

# Environmental Monitoring Report

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Project Number: 43309-013  
August 2019  
(Loan 2839/8254/3442 Grant 0278)

## CAM: Provincial Roads Improvement Project

Semi-Annual Environmental Monitoring Report  
January - June 2019

Prepared by: Detailed Design and Implementation Supervision (DDIS) Consulting Services for the Asian Development Bank.

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**KINGDOM OF CAMBODIA**



**MINISTRY OF PUBLIC WORKS AND TRANSPORT**

**PROVINCIAL ROADS IMPROVEMENT PROJECT  
ADB LOAN 2839-CAM (SF)/8254-CAM (SCF)**

**Consulting Services for  
Detailed Design and Implementation Supervision (DDIS)**

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**SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT**

**Covering Period from January to June 2019**

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**August 2019**

**KCI** **Korea Consultants International**

In association with

**Dainichi Consultant Inc., Sambo Engineering Co., Ltd. and Hankuk  
Engineering Consultants**

In Sub-consultancy with

**Moha Engineering & Consulting Co., Ltd., SBK, KACE and SAWAC**



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## ABBREVIATIONS

ADB	Asian Development Bank
AP	(Project) Affected Persons
BOD	biological oxygen demand
CBF	Cross Border Facility
CEMP	Contractor Environmental Management Plan
COI	Corridor of Impact
CW	Civil Work
DBST	Double Bituminous Surface Treatment
DDIS	Detailed Design and Implementation Supervision
EA	Executive Agency
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
ESO	Environment and Social Office
GoC	Government of Cambodia
GGF	Good Governance Framework
GRM	Grievance Redress Mechanism
IEE	Initial Environmental Examination
KCI	Korea Consultants International
KEXIM	Korea Export and Import Bank
MCFA	Ministry of Culture and Fine Arts
MEF	Ministry of Economy and Finance
MOU	Memorandum of Understanding
MOE	Ministry of Environment
MRD	Ministry of Rural Development
MPWT	Ministry of Public Works and Transport
MT	motorized transport
NDF	Nordic Development Fund
NGO	Non-Government Organization
NR	National Road
NTFP	non-timber forest products
PDOE	Provincial Department of Environment
PDRD	Provincial Department of Rural Development
PMU	Project Management Unit
PR	Provincial Road
PRIP	Provincial Road Improvement Project
PPE	Personal Protective Equipment
PPTA	Project Preparation Technical Assistance
RGC	Royal Government of Cambodia
ROW	Right of Way
RP	Resettlement Plan
SBST	Single Bituminous Surface Treatment
SDR	Special Drawing Right
SPS	ADB's Safeguard Policy Statement
STD	Sexually Transmitted Disease
TOR	Terms of Reference
UNESCO	United Nations Educational Scientific and Cultural Organization
WB	World Bank
UXO	Unexploded Ordnance

## EXECUTIVE SUMMARY

1. Asian Development Bank (ADB) approved Loan (ADB loan No. 2839-CAM (SF)/8254-CAM (SCF), approved on 16 December 2011) and Grant 0278-CAM for Improvement of Provincial Roads (PRIP) in southeastern and mid-west province in Cambodia as requested by the Government of Cambodia. This Project is a priority project in the Government's key infrastructure development agenda as it provides all-year access to provincial and rural agricultural communities of Prey Veng and Svay Rieng provinces of southeastern Cambodia, and Kampong Chhnang and Kampong Speu province in the Midwest of Cambodia.

2. The Project aims to rehabilitate of national/provincial roads in Kampong Chhnang, Kampong Speu, Prey Veng, and Svay Rieng provinces to climate resilient paved condition of provincial roads in the southeast and rural roads in the mid-west. The rehabilitation program will provide a safer, cost-effective provincial road network with all-year access from national road network to markets and other social services for provincial centers of southeastern and mid-western Cambodia. A new Cross Border Facility (CBF) will be constructed at Prey Var, Svay Rieng to facilitate efficient cross border transport and trade between Cambodia and Vietnam. The Project will support a sustainable road maintenance regime in the Ministry of Public Works and Transport (MPWT), community-based road safety measures, HIV/AIDS and human trafficking prevention program (HHTPP), and climate resilient measures.

3. The Provincial Roads Improvement Project (PRIP) will be implemented for a Contract period of 36 months, from September 1st, 2014 and will be completed at the ends of August in 2017. These are: **CW-A:** Improvement of NR13 (62.4km) located in Prey Veng and Svay Rieng province; **CW-B1:** Improvement of PR314D (25.5km) located in Svay Rieng province; **CW-B2:** Prey Var CBF; **CW-C:** Improvement of NR53, PR150B and PR151B (70.63km) located in Kampong Chhnang and Kampong Speu province which are under Civil Works Output; and CW-D1 and D4 located in Kampong Leaeng district Kampong Chhnang province which are under Climate Resilience Output.

4. The Subprojects (**CW-A; CW-B1**) at the southeast of Cambodia, in which located at Prey Veng and Svay Rieng provinces, the roads will be upgraded to DBST<sub>1</sub> road, 11m width with 7m carriage way & 2m shoulder in both sides. The Subprojects (**CW-C**), on the other hand, at the mid-west is location at Kampong Chhnang and Kampong Speu provinces, the roads will be upgraded to SBST<sub>2</sub> road, 8m width with 6m carriage way & 1m shoulder in both sides (Cross Section of NR-53, PR-150B & PR-151B). The project is also included reconstruction of bridges and installation of drainage structures such as box culverts and pipe culverts. Based on the results of IEE report which had been conducted as part of project preparation in accordance with ADB's Safeguard Policy Statement of 2009 (ADB SPS), the project is classified environmental Category B.

5. To monitor accurately documents in the semi-annual environmental monitoring report (SEMR), field monitoring and interviews were conducted by DDIS consultant team: National Environmental Specialist and National Social and Gender Specialist from 22 to 24 July 2019 to monitor ongoing construction works which being carried out by the Contractors for CW-A, CW-B1, CW-B2, CW-C, CW-D1 and CW-D4. During the sites monitoring, the consultant team has arranged meeting with RE, ARE, site engineers in each subproject and also discussion meetings with the contractor's representatives. Furthermore, Local Authorities and Affected People were also interviewed. This Semi-annual report covers the period from January to June 2019, for review and monitoring of all activities during construction stage of the subprojects of PRIP.

6. As a result of physical progress of the contracts by June 2019, progress indicated: (i) CW-A: Improvement of NR13, the works have been fully completed and the contract is progressing as a progress rate of 100.0%; (ii) CW-B1: (PR314D), the works have been fully completed, the contract is progressing as a progress rate of 100.0%; (iii) CW-B2 (CBF) the progressing work is delayed due the lack of contractor's labor/equipment and continuous raining. The total progress rate of 58.6%; (iv) CW-C: (PR150B, NR53, and PR151B) the works have been fully completed, the contract is progressing as a progress rate of 100.0%; (v) CW-D1 (climate resilience, 3 dikes), the contract is progressing rate is 100%, vi) CW-D2 (climate resilience, Khsaet Lake) total progress is 100%, and vii) CW-D4 (climate resilience, EMC) the total progressing rate is progress 100%. (progress report PRIP-KCI, June, 2019).

7. ADB has no-objection to the extension of L3442-CAM closing date by 18 months from 31 December 2018 to 30 June 2020. ADB has separately reviewed the request for i) second extension of the closing date of L2839/L8254/G0278-CAM by 18 months from 31 December 2018 to 30 June 2020; and ii) minor change in scope under G0278-CAM, particularly for additional dikes rehabilitation and dredging works. And ADB has no-objection to the extension of the closing date of L2839/L8254/G0278-CAM by 30 June 2020 and minor change in scope under G0278-CAM. (progress report PRIP-KCI, June, 2019).

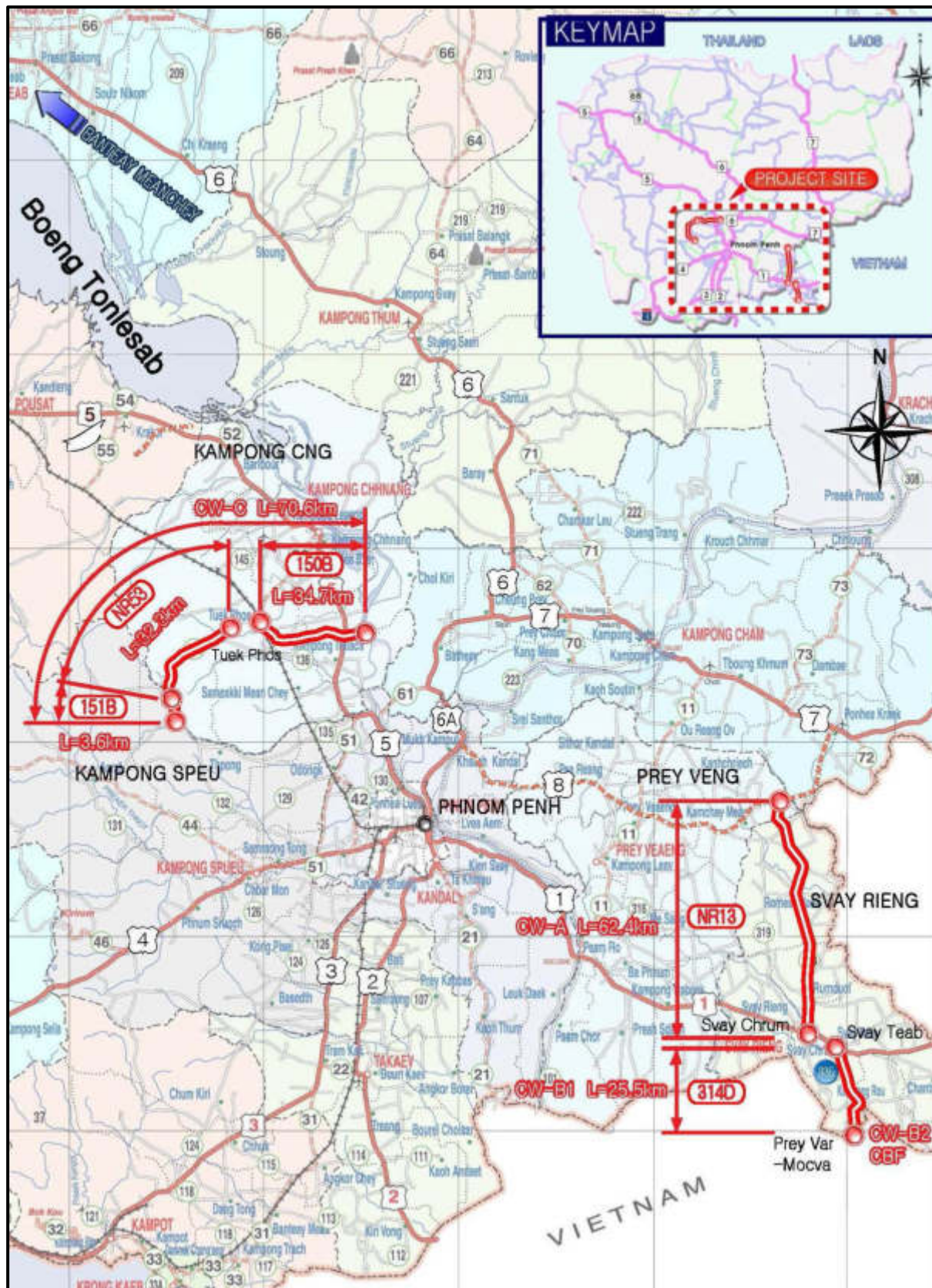
8. Environmental mitigation measures were being implemented based on the environmental checklist, and contractors are trying to minimize the impact to nearby structures as much as they could. During that time, regular sprinkling of water on the roads was rarely observed in each subproject. In addition, the regular monitoring for safeguards was carried out in actual field works i.e.: warning signs, traffic safety. Warning sign and traffic safety signs were installed at work activity area but absolutely insufficient at the dangerous areas during this period.

9. The local communities concerned to the delayed construction, muddy road in raining time and dusty road in dry season. The DDIS consultant has addressed non-compliance issues related EMP implementation to the Contractor to take immediate action for reducing of the adverse environmental impacts in compliance with IEE and EMP. Responding to the environmental issue, the Contractor has actively organized equipment and personnel to correct non-compliance issue. During the monitoring, it is observed there is no major issue.

10. Based on the observation, it was found that no any complains exists regarding project impacts and donation to the project. The interview, however, shows that they are happy with the project that they prefer the new DBST road with access road to facilitate in travelling and expressed their gratitude to all of the donors as well as Cambodia Government for improvement of their quality of life and reducing poverty.

## PROJECT LOCATION MAP







## 1. Introduction

### 1.1 Project Description

11. ABD has approved the Loan No.2839-CAM (SF)/8254-CAM (SCF) on 16 December 2011 and Grant 0278-CAM for Improvement of Provincial Roads at the southeastern and mid-west provinces in Cambodia as requested by Royal Government of Cambodia (RGC). This project is most important project to improve quality of people's life through improvement of roads and other infrastructures as it provides all-year access to provincial and rural agricultural communities of Prey Veng and Svay Rieng provinces of Southeastern Cambodia, and Kampong Chhnang and Kampong Speu province in the Mid-West of Cambodia.

12. The Provincial Roads Improvement Project (PRIP) will be implemented for a Contract period of 46 months, which commencement works from September 1st, 2014 and will be completed at the end of June in 2018, in selected national/provincial roads in 4 provinces of Cambodia, namely: (i) Svay Rieng, (ii) Prey Veng, (iii) Kampong Chhnang, and (iv) Kampong Speu. There are eight (8) Contract packages to be implemented under the project in selected national roads and provincial roads in Cambodia in 4 provinces included climate resilience works. These are: CW-A: Improvement of NR13 (62.4km) located in Prey Veng and Svay Rieng province; CW-B1: Improvement of PR314D (25.5km) located in Svay Rieng province; CW-B2: Prey Var CBF; CW-C: Improvement of NR53, PR150B and PR151B (70.63km) located in Kampong Chhnang and Kampong Speu province which are under Civil Works Output; and CW-D1 ~ D4 located in Kampong Leang district Kampong Chhnang province which are under Climate Resilience Output.

13. The project is expected to get more around 640,900 beneficiaries (Commune Database Online, 2010) residing in the areas covered by the project with the Ministry of Public Works and Transport (MPWT) as the Executing Agency (EA). The Project Management Unit 3 (PMU3), as part of the General Department of Public Works of MPWT, is the implementing agency of the Project. MPWT will be responsible for engaging consulting services and awarding civil works contracts. The Project Director of PMU3 will have overall administrative oversight of the consulting services and civil work contracts, and the Project Manager will have responsibility for day-to-day operations.

14. The road will provide an all-year road access from national road to other national roads and provincial town areas, and will provide greater accessibility to basic facilities and services. It will also strengthen the capacity of the MPWT to plan, manage and monitor road maintenance operations and implement the loan covenants and other conditions in the loan package. Environmental and Social Office (ESO) has been established in MPWT and this will be strengthened during the project. It is also intended to further involve the Provincial Department of Public Works and Transport (PDPWT) in project implementation and monitoring.

15. The road will upgrade target existing poor conditioned unpaved and paved roads of NR/PR in four provinces to a paved road standard with double bituminous surface treatment (DBST) and single bituminous surface treatment (SBST). The project will also improve bridges and other drainage structures such as box culverts, pipe culverts, and side drainage systems. For these subprojects no new roads will be built. The Project is classified as environment category B and an initial environmental examination (IEE) was conducted as part of project preparation in accordance with ADB Safeguard Policy Statement of 2009 (ADB SPS). The list of the subproject roads and work progresses is shown in table 1 and table 2.

**Table 1: List of Construction Work**

Contract	Road No.	Construction Works (road type)	Location			Work Scale (Length and Width )
			Province	Starting Point	End Point	
CW-A	NR13	DBST road	-Prey Veng, -Svay Rieng	St.0+000 (Kamchay Mear district, Prey Veng province, Junction NR 8)	St.62+400 (Prosot district, Svay Rieng province, Junction NR 1)	Length: 62.4 km Width: 11 m
CW-B1	PR314D	DBST road	-Svay Rieng	St.0+000 (Prosot district, Junction NR.01)	St.25+500 (Prey Vor, Cambodia-Vietnam Border)	Length: 25.5 km Width: 11 m
CW-B2		CBF	-Svay Rieng	Prey Var Cambodia-Vietnam Border		Area: 5 Ha
CW-C	PR150B-E	SBST road	-Kampong Chhnang	St.0+000 (Thnal Thor Thoung, Junction NR.05)	St.5+447.33 (Taches market, Boeung Tonle Sap)	Length: 5.447 km Width: 8 m
	PR150B-W	SBST road	-Kampong Chhnang	St.0+000 (Thnal Thor Thoung, Junction NR.05)	St.25+550 (Tuek Phos)	Length: 25.55 km Width: 8 m
	NR53	SBST road	-Kampong Chhnang	St.0+000 (Chi Prang)	St.31+879.41 (Thnal Kaeng)	Length: 31.879 km Width: 8 m
	PR151B	SBST road	-Kampong Speu	St.0+000 (Thnal Kaeng, Kampong Chhnang province)	St.3+581.25 (Amleang, Kampong Speu province)	Length: 3.581 km Width: 8 m
CW-D1 CW-D4		Dikes, EMC	-Kampong Chhnang			- 3 dikes - 1 emergency center - 6 Safety areas

**Table 2: Civil Works Progress by December 2018**

Contract	Contract Amount (US\$)	Work Period	Progress (%)	Implementation of Work during monitoring	Remarks
CW-A (NR13)	22,768,558.44	from Sep 2014 to Feb 2019	100.0	The sub-base, base course, and bituminous sealing and road traffic signs works	Sinohydro
CW-B1 (PR314D)	10,728,905.58	from Sep 2014 to Feb 2019	100.0	The sub-base, base course, and bituminous sealing and road traffic signs works	Sinohydro
CW-B2 (CBF)	5,161,001.14	from Mar 2017 to Apr 2019	58.6	Fencing, Building, road and structure works	Tan Kim Eng Co., Ltd
CW-C (PR150B, NR53, PR151B)	18,513,806.09	from Sep 2014 to Mar 2019	100.0	The sub-base, base course, and bituminous sealing and road traffic signs works	Gumkang-Visvakam JV
CW-D1 (Climate resilience, 3 Dikes)	756,115.74	from May 2016 to Dec 2018	100.0	Earthworks, and structure works	Royal Mekong
CW-D4 Climate resilience, (EMC)	350,626.95	from Oct 2016 to Aug 2018	100	Building works for Emergency Management Center, backfill and toilet works for safety areas	Tan Kim Eng Co., Ltd

Source: Monthly Progress Report June, 2019.

## 1.2 Objective of Environmental Monitoring

16. The Environmental Management Plan (EMP) report for the Provincial Road Improvement Project is required to conduct or implement the Environmental Monitoring Program/Plan (EMoP), including social safeguards monitoring during and after project maintenance stage. The consultant's environmental specialist has responsibility for environmental monitoring during and after construction or operating stage.

17. For the Provincial Road Improvement Project on the NR13 (62.4km), PR314D (25.5km) and NR53, PR150B and PR151B (70.63km), the Environmental Monitoring Program (EMoP) will be carried out throughout during implementing stage. The contractor will be responsible for all environmental monitoring activities under supervision from environmental monitoring team, with the collaboration of the MPWT's Environmental and Social Office (SEO). During road improvement project, the environmental and social monitoring program will provide information on:

- Identify the potential environmental impacts along the project route and at worker camps, with respect to the environmental and social safeguard management, especially within the national and provincial road improvement section
- The results of an initial environmental examination or impact assessment
- The potential impacts from all the project's improvement or construction activities compared to the normal condition before the project implemented;
- Supervision and inspection of implementation of EMP and mitigation measures by the contractors during the construction and maintenance period in accordance with the approved EMP report.
- Assistance with the identification of alternative mitigation measures that may further reduce the negative impacts of the activities undertaken.
- Identifying issues or problems and complains from affected communities or parties,
- Providing comment and develop plans or measures for correcting operation actions for mitigating negative impacts.

## 2. Laws and Regulations

18. Overall environmental management is required to comply with the Cambodia National Environmental laws, overseen by the Ministry of Environment (MoE). Their main responsibility is for ensuring the implementation of the Law on Environmental Protection and Natural Resources Management. At provincial and city levels, corresponding provincial/city environment departments exist to oversee this role. These local departments have the responsibility for enforcing the environmental legislation, under the supervision of the MoE. However, the daily operation of these departments would normally be under the direct control of the provincial authorities. The EMoP should be conducted by the contractor, overseen by the project owner (i.e. MPWT), in collaboration with the environmental agencies.

19. In the sub-decree on EIA Process MoE 1999 of **Article 3**: The MoE has responsibilities as following: (i) Scrutinize and review the report of the Environmental Impact Assessment in collaboration with other concerned ministries; (ii) Follow up, monitor and take appropriate measures to ensure a Project Owner will follow the Environmental Management Plan (EMP) while project construction is taking place and accede to their EIA/IEE report's approval. The

Follow up, monitor and take appropriate measures to ensure a Project Owner will follow the Environmental Management Plan (EMP) in including Environmental Monitoring Plan (EMoP) while project construction is taking place and accede to their EIA report's approval. (Sub-Decree on EIA Process MoE, 1999)

20. Base on Sub-decree on EIA Process MoE, 1999. The follow up, monitor and take appropriate measures to ensure a Project Owner will follow the Environmental Management Plan (EMP) in including Environmental Monitoring Plan (EMoP) while project construction is taking place and accede to their EIA/IEE report's approval. The legislations and guidelines for managing of the environmental aspect of this project, under responsible of MoE and relevant laws and regulations are shown below:

- Law on Environmental Protection and Natural Resource Management. MoE, December, 1996.
- Sub-decree on Environmental Impact Assessment. MoE, August, 1999.
- Sub-decree on Water Pollution Control. MoE, April, 1999.
- Sub-decree on Solid Waste Management. MoE, 1999.
- Sub-decree on Air Pollution Control and Noise Disturbance. MoE, July, 2000.
- Law on Land Traffic. MPWT, December, 2006.
- Land Law. MLMUPC, August, 2001.
- General Environmental Guideline for road maintenance work. MPWT/PAMP, 2008.
- The Environmental and Social Safeguards Policy. ADB, 2009
- Environmental Assessment Guideline. ADB, 2003.

### **3. Environmental Monitoring Mechanism**

#### **3.1 Introduction**

21. The Environmental monitoring describes the processes and activities that need to take place to characterize and monitor the quality of the environment. Environmental monitoring is used in the preparation of environmental impact assessments, as well as in many circumstances in which human activities carry a risk of harmful effects on the natural environment. All monitoring strategies and programs have reasons and justifications which are often designed to establish the current status of an environment or to establish trends in environmental parameters. In all cases the results of monitoring will be reviewed, analyzed statistically and published. The design of a monitoring program must therefore have regard to the final use of the data before monitoring starts, (ADB, 2009).

22. Environment Monitoring Mechanism were established for mitigation measures and taken action on adverse environmental impacts during project's implementation, as full implementation of the IEE, and EMP of the project. Therefore, the environmental specialists (National Environmental Specialist) were mobilized for preparation of the semi-annual environment monitoring report of the civil works from July to December 2016. The report represented the activities of the contractors on the project sites in order to ensure compliance with ADB's Social Safeguard Policy Statement 2009. During site inspection, the DDIS consultants and the contractor's representatives were arranged for discussion meeting, at that time Local authorities, site managers, workers, and affected people who are living along the road project were short interviewed as well.

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### 3.2 Environmental Management Plan (EMP) and CEMP

23. An EMP (Environmental Management Plan) was included in the bidding documents of civil works during the procurement stage. The contractors were required to consider the requirements of the EMP when submitting their bids as the conditions in the EMP become contractually binding on the contractors.

24. The EMP included in the bidding documents is, of necessity, general in scope. This is because specific details such as location of contractors camps, borrow pit areas, batching plant, rock sources, crushing plants and the like are not known at the bidding stage. These details must be supplied by the contractor in his CEMP – Contractors Environmental Management Plan. All contractors had previously supplied a CEMP. This CEMP for the subprojects has been prepared to deal with mitigation and management measures to be taken during Project implementation to avoid, reduce, mitigate for adverse environmental impacts in compliance with the IEE and EMP in the Contract Documents.

### 3.3 Environmental Management Program

25. The Follow up, monitor and take appropriate measures to ensure a Project Owner will follow the Environmental Management Plan (EMP) in including Environmental Monitoring Plan (EMoP). The Project Owners or contractors will follow the Environmental Management Plan (EMP) while project construction is taking place and accede to their EIA/IEE report's approval (Sub-Decree on EIA Process, MoE, 1999). The EMP during the construction phase will form the basis of contractual obligations to be carried out by the road maintenance/construction contractors. Field engineer under supervision of the Project Supervision Consultant will supervise and monitor the contractor performance (Environmental and Social Safeguards Policies, MPWT, 2008). The Environmental Monitoring Program is included in the Environmental Management Plan and so the EMP can be considered as an Environmental Management and Monitoring Plan.

### 3.4 The Scope of Work

26. The Scope of Work or Major Tasks for the environmental monitoring program during construction stage is including:

- Reviewing the environmental report or monitoring report in previous monthly reports that prepared by contractors such as for: Sinohydro (CW-A and CW-B1); Gumkang Visvakam JV (CW-C); Royal Mekong Construction & Development (CW-D1); and Tan Kim Eng (CW-B2, and CW-D4)
- Presenting and guidance to MPWT's staff/PMU environmental engineers on environmental monitoring aspect, in the field practice;
- Field monitoring on road construction activities and contractor's environmental mitigation measure performance in all road projects;
- Consultation with local authorities and communities along the road sites and including relevant agencies.
- Identifying impacts or issues which will be happened during construction stage
- Recommend to contractors to implement all EMP as stated in IEE report and other environmental safeguards in construction contract documents; and
- Instruct to take an action to mitigate or rectify on other issues that find out in the construction stage.



27. The main purpose of environmental monitoring is to ensure that the environmental impacts of project activities are adequately addressed and mitigated. In addition, the project also needs to comply with ADB's SPS 2009 and Cambodia's environmental laws as indicated in the loan agreement. The contractors have a duty to comply with the relevant legislation. The DDIS consultant must check their activities and report to MPWT. In the event of non-compliance issues related EMP implementation, the DDIS Consultant can instruct the contractor to comply with the environmental safeguards guideline. Given the nature of the work activities most monitoring is based on visual observations.

### 3.5 Measurements

28. Measurements system is a very important component to measure the progressive works especially during the construction stage. It may be necessary to carry out measurements to establish if the regulations are being met. There will be a "hierarchy" of monitoring and measurements. This would be based on measurements being made by persons in the following order:

- Contractors
- Consultants inspectors
- ESO, environmental staff from MPWT
- Ministry of Environment (MOE would only be involved if an official complaint was made to them),
- Local authorities and Communities.

29. Initially, contractors are required to check daily that all operations are being conducted correctly. In general, "good housekeeping" must be employed. If contractor's camps are established, then overflowing of septic tanks must be checked by visual inspection. Dust must be controlled by covering of stockpiles and water sprays. Solid waste, engine oil and grease, must be taken away by waste removal contractors and records kept. For road construction operations, lack of dust suppression is usually the main sources of potential nuisance if activities take place near residential dwellings. Crusher plants and borrow areas can also be sources of noise and dust. Inspection of borrow areas should also include borrow access roads used by contractor's vehicles. After extraction from borrow areas is finished, reinstatement must be carried out. Warning signs must be erected to avoid drowning if deep ponds are left. Inspectors and ESO staff must make regular checks by visual inspection.

30. Checklists were established and controlled by Construction supervision inspectors who they are making daily spot checks and weekly formal checks on site operations. They check all of the above and view records for waste disposal. They must also investigate any pollution incidents and also taken action in all complaints from residents/Local Authorities if necessary. They are using checklists for record purposes and ensure that any complaints or incident are brought to the notice of the contractor immediately, verbally and with a follow up written notice.

31. During conducting environmental monitoring for Provincial Road Improvement Project, the monitoring team (National Environmental and Social-Gender Specialists) conducted field monitoring for: CW-A, CW-B1, CW-B2 on 29 to 30 January 2019 and CW-C, CW-D1, and CW-D4 on 22-24 June 2019 along the construction roads and construction areas. Monitoring is including consultation or discussion with contractors, assistant resident engineers, site engineers, site inspect engineers, site construction leaders and workers, local communities

located at along the project roads.

32. Initial monitoring is based on visual inspection and site assessment. Normally, implementation of “Good Housekeeping” and the contractor demonstrating a responsible attitude are sufficient to ensure an environmentally satisfactory operation.

33. The results must be submitted to ESO who will interpret them with respect to the relevant regulations. Discussions must then be held between ESO, the consultants’ inspectors and the contractor to determine how to resolve any problems and how to implement environmental management for mitigation negative impacts.

### **3.6 Time of Monitoring**

34. The timing of the monitoring is very important for taken action on time. The following list is for guidance and is indicative only.

- Liquid emissions from sites must be checked at least weekly for the Contractors and monthly for the DDIS Consultant or after heavy rain if overflowing is reported.
- Dust emissions on site must be checked weekly by visual inspection and monthly by examining records of water spraying. Ambient air quality must be checked over a 24h continuous period at sensitive receptors in the event of complaints.
- Noise levels must be checked at site perimeters in the event of a complaint, at night as well as during the daytime.
- Correct removal and disposal of food waste and waste engine oil and grease must be checked weekly by visual inspection of the camps and checking of records from the waste disposal contractors.
- Noise and vibration must be checked at sensitive receptors if blasting occurs or in the event of complaint. Before blasting commences warning notices must be posted to local residents.
- Reinstatement of borrow pits and quarries must be checked after closure of the facility.
- Implementation of EMP will be checked weekly by the Contractors and at least once a month, and preparation of semi-annual environmental report by the DDIS Consultant, and semi-annual. Contractors and the DDIS Consultant, as well as ESO have to carry out the last EMP monitoring checklist approval.

35. In addition to regular monitoring, unannounced spot checks must be made by ESO on contractor operations. All of the above procedures should be carried out by the site inspectors, in conjunction with ESO, and where appropriate MOE/DOE. The results should be formally recorded every week and compiled into a monthly report. This should be submitted to the Engineer, the Chief Resident Engineer and discussed with ESO and the contractors as necessary but at a minimum on a monthly basis. Monthly reports are being compiled into semi-annual reports for submission to ADB.

### **3.7 Monitoring of CEMP by Checklists**

36. The CEMP is monitored and enforced by the Supervision Consultants inspectors who use Checklists included in the EMP. By using the checklists consistency is maintained between the various packages. The checklists are compiled every month and the checklists for all

Contract Packages for 1) CW-A: Improvement of NR13; 2) CW-B1: Improvement of PR314D; 3) CW-C: Improvement of PR150B, NR53, and PR151B; 4) CW-B2: Improvement of Prey Var CBF, 5) Climate Resilience: Dikes. In general, the semi-annual environmental report is conducted every 6 months (two times per year) by compiling monthly reports. Site inspection in monthly, quarterly, and semi-annual of all Environment aspects were conducted, sighted, and reviewed by the National Environmental Specialist.

37. The checklists had been filled in correctly and reporting was thorough. No significant environmental issues were identified. Dust from roads was commented upon during dry patches but was not a significant issue and was remedied by increased frequency of water sprays. During the dry season it appears to be an issue. And much dust has been generated during monitoring. No noise complaints had been received. The sub-contractors rent local houses for their workers rather than establishing camps. This is easier for them and avoids issues over sanitation and water supply. This approach is actively encouraged and appears to be working well during construction stage.

### 3.8 Establishment of ESO

38. Environmental & Social Office (ESO) is a division which has been established in the Department of Planning, MPW, 2009. There is now 6 staff within Environmental and Social Office (SEO): 1 Chief, 1 Vice chief, 2 Resettlement, 2 Environment & Social Safeguards. It is considered that this now makes them effective. ESO can act together with the DDIS consultant or independently to check contractor's activities. In the event of non-compliance issues related EMP implementation, ESO as part of MPWT can instruct the contractor to comply with the environmental safeguards guideline. During site inspection on environmental monitoring, the ESO should have cooperated with the DDIS team, if time availability.

## 4. Result of Environmental Monitoring

39. The Semi-Annual Environmental Monitoring Report focuses on potential environmental and social resources, adverse environmental issues, and proposed mitigation measure were described in following paragraph, and the field record is included environmental monitoring checklist data from January to June 2019 attached in Appendices.

40. To verify the environmental assessments done by checklist, site visits were conducted to several selected roads by the National Environmental and National Social-Gender Specialists in cooperation with Resident Engineers, Assistant Resident Engineers of the subprojects and contractors, and also included discussion with site workers and local communities. The results of site observation are given in below:

### 4.1 Contract CW-A: Improvement of NR13 in Prey Veng and Svay Rieng

41. **CW-A** is the improvement of NR13 with structural works along the National Road No13, the starting point of the project is the junction of NR8 (PK 0+000) in Prey Veng province and end point is the junction of NR1 (PK62+430) in Svay Rieng province. The road will be upgraded to DBST road of 62.4 km and reconstruction of other road structures. SINOHYDRO Corporation Limited Co., Ltd is the Contractor for the project. Construction works commenced on 1st September 2014.

42. Site visit and inspection indicates that all the construction work activities were progressing slowly against planned. The road construction works have been completely finished. There are road marking works in some section, and contract is now under maintenance stage (updating of installation traffic signs, road marking, and safety signs).
43. **Air and Noise Emission:** The road construction activities have been completely finished, so there are not significant impacts or any pollutions to air and noise quality from construction activities. The some sections of the project area are located in the rural area, so the air quality looks still good and no industries are near the roadway; some road sections are located in rural areas (village and market areas), so the air and noise quality may be increased by increasing the local vehicles movement on the improvement road (DBST road) of NR13 (after construction).
44. **Soil Erosion:** In general, there was no major issue of soil erosion during the site monitoring. During site monitoring there is no major issue.
45. **Borrow pits/quarries:** Most activities of quarry and borrow pits has been completed. There are no activities to provide any materials from borrow pit and quarry sites.
46. **Leaks and Spills Hazardous material and Non-Hazardous Waste:** These wastes are more considered only in main campsite of Sinohydro, other campsites on the road site have been removed and partly clearing. The spills or generating of hazardous material waste (fuel waste from construction machine) storage in safety bins or containers at SINOHYDRO's site camp are managed well. Both fuel storage facilities had an in charged person for daily operation and maintained with security and safety. The oil waste in main campsite's garages is discharged and stored in safety tanks and sell to private collector, shall not discharge into soil or public area.
47. **Waste management:** The workshops and storage areas in Sinohydro 's Campsite of are still limited of management of garbage bins, limited sanitation (toilet and campsite condition), the waste is still on the field and burning. Generally, all solid wastes are regularly collecting, keeping in rubbish bins with separating by hazardous and non-hazardous waste, temporary stored in the campsites, and giving to local licensed waste sub-contractor to transport to public disposal site. But, the monitoring is found a few existing social wastes were burned in campsite. So the contractor should be proper manage waste management complying to approved IEE/EMP. The burning waste is prohibited.
48. **Water Quality:** During field observation, based on visual monitoring, assessment of the surface water quality (canals, streams, rice field, and other water body located along or crossing the roads) was not polluted. Results from field monitoring, there is no water quality pollution and any water quality issues or complains.
49. **Dust generation:** Now the road construction activities are completely finished, the a few works are remaining the installation of the road marking, So the dust generation or dust affected from project activities is no significant during this stage. During field visits and discussion with local people, no dust impact along this road and local peoples are very happy this improvement road DBST road.
50. **Safety:** The oil water is collected and stored in safety tanks and handed over to local sub-contractor for reusing or recycling. During the inspection along the road, there are no



construction activities and no issues of safety for workers and road construction sites. But the local people is considered to traffic safety and traffic accident from local vehicles, so the traffic signs should be checked and installed in sensitive areas and traffic law enforcement.

### Pictures of the Condition of Road NR13 (July 2019)



The condition of NR13 in rural areas, after finished construction, some road markings is not completed



The condition of NR13, after finished construction on rural area



Discussion with secondary students (affected group) on NR13



The discussion with local people along the NR13



The condition of in site the Sinohydro, main campsite



The condition of equipment parking and construction materials are in Sonohydro campsite



The oil tanks and solid waste are in Sonohydro, main campsite



The condition of sub-contractor campsite on NR13 is after construction on NR13



**- Consultation with community on NR13**

No	Name	Sex	Commune/Agency	Function	Phone
1	Sour Mom	F	Popeal Commune	Villager	
2	Chhim Saran	F	--	--	
3	Tep Sakan	F	--	--	
4	Sam Rarum	M	--	--	
5	Srey Dy	F	Krabao Commune	Fruit Seller	
6	On Neardei		--	--	

**4.2 Contract CW-B1: Improvement of PR314D in Svay Rieng**

51. CW-B1 is the improvement of PR314D with the structural works along the road, the starting point of the project is the junction of NR1 at **Svay Teap** and the ending point is at the **Kampong Ro** at which is Cambodia-Vietnam border, Prey Var CBF, and the road will be upgraded to DBST road. SINOHYDRO Corporation Limited Co., Ltd is the Contractor for the project. Construction works commenced on 1st September 2014.

52. The construction progress was delay, but now the whole works of PR314D have been substantially completed except road safety sign and lane marking in some section. The contractor informed substantial completion of works on 28 February 2019. Based on the above, taking-over inspection has been carried out on 27 March 2019 by the inspection team. Contractor carried out remedial works during this period. During field visit have been found, the road marking installation is still not finished for some road sections.

53. Related to the EMP implementation, Environmental monitoring of CW-B1 was conducted by consultant team (National Gender-Labor and Environmental Specialists). According to field investigation and the discussion with local people along the roadway, the general environmental and social safeguards in the road project, now it looks good and no any activities or sources affected to community, because the road construction has been completely finished.

54. **Water quality:** During field observation, there was no sign of water laden into the rice field or water body. No any pollution sources for project activities were affected to water quality in the project area. Disposal and discharging wastes into the water bodies is managed and prohibited.

55. **Dust management:** The dust is mostly generated in dry season during operation of the road embankment, or during road construction works. Now the road construction has been fully finished. During field visit, no dust increased has been found on the roadway.

56. **Waste Management:** All the wastes are collected, removed and clear up by contractor and sub-contractors. The solid wastes are regularly collecting, keeping in rubbish bins with separating by hazardous and non-hazardous waste, temporary stored in the campsites, and giving to local licensed waste sub-contractor to transport to disposal site. No wastes are remaining in the sub-contractors' campsites (on the road), but in the main contractor campsite of Sinohydro, the wastes are not properly clear out, some oil waste and solid wastes are still on the land of campsite. So the contractor should collect temporary stores in safety bins and dumped in local waste dumping sites. The burning waste is prohibited.

57. **Safety:** During the inspection along the road, the traffic sign boards and other safety signs on the roadway are installed, but a few section of this road the road marking is still not completed. The local communities are concerned about road traffic safety and accident, it will be caused by over driving speed of local vehicles movements, and un-comply with traffic regulations, especially in urban and sensitive locations.

#### Pictures of Activities of PR314 (July 2019)



#### 4.3 Contract CW-B2 (CBF) for Improvement of the Prey Var CBF

58. **The Cross Border Facility (CBF)** is being constructed at Prey Var, Svay Rieng to facilitate efficient cross border transport and trade between Cambodia and Vietnam, the CBF project has started at March 2017. The construction progress is delayed due to lack of contractor's labors, equipment and continuous raining. The present actual physical progress of the contract CW-B2 is 58.6%. (monthly report June 2019). The CBF construction activities are

civil works and CBF building: backfill, excavation for drainage, fencing, and access road construction. There is no major negative impact on the environmental and social quality (air, water quality, soil, and public safety). During the construction stage, there are some minor impacts related to construction workers in the CBF site. But, the contractor shall be prepared the environmental and social safeguards management, dust control, and any mitigation measures such as check regular maintenance of the equipment watering for dust, and provide PPE for construction workers.

59. **Air and Noise Quality:** Prey Var CBF site is located in rural area, and there are a few residents, and not urban area is located near the construction site. The air and noise quality has minor negative impact. All the heavy construction equipment shall be complied with national air and noise standards. The providing of watering to reduce dust generation is ongoing; however, some section is dusty.

60. **Water quality:** During field observation, there was no sign of water laden into the rice field or water body around the CBF construction site. There is no any source to be significantly affected or pollution on the water quality in the project area. Disposal and discharging into the water bodies is prohibited.

61. **Waste Management:** The waste is managed by contractor. The solid wastes generation from project is regularly collecting, keeping in rubbish bins, and dispose by local licensed sub-contractor for disposal. There are no significant negative environmental issues related to waste generation from CBF construction project.

62. **Safety:** The worker and public safety is not fair managed in and around construction of CBF. All the workshops have storage yards, staying rooms, sanitation toilets (man and woman), safety materials, and drinking water. Installation of the fence around the construction site and safety sign boards to protect any animals or human entering is necessary to increase. It was observed that some construction areas are lack of safety fence and lack of providing and using of the Personal Protected Equipment (PPE). So, the contractor should be responded and provided the proper PPEs to all workers, install safety device and safety signs in construction sites/construction zones. And labors are not allowed to stay at construction site for living.

#### Pictures of the Construction Activities of Pry Var CBF (July 2019)







The CBF site is under construction of drainage system and access road



Some women are involving for un-skill construction works. Lack of PPE for workers



The present condition of CBF buildings are under construction



The condition of road is in front of CBF site

**Consultation list on Prey Var CBF**

No	Name	Sex	Institution	Function	Phone
1	Inth Sokha	F	Prey Veng province	Construction worker	
2	Sok Souy	F	--	--	
3	Oun Than	M	--	--	
4	Ham Moa	M	--	--	
5	Hat Channy	F	Kampong Ro district	--	
6	Mom Vy	F	--	--	
7	Bun Bean	M	--	--	
8	San Sary	F	--	--	
9	Poa Chanthan	M	--	--	

**4.4 Contract CW-C: Improvement of PR150B, NR53, and PR151B in Kampong Chhnang and Kampong Speu**

63. **CW-C** is the improvement of PR150B, NR53, and PR151B with structures work along the provincial roads located in Kampong Chhnang and Kampong Speu province (70.6 km) and the road is under upgrading to DBST road. The Gumkang-Visvakam JV is the contractor for the project. Construction works commenced on 1st September 2014 and plan to complete by April 2019. Actual progress of the contract CWC is 100.0%, and disbursement progress is 79.3%. The Embankment, sub-base, aggregate base course, prime coat, Bituminous seal coat works have been completed. (monthly report June 2019)

64. **Waste management:** The waste in temporary campsites along the roadway is problem, but the main Contractor's campsite of Gumkang-Visvakam JV is moderately or still limited managed solid waste. The garbage bins/recycle bins at the campsite area and the contractor's office were equipped. So the contractor regularly collected, clean-out all the wastes and temporary store in the rubbish bins than transport and dispose to local dumping site by local licensed waste sub-contractor.

65. **Leaks and spills of hazardous and oil waste:** Based on visual monitoring, the trucks and construction are in the main campsite. The oil and hazardous waste are limited management and clean-out: the oil waste and hazardous from equipment, truck garage, unusing tires, and oil tanks are still in camp of **Gumkang-Visvakam JV**, oil leaks on the field/top of land in campsite car garage and oil store site. The constructor should be put more attention to the remaining wastes in campsites. The hazardous wastes and oil waste shall be collected and cleaned out, temporary store in safety tanks, and provided to local sub-contractor to reuse or recycle, and dump to local license dumping site. Strictly management for non-disposal in campsite or public area or water sources is required.

66. **Water quality:** The road construction of CW-C sub-project has been completely finished, during field monitoring. There was no sign of waste water and wastes laden into the rice field or water body. There is no impact on water quality or water sources during this stage, the water sources are far from project campsite.

67. **Dust and Air pollution:** The road construction activities are fully finished, so there are not air, noise, and dust are polluted from project activities. Base on the discussion with local people along the roadway, they feel very happy with new improvement of DBST road in their communes, no slipping/muddy road and no dust.

68. **Public Safety and Traffic Safety:** There are no any problem of public safety and traffic safety from activities of this road improvement project, because the constructions are fully finished except a few road marking are remaining in a few sections of the roadway (PR150B). But, for public safety, the campsites is moderate waste clean-out and providing the sanitation in campsite zone. The local communities along the roadways are happy with new DBST road, but they concern to road traffic safety or traffic accident that can be cause from over driving speed, no comply with traffic traffic laws, especially in urban areas and rod sensitive sections.

#### Pictures of Road Project (CW-C)



The condition of road PR150B in Ta Cheas Market, Ta Cheas Commune



The condition of PR150B after construction. The road marking is not completely installed



The grass planting on the road (PR5150B)





The bridge is after construction and condition of bridge campsite on road PR150B



The condition of road NR53 is after construction



The oil tank and equipment garage are in the main campsite of CW-C



The construction materials, equipment, and plastic wastes are remaining in main campsite of CW-C



The condition of main campsite of CW-C is lack of control for animal entry

#### 4.5 Contract CW-D1: Climate Resilience, Reconstruction of Portanorn, Bakdao and Srok Dikes in Kampong Leaeng

69. **CW-D1** is the subproject for Climate Resilience output located at Kampong Leaeng District Kampong Chhnang Province, and 3 dikes are under reconstruction. Royal Mekong Construction & Development Pte., Ltd is the Contractor for the project. Construction works commenced on 9 May 2016 and the completion is by December 2018. The purpose of reconstruction of 3 dikes namely Portanorn Dike, Bakdao Dike and Srok Dike is to improve water management in reservoirs, provide water for irrigating rice fields, and provide water for local community use during dry season. The dikes are to retain or manage water for most to irrigate or support dry rice fields and other for animal and households using, and for improving local recreation. The entire Dikes' construction work activities have been completed. There was no major adverse environmental issue from project activities during conducted site monitoring.

70. The damaged slope on Srok Dike has been measured and it has been agreed to deduct from completed embankment quantity because remedial work for damaged slope is not possible to carry out currently. Contractor carried out remedial works during this period. Actual physical progress of the contract CW-D1 is 100.0%, and disbursement progress is 89.9%. Certificate of completion of works has been issued on 12 June 2019. (Monthly report June 2019)

#### 4.6 Contract CW-D4: Climate Resilience, Construction of Emergency Management Center and Safety Areas in Kampong Leaeng

71. **CW-D4** is the subproject for Climate Resilience output located at Kampong Leaeng District Kampong Chhnang Province. There are 1 Emergency Center and 6 Safety Areas. The Emergency Center (EMC) was built in Kampong Hau Commune, Kampong Leaeng District Town, Kampong Chhnang Province.

72. The contract has been signed on 13 October 2016, and work start date was on 25 October 2016. Mine/UXO clearance work has been completed. Main works for Emergency Management Center has been completed. The construction of Emergency Management Center (EMC) has been fully completed with safety areas. No major adverse environmental issue was observed during the site monitoring and there are no any negative impacts and complains from local communities.

## 5. Review of Environmental Parameters

73. Environment parameters were checked and reviewed for three contract packages. All civil works have been evaluated satisfactory and no major environmental issues were found. The reviewing of results on environmental parameters of each contract package is shown in **Table 3**.

**Table 3: Environmental Parameters Contract Packages CW-A, CW-B1, CW- B2, CW-C, and CW-D**

Regulation	Environmental Issue	Parameter	Standard	Contract Packages CW-A	Contract Packages CW-B1	Contract Packages CW-B2	Contract Packages CW-C	Contract Packages CW-D
ADB requirement	Notification of EMP to contractors	General requirements	ADB Social Safeguards Policy Statement 2009	Completed. EMP included in Tender Documents issued to contractors.	Completed. EMP included in Tender Documents issued to contractors.	Completed. EMP included in Tender Documents issued to contractors.	Completed. EMP included in Tender Documents issued to contractors.	Completed. EMP included in Tender Documents issued to contractors.
ADB requirement	Submission of CEMP from contractor to MPWT	Specific details must be supplied by contractor on construction camps, borrow areas and roads, quarries, crushing and screening plants.	ADB Social Safeguards Policy Statement 2009	Submitted by contractor.  NR13 completed.	Submitted by contractor.  PR314D completed.	Submitted by contractor.	Submitted by contractor.  PR150B, NR53, PR151B Completed	Submitted by contractor.  CW-D1 completed.
EMP requirement	Monthly Checklists	All environmental parameters	As per individual checklists given in EMP	Checklists completed by Engineer with contractor for July to December 2018. Checklists reviewed and confirmed to be in order. No environmental issues identified.	Checklists completed by Engineer with contractor for July to December 2018. Checklists reviewed and confirmed to be in order. No environmental issues identified.	Checklists completed by Engineer with contractor for July to December 2018. Checklists reviewed and confirmed to be in order. No environmental issues identified.	Checklists completed by Engineer with contractor for July to December 2018. Checklists reviewed and confirmed to be in order. No environmental issues identified.	Checklists completed by Engineer with contractor for July to December 2018. Checklists reviewed and confirmed to be in order. No environmental issues identified.
Sub-decree on Water Pollution Control	Water Quality	BOD	< 50mg/L	No visual evidence was sighted of impacts on water quality. No spills were observed. No remedial action is required. No sampling or measurements of water is required.	No visual evidence was sighted of impacts on water quality. No spills were observed. No remedial action is required. No sampling or measurements of water is required.	No visual evidence was sighted of impacts on water quality. No spills were observed. There are no major water courses near project roads. No remedial action is required. No sampling or measurements of water is required.	No visual evidence was sighted of impacts on water quality. No spills were observed. No remedial action is required. No sampling or measurements of water is required.	No visual evidence was sighted of impacts on water quality. No spills were observed.
		SS	< 50mg/L					
		Temperature	<45°C					
		pH	6-9					
		Oil & Grease	< 5mg/L					
		Dissolved Oxygen	> 4mg/L					

Regulation	Environmental Issue	Parameter	Standard	Contract Packages CW-A	Contract Packages CW-B1	Contract Packages CW-B2	Contract Packages CW-C	Contract Packages CW-D
Sub-decree on Air and Noise Pollution Control	Air Quality	TSP	< 0.33 mg/m <sup>3</sup>	No major air quality issues identified. Dust suppression on roads improved by more water spraying.	No major air quality issues identified. Dust suppression on roads improved by more water spraying.	No major air quality issues identified	No major air quality issues identified. Dust suppression on roads improved by more water spraying.	No major air quality issues identified.
	Noise Quality	Leq	75dB(A)					
		Leq	65dB(A)					
No Regulation	Vibration	PPV	< 1mm/sec	No blasting taking place. Blasting will be carried out by commercial quarry owner with permission of local commune	No blasting taking place. Blasting will be carried out by commercial quarry owner with permission of local	No blasting taking place.	No blasting taking place. Blasting will be carried out by commercial quarry owner with permission of local commune	No blasting taking place.
Sub-decree on Solid Waste Management	Solid Waste	Food Waste	Properly Removed	Site camps acceptable. Attention to be given to oil storage and handling.	Site camps acceptable. Attention to be given to oil storage and handling.	Site camps acceptable. Attention to be given to oil storage and handling.	Site camps not acceptable. Attention to be given to oil storage and handling.	Site camps acceptable. Attention to be given to oil storage and handling.
	Liquid Waste	Waste Oil, Grease	Properly Controlled After Removed by Subcontractor					
No Regulation	Septic Tank	Smell, Sewage	No Smell, No Overflowing	Workers camps acceptable. Where possible houses are being rented rather than setting up camps.	Workers camps acceptable. Where possible houses are being rented rather than setting up camps.	Workers camps acceptable.	Workers camps acceptable. Where possible installed on the residential land are being rented for setting up camps.	Workers camps acceptable. Where possible houses are being rented rather than setting up camps.
No Regulation	Borrow Pits	Condition of Borrow Pits	Filled after Project Completion, Topsoil resurfaced	No issues identified. But shall be fenced after Project Completion	No issues identified. But shall be fenced after Project Completion	No issues identified. But shall be fenced after Project Completion	No issues identified. But shall be fenced after Project Completion	No issues identified. But shall be fenced after Project Completion
No Regulation	Borrow Pits	Depth of Borrow pits	No Drowning Hazard	No issues identified	No issues identified	No issues identified.	No issues identified.	No issues identified
No Regulation	Borrow Road	Location for Borrow Road	No complaints from residents	No issues identified	No issues identified	No issues identified.	No issues identified.	No issues identified
No Regulation	Quarries	Condition of Quarries	Quarries reinstated	N/A	N/A	N/A	N/A	N/A
No Regulation	Trees if Cut	Number of Trees	Tree Replanted	N/A	N/A	N/A	N/A	N/A



## 6. Correct Action

74. Most of the Corrective Actions are complying with the CEMP, and also implemented by the Contractors or Sub-contractors, while the other minor non-compliance issues or negative impacts should have been corrected from January to June 2019 concerned about dust mitigation, safety signs and traffic signs at construction sites, and improving of the PPE for construction workers. During site monitoring and discussion with local people on July 2019, the roads improvement works are completed and only remaining some road markings and only CBF is under construction.

## 7. Outstanding Issues

75. There are outstanding issues involved in environmental management in CW-A, CW-B1, CW-B2 and CW-C contract package.

76. **CW-A:** There are no major outstanding issues. Contractor is required to clean-up site camp after completion of work. The contractor should: (i) Implement and improve the EMP, how to mitigate the environmental concerns and management measures to be taken during project closing or abandonment. (ii) Collaborate with sub-contractors to proper cleanup or restoration the project campsites before site abandonment. (iii) The oil waste should be collected and stored in safety tank and contracted with sub-contractor to transport out for reuse or recycle. (iv) Prepare the report of clear or restoration campsites, shall be approve from land owner and local authorities, this report should be submitted to DDIS and PMU for review and approve.

77. **CW-B1:** For CW-B1 the construction activities are completed is remaining of install the traffic sign poles and road markings. There are no major outstanding issues. However, before site abandonment, the Contractor is required to clean-up small worker-campsite after completion of work such as: few a solid waste and construction materials.

78. **CW-B2:** The CW-B2 is under construction, the monitoring is found of lack of Personal Protective Equipment (PPE) for construction workers and traffic safety management at CBF construction sites. The contractor shall take corrective action inside and around the CBF construction site: (i) Sufficient road safety devices are necessary to install at all site activity area immediately, (ii) Install the safety barriers, safety zone, and traffic signs, (iii) PPE shall be provided to the all workers. (iv) Labors shall not be allowed to stay at construction site building, (v) Limited the driving speed on the CBF area.

79. **CW-C:** Lack of proper management of garbage/waste (sanitation) and fuels (oil waste) at the construction campsite. The contractor shall take corrective actions: (i) Implement and improve the EMP, how to mitigate the environmental concerns and management measures to be taken during project closing or abandonment. (ii) Collaborate with sub-contractors to proper cleanup or restoration the project campsites before site abandonment. (iii) The oil waste should be collected and stored in safety tank and contracted with sub-contractor to transport out for reuse or recycle. (iv) Prepare the report of clear or restoration campsites, shall be approve from land owner and local authorities, this report should be submitted to DDIS consultant and PMU for review and approve.

80. The general Environmental Management Plan (EMP) and the Contractors EMP (CEMP) gives guidance on how to mitigate the environmental concerns identified in connection with this project The EMP deals with mitigation and management measures to be taken during all stages of Project Implementation (pre-construction, during construction, and project abandonment) to avoid, reduce, and mitigate adverse environmental impacts, so the contractor shall be regularly managed and monitored follow to approved EME and CEMP and other national environmental regulations or policies. More correcting actions are provided in conclusion below.



81. In this period the project all most completed, so the environmental issues and corrections are concerned to construction campsites as well as waste management. The Sub-Decree N. 36 on Solid Waste Management, MoE 2009,

**Article 5:** The collection, transport, storage, recycling, minimizing and dumping of waste in the provinces and cities is the responsibility of the authorities of provinces and city.

**Article 6:** The Ministry of Environment shall monitor the implementation in disposal, collection, transport, storage, recycling, minimizing and dumping of the household waste in the provinces and cities.

**Article 7:** The disposal of waste in public sites or anywhere that is not allowed by the authorities shall be strictly prohibited.

## 8. Conclusion

82. All the above results of the semi-annual environment monitoring to the ongoing and completed civil works of the Project observed no significant impact. However, outstanding issues have been found to the CW-A, CW-B1, CW-B2, and CW-C contract package of after construction stage and ongoing stage as well. The Contractor shall be properly implementing the environmental management and mitigation measures in compliance with the approved EMP/CEMP.

83. Strict implementation of dust control at CBF site of CW-B2 contract package such as: Construction equipment and vehicles shall be used new equipment/machines and regularly well maintained and control to reducing air pollution and noise emission and also regularly watering on construction sections, where are dusty.

84. Separate solid waste into hazardous, non-hazardous, and store temporary on site. Provide sufficient, safety waste tanks/bins. The CW-A, CW-B1 and CW-B2, all the waste are stored in safety tanks, clean out as same as normal existing condition. Undertake regular collection and disposal of waste to the approved site by authority. The solid wastes shall be collected and temporary stored in safety rubbish tanks in camp sites and disposal shall be delivered to local licensed waste sub-contractor to transport and dispose to local dumping sites under permitting from national / local authority. Provide education of proper waste management (collection and sanitation) in main campsites and site construction campsites. The oil waste shall be collected and stored in safety container and contracted with local subcontractor to collect outer dispose.

85. Implementing the construction safety policy (CW-B2): Construction Personnel Protective Equipment (PPE) shall be provided with safety gears such as: hard cap and other safety uses, Traffic management, to secure traffic safety (CBF site), shall be planned and implemented. The safety zone and poles shall be provided around the construction sites, and accident response plan shall be prepared in working sites such as: materials, medicines, skill staffs, and other public safety measures presented in EMP.

86. Inform and follow-up work closely with local authorities and communities of working scheduled (timing, location, and any issues can be happened) for negotiating or mitigating these issues. Provide enough traffic safety and other safeties use on the construction sites. Provide safety materials and Personal Protection Equipment (PPE) to construction staffs and workers. Prepared emergency response plan in the constructions sites such as: materials/equipment, responsible staffs, and response places, especially for CBF working site.

87. Related to the EMP implementation, air pollution mitigation has been carried out continually

to reduce dust generation and gaseous emissions from construction work activities and machineries by the Contractor at the CBF construction site. There are no any serious environmental issues or influences caused by the project during construction stage. Therefore, the construction activity has been constantly carried out following the environmental monitoring in the EMP and CEMP and other relevant environmental contracts. DDIS consultants' field monitoring to ensure compliance with the requirements in the EMP and CEMP shall be implemented frequently and closely whether the contractor's field activities are compliance with the requirements in the EMP and CEMP. Among of monitoring items, worker camp sites are the most important to determine the effects of the project activities. As the results of the monitoring on site camp of the Contractors, it is observed in fair condition. But before closing campsites or sub-contractor 's campsites, the wastes collection (especially hazardous wastes) and clear up should be properly managed before handout to owners and should be agreed from land owners.

88. The Contractor shall be implemented and improved EMP and CEMP gives more detailed mitigation and management measures to be taken during all stages of project (pre-construction, during construction, and project abandonment) to avoid, reduce, and mitigate adverse environmental impacts. Prepare the report of clear or restoration campsites, shall be approve from land owner and local authorities, this report should be submitted to DDIS and PMU for review and approve, before project abandonment.

89. Based on the site monitoring on July 2019, no significant issues have been found concerning to environmental quality and social safety because road construction for CW-A, CW-B1 and CW-C has been completed except minor works. Some local peoples are considered to traffic accident, traffic signs in sensitive road sections and over load trucks. So the road traffic safety, traffic sign boards in sensitive sections should be provided. Road safety and road traffic law awareness training to communities, implementing agencies and local resident along the road has been provided.

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**Appendix A: Checklist of EMP Implementation for Contract CW-A****ENVIRONMENTAL MONITORING CHECK LIST**

January-February 2019

Provincial Road Improvement Project  
ADB Loan No.2839-CAM (SF)/8254-CAM  
Contract Package CW-A: **Improvement of NR13**

**Table:** Checklist of EMP Implementation for Contract **CW-A**

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
<b>1. Community Facilities (power lines, irrigation canals, etc.)</b>																			
Interruption of utility services are minimized by laying out new lines prior to transfer			√			√													
Replacement structure are constructed prior to demolition of existing structure			√			√													
Temporary facilities to maintain adequate services are in place	√			√															
Coordination with local company or local offices	√			√															
Affected parties are informed in advance	√			√															
<b>2. Air Quality (Dust and Gaseous Emissions)</b>																			
Vehicles and equipment are well maintained and in good condition.	√			√															
Borrow areas, casting yard and other project facilities are duly licensed and have all the necessary environmental approvals	√			√															
All construction vehicles and equipment are tested for compliance with relevant emission standard and properly licensed	√			√															
Parked vehicles on the site works have their engines turned off. Unnecessary engine idling of vehicles and equipment is prohibited.	√			√															
Water spraying of roadways, working areas and other construction-related facilities near sensitive receptors and handling of all raw sand and aggregates, and other similar materials			√			√													
Dust barriers are installed as necessary			√			√													
Storage areas of construction materials such as sand, gravel, cement, etc. , have provisions that prevent them from being blown away towards sensitive receptors	√					√													

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Trucks transporting construction materials(i.e. sand, soil, cement, gravel, etc) are tightly covered	√			√															
Roadways are regularly cleaned of tracked in mud, cement, etc. from construction works			√			√													
Stockpiling of spoils near sensitive receptors is prohibited	√			√															
Construction vehicles have speed limits(typically 25 km/hour or less) along areas where sensitive receptors are located	√			√															
Areas where there is a regular movement of vehicles have an acceptable hard surface and are clear of loose surface material			√			√													
Cement and other fine-grained materials delivered in bulk are stored in closed containers			√			√													
Conveyor belts are fitted with wind-boards, and conveyor transfer points and hopper discharge areas are enclosed																			
Weigh hoppers are vented with a suitable filter																			
Wheel washers are used to clean delivery/ haul trucks of mud and dirt as they exit the work area			√			√													
Smoke belching vehicles and equipment are not used for the project	√			√															
Construction vehicle trips and travel distances for material deliveries are minimized (e.g., by using local materials and labor sources).	√			√															
Construction access roads are temporarily paved or sealed			√			√													
3. Noise Levels																			
Prior notification to the community on construction schedule	√			√															
Vehicle and equipment are fitted with emission control and silencers to meet national noise standard	√			√															
Vehicles and equipment are well maintained and checked by the contractor every 6 months	√				√														
Only vehicles and equipment that are registered and have necessary permits are used	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Noisy equipment are completely enclosed whenever possible	√			√															
Stationary equipment that produce high noise level are positioned as far as is practical from sensitive receptors.	√			√															
Noisy construction activities within 200m of a settlement are only daytime	√			√															
Suitable noise control barriers are used d in the vicinity of house, school, temples, medical facilities and other sensitive receptors	√			√															
Noisy construction activities are avoided near school during examination period and coordinated with school administration	√			√															
Noisy construction activities are avoided in the vicinity of sensitive receivers	√			√															
Suitable noise level reduction measures are installed by the contractor if construction activities are disruptive	√			√															
Speed limits on construction vehicles are imposed	√			√															
Construction traffic routes are defined in cooperation with local communities and traffic police			√			√													
Asphalt concrete batching plants and crushing plant are located at least 500 m away from inhabited areas and other sensitive receptors	√			√															
4. Vibration Levels																			
Fully loaded trucks are rerouted away from roadways that go through heavily built areas	√			√															
Heavy equipment are operated away from vibration-sensitive areas	√			√															
Simultaneous activities like demolition, ground impacting and earth moving are avoided	√			√															
Alternative equipment is used	√			√															
Use of vibrating rollers near vibration- sensitive structures are avoided	√			√															
5. Erosion and Sedimentation																			
Suitable soil erosion control measures are implemented prior to excavation of the bridge	√			√															



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
pier foundation and construction activities at waterways																			
Silted water carried with the spoils during excavation and construction of bridge foundation are properly treated	√			√															
Spoils (excavated soil, rocks, removed asphalt, etc.) stockpiles are located at least 50 m from watercourses	√			√															
A bund is placed around the spoils stockpile area	√			√															
Spoil disposal does not cause sedimentation and obstruction of water flow, damage to agricultural land and densely vegetated areas	√			√															
Grading is avoided or minimized during the rainy season particularly in areas of steep topography and/or adjacent to water courses			√			√													
Phased grading schedule is implemented to limit the area subject to erosion at any given time	√			√															
Appropriate erosion control and stabilizing measures (such as geotextiles, mats, fiber rolls, soil binders that are not toxic to the environment, or vegetation measures/ temporary landscaping) are used in disturbed areas and on graded slopes	√			√															
Construction works (bridges, culverts, drainage, etc.) on or near watercourses do not cause obstruction of channel flow	√			√															
Slopes along water channels are stabilized	√			√															
Dumping of soil, rocks, construction materials and debris onto watercourses is prohibited	√			√															
When construction works cause obstruction of watercourses, the obstruction is immediately cleared to restore channel flow	√			√															
6. Spoil Disposal																			
Spoils (excavated soil and rocks, cut vegetation, removed pavement such as asphalt, etc.) are immediately transported to disposal sites approved by local authorities	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Temporary spoils stockpiles near paddy fields have bund or silt fence around them			√			√													
Temporary spoils stockpile that are planned to be used longer than six months are sodded.	√		√																
Height of spoils stockpile are limited to minimize windblown dust			√			√													
7. Soil and Ground Water Contamination																			
Maintenance shops, fuel and oil depot have impermeable flooring with sump			√			√													
Refueling and servicing of equipment are carried out only in adequately equipped areas	√			√															
Only minimal chemicals, hazardous substances and fuel are stored on site works, within an enclosed and covered secure area that has an impervious floor and impervious bund around it	√			√															
Storage area for chemicals, hazardous substances and fuel are located away from watercourses, flood-prone areas, work camps, and danger areas	√			√															
Oil-stained refuse such as oily rags, spent oil filters and used oil are collected and disposed of through recyclers/authorized waste handlers and disposed in authorized waste facilities	√			√															
Availability of spill clean-up materials specifically designed for petroleum products and other hazardous substances	√			√															
Immediate cleanup of spills or leaks of petroleum products and/or hazardous substances	√			√															
Training of relevant construction personnel in handling of fuels/hazardous substances and spill control procedures			√			√													
At least weekly check for leakage in containers and immediate repair or replacement when necessary			√			√													
Equipment maintenance and fuel storage areas are provided with drainage to an oil-water separator that is regularly skimmed of oil and maintained	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Discharge of oil-contaminated water into the environment is prohibited	√			√														√	
Waste oil, used lubricant and other hazardous wastes are stored in tightly sealed containers with proper labeling	√			√															
Removal and treatment or proper disposal of oil contaminated soils is included in work sites restoration	√			√															
8. Water Availability																			
Temporary canals/irrigation channels to prevent disruption of water supply to farmlands.			√			√													
9. Water Quality																			
Suitable settling/retention ponds are constructed prior to operation of asphaltic concrete batching plants and casting yards	√			√															
Settling/retention ponds are properly operated and maintained to ensure effluent quality meets applicable effluent standards	√			√															
Bentonite slurry and sludge, mud and other materials and wastes from drilling are collected and processed to avoid pollution of surface water		√			√														No use
Bentonite slurry sludge, mud and other materials and wastes from drilling are not discharged into watercourses		√			√														No use
Drilling solutions (e.g., bentonite slurry) for bridge construction, abutment construction, piling, etc. are processed in a closed system	√			√															
Proper disposal of bentonite-containing spoils as fill material in appropriate sites	√			√															
Spilled bentonite mud in agricultural land is cleaned immediately before it cakes and hardens		√			√														
Water from bridge foundation dewatering is not discharged directly into a water body	√			√															
Total suspended solids content of discharges into water bodies comply with applicable standards	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Sanitation facilities with sufficient capacity are provided to handle and treat sewage generated by workers	√			√															
Equipment service and maintenance yards are provided with impermeable flooring and collection sump	√			√															
All equipment maintenance shops are provided with water-tight receptacles for waste oil, oily rags, spent oil filters, solvents and oily containers	√			√															
Disposal of all waste oil, oily rags, spent oil filters, solvents and oily containers are through authorized waste handlers and recyclers	√			√															
Paving operations are restricted during wet weather	√			√															
Use of sediment control devices downstream of paving activities			√			√													
Use of mobile fueling/maintenance units for construction equipment whenever feasible	√			√															
Accurate and up-to-date written inventories and labels for all stored hazardous materials	√			√															
Use of berms, ditches, and/or impervious liners, etc. Material storage vehicle/ equipment maintenance and fueling areas.	√			√															
Material storage, maintenance and fueling areas and septic systems are at least 30 m from storm drains and surface waters	√			√															
Facilities for solid and domestic liquid waste management are used and maintained	√			√															
10 Solid Waste																			
Garbage bins and temporary storage facilities for construction wastes, domestic solid wastes and segregated wastes are provided in the project site			√			√												√	
Waste segregation (hazardous, non-hazardous, reusable) is practiced	√			√															
Regular collection and disposal of wastes (by contractor or authorized third party) to sites approved by local authorities	√			√															



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Wastes are not dumped into watercourses, agricultural land and surrounding areas	√			√															
11. Borrow Pits																			
Borrow areas are not located in productive land, forested areas and near water courses such as rivers, streams, etc.	√			√															
Topsoil are properly removed, stockpiled and preserved for later use during site restoration and provision of vegetation cover to minimize erosion	√			√															
Stable side slopes are provided during excavation of the borrow pits	√			√															
Quarry sites lying on small rivers and streams are avoided	√			√															
Quarry sections located on the river bed are avoided or reduced if unavoidable	√			√															
Borrow pits are left in a tidy state with stable side slopes and proper drainage	√			√															
Quarry sites and borrow pits are restored and rehabilitated after use	√			√															
12. Traffic Management and Local Access																			
Signs advising that construction is in progress are provided, particularly where the alignment crosses existing roads and where construction related-facilities are located	√			√															
Flag persons are employed to regulate traffic especially in potentially hazardous areas			√			√													
Traffic advisory signs (to minimize traffic build-up) are posted in coordination with local authorities		√			√														
Sufficient lighting at night within and in the vicinity of construction sites are provided		√			√														
Regular monitoring of traffic conditions along access roads to ensure that project vehicles are not causing congestion	√			√															
Schedules are observed for different types of construction traffic trips (e. g., transport of pre-	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
cast sections, haulage of spoils, delivery of construction materials, etc.)																			
Delivery of construction materials and equipment and transport of spoils are during non-peak hours	√			√															
Interactions between construction works, traffic flows and pedestrians are minimized by the following safety measures: <ul style="list-style-type: none"><li>• Temporary signals or flag controls</li><li>• Adequate lighting</li><li>• Fencing</li><li>• Signage</li><li>• Road diversion</li><li>• Traffic cones</li><li>• Barricades</li></ul>	√			√															
Use of escort vehicles and warning signs/lights to increase public awareness of potential hazards			√			√													
Construction activities and schedules are coordinated in advance with local agencies, community representatives, businesses, schools	√			√															
Existing access routes are maintained (whenever feasible)	√			√															
Provision of alternative access and/or parking when impacts to principal access routes and parking areas cannot be avoided		√			√														
Adequate informational and directional signage to improve alternative access function	√			√															
Construction operations are scheduled to avoid or minimize conflicts with local uses/activities	√			√															
At least one safe through lane is maintained at all times in construction areas	√			√															
<b>13. Damage to Properties and Community Facilities</b>																			
Local roads used by the project are upgraded prior to use	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Local and access roads used by the project are repaired and maintained regularly and fully restored at the end of the project			√			√													
Contractor immediately repairs and/or compensates for any damage to properties			√			√													
14. Accidental Discovery of Artifacts																			
Immediate stoppage of operations on road section where artifacts/ archaeological finds are unearthed; contractor informs the DDIS and CIPM	√			√															
CIPM notifies Ministry of Culture and Information (MCI) to obtain advice regarding the next steps	√			√															
Work is resumed only after MCI has provided official notification	√			√															
15. Occupational Health and Safety																			
Orientation for construction workers regarding health and safety measures, emergency response and prevention of HIV/AIDS and other diseases	√			√															
Workers at the bridge site are provided with life vests/buoyancy devices at all times	√			√															
Stable footpaths/access with sturdy guardrails to the bridge work sites shall be provided	√			√															
Preparation and implementation of a waterway safety plan, approved by the agencies in charge		√			√														No resource
Contractor complies with the waterway traffic safety during construction	√			√															
First aid facilities that are readily accessible to workers	√			√															
Fire-fighting equipment at construction camps and work areas, as appropriate	√			√															
Adequate drainage in worker's camps	√			√															
Adequate and clean housing and sanitation facilities for all workers at the workers'/ construction camps	√			√															
Separate sleeping quarters for male and female workers	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Reliable supply of water for drinking, cooking and washing purposes at the workers' camps	√			√															
Separate hygienic sanitation facilities/ toilets and bathing areas with sufficient water supply for male and female workers	√			√															
All waste water from workers' and construction camps and project-related activities/facilities are treated consistent with national regulations	√			√															
Proper collection and disposal of solid wastes within the workers'/construction camps	√			√															
Sturdy fencing on all excavation areas greater than 2 m deep	√			√															
Workers are provided and use appropriate and complete safety equipment such as safety boots, protective clothes, breathing mask, ear protection, helmets, gloves, etc.	√			√															
Reversing signals are installed on all construction vehicles	√			√															
Fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, falling into operating machinery or through an opening	√			√															
16. Public Safety																			
Signage are installed at the periphery of the construction site to warn and direct traffic and pedestrians	√			√															
Security personnel are deployed in hazardous areas to restrict public access	√			√															
Speed limits are imposed on construction vehicles along residential and other sensitive areas(typically 25 km per hour)	√			√															
Drivers are taught safe driving practices to minimize accidents and prevent spill of hazardous and other construction materials during transport	√			√															
Safe access to properties and establishments affected by construction works	√			√															
Safe passageways for pedestrians crossing the construction site	√			√															



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Excavated areas are immediately backfilled, covered (e. g. , with metal plates) and/or repaved		√			√														Installed the direction traffic
All construction vehicles and equipment are secured during non-working periods to prevent unauthorized access or use	√			√															
Appropriate safety barriers and warning signs are installed in areas that pose safety risks such as open excavations, cut slopes, erosion-prone slopes, manufactured slopes, drainages, etc.	√			√															
17. Flora and Fauna																			
Vegetation removal is coordinated with forest authority			√			√													
Tree-cutting permit is secured, as necessary	√			√															
Tree planting and landscaping plan that includes: <ul style="list-style-type: none"><li>• Inventory of the number of species of trees proposed for removal</li><li>• Identifying and documenting quantity, variety, and location of replacement trees</li><li>• Replanting at the outer portions of the ROW and in other locations agreed with local authorities</li><li>• Monitoring and maintenance program to ensure effectiveness of the plan</li><li>• Adopting remedial measures where appropriate (e.g., replacing dead/damaged replanted trees)</li></ul>			√			√													
Clearing of trees is limited to areas that are only necessary based on the project design and as approved by the forestry department			√			√													
Cutting of trees for firewood and for use in project is prohibited.	√			√															
New alien plant species are not used for replanting/revegetation without an existing regulatory framework	√			√															
Invasive species are not introduced into new environments	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Workers are prohibited from hunting wild animals and collecting forest products	√			√															
Bridge works are scheduled in dry season to minimize adverse impacts to aquatic resources	√			√															
Contractors do not buy or use wood from illegal sources (illegal logging)	√			√															
No construction camps, asphalt mixing plants, material storage sites and other construction facilities are located in protected areas	√			√															
Construction camps, asphalt mixing plants, material storage sites and other construction facilities are located at least 1 km from the boundaries of national parks and class 1A and 1B watershed designated areas	√			√															
Precautions are adopted to ensure that damage to vegetation is avoided should fires resulting from execution of the works occur	√			√															
Road improvement works are restricted to the existing ROW boundaries	√			√															
Grading methods and facilities i.e., rounding, benching, terracing and retaining walls are used to reduce earthwork and related topographic alteration/vegetation removal.	√			√															
Suitable wildlife crossing structures are installed at locations agreed with the park management boards and National Environmental Board	√			√															

**Source:** Monthly Progress Reports January to June 2019. Sinohydro Bureau 15 Cambodia

Inspector's name and signature:

Bao po:  
Project Manager

THANAWCIH Nithis:  
Resident Engineer



## **Appendix B: Checklist of EMP Implementation for Contract CW-B1**

# ENVIRONMENTAL MONITORING CHECK LIST

January-February 2019

Provincial Road Improvement Project  
ADB Loan No.2839-CAM (SF)/8254-CAM  
Contract Package CW-B1: **Improvement of PR314D**





**Table:** Checklist of EMP Implementation for Contract **CW-B1**

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
<b>1. Community Facilities (power lines, irrigation canals, etc.)</b>																			
Interruption of utility services are minimized by laying out new lines prior to transfer			√			√												√	
Replacement structure are constructed prior to demolition of existing structure	√			√															
Temporary facilities to maintain adequate services are in place	√			√															
Coordination with local company or local offices	√			√															
Affected parties are informed in advance	√			√															
<b>2. Air Quality (Dust and Gaseous Emissions)</b>																			
Vehicles and equipment are well maintained and in good condition.	√			√															
Borrow areas, casting yard and other project facilities are duly licensed and have all the necessary environmental approvals	√			√															
All construction vehicles and equipment are tested for compliance with relevant emission standard and properly licensed	√			√															
Parked vehicles on the site works have their engines turned off. Unnecessary engine idling of vehicles and equipment is prohibited.	√			√															
Water spraying of roadways, working areas and other construction-related facilities near sensitive receptors and handling of all raw sand and aggregates, and other similar materials			√			√													
Dust barriers are installed as necessary			√			√													
Storage areas of construction materials such as sand, gravel, cement, etc., have provisions that prevent them from being blown away towards sensitive receptors			√			√													

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Trucks transporting construction materials (i.e. sand, soil, cement, gravel, etc) are tightly covered			√			√													
Roadways are regularly cleaned of tracked in mud, cement, etc. from construction works			√			√													
Stockpiling of spoils near sensitive receptors is prohibited	√			√															
Construction vehicles have speed limits (typically 25 km/hour or less) along areas where sensitive receptors are located	√			√															
Areas where there is a regular movement of vehicles have an acceptable hard surface and are clear of loose surface material			√			√													
Cement and other fine-grained materials delivered in bulk are stored in closed containers			√			√													
Conveyor belts are fitted with wind-boards, and conveyor transfer points and hopper discharge areas are enclosed																			
Weigh hoppers are vented with a suitable filter.																			
Wheel washers are used to clean delivery/ haul trucks of mud and dirt as they exit the work area		√			√														
Smoke belching vehicles and equipment are not used for the project	√			√															
Construction vehicle trips and travel distances for material deliveries are minimized (e.g., by using local materials and labor sources).	√			√															
Construction access roads are temporarily paved or sealed		√			√														
3. Noise Levels																			
Prior notification to the community on construction schedule (informing)	√			√															
Vehicle and equipment are fitted with emission control and silencers to meet national noise standard	√			√															
Vehicles and equipment are well maintained and checked by the contractor every 6 months		√			√														
Only vehicles and equipment that are registered and have necessary permits are used	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Noisy equipment are completely enclosed whenever possible	√			√															
Stationary equipment that produce high noise level are positioned as far as is practical from sensitive receptors.	√			√															
Noisy construction activities within 200 m of a settlement are only during daytime	√			√															
Suitable noise control barriers are used in the vicinity of house, school, temples, medical facilities and other sensitive receptors	√			√															
Noisy construction activities are avoided near school during examination period and coordinated with school administration	√			√															
Noisy construction activities are avoided in the vicinity of sensitive receivers	√			√															
Suitable noise level reduction measures are installed by the contractor if construction activities are disruptive	√			√															
Speed limits on construction vehicles are imposed		√			√														
Construction traffic routes are defined in cooperation with local communities and traffic police	√			√															
Asphalt concrete batching plants and crushing plant are located at least 500 m away from inhabited areas and other sensitive receptors	√			√															
4. Vibration Levels																			
Fully loaded trucks are rerouted away from roadways that go through heavily built areas	√			√															
Heavy equipment are operated away from vibration-sensitive areas	√			√															
Simultaneous activities like demolition, ground impacting and earth moving are avoided	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Alternative equipment is used	√			√															
Use of vibrating rollers near vibration-sensitive structures are avoided	√			√															
5. Erosion and Sedimentation																			
Suitable soil erosion control measures are implemented prior to excavation of the bridge pier foundation and construction activities at waterways	√			√															
Silted water carried with the spoils during excavation and construction of bridge foundation are properly treated	√			√															
Spoils (excavated soil, rocks, removed asphalt, etc. ) stockpiles are located at least 50 m from watercourses	√			√															
A bund is placed around the spoils stockpile area	√			√															
Spoil disposal does not cause sedimentation and obstruction of water flow, damage to agricultural land and densely vegetated areas	√			√															
Grading is avoided or minimized during the rainy season particularly in areas of steep topography and/or adjacent to water courses.			√			√													
Phased grading schedule is implemented to limit the area subject to erosion at any given time																			
Appropriate erosion control and stabilizing measures (such as geotextiles, mats, fiber rolls, soil binders that are not toxic to the environment, or vegetation measures/ temporary landscaping) are used in disturbed areas and on graded slopes	√			√															
Construction works (bridges, culverts, drainage, etc.) on / near watercourses do not cause obstruction channel flow	√			√															
Slopes along water channels are stabilized	√			√															
Dumping of soil, rocks, construction materials and debris onto watercourses is prohibited	√			√															



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
When construction works cause obstruction of watercourses, the obstruction is immediately cleared to restore channel flow	√			√															
6. Spoil Disposal																			
Spoils (excavated soil and rocks, cut vegetation, removed pavement such as asphalt, etc. ) are immediately transported to disposal sites approved by local authorities	√			√															
Temporary spoils stockpiles near paddy fields have bund or silt fence around them			√			√													
Temporary spoils stockpile that are planned to be used longer than six months are sodded.		√			√														No use
Height of spoils stockpile are limited to minimize windblown dust	√			√															
7. Soil and Ground Water Contamination																			
Maintenance shops, fuel and oil depot have impermeable flooring with sump	√			√															
Refueling and servicing of equipment are carried out only in adequately equipped areas	√			√															
Only minimal chemicals, hazardous substances and fuel are stored on site works, within an enclosed and covered secure area that has an impervious floor and impervious bund around it	√			√															
Storage area for chemicals, hazardous substances and fuel are located away from watercourses, flood-prone areas, work camps, and danger areas	√			√															
Oil-stained refuse such as oily rags, spent oil filters and used oil are collected and disposed of through recyclers/authorized waste handlers and disposed in authorized waste facilities	√			√															
Availability of spill clean-up materials specifically designed for petroleum products and other hazardous substances	√			√															
Immediate cleanup of spills or leaks of petroleum products and/or hazardous substances	√			√															
Training of relevant construction personnel in handling of fuels/hazardous substances and spill control procedures			√			√													

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
At least weekly check for leakage in containers and immediate repair or replacement when necessary	√			√															
Equipment maintenance and fuel storage areas are provided with drainage to an oil-water separator that is regularly skimmed of oil and maintained	√			√															
Discharge of oil-contaminated water into the environment is prohibited	√			√														√	
Waste oil, used lubricant and other hazardous wastes are stored in tightly sealed containers with proper labeling	√			√															
Removal and treatment or proper disposal of oil contaminated soils is included in work sites restoration	√			√															
<b>8. Water Availability</b>																			
Temporary canals/irrigation channels to prevent disruption of water supply to farmlands.	√			√															
<b>9. Water Quality</b>																			
Suitable settling/retention ponds are constructed prior to operation of asphaltic concrete batching plants and casting yards	√			√															
Settling/retention ponds are properly operated and maintained to ensure effluent quality meets applicable effluent standards	√			√															
Bentonite slurry and sludge, mud and other materials and wastes from drilling are collected and processed to avoid pollution of surface water		√			√														No use
Bentonite slurry and sludge, mud and other materials and wastes from drilling are not discharged into watercourses		√			√														No use
Drilling solutions (e.g., bentonite slurry) for bridge construction, abutment construction, piling, etc. are processed in a closed system		√			√														No use
Proper disposal of bentonite-containing spoils as fill material in appropriate sites	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Spilled bentonite mud in agricultural land is cleaned immediately before it cakes and hardens	√			√															
Water from bridge foundation dewatering is not discharged directly into a water body	√			√															
Total suspended solids content of discharges into water bodies comply with applicable standards	√			√															
Sanitation facilities with sufficient capacity are provided to handle and treat sewage generated by workers	√			√															
Equipment service and maintenance yards are provided with impermeable flooring and collection sump	√			√														√	
All equipment maintenance shops are provided with water-tight receptacles for waste oil, oily rags, spent oil filters, solvents and oily containers	√			√															
Disposal of all waste oil, oily rags, spent oil filters, solvents and oily containers are through authorized waste handlers and recyclers	√			√															
Paving operations are restricted during wet weather			√			√													
Use of sediment control devices downstream of paving activities			√			√													
Use of mobile fueling/maintenance units for construction equipment whenever feasible	√			√															
Accurate and up-to-date written inventories and labels for all stored hazardous materials	√			√															
Use of berms, ditches, and/or impervious liners, etc. in material storage, vehicle/equipment maintenance and fueling areas	√			√															
Material storage, maintenance and fueling areas and septic systems are at least 30 m from storm drains and surface waters	√			√															
Facilities for solid and domestic liquid waste management are used and maintained			√			√													
10 Solid Waste																			

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Garbage bins and temporary storage facilities for construction wastes, domestic solid wastes and segregated wastes are provided within the project site	√			√														√	
Waste segregation (hazardous, non-hazardous, reusable) is practiced	√			√															
Regular collection and disposal of wastes (by contractor or authorized third party) to sites approved by local authorities	√			√															
Wastes are not dumped into watercourses, agricultural land and surrounding areas	√			√															
11. Borrow Pits																			
Borrow areas are not located in productive land, forested areas and near water courses such as rivers, streams, etc.	√			√															
Topsoil are properly removed, stockpiled and preserved for later use during site restoration and provision of vegetation cover to minimize erosion	√			√															
Stable side slopes are provided during excavation of the borrow pits	√			√															
Quarry sites lying on small rivers and streams are avoided	√			√															
Quarry sections located on the river bed are avoided or reduced if unavoidable	√			√															
Borrow pits are left in a tidy state with stable side slopes and proper drainage			√			√													
Quarry sites and borrow pits are restored and rehabilitated after use	√			√															
12. Traffic Management and Local Access																			
Signs advising that construction is in progress are provided, particularly where the alignment crosses existing roads and where construction related-facilities are located	√			√															
Flag persons are employed to regulate traffic especially in potentially hazardous areas	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Traffic advisory signs (to minimize traffic build-up) are posted in coordination with local authorities	√			√															
Sufficient lighting at night within and in the vicinity of construction sites are provided			√			√													
Regular monitoring of traffic conditions along access roads to ensure that project vehicles are not causing congestion	√			√															
Schedules are observed for different types of construction traffic trips (e.g., transport of pre-cast sections, haulage of spoils, delivery of construction materials, etc. )	√			√															
Delivery of construction materials and equipment and transport of spoils are during non-peak hours	√			√															
Interactions between construction works, traffic flows and pedestrians are minimized by the following safety measures: <ul style="list-style-type: none"><li>• Temporary signals or flag controls</li><li>• Adequate lighting</li><li>• Fencing</li><li>• Signage</li><li>• Road diversion</li><li>• Traffic cones</li><li>• Barricades</li></ul>	√			√															
Use of escort vehicles and warning signs/lights to increase public awareness of potential hazards		√			√														
Construction activities and schedules are coordinated in advance with local agencies, community representatives, businesses, schools	√			√															
Existing access routes are maintained (whenever feasible)	√			√															
Provision of alternative access and/or parking when impacts to principal access routes and parking areas cannot be avoided			√			√													
Adequate informational and directional signage to improve alternative access function	√			√															



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
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	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Construction operations are scheduled to avoid or minimize conflicts with local uses/activities	√			√															
At least one safe through lane is maintained at all times in construction areas	√			√															
<b>13. Damage to Properties and Community Facilities</b>																			
Local roads used by the project are upgraded prior to use	√			√															
Local and access roads used by the project are repaired and maintained regularly and fully restored at the end of the project	√			√															
Contractor immediately repairs and/or compensates for any damage to properties			√			√													
<b>14. Accidental Discovery of Artifacts</b>																			
Immediate stoppage of operations on road section where artifacts/ archaeological finds are unearthed; contractor informs the DDIS and CIPM	√			√															
CIPM notifies Ministry of Culture and Information (MCI) to obtain advice regarding the next steps	√			√															
Work is resumed only after MCI has provided official notification	√			√															
<b>15. Occupational Health and Safety</b>																			
Orientation for construction workers regarding health and safety measures, emergency response and prevention of HIV/AIDS and other diseases			√			√													
Workers at the bridge site are provided with life vests/buoyancy devices at all times	√			√															
Stable footpaths/access with sturdy guardrails to the bridge work sites shall be provided	√			√															
Preparation and implementation of a waterway safety plan, approved by the agencies in charge	√			√															
Contractor complies with the waterway traffic safety during construction		√			√														no resource

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
First aid facilities that are readily accessible to workers	√			√															
Fire-fighting equipment at construction camps and work areas, as appropriate																			
Adequate drainage in workers' camps	√			√															
Adequate and clean housing and sanitation facilities for all workers at the workers'/ construction camps	√			√															
Separate sleeping quarters for male and female workers	√			√															
Reliable supply of water for drinking, cooking and washing purposes at the workers' camps	√			√															
Separate hygienic sanitation facilities/toilets and bathing areas with sufficient water supply for male and female workers	√			√															
All waste water from workers' and construction camps and project-related activities/ facilities are treated consistent with national regulations	√			√															
Proper collection and disposal of solid wastes within the workers'/construction camps	√			√															
Sturdy fencing on all excavation areas greater than 2 m deep			√			√													
Workers are provided and use appropriate and complete safety equipment such as safety boots, protective clothes, breathing mask, ear protection, helmets, gloves, etc.	√			√															
Reversing signals are installed on all construction vehicles	√			√															
Fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, falling into operating machinery or through an opening	√			√															
16. Public Safety																			
Signage are installed at the periphery of the construction site to warn and direct traffic and pedestrians	√			√															
Security personnel are deployed in hazardous areas to restrict public access	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Speed limits are imposed on construction vehicles along residential and other sensitive areas(typically 25 km per hour)	√			√															
Drivers are taught safe driving practices to minimize accidents and prevent spill of hazardous and other construction materials during transport			√			√													
Safe access to properties and establishments affected by construction works	√			√															
Safe passageways for pedestrians crossing the construction site	√			√															
Excavated areas are immediately backfilled, covered (e. g. , with metal plates) and/or repaved			√			√													
All construction vehicles and equipment are secured during non-working periods to prevent unauthorized access or use	√			√															
Appropriate safety barriers and warning signs are installed in areas that pose safety risks such as open excavations, cut slopes, erosion-prone slopes, manufactured slopes, drainages, etc.	√			√															
17. Flora and Fauna																			
Vegetation removal is coordinated with forest authority	√			√															
Tree-cutting permit is secured, as necessary	√			√															
Tree planting and landscaping plan that includes: <ul style="list-style-type: none"><li>Inventory of the number of species of trees proposed for removal</li><li>Identifying and documenting quantity, variety, and location of replacement trees</li><li>Replanting at the outer portions of the ROW and in other locations agreed with local authorities</li><li>Monitoring and maintenance program to ensure effectiveness of the plan</li></ul>	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
<ul style="list-style-type: none"><li>Adopting remedial measures where appropriate (e. g. , replacing dead or damaged replanted trees)</li></ul>																			
Clearing of trees is limited to areas that are only necessary based on the project design and as approved by the forestry department			√			√													
Cutting of trees for firewood and for use in project is prohibited	√			√															
New alien plant species are not used for replanting/revegetation without an existing regulatory framework	√			√															
Invasive species are not introduced into new environments	√			√															
Workers are prohibited from hunting wild animals and collecting forest products	√			√															
Bridge works are scheduled in dry season to minimize adverse impacts to aquatic resources	√			√															
Contractors do not buy or use wood from illegal sources (illegal logging)	√			√															
No construction camps, asphalt mixing plants, material storage sites and other construction facilities are located in protected areas	√			√															
Construction camps, asphalt mixing plants, material storage sites and other construction facilities are located at least 1 km from the boundaries of national parks and class 1A and 1B watershed designated areas	√			√															
Precautions are adopted to ensure that damage to vegetation is avoided should fires resulting from execution of the works occur	√			√															
Road improvement works are restricted to the existing ROW boundaries	√			√															
Grading methods and facilities i.e., rounding, benching, terracing and retaining walls are used to reduce earthwork and related topographic alteration/vegetation removal	√			√															

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Suitable wildlife crossing structures are installed at locations agreed with the park management boards and National Environmental Board	√			√															

**Source:** Monthly Progress Reports January-June 2019. Sinohydro Bureau 15 Cambodia

Inspector's name and signature:

Bao po:

*Project Manager*

THANAWCIH Nithis:

*Resident Engineer*



## **Appendix C: Checklist of EMP Implementation for Contract **CW-C****

### **ENVIRONMENTAL MONITORING CHECK LIST**

January-March 2019

Provincial Road Improvement Project

ADB Loan No.2839-CAM (SF)/8254-CAM

Contract Package **CW-C: Improvement of PR150B, NR53, and PR151B**



**Table:** Checklist of EMP Implementation for Contract **CW-C**

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
1. Community Facilities (power lines, irrigation canals, etc.)																			
Interruption of utility services are minimized by laying out new lines prior to transfer			√			√			√								√		
Replacement structure are constructed prior to demolition of existing structure	√			√			√												
Temporary facilities to maintain adequate services are in place	√			√			√												
Coordination with local company or local offices	√			√			√												
Affected parties are informed in advance	√			√			√												
2. Air Quality (Dust and Gaseous Emissions)																			
Vehicles and equipment are well maintained and in good condition.	√			√			√												
Borrow areas, casting yard and other project facilities are duly licensed and have all the necessary environmental approvals	√			√			√												
All construction vehicles and equipment are tested for compliance with relevant emission standard and properly licensed	√			√			√												
Parked vehicles on the site works have their engines turned off. Unnecessary engine idling of vehicles and equipment is prohibited.	√			√			√												
Water spraying of roadways, working areas and other construction-related facilities near sensitive receptors and handling of all raw sand and aggregates, and other similar materials.	√			√			√												
Dust barriers are installed as necessary		√			√			√											If necessary, will install
Storage areas of construction materials such as sand, gravel, cement, etc. , have provisions that prevent them from being blown away towards sensitive receptors	√			√			√												
Trucks transporting construction materials (i.e. sand, soil, cement, gravel, etc) are tightly covered	√			√			√												Will cover during transportation

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Roadways are regularly cleaned of tracked in mud, cement, etc. from construction works	√			√			√												
Stockpiling of spoils near sensitive receptors is prohibited	√			√			√												
Construction vehicles have speed limits (typically 25 km/hour or less) along areas where sensitive receptors are located	√			√			√												
Areas where there is a regular movement of vehicles have an acceptable hard surface and are clear of loose surface material	√			√			√												
Cement and other fine-grained materials delivered in bulk are stored in closed containers	√			√			√												
Conveyor belts are fitted with wind-boards, and conveyor transfer points and hopper discharge areas are enclosed		√			√			√											Mixing plant site is 900m far from house
Weigh hoppers are vented with a suitable filter		√			√			√											Mixing plant site is 900m far from house
Wheel washers are used to clean delivery/ haul trucks of mud and dirt as they exit the work area		√			√			√											
Smoke belching vehicles and equipment are not used for the project	√			√			√												
Construction vehicle trips and travel distances for material deliveries are minimized (e. g., by using local materials and labor sources).	√			√			√												
Construction access roads are temporarily paved or sealed			√			√			√										No have quantities
3. Noise Levels																			
Prior notification to the community on construction schedule	√			√			√												
Vehicle and equipment are fitted with emission control and silencers to meet national noise standard	√			√			√												
Vehicles and equipment are well maintained and checked by the contractor every 6 months	√			√			√												
Only vehicles and equipment that are registered and have necessary permits are used	√			√			√												

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	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Noisy equipment are completely enclosed whenever possible	√			√			√												
Stationary equipment that produce high noise level are positioned as far as is practical from sensitive receptors.	√			√			√												
Noisy construction activities within 200m of a settlement are only during daytime	√			√			√												
Suitable noise control barriers are used in the vicinity of house, school, temples, medical facilities and other sensitive receptors		√			√			√											Minimize the noise in the vicinity sensitive receptors.
Noisy construction activities are avoided near school during examination period and coordinated with school administration	√			√			√												
Noisy construction activities are avoided in the vicinity of sensitive receivers	√			√			√												
Suitable noise level reduction measures are installed by the contractor if construction activities are disruptive	√			√			√												
Speed limits on construction vehicles are imposed	√			√			√												
Construction traffic routes are defined in cooperation with local communities and traffic police	√			√			√												
Asphalt concrete batching plants and crushing plant are located at least 500 m away from inhabited areas and other sensitive receptors			√		√			√											Purchase from other quarries
4. Vibration Levels																			
Fully loaded trucks are rerouted away from roadways that go through heavily built areas	√			√			√												
Heavy equipment are operated away from vibration-sensitive areas	√			√			√												
Simultaneous activities like demolition, ground impacting and earth moving are avoided	√			√			√												
Alternative equipment is used	√			√			√												
Use of vibrating rollers near vibration- sensitive structures are avoided	√			√			√												
5. Erosion and Sedimentation																			
Suitable soil erosion control measures are implemented prior to excavation of the bridge	√			√			√												

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2019			February 2019			March 2019			April 2019			May 2019			June 2019			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
pier foundation and construction activities at waterways																			
Silted water carried with the spoils during excavation and construction of bridge foundation are properly treated	√																		
Spoils (excavated soil, rocks, removed asphalt, etc. ) stockpiles are located at least 50 m from watercourses	√			√			√												
A bund is placed around the spoils stockpile area	√			√			√												
Spoil disposal does not cause sedimentation and obstruction of water flow, damage to agricultural land and densely vegetated areas	√			√			√												
Grading is avoided or minimized during the rainy season particularly in areas of steep topography and/or adjacent to water courses	√			√			√												
Phased grading schedule is implemented to limit the area subject to erosion at any given time	√			√			√												
Appropriate erosion control and stabilizing measures(such as geotextiles, mats, fiber rolls, soil binders that are not toxic to the environment, or vegetation measures/temporary landscaping) are used in disturbed areas and on graded slopes	√			√			√												
Construction works (for bridges, culverts, drainage, etc. ) on or near watercourses do not cause obstruction of channel flow	√			√			√												
Slopes along water channels are stabilized	√			√			√												
Dumping of soil, rocks, construction materials and debris onto watercourses is prohibited	√			√			√												
When construction works cause obstruction of watercourses, the obstruction is immediately cleared to restore channel flow	√			√			√												
6. Spoil Disposal																			
Spoils (excavated soil and rocks, cut vegetation, removed pavement such as asphalt, etc. ) are immediately transported to disposal sites approved by local authorities	√			√			√												



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Temporary spoils stockpiles near paddy fields have bund or silt fence around them	√			√			√												No have
Temporary spoils stockpile that are planned to be used longer than six months are sodded.	√			√			√												No have
Height of spoils stockpile are limited to minimize windblown dust	√			√			√												No have
7. Soil and Ground Water Contamination																			
Maintenance shops, fuel and oil depot have impermeable flooring with sump	√			√			√												
Refueling and servicing of equipment are carried out only in adequately equipped areas	√			√			√												
Only minimal chemicals, hazardous substances and fuel are stored on site works, within an enclosed and covered secure area that has an impervious floor and impervious bund around it	√			√			√												
Storage area for chemicals, hazardous substances and fuel are located away from watercourses, flood-prone areas, work camps, and danger areas	√			√			√												
Oil-stained refuse such as oily rags, spent oil filters and used oil are collected and disposed of through recyclers/authorized waste handlers and disposed in authorized waste facilities	√			√			√												
Availability of spill clean-up materials specifically designed for petroleum products and other hazardous substances	√			√			√												
Immediate cleanup of spills or leaks of petroleum products and/or hazardous substances	√			√			√												
Training of relevant construction personnel in handling of fuels/hazardous substances and spill control procedures	√			√			√												
At least weekly check for leakage in containers and immediate repair or replacement when necessary	√			√			√												
Equipment maintenance and fuel storage areas are provided with drainage to an oil-water separator that is regularly skimmed of oil and maintained		√			√			√											Maintain in the garage

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Discharge of oil-contaminated water into the environment is prohibited	√			√			√												
Waste oil, used lubricant and other hazardous wastes are stored in tightly sealed containers with proper labeling		√			√			√											Maintain in the garage
Removal and treatment or proper disposal of oil contaminated soils is included in work sites restoration		√			√			√											Maintain in the garage
8. Water Availability																			
Temporary canals/irrigation channels to prevent disruption of water supply to farmlands.	√			√			√												
9. Water Quality																			
Suitable settling/retention ponds are constructed prior to operation of asphaltic concrete batching plants and casting yards		√			√			√											
Settling/retention ponds are properly operated and maintained to ensure effluent quality meets applicable effluent standards.		√			√			√											No have
Bentonite slurry and sludge, mud and other materials and wastes from drilling are collected and processed to avoid pollution of surface water																			No use
Bentonite slurry and sludge, mud and other materials and wastes from drilling are not discharged into watercourses																			No use
Drilling solutions (e.g., bentonite slurry) for bridge construction, abutment construction, piling, etc. are processed in a closed system																			No use
Proper disposal of bentonite-containing spoils as fill material in appropriate sites																			There is no bentonite
Spilled bentonite mud in agricultural land is cleaned immediately before it cakes and hardens																			There is no bentonite
Water from bridge foundation dewatering is not discharged directly into a water body	√			√			√												
Total suspended solids content of discharges into water bodies comply with applicable standards	√			√			√												

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Sanitation facilities with sufficient capacity are provided to handle and treat sewage generated by workers	√			√			√												
Equipment service and maintenance yards are provided with impermeable flooring and collection sump		√			√			√											Maintain in garage
All equipment maintenance shops are provided with water-tight receptacles for waste oil, oily rags, spent oil filters, solvents and oily containers	√			√			√												local waste sub-contractor
Disposal of all waste oil, oily rags, spent oil filters, solvents and oily containers are through authorized waste handlers and recyclers	√			√			√												
Paving operations are restricted during wet weather	√			√			√												
Use of sediment control devices downstream of paving activities		√		√			√												
Use of mobile fueling/maintenance units for construction equipment whenever feasible			√			√													
Accurate and up-to-date written inventories and labels for all stored hazardous materials	√		√			√													
Use of berms, ditches, and/or impervious liners, etc. in material storage, vehicle/equipment maintenance and fueling areas	√			√			√												
Material storage, maintenance and fueling areas and septic systems are at least 30 m from storm drains and surface waters	√			√			√												
Facilities for solid and domestic liquid waste management are used and maintained	√			√			√												
10 Solid Waste																			
Garbage bins and temporary storage facilities for construction wastes, domestic solid wastes and segregated wastes are provided within the project site	√			√			√												
Waste segregation (hazardous, non-hazardous, reusable) is practiced	√			√			√												
Regular collection and disposal of wastes (by contractor or authorized third party) to sites approved by local authorities	√			√			√												

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Wastes are not dumped into watercourses, agricultural land and surrounding areas	√			√			√												
11. Borrow Pits																			
Borrow areas are not located in productive land, forested areas and near water courses such as rivers, streams, etc.	√			√			√												
Topsoil are properly removed, stockpiled and preserved for later use during site restoration and provision of vegetation cover to minimize erosion			√			√			√										
Stable side slopes are provided during excavation of the borrow pits			√			√			√										The owner of borrow pit need it
Quarry sites lying on small rivers and streams are avoided	√			√			√												
Quarry sections located on the river bed are avoided or reduced if unavoidable	√			√			√												
Borrow pits are left in a tidy state with stable side slopes and proper drainage			√			√			√										
Quarry sites and borrow pits are restored and rehabilitated after use			√			√			√										Will restored and rehabilitation
12. Traffic Management and Local Access																			
Signs advising that construction is in progress are provided, particularly where the alignment crosses existing roads and where construction related-facilities are located	√			√			√												
Flag persons are employed to regulate traffic especially in potentially hazardous areas	√			√			√												Don't have hazardous areas
Traffic advisory signs (to minimize traffic build-up) are posted in coordination with local authorities	√				√			√											provided more
Sufficient lighting at night within and in the vicinity of construction sites are provided			√			√			√										If necessary will provided
Regular monitoring of traffic conditions along access roads to ensure that project vehicles are not causing congestion	√			√			√												
Schedules are observed for different types of construction traffic trips (e. g. . transport of pre-	√			√			√												

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cast sections, haulage of spoils, delivery of construction materials, etc. )																			
Delivery of construction materials and equipment and transport of spoils are during non-peak hours	√			√			√												
Interactions between construction works, traffic flows and pedestrians are minimized by the following safety measures: <ul style="list-style-type: none"><li>• Temporary signals or flag controls</li><li>• Adequate lighting</li><li>• Fencing</li><li>• Signage</li><li>• Road diversion</li><li>• Traffic cones</li><li>• Barricades</li></ul>			√			√			√										
Use of escort vehicles and warning signs/lights to increase public awareness of potential hazards			√			√			√										If necessary will provide
Construction activities and schedules are coordinated in advance with local agencies, community representatives, businesses, schools	√			√			√												
Existing access routes are maintained (whenever feasible)	√			√			√												
Provision of alternative access and/or parking when impacts to principal access routes and parking areas cannot be avoided	√			√			√												
Adequate informational and directional signage to improve alternative access function	√			√			√												
Construction operations are scheduled to avoid or minimize conflicts with local uses/activities	√			√			√												
At least one safe through lane is maintained at all times in construction areas	√			√			√												
13. Damage to Properties and Community Facilities																			
Local roads used by the project are upgraded prior to use		√			√			√											upgraded after using

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Local and access roads used by the project are repaired and maintained regularly and fully restored at the end of the project		√			√			√											upgraded after using
Contractor immediately repairs and/or compensates for any damage to properties	√			√			√												
14. Accidental Discovery of Artifacts																			
Immediate stoppage of operations on road section where artifacts/ archaeological finds are unearthed; contractor informs the DDIS and CIPM	√			√			√												
CIPM notifies Ministry of Culture and Information (MCI) to obtain advice regarding the next steps			√			√			√										
Work is resumed only after MCI has provided official notification	√			√			√												
15. Occupational Health and Safety																			
Orientation for construction workers regarding health and safety measures, emergency response and prevention of HIV/AIDS and other diseases	√			√			√												
Workers at the bridge site are provided with life vests/buoyancy devices at all times	√			√			√												
Stable footpaths/access with sturdy guardrails to the bridge work sites shall be provided	√			√			√												
Preparation and implementation of a waterway safety plan, approved by the agencies in charge		√			√			√											don't have
Contractor complies with the waterway traffic safety during construction	√			√			√												
First aid facilities that are readily accessible to workers		√			√			√											in office and campsites
Fire-fighting equipment at construction camps and work areas, as appropriate	√			√			√												
Adequate drainage in workers' camps.	√			√			√												
Adequate and clean housing and sanitation facilities for all workers at the workers'/ construction camps	√			√			√												
Separate sleeping quarters for male and female workers	√			√			√												



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Reliable supply of water for drinking, cooking and washing purposes at the workers' camps	√			√			√												
Separate hygienic sanitation facilities/toilets and bathing areas with sufficient water supply for male and female workers	√			√			√												
All waste water from workers' and construction camps and project-related activities/ facilities are treated consistent with national regulations	√			√			√												
Proper collection and disposal of solid wastes within the workers'/construction camps	√			√			√												
Sturdy fencing on all excavation areas greater than 2 m deep			√			√			√										
Workers are provided and use appropriate and complete safety equipment such as safety boots, protective clothes, breathing mask, ear protection, helmets, gloves, etc.			√			√			√										Safety equipment is provided
Reversing signals are installed on all construction vehicles	√			√			√												
Fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, falling into operating machinery or through an opening			√			√			√										installed
16. Public Safety																			
Signage are installed at the periphery of the construction site to warn and direct traffic and pedestrians			√			√			√										Provide at detour road
Security personnel are deployed in hazardous areas to restrict public access			√			√			√										
Speed limits are imposed on construction vehicles along residential and other sensitive areas(typically 25 km per hour)	√			√			√												
Drivers are taught safe driving practices to minimize accidents and prevent spill of hazardous and other construction materials during transport	√			√			√												
Safe access to properties and establishments affected by construction works	√			√			√												
Safe passageways for pedestrians crossing the construction site	√			√			√												

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Excavated areas are immediately backfilled, covered (e. g. , with metal plates) and/or repaved	√			√			√												
All construction vehicles and equipment are secured during non-working periods to prevent unauthorized access or use	√			√			√												
Appropriate safety barriers and warning signs are installed in areas that pose safety risks such as open excavations, cut slopes, erosion-prone slopes, manufactured slopes, drainages, etc.			√			√			√										will provided if necessary
17. Flora and Fauna																			
Vegetation removal is coordinated with forest authority			√			√			√										Within RoW
Tree-cutting permit is secured, as necessary	√			√			√												
Tree planting and landscaping plan that includes: <ul style="list-style-type: none"><li>• Inventory of the number of species of trees proposed for removal</li><li>• Identifying and documenting quantity, variety, and location of replacement trees</li><li>• Replanting at the outer portions of the ROW and in other locations agreed with local authorities</li><li>• Monitoring and maintenance program to ensure effectiveness of the plan</li><li>• Adopting remedial measures where appropriate (e. g. , replacing dead or damaged replanted trees)</li></ul>			√			√			√										
Clearing of trees is limited to areas that are only necessary based on the project design and as approved by the forestry department	√			√			√												
Cutting of trees for firewood and for use in project is prohibited.	√			√			√												
New alien plant species are not used for replanting/revegetation without an existing regulatory framework	√			√			√												
Invasive species are not introduced into new environments	√			√			√												

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Workers are prohibited from hunting wild animals and collecting forest products	√			√			√												
Bridge works are scheduled in dry season to minimize adverse impacts to aquatic resources	√			√			√												
Contractors do not buy or use wood from illegal sources (illegal logging)	√			√			√												
No construction camps, asphalt mixing plants, material storage sites and other construction facilities are located in protected areas	√			√			√												
Construction camps, asphalt mixing plants, material storage sites and other construction facilities are located at least 1 km from the boundaries of national parks and class 1A and 1B watershed designated areas	√			√			√												
Precautions are adopted to ensure that damage to vegetation is avoided should fires resulting from execution of the works occur	√			√			√												
Road improvement works are restricted to the existing ROW boundaries																			
Grading methods and facilities i. e. , rounding, benching, terracing and retaining walls are used to reduce earthwork and related topographic alteration/vegetation removal	√			√			√												
Suitable wildlife crossing structures are installed at locations agreed with the park management boards and National Environmental Board	√			√			√												No protected areas

**Source:** Monthly Progress Reports, January-June 2019, Gumkang-Visvakam JV

Checked by:

Monitored by:

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