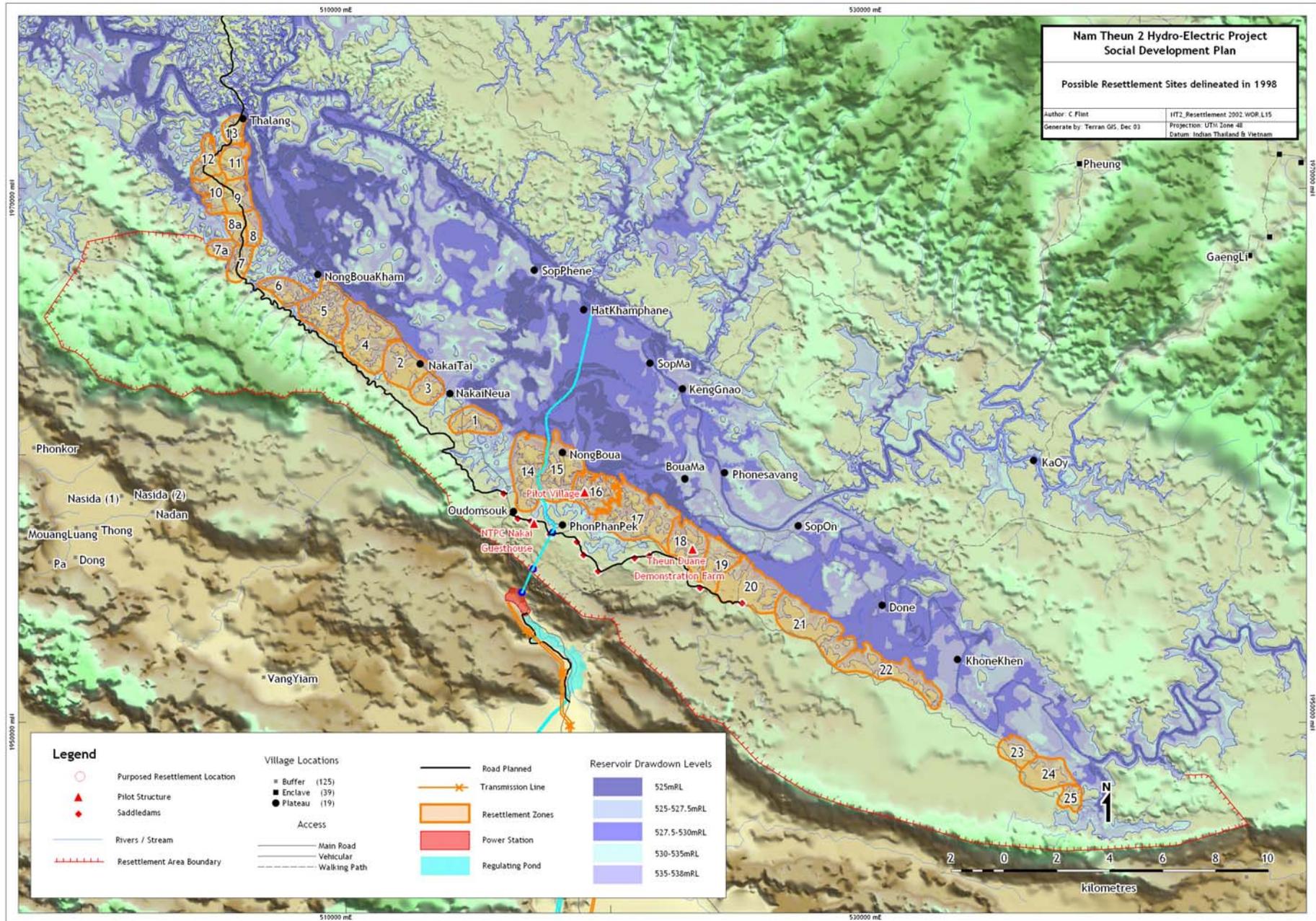
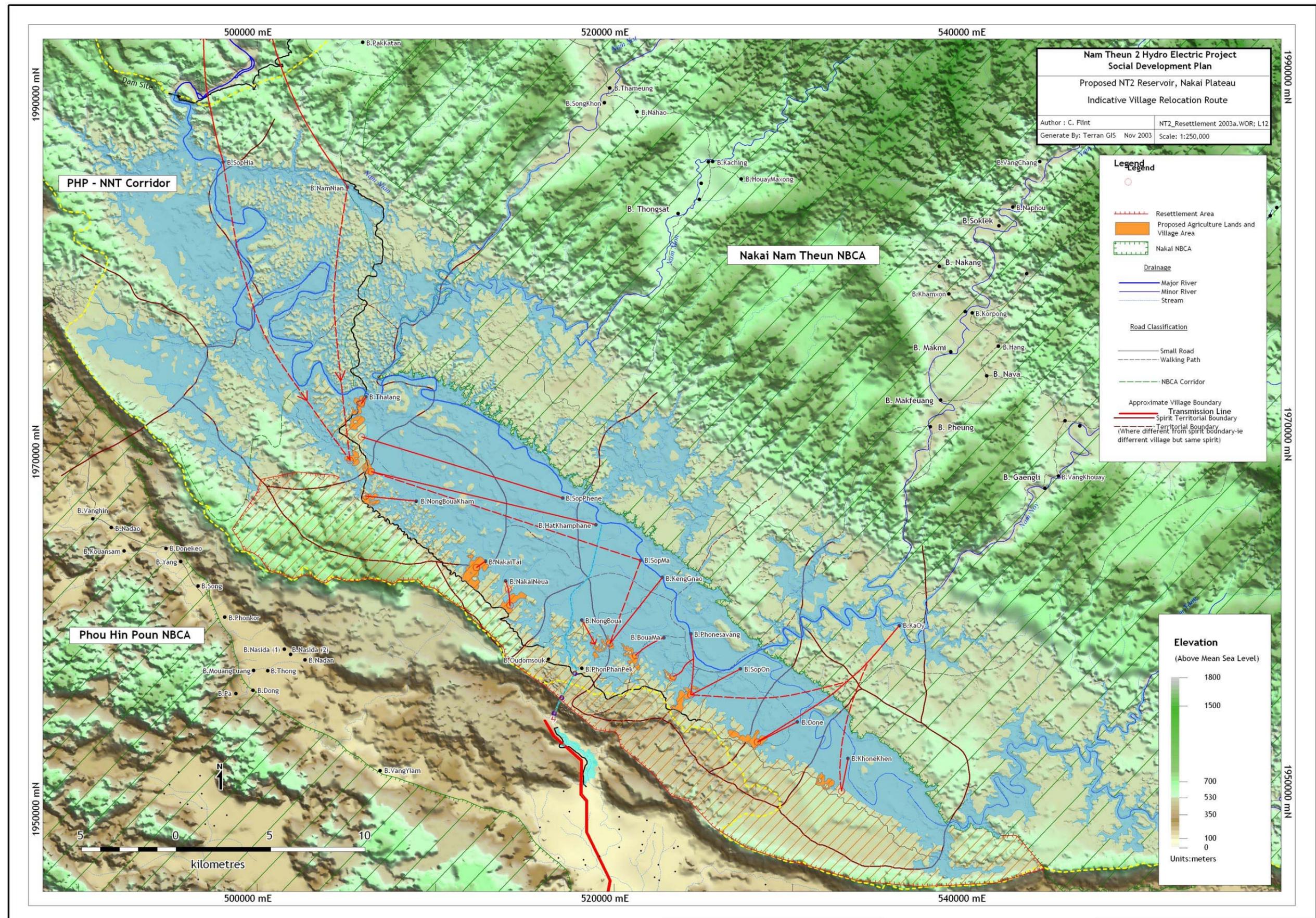


Figure 10-2: Indicative Village Boundaries (1997) of Existing Plateau Villages, and Proposed Relocation Route and Sites (as of 2003)



10.3.2 Ethnic Identity and Relocation

From the point of view of ethnic identity and the possible impact on the culture of the different ethnic groups, all groups share a common culture on the Nakai Plateau, as described in the EMDP. The vast majority converse in Lao, share cosmological beliefs and a common livelihood system. Indeed, many plateau inhabitants, especially the Tai Bo, describe themselves as ‘Tai Nakai’, meaning ‘ethnic group of the Nakai Plateau’. The Brou and Bo populations have co-existed in the region for hundreds of years and intermarriage is common. Therefore, one should consider that any relocation within the Plateau, even if they are outside traditional village boundaries, as being within the general cultural and cosmological system of reference. Thus, such relocation is not a threat to traditional ways of thinking or an introduction of new cultural beliefs.

There are historical instances of movement within the plateau area with existing villages splitting, satellite hamlets developing and smaller communities joining. Some examples of this historical splitting and consolidation of plateau villages are described under Village Consolidation in Section 10.3.5.

10.3.3 Cultural Preferences and Resource Access

When the idea of relocation was presented to affected villagers during the participatory consultative process, their first reactions were mainly positive. Most welcomed the potential for improved lifestyles and new livelihood options given the poor economic situation on the Plateau. Their main concern was food security, but this did not mean, nor has it ever meant, self-sufficiency in rice. The communities are accustomed to exchanging forest products, fish and livestock for rice or working for others to make up deficiencies in family food needs. Hence, the potential for vegetable, fruit trees and livestock in their new livelihoods was a food security concept with which they were already familiar, given their existing practices. There are also instances in plateau communities where paddy rice production has been developed, primarily the Brou villages to the southeast (Don and Khon Kaen and the Bo villages of Ban Nakai Tai and Ban Nakai Neua.

As regards production forestry, the plateau populations have experience in at least two types:

- (a) the forest plantation owned and managed by BPKP near Ban Oudomsouk (now defunct) where some of the nearby villagers have worked, and
- (b) the various logging activities over the last ten years, in which some villagers have participated in, in various capacities.

Many villagers are now interested in the prospect of working on community commercial forestry activities, particularly as it held the promise of a stable cash income.

Villagers are aware that the GOL prefers that they stop practicing pioneering swidden in new areas of forest and try to develop sedentary farming practices. Although they are more familiar with swidden agriculture, most expressed a willingness to adopt stabilised agricultural activities. However they were also keenly aware that their new lifestyles would have a number of unfamiliar aspects for which they would require training.

10.3.4 Assessment of Villager Preferences in 1998

Villager preferences for the plateau relocation sites have been previously assessed on two occasions. The first, in the dry season of 1997/78, identified the general area where they would prefer to be resettled. In the second assessment, conducted in 2003 more specific sites were identified within the broader area selected earlier. The results of these two participatory assessments, along with the relocation distances and boundary changes that they would incur, are presented in Table 10-2 and the latest indicative resettlement site shown in Figure 10-2. The third assessment will be made during the rather protracted FLUPAM process (see Section 10.8)

Table 10-2: Summary of Consultations on Villager Preferences for Relocation Sites.

Reservoir Village	Potential sites considered in 1997-98, > distance from village	Indicative Site(s) 2003, and distance from current village	Within same ethnic group	Within village boundary	Within district boundary
Ban Thalang	Zone 11: 2 km Zone 12: 2.5 km Zone 13: 1 km	Zone 11: 0.5 km	Yes	Yes	Yes
Ban Nong Boua Kham	Zone 5: 1.5 km Zone 6: 2 km Zone 8: 2 km	Zone 7: 2.9 km	Yes	Yes	Yes
Ban Nakai Tai	Zone 4a): 1 km Zone 4b): 2 km Zone 4c): 3 km	Zone 2: 0.6 km	Yes	Yes	Yes
Ban Nakai Neua	Zone 1: 1 km Zone 2: 1 km Zone 3: 0.5 km	Zone 1: 0.9 km	Yes	Yes	Yes
Ban Sop Phene	Zone 1: 5 km Zone 2: 5 km	Zone 11: 12.2 km	No	No	No
Ban Hat Khamphane	(Considered as one administrative unit)	Zone 11: 13.2 km (possibly with Sop Ma)	No	No	No
Ban Sop Ma	Zone 14: 6 km Zone 15: 6 km Zone 16: 6 km	Zone 8: 10.6 km (with Hat Khamphane) Zone 16: 5 km (with Keng Gnao)	No Yes	No No	No No
Ban Keng Gnao		Zone 16: 4.8 km (possibly with Sop Ma)	Yes	No	No
Ban Sailom, Ban Nong Boua, Ban Pamanton	Zone 16: 2 km Zone 17: 3 km Zone 18: 3 km	Zone 16: 2 km (pilot village site)	Yes	Yes	Yes
Ban Boua Ma	Zone 17: 2 km Zone 18: 1 km Zone 19: 3 km	Zone 17: 2 km	Yes	Yes	Yes
Ban Phonsavang	Zone 19: 3 km Zone 20a): 1 km Zone 20b): 5 km	Zone 18: 3 km beside Theun Douane Demo Farm Zone 19: 3.5 km (with Sop On)	Yes Yes	No No	No No
Ban Sop On (including Nikhom 3)	Zone 20a): 3 km Zone 20b): 3 km Zone 21: 4 km	Zone 19: 3.3 km (possibly together with Phonsavang)	Yes	Yes	Yes
Ban Done	Zone 21a): 3 km Zone 21b): 2 km Zone 21c): 2 km Zone 22: 2 km	Zone 21: 2.9 km	Yes	Yes	Yes
Ban Khone Khen	Zone 23: 4 km Zone 24: 6 km Zone 25: 7 km	Location to the south of original site 22: 2 km	Yes	Yes	Yes
Ban Ka Oy	Zone 20a): 1 km Zone 20b): 1 km BR : 1 km	Zone 19: 12 km (together with Sop On & Phonsavang) Zone 21: 10.5 km (with Done) Near Zone 22: 11 km (with Khone Khen)	No	No	No
Ban Sop Hia (Vietic Groups)	1) in-situ, up slope, 500 m 2) Zones 7-13: 15-20 km 3) Bolikhamxay	Zones 10-12: as its own village, or possibly a hamlet of Thalang	Partially	Partially	No
Ban Sop Hia and Nam Nian (Tai Groups)	“as above”	Ban Nam Pan area, in Khamkerd District	Yes	No	No

10.3.5 Possible Village Consolidation or Splitting

As can be seen from the above table, adhering to villager preferences for relocation sites will, in some instances, require the consolidation of more than one community or hamlets into a resettlement village. Such village consolidation will facilitate the provision of improved infrastructure and services, and with the proper support as planned under the SDP, will allow stronger and more cohesive communities to develop, with the capacity to manage and improve their own livelihoods in a cooperative and sustainable manner. Existing village structures will be maintained, and the cultural traditions of villagers will be

respected during any consolidation process that may be required. The following consolidations are likely to occur:

1. The hamlets of Nongboua, Sailom and Pamonton are an unstable village group that has changed composition and location several times over the past 10 years. Originally, a number of families left the large village of Bouma, a mixed Bo and Brou village, to establish a new village called Sailom. This later split into different hamlets in the 1990s. In 2001, Pamonton ceased to exist as its inhabitants joined the other two hamlets. The Pilot Village involves the relocation of the remaining two hamlets into one new village, called Nongboua Mai ('mai' meaning new). In establishing this 'consolidated' village, there have been no problems regarding ethnicity since both Bo and Brou families have been living together for some time, and are originally from the same village. Villagers themselves agreed to this arrangement during detailed consultations held in 2002-03. In addition, the site of relocation is within traditional territory and within the spirit boundaries of Bouma village, the village of origin of these hamlets.
2. The villages of Keng Ngao, Hat Khamphene and Sop Ma are all small hamlets, located on the left bank of the Nam Theun upstream from Ban Talang. They form one administrative village unit with a single leadership structure. The first village is a predominantly Brou village while the latter two have majority Bo populations. All three settlements are fairly new, being formed as offshoots from Ban Bouma but a number of Brou households joined these settlements from Ban Teng and Ban Thaphaiban in the NT2 Watershed area. There are two proposed sites for the three settlements since none are more than 30 households. No problems regarding ethnicity is envisaged since both Bo and Brou families have been living together for some time, and the village units are already functioning administratively as one village. Proposed relocation is outside traditional boundaries but within familiar territory with the same neighbouring villages.
3. The village of Ka-Oy to the north of the proposed reservoir and on the Nam Theun is a traditional Brou village. There are close ties with the neighbouring villages on the Nakai Plateau, intermarriage and trade agreements, especially with Ban Done, Khone Khen and Ban Sop On. There has also been a history of migration up and down the Nam Theun in search of suitable sites for swidden and to avoid flooding and pests. Villagers in Ka-Oy look upon the other Brou and Bo villages as relatives (*phii nong*) and should not have a problem integrating with regards to ethnicity. Special efforts should be made to ensure that a consensus is reached in an equitable manner and that the village moves as a whole unit, or at least following clan lines.
4. The village of Phonesavang is a Brou village that has been formed by households from Sop On to the southeast and by new arrivals from the NT 2 Watershed Area. Many of these villages are related but a number of families have connections to villages to the north in the Watershed. The latter are relatively new arrivals. The proposed integration into the new site for Sop On should not create problems for ethnicity as long as traditional clans and kinship organisation are respected in the village layout. If necessary, there is also the option of relocating Ban Phonesavang on a separate site.
5. The Tai populations in the villages of Sop Hia and Nam Nian in Bolikhamxai Province are a special case since most are recent arrivals (within the last 10 years) from Khamkeut District and surrounding areas. These villages have located beside existing Vietic groups and have adapted to swidden farming and gathering of NTFPs. This was an economic migration caused in part by a shortage of land in their original village sites and in part by the opportunity to exploit an area relatively rich in natural resources and with a low population. The relocation of the Tai-speaking groups to a site in Bolikhamxai would be to return them to familiar territory, of the same ethnic group, but with support for developing sustainable livelihood systems. The various Tai groups speak different dialects and are divided into clans but there is considerable intermarriage and shared values.

10.4 TECHNICAL SITE INVESTIGATIONS

10.4.1 Specific Site Selection Criteria and Site Carrying Capacity

Following the consensus amongst plateau villages that the main resettlement zone should be on the southern shore of the Nakai Reservoir, the Prime Ministerial Decree 193/PM was enacted on 29th

December 29, 2000 to legally establish the entire plateau area southeast of the reservoir as the Resettlement Area, and defined its boundaries and legal status. The decree required that more detailed studies would be required to establish the exact location of specific resettlement sites.

During consultations undertaken between 2001 and 2003, leaders of plateau villages then went on to further clarify the exact preferred location of the resettled village (see Figure 10-2).

Notwithstanding the fact that total village consensus will first be sought, rather than just villager leaders, for relocation site preference, a range of technical studies or other considerations must also be undertaken to confirm the resources, the development potential and the suitability of each site, before detailed village layout planning can be undertaken. At least three types of technical studies are will required to precisely locate the resettlement village sites and farm plot areas (see Sections 19.4.2 to 19.4.4) based on the three main technical considerations for resettlement site selection and suitability assessment - topographic, soils and irrigability, which are part of the larger considerations of agricultural potential, social considerations and resource endowments and location (see Table 10-1).

On the basis of the above criteria, potential resettlement sites should be located on the reservoir shoreline, with access to irrigation water, and the drawdown zone. Access to grazing and forest lands is also important. Most of the land should have slopes less than 15 percent, suitable for village sites and the establishment of individual farm plots. Many of the potential resettlement areas meet these criteria, and also fall within existing village customary use areas (see Figure 10-2). The existing land use in the resettlement area is indicated in two maps, a interpretation based on year 2000 Spot imagery (Figure 10-3) and the more recent satellite photo compilation of QuickBird photos and Landsat images (Figure 10-4).

The availability of land is of course a basic consideration. A minimum total resettlement area of 810 ha will required, based on approximately 1000 households each requiring a 0.66 ha flat or terraced farm plot, with an additional approximate requirement of 140 ha of land required for housing and associated village facilities (based on a house plot size of 30 x 30 m, or 0.09 ha, plus land for schools, markets village meeting hall and office etc).

Beginning in 2003, the NIPC has started to investigate the topographic, soil-type and irrigation considerations. The investigations could be seen a progressing through four (4) phases, as follows:

- (i) Reconnaissance;
- (ii) Conceptual planning;
- (iii) Detailed survey and feasibility assessment; and
- (iv) Detailed Design.

A summary of these four phases, and progress to date, for the three main technical considerations, is provided in Table 10-3 and described in more detail in the following sections.

10.4.2 Topography

Resettlement village sites must encompass adequate areas of flat or gently sloping land for house construction and agricultural land development. These areas must also be largely contiguous to enable the development of irrigation systems and associated structures. Slopes must be less than 15 percent for effective development of terraced farm land. Steeper slopes would require the movement of excessive amounts of top soil (to create terraces), uncovering infertile sub-soil horizons or even underlying parent material in the shallow surface soils that predominate in the area. In addition, the risk of soil erosion, particularly in the early years of terrace development before contour hedgerows are fully established, increases with steeper slopes. Soil erosion is a particular risk, given the erodable nature of the sandy loams and loamy sands common in the area.

In addition to the presence of sufficient areas of appropriate land for the village site and farm plots, at least one point of sufficiently high elevation to site a header tank providing adequate head for gravity irrigation will be required in close proximity to the agricultural land area. Topographical considerations will also be important in designing the layout of irrigation water distribution systems.

Table 10-3: Technical Survey and Design Studies for Topography, Soils and Irrigation.

PHASE	Topography	Soils	Irrigation
Reconnaissance	Use existing topo-maps and field visits to develop general understanding of potential resettlement sites	Broad reconnaissance soil survey to be conducted along transects to identify particularly promising or extremely poor soils.	General survey of irrigation potential to identify potential for each site, possible systems and approximate costs.
>> status	<i>completed in 1998</i>	<i>due Oct to Dec 2004</i>	<i>completed in 1998</i>
Conceptual	Using existing topo maps and other available data to develop a conceptual plan for each site.		Following further site-specific studies on sites identified by soil and topo. surveys to select systems and define specifications.
>> status	<i>ongoing</i>		<i>completed, see Chapter 13</i>
Detailed survey and feasibility assessment	Topographical survey's and mapping, at detailed scale, on which to assess agricultural and irrigation feasibility.	Soil survey of selected sites to assist feasibility analysis	Based on topographic survey, including location of pump site and header tank, to contribute to feasibility and confirmation of 'concept'.
>> status	<i>3 villages complete by May 2004, another 5 by Dec 2004</i>	<i>due November to Dec 2004</i>	<i>start June 2004</i>
Design	Design of farm plot layout and village house layout etc		
>> status	<i>pilot village complete, first group of others in 2004-05</i>		

Existing topo-maps and topographical data have been used for preliminary resettlement site selection and for assessing and comparing the potentials of each. A detailed topographic survey will be undertaken at each of the chosen resettlement sites, following the reconnaissance soil survey. The data collected during the survey, will be used to produce topographical maps at a scale of 1:2,000 with 0.5 m contour intervals. The topographical maps produced will be used to identify housing sites, and will also be the basis for the layout, and later titling, of the individual farm plots. The completed maps will also be used for village layout and infrastructure planning including the location of roads, houses, community structures and areas for future growth, for planning the soil survey and for the detailed design of the water supply systems both agricultural and domestic.

10.4.3 Soil Survey and Suitability

Soil surveys are required to (a) identify any areas with significantly better soils than those areas currently identified by a combination of villager preference, topography and closeness to reservoir waters, and (b) provide a better understanding of soil quality and constraints of selected resettlement sites. The aim is to reduce the level of risk associated due to poor physical and nutrient condition of the soil types which predominate in all the resettlement sites.

Soil surveys will begin with an initial reconnaissance survey covering all land identified as generally suitable for agriculture based on topography and irrigation potential. The intention here is to identify any soil types with particular promise for agriculture or any particularly poor soils unsuited to agricultural production. This survey will be transect-based and somewhat broad, based on a few main parameters (texture, colour, pH, N, P, CEC, for example). Existing or earlier forest types may be assessed prior to the survey as an aid to defining appropriate transect lines to ensure that potentially promising soil types are not missed, as natural forest cover is determined to a large extent by soil moisture regime and soil type and thus may be a valuable indicator of soil fertility.

Following the reconnaissance survey, a detailed grid-based soil survey may be undertaken. Survey results will be computerised and used in a GIS system, where they can be overlaid with topographical survey and other spatial data sets to assess land capability classes. Here again, the survey will be supported with soil chemical analysis for all soil types identified. Unlike previous soil surveys, chemical analysis will be expanded to include lime requirement and soluble ferric iron. Lime requirement is essential for calculating inputs to ameliorate the high level of acidity in the major soil types and soluble ferric iron levels. This is essential to assess the potential risk of iron toxicity in paddy rice to which the commonly occurring Ferric Acrisols found in the area are prone.

The second and more detailed survey will thus include:

- Soil survey of the potential resettlement sites at a scale of 1:5,000
- Preparation of maps at a scale of 1:5,000 for soils, land use and land capability
- Prepare of a soils report incorporating the findings of the survey including physical and chemical characteristics

The grid survey method will require up to 120 observations per square kilometre, to be used with additional observations on the physiographic correlation of the soils, and some additional detailed observations at designated intervals. The physiographic survey is used to provide for more exact soil boundaries. Aerial photo interpretation (API) may be used in combination with topographic maps, traditional land use, forest cover and geological maps as a means of finalizing the soil boundaries after completion of the fieldwork. Such a detailed soil survey will take time and require significant manpower requirements and will therefore begin in late 2004, immediately following the topographic surveys.

10.4.4 Water Supply and Irrigation Potential

All resettlement sites will be provided with water supply systems for both domestic use and irrigation of the agricultural land. The water sources, types and designs of individual systems will vary according to local topography, distance from the reservoir, groundwater-quality, water-table types and depths, and the resettled village population.

Domestic supply will be of adequate quality and quantity to serve the needs of all households. In some cases it may be common to the irrigation supply system, with or without additional treatment. In other cases, however, domestic and irrigation water systems will be separate. Domestic water supply systems that might be considered include rainwater storage, bore holes, lined dug wells, impoundment of small streams, and reservoir-water with or without treatment depending on water quality. Water sources and supply systems for domestic purposes will be assessed for each site, and, where required, groundwater surveys will be conducted.

The assessment, planning and conceptual design of irrigation systems will be based on access to year round water from the reservoir, which is dependent on local topography and slope. Systems will comprise intakes, pump-stations, supply lines, header-tanks, distribution systems and on farm irrigation structures. The potential options currently under consideration for each of the system components, along with design considerations are presented in Table 10-4.

The above system components and design considerations were developed through a generalized reconnaissance design study in 2003 (see Chapter 13). This study assessed overall irrigation potential, feasibility of different sources and delivery systems and estimated approximate cost figures for each.

Table 10-4: Irrigation System Design Considerations and Options for Resettlement Sites

System component	Options	Design considerations
Water sources	Reservoir Natural water courses	Proximity to reservoir yield of water - most likely insufficient
Intake structures	Low-level sump Excavated supply channel	Reservoir water levels/drawdown Channel excavation volumes Sedimentation of sumps/supply channels
Pump-stations	Pontoon pump systems Electric centrifugal pumps Various capacities (12-122 kW) Axial flow pumps at reservoir edge	Power supply Distance/vertical interval to header tank Population/area served/percolation losses Pumping costs/care and maintenance Pumping hours/water duty Future system expansion needs
Supply lines	Flexible hoses to edge of reservoir Steel delivery pipes Flushing valves (for sediment/debris)	Distance to header tank/local topography Static head/pipe diameter Sediment load
Header-tanks,	Reinforced concrete header tanks Sand sediment trap (function of header tank) Stilling basins	Elevation/availability of high points Local topography/area served/IWR Future system expansion needs
Distribution systems	Gravity feed from header tank Lined canals (trapezoidal) Buried pipelines (as in the Pilot Village)	Population/land area/IWR Local topography Lining material for canals
On-farm structures	Stilling basin Flood/furrow/siphon-pipe/hand irrigation On-farm drainage outlet(s)	Cropping patterns/irrigation schedules Soil and slope characteristics of farm plots Size and shape of individual plots

Further site-specific studies for the most appropriate farm plot locations identified by soil and topographical surveys are required to develop detailed irrigation plans. Making use of the aforementioned survey data, these studies will select the most appropriate type of system, the necessary capacity, most suitable components, define specifications and approximate costs, for each of the resettlement sites. These conceptual design studies will begin in 2004, once the topographical and soil survey data become available.

Based on the specifications and cost estimates from the conceptual design phase, detailed irrigation system design will be tendered to private sector contractors under the supervision of Resettlement Office staff. Detailed irrigation system planning will be dependent on the following:

- Accurate topographical data and maps from the completed topo-survey;
- Finalised farm-plot location and layout; and
- Finalised village residential site selection (for combined irrigation/domestic water systems).

Detailed irrigation system designs will take into account the potential need for future expansion to accommodate anticipated population and/or IWR demand increases.

Figure 10-3: Indicative Land Use and Forest Cover of the Plateau Resettlement Area

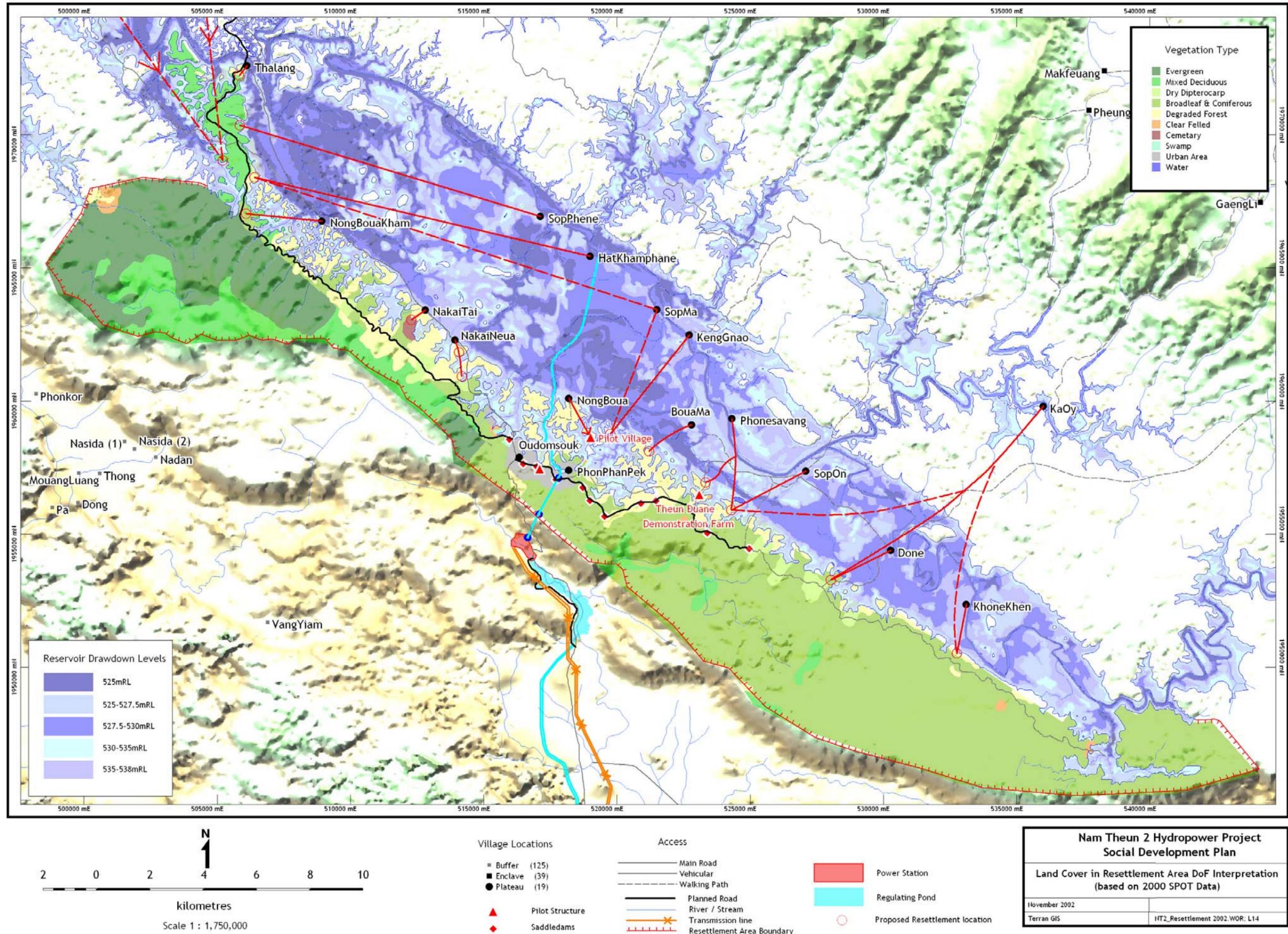
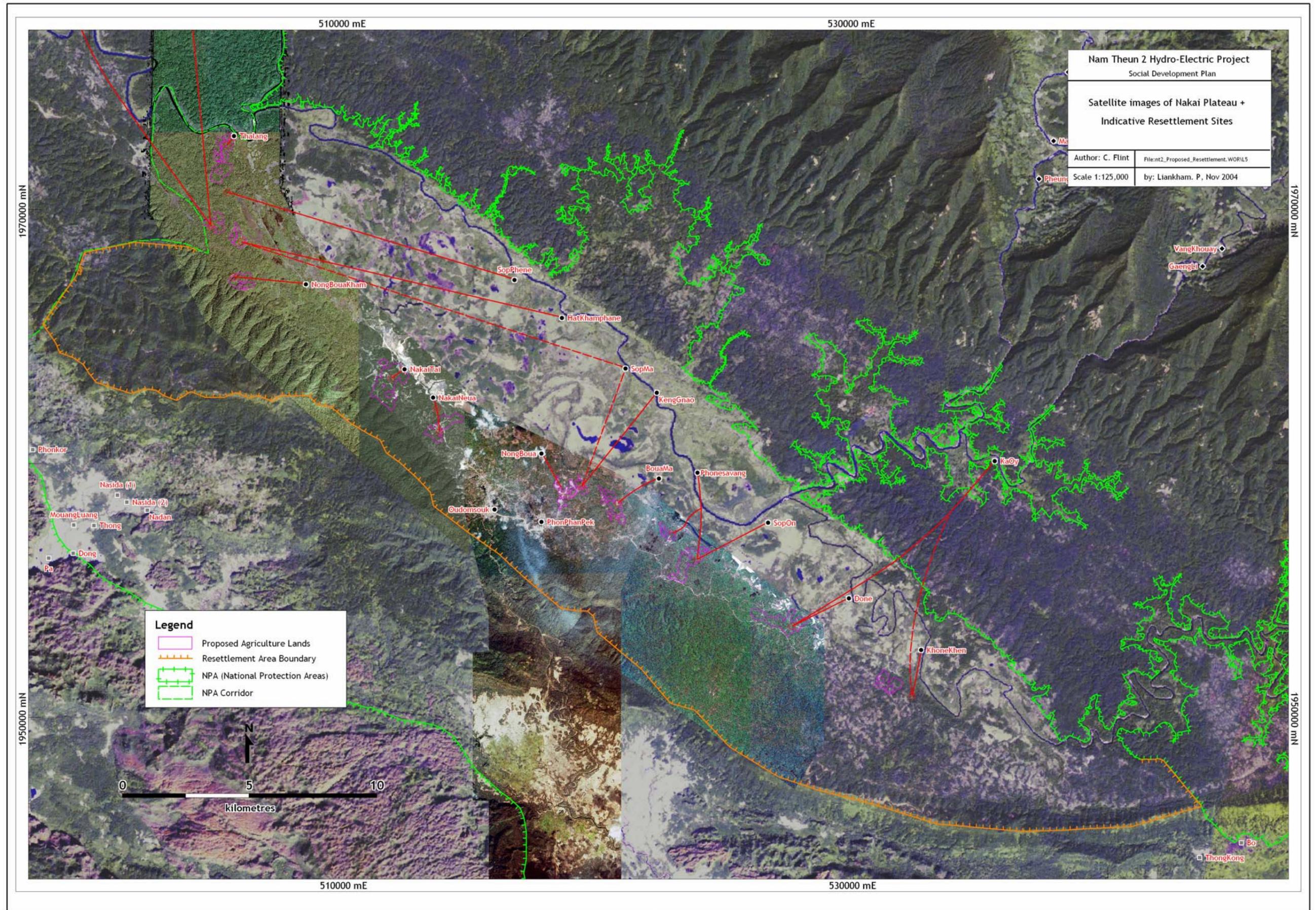


Figure 10-4: Satellite Photo Coverage Indicating Forest Cover and Land Use of the Resettlement Area



10.5 EXPERIENCE OF RESETTLEMENT OF THE PILOT VILLAGE - BAN NONG BOUA

The objective of selecting and establishing a Pilot Village to be moved in advance of the others is to provide an opportunity to trial implement the survey, design and implementation procedures, to test assumptions, to verify predictions and work out solutions to problems in advance of the main relocation. The Pilot Village has been carefully planned and implemented and is already providing insights and lessons for the future resettlement process.

The three hamlets of Ban Nong Boua, Ban Sailom and Ban Pamanton were selected for relocation as a Pilot Village based on the following:

- Villagers were positively inclined towards moving as soon as possible;
- The hamlets were relatively small and had much to gain from resettlement;
- The re-location distances involved were generally less than one kilometre;
- The hamlets contain both Brou and Bo ethnic groups, and would thus provide valuable lessons for future village consolidation;
- The total number of households involved was 30, which was considered sufficient to be representative of future relocations, but small enough to be manageable as a pilot;
- Existing houses and conditions were generally of very poor quality; and
- The potential for developing irrigation based on a small reservoir on the Malai creek.

Planning for the establishment and relocation to the Pilot Village commenced in 2000 and actual relocation began in early 2002. Planning involved:

- In depth consultations with the 30 households involved;
- Participatory preparation of village layout plans and options;
- Soil survey
- Topographic surveys and design of field and house layouts;
- Preliminary design of infrastructure works; and
- Detailed design of the irrigation systems.

Detail consultations were carried out with villagers from the three hamlets regarding site selection, village and farm-plot layout and the location of individual households. Following site selection, EI 538 was marked off with fencing and land was cleared in April 2002. Identification of potential land for irrigation and system requirements was carried out in the second half of 2002. An access road to the relocation site was completed and facilities for technical staff were constructed in late 2002. The RMU supervised planning and relocation activities with the assistance of the RO, technical specialists from the demonstration farm at Theun Duane and Ban Nakai Neua Nursery staff. The villagers first cropped their agricultural lands in the 2002 wet season, and three houses constructed at that time. Most houses were constructed in late 2002 and 2003. Appendix C provides a detailed overview of the establishment of the Pilot Village and its present status.

Valuable experience has been gained from Pilot Village relocation, and has been used to modify future plans for the main resettlement process. Ongoing development and support is being provided, and further lessons are expected to be generated. The major lessons learned to date include:

- The topographical survey data were not sufficiently detailed for planning purposes. As a result, topo-survey plans for the remaining areas have now been changed to a scale of 1:2,000 with 0.5m contour intervals.
- Soil surveys were not implemented on a grid system, and thus results difficult to interpret and use.
- The original plans that each family would be given 0.15 ha area of paddy separate from the main farm plot was found not to be workable, nor wanted by villagers. As a result, the 0.15 paddy land entitlement and the 0.5 ha of agricultural land entitlement, will be combined to a 0.65 ha irrigated

agricultural land entitlement, and villages will develop and plant paddy rice were and when they consider it feasible, but most likely on the lower terraces of the farm plot.

- The original plan of constructing the family house on the farm plot was not acceptable to villagers, who wanted to reside together as a ‘nuclear’ village in close proximity to each other.
- The consolidation of disparate hamlets of different ethnic groups into a single community has not posed any problems. The various groups are living together in harmony and inter-marriage continues to take place.
- Planning and constructing the irrigation system highlighted a number of technical and local constructor capacity problems. It emphasized the need for thorough surveys prior to design, for a thorough design process of all components, and the need to strengthen the technical screening and selection of contractors.

10.6 SCHEDULE OF VILLAGE RELOCATION

It is intended to move all villages to their respective resettlement sites in an orderly manner with the minimum level of stress and social upheaval in the affected populations. The relocation schedule will be carefully developed, to ensure all villages are relocated in an orderly manner, and before any impacts are experienced in their existing locations. Existing villages will be affected by flooding at different times, as first the coffer dam (at 524 ESL) and then the main reservoir fills. Those (slightly lower) villages that will be affected by backwater flooding due to the coffer dam will need to be moved first, followed by those that will be affected first by reservoir inundation. The impact of flooding is obviously dependent on elevation, thus those villages at higher elevations, those very close to new resettlement areas (on the edge of the plateau) will be moved last. The current planning schedule for relocation is presented in table 10-5 below.

Table 10-5: Indicative Relocation Schedule of Plateau Villages with Predicted Number of Households to be relocated at the actual time of Relocation.

no	Old Village Name	New Village (post relocation)	No. HHS at time of relocation
Already relocated (2003)			
1	Nong Boua	Nong Boua	30
Relocation planned for 2005 - 2006 dry season			
1	Sop Hia	New Sop Hia & Nam Pan	58
2	Nam Nian	Nam Pan	28
3	Boua Ma	Boua Ma	64
4	Sop Phene	Sop Phene	54
5	Nong Boua Kham	NongBouakham	50
6	Sopma, Hartkhampan, Gangnao	Sopma & Nong Boua	68
7	Phonsavang	Phonsavang	32
8	Sop On	Sop On	99
<i>sub-total (05/06)</i>			453
Relocation planned for 2006 - 2007 dry season			
1	Thalang	Thalang	70
2	Done	Done	127
3	KhoneKhen	Khone Kene	48
4	Ka Oy	> Done/Khone Kene	32
5	Nakai Neua	Nakai Neua	91
6	Nakai Tai	Nakai Tai	195
7	Oudomsouk	Oudomsouk	103
8	Phonphanbaek	Phonphanbaek	56
<i>sub-total (06/07)</i>			722
<i>Total (approximate)</i>			1,205

note: refer to table 2-2

The plan is to build houses and give the villages the option of relocating their dwellings over a two year period after Financial Close. This front loaded schedule is required to ensure that villagers dwellings are established in the new locations, before the Nakai Dam is closed and the plateau starts to be inundated, which is due in May 2008.

However, the development of the agricultural fields in close proximity to the villages themselves can take place over a slightly longer period, in the 3 years after Financial Close. This is for two main reasons:

- (i) prior to dam closure villagers will still be able to crop (to some extent), forage, graze animals and fish on the main plateau area, so the incentive and the need to focus their agriculture solely on their new site is not as strong as it will be after the start of plateau inundation;
- (ii) as access to water for irrigation purposes will, for most resettlement sites, be dependent on reservoir inundation, full development of irrigated agriculture can only take place 4 to 5 years after Project Commencement (FC). Resettlement sites with an opportunity for non-reservoir based irrigation (e.g. Nong Boua, Bouma and Phonsavang villages) will be developed first. However, it will be unavoidable that in some villages the full development of irrigated agriculture can only take place when the water from the reservoir is available.

10.7 VILLAGE LAYOUT

10.7.1 Village Layout Preferences of Affected Communities

PCPP meetings were held in the affected villages on the Nakai Plateau by NTEC consultants and GOL officials in 1997 and 1998. These participatory consultations were aimed at fully ensuring active community involvement in planning, improving villager understanding of how the Project would affect their lives, and obtaining local perspectives on resettlement. Participatory mapping techniques based on individual aspirations and community ‘visions’ for livelihood systems and quality of life were used in these consultations. Table 10-6 summarizes the results of the participatory mapping exercises which culminated in sketching ‘dream’ maps of the resettlement areas, along with key attributes of the new villages.

Table 10-6: Resettlement Preferences of Plateau Villagers

Resettlement Village	decreasing level of perceived need																
	Within vicinity	School	Road access	Electricity	Dispensary	Water source	Toilets	Temple	Well water	Market	Rice mill	Paddy	Vegetable gardens	Village hall	Orchards	Forest access	Grazing areas
Ban Sop Hia	•	•	•	•	•	•							•			•	
Ban Nam Nian	•	•	•	•	•	•	•		•	•		•		•			
Ban Thalang	•	•	•	•	•	•	•	•		•				•		•	
Ban Nakai Tai	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Ban Nakai Neua	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Ban Sop Phene	•	•	•	•	•	•			•				•		•	•	
Ban Sop Ma*	•	•	•	•	•	•	•	•	•	•	•		•				
Ban Sailom**	•	•	•	•	•	•	•	•	•		•	•	•	•	•		
Ban Boua Ma	•	•	•	•	•		•	•	•	•	•		•	•		•	
Ban Phonsavang	•	•	•	•	•	•	•	•		•	•	•			•		•
Ban Sop On***	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
Ban Done	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Ban Khone Khen	•	•	•	•	•		•				•	•					•

*Ban Sop Ma includes three hamlets: Ban Sop Ma, Ban Hat Khamphane and Ban Keng Gnao

**Ban Sailom includes three hamlets: Ban Nong Boua, Ban Sailom and Ban Pamanton

***Ban Sop On includes the three households of Ban Nikhom 3

Review of Table 10-6 and reference to notes taken during the consultations, revealed a number of key local preferences for the new village layouts:

- As with current village layouts, residential areas should form the core of the village separate from farm plots;
- Orientation of the village should be along a road with each house having access to the road;
- Services such as electricity, access to running water and toilets should be privately owned and not communally shared;
- Each household would like their own small garden area by the house; and
- Non-residential buildings such as schools, the dispensary, village hall and religious structures should be located adjacent to, but outside the village residential area.

A similar participatory planning process has already been used for the design of the Pilot Village. Here again, a major design feature desired by the resettled households was that villages houses should be grouped together, separate from the farm plots. This is reflected in the Pilot Village resettled households' choice of Layout 2 from the two proposed layouts, Figure 10-5 and Figure 10-6.

10.7.2 Detailed Village Layout Planning

A consultative and participatory approach will continue to be taken in the planning of village layouts to ensure that local preferences are incorporated, and to allow for flexibility among different resettlement villages. The process will consist of two main steps:

- (i) the development of village layout options through participatory planning for each resettlement village; and
- (ii) the preparation of technical plans for the desired layout.

The first step is entirely participatory and based largely on villager ideas and preferences (with facilitation from RO and RMU staff). These proposed village layouts will be over-laid on the new topographic maps (at 1:2,000 to 1:5,000 scale), along with information on soils, water supplies, etc. to check their technical feasibility. This will generate detailed technical plans which will be re-presented and discussed with villagers for feedback, modification and final approval.

The development of alternative village layout options will be an iterative process. As new ideas and options are received from one resettlement community, they will be added to the growing 'inventory' of options that can then be presented to and discussed with other villages during the planning process. The participatory nature of planning will be facilitated by simple approaches. Maps and aerial photographs will be used to aid participatory analysis at two levels, firstly, the village position and its relationship with farm-plots and other resources such as the reservoir, grazing land and village-use forests, and secondly, the location of houses, roads and infrastructure within the village itself.

Scale 3-D models may also be used to place specific features - houses, schools, farm plots, forest, etc. - to enable villagers to explore different options and combinations in a visual, easily understood and realistic format.

Figure 10-5: Proposed Pilot Village Layout 1 - Houses Located on Agricultural Plots - Farms

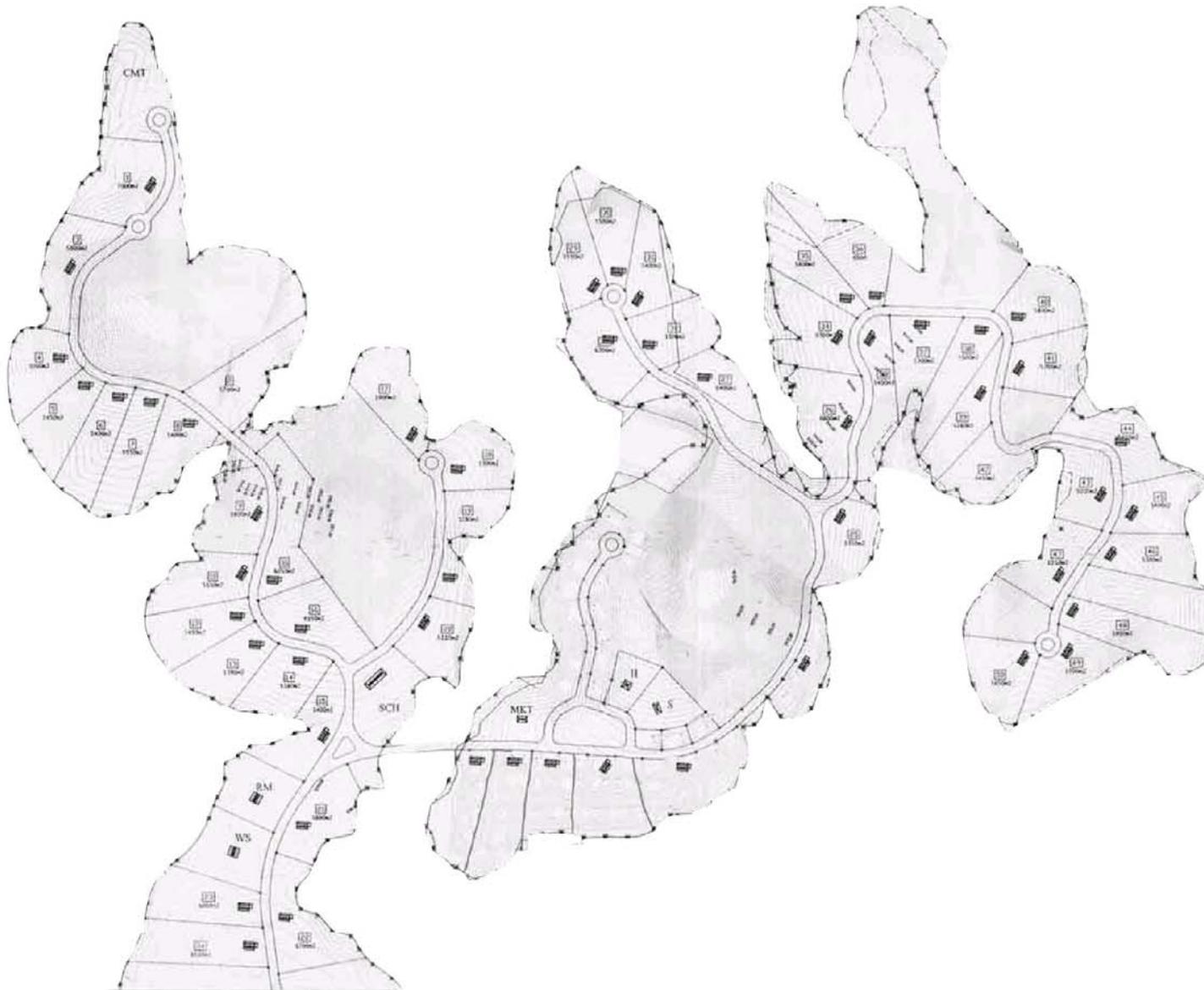
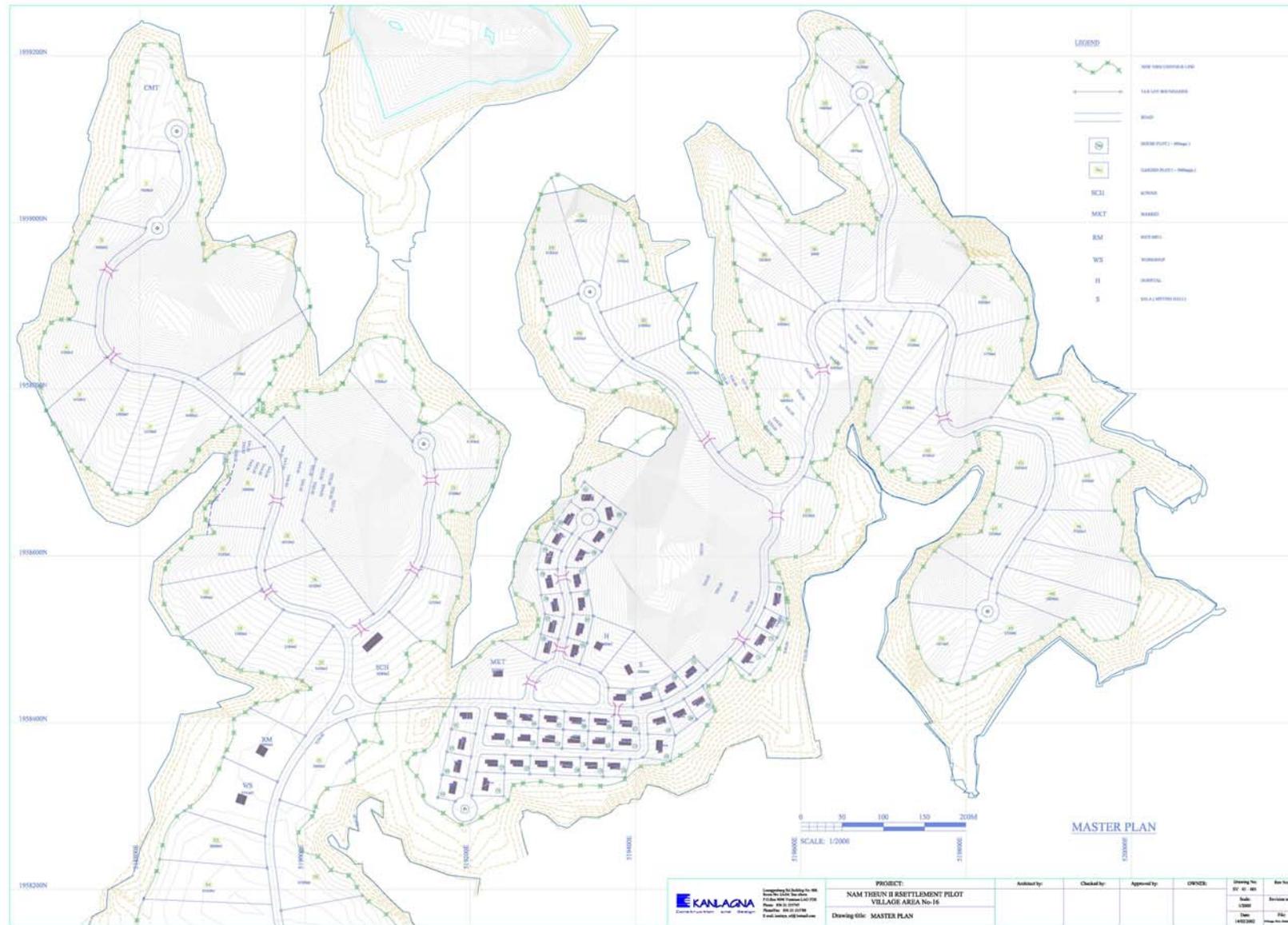


Figure 10-6: Proposed Pilot Village Layout 2 - Houses Grouped in a Village - Chosen by Villagers



10.8 VILLAGE LAND AND FOREST USE PLANNING

Prime Ministerial Decree 193 of 29/5/2000 defines the (approximately) 20,000 ha Resettlement Area, and specifies that the Resettlement Area and Forest Area will be used by resettlers, allocated to families to establish houses and given to them for sustainable use.

Prime Ministerial Decrees 37 of 12/4/04 then specifies in article 4.1 that '*The Minister of Agriculture and Forestry is entrusted in collaboration with the Provincial Governor, local administrative authorities, the department for national land planning and development and the Resettlement Committee for the determination of the boundary of the land areas and categories of land uses such as the area on which new villages will be established, the area for agricultural production activities, the forest land area for a sustainable forestry business activities, the area for construction and expansion of Nakai District for the future, consistent with the actual local conditions*'.

Recent discussions on this directive have resulted in the agreement that villagers should also be incorporated in the land and forest use planning exercise, and indeed this is consistent with the widely accepted FLUPAM process. This issue, along with the need to ensure (a) that the land and forest use planning in the resettlement areas takes the resettlers needs as the primary objective, and (b) to ensure that land acquisition and use is managed (not just planned), will be addressed by the enactment of a Provincial Governors Directive (in December 2004) to ensure the managed and appropriate planning, delineation and distribution of land and resources in the Resettlement Area (see Chapter 3).

The ultimate objective will be to have a Land and Forest use management plan for the entire Resettlement Area, which would include zonation in to major use categories which may include;

- urban areas (especially around Nakai District centre);
- village areas;
- industrial areas;
- tourism areas;
- rural and permanent agriculture areas; and
- forestry areas, etc

However, such a total Resettlement Area planning should ideally be a product of a participatory planning process, the main component of which would be the forest and land use planning of each resettlement village, as described below.

10.8.1 Forest and Land Use Planning, Allocation and Management

Forest and Land Use Planning, Allocation and Management (FLUPAM) is a process of participatory resource management planning, aimed at ensuring equitable access to forest and land resources and providing the basis for their sustainable management by local communities. The process was initiated some years ago in the Lao PDR, and has seen evolution and improvement to the stage where clear and effective guidelines and processes are now available. However, FLUPAM objectives, and also the guidelines and processes for its implementation, must be adapted to the particular situation, and the resettlement of villages on the Nakai Plateau is such a particular situation.

In the case of the Nakai plateau Resettlement Area, the major objectives of FLUPAM will be;

- to develop appropriate and balanced forest and land use zonation, with a view to sustainable management systems and productive land use in order to achieve sustainable and integrated resettler livelihoods;
- to ensure equitable access to forest and land resources for all resettler community members, and formalizing land use rights within the existing legal framework.
- to develop a partnership between villages and the Government for the joint management of forests, agriculture land, other lands and the reservoir.

Although NTRA-FLUPAM will employ many of the methods and tools which are common to standard LUP procedures, the process has been modified in a many key areas to make it more appropriate for use in Resettlement Area.

- ❖ It will have to be closely scheduled with the whole resettlement program and with the timing that the various livelihoods will be able to be initiated and developed;
- ❖ Land will initially not be allocated with temporary certificates, but rather with permanent land titles (to housing and agricultural land) and permanent use certificates to the rest of the land, to be provided within one year after relocation, or establishment of the agricultural lands;
- ❖ Rather than working in one village at a time, it will be conducted simultaneously for all the villages, or at least in two groups of north western and south eastern villages. The fact that the community networks have already being promoted over many years already, will facilitate this process;
- ❖ Swidden cultivation will not be contemplated in the Resettlement Area, as all agriculture will be sedentary and managed. Thus, monitoring of agricultural land use over time will be much more manageable (in comparison to areas where shifting cultivation is a feature);
- ❖ Unlike other areas, the forests will be intensively surveyed and managed, this facilitating (a) planning of forest use and (b) monitoring of forest use;
- ❖ While NTFP and other forest products will be allocated to each village management and utilization, the commercial timber resource will be managed jointly by all the villages, as one production forest;
- ❖ A significant portion of the Resettlement Area, around 6,000 ha or more, is currently degraded forest, and decisions as to how to develop or manage this area - for forest regeneration, for development for agriculture or grazing, or a mixture of these, can only be made over a long period of time as the productive potential of these areas and livelihoods is further tested and understood.
- ❖ Most (not all) of the RA is currently divided under the responsibilities of 9 villages - which will also be relocated into their own area villages - and the area of these villages will have to be subdivided to make room for 6 other villages relocating into the area from the other side of the plateau. Thus, the current boundaries will have to be modified and new and land use arrangement will have to be renegotiated;
- ❖ The village settlement (housing) zones will be the subject of detail urban planning, except in this case village participation will be an integral part of the urban planning;
- ❖ The planning of the irrigated agriculture zones areas will also be the subject of detail design;
- ❖ The livelihoods of the villages - to which the forest, land and reservoir use planning is inextricably linked - are not their current livelihoods but the range of new (if not similar livelihoods) some of which are unknown in terms of productivity, and all of which will be progressively developed at different times, over the next 6 years.

Thus, the NTRA-FLUPAM will have to be both;

- (i) **timely**, in that the Project construction and relocation program musty follow certain timelines
and
- (ii) **flexible**, to accommodate both (a) the progressively initiating and then development of each of the livelihood options livelihoods - and (b) the change in the physical characteristics of the area with the inundation of the reservoir 3.5 years into the program, and the operation of the reservoir 5 years into the program.

Thus, the NTRA-FLUPAM will be a phased but iterative process which proceeds through various stages, some run simultaneously in each village with technical studies and livelihood development planning. While the exact processes and steps will be improved and modified over time, Table 10-7 provides a preliminary definition of the progressive implementation of FLUPAM in the Resettlement Area.

Table 10-7: Steps and Procedures for NTRA-FLUPAM in Coordination with Livelihood Development and Technical Studies

Stage	Village FLUPAM Steps	Livelihood Development Steps	Technical Studies s
Stage 1. Relocation Site selection	Villages preferences have been based on; <ul style="list-style-type: none"> - closeness to reservoir; - amount of forest; - amount of drawdown zone; - amount of agricultural land; - amount of grazing land; - current village boundaries; 	<u>Consultations</u> to explain and review: <ul style="list-style-type: none"> > the range of livelihood options available; > the risk and benefits of these options; > the balance between options which the villages would prefer. 	Technical studies; <ul style="list-style-type: none"> > topographic surveys; > soil survey; > irrigation design and village layout concept studies; . > forest inventories.
Stage 2. Initial boundary negotiations	<ol style="list-style-type: none"> 1. Village FLUPAM orientation preparation. 2: Initial negotiations regarding realignment of boundaries, sharing of resource's etc. 3. Initial negotiations regarding use of drawdown and reservoir areas; 4 Draft initial (new) village boundaries, on <ul style="list-style-type: none"> (a) land (b) drawdown; and (c) reservoir 	Participatory review of Livelihood options and activities	> detailed satellite , topographic maps, reservoir maps etc provided to villages to facilitate negotiations.
FOLLOWING RELOCATION			
Stage 3. Testing of livelihoods		<ul style="list-style-type: none"> ❖ Commercial forestry livelihoods tested (salvage logging for 3 years). ❖ Irrigated agriculture tested in Three villages (Ban Nong Boua, Ban Bouama, Ban Phonsavang) Initiation and testing of DMC	
Stage 4. Review of livelihood options and land use planning	Participatory review of (a) irrigated agriculture, (b) forestry activities and (c) DMC Two levels of review: <ul style="list-style-type: none"> > review by pilot village themselves 		Technical review of (a) irrigated agriculture, (b) forestry activities and (c) DMC Technical review of socio

Stage	Village FLUPAM Steps	Livelihood Development Steps	Technical Studies s
	<ul style="list-style-type: none"> > review by other villages 		economic data of families (socioeconomic survey at FC + 3)
	Presentation of experts review		
	Participatory planning, village by village, on the preferences for land and forest use, especially: <ul style="list-style-type: none"> (a) decision to go ahead with irrigated agriculture, or not (b) decision on how to manage and use degraded forest areas - grazing, DMC or forest regeneration. 		
Stage 5. Zonation Step 2	Confirm plans for agricultural development, and then <ul style="list-style-type: none"> ❖ If feasible, allocate rainfed upland areas - via DMC systems - to original and new families ❖ planning for use of forest products - within villages and between villages ❖ forest and land use zonation ❖ develop regulations re land and forest use, in relation to zones 		Production of good maps
FOLLOWING RESERVOIR FILLING AND OPERATION OF FISHERIES: ABOUT COD + 2			
Stage 6. Drawdown and Reservoir	<u>Drawdown zones:</u> <ul style="list-style-type: none"> > review villager activities in this areas > if feasible to use, then review zonation and boundaries. > allocate land, mainly to new families 		1: Technical surveys and studies of <ul style="list-style-type: none"> (a) fisheries (b) drawdown zone 2: Technical review of socio economic data of families)
	<u>Reservoir</u> <ul style="list-style-type: none"> > review villager activities and fish catch > review zonation and allocation ot villages - and rights and responsibilities of such allocation. 		

Stage	Village FLUPAM Steps	Livelihood Development Steps	Technical Studies s
	<p>> review management rules and regulation</p>		
<p>Stage 7. On-going FLUPAM</p>	<p>Following the zonation and allocation of the drawdown zone and reservoir areas, FLUPAM will be undertaken on a cyclical basis, probable every 3 years</p> <p>The aim is to</p> <ul style="list-style-type: none"> (a) revise the macro level zonation and allocation to competitive uses, in accordance with the requirement so the livelihoods of the reseller's, and sustainable resource utilization and management (b) revise land and resource management arrangements and process's (b) ensure the equitable access to resource 		

FLUPAM has a number of important attributes which will be adhered to in order to achieve its desired objectives. That is, FLUPAM must be e:

- Participatory: It involves villagers in every step of the process and encourages them to make their own decisions about livelihoods and sustainable natural resources management.
- Empowering: It strengthens community organisation and capability and provides villagers with the skills and tools to solve their own problems and make improved land and forest use and management decisions.
- Gender responsive: It promotes the active participation of women in all decisions regarding resource allocation and management and addresses the unique problems of women by the use of gender dis-aggregated discussion groups.
- Networking: It promotes inter-village cooperation to solve resource use conflicts and creates linkages and networks between villages to facilitate mutual support and cooperation in both conservation and community development activities.
- Holistic: It focuses at the level of the entire ecosystem, including community livelihood systems, and addresses the key interactions between habitats and people.
- Interdisciplinary: It involves group tasks by teams comprising land use planners, foresters, agriculturists, gender specialists and district officials who work with villagers in an interdisciplinary manner.
- Integrated: It links sustainable resource use and management with development in an integrated manner
- Stepwise: It follows a logical sequence and provides time for both villagers and officials to consider the outcomes and implications of each step in the process.
- Iterative, flexible: As villagers implement agreements and adopt new resource management and livelihood practices, conditions change, new problems emerge and additional lessons are learned requiring that certain steps are repeated in the light of the changed circumstances.

10.8.2 Family and Village Livelihood planning

Family and livelihood planning is a central feature of the resettlement program, and as such will be an integral part of NTRA-FLUPAM. Family level socio-economic data already well known, and will be monitored continuously. In addition, the range of livelihood options will be both;

- (a) tested in pilot schemes; and
- (b) reviewed, both by specialists and by the villagers themselves.-

Such experience and review will lead to choices being made about the livelihoods mixes that a family may wish to adopt, and then the way that a village wishes to use, develop and manage its village territory of land, forest, drawdown zone and reservoir.

Livelihoods in the drawdown zone will be dependant on the technical feasibility of cropping, grazing or otherwise using the area, which is influenced by;

- (a) the operation of the reservoir, and
- (b) the level of soil erosion or deposition in any particular.

Livelihoods in the reservoir will be basically be defined by two issues.

- (a) the technical feasibility and productivity of fishing, and the need for fisheries management from an ecological perspective.
- (b) the decision as to where to manage and harvest the fisheries by (a) private (household) enterprise or (b) a cooperative business enterprise.

Development of the livelihoods in the land of the Resettlement Area itself itself, however, is somewhat more difficult as (a) there are a range of options, (b) the relative productivity of the options is not known

actuary, and (c) the villager adaptability and preferences for these options will change over time. These issues (b) and (c) will only be resolved progressively, over about 6 years.

Basically, the challenge will be to match the resource availability in the site with the gradual development of livelihoods of the resettlers, and such balancing will then lead to the required zonation. Thus, eventually, villagers must decide on the balance of the land (that land which is currently degraded forests) will be used to be used for:

- agricultural land;
- grazing land;
- regenerating forest land; or
- other uses.

A parallel choice which will have to be made is the programs (and villagers) focus on intensive irrigated agriculture or the more extensive rain fed cropping using DMC systems.

It should be noted however, that all three livelihoods are not mutually exclusive. For example, it may be possible for some, maybe many villages, to have separate area areas dedicated to both irrigated and rainfed cropping systems. Silvo-pastoral systems may be developed whereby grazing and forestry are compatible. In addition, the establishment of grass swards for grazing could be an integral part of the DMC systems.

10.8.3 Forest and Land Use and Urban Development Monitoring and Mapping

Unlike most other development projects, the status of forests will be surveyed and monitored in detail by the NPVFA and district forestry staff. They will delineate;

- production forest areas
- conservation forest areas (mainly the sloping areas)
- degraded forest areas - which will be the subject of on going trials to define the best use of these areas - which could be regeneration forest, DMC systems or grazing, or a combination of all three
- nature tourism areas which could be undertaken in the first 2 areas above

The data of these areas is aided by the availability, over 60 % of the areas, of detailed satellite photos. Thus, monitoring and mapping is achieved by the parallel activities of (i) review and mapping from satellite photos and (ii) field/forest level verification. Also, unlike most other development projects, the status of the agricultural areas will be the subject of detailed topographic surveys and land allocation and irrigation development. The urban areas likewise will be the subject of detailed mapping, planning.

This forest cover and land use mapping will be repeated every 5 years, using both detailed forest and field surveys and satellite photos as the basis for monitoring land use changes and as a means of checking that village land use agreements are being followed.

On-going FLUPAM processes will then ensure participatory review of the data (photos, maps etc.) in parallel to review of the socio-economic and livelihood development. Based on these reviews, the zonations and land use plans and regulations may be amended, as required.

10.9 ACHIEVEMENT OF A 'GREEN LIGHT' ON A RESETTLEMENT SITE

The above sections review the social and technical considerations that will be taken into account in the process of deciding on (a) the resettlement site location, and (b) the land and forest use planning for that whole area allocated to each villages.

These considerations (for resettlement site selection) can be summarised into a checklist of issues which must be finalised before a "green-light" can be given as confirmation of a particular resettlement site.

Social green-light indictors

- (i) all villagers having visited the site;
- (ii) all villagers having being given technical information about the site;
- (iii) all villagers having agreed on the site;
- (iv) if in another villages territory, arrangements and agreements reached with that village; and
- (v) preliminary forest, land (and reservoir) use planning and allocation being undertaken w.r.t. the whole area allocated to the villages (and within boundaries agreed to by neighbouring villages).

Technical green-light indicators

- (i) topographic studies complete, and showing sufficient land with slope less than 15 %;
- (ii) access to year round reservoir water confirmed and costed, and appropriate location for a header tank defined; and
- (iii) soils as good as possible.

10.10 LAND AND RESOURCE TENURE IN THE NAKAI RESETTLEMENT AREA

These zones, or similar, would be subject to review and revision over a set period of time, every 5 years, for example. Within, and between these zones, or areas of approved land use, there will be differing tenure arrangements depending largely on the type of ownership, such as:

1. land owned and managed by individual households, including (i) resettlement houses, (ii) farm plots, and (iii) privately owned land of existing households who are not to be resettled;
2. land owned and managed communally by individual resettlement villages (for example, community infrastructure, public areas, sacred grounds, etc.);
3. land owned by the State, public land and buildings such as hospitals, schools, roads, etc
4. community commercial forest areas managed for the common benefit of all resettlement villages.

The NT2 Project policy specifies that resettlers will be provided with guaranteed land titles to their house and agricultural plots soon after they are relocated into the resettlement sites. In addition, it is intended to ensure that resettled communities are provided with communal rights to village use land areas, and that fair and equitable tenure and management arrangements are put in place for common property land and resources on the plateau.

10.10.1 Privately Owned Land

Under Lao law, all land is the property of the national community, but all citizens have the right to use, transfer and inherit this land. The usual process of land registration involves an assessment of an individual's right to the land, and if successful in showing such right, the individual is issued with a land title, registered in a Land Register Book and Land Parcel Register Index specific to each village. In the case of the NT2 Project, the issuance of PM Decrees 193 and the register of eligible households will provide for the 'assessment of an individuals right to the land'.

Such titles can be inherited, sold and be the subject of a court order (known as permanent assignment). It may also be leased or mortgaged (indefinite assignment). The land title provides the owner with security of tenure for that land but it does not specific the uses such land may be put to or classified as (for example agricultural or forestry land). In the NT2 Project, all resettlement housing and agriculture land will be issued a land title in accordance with the procedure based on the Ministerial Direction on Systemic Adjudication of Land Use Right No. 997/MOF, and in the name of both the husband and wife's of each individual households. An example of a Land Title Certificate and an English translation are presented in Figure 10-7 and Figure 10-8.

Figure 10-7: Example of Land Title Certificate as Used in the Lao PDR



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນະຖາວອນ

ກະຊວງການເງິນ
ກົມຄຸ້ມຄອງທີ່ດິນ ແລະ ເຮືອນ
ຫ້ອງການຄຸ້ມຄອງທີ່ດິນ ແລະ ເຮືອນ
ສະໝຸດຕາດິນເຫລັ້ມທີ.....

ໃບຕາດິນ

ລະຫັດ ແຂວງ.....
ເມືອງ.....
ບ້ານ.....

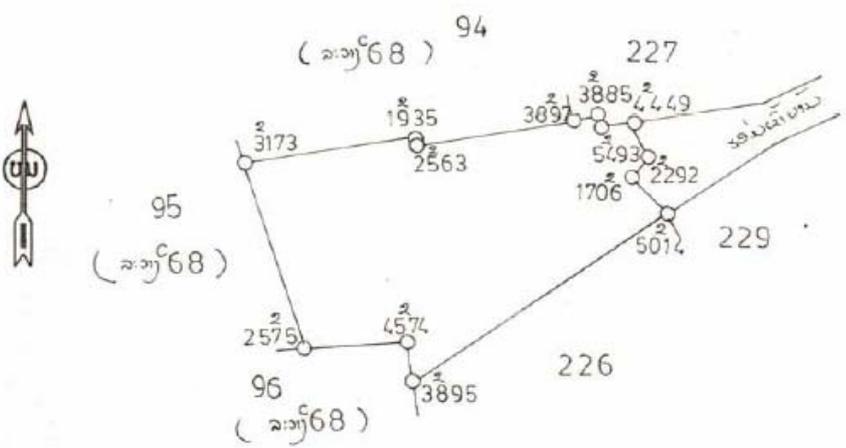
ໃບທີ..... ເລກທີ.....
ອອກໃຫ້ແກ່.....

ວັນເດືອນປີເກີດ..... ສັນຊາດ..... ອາຊີບ.....
ບ້ານຢູ່ປະຈຸບັນ..... ໜ່ວຍ..... ເມືອງ.....
ແຂວງ..... ຊື່ພໍ່..... ຊື່ແມ່.....

ສາມີ ຫລື ພັນລະຍາ.....
ທີ່ຕັ້ງຂອງດິນ: ຖະໜົນ..... ໜ່ວຍ..... ບ້ານ.....
ເມືອງທີ່ຂອງດິນ..... ສຕ..... ຕາແມດ.....

ມາດຕາສ່ວນ..... ແຜນທີ່ດິນໃບທີ..... ເລກທີ.....

ແຜນທີ່ດິນ



ອອກໃຫ້ທີ່..... ວັນທີ..... ເດືອນ..... ປີ.....
ຫົວໜ້າພະແນກການເງິນ..... ຫົວໜ້າຫ້ອງການຄຸ້ມຄອງ
ທີ່ດິນ ແລະ ເຮືອນ.....

However, due to the specific and unique nature of the NT2 relocation of mainly ethnic minorities, and in order to protect these villagers from unwise decisions, it is intended to enact a Resettlement Committee regulation to ensure that the land titles issued to each resettler family are endorsed to the effect that they cannot sell the land (or title) until the end of the Resettlement Period (about 8 years), unless that resettler makes a claim to the Grievance Committee who may decide that they indeed have a valid and reasonable rationale for selling the land.

Thus, while the basic procedures of land titling (systematic registration) in Lao PDR will be followed for the registration and issuance of land titles for all resettled families - in the name of both the husband and wife, and for both household and farm plots - some modifications will be required to meet the somewhat unique needs of NT2 resettlement process. These are summarised in Table 10-8.

Table 10-8: Steps in the Land Titling Process for Plateau Resettled Villages

Normal land titling process	Modifications proposed under the RAP
1. Adjudication Team (AT) inspects the property	Inspections will be phased according to relocation schedules. Adjudication team will be provided with all relevant maps and assisted on-site by RMU staff.
2. AT reviews with the abutting neighbours regards the boundary - assume consensus.	Representatives of resettlement households will have to be on-site during this process.
3. Survey team surveys the land (and installs 'posts')	House and farm plot maps to be provided by RO/RMU.
4. AT calls for all documentary and historical evidence of land occupancy (15 yrs required)	No historical evidence in the NT2 project, in which case PM Decree 193 effectively waives the 15 years occupancy requirement..
5. AT gets info. on claimants name, address, etc.	To be provided by RMU and RO, as part of the census on eligibility of households.
6. Public announcement period of land claim (390 days): posted in Village leaders house, AT office, public area	Public announcements to be posted in each villages, and in Nakai Town notice board.
7. Title prepared and register book	RO/RMU will also maintain a land file for each individual land parcel in all resettlement villages.
8. Title goes to Provincial Land Office for approval and signing.	As normal titling procedures, with the specification that an endorsement be given to protect resettlers.

10.10.2 Common Property Resources and Land in the Resettlement Area

In regard to land use management and tenure of each resettlement village land and forest areas the forest areas surrounding each village, current government policy emphasizes the use of a well-established system of participatory land use planning (LUP) to identify, delineate and define uses for a variety of land use zones within customary village land use boundaries. The various zones recognized are as follows:

1. Village Settlement Land: Includes private houses, public buildings, roads, and so forth.
2. Village Agricultural Land: Includes cultivated land, and other intensive productive uses, such as fishponds, livestock and so on.
3. Village Conservation Forest: Strict controls are enforced, with few uses are allowed.
4. Village Protection Forest: Activities that contribute to soil erosion are prohibited, including the cutting of trees, and forest clearance, by NTFPs collection permitted.
5. Village Use or Production Forest: Cutting of timber permitted for domestic use, but timber will be extracted by the NPVFA, following a sustainable logging plan.

In the NT2 Resettlement Area, the above zones and the participatory land use planning system will be adapted to define uses and management responsibilities for common property resources.

Although village customary land use boundaries exist (Figure 10-2), the loss of much of these to reservoir inundation, the creation of new resettlement villages, and the consolidation of some former villages means that retaining them would result in a highly inequitable distribution of resources and management responsibilities. It is therefore proposed to use a modified LUP process where all resettlement villages would together address the issues of common property resource tenure and management, including forest areas, grazing land, the reservoir and other water resources. The aim is to develop appropriate management agreements for their use to ensure:

- an improved understanding in resettlement communities of the potential benefits and key management issues associated with these resources;
- equitable and appropriate access to the resources for all resettlement communities;
- a fair division of tasks and responsibilities among communities for their sustainable and productive management;
- an equitable distribution of the benefits accruing from the use of the resources; and
- the development of appropriate management and conservation agreements for their sustained use.

This significant LUP exercise will need to be phased over the period of resettlement and beyond as villagers acclimatize to their new locations and as they adjust to different livelihoods, as commercial management plans are developed for forestry, and as water is impounded in the reservoir.

10.11 BOLIKHAMXAY RESETTLEMENT VILLAGES

The two northern villages of Sop Hia, located in Bolikhamxay Province and Nam Nian (located on the border of the Bolikhamxay and Khammouane Provinces) have compositions and histories that differ from the other villages on the Nakai Plateau. Some Sop Hia residents are Vietic people, indigenous to the area (Ahoé), others are Tai settlers recently arrived from the Khamkeut District. Nam Nian village was established mainly as a roadside village and service centre for logging trucks and consists mainly of Tai groups, originally from the Lak Sao area.

10.11.1 Choice of General Resettlement Area

Discussions with villagers from Sop Hia beginning in early 2002, revealed that the Vietic households wanted to remain on the plateau and relocate resettlement areas 7-13, near Ban Thalang. The remaining Tai households preferred to relocate to the districts in Bolikhamxay from where they originated. Further discussions in early 2003 concluded that the Tai groups from Sop Hia and Nam Nian would relocate in Bolikhamxay Province and the Vietic groups from Sop Hia would relocate on the plateau. The results of the latest round of consultations with villagers are presented in Table 10-9.

Table 10-9: Results of 8 June 2003 Consultations with Sop Hia and Nam Nian Villages

Village	Preferred Location by Number of Households		
	Lak Sao	Nakai Reservoir	Elsewhere
Sop Hia	21	32	4
Nam Nian	26	0	0
Totals	47	32	4

Given the fact that there are only 25 Vietic households, there are not enough to compose a new administrative unit. Hence, it was proposed to relocate them at a separate site, but close enough to share health and education facilities with Ban Thalang. This satisfies their desire to retain their original village composition, and at the same time, allows the necessary improvements in social and livelihood services to be provided. It should be pointed out that there are already Vietic groups in Thalang (4 households) and that Sop Hia's swidden fields are located in Nakai District, which is familiar territory to them. The Vietic

households from Sop Hia thus become part of the plateau resettlement process which has already been discussed in the preceding sections of this Chapter.

In regard to relocating the Tai groups from Sop Hia and Nam Nian, district authorities along with RMU staff identified a suitable area near to their original village sites. The chosen site is in Khamkerd District of Bolikhamxay Province, close to Nam Pan village, which lies to the southeast of Lak Sao, the district centre.

The site was chosen as there is good access to Road 8A, an availability of spare land, and potential for the construction of an irrigation system. However, unlike the plateau resettlement sites, there is a small recipient village, Nam Pan, established in 1975 by 17 families from the Nam Pheo area. It now has 35 families of the same ethnic groups as those to be resettled. Because currently, the Nam Pan community is so small, it is administratively part of another village, Chom Jeng, which is close to Lak Sao Town.

Thus, while it was originally envisaged that resettlers from Sop Hia and Nam Nien would be relocated in a newly established village area, this new option allows them to combine with a similar ethnic group, making the new community large enough to be officially recognized in its own right and thus have its own administration, school, water supply and the like.

Discussions have been held with Nam Pan villagers, who are generally receptive to the idea of accepting the resettled families from Sop Hia and Nam Nian for a number of reasons:

- The proposed consolidation will allow the village to be officially recognized in its own right.
- Current families will benefit from the improved social services such as a school, dispensary, etc.
- Existing residents will also have access to irrigation water from the system to be constructed for the resettled households.
- Resettlers are of the same ethnic group and are originally from the same area.

A number of additional steps will be required to finalize the proposed relocation agreement between the recipient and resettled communities. Firstly, a visit to Nam Pan by Sop Hia and Nam Nian residents will be organized to discuss the desirability of consolidation and how best to achieve this. If agreement is reached, follow-up visits will be required to jointly explore possibilities for the location of housing and agricultural land.

It is also planned to organize a series of extended visits by Sop Hia and Nam Hian representatives to undertake land use planning jointly with Nam Pan residents. This will allow both parties to jointly assess the land and forest resource base, its current uses and to develop new management plans to accommodate the resettled households into the area.

Forest and Land Use Planning Allocation and Management Land (FLUPAM) procedures will be used to extend the standard LUP process in two important dimensions. First, it will cater for the issuance of land use certificates to resettled (and existing) families for their house and farm-plots. Second it will be used to plan livelihood development activities in support of relocation, in a participatory manner.

FLUPAM processes of resource management planning are aimed at ensuring equitable access to forest and land resources and providing the basis for their sustainable management by local communities, by:

- Stabilizing forest and land use patterns under a sustainable management system;
- Ensuring equitable access to forest and land resources for all community members and formalizing land use rights within the existing legal framework;
- Establishing resource use and conservation co-management agreements with local communities; and
- Developing a partnership between villages and government for the joint management of community development and conservation activities.

As such, it is considered an extremely appropriate tool for use in preparing both recipient and resettled communities for the proposed relocation and consolidation.

10.11.2 Detailed Site Investigation

Detailed site investigations in the proposed Nam Pan resettlement site will proceed largely as those described for plateau resettlement sites in Section 10.10, but with a few important differences:

- The social requirements of consolidating two resettlement and one recipient village into a single harmonious ethnic Tai community.
- An assessment of existing infrastructure and services and the preliminary identification of what is needed or what will be upgraded in the relocation site.
- Consideration of existing land-use and in the specific resettlement site and customary tenure issues in order to determine the need for compensation in the host community.

Resettlers at in Nam Pan will not have the same opportunities as those who are resettled adjacent to the Nakai Reservoir. They will not have:

- Access to reservoir fisheries resources;
- Access to the Nakai Plateau Village Forestry Association; nor
- The employment opportunities created both during and after construction of the hydropower project.

These differences will be fully assessed and adequate provisions will be made to ensure a fair and equitable entitlement package. For example, as the plateau resettlers are to be provided with a 0.66 ha irrigated farm plot, it is proposed that Nam Pan resettlers be provided with a larger 1.5-ha plot, to compensate for their inability to participate in the fisheries and forestry income generating activities. A fuller comparison of potential entitlements is described in Table 10-10.

Table 10-10: Comparison of Projected Full Development Household Incomes

Element & Component	Nakai Plateau		Khamkerd - Nam Pan	
	Remarks	Income (US\$/year)	Remarks	Income (US\$/year)
<i>Agriculture</i>				
1. Wet season paddy rice	0.16-ha plot	45	1.5-ha plot	450
2. wet season other crops	0.5-ha plot	87		
3. Dry season paddy rice				
4. Vegetables	0.03-ha plot	87	0.25-ha plot	290
5. Field crops	0.62-ha	100	1.25-ha	200
6. Fruits	70 trees	33		0
7. Buffalo	5 buffalo	65	As Nakai	65
8. Pigs	1 pig	40	As Nakai	40
9. Forestry		225		0
10. Fisheries		350		0
11. Employment		250		0
12. NTFPs		20		75
Total		1,302		1,330

Note: For 50 households and a 1.5-ha plot, a net irrigation area of 75ha is required. Allow a 10% increase for land lost by track and canal right-of-way, plot berms, gullies etc. A 82.5-ha gross scheme area is required to be established.

The Khamkerd District officials proposed two possible areas for village and irrigation development:

1. Houay Sot Irrigation Scheme: BPKP has prepared drawings and a design report for 63-ha scheme; and

2. Nam Pan Irrigation Scheme: Khamkerd DAFO have prepared a preliminary assessment report and commenced a topographical survey.

The Houay Sot scheme was investigated and considered infeasible. The potential irrigated agriculture area is only 63-ha, and two earth dams are required to be constructed to service this area. Thus, at an estimated total development cost of US \$454,000 (US \$7,208 per hectare), this option is far too expensive. It is also near a river in an area subject to flash floods which would cause wet season damage, while the river has low dry season flows.

The Nam Pan Irrigation Scheme

The DAFO report shows an earth dam 780-m long and 28.7-m high. A high spillway and main canal intake structure will be required. A less expensive option is required.

The Consultant has identified an irrigation area of around 150 ha. The revised proposal includes:

- Irrigate below the 530 masl. contour.
- The cropping pattern is wet season rice and dry season vegetable and field crops.
- An embankment dam about 190-m long and 10-m high located on the Nam Pan. A reinforced concrete spillway. If no storage is proposed, the dam will be smaller.
- A gravity canal system distribution system including a main canal, 4 secondary canals and a series of tertiary canals.
- Including households from the existing Ban Nam Pan. They will have traditional land-rights in the area.

Exercises based on the topographical survey maps will be sufficient as a pre-feasibility study. For a feasibility study, further investigations are required including:

- Geo-technical for the dam foundation and borrow pits.
- Hydrology. Nam Pan mean monthly and flood discharges.
- Soils in the irrigation area.
- Cost comparison of various options on cropping patterns, dam storages and command areas.

A local consultant company will complete these studies.

Figure 10-9: General Map of Indicative Resettlement Site, Ban Nam Pan in Khamkerd District, for Tai Villagers from Sop Hia and Nam Nian

