

Project: ADB Grant No 0117 LAO SF

Lao PDR:

GMS Sustainable Tourism Development Project STDP

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**Final Environmental Assessment  
of all Infrastructure Works associated to the STDP**

Vientiane  
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# 1. Introduction

## 1.1 Rationale and Layout of this Assessment Report

1. Within a project cycle, that involves both infrastructure development and awareness components, monitoring of the goals achieved is an essential management tool as it provides the basic information and feedback for rational management decisions, and verification of the effectiveness of plans previously made under this assignment<sup>1</sup> to guarantee sound and safe environmental conditions during and after completion of the development activities associated with each of the sub-projects for the Sustainable Tourism Development Project in Lao PDR.

2. The prime objectives of this final environmental monitoring activities are:

- To check on whether mitigation and enhancement measures stipulated in the Environmental Management Plan EMP and the Environmental Guidelines<sup>2</sup>, respectively those proposals discussed previously with the site managers, with the Engineer and with local authorities have actually been adopted and put effectively in practice
- To provide information on the actual nature and extent of any current or residual impact. As applicable, each assessed impact or observed deficiency / shortcoming is commented and a mitigation proposal is offered.
- To assess the effectiveness of mitigation and enhancement measures adopted.
- To identify the need for further actions and appropriate control measures to mitigate or stop environmental impacts associated with the ongoing project activities.

3. The applied monitoring followed two major principles:

- *Compliance monitoring*, which checks whether prescribed actions have been carried out, usually by visual observation and the use of checklists prepared by the Environmental Monitoring & Supervision team.
- *Effects monitoring*, recording the beneficiary and (potential) adverse consequences of activities carried out under the specific project, be it on the biophysical or the social environment, including public health. Adverse environmental (and social) effects are measured against a set of measurements set of objectively verifiable *indicators* as they have been elaborated in the EMPs for the sub-projects..

4. By their nature, environmental impacts in infrastructure development projects are mainly subject to compliance deficiencies during the construction phase, while negative effects are mainly caused by poor planning and by incremental and induced or cumulative effects during the operational phase. Accordingly, the tables in elaborated in this report following the logical sequence of potentially appearing aspects on environmental issues that are typically associated with such activities.

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<sup>1</sup> See Reports: Updated IEEs for all sub-project, Mastaller, March 2010; EMP for siphandone Wetlands, Mastaller March 2010; Baseline Study for Tourism Development of Nam Eng Cave, Mastaller, March 2010

<sup>2</sup> Manual on Environmental Management of Tourist Attractions in Lao PDR. Thammavongsa & M. Mastaller, July .2010; Regulations on Sanitation for Vang Vieng District, UDAA, March 2010

5. For practical reasons and better readability, the assessment is presented in tabular form, each following similar structure for each of the four main regions where this project was active. Effects monitoring focused on infrastructure works and their environmental implications. Soft components (such as awareness and environmental perception, pro-poor activities etc.) were not assessed in this assignment.

## **1.2 Monitoring Team, Flow of Information and Former Reporting**

6. Environmental safeguard and compliance monitoring is effected by a monitoring team contracted by the Project Design Company (Lao Consulting Group LCG). As project implementing company is accountable to the National Project Coordinating Unit (PCU), the Lao National Tourism Department LNTD. The contracted monitoring team consisted of one International (Michael Mastaller) and one domestic environmental expert (Somvang Thammavongsa) who accompanied the said activities during the entire project cycle, from October 2009. The anticipated completion of all sub-project components is end of 2011.

7. The monitoring team prepared, in line with the TOR and/or following special requests from the PCU, annual reports and special reports (see previous page footnotes 1 + 2). The focal aspects of all reporting were compliance with environmental conservation and safeguard requirements, including both workmanship, work processes, indirect and direct impacts caused by ongoing or planned work activities. During the entire period, all reports were submitted to LCG and as copy to the PCU.

8. All environmental findings, including issues and proposed mitigation measures, were assessed and discussed in public, especially with the relevant units at both District, Provincial and National level. The PCU takes care that all proposed mitigation measures are subject to public disclosure, including a series of public hearings at sites.

9. The monitoring activities performed took into due account restrictions and limitations that are unavoidable while operating under rural conditions in the country. As such, in many cases aspects like adequate protection of ambient natural resources, protection of laborer's work safety, worker's insurances, traffic safety, disposal of hazardous materials, adherence to 'good practices' in various work processes and when decommissioning work sites, avoidance of interferences with public life, impediments of agricultural, social and cultural activities, potential risks of spreading HIV/AIDS, gender issues, could not be assessed to the depth that would be required in other circumstances. The inherent difficulties to fully apply international standards or to accept to a certain degree substandard environmental performances at the given sites were discussed with the responsible project managers at PCU, and with respect to obtain a meaningful completion of the project it was agreed to elaborate a set of mitigation proposals as and where suitable. However, it needs to be noted that many of the recommendations provided in this report were strongly influenced and constrained by the shortage of available funds.

## **2. Methodologies Applied**

10. Most sub-components for the STDP are in a stage of either being completed or being completed<sup>3</sup> within few month at latest by the end of this year. The compliance monitoring process included basically the following four methodological approaches:

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<sup>3</sup> with exception of most interventions planned in the Northern Provinces Bokeo and Luang Namtha, where commencement of works was generally delayed.

## **2.1 Site Checks on the Structural Finishing and Ongoing Construction Activities:**

11. The Environmental Team verified on site whether to implemented structural solutions incorporate appropriate measures to avoid or minimise negative impacts, as identified beforehand in other site visit assessments. The Team checked if the chosen solutions are environmentally and socially acceptable and benign, and if not, which additional measures would be required for correction. All inconsistencies and defects were discussed on site, commonly in presence of both the Resident Engineer and the responsible Contractor. In case special mitigation actions were required, the Team tried to combine possible stakeholder's concerns, technical feasibilities and practicalities, as well as financial implications.

## **2.2 Checking Work Performance Compliance in line with the Requirements documented in the Technical Specifications, and with the EMP for each Sub-Project**

12. The bulk of the field work and discussions with Contractors focused on matters of compliance with environmental safeguard requirements as outlined in the Contract Document (namely in the Technical Specifications, part B of the Bidding Documents), and in the respective EnvironmentL Management Plans EMP. Non-compliance of the requirements for appropriate environmental protection, medical issues, work safety and social safeguard aspects revealed the most critical findings during the assessment work. Major issues were commonly associated with inappropriate or insufficient sanitary facilities and insurance arrangements.

13. Reasons for widespread non-compliance with corresponding contract clauses were taken into due consideration, as contract bidding and execution of works follow their own particular rules and patterns in the Lao cultural and practical context. Efforts were made to find acceptable technical solutions with the Contractors (or Sub-Contractors), i.e. gain mutual understanding for executing all works with application a minimum of environmental safeguards.

14. The environmental safeguard framework makes provisions for both general and specific work clauses included in the bid documents, and describes technical details and requirements in the Technical Specifications. Thus, all Contractors are fully aware of such clauses. In this context it also needs mentioning that the financial provisions made in the bidding documents for environmental safeguard actions (including insurances and liabilities for environmental damages are rather limited.

15. Matters to be considered for environmental safeguards in all sub-projects will focus particularly on aspects of EHS, i.e. Environmental Protection, Work Safety, and Health. Based on field experience, the Environmental Team checked particularly those aspects mentioned in the following table:

**Table 1: Sub-Clauses Relating to Environment Safeguards, Work Safety, and Social Welfare**

Sub-Clause Number	Specification of environmental safeguards
Gen.Req. 104.01, 1) 102.10.2.1	Site Operations and Methods of Construction, general avoidance of garbage and spillage on all work sites
Gen.Req. 104.01, 2),3)	Work to be in Accordance with national rules and laws on env. Protection, ensure intl' standards of practice
104.01 3b and c, 104.02 104.01, 3d and f 104.01, 3g	earthwork operations, contain risks of sedimentation and erosion ensure all-time proper drainage suppress dust and noise emissions
102.06; 104.01, 3g, 104.02,10) 104.01, 3g	Natural habitat disturbance, hunting, fishing, wildlife killing Notification in case of finding UXOs Preservation of natural vegetation
104.02, 4) and 5) 102.02.05	Collection of refuse and disposal at work sites Requirement for re-vegetation
104.02, 4) and 5) 104.03	environmentally safe borrow operations Preservation and protection of waterways and natural resources
104.02, 4) and 5) 104.02, 8)	Prevention of development of stagnant water areas Protection of cultural and communal assets
104.05	Insurance against Accident to Workmen
A.1.1.30	Compliance with Statutes, Regulations
A.1.1.18	Noise control
104.06	Air quality and dust control
104.07	Storage of equipment and camp facilities
104.08	Sanitation and waste management requirements, incl. hazardous materials disposal
104.09.04	Work safety provisions, safety cloths, helmets, gloves, shoes
102.03.01; 104.10.01 102.03.2; 104.10.02	First Aid Facilities
104.10.01	Safe asphalt layering equipment
104.10.03	Appropriate cooking facilities
104.11	Interference with Traffic, Emergency Plan
104.12	Traffic diversions during temporary works
104.13	Avoidance of social tensions
A.1.1.23, 24; 707 603.01 – 03	Clearance of Site on Completion, Landscaping
706.01.-1) and 3)	Waste Disposal

### 2.3 Assessing Visible, Direct and Indirect Environmental Impacts (including social impacts), and their Potential Magnitudes

16. The Environmental Team focused their assessment on potential impacts on natural values and resources as outlined in the EMPs, such as

- Impacts on adjacent soils; erosion, land slides and embankment scour
- Impacts on adjacent water bodies
- Impacts on adjacent agricultural lands

- Impacts on adjacent forest lands and wetlands
- Impacts on adjacent cultural assets
- Impact on the social fabrics in the vicinity of the work sites
- Impacts on the general aesthetical values of adjacent landscape

17. The Team conducted as much as possible personal interviews with local residents and workers, to identify possible changes or impacts on land values, waste management issues, local economic setting, social tensions, and transmission of STDs.

## 2.4 Assessment of Direct, Indirect and Cumulative Environmental Impacts (including Social Impacts), and Forwarding Mitigation Suggestions

18. The assessed aspects and presented engineering solutions were tested against the following table of Indicators:

**Table 2 : Indicators of Unacceptable Environmental Effects during Construction Activities (e.g. roads, parking lots, information centres, markets etc.)**

Environmental Effect	Objectively Verifiable Indicators
Deteriorating condition of roads used by construction traffic	physical degradation of hauling/access roads, pavement cracking, embankment subsiding, increased number of accidents
Excessive delays to normal traffic; hindrance to market goods deliveries	hours delay as compared with previous travel time for same distance; type and amounts of food/crop items getting spoiled
Unreasonable frequency of work accidents, involving local residents	records of number and nature of accidents, compared with records of similar construction works in Lao PDR
Excessive airborne dust	direct measurements of dust particle concentration; reports on increase of respiratory problems among local communities and labourers; public health records specifying respiratory ailments
Excessive noise development	Records from local grievance and complaint office; school masters, hospitals, monasteries, restaurants
Poor health of labour force	Records of type and duration of diseases among labour force, compared with local health statistics, apparent injuries among workers
Sanitation and public health issues	Availability of sanitary facilities and supply of safe drinking water. Number and types of latrines and waste deposit sites as per number of users; records from local grievance and complaint office; shortages in medical supply, first aid at camp
Drinking water problems	Lowering of groundwater table, diseases recorded in relation to poor drinking water, laboratory tests if possible
Complaints from and poor relations with local communities	Crime records within local community; records from local grievance and complaint office; number of conflicts associated with violence; no. of cases involving theft, poaching, harassment of women, violation of local religious customs, trespassing into locally sacred sites.
Decline in local crop production	Crop sales at local market; records from local grievance and complaint office; production figures for rice and other staple crops; records of water-use associations; individual accounts of local farmers
Decline of fisheries resources	Fish sales at local market; sample catches at fish migrating and nursing sites, and comparison to previous fisheries data

19. In most cases the Environmental Team had the opportunity to check compliance and make observations where work sites are still active. Focal point of assessment included:

- Compliance with work performance to avoid adverse environmental impacts
- Verification that no UXO were detected during works
- Performance of works in borrow pits
- Efforts to avoid excessive emissions (exhaust, dust, noise)
- Compliance to prescribed methodology for asphalt layering
- Efforts to mitigate ambient pollution or impacts (water, soil, crops, livestock)
- Compliance with water use restrictions
- General hygienic conditions at campsite and its facilities
- Compliance with prescribed work hours
- Compliance with vehicle safety requirements
- Compliance with traffic management requirements during works, including observance of prescribed speed limits
- Compliance with basic sanitary and waste management requirements
- Compliance with work basic safety requirements, availability of work insurances
- Risk of environmental damages and impediments (e.g. drainage problems, ponding, traffic congestion, accident risks, impediments to boat transport traffic)
- Interference with adjacent ecological resources and values, observance of hunting and fishing restrictions
- Interference with surrounding social and cultural settings
- Compliance with the requirement, to employ at certain percentage local labourers for unskilled work.
- Efforts of Contractor to liaise with local officials and villagers, especially to settle raising disputes

20. As for developing mitigation suggestions, the team made due efforts to discuss commendable solutions with the local Contractor and, as applicable, together with the Resident Engineer and representatives from Provincial or District Departments of the LNTA. Prime aspects for all forwarded recommendations were their technical and financial feasibilities.

21. Wherever applicable, the Environmental Team assessed the rehabilitation efforts made by the Contractor when decommissioning a work site. Special attention was given to assess the situation at camp sites, focusing on aspects like sanitation, garbage management, removal of surplus stockpiles, removal of temporary work facilities, clearance from harmful substances and depositing them onto safe sites, re-vegetation, landscaping and/or levelling of the site before handing back to the land owner.

### **3. Assessment Results**

22. The following assessment matrices refer each to one of the four regions where the STDP project is active, namely:

- 3.1 Siphandone Wetlands – Champasak Province
- 3.2 M. Phin – Savannakhet Province (incl. M&O Plan)
- 3.3 Vang Vieng – Vientiane Province
- 3.4 North-South Corridor – Luang Namtha and Bokeo Province

### **3.1 Assessment of Sub-Component Siphandone Wetlands, Champasak Province**

23. Infrastructure Development Components subject to site checks included:

- Rehabilitation / New Construction of Nakasang Access Road (Type: asphalted rural road)
- New Construction of Ban Nakasang Tourist Information Centre and parking lot
- Rehabilitation and partly new construction of Nakasang Public Market Facilities
- Improvement of Nakasang Stormwater Drain System (from the market to the boat landing ramp)
- Construction of boat landing and embarking facilities at B. Nakasang
- Construction of a 70 m riverside promenade at B. Nakasang
- Track improvement and transport access rehabilitation works on Don Det and Don Khone islands
- Parking lot improvement at Don Det and B. Hang Khone
- Establishment of a communal dumpsite on Don Khone island
- Shelter constructions for historical monuments (locomotives) on Don Khone
- Creation of interpretation facilities at B.Han Khone site / entry point for dolphin watching tours
- Construction of a viewing platform at B. Hang Khone

Activities carried out by Environmental Team - Assessment Period: May 2011

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
<b>Maintaining Ecological Integrity (Geological features, Soil and Water Resources)</b>						
Adverse effects/impacts on special geological or geomorphologic features in the area	<ul style="list-style-type: none"> <li>Identify sensitive geological formations (e.g.karst phenomena)</li> <li>Identify project activities causing land disturbance on such sensitive features</li> </ul>	√				<ul style="list-style-type: none"> <li>➤ No presence of special / environmentally sensitive geomorphologic features in the area</li> <li>➤ No evidence of land disturbance of the environs, being mainly paddy fields and few forest lands</li> </ul>
Ecological sensitive area, soil properties and stability, erosion risks.	<ul style="list-style-type: none"> <li>Identify sensitive elements regarding fauna and flora specific and/or endemic to the area</li> <li>Project activities causing land disturbance, soil erosion, subsistence, instability or landslips</li> </ul>	√	√			<ul style="list-style-type: none"> <li>➤ No records of sensitive fauna or flora elements in the area.</li> <li>➤ The construction of promenade at Ban Nakasang may cause some temporary land disturbance, but this work will eventually help to stabilize the bank and protect against erosion and bank slides</li> </ul>
Land-Use impacts and potential land speculation	<ul style="list-style-type: none"> <li>Adverse impacts on locally specific land-uses and amenity values (e.g. agricultural assets, local fisheries, collection of forest and non-forest products)</li> <li>Land speculation as induced impact</li> </ul>	√	√			<ul style="list-style-type: none"> <li>➤ Agricultural land uses along the newly rehabilitated access road remain unchanged (paddy); no additional/attracted new land uses took place. Few new houses were/are under construction, but not to a degree that this would alter the land character significantly. Reportedly, local land prices have increased with the development of new infrastructure (access road). Land speculation, however, has not been recorded.</li> </ul>
Water quality and quantity impacts	<ul style="list-style-type: none"> <li>Reducing of local (wider) catchment area, both in terms of quality and quantity</li> <li>Change of surface drainage pattern</li> <li>Increased sedimentation loads, turbidity</li> <li>Further excessive demand for extraction (for project purposes)</li> <li>Risk of increasing flow peaks and flooding impacts</li> </ul>	√	√	√		<ul style="list-style-type: none"> <li>➤ No significant concern on water quantity and quality degradation recorded as the construction activities had not altered the catchment area. Existing (new) pipe culverts sufficient to cope with excess water in the area.</li> <li>➤ Surface runoff and household wastewater is drained well into the roadside drains and then discharged, via new channel system, into the Mekong River</li> <li>➤ Sediment road runoff of new road will be minimized as road is paved and side ditches will absorb excess sediments.</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<p>in the downstream areas</p> <ul style="list-style-type: none"> <li>• Proper waste water management to avoid impacts on public health at market site</li> </ul>					<ul style="list-style-type: none"> <li>➤ Wastewater from Nakasang market would cause odour and stagnant water unless properly mitigated by providing sufficient water for cleaning the market stalls and draining wastewater to roadside drainage system.</li> <li>➤ New tourist toilets need to supply sufficient water all time. LNTA /thru local village committees, shall ensure there is sufficient water supply to the toilets.</li> </ul>
<b>Maintaining Ecological Integrity (Vegetation and Fauna)</b>						
Loss or other impacts on local vegetation	<ul style="list-style-type: none"> <li>• Impacts due to direct impact (area clearing, tree felling, burning, spraying of herbicides)</li> <li>• Identification of specific losses of plants that have local significance such as food, construction material, medicinal, or cultural</li> <li>• Increase in frequency or intensity of bush fires</li> </ul>	√	√			<ul style="list-style-type: none"> <li>➤ Some vegetation was cleared from the construction campsites but there is no primary forest in the areas. Re-vegetation program shall be implemented where appropriate, during the rainy season.</li> <li>➤ Vegetation within the areas consists of secondary forest or crops (rice), none has conservation values;</li> <li>➤ There was no record of bush fire during the entire construction phase. However, such risk would continue in case of inappropriate decommissioning (e.g. unauthorized burning of solid waste material within the camp compound).. Decommissioning plan needs to be properly implemented</li> </ul>
Impacts on local fauna, breeding habitats or on livestock	<ul style="list-style-type: none"> <li>• Introduction of exotic species, loss of locally important or endemic species.</li> <li>• Any negative effects on wildlife breeding or nesting sites</li> <li>• Any impact on buffer zones towards protected areas.</li> <li>• Increase in unnatural noise and lighting effects during construction activities</li> </ul>	√	√	√		<ul style="list-style-type: none"> <li>➤ Additional soil material brought to the construction sites (both at Nakasang Access road and on Don Det/Don Khone Islands)is rather insignificant in terms of environmental effects.</li> <li>➤ No local records of breeding habitat for wildlife or nesting places anywhere at Nakasang Access Road., hence, no impacts.</li> <li>➤ In case of road improvement on Don Khone, no records of wildlife habitat interference.</li> <li>➤ No protected areas in the close vicinity to any of the newly constructed infrastructure.</li> <li>➤ Relative low noise impact from movement of machines during construction and operation phase,</li> <li>➤ Local livestock remained unaffected during all works.</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
<b>Social Fabrics and Awareness</b>						
Public Awareness	<ul style="list-style-type: none"> <li>Public Consultation: details and records</li> <li>Assessment of effectiveness of awareness campaigns launched by the project</li> </ul>		√	√		<ul style="list-style-type: none"> <li>Villagers and local community was duly informed about the project and the (<u>temporary</u>) impacts generated both during and after completion of the construction</li> <li>Insofar, no public assessment implemented. Local authorities and responsible agencies (LNTA / Provincial/District Tourism Departments) need to assess the perception level of local people about each sub-projects, opportunities and benefits.</li> </ul>
Public Health Risks	<ul style="list-style-type: none"> <li>Contamination of local crops due to contamination with chemicals originating from project activities, and subsequent public health risks identified</li> <li>Identified risks for bio-accumulation of hazardous contamination (e.g. of local crops and vegetables)</li> <li>Increase and type of accidents that might be attributed to the development of the subproject</li> <li>Introduction of pests, weeds, diseases etc due to ongoing or completed project activities.</li> <li>Creation of temporary or permanent breeding habitats for mosquito or vermin disease vectors</li> <li>Generation of emissions causing impacts to human health</li> <li>Increase in local noise generation and in vibration.</li> </ul>	√ √ √	√	√		<ul style="list-style-type: none"> <li>No record of use of hazardous chemical for the construction that would lead to severe health impact; No records of farmers complaints available;</li> <li>There were negligible amounts of hazardous chemicals used in all sub-project components; there were no paint spills recorded during market and info-center construction;</li> <li>There were only two records of road accidents occurring during the entire construction period. In both cases, over speeding and drug abuse played a role. Speed limit signs will soon be installed at appropriate locations (e.g. near schools and market)</li> <li>Not a major concern, as long as local depressions will be filled up to avoid the development of stagnant puddles that will act as mosquito breeding habitat.</li> <li>Stagnant water as a result of poor management of the construction plan. RE of each sub-project components has to assure this issue will be properly mitigated</li> <li>Only emission from construction equipment's engines caused temporary air pollution impact during the construction, and this was acceptable by local residents in view of the welcomed benefits.</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
Waste Generation and Public Awareness to Participate in Environmental Protection	<ul style="list-style-type: none"> <li>• Generation and left-over of excessive waste material from ongoing or completed construction activities</li> <li>• Generation and left-over of excessive garbage from ongoing tourism activities</li> <li>• Deficiencies in waste collection system</li> <li>• Deficiencies in waste disposal system</li> <li>• Did the project observe or create appropriate landfill sites and waste management procedures</li> <li>• Availability and effectiveness of public awareness signs to cooperate in waste management efforts</li> <li>• Preparedness and commitment of local tour guides to participate in environmental protection and waste management programs launched by the Project</li> </ul>	√	√	√		<ul style="list-style-type: none"> <li>➤ Solid waste and excessive materials were left over at the contractors' workshop and camp sites. These sites need be properly cleaned and decommissioned (in line with Tech.Specs requirements) before handing over the project. RE and PIU are responsible to monitor this work.</li> <li>➤ Excessive garbage accumulates along both sides of Nakasang road where commercial shops located. Cleaning and garbage collection needs to be carried out, as stipulated in the Tech.Specs.</li> <li>➤ Waste was dumped outside collection bins. Public awareness campaign/signboards need be in place by responsible agencies (LNTA/ village committees)</li> <li>➤ Villagers habitually continue with environmental harmful practices, such as burning and dumping household waste into the Mekong River. Public campaign needed to address such practices.</li> <li>➤ One designated dump site was established at the contractor camp near Hang Khone. This site will continue to be used as communal waste dump for both Don Det and Don Khone residents and guesthouses. For garbage collection, in future a fee is collected.</li> <li>➤ No information of the public awareness signs were installed in the project areas</li> <li>➤ Garbage and solid waste management, embedded in a broad public awareness campaign, is still an outstanding issue and needs to be tackled in the near future. Provincial and district authorities of LNTA will thereby play an important role.</li> </ul>
Public Life Hindrances and/or Social Conflicts due to Construction Works						
Potential adverse effects due to ongoing construction activities	<ul style="list-style-type: none"> <li>• Mobility hindrance and other problems caused by construction activities</li> <li>• Creation of noise, dust, vibration</li> <li>• Observance of nighttime working restriction within</li> </ul>	√				<ul style="list-style-type: none"> <li>➤ All inconveniences in travelling during the construction of the road and other infrastructure was fully accepted by the local residents, appreciating the benefits they would gain through the project.</li> <li>➤ Ditto, as above</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	settlement areas. <ul style="list-style-type: none"> <li>• Social and other conflicts between construction workers from other areas and local residents or workers</li> <li>• Does/Did the project affect any public utilities (electricity, community assets, water supply, health services and other public infrastructure and services?)</li> </ul>	√				<ul style="list-style-type: none"> <li>➤ Nighttime working activities were very limited. If so, local residents had no complaints about excessive noise, vibration and dust creation;</li> <li>➤ No conflict between the workers and local residents recorded</li> <li>➤ Local community was able to get access to existing public utilities at all times during construction works.</li> </ul>
<b>Potential adverse effects on Public Life Integrity and Utilities</b>	<ul style="list-style-type: none"> <li>• Hindrance and other problems caused by parking or traffic</li> <li>• Does/Did the project affect any public utilities (electricity, community assets, water supply, health services and other public infrastructure and services?)</li> </ul>	√	√			<ul style="list-style-type: none"> <li>➤ Traffic volume to this area is quite light in each day, hence impact causes by the traffic is not significant</li> <li>➤ Local community was able to secure full access to public utilities during the entire construction period;</li> </ul>
Archaeological, cultural and historical sites impacts	<ul style="list-style-type: none"> <li>• Loss or damage to archaeological/historical/ cultural monuments or areas</li> <li>• Impairment or degradation of aesthetic property values</li> <li>• Nuisance (odor, pest animals, rodents) to culturally important sites</li> </ul>	√			√	<ul style="list-style-type: none"> <li>➤ No impact to such area from project activities</li> <li>➤ The project helps to improve aesthetic property values as a result from better infrastructure provided</li> <li>➤ Nakasang temple received some noise impact resulting from nearby construction activities. Public hearings were held to create a climate of acceptance within the broad public. Tourists had no specific complaints in this matter.</li> </ul>
Safety	<ul style="list-style-type: none"> <li>• Conflicts generated by increasing traffic volume</li> <li>• Potential increase in road accidents, involving local residents.</li> <li>• influx of external tourists</li> <li>• Adverse impacts on existing recreational uses performed by local residents</li> <li>• Observance of public dissent and concerns</li> </ul>	√			√	<ul style="list-style-type: none"> <li>➤ Public hearings were held; Local residents are prepared to cope with increasing traffic volume as this would generate more income to their villages</li> <li>➤ One road accident was recorded on the new Nakasang Access road, with one life lost resulting from drunk-drive practice. Thus, speed limit and warning signs should be installed where appropriate</li> <li>➤ Insofar, no specific records available</li> <li>➤ Most local residents fully support the project</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
Social Conflicts	<ul style="list-style-type: none"> <li>Conflicts generated by increasing influx of external tourists</li> <li>Conflicts with local school operations</li> <li>Prostitution, human trafficking, STDs</li> <li>Cultural clashes between visiting tourists and local residents</li> <li>Adverse impacts on existing recreational uses performed by local residents</li> <li>Observance of public dissent and concerns</li> </ul>	<ul style="list-style-type: none"> <li>√</li> <li>√</li> <li>√</li> <li>√</li> <li>√</li> <li>√</li> </ul>				<ul style="list-style-type: none"> <li>➤ Both workers and villagers respected each other. A certain portion of local labours were employed for construction works. However, the quota suggested by the Tech. Specs. Could not be realized as many local residents prefer fishing activities to construction works, as profits are seemingly higher</li> <li>➤ No record about such incidents</li> <li>➤ Potential increase of STDs in the future thus health education awareness about STDs needs to be controlled by LNTA/local tourism offices; insofar, no indications available;</li> <li>➤ No records about such incidents since the project started</li> <li>➤ The project had not impact that lead to the change of any existing recreational uses</li> <li>➤ Local residents unanimously support the project</li> </ul>
<b>Performance of Construction Works, incl. Campsites and Decommissioning</b>						
Deficiencies related to ongoing construction activities and, in particular, the operation and maintenance of construction work sites	<ul style="list-style-type: none"> <li>Non-observance of safety precautions for workers, especially those exposed to dangerous or risky work activities (e.g. bitumen layering, welding, steel works, pit cleaning, handling of chemicals)</li> <li>Non-Observance of nighttime working restrictions</li> <li>Sanitation problems (leading to localized water and soil pollution)</li> <li>Garbage disposal and burning</li> <li>Incidences of infection diseases due to lack of hygiene and sanitation in the camps</li> <li>Do/Did the construction activities cause any impediments on public utilities (electricity, community assets, water supply, health services and other public infrastructure and services?)</li> </ul>	<ul style="list-style-type: none"> <li>√</li> <li>√</li> <li>√</li> <li>√</li> <li>√</li> <li>√</li> </ul>	<ul style="list-style-type: none"> <li>√</li> <li>√</li> </ul>	<ul style="list-style-type: none"> <li>√</li> </ul>		<ul style="list-style-type: none"> <li>➤ Safety concerns and equipment for workers at almost all sites substandard and not in line with Technical Specifications. Particular lack in the provision of basic safety gears such as safe welding gear and protective helmets for workers.</li> <li>➤ Nighttime working activities were very limited. If so, the works did not create unaccepted noise, vibration and dust</li> <li>➤ No particular sanitation facilities at sites; existing toilet facilities in the vicinity are used; Generally, local workers fully accept the existing offers with respect to sanitation facilities.</li> <li>➤ Almost without exception, garbage management at camp sites would need strict improvement, which is principally the obligation of the Contractor, including proper instruction and education. General lack of appropriate bins inside the camp; a regular waste</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<ul style="list-style-type: none"> <li>Records of social and other conflicts between construction workers from other areas and local residents or workers</li> </ul>	√				<p>collection schedule needs to be in place.</p> <ul style="list-style-type: none"> <li>➤ No record of such incidents regarding impediments of use of public utilities found;</li> <li>➤ No records about social conflict issues.</li> </ul>
Impacts and damages related to decommissioning the sites	<ul style="list-style-type: none"> <li>Environmental problems caused by construction activities and leftover waste material in camp sites (type of hazardous material, quantities, effects on nearby waterways and settlements)</li> <li>Issues related to proper decommissioning of the sites, in accord with Technical Specifications (type of left waste material, water pools, excessive clearance of vegetation;</li> <li>Does/Did the decommissioning of campsite cause impacts on any public utilities (electricity, community assets, water supply, health services and other public infrastructure and services?</li> </ul>	√		√		<ul style="list-style-type: none"> <li>➤ Decommissioning was at no site assessed going on;</li> <li>➤ Nevertheless, current volume and characteristics of leftover waste material spilled all over the camp sites and its workshops gives reason to forward great concerns that the site will be cleared and managed properly in order to guarantee an environmentally acceptable and safe hand-over.</li> <li>➤ There were at all camp sites signs of bad environmental management, mainly attributable to spill of oils and lubricants, excessive plastic and tin garbage, filthy aesthetics and lack of any ground vegetation. Water ponding was wide spread, with apparent influx from breeding mosquitoes</li> <li>➤ The proper decommission of the sites is strongly recommended as all left waste materials, particularly surplus concrete has to be removed from the sites and discarded in appropriate locations</li> </ul>

### **3.2. Assessment of Sub-Component M. Phin, Savannakhet Province, including a Management & Operation Plan**

#### 3.2.1 Site Assessment

24. The assessed infrastructure development components in this sub-project included:

- New Construction of Retail Market Facilities at Muang Phin
- New Construction of Tourist Information Center At Muang Phin
- New Construction of auxiliary facilities (parking lot, walkways, public toilets)

The activities carried out by the Environmental Team Assessment took place in May 2011

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
<b>Maintaining Ecological Integrity (Geological features, Soil and Water Resources)</b>						
adverse effects/impacts on special geological or geomorphologic features in the area	<ul style="list-style-type: none"> <li>Identify sensitive local geological formations (</li> <li>Identify project activities causing land disturbance on such sensitive features</li> </ul>	√				<ul style="list-style-type: none"> <li>No presence of special / environmentally sensitive geomorphologic features in the area</li> <li>No evidence of land disturbance of the environs, being mainly uncultivated grassland and public sports fields; part of adjacent lands allocated for new development activities (commercial bank)</li> </ul>
Ecological sensitive area, soil properties and stability, erosion risks.	<ul style="list-style-type: none"> <li>Identify sensitive elements regarding fauna and flora specific and/or endemic to the area</li> <li>Project activities causing land disturbance, soil erosion, subsistence, instability or landslips</li> </ul>	√	√			<ul style="list-style-type: none"> <li>No indication or records of sensitive fauna or flora elements in the area.</li> <li>The construction of promenade at Ban Nakasang may cause minor temporary land disturbance; erosion risks and excessive sedimentation spills to adjacent terrain can be fully mitigated by good workmanship practices.</li> </ul>
Land-Use impacts and potential land speculation	<ul style="list-style-type: none"> <li>Adverse impacts on locally specific land-uses and amenity values (e.g. agricultural assets, local fisheries, collection of forest and non-forest products)</li> <li>Land speculation as induced impact</li> </ul>	√	√			<ul style="list-style-type: none"> <li>There are no agricultural land uses in the vicinity of all work sites.</li> <li>Land speculation, is not an issue according to local authorities (Governor of Phin District)</li> </ul>
Water quality and quantity impacts	<ul style="list-style-type: none"> <li>Reducing of local (wider) catchment area, both in terms of quality and quantity</li> <li>Change of surface drainage pattern</li> <li>Increased sedimentation loads, turbidity due to untreated drainage runoffs</li> <li>Further excessive demand for extraction (for project purposes), especially during operation phase</li> </ul>	√		√		<ul style="list-style-type: none"> <li>No significant concern on water quantity and quality degradation recorded as the construction activities do not affect nearby [ca 3 km distance] natural natural waterways. Proposed drainage will protect the respective catchment area.</li> <li>Surface runoff and wastewater from the current camp site facilities established within the construction terrain are currently drained, indiscriminately and untreated, into the existing low side drains, sloping to the South.</li> <li>It could not be verified to which extent further water demands of the new facilities will attribute to potential water shortage for the adjacent settlement,</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<ul style="list-style-type: none"> <li>Risk of increasing flow peaks and flooding impacts in the downstream areas</li> <li>Proper waste water management to avoid impacts on public health at market site</li> </ul>	√				<p>however the expected quantities seem not cause major environmental risks.</p> <ul style="list-style-type: none"> <li>➤ Wastewater from the new retail market area are assessed as small volume that will not cause any flooding impacts – provided the M&amp;O plan described hereunder will be followed. and the stipulated drainage system will be in place.</li> <li>➤ See M&amp;O plan included to this matrix, below. This refers particularly to the regular maintenance works for the drains and for the septic tank of the public toilets.</li> </ul>
<b>Maintaining Ecological Integrity (Vegetation and Fauna)</b>						
Loss or other impacts on local vegetation	<ul style="list-style-type: none"> <li>Impacts due to direct impact (area clearing, tree felling, burning, spraying of herbicides) or fires</li> <li>Identification of specific losses of plants that have local significance such as food, construction material, medicinal, or cultural</li> </ul>	√				<ul style="list-style-type: none"> <li>➤ None of the mentioned issues are applicable to this sub-project</li> <li>➤ Vegetation within the areas consists of local reed grasses of no conservation value; Trees and bushes are absent.</li> </ul>
Impacts on local fauna, breeding habitats or on livestock	<ul style="list-style-type: none"> <li>Introduction of exotic species, loss of locally important or endemic species.</li> <li>Any negative effects on wildlife breeding or nesting sites</li> <li>Any impact on local livestock</li> <li>Impacts on the project, caused by local livestock</li> </ul>	√	√		√	<ul style="list-style-type: none"> <li>➤ None of the mentioned issues are applicable to this sub-project</li> <li>➤ Local livestock currently grazes unattended within the entire terrain and have unhindered access to at all work sites. Animal feces currently add to the poor environmental appearance of the entire work site. For further improvement, it is therefore strongly recommended to consider a complete fencing of the market area (including a gate which can be closed during night) to protect the entire area against intrusion (and soiling) by local livestock animals.</li> </ul>
<b>Social Fabrics and Awareness</b>						
Public Awareness	<ul style="list-style-type: none"> <li>Public Consultation: details and records</li> </ul>		√			<ul style="list-style-type: none"> <li>➤ Villagers and local community was duly informed by the local authority about the project and the (temporary) impacts generated both during and after</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<ul style="list-style-type: none"> <li>Assessment of effectiveness of awareness campaigns launched by the project</li> </ul>	√				<p>completion of the construction</p> <p>➤ Insofar, no public assessment implemented. Local authorities and responsible agencies (LNTA/Provincial/District Tourism Departments) need to assess the perception level of local people about each sub-projects, opportunities and benefits</p>
Public Health Risks	<ul style="list-style-type: none"> <li>Contamination of local soil with chemicals originating from project activities, and subsequent public health risks pertaining</li> <li>Increase and type of accidents or frequent ailments among workers that might be attributed to the development of the subproject</li> <li>Creation of temporary or permanent breeding habitats for mosquito or vermin disease vectors</li> <li>Generation of garbage and water spills causing impacts to human health</li> <li>Observance of minimum safety standards for certain work activities that may cause health risks; Provision of standard safety equipment and</li> </ul>	√		√		<p>➤ No record of use of hazardous chemical for the construction that would lead to severe health impact; Handling/spilling of hazardous substances and paints generally poor, as observed during checks. No records of complaints on environmental issues available;</p> <p>➤ No reports or records about local accidents attributable to work activities. Labourers suffer from time to time from intestinal problems which is attributed to the sub-standard living conditions in the worker's dormitory and absence of sanitary facilities.</p> <p>➤ Due to the general deplorable environmental appearance of the entire work site (garbage spill, open urinary habits, wide-spread water ponding with foul water puddles, lack of ground leveling and drainage, lack of proper site management and hygiene) the site needs strong improvement efforts. The local Contractor seems unable to accept his (contractual) obligations for maintaining a minimum sanitary management of the site. Water spill was observed during the entire assessment period (3 days).</p> <p>➤ All site workers were not equipped with minimum safety equipment (helmets, safety goggles for welding, gloves, protective shoes). The welding process lacked safety precautions, paints were</p>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<p>workers' insurance policies.</p> <ul style="list-style-type: none"> <li>• Observance of the environmental safeguard requirements as described in the Technical Specifications of the Bidding Documents..</li> <li>• Development of stagnant water puddles which soon will develop into breeding grounds for disease vectors, and attribute to an unattractive landscape appearance</li> <li>• Development of emissions due to work activities, affecting public health and daily life</li> </ul>			<p>√</p> <p>√</p>		<p>spilled indiscriminately; The contractor maintained that insofar there were no records of work accidents; None of te workers has an insurance against injuries, invalidity or death.</p> <ul style="list-style-type: none"> <li>➤ The general impression prevails, that the Contractor deliberately ignores all safeguard requirements stipulated in the Technical Specifications, which he claimed not to be aware of.</li> <li>➤ Remains a major concern if not properly addressed: The Contractor maintains that there is lack of funds to perform an orderly and specified terrain leveling, and the construction of efficient and covered side drains for the collection of waste waters. Coffered drains are strongly recommended as the entire area will presumably always be subject to intensive garbage spilling, which will be blown by the prevailing Westerly winds frequently into the side drains and will regularly clog them, if not properly maintained or remaining open without cover. Uncovered side drains will most likely develop stagnant water habitats, being prime mosquito breeding habitats</li> <li>➤ Emission from construction equipment's engines caused temporary air pollution impact during the construction, but this was accepted by local residents; no complaints filed.</li> </ul>
Waste Generation and Public Awareness to Participate in Environmental Protection	<ul style="list-style-type: none"> <li>• Generation and left-over of excessive waste material from ongoing or completed construction activities</li> <li>• Deficiencies in waste collection system</li> </ul>			<p>√</p> <p>√</p>		<ul style="list-style-type: none"> <li>➤ Solid waste and excessive materials were left over at the entire work site, including the Contractors' camp sites. These sites need be properly cleaned and decommissioned (in line with Tech.Specs requirements) before handing over the project. RE and PIU are responsible to monitor this work.</li> <li>➤ addressed in the M&amp;O Plan, below</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<ul style="list-style-type: none"> <li>Deficiencies in waste disposal system</li> <li>Did the project observe or create appropriate landfill sites and waste management procedures</li> <li>Availability and effectivity of public awareness signs to cooperate in waste management efforts</li> </ul>			<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> </ul>		<ul style="list-style-type: none"> <li>➤ Ditto</li> <li>➤ Villagers (but also site workers) habitually continue with environmental harmful practices, such as burning and dumping household waste indiscriminately in the open countryside. Public campaign needed to address such practices (see M&amp;O Plan, below)</li> <li>➤ addressed in the M&amp;O Plan, below</li> </ul>
<b>Public Life Hindrances and/or Social Conflicts due to Construction Works</b>						
Potential adverse effects due to ongoing construction activities	<ul style="list-style-type: none"> <li>Mobility hindrance and other problems caused by construction activities</li> <li>Creation of noise, dust, vibration</li> <li>Observance of nighttime working restriction within settlement areas.</li> <li>Social and other conflicts between construction workers from other areas and local residents or workers</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> </ul>				<ul style="list-style-type: none"> <li>➤ Negligible, as the work site does not affect the traffic running in front of the market</li> <li>➤ Ditto, as above</li> <li>➤ Nighttime working activities were very limited. If so, local residents had no complaints about excessive noise, vibration and dust creation;</li> <li>➤ According to Governor, there are no records about conflicts between the workers and local residents</li> </ul>
Potential adverse effects on Public Life Integrity and Utilities	<ul style="list-style-type: none"> <li>Hindrance and other problems caused by parking or traffic</li> <li>Does/Did the project affect any public utilities (electricity, community assets, water supply, health services and other public infrastructure and services?)</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> </ul>			<ul style="list-style-type: none"> <li>➤ Site currently not used by the public</li> <li>➤ Local community was able to secure full access to public utilities</li> <li>➤ No records forwarded regarding restricted /hampered access to public utilities</li> </ul>
Archaeological, cultural and historical sites impacts	<ul style="list-style-type: none"> <li>Loss or damage to archaeological/historical/cultural monuments or areas</li> <li>Impairment or degradation of aesthetic property values</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>				<ul style="list-style-type: none"> <li>➤ Not applicable, as no such records from this area</li> <li>➤ Once completed, the project intends to improve aesthetic property values as a result from better infrastructure provided</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
Safety	<ul style="list-style-type: none"> <li>Conflicts generated by increasing traffic volume</li> <li>Potential increase in road accidents, involving local residents.</li> <li>influx of external tourists</li> </ul>	√				<ul style="list-style-type: none"> <li>Public hearings were held to inform local residents about potential risks.</li> <li>Insofar, no work or traffic accident was recorded that would be attributable to the ongoing project activities.</li> <li>Assessment not applicable at this time of project cycle.</li> </ul>
Social Conflicts	<ul style="list-style-type: none"> <li>Conflicts generated by increasing influx of external tourists</li> <li>Prostitution, human trafficking, STDs</li> <li>Cultural clashes between visiting tourists and local residents</li> <li>Observance of public dissent and concerns among the local population</li> </ul>	√				<ul style="list-style-type: none"> <li>Both workers and villagers respected each other. A certain portion of local labors were employed for construction works. According to the Contractor, the quota suggested by the Tech. Specs. could not be realized . No specific reasons were given.</li> <li>Health education about STDs needs to be implemented throughout the region as prostitution (particularly aiming at the recent increase in street-side brothels) is obviously a raising problem. However, this problem needs be tackled without the direct context of this project, as it will neither prevent nor promote such development.</li> <li>No records about such incidents since project start</li> <li>Local residents widely agree with the ongoing project, as they perceive benefits at various levels.</li> </ul>
<b>Performance of Construction Works, incl. Campsites and Decommissioning</b>						
Deficiencies related to ongoing construction activities and, in particular, the operation and maintenance of construction camp sites	<ul style="list-style-type: none"> <li>Non-observance of safety precautions for workers, especially those exposed to dangerous or risky work activities (e.g. bitumen layering, welding, steel works, pit cleaning, handling of chemicals)</li> <li>Non-Observance of nighttime working restrictions</li> <li>Sanitation problems (leading to localized water and soil pollution)</li> <li>Garbage disposal and burning</li> </ul>	√	√	√		<ul style="list-style-type: none"> <li>Safety concerns and equipment for workers at almost all sites substandard and not in line with Technical Specifications. Particular lack in the provision of basic safety gears such as safe welding gear and protective helmets for workers.</li> <li>Nighttime working activities were very limited. If so, the works did not create unaccepted noise, vibration and dust</li> <li>No particular sanitation facilities at sites; Generally, local workers fully accept the existing (totally unhygienic) situation and the lack of facilities.</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<ul style="list-style-type: none"> <li>• Incidences of infection diseases due to lack of hygiene and sanitation in the camps</li> <li>• Do/Did the construction activities cause any impediments on public utilities (electricity, community assets, water supply, health services and other public infrastructure and services)?</li> <li>• Records of social and other conflicts between construction workers from other areas and local residents or workers</li> </ul>	√				<ul style="list-style-type: none"> <li>➤ Almost without exception, garbage management at the entire site needs strict improvement, which is principally the obligation of the Contractor, including proper instruction and education. General lack of appropriate bins inside the camp; a regular waste collection schedule needs to be in place (see M&amp;O)</li> <li>➤ No record of such incidents regarding impediments of use of public utilities found;</li> <li>➤ No records about social conflict issues.</li> </ul>
Impacts and damages related to decommissioning the sites	<ul style="list-style-type: none"> <li>• Environmental problems caused by construction activities and leftover waste material in camp sites (type of hazardous material, quantities, effects on nearby waterways and settlements)</li> <li>• Issues related to proper decommissioning of the sites, in accord with Technical Specifications (type of left waste material, water pools, excessive clearance of vegetation;</li> <li>• Does/Did the decommissioning of campsite cause impacts on any public utilities (electricity, community assets, water supply, health services and other public infrastructure and services)?</li> </ul>				√	<ul style="list-style-type: none"> <li>➤ Decommissioning was at no site assessed going on;</li> <li>➤ The current volume and characteristics of leftover waste material spilled all over the camp sites and its workshops gives reason to forward great concerns that the site will be cleared and managed properly in order to guarantee an environmentally acceptable and safe hand-over.</li> <li>➤ The present 'solution' of a work camp sites include a number of signs of bad environmental management, mainly attributable to spill of oils, lubricants, excessive plastic and tin garbage. Generally the site appears as filthy aesthetics. Water ponding is wide spread, with apparent influx from breeding mosquitoes. The situation will invariably aggravate during the nearing wet season.</li> <li>➤ The proper cleaning and later, decommission of the sites is strongly recommended as all left waste materials, particularly crackdown spoils have to be removed from the site and discarded in appropriate locations. A tight supervision of the decommissioning works is strongly recommended to avoid continuation of the current deplorable environmental condition at this site (see also M&amp;O)</li> </ul>

### 3.2.2. Management and Operation Plan for M. Phin New Market Facilities

25. Following the recommendation of the last Grant Review Mission of ADB (9-23 March 2011) a site management plan for Meuang Phin facilities is included hereunder. The plan describes the major management options and requirements, and the responsibilities for implementation of the recommended procedures after civil works will be completed<sup>4</sup>.

26. The following recommendations have been discussed with the Phin Municipality (Governor) and the Provincial Authorities of LNTA.

#### (i) Maintenance of the Facilities, particularly in view of Sanitation and Security Aspects

27. **Waste Management and Sanitation:** Indiscriminate generation and littering of garbage, particularly of plastic materials, is a major concern for proper maintenance of the site. To encounter inherent problems (aesthetic, drainage congestion, public health) the M&O Plan shall foresee:

- a) Erection of a solid metal **fence** around the entire market terrain, including the parking lot that shall be equipped with fence gates which can be closed at night. Principal purpose of the fence is to avoid access of unauthorized persons to the market facilities, and to prevent domestic animals roaming through the area, thereby soiling the terrain and causing public health and aesthetic problems. The costs of the fence shall be included in the overall construction costs of this sub-component. The fence shall match with landscaping principles and be in harmony with the new buildings and parking lot.
- b) Establishment public **signboards**, produced by the Provincial Office of LNTA. The signboards, min. 2 m<sup>2</sup> in size, will be set up at prominent locations (e.g. parking lot, in front of Information Centre and near market stalls) calling for discipline and avoidance of littering. The signboards will be written in an educative manner to secure public acceptance and collaboration. The costs for the establishment and maintenance of the signboards need be covered from LNTA's own budget. The signboard information shall include clear warnings, including penalty indications, against burning of garbage in the open air.
- c) The Town Committee of Phin Administration Authorities will engage, through local contractual agreement, a private entrepreneur as **caretaker** for the market site, being responsible for the following tasks:
  - Collect management fees from the market stall owners, from car parking facilities and from users of the public toilets. The income from fee collection shall partly cover the entrepreneur's expenses. Additional management fees are subject to negotiations with the Town Administration Authorities of M.Phin.
  - Control, regular cleaning and maintenance of the waste collection facilities (bins) distributed at 4 locations at Phin market site (1 at parking lot, 1 next to the entrance gate, one in front of the retail market stalls, and 1 between the information centre and the public toilet) All collection bins shall be market bilingually (Lao/English) and be fitted with a cover lid that cannot be removed by animals. The bins shall be provided from the budget of M.Phin Administration Authority. Maintenance and renewal shall be the obligation of the entrepreneur.
  - Enforce litter regulations and, as applicable. The caretaker shall be authorized to collect penalty fees from violators. In case where retail market holders are identified as

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<sup>4</sup> Planned for end of 2011

violators against environmental safeguard regulations, warnings will be pronounced before more stringent actions take place, such as the cancellation of market license;

- The caretaker has full responsibility to daily inspection and maintaining the public toilets in an orderly stage, i.e. provision of toilet paper, ensuring full functionality of flush systems, daily cleaning and provision of soap/detergent at washing facilities. The caretaker is also liable for performing, at his own costs, smaller repairs to maintain full functioning of the public toilets, such as door locks, appliances, water taps). The tasks include inspection of electric wiring and, where necessary, replacement of defective items (e.g. cables, lamps). Costs for larger repairs and the annual emptying of the septic tank shall be borne by the Town Administration Authorities of M.Phin.
  - Sweep and clean the facilities and all buildings.
  - The caretaker shall also have responsibility to inspect, clean and desilt the newly established drains at site, to ensure all-time flow of excess and stormwaters. Regular actions include the cleaning of screens of drainage and culvert structures. This will be particularly in demand at times of heavy local rains (if applicable, two controls per day). Repair, backfill and compact drain and other areas as and where necessary. Backfill depressions where stagnant water puddles develop.
  - Maintenance (watering, tending) of the landscaping plants suggested below. Weeding where necessary, especially around entrance area of tourist information center and along walkways.
  - Inform the Town Authorities about and repair or further maintenance actions required, such as backfilling, worn-out electric appliances and cables, defect structures, wall painting, signboard replacement.
  - Inform the Town Authorities about and repair or further maintenance actions required for the protective fence encircling the market terrain.
  - Report, without delay, to Town Authorities any form of non-compliance with regulations, observances of vandalism, or intrusion of animals into the site.
- d) The Town Committee of Phin Administration Authorities will be responsible to designate a communal **dump site** where all garbage collected from market site shall be delivered and dumped in a described manner, i.e. to avoid any environmental hazards for neighboring land and water resources

(ii) **Construction and Maintenance of Drainage Facilities**

28. **Drainage:** It is suggested to consider a well-functioning drainage system for the entire market facility terrain in M. Phin. The issue remains that the Master Plan did not design for a proper drainage structure, due to lack of funds. However, the BoQ makes budgetary provisions for terrain leveling to ensure adequate drainage of the terrain. No provisions are currently made for constructing lined and covered side drains that would not easily be congested by accumulating litter<sup>5</sup> or excess sedimentation<sup>6</sup>.

29. Once all parties involved, above all the Phin Municipality Administration and the Provincial Authorities of LNTA, agree to provide sufficient funds to construct a functional drainage system at tis site, the risk of environmental hazards (including additional / cumulative) maintenance costs remain.

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<sup>5</sup> The prevailing westerly winds already now blow and accumulate significant amounts of litter into the existing side drain ditches

<sup>6</sup> As the entire terrain consists of lateritic soft soils, much of the existing side drains is already filled up with fine sediments, particularly after strong rainfall periods.

30. From environmental point of view an insufficient drainage system at this newly developed site will result in various undesirable and adverse effects, and in cumulative impacts. The most prominent problem in this context is the development of small ponds and puddles after long or intensive rainfalls. These waterfilled depressions, being the result of poor or inexistent ground leveling, act as breeding habits for disease vectors, resulting in local propagation of diseases like dengue fever and malaria. Other problems, especially in such areas where crowds of people gather, are associated with the rapid propagation of infectious diseases (intestinal ailments, cholera etc.). Town planners and authorities need therefore undertake all efforts possible to counteract and mitigate such problems. Proper ground leveling and installation of a well-functioning drainage system are considered the most effective means of choice. LNTA, Provincial and Town Authorities are therefore challenged to tackle this problem at the earliest stage possible, and to invest in the proposed infrastructure solutions, i.e. a central drainage canal running parallel to the proposed parking lot, and leading into a sufficiently dimensioned side drain<sup>7</sup> running parallel to the East of the market side, following an already small but inefficient roadside ditch. Covers with removable concrete slabs seem to be the solution for this terrain, particularly in view of the high risk of litter and other waste accumulation in the drainage system. Removable covers will substantially facilitate regular maintenance works, and reduce the risk of accidents with vehicles and pedestrians. If well maintained, such type of drains can also contribute to landscaping.

31. **Landscaping:** After leveling the entire terrain and filling up the depressions it is recommended to beautify the terrain with some basic landscaping activities, such as

- aesthetical and functional walkways, preferably hexagonal concrete plates embedded in a lawn, consisting of robust endemic species;
- planting of (ornamental) bushes and trees near the entrance signboard/gate, and between the parking lot and the information center, and in the backside of the public toilet. All selected vegetation selected for landscaping purposes should be endemic, robust and easy to maintain. Planting shall take place before the onset of the rainy season. Withered or infected plants shall immediately be replaced.

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<sup>7</sup> Excavation to at least 60 cm depth and 80 cm width. Concrete lining suggested, and filled with round/crushed lime gravel of 5-8 cm size.

### **3.3 Assessment of Sub-Component Vang Vieng, Vientiane Province**

32. Infrastructure Development Components subject to site checks included:

- New Construction resp. Rehabilitation works of Urban Drainage System , including stormwater pipes and 3 gross pollution traps
- Retention pond near the urban periphery (South of Vang Vieng)
- Construction of a New Entrance Gate at National Road # 13
- Improve/reconstruct urban cross road #2, including provision of new street lights.

33. In addition, assessment of the newly established Nam Song River Water Quality Monitoring Program

34. All activities carried out by Environmental Team together with representative from UDAA and with the Resident Engineer. The assessment took place in May 2011.

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
<b>Maintaining Ecological Integrity (Geological features, Soil and Water Resources)</b>						
adverse effects/impacts on special geological or geomorphologic features in the area	<ul style="list-style-type: none"> <li>Identify sensitive local geological formations or other habitats</li> <li>Identify project activities causing land disturbance on such sensitive features</li> </ul>	√		√		<ul style="list-style-type: none"> <li>No presence of special / environmentally sensitive geomorphologic features in the area affected by this project</li> <li>No risk of land disturbance of sensitive environs, being mainly urban built-up area; near retention pond the secondary bush land and residual wetlands will partly and seasonally be affected by accumulation of settling sludge. EMP in place, to set off potential and long-lasting impacts. Fishing activities in the retention pond shall be restricted, due to public health risk when consuming contaminated fish.</li> </ul>
Ecological sensitive area, soil properties and stability, erosion risks.	<ul style="list-style-type: none"> <li>Identify sensitive elements regarding fauna and flora specific and/or endemic to the area</li> <li>Project activities causing land disturbance, soil erosion, increase in sedimentation loads, instability or landslips</li> </ul>	√		?		<ul style="list-style-type: none"> <li>No indication or records of sensitive fauna or flora elements in the area. Currently, the fauna and flora around and in the area of the retention ponds and adjacent wetlands is unsurveyed. No data at WREA.</li> <li>New construction and rehabilitation of urban drainage canals may cause minor temporary land disturbance; erosion risks and excessive sedimentation spills to adjacent terrain can be fully mitigated by good workmanship practices.</li> </ul>
Land-Use impacts and potential land speculation	<ul style="list-style-type: none"> <li>Adverse impacts on locally specific land-uses and amenity values</li> <li>Land speculation as induced impact</li> </ul>	√	√			<ul style="list-style-type: none"> <li>There are no agricultural land uses in the vicinity of almost all work sites being located within urban perimeter of Vang Vieng.</li> <li>Land speculation, is not an issue according to local authorities (UDAA)</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
Impacts of the local water quality and quantity	<ul style="list-style-type: none"> <li>Reducing of local (wider) catchment area, both in terms of quality and quantity</li> <li>Change of surface drainage pattern, or Increased sedimentation loads, turbidity due to untreated drainage runoffs</li> <li>Further excessive demand for extraction (for project purposes), especially during operation phase</li> <li>Risk of increasing flow peaks and flooding impacts in the downstream areas</li> <li>Proper urban waste water management to avoid impacts caused by dysfunctioning of the new drainage system</li> </ul>	√				<ul style="list-style-type: none"> <li>No concern, as this sub-project addresses the environmentally sound construction of urban drainage and storm waters. The proposed drainage improvement will protect nearby catchment areas.</li> <li>Surface runoff will be channeled more effectively into the urban drainage system and improve the overall environmental conditions of Vang Vieng.</li> <li>No concern, as the requirement for (technical) water for construction purposes is all time available and natural water resources will not be affected.</li> <li>No concern, as the dimensioning of the rehabilitated drainage system is capable to cope with the expected quantities of urban drain waters.</li> <li>UDAA, together with the Water Management Authority of Vang Vieng, are expected to implement an effective waste management system, as outlined in the town's Master Plan 2010.</li> </ul>
<b>Maintaining Ecological Integrity (Vegetation and Fauna)</b>						
Loss or other impacts on local vegetation	<ul style="list-style-type: none"> <li>Impacts due to direct impact (area clearing, tree felling, burning, spraying of herbicides) or fires</li> <li>Identification of specific losses of plants that have local significance such as food, construction material, medicinal, or cultural</li> </ul>	√				<ul style="list-style-type: none"> <li>None of the mentioned issues are applicable to this sub-project</li> <li>Not applicable at all construction sites</li> </ul>
Impacts on local fauna, breeding habitats or on livestock	<ul style="list-style-type: none"> <li>Introduction of exotic species, loss of locally important or endemic species.</li> <li>Any negative effects on wildlife breeding or nesting sites</li> </ul>	√	√			<ul style="list-style-type: none"> <li>None of the mentioned issues are applicable to this sub-project</li> <li>Not applicable at all construction sites. In case of establishment of the retention ponds, the adjacent biotopes and wetland habitats will not be affected; therefore, wildlife presence or breeding will only be, moderately, affected during the proper construction phase. However, no adverse long-term effects are likely.</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<ul style="list-style-type: none"> <li>Any impact on local livestock</li> <li>Impacts on the project, caused by local livestock</li> </ul>	√				➤ Livestock tenure will not be affected or have any negative effect, at any location of this sub-project.
<b>Social Fabrics and Awareness</b>						
Public Awareness and Acceptance of the Project	<ul style="list-style-type: none"> <li>Public Consultation: details and records</li> <li>Assessment of effectiveness of awareness campaigns launched by the project</li> </ul>	√				<ul style="list-style-type: none"> <li>➤ Villagers and local community were duly informed by the local authority (UDAA) about the project and the (temporary) impacts generated both during and after completion of the construction</li> <li>➤ Insofar, no public assessment implemented. Local authorities and responsible agencies (LNTA/Provincial/District Tourism Departments, UDAA) will assess the perception level of local people at time of project completion. Insofar, all local residents interviewed in conjunction with this project appreciated the (environmental) benefits.</li> </ul>
Public Health Risks	<ul style="list-style-type: none"> <li>Contamination of local soil with chemicals originating from project activities, and subsequent public health risks pertaining</li> <li>Increase and type of accidents or frequent ailments among workers that might be attributed to the development of the subproject</li> <li>Creation of temporary or permanent breeding habitats for mosquito or vermin disease vectors</li> <li>Generation of garbage and general poor sanitation standards at work sites</li> <li>Observance of minimum safety standards for certain work activities that may cause health risks; Provision of standard safety equipment and workers' insurance policies.</li> </ul>	√	√	√	√	<ul style="list-style-type: none"> <li>➤ No record of use of hazardous chemical for the construction that would lead to severe health impact; No hazardous handling or spilling of harmful substances was observed during field checks.</li> <li>➤ No records of complaints on environmental issues or work accidents available;</li> <li>➤ No incidents observed or records obtained during field survey and local interviews.</li> <li>➤ No incidents observed or records obtained during field survey and local interviews. Note, the current construction activities do not require the establishment of a labor camp site.</li> <li>➤ Currently, only one work site is active, where workers were not equipped with safety equipment like helmets, safety goggles for welding, gloves, or protective shoes. None of the workers at site had an insurance against injuries, invalidity or death.</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<ul style="list-style-type: none"> <li>Observance of the environmental safeguard requirements as described in the Technical Specifications of the Bidding Documents..</li> <li>Development of emissions due to work activities, affecting public health and daily life</li> </ul>		√			<ul style="list-style-type: none"> <li>Some safeguard provisions like work safety equipment, protective clothes, helmets and appropriate steel work and welding equipment are not in accord with the Tech. Specifications- Needs proper addressing by the Contractor, Cleaning up of work sites is another concern that needs thorough monitoring before hand-over of infrastructure.</li> <li>Emission from construction equipment's engines caused temporary air pollution impact during the construction, but this was accepted by local residents; no complaints filed.</li> </ul>
Waste Generation and Public Awareness to Participate in Environmental Protection	<ul style="list-style-type: none"> <li>Generation and left-over of excessive waste material from ongoing or completed construction activities</li> <li>Deficiencies in the urban waste management system</li> <li>Availability and effectiveness of public awareness signs to cooperate in waste management efforts</li> </ul>			√		<ul style="list-style-type: none"> <li>Work sites need be properly cleaned and decommissioned (in line with Tech.Specs requirements) before handing over the project. RE and PIU are responsible to monitor this work.</li> <li>Villagers (but also site workers) habitually continue with environmental harmful practices, such as burning and dumping household waste indiscriminately in the open countryside. Public campaigns (carried out by UDAA) needed to address such practices.</li> </ul>
<b>Public Life Hindrances and/or Social Conflicts due to Construction Works</b>						
Potential adverse effects due to ongoing construction activities	<ul style="list-style-type: none"> <li>Mobility hindrance and other problems caused by construction activities</li> <li>Creation of noise, dust, vibration</li> <li>Observance of nighttime working restriction within settlement areas.</li> <li>Social and other conflicts between construction workers from other areas and local residents or workers</li> </ul>	√				<ul style="list-style-type: none"> <li>Negligible, as the work does not affect the urban traffic</li> <li>Ditto, as above</li> <li>Nighttime working activities were very limited. If so, local residents had no complaints about excessive noise, vibration and dust creation;</li> <li>According to UDAA, there are no records about conflicts between the workers and local residents</li> </ul>
Potential adverse	<ul style="list-style-type: none"> <li>problems / impediments caused by installation of</li> </ul>			√		<ul style="list-style-type: none"> <li>Concerns relate to noise and smell caused by</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
effects on Public Life Integrity and Utilities	<p>gross pollution traps in the immediate vicinity of residential areas</p> <ul style="list-style-type: none"> <li>Does/Did the project affect any public utilities (electricity, community assets, water supply, health services and other public infrastructure and services?)</li> </ul>	√				<p>operating the gross pollution trap machinery in close vicinity to dense residential area. Further concerns were forwarded to the local authorities with respect to the functionality and fault liability (impedance) of the proposed appliances in view of the frequent power supply failures in Vang Vieng's electricity net.</p> <ul style="list-style-type: none"> <li>Until present, the local community was able to secure full access to public utilities; No records regarding restricted /hampered access. Residents generally welcome this project, perceiving the environmental benefits. They also accept special fees and contribution levies.</li> </ul>
Archaeological, cultural and historical sites impacts	<ul style="list-style-type: none"> <li>Loss or damage to archaeological/historical/cultural monuments or areas</li> <li>Impairment or degradation of aesthetic property values</li> </ul>	√				<ul style="list-style-type: none"> <li>Not applicable, as no such records from this area</li> <li>Once completed, the project intends to improve aesthetic property values as a result from better infrastructure provided</li> </ul>
Safety	<ul style="list-style-type: none"> <li>Conflicts generated by increasing traffic volume</li> <li>Potential increase in road accidents, involving local residents.</li> </ul>	√				<ul style="list-style-type: none"> <li>Public hearings were held to inform local residents about potential risks.</li> <li>Insofar, no work or traffic accident was recorded that would be attributable to the ongoing project activities.</li> </ul>
Social Conflicts	<ul style="list-style-type: none"> <li>Conflicts generated by increasing influx of external tourists</li> <li>Prostitution, human trafficking, STDs</li> <li>Cultural clashes between visiting tourists and local residents;</li> <li>Observance of public dissent and concerns among the local population</li> </ul>	√		n.a.		<ul style="list-style-type: none"> <li>Assessment not applicable at this time of project cycle (construction thus far incomplete).</li> <li>Health education about STDs needs to be implemented as, according to local authorities, prostitution, drug abuses and related crimes are among the most critical social problems in Vang Vieng. The project will neither prevent nor promote such development. Therefore, not applicable.</li> <li>Ditto, no influence related to this project</li> <li>No records about such incidents since project start; Local residents widely agree with the ongoing project, as they perceive benefits at various levels.</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
<b>Performance of Construction Works, incl. Campsites and Decommissioning</b>						
Deficiencies related to ongoing construction activities and, in particular, the operation and maintenance of construction camp sites	<ul style="list-style-type: none"> <li>Non-observance of safety precautions for workers, especially those exposed to dangerous or risky work activities (e.g. welding, steel works, painting, handling of chemicals).</li> <li>Non-Observance of nighttime working restrictions</li> <li>Sanitation problems (leading to localized water and soil pollution).</li> <li>Garbage disposal and burning</li> <li>Do/Did the construction activities cause any impediments on public utilities (electricity, community assets, water supply, and services)?</li> <li>Records of social and other conflicts between construction workers from other areas and local residents or workers</li> </ul>	<p>√</p>	<p>√</p>	<p>√</p>		<ul style="list-style-type: none"> <li>Safety concerns and equipment for workers at assessed sites substandard and not in line with Technical Specifications. Particular lack in the provision of basic safety gears such as safe welding gear and protective helmets for workers.</li> <li>No records; Nighttime working activities were very limited. If so, the works did not create unaccepted noise, vibration and dust</li> <li>No particular sanitation facilities at sites; Generally, local workers fully accept the existing situation and the lack of facilities.</li> <li>Almost without exception, garbage management at construction sites needs improvement and supervision by the Contractor, to maintain the site as stipulated in the Technical Specifications.</li> <li>No records available about impediments of use of public utilities in connection with ongoing construction activities.;</li> <li>No records about social conflict issues.</li> </ul>
Impacts and damages related to decommissioning the sites	<ul style="list-style-type: none"> <li>Environmental problems caused by construction activities and leftover waste material in camp sites (type of hazardous material, quantities, effects on nearby waterways and settlements)</li> <li>Issues related to proper decommissioning of the sites, in accord with Technical Specifications (type of left waste material, water pools, excessive clearance of vegetation;</li> </ul>			<p>√</p> <p>√</p>		<ul style="list-style-type: none"> <li>Decommissioning not yet due, as constructions still ongoing.</li> <li>Decommissioning the work sites will require rigorous supervision to ensure that no environmental damage takes place due to excessive garbage, unused construction materials and hazardous chemicals at site. Apart from maintaining the landscape aesthetics special attention will be needed to avoid the creation of any stagnant puddles which may generate public health risks as breeding habitats for disease vectors.</li> </ul>
Monitoring of Water	<ul style="list-style-type: none"> <li>Screening of monitoring records of Nam Song river</li> </ul>					<ul style="list-style-type: none"> <li>Each of the measured results was assessed in</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
Quality of Nam Song River, and consecutive legal and enforcement steps	(monthly recording of 10 hydro-physical and hydro-chemical parameters, analyzed by Chinaimo Water Treatment Plant Laboratory, Vientiane).					special reports submitted to the project EA. In general, the data indicate (i) the need of stringent supervision of enterprises that charge pollutants into the local water resources, (ii) closer monitoring of harmful land-use practices, (iii) awareness campaigns focusing on local farmers about the use of hazardous chemicals and fertilizers; (iv) iron and lead need to be carefully monitored due to their concentration levels are above the safe limits; (v) Enforce regulations and controls: Effluents and run off from domestic sewage, including the indiscriminate spilling of harmful substances, detergents, paints etc. into the urban drains need to be contained by firm actions and by tightening local regulations to reduce harmful discharges into the Nam Song river, to reduce contamination risks for organisms taken from the river for human consumption, and to enable some recovery of the local fisheries. Enforce the 'polluter-pay' principle.

### 3.4 Assessment of Sub-Component North-South Corridor, Luang Namtha and Bokeo Provinces

35. In this region, the infrastructure development components of STDP<sup>8</sup> subject to site checks included :

*(in brackets: abbreviations for locations as used for specific assessment details in the checklist tables below)*

- **Nam Ha Interpretation Centre and Market (H):** 5 retail market stalls , 1 information centre, 1 toilet, 1 coffeshop, car parking 1000 m<sup>2</sup>, walkways.
- **Nam Eng Cave Tourism Facilities (E):** Car parking area 1000 m<sup>2</sup>, 4 retail market stalls, 1 coffeshop, 1 ticket booth, 1 toilet, 1 small bridge over creek, picnic area with 8 table units, gravel walking path to cave, concrete steps at cave entrance, walled cave entrance plus gate, steel-grated walkway within cave (approx. 250 m) and 2 steel-bridges with hand rails
- **Nam Pae Viewpoint (P):** Car parking lot 800 m<sup>2</sup>, Access ramp, drainage system rehabilitation/new construction, retail market single stall, toilet, viewing deck tower and platform, walkways.
- **Bor Kung Spring Nature Park, Vieng Poukha (BK):** Car parking area, 6 retail market stalls, 2 toilets, camping ground 1285m<sup>2</sup>, walkways, additional spa facilities.
- **Don Chai Market and Nam Kan Visitor Center (Ch):** 4 retail market stalls, 1 information centre, parking lot, toilet, walkways.
- **French Army Fort Improvements, Houay Xay (FF):** restructuring one building as museum/information center, parking lot, toilet, walkways, view platform structure in one of the remaining watch towers.

36. The activities were carried out in June 2011 by the Environmental Team, jointly with representatives from Provincial Tourism Offices, the Supervising Engineer and local Contractors.

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<sup>8</sup> For technical drawings, site maps and more detailed geographic information, reference is made to previous reports (Mastaller, Nam Eng Baseline Survey, March 2010; Mastaller. IEE for N-S Corridor, revised, March 2010),

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
<b>Maintaining Ecological Integrity (Geological features, Soil and Water Resources)</b>						
adverse effects/impacts on special geological or geomorphologic features in the area	<ul style="list-style-type: none"> <li>Identify sensitive geological formations (e.g.karst phenomena)</li> <li>Identify project activities causing land disturbance on such sensitive features, or vice versa, potential impacts of external activities and development acting on the proposed projects.</li> </ul>	√		√		<ul style="list-style-type: none"> <li>➤ <b>(E)</b> Special attention needs to be given to the sensitive karst environment at Nam Eng Cave; Of particular concern are potential impacts relating to steel and concrete work activities within the cave. At all other sites <b>(H,P,BK)</b> care needs to be taken to maintain the existing landscape and ecological character of the respective environment. At the historical site <b>(FF)</b> attention must be paid not to alter any of the historic features and values. Structural improvements and safety measures need to match with the old architecture. In view of earthquake risks, inclusion of safety features for visitors must be a particular concern.</li> <li>➤ No evidence of land disturbance of the environs, being mainly paddy fields and few forest lands. At <b>(BK)</b> however, concerns are forwarded about environmental impacts caused by a nearby brick factory which may exert negative influence on the appearance and use of the proposed spa.</li> <li>In <b>(Ch)</b>, due consideration must be given to plan for further water supply infrastructure, particularly aiming at a new retention dam on a nearby creek</li> </ul>
Ecological sensitive area, soil properties and stability, erosion risks.	<ul style="list-style-type: none"> <li>Identify sensitive elements regarding fauna and flora specific and/or endemic to the area</li> <li>Project activities causing land disturbance, soil erosion, subsistence, instability or landslips</li> </ul>	√		√		<ul style="list-style-type: none"> <li>➤ No records of sensitive fauna or flora elements in the area. Although there is lack of baseline studies, the surrounding environment at <b>(E, P)</b> and <b>(BK)</b> indicate the presence of highly diverse and specialized fauna and flora that requires protection.</li> <li>➤ The site preparation and vegetation clearing at <b>(FF)</b> requires cautious actions as it presently harbors a marked biodiversity (insects, reptiles, birds, plants).</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
Land-Use impacts and potential land speculation	<ul style="list-style-type: none"> <li>Adverse impacts on locally specific land-uses and amenity values (e.g. agricultural assets, local fisheries, collection of forest and non-forest products)</li> <li>Land speculation as induced impact</li> </ul>	√		√	?	<ul style="list-style-type: none"> <li>None of the interventions is likely to attract significant changes in adjacent land uses, except the potential development of small food stalls.</li> <li>There is little risk that in the sub-project sites the land-values of adjacent lands will change, with the exception of the area adjacent to Nam Eng Cave where local authorities already are confronted with approaches from foreign developers. LNTA may resume full responsibility to contain undesired land development in that area, particularly when the cultural and economic integrity of local communities are at stake.</li> </ul>
Water quality and quantity impacts	<ul style="list-style-type: none"> <li>Reducing of local (wider) catchment area, both in terms of quality and quantity</li> <li>Change of surface drainage pattern, increased sedimentation loads, turbidity</li> <li>Further excessive demand for water extraction (for project purposes), and subsequent drainage issues (e.g. public health issues at market sites)</li> <li>Sufficient flush water supply for newly established public toilets.</li> </ul>	√		√		<ul style="list-style-type: none"> <li>None of the interventions is likely to cause such environmental risks.</li> <li>Ditto, creation of new water pipe connections (<b>H</b>, <b>P</b> and <b>Ch</b>) are unlikely to result in water use or erosion and drainage risks.</li> <li>Surface runoff at the market site (<b>Ch</b>) need to be addressed by the engineer to avoid drainage problems, and in turn, risk to the public health. It is therefore recommended to re-calculate the dimensioning of the proposed drainage structures.</li> <li>Newly constructed toilets need to be supplied with sufficient flush water all time. LNTA /thru local village committees, shall ensure there is sufficient water supply available. All public toilets need to be pay toilets to recover maintenance and operation costs.</li> </ul>
<b>Maintaining Ecological Integrity (Vegetation and Fauna)</b>						
Loss or other impacts on local vegetation	<ul style="list-style-type: none"> <li>Impacts due to direct impact (area clearing, tree felling, burning, spraying of herbicides)</li> <li>Identification of specific losses of plants that have local significance such as food, construction material, medicinal, or cultural.</li> </ul>	√	√			<ul style="list-style-type: none"> <li>Clearing site from local vegetation needs to be done with care and appreciation of existing flora, particularly at picnic sites at (<b>E</b>) and within the entire area of the (<b>FF</b>) Re-vegetation program shall be considered where appropriate, e.g. when completing the site preparation for parking lots and information centers at (<b>H</b>), (<b>E</b>) and (<b>P</b>). All such activities shall be</li> </ul>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<ul style="list-style-type: none"> <li>Proper decommissioning of all work sites, planning for re-vegetation of cleared sites, taking landscaping values into consideration.</li> </ul>		√			<p>carried out before the onset of the rainy season. Observe good landscaping criteria, and exclusively use endemic plants.</p> <p>➤ Decommissioning plans for all sites needs to be properly implemented and supervised.</p>
Impacts on local fauna, breeding habitats or on livestock	<ul style="list-style-type: none"> <li>Introduction of exotic species, loss of locally important or endemic species.</li> <li>Any negative effects on wildlife breeding or nesting sites</li> <li>Any impact on buffer zones towards protected areas.</li> <li>Increase in unnatural noise and lighting effects during construction activities.</li> <li>Potential impact on local livestock, due to construction activities</li> </ul>	√				<p>➤ Additional soil material brought to the construction sites need to be removed and properly deposited at designated and environmentally safe locations.</p> <p>➤ Observe, as available, local records of breeding habitat for wildlife or nesting places anywhere at the construction sites or in adjacent/buffer areas, particularly at <b>(E)</b> and <b>(BK)</b>.</p> <p>➤ No protected areas in the close vicinity to any of the sub-project sites; however, special attention needs to be given to the sensitive karst landscape around Nam Eng Cave entrance..</p> <p>➤ Noise impact shall be kept at minimum at all construction sites. Particular caution during works are mandatory for all works within the Nam Eng cave, as this may severely affect the local cave fauna.</p> <p>➤ Local livestock is unlikely to be affected during entire construction period, at all work sites.</p>
<b>Social Fabrics and Awareness</b>						
Public Awareness	<ul style="list-style-type: none"> <li>Public Consultation: details and records</li> <li>Assessment of effectiveness of awareness campaigns launched by the project</li> </ul>		√	√		<p>➤ According to Provincial Authorities of LNTA, villagers and local community was duly informed about the project and the <u>(temporary)</u> impacts generated both during and after completion of the construction</p> <p>➤ Insofar, no public assessment implemented. Local authorities and responsible agencies (LNTA/Provincial/District Tourism Departments) need to assess the perception level of local people about each sub-projects, opportunities and benefits</p>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
Public Health Risks	<ul style="list-style-type: none"> <li>Contamination of local crops due to contamination with chemicals originating from project activities, and subsequent public health risks identified</li> <li>Identified risks for bio-accumulation of hazardous contamination (e.g. of local crops and vegetables)</li> <li>Increase and type of accidents that might be attributed to the development of the subproject</li> <li>Introduction of pests, weeds, diseases etc due to ongoing or completed project activities.</li> <li>Creation of temporary or permanent breeding habitats for mosquito or vermin disease vectors</li> <li>Generation of emissions causing impacts to human health</li> <li>Increase in local noise generation and in vibration.</li> <li>Health risks due to animal feces within market site</li> </ul>	<ul style="list-style-type: none"> <li>√</li> <li>√</li> <li>√</li> <li>√</li> <li></li> <li>√</li> <li>√</li> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> <li></li> <li></li> <li></li> <li>√</li> <li></li> <li></li> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> </ul>	<ul style="list-style-type: none"> <li>➤ At all sites surveyed, no record of use of hazardous chemical for the construction that would lead to health impacts;</li> <li>➤ No records of farmers complaints available;</li> <li>➤ No records from any construction site</li> <li>➤ No records from any project site</li> <li>➤ Relevant for some sites, especially <b>(Ch)</b>. Not a major concern, as long as local depressions will be filled up to avoid the development of stagnant puddles that will act as mosquito breeding habitat.</li> <li>➤ No significant issue, as most project sites are at some distance from settled areas.</li> <li>➤ Ditto, as above</li> <li>➤ In Don Chai market <b>(Ch)</b> fencing is strongly recommended to stop domestic animals roaming through the market site.</li> </ul>	
Waste Generation and Public Awareness to Participate in Environmental Protection	<ul style="list-style-type: none"> <li>Generation and left-over of excessive waste material from ongoing or completed construction activities</li> <li>Generation and left-over of excessive garbage from ongoing tourism activities</li> <li>Deficiencies in waste collection system</li> <li>Deficiencies in waste disposal system</li> </ul>	<ul style="list-style-type: none"> <li></li> <li></li> <li></li> <li></li> </ul>	<ul style="list-style-type: none"> <li>√</li> <li></li> <li>√</li> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> <li>√</li> <li></li> <li>√</li> </ul>	<ul style="list-style-type: none"> <li>➤ Solid waste and excessive materials are present at all workshop and camp sites. These sites need be properly cleaned and decommissioned (in line with Tech.Specs requirements) before handing over the project. RE and PIU are responsible to monitor this work.</li> <li>➤ At present no obvious issue at any of the project sites. However, proper waste management planning (provision of covered bins, regular collection schedule, awareness signage etc) need to be followed as specified in the Technical Specifications.</li> <li>➤ Waste was dumped outside collection bins. Public awareness campaign/signboards need be in place by responsible agencies (LNTA/ village committees)</li> <li>➤ Villagers habitually continue with environmental</li> </ul>	

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	<ul style="list-style-type: none"> <li>Did the project observe or create appropriate landfill sites and waste management procedures</li> <li>Availability and effects of public awareness signs to cooperate in waste management efforts</li> <li>Preparedness and commitment of local tour guides to participate in environmental protection and waste management programs launched by the Project</li> </ul>			√		<p>harmful practices, such as burning and dumping household waste at random in the landscape.. Public campaigns, carried out by/through LNTA agencies needed to address such practices.</p> <p>➤ In line with recommendation, above.</p> <p>➤ No information of the public awareness program launched by LNTA available. At present, no signs concerning environmental awareness in the project areas. Garbage and solid waste management, embedded in a broad public awareness campaign, is still an outstanding issue and needs to be tackled in the near future. Provincial and district authorities of LNTA will thereby play an important role.</p>
<b>Public Life Hindrances and/or Social Conflicts due to Construction Works</b>						
Potential adverse effects due to ongoing construction activities	<ul style="list-style-type: none"> <li>Mobility hindrance and other problems caused by construction activities</li> <li>Creation of noise, dust, vibration</li> <li>Observance of nighttime working restriction within settlement areas.</li> <li>Social and other conflicts between construction workers from other areas and local residents or workers</li> <li>Does/Did the project affect any public utilities (electricity, community assets, water supply, health services and other public infrastructure and services?)</li> </ul>	√				<p>➤ All inconveniences in travelling during the construction of the road and other infrastructure was fully accepted by the local residents, appreciating the benefits they would gain through the project.</p> <p>➤ Ditto, as above</p> <p>➤ Nighttime working activities were very limited at all sites. If so, local residents had no complaints about excessive noise, vibration and dust creation;</p> <p>➤ No conflict between the workers and local residents recorded</p> <p>➤ At all sites the local community was able to get access to existing public utilities at all times during construction works.</p>
Potential adverse effects on Public Life Integrity and Utilities	<ul style="list-style-type: none"> <li>Hindrance and other problems caused by parking or traffic</li> <li>Does/Did the project affect any public utilities</li> </ul>		√			<p>➤ Traffic volume to this area is quite light in each day, hence impact causes by the traffic is not significant. At Nam Pae, however, the parking situation needs special addressing due to lack of ample space.</p> <p>➤ Local communities are able, at all project sites, to</p>

Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	(electricity, community assets, water supply, health services and other public infrastructure and services?)	√				maintain full access to public utilities during the construction period.
Archaeological, cultural and historical sites impacts	<ul style="list-style-type: none"> <li>Loss or damage to archaeological/historical/cultural monuments or areas</li> <li>Impairment or degradation of aesthetic property values</li> <li>Nuisance (odor, pest animals, rodents) to culturally important sites</li> </ul>	√				<ul style="list-style-type: none"> <li>➤ Not applicable in most project sites; the contractors at <b>(BK and FF)</b> are aware of ancient/historically important remains that need special protection against damage and impacts from ongoing works.</li> <li>➤ The Contractors responsible for Nam Eng Recreational Area and of the <b>(FF)</b> are aware of the need to preserve the aesthetical and landscape values of these sites. The project helps to improve aesthetic property values as a result from better infrastructure provided</li> </ul>
Safety	<ul style="list-style-type: none"> <li>Conflicts generated by increasing traffic volume</li> <li>Potential increase in road accidents, involving local residents.</li> <li>Observance of public dissent and concerns</li> </ul>	√				<ul style="list-style-type: none"> <li>➤ Public hearings were held in all sub-project areas, alerting the public general for general risks associated with the ongoing activities and works..</li> <li>➤ Insofar, no records available that would indicate an accident associated with the ongoing construction activities at all sites.</li> <li>➤ Insofar, no specific records available. According to local officials, all sub-project are welcomed by local residents, many of them perceive positively the prospected opportunities for employment or sale of local products.</li> </ul>
Social Conflicts	<ul style="list-style-type: none"> <li>Conflicts generated by increasing influx of external tourists</li> <li>Conflicts with local school operations</li> <li>Prostitution, human trafficking, STDs</li> <li>Cultural clashes between visiting tourists and local</li> </ul>	√				<ul style="list-style-type: none"> <li>➤ No records available that would indicate any local social conflict associated with the ongoing construction activities at all sites.</li> <li>➤ Not applicable at any of the sites in the NS-corridor</li> <li>➤ No records about such incidents since the project started</li> <li>➤ The project bears no risks that the planned activities would lead to a change of any existing recreational uses</li> <li>➤ Local residents unanimously support the project and</li> </ul>



Project Activities possibly affecting env. resources or values	Survey and Assessment Methods Applied	Potential Effects if unmitigated				Supplementary Information / Assessment of Effects
		insignificant	minor	medium	major	
	residents or workers					
Impacts and damages related to decommissioning the sites	<ul style="list-style-type: none"> <li>Environmental problems caused by construction activities and leftover waste material in camp sites (type of hazardous material, quantities, effects on nearby waterways and settlements)</li> <li>Issues related to proper decommissioning of the sites, in accord with Technical Specifications (type of left waste material, water pools, excessive clearance of vegetation;</li> <li>Does/Did the decommissioning of campsite cause impacts on any public utilities (electricity, community assets, water supply, health services and other public infrastructure and services?</li> </ul>			√		<ul style="list-style-type: none"> <li>➤ Decommissioning was at no site assessed going on, therefore not subject to current assessment.</li> <li>➤ Ditto, however, discussions were held with all site contractors to execute the decommissioning in an environmentally safe and acceptable manner at the time of official hand-over.</li> <li>➤ The proper decommission of the sites is strongly recommended as all left waste materials, particularly surplus concrete has to be removed from the sites and discarded in appropriate locations. Special care needs to be taken to leave the terrain unleveled in order to avoid the development of stagnant water puddles during / after heavy rainfalls.</li> </ul>

#### 4. Conclusions and Recommendations

37. The overall conclusion of all infrastructure and activities assessed is that there are no major detrimental effects in junction with the completed or ongoing actions. The majority of the deficiencies and negative impacts observed are assessed as manageable once the mitigation and control mechanisms described in the Technical Specifications of all bidding contracts and in former planning documents (e.g. EMPs) are observed.

38. Major issues and concerns, in terms of environmental implications and further investigations, are summarized for each sub-project as follows:

a) Siphandone Wetlands (var. components)

- Addressing the problem of water ponding in the back-area of Nakasang Market; Site leveling, backfilling and drainage-redimensioning required;
- Improve waste management system once the market facilities are in operation;
- Enforce proper decommissioning of camp sites, supervise clean-up and landscaping obligations of local contractors;
- Supply adequate signage and environmental awareness signs at all sites.

b) M.Phin Market Facilities

- Site leveling and back-filling of depressions;
- Installation of proper and functional drainage system, including coffered drains;
- Implementation of the M&O Plan;
- Enforce proper decommissioning of the entire work site, supervise clean-up and landscaping obligations of local contractors;
- Supply adequate signage and environmental awareness signs at all sites.

c) Vang Vieng Town Drainage

- Enforce proper decommissioning of camp sites, supervise clean-up and landscaping obligations of local contractors;
- Verify appropriateness of proposed systems for gross pollution traps;
- Ensure regular maintenance and cleaning of communal drainage canals;
- Enable continuation of water quality monitoring program for Nam Song River;
- Ensure (with specific tests) the quality of fish taken from the retention pond.

d) N-S Corridor (var. components)

- Where applicable, ensure proper site leveling and back-filling of depressions;
- Enforce proper decommissioning of camp sites, supervise clean-up and landscaping obligations of local contractors;
- Provide for fencing the market area at Don Chai; a M&O plan might be considered that is similar to the one elaborated for M.Phin market facilities;
- Supply adequate signage and environmental awareness signs at all sites.

## **5. Acknowledgements:**

The author of this report expresses gratitude to all persons who contributed information and opinions about the diverse sub-projects. Special thanks go to the Dept. Director of the Lao National Tourism Agency, Mr. Thavipeth Oula and his advisory team, namely Mr. Rik Ponne, Mrs. Phongsith Davading. Similarly, gratitude for their time taken in discussing actual issues and further steps forward go to the, and to the Head of the Provincial Tourism Department Mrs Mala Chanthalam and her STDP Officer Mr. Soulichany (Pakse/Champasak), Mrs Bounmy Khantivong and Mr. Syha Khantivong (Savannakhet), Mr. Sompeth Inthat (Phin District Council Administration), Mr. Phonesavath Kamonthong and Mrs Alinda Phengsavath (Luang Namtha Prov. Tourism Agency), and Mr Oudomsin Soukbuakham (Bokeo Prov. Tourism Agency). The team also acknowledges the generous help offered the site engineers in the respective sub-projects, namely Mr. Outhit Soulivanh, Mr. Seng Pachanh, Mr. Anousone Sengkeo and Mr. Saysavath Khaokeopaseuth 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.

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Finally, thanks to Mr. Stephen Schipani (ADB) for his encouragement and valuable recommendations on various project aspects.

## Appendix

### Persons and Institutions Contacted for this Assignment

(Period 3<sup>rd</sup> May to 20 June, 2011)

No	Meeting Date	Name of Organization, Location	Name	Position	Contact Information
1	08.04 and 12.04	Asian Development Bank, Manila, Philippines	Steven Schipani	Social Sector Specialist SEAD ADB, Coordinator	<a href="mailto:sschipani@adb.org">sschipani@adb.org</a> (+632) 683 1954
2	02.05.	Lao Consulting Group, Vientiane 377 Lao-Thai Road, Ban Vatnak, Moung Sisattanak	Manilay Bouavong	Director LCG	<a href="mailto:manilaybv@laoconsulting.com">manilaybv@laoconsulting.com</a> <a href="mailto:lcg@laoconsulting.com">lcg@laoconsulting.com</a> , <a href="http://www.laoconsulting.com">www.laoconsulting.com</a> 021-313 259 020-55506901
3	02.05.	Lao Consulting Group, Vientiane	Arouny A. Sakulku	Teamleader, Civil Engineer STD PM	<a href="mailto:arounys@laoconsulting.com">arounys@laoconsulting.com</a> 020-55503419 021-313 259
4		Lao Consulting Group, Vientiane	Somvang Thammavongsa	Civil Engineer (CP)	<a href="mailto:e_deng1974@yahoo.com">e_deng1974@yahoo.com</a> 020-2153153 55529166
5		Lao Consulting Group, Vang Vieng	Anousone Sengkeo	Civil Eng. for Vang Vieng	<a href="mailto:anousong@laoconsulting.com">anousong@laoconsulting.com</a> 020-22860237
6		Lao Consulting Group, Phine	Seng Phachanh	Civil Eng. for M.Phine	<a href="mailto:senginthatvong@hotmail.com">senginthatvong@hotmail.com</a> 020-22860237
7		Vang Vieng Urban Administration,	Phutthasone	Depty Dir. of UDDA	020-23411111
8		Vang Vieng Urban Council	Kampheng	PM, Vang Vieng Wastewater Treatment	020-22123569
9		WREO Vang Vieng Env. Bureau	Mixay	Dir. WREO of V.V.	020-22259998
10		Vang Vieng Contractor for Drains	Phaypadith	Dir. Constr. Company	020-55045345
11	16.05	Provincial Tourism Dept. Savannakhet	Bounmy Khantivong	Director of Agency	041-212755 020-22319236
12	16.05	Provincial Tourism Dept. Savannakhet	Syha Phannavong	Depty. Director of Agency	020-55541979
13	17.05.	District Council Administr. Phine	Somphet Inthath	Head of Administration	

No	Meeting Date	Name of Organization, Location	Name	Position	Contact Information
14	17.05	District Council Administr. Phine	Phomma Martebphavong	Env. Office of Administration	
15	16-17.05	Lao Consulting Group, Phine	Khamthan	Civil Eng. Assistant, Site	
16	18.05	Provincial Tourism Authority Pakse	Soulchan	Project Officer for STDP	020-97208299
17	19.05	Provincial Tourism Authority Pakse	Mala Chanthalam	Director of Agency	031-212021, 5635461 <a href="mailto:chanthammala@yahoo.com">chanthammala@yahoo.com</a> <a href="mailto:ou-thai@hotmail.com">ou-thai@hotmail.com</a>
18	21-25.05	Lao Consulting Group, Nakasang	Outhit Soulivanh	Civil Eng. Assistant, Site	<a href="mailto:nouthit@yahoo.com">nouthit@yahoo.com</a> 020-55657218
19	21.05.	Contractor for Nakasang Access Rd	Somxay Lounthapanya	Chief Manager	<a href="tel:020-55724019">020-55724019</a>
20	21.05	Contractor for Nakasang Market	Chanenychone Vangkonevilay	Chief Manager	
21	24/25.5	Contractor Don Khone	Somkhuan	Chief Manager	020-22324660
22	29.05	Lao National Tourism Administr., Vientiane .	Rik Ponne	Natl. STDP Coordinator	<a href="mailto:rikponne@gmail.com">rikponne@gmail.com</a> 021-217910 020-58871654
23	31.05	Provincial Tourism A. Luangnamtha	Phonesavath Kamonthong	Director	
24	31.05	Provincial Tourism A. Luangnamtha	Alinda Phengsawat	Head, Planning Division	020-2394355 <a href="mailto:alinda.solana@yahoo.com">alinda.solana@yahoo.com</a>
25	31.05	LCG Site Engineer, Luangnamtha	Saysavath Khaokeopaseuth	Supervising Engineer	<a href="mailto:saysavathks@yahoo.ca">saysavathks@yahoo.ca</a>
26	31.05	Nam Ha Site, Nam Eng Cave Contractor	Sitthiphone	Chief Manager	020-22390061
27	01.06	Bor Kung Site, Nam Pae Contractor	Phouvanh		020-99996111
28	02.05	Don Chai Site, French Fort HouayXai Contractor	Phayboun	Chief Manager	020-22209922
29	03.05	Provincial Tourism A. HouayXai	Oudomsin Soukbuakham	Deputy Director	020-55683050
30	06.06	Lao National Tourism Administration, Vientiane	Thavipheth Oula	Deputy Dir. General PM of STDP	<a href="mailto:thavipheth@yahoo.com">thavipheth@yahoo.com</a> 021-252976, Fax: 021-212769 020-55777947