Environmental Management Plan

Project Number: 46293-004
Loan 3194-CAM

July 2018

CAM: Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth Project

Kampot Pier Development Sub-project

Prepared by the Ministry of Tourism, Cambodia for the Asian Development Bank.

MINISTRY OF TOURISM

ASIAN DEVELOPMENT BANK

MINISTRY OF TOURISM

INTERNATIONAL STANDARD COORDINATION UNIT

GREATER MEKONG SUBREGION TOURISM INFRASTRUCTURE FOR INCLUSIVE GROWTH

ADB LOAN No. 3194-CAM (SF)

FINAL REPORT

Environmental Management Plan (EMP)

Kampot Pier Environmental Improvements

July 2018

SBK

Executing Agency:	**Funding Agency:**	SBK Cambodia, Ltd
Ministry of Tourism 1st Floor, Lot#3, Sangkat Veal Vong Khan 7 Mekara Phnom Penh, Cambodia	Asian Development Bank (ADB) 6 ADB Avenue, Mandaluyong City Metro Manila, Philippines	Out/backside MOT PCU sub-office Phnom Penh, Cambodia

CURRENCY EQUIVALENTS

(as of 1 January 2014)

Currency Unit	–	Riel R
R1.00	=	$0.00024
$1.00	=	R4,050

ABBREVIATIONS

ADB	-	Asian Development Bank
AP	-	Affected Person
CEMP	-	Contractor Environmental Management Plan
DAFF	-	Department of Agriculture, Forestry and Fisheries
DDSC	-	Detailed Design & Supervision Consultant
DOE	-	Department of Environment
DPWT	-	Department of Public Works and Transport
DOT	-	Department of Tourism
DOWRAM	-	Department of Water Resources and Meteorology
EA	-	Executing Agency
EIA	-	Environmental Impact Assessment
EMC	-	Environmental Monitoring Consultant
EMP	-	Environment Management Plan
EO	-	Environmental Officer
ERT	-	Emergency Response Team
EERT	-	External Emergency Response Team
GMS	-	Greater Mekong Subregion
Government	-	Government of Cambodia
IEE	-	Initial Environment Examination
IEIA	-	Initial environmental Impact Assessment
MAFF	-	Ministry of Agriculture, Forestry and Fisheries
MOE	-	Ministry of Environment
MIME	-	Ministry of Industry, Mines and Energy
MPWT	-	Ministry of Public Works and Transport
MOT	-	Ministry of Tourism
MOWRAM	-	Ministry of Water Resources and Meteorology
MRF	-	Material Recovery Facility
PAM	-	Project Administration Manual
PCU	-	Project Coordinating Unit
PIU	-	Project Implementation Unit
PPTA	-	Project Preparatory Technical Assistance
RP	-	Resettlement Plan
GRC	-	Royal Government of Cambodia
SPS	-	ADB's safeguard policy statement (2009)
SFP	-	Safeguard Focal Person
SS	-	Safeguards Specialist
WWTP	-	Waste Water Treatment Plant

WEIGHTS AND MEASURES

Km	-	Kilometer
Kg	-	Kilogram
Ha	-	Hectare

In this report, "$" refers to US.

TABLE OF CONTENTS

I. INTRODUCTION

1. The environmental management plan (EMP) for the Kampot Passenger Pier Development in Kampot Town, Kampot Province provided herein is one of two EMPs that have been prepared for the subprojects of the GMS Tourism Infrastructure for Inclusive Growth project (the project) in Cambodia. The other EMP addresses the Crab Market Environmental Improvement subproject in Kep Town neighboring Kep Province. A single Initial Environmental Examination (IEE)/Initial Environmental Impact Assessment report (IEIA)[4] of both subprojects was prepared. The separate EMPs are comprehensive and are developed as stand-alone management tools that are supported by the parent IEE/IEIA.

A. Kampot Passenger Pier Development

2. The new passenger pier development consists of a pier and supporting tourist facilities such as a customs/immigration building, car park, public toilets, and vendor kiosks. The access road to the pier will also be upgraded. Table 1 reproduces the list the subproject activities shown in the IEE/IEIA.

Table 1: Summary of Components of Passenger Pier Development in Kampot

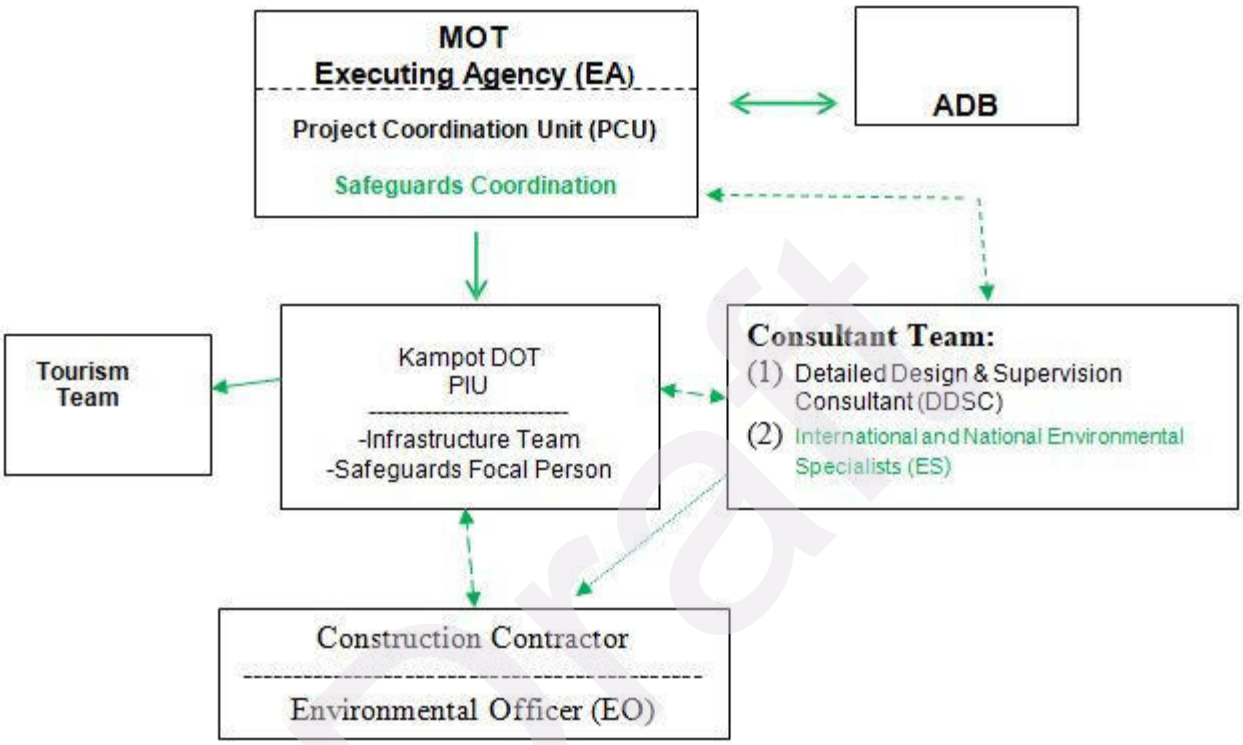
Activity	General Specifications
Upgrade existing 2.3 km access road	2.3 km x 11m carriageway (1+9+1) Reinforced concrete (actually it is a completely construction in a reserved 15m wide road corridor which follows only little alignment of existing road)
Install new embankment stabilization structure	
Construct new internal access roads	
Construct new pier	suitable for tidal and flood level fluctuation; Longitidunal to the riverbank
Construct new passenger landing area	1,400 m^2
Construct new passenger arrival/departure hall with customs/immigration offices, administration and ticket offices, landscaped tourist reception/information center, restaurant area	total area of 1,900 m^2 equipment to support customs and immigration operations
Waste Water Treatment Plant WWTP	Compact containerized waste water treatment plant by anaerobic-aerobic treatment process 100m3/day. Similar to Kep Crab Market system
Install new public toilets	
Construct new parking area	2,000 m^2
Install new power supply and lighting system to all internal and external public areas	
Connect the project site to Kampot Town Water Supply system	Include internal piped supply system with concrete reservoir storage
Develop new solid waste management	garbage bins and garbage waste collection station
Construct new perimeter security fence	
Install directional and information signage	
Provide other supporting infrastructure utilities	

[4] https://www.adb.org/sites/default/files/project-documents/46293/46293-004-iee-en.pdfl

II. INSTITUTIONAL ARRANGEMENTS & RESPONSIBILITIES

3. At the feasibility stage the management framework[5] for the implementation of the environmental management plan for the subproject is summarized in Figure 1. The full project management framework for Cambodia is in Annex 1.

Figure 1: Management Framework for EMP Implementation



4. The Ministry of Tourism (MOT) which is the executing agency (EA) for the project will take overall responsibility for successful implementation of the EMP. The EA will establish a Phnom Penh-based Project Coordination Unit (PCU) within the Tourism Development Department which, *inter alia*, will provide Safeguards Coordination for e EMP. The provincial Department of Tourism (DOT) in which the project implementation unit (PIU) will be created will implement the EMP with support from the PCU assisted by a battery of both international and national consultants who will likewise orient and capacitate PIU staff and stakeholders. The PIU will be comprised of technical teams for infrastructure and tourism. The infrastructure team will be cross appointed from the Department of Public Works and Transport (DPWT). The infrastructure team will include a Safeguards Specialist who will lead the implementation of the EMP in conjunction with the Environmental Officer(s) (EO) of the construction contractor(s).

5. The Safeguards Coordination Unit of the PCU will provide operational guidance to the PIU for implementation of the EMP and will liaise with the ADB on safeguard reporting and issues. The Safeguards Focal Person of the PIU will oversee the work of the EO of the contractor on the implementation of the CEMP[5] for the particular construction package.

[5] Contractor Environmental Management Plan prepared by the Contractor based on updated EM

6. External support for the implementation of the EMP will be provided by the International and National Environment Specialists (ES) of the Detailed Design and Supervision Consultant (DDSC), and a contractor safeguard officer.

7. The responsibilities of the different agencies of the management framework in Figure 1 are listed in Annex 2. Provided below is a summary of responsibilities for implementation of the EMP.

8. The responsibilities of the EA as supported by PCU include:

- Provide coordination for environmental and social safeguards and monitoring;
- Liaise with ADB on the implementation of the EMP; and
- Coordinate resolution with PIU, and ADB if necessary with issues arising from the implementation of EMP.

9. The responsibilities of the Safeguards Focal Person (SFP) of the PIU include:

- Initially assist DDSC with updating the EMP to meet final detailed subproject designs;
- Notify DOT to verify that Government approvals of project are met, and that the EMP is compliant with requirements of Royal Government of Cambodia (RGC) sub-decree on EIA, No 72 ANRK.BK, issued by the Ministry of Environment (MOE, 1999);
- Assist the DDSC with inclusion of CEMP requirements in bidding documents, including bid evaluations, based on the updated EMP;
- Undertake day to day management of EMP implementation activities;
- Work with EMC on implementation of monitoring plan of EMP;
- Ensuring compliance with loan covenants and assurances in respect of all subprojects, including EMPs (as well as the GAP and resettlement plans);
- Lead follow-up meetings with all affected stakeholders;
- Prepare and submit quarterly reports on EMP implementation to the PCU;
- Oversee implementation of the CEMP by contractor;
- Coordinate with ES of DDSC for EMP implementation;
- Undertake regular construction site inspections to ensure contractor implements the CEMP properly; and
- Ensure the contractor's EO submits monthly reports on construction mitigations and monitoring.
- Oversee and coordinate the strict compliance and monitoring of EMP mitigation measures

10. The responsibilities of the Environmental Specialists of the DDSC are detailed in the Terms of Reference for the two positions in Annex 3. Their key responsibilities for the EMP are listed below:

- Updating the EMP to meet final detailed design requirements of subprojects;
- Provide technical direction and support to PIU for implementation of the EMP;
- Oversee the design and delivery of capacity development and training of PIU staff and the contractor's EO;
- Provide advice and support to the EMC with their monitoring activities;
- Review all reports prepared by the PIU and EMC for PCU and ADB; and
- Review and inspect the location of any possible contaminated sites near subprojects.

11. The responsibilities of Environmental Officer (EO) of Contractor include:

- Implement the CEMP during the construction phase of subprojects; and
- Prepare and submit monthly reports on mitigation and monitoring activities of CEMP and any environmental issues at construction sites.
- Carry out the strict implementation and monitoring of the EMP mitigation measures compliance

12. The Department of Environment (DOE) is the provincial agency which oversees environmental management of Kampot. The DOE with district staff provide direction and support for environmental protection-related matters including application of the Law on Environmental Protection and Natural Resources Management, enacted by National Assembly, 1996, promulgated by Preah Reach Kram/NS/RKM-1296/36; and environmental standards.

13. The ADB provides guidance to EA/PCU with any issues related to EMP and reviews quarterly reports on EMP activities compiled and submitted by the PCU.

A. Worker and Community Health and Safety

14. In 2003 the International Labour Organization (ILO) created the New Global Strategy for Occupational Safety and Health (OSH). Based on the OSH[6], the Ministry of Labour and Vocational Training (MLVT) through the Department of Occupational Safety & Health is developing the Occupational Safety and Health Master Plan (OSHM; 2009-2013) of Cambodia.

15. The emerging OSHM, *inter alia,* addresses worker and public safety in the construction and operation of small-medium enterprises and notably rural roads. The EA/PCU as supported by the PIUs must obtain and implement the directives of the OSH Master Plan. The pertinent associated law and directives is the Labour Law of Cambodia (1997) with specific reference to chapter VIII governing health and welfare of workers and the public.

16. To supplement the OSHM the IFC/World Bank Environment, Health, and Safety Guidelines (2007) should also be consulted the IFC EHS guidelines currently provide the international standard for worker and public safety.

17. ADB assists the PCU with timely guidance at each stage of project implementation following agreed implementation arrangements and reviews all documents that require ADB approval including environmental safeguards.

B. Regulatory Framework and Guidelines for Kampot Subproject Components

18. Regulations and guidelines that apply to the construction the new pier facility in Kampot are summarized in Table 2. The current environmental standards for Cambodia are provided in Annex 4. See the IEE/IEIA for the complete legal and regulatory framework for environmental management in Kampot province.

[6] ILO. 2009. Asean-Oshnet, Occupational Safety and Health Practices

Table 2: Regulations and Guidelines Applicable to Subproject

Solid Waste Management
• Law on Environmental Protection and Natural Resources Management, enacted by National Assembly, 1996, promulgated by Preah Reach Kram/NS/RKM-1296/36; o Sub-decree on Water Pollution Control (1999): - Annex 2: Industrial effluent standards (including WWTPs); - Annex 4: Water quality standards for public water & biodiversity; and - Annex 5: Water quality standards for public waters and health. • Directive Managing Health Wastes in the Kingdom of Cambodia (MOH, 2008).

III. SUMMARY OF POTENTIAL IMPACTS

19. The potential impacts of the new passenger pier construction and operation including upgrading of the access road are summarized in the IEIA as shown in Table 3. These impacts are all related to the civil works that will be undertaken during the construction phase to include: noise and dust pollution, increased traffic accidents, public and workers' safety, soil erosion, sedimentation of the Teuk Chuu River, and solid and waste water disposal. Most of these impacts will be momentarily taking place and do not cause long term severe impacts on the ecosystem.

20. The projected initial increase of 10–15 daily ferry departures in/out of Teuk Chuu River as a result of the new passenger pier will have potential adverse effect on the sea grasses in the near shore of Kampot Bay, though it may not be serious but needs to be minimized if not prevented. Oil leaks from fishing boats, litters and other toxic contaminants from the ferry passengers cruising the estuarine so rich in seagrasses may endanger the sensitive habitat and foraging ground of marine life.

21. With the improvement of the environmental service in the Kampot pier complex, increasing number and frequency of tourists going to the area is expected. As such, there will also be a corresponding upsurge in the volume of both solid waste and sewage which certainly affect sanitation and hygiene in the immigration complex area and immediate vicinity

22. Directly discharging large volumes of the treated waste water into the estuary may adversely affect the rich marine life in the immediate coastal environment. In this case, there is a need to constantly monitor the quality of the treated waste water to ensure that it meets the required threshold standard (i.e., effluent water quality BOD <30 mg/l) without causing any subsequent change in the marine life population. Likewise, it is recommended to conduct a yearly macro-benthic assessment where the treated waste water is being discharged. The aim is to determine any change in composition of the substrate that serves as food for marine life.

23. In summary, there are three (3) main sources of pollution during the pier construction and operation phase: a) earth diggings causing soil movements and sedimentation, b) construction wastes, including hazardous elements (DBST), and c) waste and spillage generated during the operation phase, such as water discharge from WWTP, motor boats' oil leaks and ferry passengers' litters. All these can easily be mitigated by putting in place necessary preventive measures and having sound solid waste/sewage management system.

Table 3: Summary of Potential Negative Environmental Impacts of New the Passenger Pier[7]

Pre-construction Phase
• Possible movement of land speculators to the new pier area and along the fringes of the upgraded access roads. • Influx of shop owners and other business operators to the site in anticipation of the pier construction may cause physical pressure and displacement of local people nearby • Confirmation of no required resettlement, relocations, and compensation may lead to social conflict • UXO Survey and Clearing Plan implementation may result to slight ground scrapping • Recruitment of workers may discriminate the locals
Construction Phase
• Disturbances due to civil works, such as noise, reduced public access to the area, etc., • Air pollution from NOx, SOx, & CO caused by increased traffic and heavy equipment use • Surface water pollution caused by equipment operation and maintenance, • Mishandling, faulty storage and disposal of DBST may result to burns and health hazard • Endanger public and workers' safety due to possible road accident • Soil erosion and surface water sedimentation of Teuk Chuu river, • Drainage and flooding problems, • Solid waste accumulation from worker camps, • Social issues and community problems caused by migrant workers • Temporal and minor disturbance of certain portion of seagrass and mangroves where the pier will be set up • Temporal disturbance of certain portion of the fishing ground within a distant reach from the pier location due to noise, minimal disruption of the normal navigational use of the waterway, construction waste unconsciously being dumped into the water • Bulk of soil particles from pier foundation excavation not extracted but slowly settle down on the seafloor will cause damage on the seagrasses and marine biodata • Temporary disturbance to the navigation during the construction
Operational Phase
• Heavy traffic (minibus, motorbike, and car) on access road to/from the new passenger pier will increase the risk and frequency of road accidents and noise. • Influx of huge number of tourists resulting to congestion that may probably exceeds the service capacity of existing facilities, such as waiting bays, toilets, kiosk, restaurants which may affect sanitation and environmental quality**.** With more people, more anticipated litters and wastes, requiring additional facilities for improved recycling and disposal system • Increased number of stalls and other shopping destinations along the new highway will affect public safety, sanitation and convenience • Real estate and housing projects will suddenly mushroom in the new development area • Possible social conflicts may erupt amidst the increasing commercial and other social activities in the area as a result of improved accessibility and mobility in the pier area. • Oil leaks from low maintenance motor boats causing potential damage to seagrass beds and reaching even up to the conservation areas south of the mouth of Teuk Chu River, alongside with careless dumping of solid wastes, litters and toxic contaminants by ferry passengers on transit, • Slight changes in population count of the marine macro and microbenthic organisms may alter the soil substrate composition, resulting from the WWTP waste water discharge into the seas, • Potential presence of coliforms in the waters if the discharge from the ABR to the sea does not meet the water quality threshold standards.

[7] Taken from IEE/IEIA of GMS Tourism Infrastructure for Inclusive Growth Project and results of field validation and interview in Kampot July 6, 2018

IV. DISCLOSURE, PUBLIC CONSULTATION AND PARTICIPATION

24. The stakeholder consultation procedure contained in the IEE/IEIA will be conducted at the pre-construction phase. The first step will be the disclosure of the approved IEE/IEIA to the affected stakeholders who were consulted earlier for their review and comment.

25. As indicated in the IEE/IEIA, the primary concern of the public and stakeholders are mainly related to the anticipated disturbances during the construction and operation phase of the upgraded road. Although, the pier site is far away from the population center, the projected busy traffic due to the new gateway to other tourist destinations via Kampot may result to increased road accidents and car congestions.

26. However, the most immediate and critical issue confronting the local stakeholders, the fisherfolks in particular, is the impact of the pier construction and operation on the seagrasses and mangroves as important habitat supporting their fishing livelihood.

27. The fisherfolks in Trapeang Sangkae and Koun Sat communes, though they are approximately 6-km away from the pier location, need to be consulted too about subproject effect on their access to the public fishing area. The expected busy traffic on the waterway due to increased number and frequency of ferry boats transiting tourists later on may limit their access. Thus, they should be informed and get involved in addressing this issue, especially on the delineation of the extent of the waterway for the ferry boats.

28. An interview with the Kampot PIU Director together with the Chairman of the Fisherfolks Trapeang Sankae and Koun Sat Communes was conducted on July 6, 2018. Table 4 presents the highlights of the consultation.

Table 4: Summary Results of the Key Informant Interview with Kampot PIU Director and the Chairman of the Fisherfolks of Trapeang Sankae and Koun Satv Communes

DOMAIN OF INTEREST	ISSUES/CONCERNS	FINDINGS/OBSERVATION
1. Status of land occupancy on state lands within the affected project site	Possible eviction of people in certain communes within the subproject area if there is no clear security of tenure	• Trapeang Sangke community has 337 hectares, being recognized by the Ministry of Agriculture, Forestry and Fisheries with legal rights issued in 2011 which is within the Conservation Area. • PIU Director attested that there is no land right issues related to the pier construction.
2. Extent of fishing or travelling by the locals within Koh Samoa area and to the nearby coast.	• There is a need to identify the communities and corresponding number of fisherfolks in Koh Smao area • Determine also the number of people travelling between Koh Samoa and the coast everyday by boat	• Five (5) communes: Koun Sat, Trapeang Pring, Chum Kreal, Kampong Samrong, Trapeang Sangke • Around 600 fishing boats in entire Kampot municipality and 2,000 fishing families, but not all of them are regularly fishing . • About 300 fishing boats regularly operating coming from the five communes per day characterized with low fishing intensity. • Tourism statistics for 2017 and 2018 show the trends in number of visitors in Trapeang Sangke Fisheries Community: - 2017: Locals (14,060); International (1, 513). Total = 15,573 - 2018: Locals (15,705); International (697). Total = 16,402.
3. Status of fishery in Trapeang Sangkea and Koun Sat Communes	•Number of fisherfolks dependent on the mangrove and seagrass for livelihood •What are their current activities in relation to mangrove /seagrass destruction protection? •What are the anticipated threats in their livelihood in relation to the new pier construction?	• Main livelihood occupation of people in Trapeang Sangke and Koun Sat are vegetable production and fishing. None depends directly on extracting mangrove and seagrasses for income and food source. . • People are actively engaged in mangrove and seagrasses protection through regular surveillance and monitoring activities. • They are also engaged in ecotourism promotion • The fisherfolks Chairman attested that there is no perceived significant negative impact of the pier construction on their livelihood. As a matter of fact, it is expected to even improve their economic condition through livelihood diversification and increased income in tourism which most families have already been enjoying. • Accordingly, some of the fisherfolks are already into selling souvenir items, set up homestays or guesthouses, eateries with sea food as specialty, and serve as tourist guides or boatman.
4. Point sources of environmental degradation in the project area	• What are the emerging environmental pollution issues related to the pier construction and operation?	• The Kampot PIU Director claimed that the main culprit posing real threats to the seagrasses and mangrove in the coastal offshore along the mouth of the sea are the private individuals, each trying to establish wharf landings and other water related sports entertainment in anticipation to tourism boom in the area with the establishment of pier as a new added facility. • Private investors excavate the existing waterway for setting up the foundations of their infrastructures. This causes great disturbance and damage on the seagrasses and mangroves. • Excavated soil is not taken out but only piled up. The rooting

		system of mangrove needs at least 20% sand. But without soil extraction, this results more sand accumulation along the waterway, causing serious damage on seagrass and mangrove. • Dumping construction garbage and waste water from the WWTP to the estuarine is an unavoidable consequence during the construction and operation phases respectively. Hence, the impact on water quality may certainly cause damage on the seagrass if the threshold standards for safe coastal waters are exceeded.
5. Fishing communities to be affected by the waterway	• What are the communities to be affected by the waterway? • How do these conditions negatively impact fisherfolks' livelihood?	• Pier construction will certainly involve ground excavation and expansion of the delineated existing waterway area. If the excavated soil will not be extracted, it will pose serious damage on the sea grasses and mangroves by altering the natural ecology. Likewise, uncontrolled or profuse leaking of engine oil from fishing boats can aggravate the water pollution problem. • All the aforementioned environmental issues and concerns will adversely affect the condition of the seagrasses and mangroves as important foraging, breeding and spawning grounds of fish and other marine life that comprise the main source of livelihood for many households in the project area and vicinities.
6. General assessment and comments	• What is the extent of Kampot pier construction project impact on the Trapaeng Sangke and other community fisheries (Koun Sat Commune, etc)?	• The PIU Director claimed that the pier construction site is about 6 kms away from the communities. Likewise, the proposed waterway is about 3-4 kms from Trapeang Sangke Community fisheries. He further added that the only probable negative impacts which can even be easily mitigated by proper management and monitoring is the increasing solid waste accumulation due to growing number of tourists, alongside with coastal water pollution brought about by discharging waste water from the WWTP to the estuarine. • The Fisherfolks Chairman also attested that the project will provide positive gains in terms of livelihood and income benefits to the five (5) fishing communities more than the threats they anticipate. There will be more economic opportunities and livelihood options for them with the presence of the pier in the area.

29 In general, the fisherfolks in the five communes, including Trapeang Sangkae and Koun Sat perceived more benefits and gains from the pier construction in terms of future additional livelihood opportunities they will get from ecotourism boom than the projected threats anticipated. The locals can also be recruited as laborers and/or become service providers, such as eatery operators, store keepers, and other small business enterprise owners when the civil works begin.

30 As regards to the earlier findings[8] that Trapeang Sangkae and Koun Sat fisherfolks are anxious about the impact of the pier construction and operation, the Chairman of the fishery association however, contradicted this claim. According to him, the 6 km distance between the 2 communes and the site of civil works is quite far. As such, earth diggings and excavations, piles thrusting and soil scraping activities have insignificant or no impact at all on the condition of the seagrasses and mangroves in their fishing area.

[8] Casting A Wider Net: ActionAid Cambodia. January 2017

31 On the overall assessment based on the recent interview and site inspection of the subproject area, it appears that the three (3) main sources of real threat to the sea grasses and mangroves are: a) indiscriminate dumping of construction waste, wrappers, plastic bottles and other forms of litters generated by transiting boat passengers, b) oil leaks from motor boats and ferry crafts, and c) discharging large volumes of waste water from the WWTP, or if the WWTP is not working correct into the estuary during the operation phase.

V. GRIEVANCE REDRESS MECHANISM

32 A well-defined grievance redress and resolution mechanism will be established to address all affected stakeholders' lodge grievances and complaints regarding the project's impacts on the environment and people's livelihood, as well as on land acquisition, compensation and resettlement, in a timely and satisfactory manner. All stakeholders will be made fully aware of their rights, and the detailed procedures for filing grievances and an appeal process will be published through an effective public information campaign. The grievance redress mechanism and appeal procedures will also be explained in a project information booklet (PIB) that will be distributed to all stakeholders. The Grievance reporting is to fit into the PCU grievances/complaints mechanism of recording and reporting of these events.

33 Affected Person (AP)'s complaints can be made verbally or in written form. In the case of verbal complaints, the committee on grievance will be responsible to make a written record during the first meeting with the APs.

34 A Grievance Committee that has experience with environmental and social issues will be organized in local communes, comprising local leaders designated for such tasks. The designated commune officials shall exercise all efforts to settle issues at the commune level through appropriate community consultation. All meetings shall be recorded by the Grievance Committee and copies of meeting minutes shall be provided to affected persons. A copy of the minutes of meetings and actions undertaken shall also be provided to each of the project focal persons of DOT, PIU, and ADB upon request.

35 The procedures for environmental and social grievance redress are set out below which is consistent with the legal process for resolution of disputes in Cambodia:

a. **Stage 1**: Complaints from AP for the first time shall be lodged verbally or in written form with the village head or commune leader. The complaints shall be discussed with the AP and the designated Head of Grievance Committee or members of the committee. Because initial environmental issues will most likely be construction-related the Environment Officer/contractor and Safeguards Focal Person/PIU need to be notified immediately. It will be the responsibility of the Head of Grievance Committee to resolve the issue within 15 days from the date the complaint is received. All meetings shall be recorded and copies of the minutes of meetings will be provided to AP.

b. **Stage 2**: If no understanding or amicable solution can be reached or if no response is received from the Grievance Committee within 15 days from filing the complaint, the AP can elevate the case to the District Grievance Committee. The District Grievance Committee is expected to respond within 15 days upon receiving the AP appeal.

c. **Stage 3**: If the AP is not satisfied with the decision of the District Office, or in the absence of any response, the AP can appeal to the Provincial Grievance Committee (PGC).

The PGC will review and issue a decision on the appeal within 30 days from the day the complaint is received.

d. **Stage 4**: If the AP is still not satisfied with the decision of the PGC or in the absence of any response within the stipulated time, the AP, as a last resort may submit his/her case to the provincial court. The court will address the appeal by written decision and submit copies to the respective entities which include the DOT, DGC/PGC and the AP. If however, the AP is still not satisfied the court's decision, the case may be elevated to the provincial court. If however, the decision of the provincial court is still unsatisfactory to the AP, the AP may bring the complaints to the Higher Court.

36 The PCU will be responsible for checking the procedures and resolutions of grievances and complaints. The PCU may recommend further measures to be taken to redress unresolved grievances. The environmental specialists of the DDSC will provide the necessary training to improve grievance procedures and strategy for the grievance committee members when required.

37 The executing agency will shoulder all administrative and legal fees that will be incurred in the resolution of grievances and complaints if the AP win their case. Other costs incurred by legitimate complaints will also be refunded by the project if the AP win their case.

38 In cases where AP does not have the writing skills or are unable to express their grievances verbally, AP has to seek assistance from recognized local groups, NGOs, family members, village heads to have their grievances recorded in writing. This is to ensure that whatever disputes do occur, all the details have been recorded accurately enabling all parties to be treated fairly. Throughout the grievance redress process, the responsible committee will ensure that the concerned APs are provided with copies of complaints, decisions or resolutions reached.

39 If efforts to resolve disputes using the grievance procedures remain unresolved or are unsatisfactory, APs have the right to directly discuss their concerns or problems with ADB's Southeast Asia Department through the ADB Cambodia Resident Mission (CARM). If APs are still not satisfied with the responses of CARM and the Southeast Asia Department, they can directly contact the ADB Office of the Special Project Facilitator (OSPF).

VI MITIGATION PLAN

40 The mitigation measures of the EMP are presented in the mitigation plan for the subproject Table 5. Following the structure of the IEE/IEIA, the mitigation plan is organized by the three development phases of the subproject defined by the pre-construction; construction; and the operational phase. The mitigation plan addresses the environmental issues and concerns raised at the stakeholder meetings.

41 The mitigation plan combines construction phase impacts common to the access road upgrades and the passenger pier for which single mitigation measures are prescribed. In this way redundant mitigation measures are not re-stated numerous times. However, impacts and required mitigations specific to a subproject component are also identified. Or, common mitigations that are particularly important for a subproject component are underscored.

42 The mitigation plan identifies potential impacts, required mitigations, responsible parties, location, timing, and indicative costs. The mitigation plan is decidedly comprehensive in order for it to be easily updated at the detailed design phase to fully address the potential impacts of the final subproject designs.

43 In the event that the contractors do not comply accordingly to the stipulations and conditions set in this EMP, in particular, the mitigating measures of a given negative impact, the PIU has the prerogative to sue or subject the former to legal sanction or withhold the payment that corresponds to the needed action or service required as remedial scheme to an identified pressing environmental concern or problem.

44 Likewise, for any unanticipated or miscalculated occurrence of a negative impact, it is the joint-responsibility between PCU and the contractors to address any arising environmental threat that is related or directly linked to the civil works or operation of a given subproject component. If the damage has bearing on human health or livelihood, it may require compensation or any other forms of development assistance that would ease the negative repercussion of an unforeseen or underestimated negative impact.

45 The Safeguard Focal Person of the PIU should notify the PCU of any unanticipated or underestimated negative impact. A composite team from MOT, MOE and other relevant agencies to be spearheaded by the Environmental Monitoring Consultant should inspect and assess the extent of threat or damage. The Team will decide based on sound professional judgment the severity of the impact for proper action.

46 On entirely different matter, not related to subproject impacts but on climate change preparedness, it was noted that the soil structure where the pier foundation will be erected is made up of loose alluvium sediment deposit- a combination of silt, clay and organic matter, rather than limestone rock as parent material. Hence, it is unstable and fragile. This EMP recommends the use of massive solid concrete piles as fill in materials. Likewise, the design for the pier platform level and other structures are to be increased from its normal design levels (compared to present sea High Water Level) and should include an added 20cm [9] for climate change mitigation.

[9] Average rise in sea level is 3-4mm per year, 20cm covers 60 year.

GMS Tourism Infrastructure for Inclusive Growth Project (RRP CAM 46293-004)

Table 5: Environmental Impact Mitigation Plan

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] ($)	Responsibility	
							Supervision	Implementation
Pre-Construction, Detailed Design Phase								
Confirmation of no required resettlement, relocations, & compensation	No negative environmental impacts	1. Affected persons well informed well ahead of subproject implementation.	All affected persons in subproject areas	Before project implemented	See resettlement plans	See resettlement plan	PIU/SS	Resettlement committees
Disclosure, & engagement of community	No community impacts	2. Initiate Information Disclosure and Grievance process of IEE/IEIA	For all construction sites.	Beginning of project	Quarterly	No Marginal Cost	PIU/SS	PIU
Government approvals	No negative impact	3. Inform MoE of the changed of scope of work in the subprojects	Entire subproject	Before construction	As required	No marginal cost	PIU/DoE	DoE
Detailed designs of subproj ect,	Minimize negative environmental impacts	4. Work with DDSC[8] to complete detailed designs of the upgraded access road, and passenger pier. Ensure the following measures are included: a) identification of spill management prevention plans, and emergency response plans for all construction sites; b) no disturbance or damage to culture property and values; c) no, or minimal acquisition of agriculture or forested lands. d) locate aggregate borrow pits and rock supply areas away from human settlements with fencing and access barriers; e) no, or minimal disruption to village water supplies along access roads, utilities, and electricity with contingency plans for unavoidable disruptions; f) no, or minimal disruption to normal pedestrian and vehicle traffic along all road segments with contingency alternate routes; g) for residential areas include specific plan to notify & provide residents and merchants of construction activities & schedule to minimize disruption to normal commercial and residential activities. h) finalize disposal site for WWTP remainder sludge with MOE and DPWT. i) Wastewater treatment plant should be located at a safe place where is far from sources of salt farms.	Final siting	Before construction initiated	Once with detailed designs documents	No marginal cost[9]	DDSC	EA/PIU

.

.

[7] Costs will need to be updated during detailed design phase

[8] DDSC is detailed design and supervision consultant

[9] No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of bids of contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] ($)	Responsibility	
							Supervision	Implementation
Establish expert committee to develop Teuk Chuu River & navigation mgt Kampot bay plan & and regulations	Prevent loss or damage to seagrass and mangroves	5. Committee to be formed comprised of DoT, DAFF, DPWT, DoE, other marine navigation authorities, and Kampot cargo & fishing boat associations to review navigation needs, existing reports, and required studies needed to produce data/information necessary develop navigation management plan and regulations 6. Committee to develop scope of management plan, (e.g. buoyed navigation lanes, seagrass and mangrove zones markers, signage, allowable boat speeds, and boat drafts, seasonal (water depth) specifications)	Teuk Chuu river below passenger pier and near shore Kampot bay	Before construction	Once	No marginal cost	DDSC / Committee	DDSC/PIU
Develop draft navigation management plan & and regulations	Prevent loss or damage to seagrass and mangroves	7. Review draft plan to ensure it addresses expected increase in boat traffic to/from river	Teuk Chuu river below passenger pier and near shore Kampot bay	Before construction	Once	tbd	DDSC / M/DoT, M/DAFF, M/DoE,	DDSC/PIU
Implement Updated EMP	Positive environmental impacts	8. Confirm siting of passenger pier facilities with DoE/ DPWT 9. Review finalized RoW of upgraded access road to confirm absence of valued ecological or cultural resources. 10. Re-clarify with DoE that no known rare or endangered species inhabit the subproject areas 11. Identify any new potential environmental impacts of subproject and include in EMP. 12. Update mitigation measures and monitoring requirements of EMP where necessary to meet detailed designs, and to protect affected environments. 13. Submit updated EMP with new potential impacts to ADB to review. 14. Develop individual management sub plans for: a) Construction drainage; b) Erosion; c) Noise and Dust; d) Contaminated Spoil Disposal; e) Solid and Liquid Waste Disposal; f) Construction & Urban Traffic; g) Utility and Power Disruption; h) Worker and Public Safety; i) Tree and Vegetation Removal and Site Restoration; j) Construction Materials Acquisition, Transport, & Storage, and k) Cultural chance finds.	All sites	Before construction initiated	Once with detailed designs documents		DDSC	EA/PIU

Awareness campaign	No negative environmental impact	15. DoT to review potential locations of physical cultural resources, and explain possible PCR to contractors and DDCS	All subproject areas	Before construction Begins	Once	No marginal cost	DoT	DoT/PIU
Confirm Government approved construction waste disposal sites	No negative impact	16. Notify DoE, DAFF, and DPWT to confirm locations of sites for borrow pits and disposal areas for construction and hazardous waste for subprojects, and obtain required permits.	Entire subproject	Before construction	As required	No marginal cost	PIU/DoE/ DAFF/DPW T	PIU
UXO survey, & removal	Injured worker or public	17. Ensure Government is consulted for UXO, and clears areas where necessary	All construction sites.	Beginning of subproject	Once	See Monitoring Plan below	EA/PIU	PIU/Govern ment
Obtain & activate permits and licenses	Prevent or minimize impacts	18. Contractors to comply with all statutory requirements set out by Government for use of construction equipment, and operation construction plants such as concrete batching.	For all construction sites	Beginning of constructio n	Once	No marginal cost	DDSC	PIU & contractors
Develop bid documents	No negative environmental impact	19. Ensure updated EMP is included in contractor tender documents, and that tender documents specify requirements of CEMP must be budgeted. 20. Specify in bid documents that contractor must have experience with implementing EMPs, or provide staff with the experience.	All subproject areas	Before construction begins	Once for all tenders	No marginal cost	DDSC	PIU
Capacity development	No negative environment al impact	21. Develop and schedule training plan for (PIU/SS) to be able to fully implement EMP, and to manage implementation of mitigation measures by contractors. 22. Create awareness and training plan for contractors whom will implement mitigation measures.	All subproject areas	Before construction begins	Initially, refresher later if needed	No marginal cost	DDSC	DDSC
Recruitment of workers	Spread of sexually transmitte d disease	23. Use local workers as much as possible thereby reducing number of migrant worker	All work forces.	Throughout construction phase	Worker hiring stages	No marginal cost	EA/PIU	Contractor's bid documents

Development of Env'tal, Health, and Safety Manual	Injured workers and public Community health and safety	Develop the EHS manual to ensure that all workers are stay at safe place, living in good environment, use of clean water, and no accident due to providing sufficient safety equipment. Training the workers on the EHS manual and proper implementation Implementing safety measures around the construction sites to protect public including warning sign…	At construction sites	As required	During construction	No marginal cost	EA/PIU	Contractor
Construction Phase of Passenger Pier, and Upgrades to Access Road								
Initiate EMP & sub-plans,	Prevent or minimize impacts	24. Initiate updated EMP & CEMP including individual management sub-plans for different potential impact areas that are completed in pre-construction phase (see sub-plan guidance below).	For all construction sites	Beginning of construction	Once	No marginal cost	DDSC	PIU & contractors
Worker camps	Pollution and social problems	25. Locate worker camps away from human settlements. 26. Ensure adequate housing and waste disposal facilities including pit latrines and garbage cans. 27. A solid waste collection program must be established and implemented that maintains a clean worker camps 28. Locate separate pit latrines for male and female workers away from worker living and eating areas. 29. A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times. 30. Worker camps must have adequate drainage. 31. Local food should be provided to worker camps. Guns and weapons not allowed in camps. 32. Transient workers should not be allowed to interact with the local community. HIV/Aids education should be given to workers. 33. Camp areas must be restored to original condition after 34. construction completed.	All worker camps	Throughout construction phase	Monthly	No marginal cost	DDSC/PIU	contractor
Training & capacity	Prevent of impacts through education	34. Implement training and awareness plan for PIU/SS and contractors.	PIU office, construction sites	Beginning of construction	After each event	No marginal cost	DDSC	DCSC/PIU

Implement construction materials acquisition, transport, and storage sub- plan	Pollution, injury, increased traffic, disrupted access	35. All borrow pits and quarries should be approved by DoE. 36. Select pits and quarries in areas with low gradient and as close as possible to construction sites. 37. Required aggregate volumes must be carefully calculated prior to extraction to prevent wastage. 38. Pits and quarries should not be located near surface waters, forested areas, critical habitat for wildlife, or cultural property or values. 39. If aggregate mining from fluvial environments is required small streams and rivers should be used, and dry alluvial plains preferred. 40. All topsoil and overburden removed should be stockpiled for later restoration. 41. All borrow pits and quarries should have a fence perimeter with signage to keep public away. 42. After use pits and quarries should be dewatered and permanent fences installed with signage to keep public out, and restored as much as possible using original overburden and topsoil. 43. Unstable slope conditions in/adjacent to the quarry or pit caused by the extractions should be rectified with tree planting. 44. Define & schedule how materials are extracted from borrow pits and rock quarries, transported, and handled & stored at sites. 45. Define and schedule how fabricated materials such as steel, wood structures, and scaffolding will transported and handled. All aggregate loads on trucks should be covered.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	DDSC/PIU	contractor
DBST production, and application (if used)	Air pollution, land and water contamination, and traffic & access problems,	47. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non traffic areas 48. Stored DBST materials well away from all human activity and settlements, and cultural (e.g., schools, hospitals), and ecological receptors. Bitumen production and handling areas should be isolated. 49. Contractors must be well trained and experienced with the production, handling, and application of bitumen. 50. All spills should be cleaned immediately and handled as per hazardous waste management plan, and according to Government regulations. 51. Bitumen should only be spread on designated road beds, not on other land, near or in any surface waters, or near any human activities. 52. Bitumen should not be used as a fuel.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	DDSC & PIU	Contractor

Implement spoil management subplan	Contamination of land and surface waters from excavated spoil, and construction waste	53. Uncontaminated spoil to be disposed of in Government -designated sites, which must never be in or adjacent surface waters. Designated sites must be clearly marked and identified. 54. Spoil must not be disposed of on sloped land, near cultural property or values, ecologically important areas, or on/near any other culturally or ecologically sensitive feature. 55. Where possible spoil should be used at other construction sites, or disposed in spent quarries or borrow pits. 56. A record of type, estimated volume, and source of disposed spoil must be recorded. 57. Contaminated spoil disposal must follow Government regulations including handling, transport, treatment (if necessary), and disposal. 58. Suspected contaminated soil must be tested, and disposed of in designated sites identified as per Government regulations. 59. Before treatment or disposal contaminated spoil must be covered with plastic and isolated from all human activity 60. Management of general solid and liquid waste of construction will follow Government regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force. 61. Areas of disposal of solid and liquid waste to be determined by Government. 62. Disposed of waste should be catalogued for type, estimated weigh, and source. 63. Construction sites should have large garbage bins. 64. A schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible. 65. Solid waste should be separated and recyclables sold to buyers in community. <u>Hazardous Waste</u> 66. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow Government regulations. 67. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents) 68. Wastes must be stored above ground in closed well labeled, ventilated plastic bins in good condition, away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors.	All excavation areas	Throughout construction phase	Monthly	See Monitoring Plan for contaminated soil analyses	DDSC & PIU & DoE	Contractor

		69. All spills must be cleaned up completely with all contaminated soil removed and handled with care						
Implement solid and liquid construction waste sub-plan	Contamination of land and surface waters from construction waste	70. Management of general solid and liquid waste of construction will follow Government regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force. 71. Areas of disposal of solid and liquid waste to be determined by Government. 72. Disposed of waste should be catalogued for type, estimated weigh, and source. 73. Construction sites should have large garbage bins. 74. A schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible. 75. Solid waste should be separated and recyclables sold to buyers in community. <u>Hazardous Waste</u> 76. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow Government regulations. 77. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents) 78. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors. 79. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil sub-plan.	All construction sites and worker camps	Throughout construction phase	Monthly	No marginal cost	DDSC & PIU & DoE	Contractor
Implement noise and dust sub-plan	Dust Noise	70. Regularly apply wetting agents to exposed soil and construction roads. 71. Cover or keep moist all stockpiles of construction aggregates, and all truckloads of aggregates. 72. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately after work is completed. 73. As much as possible restrict working time between 07:00 and 17:00. In particular are activities such as pile driving. 74. Maintain equipment in proper working order 75. Replace unnecessarily noisy vehicles and machinery. 76. Vehicles and machinery to be turned off when not in use. 77. Construct temporary noise barriers around excessively noisy activity areas where possible.	All construction sites.	Fulltime	Monthly	No marginal cost	DDSC & PIU	Contract

Implement utility and power disruption sub-plan	Loss or disruption of utilities and services such as water supply and electricity	78. Develop carefully a plan of days and locations where outages in utilities and services will occur, or are expected. 79. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages. 80. Contact affected community to inform them of planned outages. 81. Try to schedule all outages during low use time such between 24:00 and 06:00.	All construction sites.	Fulltime	Monthly	No marginal cost	DDSC & PIU & Utility company	Contractor
Implement tree and vegetation removal, and site restoration sub-plan	Damage or loss of trees, vegetation, and landscape	82. Contact provincial forestry department for advice on how to minimize damage to trees and vegetation 83. Restrict tree and vegetation removal to within RoWs. 84. Within RoWs minimize removals, and install protective physical barriers around trees that do not need to be removed 85. All RoWs to be re-vegetated and landscaped after construction completed. Consult provincial forestry department to determine the most successful restoration strategy and techniques. Three trees should be replanted for each tree that has to be removed.	All construction sites.	Beginning and end of subproject	Monthly	No marginal cost	DDSC & PIU	Contractor
Implement erosion control sub-plan	Land erosion	86. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas. 87. Earthworks should be conducted during dry periods. 88. Maintain a stockpile of topsoil for immediate site restoration following backfilling. 89. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready. 90. Re-vegetate all soil exposure areas immediately after work is completed.	All construction sites	Throughout construction phase	monthly	No marginal cost	DDSC & PIU	Contractor
Implement worker and public safety sub-plan	Public and worker injury, and health	91. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites. 92. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites 93. Worker and public safety guidelines Government should be followed. See draft Occupational Safety & Health Master Plan of Ministry of Labor & Vocational Training (MLVT)). 94. Population near blast areas should be notified 24 hrs ahead, and evacuated well before operation. Accepted Government blast procedures and safety measures implemented. 95. Speed limits suitable for the size and type of construction vehicles, and current traffic patterns should be developed, posted, and enforced on all	All construction sites.	Fulltime	Monthly	No marginal cost	DDSC & PIU	Contractor

		roads used by construction vehicles in Kampot. 96. Standing water suitable for disease vector breeding should be filled in. 97. Worker education and awareness seminars for construction hazards should be given at beginning of construction phase, and at ideal frequency of monthly. A construction site safety program should be developed and distributed to workers. 98. Appropriate safety clothing and footwear should be mandatory for all construction workers. 99. Adequate medical services must be on site or nearby all construction sites. 100. Drinking water must be provided at all construction sites. 101. Sufficient lighting be used during necessary night work. 102. All construction sites should be examined daily to ensure unsafe conditions are removed.						
Civil works	Degradation of water quality & aquatic resources	103. Protective coffer dams, berms, plastic sheet fencing, or silt curtains should be placed between all earthworks and nearby surface waters. 104. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion. 105. Earthworks should be conducted during dry periods. 106. All construction fluids such as oils, and fuels should be stored and handled well away from surface waters. 107. No waste of any kind is to be thrown in surface waters. 108. No washing or repair of machinery near surface waters. 109. Pit latrines to be located well away from surface waters. 110. No unnecessary earthworks in or adjacent to water bodies 111. No aggregate mining from rivers or lakes. 112. All irrigation canals and channels to be protected the same way as rivers, streams, and lakes 113. Wire or nylon mesh must be spread as huge catchment 114. bag at the entire pier foundation construction area above the water surface where soil excavation and movements are done to minimize soil wash out resulting to sedimentation and damaging seagrasses	All construction sites Entire pier construction area	Throughout construction phase	Monthly	No marginal cost	DDSC & PIU	Contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] ($)	Responsibility	
							Supervision	Implementation
Civil works	Degradation of terrestrial resources	114. All construction sites should be located away forested or all plantation areas as much as possible. 115. No unnecessary cutting of trees. 116. All construction fluids such as oils, and fuels should be stored and handled well away from forested and plantation areas. 117. No waste of any kind is to be discarded on land or in forests/plantations.	All construction sites	Throughout construction phase	Monthly	No marginal cost	DDSC & PIU	Contractor
Implement construction and urban traffic sub-plan	Traffic disruption, accidents, public injury	118. Schedule construction vehicle activity during light traffic periods. Create adequate traffic detours, and sufficient signage & warning lights. 119. Post speed limits, and create dedicated construction vehicle roads or lanes. 120. Inform community of location of construction traffic areas, and provide them with directions on how to best co-exist with construction vehicles on their roads. 121. Demarcate additional locations where pedestrians can develop road crossings away from construction areas. 122. Increase road and walkway lighting.	All construction sites	Fulltime	Monthly	No marginal cost	DDSC & PIU	Contractor
Implement construction drainage sub-plan	Loss of drainage & flood storage	123. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding. 124. Manage to not allow borrow pits and quarries to fill with water. Pump periodically to land infiltration or nearby water courses. 125. Install temporary storm drains or ditches for construction sites 126. Ensure connections among surface waters (ponds, streams) are maintained or enhanced to sustain existing storm water storage capacity. 127. Protect surface waters from silt and eroded soil.	All areas with surface waters	Design & construction phases	Monthly	No marginal cost	DDSC & PIU	Contractor
Civil works: cultural chance finds sub-plan	Damage to cultural property or values, and chance finds	127. As per detailed designs all civil works should be located away from all cultural property and values. DoT identified potential sites and types of PCR in pre- construction phase .128. Chance finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. 129. Upon a chance find all work stops immediately, find left untouched, and PIU notified to determine if find is valuable. Culture section of DoT notified by telephone if valuable. 130. Work at find site will remain stopped until DoT allows work to continue.	All construction sites	At the start , and throughout construction phase	Monthly	No marginal cost	DDSC & PIU	Contractor

Post-construction Operation of Upgraded Access Road to Passenger Pier							
Operation of upgraded access road	Increased risk of accident or injury.	131. Enforce well marked speed limits, provide guard rails along road where needed, and educate village communities on new road safety. 132. Install warning signs and signages along the highway	Upgraded access road	Fulltime	Biannual	O&M	DPWT
	Increased air pollution & noise	133. Ensure vehicles maintained in proper working condition	Upgraded access road	Periodic checks	Biannual	O&M	DPWT
Post-construction Operation of New Passenger Pier							
Operation of passenger pier	Boat accidents Damage to seagrass beds and mangrove forests	134. Implement special navigation plan and regulations for boat traffic in river and near shore Kampot bay. 135. Install warning signs and signages along the waterway	Teuk Chuu river and near shore Kampot bay	Continuously	Biannual	O&M	DPWT
Operation of passenger pier	Solid, & domestic, waste at pier facility, and boat pollution	[a] 136. Ensure solid and domestic waste management facilities and plans are implemented properly. Ensure all passenger boats are maintained properly, and gas and oils are handled and stored on pier site properly. 137. Impose monthly check up of oil leaks from fishing motor boats and ferry crafts and ban those units with profuse leaking 138. Impose heavy penalty for littering and discharging of solid waste and other contaminants into the sea 139. Conduct macro and micro-benthic assessment along the coastal zone where waste water from the WWTP is discharged at least twice a year 140. Conduct periodic water quality analysis to ensure that no coliforms and other parasitic organism thrive resulting from the waste water discharge from the WWTP into the sea	Access road, pier facility, Teuk Chuu river Waste water discharge area and immediate environment	Continuously Mid and end part of the year	Biannual Biannual	O&M O&M	DPWT MOE

VI. MONITORING PLAN

46. The environmental monitoring plan for the EMP is provided in Table 6. The monitoring plan focuses on all three phases (pre-construction, construction, post-construction/operation) of the access road and passenger pier and consists of environmental indicators, the sampling locations and frequency, method of data collection, responsible parties, and estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected positive or negative environmental impacts of the subproject.

a) Environmental Standards for Subproject Components

47. Environmental standards for ambient water quality for Cambodia are found in Annex 4. The environmental standards provided by the Environmental, Health and Safety Guidelines of the IFC/World Bank (2007) (e.g., ambient air quality and noise) should be followed to supplement standards that are not provided by the Government.

48. An independent environmental monitoring consultant (EMC) will be required to implement the environmental monitoring program. The EMC will be responsible for the sampling of environmental parameters that must be analyzed in a laboratory. The SS and EO will coordinate with the EMC. The DDSC/PIU will provide logistical support to the EMC where necessary for the implementation of environmental monitoring plan.

49. After construction is completed and the pier is in operation the impact on traffic patterns and frequency of accidents should be monitored by the DPWT. The natural environment of the site should be monitored by the DOT with assistance from the DOE.

b) Performance Monitoring

50. Performance monitoring is required to assess the overall performance of the EMP. A project performance monitoring system will be developed by the EA for the entire subproject. Select indicators of major components of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 6.

VII. REPORTING

51. Regular reporting on the implementation of mitigation measures and on monitoring activities during construction phase of the subproject is required. Reporting is the responsibility of PIU and should be conducted in conjunction with regular meetings with stakeholders as part of the continuation of stakeholder communications. The mitigation and monitoring plans (Table 5 and 6) summarize proposed timing of reporting. A report on environmental monitoring and implementation of EMP will be prepared quarterly for the EA/PCU by the PIU. The PIU report will compile monthly reports provided by the EO of contractor, the reports of the EMC on monitoring, and input from the ES of the DDSC. The PIU report will also be sent to the DOE and PCU for consolidation and transmission to ADB. A semi-annual report will be prepared by PCU and to be submitted on the 3rd week of the succeeding reporting month. The reports will assess all indicators measured with the monitoring plan of EMP including performance monitoring indicators (Table 7), and will include relevant Government environmental quality standards. Templates for the monitoring reports to be prepared by the EO, PIU, and EMC will be developed by the ES of the DDSC at detailed design. The format, specifically for the semi-annual Environmental Monitoring Report is attached in Appendix 1 of this document.

Table 6: Environmental Monitoring Plan

Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility Supervision / Implementation		Estimated Cost (USD)
Pre-construction Phase – Update Baseline Conditions							
Update baseline on sensitive receptors (e.g., cultural property & values, schools or hospitals, rare/endangered species, critical habitat), and aquatic resources and human	A) Final ROW for access road upgrades, • Kep: B) Passenger pier site; and C) Mouth of Teuk Chuu river & near shore Kampot bay	Original field work, literature survey, community consultations	Once	Once	EA/PCU/ PIU	Environmental Monitoring Consultant	$3,000.
A) Air quality: dust, CO, NOx, SOx, noise, wind, temperature, and vibration levels B) Affected surface water quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P	A): At three sites along access road B): Teuk Chuu river below pier site	Using field and analytical methods approved by DoE.	One day and one night measurement during rainy & dry seasons.	One baseline supplement report before construction phase starts	PCU/PIU	Environmental Monitoring Consultant	A) $3,000. B) $4,000
Inventory of present and past land uses that could cause contaminated soil.	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoE.	Once	Once	PCU/PIU	Environmental Monitoring Consultant	$500.

Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility Supervision / Implementation		Estimated Cost (USD)
Construction Phase of Passenger Pier, and Access Road Upgrades							
Analysis of soil quality (heavy metals (As, Cd, Pb, oil & grease, hydrocarbons).	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoE.	Once if needed	Once	PCU/PIU	Environmental Monitoring Consultant	$2,000.
A) Air quality: dust, CO, NOx, SOx, noise, wind, temperature, and vibration levels B) Affected surface water quality: TSS, heavy metals (As, Cd, Pb) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P C) Analysis of soil quality (heavy	A & B): Baseline sites of pre-construction phase. C) At sites where Suspected contaminated soil and	A – C: Using field and analytical methods approved by DoE. Include visual observations of dust and noise from contractor & public reports.	(A – B): Quarterly during construction periods Daily visual records	Monthly	(A - D):		A & B: $8,000/yr C: $1,500/yr
					PIU	Monitoring consultant	

metals (As, Cd, Pb, Hg, Mn). D) Domestic (worker) and construction solid waste inside & outside construction sites including worker camps. E) Public comments and complaints F) Incidence of worker or public accident or injury	hydrocarbons D) All construction sites and worker camps E) Using hotline number	D) Visual observation (E)Information gathered telephone hotline. Number posted at all construction sites	(C)Once at start of excavation (D) Monthly (E)continuous public input (F) Continuous				D: $0.0 (E & F) daily observations E: $5000/yr F: $0
					EA/PIU	contractor	

ENVIRONMENTAL EFFECTS MONITORING						
Environmental Indicators	**Location**	**Means of Monitoring**	**Frequency**	**Reporting**	**Responsibility** Supervision / Implementation	**Estimated Cost (USD)**
Operation of Upgraded Access Road						
Air quality: dust, CO, NOx, SOx, noise and vibration levels	Baseline sites of pre-construction phase.	Using field and analytical methods approved by DoE.	Quarterly for 5 years	Biannual	MoT/DoE	$3,000/yr
Traffic accidents	Upgraded road.	Regular record keeping.	Continuously	For each event	MoT/DPWT	$0.0
Incidence of flooding	Adjacent to upgraded road	Surveys, public complaints	Seasonal for 5 years	Seasonal	MoT/DPWT	$500/yr
Operation of Passenger Pier and Facilities						
Incidence of garbage and litter	Along access road and at pier facility	Visual inspection	Weekly	Quarterly	MoT	O&M
Water quality of Teuk Chuu river below pier site: TSS, heavy metals (As, Cd, Pb,) oil and grease, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P	At sampling sites during pre- construction phase	Using field and analytical methods approved by DoE.	Bi-annually	Bi-annually	DoE	$3000/yr
Population count and composition of macro and micro benthic organisms and fauna, such as fish, crustaceans, invertebrates, bivalves, mollusk, and microscopic life forms	At sampling sites during pre-construction and operation phases	Using field and analytical methods approved by DoE.	Bi-annually	Bi-annually	DoE, MAFF	US $ 1,000/year

Table 7. Performance Monitoring Indicators for New Passenger Pier & Access Road

Major Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase			
Public Consultation and Disclosure	Affected public and stakeholders	Meetings with stakeholders contacted during IEE/IEIA & new stakeholders convened for follow-up consultation and to introduce grievance mechanism	Minutes of meeting, and participants list
EMP	Updated EMP	All stakeholders contacted during IEE/IEIA re-contacted for follow-up consultation	EMP
Bid Documents	Requirements of updated EMP (CEMP)[8]	Updated EMP appended to bidding documents with clear instructions to bidders for	Bid documents
Training of PMU/PIU/SS	Training course(s) & schedule	By end of preconstruction phase, required course(s) that will be delivered are designed and scheduled	Course(s) outline, participants, and schedule
Construction Phase			
All subproject areas	Critical habitat, rare or endangered species *if Present*	All *present* critical habitat and R & E species if unchanged, and unharmed	Monitoring by EMC[9]
Groundwater quality	Heavy metals, coliform bacteria, TDS, H_2S, BOD_5, TN, NH_3, TP, nutrient forms of N & P[10]	Government environmental standards and criteria met	Monitoring by EMC
Surface water quality	TSS, DO, BOD, COD, pH, oil & grease, nutrient forms of T & N, metals Coliforms	Government environmental standards and criteria met	Monitoring by EMC
Air quality	SOx, NOx, dust, , CO, noise,	Levels never exceed pre-construction baseline levels	EMC & contractor
Soil organic content	Solid and liquid waste	Rigorous program of procedures and rules to collect and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Hazardous materials and waste	Oil, gasoline, grease, alum, chlorine, soda	Rigorous program of procedures to manage and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Public and worker safety	Frequency of injuries	Adherence to Government policy and site-specific procedures to prevent accidents[11]	Contractor reports
Cultural property	Incidence of damage or complaints	No valued cultural property, or unearthed valuable relic is harmed in any way	Public input, contractor reports, public input, EMC reports

[8]Contractor Environmental Management Plan developed from the updated EMP in the bidding document
[9]Environmental Monitoring Consultant to be hired in November 2018 to assist in the implementation of the EMP
[10] See Annex 4 for environmental standards, analyzed by laboratory facilities in Phnom Penh.
11. MLVT's new Occupational Safety & Health Master Plan needs to be applied, *or* IFC World Bank EHS (2007)

Major Environmental Component	Key Indicator	Performance Objective	Data Source
Traffic	Frequency of disruptions and/or blocked roadways	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports, EMC reports
Operation Phase of Upgraded Road			
Traffic safety	Frequency of accidents	No increase in pre-construction Frequency	MoT/DPWT
Air quality	SOx, NOx, dust, CO, noise along upgraded road	Levels never exceed pre-construction baseline levels	DoT/DOE
Operation of Passenger Pier			
Human safety	Incidence of boat accidents/collisions, worker-public injury	Zero incidence	DPWT/marine ports & waterways
Water quality	Oils and grease, nitrogen, solid waste	Compliance with Government standards (Annex 4)	DOE

VIII. ESTIMATED COST OF EMP

52. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures during the construction phase are included with the construction costs in contractor bid documents.

53. Table 8 summarized the estimated cost for the implementation of the EMP for the passenger pier development in Kampot. These costs include per diem technician fees. Note that a margin of cost uncertainty/contingency to the total EMP cost has been added.

54. An estimated total budget of US$68,000 is required for the implementation of the Environmental Monitoring Plan. The costs will need to be reviewed and updated by the DDSC in conjunction with the PIU during the pre-construction phase.

Table 8: Estimated costs for Environmental Monitoring Plan of EMP

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline	
cultural receptors	$3,000
environmental quality	$7,500
Training for EMP Implementation	$4,000
Construction Phase	
environmental quality	$21,000
public consultation	$2,000
Post-construction Operation Phase	
environmental quality	$28,000
public input	$2,500
Total	**$68,000**

IX. EMERGENCY RESPONSE PLAN

55. The Contractor must develop emergency or incident response procedures during construction. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. The construction phase should ensure:

i) Emergency Response Team (ERT) of the Contractor as initial responder;
ii) The District fire and police departments, emergency medical service, the Department of Public Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders.

56. The Contractor will provide and sustain the required technical, human and financial resources for quick response during construction. Table 9 provides the role and responsibilities of concerned actors during emergency operation.

Table 9: Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (ERT)	- Communicates / alerts the EERT. - Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site. - When necessary & requested by the EERT, lends support / provides assistance during EERT's response operations.
External Emergency Response Team (EERT)	- Solves the emergency/incident
Contractor Resources	- Provide and sustain the people, equipment, tools and funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response & adequate protection, by keeping them informed of subproject progress.

57. The ERT will be led by the Contractor's senior engineer (designated ERTL) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

58. The Contractor will ensure that ERT members are physically, technically and psychologically fit for their emergency response roles and responsibilities.

59. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the PCU/PIU, will meet with the ultimate response institutions to discuss the overall construction process, including, but not limited to:

i) Subproject sites;
ii) construction time frame and phasing;
iii) any special construction techniques and equipment that will be used; i
iv) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;
v) the Contractor's Emergency Management Plan
vi) names and contact details of the ERT members

60. The objective of this meeting is to provide the ultimate response institutions the context for:

i) their comments on the adequacy of the respective Emergency Management Plans
ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated
iii) the arrangements for coordination and collaboration.

61. To ensure effective emergency response, prior to mobilization of civil works, the Contractor will:

i) set up the ERT;
ii) set up all support equipment and facilities in working condition
iii) made arrangements with the EERT;
iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force;
v) conduct orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and
vi) conduct drills for different possible situations.

62. To sustain effective emergency response throughout subproject implementation an adequate budget shall be provided to sustain the capabilities and efficiency of the emergency response mechanism, the emergency response equipment, tools, facilities and supplies. Drills and reminders will take place regularly, the former at least every two months and the latter at least every month.

a) Alert Procedures

63. Means of communicating, reporting and alerting an emergency situation may be any combination of the following: (i) audible alarm (siren, bell or gong); (ii) visual alarm (blinking/rotating red light or orange safety flag); (iii) telephone (landline); (iv) mobile phone; (v) two-way radio; and (vi) public address system/loud speakers. Some rules relative to communicating/alerting will be:

(i) Whoever detects an emergency situation first shall immediately :
- call the attention of other people in the emergency site,
- sound the nearest alarm, and/or
- report/communicate the emergency situation to the ERT.

(ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and should be defined in the Emergency Management Plans.

(iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: (i) the type of emergency situation; (ii) correct location of the emergency; (iii) estimated magnitude of the situation; (iv) estimated persons harmed; (v) time it happened; (vi) in case of a spill, which hazardous substance spilled; and (vii) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions.

For an effective reporting/alerting of an emergency situation:

(i) The names and contact details of the relevant persons and institutions should be readily available in, or near to, all forms of communication equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:
   - Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
   - EERT institutions/organizations
   - Concerned village authority/ies
   - PIU Office, SS

(ii) All subproject sites should have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.

(iii) Contractor's construction vehicles should also be equipped with the appropriate communication facilities.

b) Emergency Response Situations

64. Tables 10, 11 &12 suggest the general procedures that will be refined in the final EMP during detailed design, and described in more detail in the Emergency Management Plans of the Contractor.

Table 10: Evacuation Procedure

Procedure	Remarks
Move out as quickly as possible as a group, but avoid panic.	All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.
Evacuate through the directed evacuation route.	The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL & immediately communicated to ERT members.
Keep moving until everyone is safely away from the emergency site and its influence area.	A restricted area must be established outside the emergency site, all to stay beyond the restricted area.
Once outside, conduct head counts.	Foremen to do head counts of their subgroups; ERTL/Deputy ERTL of the ERT.
Report missing persons to EERT immediately.	ERTL/Deputy ERTL to communicate with the EERT.
Assist the injured in evacuation & hand them over to the ERT first-aiders or EERT medical group	ERT to manage injured persons to ensure proper handling.
If injury warrants special care, DO NOT MOVE them, unless necessary & instructed/directed	ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 11: Response Procedure during Medical Emergency

Procedure	Remarks
Administer First Aid regardless of severity immediately.	Fundamentals when giving First Aid: - Safety first of both the rescuer and the victim. - Do not move an injured person unless: - victim is exposed to more danger when left where they are, e.g., during fire, chemical spill it would be impossible for EERT to aid victims in their locations, e.g., under a collapsed structure - instructed or directed by the EERT. - First Aid to be conducted only by a person who has been properly trained in giving First Aid.

Call the EERT emergency medical services &/or	ERTL/Deputy ERTL or authorized on-site emergency communicator
Facilitate leading the EERT to the emergency site.	ERTL/Deputy ERTL to instruct: - an ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention & lead them to site. - Other ERT members to clear access road for smooth passage of the EERT.
If applicable, vacate site & influence area at once, restrict site, suspend work until further notice.	Follow evacuation procedure.

Table 12: Response Procedure in Case of Fire

Procedure	Remarks
Alert a fire situation.	Whoever detects the fire shall immediately: - call the attention of other people in the site, - sound the nearest alarm, and/or - Foreman or any ERT member among the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) - report/communicate the emergency situation to the ERTL/Deputy ERTL.
Stop all activities/operations and evacuate.	All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
Activate ERT to contain fire/control fire from spreading.	Guided by the training they undertook, ERT members assigned to mitigate the fire shall assess their own safety situation first before attempting to control fire spread.
Call the nearest fire & police stations &, if applicable, emergency medical services.	When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.
Facilitate leading the EERT to the emergency site.	ERTL/Deputy ERTL to instruct: - an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. - some ERT members to stop traffic in, & clear, the access road to facilitate passage of the EERT.
ERT to vacate the site as soon as their safety is assessed as in	Follow appropriate evacuation procedure.

X. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

65. Currently there is little experience and capacity for environmental assessment and management amongst national counterparts responsible for the implementation of the EMP, i.e., the DOT/PIU and DPWT in Kampot province. No dedicated that environmental staff exist in the DOT and thus the PIU. The DDSC with assistance from the safeguards specialists of the subproject will develop and deliver training courses to the DOT/PIU staff responsible for the implementation of the subproject. The purpose of the course(s) is to strengthen the ability of the PIU/PMU to oversee implementation of the EMP by construction contractors, and the EMC. The safeguards specialists, who will be full-time environmental member of the PIU, as well as the EO of the contractor, should attend training courses as required. Cost for training on the implementation of the EMP is included in the total budget as shown in Table 8.

66. Training on the implementation of an EMP should address two thematic areas. The first area should be principles environmental management focused on the potential impacts of subproject activities on the natural and social environment. The second area should be environmental safeguard requirements of the ADB and Government, with specific reference to the EMP.

APPENDIX 1: FORMAT OF SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT

Environmental Safeguards Monitoring Report

Semi-Annuall Report
xxx {month} 20xx

COUNTRY: xxx {Project name}, xxx {sub-project name, if report covers only one sub-project}

Prepared by the Project Management Unit of {complete name of Implementing Agency} for the {complete name of the borrower} and the Asian Development Bank.

NOTE

(i) In this report, "$" refers to US dollars.

This safeguards monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

Executive Summary

- **Description of monitoring activities** carried out (e.g. field visits, environment effect monitoring, survey questionnaire, public consultation meetings, focus group discussions, etc)
- **Key findings, issues**, any **corrective actions** already taken, and any **grievances**
- **Major activities planned** in the next reporting period
- **Recommendations**

1. xxx

2. xxx

Project Overview, General safeguard matters

1. Project Overview

{Read and delete: Briefly describe project objectives, scope and components – can be taken from PAM or other relevant document}

3. xxx

4. xxx

2. Project Progress

{Read and delete: Using most recent project progress report, describe status of project implementation related to civil works}

5. xxx

6. xxx

Table 1: Project Overview, Snapshot of Project Progress

Project Number and Title:		
Safeguards Category	Environment	
	Indigenous Peoples	
	Involuntary Resettlement	
Reporting period:		
Last report date:		
Key sub-project activities since last report:	*{Read and delete: This section should include, among others, the following:}* • Contract awarding • Progress of Work (% physical completion) • Safeguard Approvals / Permits / Consents if there is any	
Report prepared by:		

3. Safeguard Plans Implementation Arrangements

{Read and delete: Describe institutional arrangements and responsibilities for EMP implementation, internal and external monitoring, and reporting, defining roles of PMU, Engineer, Implementation Consultant, Contractors. (Table format as needed)}

7. xxx

8. xxx

9. xxx

10. xxx

Environmental Performance Monitoring

1. Status of EMP implementation (Mitigation Measures)

{Read and delete: Summarize main mitigation/protection measures implemented in the reporting period (narrative section). Structure in accordance to phases (detailed design, construction preparation, construction, and operation).}

11. xxx

12. xxx

{Read and delete: Include EMP table or updated EMP table if applicable. Assess compliance of environmental management activities with the original or updated EMP. For that purpose, include additional columns entitled "Compliance Status", "Comment or Reasons for Non-Compliance", and "Issues for Further Action". Example is provided below.}

Table 2: Compliance with EMP Requirements (Environmental Performance)

EMP Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non-Compliance	Issues for Further Action
Use environmental impact as main heading and EMP as listing (see example below)	Use EMP list as basis for rating/evaluating compliance (see example below)		
Rise of employment opportunities: • Job openings of the project should give priority to local communities. • Recruitment of local laborers should be stipulated in the contract for construction	• Field inspections and interviews with communities - DONE • Note each complaint case in the field – 3 COMPLAINTS RECEIVED • Set up grievance centre and report as part of monitoring action plan – NOT DONE		

Summary

13. xxx

14. xxx

15, xxx

Table 3: Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of EMP measures or activities not completed (last column of previous table)			
New Issues from This Report			

2. Health and Safety

{Read and delete: Provide narrative of occupational and community health and safety issues that occurred during the reporting period. Any accident involving injury or death of workers or community members must be reported. Include investigation report of DOLISA as attachment to the report. Provide details in the Table below}.

13. xxx

14. xxx

Table 4: Health and Safety Issues

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

3. Environment Effect Monitoring

15. **Monitoring plan.** xxx *{Read and delete: Present the environment effect monitoring plan as defined in the EMP or the updated monitoring plan. Refer to Table 4. Describe monitoring responsibilities}*

16. **Monitoring activities in the reporting period.** Xxx *{Read and delete: Describe the environment effect monitoring activities in the reporting period, including number of monitoring campaigns, number of samples, etc. Confirm compliance with the monitoring plan, or justify any deviation from the plan}*

Table 4: Environment Effect Monitoring Results in the Reporting Period

{Read and delete: Present monitoring result in a Table (see example below, adjust as needed). Any non-compliance should be highlighted for attention and follow-up.}

Location	Parameter	Date	Monitoring value	Relevant government standard, standard value

17. **Assessment.** *Xxx {Read and delete: Compare monitoring results with baseline conditions (if baseline data is available) and relevant government standards in qualitative terms. Additional explanatory comments should be provided as necessary. Possible reasons for non-compliance should be identified.}*

Public consultation, Information Disclosure, Capability Building

{Read and delete: Describe public consultation activities during the reporting period. Confirm compliance with consultation plan defined in the IEE/EMP, or justify deviation from these plans. Present planned consultation activities in next reporting period. Use Tables as appropriate.}

- Field Visits (sites visited, dates, persons met)
- Public Consultations and meetings (Date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)
- Training (Nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)
- Press/Media Releases
- Material development/production (e.g., brochure, leaflet, posters)
- Information disclosure

Grievance Redress Mechanism

{Read and delete: Describe mechanisms established to address and redress public complaints and grievances related to social and environment safeguards. Summarize grievances received, if any, and measures implemented to redress them.}

- Number of new grievances, if any, since last monitoring period: ____
- Number of grievances resolved: _____
- Number of outstanding grievances: _____

Type of Grievance	Details (Date, person, address, contact details, etc.)	Required Action, Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

Conclusion AND RECOMMENDATIONS

{Read and delete: Highlight important results from the implementation of EMP and RP monitoring; recommendations to improve EMP management, implementation, and monitoring; key activities planned in next reporting period}.

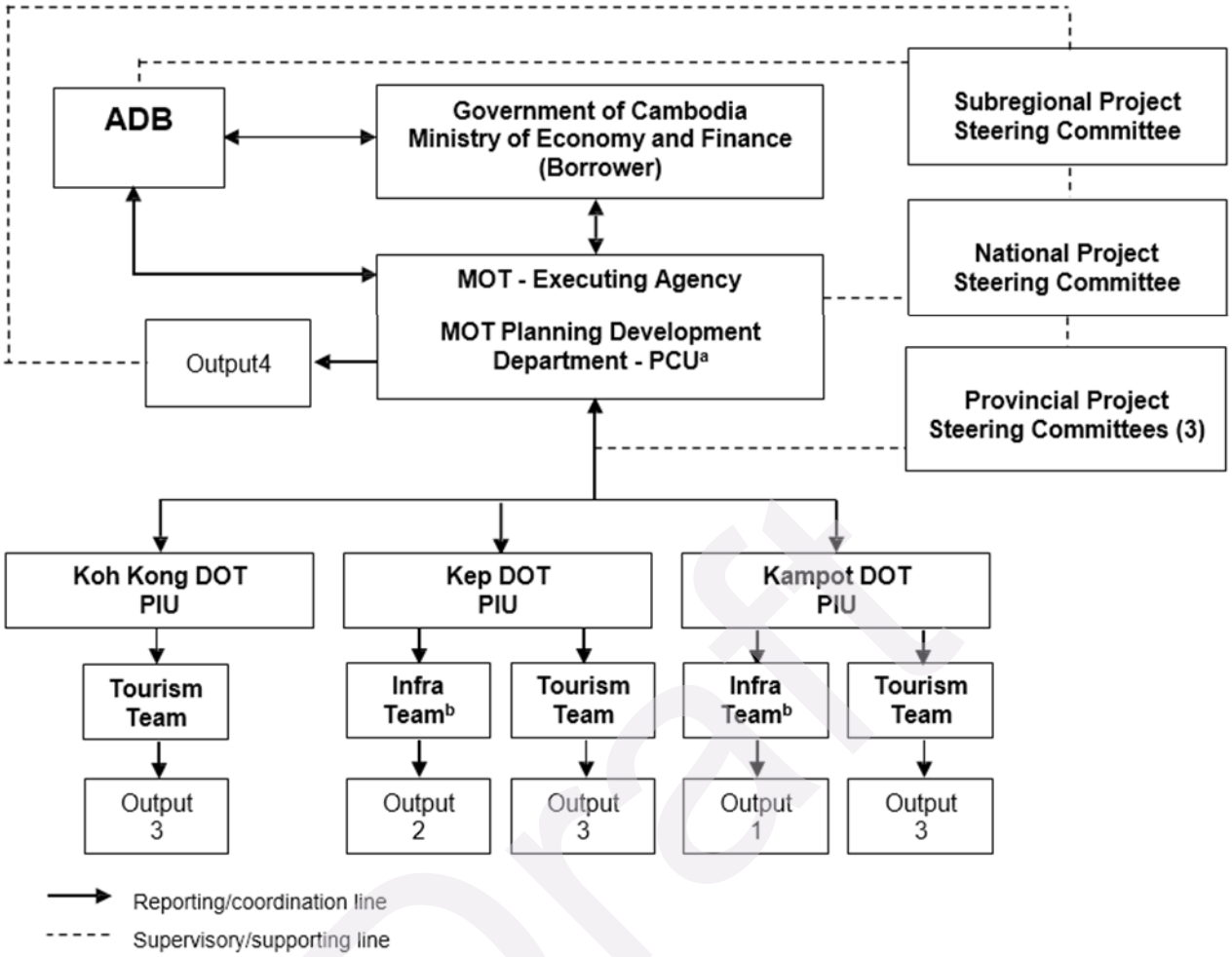
18. xxx

19. xxx

Attachments

- Consents / permits if there is any
- Monitoring data (water quality, air quality, etc.)
- Inspection checklists
- Photographs
- Others

ANNEX 1: MANAGEMENT ORGANIZATION OF THE PROJECT IN CAMBODIA



(a) The Ministry of Economy and Finance and Ministry of Public Works and Transport will each appoint a coordinator to the PCU.
(b) Infrastructure team members are seconded from the DPWT.
ADB = Asian Development Bank; DOT= Department of Tourism; Infra = infrastructure; MOT = Ministry of Tourism; PCU = project coordination unit; PIU = project implementation unit.

ANNEX 2: INDICATIVE RESPONSIBILITIES OF KEY MANAGEMENT UNITS OF EMP

EMP Implementation Organizations	Roles and Responsibilities
Executing agency (EA) (MOT)	Overall responsibility for the execution of the project Reviews the project implementation progress Reviews and endorses any proposed change in the project scope or implementation arrangements Supervises compliance with loan covenants
Project Coordination Unit (PCU), inside MOT	Project preparation, including the setting up of financial and management systems and procedures, and the procuring of PCU office equipment Consultant recruitment and supervision Review and approval of goods and civil works contracts, including bid documents Coordination between the concerned agencies at the national and provincial levels Coordination of activities of the PIUs and the inputs of concerned stakeholders Coordination of all reporting aspects of the project Coordination of institutional strengthening measures Ensuring compliance with ADB Loan covenants, assurances and safeguard requirements, as well as with national and provincial policies and regulations Provision of administrative and technical support to the PIUs Preparation of consolidated project accounts to be forwarded to ADB Advice to PIUs on revenue-enhancing activities related to the recovery of costs of constructing, operating, and maintaining project facilities and equipment; Coordination of project audits All specified monitoring, evaluation and reporting activities Communication of Project's outcomes, outputs, and activities to all stakeholders Provide coordination for safeguards and monitoring for PIU
Provincial Project Steering Committee (PPSC)	Ensuring that concerns of all stakeholders are adequately reflected in the project Coordination of project implementation between the concerned agencies Confirming compliance with local regulations and provincial policies Overseeing budgeting and disbursement of counterpart funds Overseeing implementation of resettlement plans, compensation schemes and all other project safeguard procedures
Project Implementation Units (PIUs) inside DoT	Coordination and supervision of consultants' inputs on the appraisal of feasibility studies, and conceptual and detailed designs construction Procurement of goods and civil works contracts, including the preparation of bid documents and bid evaluations Approving payments to contractors and maintaining disbursement records Ensuring that institutional-strengthening and capacity-building initiatives involving DMOs, private partners, SMEs and CBTOs are implemented in line with agreed project designs, schedules and budgets

EMP Implementation Organizations	Roles and Responsibilities
	Ensuring compliance with loan covenants and assurances in respect of all sub projects, including updating of IEIAs, EMPs, GAPs, resettlement plans Oversee implementation of EMP by contractor EO, and EMC Prepare quarterly reports on EMP implementation for PCU Coordinate with DDSC to design and deliver capacity development & training. Coordinating the process of establishing appropriate cost-recovery mechanisms Coordinating the implementation of identified Public-Private Partnership (PPP) initiatives; Meetings with all concerned stakeholders Quarterly progress and monitoring-and-evaluation reporting to the PCU
Detailed Design & Supervision Consultant (DDSC)	Completes detailed designs of subprojects with PIU Update EMP to meet final detailed designs of subprojects Supervises and assists PIU with contractor management Provides technical advice and support when needed to PIU and EMC Designs and oversees delivery of all training and capacity development of PIU for construction and operation of completed subprojects including EMP. Provides advisory role for implementation of EMP by PIU and EMC
Environmental Monitoring Consultant (EMC)	Implements environmental sampling for EMP Conducts laboratory analyses of environmental quality samples from field sampling Prepares periodic monitoring reports for PIU
Environmental Officer (EO) of Contractor	Implements the CEMP for the construction phase Maintains a daily log of environmental issues at the construction sites Prepares brief monthly summaries of mitigation activities and environmental issues at constructions site to PIU.
ADB	Assists PCU through timely guidance at each stage of project implementation following agreed implementation arrangements Review all documents that require ADB approval Review of monitoring reports on EMP implementation to ensure EMP meets SPS (2009) Approval of procurement activities Periodic project review missions, a mid-term review and a completion mission for the project Ensuring compliance of all loan covenants Timely processing of withdrawal applications and release of eligible funds Ensuring compliance of financial audit recommendations Regularly updates project information disclosure on the ADB website

ANNEX3: INDICATIVE TORS FOR ENVIRONMENTAL SPECIALISTS OF DDSC

International Environmental Specialist. With assistance from the national environmental specialist the international consultant will be responsible for updating the provincial EMPs at detailed design, and assisting the PIU with overall environmental management of the implementation of the subprojects in Cambodia. The consultant will: (i) update environmental management plans (EMP) for subprojects in Kampot and Kep to ensure that EMPs address the detailed designs and engineering of subprojects. Updates to EMPs include mitigation and monitoring plans, budget, and capacity development needs of executing agency (EA/PCU) and PIUs (DOT / DPWT); (ii) with national consultant design comprehensive training plan for safeguards specialist/PIU and on principles of EIA, and the purpose, content, and roles and responsibilities for implementation of updated EMPs highlighting environmental issues of subprojects; (iii) ensure that all relevant safeguards of the EMPs are adequately addressed in the bidding documents (instruction to bidders), and in the evaluation criteria for awarding contracts; (iv) Coordinate and work with the PIUs to ensure that contractors finalize their respective site-specific CEMPs based on the updated EMPs and the actual site conditions; (v) oversee the implementation of all safeguards of the three EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) Coordinate with the MOT/PCU to develop expert committee of marine resources agencies to design Navigation System and Plan for Teuk Chuu river and nearshore Kampot bay; (vii) coordinate with the two provincial Departments of Environment (DOT)on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (viii) prepare ToR(s) for survey, detection, and removal of unexploded ordnance (UXO) at all civil works sites. Ensure that EA and/or PIUs consult Government authorities to assist with TOR development and implementation; (ix) with PIU/DPWTs, prepare TORs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction. Of particular concern is upgrades to access roads; (x) prepare TOR(s) for external national environment monitoring consultant (EMC) for conducting water and air quality sampling, and laboratory analyses for the monitoring plans for the provincial EMPs; (xi) coordinate with PWDTs to address vehicle traffic issues, respectively during road upgrades; (xii) advise PIU/DPWTs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (xiii) with PIU/DPWTs, ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xiv) assist EA and PIU/DPWTs prepare a table of contents for regular reports PIU must submit to the EA on implementation of EMPs, environmental, issues, and corrective actions; (xv) assist PIU/DPWTs prepare simple report template for construction contractors to report monthly on mitigation activities, and environmental issues that occur during construction phase; and (xvi) prepare a quarterly status report on implementation of EMPs, environmental issues, and public safety protection to be submitted through the PIU and EA to the provincial DOTs and ADB. The consultant should have an advanced university degree the environmental sciences and at least 7 years experience implementing and managing environmental assessment of infrastructure projects in southeast Asia countries (preferably Cambodia) including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with and supervising the activities of provincial and national environmental management agencies with environmental safeguards; and c) designing and delivering training and capacity development programs to provincial environment, project implementing units.

National Environmental Specialist. Provide assistance to the international environmental specialist including acquisition of information new information to update the provincial EMPs at detailed design, and work with the PIU with overall environmental management of the implementation of the subprojects in Cambodia. The national consultant will assist with: (i) updating environmental management plans (EMP) for subprojects in Kampot and Kep provinces to ensure that EMPs address the detailed designs and engineering of subprojects.; (ii) deliver initial training to M/DOT and DPWT on the purpose, content, and roles and responsibilities for implementation of updated EMPs; (iii) ensure relevant safeguards of the EMPs are addressed in the bidding documents in local language and in evaluation criteria for awarding contracts; (iv) help PIUs to ensure that contractors prepare their respective site-specific plans based on the updated EMPs and the actual site conditions; (v) help the international consultant oversee the implementation of all safeguards of the three EMPs relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) assist coordination with the three provincial DOTs on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (vii) with PIU/DPWTs, prepare TORs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction. Of particular concern is upgrades to access roads; (viii) assist PWDTs to address vehicle traffic issues, respectively during road upgrades; (ix) with the international consultant advise the PIU/DPWTs on environment-related concerns arising during sub-projects construction, and recommend corrective measures; (x) with PIU/DPWTs, ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xi) assist with all reporting for the EMP. The consultant should have a university degree in the environmental sciences and at least 5 years with environmental assessment of infrastructure projects in Cambodia including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with international consultants; and c) delivering training and capacity development programs to provincial project implementing units.

ANNEX 4: ENVIRONMENTAL STANDARDS FOR CAMBODIA

From Government Sub-decree on Water Pollution Control (1999)
http://www.wepa-db.net/policies/law/cambodia/02.htm

Table 1. Effluent standard for pollution sources discharging wastewater to public water areas or sewer access

No	Parameters	Unit	Allowable limits for pollutant substance discharging to	
			Protected public water area	Public water area and sewer
1	Temperature	^{0}C	< 45	< 45
2	pH		6 – 9	5 - 9
3	BOD5 (5 days at 200 C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 50	< 80
6	Total Dissolved Solids	mg/l	< 1000	< 2000
7	Grease and Oil	mg/l	< 5.0	< 15
8	Detergents	mg/l	< 5.0	< 15
9	Phenols	mg/l	< 0.1	< 1.2
10	Nitrate (NO3)	mg/l	< 10	< 20
11	Chlorine (free)	mg/l	< 1.0	< 2.0
12	Chloride (ion)	mg/l	< 500	< 700
13	Sulphate (as SO4)	mg/l	< 300	< 500
14	Sulphide (as Sulphur)	mg/l	< 0.2	< 1.0
15	Phosphate (PO4)	mg/l	< 3.0	< 6.0
16	Cyanide (CN)	mg/l	< 0.2	< 1.5
17	Barium (Ba)	mg/l	< 4.0	< 7.0
18	Arsenic (As)	mg/l	< 0.10	< 1.0
19	Tin (Sn)	mg/l	< 2.0	< 8.0
20	Iron (Fe)	mg/l	< 1.0	< 20
21	Boron (B)	mg/l	< 1.0	< 5.0
22	Manganese (Mn)	mg/l	< 1.0	< 5.0
23	Cadmium (Cd)	mg/l	< 0.1	< 0.5
24	Chromium (Cr)+3	mg/l	< 0.2	< 1.0
25	Chromium (Cr)+6	mg/l	< 0.05	< 0.5
26	Copper (Cu)	mg/l	< 0.2	< 1.0
27	Lead (Pb)	mg/l	< 0.1	< 1.0
28	Mercury (Hg)	mg/l	< 0.002	< 0.05
29	Nickel (Ni)	mg/l	< 0.2	< 1.0
30	Selenium (Se)	mg/l	< 0.05	< 0.5
31	Silver (Ag)	mg/l	< 0.1	< 0.5
32	Zinc (Zn)	mg/l	< 1.0	< 3.0
33	Molybdenum (Mo)	mg/l	< 0.1	< 1.0
34	Ammonia (NH3)	mg/l	< 5.0	< 7.0
35	DO	mg/l	> 2.0	> 1.0

36	Polychlorinated Biphenyl	mg/l	< 0.003	< 0.003
37	Calcium	mg/l	< 150	< 200
38	Magnesium	mg/l	< 150	< 200
39	Carbon tetrachloride	mg/l	< 3	< 3
40	Hexachloro benzene	mg/l	< 2	< 2
41	DTT	mg/l	< 1.3	< 1.3
42	Endrin	mg/l	< 0.01	< 0.01
43	Dieldrin	mg/l	< 0.01	< 0.01
44	Aldrin	mg/l	< 0.01	< 0.01
45	Isodrin	mg/l	< 0.01	< 0.01
46	Perchloro ethylene	mg/l	< 2.5	< 2.5
47	Hexachloro butadiene	mg/l	< 3	< 3
48	Chloroform	mg/l	< 1	< 1
49	1,2 Dichloro ethylene	mg/l	< 2.5	< 2.5
50	Trichloro ethylene	mg/l	< 1	< 1
51	Trichloro benzene	mg/l	< 2	< 2
52	Hexaxhloro cyclohexene	mg/l	< 2	< 2

Remark: The Ministry of Environment and the Ministry of Agriculture, Forestry and Fishery shall collaborate to set up the standard of pesticides which discharged from pollution sources.

Table 2: Water Quality Standard in public water areas for bio-diversity conservation

- Kampot project site is classed between I and III from the table here below

I. For River			
No	**Parameter**	**Unit**	**Standard Value**
1	pH	mg/l	6.5 – 8.5
2	BOD5	mg/l	1 – 10
3	Suspended Solid	mg/l	25 – 100
4	Dissolved Oxygen	mg/l	2.0 - 7.5
5	Coliform	MPN/100ml	< 5000

II. Lakes and Reservoirs

No	**Parameter**	**Unit**	**Standard Value**
1	pH	mg/l	6.5 – 8.5
2	COD	mg/l	1 – 8
3	Suspended Solid	mg/l	1 – 15
4	Dissolved Oxygen	mg/l	2.0 - 7.5
5	Coliform	MPN/100ml	< 1000
6	Total Nitrogen	mg/l	– 0.6
7	Total Phosphorus	mg/l	0.005 – 0.05

III. Coastal Water

No	Parameter	Unit	Standard Value
1	pH	mg/l	7.0 – 8.3
2	COD	mg/l	2 – 8
3	Dissolved Oxygen	mg/l	2 - 7.5
4	Coliform	MPN/100ml	< 1000
5	Oil content	mg/l	0
6	Total Nitrogen	mg/l	– 1.0
7	Total Phosphorus	mg/l	0.02 – 0.09

Table 3. Water Quality Standard in public water areas for public health protection

No	Parameter	Unit	Standard Value
1	Carbon tetrachloride	µg/l	< 12
2	Hexachloro-benzene	µg/l	< 0.03
3	DDT	µg/l	< 10
4	Endrin	µg/l	< 0.01
5	Diedrin	µg/l	< 0.01
6	Aldrin	µg/l	< 0.005
7	Isodrin	µg/l	< 0.005
8	Perchloroethylene	µg/l	< 10
9	Hexachlorobutadiene	µg/l	< 0.1
10	Chloroform	µg/l	< 12
11	1,2 Trichloroethylene	µg/l	< 10
12	Trichloroethylene	µg/l	< 10
13	Trichlorobenzene	µg/l	< 0.4
14	Hexachloroethylene	µg/l	< 0.05
15	Benzene	µg/l	< 10
16	Tetrachloroethylene	µg/l	< 10
17	Cadmium	µg/l	< 1
18	Total mercury	µg/l	< 0.5
19	Organic mercury	µg/l	0
20	Lead	µg/l	< 10
21	Chromium, valent 6	µg/l	< 50
22	Arsenic	µg/l	< 10
23	Selenium	µg/l	< 10
24	Polychlorobiohenyl	µg/l	0
25	Cyanide	µg/l	< 0.005

ANNEX 5: GOVERNMENT COST NORMS FOR LABORATORY ANALYSES

ល.រ	បរិយាយ	តម្លៃសេវា (រៀល)	រយៈពេលផ្តល់សេវា (ថ្ងៃធ្វើការ)	សុពលភាព
24	Chloride(Cl-)	28,000	3ថ្ងៃ	
25	Manganese(Mn)	60,000	5ថ្ងៃ	
26	Magnesium(Mg)	60,000	5ថ្ងៃ	
27	Alumium	70,000	5ថ្ងៃ	
28	Iron(Fe)	70,000	5ថ្ងៃ	
29	Copper (Cu)	70,000	5ថ្ងៃ	
30	Zinc(Zn)	70,000	5ថ្ងៃ	
31	Cadmium(Cd)	90,000	5ថ្ងៃ	
32	Selenium(Se)	80,000	5ថ្ងៃ	
33	Mercury(Hg)	90,000	5ថ្ងៃ	
34	Nickel(ni)	80,000	5ថ្ងៃ	
35	Chromium(C)	80,000	5ថ្ងៃ	
36	Lead(Pb)	80,000	5ថ្ងៃ	
37	A senic(As)	80,000	5ថ្ងៃ	
38	Total Coli form	36,000	7ថ្ងៃ	
39	Feacal Coliform	36,000	7ថ្ងៃ	
40	Total Bacteria	36,000	5ថ្ងៃ	
41	Pathogen Staphylococcus	40,000	7ថ្ងៃ	
42	E-Coli	40,000	7ថ្ងៃ	

ល.រ	បរិយាយ	តម្លៃសេវា (រៀល)	រយៈពេលផ្តល់សេវា (ថ្ងៃធ្វើការ)	សុពលភាព
43	Feacal Streptococcus	40,000	7ថ្ងៃ	
44	Total Nitrogen(TN)	36,000	4ថ្ងៃ	
45	Thermo tolerant Coli form	28,000	7ថ្ងៃ	
46	Barium(Ba)	60,000	5ថ្ងៃ	
47	Beryllium(Be)	60,000	5ថ្ងៃ	
48	Bismuth(Bi)	60,000	5ថ្ងៃ	
49	Boron(B)	60,000	5ថ្ងៃ	
50	Calcium(Ca)	52,000	5ថ្ងៃ	
51	Cobalt(Co)	60,000	5ថ្ងៃ	
52	Cesium(Cs)	72,000	5ថ្ងៃ	
53	Gallium(Ga)	60,000	5ថ្ងៃ	
54	Indium(In)	60,000	5ថ្ងៃ	
55	Potassium(k)	52,000	5ថ្ងៃ	
56	Lithium(Li)	52,000	5ថ្ងៃ	
57	Molybdenum(Mo)	60,000	5ថ្ងៃ	
58	Rubidium(b)	80,000	5ថ្ងៃ	
59	Sodium(Na)	52,000	5ថ្ងៃ	
60	Silver(Ag)	80,000	5ថ្ងៃ	
61	Strontium(S)	80,000	5ថ្ងៃ	

ល.រ	បរិយាយ	តម្លៃសេវា (រៀល)	រយៈពេលផ្តល់សេវា (ថ្ងៃធ្វើការ)	សុពលភាព
62	Titanium(Ti)	80,000	5ថ្ងៃ	
63	Vanadium(V)	80,000	5ថ្ងៃ	
64	Uranium(U)	80,000	5ថ្ងៃ	
65	Ortophosphate(PO4)	24,000	3ថ្ងៃ	
66	Poliphosphate(PO4--)	24,000	4ថ្ងៃ	
67	Carbondioxide(CO2)	24,000	3ថ្ងៃ	
68	Salinity(NaCl)%	24,000	2ថ្ងៃ	
69	Chromium(C 3)	24,000	3ថ្ងៃ	
70	Chromium Exavalend(C 6)	24,000	4ថ្ងៃ	
71	Sulphite(SO2)	28,000	5ថ្ងៃ	
72	Sulfide(S)	28,000	4ថ្ងៃ	
73	Brome(B)	40,000	5ថ្ងៃ	
74	Iron(Fe+3)	40,000	5ថ្ងៃ	
75	Iron(Fe+2)	40,000	5ថ្ងៃ	
76	Color	28,000	3ថ្ងៃ	
77	Chlorohpyll,a	28,000	3ថ្ងៃ	
78	Transparency	20,000	3ថ្ងៃ	
79	Ammonium(NH4)	28,000	3ថ្ងៃ	
80	HydrogenCarbonate(HCO3)	20,000	3ថ្ងៃ	

ល.រ	បរិយាយ	តម្លៃសេវា (រៀល)	រយៈពេលផ្តល់សេវា (ថ្ងៃធ្វើការ)	សុពលភាព
81	Silicon(SiO2)	60,000	5ថ្ងៃ	
82	Chlorine(cl-)	28,000	3ថ្ងៃ	
83	NO_2 (តិនិត្យក្នុងពេល១ម៉ោង)	280,000	7ថ្ងៃ	
84	SO_2 (តិនិត្យក្នុងពេល១ម៉ោង)	280,000	7ថ្ងៃ	
85	TSP			
	តិនិត្យក្នុងពេល1ម៉ោង	100,000	5ថ្ងៃ	
	តិនិត្យក្នុងពេល8ម៉ោង	200,000	5ថ្ងៃ	
	តិនិត្យក្នុងពេល២៤ម៉ោង	480,000	5ថ្ងៃ	
86	PM10			
	តិនិត្យក្នុងពេល1ម៉ោង	100,000	5ថ្ងៃ	
	តិនិត្យក្នុងពេល8ម៉ោង	200,000	5ថ្ងៃ	
	តិនិត្យក្នុងពេល24ម៉ោង	480,000	5ថ្ងៃ	
87	PM2.5			
	តិនិត្យក្នុងពេល1ម៉ោង	100,000	5ថ្ងៃ	
	តិនិត្យក្នុងពេល8ម៉ោង	200,000	5ថ្ងៃ	
	តិនិត្យក្នុងពេល24ម៉ោង	480,000	5ថ្ងៃ	
88	Noise	200,000	5ថ្ងៃ	
	តិនិត្យក្នុងពេល8ម៉ោង	60,000	5ថ្ងៃ	
	តិនិត្យក្នុងពេល24ម៉ោង	120,000	5ថ្ងៃ	