

# Initial Environment Examination - revised

---

Project: ADB Grant No 0117 LAOSF

Lao PDR:  
GMS Sustainable Tourism Development Project

## **SUB-COMPONENT 1:**

### **BIODIVERSITY CONSERVATION AND SUSTAINABLE TOURISM DEVELOPMENT IN THE SIPHANDONE WETLANDS**

ANNEXES ARE AVAILABLE UPON REQUEST  
TO OBTAIN COPIES, PLEASE CONTACT MR RIK PONNE: [rikponne@gmail.com](mailto:rikponne@gmail.com)

---

Vientiane  
March 2010  
Michael Mastaller (Lao Consulting Group)

## Table of Content:

		Page
A	Introduction	3
	Disclaimer, Acknowledgement	4
B	Description of the Project	4
B.1	Civil Works – Components and Schedules	4
B.2	Non-physical Project Activities	6
B.3	Location of the Proposed Civil Works	6
B.4	Expected Outcomes and Benefits of this Project	7
B.5	Cost Estimates	7
C	Description of the Environment	8
C.1	Physical Resources	8
C.2	Ecological Resources and Issues	9
C.3	Demography, Socio-Economic Conditions and Development Plans	10
C.4	Infrastructure and Utilities on Don Det and Don Khone	11
D	Screening of Potential Environmental Impacts and Proposed EMP	11
D.1	Environmental Screening of the Project Components and Activities	11
D.2	Proposed Mitigation Measures and Environmental Management Plan	13
D.2.1	General	13
D.2.2	Public Health, Sanitation, and Accident Risk Management	13
D.2.3	Maintaining Cultural Values and Integrity	16
D.2.4	Environmental Concerns and Enhancement Recommendations	17
E	Institutional Framework and Environmental Monitoring Plan	19
E.1	Key Institutions and Stakeholders	19
E.2	Environmental Monitoring	21
F	Public Consultation and Information Disclosure	22
G	Findings and Recommendations	23
H	Conclusions	24
Annex 1	Environmental Screening List and Checklist	25
Annex 2	Environmental Management (and Monitoring) Plan EMP	30
Annex 3	Field Survey Pictures	48
Annex 4	Field Survey and Stakeholder Consultation Report	51
Annex 5	Environmental and Socio-Economic Threats for the Siphandone Wetlands	58

## LIST OF ABBREVIATIONS

ADB	Asian Development Bank
Ban	Village
Don	Island
EA	Executing Agency
EARF	Environmental Assessment Review Framework
EMP	Environmental Management Plan
Gvt	Government
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
Kip	Currency of Laos PDR (1 USD = 8.500 Kip as per March 1 <sup>st</sup> 2010)
Lao PDR	People's Democratic Republic of Laos
LCG	LaoConsulting Group, Vientiane
LNTA	Lao National Tourism Agency
MAG	Mines Clearance Advisory Group
MRC	Mekong River Commission
NGO	Non-governmental organization
PCU	Project Coordination Unit
PIU	Project Implementing Unit (Provincial Level)
RAMSAR	International Wetland Convention
RoW	Right of Way
RP	Resettlement Plan
STDP	Sustainable Tourism Development Project
STEA	Science, Technology and Environmental Agency <i>[this responsibility has now been taken over by WREA]</i>
UXO	Unexploded ordnances
WREA	Water Resources and Environment Administration
WWF	World Wildlife Fund

## BIODIVERSITY CONSERVATION AND SUSTAINABLE TOURISM DEVELOPMENT IN THE SIPHANDONE WETLANDS

### A. Introduction

1. The current scope of the environmental assessment for the STDP includes the task to revise and update, as applicable, the IEEs for all sub-components for the program that involve physical construction of infrastructure. The first IEE for this specific sub-project has been published in June 2008 under ADB Project Reference 38015. Meanwhile, this Project changed into a grant, and new technical design<sup>1</sup> proposals require such update and review. Therefore, a new Environmental Team<sup>2</sup> was contracted to

- update the environmental impact screening and environmental checklist in line with the EARF (→ **Annex 1**)
- upgrade and actualize the Environmental Management Plan (EMP) for all planned interventions (→ **Annex 2**)
- conduct additional field surveys and stakeholder interviews (→ **Annex 3 and 4**), and
- prepare environmental safeguard clauses to become included in the Technical Specifications of the bidding documents for contract awards.<sup>3</sup>
- Identify potential issues and concerns associated with the proposed project (→ **Annex 5**)

2. The sub-project is located in Southern Lao PDR in Kong District, Champasak Province. The Siphandone Wetland extends to the border with Cambodia and contains thousands of channels and islands, with the largest and most visited among them being Don Kong, Don Det and Don Khone. The wetland is part of the Tri-border Biodiversity Corridor<sup>4</sup> that connects Lao PDR and Vietnam. The natural scenic beauties and values of the Siphandone Wetlands attracting both national and foreign visitors represents a great assets for country's tourism economy. The main tourism access to Siphandone is via a small boat landing pier 4 km off Highway 13 at Ban Nakasang. Currently, there is a notable and increasing development fuelled by local, national and international investors to take part in the booming business with guesthouse/restaurant constructions and local tour operators.

3. The wetland is home to 136 villages with an estimated population (2006) of 72,600. The majority of these islands are small and uninhabited. Siphandone's biodiversity is threatened by over-fishing and hunting activities by poor communities living in and adjacent to the wetland who depend on it for food security and harvesting of natural resources for income. The fast-growing tourism industries give further reasons for development concerns if this is not properly guided and managed.

4. The Siphandone Wetlands are recently subject to major environmental threats that would not only negatively affect the development efforts of STDP, but will assumingly the tourist attractiveness, the socio-economic balance and the traditional fisheries sector of this area at stake. It is therefore regarded crucial to discuss hereunder the possible effects in the context of sustainably tapping the benefits of this Project. One of the largest threats are established by

---

<sup>1</sup> Technical Design Team of LaoConsulting Group Ltd. Vientiane, headed by Mr. Outhit Soulivanh under the direction of the TL, Arouny A. Sakulku, Engineering Consultant

<sup>2</sup> Michael Mastaller, Env. Engineer, Int'l Consultant, and Samvong Thammavongsa, National Env. Consultant, LaoConsulting Group

<sup>3</sup> Delivered already as separate output to the EA in November 2009

<sup>4</sup> IUCN and the Mekong River Commission are currently working with the Ministry of Agriculture and forestry to assist in the designation of Siphandone as a Candidate RAMSAR Site.

recent plans to build a large/scale hydropower scheme in the heart of the Siphandone region give reason for major environmental concerns. For details, reference is made to **Annex 5**.

5. Local communities continue to depend largely upon harvesting wetland biodiversity resources for food security and income. When local people do work in the tourism industry, a lack of skills and understanding of tourism is causing most of them to remain stuck in low-paying jobs such as day-labourers and cleaners that miss out on higher paying tourism-related employment opportunities such as guides and small business managers and operators. There is thus a need to develop ways in which local communities can participate more effectively in tourism-related livelihood opportunities in order to contribute more effectively to biodiversity conservation of the wetland.

6. Disclaimer: This document represents a revision and updating of information, based on the original information provided in the 'ADB Initial Environmental Examination Report, Output 1 – Siphandone Wetland Biodiversity and Tourism, Project No. 38015', dated March 2008. All views expressed herein originate from the Environmental Expert Team contracted for actualizing this document, and do not necessarily represent those of the ADB Board of Directors, Management or Staff, and therefore may be preliminary in nature.

7. Acknowledgement: The Environmental Team wishes to express their appreciation to all persons who shared their views, gave guidance and recommendations. Special thanks go to the Dept. Director of the Lao National Tourism Agency, Mr. Thavipeth Oula and his advisory team, namely Mr. Steven Schipani, Mrs. Phongsith Davading, and to the Head of the Provincial Tourism Department Mr. Kamphonh Nuanesengsy (Pakse/Champasak). The team also acknowledges the generous help offered by assistants affiliated to the above agency, who accompanied during various parts of the field surveys and assisted in meeting with stakeholders. Particular acknowledgement goes to Arouny A. Sakulku and the administration staff of LaoConsulting Group who facilitated all field works and mobilization.

## B. Description of Project

### B.1 Civil Works –Components and Schedules

8. The physical components requiring the employment of civil works for this sub-project are enlisted as following:

- **Access Road Upgrade** : A 4.0 km access road from highway 13 to the boat landing at Nakasang Village already exists but the pavement and drainage have not been engineered or constructed to adequate standard. The civil works require the establishment of a temporary work camp in the vicinity of Ban Nakasang. Poor drainage and contamination of the pavement by clay has resulted in the pavement failing making the road impassable during wet periods. The engineering works allowed for this road includes a design with drainage and pavement to a sealed standard. The reconstructed road will be the same wide (approx. 6 meters) as the existing road and all drainage is to be constructed in the road reserve within the existing fences. The first 3.6 km of road will be constructed with earth shoulder drains and the final 400 meters passed the market is to be constructed with kerb and gutter and piped stormwater drainage. The road class is selected based on expected traffic and constraints of existing roadway reserve with following criteria:
  - Design speed: 40 Km/h
  - Number of lanes: 2 lanes

- Width of carriageway:  $2 \times 3.0 = 6$  m (to match existing)
  - Width of shoulders:  $0.5 + 0.5 = 1.0$  m
  - Width of roadway: 7 m
  - Maximum gradient: 4%
  - Road surface cross slope: 3%
  - Shoulder cross slope: 5%
  - Minimum radius of horizontal curvature: 100 m or 30 m in constrained sections.
  - Minimum radius of vertical curvature:
  - Type of road surface: A2
  - Required Elastic modulus:  $E_y/c = 1270$  daN/cm<sup>2</sup>
  - Designed load capacity: Vehicle axles 8.3 tons
- **Stormwater Drainage within Nakasang Village:** Currently, all stormwater originating from Nakasang village and roads discharge directly to the Mekong River through natural drainage paths. The Project plans for stormwater collection structures along both sides of the final 400 meters of the rehabilitated Nakasang Access Road. Stormwater will be collected in pipes from both the road and buildings. This water passes through a Gross Pollution Trap to remove solid wastes and sediments. The discharge outlet will be at a river level below the summer flow of the river.
  - **Visitor Information Centre and Parking Lot at Nakasang:** A 200 m<sup>2</sup> facility is planned with toilets is to be constructed at the front of the parking lot, opposite of the Nakasang market. The proposed structure will be a well-marked building to service the arriving tourists. The form of the building and materials used in construction is in harmony with the surrounding buildings. Full information services on environmental, geographic, health and emergency facilities and infrastructure conditions of the Siphandone Wetlands, as well as boat tickets to the island destinations will be available within the building. A sealed parking lot with drainage will also be constructed at this site. The foreseen area is approximately 2000 m<sup>2</sup>, with a capacity of 50 cars and 6 buses.
  - **Promenade Walkway with 2 Boat Landing Piers:** A paved walkway of approximately 70 meters length is planned, with 2 access points (piers/steps) to the river for boat embarkation. The promenade surface will be concrete hexagonal pavement tiles laid over the existing path. The new path is to be constructed 2.0 meters wide with drainage. At regular intervals, fixed waste containers with lid will be placed. Access to the river for 2 boat embarking piers is in the form of profiled steps 3 meters wide down the river bank constructed in reinforced concrete to handle different water levels in the river and protect the bank from erosion. Structured steps and a handrail are foreseen to attain sufficient security for embarking/disembarking passengers.
  - **Re-Construction of Nakasang Market:** The market presently contains 36 stalls of poor quality with dirt pavement and no sanitary, water or formal stormwater drainage. The Nakasang market will be re-constructed with 50 stalls. 10 stalls are to be constructed with full utilities supply including water pipes and septic tanks. A separate area is foreseen for solid waste collection, toilets for the public and a central bus stand covered by tin roof. The central area will be a combination of pavement and bitumen sealed to provide an all weather surface.
  - **Track Improvements to Don Det and Don Khone Islands:** A 3 meter wide pathway that begins at Ban Houa and ends at Ban Hangkhone will be upgraded. Construction elements are to provide shoulder drains, repair any soft spots and provide additional gravel to at least 150mm depth and profile with 5% fall both ways to the shoulder drains. By providing a crossfall on the pathway stormwater will actively flow to the shoulder

drains and away stopping the track becoming a water course and eroding the surface away.

- **Parking Lot on Don Det:** The parking area on Don Det, near the central boat landing pier, will be surfaced and will contain adequate provisions to handle stormwater and a gravel pavement.

9. The commencement of the civil works are scheduled for right after completion of the bidding process (springtime 2010) in May 2010. The proposed duration until completion of the civil works is likely to last until the end of the year 2010.

## B.2 Non-Physical Project Activities

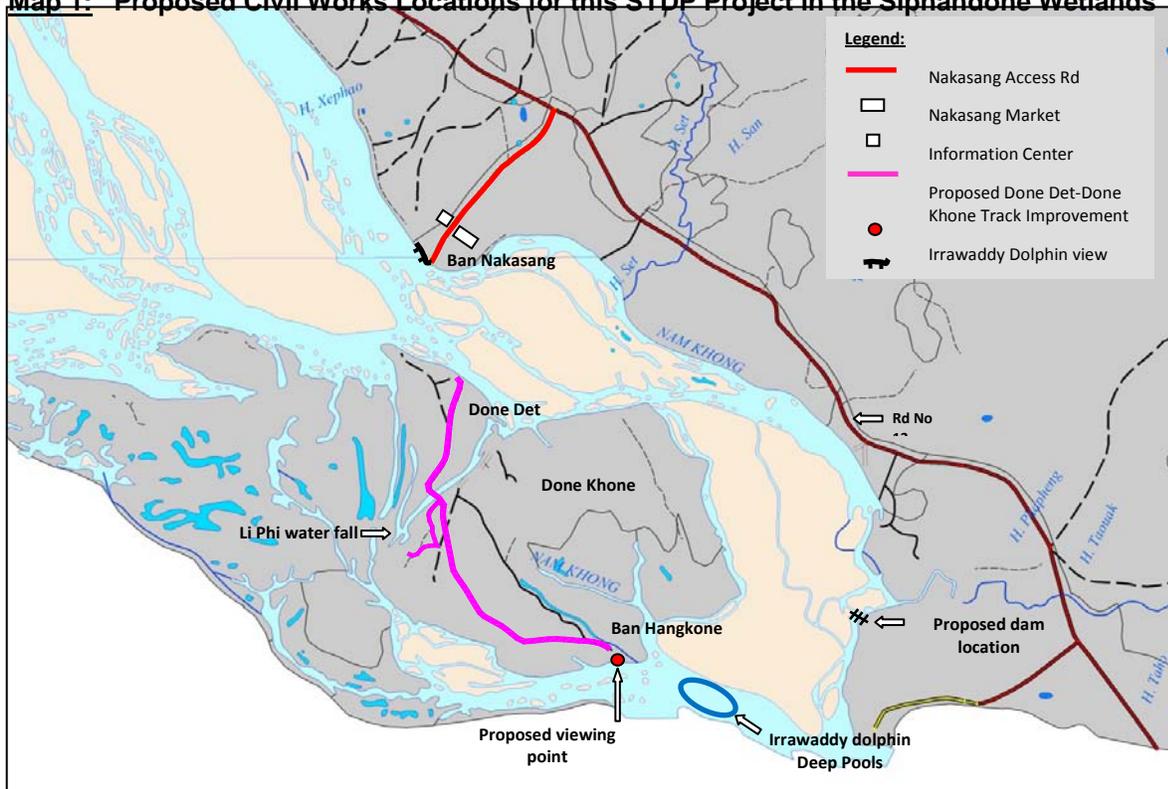
10. During the first planning phase (2007-2008) the former consultants prepared a heritage-based tourism zone mapping and a structure and management plan for the entire Siphandone Wetland area. The project plans for environmental awareness material and signboards at key points, such as

- at the Nakasang visitor information and interpretation and ticket sale centre,
- at 2-3 boat landing piers,
- at the Don Det/Don Khone historical railway bridge,
- at selected sites along the island trails, and
- at the observation tower at B. Hangkhone

11. The project will also provide capacity building and livelihood support to local communities, especially for women, youth and ethnic minorities, to participate in tourism-related livelihoods, and training for site managers to engage local communities in managing and interpreting the natural heritage values of the wetland. All activities are foreseen to complete by spring 2011.

## B.3 Location of the Proposed Civil Works

**Map 1: Proposed Civil Works Locations for this STDP Project in the Siphandone Wetlands**



#### **B.4 Expected Outcomes and Benefits of this Project**

12. The expected outcomes and general benefits from the project are:

- Significantly increase the level of participation and ownership in higher value tourism-related livelihood opportunities by local communities living in and adjacent to the wetlands;
- Ensure that tourism development in the wetlands is environmentally sustainable and contribute to the conservation and protection of the areas rich biodiversity;
- Document, conserve and interpret the area's natural and cultural resources and traditional livelihood practices;
- Ensure that women, ethnic minorities, youth and the elderly are given opportunities to equitably participate in the tourism industry ;
- Facilitate the management and flow of tourists into the wetland through improvements to the sites physical infrastructure and tourism management systems

13. The specific benefits and positive environmental impacts of this project are identified as follows:

- creating a better visitor arrival point to the wetlands and Ban Nakasang village that will overcome current congestion, traffic and parking problems;
- providing a better understanding of the value and conservation significance of the Siphandone wetlands, with benefits felt on an international scale (through visiting foreigners), and at national and local community level;
- upgrading basic visitor infrastructure that allows visitors to access and enjoy the wetlands;
- reducing the level of pollutants entering the river by the drainage line with use of a gross pollutant trap; and
- improving the living conditions of the local community through the reduction of public health hazards associated with lack of sanitation and solid waste treatment.

#### **B.5 Cost Estimates**

14. Base Costs were prepared by the engineers estimating quantities for the main items of work (e.g. pavements, pipelines, drains, items of equipment) and services, and applying unit rates to derive amounts for each item. The quantities and estimates are based on preliminary designs, and are likely to change following detailed investigations, survey and design and therefore the accuracy of the estimates is not expected to be better than about  $\pm 10\%$  for the items described in this report. The rates have been derived from a combination of suppliers' rates, provincial costing provide by departments of construction, and historical rates for previous projects in Laos. The preliminary base cost for all above civil works for this sub-project is estimated at \$1.806million.

15. These costs do not include additional costs for environmental management, such as regular environmental clean-up operations, environmental signboards and information material, awareness campaigns and specific environmental enhancement activities. It needs to be mentioned, however, that the recurrent cost recovery for all environmental information material

(e.g. leaflets, handout material, and signboard maintenance) is planned to be realized from the boat ticket sales in the Nakasang Tourist Information Centre.

16. The LNTA (Mr. Thavipeth Oula, *pers. information*) determined that the environmental management budget for this sub-project (Siphandone Wetlands) remains the same as formerly allocated, i.e. a total of 4,000.00 US\$. All costs for the environmental monitoring and supervision, as detailed in the EMP and in Chapter E.2 of this document, are to be included in the Project's overall budget.

## C. Description of Environment

### C.1 Physical Resources

17. Siphandone Islands (the Project Area) lies in the Champasak Province in the south-western part of Laos and has a total land area of 1.541 million hectares. The Salavan Province lies to the north of the project area, Sekong and Attapeu Provinces to the east, Cambodia to the south and Thailand to the west. Pakse is located on the confluence of the Mekong and Se Don Rivers, is the Province's capital city and the largest city in southern Laos. Some 62% of the Province land area is forest land, 31% is used for agriculture and 3% is wetland.

18. The local/regional climate is dominated by the monsoon regime, with a southwest monsoon (humid-hot) from late March to October and the northeast monsoon (dry and cooler) from November to early March. The dry season extends from January to April, while rain falls mainly during May to October. The average rainfall at Khong is about 1700mm per annum with falls of around 300mm per month experienced during June to September. The monsoon equally affects the hydrology and ecology of the Mekong River: The water level rises quickly during the rainy season and floods the river corridor and often damages village and crops. After the rainy season the water levels falls and reaches a minimum in April. The rising waters of the Mekong create backflow into the floodplains and allow fish to migrate into the seasonal wetlands.<sup>5</sup>

19. Interviews with key persons on all project sites indicate that the Siphandone region rarely experiences natural calamities. Seismic events have not been recalled over the past 50-60 years, and hefty thunderstorms accompanied by torrential rainfall rarely occur. Of concern for the regional agriculturists are long-lasting periods of drought being observed during the past decade.

20. The Mekong River, before crossing into Cambodia, braids into a maze of channels and islands known as Siphandone, meaning "four thousands islands in Lao language". These islands, riverbed isles and sandbars rise from the Mekong River, whereby they expand for about 14 km. The majority of the islands can be seen best from January to March but some will be submerged during the monsoon period, from May to November. Larger islands characterize the northern part of the wetlands: Don Khong is the largest island in southern Laos with permanent residents of farmers and fishermen. The central part has some large alluvial islands separated by narrow channels, rapids and many small islets. The southern part has a few sandy islands and features a series of waterfalls and rapids. The most spectacular natural attraction is Khone Phapaeng, the largest waterfall in Southeast Asia (Photo A-4-1, Annex 5). From here the Mekong discharges into a deep pool towards the border with Cambodia.

---

<sup>5</sup> G. Daconto (Editor) 2001. in cooperation with Department of Forestry, Ministry of Agriculture and Forestry and Agriculture and Forestry Division. Environmental Protection and Community Development in Siphandone Wetland, Champasak Province, Lao PDR, Final report., Siphandone Wetlands; Funded by the European Commission

21. The soils in the floodplains are generally sandy alluvium with limited silt deposits at the base of the low hills. The larger islands are permanent sand deposits with steep and erodible riverbanks. The smaller islands are also alluvial and often seasonally inundated. The alluvial soils along the river banks are unstable and affected by river levels, changes to the channels and removal of the vegetation – a river erosion survey found that 65% of the banks could be classified as prone to erosion damage<sup>6</sup>. Sandstone rocky islets and deep pools are found more in the southern part of the wetland complex. Laterite soils are found in the Ban Nakasang area.

22. Most of the local people rely on the river as a sole source for drinking water, cleaning and disposal of solid and liquid wastes. As a consequence, the waters of Siphandone channels commonly show signs of substantial river pollution (foam development and solid waste flotsam), while local health authorities report a variety of health hazards caused by faecal contamination and vector borne diseases resulting from the general lack of sanitation coupled with the high (and increasing) population density. According to local health officers in Nakasang and reported by Daconto<sup>7</sup> – frequent contamination of the surrounding riverine waters has led to diarrhoea infections, malaria, schistosomiasis and opisthorchiasis incidents.

## C.2 Ecological Resources and Issues

23. The total area of Siphandone Wetlands has been estimated (IUCN as being 399km<sup>2</sup> but when adding in a 1km buffer along the river course, the total area would be 486m<sup>2</sup>. There is no overall management plan for the wetlands but research and investigations have been conducted, primarily into improving aquatic resources management. Work funded by the European Commission has recommended greater grass-roots level resource management, environmental management capacity building, seeking RAMSAR listing due to the high biodiversity value and wide range of hydrological conditions and habitat structures that have evolved as a consequence of the complex morphology of the Mekong River channels and the wide seasonal range of the river regime, considering future ecotourism opportunities and increased scientific research. There are 62 mammal species, 44 reptile species, 400 fish species, 344 bird species and 21 amphibian species identified within the Province. The Khone Phapeng Fall<sup>8</sup> limits the migratory routes for most aquatic organisms on the river.

24. **Water pollution and habitat degradation:** Most of the islands within Siphandone have been converted to rice paddys and generally there is a very narrow wooded strip along the river foreshore. Some of these forests are remnant mixed semi-deciduous evergreen forests although are subject to harvesting and clearing. The Siphandone area plays a key role for the regional fish fauna - and therefore it is of vital significance for millions of people depending on subsistence fisheries both upstream and downstream. Many commercially utilized fish of the Lower Mekong River Basin have adapted to the local ecological constraints (e.g. natural barriers in form of large water falls and rapids), causing high natural mortalities. Most fish in the region reach sexual maturity early, and lay a high number of eggs which develop rapidly. Nearly all species are much more sensitive to environmental changes than to over-fishing. This leads to the conclusion that for the fisheries to be sustained, it is more important to manage the environment than to manage the fisheries *per se*.

25. Deep pools in the Mekong River generally play an important role as a dry season habitat. Most of the migratory species migrate from the Siphandone wetlands upstream into tributaries

---

<sup>6</sup> Daconto et alt. (2001), page 33

<sup>7</sup> ibid page 22

<sup>8</sup> also referred in some publications as 'Khone Falls'

during the high flood season and return to deep pools in the main stream at the beginning of the dry season. Habitat degradation in and around the mentioned deep pools limit the distribution and abundance of many aquatic species, including the Irrawaddy Dolphin: The deep pool off Ban Hangkhone (see Map 1), is, according to local guides, currently home to about a dozen dolphins, both adults and calves that can be spotted at surface particularly during the dry season. As such, the dolphins are regarded as major natural asset of the Siphandone attraction values, and major source of income for local boat operators who participate in the dolphin program organized by the local dolphin watching association. This important livelihood source will equally at stake in the near future once current levels of river pollution and potential other disturbances (**Annex 5**) are imminent. There are several investment plans circulating that refer to the development of the Region. Apart from the mentioned large-scale hydropower scheme at the Don Sahong Channel there are other proposals for large scale developments near Khone Phapheng including an international airport, hotels, casino, golf courses, restaurants, zoo and resorts. There is currently a hotel and golf course near completion and a Korean funded development proposal for using a 80ha site near the Khone Waterfalls for a hotel and golf course development – if approved, it will be within close proximity of the waterfall and involve clearing of remnant pristine vegetation. The Environmental Team was unable, however, to obtain more detailed information of the technical nature, time frame and other parameters linked to such proposals.

26. Two deep pools located South of the Khone Phapeng Falls (see Map 1) clearly emerge as an important dry season habitat for up to 53 aquatic species, including the Irrawaddy Dolphin (*Orcaella brevisrostris*)<sup>9</sup>. On the other hand, both the Khone Papheng and the Li Phi waterfall apparently do not present a major physical barrier for many migratory fish species of the Mekong. In fact, most species are known to migrate either below and above (upstream) of the falls (see also Box 1, **Annex 5**). Surveys conducted by MRC (*loc.cit.*) on the specific fish migration patterns in the wider Siphandone region showed that the timing of the fish migrations coincides with the main spawning periods for most species both below and above the two waterfalls.

### **C.3 Demography, Socio-Economic Conditions and Development Plans**

27. The latest census in 2001 indicates that the population of Champasak Province is over 500,000. Pakse is the capital city of Champasak Province and the largest city in southern Laos. The province's population includes lowland Lao, Khmer, Phu Thai and various Mon-Khmer groups. The province is well known for silks and cottons that are hand-woven of tie-dyed threads (*matmii*). The Siphandone wetlands are home to 136 villages with an estimated population of 72,600. Around 75% of these rate themselves as poor. The main source of employment is farming, fishing and new business associated with raising numbers of visiting tourists, many of them travelling to the Siphandone islands after a visit to Vang Vieng, a prime target by backpackers and low-budget travellers in Lao PDR.

28. The community consultation during the first IEE (2007-2008) revealed general support for the proposed improvements as it was seen as increasing visitors to the area and providing more opportunities for gaining income.

29. The Siphandone wetlands are not only of immense ecological value, but they are vital to the local community as a source of food and resources from the river and floodplains. Therefore, environmental degradation of this region would implicit wide socio-economic

---

<sup>9</sup> Source: Bao T.Q et al (2001) Local knowledge in the Study of River Fish Biology – Experiences from the Mekong; MRC, Mekong development Series No 1, 22 pp

consequences. This refers particularly to a recently planned large-scale hydro-electric development (**Annex 5**) that would alter fish migratory routes, hydrology, silt depositing and the conditions of the aquatic environs (e.g. water temperature, water quantity, turbidity), large scale irrigation schemes and pesticides. Other concerns relate to environmental problems that are widespread in Laos P.D.R, such as uncontrolled land development which cause loss of forest habitat, increased run-off and new sources of pollution (e.g. fertilisers), unsustainable fishing practices, large scale deforestation, mining and road construction within the river catchment that led to increased silt deposition, alien species introduction in the Mekong system, uncontrolled hunting and riverbank vegetation harvesting<sup>10</sup>. Indiscriminate dumping of domestic wastes, lack of stormwater control give further reasons for environmental concerns if not well-addressed in the near future.

#### **C.4 Infrastructure and Utilities on Don Det and Don Khone**

30. The Siphandone inhabited islands are still in a rather undeveloped stage, with only basic provision of (unpaved) roads and tracks, no specific landing piers, and modest infrastructure to serve as local administrative centres. On Don Det and at the Southern tip of Don Khone there are two primary schools (see **Annex 3**), with very limited facilities and equipment.

31. Regular electricity supply has only recently (2009) been connected to Don Khone island, whilst there are still considerable shortages common. On Don Det, private households depend on their own generator electric supply. There are only rudimentary fixed-line telephone connections, mainly based on privately organized satellite phone applications.

32. Apart from guesthouses and restaurants there are few food and amenity shops on both islands. Essential goods, food and drinks are all sold in guesthouses, while Nakasang represents the main source for market supplies.

33. The public health sector is underdeveloped, with only one ambulance station at Don Khone. The actual health facilities are far insufficient to cope with the current influx of visitors. In cases of severe injuries, birth, major illnesses etc. have to be treated in Pakse hospital, being at about 130 km distance and involving a laborious 3-4 hrs transport in case of an emergency.

34. According to the village heads, there is only a small police force (village guards) with modest facilities at hand to manage the rising security and crime concerns on both islands.

### **D. Screening of Potential Environmental Impacts and Proposed Mitigation Measures**

#### **D.1 Environmental Screening of the Project Components and Activities**

35. The Environmental Team undertook a screening of all planned project activities described in Chapter B1. None of the envisaged project activities described in Chapter B.2 will cause any adverse environmental impact. In fact, these are activities that contribute to better environmental awareness of the broad public and therefore are considered as beneficial impacts. The results of the screening exercise for all components of the sub-project are shown in tabular form in **Annex 1**.

---

<sup>10</sup> G. Daconto (Editor) 2001. Siphandone Wetlands, Funded by the European Commission.

36. This Annex also contains the Project summary assessment results in accord with the environmental checklist stipulated in the EARF for the STDP. The assessment was conducted jointly with the Design Engineering Team of LaoConsulting Group.

37. The project will undoubtedly result in a number of positive and beneficial impacts: Insofar, the following positive environmental impacts are identified:

- (i) creating a better visitor arrival point to the wetlands and Ban Nakasang village that will overcome current congestion, traffic and parking problems;
- (ii) providing a better understanding of the value and conservation significance of the Siphandone wetlands, with benefits felt on an international scale (through visiting foreigners), and at national and local community level;
- (iii) upgrading basic visitor infrastructure that allows visitors to access and enjoy the wetlands;
- (iv) reducing the level of pollutants entering the river by the drainage line with use of a gross pollutant trap; and
- (v) improving the living conditions of the local community through the reduction of public health hazards associated with lack of sanitation and solid waste treatment.

38. The negative environmental impacts due to the foreseen project interventions **are not significant** and only temporary in nature, thus they can be mitigated with responsible application of environmental processes during pre-planning, construction and operation as indicated in the EMP. None of the proposed infrastructure design solutions will affect environmentally sensitive areas, nor will they cause changes in the physical, biological, and social environment. There may be some inconvenience to access and traffic flows during the upgrading of the roads, market place and parking area but this will be temporary only and without precluding access. There will be some increased flows into the drainage system due to road widening and improved drainage lines along the road and market areas. However the gross pollutant trap will collect waste that enters the river system and will reduce ponding within the road drains, thereby reducing community health risks associated with mosquitoes, vermin and sullage seepage. The proposed waste management is apt to improve the overall environmental situation along the river channels and the island shores. It will also largely contribute to the visual aesthetics of the said environs.

39. The proposed works are aimed at addressing and improving existing environmental problems. The works are equally designed to improve the overall capacity of the local area to sustain increased visitation in future years. The suggested environmental signage and awareness information material aims at providing better conservation outcomes for the entire area, and will thus upgrade the living conditions of the local population.

40. All anticipated environmental impacts identified with the planned execution of the project (civil works) are considered as minimal and short-termed, and are likely to be fully controlled by the respective mitigation measures described in the Environmental Management Plan (Annex 2). To ensure environmental sustainability, this IEE also provides for an Environmental Monitoring and a meticulous supervision of all construction activities as specified in the Technical Specifications included in the bidding documents. It is therefore concluded that under the current application of the Regulation on Environmental Assessment process in Lao PDR, and in accordance with the criteria of the *ADB Environmental Assessment Guidelines 2003* where there is no need for the preparation of an EIA.

41. **UXO Risk Assessment:** The eastern parts of Champasak Province were heavily bombed during the Vietnam War, however, several discussions held with local authorities and schoolmasters in all project sites did not result in any record of UXO incidents during the past 50 years in that area. Local Authorities therefore advised that no specific UXO clearance operation would be required. In addition, consulting with the Provincial MAG Office in Pakse resulted equally in the statement that their assessment maps, including the Siphandone region, should be free of any UXO occurrence and that no predictable disturbance should occur at any of the construction sites.

## **D.2 Proposes Mitigation Measures and Environmental Management Plan EMP**

### **D.2.1 General**

42. The measures to reduce or mitigate the potential impacts identified with works for components described in B.1, including the provisions made for monitoring tasks<sup>11</sup> are listed in the Environmental Management Plan. The EMP, documented in **Annex 2**, indicates the (i) site works/activity, (ii) potential environmental impacts, (iii) mitigation measures, (iv) responsible entity, (v) outputs and observation results to be verified and monitored, and (vi) funding. In most cases the mitigation measures are capable of reducing or minimising the impacts over time, as none of the identified impacts is severe or long-lasting by its nature.

### **D.2.2 Public Health, Sanitation, and Accident Risk Management**

43. Based on interviews with stakeholders during 2 field visits (October 2009 and February 2010) there are needs to consider certain aspects in relation to public health and sanitation: Public health and safeguard providence planning will become increasingly important with the growing numbers of visitors. Two scenarios are likely to happen that need proper planning for emergency actions:

#### **a) Boat and swimming/tubing accidents, water accident rescue operations:**

44. Visitors are brought with local longboats from Nakasang pier to the islands of Don Det and/or Don Khone. At times of sudden storms, the Mekong waters are reportedly rough and wavy, and given the relative unstable layout of local transport boats.

45. Proposed mitigation measures include:

- All transport boats shall be sufficiently be equipped with well-maintained life-jackets. The personnel of the ticket-selling in the Tourist Information Centre Nakasang shall be responsible for regular checks upon the adequate number, safety status and replacement of life-vests on board. Each boat shall also have at least 3 jackets that will fit small body sizes.
- All passengers need to wear obligatorily life jackets throughout the entire boat passage; this needs particularly be controlled and enforced at rough river conditions and during heavy rainfall.
- An officer of the Nakasang Boat Association shall be responsible to decide whether transport passage for visitors shall be safe or need to be postponed until weather conditions become safer and further notice.

---

<sup>11</sup> In a separate documentation, the Environmental Team prepared *Monitoring Compliance Sheets* to be used as framework for both the Supervision Engineers and the Contractors

- All boat drivers transporting tourists shall undergo a good training in rescuing drowned persons, and become familiar with reanimation procedures in case of such emergencies. Repeated and refreshment training shall be scheduled by the PIU who will employ a qualified person to conduct such training. The training shall be obligatory to all persons involved in the boat transport business of Siphandone islands.
- The safety and first aid training shall also be obligatory to the owners/personnel of those local businesses who recently start to engage in tubing activities. Such personnel need receive a specific awareness program alerting to the dangers of such activities under the strong influence of alcohol and drugs, and to warn tube users about the lethal danger of approaching rapids and, in the worst case, the waterfalls adjacent to Don Khone (Li Phi and Khone Phapeng).
- The general public and all visitors shall be informed (included in handout-brochures and adequate signboards at prominent locations) about the general unsafe conditions and health risks when swimming/bathing in the partly heavily polluted local Mekong waters where all households indiscriminately discharge untreated domestic sewage.

### **b) General Accident Risk Management**

46. In view of the relative remoteness of the Siphandone region and the prospects of increasing numbers of visitors in the coming years, accident management will become increasingly important. At present, the situation for the two local dispensaries is already precarious, as they hardly can cope with the existing number of admittances. Serious injuries can only be treated in Pakse Hospital, at some 130 km distance from Nakasang village.

47. Land accidents most likely to happen nowadays and in future include road accidents, involving foot walkers, bicyclers and, above all, motorcyclists. The entire project road length, starting from junction of Hwy No.13 to the Nakasang Access Road, and on Don Det/Don Khone trails, is about 11 km down to B.Hangkhone. In addition, there are several more kilometres along both islands leading on sandy tracks. The current planning foresees only a gravel-compacted rehabilitation of the old railway track between Don Det and B.Hangkhone, which probably will remain even after completion rather difficult to manoeuvre both for bicycles and motorcycles. In addition, these tracks will be regularly used by local truck-taxis which may eventually cause additional wear and deterioration, especially during and after the rainy season.

48. Proposed mitigation measures to improve the overall traffic safety situation on Siphandone Islands and the Nakasang Access Road include:

- As for driving licenses, especially for motorbikes; no under-aged children should be allowed to drive such vehicles. Efforts shall be established to get such requirements controlled and enforced.
- Recreational motorcycles may substantially contribute to serious injuries and accidents under the local conditions, particularly when foreign visitors use rental bikes without special knowledge of both the vehicles and the partly rough terrain. The PIU, together with the local community representatives, may therefore consider banning the rental of motorcycles to tourists on Siphandone islands. In fact, all scenic trails and tracks in the area are best seen by foot or bicycle. If rapid transport is needed, the use of local taxi-trucks is still available.
- In case of severe accidents happening in or near B.Hangkhone, patients may be rushed by boat (less than 1 hour) over the Mekong to the Cambodian side (Hospital near Kratie).

- It is recommended that prominent spots along the entire Siphandone track (e.g. landing facility/pier at Don Det, old railway bridge crossing and Observation Tower/Dolphin Watching Centre at B.Hangkhone) will be equipped with a short-range radio-phone station which is clearly marked to be used also by the public in case of an emergency call situation.
- At least one vehicle of the present/planned taxi-truck fleets shall be equipped with an emergency stretch to be able carrying injured persons safely to the Don Det ferry pier. The driver of such vehicle shall receive a special training in first aid for road accident victims.

### **c) Improving Road Safety at Sensitive Spots**

49. Interviews with 4 local schoolmasters (**Annex 4**) indicate the need for adequately addressing road safety and accident risk management, above all in front of schools located adjacent to the new project road and tracks. It is suggested that the engineering design takes all recommendations made by the respective Schoolmasters into full account while planning for engineering solutions at the following locations:

- Primary school at Maisivilay, located at km 2,2 on the access road from Hwy 13 to Nakasang Village planned for rehabilitation
- Secondary school at Maisivilay, located opposite side of the same access road
- Primary school at Don Det landing pier/parking lot
- Primary school at village entrance of B.Hangkhone, at the southernmost end of the rehabilitation trail on Khone Island.

50. Commendable precaution measures at the mentioned school sites (= black spots) include:

- Changing the school exit gates into safer technical solutions in order to avoid traffic accidents with children running out to the road after school breaks
- Adequate warning signs in the vicinity of school entrance gates, also indicating the peak times of children passing on the road
- Road safety awareness program for the respective school children
- Speed bumps across the road, in the close vicinity of the school exits, and
- Planting of adequate hedges to reduce traffic impacts on school children (noise, dust, visual barrier).

### **d) Sanitation Facilities and Waste Management**

51. At present, visitors often complain that there is no toilet facility at any prominent destination point on the Siphandone Islands. There are few possibilities to use such facilities (pay toilets) run by private people along the Nakasang road, and local restaurant owners on both islands allow tourists to use their facilities, sometimes charging a small fee.

52. Uncontrolled dispersal of waste material is an environmental problem in the entire settlement area of Nakasang village and all over the islands of Don Det and Don Khone. Judging by the nature of waste and discussions with village leaders it is assumed, however, that the majority of such wastes is mainly generated by the local population and less by visiting tourists.

53. Proposed mitigation measures include:

- The Nakasang Tourist Information Centre, where equally the boat tickets will be purchased, will offer adequate pay toilet facilities.
- It has been discussed with the planning engineers to include further toilet facilities: Recommended locations are
  - at Don Det Island pier,
  - at the old railway bridge between Don Det and Don Khone
  - at the observation tower, Hangkhone village
- It needs to be determined if such facilities are free of use or will have a small nominal charge. Charging the users would partly recover the necessary maintenance costs.
- Slightly higher user charge will be required for public lavatories that are equipped with washing facilities.
- The design planning team will make provisions to include an adequate waste collection system (containers with adequate lid cover) at prominent sites where most tourists will embark/disembark.
- At prominent locations (e.g. boat embarking and landing places) it is recommended to establish awareness signboards in 4 languages (Lao, Thai, Chinese, English) that will encourage visitors to observe basic environmental protection rules and explain the ecological values of a proper and clean environment in the Siphandone wetlands.
- The PIU will undertake all efforts to receive the support by the local communities, i.e. enabling a waste collection and proper disposal program to safely deposit domestic and other waste material in designated landfills.

### **D.2.3 Maintaining Cultural Values and Integrity**

#### **a) Distribution of Good Information Material**

54. Visiting foreigners may violate (sometimes inadvertently or due to lack of information) the cultural values and feelings of local populations. Cultural insensitive behaviour that may lead to conflicts with local communities may include loud speaking, scolding, walking in bathing suits in the public, drinking and use of drugs. The avoidance of disturbance to local school class operations is another exigency as concluded from the field surveys (see **Annex 4**).

55. Proposed mitigation measures:

- The key to any successful achievement of mutual cultural understanding lies in providing good information to all parties involved. As for the visiting tourists, it is important to provide them, right at the first step into the Siphandone when purchasing a boat ticket at Nakasang Tourist Information Centre, a set of adequate information in form of educative signboards, hand-out leaflets, photo tables and well-trained personnel working in the Information Centre.
- In addition, small brochures might be planned to distribute among the local guesthouses in the islands. The LNTA already has a good selection of such awareness material that is used successfully throughout the country at popular destinations. The Siphandone Wetlands should certainly share an adequate distribution of such material, including the erection of a number of awareness signboards that would support better understanding of the different cultures.

## **b) Maintaining Good Relationship between Visitors, Local Population and Authorities**

56. At the time of the Environmental Team's last field visit (2<sup>nd</sup> Week of February 2010) it was observed at several incidents that the new levy of 20.000 Kip/visitor/day charged on every foreigner crossing the old French Railway Bridge from Don Det to Don Khone creates frictions and dissatisfaction among the visitors, especially as no information board would explain the rationales for such levy. Similarly, tourists sometimes complained about arbitrarily high boat prices they were asked when returning from their guesthouses to Nakasang.

57. Proposed mitigation measures include:

- The key to avoid unnecessary frictions and misunderstandings between local authorities and visitors from abroad lies in the combination of a consistent and unswerving policy for charging visitors to Siphandone on one hand, and provide them with good reasoning and information on how the fees are used for enhancing the environmental value of the area.
- It needs to be discussed among all stakeholders involved what would be an acceptable fee for visiting foreigners to avoid the current dissatisfaction and clashes at the said checkpoints.
- Another solution to create funds for environmental enhancement as well as for community development costs would be to include such fee into the boat tickets for all foreign visitors. Such policy could be well explained in respective information leaflets that are suggested to hand out to any visitor contacting the Nakasang Tourist Information Centre which will be the place for purchasing the boat transfer tickets to the Siphandone islands.
- The local schools along the project roads and tracks need multilingual signboards to prevent tourists from unauthorized entering and disturbing the local school compounds.
- It is recommended to increase the budget of local authorities to establish a suitable police force to cope with the ongoing and anticipated social problems, including crimes and prostitution.

### **D.2.4 Environmental Concerns and Enhancement Recommendations**

58. Based on various field surveys, observations and stakeholder meeting, including the sharing of view with local authorities and decision makers, encouraged the Environmental Team to come forward and integrate into the EMP a number of proposals for environmental enhancement, to give the proposed project a good position and chance to achieve its goals and objectives. It needs to be mentioned that all recommendations made hereunder were duly discussed and agreed with the Head of Champasak Tourism Agency, and with the Engineers and Technical Designers of LaoConsulting Group, Mrs Arouny A. Sakulku and Mr. Outhit Soulivanh:

- a) **Enforcement of the Right of Way (RoW) at Nakasang Access Road:** In Lao PDR. It is common practice that RoW issues are generally solved in a friendly manner between the affected people and the local authorities or communal leaders. For the Nakasang Access Road (Class 3 road) the RoW is supposed to be 10 m each side from the Center Line. However, this RoW is generally not observed by local people, and it is also not enforced. According to ruling practice (*pers. information/LCG Engineers*), the solution is habitually sought in mutual agreements, meaning that if Gvt needs land for road construction purposes, it reserves the right to retrieve this land and the perpetrator normally (and sometimes upon 'social pressure' under the interference of the village leader(s) will agree to give the said land. It is also common that he/she will then receive

assistance to find additional land within the village periphery for compensation. Hence, it is not believed that RoW issues will jeopardize any of the road rehabilitation and drainage construction works planned under this project.

- b) **Roadside Replantation:** Roadside tree plantation does not follow international practices in Lao PDR. Replanting trees and bushes that are to be removed due to road construction/rehabilitation works is not foreseen, but a practical solution is commonplace: In the beginning of June (National Planting Day) the community will organize themselves to plant ornamental roadside trees and ornamental bushes, at their own cost. Often the plant material is provided by the District Forestry Department. Such planting programming is usually done by the Forestry Dept. by its own discretion, and does reportedly not require the intervention of this project.
- c) **Diversion Roads:** During the construction of the 5 culverts at 4 locations in the Nakasang Access Road, about 2-3 weeks of local traffic diversion is unavoidable. To mitigate possible shortcomings and impacts, the construction plan shall foresee to carry out such works only in the dry season so there will be no hindrance to the traffic flow from and to Nakasang village.
- d) **Drainage Facilities within Nakasang Village:** Currently existing blockage of the drainage facilities will be solved with the intervention of the village leader; this refers particularly to those plots ((Chinese vendors, see Photo 8, **Annex 3**) where currently it is obvious that the existing drainage is blocked by structures and garbage, often fostering the development of stagnant puddles (→ avoidance of malaria breeding pools).
- e) **Promenade Walkway** (Photo 7, **Annex 3**): Stabilization / River erosion issues are apparent. The edge of the planned River Promenade at Nakasang needs a reinforced retention wall or similar structure with adequate drainage provision to avoid further collapse of that stretch of village path. It is further recommended to install fixed garbage containers with appropriate lid along the promenade. It is suggested to establish at the beginning of the Nakasang Riverside Promenade and at the locations where the embarkation stairs branch off with Environmental Awareness Signboards.
- f) **Pier Construction at Nakasang and at Don Det:** All piers need to include certain safety structures to avoid accidents that are commonly caused by muddy and slippery surfaced on steps. Particularly during the wet season a slippery mud cover on the steep steps poses the risk of sliding when people embark/disembark. Proposed technical countermeasures would include (a) a handrail in the center of the stairs that will assist people carrying heavy luggage to hold themselves and not to stumble or slide on the steps, (b) a well-structured and/or grooved surface of the pre-cast concrete steps that lead down at the piers. The pier shall also have a well-marked emergency telephone post to call for ambulance services in case of victims transported to the pier from the island(s).
- g) **Public Toilets:** It needs to be discussed with the communal authorities which solution shall be given preference, i.e. privately run (pay) toilets or public toilets. Presumably the solution of privately organized pay toilets may be the best solution in places such as the landing pier at Don Det, at the Don Khone bridge and at the parking lot at B. Hangkhone. It needs to be recalled that there already public toilets (8) planned at the Nakasang Information Centre opposite Nakasang Market. Presumably, the design for the renewed market will also include a new public (pay) toilet facility.
- h) **Environmental Awareness and Information Material:** Currently, visitors often complain about very little if any information on the ecological and socio-cultural values of

the Siphandone Wetlands (see var. photos, **Annex 3**). It is therefore recommended to consider a number of environmental information material and information to be distributed to future visitors. It is suggested to combine both signboard information at selected spots and trails, and to provide adequate and multi-lingual handout (leaflet) information to each visitor who arrives at the Nakasang Visitor Information Centre to purchase a boat transfer ticket to the islands. Such information shall include, among others, the following information either in form of handout leaflets or small comprehensive booklets for those who wish to obtain more specific details on:

- Description of the uniqueness, spectacular fishing practices and ecological values of the Siphandone Wetlands, including the Khone and Li Phi waterfalls.
- Historical account on the Siphandone area during the colonial period
- Description of key plant and animal species occurring in the Siphandone Wetlands that underscore the justification to include this area into the RAMSAR Convention
- Explanation of conservation values and issues
- Basic accurate maps, including tracks and spots of natural interest
- Alert of specific dangers in the Siphandone Wetlands (e.g. motorcycle accidents, tubing)
- Information about drug and other crime issues
- Indications of emergency posts and ambulances, and instructions what to do in case of emergency situations
- Information about Lao cultural etiquettes and ethics
- Specific information about the Irrawaddy Dolphin, and the offered dolphin watch tours near B. Hangkhone.

## **E. Institutional Framework and Implementation Arrangements**

### **E.1 Key Institutions and Stakeholders**

59. The responsibilities for environmental concerns relating to the STDP encompasses various levels of government agencies, designers, engineers, supervision consultants and the project contractors respectively their sub-contractors. Regarding governmental agencies these include the Lao National Tourism Administration (LNTA), the Water Resources and Environment Administration (WREA) offices at national and provincial/district level, such as local Water Boards, Fisheries Departments, Forestry Departments and, in case of urban development interventions, the local town planning authorities.

#### **a) The Lao National Tourism Administration**

60. The LNTA will be the Executing Agency for the STDP Project. It will be responsible for the overall technical supervision and execution of the Project and will establish a central Project Coordination Unit (PCU). This PCU will be responsible for the day-to-day management and monitoring of all project activities including coordination with the provincial Tourism Offices. The PCU will be headed by a project director and eight permanent staff, including a project manager, a financial controller, a tourism development specialist, a natural and cultural heritage specialist, an environment specialist, a social development specialist, a marketing specialist and a monitoring and evaluation specialist. The PCU will be supported, in case of environmental aspects, by international and national consultants.

61. The LNTA will be also be responsible for the overall coordination of organizations for the monitoring and reporting activities during the construction and the operational phase of this project. It is anticipated that the LNTA will resume this responsibility at least for three years after all civil works are implemented. In addition, the LNTA will appoint a Social Development Specialist who will be responsible for all resettlement aspects of this Project.

**b) The Provincial Implementation Units**

62. The LNTA will establish Provincial Project Implementation Units (PIUs) at to undertake the actual delivery of the sub-projects. It is planned that the PIUs will be headed by a project director and staffed by a project manger, a tourism development and training specialist, a social development specialist, an environmental specialist, and a construction supervisor. The PIUs will be responsible for implementing, coordinating, monitoring, and reporting activities at the Provincial level under PCU's instruction and guidance.

**c) The Environmental Team**

63. All environmental planning and implementation aspects will be subject to the assessment and supervision of an Environmental Expert Team assigned to this project, consisting of a National and an International expert. The team's main tasks are to ensure, at all stages of the STDP project, that all environmental safeguard requirements in line with the national and ADB's environmental policies, legislation and guidelines are duly observed and incorporated in the specific design and implementation proposals. This refers particularly to the review and updating of the IEEs and EMPs for all sub-components, the preparation of environmental safeguard clauses in the bidding contracts for the Contracts, and the supervision and monitoring of the ongoing construction and infrastructure rehabilitation works throughout the project period. The Environmental Team will assist the PIUs and the contractors to develop standardized environmental reporting procedures, based on an environmental compliance monitoring framework. The Environmental Team will also assist local agencies such as town planning units and the provincial Water Resources and Environment Administration Offices (WREOs) in their efforts to establish, as applicable, environmental monitoring programs,

64. The Environmental Team assists the Implementing Agency, the LNTA, and the Technical Designers of the contracted consulting firm (LCG) in finding adequate solutions to ensure environmental protection and enhancement. Of particular concern will be to prepare mitigation measures (i.e. the present EMP, this document) to avoid primary and secondary impacts on natural resources due to construction activities, waste management, drainage and impediments affecting public life and health.

65. The Environmental Team had received the task to obtain official documentation and certification, as applicable and necessary, to ensure that each of the designated project intervention sites is clear of unexploded ordnances. However, given the very low risk of UXO interference in all sites of this Project, it has been advised by the LNTA that adequate documentation, based on stakeholder consultation during the field survey, shall be sufficient to comply with the need to ensure that there are no such risks. Accordingly, the Team made all possible efforts to retrieve such information (documented in **Annex 4**)

**d) The Contractors**

66. During the preparative and the construction phase, the Environmental Team will act as interface between the policy requirements on one hand and the executing work forces on the other hand. Therefore, the Contractors will be fully integrated in the process of environmental

safeguarding as detailed in the Technical Specifications of the bidding documents, and included in the respective contracts. The Environmental Team will assist the Contractors to fulfill their obligations with respect to compliance, and the implementation of training and awareness campaigns as needed in the fields of environmental protection, work safety, and good relationship with the local communities. The latter aspect will include the minimization of construction-related impacts, competition with local resources (food, water), water uses, maintenance of utility functioning, prevention of social conflicts etc. In principle, the overall guidance for proper environmental social management during the construction and the operation phase will be in line of the Environmental Management Plan EMP which is the core of this document.

## E.2 Environmental Monitoring

67. The Environmental Protection Law 1999 provides overall responsibility for environmental protection to the Water Resources and Environmental Administration (WREA), an administrative body created within the Prime Minister's Office. All IEE and EIA proposals are considered under the *Regulation on Environment Assessment in the Lao PDR (2002)*. There are no standard guidelines for the environment screening in Lao PDR and judgement is based on experience and considering suggested guidelines in other countries and agencies (e.g. ADB, World Bank).

68. The Environmental Management Plan EMP (Annex 2) includes detailed information on the monitoring aspects and tasks for each of the examined parameters that are proposed for mitigation measures. The monitoring framework is in line with a document prepared by the Environmental Team separately for the STDP, namely the preparation of Compliance Sheets to facilitate the monitoring and reporting tasks of the Contractors as applicable. While the monitoring tasks during the construction phase will concentrate on all observations and issues related to the civil works and their immediate and/or secondary impacts, focal aspects of environmental monitoring during the operative phase of this project will be (i) waste management, (ii) drainage functionalities, and (iii) road safety and general accident management.

69. As for institutional responsibility, all monitoring reports and outputs such as the compliance sheets prepared jointly by the Environmental Supervision Engineer and the Contractor(s) will be submitted for screening and approval to the WREA office in Vientiane and the provincial governor's office of Champasak Province.

70. Discussions held with the Mekong River Commission indicated that there was no extensive baseline data collected on water quality at Siphandone wetlands. There is little value in monitoring water quality in the Mekong River for the following reasons: (a) there is limited potential for deteriorating the ambient water quality resulting from the planned project activities, (b) the Mekong is a vast river system subject to many sources of pollution upstream of the site; (c) the high costs of monitoring involved with limited relevance to the project<sup>12</sup>. The Environmental Budget (see next paragraph) allows for labour in cleaning-up and analysing waste at the river environs near the gross pollutant traps at Nakasang every year for 3 years after works completion. The key aspects of the monitoring for the gross pollutant trap will be to keep records of the (i) amount of waste removed; (ii) analysis of the waste material collected by broad categories by volume e.g. plastic, food, paper, cloth; (iii) monitoring of the frequency of clean-up of the trap; and (iv) the overall condition of the river environs (e.g. level of waste

---

<sup>12</sup> Determining the ambient quality of the Mekong River is primarily the task of the Mekong River Commission who will also provide the strategic approach on a much broader scale.

observed) up to 100m below the trap. The local authorities shall look after the necessity to regularly clean-up operations along all shore environs from any drifting plastic material. These authorities will be also responsible in monitoring the overall environmental appearance and quality of the Siphandone Islands.

#### F. Public Consultation and Information Disclosure

71. During the preparation of the first IEE public consultation meetings were arranged during July 2006 at the following locations: Khone Phapheng, Ban Nakasang, Don Det, Don Kong and Done Khone. In addition meetings were held with the Vice Governor of Champasak Province and the provincial offices of Planning; Agriculture and Fisheries; Tourism; and STEA<sup>13</sup>. Meetings were also held in Vientiane with the national Lao PDR offices of Tourism, STEA, WWF and the Mekong River Commission. In addition the projects were discussed with participants at the two national workshops held in Vientiane during July 2006 and September 2006. Workshops have been conducted each year on the protection of biodiversity values in the Siphandone wetlands with the proceedings being formerly documented by STEA<sup>14</sup>, and these were reviewed as part of the background research. Website research and review of any relevant reports and information was also conducted.

72. In addition to various public consultations documented in the previous IEET the current Environmental Team undertook further consultations with various authorities and stakeholders from both the public and the private sector. The purpose of the recent series of public consultation was to update and detail background information on the Siphandone wetlands including relevant policies, research, environmental issues and response to the planning ideas and concerns for the components. The details and suggestions obtained during these consultations are provided in **Annex 4**. It needs to be underscored that all recommendations received during these consultations were duly discussed with the Technical Design Engineers and incorporated to the extent possible.

73. The Environmental Team also made efforts to put light to the many concerns raised in the public (**Annex 5**) in relation to potential environmental impacts of a major hydro-electric power scheme development proposal in the southern portion of the Siphandone wetlands (Khone Falls area) which could create extensive flooding, affect fish migration routes, damage wetland habitat values and involve resettlement of villagers. There is concern that any negative impacts would not only be in the Khone Falls area, but also on fisheries and communities all along the Mekong River and its tributaries in Laos as it would block fish from migrating into Laos from Cambodia. Other concerns relate to the possible commencement of a major resort/golf course development within close proximity of Khone Phapheng Falls, involving clearing of a large area of remnant vegetation.

---

<sup>13</sup> The implementation of the environmental law in Lao was previously with the Science, Technology and Environmental Agency (STEA) and this responsibility has now been taken over by WREA.

<sup>14</sup> STEA 2004 Proceedings Workshop on problems and Opportunities for Environmental and Biodiversity Management at Wetland Ecology in Kong District; STEA 2005 Activity Financing contract Second Workshop of Ecotourism and integrated Ecosystem Management; and STEA 2006 Proceedings Workshop on Man and the Biosphere.

## G. Findings and Recommendations

74. There are limited environmental impacts associated with the proposed developments for the Siphandone Wetland Biodiversity and Tourism Development Project. The initial screening of potential environmental impacts of the components clearly indicate that none of the envisaged activities will significantly affect environmentally sensitive areas, nor will they cause changes in the physical, biological, and social environment. Any potential negative effects would be minor and easily mitigated through the adoption of sound technical planning, design solutions, construction modes and management practices at all sites. Many of the proposed actions provide positive environmental impacts as the aim to solve existing environmental problems and to improve the capacity of the local area to sustain increased visitation in future years. Importantly these works are also aimed at providing better conservation outcomes for the Mekong River, wetlands, villages and the living conditions of the local population. No EIA or EMP is required to be prepared to identify, assess and manage the potential impacts associated with this project.

75. Reference is made to a number of suggestions and recommendations described in Chapter D.2.4 and in **Annex 4** of this document. All recommendations are primarily aiming at improving the overall environmental appearance of the Siphandone Wetlands, to preserve their ecological values and unique assets, and to contribute to a tangible amelioration of the public safety and awareness situation.

## H. Conclusions

76. Under the assumption that the proposed enhancement mitigation measures are observed and monitored, it is concluded that the proposed project and its activities will not cause significant environmental impact. Depending on their nature, the proposed project would be included as Category B for the physical infrastructure improvement / civil works, and as Category C for all other planning interventions under the criteria of the *ADB Environmental Assessment Guidelines 2003*. With reference to the regulations and legislative framework<sup>15</sup> used by WREA, it is equally conferred that no full EIA would be required for the proposed works.

77. The proposed works are suited to provide a range of social and environmental benefits including:

- creating a better visitor arrival point to the wetlands and Ban Nakasang village that will overcome current congestion, traffic and parking problems;
- providing a better understanding of the value and conservation significance of the Siphandone wetlands to the globe, nation and local community;
- upgrading basic visitor infrastructure that allows visitors to access and enjoy the wetlands;
- reducing the level of pollutants entering the river by the drainage line with use of a gross pollutant trap; and
- improving the living conditions of the local community through the reduction of health hazards involved with lack of sanitation and solid waste treatment.

---

<sup>15</sup> Regulation on Environmental Assessment within the Environmental Protection Law 1999, Lao PDR.