Semi-Annual Environmental Monitoring Report

Project number: 44240-013

Period: April – October 2018
Submission Date: December 2018

BHU: Urban Infrastructure Project

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Semi-Annual Environmental Monitoring Report

Reporting Period: ***November 2018***

BHU: Urban Infrastructure Project

Project Number: ADB Loan No. 2816 - BHU

Prepared by K.D. Chamling, Environmental Specialist,
Design, Monitoring and Supervision Consultants (DMSC),
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1. INTRODUCTION

1.1 OVERALL PROJECT DESCRIPTION AND OBJECTIVES

1. The Royal Government of Bhutan (RGoB) had signed a loan agreement (Loan Agreement No. 2258–BHU) in the year 2007 with the Asian Development Bank (ADB) for implementation of Urban Infrastructure Development Project (UIDP). The project covered Thimphu, Phuentsholing and Dagana. The project was completed and closed in 2014.

2. Later on Government expressed their need for further infrastructure development in Bhutan and requested ADB for project preparation to ensure sustainable urban development in additional towns. ADB conducted a PPTA study under TA 7360 and identified work components in the following towns – Thimphu, Phuentsholing, Samdrup Jongkhar and Rinchenthang (Nganglam). Accordingly a proposed Urban Infrastructure Project (UIP) framed up by ADB in the year 2011. It was conceptualized and planned that UIP would follow the ongoing Urban Infrastructure Development Project (UIDP).The main basis for urban infrastructure investment is the Government's Structure Plans and Local Area Plans (LAP). These LAPs prioritize urban infrastructure requirements with tentative costs. The aim of improving, upgrading and expanding the urban infrastructure facilities and providing basic urban services materialized when RGoB concluded a loan agreement with ADB.

3. The name of the project is "Urban Infrastructure Project" under ADB Loan 2816-BHU. The loan was approved by ADB in November 2011 and declared effective in April 2012. The project schedule is to start on May 2013 with a completion target date of 14 February 2018. The total project cost is estimated at $23.3 million, of which ADB is financing $19.8 million and the GoB is financing $3.5 million.

4. The Executing Agency (EA) is the Department of Engineering Services (DES) under MoWHS. The EA will be supported by its Project Management Unit (PMU) headed by a Project Manager (PM) and the Project Implementation Units (PIUs), headed by PM of the PIUs from the Project areas of Thimphu, Phuentsholing and Samdrup Jongkhar. Further the PMU and the PIUs will be supported and guided by Project Management Consultancy (PMC) Unit from SMEC, India and the Design, Monitoring, Supervision Consultant (DMSC) from STUP Consultancy, Kolkata respectively.

5. The project will support the Government's efforts toward sustainable urban development in Thimphu, Phuentsholing and Samdrup Jongkhar Municipality (SJM).

Table 1: Project components under various Thromdes

Sl. No.	Component	Thromde (Municipality)	Detail
1	Waste water	Thimphu	Construction of Wastewater Treatment Plant
2	Road and Bridge	Phuentsholing	Planning, Survey, Investigation and Design of Second Bridge and Approach Roads
3	Water Supply, Waste water	SamdrupJongkhar (SamdrupJongkhar and Dewathang)	Water Resource Study Design of Water Supply facilities and rehabilitation Design of Wastewater facilities

1.2 Environmental category as per ADB Safeguard Policy Statement, 2009

The implementation of the Project will be governed by Asian Development Bank Safeguard Policy Statement (SPS, 2009) and the environmental laws, policies and regulations of the government.

The ADB SPS stipulates addressing environmental concerns, if any, of a proposed activity in the initial stages of project preparation. For this, the ADB SPS categorizes the proposed components into categories (A, B or C) to determine the level of environmental assessment required to address the potential impacts. The Project has been categorized as B. Accordingly this IEE is prepared to address the potential impacts in line with the SPS. Stakeholder consultation was an integral part of the IEE which was carried out and an EMP specifying mitigation measures to be adhered to during implementation of the Project has been prepared.

1.3 Environmental category of each subproject as per national laws and regulations

The Royal Government of Bhutan mandates all projects be subjected to environmental assessments prior to implementation. The implementation of the Project will be governed by laws, regulations, and standards for environmental assessment and management of the government. **Table 1** summarizes the main requirements of the government for environmental management that will apply to the Project.

Table 2: Government Environmental Policies, Laws, Regulations, and Standards

Statute	Outline	Relevance
Environmental Assessment Act, 2000	This Act establishes procedures for the assessment of potential effects of projects on the environment, and aims to determine measures to reduce potential adverse effects and to promote environmental benefits.	• To ensure that all foreseeable impacts on the environment, including cumulative effects are fully considered prior to any irrevocable commitments of resources or funds. • To ensure that all feasible alternatives are fully considered.
Regulation for The Environmental Clearance of Projects (RECOP), 2002	Regulation for Environmental Clearance of Projects (RECOP) defines responsibilities and procedures for the implementation of the Environmental Assessment Act, 2000 for issuance and enforcement of environmental clearances.	• To ensure that all projects are implemented in line with the sustainable development policy of the Royal Government of Bhutan • To ensure that all feasible means to avoid or mitigate damage to the environment are implemented; and • To ensure that concerned people benefit from projects in terms of social facilities.
National Environment Protection Act, 2007	The aim of this Act is to enable an effective system of conserving and protecting Bhutan's environment. This system is constituted of the National Environment Commission or other designated Competent Authorities and advisory committees responsible for independently regulating and promoting sustainable development in an equitable manner.	• The Act provides a framework for developing measures and standards to protect Bhutan's environmental quality. Guidance relevant to this project includes: • Handling of hazardous substances: No person shall handle or cause to be handled any hazardous substance except in accordance with such procedure and after complying with such safeguards as may be prescribed under national and international instruments. • Discharge of environmental pollutants: No person shall discharge or emit or be permitted to discharge or emit any pollutants in excess of such standards as may be prescribed.

Statute	Outline	Relevance
Waste Prevention and Management Act of Bhutan, 2009	The Waste Prevention and Management Regulation 2012 is adopted under section 53 of the Waste Prevention and Management Act, 2009. This Act defines the institutional framework for preventing and managing waste in Bhutan, including the establishment of sound waste management system, including monitoring procedures at every organizational level, through efficient collection, segregation, treatment, storage, transportation, reduction, reuse, recycling and safe disposal of solid, liquid and gaseous wastes. It sets out the principles, measures, mechanisms and responsibilities for reduction, segregation, and appropriate disposal of waste to protect the country's environment. The act also provided the requirements for the management of hazardous wastes to include: labeling, pre-treatment process, storage, record keeping, transportation, and disposal of hazardous waste by the generator. Sanctions and penalties are provided for non-compliance.	• Waste management requirements of relevance to the proposed development include: • Non-hazardous waste: Implementing agencies shall ensure that the reduction, reuse, recycling and disposal of non-hazardous waste are addressed in an environmentally sound manner to ensure compliance with the Act • Hazardous waste: Implementing agencies shall prevent manufacturing of products with potential to generate hazardous waste. The agencies shall also ensure that the reduction, storage, treatment, and disposal of hazardous waste are addressed in an environmentally sound manner to ensure compliance with the Act
General Rules and Regulations on Occupational Health and Safety (OHS) In Construction, Manufacturing, Mining and Service Industries, 2006	OHS Rules and Regulations aims 'to assure safe and healthful working conditions for working men and women as well as other persons present at workplaces from work related risks to their health, safety, and well being	During Construction and operation stage of the project.
The Labour and Employment Act of Bhutan, 2007	The labour and employment act of Bhutan 2007 provide policies and programs in the areas of employment promotion, labour protection and relations, vocational education and training, and occupational standards setting and certification.	The proposed development will adhere to the policies provided under different sections of the Act.
The Forest Act (1969).	The first environmental legislation in Bhutan. It brought all forest resources under government custody to regulate utilization.	This was repealed with the enactment of the FNCA in 1995

Statute	Outline	Relevance
Forest and Nature Conservation Act (FNCA) 1995	Allows community stewardship of forests and aims to provide protection and sustainable use of forests, wildlife, and related natural resources.	Schedule I of the Act, lists those wild animals and plants that are given full protection under the Act. The FNCA establishes that all forests in Bhutan are Government Reserved Forests (GRF), and prohibits any development activity in these areas except with a permit.
Forest and Nature Conservation Rules (FNCR) 2000	Under powers established by the FNCA, the Ministry of Agriculture promulgated the FNCR in 2000, which was revised in 2006.	Amongst other things the FNCR allows for: 1. Allotment of land and land rights in GRF; 2. Prohibitions, restrictions and concessions in GRF; 3. Transport and trade of forest produce; 4. Declaration and administration of protected areas; 5. Protection of wildlife and use of certain wild species; 6. Prevention of forest fires, land clearance, and activities potentially impacting soil, water and wildlife resources; and 7. Enforcing penalties for offences related to these and other aspects of the FNCR.
Land Act 1979 (Revised 2007)	The Land Act 1979 provides the basis for land tenure in Bhutan was revised in 2007 to streamline many provisions in the Land Act. One major Change was the establishment of an autonomous National Land Commission Secretariat which has been given full responsibility for all matters pertaining to land registration. Land categories have been reduced to seven including i) Chhuzhing (wetland), ii) Kamzhing (dry land) includingorchard, iii) Khimsa (Residential land), iv) Industrial land, v) Commercial land, vi) Recreational and vii) Institutional land.	Under this Act, there are provisions for acquisition of land by the Government, if it is required for the benefit of the country. In such cases, the affected person will be compensated with substitute land from the same Dzongkhag or given cash compensation depending on the land classification as per the prevailing land compensation rate determined by the Act. If a house is acquired, compensation is paid on the basis of an evaluation carried out by a qualified engineer appointed by the competent authority.

FNCA = Forest and Nature Conservation Act, FNCR= Forest and Nature Conservation Rules, GRF= Government Reserved Forests, OHS = Occupational Health and Safety.

The policy, legal, and administrative frameworks relevant to the environmental assessment of infrastructure projects in Bhutan have been established by the following laws and regulations: (i) the National Environmental Protection Act of 2007, (ii) the Environmental Assessment Act of 2000, and (iii) Regulation for Environmental Clearance of 2002. At the national policy level, environmental protection and conservation is a constitutional mandate to:

(i) Protect, conserve, and improve the pristine environment;
(ii) Safeguard biodiversity; and
(iii) Prevent pollution and ecological degradation.

Environmental Clearance Requirements: Article 33.1 of the Environmental Assessment Act 2000, grants the competent authority (CA) a power to screen, issue or deny the environmental clearance of the activities or project listed under Annex 2 of RECOP 2002. However, the executing agency (MoWHS) cannot issue an environmental clearance to itself or the Departments directly under it; even for the listed activities of the RECOP. However, it can issue the clearance to organizations like Thimphu Thromde; which is an autonomous organization.

However, the Thimphu Thromde is obliged to fill up the standard IEE forms and submit it to the MoWHS along with the no objection certificates (NOC) from the affected persons or public and other stakeholders.

Table3: Environmental Regulatory Compliance

Component Description	Royal Government of Bhutan		ADB	
	Competent Authority in accordance with ECR	Environmental Assessment	Category in accordance with SPS	Environmental Assessment
Component 1: Thimphu Thromde Construction of Wastewater Treatment Plant.	MoWHS or NACSQC - NEC	Environmental Information	Category B **	IEE and EMP
Component 2: Phuentsholing Thromde Construction of 46.8 m PSC Box Girder Bridge	MoWHS or NACSQC - NEC	Environmental Information	Category B **	IEE and EMP
Component 3: Samdrup Jongkhar Thromde Water supply: i) Intake ii) Transmission Mains iii) WTP iv) Clean Water Reservoir (CWR) v) Site office	MoWHS or NACSQC - NEC	Environmental Information	Category B **	IEE and EMP

ADB = Asian Development Bank, ECR* = Environmental Clearance Regulations, EMP = Environmental Management Plan, IEE = Initial Environmental Examination, NACSQC- = National Authority for Construction Standards and Quality Control, NEC = National Environment Commission, SPS = Safeguard Policy Statement, TRIP = Thimphu Road Improvement Project.
**Nothing is envisaged at this stage that could cause reclassification to Category A.

1.4 Project Safeguards Team

Table 4: Project Safeguard Team

Name	Designation/Office	Email Address	Contact Number	Roles
1. PMU				
Jigme Dorji	Project Manager	jdorji@mowhs.gov.bt	17643516	
2. PIUs				
a) Thimphu Thromde				
Kinley Penjore	Project Manager	kpenjore@thimphucity.gov.bt	17379020	
Thukten Tshering	Project Engineer	Ttshering&thimphucity.gov.bt	17111649	
Tashi Dorjj	Project Engineer	tashid@thimphucity.gov.bt	17172677	
b) Phuentsholing Thromde				
Anu Pradhan	Project Manager	piuadbpt2012@gmail.com	17118279	
Bikash Sharma	Project Engineer	bsharma@pcc.bt	17372162	
c) S. Jongkhar Thromde				
Pema Chokey	Project Manager	pchokey@sjthromde.gov.bt	17883968	
Mani Kumar Rijal	Project Engineer	mkrizal@sjthromde.gov.bt	17661316	
3. Consultants				
K.D. Chamling	Environment Specialist	chamlingkd@gmail.com	17111541	
Rajesh Pradhan	Social Safeguard Specialist	rajpradhan2008@gmail.com	17603661	

1.5 Overall project and sub-project progress and status

Till 27th November 2018, all the three components have been awarded and works are in progress. **Table 5** below shows the project packages, starting date of implementation, schedule date of completion etc. along with physical progress.

Table 5: Sub-project status

Sl. No	Component	Location/ Area of Activities	Start date of Implementation	Actual months of completion	Actual date of completion	Physical progress (%) as on 15th November 2018
1	**Component 1: Thimphu Thromde**					
	Construction of Waste Water Treatment Plant.	Babesa LAP	10/Nov/2016	30	9th May 2019	62.47%,
	- Completion of designs				End of Feb '19	98 %
	- Construction of Office building				End of Dec 2018	98.23%
	- Construction of staff quarter				End of Dec 2018	97.69%
	- Electrical control building				End of Dec 2018	98.08%
	- Sequencing Batch Reactor (SBR)				End of April 2019	74%
	- Pump House				End of Feb 2019	60%
	- Blower and Chlorination building				End of March 2019	44%
	- Centrifuge and Sludge holding Sump				End of Feb 2019	43%
	- Thickened Sludge and Supernatent Sump				End of March 2019	45%
	- Head Works				May 2019	32%
	- Transformer and DG Room				End of Dec 2018	33%
	- Pedestal and Pipe line				Jan 2019	43.4%
	- Procurement and Supply				May 2019	62.5%
2	**Component 2: Phuentsholing Thromde**					
	Construction of 46.8 m PSC Box Girder Bridge	Over Om Chhu, near Youth Center	1/August/2017	18	20 Feb 2019	30%
3	**Component 3: Samdrup Jongkhar Thromde**					
	Water supply: Intake, Transmission Main & WTP, Office building	Rikkechhu and Pinchinang (Char kilo)	1/5/2016	18	15 Nov 2018* (revised date)	90%**

***** New completion date extended till 15th November 2018. ****** chemical building – civil works 70% completed.

1.6 Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

Table 6: Sub-projects Implementation status

Package Number	Components/List of Works	Contract Status (specify if under bidding or contract awarded)	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M)[1]	If On-going Construction	
				%Physical Progress	Expected Completion Date
1. Thimphu Thromde	Construction of Waste Water Treatment Plant.	Contract awarded.	On-going construction.	62.47%,	May '19
	- completion of drawings/designs		On-going construction	98%	End of Feb '19
	- construction of administrative building		On-going construction	98.23%	End of Dec 2018
	- construction of staff quarters		On-going construction	97.69%	End of Dec 2018
	- Electrical control building		On-going construction	98.08%	End of Dec 2018
	- Sequencing Batch Reactor (SBR)		On-going construction	74%	End of April 2019
	- Pump House		On-going construction	60%	End of Feb 2019
	- Blower and Chlorination building		On-going construction	44%	End of March 2019
	- Centrifuge and Sludge holding Sump		On-going construction	43%	End of Feb 2019
	- Thickened Sludge and Supernatent Sump		On-going construction	45%	End of March 2019
	- Head Works		On-going construction	32%	May 2019
	- Transformer and DG Room		On-going construction	33%	End of Dec 2018
	- Pedestal and Pipe line		On-going construction	43.4%	Jan 2019
	- Procurement and Supply		On-going construction	62.5%	May 2019
2. P/ling Thromde	Construction of 46.8 m PSC Box Girder Bridge	Contract awarded.	On-going construction.	30%	20 Feb 2019
3. S. J/khar Thromde	Water supply:	Contract awarded.	On-going construction.	90%	15 Nov 2018***
	• Intake – raw water equipment	Procurement awarded.	.		Delivery at site by end March '18
	- Design WTP	Submitted to PIU in Feb '18.	completed		
	• laying of pipelines till WTP		completed		Completed by Aug '17.
	- Construction of Office building, chlorine building and centrifuge building.		completed	80%	30 April 2018
	- raw water pumping and transmission	Pumps to be procured and installed.	Procurement complete, Installation will be done by end Nov'18		

[1] If on-going construction, include %physical progress and expected date of completion

*** New completion date extended till 15th November 2018.

	- Completion of drawings	28 components designs submitted except chemical building	completed		

2. COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS[2]

Table 7: Compliance Status with National Environmental Requirements

Package No.	Subproject Name	Statutory Environmental Requirements[3]	Status of Compliance[4]	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish[5]
1. Thimphu Thromde	Construction of WWTP	Environment Clearance (EC) required.	EC obtained vide letter No. NECS/CMD/Thimphu Thromde/2568/2016/788 dated May 16, 2016.	Valid till May 15, 2019.	NA	There are **47** clauses in the EC to be complied with. Among others Clause 39 specifically requires that trees be planted within the WWTP to maintain greenery and improve aesthetic/visual impact of the area.
2. P/ling Thromde	Construction of 46.8 m PSC Box Girder Bridge	EC required.	EC obtained vide letter No. MoWHS/PPD/Env/01/2017/08 dated September 29, 2017.	Valid till 28 September 2020.	NA	There are **nine (9)** clauses with sub clauses. Under clause V. Waste Prevention and Management: The holder shall, manage wastes generated from the activities with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management.

[2] All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.

[3] Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.)

[4] Specify if obtained, submitted and awaiting approval, application not yet submitted

[5] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*

3. Samdrup Jongkhar Thromde	Water Supply	EC required.	• EC obtained vide NECS/ESD/Dzo-S/Jongkhar/3208/2015/2544 dated 15 May 2015. • EC renewed vide NECS/EACD/DZO-s-Jongkhar/3208/2018/579 dated May 24, 2018.	• Valid till May 23, 2020.	NA.	• There are **nine (9)** clauses with sub clauses. Under **clause V. Waste Prevention and Management**: The holder shall, manage wastes generated from the activities with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management. • Ensure that effective day to day monitoring of EC clauses are carried out by environmental unit or designated environment focal person. • **Clause VII** warrants that a detailed implementation plan to be submitted to NECS within three (3) months from the date of issue of this EC as per the format attached with EC. • Submit annually the Compliance Report as per the format attached with the EC.

3. COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

Table 8: Compliance Status with Environmental Loan covenants

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required
Schedule 5; Sl.no. 4 Environment	The Burrower shall ensure or cause DUDES and each of the IAs to ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project, and all Project facilities comply with (a) all the applicable laws and regulations of the Burrower relating to environment, health and safety; (b) the Environmental /safeguards; the EARF; and (d) all	Followed EMPs, but the level of knowledge and capacity to understand and prepare EMPs vary with PIUs and contractors. The quality of EMPs submitted needs to be improved and be more	1-2 days' of environmental awareness workshop needs to be conducted in the project, as the PIUs and contractors' staff need to understand the entire concept and principles behind EMP. A half-day EMP preparation exercise by the participants would enable to impart a basic working knowledge to the PIUs and contractors.

	measures and requirement setforth in the respective IEEs and EMPs. And any corrective preventive actions set forth in a Safeguard Monitoring Report.	or less consistent with different projects.	

4. COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT PLAN (Refer to EMP Tables in approved IEE/s)

4.1 Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

As per IEE, the contractors are required to submit a Contractor's EMP (CEMP) and site management plan. The CEMP shall be prepared by all contractors before the start of the construction works and shall be approved by PIU. This requirement shall be included in the construction contracts. It shall provide details on specific items related to the environmental aspects during construction. It shall include specifications on requirements for dust control, erosion and sediment control, avoidance of casual standing water, management of solid wastes, workers' camp sanitation, and pollution from oil, grease, fuel spills, and other materials due to the operation of construction machineries, safety and traffic management, avoidance of inconveniences to the public, air and noise pollution control. It shall also include guidance on the proper design of the construction zone, careful management of stockpiles, vegetation, topsoil, vehicles, and machinery.With the CEMP, PIU can easily verify the associated environmental requirements each time the contractor will request approval for work schedules.

Package-wise IEE Documentation Status

Table 9: Package-wise IEE Documentation Status

Package Number	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director? (Yes/No)	Remarks
	Not yet due (detailed design not yet completed)	Submitted to ADB (Provide Date of Submission)	Disclosed on project website (Provide Link)	Final IEE provided to Contractor/s (Yes/No)		
1. Thimphu Thromde: Construction of WWTP.	Completed			No	Monthly EMP submitted by the contractor is approved by the PM, PIU.	The PIU has not shared the final IEE with the contractors.
2. Phuentsholing Thromde: Bridge construction.	**Completed**			No	Monthly EMP submitted by the contractor is approved by the PM, PIU.	The PIU has not shared the final IEE with the contractors.
3. S. Jongkhar Thromde: Water Supply	**Completed**			No	Monthly EMP submitted by the contractor is approved by the PM, PIU.	The PIU has not shared the final IEE with the contractors.

4.2 For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.

Package-wise Contractor/s' Nodal Persons for Environmental Safeguards

Table 10: Package-wise Contractor/s' Nodal Persons for Environmental Safeguards

Package Name	Contractor	Nodal Person	Email Address	Contact Number
1. Thimphu Thromde: Construction of WWTP.	Technofab Engineering Ltd.	Amit Kr. Sharma	Amit.gunjan1993@gmail.com	17597912
2. P/ling Thromde: Bridge construction.	Bhutan Builders Pvt. Ltd.	Hari Lal Thapa	thapahary@gmail.com	17150056 / 77706078

3. S. J/khar Thromde: Water Supply	Tundi-Tacho JV	Karma Kinley	kinseldor@gmail.com	77671584

4.3 With reference to approved EMP/site-specific EMP/construction EMP, complete the table below

Summary of Environmental Monitoring Activities (for the Reporting Period)[6]

Table 11 (a): Summary of Environmental Monitoring Activities
Component 1: Thimphu Thromde - WWTP

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase & Pre-Construction Phase						
1. Incorporate design measures to minimize environmental impacts	• Detail design for project conforming to the government's environmental and technical design standards • Identify potential disposal sites.	Included in the designs.	Included in the Contract document.	Bid document.		PM, PIU
Construction Phase						
I) Orientation for Contractors, Workers on environmental management.	• PIU to conduct awareness training/orientation on implementation of mitigation measures in the EMP.	Training	Number of trainings conducted.	PIU/ Construction site office.	Not done.	None
	• Provide HIV-AIDS education and disease prevention awareness talks to the contractor and their site agents	---"---	---do—	--do—	27 – 11- '18	K.D. Chamling
II) Drainage and Hydrological Impacts including storm water management. - Wangchu River falls within the project area. Construction activities can affect/impact the river water quality due to erosion runoff.	Contractor will implement following measures to minimize the impacts. • During construction, the contractor will ensure the proper disposal of spoil and other wastes. • All construction materials, sand and stones to be procured from nearby government approved, existing and operational quarries.	Disposed spoils.	Amount of spoils disposed.	Disposal site.	27 – 11- '18	K.D. Chamling

[6] Attach Laboratory Results and Sampling Map/Locations

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
III) Materials exploitation & management. • To minimize adverse environmental impacts of borrowing and quarrying	• All construction materials, sand and stones to be procured from nearby government approved, existing and operational quarries. • Covering of materials during transportation and spraying of water along haulage route.	Materials brought on sight.	Transportation & material purchased challans.	Material stock yard	Daily basis..	PIU
IV) Waste • Reduce spoils generation. • Reduce, reuse and recycle waste to reduce contamination due to poor waste disposal practices	In principle, the waste generation will be minimized at source. • Waste products will be segregated into bio-degradable and non-biodegradable and disposed in Thimphu Thromde's waste collection system. • Recycling to be undertaken as far as possible. Examples would include recycling road resurfacing waste as aggregate (e.g. Reclaimed asphalt pavement or reclaimed concrete material) or as a base • Any recyclable waste which cannot be reused during construction will be sold to licensed scrap dealers. • Residual non-hazardous waste will be disposed-off in the municipal land fill. • Construction/workers camps will be provided with sufficient refuse bins. • Organic waste such as plant materials will be composted. • Animal carcasses will be collected in a timely manner and buried; • Disposal of solid wastes into flood ways, wetland, rivers, other watercourses, farmland, forest and associated places of worship or other culturally sensitive areas or areas where a livelihood is derived canals, agricultural fields and public areas will be prohibited. Solid	No dusts emissions during transportation. Amount of waste generated.	Visual assessment. Record of wastes generated.	During transportation. Construction sites and camps.	Daily basis Daily basis	PIU PIU

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
V) Hazardous substances • **Uses and waste disposal**	waste will only be disposed in Thimphu Thromde's designated areas such as landfills. • Sludge removed from storm water drains will be classified as hazardous or non-hazardous waste and disposed in designated landfill sites in accordance with national regulations • Oil and lubricants will be safely stored. Secondary containment around fuel storage area will be ensured. • Controls and standard operating procedures will be developed for the use of fuels and other hazardous substances to prevent spills, accidents and pilferage. • Equipment/vehicle maintenance and refueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas will be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency. • Fuel and other hazardous substances will be stored in safe and isolated areas provided with roof, impervious flooring and bund/containment wall to protect these from the spillage. • Hazardous wastes (oil, used batteries, fuel drums) will be segregated, labeled and safely stored. The spent oil and batteries will be sold to recycling dealers. • Hazardous materials will be stored away from water bodies and above flood level. • Clean-up operation using readily available absorbent such as sawdust will be carried	Methods of storage	No spillage.	Store/depot.	27 Nov 2018	KD. Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	out immediately during accidental spillage of hazardous waste. • All areas intended for storage of hazardous materials will be quarantines and provided with adequate facilities to combat emergency situations complying with all applicable statutory stipulation.					
VI) Air quality • To minimize and reduce fugitive dust emissions and fumes from the construction vehicles.	• Water sprinkling / spraying using tanker will be done twice a day or as often as required based on visual observation in order to reduce dust generation. • Fuel efficient and well-maintained haulage trucks will be employed to minimize exhaust emissions. Regular maintenance will be carried out. • All vehicles and machinery used for construction should have valid pollution control certificates (emission tests certificates) • Vehicles transporting soil, sand and other loose and fine construction materials shall not be overloaded and will be covered with tarpaulin sheets to reduce the release of dust and avoid impacts from dust. Speed limits of such vehicles within the works site and on unpaved edge areas of the Project road will be established and agreed with the PMU.	Dust emission.	Visual	Construction sites	27 Nov 2018	KD Chamling
VII)Noise • Minimize nuisance to community due to increased noise levels	• If noise level exceed the stipulated limits then design and implement noise control measures such as the installation of temporary stationary noise barriers along the	Noise at site.	Harshness of sound and no complaints from public.	Construction sites.	27 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	right of ways, use of equipment with good quality mufflers in working order, • Refraining from undertaking construction near schools during school hours or during examination periods, • Inform the residents and institutions of the construction schedule in their vicinity and the likelihood of excess noise during these periods, specifying the anticipated periods during which these impacts will affect them. • In the event, if blasting is required due to unavoidable circumstances, use only non-explosive chemical based blasting material (silent blasting technique) for rock breaking, which will not generate any noise or vibration.					
VIII) Camps construction and canteen facilities	• Avoid camp construction too close to the local communities to avoid unwanted interference to the way of living of the local communities. Camps location to be consulted with PIU. • Adequate drinking water supply, basic food items, and cooking fuel (such as kerosene) will be provided to ward off competition on local resources. • For maintenance of proper health and hygiene adequate number of pit latrines and garbage cans will provided. • Fishing, hunting and illegal tree felling will be totally prohibited. • After completion of construction, the abandoned campsite will be cleaned and restored to the original state. If a campsite is a government barren land then contractor will	Drinking water supplies and electricity provided in camps.	Observation of camps	Camp sites.	27 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	carry out compensatory plantation with suitable local or native plant species.					
IX) Occupational Health and Safety • Physical hazards	• Routing of traffic to alternative roads where possible • Where workers' exposure to traffic cannot be completely eliminated, use of protective barriers to shield workers from traffic vehicles, or installation of channeling devices (e.g. traffic cones and barrels) to delineate work zone • Workers shall be provided with appropriate personnel safety equipment such as safety boots, helmets, gloves, reflective jackets, protective clothes, dust mask, goggles, and ear protection at no cost to the workers. • Conducting training (assisted by PIU) for all workers on safety and environmental hygiene at no cost to the employees. • The contractor will instruct workers in health and safety matters as required by law and by good engineering practice and provide first aid facilities. This will include construction camp rules and site agents/foremen will follow up with toolbox talks on a regular basis. • Workers should use safety strap/belts whenever and wherever required.. • Fencing on all areas of excavation greater than 1m deep shall be done. • Contractor will at all-time keep the first aid kit at the construction sites. • Contractor will be responsible for evacuation of injured person to the nearest medical center and bear all the medical expenses	Safety equipment.	Safety gears issued and used.	Sites	27 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
• **Chemical hazards**	• Reflecting signals shall be installed on all construction vehicles and plant. • Reduction of engine idling time at construction sites to prevent high accumulation of toxic fumes. • Use of extenders or other means to direct exhaust away from the operator. • Use of protective clothing when working with cutbacks (a mixture of asphalt and solvents for the repair of pavement), diesel fuel or other solvents • Avoiding the use of lead containing paint and using appropriate respiratory protection when removing paints (including those containing lead in older installations) or when cutting galvanized steel.	Protective clothing	No burns to workers.	Work site.	27 Nov 2018	KD Chamling
• **Public Health and safety**	• Provided safety barriers and proper signage at construction sites. • Barriers must be installed to deter pedestrians' access to construction sites, except at designated crossing points. • Traffic must be adequately regulated (eg through signs, signals, markings) near critical pedestrian zones or bikeways. • Excavated trenches/ditches and freshly cut steep side slopes will be clearly marked and fenced for the safety of passersby and workers alike. • Project or construction vehicles will be briefed on speed limit within sensitive areas such as schools, commercial and residential areas.	Signs and barriers.	No accidents.	Construction sites.	27 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
• **Traffic safety and management**	• In event of accidents, the contractor will be responsible for immediate evacuation of injured person to the nearest medical center. The contractor shall bear medical and other expenses of the injured person. • Local communities to be informed about the traffic management measures that will be in place during the period of the construction.	-	-	-	-	-
Operational Phase						
1. Noise - prevent excess noise	• Noise barrier will be installed if needed in future	NA	NA	NA	NA	NA
2. Gaseous Emission - prevent air pollution	• Ensuring that vehicles undertake mandatory pollution checking and maintenance procedures. • Undertake air quality monitoring	NA	NA	NA	NA	NA
3. Particulate emissions - Control level of particulates	• The road surface will be maintained for smooth traffic flow and reduction of vehicular emission • Undertake air quality monitoring	NA	NA	NA	NA	NA
4. Soil erosion and water pollution	• Storm water drainage to be maintained and surrounding vegetation to be maintained in good working condition. • Routine cleaning of the existing drains and water bodies.	NA	NA	NA	NA	NA
5. Driving conditions and community safety	• Zebra crossings to be maintained (clear & visible). • Pedestrian footpath to be properly maintained.	NA	NA	NA	NA	NA

Table 11 (b): Summary of Environmental Monitoring Activities
Component 2: Phuentsholing Thromde –Bridge Construction

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase & Pre-Construction Phase						
1. Incorporate design measures to minimize environmental impacts	• Detail design for project conforming to the government's environmental and technical design standards • Identify potential disposal sites.	Included in the designs.	Included in the Contract document.	Bid document.	-	PM, PIU
Construction Phase						
I) Orientation for Contractors, Workers on environmental management.	• PIU to conduct awareness training/ orientation on implementation of mitigation measures in the EMP.	Training	Whether conducted.	PIU	Not done.	None
Drainage and Hydrological Impacts including storm water management.	• Provide HIV-AIDS education and disease prevention awareness talks to the contractor and their site agents	---"---	---do—	--do—	--do—	None
II) Drainage and Hydrological Impacts including storm water management. - Omchu and Amochu rivers falls within the project area. Construction activities can affect/impact the river water quality due to erosion runoff. -	Contractor will implement following measures to minimize the impacts. • During construction, the contractor will ensure the proper disposal of spoil and other wastes. Excavated construction spoil will be used for filling during road widening and embankment construction. . • All construction materials, sand and stones to be procured from nearby government approved, existing and operational quarries. • covering of materials during transportation and spraying of water along haulage route.	Disposed spoil	Amount of spoils disposed.	Disposal site.	Not done.	None.
III) Materials exploitation & management.	In principle, the waste generation will be minimized at source.	Materials brought on sight.	Site visit	Construction Site	24 Nov 2018	K D Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
• To minimize adverse environmental impacts of borrowing and quarrying	• Waste products will be segregated into bio-degradable and non-biodegradable and disposed in Thimphu Thromde's waste collection system.	No dusts emissions during transportation.	Site visit	Construction Site	Daily	PIU
IV) Waste • Reduce spoils generation.	• Recycling to be undertaken as far as possible. • Any recyclable waste which cannot be reused during construction will be sold to licensed scrap dealers.	Amount of waste generated.	Record of wastes generated.	------do------	Daily	----do---
• Reduce, reuse and recycle waste to reduce contamination due to poor waste disposal practices	• Residual non-hazardous waste will be disposed-off in the municipal land fill. • Construction/workers camps will be provided with sufficient refuse bins. • Organic waste such as plant materials will be composted. • Disposal of solid wastes into, rivers and other areas will be prohibited. Solid waste will only be disposed in Thimphu Thromde's designated areas such as landfills.					
V) Hazardous substances - Uses and waste disposal	• Oil and lubricants will be safely stored. Secondary containment around fuel storage area will be ensured. • Controls and standard operating procedures will be developed for the use of fuels and other hazardous substances to prevent spills, accidents and pilferage. • Equipment/vehicle maintenance and refueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas will be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency. • Fuel and other hazardous substances will be stored in safe and isolated areas provided with roof, impervious flooring and	Methods of storage	No spillage.	Store/depot.	24 Nov 2018	KD. Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	bund/containment wall to protect these from the spillage. • Hazardous wastes (oil, used batteries, fuel drums) will be segregated, labelled and safely stored. The spent oil and batteries will be sold to recycling dealers. • Hazardous materials will be stored away from water bodies and above flood level. • Clean-up operation using readily available absorbent such as sawdust will be carried out immediately during accidental spillage of hazardous waste.					
VI) Air quality • To minimize and reduce fugitive dust emissions and fumes from the construction vehicles.	• Water sprinkling / spraying using tanker will be done twice a day or as often as required based on visual observation in order to reduce dust generation. • Fuel efficient and well-maintained haulage trucks will be employed to minimize exhaust emissions. Regular maintenance will be carried out. • All vehicles and machinery used for construction should have valid pollution control certificates (emission tests certificates) • Vehicles transporting soil, sand and other loose and fine construction materials shall not be overloaded and will be covered with tarpaulin sheets to reduce the release of dust and avoid impacts from dust. Speed limits of such vehicles within the works site and on unpaved edge areas of the Project road will be established and agreed with the PMU. • Paving approach roads where possible.	Dust emission.	Visual	Construction sites	24 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
VII)Noise •Minimize nuisance to community due to increased noise levels	• Plan activities, in consultation with PIU, during periods of the day which will result in least disturbance; • Restrain horn blowing unless it is necessary to warn other road users or animals. • Ensure that noise levels do not exceed 5% of the NEC daytime noise level standards for residential and institutional areas. Works will not be conducted during night time. • If noise level exceed the stipulated limits then design and implement noise control measures such as the installation of temporary stationary noise barriers along the right of ways, use of equipment with good quality mufflers in working order, • Refraining from undertaking construction near schools during school hours or during examination periods, • Inform the residents and institutions of the construction schedule in their vicinity and the likelihood of excess noise during these periods, specifying the anticipated periods during which these impacts will affect them. • In the event, if blasting is required due to unavoidable circumstances, use only non-explosive chemical based blasting material (silent blasting technique) for rock breaking, which will not generate any noise or vibration.	Noise at site.	Harshness of sound and no complaints from public.	Construction sites.	24 Nov 2018 24 Nov 2018	KD Chamling KD Chamling
VIII) Camps construction and canteen facilities	• Avoid camp construction too close to the local communities to avoid unwanted interference to the way of living of the local communities. Camps location to be consulted with PIU. • Adequate drinking water supply, basic food	Drinking water supplies and electricity provided in camps.	Observation of camps	Camp sites.	24 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
IX) Occupational Health and Safety • Physical hazards	items, and cooking fuel (such as kerosene) will be provided to ward off competition on local resources. • For maintenance of proper health and hygiene adequate number of pit latrines and garbage cans will provided. • Fishing, hunting and illegal tree felling will be totally prohibited. • After completion of construction, the abandoned campsite will be cleaned and restored to the original state. If a campsite is a government barren land then contractor will carry out compensatory plantation with suitable local or native plant species. • Routing of traffic to alternative roads where possible • Where worker exposure to traffic cannot be completely eliminated, use of protective barriers to shield workers from traffic vehicles, or installation of channeling devices (e.g. traffic cones and barrels) to delineate work zone • Reduction of maximum vehicle speeds in working zones • Workers shall be provided with appropriate personnel safety equipment such as safety boots, helmets, gloves, reflective jackets, protective clothes, dust mask, goggles, and ear protection at no cost to the workers. • Conducting training (assisted by PIU) for all workers on safety and environmental hygiene at no cost to the employees. • The contractor will instruct workers in health and safety matters as required by law and by	Safety equipment.	Safety gears issued and used.	Sites	24 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
• **Chemical hazards**	good engineering practice and provide first aid facilities. This will include construction camp rules and site agents/foremen will follow up with toolbox talks on a regular basis. • Workers should use safety strap/belts where required. • Fencing on all areas of excavation greater than 1m deep and sides of temporary works shall be observed. • Contractor will at all-time keep the first aid kit at the construction sites. • Contractor will be responsible for evacuation injured person to the nearest medical center and bear all the medical expenses • Reflecting signals shall be installed on all construction vehicles and plant. • Use correct asphalt product and ensure application at the correct temperature to reduce fuming of bitumen during normal handling • Reduction of engine idling time at construction sites to prevent high accumulation of toxic fumes. • Use of extenders or other means to direct exhaust away from the operator. • Use of protective clothing when working with cutbacks (a mixture of asphalt and solvents for the repair of pavement), diesel fuel or other solvents • Avoiding the use of lead containing paint and using appropriate respiratory protection when removing paints (including those containing lead in older installations) or when cutting galvanized steel.	Protective clothing	No burns to workers.	Work site.	24 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
• **Public Health and safety**	• Provided safety barriers and proper signage at construction sites. • Safe crossing areas should be designated and marked for pedestrians and cyclists. • Barriers must be installed to deter pedestrians' access to construction sites, except at designated crossing points. • Traffic calming devices and speed controls must be installed and maintained at pedestrian crossing sites. • Construction activities will be timed and provision for safe passage of school children and elderly will be provided. • Excavated trenches / ditches and freshly cut steep side slopes will be clearly marked and fenced for the safety of passersby and workers alike. • Project or construction vehicles will be briefed on speed limit within sensitive areas such as schools, commercial and residential areas. • In event of accidents, the contractor will be responsible for immediate evacuation of injured person to the nearest medical center. The contractor shall bear medical and other expenses of the injured person.	Signs and barriers.	No accidents.	Construction sites.	24 Nov 2018	KD Chamling
• **Traffic safety and management**	• Traffic management plan for construction period to be developed • Local communities to be informed about the traffic management measures that will be in place during the period of the construction.	Signs and barriers.	No accidents.	Construction sites.	Daily	PIU / Contractor
Operational Phase						

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
1. Noise - prevent excess noise	• Noise barrier will be installed if needed in future	NA	NA	NA	NA	NA
2. Gaseous Emission - prevent air pollution	• Ensuring that vehicles undertake mandatory pollution checking and maintenance procedures. • Undertake air quality monitoring	NA	NA	NA	NA	NA
3. Particulate emissions - Control level of particulates	• The road surface will be maintained for smooth traffic flow and reduction of vehicular emission • Undertake air quality monitoring	NA	NA	NA	NA	NA
4. Soil erosion and water pollution	• Storm water drainage to be maintained and surrounding vegetation to be maintained in good working condition. • Routine cleaning of the existing drains and water bodies.	NA	NA	NA	NA	NA
6. Driving conditions and community safety	• Zebra crossings to be maintained (clear & visible). • Pedestrian footpath to be properly maintained.	NA	NA	NA	NA	NA

Table 11 (c): Summary of Environmental Monitoring Activities
Component 3: Samdrup Jongkhar Thromde – Water Supply

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase&Pre-Construction Phase						
1. Incorporate design measures to minimize environmental impacts	• Detail design for project conforming to the government's environmental and technical design standards • Identify potential disposal sites.	Included in the designs.	Included in the Contract document.	Bid document.		PM, PIU
Construction Phase						
I. Orientation for Contractors, Workers on environmental management.	• PIU to conduct awareness training/ orientation on implementation of mitigation measures in the EMP.	Training	Number of trainings conducted.	PIU/ Construction site office.	Not done.	None
	• Provide HIV-AIDS education and disease prevention awareness talks to the contractor and their site agents	---"---	---do—	--do—	20 Nov '18	K.D. Chamling
II. **Drainage and Hydrological Impacts including storm water management**. - RiversDungsum Chhu and Rikke chu falls within the project area. Construction activities can affect/impact the river water quality due to erosion runoff.	Contractor will implement following measures to minimize the impacts. • During construction, the contractor will ensure the proper disposal of spoil and other wastes. • All construction materials, sand and stones to be procured from nearby government approved, existing and operational quarries.	Disposed spoils.	Amount of spoils disposed.	Disposal site.	Daily	PIU
III) Materials exploitation & management.	• All construction materials, sand and stones to be procured from nearby government approved, existing and operational quarries.	Materials brought on sight.	Transportation & material purchased challans.	Material stock yard	Daily	PIU

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
• To minimize adverse environmental impacts of borrowing and quarrying	• Covering of materials during transportation and spraying of water along haulage route.	No dusts emissions during transportation.	Visual assessment.	During transportation.	Daily	PIU
IV) Waste • Reduce spoils generation. • Reduce, reuse and recycle waste to reduce contamination due to poor waste disposal practices	In principle, the waste generation will be minimized at source. • Waste products will be segregated into bio-degradable and non-biodegradable and disposed in SJ Thromde's waste collection system. • Recycling to be undertaken as far as possible. Examples would include recycling road resurfacing waste as aggregate (e.g. Reclaimed asphalt pavement or reclaimed concrete material) or as a base • Any recyclable waste which cannot be reused during construction will be sold to licensed scrap dealers. • Residual non-hazardous waste will be disposed-off in the municipal land fill. • Construction/workers camps will be provided with sufficient refuse bins. • Organic waste such as plant materials will be composted. • Animal carcasses will be collected in a timely manner and buried; • Disposal of solid wastes into rivers, forests, culturally sensitive areas, agricultural fields and public areas will be prohibited. Solid waste will only be disposed in Thromde's designated areas such as landfills.	Amount of waste generated.	Record of wastes generated.	Construction sites and camps.	Daily.	PIU
V) Hazardous substances • Uses and waste disposal		Methods of storage	No spillage.	Store/depot.	20 Nov 2018	KD. Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
VI) Air quality • To minimize and reduce fugitive dust emissions and fumes from the construction vehicles.	• Oil and lubricants will be safely stored. Secondary containment around fuel storage area will be ensured. • Equipment/vehicle maintenance and refueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas will be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency. • Fuel and other hazardous substances will be stored in safe and isolated areas provided with roof, impervious flooring and bund/containment wall to protect these from the spillage. • Hazardous wastes (oil, used batteries, fuel drums) will be segregated, labeled and safely stored. The spent oil and batteries will be sold to recycling dealers. • Hazardous materials will be stored away from water bodies and above flood level. • Clean-up operation using readily available absorbent such as sawdust will be carried out immediately during accidental spillage of hazardous waste. • All areas intended for storage of hazardous materials will be quarantines and provided with adequate facilities to combat emergency situations complying with all applicable statutory stipulation. • Water sprinkling / spraying using tanker will be done twice a day or as often as required based on visual observation in order to reduce dust generation.	Dust emission.	Visual	Construction sites	20 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
VII)Noise • Minimize nuisance to community due to increased noise levels	• Fuel efficient and well-maintained haulage trucks will be employed to minimize exhaust emissions. Regular maintenance will be carried out. • All vehicles and machinery used for construction should have valid pollution control certificates (emission tests certificates) • Vehicles transporting soil, sand and other loose and fine construction materials shall not be overloaded and will be covered with tarpaulin sheets to reduce the release of dust and avoid impacts from dust. • Speed limits of such vehicles within the works site will be established and agreed with the PMU. . • If noise level exceed the stipulated limits then design and implement noise control measures such as the installation of temporary stationary noise barriers along the right of ways, use of equipment with good quality mufflers in working order, • Refraining from undertaking construction near schools during school hours or during examination periods, • Inform the residents and institutions of the construction schedule in their vicinity and the likelihood of excess noise during these periods, specifying the anticipated periods during which these impacts will affect them.	Noise at site.	Harshness of sound and no complaints from public.	Construction sites.	20 Nov 2018	KD Chamling
VIII) Camps construction and canteen facilities	• Avoidcamp construction too close to the local communities to avoid unwanted interference to the way of living of the local	Drinking water supplies and electricity provided in camps.	Observation of camps	Camp sites.	20 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
IX) Occupational Health and Safety • Physical hazards	communities. Camps location to be consulted with PIU. • Adequate drinking water supply, basic food items, and cooking fuel (such as kerosene) will be provided to ward off competition on local resources. • For maintenance of proper health and hygiene adequate number of pit latrines and garbage cans will provided. • Fishing, hunting and illegal tree felling will be totally prohibited. • After completion of construction, the abandoned campsite will be cleaned and restored to the original state with appropriate bioengineering works using local plant species. • Routing of traffic to alternative roads where possible • Where workers' exposure to traffic cannot be completely eliminated, use of protective barriers to shield workers from traffic vehicles, or installation of channeling devices (e.g. traffic cones and barrels) to delineate work zone • Workers shall be provided with appropriate personnel safety equipment such as safety boots, helmets, gloves, reflective jackets, protective clothes, dust mask, goggles, and ear protection at no cost to the workers. • Conducting training (assisted by PIU) for all workers on safety and environmental hygiene at no cost to the employees. • The contractor will instruct workers in health and safety matters as required by law and by	Safety equipment.	Safety gears issued and used.	Sites	20 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
• **Chemical hazards**	good engineering practice and provide first aid facilities. This will include construction camp rules and site agents/foremen will follow up with toolbox talks on a regular basis. • Workers should use safety strap/belts whenever and wherever required.. • Fencing on all areas of excavation greater than 1m deep shall be done. • Contractor will at all-time keep the first aid kit at the construction sites. • Contractor will be responsible for evacuation of injured person to the nearest medical center and bear all the medical expenses • Reflecting signals shall be installed on all construction vehicles and plant. • Reduction of engine idling time at construction sites to prevent high accumulation of toxic fumes. • Use of extenders or other means to direct exhaust away from the operator. • Use of protective clothing when working with cutbacks (a mixture of asphalt and solvents for the repair of pavement), diesel fuel or other solvents • Avoiding the use of lead containing paint and using appropriate respiratory protection when removing paints (including those containing lead in older installations) or when cutting galvanized steel. • Provided safety barriers and proper signage at construction sites.	Protective clothing	No burns to workers.	Work site.	20 Nov 2018	KD Chamling

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
• **Public Health and safety** • **Traffic safety and management**	• Barriers must be installed to deter pedestrians' access to construction sites, except at designated crossing points. • Traffic must be adequately regulated (eg through signs, signals, markings) near critical pedestrian zones or bikeways. • Excavated trenches/ditches and freshly cut steep side slopes will be clearly marked and fenced for the safety of passersby and workers alike. • Project or construction vehicles will be briefed on speed limit within sensitive areas such as schools, commercial and residential areas. • In event of accidents, the contractor will be responsible for immediate evacuation of injured person to the nearest medical center. The contractor shall bear medical and other expenses of the injured person. Local communities to be informed about the traffic management measures that will be in place during the period of the construction. • Traffic management plan for construction period to be developed • Local communities to be informed about the traffic management measures that will be in place during the period of the construction.	Signs and barriers. Signs and barriers.	No accidents. No accidents -	Construction sites. Construction sites.	20 Nov 2018 Periodically	KD Chamling PIU / Contractor
Operational Phase						

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
1. Noise - prevent excess noise	• Noise barrier will be installed if needed in future	NA	NA	NA	NA	NA
2. Gaseous Emission - prevent air pollution	• Ensuring that vehicles undertake mandatory pollution checking and maintenance procedures. • Undertake air quality monitoring	NA	NA	NA	NA	NA
3. Particulate emissions - Control level of particulates	• The road surface will be maintained for smooth traffic flow and reduction of vehicular emission • Undertake air quality monitoring	NA	NA	NA	NA	NA
4. Soil erosion and water pollution	• Storm water drainage to be maintained and surrounding vegetation to be maintained in good working condition. • Routine cleaning of the existing drains and water bodies.	NA	NA	NA	NA	NA
7. Driving conditions and community safety	• Zebra crossings to be maintained (clear & visible). • Pedestrian footpath to be properly maintained.	NA	NA	NA	NA	NA

Overall Compliance with CEMP/ EMP

Table 12: Compliance with CEMP/ EMP

No.	Sub-Project Name	EMP/ CEMP Part of Contract Documents (Y/N)	CEMP/ EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required
1	WWTP	Yes	Yes	Satisfactory	None
2	Bridge	Yes	Yes	Partially Satisfactory	• OHS measures inadequate (helmets and hand gloves) at site. • Debris strewn at work site. • PIU need to enforce strict compliance at work sites.
3	Water Supply	Yes	Yes	Partially Satisfactory	• OHS measures inadequate (helmets and hand gloves) at site. • Debris strewn at work site. • PIU need to enforce strict compliance at work sites.

5. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

5.1 Briefly describe the approach and methodology used for environmental monitoring of each sub-project.

The approach used for environmental monitoring is a continuous one. An EMP is attached, as part of the project document, which the contractor is mandated to comply with. Therefore, the contractor is responsible for the daily monitoring of the ongoing activities. The PIU and the Environmental Officer of the Thromde are required to monitor the project activities on a regular basis, as and when required. Further, environmental monitoring is also carried out by the Environment Officers from National Environment Commission Secretariat once or twice during the project period. They make 'surprise' visits to the project sites. As part of the project requirement Semi-annual Environment Monitoring Report (SEMR)is prepared and submitted to ADB. This report is prepared by Design Monitoring Supervision Consultants (DMSC), of Progressive Research & Consultancy Services (PRCS) for the client.

6. MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS(AMBIENT AIR, WATER QUALITY AND NOISE LEVELS)

6.1 Discuss the general condition of surroundings at the project site, with consideration of the following, whichever are applicable:

- Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
  - No dust was seen escaping the site as water was sprayed wherever it was required.

- Identify if muddy water is escaping site boundaries or if muddy tracks are seen on adjacent roads.
  - No muddy water was seen escaping the site boundaries or on adjacent roads.

- Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these are intact following heavy rain;
  - No erosion and sedimentations observed at site as the works are carried out during dry period and hence the erosion and sediment control measures are not needed and thus not installed.

- Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area in the Appendix.
  - Construction of footpaths and drains are only the ongoing works.

- Confirm spill kits on site and site procedure for handling emergencies.
  - Contractors have first-aid kits at site and for emergency medical evacuation, they have vehicles and on the worst case scenario there are taxis available to reach the patients to hospitals, as the work sites are within 5-km radius.

- Identify any chemical stored on site and provide information on storage condition. Attach photograph.
  - No chemical stored at site.

- Describe management of stockpiles (construction materials, excavated soils, spoils, etc.). Provide photographs.
  - During the site visits the contractors have stock piled his construction materials, such as sand, cement and rods. The excavated spoils/soils have been disposed off to pre-identified sites.. Hence their disposals are not a major concern.

- Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
  - The solid waste quantity generated is negligible whereas there is hardly anything of liquid waste generation in the project activity.

- Provide information on barricades, signage, and on-site boards. Provide photographs in the Appendix.
  - Barricades and signage, wherever required have been erected at site.

- Indicate if there are any activities being under taken out of working hours and how that is being managed.

- No activities being undertaken out of working hours.

- Briefly discuss the basis for environmental parameters monitoring.
- Indicate type of environmental parameters to be monitored and identify the location.
- Indicate the method of monitoring and equipment used.
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements.

As a minimum the results should be presented as per the tables below.

Air Quality Results[7]

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3
-	-	-	-	-	-
-	-	-	-	-	-

Water Quality Results

Table 13: Effluent water (Project site Inlet) WWTP, Thimphu Thromde

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L
1	28.01.2017 (9.00 a.m.)	Project site Inlet	6.79	Not analysed.	201.77	201.84	21.67	15.33
2	28.01.2017 (2.00 p.m.)	Project site Inlet						
3	28.01.2017 (4.00 p.m.)	Project site Inlet						

Note:*Only in WWTP Effluent water (raw sewage water from Project site Inlet) has been collected and analysed. Three samples, in a single day, have been taken and analysed and averaged in the table above. The entire report has been annexed as* ***Annex 3.***

Noise Quality Results[8]

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

Note: These tests have not been carried out. However there are National Standards which have been annexed as **Appendix C: Environmental Criteria andStandards.**

7. GRIEVANCE REDRESS MECHANISM

7.1 Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (town-wise if applicable).

To address any grievance received Thimphu Thromde has constituted the following mechanism.

[7]No monitoring and analysis of Air Quality results have been carried out.
[8]No monitoring and analysis of Noise Quality Results have been carried out.

First tier of GRM: A designated locally elected thromde representative shall be the channel through which complaints shall be lodged. Thereafter the PIU is the first tier of GRM which offers the fastest and most accessible mechanism for resolution of grievances. The Project Managers (PM/PIU) will be designated as the key officer for grievance redress. Resolution of complaints will be done within seven working (7) days. Investigation of grievances will involve site visits and consultations with relevant parties (e.g., affected persons, contractors, police, etc.) Grievances will be documented and personal details (name, address, date of complaint, etc.) will be included unless the person complaining requests for anonymity.

A tracking number shall be assigned for each grievance, including the following elements; (i) initial grievance sheet (including the description of the grievance), with an acknowledgement of receipt handed back to the complainant when the complaint is registered; (ii) grievance monitoring sheet, mentioning actions taken (investigation, corrective measures); (iii) closure sheet, one copy of which will be handed to the complainant after he/she has agreed to the resolution and signed-off. The updated register of grievances and complaints will be available to the public at the Thromde office. Should the grievance remain unresolved it will be escalated to the second tier.

Second Tier of GRM: The PM of respective sub-projects will activate the second tier of GRM by referring the unresolved issue (with written documentation) to Thromde Office who will pass unresolved complaints upward to the Grievance Redress Committee (GRC). The GRC shall be established by Thimphu Thromde before commencement of site works. The GRC will consist of the following persons: (i) Executive Secretary; (ii) Division Heads of Thimphu Thromde; (iii) Environmental Officer (iv) Project Coordinator; (v) Elected representative of the affected person(s); and (vi) representative of the Thromde Land Record Officer. A hearing will be called with the GRC, if necessary, where the affected person can present his/her concern/issues. The process will facilitate resolution through mediation. The local GRC will meet as necessary when there are grievances to be addressed. The local GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within fifteen (15) working days. The contractor will have observer status on the committee. If unsatisfied with the decision, the existence of the GRC shall not impede the complainant's access to the Government's judicial or administrative remedies.

The functions of the local GRC with regards to environmental concerns are as follows: (i) resolve problems and provide support to affected persons arising from various environmental issues including issues; hampering conduct of business, utilities, power and water supply, waste disposal, traffic interference and public safety; (ii) reconfirm grievances of affected persons, categorize and prioritize them and aim to provide solutions within a month; and (iii) report to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

The environment officer or the land record officer in Thimphu Thromde will be responsible for processing and placing all papers before the GRC, maintaining database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out.

Third tier of GRM: In the event that a grievance cannot be resolved directly by the GRC the affected person can seek alternative redress through an appropriate court. The GRC will be kept informed by the Thromde authority. The monitoring reports shall include the following aspects pertaining to progress on grievances: (i) Number of cases registered with the GRC, level of jurisdiction, number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided

upon may be prepared with details such as Name, ID with unique serial number, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues and status of grievance.

8. COMPLAINTS RECEIVED DURING THE REPORTING PERIOD

8.1 Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).

The project has not received any grievance so far.

9. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

9.1 Summary of follow up time-bound actions to be taken within a set timeframe.

Till 27th November 2018, all the packages have been awarded and works are in progress. The work progress of some activities under each component are varied and tabulated below. **Table 14** (below) shows the project packages, starting date of implementation, schedule date of completion etc. along with physical progress.

Table 14: Sub-project status

Sl. No	Lot No. (Package 1)	Location/ Area of Activities	Starting date of Implementation	Actual months of completion	Actual date of completion	Physical progress (%) as on 15th Nov 2018
1	Component 1: -**WWTP**	Babesa **LAP,** Thimphu	10/Nov/2016	30	9/May/2019	62.47%
2	Component 2: - **Bridge**	Over Om Chhu, near Youth Center, Phuentsholing.	17/August/2017	18	17/Feb/2019	70%
3	Component 3: - **Water supply**	Rikkechhu at Pinchinang (Char kilo), S. Jongkhar	1/5/2016	18	Extended till 15-Nov-2018	90%

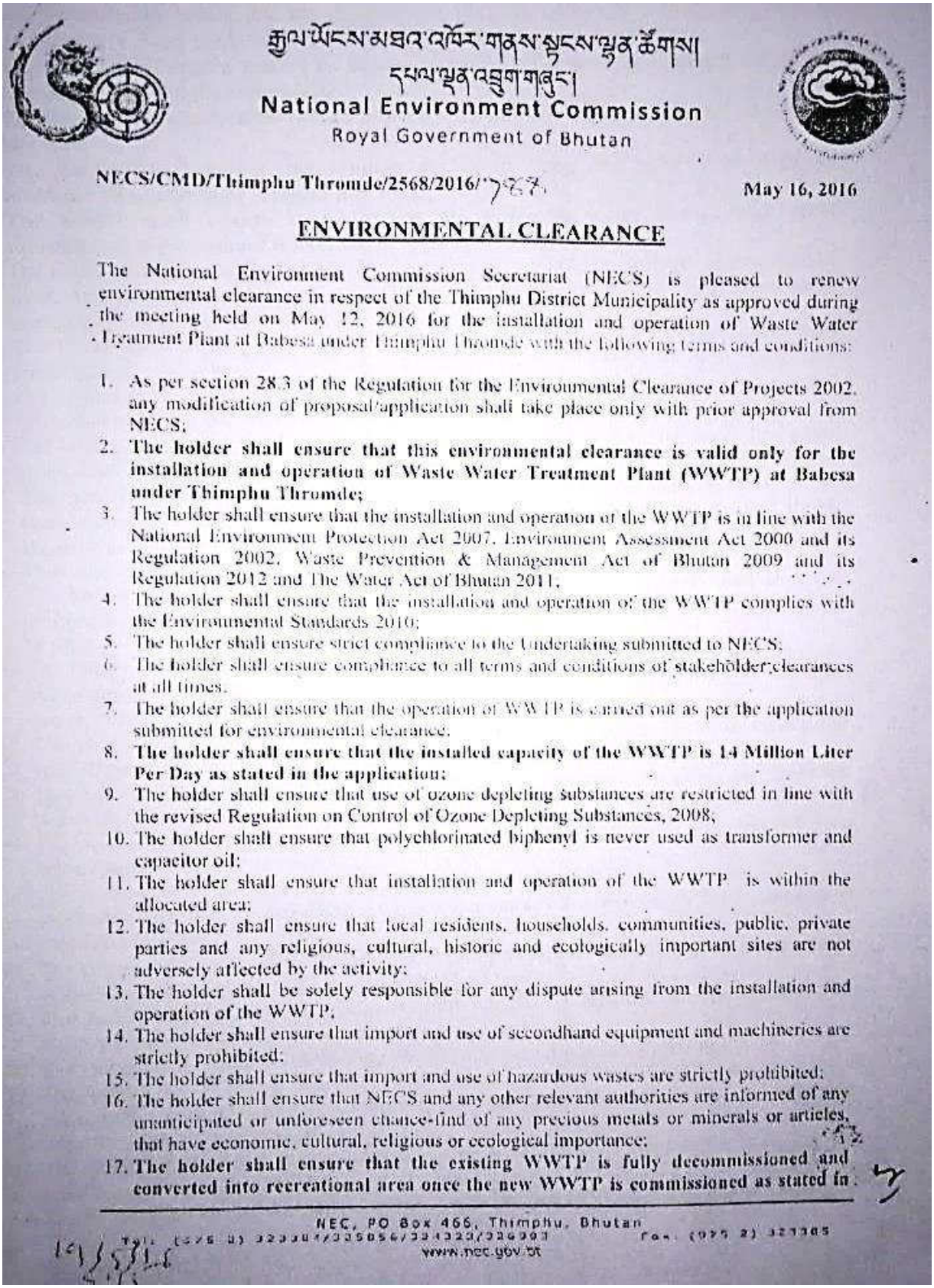
six months' time extension given and the new date of completion corresponds to 15th November 2018.

10. APPENDICES

a) Appendices
   i. Environmental Clearance
   ii. Compliance Report Format
   iii. Detailed Implementation Plan Format
b) Photographs
c) Environmental Criteria and Standards

a) Appendices

Annex 1: Environmental Clearance – WWTP at Babesa, Thimphu Thromde



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དཔལ་ལྡན་འབྲུག་གཞུང་།
National Environment Commission
Royal Government of Bhutan

NECS/CMD/Thimphu Thromde/2568/2016/

May 16, 2016

ENVIRONMENTAL CLEARANCE

The National Environment Commission Secretariat (NECS) is pleased to renew environmental clearance in respect of the Thimphu District Municipality as approved during the meeting held on May 12, 2016 for the installation and operation of Waste Water Treatment Plant at Babesa under Thimphu Thromde with the following terms and conditions:

1. As per section 28.3 of the Regulation for the Environmental Clearance of Projects 2002, any modification of proposal/application shall take place only with prior approval from NECS;
2. **The holder shall ensure that this environmental clearance is valid only for the installation and operation of Waste Water Treatment Plant (WWTP) at Babesa under Thimphu Thromde;**
3. The holder shall ensure that the installation and operation of the WWTP is in line with the National Environment Protection Act 2007, Environment Assessment Act 2000 and its Regulation 2002, Waste Prevention & Management Act of Bhutan 2009 and its Regulation 2012 and The Water Act of Bhutan 2011;
4. The holder shall ensure that the installation and operation of the WWTP complies with the Environmental Standards 2010;
5. The holder shall ensure strict compliance to the Undertaking submitted to NECS;
6. The holder shall ensure compliance to all terms and conditions of stakeholder clearances at all times.
7. The holder shall ensure that the operation of WWTP is carried out as per the application submitted for environmental clearance.
8. **The holder shall ensure that the installed capacity of the WWTP is 14 Million Liter Per Day as stated in the application;**
9. The holder shall ensure that use of ozone depleting substances are restricted in line with the revised Regulation on Control of Ozone Depleting Substances, 2008;
10. The holder shall ensure that polychlorinated biphenyl is never used as transformer and capacitor oil;
11. The holder shall ensure that installation and operation of the WWTP is within the allocated area;
12. The holder shall ensure that local residents, households, communities, public, private parties and any religious, cultural, historic and ecologically important sites are not adversely affected by the activity;
13. The holder shall be solely responsible for any dispute arising from the installation and operation of the WWTP;
14. The holder shall ensure that import and use of secondhand equipment and machineries are strictly prohibited;
15. The holder shall ensure that import and use of hazardous wastes are strictly prohibited;
16. The holder shall ensure that NECS and any other relevant authorities are informed of any unanticipated or unforeseen chance-find of any precious metals or minerals or articles, that have economic, cultural, religious or ecological importance;
17. **The holder shall ensure that the existing WWTP is fully decommissioned and converted into recreational area once the new WWTP is commissioned as stated in**

NEC, PO Box 466, Thimphu, Bhutan
Tel: (975 2) 323384/325056/324323/326903 Fax: (975 2) 323385
www.nec.gov.bt

the application;

18. The holder shall ensure that the construction sites are completely barricaded prior to starting any activity to avoid adverse visual impacts during constructions;
19. The holder shall ensure that all excavated materials are re-used or disposed within the premise as stated in the application;
20. The holder shall ensure that spillage and roll over of excavated materials are avoided at all times;
21. **The holder shall ensure that sludge generated from the WWTP is used as manure/soil conditioner if found non toxic;**
22. **The holder shall ensure that disposal of sludge in water bodies and other surrounding environment is avoided at all times;**
23. The holder shall ensure that the activity doesn't lead to blockage, storage or diversion of river, stream, irrigation channel, waterfall, underground water source or any other water resource or water course;
24. The holder shall ensure that untreated effluent is not discharged into the surrounding environment;
25. The holder shall ensure that proper records are maintained for effluent discharges and submitted to NECS quarterly;
26. The holder shall ensure that fugitive emissions from the activities are controlled using appropriate measures;
27. **The holder shall ensure that the technology adopted for the WWTP is of Intermittent Decanted Aerated Lagoon which is equivalent to Sequential Batch Reactor as stated in the application;**
28. The holder shall ensure that no foul odour is emitted from the WWTP;
29. The holder shall ensure that the operation of WWTP is closely monitored to avoid malfunction and breakdown and ultimately avoid nuisance due to foul odour at any point of time;
30. The holder shall ensure that adequate safety gadgets and outfits such as safety helmets, eye goggles, breathing masks, ear muffs, safety boots, etc. are provided to all the workers and any other person entering the WWTP;
31. The holder shall ensure that safety signs are posted at strategic locations within the WWTP premises indicating areas where specific safety gadgets are required;
32. The holder shall ensure that adequate lighting and ventilation facilities are provided within the WWTP;
33. The holder shall ensure that general housekeeping, cleanliness and hygiene are maintained at all times in the WWTP;
34. The holder shall ensure that first-aid kit is available in the WWTP at all times;
35. The holder shall ensure that adequate space is maintained within the WWTP premises to facilitate mobility;
36. The holder shall ensure that adequate fire fighting facilities are installed and expiry dates of such facilities are checked and kept valid at all times;
37. The holder shall ensure that proper health check up facilities are provided to all employees and health records are maintained;
38. The holder shall ensure that underage workers are not employed at all times;
39. The holder shall ensure that trees are Planted within the WWTP premises upon consultation with Department of Forest and Park Services to maintain greenery and improve aesthetic/visual impact of the area;
40. The holder shall ensure that adequate sanitation facilities are provided to workers and employees;
41. The holder shall ensure that separate budget is maintained for environmental activities;

42. The holder shall ensure that signboard is erected at the work site displaying the name of the Project and contact address of the implementing agency;
43. The holder shall ensure that a copy of this environmental clearance is available at the work site at all times;
44. The holder shall develop contingency plan to deal with unforeseen environmental risks, hazards & accidents and submitted to NECS within three months from the date of renewal of this environmental clearance;
45. **The holder shall ensure that renewal of this environmental clearance is processed at least one month prior to its expiry along with a copy of environmental clearance and a report on the implementation of its terms and conditions;**
46. The holder shall develop detailed implementation plan focusing on the terms and conditions of this environmental clearance and submitted to NECS within three months from the date of renewal of this environmental clearance; and
47. The holder shall ensure strict implementation of the terms and conditions of this environmental clearance at all times.

Failure to comply with any of the above terms and conditions shall constitute an offence under the Environmental Assessment Act 2000, its Regulations 2002, the National Environment Protection Act 2007 and any other relevant laws. Penalties for such offences shall include but not limited to suspension and/or revocation of environmental clearance in part or whole without any liability on the part of the Royal Government.

This environmental clearance is valid till **May 15, 2019** and is subject to periodic review and changes.

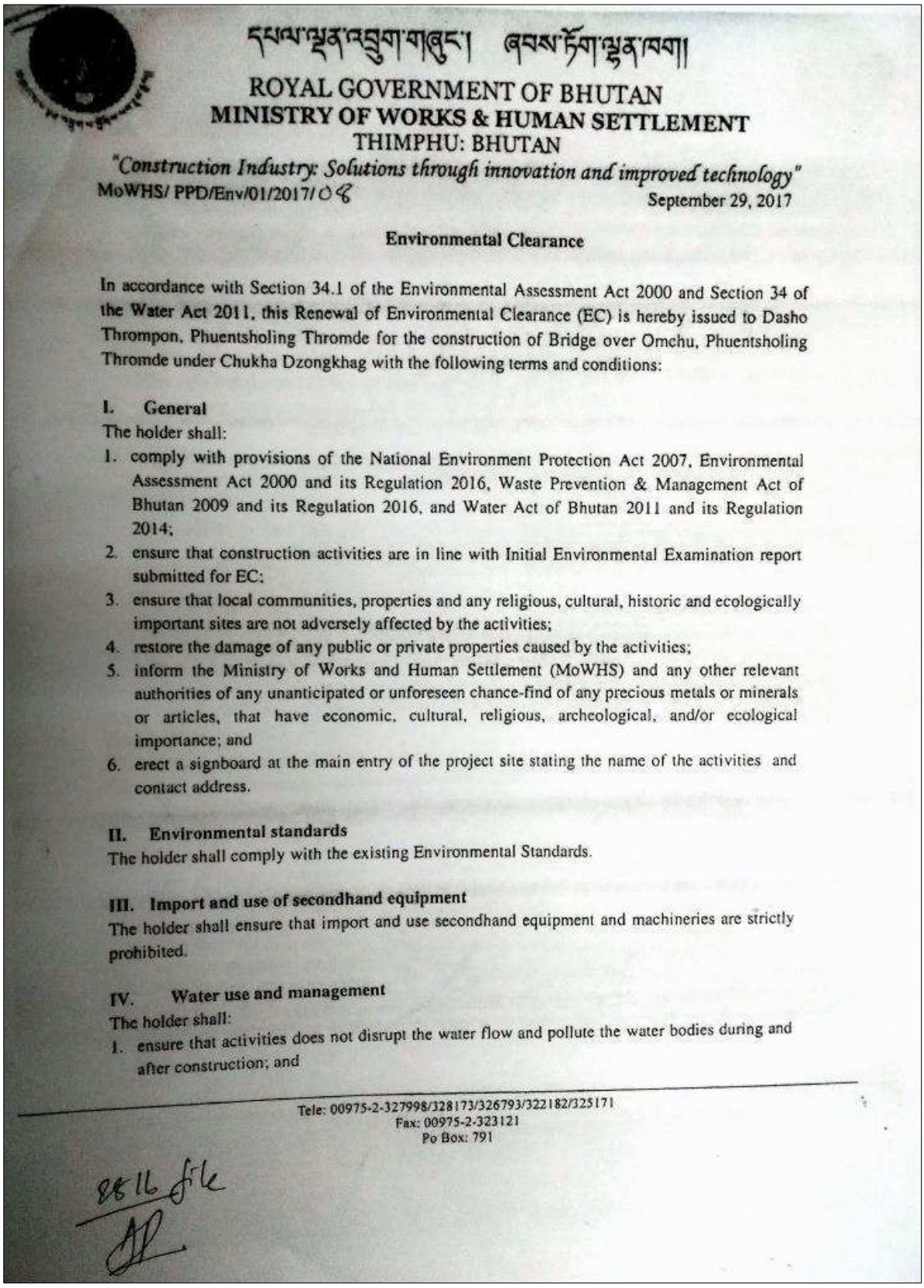
Secretary

To,
The Executive Secretary,
Thimphu District Municipality,
Post Box No- 215,
Thimphu- 11001

Copy to:

1. The Dzongkhag Environment Officer, Dzongkhag Administration, Thimphu for necessary action
2. Guardfile (Thimphu Thromde), CMD, NECS for record

Annex – 2: Environmental Clearance – Bridge Construction, Phuentsholing Thromde



ROYAL GOVERNMENT OF BHUTAN
MINISTRY OF WORKS & HUMAN SETTLEMENT
THIMPHU: BHUTAN

"Construction Industry: Solutions through innovation and improved technology"

MoWHS/ PPD/Env/01/2017/08 September 29, 2017

Environmental Clearance

In accordance with Section 34.1 of the Environmental Assessment Act 2000 and Section 34 of the Water Act 2011, this Renewal of Environmental Clearance (EC) is hereby issued to Dasho Thrompon, Phuentsholing Thromde for the construction of Bridge over Omchu, Phuentsholing Thromde under Chukha Dzongkhag with the following terms and conditions:

I. General

The holder shall:

1. comply with provisions of the National Environment Protection Act 2007, Environmental Assessment Act 2000 and its Regulation 2016, Waste Prevention & Management Act of Bhutan 2009 and its Regulation 2016, and Water Act of Bhutan 2011 and its Regulation 2014;
2. ensure that construction activities are in line with Initial Environmental Examination report submitted for EC;
3. ensure that local communities, properties and any religious, cultural, historic and ecologically important sites are not adversely affected by the activities;
4. restore the damage of any public or private properties caused by the activities;
5. inform the Ministry of Works and Human Settlement (MoWHS) and any other relevant authorities of any unanticipated or unforeseen chance-find of any precious metals or minerals or articles, that have economic, cultural, religious, archeological, and/or ecological importance; and
6. erect a signboard at the main entry of the project site stating the name of the activities and contact address.

II. Environmental standards

The holder shall comply with the existing Environmental Standards.

III. Import and use of secondhand equipment

The holder shall ensure that import and use secondhand equipment and machineries are strictly prohibited.

IV. Water use and management

The holder shall:

1. ensure that activities does not disrupt the water flow and pollute the water bodies during and after construction; and

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Fax: 00975-2-323121
Po Box: 791

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2. ensure that the downstream affects are monitored at all times to ensure that no damage is caused due to the project activity.

V. Waste prevention and management

The holder shall:

1. manage wastes generated from the activities (activity site, labour camps, offices etc.) with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management; and
2. ensure that import and use of hazardous wastes are strictly prohibited.

VI. Management of excavated materials and run-off

The holder shall:

1. dispose off excess excavated materials at the pre-identified approved dumpsite only. Construction spoils must not be allowed to contaminate watercourses; and
2. put appropriate measures to avoid erosion and landslides.

VII. Implementation plan

The holder shall prepare a detailed implementation plan focusing on the implementation of terms and conditions of this EC and submit to PPD, MoWHS within three (03) months from the date of issue of this EC.

VIII. Monitoring and reporting

The holder shall ensure that the effective day-to-day monitoring of the EC terms and conditions are carried out by the environmental unit or designated environment focal person;

IX. Renewal and modification

The holder shall:

1. ensure that renewal of this EC is processed at least three (03) months prior to its expiry along with a copy EC and a report on the implementation of its terms and conditions; and
2. obtain prior approval from MoWHS for any modification to the existing proposal/application.

Reservation

1. The MoWHS may stop the activity or impose additional terms and conditions, as may be deemed necessary; and

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2. ensure that the downstream affects are monitored at all times to ensure that no damage is caused due to the project activity.

V. Waste prevention and management

The holder shall:

1. manage wastes generated from the activities (activity site, labour camps, offices etc.) with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management; and
2. ensure that import and use of hazardous wastes are strictly prohibited.

VI. Management of excavated materials and run-off

The holder shall:

1. dispose off excess excavated materials at the pre-identified approved dumpsite only. Construction spoils must not be allowed to contaminate watercourses; and
2. put appropriate measures to avoid erosion and landslides.

VII. Implementation plan

The holder shall prepare a detailed implementation plan focusing on the implementation of terms and conditions of this EC and submit to PPD, MoWHS within three (03) months from the date of issue of this EC.

VIII. Monitoring and reporting

The holder shall ensure that the effective day-to-day monitoring of the EC terms and conditions are carried out by the environmental unit or designated environment focal person;

IX. Renewal and modification

The holder shall:

1. ensure that renewal of this EC is processed at least three (03) months prior to its expiry along with a copy EC and a report on the implementation of its terms and conditions; and
2. obtain prior approval from MoWHS for any modification to the existing proposal/application.

Reservation

1. The MoWHS may stop the activity or impose additional terms and conditions, as may be deemed necessary; and

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Po Box: 791

2. The EC shall be subject to periodic review and modifications as per Article 25 of the EA Act 2000, without any liability on the part of the Royal Government.

The holder may adopt best practices in executing these terms and conditions to avoid adverse environmental impacts.

Failure to comply with any of the above terms and conditions shall constitute an offence and the proponent shall be liable in accordance to the Environmental Assessment Act 2000 and/or existing environmental laws.

Validity:

This EC is issued with valid from **September 29, 2017** until **September 28, 2020** for the construction of Bridge over Omchu under Phuntsholing Thromde only.

(Dorji Wangmo)
Chief Planning Officer

To,
Dasho Thrompon
Phuentsholing Thromde
Chukha

Copy to:

1. Hon'ble Secretary, MoWHS for kind information
2. Executive Secretary, Phuntsholing Thromde for kind information
3. Chief Environment Officer, Environmental Services Division for information.
4. Environment Officer, Phuntsholing Thromde for necessary action.

Tele: 00975-2-327998/328171/326791/322182/325171
Fax: 00975-2-323121
Po Box: 791

Annex – 3: (a) Environmental Clearance – Water Supply, Samdrup Jongkhar Thromde

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དཔལ་ལྡན་འབྲུག་གཞུང་།
National Environment Commission
Royal Government of Bhutan

NECS/EACD/Dzo-S-Jongkhar/3208/2018/ ५२१

May 24, 2018

Environmental Clearance

In accordance with Section 34.1 of the Environmental Assessment Act 2000 and Section 34 of the Water Act 2011, this Environmental Clearance (EC) is hereby renewed to Executive Secretary, Samdrup Jongkhar Thromde for the rehabilitation of water supply within Samdrup Jongkhar Tromde with the following terms and conditions:

I. General

The holder shall:

1. comply with provisions of the National Environment Protection Act 2007, Environmental Assessment Act 2000 and its Regulation 2016, Waste Prevention & Management Act of Bhutan 2009 and its Regulation 2016, and The Water Act of Bhutan 2011 and its Regulation 2014;
2. ensure that the operation of plant is in line with Initial Environmental Examination report submitted for EC;
3. ensure that local communities, properties and any religious, cultural, historic and ecologically important sites are not adversely affected by the development and operation of plant;
4. restore the damage of any public or private properties caused by the development and operation of the plant;
5. inform NECS and any other relevant authorities of any unanticipated or unforeseen chance-find of any precious metals or minerals or articles, that have economic, cultural, religious, archeological, and/or ecological importance; and
6. erect a signboard at the take-off point of the main entry of the plant stating the name of the plant and contact address.

II. Environmental standards

The holder shall comply with the existing Environmental Standards.

III. Import and use of secondhand equipment and ODS

The holder shall:

1. ensure that import and use secondhand equipment and machineries are strictly prohibited; and
2. ensure that import and use ODS are in line with the Revised Regulation on the Control of ODS 2008.

IV. Water use and management

The holder shall:

Env. office

DIARY N° 1678
RECEIPT D 31.05.18
MARKED TO EC

1. abide by the water use priorities under the Water Act of Bhutan 2011 and no claim or compensation against or government or any person(s) shall be made for consequences arising thereon; and
2. ensure that activity does not disrupt the water flow and pollute the water bodies.

V. Waste prevention and management

The holder shall:

1. manage wastes generated from the project (Industrial site, labour camps, offices etc.) with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management; and
2. ensure that import and use of hazardous wastes are strictly prohibited.

VI. Management of excavated materials and run-off

The holder shall:

1. dispose off excess excavated materials at the pre-identified approved dumpsite; and
2. put appropriate measures to avoid erosion and landslides.

VII. Implementation plan

The holder shall prepare a detailed implementation plan focusing on the implementation of terms and conditions of this EC and submit to NECS within three (03) months from the date of issue of this EC.

VIII. Monitoring and reporting

The holder shall:

1. ensure that the effective day-to-day monitoring of the EC terms and conditions are carried out by the environmental unit or designated environment focal person;
2. maintain proper records on wastes generated and its management, stating types (industrial and general wastes), quantities and characteristic and submit to NECS annually; and
3. maintain records of water used in the plant (separately for industrial and domestic purposes) and amount discharged and submit it to NECS quarterly.

IX. Renewal and modification

The holder shall:

1. ensure that renewal of this EC is processed at least three months prior to its expiry along with a copy EC and a report on the implementation of its terms and conditions; and
2. obtain prior approval from NECS for any modification to the existing proposal/application.

Reservation

1. The NECS may stop the activity or impose additional terms and conditions, as may be deemed necessary; and
2. The EC shall be subject to periodic review and modifications as per Article 25 of the EA Act 2000, without any liability on the part of the Royal Government.

1. abide by the water use priorities under the Water Act of Bhutan 2011 and no claim or compensation against or government or any person(s) shall be made for consequences arising thereon; and
2. ensure that activity does not disrupt the water flow and pollute the water bodies.

V. Waste prevention and management

The holder shall:

1. manage wastes generated from the project (Industrial site, labour camps, offices etc.) with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management; and
2. ensure that import and use of hazardous wastes are strictly prohibited.

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The holder shall:

1. dispose off excess excavated materials at the pre-identified approved dumpsite; and
2. put appropriate measures to avoid erosion and landslides.

VII. Implementation plan

The holder shall prepare a detailed implementation plan focusing on the implementation of terms and conditions of this EC and submit to NECS within three (03) months from the date of issue of this EC.

VIII. Monitoring and reporting

The holder shall:

1. ensure that the effective day-to-day monitoring of the EC terms and conditions are carried out by the environmental unit or designated environment focal person;
2. maintain proper records on wastes generated and its management, stating types (industrial and general wastes), quantities and characteristic and submit to NECS annually; and
3. maintain records of water used in the plant (separately for industrial and domestic purposes) and amount discharged and submit it to NECS quarterly.

IX. Renewal and modification

The holder shall:

1. ensure that renewal of this EC is processed at least three months prior to its expiry along with a copy EC and a report on the implementation of its terms and conditions; and
2. obtain prior approval from NECS for any modification to the existing proposal/application.

Reservation

1. The NECS may stop the activity or impose additional terms and conditions, as may be deemed necessary; and
2. The EC shall be subject to periodic review and modifications as per Article 25 of the EA Act 2000, without any liability on the part of the Royal Government.

The holder may adopt best practices in executing these terms and conditions to avoid adverse environmental impacts.

Failure to comply with any of the above terms and conditions shall constitute an offence and the proponent shall be liable in accordance to the Environmental Assessment Act 2000 and/or existing environmental laws.

Validity:
This EC is issued with valid from **May 24, 2018** until **May 23, 2020** for the rehabilitation of water supply within Samdrup Jongkhar Tromde.

(Sign & seal)
Officiating Secretary

To,
Executive Secretary,
Samdrup Jongkhar Thromde

Copy to:
1. The Environment Officer, Dzongkhag Administration, Samdrup Jongkhar for information and necessary action.
2. Guard-file, Dzo-S-Jongkhar, NECS for record.

(b) Compliance Report Format

Compliance Report

1. General Information

1.1. Name of the activity (including nature/type of the project)
.....
.....

1.2. Location (including survey No./Plot No and project area, if applicable).....
.....
.....

1.3. Environmental Focal Person & Contact details.....
.....
.....

1.4. Number of employees (regular/casual, national and non-national):.....
.....
.....

1.5. Year of Commencement.....

1.6. EC reference No. and its validity.....
.....

1.7. Date of reporting.....

2. Description of the compliance to EC terms and conditions

Sl No	Terms and Condition of the EC	Action/activities undertaken/implemented to achieve compliance including evidence, wherever applicable	Remarks

3. **Any other initiatives undertaken other than stipulated in the EC**

.....

.....

.....

.....

4. **Emission/discharge test, if applicable**

Sl No 1	Parameters as in Environmental Standards, 2010					Emission test result carried out by the project proponent (Attach the test report)					Date and time of monitoring. Specify methodology of test	Remarks
	Industrial effluent discharge	*Ambient air quality*	*Industrial emissions*	*Work place emission*	*Noise level*	*Industrial effluent discharge*	*Ambient air quality*	*Industrial emissions*	*Work place emission*	*Noise level*		
1												
2												
3												
4												
5												

5. **Details of attachment (Documents that needs to be attached while providing information as required under point number 2, 3 and 4)**.....

.....

.....

.....

Reported by:

(Signature)
Name:
Designation:
Company:

(c) Detailed Implementation Plan Format

Detailed Implementation Plan

Sl No	Specify terms and conditions of the EC	Activities/actions that will be undertaken to implement the terms and conditions	Time frame required	Responsibility

Annex – 4: Effluent Water Analysis, Raw Sewage water, WWTP- Thimphu Thromde
(i) Sample Collection time- 9.00 a.m.

ENVIROCHECK

Environmental Laboratory
189 & 190, Rastraguru Avenue, Kolkata-700 028
Phone : 2579-2889/2891, 2549-7490
Fax : 2529-9141
E-mail : envcheck@cal2.vsnl.net.in

EFFLUENT WATER ANALYSIS REPORT

1.	Name of the Industry	:	Technofab Engineering Ltd.
2.	Address	:	Plot No.05, Sector 27-C, Faridabad – 121003
3.	Report No.	:	Env/554/W/M(i)/16-17
4.	Date of sampling	:	28.01.2017
5.	Reporting date	:	08.02.2017
6.	Type of sample	:	Domestic Effluent Water
7.	Collection & preservation of sample	:	APHA 22nd Edition, 1060
8.	Location of sample	:	Raw Sewage water from Project Site Inlet (09:00 a.m.) [Raw Water Sewage Collection from WWTP Site at Babesa Thimpu – Bhutan]

	PARAMETERS		RESULTS
1.	*Size Distribution of Particulate in Raw Sewage	:	**
2.	Temperature (°C)	:	10.0
3.	pH	:	6.72
4.	Total Suspended Solids (mg./l)	:	256.0
5.	Total Solids (mg./l)	:	410.0
6.	VSS/TSS	:	0.71
7.	Total Alkalinity (mg./l)	:	264.0
8.	Chloride (mg./l)	:	40.20
9.	Residual Free Chlorine (mg./l)	:	<0.04
10.	Oil & Grease (mg./l)	:	3.50
11.	Total Khjeldhal Nitrogen (mg./l)	:	25.0
12.	Ammonical Nitrogen (mg./l)	:	6.50
13.	Total Phosphate (mg./l)	:	18.50
14.	Dissolved Oxygen (mg./l)	:	1.20
15.	COD (mg./l)	:	496.92
16.	BOD [5 Day's at 20 °C] (mg./l)	:	210.0
17.	Total Chromium (mg./l)	:	<0.06
18.	Total Coliform (CFU/100 ml.)	:	7.2×10^4
19.	Feacal Coliform (CFU/100 ml.)	:	5.84×10^4
20.	Specific Gravity of Girit	:	2.90
21.	Quantity of Grit in Raw Sewage (mg./100 ml.)	:	1.5
22.	Oxygen Absorption ($KMnO_4$) (mg./l)	:	45.0

*Sand (%) – 40.0, Silt – 30%, Clay – 30%
Sand = 0.05 mm – 2.0 mm, Silt = 0.05 mm – 0.002 mm and Clay = <0.002 mm

Authorised Signatory :

Dr. Ajoy Paul
(Scientist)

(ii) Sample Collection time- 2.00 p.m.

ENVIROCHECK

Environmental Laboratory
189 & 190, Rastraguru Avenue, Kolkata-700 028
Phone : 2579-2889/2891, 2549-7490
Fax : 2529-9141
E-mail : envcheck@cal2.vsnl.net.in

EFFLUENT WATER ANALYSIS REPORT

1.	Name of the Industry	:	Technofab Engineering Ltd.
2.	Address	:	Plot No.05, Sector 27-C, Faridabad – 121003
3.	Report No.	:	Env/554/W/M(ii)/16-17
4.	Date of sampling	:	28.01.2017
5.	Reporting date	:	08.02.2017
6.	Type of sample	:	Domestic Effluent Water
7.	Collection & preservation of sample	:	APHA 22nd Edition, 1060
8.	Location of sample	:	Raw Sewage water from Project Site Inlet (02:00 p.m.) [Raw Water Sewage Collection from WWTP Site at Babesa Thimpu – Bhutan]

	PARAMETERS		RESULTS
1.	*Size Distribution of Particulate in Raw Sewage	:	**
2.	Temperature (°C)	:	12.0
3.	pH	:	6.80
4.	Total Suspended Solids (mg./l)	:	182.86
5.	Total Solids (mg./l)	:	380.0
6.	VSS/TSS	:	0.80
7.	Total Alkalinity (mg./l)	:	196.0
8.	Chloride (mg./l)	:	57.42
9.	Residual Free Chlorine (mg./l)	:	<0.04
10.	Oil & Grease (mg./l)	:	2.0
11.	Total Khjeldhal Nitrogen (mg./l)	:	21.50
12.	Ammonical Nitrogen (mg./l)	:	5.0
13.	Total Phosphate (mg./l)	:	15.0
14.	Dissolved Oxygen (mg./l)	:	1.60
15.	COD (mg./l)	:	486.16
16.	BOD [5 Day's at 20 °C] (mg./l)	:	215.0
17.	Total Chromium (mg./l)	:	<0.06
18.	Total Coliform (CFU/100 ml.)	:	9.0×10^4
19.	Feacal Coliform (CFU/100 ml.)	:	8.4×10^4
20.	Specific Gravity of Girit	:	2.80
21.	Quantity of Grit in Raw Sewage (mg./100 ml.)	:	1.2
22.	Oxygen Absorption ($KMnO_4$) (mg./l)	:	35.0

*Sand - 45%, Silt - 35%, Clay - 20%
Sand = 0.05 mm – 2.0 mm, Silt = 0.05 mm – 0.002 mm and Clay = <0.002 mm

Authorised Signatory :

Dr. Ajoy Paul
(Scientist)

(iii) Sample Collection time- 4.00 p.m.

ENVIROCHECK

Environmental Laboratory
189 & 190, Rastraguru Avenue, Kolkata-700 028
Phone : 2579-2889/2891, 2549-7490
Fax : 2529-9141
E-mail : envcheck@cal2.vsnl.net.in

EFFLUENT WATER ANALYSIS REPORT

1.	Name of the Industry	:	Technofab Engineering Ltd.
2.	Address	:	Plot No.05, Sector 27-C, Faridabad – 121003
3.	Report No.	:	Env/554/W/M(iii)/16-17
4.	Date of sampling	:	28.01.2017
5.	Reporting date	:	08.02.2017
6.	Type of sample	:	Domestic Effluent Water
7.	Collection & preservation of sample	:	APHA 22nd Edition, 1060
8.	Location of sample	:	Raw Sewage water from Project Site Inlet (04:00 p.m.) [Raw Water Sewage Collection from WWTP Site at Babesa Thimpu – Bhutan]

	PARAMETERS		RESULTS
1.	*Size Distribution of Particulate in Raw Sewage	:	**
2.	Temperature (°C)	:	13.0
3.	pH	:	6.85
4.	Total Suspended Solids (mg./l)	:	166.67
5.	Total Solids (mg./l)	:	350.0
6.	VSS/TSS	:	0.76
7.	Total Alkalinity (mg./l)	:	176.0
8.	Chloride (mg./l)	:	47.85
9.	Residual Free Chlorine (mg./l)	:	<0.04
10.	Oil & Grease (mg./l)	:	2.50
11.	Total Khjeldhal Nitrogen (mg./l)	:	18.50
12.	Ammonical Nitrogen (mg./l)	:	3.80
13.	Total Phosphate (mg./l)	:	12.50
14.	Dissolved Oxygen (mg./l)	:	1.80
15.	COD (mg./l)	:	430.52
16.	BOD [5 Day's at 20 °C] (mg./l)	:	180.0
17.	Total Chromium (mg./l)	:	<0.06
18.	Total Coliform (CFU/100 ml.)	:	1.248×10^5
19.	Feacal Coliform (CFU/100 ml.)	:	1.168×10^5
20.	Specific Gravity of Girit	:	2.70
21.	Quantity of Grit in Raw Sewage (mg./100 ml.)	:	1.0
22.	Oxygen Absorption ($KMnO_4$) (mg./l)	:	35.0

*Sand - 42%, Silt -28%, Clay - 30%
Sand = 0.05 mm - 2.0 mm, Silt = 0.05 mm - 0.002 mm and Clay = <0.002 mm

Authorised Signatory :

Dr. Ajoy Paul
(Scientist)

Annex – 5: Environmental Management Plan, WWTP –Thimphu Thromde

a) Monthly Safety Report, WWTP-Thimphu Thromde.

REGISTERED OFFICE
507 Eros Apartments, 56 Nehru Place
New Delhi-110 019, India
Tel: +91-11-26411931, 26415961
Fax: +91-11-26221521
Email: info@technofabengineering.com
CIN L74210DL1971PLC005712

TECHNOFAB
ENGINEERING LIMITED

D: O: 3600/TE/2017-18/46

November 06, 2018

Mr. Kinley Penjore
Project Manager
Thimphu Thromde
Thimphu – 11001,
Bhutan

CONTRACT Ref.: Contract No. TCC/WTPP/GM/001 – Design, Build, Operate and Transfer 12 MLD at WWTP at Thimphu, Bhutan

Subject : **Submission of Monthly safety report.**

Dear Sir,

This has reference to the above subject; we are submitting the Monthly safety report for the month of October for information and record.

Thanking you and assuring you our best services at all times.

Yours faithfully,
For**TECHNOFAB ENGINEERING LIMITED**

Construction Manager

TECHNOFAB ENGINEERING

Royal Government of Bhutan Ministry of works and Human Settlement
Thimphu Thromde Urban Infrastructure Development project
Contract package No.:TCC/WWTP/GM/001

MONTHLY HEALTH, SAFETY & ENVIRONMENT (HSE) REPO

Actual work start Date: 19 Number 2016 For the Month of: **October 2018**

Title of Job/Operation: 12 MLD WWTP, BABESA Report No: 14

Name of the **Contractor: Technofab-Vishwa (JV)** **Date of Submission: 06-11-2018**

Name of safety EHS/Engineer/Officer: Amit kumar Sharma

ITEM	THIS MONTH (AV)	CUMULATIVE
Total Strength (Staff + Workmen)	145	1,539
Number of HSE meetings organised at site (At Night work)	01	03
Number of HSE awareness programmes conducted at site	00	03
Number of Loss Time Accidents (Other than Fatal)	NIL	NIL
Other accidents (Non Loss Time)	NIL	NIL
Total No. of Accidents	NIL	NIL
Total man-hours worked	35,888	3,54,058
Man-hour loss due to fire and accidents	NIL	NIL
Compensation cases raised with Insurance	NIL	NIL
Compensation cases resolved and paid to workmen	NIL	NIL
Remarks	NIL	NIL

TECHNOFAB ENGINEERING LIMITED

INSPECTION CHECK LIST FOR CUTTING MACHINE

Contract No. and title:
Design, Build and Operate & Transfer 12MLD
Wastewater Treatment Plant at Thimphu, Bhutan
TCC/WWTP/GM/001

Contractor- Location of Inspection-	TECHNOFAB ENGG. LIMITED S.B.R	Equipment Number- 873135 Date of Inspection- 25-10-2018.

Sr. No.	DESCRIPTION	Observation	Remarks
1	Is ON / OFF knob provided / Damaged? (Check for damage and insulation knob)	✓	
2	Any Damage in the insulation of power supply cable and Plug top is used?	✓	
3	Any Crack & Damage of the Cutting wheel?	✓	
4	Is Cutting Wheel guard provided?	✓	
5	Is Cutting Wheel guard locking properly?	✓	
6	Is Job Holding clamp in good condition?	✓	
7	Is Handle in good condition?	✓	
8	Is Cutting dust guard provided / working?	✓	
9	Are all necessary PPEs available & used? (Safety Goggles, etc.)	✓	
10	Is Machine clearly identified & numbered?	✓	
11	Any Other?	NO	
Checked by	Name	Amit Kumar	
	Signature	25-10-2018.	

Name of Contractor's P&M Manager

Name of Contractor's Safety Engineer

TECHNOFAB ENGINEERING LIMITED

INSPECTION CHECK LIST FOR CUTTING MACHINE

Contract No. and title:
Design, Build and Operate & Transfer 12MLD
Wastewater Treatment Plant at Thimphu, Bhutan
TCC/WWTP/GM/001

Contractor- Location of Inspection-	TECHNOFAB ENGG LIMITED (S.B.R)	Equipment Number- 586973 Date of Inspection- 25-10-2018

Sr. No.	DESCRIPTION	Observation	Remarks
1	Is ON / OFF knob provided / Damaged? (Check for damage and insulation knob)	✓	
2	Any Damage in the insulation of power supply cable and Plug top is used?	✓	
3	Any Crack & Damage of the Cutting wheel?	✓	
4	Is Cutting Wheel guard provided?	✓	
5	Is Cutting Wheel guard locking properly?	✓	
6	Is Job Holding clamp in good condition?	✓	
7	Is Handle in good condition?	✓	
8	Is Cutting dust guard provided / working?	✓	
9	Are all necessary PPEs available & used? (Safety Goggles, etc.)	✓	
10	Is Machine clearly identified & numbered?	✓	
11	Any Other?	NO	
Checked by	Name	Amit Kumar Sharma	
	Signature	25-10-2018	

Amit Kumar Sharma
Name of Contractor's Safety Engineer

Name of Contractor's P&M Manager

FAB ENGINEERING LIMITED

Contract No. And title: Design, Build and operate & Transfer 12 MLD wastewater Treatment plant at Thimphu, Bhutan (TCC/WWTP/GM/001

Attendance Register for Safety Training

Project W.W.T.P	**Project No** TCC/WWTP/GM/001 (3600)
Contractor: Technolab Engineering Limited	**Topic** work at height.
Date 22-10-2018	**Location** S.B.R.
Time 10:30 am	**Conducted by** Anil Kumar Sharma, Santosh Kumar.

Sl.No	Name	Designation	Organisation	Signature/ Thumb Impression
1	Dulal Miya	mason	T.E.L	Dulal Miya
2	Imran Ali	"	T.E.L	
3	Mominur Miya	"	T.E.L	Mamtaj gmle
4	Monirul Hoque	"	T.E.L	Monirul Hoque
5	Jaydul Hossain	"	T.E.L	
6	Susanta Mojumdar	"	T.E.L	Sushantamajumdar
7	Rabiul Miya	"	T.E.L	Rabiul
8	Mojibul Hoque	"	T.E.L	
9	Sumirul Miya	"	T.E.L	
10	Biplap Mojumdar	"	T.E.L.	
11				
12				
13				
14				
15				
16				
17				

Faculty's Signature
Date

TECHNOFAB ENGINEERING LIMITED

INSPECTION CHECK LIST FOR CUTTING MACHINE

Contract No. and title:
Design, Build and Operate & Transfer 12MLD
Wastewater Treatment Plant at Thimphu, Bhutan
TCC/WWTP/GM/001

Contractor- Location of Inspection-	TECHNOFAB ENGINEERING LIMITED CCT BUILDING	Equipment Number- C 716478 Date of Inspection- 25-10-2018

Sr No.	DESCRIPTION	Observation	Remarks
1	Is ON / OFF knob provided / Damaged? (Check for damage and insulation knob)	✓	
2	Any Damage in the insulation of power supply cable and Plug top is used?	✓	
3	Any Crack & Damage of the Cutting wheel?	✓	
4	Is Cutting Wheel guard provided?	✓	
5	Is Cutting Wheel guard locking properly?	✓	
6	Is Job Holding clamp in good condition?	✓	
7	Is Handle in good condition?	✓	
8	Is Cutting dust guard provided / working?	✓	
9	Are all necessary PPEs available & used? (Safety Goggles, etc.)	✓	
10	Is Machine clearly identified & numbered?	✓	
11	Any Other?	NO	
Checked by	Name	Amit Kumar Sharma.	
	Signature	25/10/2018	

Name of Contractor's P&M Manager

Amit Kumar Sharma.
Name of Contractor's Safety Engineer

TECHNOFAB ENGINEERING LIMITED

INSPECTION CHECK LIST FOR CUTTING MACHINE

Contract No. and title:
Design, Build and Operate & Transfer 12MLD Wastewater Treatment Plant at Thimphu, Bhutan
TCC/WWTP/GM/001

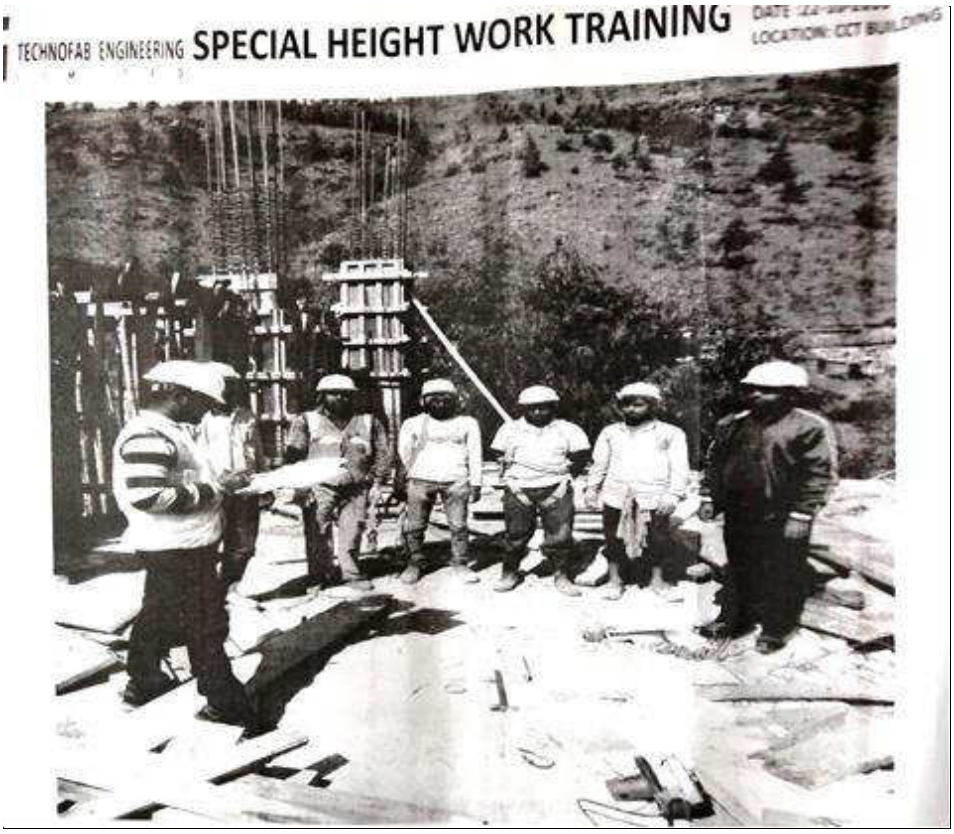
Contractor- T & L Location of Inspection- CCT BUILDING.		Equipment Number- 4400mm. (470) Date of Inspection- 25-10-2018

Sr. No.	DESCRIPTION	Observation	Remarks
1	Is ON / OFF knob provided / Damaged? (Check for damage and insulation knob)	✓	
2	Any Damage in the insulation of power supply cable and Plug top is used?	✓	
3	Any Crack & Damage of the Cutting wheel?	✓	
4	Is Cutting Wheel guard provided?	✓	
5	Is Cutting Wheel guard locking properly?	✓	
6	Is Job Holding clamp in good condition?	✓	
7	Is Handle in good condition?	✓	
8	Is Cutting dust guard provided / working?	✓	
9	Are all necessary PPEs available & used? (Safety Goggles, etc.)	✓	
10	Is Machine clearly identified & numbered?	✓	
11	Any Other?	NO	
Checked by	Name	Amit kumar Shrivastava	
	Signature	25.10.2018	

Amit Kumar Shrivastava
Name of Contractor's Safety Engineer

Name of Contractor's P&M Manager


TECHNOFAB ENGINEERING
SPECIAL HEIGHT WORK TRAINING
DATE 22-10-2010
LOCATION: CCT BUILDING


TECHNOFAB ENGINEERING
SPECIAL HEIGHT WORK TRAINING

AB ENGINEERING

Contract No. And title: Design, Build and operate & Transfer 12 MLD wastewater Treatment plant at Thimphu, Bhutan (TCC/WWTP/GM/001

Attendance Register for Safety Training

Project U.W.T.P	**Project No** TCC/WWTP/GM/001 (3600)
Contractor: Technofab Engineering Limited	**Topic** work at height.
Date 22-10-2018	**Location** C.C.T Building.
Time 10:00 Am	**Conducted by** Anil Kumar Sharma, Santosh Kumar.

Sl.No	Name	Designation	Organisation	Signature/ Thumb Impression
1	ASHRF DIN MIYA	Mason	T E L	
2	MOZIDUL RAHMAN.	"	"	
3	SWAPAN SARKAR	"	"	
4	SAMAL BISAS	"	"	
5	SHANAIA SINGH	Helper	"	
6	GULAB MANDAL	"	"	
7	CHANDRO KANTO BISWAS	"	"	
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				

Faculty's Signature

Date

TECHNOFAB ENGINEERING LIMITED	Document Title:-	Document No :- TEL/ HSE
		Rev:-
	Labour Colony Inspection	Date :-22-10-2018
		Page 1 of 2

Project- Design, Build, Operate, and transfer 12 MLD WWTP at Babesa, Thimphu: Bhutan

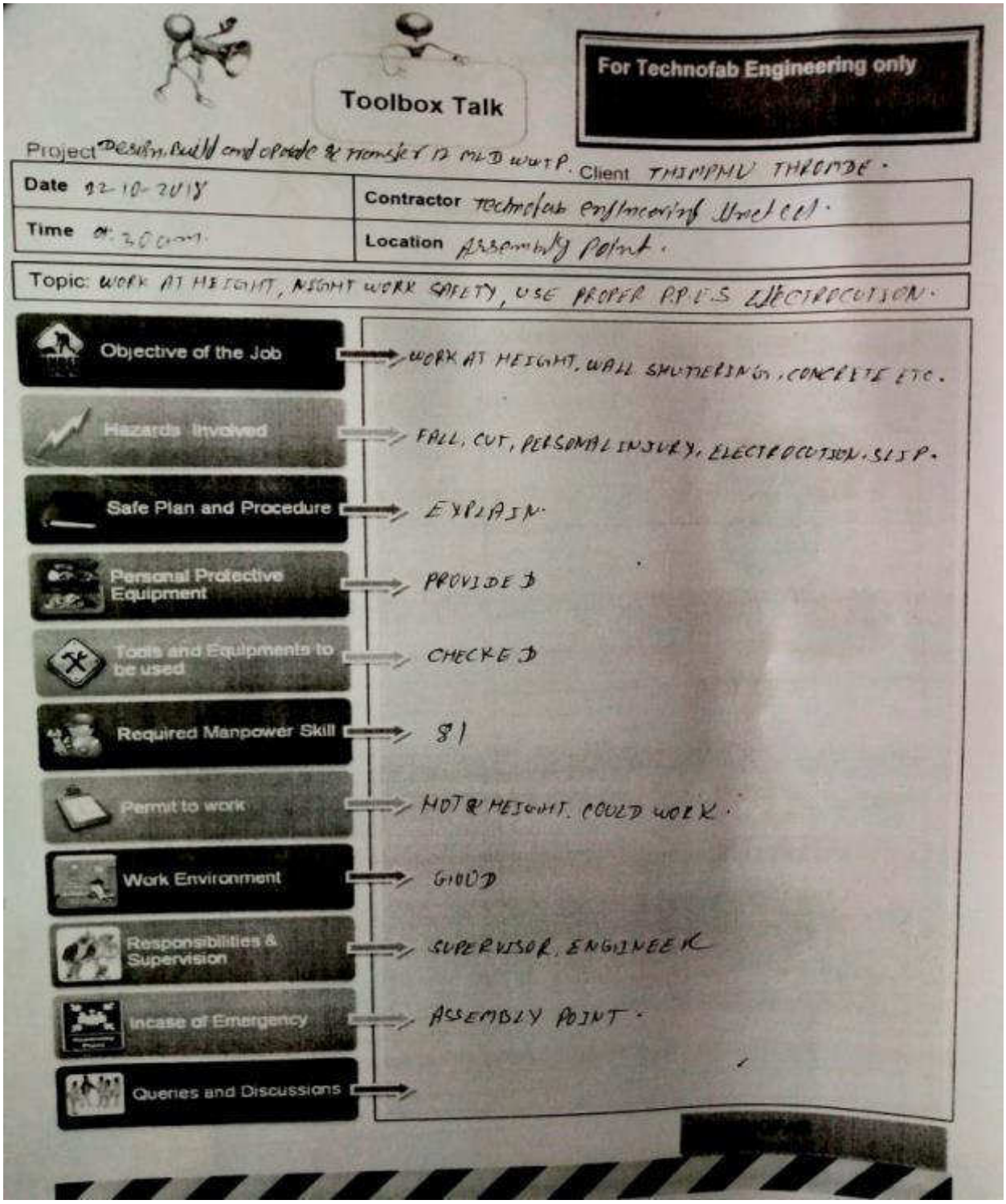
Sr. No	Points	Yes / No	Remarks
	ACCESS AND EGRESS		
1	Are the entry roads / walkways / passages to Camp kept clean and clear?	Yes	
2	Are the walkways & roads even and free from Water logging?	yes	
3	Is entry into camp area allowed only for authorized laborers?	yes	
4	Is 'Emergency Light' provided in passages?	Yes	
	GENERAL		
1	Are garbage bins allocated for each and every lane?	Yes	
2	Is the garbage cleared on regular basis?	Yes	
3	Is disinfection of all areas carried out on weekly basis?	yes	
4	Are the drinking water facilities adequate in the labour camp?	yes	
5	Is there any Emergency Communication System established?	Yes	
6	Is there any combustible material present in Camp which may be a fire hazard?	NO	
7	Are Fire Extinguishers and Fire Buckets available? Are they maintained in working condition?	Yes	
8	Are First-Aid facilities provided in Labour Camp?	Yes	
9	Is 'Security Guard' allocated for Labour Camp?	NO	
	LIVING AREA		
1	Whether cement flooring provided?	Yes	
2	Whether condition of side-walls / roof-sheet is good?	yes	
3	Is shelter strong enough to withstand wind pressure?	yes	
4	Whether electrical connections provided are safe and is MCB/ELCB of 30 Amps provided?	NO	Please take action

5	Is adequate ventilation provided?	Yes	
6	Is the general hygiene of the rooms adequate?	Yes	
7	Are adequate measures taken to control pests such as mice, bed-bugs, mosquitoes, termites?	Yes	
8	Whether rooms are over-crowded?	No	
	UTILITIES AREA		
1	Are the water tanks adequate as per total consumption?	Yes	
2	Is washing place provided for utensils, bath?	Yes	
3	Are adequate toilets available?	Yes	
4	Are the toilets cleaned regularly?	Yes	
5	Are the Septic Tanks adequate for total load? Are they emptied regularly?	yes	
6	Is area around bathroom kept clean, dry and non-slippery?	yes	
7	Is proper drainage provided? And are the man-holes connected properly to main sewer line?	yes	
8	Is drinking water available? Is quality of drinking water checked on monthly basis?	yes	
9	Are the water taps leaking?	NO	
10	Are the water tanks cleaned regularly?	yes	
	ANY OTHER INFORMATION		
1			
2			

PROJECT MANAGER SIGNATURE

TEL / VISHWA (JV) / BEC-KC (JV)

EHS OFFICER/ENGINEER SIGNATURE



Toolbox Talk

For Technofab Engineering only

Project Design, Build and Operate & Transfer of MLD WWTP. Client THIMPHU THROMDE.

Date 12-10-2019	Contractor Technofab Engineering Limited.
Time 08:30 am.	Location Assembly Point.

Topic: WORK AT HEIGHT, NIGHT WORK SAFETY, USE PROPER P.P.E.S ELECTROCUTION.

Objective of the Job	WORK AT HEIGHT, WALL SHUTTERING, CONCRETE ETC.
Hazards Involved	FALL, CUT, PERSONAL INJURY, ELECTROCUTION, SLIP.
Safe Plan and Procedure	EXPLAIN.
Personal Protective Equipment	PROVIDED
Tools and Equipments to be used	CHECKED
Required Manpower Skill	SI
Permit to work	HOT & HEIGHT, COULD WORK.
Work Environment	GOOD
Responsibilities & Supervision	SUPERVISOR, ENGINEER
Incase of Emergency	ASSEMBLY POINT.
Queries and Discussions	

TECHNOFAB ENGINEERING

Toolbox Talk Register

Sl. No	Name	Designation	Signature / Thumb impression
(1)	Mithun		Mithun
(2)	RAHUDUL ESLAM		Rahdul Eslam
(3)	MOMTAJUL MIYA		[redacted]
(4)	RAZAK HUSAIN		[redacted]
(5)	MUKUL RAY		[redacted]
(6)	DILWAR HUSAIN		[redacted]
(7)	Akramuddin		[redacted]
(8)	MANIRUL		[redacted]
(9)	FAIJUL PODDAR		[redacted]
20)	Biman Bhattacharjee	S. Supervisor	[redacted]
21.	Ringin Panjar	Sr. engineer	[redacted]
(12)	SUKAN RAY		Sukan Roy
(13)	DURLABS		Durlabh Roy
(14)	RANJUL		[redacted]
(15)	SANTO ROY		[redacted]
(16)	SHAMPAL ROY		Shyampal Roy
(17)	TARUN KUMAR ROY		Tarun Kr Roy

Conducted by : Anil Kumar Sharma

Signature : 22-10-2018

Signature [redacted]

TECHNOFAB ENGINEERING LIMITED

Toolbox Talk

Toolbox Talk Register

Sl. No	Name	Designation	Signature / Thumb impression
21	Mojibul Haque		Mujibul Haque
22	Akbar Ali		
23.	Sahibul Miya		Sahibul Mia
24.	Jaynul Hossain		Jaynul Hussain
25	Khabir miya		
26.	Hakimul Alam		Hakimul Alam
27.	Ashraful Alam		Ashraful Alam
28.	Rabiul miya/Haque		Rabiul Haque
29.	Dalu Sk		DALU SK
30.	Sayful Miya		
31.	Gopal mandal		Gopalanandal
32.	Asrul Ali		Aqub Ali
33.	Rahidul miya		
34.	Rabiul miya		Rahidul miya
35.	Sukanta majumdar		Sukanta Majumdar
36.	Jaynul miya		Khairul Hossain
37.	Biplab Majumdar		
38.	Samirul Sk		
39.	Firoj Ali Sk		FIROZ, SK
40.	Alamgir Sk		Alamgir SK

Conducted by : Anjan Kumar Sharma

Signature : 27-10-2018

Signature : [redacted]

TECHNOFAB ENGINEERING

Toolbox Talk

Toolbox Talk Register

Sl. No	Name	Designation	Signature / Thumb impression
(1)	Abdul Ali		Abdul Ali
(2)	Ashmudin mija		Ashmudin
(3)	Jamse Ali		Jamse Ali
(4)	Sarkar Niru		নিরু সরকার
(5)	Bastem Shek		Bastem Shek
(6)	Gulab mandal		Gulab mandal
(7)	HARI DAS		HARI DAS
(8)	CHANDRA KANT		চন্দ্রকান্ত
(9)	JATAN DAS		Jatan Das
(10)	SHYAM DASH		Shyam Das
(11)	MASNUR RAHMAN		Mozibul Rahaman
(12)	MABIZUL SHEK		মাবিজুল শেখ
(13)	AJNAL ALI		আজনাল আলি
(14)	Samal bishes		সমর বিশ্বাস
(15)	Sheikh Sarker.		Jubaran Sarkar
(16)	Mosad ali shek.		মসাদ আলী শেখ

Conducted by : Amit Kumar Sharma

Signature : 20-10-2018.

Signature [redacted]

[redacted]

TECHNOFAB ENGINEERING



Toolbox Talk

Toolbox Talk Register

Sl. No	Name	Designation	Signature / Thumb impression
(1)	Sahidul Mak		
(2)	Imtiaz Ahmad		
(3)	chandra		
(4)	Abdul Wahab		
(5)	Nimal		
(6)	Lokesh		
(7)	Sahadeva		
(8)	Abdul Mak		

Conducted by

Signature

Signature

Thimphu Thermedo

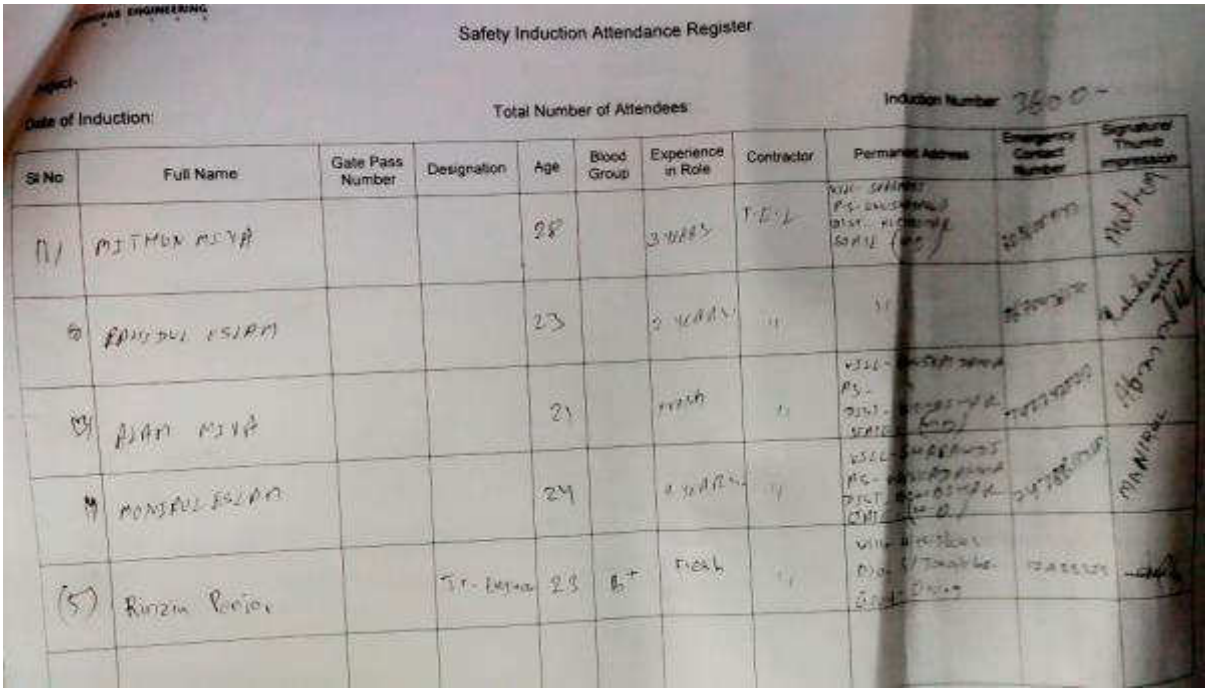
Safety Induction

Project Name Design, Build and Operate & Transfer ... Thimphu Bhutan (TCC/WWTP/OM/01)	Induction Number
Contractor Technofab Engineering Limited	Project Number TCC/WWTP/OM/EV (3600)
Inductee Name	Date of Induction 02-10-2018
Age / Blood Group	Designation
	Experience in Role

1.0	Introduction about site	✓
2.0	Safety Policy of Owner, Consultant & Contractor	✓
3.0	Alcohol policy, Drugs, No smoking	✓
4.0	Gate pass procedure	✓
5.0	First aid facilities	✓
6.0	Emergency procedure	✓
7.0	Incident Reporting	✓
8.0	Welfare facilities	✓
9.0	Personal Hygiene	✓
10.0	Good housekeeping	✓
11.0	Fire preventions and protections	✓
12.0	Safe Plan of Action (SPA)	✓
13.0	Personal Protective Equipment (PPE)	✓
14.0	Working at height (Ladders, Scaffolding, Safety harness)	✓
15.0	Fall prevention and protection (Open edges, floor cut outs)	✓
16.0	Safe use of hand and power tools	✓
17.0	Material handling	✓
18.0	Electrical safety	✓
19.0	Gas cutting, welding and Gas Cylinders	✓
20.0	Traffic rules	✓
21.0	Movement on site	✓
22.0	Permit to work	✓
23.0	Don't put yourself and other at risk. If you have any doubts ask your supervisor for help	✓
24.0	Return home safety	✓
25.0	Any other topic...... Environmental safety	✓

Your Health - should the Company and your work colleagues know about your health? Are you taking specially prescribed medication? Are you epileptic or diabetic, or do you have a heart problem/ disease? If we all know - we can help if you become ill, if we don't know, any help may be too late.

Name of Inductor ... Kumar Sharma	Name of Inductee
Signature	Signature/ Thumb Impression
Date 02.10.2018	Emergency Contact Number



Safety Induction Attendance Register

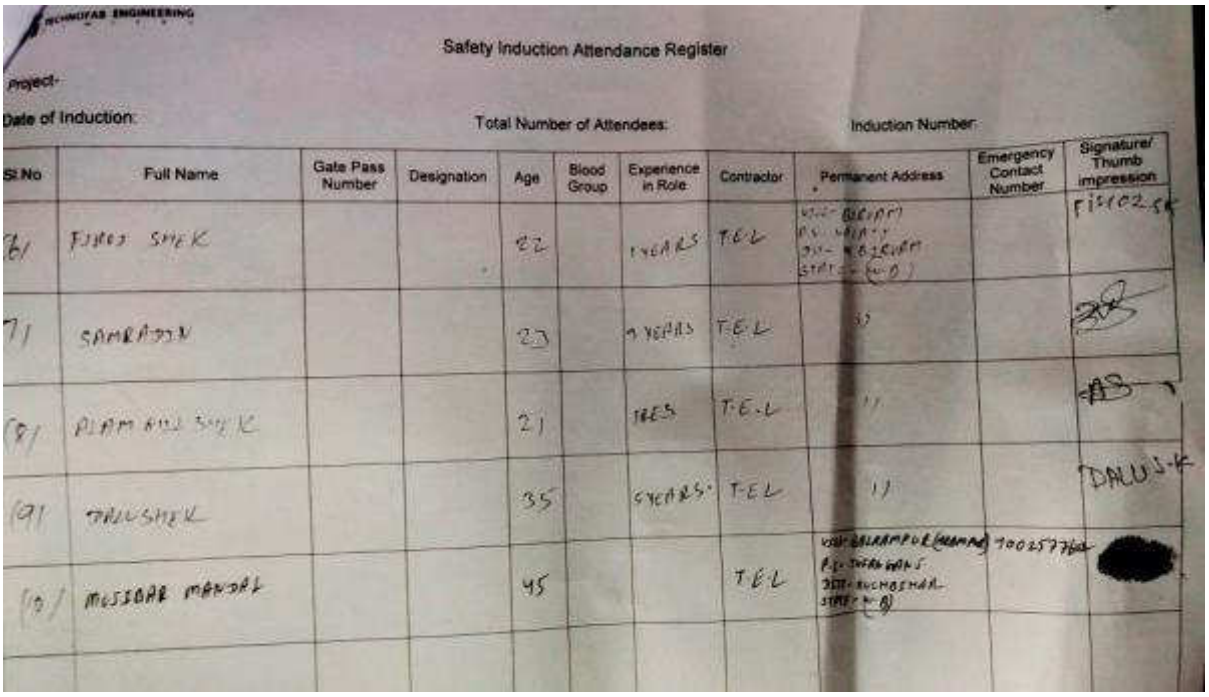
Project-

Date of Induction:

Total Number of Attendees:

Induction Number: 3500-

Sl No	Full Name	Gate Pass Number	Designation	Age	Blood Group	Experience in Role	Contractor	Permanent Address	Emergency Contact Number	Signature/ Thumb impression
1	MITHUN MIYA			28		3 YEARS	T.E.L			
2	[illegible]			23		3 YEARS	"			
3	[illegible]			21		[illegible]	"			
4	MONIRUL ISLAM			24		4 YEARS	"			
5	Ruzim Reja		Tr-Driver	23	B+	Fresh	"			



Safety Induction Attendance Register

Project-

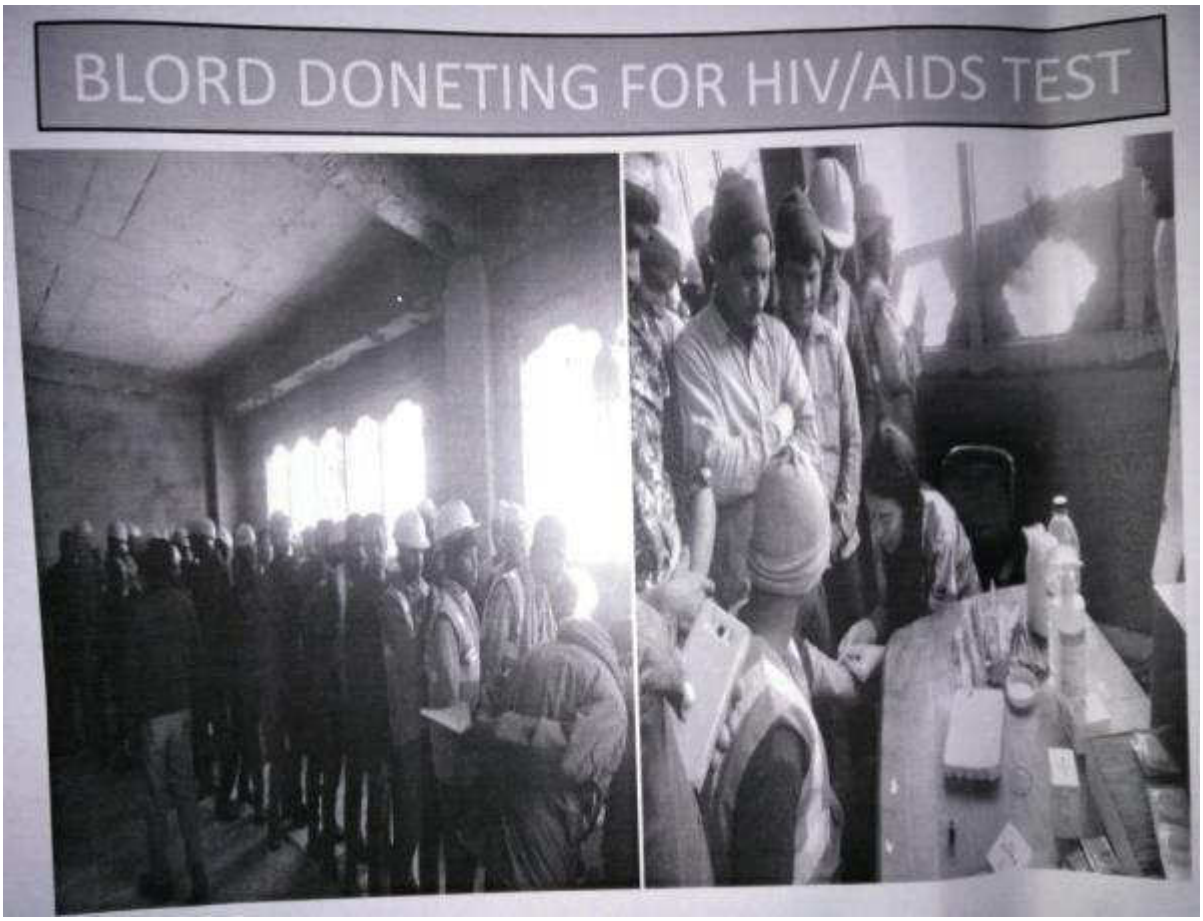
Date of Induction:

Total Number of Attendees:

Induction Number:

Sl No	Full Name	Gate Pass Number	Designation	Age	Blood Group	Experience in Role	Contractor	Permanent Address	Emergency Contact Number	Signature/ Thumb impression
6	FIROJ SHEK			22		1 YEARS	T.E.L			
7	SAMRAJJN			23		3 YEARS	T.E.L	"		
8	RIAM ALI SHEK			21		FRES	T.E.L	"		
9	TAUSHEK			35		5 YEARS	T.E.L	"		DALUS-K
10	MOSSAHR MANDAL			45			T.E.L		9002577[illegible]	

Annex - 6: HIV/AIDS campaign program, WWTP-Thimphu Thromde.



b) Photographs

Annex 7: Photographs from Field Visits for Components 1, 2, & 3.

Sl. No	Name of work/activities	Present status	Picture reference	Remarks
Component 1: Thimphu Thromde_ Construction of Waste Water Treatment Plant.				
1	Erection of signage.	Completed.		Sign board about the project put up at project site.
2	Use of OHS gadgets	Project staff using helmet at work site.		Complied.
3	Notification on the use of OHS gadgets at project site.	Safety rules notification put at site to remind everyone.		Complied

4	Notification on the use of OHS gadgets at project site.	Safety rules notification put at site to remind everyone.		Complied.
5	OHS: Awareness campaign	Celebrated one week's National Safety week by the contractor in Project.		4-10 March 2018
6	Use of OHS gadgets	Labourers using helmets and reflective jackets at work.		Complied.
7	Materials stocking. (Autoclave Aerated Concrete blocks)	Neatly stacked.		Complied.

8	Signboard at site.	Signboard “Men at Work Drive Slow” erected.		Complied.
9	Construction of Office / administrative building.	98.23%.		Construction ongoing.
10	Construction of WWTP	Construction		Construction
11	Construction of WWTP	Construction		. Construction
12	Fire Fighting equipment.	A few equipment in palce		Complied.

13	First Aid Kit	Purchased and available in site office.		Complied.
14	First Aid Kit	Purchased and available in site office.		Basic medical equipment and medicine available in the First Aid Box.
15	First Aid Kit	Purchased and available in site office.		Resuscitation Face shield also available in the kit.
16	Emergency evacuation incase of natural disaster.	Everyone has been briefed and the assembly site identified in case of any emergency evacuation.		Assembly point identified and sign put up.

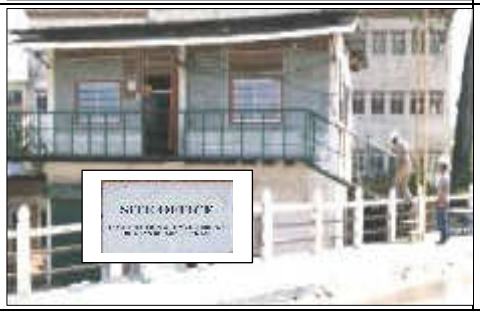
17	Materials stocking.	Pipes stacked at site. Stacked materials covered with plastic sheet at site.	 	
18	Water tanker.	Purchased for sprinkling water to suppress dust at construction site.		Operational.
19	Material stocking.	Sand and aggregates stocked.		Properly stocked at site.
20	Material stocking.	MS rods stacked at site.		

21	Material stocking.	Materials being transported at stock yard.		Sand being transported.
22	Material stocking.	Materials being stocked.		Sawn timber for construction works.
23	Concrete mixture plant.	Constructed and in operation.		
24	Construction of Staff quarters	97.69% completed.		Construction ongoing.

Component 2: Phuentsholing Thromde – Construction of 46.8m Bridge over Omchu river.				
25	Erection of sign boards.	Completed.		Sign board providing the Project information.
26	Erection of sign boards.	Completed.		**Cautionary Sign board at site.**
27	Erection of sign boards.	Completed.		**Mandatory Sign board at site.**
28	Erection of sign boards.	Completed.		**Mandatory Sign board at site.**

29	Procurement and use of OHS gadgets.	Completed.		Helmets worn during site visit. (DMSC Env. Consultant with contractor's Project Engineer)
30	Bridge construction.	Ongoing		Works viewed from **Left bank** of Omchu river**.**
31	Bridge construction.	Ongoing		Works viewed from **Right bank** of Omchu river.
32	Laying of pre-stressed cable pipes.	Ongoing		Close-up view.
33	Laying of pre-stressed cable pipes.	Ongoing		

34	Material Stocking.	Sand and aggregates.		Neatly stocked.
35	Material Stocking.	Aggregates.		Neatly stocked.
36	Toilet.	Constructed.		Labourers' toilet.
37	Camps	Constructed		Labour camps.
38	Camps	Constructed	 	Labour camps.

39	Toilet.	Constructed.		Staff toilet
40	Site Office	Constructed		Contractor'
41	**Copy of photographs from Contractor's Progress report _ October 2018**			

Bhutan Builders Private Limited

Omchu Site Photos –OCTOBER 2018

Laying of RCC blocks and ISMC beams & supports

Placing & binding of reinforcements for base slab

Erection of steel frame supports

Laying of ISMC beam supports

Formworks for Cable anchorage

Binding of reinforcement for base slab & beams

Offices Post Box #: 525, Thimphu. Tel...#:00975-02-325789, 326924, Fax. #:00975-02-323462
Post Box #: 07, Phuentsholing Tel. #: 00975-05-254045, 254531, Fax. #: 00975-05-254194

Component 3: Samdrup Jongkhar Thromde_ Water Supply from Rikke chu				
42	Erection of sign boards.	Completed.		Overall project information.
43	Camps	Completed		With office and stores.
44	Toilet	Completed		Staff's & Labourers'.
45	Intake (Weir)	Completed		Fish-ladder included.
46	Intake (Weir)	Approach road.		Temporary access road, beside the fish-ladder, to clear/remove debris above the intake, caused during summer.

47	Material stocking	Sand and aggregates stocked at site.		Neatly stocked.
48	Office cum WTP complex	Construction ongoing.		Chemical building up-coming.
49	Office cum WTP complex	Construction ongoing. (Slab casting of Chemical building)		Labourers not using helmets on site.
50	Material stock.	Cement store.		Cement stacking.
51	Water supply: Laying of pipes.	Completed by August '17		Pipes laid till WTP only.

52	Office building.	Completed.		
53	Construction of Sludge thickener and plate settler frames.	Completed.		Laying of sludge pipe lines ongoing.
54	Installation of clarified tanks.	Completed.		
55	Construction of Chemical building.	Slab casting ongoing as of 21 Nov '18.		
56	Access road to Intake.	Proposed access road for annual desilting works.		Road to be designed once final road survey data are available.
57	Meeting in PIU office.	Discussions on the final details of civil structures.		Consultants and PIU engineer.

b) **Appendix C_ Environmental Criteria and Standards**

I. Ambient Air Quality Standards (Maximum Permissible Limits in (µg/m^3)

Environmental Standards, National Environmental Commission, Royal Government of Bhutan, Nov 2010

Parameter	Industrial Area	Mixed Area*	Sensitive Area**
Total Suspended Particulate matter			
24 Hour Average	500	200	100
Yearly Average	360	140	70
Respiratable Particulate matter (PM10)			
24 Hour Average	200	100	75
Yearly Average	120	60	50
Sulfur Dioxide			
24 Hour Average	120	80	30
Yearly Average	80	60	15
Nitrogen Oxides			
24 Hour Average			
Yearly Average	120	80	30
	80	60	15
Carbon Monoxide			
8 Hour Average	5,000	2,000	1,000
1 Hour Average	10,000	4,000	2,000

*** Mixed Area** means where residential, commercial or both activities take place

****Sensitive Area** means where sensitive targets are in place like hospitals, Schools, sensitive ecosystems.

Source: Environmental Standards, National Environmental Commission, Royal Government of Bhutan, Nov 2010

II. Noise Level Limits:

Industrial Area		Mixed Area		Sensitive Area	
Day *	Night **	Day	Night	Day	Night
75 dB (A)	65 dB (A)	65 dB (A)	55 dB (A)	55 dB (A)	45 dB (A)

Note: All the values are maximum values

*Day time is from 0600 hours to 2200 hours (human activities) **Night time is from 2200 hours to 0600 hours (no human activities)

Source: *Environmental Standards, National Environmental Commission, Royal Government of Bhutan, Nov 2010*

III. Vehicle Emission Standards:

Fuel Type	Vehicle registered priorto 01st Jan 2005	Vehicle registered after 01st Jan 2005	Type Approval
Petrol (% CO)	4.5	4	Euro II
Diesel (% HSU)	75	70	

Source: Environmental Standards, National Environment Commission, Royal Government of Bhutan, Nov. 2010

IV. Ambient Water Quality Criteria for various uses (September, 2010)

Sl. No.	Parameters	A	B	C
1	pH	6.5-8.5	6 to 9	6 to 9
2	Colour, Hz Units	5	50	-
3	TSS mg/l	25	100	-
4	Conductivity, µS/cm	800	1000	2000
5	Odour	Unobjectionable	Unobjectionable	-
6	Mineral Oil	No film	No film	-
7	Nitrate, mg/l	10	50	-
8	Flouride, mg/l	1	2	-
9	Sulphates, mg/l	25	100	-
10	Chloride, mg/l	50	200	-
11	Surfactants, mg/l	0.1	0.2	-
12	Phosphates, mg/l	0.5	<1.0	-
13	DO, mg/l	6	4	-
14	BOD, mg/l	2	5	50
15	TKN, mg/l	0.5	2	
16	Ammonia, mg/l	0.05	0.5	
17	T. Coliform, MPN/100 ml*	50	5000	10000
18	F. Coliform, MPN/100 ml*	20	2000	5000
19	F.streptococci, MPN/100 ml*	20	1000	1000
20	Dissolved Iron, mg/l	0.2	0.5	-
21	Copper, mg/l	0.05	0.1	-
22	Zinc, mg/l	0.2	0.5	
23	Arsenic, mg/l	0.01	0.05	-
24	Cadmium, mg/l	0.003	0.003	-
25	Total-Chromium, mg/l	0.05	0.05	-
26	Lead, mg/l	0.02	0.02	-
27	Selenium, mg/l	0.01	0.01	-
28	Mercury, mg/l	0.0005	0.0005	-
29	Phenol, mg/l	0.001	0.002	-
30	Cyanides	0.05	0.05	-
31	PAH, mg/l	0.0002	0.0002	0.001
32	Total Pesticides, mg/l	0.0005	0.0005	0.001
33	PCB mg/l	0.0002	0.0002	-
34	SAR	-	-	-
35	Boron	-	-	1
36	Floating Materials such as wood, plastic, rubber, excreta, garbage etc.	Absent	Absent	Absent

Source: *Environmental Standards, National Environmental Commission, Royal Government of Bhutan,*

Note:

1. (Very good) Drinking water source without conventional treatment, but after disinfection whenever necessary.
2. (Good) Drinking water source without conventional treatment.
3. (Moderate) Use for irrigation, industrial cooling etc.
4. *To achieve the drinking quality standards, disinfection/ boiling of the water is recommended.*

The total coli form may be high due to their contribution from natural sources like soil, litter, etc., which does not relate to pathogen. If MPN of total coli form is noticed to be more than the limit suggested, than regular test should be carried out. The criteria would be satisfied if during a period not more than 5 % sample shows greater than prescribed limit.

V.*List*

a) *Noise, b) Air Pollution, c) Dust Control, e) Construction Waste, f) Pedestrian Safety, g) Traffic Safety, h) Contamination of Water Sources, i) Services Disruption, j) Mobility Access, k) Excess Material Disposal, l) Traffic Management Plan. M) GRM---Important, n) Integration of Transport, o) Slope Stabilization, p) IBET, q) EMP, r)* Traffic Management

SOUTH ASIA REGIONAL DEPARTMENT
SAUW Semi-Environmental Monitoring Report Log Sheet

Project title:	**BHU: Urban Infrastructure Project**			
Loan Number:	2816	**Project Number:**	44240-013	
Overall Project and Objectives	The Royal Government of Bhutan (RGoB) had signed a loan agreement (Loan Agreement No. 2258–BHU) in the year 2007 with the Asian Development Bank (ADB) for implementation of Urban Infrastructure Development Project (UIDP). The project covered Thimphu, Phuentsholing and Dagana. The project was completed and closed in 2014. A few years later, Government expressed their need for further infrastructure development in Bhutan and requested ADB for project preparation to ensure sustainable urban development in additional towns. ADB conducted a PPTA study under TA 7360 and identified work components in the following towns – Thimphu, Phuentsholing, Samdrup Jongkhar and Rinchenthang (Nganglam). The loan was approved by ADB in November 2011 and declared effective in April 2012. The project schedule started back in May 2013 with a completion target date of 14 February 2018.			
Approved Categorization		Category A		Category C
	X	Category B		FI
Loan Effectivity Date:			**Frequency of Reporting**	Semiannual
Project Officer	Shinjini Mehta	**Project Analyst**	Teresita Capati	
Reporting Year	2018	**Coverage Period**		January to June
			X	July to December
Dates	**PMU submission to ADB**	6 December 2018	**ADB comment submission to PMU**	15 January 2019

Item	Findings in the SEMR	Comments	Action/s Required	Response by PMU
A. Project Safeguards Team *(check loan agreement and PAM requirements)*				
PMU[1]	Safeguards staff under the PMU, along with contact details, has been included in the SEMR	No further comments		
PIU[2]	Safeguards staff under the PIUs for the different thromdes, along with contact details, have been included in the SEMR	No further comments		
Consultants	Safeguards consultants, along with contact details, have been included in the SEMR	No further comments		
Others *(e.g. auditor, external monitoring team, etc)*				
B. Overall Project and Subproject Description *(summarize number and type of packages)*[3]				

[1] PMU – project management unit
[2] PIU – project implementation unit
[3] DB/DBO – design-build or design, build, and operate or where contractor will finalize the detailed engineering design; civil works contract – enough details of the package is known and used as basis for bid/contract's Technical Specification

Item	Findings in the SEMR	Comments	Action/s Required	Response by PMU
Number of Packages with civil works *(check if consistent with latest procurement plan)*	3 packages included in the SEMR			
Number of DB/DBO packages and status (see footnote 3)				
Number of civil works packages and status (see footnote 3)	3 packages have ongoing construction works - Thimphu - Phuentsholing - Samdrup Jongkhar (Samdrup Jongkhar and Dewathang)	A table containing a list of activities that have been completed and pending would help provide a more complete picture of the status of civil works packages	Provide a table containing a list of activities per package, along with an indicative timeline, with the following headings: - Planned activities - Completed works - Pending works	
IEEs cleared for awarded packages?	Confirmed Disclosed as of October 2011	No comments		
Safeguard documents disclosed on project website?	No information provided in the IEE	SEMR should reflect if safeguards documents have also been disclosed on project website	Indicate in SEMR if safeguard documents have been disclosed on project website	
SEMR information on package-wise implementation phase (bidding, on-going, construction, completed, under operation, others)	Information provided in SEMR is as of 2017. No progress provided for 2018. Information provided in current SEMR is actually a repeat of SEMR submitted last May 2018 (https://www.adb.org/projects/documents/bhu-44240-013-emr-0)	2018 progress on package-wise implementation should be provided in the SEMR	Provide 2018 progress on package-wise implementation in the next SEMR	
C. Status of compliance with statutory clearances *(check IEE for the complete list, summarize the findings for each package – obtained/under application and if obtained, specify validity period)*				
Environmental Clearance (EC)	ECs obtained and appended in the SEMR for all three packages	No further action required	Provide renewed ECs for the next SEMR, especially for Thimphu package as it is only valid until 15 May 2019	
Forest Clearance	Information not provided.		- provide information if required	
No Objection Certificate/Letter	Information not provided.		- provide information if required	
Site location clearance	Information not provided.		- provide information if required	

Item	Findings in the SEMR	Comments	Action/s Required	Response by PMU
Permit/Consent to Construct (or equivalent)	Information not provided.		- provide information if required	
Permit/Consent to Operate (or equivalent)	Information not provided.		- provide information if required	
Road-cutting permit	Information not provided.		- provide information if required	
Utilities shifting permit	Information not provided.		- provide information if required	
Tree-cutting permit	Information not provided.		- provide information if required	
Others (specify)				
D. Status of Compliance with loan covenants *(verify items in SEMR with project loan agreement)*				
Procurement of goods, works and consulting services (Schedule 4, Item 7)	No information provided in the SEMR	Status of compliance with particular loan covenant need to be included in the SEMR	Provide compliance status with Schedule 4, Item 7	
Safeguards environment (Schedule 5, Item 5)	Compliance status for Schedule 5, Item 4 was provided in the SEMR	Please ensure that environmental awareness and even OHS sessions need to be conducted on a regular basis onsite, especially for the benefit of the contractors' personnel. Environmental awareness should not end with one workshop. Just like public consultations, it needs to be conducted on a continuous basis.	Provide minutes of consultation meetings conducted	
Human and financial resources to implement safeguards requirements (Schedule 5, Item 9)	No information provided in the SEMR	Status of compliance with particular loan covenant need to be included in the SEMR	Provide compliance status with Schedule 5, Item 9	
Safeguards-related provisions in bidding documents and works contracts (Schedule 5, Item 10)	No information provided in the SEMR	Status of compliance with particular loan covenant need to be included in the SEMR	Provide compliance status with Schedule 5, Item 10	
Safeguards monitoring and reporting (Schedule 5, Item 11)	Under compliance 4th SEMR covering period July to December 2018 submitted to ADB	Status of compliance with particular loan covenant need to be included in the SEMR	Provide compliance status with Schedule 5, Item 11	
Prohibited list of investments (Schedule 5, Item 12)	No information provided in the SEMR	Status of compliance with particular loan covenant need to be included in the SEMR	Provide compliance status with Schedule 5, Item 12	
Labor standards, health and safety (Schedule 5, Item 13)	No information provided in the SEMR	Status of compliance with particular loan covenant need to be included in the SEMR	Provide compliance status with Schedule 4, Item 7	
E. Contractors Compliance with Environmental Safeguards Requirements				

Item	Findings in the SEMR	Comments	Action/s Required	Response by PMU
Appointment of Environment, Health and Safety (HSE) and/or nodal person	Names and contact details of nodal persons identified per package	Safeguards team members' roles not defined in the SEMR	Provide a description of members' TORs to have a clear picture of responsibilities and accountabilities	-
Submission of site-specific EMPs	Table 12 (Overall compliance with CEMP/EMP) indicates that this package has observed full compliance. However, Table 9 (Package-wise IEE documentation status) says that the PIU has not shared the final IEE with the contractors.	PIU needs to provide contractors with the final IEE with the site-specific EMPs. PIU also needs to justify why this has not been provided to the latter.	PIU to provide the contractor with the final IEE with the SEMP Provide site-specific EMP following recommended steps as provided in the attached EMP extracted from ADB-cleared IEE during loan processing stage	-
Submission of SEMP implementation report *(specify in comments frequency – daily, weekly, monthly or quarterly basis)*	Under compliance in terms of submission frequency Current SEMR is the 4th submission since its loan effectivity in April 2012 Non-compliance in terms of basis of SEMP implementation There is no existing SEMP, therefore, monitoring parameters are not site-specific	No further comments	Provide site-specific EMP following recommended steps as provided in the attached EMP extracted from ADB-cleared IEE during loan processing stage	-
Site verification by PMU, PIU, or consultants *(verification report should be attached to the SEMR)*	Sample of signed monthly environmental site inspection report included in appendix	There are three packages currently undergoing different stages of construction. It is preferred to have three signed monthly environmental site inspection reports to represent the three packages under the project	Provide three separate signed monthly environmental site inspection reports in the next SEMR.	-
SEMR compliance matrix on mitigation measures implementation (matrixes are based on approved SEMPs)	The SEMR mentions that the contractors follow a CEMP, but not an SEMP as it has not yet been generated because PIU has not provided contractors with final IEE. This is reflected in tables 9 and 12 where table 9 says the PIU has not shred the final IEE with the contractor, but table 12 states that the packages are observing full compliance.	An SEMR compliance matrix on mitigation measures implementation should be based on an SEMP.	Provide site-specific EMP following recommended steps as provided in the attached EMP extracted from ADB-cleared IEE during loan processing stage	

Item	Findings in the SEMR	Comments	Action/s Required	Response by PMU
			Provide a compliance matrix on mitigation measures implementation based on the SEMP for the next SEMR -	
Other information			-	-
F. Environmental Monitoring based on EMP				
Rationale				
Parameters to be monitored are commensurate to the impacts, mitigation measures, and project/subproject/package	Information not provided.	SEMP not yet submitted by contractors yet therefore no information during reporting period	Provide SEMP and EMP compliance matrix in the next SEMR	
Sampling locations identified and appropriate	Information not provided.	SEMP not yet submitted by contractors yet therefore no information during reporting period	Provide in the next SEMR the sampling locations based on contractors SEMP	
Sampling frequency identified and appropriate	Information not provided.	SEMP not yet submitted by contractors yet therefore no information during reporting period	Provide in the next SEMR the sampling frequency based on contractors SEMP	
Sampling collection and analysis are in accordance with internationally-accepted practices	Information not provided.	SEMP not yet submitted by contractors yet therefore no information during reporting period	Provide in the next SEMR the sampling collection and analysis based on contractors SEMP	
Standards and performance indicators are compliant with ADB SPS requirements[4] (provide justification if less stringent standards are used)	Information not provided.	Table/s comparing Kingdom of Bhutan standards vs. EHS guideline values should be included in the SEMR. The more stringent value will be applicable to the project.	If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client will provide full and detailed justification.	

[4] ADB SPS (Appendix 1 para 33) requires projects to apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines (https://www.ifc.org/ehsguidelines). These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/client will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented ADB SPS.

Item	Findings in the SEMR	Comments	Action/s Required	Response by PMU
		A sample table (Indian standards) is attached for reference.		
G. Environmental monitoring results (narrative based on presented results)				
Visual inspection *(refer to EMP tables in the IEE where visual inspections are required to determine if there are environmental impacts)*	Visual inspection results described in narrative form under Section 6 of the SEMR	Visual inspection results for the current SEMR are the same as the May 2018 SEMR (October 2017 to May 2018)	Provide real and actual visual observation results for activities conducted after May 2018 based on SEMP	
Air quality results	No sampling and analysis conducted during the reporting period	SEMP not yet submitted by contractors yet therefore no information during reporting period	Provide real and actual air quality results based on SEMP	
Water quality results	Water quality results provided.	Results are not updated as analysis was done back in 2017. Water quality results are also identical to results inputted in the SEMR last May 2018 for the period of November 2017 to April 2018.	Provide real and actual water quality results based on SEMP	
Noise level results	No sampling and analysis conducted during the reporting period	SEMP not yet submitted by contractors yet therefore no information during reporting period	Provide real and actual noise level results based on SEMP	
Others				
H. Consultations and/or FGDs during the reporting period				
Number	None	It is important to note that consultations are a continuous activity, especially during project construction stage. Whether formal or informal, with a large or small group, consultation proceedings should be documented and included in the SEMR during reporting period	Provide documentation of consultation proceedings in succeeding SEMRs	
Reason/s for consultations/FGDs	NA			
Number of participants	NA			
Number of **female** participants	NA			
I. Trainings, Workshops, Seminars during the reporting period				
Number	None Table 8 indicated that 1-2 days of environmental awareness workshop needs to be conducted in the project to empower PIUs and contractors' staff about EMP principles	Apart from environmental awareness workshops, short but useful toolbox talks will help especially staff onsite on EHS, OHS and community health and safety.	Conduct environmental awareness workshops to help PIU and contractors' staff. Document	

Item	Findings in the SEMR	Comments	Action/s Required	Response by PMU
	Toolbox talk conducted on 22 October 2018. Topics, contractor and location details appended in SEMR		proceedings, especially questions raised. This will serve as a benchmark on topics to focus on for subsequent training workshops Continue toolbox talks on a more regular basis and document sessions to ensure everything is covered	
Topics	NA			
Number of participants	NA			
Number of **female** participants	NA			
J. Grievance Redress Mechanism				
GRM per PAM or IEE/EARF established	GRM description in the SEMR is generic. No GRM established nor notification provided. GRC members not identified.	The PAM that **within 6 months of project effectiveness,** BHU UIP will prepare a grievance redress mechanism, acceptable to ADB, and establish a grievance redress committee to receive and resolve complaints/grievances or act upon reports from stakeholders on misuse of funds and other irregularities relating to the project, including but not limited to grievances due to safeguard issues	This is overdue activity Specify timeline for establishing the GRM per PAM and IEEs	
GRM notified via publication or notice boards	No notification yet		Specify timeline for GRM notification	
GRM members identified	No GRM members have been appointed		Specify timeline for GRM members appointment	
GRM members have capacity to address project-related complaints *(detailed information on capacity development of GRM members such as trainings, workshops, briefings, etc should be attached in the SEMR)*	No information provided.	GRM members should be provided with project briefings and explained with the project GRM	Ensure GRM members are provided with project briefing and GRM per PAM and/or IEEs Identify gaps and training needs	

Item	Findings in the SEMR	Comments	Action/s Required	Response by PMU
			Provide necessary capacity building	
Number of meetings conducted *(attach minutes of the meeting)*	No information provided			
K. Complaints Received *(detailed information on nature of complaints, summary and status of resolution)*				
Number of complaints	None			
Nature *(provide summary of issues/concerns)*	NA			
Status of resolution	NA			
L. Summary of Issues and Corrective Actions				
Major issues/concerns (specify)	Site-specific EMP			
Corrective Action to be implemented, timeline, responsible person/s, and budget are clearly specified	The non-submission of the SEMP and non-issuance of the GRM notification becomes non-compliances deserving of corrective action	Considering that the different packages under the project have been undergoing different stages of construction works, the following non-compliances deserve corrective actions: - SEMP submission (as the SEMP is the basis for monitoring activities Issuance of GRM notification	Provide the following in time for the succeeding SEMR: - SEMP - GRM notification - Real and actual air quality, water quality, and noise level test results based on monitoring parameters gathered from the SEMP	
M. Status of Corrective Action Plan from Previous Reporting Period (list all and provide status)				
N. Appendixes				
Photos	Field visit photographs provided	No further comment		
Summary of consultations	None provided	Consultations should be conducted on a continuous basis	Document consultation proceedings and incorporate into succeeding SEMR	
Copies of environmental clearances and permits	Environmental clearances for all three thromdes provided in Appendix 1-3	No further comment		
Site EMPs	Not provided	SEMP should be provided. Guide on how to convert draft EMP from ADB-approved IEEs	For all three packages, convert draft EMPs contained	

Item	Findings in the SEMR	Comments	Action/s Required	Response by PMU
		disclosed on website is provided in the attached extracted EMP	in ADB-approved IEEs disclosed on the website into SEMPs using, as guide, the steps contained in the attached extracted EMP. Attach SEMP in next SEMR and EMP implementation compliance should be based on SEMP	
Checklists	None provided			
Others				

O. Review and clearance for disclosure		
Reference	BHU UIP SEMR for November 2018	
	BHU UIP IEE disclosed on October 2011 (https://www.adb.org/projects/documents/bhu-44240-013-iee)	
	Name	**Date**
Reviewed by	**Zarah C. Pilapil**	**16 January 2019**
Noted by	**Ninette R. Pajarillaga**	
Response to ADB comments by:		
Status/Remarks	1. Recorded as submitted	
	2. Send comments to PMU for response to comments	