

# Environmental Monitoring Report

---

Annual Report  
December 2017  
(September 2016-August 2017)

## BHU: SASEC Road Connectivity Project

Pasakha Access Road

Prepared by the Ministry of Works and Human Settlements (MOWHS), Royal Government of Bhutan for the Asian Development Bank.

## **CURRENCY EQUIVALENTS**

(as of 7 December 2017)

Currency unit	–	Bhutanese Ngultrum
Nu1.00	=	\$ 0.0155
\$1.00	=	Nu 64.526

## **ABBREVIATIONS**

ADB	-	Asian Development Bank
CSC	-	Construction Supervision Consultant
DEC	-	District Environment Committee
PAR	-	Pasakha Access Road
DOF	-	Department of Forest
EC	-	Environment Clearance
EFRC	-	Environment Friendly Road Construction
EMP	-	Environmental Management Plan
ES	-	Environment Specialist
IEE	-	Initial Environmental Examination
NCE	-	National Environment Commission
NRDCL	-	Natural Resource Development Corporation Limited
NWF	-	National Work Force
OHS	--	Occupational Health and Safety
PC	-	Project Coordinator
PM	-	Project Manager
PMO	-	Project Management Office
RGOB	-	Royal Government of Bhutan
ROW	-	Right-of-way
BHU	-	Basic Health Unit
DGM	-	Department of Geology and mines

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

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

## TABLE OF CONTENTS

I.	Introduction .....	1
II.	Project Description.....	1
III.	Construction Approach and methodology .....	4
IV.	Climate Change adaption measures .....	4
V.	Project Cost .....	5
VI.	Project Categorization.....	5
VII.	Status of PAR Implementation arrangements. ....	6
VIII.	Tasks and Responsibility of key Experts .....	6
IX.	Environmental Management Plan. ....	7
X.	Compliance as per Environmental Management aspects of Pasakha Access Road .....	14
XI.	Conclusion .....	17

### ANNEXURE

Annexure 1: Photolog.....	19
---------------------------	----

### LIST OF TABLES

Table 1: Work item, Contractors schedule, date of award and completion date.....	2
Table 2. Status of compliance as per EMP of IEE. ....	8
Table 3: Compliance with the Terms and Conditions of the Environmental Clearance .....	14
Table 4: Compliance with the EMP .....	16

### LIST OF FIGURES

Figure 1: Location of Pasakha Access Road.....	3
--	---



## **I. INTRODUCTION**

1. The Royal Government of Bhutan (RGOB) has received a grant from the Asian Development Bank (ADB) to finance part of the cost of South Asian Sub-regional Economic Cooperation (SASEC) Road Connectivity project and in particular for the improvement of Pasakha Access Road (PAR). The Department of Roads (DOR) under the Ministry of Works and Human Settlement (MoWHS) will implement the widening and rehabilitation of PAR.

2. The Pasakha Access Road (PAR) will consist of improving a 1.2 km section of the existing improvement of the road from Phuentsholing to Pasakha and near to proposed additional international border crossing facilities and the associated roads. The 1.2km Pasakha Access Road or PAR is proposed in between Alay Land Custom Station and Pasakha Industrial Estate within Bhutan. It will connect the Indian SASEC Road from Hashimara under West Bengal, India to Alay in Bhutan.

3. PAR construction activities will include i) widening and rehabilitation of 1.2km of the existing access road to Pasakha from Phuentsholing; ii) construction of 50m multi-cellular culvert over Bhawanihora slide zone; iii) 123m span pre-stressed concrete bridge over Bhalujhora river; iii) construction of river training and check dams for minimizing the flow velocity; iv) construction of road side drains and culverts; v) road surfacing works; and upstream catchment improvement through bioengineering applications.

4. The Pasakha access road provides the principal access to the Pasakha industrial estate from Thimphu, Phuentsholing and India. The PAR is classified as a primary national highway and is managed by Department of Roads (DOR). The existing road infrastructure from Pasakha to the west needs to be improved because the standards and conditions are inadequate to meet rapidly growing demand for efficient traffic movement.

5. The waste disposal issues for the works should be manageable, surplus materials will be reused in filling.

6. In order to cope up with the socio-economic development and the consequent expansion of vehicular traffic, the existing road infrastructure must be upgraded and improved. The objectives for road transport services were to develop safe, reliable and efficient.

7. To achieve these objectives, the plan's strategies included focusing on safety and environmental standards through vehicle inspection, and expanding services through regulation and selective support of private transport enterprises.

8. The contract for the civil works was awarded to M/s Gaseb-SPML-Maccaferri JV, Bhutan/India. The Contract duration is for 24 months. The contract commencement date was on September 1, 2015 and was intended to complete on August 31, 2017. In between the contract was terminated on January 19, 2016 due to poor performance of the contractor. Recruitment of the new contractor is currently under process.

## **II. PROJECT DESCRIPTION.**

9. The proposed works will require widening and reconstruction of a 1.2km section of the existing access road to Pasakha coming from Phuentsholing; reconstruction of the bridge over the Bhalujhora River (123m) and construction of the multi-cellular culverts over Bhawanihora landslide debris flow.

10. The activities that are included are (i) earthworks to facilitate replacement and upgrading of the PAR carriageway, extended road base, multicellular culvert over the landslide sections of PAR, (ii) re-construction of the bridge (iii) renewing and reconstructing culverts across the PAR route, providing better crossing drains and better side drains and lead off drainage facilities and (iv) surfacing works.

11. The scope of work for PAR connectivity project is provided in table.

**Table 1: Work item, Contractors schedule, date of award and completion date.**

Sl.no	Work item	Name of Contractor	Contract award date/start date	Contract completion date
1.	Widening and reconstruction of a 1.2km access road	Contractor was terminated from January 19, 2017 till date.	May 05, 2015 (old)	August 31, 2017 (old)
2.	Construction of bridge over the Bhalujhora river (123m)		(Tentative new contract award date: December 2017)	(Tentative completion of new contract: February 2018)
3.	Construction of multicellular culverts over Bhawanihora.			
4.	Construction of Gabion wall/check dams			

12. The progress of work as of August 2017 as follows;

- i) Removal of contractor's site office and comps = 100% completed
- ii) Removal of batching plant at Bhawanihora = 100% completed
- iii) Removal of CDCL Asphalt Plant = 100% completed
- iv) Pasakha Access Road widening work = not yet started
- v) Construction of Bhalujhora bridge = foundation excavation and footing (A1 & A2) completed but filled by boulders and sand by monsoon flood.
- vi) Construction of multi-cellular culvert over Bhawanihora (sub-structure) = 39.56%
- vii) Construction of gabion structures = 12.11% completed.
- viii) Pre stressed bridge (Bhalujhora) = 32.02%
- ix) Overall project = 15.31% completed.

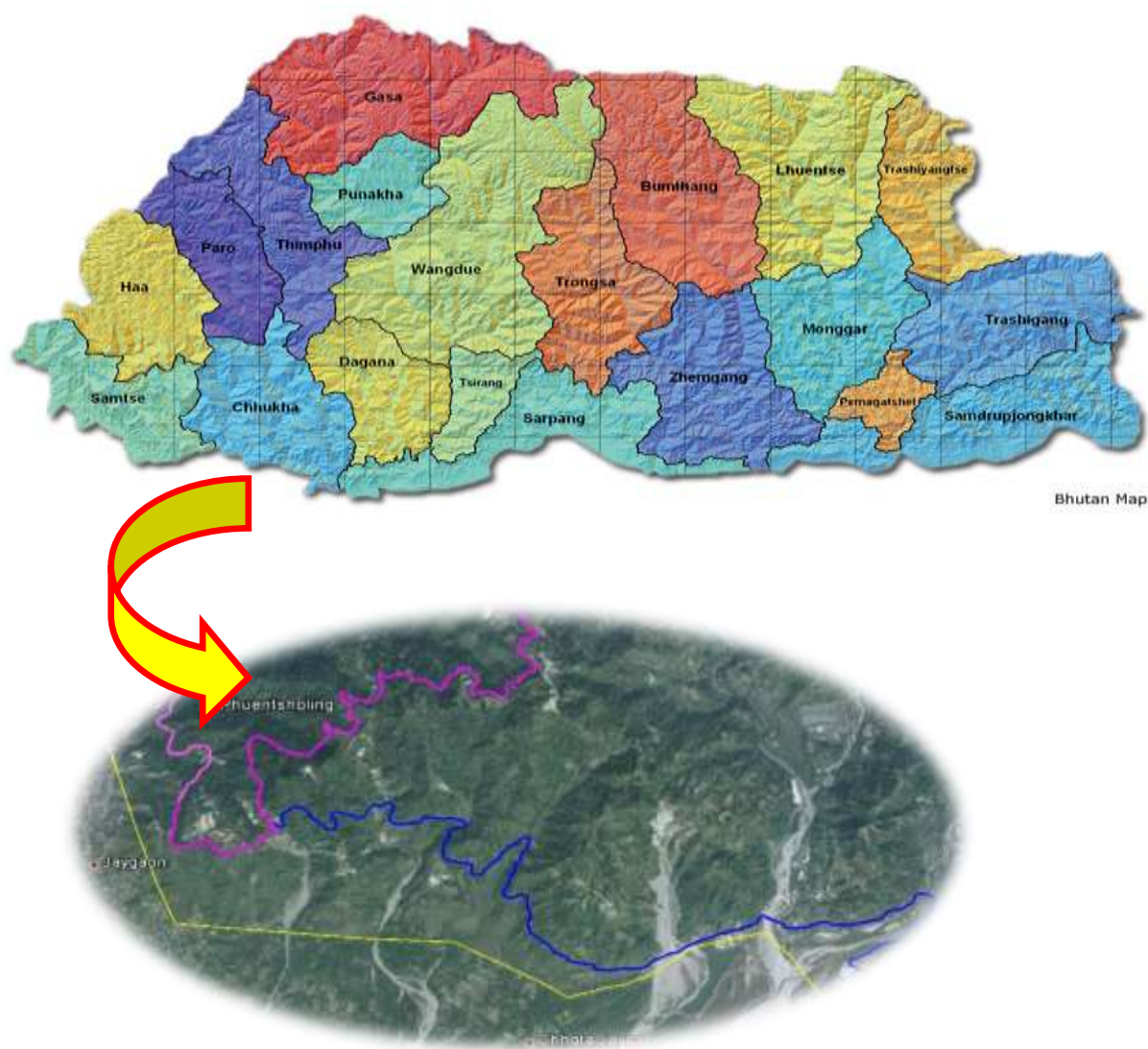
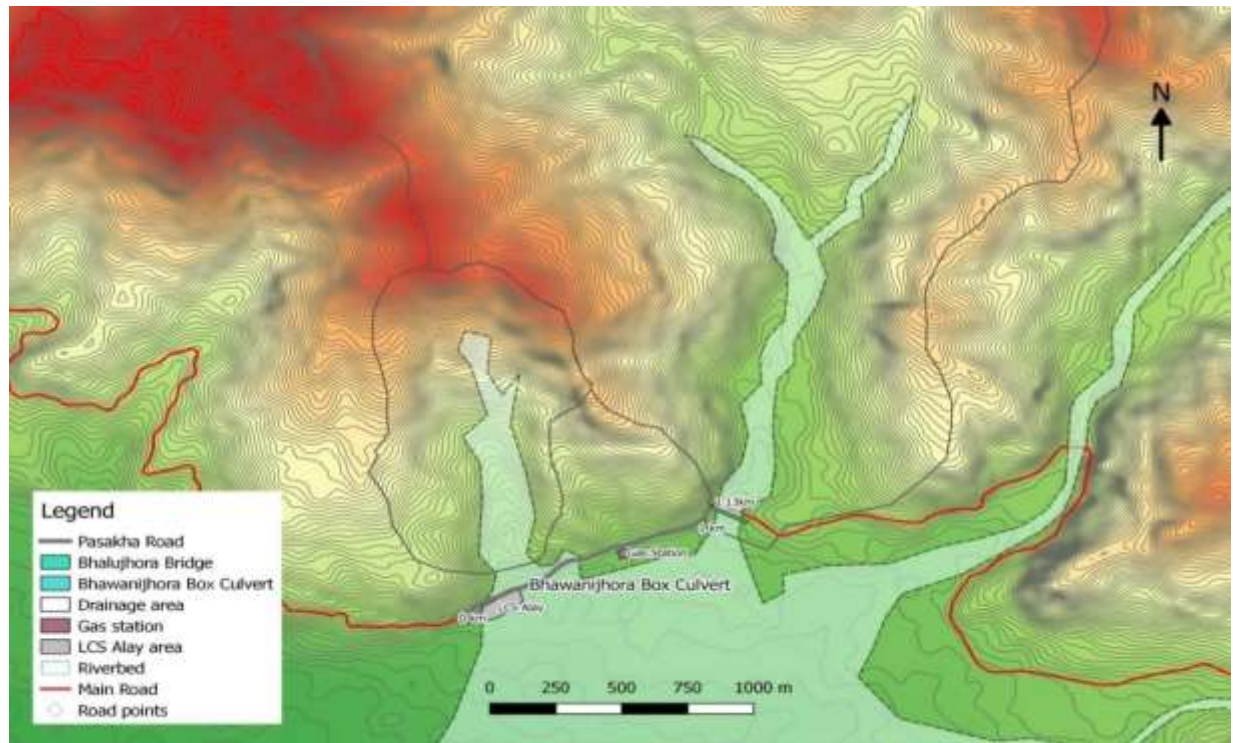


Figure 1: Location of Pasakha Access Road



### III. CONSTRUCTION APPROACH AND METHODOLOGY

13. PAR widening and reconstruction will be based on Environment Friendly Road Construction (EFRC) Technology with the principle of balance cut and fill. Excess excavated materials will be disposed off in the pre-identified approved disposal sites.

14. Civil and Bioengineering techniques will be applied to rehabilitate degraded or unstable Bhawaljhora area along the road corridor.

### IV. CLIMATE CHANGE ADAPTION MEASURES

15. In the detailed design study, surface Geological investigation and subsoil investigation by seismic refraction technique was carried out at Pasakha Access road, across Bhawanijhora debris bed and at entire Bhawanijhora Slide. The slides have been apparently triggered due to the stream cutting at the toe of the slide which is composed of talcosephylite. Till such time the phyllite layer is completely moved down by the slide, the slope will remain active.

16. Most of the areas at the western slopes towards Phuentsholing show signs of distress mainly due to the stream cutting, steep angle of repose and saturated clay. On the contrary, the eastern side of the slide towards Pasakha is observed to be stable with bed rock of phyllite and quartzitic-phyllite at the base of slope.

17. The geology between Bhawanijhora slide and the stretch of Pasakha road that passes through this slide debris is characterized by sandy gravels, boulders of dark grey and pink quartzite and phyllite. The distance between the road and the base of the slide is almost 1000m. The Bhawanijhora slide covers about 1000m length by 500m width through the active zone.

18. Based on the surface geology and seismic refraction results, presence of loose top soils with debris of alluviums/colluviums at the widespread stream bed for a depth of about 5m is



inferred. Below this layer there is possibility of weathered rock (possibly phyllite) and compact colluviums and alluviums of quartzite and phyllite with silt, sand and gravels.

19. The proposed mitigation measures are as follows:

- i. Construction of check dams of tentatively 5m high and 50m to 80m length at a spacing of 150m to 200m at the required locate on the flood plain. This will help to control the debris flow.
- ii. Construction of about 300m of protection wall at the base of slope starting from the confluence of main Bhawanijhora stream with its tributary from Alay side to the start of the active slide at this slope (below Pradhan's house) the slope is very unstable due to presence of highly weathered talcosephyllite.
- iii. Bio-engineering to be applied at the unstable area with local species of plants and grasses where ever possible especially in the stabilizing zones to prevent reactivation of the slide.

20. Besides mitigation measures, the following climate change adaption measures have been designed:

- i. Design of drainage structures have been based on future predicted design discharge using rational method and Peak flow SCS method.
- ii. Culverts of higher discharge capacity for example 1200 mm diameter hume pipes have been proposed as compared to 600 mm and 900 mm diameter hume pipe culverts.
- iii. Adequate wing walls and aprons both upstream and downstream, and scour protection works have been included in the design.
- iv. Trapezoidal drains with increased discharge capacity have been proposed in place of L- shaped drains.
- v. Sufficient river training structures, wing walls, aprons and scour protection structures have been considered for bridges and culverts.
- vi. The application of bio-engineering techniques for slope stabilization have been proposed to the maximum extent
- vii. The drainage capacity of bridges & culverts (increased span and height) and side drains have been increased and number of relief culverts have been proposed according to the site requirement

21. Climate change adaptation (CCA) measures as mentioned above have not been implemented at the moment of writing this report.

## **V. PROJECT COST**

22. The estimated cost for PAR is Nu. 371.5 million including 5% physical contingencies. As per the detail design costing, the environmental management cost comes to around Nu.10.74 million which is about 3% of the total project cost.

## **VI. PROJECT CATEGORIZATION.**

23. The project is classified as Category B in accordance with ADB's Safeguard Policy Statement (2009), as no significant impacts are envisioned.

## **VII. STATUS OF PAR IMPLEMENTATION ARRANGEMENTS.**

24. Department of Roads (DOR) under the Ministry of Works and Human Settlement (MOWHS) is the implementing agency and PAR will be implemented through the Project Implementation Unit (PIU). Under the PIU there will be three Project Implementation Units (PIUs) responsible for day-to-day operation of Pasakha Access Road (PAR).

25. Project Manager (PM) from the PIU will be the environmental focal person for the DOR at the PIU level, who is responsible for ensuring the compliance of environmental conditions of the project. Construction Supervision Consultant (CSC) hired is part of the PIU.

26. CSC includes Team Leader (the Engineer) supported by Survey Engineer, Bridge Engineer, Material Engineer, Quantity Surveyor, Environmental Specialist (ES), Resettlement Social Specialist (RS), and Resident Engineer (RE) and Site Inspector (SI).

27.

28. RE and SI will be main the persons who will carry out the daily monitoring of construction works; and ensure the implementation of environmental mitigation measures as prescribed in the EMP, by the construction contractor (CC).

29.

30. The contractor through its Project Manager/engineer will be responsible for submission of monthly EMP compliance report. Similarly, RE will also make the monthly project progress report which includes the section on compliance of environmental terms and conditions.

31. ES will carry out intermittent environmental compliance monitoring of the project to ensure the environmental mitigation measures or conditions are adequately addressed. ES will be responsible for compiling and submitting the annual environmental monitoring report to the DOR through PIU; and to the ADB.

32. A District Environmental Committee (DEC) consists of Dzongkhag planning officer, Dzongkhag forest officer, Dzongkhag land record officer, Dzongkhag agriculture officer, Dzongkhag environmental officer, and Dzongkhag engineer. The District Environmental Officer (DEO) is district official of NECS. DEC is responsible for issuing Environmental Clearance to some project activities mandated to the committee and for checking compliance of the projects to which it issues EC periodically. As part of its regular activities, NECS gives general training and orientation to DEOs before sending them to districts. These orientations focus mainly on Bhutan's environmental requirements.

## **VIII. TASKS AND RESPONSIBILITY OF KEY EXPERTS**

### **A. Environmental Specialist.**

- Support DOR to ensure proper implementation of all environment safeguard requirements under all works package (PAR)
- Update the Environment Management Plan as and when necessary.
- Procure equipment for collecting data on air quality and noise levels along the project road.
- Prepare the annual environmental monitoring report on implementation of the EMP including implementation of climate adaptation measures for review and approval by DOR and further submission to ADB for disclosure.
- Organize training workshops and provide onsite technical advice to the contractor as necessary.

- Report to Team Leader and work in close coordination with Project Management Team.

**B. Climate Change Specialist (Adaptation).**

- Review the climate change study prepared for the Pasakha access road and climate change resilient design incorporated in detail design
- Prepare manual/report to incorporate climate change adaptation measures based on relevant international best practices into the designs of newly constructed roads and maintenance works of the existing roads
- Provide trainings to DoR engineers on the aspect of climate change resilient designs, other practical measures based on relevant international best practices during construction and maintenance
- Coordinate and recommend institutions for training DoR engineers on climate change resilient design of road infrastructures
- Provide necessary guidance to the national Environmental Specialist on monitoring implementation of adaptation measures during construction
- Report to Team Leader and work in close coordination with Project Management Team

**C. Environmental Focal Person (Site Engineer)**

- Undertake overall site management of one Construction package
- Supervise and guide the contractor
- Assist the Project Manager
- Ensure environment compliance

**IX. ENVIRONMENTAL MANAGEMENT PLAN.**

33. Environmental Management Plan (EMP) includes mitigation measures and environmental monitoring to minimize the environmental impacts during the construction and operational phases.

34. The EMP is prepared to ensure the negatives impacts are mitigated to the maximum extent. The EMP which will form part of the bidding and contract documents includes: (i) waste management and spoil disposal; (ii) temporary and permanent drainage; (iii) runoff control and excavation protection; (iv) noise and dust control; (v) temporary traffic management; and (vi) workers and public safety.

35. Contractor Engineer (environmental focal person) will have to submit both the proposed EMP and Implemented EMP along with the monthly work plan to CSC office, where Consultant site engineers (RE/SI) will and necessary remarks and submit EMP to ES.

36. The construction and operation of the PAR will have beneficial effects on the overall surrounding environment. The construction of PAR and Hashimara-Pasakha Bypass Road will remove congestion of Phuentsholing town; improve transport efficiency through shortening of transport distance; reduce greenhouse gas emission; minimize air pollution; and improve the regional trade and commerce. The improved road will also reduce dust pollution which is the common sight along the existing PAR.

**Table 2. Status of compliance as per EMP of IEE.**

SN	Activity	<u>Mitigation measures</u>	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
<b>PRE-CONSTRUCTION</b>					
1	Design measures	-DoR has submitted application to NEC for renewal of environmental clearance of PAR project. -Public clearance from Phuentsholing Thromde was obtained. -IEE recommendations have been incorporated in the design. -Unnecessary stockpiling of rock and bitumen based materials near road is avoided. -Water and power supply is provided from different source from community.	Yes		
2	Environmentally responsible procurement	-Procured air and noise monitoring equipments. Contractor engineer is trained at site on day to day basis on environmental dos.	Yes		
3	Environmental capacity development	-Environment baseline (air and noise) monitoring equipment and required training on data collection and assessment is conducted. - Health awareness camping on STD/HIV/AIDS has been conducted at contractor's camp area.	Yes		
4	Protect and reprovion irrigation and utilities	Power, water supply, telecommunications and irrigation systems are not interrupted by project work.	Yes		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
5	Tree cutting	-few trees felled only in required area with approval from Department of Forestry.	Yes		
<b>CONSTRUCTION</b>					
1	Orientation for Contractors, Workers on environmental and social management.	Contractors will be orientated during the monthly meeting and workers at construction site. Awareness camping has been conducted at camp area on health issues as per social plan.	Yes		
2	Loss of vegetation and impacts to fauna	Impact on vegetation and fauna is very minimal.	Yes		
3	Drainage and Hydrological Impacts	- Provided adequate drainage at construction sites and camps to avoid pounding and flooding. - Implemented agreed designs for bridges and culverts sufficient to control flooding as designed and to dissipate energy of flow to reduce erosion.	Yes		
4	Materials exploitation and management of quarry and borrow areas	-Not required as construction materials are being transported from approved private mines	No	Not required as the mines/quarry is managed by private individual	
5	Spoil Disposal	-Till date there is no issue for spoil disposal since the spoils are being disposed in pre-identified locations.	Partial	Excavation work is being carried out	
6	General Construction Waste Disposal	-Contractor will be asked to make pits for Organic waste/non organic, sufficient refuse bins within site camps and offices.	Yes		Contractors will be sensitized on waste management
7	Use of hazardous substances and hazardous waste disposal	-No hazardous substances and waste are generated at construction site, Contractor maintains their machines and vehicles in Phuentsholing	Yes		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
		workshops (7km away from construction site) -Project vehicles are fueled from Pasakha fueling station.			
8	Asphalt plant rock crushers, bitumen usage and soil contamination	They might source from private farm. Therefore, there would not be soil contamination.	Yes		
9	Noise and dust nuisances	-Noise is very minimal as construction site is away from human settlements. -Project vehicles will be maintained on time. -Water tanker will be deployed by contractor to subside the dust along the road within project area. -Air and noise have been monitored by CSC.	Yes		
10	Blasting (if required)	Nil	No	Project did not encounter rock till now.	Might require in future
11	Erosion control / run-off	-Project has constructed gabion wall at different location within project. -temporary drainage has been constructed. -implementation of bio-engineering work is not applicable as of now.	Partial	gabion walls constructed but due to monsoon rain, most of gabion walls are buried and damaged	Contractor will restore all the damaged gabion walls within few months time. Bio-engineering work will be implemented by next year (April/May) 2017
12	River protection and bridge repair	-Bridge work is carried out only in dry season. -Rocks and stones will not be disposed to block rivers and streams. -bridge repair and demolition work yet to start. - No cofferdams will be constructed.	Yes		

<b>SN</b>	<b>Activity</b>	<b><u>Mitigation measures</u></b>	<b>Compliance attained (Yes, No, Partial)</b>	<b>Comment/Reasons for Partial or Non-Compliance</b>	<b>Issues for further action and target dates</b>
13	Water quality	-Camps and site office are located away from Bhalujhora river. -No solid waste from construction thrown in river. -washing of machinery and vehicles in river will be strictly prohibited within project premises.	No		
14	Water resources	-Water has been sourced from different source from community. -camps located away from the water source.	Yes		

**a. Loss of trees**

37. Loss of trees and vegetation cover during construction will be limited. PAR is basically an improvement of existing road to Pasakha from Alay. However, if the tree felling is required, then it will be carried out in accordance with Forest and Nature Conservation Rules. The ratio of tree felled and compensatory plantation required will be decided by ES.

38. Compensatory plant using local or native tree species will be carried out to replace the trees felled during the construction. The compensation of trees will be done in-consultation with the Department of Forest under Ministry of Agriculture. Ratio for compensation will be 1:1 if the area of plantation is small.

**b. Spoil Disposal**

39. There will be limited excavation requirement and hence the limited spoil generation. 100% balance cut and fill for PAR will be implemented. Therefore, disposal site is not required for PAR.

**c. General Construction Waste Management**

40. Uncontrolled waste disposal will contaminate soil and water bodies, thereby harming the environment. Mitigation measures will seek to reduce, recycle and reuse waste as far as practicable.

41. In principle, the waste generation will be minimized at source. Waste products will be segregated, recycled and reused whenever possible. Recyclable waste will be sold to the scrap dealers.

42. Organic waste such as plant materials will be composted. Residual non-hazardous waste will be disposed off in the pits. Construction/workers' camps were provided with sufficient refuse bins. Burning of construction and domestic wastes will be prohibited.

**d. Occupational Health and Safety Measures**

43. Labor and Employment Act 2007, provides general legislation government employment condition governing employment conditions and environment at work. The aim of this Act is to improve the work environment and working conditions in order to safeguard and maintain the employee's work ability and prevent occupational accidents, diseases, and other physical or mental health problems related to work.

44. All the labours at construction site are provided with the safety gadgets like helmets, gumboots, safety jackets and etc. Fire extinguishers are kept at contractor's site office and CSC site office.

45. Two pits shall be dug near contractor's camp to dispose waste from kitchen and dust bins to be kept in-place at designated place within project office areas. Drainages are to be made around the camp area and will have to be well maintained.

46. Import of laborers will likely result in spread of communicable diseases such as HIV/AIDS, STDs, malaria and Tuberculosis (TB). In order to prevent health related impacts the



CSC has conducted awareness health campaign on HIV/AIDS on April 22, 2016 with assistance from the Health Information Service Centre, Phuentsholing.

**e. Construction materials**

47. There are no identified quarries within the project area, construction materials particularly stone will be sourced from the nearby government approved, existing and operational quarries. Contractor use river boulders and surface collection, boulders and sand are brought from Toorsa River and aggregate from Kamji mines. Raw materials are brought as per the rules and regulation of Forestry Division.

**f. Batching Plant**

48. Contractor has removed their batching plant from construction site, Pasakha. All the labours who will be enough with batching plant will be provided with safety out fits and dust is taken care. New batching plant will located away from human settlements.

**g. G) Asphalt Plant established by CDCL within PAR**

49. The asphalt plant installed by the Construction Development Corporation Ltd. (CDCL) right next to the site office and worker camps was removed. The plant was removed after completion of resurfacing works under Phuentsholing Thromde.

**h. Public Safety**

50. Project vehicles will be briefed on speed limit within project areas such as commercial and residential areas. Road diversion sign board will be in-place within project vicinity. In the event of accidents, the contractor will be responsible for immediate evacuation of injured person to the nearest medical center.

**i. Archaeological and cultural artifacts.**

51. No archeological and cultural artifacts are found within the Project area. However, if they are sited during the construction, site engineers will notify the PIU. The PIU in turn will inform the relevant authorities.

**j. Air Quality**

52. Air pollution in Bhutan is a recent phenomenon and can be attributed to rapid urbanization and industrial developments. Diesel vehicles with poor engine maintenance and poor quality of fuel are also major sources for the urban air pollution.

53. Air quality monitoring was carried out on March 25, 2016 at Pasakha Project site by Engeo Consultant. By observation in general, air quality near the PAR is acceptable but there are large amounts of dust being re-suspended from the roads surface.

54. Air quality appears to be generally acceptable with the exception of dust. Dust arises owing to the poor condition of the existing roads and dust arising when vehicles pass over the landslide and unsealed shoulders of roads in many places. The training for air quality was conducted by Mr. Karma Chogyel, Environmental Specialist from Engeo Consultancy,

Thimphu. During the reporting period Air quality monitoring at construction site was not conducted since the project got terminated and no construction activities took place.

#### **k. Noise**

55. Noise from vehicles is not a concern in most of the areas around the PAR as the sensitive receivers are set well back (<30m) from the road and uphill and at present traffic is confined to occasional vehicles. The training for noise level was conducted on 8-9<sup>th</sup> of September 2016 by Mr. Karma Chogyel, Environmental Specialist from Engeo Consultancy, Thimphu. During the reporting period noise monitoring at construction site was not conducted since the project got terminated and no construction activities took place.

### **X. COMPLIANCE AS PER ENVIRONMENTAL MANAGEMENT ASPECTS OF PASAKHA ACCESS ROAD**

56. The Environmental Compliance of Pasakha Access Road (PAR) project is prepared as per terms and conditions of EC and implementation of Environmental Management Plan (EMP) of the project.

57. Following tables 3 and 4 contains the compliance requirements and the status compliance of PAR.

**Table 3: Compliance with the Terms and Conditions of the Environmental Clearance**

<b>No.</b>	<b>Compliance Requirement</b>	<b>Status</b>
1	Any modification of the proposal shall take place only with the prior approval of the NEC	Submitted application for renewal of Environmental Clearance to NEC
2	Construction complies with the National Environmental Protection Act 2007 Environmental Assessment Act 2000 and its Regulation 2002, Waste Prevention and Management Act of Bhutan 2009 and its Regulation 2012, and the Water Act 2011	Construction is going on as per the mentioned laws.  The site is monitored by the Dzongkhag Environmental Officer, DoR as well as the site supervisor from the consultant firm.
3	Complies with the Environmental Standards 2010	
4	Construction is carried out as per the projects documents submitted for environmental clearance.	Construction is as per the IEE submitted and as per the Environmental Clearance issued
5	Environmental Clearance is valid only for the construction of the road widening and improvement of one point two (1.2) kilometer of Rinchending-Pasakha Highway, construction of 170m bridges and flood retention walls at Pasakha under Chhukha Dzongkhag.	No works other than the road widening and improvement of one point two (1.2) kilometer of Rinchending-Pasakha Highway, construction of 170m bridges and flood retention walls construction is being carried out
6	The construction is confined within the allotted area	Construction is within the premises of the Pasakha Access Road (PAR) project.
7	Ensure compliance to all conditions of stakeholder clearances	Construction is being carried out as per stakeholder clearances

No.	Compliance Requirement	Status
8	Local residents, households, communities, public, private parties, and any religious, historic and ecologically importance sites are not adversely affected by the construct.	The construction does not affect any sites of this nature. However only one household has been affected by the project road and compensation payment is under process.
9	NEC is informed of any chance finds of precious metals or minerals or articles that have economic, religious or ecological significance	There have been no such chance findings yet
10	Holder shall be solely responsible for any disputes	As all disputes and settlements have been made during the IEE stage, the construction phase does not envisage any disputes.
11	Holder shall ensure that the import and use of secondhand equipment and machineries are strictly prohibited	Equipment used at the site were all found to be in good condition.
12	Construction conforms to Safety Rules and Norms	Contractors will be asked to appoint Safety Officer. From PIU, PM takes care of safety issues and from CSC side Environmental Focal Person monitors this.
.13	Felling of trees is done upon obtaining approval from the Divisional Forest Office	There are hardly any trees within the project area. Forest permit shall be obtained if necessary.
14	Excavated material is dumped at pre-identified sites	Excavated materials have been dumped in designated dumping site and moreover cut and fill method is being implemented at site for minimizing disposal of excavated materials.
15	Spillage and roll over of excavated materials is avoided	Due to the flat terrain excavated materials will not be rolled over.
16	The holder shall ensure that adverse visual impact of construction is minimized	There are no adverse visual effects that need to be covered
17	Safety signs are posted at strategic locations	There are no strategic locations which necessitate specific warning signs. However, the Contractor will be advised to erect a sign at the access to the site with the necessary information specified in the Environmental Clearance.
18	Ensure that adequate safety gadgets are provided to the workers	Gum boots, helmets, and face masks have been issued to the workers.
19	Adequate sanitation facility is provided to the workers	Contractor will be advised to construct toilets at the workers camp with adequate water supply.
20	Ensure that first Aid kit is available at site	First Aid kit will be made available at the site. Other than treating simple cuts and wounds at site, workers are taken to the hospital.

No.	Compliance Requirement	Status
21	Copy of the Environmental Clearance is available at the site office	Copy of the EC will be made available with the Contractor office.

**Table 4: Compliance with the EMP**

No.	Compliance Requirement	Status
1	Loss of vegetation	Only marked trees shall be felled in required areas. Cut trees must be compensated by replantation.
2	Compensatory Plantation	Project in consultation with Divisional Forest Office must implement compensatory plantation using local or native tree species. Ration for compensation plantation will be 1:1 if the area is small. However, project can go up 1:4 if the area is large.
3	Awareness to Contractor's workers on Health.	CSC in-consultation with Public Health Unit will conduct health awareness campaign on HIV/AIDS/STD and other disease as per social plan of the project.
4	Camp area location & operation (drinking water/latrines/waste disposal/energy supply.)	Location of camp area at-least 500m away from communities. Sourcing of water for site office and camp area are separate from community water sources. Provision of proper toilets/bathing facilities will be away from streams and rivers.
5	Provide first Aid kit box	Basic Medical supplies with medical kit will be arranged in camp and site office.
6	Ensure fire extinguishers are kept at site office.	Provision of fire extinguishers will be made available at site office and camp area.
7	Provision of dust bins and pits within camp area	Contractor will be asked to provide waste dust bins and disposal pits within camps area and site office.
8	Construction material and its transportation	Contractors will transport boulders from Toorsa and aggregates from Kamji from (Private approved quarry) Sand will be transported from Toorsa/Amochhu (Bhutan)
9	Spoil disposal	Total cut and fill of excavated materials or excavated materials are deposited to designated dumping areas like T1,T2& T3.
10	General Construction waste disposal	The waste generated will be minimized at source. Recyclable waste will be sold to the scrap dealer. Organic waste can be composed Non hazardous waste has been disposed off in the municipal landfill. Labour camp and site office will be provided with bins/pits. Burning of construction waste will be prohibited. No solid waste disposed into streams and rivers.
11	Use of hazardous substances and waste disposal	Oil and lubricants are safely stored. No secondary containment around fuel store
12	Batching plant	Location will be 500m away from the communities.

No.	Compliance Requirement	Status
		Soil waste generated during the construction will be properly treated and safely disposed at safer areas. Ensured safety at batching plant. Less pollution on environment as it will be generated by electrical power.
13	Noise and dust	Noise pollution on human receptor will be negligible as site is away from any residential area. Water will be sprinkled at-least twice a day within project premises.
14	Water quality	Waste generated from construction camps will be taken care (not to throw into river and streams) Washing of machines and vehicles in surface waters will be prohibited.
15	River protection and bridge repair	Bridge foundation excavation works have been suspended during heavy flooding. The bridge structures shall not be dropped into river and stream. Almost 80% of foundation excavation was completed.
16	Ensure safety outfits	Fencing on all areas of excavation greater than 1m deep is observed. All workers will be provided with appropriate personal safety equipment such as safety boots, helmets, gloves and etc.
17	Public safety	Installed barriers/temporary fence at construction areas. Speed restrictions shall be imposed on the project vehicles and equipment.

## XI. CONCLUSION

58. This SASEC, PAR Connectivity Project annual environmental monitoring report is required to be prepared and disclosed in DoR and ADB website as required by SPS 2009 for the environment category-B project. There are different project component under SASEC, PAR connectivity project, in various stage of civil works.

59. The contract package was awarded by the Department of Roads under Ministry of Works and Human Settlement to SPML-Gaseb-Maccaferi JV Bhutan/India. However, the contract was terminated in January 2016 due to poor performance of the contractor. Recruitment of the new contractor is currently under process.

60. The project is compliant with ADB's requirements as well as RGoB guidelines concerning environment safeguards as provided in IEE and EMP. Sector guidelines related to the environment, road construction and traffic safety are complied with by the project.

61. As required by SPS 2009 (ADB) for the environment category-B project, annual environmental monitoring report is required to be prepared and disclosed in DoR and ADB website.

62. Almost 80% of foundation excavation was completed at Bhalujhora bridge, which has however been covered by monsoon flood. All the necessary facilities are provided to the staff and labours working at Construction site. First Aid-Kits, fire extinguishers, safety out fits like hamlet, gum boots, safety shoes, breathing mask and etc are provided at work site. Our Environmental Focal Person from Contractor and CSC monitors the safety issues at construction site.

63. SASEC, PAR project is in-line with the NEC, RGoB guidelines and ADB, SPS guidelines. Environmental site inspections are carried out daily and reported in monthly Environmental Management Plans and Annual Environmental Monitoring Reports. In addition a District Environmental Committee lead by the District Environmental Officer inspects the Construction site.

64. PAR project got terminated due to following reasons;

- a. Insufficient workforce.
- b. Insufficient machineries.
- c. Delay in material mobilization. In addition to the above points, contractor could achieve only 15.31% against target of 47.51% upon elapse of 66% of project period.

## ANNEXURE 1: PHOTOLOG



Picture 1: Fire extinguisher at CSC site office



Picture 2: Site Office

Picture 3: Batching Plant at Bhalujora  
(before)

Picture 4: Batching Plant removed (after)



Picture 5: Bhalujhora Bridge (summer)



Picture 6: Bhalujhora Bridge foundation.



Picture 7: CDCL Asphalt Plant (before)



Picture 8: CDCL Asphalt Plant  
(removed/after)