Asian Development Bank	CDCL	Kingdom of Bhutan

Construction Development Corporation Limited (CDCL)
Phuentsholing Township Development Project

Project Number: 50165-002
Loan Number: 3668-BHU(COL)
Grant Number : 0573-BHU(SF)
Contract N°:PTDP-PIC-1

Project Implementation Consultant (PIC)

Project Quarterly Report N° 05

01 October 2019 – 31 December 2019

PIC Report Cataloguing n° PTDP – 047

Document Quality Information

General information

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Project's Name	Phuentsholing Township Development Project (PTDP) PIC Report Cataloguing N° PTDP - 047
Document Name	Project Quarterly Report N° 05
Date	20 January 2020
Reference	Version N° 01

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Mehmet Kahraman	Team Leader, Egis International	20 January 2020

History of modifications

Version	Date	Written by	Approved/ Reviewed by

Abbreviations

ADB	: Asian Development Bank
ADF	: Asian Development Fund
ALDTP	: Amochhu Land Development and Township Project
APFS	: Audited Project Financial Statement
BMBMS	: Biodiversity Monitoring and Bench Marking Study
CDCL	: Construction Development Corporation Ltd.
CEMP	: Contractor-Environmental Management Plan
CW	: Civil Works
CV	: Contract Variation
DHI	: Druk Holdings and Investment Ltd.
DMF	: Design Monitoring Framework
EA	: Executing Agency
EIA	: Environmental Impact Assessment
EMP	: Environmental Management Plan
FIDIC	: Fédération des Ingénieurs Conseils
GAP	: Gender Action Plan
GFC	: Good For Construction
GRC	: Grievance Redress Committee
GRM	: Grievance Redress Mechanism
HSE	: Health Safety and Environment
IA	: Implementing Agency
ICB	: International Competitive Bidding
LTP	: Letter to Proceed
MoF	: Ministry of Finance
MOM	: Management, Operation and Maintenance
MoWHS	: Ministry of Works and Human Settlements
NCB	: National Competitive Bidding
NC	: Non-Conformance
NCR	: Non-Conformance Report
NEC	: National Environment Commission
Nu	: Ngultrum
PT	: Phuentsholing Thromde (city council)
PAC	: Project Advisory Committee
PCR	: Phuentsholing – Chamkuna - Road
PIC	: Project Implementation Consultant
PIU	: Project Implementation Unit
PMU	: Project Management Unit
PS	: Provisional sum
PTDP	: Phuentsholing Township Development Project
PPTA	: Project Preparatory Technical Assistance
QAP	: Quality Assurance Plan
RENEW	: Respect Educate Nurture Empower Women
RGoB	: Royal Government of Bhutan
RFI	: Request For Inspection
RFQ	: Request For Quotation
SEMR	: Semi-annual Environmental Monitoring Report
TN	: Technical Note
ToR	: Terms of Reference
VO	: Variation Order

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Basic Project Information

Name of the project	Phuentsholing Township Development Project
Cost of project	63.00 $million
Name of Agency	Druk Holding and Investments Limited
Implementing Agency	Construction Development Corporation Ltd
Approval Date	5th June 2018
Project effectiveness (Loan & Grant)	26th July 2018
CDCL PMU created	26th July 2018
Project Completion Date	30th June 2025 (Overall Zone-A)
Project Closing Date	31st December 2025
Project Location	Bhutan / Phuentsholing
PTDP anticipated impact	Impact 1: Balanced and sustainable development of human settlements ensured; Impact 2: Smart growth principles applied in planning and development.
PTDP anticipated outcome	Phuentsholing's urban area protected from floods and expanded with improved amenities and services
PTDP Outputs	Output 1: Flood and erosion protection measures installed Output 2: Municipal infrastructure constructed Output 3: Township management systems installed
Date of the Loan & Grant agreements	03rd July 2018
Mobilization of PIC	01st October 2018
CW-01 start date	1st November 2018
ADB review missions since project start	14th to 15th Nov 2018, 7th to 10th May 2019, 31st October to 1st November 2019
Reporting Period	1st October to 31st December 2019

Project funding source	Amount ($million)	Share of Total (%)
Asian Development Bank[a]	53.00	84.1
Ordinary capital resources (concessional loan)	28.74	45.6
Special Funds resources (ADF grant)	24.26	38.5
Government	10.00	15.9
Total	**63.00**	**100.0**

[a] Disaster Risk Reduction Fund will finance $6.07 million equivalent of the concessional OCR loan and $6.07 million of the ADF Grant.

Source: Asian Development Bank.

A. Executive Summary

A.1 Major issues

(To be resolved by the parties during the report period, Oct-Dec, 2019)

PIU / PMU (Client)

- To agree and revise the final layout of the project boundary between PTDP and PCR in relation to the change of road alignment from a single carriageway to dual carriageway type and associated junctions, side / service roads details for a smooth connectivity to PTDP
- To issue the revised Outfall GFC drawings for CW-01 to proceed for construction in order to mitigate delay for the project
- To issue an official instruction to start the additional works from PTDP boundary to Omchu bridge
- To conclude the unit price for earth filling and embankment works as per BoQ item. Contractor was requested to give breakdown of rate analysis as per the ADB format
- To confirm the ADB approval on the lower walkway level recommended by the PIC resulted from 2D Hydraulic Modelling as well as the upper walkway level after final submission from PIC
- To provide sufficient work front for the contractor to avoid any delay and mitigate claim from the contractor due to delay issuing the project revised drawings
- To continue working on the package CW-02 bid documentation for submission to ADB

PIC (Consultant)

- To propose recommendation for the lower walkway level, and upper walkway level after finalizing the 2D Hydraulic Modelling
- To assist PIU for the preparation of the package CW-02 bid documentation together with the help of international experts input for submission and review / comment / approval from ADB
- To propose recommendation to client on to carry out BMBMS study or rescheduling for a later stage, ie., after the CW01 near to its completion, due to current dredging activities at Zone C
- To plan to conduct FMC study in the early 2020 after the 2D Hydraulic Modelling has been completed and awaiting for ADB review / approval
- To continue to cooperate / coordinate with the changing of the Contractor's resources requirements, in order for timely completion of the project

CW-01 (Contractor)

- Plan to mobilize /demobilize resources as per the project progress, in order to achieve the agreed project completion date and the set budget for the project
- To maintain the approved / agreed temporary traffic management together with cooperation / coordination with the PCR's contractor throughout the project life
- To enhance the implementation of HSE rules and regulations for the project as set out in the HSE Plan as well as updating the Health and Safety file as required

A.2 Progress made during the reporting period

Table 1 : Project progress during the period

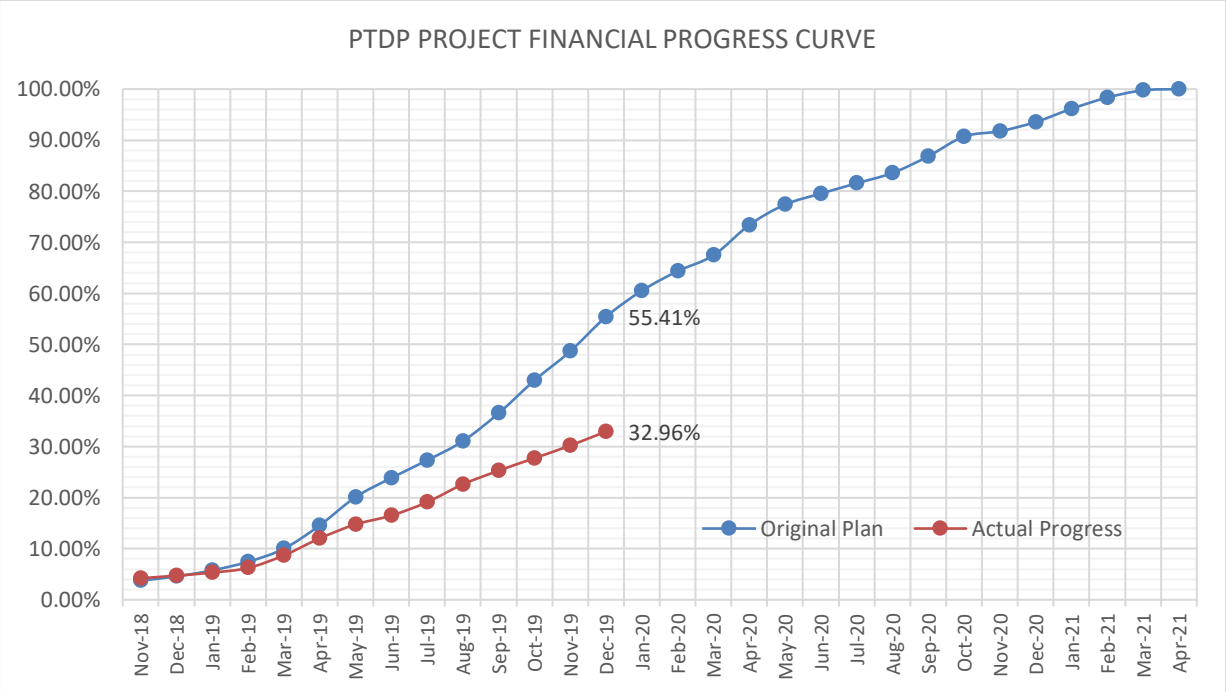
Activity	% Accomplished vs. Target for the period[a]		Summary of Progress
	Accum.	Planned	
River Training and Embankment Protection Works	30.20%	48.66%	D-Wall: 2652 m length; Cast In Situ Wall (2.3 m height): 474 m length; General Earth Filling: 711,812.92 cum
Common Urban Infrastructures	0.0%	0.0%	
Township Management System	0.0%	0.0%	

[a] Accomplishment and target refers to the financial forecast

Progress of activities against output indicators are listed in **Appendix-1**.

The updated implementation schedule showing actual progress included in **Appendix-2**.

Progress photograph is attached in **Appendix-15**



A.3 Problems encountered

Here below are the proposed action taken for the pending issues encountered during the start of the project:

1. Removal of deposited river bed material

For general earth filling works item no. 401, contractor needs to execute with selected approved materials after excavating from river bed including levelling. However, general earth filling is given to a sub-contractor, for which the material is from stockpiles already available.

CW01 updated and incorporated the method statement for item no. 402, for which contractor agreed to execute the general earth filling works with selected and approved materials after excavating from river bed including levelling.

Therefore, it is foreseeable that the present condition as per CW-01 contract will not resolve the requirements for channelization of the whole riverbed as per geometry mentioned in the design. Hence an alternative solution has to be found to remove the extra volume of deposits along the 300m river channel within Zone-A to bring the river bed to designed level.

2. Removal of unsuitable material

There is no BOQ item for removal of unsuitable materials. During the execution of the general earth filling work unsuitable materials are encountered in the temporary stream diversion / channels developed due to outfalls from the hill side. These are the fine and deleterious material which needs to be removed before preparation of groundwork for general earth filling and to achieve the required field test as per the technical specifications and requirements of the contract.

This item was not anticipated during design phase as it occurred during the monsoon season, however the quantity variation is not huge and this will have not much cost implication for the project.

3. Sediment Management

A large volume of RBM was removed along the Amochhu in PTDP's Zone B prior to the 2019 monsoon season and the process is still being continued. If needed, this area is seen as a proposed sediment trap to control the sediment accumulation within Zone A after its completion. Considerable sand was deposited in this area during the 2019 monsoon indicating that sediment could be trapped in this area prior to entering the Zone A of design channel. The area of sand deposition remains approximately 1 m above the low flow water level, suggesting that lowering this surface an additional meter may lead to channel migration and large volumes of gravel deposition as would be required to serve as an effective sediment trap for PTDP. Sediment would likely need to be removed annually to maintain the effectiveness of sediment trapping in this area, but would be less disruptive than such sediment management if occurring directly adjacent to Zone A.

4. Revision of Design

Due to the datum level issues, update / revision in the lower walkway and hence the upper walkway level (final embankment) was required as recommended by 2D Hydraulic modelling results. The proposed recommendation is to set the lower walkway level above 3.42 meters from the proposed river bed level. A letter was issued from PIC to PIU recommending necessary update/revision on the civil and structural design including outfalls. In addition, some of the works already constructed might require remedial works including design, e.g. the top of the constructed diaphragm walls will need to be raised with additional cast in-situ concrete wall to achieve the revised design level.

5. PIC staffing and mobility

The construction supervision team has been upgraded to fulfill set tasks (control and supervision) of the project works with recently deputation of two more site inspectors for the project. However, the construction activities are anticipated to increase after receiving the updated/revised design documentation, drawings from PIU. The project will certainly need to employ additional technical staff for an effective monitoring, checking, witnessing, recording and reporting the site activities for a successful completion of this project.

To take care of this, Contract Variation-02 (CV-02) to PIC Contract was signed on 26th July 2019, where the following additional non-key national personnel staff were included.

Presently PIC has following field Inspectors.

- 4 Site Inspectors
- 2 Laboratory Technician (one seconded by CDCL)
- 2 Land surveyors (Seconded by CDCL)
- 1 Assistant Land surveyors (Seconded by CDCL)

CW01 is working round the clock (24 hours/day) in shift system and PIC has tried to manage construction supervision activities but there will be requirement of additional field inspectors after finalizing the design works.

PIC has two numbers of pick up vehicles and two numbers of motorcycles for supervision and monitoring of the project site activities. The second motorbike was procured on 23rd November 2019.

6. CW-01 Civil Works Contract

6.1 Contract design drawings

The ground conditions considered during preparation of detail design drawing is not consistent with the existing ground conditions. This could be due to seasonal flooding of Amochhu, Temporary flood protection works and due to extensive dredging activities.

The redesigning of outfalls structures needs to be carried out, which will be done by HCP, the design consultant once the levels are finalized. The dimensions and opening sizes of outfalls are different from the PCR, however as suggested in IDPR dimension adopted for the PCR project will be considered for PTDP.

Due to datum and transboundary requirements, 2D modelling is being initiated by PIC and as a result of this the proposed river bed level and lower walkway level changes were recommended. The modeling for the lower walkway, which is the frequent flood level is completed and has recommended to increase the height of cast in-situ wall from 2.5 m to 3.42 m, an increase by 0.92m. PIC has recommended to maintain the lower walkway level at 3.42 m above the proposed river bed level. PIU has engaged HCP to review and update the drawings as per PIC's recommendations. HCP, during their visit to the PTDP on December 2019, agreed to review the change in height and issue the comments or updated Feb by 17th January 2020.

To maintain the work progress and minimize the contractual issues, PIC in consultation with PIU has tried the best possible way to create work front and had allowed concreting work up to a maximum height of 2.3m depending on the location of the anchorage system. PIC has allowed for producing precast concrete blocks for slope protection work as well.

6.2 Site safety

Temporary flood protection measures to protect from the 2019 monsoon flooding from Omchu and outfalls have been effective and the temporary flood control measures were able to avoid risk of flooding to the project site.

The existing temporary bund built by Phuentsholing Thromde along the Amochu is cut through for the construction of Guide wall and diaphragm wall, and the target for now is that the upper walkway retaining wall shall be completed before the onset of coming monsoon if the design levels are finalized within January 2020. Construction activities will be focused in this critical area to protect the project from upcoming 2020 monsoon.

6.3 Works sectioning and milestones for Delay Damage application

Particular conditions of Contract introduce 5 sections of works, a time for completion and a rate for application of Delay Damages on each section. Usually, when linear works are concerned, sections are clearly defined as once works are completed taking over certificate for part of works are issued and immediately the Defect Liability Period for that section starts. The Employer is then responsible for any damages occurred due to external activities.

However, in the case of CW-01 no sections have been geographically determined and work to be accomplished are just related to quantities of some items. In these conditions, issuance of taking over certificate of part of works would be difficult to apply as it will discharge Contractor for further responsibility.

This would mean that if a section of diaphragm wall is taken over by Employer and later when the contractor has to construct cast in situ walls or any other structure linked to the D-wall section, Employer has to hand over the site to the Contractor again. This situation does not seem practicable.

In view of the above, the Engineer's Representative will not be taking over for part of works and hence there will be no ground for Delay Damages notice as per the milestones.

Therefore, it is suggested that:

- Either works sectioning be clearly defined with linear works functional section; or
- works sectioning, with intermediate milestones be removed as unpractical.

This was discussed during the last ADB mission visit in October 2019, whereby it was decided to maintain the milestone targets as per contract to keep the construction activities on track, but the sections of completed work will not be taken over by the client. Further, it was discussed that in case of any delay for achieving the milestone, the delay damages will not be levied on the sectional milestones due to above mentioned complexities.

6.4 Pay Item for payment of backfilling works

Contractor has been warned, on 8th March 2019, that works carried out by sub-contractor for backfilling cannot cover underpay items described in the General Earth Filling section of CW-01 Contract. Every item description includes "excavation in river bed, levelling the river bed as per the levels provided in the drawings" works, which will not be executed by Sub-contractor.

Therefore, the Contractor has been advised:

- to confirm that works will be performed as per item description in Bill No-02c for General Earth Filling of Bill of Quantities; or

- Submit a proposal of Variation to Contract, as per GCC 13.2, "Value Engineering" justifying and introducing a new unit rate, which can only be less than item Contract rates (in particular rate of item n°401)

The contractor did not respond to the Engineer's letter; however, they continued to submit statements using the same Item 401.

As the Engineer has the option to reject the statement, or determine a provisional rate, until an appropriate rate is agreed by both parties, Engineer applied a provisional rate for the payment of backfilling works.

Moreover, the PIC is working on to resolve this issue in the near future, i.e., after the completion of the earth filling and river bed material excavation and levelling as per the BoQ item no. 401 requirements.

Meanwhile, for the BOQ item no. 402 under bill no. 2c, contractor has updated and is now executing the general earth filling work as per the contract requirements. CW01 has submitted the method statement incorporating the comments of PIC and they have agreed to execute with selected approved materials after excavating from the river bed and bank with 95% proctor density by using vibratory roller for compaction including leveling the river bed to a proposed level as per the BoQ item no. 402 requirements as set out in the contract. The rate applied shall be quoted rate with 10% rebate as laid out in the contract.

A.4 Proposed program of activities / work plan for the next quarter

From PIU / PMU

- Coordinate with PCR on the outfalls and the final level of the road as well as the updated/ latest dual carriage way type of road connecting to PTDP
- Submission of the draft CW-02 bid documents to ADB
- Submit SEMR to ADB for public disclosure.
- Issue updated GFC drawings in coordination with HCP.
- Finalize floor finishing materials.
- Update PTDP master plan and incorporate necessary changes in coordination with HCP

From PIC

- Assist PIU/PMU for preparation / submission of the CW-02 bid documents to ADB
- Mobilization / demobilization of construction supervision team as per project need basis.
- Continue to supervise Civil Works Contract N°01 (CW-01) under FIDIC contract.
- Prepare and conduct training session for PIU & PMU.
- Prepare SEMR for further submission to PIU.
- Finalization of upper walkway and embankment level.
- Start working on the contract variation.

From Contractor

- Continue implementation of C-EMP;
- Carry out HIV/AIDS and health disease awareness campaign at project
- Continue the temporary traffics management for public vehicles, as well as PCR and PTDP vehicles inside PTDP area.
- Continue construction of Diaphragm Wall

- Continue General Earth Filling works
- Continue construction of Cast in Situ Wall
- Continue production of Precast Grass Paver Blocks
- Resume outfall works
- Start nursery for sapling
- Start Dead Man Anchor work
- Start Anchor slab work
- Start upper walkway Retaining wall work
- Start stone in wire crates work

B. Project activities

B.1 Project Organization Management

General

The proposed Phuentsholing Township Development Project will reclaim total area of 1146.69 acres of riparian land out of which 162.88 acres is under development in zone A. The project will develop river training structure to prevent threat of flooding and erosion, thereby creating additional land for a planned expansion of the Phuentsholing township. The reclaimed areas will be provided with planned services and facilities like access road, water supply, sewerage system, solid waste management, Power, Telecom and early warning system.

Organization

Within the ADB Project agreements, the Executing Agency (EA) of the project is Druk Holding and Investments Limited (DHI). The Implementing Agency (IA) is Construction Development Corporation Limited (CDCL), a subsidiary of DHI specialized in urban and infrastructure development, who has established a Project Management Unit (PMU) at Thimphu and a Project Implementation Unit (PIU) in Phuentsholing for the sole purpose of implementing the Project.

The PIU is headed by a Project Manager and is well staffed. The PIC reports to the Project Manager and supports PIU. The Project management organization chart is displayed hereafter.

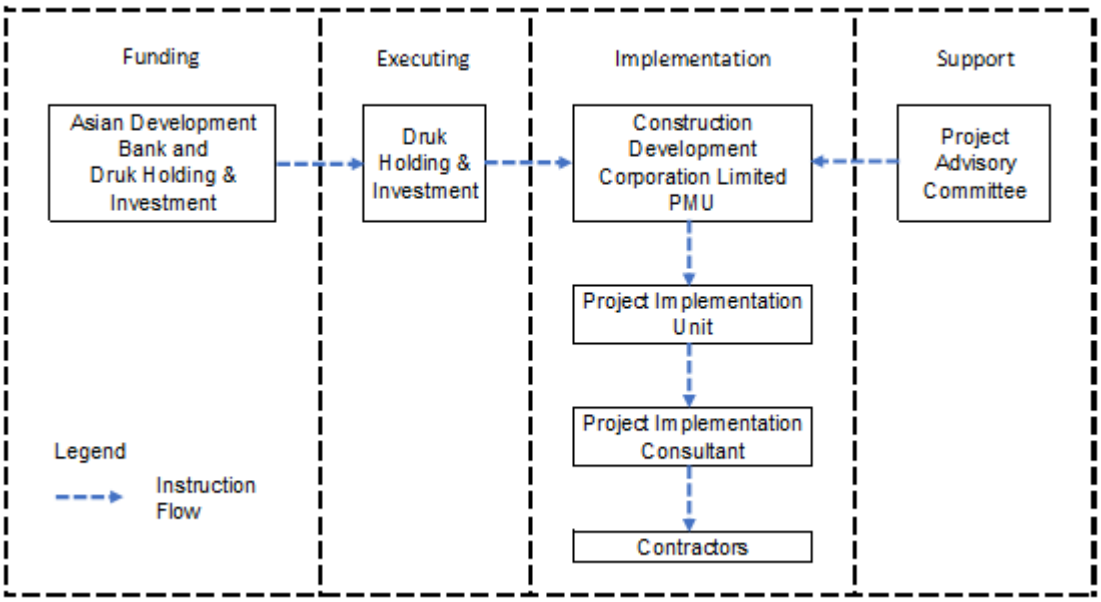


Figure 1: PDTP (Phase 1) Implementation Arrangements

The PMU and PIU staffs are listed in **Appendix 3.**

B.2 Consultant Activities

B.2.1 Signed Consultancy Contracts data / Ongoing Procurement

Consultancy service contract has been signed with M/s. Egis International - Egis India Joint Venture, in association with M/s. Gyaltshen Consultancy as sub-consultant for Project Implementation Consultancy services on 18th July 2018 and were mobilized from 28 October 2018.

Procurement of Independent Environmental Monitoring Expert, including negotiations, has been conducted by PIU/PMU and the contract signed on April 4, 2019.

B.2.2 Status of Variation Orders

PIC contract Variations:

The PIC CV-01 includes:

- PIC mobilized national Material Engineer and was officially approved from 15th January 2019
- PIC mobilized Environmentalist on Intermittent, monthly presence in order to monitor the C-EMP, contractor's activities and has been approved by PIU on 23rd March 2019
- PIU seconded to PIC one laboratory Technician on 4th March 2019.
- The contract variation nº1 has been approved and signed by PMU and Egis International on 4th March 2019.
- PIC mobilized Quantity Surveyor on 13th March 2019 after PIU approval.

The contract remained unchanged. Contingencies increased slightly from USD 939,453 to USD 946,155.

The CV-02 includes:

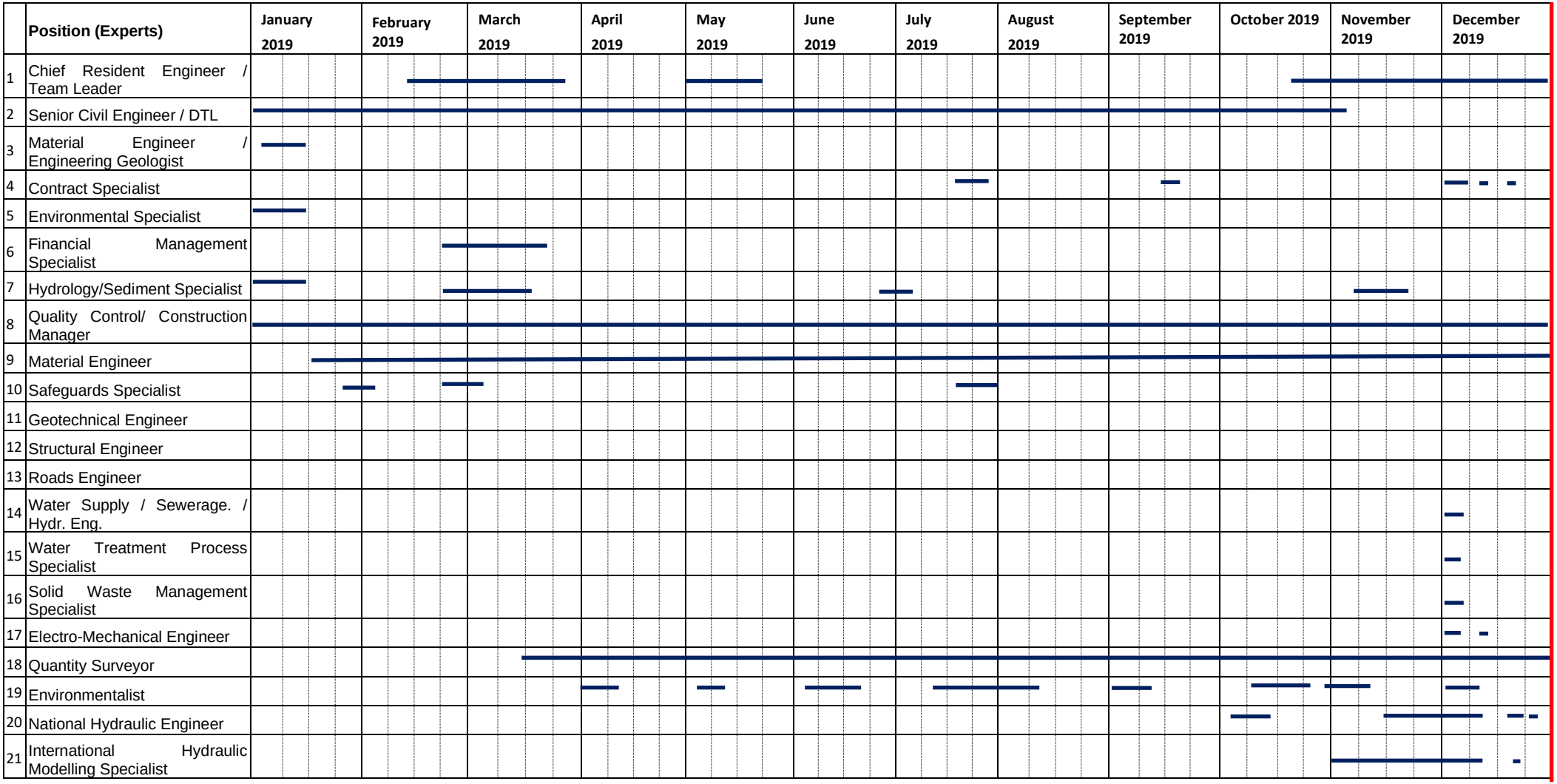
- The Contract Variation nº02 has been approved and signed by PMU and Egis International on 26th July 2019. However, there is no change in the contract amount in USD and BTN.
- PIC mobilized Site inspector on 29th July 2019 as per PIU approval.
- PIU seconded one land surveyor on 29th July 2019.
- PIC mobilized office guard on 2nd August 2019 as per PIU approval
- PIC mobilized lab Technician on 15th August 2019 as per PIU approval.
- PIC Mobilized Site Inspector on 1st December 2019 as per PIU approval.

The Contract amount would remain unchanged, but Contingency decreases from USD 946,154.94 to USD 698,669.82.

B.2.3 PIC Organization and Personnel Activities

Consultant Staffing

Table 2: PIC staffing bar Schedule



	Position (Experts)	January 2019	February 2019	March 2019	April 2019	May 2019	June 2019	July 2019	August 2019	September 2019	October 2019	November 2019	December 2019
1	Chief Resident Engineer / Team Leader												
2	Senior Civil Engineer / DTL												
3	Material Engineer / Engineering Geologist												
4	Contract Specialist												
5	Environmental Specialist												
6	Financial Management Specialist												
7	Hydrology/Sediment Specialist												
8	Quality Control/ Construction Manager												
9	Material Engineer												
10	Safeguards Specialist												
11	Geotechnical Engineer												
12	Structural Engineer												
13	Roads Engineer												
14	Water Supply / Sewerage. / Hydr. Eng.												
15	Water Treatment Process Specialist												
16	Solid Waste Management Specialist												
17	Electro-Mechanical Engineer												
18	Quantity Surveyor												
19	Environmentalist												
20	National Hydraulic Engineer												
21	International Hydraulic Modelling Specialist												

PIC Logistic

Table 3: PIC logistics

Site Office	Prefabricated office structure with toilets, pantry and furniture provided under CW01 contract and occupied from 11th February 2019
Office Equipment	- Procured ASUSTOR AS6102T on 7th December 2018. - Procured photocopy/printing machine - Konica Minolta bizhub 287 with RADF + Double tray & NETWORK from 14th December 2018 - Procured EPSON L1800 A3 color printer from 14th December 2018. - Desktop i5-8400 2 numbers and desktop i3-8100 procured on 14th December 2018. - Procured three digital cameras on 3rd April 2019. - Procured one UPS 1VA on 8th April 2019 and Five UPS 600VA on 9th April 2019.
Transportation	- Isuzu D-Max from 11th December 2018 - Rental Car till 15th April 2019 - Isuzu S-cab from 15th April 2019 - Motorbike from 18th September 2019 - Second motorbike procured on 23rd November 2019. - Rented Car for 2D Modelling for 35 days

Construction Supervision (CS) Team Activities

1. **Mobilization of Specialists**

Table 4: Mobilization of Specialist

Sl No.	Particulars	Date	Purpose
1	Material Engineer / Engineering Geologist / Mr. Vishwas Raghu Rao	17th December 2018 – 13th January 2019 (Project Site)	- To assist Engineer's representative within his construction supervision tasks to monitor CW01 Contractor activities during mobilization phase.
2	Senior Environmentalist / Mr. Surjit Singh Deepak	3rd January 2019 – 18th January 2019 (Project Site)	- Produce the first Semi-Annual Environmental Monitoring Report
3	Structural Designer / Prasanta Bhowmik	18th March 2019 - 15 April 2019 (Project Site)	- Review the design of outfalls as per changed ground profile.
4	Financial Specialist / Mr. Verdizon	25th February 2019 – 22nd March 2019 (Project Site)	- Prepare Project financial & accounting reporting and train PMU personnel for use of ADB FIS System - Prepare different loan and grant disbursement, accounts and financial, statements or reports, templates
5	Hydrology and Sediment Specialist / Mr. John Field	31st December 2018 – 13th January 2019 (Project Site)	- ToR for Flood Management Consultants - Recommendation to adapt outfalls design to project boundary constraints - Analyze CW-01 contractor proposal for temporary measures against floods during construction - Determine quantities and analyze consequences, of substantial sedimentation in Amo chhu riverbed.
6	Hydrology and Sediment Specialist / Mr. John Field	25th February 2019 – 15 March 2019 (Project Site)	
7	Hydrology / Sedimentation specialist / Mr. John Field	21st June 2019 - 05 July 2019 (Project Site)	- Prepare response to ADB's comments on PIC Technical Note No. 10 - Implications for a +1 m Rise in the PTDP embankment level and recommendation - Update on Temporary Flood Protection Measures
8	River Engineer / River Morphology Specialist / Mr. John Field	8th November 2019 - 19th November 2019 (Project Site)	- Flood Management Consultancy

9	Safeguard and Communication Specialist / Megay Penjore	23rd January 2019 – 3rd February 2019 (Project Site)	-
10	Safeguard and Communication Specialist / Megay Penjore	21st February 2019 – 3rd March 2019 (Project Site)	-
11	Safeguard and Communication Specialist / Megay Penjore	18 July 2019 – 1st August 2019 (Project Site)	-
12	National Hydraulic Engineer/ Chhimi Dorji	12th August 2019 – 14th August 2019 (Project Site)	
13	National Hydraulic Engineer/ Chhimi Dorji	15th August 2019 – 17th August 2019 (Home Input)	
14	National Hydraulic Engineer/ Mr. Chhimi Dorji	4th October - 9th October 2019 (Project Site)	2D Hydraulic Modelling Survey: - Helped assemble and test the ADCP, understand the survey plans inspected drone flights ultimate chainage 750m - Helped get 3 cross sections with ADCP & survey team - Review of Drone Images - Worked with kayak & boat team - Set out rope measurement system - Identified critical sections and explained to survey team - Meeting on next steps & plans
15	National Hydraulic Engineer /Mr. Chhimi Dorji	14th November 2019 - 23rd November 2019 (Home Input)	- Meeting and discussions with NCHM and other agencies in Thimphu to finalize the DEMs and input. - Continuation of work at Thimphu with survey team and NCHM. - Prepare mesh for 2D modelling, correction and bathymetry surveys, drone, riverbed sample analysis etc. - Work on new hydrologic data compilation - Sediment data collection from NCHM head office
16	National Hydraulic Engineer / Mr. Chhimi Dorji	24th November 2019 - 27th November 2019 (Project Site)	- 2D Hydraulic Modelling
17	National Hydraulic Engineer / Mr. Chhimi Dorji	28th November 2019 to 4th December 2019 (Home Input)	- Preparing and processing topographical and hydrological survey data
18	National Hydraulic Engineer / Mr. Chhimi Dorji	5th December 2019 to 9th December 2019 (Project Site)	- Working on 2D Hydraulic Modelling with ADB Consultant & International Consultant.
19	National Hydraulic Engineer / Mr. Chhimi Dorji	10th December 2019 – 13th December 2019 (Home Input)	- Reviewing, understanding and advising / commenting on 2D Modelling report produced by Mr. Christiaan Sprengers and comments from Mr. Han. G. Enggrob on Sediment data analysis. - Studying on Hydraulic and Hydrological report for 2D Modelling and review of scouring at bend, subsequently reporting from these reviews. - Studying Hydraulic and Hydrological report for 2D Modelling and worked on the report with the international expert. - Clarifying ADB & ADB Consultants comments on the draft report.
20	National Hydraulic Engineer / Mr. Chhimi Dorji	18th December 2019 – 20th December 2019 (Home Input)	
21	National Hydraulic Engineer / Mr. Chhimi Dorji	23rd December 2019 – 24th December 2019 (Home Input)	
22	Chief Resident Engineer/Team Leader/ Mr. Mehmet Kahraman	25th October 2019 (Project Site)	- Team Leader / Chief Resident Engineer for PTDP
23	International Hydraulic Modelling Specialist/ Mr. Christiaan Sprengers	2nd November 2019 – 12th December 2019 (Project Site)	- 2D Hydraulic Modelling

24	International Hydraulic Modelling Specialist / Mr. Christiaan Sprengers	20th December 2019 (Home Input)	- Preparation of final report of 2D Hydraulic Modelling - Responding on the ADB comment matrix and the updated technical note
25	Contract Specialist / Mrs. Lucila C Perlada	18th July 2019 – 31st July 2019 (Home Input)	- Review contractor's claim on delay damages
26	Contract Specialist / Mrs. Lucila C Perlada	16th September 2019 – 20th September 2019 (Home Input)	- Review of BMBMS documents
27	Contract Specialist / Mrs. Lucila C. Perlada	2nd December 2019 – 4th December 2019 (Home Input)	- Reviewing for the package CW02 bid documentation on contractual point of view - Providing suggestions/advises for the use of Ad-measurement and Design & Built contract under one contract package - Providing comments/suggestions on the infusion and incorporation of D & B into the SBD for Admeasurement type of contract - Providing FIDIC forms of contract types (Red Book, Yellow Book, Silver Book, Green Book).
28	Contract Specialist / Mrs. Lucila C. Perlada	6th December 2019 - 7th December 2019 (Home Input)	
29	Contract Specialist / Mrs. Lucila C. Perlada	10th December 2019 - 16th December 2019 (Home Input)	
30	Electro – Mechanical Engineer / Mr. Dominique Chod	2nd December 2019 – 6th December 2019	- Reviewing the package CW02 bid document on Electro-Mechanical related items - Reviewing and commenting on technical specification, mechanical and electrical calculations and drawings, SCADA documents, testing schedule. - Commenting on bill of quantities items, water treatment plants, well pumps, raw materials pumps and treated water pumps. - Reviewing and commenting on sewage pumping station i.e. sewage pumps as well as fire station specification, electrical and mechanical equipment communication.
31	Electro – Mechanical Engineer / Mr. Dominique Chod	13th December 2019 (Home Input)	
32	Water Treatment Process Specialist / Mr. Gautier Main	2nd December 2019 – 4th December 2019 (Home Input)	- Reviewing for the package CW02 bid document on Water Treatment Processes - Reviewing and commenting on water treatment process, technical specification, water treatment plant capacity, raw or treated water, treatment technologies, sewage treatment plant. - Reviewing and commenting on sewage treatment plants, capacity – short & long term, Number of facilities.
33	Water Supply / Sewerage / Hydraulic Engineer / Mr. Guillaume Houdre	2nd December 2019 – 5th December 2019 (Home Input)	- Reviewing for the package CW02 bid document on water supply / sewerage / hydraulic perspective - Reviewing and commenting on water supply / sewerage / hydraulic technical specification. - Commenting on wastewater generation estimation, manholes, pipe diameter, pure water distribution materials - Reviewing and commenting on water supply network, technical specification, water pumping stations and sewage and pumping station.
34	Solid Waste Management Specialist / Mr. Christopher Round	2nd December 2019 – 5th December 2019 (Home Input)	- Reviewing for the package CW02 bid document on solid waste management aspects - Reviewing and commenting on solid waste management design basis – waste generation, waste composition, waste collection, waste treatment process - Reviewing and commenting on solid waste treatment yard drawings, composting equipment, sorting line in bill of quantities - Reviewing and commenting on bill of quantities, biogas plant, weight bridge and sanitary landfill

2. PIC Reports

Table 5 : PIC Reports

Sl No.	Reports	Date
A	**Bi-Weekly Progress Report 2019**	
1	Weekly Progress Report up to 26th January 2019	28th January 2019
2	Weekly Progress Report (27th January 2019 – 2nd February 2019)	7th February 2019
3	Bi-Weekly Progress Report (1st February 2019 – 15th February 2019)	20th February 2019
4	Bi-Weekly Progress Report (1st March 2019 – 15th March 2019)	25th March 2019
5	Bi-Weekly Progress Report (1st April 2019 – 15th April 2019)	1st May 2019
6	Bi-Weekly Progress Report (1st May 2019 – 15th May 2019)	22nd May 2019
7	Bi-Weekly Progress Report (1st June 2019 – 15th June 2019)	19th June 2019
8	Bi-Weekly Progress Report (1st July 2019 – 15th July 2019)	17th July 2019
9	Bi-Weekly Progress Report (1st August 2019 – 15th August 2019)	20th August 2019
10	Bi-Weekly Progress Report (1st September 2019 – 15th September 2019)	28th September 2019
11	Bi-Weekly Progress Report (1st October 2019 – 15th October 2019)	18th October 2019
12	Bi-Weekly Progress Report (1st November 2019 – 15th November 2019)	25th November 2019
13	Bi-Weekly Progress Report (1st December 2019 – 15th December 2019)	24th December 2019
B	**Monthly Project Report 2019**	
1	Monthly Project Report – December 2018	25th January 2019
2	Monthly Project Report M2 – December 2018 (Revision 01)	4th February 2019
3	Monthly Project Report M3 – January 2019	19th February 2019
4	Monthly Project Report M3 – January 2019 (Revision 01)	9th March 2019
5	Monthly Project Report M4 – February 2019	19th March 2019
6	Monthly Project Report M5 – March 2019	15th April 2019
7	Monthly Project Report M6 – April 2019	18th May 2019
8	Monthly Project Report M7 – May 2019	19th June 2019
9	Monthly Project Report M8 – June 2019	22nd July 2019
10	Monthly Project Report M9 – July 2019	15th August 2019
11	Monthly Project Report M10 – August 2019	19th September 2019
12	Monthly Project Report M11 – September 2019	21st October 2019
13	Monthly Project Report M12 – October 2019	22nd November 2019
14	Monthly Project Report M13 – November 2019	24th December 2019
C	**Quarterly Project Report 2019**	
1	Quarterly Project Report N1 (1st October 2018 – 31st December 2018) Revision 01	3rd March 2019
2	Quarterly Project Report N1 (1st October 2018 – 31st December 2018) Revision 02	14th March 2019
3	Quarterly Project report N2 (1st January 2019 – 30th March 2019) Revision 01	16th April 2019
4	Quarterly Project report N2 (1st January 2019 – 30th March 2019) Revision 02	28th April 2019
5	Quarterly Project Report N3 (1st April 2019 – 30th June 2019) Revision 01	27th July 2019
6	Quarterly Project Report N3 (1st April 2019 – 30th June 2019) (Revision 03)	15th October 2019
7	Quarterly Project Report N4/Q3 (July – August – September 2019) – Revision 01	18th October 2019
8	Quarterly Project Report N4 (1st July – 30th September 2019) (Revision 01)	26th October 2019
D	**Semi - Annual Report/Environmental Monitoring Report (EMR) 2019**	
1	Semi Annual Environmental Monitoring Report – December 2018	19th January 2019
2	Final Environmental Monitoring Report (July – December 2018)	30th January 2019
3	Environmental Monitoring Report – February 2019	2nd April 2019
4	Semi Annual Report S1 (January – June 2019)	30th July 2019
5	Response to Environmental Monthly Report (EMR) – August 2019	6th September

		2019
6	Semi – Environmental Monitoring Report (1st January – 20th July 2019) (Revision – 04)	21st October 2019
E	**Biodiversity Monitoring and Bench Marking Study (BMBMS) 2019**	
1	Terms of Reference of Biodiversity Monitoring and Bench Marking Study (BMBMS) for PTDP	6th March 2019
2	Terms of Reference & Estimated Quotation for Biodiversity Monitoring and Bench Marking Study (BMBMS) for PTDP	4th April 2019
3	Terms of Reference & Quotation of Biodiversity Monitoring and Bench Marking Study (BMBMS) for PTDP	18th July 2019
4	Approval of Request for Quotation Document for Biodiversity Monitoring and Bench Marking Study (BMBMS) for PTDP	29th October 2019
5	Biodiversity Monitoring and Bench Marking Study (BMBMS) for PTDP Request for Quotation RFQ: Shopping for Works – November 2019	6th November 2019
6	Bid Evaluation Report for Biodiversity Monitoring and Bench Marking Study (BMBMS) for PTDP	9th December 2019
7	Methodology & Cost Analysis for Biodiversity Monitoring and Bench Marking Study (BMBMS) for PTDP	24th December 2019
F	**Topography & Bathymetry Survey & 2D Hydraulic Modeling 2019**	
1	Tentative Work Plan for 2D Hydraulic Modelling at PTDP	29th July 2019
2	Inception Report for "Topography & Bathymetry Survey" & "2D Hydraulic Modelling"	20th August 2019
3	Response to ADB's Comment on the Inception Report for "Topography & Bathymetry Survey" & 2D Hydraulic Modelling"	17th September 2019
4	Document Format for Topographic & Bathymetry Survey Procurement as part of 2D Hydraulic Modelling	26th September 2019
5	PIC Response to ADB Comments on "Hydraulic Modelling Report" – Draft Version 12 December 2019	23rd December 2019
6	Quotation & Comparative Statements for Topographic & Bathymetric Survey for 2D Hydraulic Modelling	27th September 2019
7	Response to ADB's Comments on 2nd October 2019 regarding 2D Hydraulic Modelling Inception Report	9th October 2019
8	Engineers Estimate for Topographic & Bathymetric Survey	29th October 2019
9	Work Order for Topographic & Bathymetry Survey at PTDP	12th October 2019
10	Commencement of Topographic & Bathymetry Survey at PTDP	12th October 2019
G	**Flood Management Consultancy 2019**	
1	Terms of Reference for Flood Management Consultancy	10th January 2019
2	Terms of Reference for Flood Management Consultancy (Revision 01)	21st January 2019
3	Inception Report "Flood Management Consultancy – Development of Flood Early Warning System & Flood Management Plan"	28th November 2019
4	Tentative Work Plan & Schedule of Flood Management Consultancy at PTDP	16th September 2019
H	**Other Reports 2019**	
1	Health & Safety Manual	4th February 2019
2	Health & Safety Manual (Version 02)	3rd March 2019
3	Manual Management of Civil Works Contracts under FIDIC	16th March 2019
4	Guidelines & Procedure in Invoice Processing – March 2019	21st March 2019
5	Risk Management Plan Framework	18th May 2019.
6	PIC Management Information System (Volume 1) Presentation	31st May 2019
7	PIC's Initial Review & Recommendations of Package CW-02 Contract for Bid-Document Preparation	9th September 2019
8	First Draft Document for CW02 Package	27th December 2019
9	Risk Management Plan	15th January 2020
10	Project Performance Management Evaluation System	20th January 2020

3. Project Audit:

The CDCL Internal Audit division audited the PIU & PMU In October 2019. The audit report was shared and discussed with the CDCL Management Audit Committee. The audit observations and memos are followed through and resolved by PIU & PMU.

The Royal Audit Authority (RAA) conducted the project audit for the year 2018 from 20th November to 10th December 2019. Subsequently, PMU submitted the RAA report to BHRM, ADB in December 2019.

4. VIP Site Visits

- Minister of Labour and Human Resources visit on 2nd February 2019
- Minister of Work and Human Settlement Secretariat visit on 10th April 2019
- His Majesty's Secretary Visit on 10th April 2019
- Minister of Economic Affairs visit on 10th July 2019
- His Excellency, The Prime Minister visited on 8th September 2019
- Minister for Home & Cultural Affairs visit on 13th October 2019
- Minister of Education visit on 27th October 2019
- Minister of Finance visit on 30th November 2019.
- Minister of Agriculture and Forests Meeting & Site visit on 5th December 2019

5. ADB Mission Meetings / Site Visit

- ADB & Phuntsholing Thrompon Meeting on 17th April – 18th April 2019
- ADB Mission Meeting in Thimphu on 7th May 2019
- ADB Mission meeting & Site Visit with PMU/PIU & PIC on 7th May 2019 - 10th May 2019
- ADB & PCR & PIU Meeting on 14th May 2019
- Video Conference with ADB on 24th July 2019
- ADB Hydrologist (CHRISD), PIC Hydrologist & ADB Programme Analyst Meeting on 28th June 2019 – 29th June 2019
- ADB Technical Assistance Meeting with PIU & PIC on 28th, 29th and 30th June 2019
- ADB's Project Preparatory Technical Assistance (PPTA) visit from 25th- 30th September 2019
- ADB & Phuntsholing Thromde Meeting conducted on 31st October 2019
- ADB Mission Meeting & Site Visit on 31st October – 1st November 2019
- ADB & PTDP HSE Team Meeting on 1st November 2019
- ADB & PTDP (PIU - PIC & CW01) Meeting & Site Visit on 1st November 2019
- ADB & PIU/PIC Video Conference on 19th December 2019

6. Official Meetings / Site Visit

- BAOWE (Bhutan Association of Women Entrepreneurs) & Phuntsholing Thromde visit on 14th May 2019
- CDCL Project Management Committee Site Visit on 14th June 2019
- DHI CEO site visit on 26th June 2019
- Bhutan Broadcasting Service visit on 14th August 2019
- DHI Officials Site Visit for Project Progress Review on 30th September 2019
- Director of Department of Forest and Park Services (DoFPS) visit on 14th September 2019
- DHI CEO & officials site visit on 31st October 2019
- DHI Meeting with PTDP on 7th November 2019
- Stakeholders (MoF DRC DES Thromde PCR CDCL) Site Visit on 30th November 2019
- Stakeholder Consultation Meeting conducted on 13th December 2019
- Royal Audit Authority Meeting & Site Visit on 20th December 2019

7. PTDP & PCR Coordination Meeting

- 1st PCR & PTDP Meeting on 12th January 2019
- 2nd PCR & PTDP coordination meeting on 27th May 2019.
- 3rd PCR & PTDP Coordination Meeting on 9th July 2019
- PTDP & PCR discussion on 13th September 2019
- PCR & PTDP (PIU-PIC & CW01) Meeting on 13th November 2019.

- PCR & PTDP Monthly Interface Meeting conducted on 18th December 2019

8. Special Meetings/ Discussions

- Meeting with HCP (IDPR design consultant) - 1 (PIU, PIC & HCP) on 25th June 2019.
- Meeting with HCP - 2 (PIU, PIC, HCP & CW01) on 26th June 2019
- MIS Presentation & Training by QLE/IT on 10th June 2019
- 2D Modelling Meeting with National Hydraulic Engineer & PTDP on 12th August 2019
- Technical Discussion (PIU & PIC) on 13th September 2019
- Construction Seminar on 29th August 2019 – 30th August 2019 at Royal University of Bhutan (RUB)
- Special Discussion with PCR & PTDP on 13th September 2019
- 2D Hydraulic Survey Meeting with PIU & PIC on 1st October 2019
- Tender opening for Biodiversity Monitoring and Bench Marking Study conducted on 2nd December 2019
- PTDP & Green Bhutan Meeting conducted on 5th December 2019
- Video Conference between PIU, PIC & ADB's experts on 2D modelling report on 19th December 2019
- PTDP Meeting with HCP conducted on 27th December 2019

9. Health Safety & Environment

- Health Awareness Campaign conducted on 30th December 2019 at site on various subjects such as:
    - Sexual Harassment
    - HIV/AIDS
    - Feminine Hygiene
    - Asthma
    - Respiratory System
    - Diabetes

by Mr. Kelzang Jigme, Anesthetist from Phuentsholing General Hospital and please refer Health briefing - attendance sheet in **Appendix 14**

Table 6: Activities under Health safety and Environment

Sl No.	Activities	Date
1	Safety Motivation Program by CW01 at CW01 Assembly Point	24th April 2019
2	Fire Briefing & Mock drill by CW01	13th May 2019
3	Plantation at Camp Site on Environment Day	05th June 2019
4	Safety Awards by CW01 on World Environment Day	05th June 2019
5	Emergency Evacuation Briefing by CW01	10th June 2019
6	CDCL Health & Safety Training / Site Visit by CW-O1	17th July 2019 - 18th July 2019
7	Meeting between Health Safety & Environment Team with Independent Environmental Monitoring Expert (PIU PIC CW01)	20th July 2019
8	Meeting on Improving Safeguard Policy Applications in South Asia Developing Member Countries	22nd July 2019
9	1st Mass Cleaning Campaign at Site to observe "Zero Waste Hour"	3rd August 2019
10	Information Session on Dengue by PIU/PIC environment officials to CW-01 especially residing outside PTDP site	7th- 8th August 2019
11	Earthquake Mock Drill	20th August 2019
12	2nd Mass Cleaning Campaign at Site to observe "Zero Waste Hour"	7th September 2019
13	PTDP HSE Team site visit at labour camps at site	11th September 2019
14	Health Awareness Campaign at Site from Phuntsholing General Hospital	16th October 2019
15	CW01 Safety Award	16th October 2019
16	Health Awareness Campaign	30th December 2019

10. Production of Technical Note till this report period

- TN n°1: Procurement of CW-02 package
- TN n°2: Improvement of Contract Documents
- TN n°3: Design Review – Outfalls / Omchhu unprotected stretch
- TN n°4: Diaphragm-Wall realignment
- TN n°5: Proposal for Change of Revision of alignmentof Diaphragm Wall at North End of Zone A
- TN n°6: Outfalls Design Review and Recommendations
- TN n°7: Temporary Flood Protection Measures
- TN n°8: Flood Management (FEWS/FMP) Consultancy recruitment
- TN n°9: PIC deliverables contents
- TN n°10: Sediment Management & Design Implication
- TN n°11: Revisions to Temporary Flood Protection Measures
- TN n°12: Project Performance Management Evaluation
- TN n°13: Implications for a +1 m Rise in the PTDP Embankment Level
- TN n°14: Update on Temporary Flood Protection Measures
- TN n°15: Post Monsoon Changes to PTDP and Recommendations
- TN n°16: Inception/draft report on 2D modelling

11. Coordination Meeting (PIU, PIC & CW01)

- Coordination Meeting – 1 (PIU, PIC & CW01) on 9th April 2019
- Coordination Meeting – 2 (PIU, PIC & CW01) on 10th June 2019.
- Coordination Meeting – 3 (PIU, PIC & CW01) on 23rd August 2019

12. Site Activities

- Engineer's Day celebration on 15th September 2019
- Cast in Situ Wall consecration on 26th September 2019
- CW01 Presentation on Gabion Wire Crates by TECHFAB India on 17th October 2019

13. Factory Visit

- 1st Factory Visit for Anchor bars & Couplers material (KRIDHAN INFRA, INDIA) on 21st to 25th April
- 2019
- 2nd Factory Visit for Wire Crates material (TECHFAB, INDIA) on 16th to 20th June 2019
- 3rd Factory Visit (Perfect Steel TMT) on 9th August 2019

Use of Provisional Sum

Table 7: Status of use of PIC contract provisional sum

Item	Status	Allocated Amount as per contract (USD)
Purchase of 2 Vehicles & Motor Cycle	In contract Variation Nº 02 this was removed from provisional sum and allocated to the reimbursable expenses in the contract.	122 500
Office Equipment	- Procure three digital cameras on 3rd April 2019. - Procured one UPS 1VA on 8th April 2019 and Five UPS 600VA on 9th April 2019. Procurement conducted as per ADB Guidelines.	10 000
Seminars, Workshops, and Training Sessions	Fund disbursement training to CDCL staff in Thimphu on 13 March 2019 and PIU & PIC on 20th March 2019 by PIC Financial Management Specialist. As per contract variation n°01, the budget for seminars,	50 000

	workshops and training sessions is changed from 10 000 to 50 000.	
Studies, Surveys and Reports	a) Biodiversity Monitoring and Benchmarking Survey: - Quotation and TOR submitted to PIU on 04 April 2019 has been approved by ADB. - Procurement were conducted as per ADB guidelines. - PIC submitted bid evaluation report for PIU's review and approval. - PIC submitted methodology and cost analysis for BMBMS for PIU's review and approval. b) Flood Management Consultancy: - TOR had been approved in contract variation Nº 02. - PIC submitted Technical and Inception report for PIU's review and approval.	120,845.87
Topographic and Bathymetric Surveys for 2D Modeling	The Topographic and Bathymetric Survey for 2D modelling was conducted from 12th October 2019 to 12th November 2019. The quotation price was negotiated at Nu 2,300,000.00	35 000
2D Modeling Software License Rental for 2 months	The MIKE 21C for 2D modelling software rented for 2 months, started from 5th November 2019 till 5th January 2020.	1 750

2D Modeling

- The PIC has prepared TOR and had been approved in contract variation No.02 (CV-02). The overall cost is USD 94,652.50 and BTN 840,000 i.e. approximately USD 106,626.84
- PIC submitted inception report to PIU on 20th August 2019
- PIC responded to ADB's comment on inception report on 17th September 2019
- PIC prepared document format on procurement for Topographic and Bathymetric Surveys as part of 2D modelling on 26th September 2019
- PIC submitted quotation and comparative statement on 27th September 2019
- Topographic and Bathymetric Surveys for 2D Modeling has been conducted from 12th October till 12th November 2019
- PIC rented 2D modelling software- MIKE 21C for 2 months, started from 5th November 2019 till 5th January 2020 after PIUs approval
- PIC received comments from ADB on the Hydraulic Modelling report and submitted for PIU's review and approval
- Involvement of Mr. Hans (ADB PPTA for 2D modeling)
- Video conference with ADB, Manila and BHRM Thimphu regarding 2D modeling

B.2.4 PIC Performance

PIC is mandated to provide technical, management and supervision support to PIU/PMU in implementation of the project. Thus far, PIC has been professional and consistent in furnishing with the required deliverables as agreed in contract documents. PIC has also provided technical advice and support to client in areas of project interest and ensured proper supervision and monitoring at project site. Hence, the client is currently comfortable with the performance and the competence in PIC. While PIC has mobilized the new Team Leader from 22nd October 2019, the deputy Team Leader is demobilized from 3rd November 2019 who is expected to rejoin from last week of January 2020.

B.2.5 PIC Man-Months:

Table below shows the summary of PIC experts mobilized till the report period and the remaining man-months available:

PIC Person Month Used / Balance as of December 2019

No.	Name / Position (as in TECH-6)	Nationality / Firm	Currency	CONTRACT PROVISION AFTER CONTRACT VARIATION 2 Person-month	Mobilized till Dec- 2019	BALANCE REMAINING Person-month
	Name					
1.	Mehmet Kahraman	Ireland	USD	1.50	0.20	1.30
	Chief Resident Engineer / Team Leader	Egis International		32.50	6.30	26.20
2.	Edwin ANGGRIJATNO	Indonesian	USD	1.00		1.00
	Senior Civil Engineer / Deputy Team Leader	Egis International		39.00	10.80	28.20
3.	Vishwas R RAO	Indian	USD	-		0
	Material Engineer/ Engineering Geologist	Egis India		4.00	0.90	3.10
4.	Lucila PERLADA	Filipino	USD	1.00	0.73	0.27
	Contract Specialist	Egis International		3.00	0.83	2.17
5.	Surjit Singh DEEPAK	Indian	USD	-		0
	Environmental Specialist	Egis India		3.00	0.53	2.47
6.	Virgilio DIZON	Filipino	USD	1.00		1
	Financial Management Specialist	Egis International		5.00	0.87	4.13
7.	John FIELD	American	USD			
	Hydrology/Sediment Specialist	Egis International		2.50	1.63	0.87
7.a	John FIELD	American	USD			
	Team Leader / River Engineer / River Morphology Specialist	Egis International		2.50	0.43	2.07
8.	Christiaan Sprengers	Dutch	USD	-		0
	Hyraulic Modelling Specialist	Egis International		2.00	1.40	0.60
	Sub-Total for Key Experts (International)			**98.00**		78.88
	KEY EXPERTS (National)					
9.	Sonam Tobgay K	Bhutanese	BTN	-		0
	Quality Control / Construction Manager	Gyaltshen		40.00	14.07	25.93
10.	Dwarika Gotamey	Bhutanese	BTN	-		0
	Material Engineer	Gyaltshen		40.00	11.47	28.53
11.	Megay Penjore	Bhutanese	BTN	-		0
	Safeguards and Communications Specialist	Gyaltshen		8.00	2.03	5.97
12.	Chimi Dorji	Bhutanese	BTN	-		0
	National Hydraulic Engineer	Gyaltshen		2.00	1.50	0.50
12.a	Chimi Dorji	Bhutanese	BTN	-	-	
	Flood Early Warning Specialist/Hydrologist/Hydraulic	Gyaltshen		4.00	-	4.00
13.	Gautam Thapa	Bhutanese	BTN	-		0
	Flood Management Specialist	Gyaltshen		4.00		4
	NON-KEY EXPERTS (International)					
14.	Bosco PURNOMO	Indonesian	USD	-		0
	Geotechnical Engineer	Egis International		3.00		3
15.	Prasanta Kumar Bhowmik	Bangladesh	USD	1.00	-	1
	Structural Engineer	Egis International		3.00	0.97	2.030
16.	Nirupam Singh	Indian	USD	1.00		1
	Roads Engineer	Egis India		2.50		2.5
17.	Guillaume HOUDRE	French	USD	1.00	0.13	0.87
	Water Supply / Sewerage / Hydraulics Engineer	Egis International		1.00		1
18.	Gautier MAIN	French	USD	1.00	0.10	0.90
	Water Treatment Process Specialist	Egis International		1.00		1
19.	Christopher ROUND	French	USD	1.00	0.13	0.87
	Solid Waste Management Specialist	Egis International		1.00		1
20.	Dominique CHOD	French	USD	1.00	0.20	0.80
	Electro-Mechanical Engineer	Egis International		1.00		1
	NON-KEY EXPERTS (National)					
21.	Karma Dezang	Bhutanese	BTN	-		0
	Quantity Surveyor	Gyaltshen		40.00	9.50	30.50
22.	Sonam Deki	Bhutanese	BTN	-		0
	Environmentalist	Gyaltshen		20.00	4.37	15.63
23.	Yangchen Seldon	Bhutanese	BTN	-		0
	Laboratory Technician 1	Gyaltshen		24.00	4.50	19.50
24.	Tashi Namgyel	Bhutanese	BTN	-		0
	Site Inspector 3	Gyaltshen		24.00	5.10	18.90
25.	Yeshi Jamtsho	Bhutanese	BTN	-		0
	Site Inspector 4	Gyaltshen		24.00	1.00	23.00

B.2.6 Independent Environmental Monitoring Expert:

CDCL signed the contract with Independent Environmental Monitoring Expert on 4th April 2019. The proposed mobilization dates for the Independent environmentalist is attached in **Appendix 13**

B.3 Implementation of physical works

B.3.1 Signed Civil Works Contracts data / Ongoing Procurement

Only one contract is signed with AFCONS Infrastructure Pvt. Ltd for river training works on 18th July 2018. Site handed over on 27th September 2018. Notice to commence from 1st November 2018.

B.3.2 Status of variation orders

No new Variation Order initiated for CW-01

B.3.3 Civil Works package summary of financial progress

Table 8: CW-01 Summary of financial progress

Contract	Contract Date	Start date	Time for completion (days)	Completion date	Financial progress (%)		Elapsed time (days)
					Target	Actual	
CW-01	18 July 2018	01 Nov. 2018	912	01 May 2021	55.41	32.96	426

Advance Payment (2 instalments paid) and Material Advance (3 instalments paid)

Table 9: CW-01 Contractors Establishment

N°	Description	Status
1	Project Management	At the end of the report period, 39 expatriat staffs, 11 national staffs and 23 Sub-Contractor national staffs. Totally 73 Management Staff available up to this month.
2	Manpower	At the end of the report period, there was 419 manpower available. Contractor: 59 National Manpower and 167 Expatriate Manpower. Sub-Contractors: 92 National Manpower and 101 Expatriate Manpower.
3	Plant and Equipment	All key equipment as per required by Contract Document – General Specifications, Section-7 had been mobilized to the project site.
5	Quarry / Crusher	No Quarry / Crusher is provided by Contractor. *Source of coarse aggregates and fine aggregates are from Quarry / Crusher supplier located within the vicinity of the project site*.
6	Pre-casting Yard	Pre-casting yard for precast grass paver blocks, including curing ponds and stock yard.
7	Filling Material	No Quarry will be provided by Contractor *Source of filling material is from Quarry / Crusher supplier located at project vicinity*

Table 10: CW-01 Work progress

General Requirements

N°	Description	Status
1	Site Possession	Handover of Hindrance Free Area for the project on 27th September 2018. Area handover for Site Installation 1st November 2018
2	Obstructions	Traffics from public / private vehicles moves inside project site at some locations.
3	Utilities [electrical poles etc.]	Frequent failures of electrical power supply at site offices. Tap water supply for site offices is not continuous during the day work. *Contractor to provide suitable generator set to supply electricity temporarily during blackout*

		time. *Contractor to ensure the continuous supply of tap water by providing a proper pump.*
4	Health &Safety	No NCR / CAR issued. No major accidents reported but 6 cases of Dengue (for day workers from across the borders) were reported during the period.
5	Maintenance of Site Road	PTDP Contractor and PCR Contractor carries out dust control by a periodic sprinkling of water on and maintenance of the temporary road.
6	Environment	No NCR / CAR issued. No environmental accidents reported.
7	GRM	No grievances related to Contractors activities registered during the last 3 months.
8	Design	The contractor is required to review all the latest revision working drawing (good for construction) and submit a discrepancy list (if any). There is no discrepancy, querries submitted by Contractor. Outfalls design may be changed due to datum issues and erroneous contour and may need to follow PCR design at project boundary. Due to change of embankment top level, there will be some modifications in some areas, like Cast in Situ Wall works and Outfall works.

Quality Control Activities

N°	Description	Status
1	Contractor Quality Control Plan	Quality Control Plan has been submitted to PIC by contractor. Quality Control Plan is very broadly and refers to an internal set of procedures from Contractors, submitted on case-by-case basis. PIC checks when required and sometimes may request for improvement, dependin on its requirement. PIC, in particular, requires the Contractor to revise QCP as follows: *Method Statement for all work activities with shop drawings are submitted and approved prior to the commencement of work.* *Test are conducted for all materials to be used for construction as per the technical specifications and as per the instruction of the engineer's representative.* *Testing frequency is followed as per the technical specification and standard* *QCP are submitted for all work activities.*
2	Material Source Approval & mix designs	Materials source have been approved: - *Wire Crates (TECHFAB INDIA), Silicone Paint (EXCEL, India);* - *Polysulfide Sealant (CERA CHEM, INDIA), Coal Tar Epoxy (CERA CHEM, INDIA);* - *Wire Crates (GABION TECHNOLOGY, INDIA), SS316 mesh.* - *Normet admixture source approval and mix design under process* - *Hindcon admixture source approval and mix design under process* - *Perfect TMT from Pasakha, Bhutan- materials approved and procuring*
3	Materials Testing	Compressive strength results of Mix Design with Penden Cement and Fosroc Admixture & Penden Cement and Sika Admixture concluded. Anchor bar and couplers had been tested and approved, Wire Crates had been tested and approved.
4	Inspection	PIC is in need of one more site inspector as the work fronts have increased. PIU is notified on the requirement. Checklist of RFI still requires improvement and making necessary changes with the requirement.
5	Non-Conformance	No NCR / CAR was issued during this period.

Works Status

N°	Description	Status
1	General Items	Site offices, Contractor's Staff and Labour accommodation, Materials Stock Yards, Testing Laboratory and Batching Plant with Silos have all been established.
2a	River Training Works	Guide Wall work: 4626 m cumulative length completed, 97%. Diaphragm Wall: 2652 m cumulative length completed, 56%.

		Cast In-situ Wall: 1481 m cumulative length completed, 31% (First Lift).
2b	Embankment Works	All Outfall Works suspended due to embankment level issues. The levels will be finalized once the 2D modelling is completed. Lower walkway is 3.42 m from the RBL. Outfall 2- 60% completed (as per initial design level). Outfall 3- 18% completed (as per initial design level). Some modification/alteration may be required to adjust the completed outfall works to the revised design level.
2c	General Earth Filling	Started on 18 Feb. 2019. Earthworks are executed by Sub-Contractor, M/s Rigsar Construction Company Pvt. Ltd. General Earth Filling Item No. 401a – completed 589,157.53 cum against 530,281.00 cum (111%) General Earth Filling Item No. 402 – completed 122,655.39 cum against 1,060,561 cum (11.56%)
2d	Promenade Finishing	Production of Precast Grass Paver Blocks (Hollow) – completed 4215 No. against 9975 No. (42.25%) Production of Precast Cement Concrete Blocks (Solid) – completed 1425 No. against 1425 No. (100%)
2e	Irrigation & Landscape	Not yet started
3	Provisional Sum	For Survey Equipment, Office Camera, Projector and Radio Handset. *Procurement conducted and equipment received.*
		For pickup vehicles. *Procurement cancelled by the employer. Vehicle procured from employer's fund.*
		For electricity main supply: partially used for installing the main transformer for the project
		For Geological Investigations. *Partially used for investigations of rock / boulders layer at North end part-08*
		For Temporary Flood Protection *Partially used for strengthening existing long spur and existing big bund and to construct new spurs*
4	Day works	No day works ordered
5	Extra Item	Removal of unsuitable materials

Table 11: Physical progress per major works items

Major works items	Unit	Contract quantity	Target 31/12/2019	Achieved	% Achieved
Diaphragm wall	M^2	40,929	23,738.82	22,568.52	95.00
Cast in situ wall	M^3	6,000	2105	1620.72	76.99
Retaining wall	M^3	8,600	0	0	0
Ducted and open outfalls	M	2,562	On hold		
Embankment construction	M^3	3,140,000	734,760.00	711,812.92	96.87
Lower Level walkway	M^2	4,600	0	0	0
Upper Level walkway	M^2	23,800	0	0	0

B.4 Field Monitoring visits, workshops, training and particular meetings

The list of field monitoring visits, workshops, training and particular meetings is presented in **Appendix 4**

B.5 Status of Contract Awards

Table 12: Status of Contract award

Contract	Bid preparation	Bid period	Bid evaluation	Award & Negotiation	LTP
Civil works packages					
CW-01 River Training	Q1 2017	Q1& Q2 2017	Q2 2017	Q2 2018	12 Sep. 2018
CW-02 Common urban infrastructure	Q3 2019				
CW-03 Flood early warning system	Q1 2021				
CW-04 Power transmission infrastructure	Q1 2023				
CW-05 ICT infrastructure	Q1 2023				
Consultancy services packages					
CS-01 PIC	Q1 2017	Q2 & Q3 2017	Q3 2017	Q3 2017	17 Sep. 2018
CS-01-CV-01 Environment monitoring expert	Q4 2018	Q1 2019	Q1 2019	Q2 2019	4 April 2019
CS-01-CV-02 Flood Management Consultancy	Q1 2019	Q1 2019	Q1 2019	Q2 2019	
CS-03 Urban Management Advisor					
CS-04 Investment Promotion Advisor					
CS-05 Sustainable Township management capacity development consultants					
CS-06 Investor promotion and transaction advisory consultants					

Appendix 6 shows the Updated Procurement plan and Contract Award schedule. There is no change compared to the initial PAM Procurement Plan.

B.6 Disbursement of Project Funds

The total and breakdown of investment costs remain unchanged (see **Appendix 7**) as per the contract award. The invoice amounts are as follows (extracted from **Appendix 7**).

Table 13: Financial Status of PTDP Civil Works, Goods 7 Consultancy Contracts

1st Quarter: January 2019 – March 2019

Investment costs	Contracts Amount (Taxes included)		Certified until this month* (Dec 2018)		Certified on Jan 2019*		Certified on Feb 2019*		Certified on March 2019*		Total Certified up to March 2019*	
	Cur;	Amount	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Civil Works Contracts (CW-01)	BTN	2,934,669,207	134,507,298	4.6	17,194,390	0.6	25,735,103	0.9	70,153,356	2.4	247,590,147	8.4
Consultancy Services (CS-01 PIC)	USD	4,138,144	115,469.14	2.8	46,383	1.1	40,226	1.0	91,138	2.2	293,216	7.1
	BTN	91,474,227	2,000,900	2.2	1,034,300	1.1	1,699,300	1.9	1,607,333	1.8	6,341,833	6.9

2nd Quarter: April 2019– June 2019

Investment costs	Contracts Amount (Taxes included)		Certified until this month* (Mar 2019)		Certified on April 2019*		Certified on May 2019*		Certified on June 2019*		Total Certified up to June 2019*	
	Cur;	Amount	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Civil Works Contracts (CW-01)	BTN	2,934,669,207	247,590,147	8.4	94,540,079	3.2	78,131,331	2.7	49,406,689	1.7	469,668,245	16.0
Consultancy Services (CS-01 PIC)	USD	4,138,144	293,216	7.1	68,988	1.7	38,917	0.9	25,760	0.6	426,881	10.3
	BTN	91,474,227	6,341,833	6.9	1,716,500	1.9	1,712,600	1.9	1,697,167	1.9	11,468,100	12.5

3rd Quarter: July 2019 – September 2019

Investment costs	Contracts Amount (Taxes included)		Certified until this month* (June 2019)		Certified on July 2019*		Certified on August 2019*		Certified on Sept 2019*		Total Certified up to Sept 2019*	
	Cur;	Amount	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Civil Works Contracts (CW-01)	BTN	2,934,669,207	469,668,245	16.0	74,723,787	2.5	99,571,657	3.4	76,401,069	2.6	720,364,758	24.5
Consultancy Services (CS-01 PIC)	USD	4,138,144	426,881	10.3	41,524	1.0	18,440	0.4	23,886	0.6	510,731	12.3
	BTN	91,474,227	11,468,100	12.5	2,540,100	2.8	2,144,333	2.3	2,045,667	2.2	18,198,200	19.9

4th Quarter: October 2019 – December 2019

Investment costs	Contracts Amount (Taxes included)		Certified until this month* (Sept 2019)		Certified on Oct 2019*		Certified on Nov 2019*		Certified on Dec 2019*		Total Certified up to Nov 2019*	
	Cur;	Amount	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Civil Works Contracts (CW-01)	BTN	2,934,669,207	720,364,758	24.5	69,725,114	2.4	70,293,560	2.4	0.00	0.00	860,383,433	29.3
Consultancy Services (CS-01 PIC)	USD	4,138,144	510,731	12.3	27,553.33	0.7	70,110	1.7	0.00	0.00	608,394	14.7
	BTN	91,474,227	18,198,200	19.9	2,207,867	2.4	2,255,633	2.5	0.00	0.00	22,661,700	24.8

* Amount of works and services billed in the table above excludes taxes and advances. The data are from invoice of January 2019 to November 2019.

Summary of disbursements for the reporting period showing actual payments against each contract is indicated in the table below.

Table 14: Status of Disbursement of project Fund (till report period)

Category	Description/ Name	Budget Allocation (mil. US$)	Contracts Awarded (mil. US$)	Uncontracted Balance (mil. US$)	Total Disbursed (mil. US$)	Undisbursed Amount (mil. US$)
		(a)	(b)	(c) = (a - b)	(d)	(e) = (a -d)
Loan	Civil Works	15.05	15.05	0	0	15.05
	Consulting services *(PIC)*	7.42	5.27	2.073	0.89	6.53

Category	Description/ Name	Budget Allocation (mil. US$)	Contracts Awarded (mil. US$)	Uncontracted Balance (mil. US$)	Total Disbursed (mil. US$)	Undisbursed Amount (mil. US$)
		(a)	(b)	(c) = (a - b)	(d)	(e) = (a -d)
	Independent Environment Expert		0.077			
	Others	6.28	0	6.28	0	6.28
	Total	**28.74**	**20.397**	**8.353**	**0.65**	**27.86**
Grant	Civil Works (CW-01)	19.57	19.57	**0**	15.35	4.22
	Others	**4.69**	**4.69**	0	0	**4.69**
	Total	**24.26**	**24.26**	**-**	**15.35**	**8.91**
DHI	PMU and PIU Expenditures	1.67	N/A		0.182	1.48
	Training	0.21	0	0	0.043	0.167
	Operation and Maintenance	0.86	0	0	0.163	0.697
	Others	7.25	0		0.394	6.856
	Subtotal	**10.00**			**0.80**	**9.20**

*1US$ = 70.5 BTN

Appendix 8 displays the S-curves and quarterly details for Loan 3668-BHU and Grant 0573-BHU contracts awards and disbursements.

B.7 Details of Counterpart Contribution

Within the report date, DHI has disbursed an amount of USD 1.8 Million as equity fund to CDCL from which the counterpart disbursements are made. The table below shows the status:

N°	Required Counterpart Expenditure by EA	Budget by DHI/CDCL in current financial year (2019) (million USD)	Actual Amount Released (million USD)	Disbursed till December 2019 (million USD	Balance (million USD)
1	Non-Reimbursable (Activities fully funded by EA)	1.429	1.8	1.10	0.7
2	Reimbursable (from Loan)	Nil	Nil	N/A	Nil

B.8 Implementation Schedule

Appendix 2 display updated Implementation schedule for Outputs (actual vs. scheduled)

C. Environmental aspects (October 2019 – December 2019)

C.1 Environmental Monitoring Review

A Summary of Environmental Monitoring Review from October 2019 – December 2019 is attached in **Appendix 9.**

In addition to above, there are some activities that have been carried out as part of the submission from the PIC or Contractor side during the quarterly review period, which is listed in the **Table 15** below:

Table 15: Environmental Deliverables

No	Subject/ Deliverables	Date
1	2D Hydraulic survey meeting with PIU and PIC	1st October 2019
2	ADB & PTDP HSE team discussion and site visit	1st November 2019
3	Request for quotation for BMBMS	8th November 2019
4	Tender opening and evaluation for BMBMS	2nd December 2019
5	Ministry of Agriculture and Forest visit to PTDP	5th December 2019
6	PIC environmentalist meeting with Green Bhutan to discuss the saplings and plants which will be used at the PTDP site	5th December 2019
7	PIC requested ChhimiD consulting firm with the lowest bid for the BMBMS study to submit methodology and cost analysis details, which was forwarded to PIU by PIC	24th December 2019

Some environment-related issues had been observed as part of the monitoring at the project site. The major issues have been highlighted and observation/action taken has been duly reflected as follows:

- 17th October 2019: Second terrestrial walkthrough was conducted by AFCONs and Ecolab with members from PIU and PIC
- 21st – 23rd October 2019: Aquatic survey for the autumn season was conducted by Fish experts from the Department of Forest with assistance from Ecolab
- 25th October 2019: Spot briefing was conducted at workshops and the store on the importance of waste segregation, segregation system on site, and the importance to manage our waste
- 142.25 MT of Sodium bentonite was used for the month of October
- A cumulative rainfall of 154 mm over a total of nine days was recorded for the month of October
- 8th November 2019: PIC circulated a request for BMBMS quotation to all interested participants via email
- 9th November 2019: Contractor submitted the aquatic survey report for the post monsoon season
- 16th November 2019: Third terrestrial walkthrough was conducted by AFCONs and Ecolab with members from PIU and PIC
- For the month of November, approximately 1.8 metric tons of degradable waste and 1.6 metric tons of non-degradable waste was generated
- Cumulative rainfall of 9.5 millimetres with a total of two days of rain was recorded for the month of November
- For the month of November, 110.5 MT of Sodium Bentonite was used
- 2nd December 2019: Bid documents from three firms for the BMBMS study was received by PIC before 12:00 pm. Committee of five members from PIC opened the bid and documents were circulated for evaluation
- 5th December 2019: Green Bhutan visited the PTDP site to discuss the recommended sapling and plants for the PTDP project
- 5th December 2019: Minister from the Ministry of Agriculture visited the PTDP project site

- 13th December 2019: Stakeholder consultation meeting was held at Revenue Custom Office to spread awareness and inform the public regarding the project
- 16th December 2019: Fourth terrestrial walkthrough was conducted by AFCONs and Ecolab with members from PIU and PIC
- 18th December 2019: Monthly PTDP and PCR meeting was held at the PTDP project site to mitigate any issues and collaboratively work together for the smooth functioning of both the projects
- 24th December 2019: Upon PIU's request, PIC submitted the cost analysis and methodology from ChhimiD consulting for the BMBMS study
- There was no rainfall recorded for the month of December
- For the month of December, 159 MT of Sodium Bentonite was used

D. Health and Safety

D.1 Health and Safety aspects

- 16th October 2019: Second health briefing was conducted by official from the Phuentsholing General hospital. AFCONS invited new recruits from PIU, PIC and AFCONs, along with other employees who missed the last health briefing session which was conducted in March. The topics addressed were on Dengue, Hypertension, HIV/AIDS and Feminine Hygiene
- 25th October 2019: AFCONS conducted a briefing on hot work permit at the workshop on the importance of PPE, and things to be kept in mind before, while and after hot work
- 25th October 2019: AFCONS conducted a briefing on material safety data sheet at the workshop and store on topics related to respective occupational hazards, work safety and PPE and dress code on site
- Safe man hours 103600 and cumulative man hours was 902950, achieved on 24th November 2019.
- 1st November 2019: ADB mission visited the PTDP site
- 13th November 2019: PTDP and PCR had a meeting and discussed on maintenance of the PTDP-PCR boundary road on a monthly basis.
- 23rd November 2019: AFCONS conducted spot briefing at the pre-cast area on lifting and rigging safety
- 30th November 2019: Stakeholder (MoF, DRC, DES, Phuentsholing Thromde, PCR, CDCL) visited PTDP site.
- 30th November 2019: AFCONS conducted spot briefing on housekeeping at part 1, on topics related to the importance of waste management and segregation of biodegradable and degradable waste
- December 2019: HSE code of conduct training was provided to on job training (OJT) students from College of Science and Technology and Jigme Namgyel Engineering College
- 10th December 2019: At 3:25 AM after the completion of cast in-situ wall for panel no.284-289 the chute of transit mixer while returning back to the batching plant, touched Mr. Arjit, who lost balance and while trying to regain balance, the grating placed near him fell down and hit his right leg. He was immediately evacuated to the Phuentsholing General Hospital. After doing an x-ray it was found that the femur bone (thigh bone) was fractured. He was admitted in the hospital and was discharged on 18th December 2019. As a result of the above accident safe man hours of 1 million/ Lost Time Injury (LTI) was recorded for the month of December
- 14th December 2019: Hazard identification and risk assessment was conducted at the batching plant and part 3
- 21st December 2019: Personal Protective Equipment spot briefing was conducted by the HSE in charge at part 3
- 30th December 2019: Health briefing was conducted by Mr. Kelzang Jigme, Anaesthetist from Phuentsholing General Hospital to the new recruits and OJT students. The session focused on HIV/AIDS, Feminine hygiene and diabetes
- The cumulative man hours was 1131790 and safe man hour was 0 due to the accident on 10th December
- Dust control is being taken care of by sprinkling of water along the road and construction sites. A log sheet is maintained by the drivers to indicate the number of times and location the sprinkler truck was deployed

Health and safety-related issues have been observed at the site as mentioned below:

Table 16: Recommendation for Health and safety issues

Issue	Recommendation and action taken
Barricade section of the main road to create walk way for workers	Since there are many heavy machines and transporting of construction good plying on the roads, it poses risk to the passer-by. AFCONs was recommended to barricade sections on the road throughout the project to create a walk way for the safety of PTDP workers and outside people

	entering the project site.
Covering water tanks with lids	Water tanks near the QS labs has not been covered with lid. The water from the tank is not used for any drinking or washing purposes, but the risk of it becoming a breeding ground for mosquitoes could become particularly unsafe for the people near the QS lab. There is still presence of dengue in Phuentsholing so such open water spaces should be tightly covered, if not it can become a breeding ground to the infected mosquitoes. There are also no precautionary signage's to not drink or use the water for washing purposes. This can be unsafe and if consumed could cause fatal diseases.
Cover trucks with tarpulin	AFCONs has been informed to ensure that all project trucks carrying aggregates or construction materials should be properly covered with tarpaulin. AFCONs has also been informed to convey the message to all the private companies whose truck are piled with aggregates and ply along the project road. This could be risky for passer-by when trucks are not covered and speeding along the roads.

D.2 Accident prevention

From October - December 2019, one serious accident was reported on 10th December at 3:25 AM after the completion of cast in-situ wall for panel no.284-289, the chute of transit mixer while returning back to the batching plant touched Mr. Arjit Karj, who lost balance and while trying to regain balance, the grating placed near him fell down and hit his right leg. He was immediately evacuated to the Phuentsholing General Hospital. After doing an x-ray it was found that the femur bone (thigh bone) was fractured. He was admitted in the hospital and was discharged on 18th December 2019. Due to the accident Lost Time Injury of 1 million hours was recorded for the month of December. AFCONs ensure that the injured employee was granted leave until fully recovered. Mr. Arjit has also been recommend to avoid any heavy work for the next six months.

All other cases reported to the First Aid Station were minor issues. All issues or cases are registered at the First Aid Station located at the Project site. The signboard display with accident statistics has been erected at the entrance of the office project zone.

D.3 HIV / AIDS Prevention

The first Health and Safety Campaign on "HIV / AIDS prevention, Malaria, Dengue Fever, and Menstrual Health and Safety" was conducted by health professionals from Phuentsholing General hospital from 21st – 23rd March 2019 as reported in the 2nd QPR.

Due to the ongoing Dengue epidemic in Phuentsholing, it was difficult to bring in a health professional to conduct the health and safety campaign for some period of time. However, on the 16th October 2019, the second health briefing was conducted by official from the Phuentsholing General hospital. AFCONS invited new recruits from PIU, PIC and CW01, along with other employees who missed the last health briefing session which was conducted in March. The topics addressed were on Dengue, Hypertension, HIV/AIDS and Feminine Hygiene. The third health and safety campaign was conducted on 30th December 2019. Health briefing was conducted by Mr. Kelzang Jigme, Anaesthetist from Phuentsholing General Hospital to the new recruits and OJT students. The session focused on HIV/AIDS, Feminine hygiene and diabetes.

D.4 Traffic Safety

The project has the Samtse-Phuentsholing highway running along its boundary and at the northern end of the project site lies a private quarry. This quarry had one of its approach road crossing the project diaphragm wall alignment. Every day heavy vehicles ply on this road posing risk to the project vehicles as well as the project employees. Often heavy vehicles were seen speeding on this road which not only generated a lot of dust but also posed risk to the passer-by. Despite speed breakers and speed limit signage which have been placed at strategic locations, the risk factor was still present.

The first road diversion was completed on 1st March 2019. This approach road was paved to minimize plying of third party vehicles along the project site. Although there was a reduction of third party vehicles, creating a safer and less dusty project office site, there was still presence of third party vehicles dropping off individuals working in the private companies along the PTDP project and heavy vehicles transporting third party construction materials. On 9th August 2019, a second road diversion was paved at part 3, which is only accessible for project vehicles. This has drastically reduced the number of private vehicles plying at the project site, which has in return made it easier to monitor the speed limit.

To illustrate the interference with third party vehicles, PIC asked the Contractor to conduct simple traffic counts to identify the vehicle type and origin. The detail on the traffic study is attached as **Appendix 5**.

D.5 Labor Engagement Statistics at the end of the Reporting Period

The contractor only recruits Bhutanese with proper documents and other foreign workers with authentic permits. Work permits are issued to all the Non-Bhutanese Engineers, workers and labours working in Bhutan. As of December 2019, the contractor has employed the following:

- Bhutanese Day Labour (Female) – 16
- Non-Bhutanese Day Labour (Female) – 1
- Bhutanese Day Labour (Male) – 35
- Non-Bhutanese Day Labour (Male) – 25
- Non-Bhutanese Resident Labour (Male) – 166

The labour register and muster roll of the main contractor are maintained and updated.

D.6 Engagement of Vehicle, machines and equipment

The contractor has deployed various vehicle, machines, and equipment at the site either directly or through subcontractors. Vehicles are also checked for proper registration, fitness, and emission certificates. Please refer to **Appendix 12** for all vehicle clearance certificate.

E. Social Safeguard and Communication

E.1 Social Safeguard

No specific action conducted this quarter

E.2 Communication action (website, events…)

CDCL Information Technology team visited the project site on 26th March 2019 and has developed the CDCL website. Information on the PTDP is already available in CDCL website (www.cdcl.bt).

See **Appendix 4** for a comprehensive list of meetings

E.3 Updated Stakeholder Communication Plan

The Project Administration Manual has developed a stakeholder communication plan which was updated as follows:

Table 17: Updated stakeholder communication plan

Project information to be communicated	Means of communication	Resp. Agency	Audience(s)	Frequency
Report and Recommendation of the President	ADB Website (linked documents)	ADB	ADB, DHI, CSOs, beneficiaries and RGoB	Once at Project inception
Procurement and bidding documents	Invitations for bids published on the DHI and CDCL websites and in the newspapers. Information for pre-bid meetings to be published likewise	PMU	Contractors and local suppliers of goods and services ADB, DHI, CDCL	During the procurement period. 1. Project Quarterly Report 2. As per the procurement plan
Construction	The selected construction company(s) will ensure that the construction areas will have signage boards with their contact information	PIU	ADB, DHI, CDCL, Stakeholders	During the construction period. Reported Monthly in Monthly Progress Report
Progress status during construction works and construction issues	Signage boards on site	PIU	ADB, DHI, CDCL General Public	During the construction period. 1. Reported Monthly in Monthly Progress Report 2. For the general public. Within Specific Public event (once a year)
Project performance reports	ADB and DHI Websites	ADB and DHI	Beneficiaries, stakeholders and RGoB	Either Semi-annually or annually once DMF (Design and Monitoring Framework) is set-up.
Safeguard monitoring (Environment and Social monitoring reports)	ADB websites	ADB and CDCL	ADB, DHI, CSOs, beneficiaries and RGoB	Semi-annually (January to June 2019)
Project completion Report	ADB Websites	ADB and CDCL	ADB, DHI	At Project closure

F. Grievance Redress Mechanism

F.1 Grievance Redress Mechanism set-up

A two-tier mechanism is adopted by the project. The first tier is in the field at the PIU level led by PIU head and the second level/tier GRM is led by the PMU head.

Secretariat

The first level secretariat of GRM is established in the PIU office, with PIC/PIU's Health and Safety officer acting as the secretary.

Composition

At the first level GRM, the team called the 'Grievance Redress Committee (GRC)' is established at the PIU level and consist of the PIU head as the lead of GRC. The composition of the first tier GRM is shown in Table 1 hereafter.

Table 18: Composition of the First tier GRM

Organization	Positions	Names
PIU	Project Manager	Mr. Kamal Dhakal
PIU	Dy Project Manager	Mr. Dawa Tshering
PIU	Environment Manager	Mr. Pemchung Bhutia
PIC	Team Leader	Mr. Mehmet Kahraman
PIC	Dy Team Leader	Mr. Edwin Anggrijatno
PIC	Safeguard and H&S Specialist	Mr. Megay Penjore
Phuentsholing Constituency	Representative	Mr. Nar Bahadur Rai
Phuentsholing Thuemi	Representative	Mr. Sonam Tenzin
RENEW (Community-based org.)	Representative	Ms. Dechen
Members on-call basis based on the nature of grievance representing relevant section of district office		
Contractor CW-01	Project Manager	Mr. Ravichandran

The composition of the second tier GRM is shown in Table 19 hereafter:

Table 19: Composition of the Second Tier GRM

Organization	Positions	Names
PMU	Project Director	Mr. Tshering Dupchu
PMU	Urban Planner	Ms. Kamala Thapa
PIU	Project Manager	Mr. Kamal Dhakal
PIU	Environment Manager	Mr. Pemchung Bhutia
Central Government / MOWHS	Representative	Mr. Namgay Tshering
RENEW (Community-based org.)	Representative	Ms. Lhaden

F.2 Revised GRM

As part of the site visit by PIC environmental specialist to review and approve the draft CEMP, revisions were proposed in the draft GRM which was endorsed by ADB as part of the CEMP. The changes made were as follows:

Table 20: Comments and observation on GRM by PIC

Chapter; Section Comment	Comment
Issues	It should be mentioned that Grievances related to the Social and Environmental Concerns of the project shall be covered by the GRM
Complaint/ Feedback/ Dropbox	Shall be at the contractor's site office and PIU office with a proper signboard with names and numbers of contact person at all these locations.
Dealing with complaints	It was suggested that minor issues/complaints received may be dealt by PIU and contractor directly as appropriate. But proper recording should be done and reported to the committee.
Register of complaints	All complaints received- written, telephonic, email, verbal, anonymous etc shall be recorded and verified. A proper register should be maintained and reported to the GRM committee.
Corrective Measures to be done by the contractor	Please include how corrective measures would be addressed and borne by the contractor

All the comments have been incorporated and are part of the GRM in the CEMP

F.3 Grievances registered

As of now, no grievances have been registered and grievance reporting format has also been uploaded on the CDCL website (www.cdcl.bt/ptdp/).

G. Design Monitoring Framework and actions agreed during last ADB review mission

G.1 Performance against DFM Indicators

Status of performance against Project Design and Monitoring Framework indicators is shown in **Appendix 1**. Compliance with loan and grant Covenant updated table is attached in **Appendix 11.**

G.2 Action agreed during last ADB review mission

The Last ADB mission was in between 29th October 2019 and 4th November 2019, which is shown in table 21 below:

Table 21: Status of actions agreed during last ADB review mission (October 2019)

Agreed Actions Schedule					
Sl No	**Activity**	**Due Date (ADB)**	**Respon sibility**	**CDCL Proposal**	**Remarks/Comments**
Project Management					
1	Fully staff PIU and PMU	Immediate	CDCL	Agreed	Required staffs are mobilized. Further will be mobilized based on requirements at site.
2	Update the PPMES and RMP	Every Quarter	PIU/PIC	Agreed	
3	Coordination Meeting with PCR and LAP (Integration of design level, dust suppression and traffic management)	Monthly	PIU	Agreed	Will be held monthly & based on critical Agenda/Issues
4	Letter to DHI management to uptake section of Omchhu river training works	08-Nov-19	PMU	Deferred	Done on 25th November 2019
5	PMC meeting with other Ministry stakeholders	30-Dec-19	PMU	Deferred	Meeting with MoWHS planned for January 2020
6	Submit Quarterly Progress Report to ADB (include PPMES and RMP)	30-Jan-20	PMU	Agreed	Will be submitted by January end, 2020
7	Agreement between PTDP and the Thromde	30-Mar-20	PMU	Agreed	Under Process
Flood forecasting					
8	NCHM MOU shared with ADB	30-Nov-2019	PMU/PIU	Deferred	Some clarifications soughed by NCHM which require consultation with ADB. PMU will discuss jointly

					with BHRM in Jan, 2020
9	Flood management consultancy inception report submitted to ADB and PMU	15-Feb-20	PIC	Agreed	FMC work plan submitted to ADB. FMC will be mobilized after 2D modelling is completed (Feb 2nd week)
CW01					
10	Revised hydraulic model inception report submitted to PIU/ADB	15-Nov-19	PIC	30th Nov, 2019	2D model report on lower walkway level submitted to ADB. Final report will be submitted by 1st Week of Feb, 2020
11	Hydraulic model-design level submitted to PIU/ADB	13-Dec-19	PIC	Deferred	Lower walkway level submitted and finalized. Upper walkway level will be finalized by 1st week of Feb. 2020
12	Hydraulic model draft report submitted to PIU and ADB	17-Jan-20	PIC	Deferred	Feb 1st Week, 2020
13	HCP designers fielded to site	15-Jan-19	PIU	Agreed	HCP team visited site on 26th – 27th December 2019. Agreed to do the design works from home.
CW02					
14	Submit updated SAP timelines to ADB	30-Dec-19	PMU	Deferred	Proposed to defer to 31st March 2020
15	PIU to submit CW02 Bid Documents to ADB	30-May-20	PIU	Agreed	First draft prepared and under review by CDCL
Safeguards					
16	PMU letter sent to NEC regarding EC project title	15-Nov-19	PMU	Deferred	Sent on 25th November 2019.
17	Issue BMBMS request for quotation (RFQ)	22-Nov-19	PIC	Agreed	
18	Pest control report submitted to ADB	30-Nov-19	PIU	Deferred	Included in the SEMR report to be submitted by Jan 30, 2020

19	Independent Environmental monitoring expert work schedule shared with ADB	06-Dec-19	PMU	Deferred	To be submitted with QPR no 5 (Oct – Dec 2019)
20	BMBMS recruited under PIC	20-Dec-19	PIC	Deferred	A separate letter will be sent to ADB by 1st Week of Feb, 2020, justifying to defer BMBMS
21	Public consultation meeting	30-Nov-19	PIU	15-Dec-2019	Conducted on 13-Dec-2019
22	EMR covering July to December 2019 submitted	31-Jan-20	PMU	Agreed	
Finances					
23	Submit 2018 APFS to ADB	31-Dec-19	PMU	Agreed	Submitted to BHRM
24	Submit 2019 APFS to ADB	30-Jun-20	PMU	Agreed	

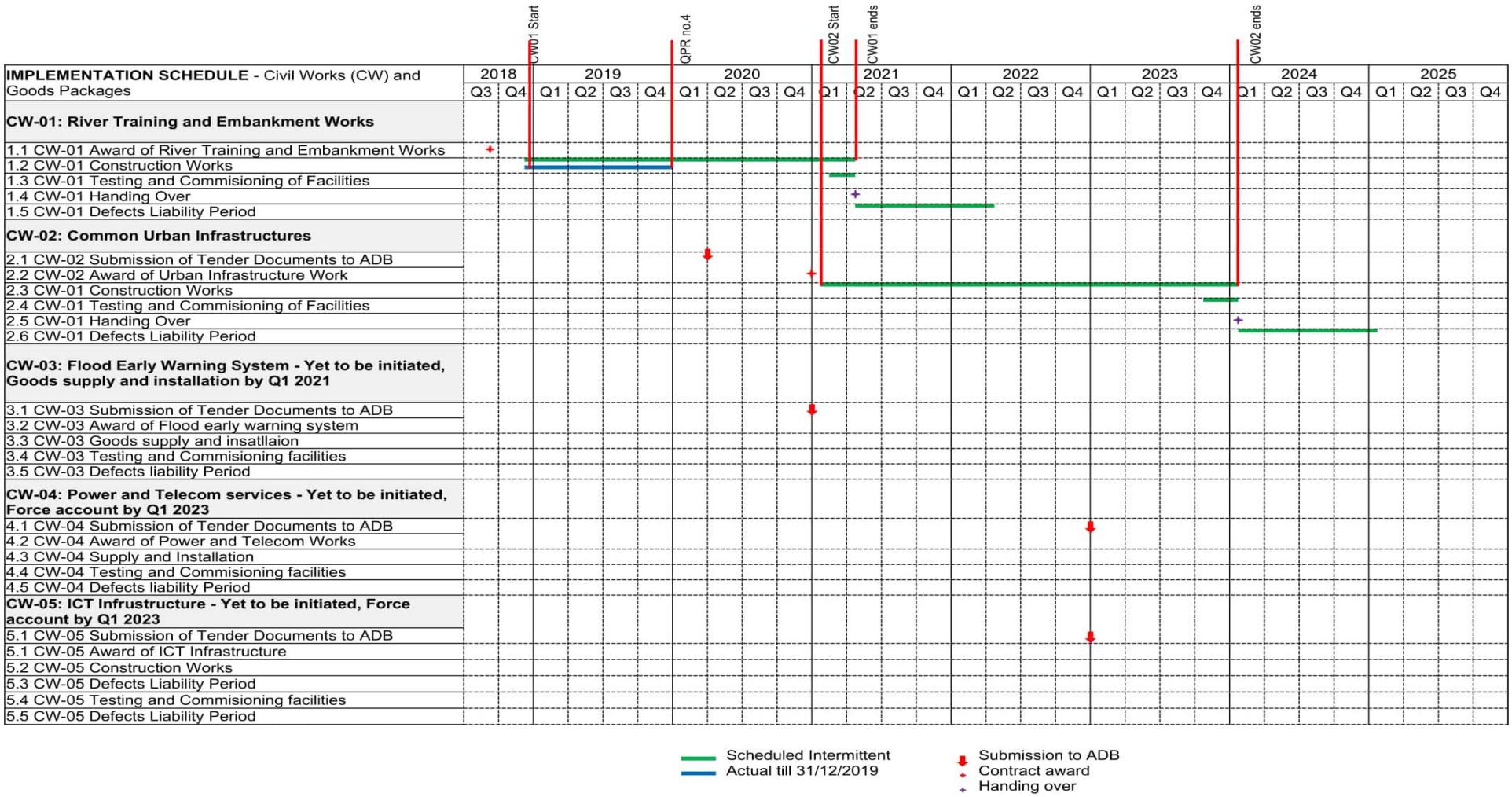
G.2.1 Risk Management Plan

The Risk Management Plan (RMP) - an updated Risk Management Plan is finalized, which has been submitted as part of the Quarterly Progress Report (QPR No. 5), October – December 2019 and is attached in **Appendix 16**.

Appendix 1: Design and Monitoring Framework

	Indicator	Progress till 31st December 2019
Outcome Phuentsholing's urban area protected from floods and expanded with improved amenities and services	By 2026: a. Phuentsholing and reclaimed land protected from 100-year flood events in the Amochhu River (2018 baseline: Phuentsholing is protected from mean annual floods) b. At least 10% of fully serviced plots tendered for development (2018 baseline: NA)	a. First assessment of the progress of achievement when cast-in-situ wall achieved. Q2/2020. b. confirmation of tender scheduleQ2/2024
Outputs 1. Flood and erosion protection measures installed	By 2025: 1a. 4 km of climate and erosion-resilient river walls constructed to protect against 100-year probable flood (2018 baseline: 0) 1b. At least 66 ha of land reclaimed (2018 baseline: 0) 1c. A flood early warning system and community-based flood management plan established and operational (2018 baseline: NA)	1a. Construction of river protection started in Jan 2019. 44% Achieved. 1b. Construction of backfilling started in Feb 2019. 15 % Achieved. Land reclaimed when walkways finished. 1c. Not yet started. FEWS to be installed from Q2/2020 to Q4/2021
2. Municipal infrastructure constructed	2a. 10 km of roads with footpaths, landscaping, and streetlights planned with at least 30% female participation (2018 baseline: 0) 2b. Water treatment plant with a capacity of 4 MLD constructed (2018 baseline: none) 2c. 12 km of new primary and secondary water mains constructed (2018 baseline: 0) 2d. 9 km of new sewer mains and 9 km of new storm drains constructed (2018 baseline: 0) 2e. A sewerage treatment plant with a capacity of 3 MLD constructed (2018 baseline: 0) 2f. A resource recovery system for solid waste management installed (2018 baseline: 0) 2g. A 630 KVA grid substation constructed (2018 baseline: 0) 2h. 16 circuit-km of 415-volt power distribution lines installed (2018 baseline: 0) 2i. 11 circuit-km of telecommunication transmission cables installed (2018 baseline: 0)	To be started with CW-02, CW-03, CW-04 & CW-ti05 start. 2a. To be assessed from Q3/2021. 2b. To be assessed from Q3/2021 2c. To be assessed from Q3/2021 2d. To be assessed from Q3/2021 2e. To be assessed from Q3/2021 2f. To be assessed from Q3/2021 2g. To be assessed from Q2/2022 2h. To be assessed from Q2/2022 2h. To be assessed from Q2/2022
3. Township management systems installed	3a. At least 80% of township management staff reported improved knowledge of modern urban management (2018 baseline: NA) 3b. An asset management system established with 100% of project infrastructure and facilities geocoded in a database (2018 baseline: NA) 3c. At least 10 potential investors attended investor outreach campaigns (2018 baseline: NA)	3a. First assessment in the Year 2024 3b. To be assessed from Q2/2022 3a. To be assessed on Q3/2024

Appendix 2: Updated Implementation Schedule



Appendix 3: PMU, PIU and PIC Details

STAFFS OF PHUENTSHOLING TOWNSHIP DEVELOPMENT PROJECT, CDCL

Project Management Unit (PMU), CDCL

Sl.No	Name	Function
1	Chief Executive Officer	Mr. Phuntsho Gyeltshen
2	Director, Department of Engineering and Construction	Mr. Reezang Wangdi (resigned), new to be recruited
2	General Manager, Finance and Investment Division	Ms. Dechen Wangmo
3	Project Director	Mr. Tshering Dupchu
4	Finance Manager	Mr. Phurba Dorji
5	Project Accountant	Mr. Lhaten Tshering (resigned, new to be recruited)
6	Urban Planner	Ms. Kamala Thapa
7	Legal Officer	Mr. Kinley Dorji
8	Human Resources Manager	Mr. Kencho Tshering

Project Implementation Unit (PIU), CDCL

Sl.No	Function	Name
1	Project Manager	Mr. Kamal Dhakal
2	Dy. Project Manager	Mr. Dawa Tshering
3	Environment Manager	Mr. Pemchung Bhutia (Pushpa Raj Pradhan resigned)
4	Stakeholder Manager	Mr. D.B Ghalley
5	Adm.Officer (Document Control)	Ms. Tshering Pelden
6	Health and Safety Inspector	Mr. Yeshey Wangdi
7	Site Engineer	Ms. Kinley Dema
8	Asst. Document controller	Ms. Kezang Lhaden
9	Driver	Mr. Rinzin Dorji

Project Implementation Consultant (PIC)

Sl.No	Function	Name
1	Team Leader / Chief Resident Engineer	Mr. Mehmet Kahraman
2	Deputy Team Leader/RE	Mr.Edwin Aggrijatno
3	Construction Manager/QLE	Mr.Sonam Tobgay K
4	Material Engineer	Mr. Dwarika Gotamey
5	Quantity Surveyor	Mr. Karma Dezang
6	National Hydraulic Engineer/ FEMS Specialist	Mr. Chhimi Dorji
7	Safeguard and Communication Specialist	Mr. Megay Penjore
8	Environmentalist	Ms. Sonam Deki
9	Office Manager	Ms. Sangay Choizom
10	Accountant	Ms. Dorji Lhamo
11	Assistant Office Manager	Ms. Namgay Lhamo Tenzin
12	MIS/IT	Mr. Pema Namgay
13	AutoCAD	Mr. Phuntsho Namgyal
14	Site Inspector	Mr. Prem Kumar Ghalay
15	Site Inspector	Mr. Tashi Namgyel
16	Site Inspector	Mrs. Kencho wangmo
17	Site Inspector	Mr. Yeshi Jamtsho
18	Land Topography Surveyor	Mr. Namgay Wangchuk
19	Lab Technician	Ms. Yangchen Seldon
20	Land Topography Surveyor	Mr. Karma Wangchuk
21	Lab Technician	Ms. Tandin Wangmo

22	Assistant Surveyor	Mr. Drutuk Zangpo
23	Driver	Mr. Suresh Rai
24	Driver	Mr. Choki Dorji
25	Messenger	Ms. Yeshi Dolma
26	Office Guard	Mr. Jurmey Namgay

Intermittent key experts will be present as per their requirement.

Appendix 4: List of particular meetings, training/workshops and visits

Appendix 4.1 List of particular meetings from 1st January 2019 to 31st December 2019

Sl. No	Subject	Date	Location	Attendee
1	1st PCR & PTDP Meeting	12th January 2019	PIU Meeting Room	PCR PTDP
2	ADB Mission Meeting in Thimphu	7th May 2019	Thimphu	ADB PMU/PIU PIC
3	ADB Mission meeting with PMU/PIU & PIC	7th May 2019 - 10th May 2019	PIU Meeting Room	ADB PMU PIU PIC
4	ADB & PCR & PIU Meeting	14th May 2019	PIU Meeting Room	ADB PCR PIU
5	2nd PCR & PTDP coordination meeting	27th May 2019.	PIU Meeting Room	PCR PTDP
6	ADB Hydrologist (CHRISD), PIC Hydrologist & Programme Analyst Meeting on	28th June 2019 – 29th June 2019	PIU Meeting Room	ADB PIU PIC
7	ADB Technical Assistance Meeting with PIU & PIC on	28th, 29th and 30th June 2019	PIU Meeting Room	ADB PIU PIC
8	3rd PCR & PTDP Coordination Meeting	on 9th July 2019	PIU Meeting Room	PCR PTDP
9	Video Conference with ADB	24th July 2019	Thimphu	ADB PMU/PIU PIC
10	ADB & Phuntsholing Thromde Meeting	31st October 2019	PIU Meeting Room	ADB PIU Thromde
11	ADB Mission Meeting	31st October – 1st November 2019	PIU Meeting Room	ADB PIU PIC CW01
12	ADB & PTDP HSE Team Meeting	1st November 2019	PIU Meeting Room	ADB PIU PIC CW01
13	ADB & PTDP (PIU - PIC & CW01) Meeting	1st November 2019	PIU Meeting Room	ADB PIU PIC CW01
14	DHI Meeting with PTDP	7th November 2019	PIU Meeting Room	DHI PMU/PIU
15	Stakeholder Consultation Meeting	13th December 2019	Druk Hotel Phuntsholing	Stakeholder PIU PIC CW01
16	ADB & PIU/PIC Video Conference	19th December 2019	PIU Meeting Room	ADB PIU PIC CW01
17	Royal Audit Authority Meeting	20th December 2019	PIU Meeting Room	RAA PIU
18	PTDP & PCR discussion	13th September 2019	PIU Meeting Room	PCR PTDP
19	PCR & PTDP (PIU-PIC & CW01) Meeting	13th November 2019.	PIU Meeting Room	PCR PTDP
20	PCR & PTDP Monthly Interface Meeting	18th December 2019	CW01 Conference Room	PCR PTDP
21	Meeting with HCP (IDPR design consultant) - 1 (PIU, PIC & HCP)	25th June 2019.	PIU Meeting Room	PIU PIC HCP
22	Meeting with HCP - 2 (PIU, PIC, HCP & CW01)	26th June 2019	PIU Meeting Room	PIU PIC CW01 HCP
23	2D Modelling Meeting with National Hydraulic Engineer & PTDP	12th August 2019	PIU Meeting Room	PIU PIC NHE
24	Technical Discussion (PIU & PIC)	13th September 2019	PIU Meeting Room	PIU PIC
25	Special Discussion with PCR & PTDP	13th September 2019	PIU Meeting Room	PTDP PCR
26	2D Hydraulic Survey Meeting with PIU & PIC	1st October 2019	PIU Meeting Room	PIU PIC
27	PTDP & Green Bhutan Meeting	5th December 2019	CW01 Conference Room	PTDP Green Bhutan

28	PIC Video Conference with National Hydraulic Engineer	19th December 2019	PIC Office	PIC NHE
29	PTDP Meeting with HCP	27th December 2019	PIU Meeting Room	PTDP HCP
30	Monthly Coordination Meeting – 1 (PIU, PIC & CW01)	9th April 2019	CW01 Conference Room	PIU PIC CW01
31	Monthly Coordination Meeting – 2 (PIU, PIC & CW01)	10th June 2019.	CW01 Conference Room	PIU PIC CW01
32	Monthly Coordination Meeting – 3 (PIU, PIC & CW01)	23rd August 2019	CW01 Conference Room	PIU PIC CW01

Appendix 4.2 List of training and workshops from 1st January 2019 to 31st December 2019

Sl. No	Subject	Date	Location	Attendee
1	MIS Presentation & Training by QLE/IT	10th June 2019	PIU Meeting Room	PIU PIC
2	Construction Seminar	29th August 2019 – 30th August 2019	Royal University of Bhutan (RUB)	Stakeholders PIU PIC CW01
3	Tender opening for Biodiversity Monitoring and Bench Marking Study conducted on	2nd December 2019	PIU Meeting Room	PIU PIC
4	1st Factory Visit for Anchor bars & Couplers material	21st to 25th April 2019	KRIDHAN INFRA, INDIA	PIU PIC CW01
5	2nd Factory Visit for Wire Crates material	16th to 20th June 2019	TECHFAB, INDIA	PIU PIC CW01
6	3rd Factory Visit	9th August 2019	Perfect Steel TMT Phuntsholing	PIU PIC CW01
7	Safety Motivation Program by CW01 at CW01 Assembly Point	24th April 2019	CW01 Assembly Point	PIU PIC CW01
8	Fire Briefing & Mock drill by CW01	13th May 2019	Near Batching Plant	PIU PIC CW01
9	Plantation at Camp Site on Environment Day	05th June 2019	CW01 Camp Site	PIU PIC CW01
10	Safety Awards by CW01 on World Environment Day	05th June 2019	CW01 Assembly Point	PIU PIC CW01
11	Emergency Evacuation Briefing by CW01	10th June 2019	CW01 Assembly Point	PIU PIC CW01
12	CDCL Health & Safety Training / Site Visit by CW-O1	17th July 2019 - 18th July 2019	CW01 Conference Room	PIU PIC CW01
13	Meeting between Health Safety & Environment Team with Independent Environmental Monitoring Expert (PIU PIC CW01)	20th July 2019	PIU Meeting Room	PIU PIC CW01
14	Meeting on Improving Safeguard Policy Applications in South Asia Developing Member Countries	22nd July 2019	Hotel Ga Me Ga Phuntsholing	PIU PIC CW01
15	1st Mass Cleaning Campaign at Site to observe “Zero Waste Hour”	3rd August 2019	Project Site	PIU PIC CW01
16	Information Session on Dengue by PIU/PIC environment officials to CW-01 especially residing outside PTDP site	7th- 8th August 2019	CW01 Conference Room	PIU PIC CW01
17	Earthquake Mock Drill	20th August 2019	CW01 Assembly Point	PIU PIC CW01
18	2nd Mass Cleaning Campaign at Site to observe “Zero	7th September	Project Site	PIU PIC

	Waste Hour"	2019		CW01
19	Health Awareness Campaign at Site from Phuntsholing General Hospital	16th October 2019	CW01 Conference Room	PIU PIC CW01
20	CW01 Safety Award	16th October 2019	CW01 Assembly Point	PIU PIC CW01
21	Health Awareness Campaign	30th December 2019	CW01 Conference Room	PIU PIC CW01

Appendix 4.3 List of visits from 1st January 2019 to 31st December 2019

Sl. No	Subject	Date	Location	Attendee
1	Ministry of Labour and Human Resources	2nd February 2019	Project Site	MoLHR PIU PIC CW01
2	Ministry of Work and Human Settlement Secretariat	10th April 2019	Project Site	MoWHS PIU PIC CW01
3	His Majesty's Secretary	10th April 2019	Project Site	Officials PIU PIC CW01
4	Ministry of Economic Affairs	10th July 2019	Project Site	MoEA PIU PIC CW01
5	His Excellency, The Prime Minister	8th September 2019	Project Site	Officials PIU PIC CW01
6	Ministry of Home & Cultural Affairs	13th October 2019	Project Site	MoHCA PIU PIC CW01
7	Ministry of Education	27th October 2019	Project Site	MoE PIU PIC CW01
8	ADB Mission	7th May 2019 - 10th May 2019	Project Site	ADB PMU PIU PIC
9	ADB Mission	31st October – 1st November 2019	Project Site	ADB PIU
10	ADB & PTDP	1st November 2019	Project Site	ADB PIU PIC CW01
11	BAOWE (Bhutan Association of Women Entrepreneurs) & Phuntsholing Thromde	14th May 2019	Project Site	BAOWE Officials, P/ling Thromde, PIU
12	DHI CEO	26th June 2019	Project Site	DHI Officials PIU
13	Bhutan Broadcasting Service	14th August 2019	Project Site	BBS PIU
14	DHI Officials Site Visit for Project Progress Review	30th September 2019	Project Site	DHI Officials PIU PIC CW01
15	Director of Department of Forest and Park Services (DoFPS)	14th September 2019	Project Site	DoFPS Officials PIU
16	DHI CEO & officials	31st October 2019	Project Site	DHI Officials PIU PIC

17	Stakeholders (MoF DRC DES Thromde PCR CDCL)	30th November 2019	Project Site	Stakeholders PIU PIC CW01
18	PTDP HSE Team site visit at labour camps	11th September 2019	Project Site	PIU PIC CW01
19	CDCL Health & Safety	17th July 2019 - 18th July 2019	Project Site	CDCL PIU PIC CW01
20	ADB's Project Preparatory Technical Assistance (PPTA)	25th- 30th September 2019	Project Site	ADB PIU PIC CW01

Appendix 5: Traffic study

The project has the Samtse-Phuentsholing highway running along its boundary and at the northern end of the project site lies a private quarry. This quarry has one of its approach road crossing the project diaphragm wall alignment. Every day heavy vehicles ply on this road which poses risk to the project vehicles as well as the project employees. Often heavy vehicles are seen speeding on this road that not only generates a lot of dust but also poses risk to the project workers. Despite speed breakers and speed limit signage that have been placed at strategic locations, the risk factor is still present.

The first road diversion was completed on 1st March 2019. This approach road was paved to minimize plying of third party vehicles along the project site. Although there was a reduction of third party vehicles, creating a safer and less dusty project office site, there was still presence of third party vehicles dropping off individuals working in the private companies along the PTDP project and heavy vehicles transporting third party construction materials. On 9th August 2019, a second road diversion was paved at part 3, which is only accessible for project vehicles. This has drastically reduced the number of private vehicles plying at the project site, which has in return made it easier to monitor the speed limit.

To illustrate the interference with third party vehicles, PIC asked the Contractor to conduct simple traffic counts to identify the vehicle type and origin. The traffic counts shown below are for the months from October – December. **Table 1** below gives the traffic results, which shows that the diverted road used by the project vehicles is minimal in comparison to third party vehicles.

Table 1: Traffic counts from October – December 2019

DAY								
Location / Date / Time	**Project LV**	**Project HV**	**Trailer**	**Project Total**	**Others LV**	**Others HV**	**Trailer**	**Others Total**
10/10/2019	145	96	8	**249**	1107	1073	40	**2220**
NIGHT								
Location / Date / Time	**Project LV**	**Project HV**	**Trailer**	**Project Total**	**Others LV**	**Others HV**	**Trailer**	**Others Total**
17/10/2019	21	6	0	**27**	210	176	3	**389**
DAY								
Location / Date / Time	**Project LV**	**Project HV**	**Trailer**	**Project Total**	**Others LV**	**Others HV**	**Trailer**	**Others Total**
15/11/2019	148	72	6	**226**	982	756	23	1761
NIGHT								
Location / Date / Time	**Project LV**	**Project HV**	**Trailer**	**Project Total**	**Others LV**	**Others HV**	**Trailer**	**Others Total**
15/11/2019	23	6	0	**29**	262	248	8	**518**
DAY								
Location / Date / Time	**Project LV**	**Project HV**	**Trailer**	**Project Total**	**Others LV**	**Others HV**	**Trailer**	**Others Total**
28/12/2019	132	121	9	**262**	1195	916	3	**2114**
NIGHT								
28/12/2019	26	5	0	**31**	225	168	8	**401**

Result

- The day survey is conducted from 8:00 AM – 5:00 PM with a lunch gap of one hour
- The night survey is conducted from 8:00 PM – 8:00 AM

There is a fluctuation in the number of project vehicle plying on the diverted road. This is also due to the fact that the work has moved towards part 6-8, and the newly paved road is not used constantly. The number of private vehicles has increased due to the recent extension granted by the Ministry of Agriculture and Forest to all private companies to clear their RBM materials from the PTDP project site, most of the trucks are not safely covered with tarpaulin, and pose risk to the workers walking in the project site. The issue has been raised to the private companies, and awaiting their implementation and cooperation.

Appendix 6: Updated Procurement Plan and Contract Award Schedule

Phuentsholing Township Development Project

No.	Package	Procurement Plan Amount($ millions)		Note	Type	Implementation Period	Current Status of Designs/Bid Documents	Submission Date to CDCL	Submission Date to ADB for Clearance	Advertize Bid	Bids Submitted	Submission Date of TDER to ADB for clearance	Submission Date for FBER to ADB for Clearance	Target date of Contract Award	Start Date
Works & Goods															
1	CW-01	35	River training and land reclamation	1	ICB	Q4-2018 to Q2-2022			14-Mar-17	25-May-17				18-Jul-18	27-Aug-18
2	CW-02	11,2	Common Urban Infrastructure		ICB	Q3-2021 to Q2-2024		10-Dec-20	24-Dec-20	28-Jan-21	11-Mar-21	8-Apr-21	13-May-21	3-Jun-21	1-Jul-21
3	CW-03	0,2	Flood warning system		ICB Goods	Q2-2020 to Q3-2020		11-Nov-19	18-Nov-19				12-Feb-20	11-Mar-20	1-Apr-20
4	CW-04	0,5	Power transmission infrastructure		FA	Q1-2023 to Q2-2024									
5	CW-05	0,9	ICT infrastructure		FA	Q1-2023 to Q2-2024									

No.	Package	Procurement Plan Amount($ millions)		Note	Type	Implementation Period	Current Status of Designs/Bid Documents	Submission Date to CDCL	Submission Date to ADB for Clearance	Advertize Bid	Bids Submitted	Submission Date of TDER to ADB for clearance	Submission Date for FBER to ADB for Clearance	Target date of Contract Award	Start Date
Consultants															
1	CS-01	5,7	Project Implementation Consultant	2	QCBS 90:10	Q3-2018 to Q2-2025			6-Dec-16	21-Feb-17	15-May-17				29-Oct-18
2	CS-02	0,25	Independent environmental monitoring expert		ICS	Q4-2018 to Q2-2025		16-Sep-18	23-Sep-18	13-01-19	21-01-19	31-01-19		4th April 2019	15-Jul-19
3	CS-03	0,1	Urban management advisor		ICS	Q2-2022 to Q1-2025		18-Mar-22	25-Mar-22	29-Apr-22		3-Jun-22			1-Jul-22
4	CS-04	0,1	Investment promotion advisor		ICS	Q4-2022 to Q1-2025		18-Jun-22	25-Jun-22	30-Jul-22		3-Sep-22			1-Oct-22
5	CS-05	1,3	Sustainable township management capacity developmen		QCBS 90:10	Q1-2023 to Q2-2025		6-May-22	23-May-22	10-Jul-22	4-Sep-22	2-Oct-22	30-Oct-22	4-Dec-22	1-Jan-23
6	CS-06	1,1	Investor promotion and transaction advisory services		QCBS 90:10	Q3-2023 to Q2-2025		3-Nov-22	10-Nov-22	7-Jan-23	4-Mar-23	1-Apr-23	29-Apr-23	3-Jun-23	1-Jul-23

achieved
pending
overdue
actual dates

	Indicative Durations						
ICB Works	14	35	42	28	35	21	28
ICB Works	7			86	28		
NCB Goods	7			72	28		
QCBS	7	58	56	28	28	35	28
ICS	7	35		35			28

Notes:

1 Includes cross drainage structures, land formation, and about $250K for supply and
2 to include prov sum packages for traffice management study ($100K), preparation of emergency management plan ($200K), and

Details on Contract award process

Contract	Bid prep.	Bid period	Bid evaluation	Award & Negotiation	LTP
CW-01 River Training	Q1 2017	Q1& Q2 2017	Q2 2017	Q2 2018	12 Sep. 2018
CW-02 Common urban infrastructure	Q2& Q3 2019				
CW-03 Flood early warning system	Q3 2019				
CW-04 Power transmission infrastructure	Q3 2020				
CW-05 ICT infrastructure					
CS-01 PIC	Q1 2017	Q2 & Q3 2017	Q3 2017	Q3 2017	17 Sep. 2018
CS-02 Environment monitoring expert.	Q4 2018	Q1 2019	Q1 2019	Q2 2019	4th April 2019

Appendix 7: Updated Investment Cost

Project Investment Plan

(in $ million / Assumption Nu.67.97=$1.00 as of 31 Dec.2016)

Sources	Amount / Share	
	Amount	%
Asian Development Bank[a]	**53.00**	**84.1**
Ordinary capital resources (concessional loan)	28.74	45.6
Special Funds resources (ADF grant)	24.26	38.5
Government	**10.00**	**15.9**
	63.00	**100.0**

[a]Disaster Risk Reduction Fund will finance $6.07 million equivalent of the concessional OCR loan and $6.07 million of the ADF grant.

Source: ADB – PAM May 2018

Investment costs from Loan and Grant agreements

(in $ million)

Investment costs	Total Amount (Taxes included)		ADB Loan		ADB Grant			Government*			
	Cur.	Amount	Amount	%	Amount	%		Costs	Taxes & duties	Total	%
Civil Works	USD	37.59	15.05	40	19.57	52		2.97		2.97	8
Consultancy Services (PIC)	USD	7.55	7.42	98					0.13	0.13	2
Recurrent Cost	USD	2.73						2.73		2.73	100
Contingencies	USD	14.07	6.27	45	4.69	33		3.11		3.11	22
Financial Charges	USD	1.05						1.05		1.05	100
	Total	**63.00**	**28.74**		**24.26**			**9.86**	**0.13**	**10**	**16**

Breakdown of Investment costs per Contracts and amounts used.

1st Quarter: January 2019 – March 2019

Investment costs	Total Amount (Taxes included)		ADB Loan		ADB Grant		Government*			
	Cur.	Amount	Amount	%	Amount	%	Costs	Taxes & duties	Total	%
Civil Works	USD	37.59	15.05	40	19.57	52	2.97		2.97	8
Consultancy Services (PIC)	USD	7.55	7.42	98				0.13	0.13	2
Recurrent Cost	USD	2.73					2.73		2.73	100
Contingencies	USD	14.07	6.27	45	4.69	33	3.11		3.11	22
Financial Charges	USD	1.05					1.05		1.05	100
	Total	**63.00**	**28.74**		**24.26**		**9.86**	**0.13**	**10**	**16**

2nd Quarter: April 2019– June 2019

Investment costs	Contracts Amount (Taxes included)		Certified until this month* (Mar 2019)		Certified on April 2019*		Certified on May 2019*		Certified on June 2019*		Total Certified up to June 2019*	
	Cur.	Amount	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Civil Works Contracts (CW-01)	BTN	2,934,669,207	247,590,147	8.4	94,540,079	3.2	78,131,331	2.7	49,406,689	1.7	469,668,245	16.0
Consultancy Services (CS-01 PIC)	USD	4,138,144	293,216	7.1	68,988	1.7	38,917	0.9	25,760	0.6	426,881	10.3
	BTN	91,474,227	6,341,833	6.9	1,716,500	1.9	1,712,600	1.9	1,697,167	1.9	11,468,100	12.5

3rd Quarter: July 2019 – September 2019

Investment costs	Contracts Amount (Taxes included)		Certified until this month* (June 2019)		Certified on July 2019*		Certified on August 2019*		Certified on Sept 2019*		Total Certified up to Sept 2019*	
	Cur.	Amount	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Civil Works Contracts (CW-01)	BTN	2,934,669,207	469,668,245	16.0	74,723,787	2.5	99,571,657	3.4	76,401,069	2.6	720,364,758	24.5
Consultancy Services (CS-01 PIC)	USD	4,138,144	426,881	10.3	41,524	1.0	18,440	0.4	23,886	0.6	510,731	12.3
	BTN	91,474,227	11,468,100	12.5	2,540,100	2.8	2,144,333	2.3	2,045,667	2.2	18,198,200	19.9

4th Quarter: October 2019 – December 2019

Investment costs	Contracts Amount (Taxes included)		Certified until this month* (Sept 2019)		Certified on Oct 2019*		Certified on Nov 2019*		Certified on Dec 2019*		Total Certified up to Nov 2019*	
	Cur.	Amount	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Civil Works Contracts (CW-01)	BTN	2,934,669,207	720,364,758	24.5	69,725,114	2.4	70,293,560	2.4	0.00	0.00	860,383,433	29.3
Consultancy Services (CS-01 PIC)	USD	4,138,144	510,731	12.3	27,553.33	0.7	70,110	1.7	0.00	0.00	608,394	14.7
	BTN	91,474,227	18,198,200	19.9	2,207,867	2.4	2,255,633	2.5	0.00	0.00	22,661,700	24.8

* Amount of works and services billed in the table above excludes taxes and advances. The data are from invoice of January 2019 to November 2019.

Appendix 8: Contract and disbursement S-Curve, ADB Loan and ADB Grant

Appendix 8.1 Status of Disbursement of Project Funds

Cat	Description/ name	Budget Allocation (mil. US$) (a)	Contracts Awarded (mil. US$) (b)	Uncontract Balance (mil. US$) (c) = (a - b)	Total Disbursed (mil. US$) (d)	Undisbursed Amount (mil. US$) (e) = (a -d)
Loan	Civil Works	15.05	15.05	0	0	15.05
	Consulting services	7.42	5.34	2.08	0.89	6.53
	Contingencies - Physical	1.46		1.46		1.46
	Contingencies - Financial	4.82		4.82		4.82
	Sub total	**28.74**	**20.39**	**8.35**	**0.89**	**27.86**
Grant	Civil Works (CW-01)	19.57	19.57	0	15.35	4.22
	Contingencies - Physical	1.96	1.96	0	0	1.96
	Contingencies - Financial	2.73	2.73	0	0	2.73
	Sub total	**24.26**	**24.26**	**0**	**15.35**	**8.91**
Gov.	Civil works	2.97	2.97	N/A	0.35	2.62
	Consulting services	0.13	0.13		0.044	0.086
	PMU and PIU Expenditures	1.67	N/A		0.182	1.48
	Training	0.21	N/A		0.043	0.167
	Operation and Maintenance	0.86	N/A		0.163	0.697
	Contingencies - Physical	1.70	1.70			1.7
	Contingencies - Financial	1.40	1.40			1.4
	Financial charges	1.05	1.05			1.05
	Sub total	**10.00**			**0.80**	**9.20**

Note* -

The disbursed values (d) are as per CDCL Finance Division statement for PTDP for 2019-year end.

An Equivalent amount at signing date CW-01 Contract, Nu.2,934,669,207=41.63million$ and PIC Contract, 5,44 million$ at 1US$ = 70.5 BTN

For CW-01 Contract amount, 41.63million$, remaining balance from Loan, 15.05, Grant, 19.57 and DHI, 2.97 is 4.04million$. If affected on an equal proportion of Civil Works items (Loan, 40%, Grant, 52% and Gov., 8%) to Physical Contingencies. Loan and Grant remaining amounts insufficient.

Appendix 8.2 Schedule of contracts award and disbursement for Loan 3668-BHU

Exchange rate 1USD=70BTN

PTDP Loan: Contract Awards and Disbursement($Million)

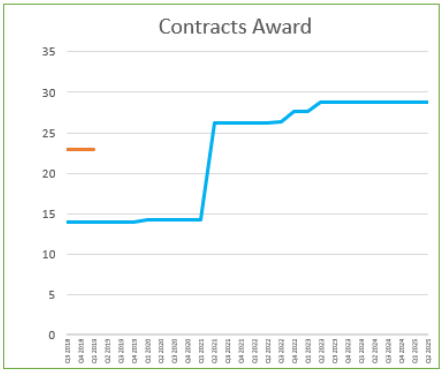
	Contract Awards($Million)					Disbursements($Million)				
Year	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2018			14,04		14,04				1,38	1,38
2019					0	0,64	0,64	0,64	0,65	2,57
2020	0,2				0,2	0,64	0,64	0,74	0,75	2,77
2021		11,94			11,94	0,64	0,64	0,64	1,84	3,76
2022		0,1	0,1	1,28	1,48	1,54	1,54	1,54	1,54	6,16
2023		1,08			1,08	1,1	1,22	1,22	1,36	4,9
2024					0	1,36	1,36	1,36	1,36	5,44
2025					0	0,46	1,3			1,76
	Total contract award				28,74	Total Disbursements				28,74

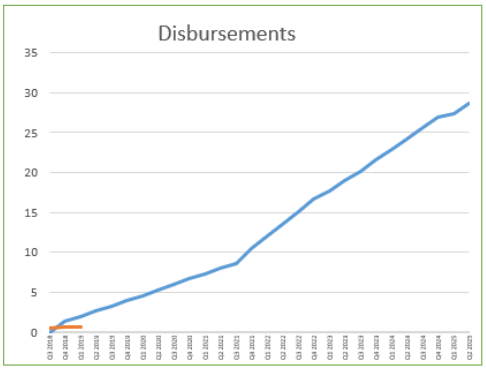
Loan conracts Award ($million)

	Target		Actual	
Quarter	Amount	Cumul.	Amount	Cumul.
Q3 2018	14,04	14,04	23,01	23,01
Q4 2018	0	14,04	0	23,01
Q1 2019	0	14,04	0	23,01
Q2 2019	0	14,04	0	23,01
Q3 2019	0	14,04	0	23,01
Q4 2019	0	14,04	0	23,01
Q1 2020	0,2	14,24	0	23,01
Q2 2020	0	14,24	0	23,01
Q3 2020	0	14,24	0	23,01
Q4 2020	0	14,24	0	23,01
Q1 2021	0	14,24	0	23,01
Q2 2021	11,94	26,18	0	23,01
Q3 2021	0	26,18	0	23,01
Q4 2021	0	26,18	0	23,01
Q1 2022	0	26,18	0	23,01
Q2 2022	0,1	26,28	0	23,01
Q3 2022	0,1	26,38	0	23,01
Q4 2022	1,28	27,66	0	23,01
Q1 2023	0	27,66	0	23,01
Q2 2023	1,08	28,74	0	23,01
Q3 2023	0	28,74	0	23,01
Q4 2023	0	28,74	0	23,01
Q1 2024	0	28,74	0	23,01
Q2 2024	0	28,74	0	23,01
Q3 2024	0	28,74	0	23,01
Q4 2024	0	28,74	0	23,01
Q1 2025	0	28,74	0	23,01
Q2 2025	0	28,74	0	23,01

Loan Disbursements ($million)

	Loan		Actual	
	Quarter	Cumul.	Quarter	Cumul.
Q3 2018	0	0	0,58	0,58
Q4 2018	1,38	1,38	0,05	0,63
Q1 2019	0,64	2,02	0	0,63
Q2 2019	0,64	2,66	0	0,63
Q3 2019	0,64	3,3	0	0,63
Q4 2019	0,65	3,95	0	0,63
Q1 2020	0,64	4,59	0	0,63
Q2 2020	0,64	5,23	0	0,63
Q3 2020	0,74	5,97	0	0,63
Q4 2020	0,75	6,72	0	0,63
Q1 2021	0,64	7,36	0	0,63
Q2 2021	0,64	8	0	0,63
Q3 2021	0,64	8,64	0	0,63
Q4 2021	1,84	10,48	0	0,63
Q1 2022	1,54	12,02	0	0,63
Q2 2022	1,54	13,56	0	0,63
Q3 2022	1,54	15,1	0	0,63
Q4 2022	1,54	16,64	0	0,63
Q1 2023	1,1	17,74	0	0,63
Q2 2023	1,22	18,96	0	0,63
Q3 2023	1,22	20,18	0	0,63
Q4 2023	1,36	21,54	0	0,63
Q1 2024	1,36	22,9	0	0,63
Q2 2024	1,36	24,26	0	0,63
Q3 2024	1,36	25,62	0	0,63
Q4 2024	1,36	26,98	0	0,63
Q1 2025	0,46	27,44	0	0,63
Q2 2025	1,3	28,74	0	0,63





Appendix 8.3 Schedule of contracts award and disbursement for Grant 0573-BHU

PTDP Grant: Contract Awards and Disbursement($Million)

Exchange rate 1USD=70BTN

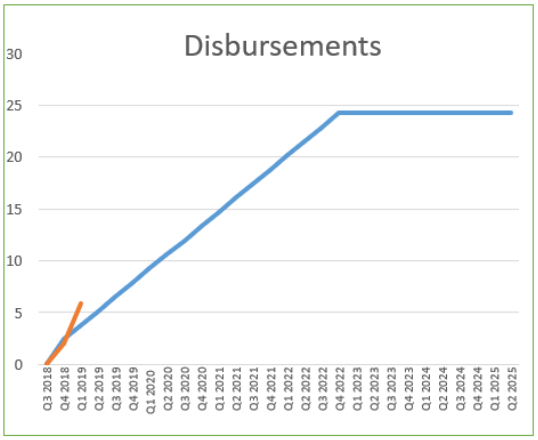
	Contract Awards($Million)					Disbursements($Million)				
Year	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2018			24,26		24,26				2,43	2,43
2019					0	1,37	1,37	1,37	1,37	5,46
2020					0	1,37	1,37	1,37	1,37	5,46
2021					0	1,37	1,37	1,37	1,37	5,46
2022					0	1,37	1,37	1,36	1,36	5,45
2023					0					0
2024					0					0
2025					0					0
	Total contract award				24,26	Total Disbursements				24,26

Grant conracts Award ($million)

	Target		Actual	
Quarter	Amount	Cumul.	Amount	Cumul.
Q3 2018	24,26	24,26	23,89	23,89
Q4 2018	0	24,26	0	23,89
Q1 2019	0	24,26	0	23,89
Q2 2019	0	24,26	0	23,89
Q3 2019	0	24,26	0	23,89
Q4 2019	0	24,26	0	23,89
Q1 2020	0	24,26	0	23,89
Q2 2020	0	24,26	0	23,89
Q3 2020	0	24,26	0	23,89
Q4 2020	0	24,26	0	23,89
Q1 2021	0	24,26	0	23,89
Q2 2021	0	24,26	0	23,89
Q3 2021	0	24,26	0	23,89
Q4 2021	0	24,26	0	23,89
Q1 2022	0	24,26	0	23,89
Q2 2022	0	24,26	0	23,89
Q3 2022	0	24,26	0	23,89
Q4 2022	0	24,26	0	23,89
Q1 2023	0	24,26	0	23,89
Q2 2023	0	24,26	0	23,89
Q3 2023	0	24,26	0	23,89
Q4 2023	0	24,26	0	23,89
Q1 2024	0	24,26	0	23,89
Q2 2024	0	24,26	0	23,89
Q3 2024	0	24,26	0	23,89
Q4 2024	0	24,26	0	23,89
Q1 2025	0	24,26	0	23,89
Q2 2025	0	24,26	0	23,89

Grant Disbursements ($million)

	Target		Actual	
Quarter	Amount	Cumul.	Quarter	Cumul.
Q3 2018	0	0	0	0
Q4 2018	2,43	2,43	2,07	2,07
Q1 2019	1,365	3,795	3,83	5,9
Q2 2019	1,365	5,16	0	5,9
Q3 2019	1,365	6,525	0	5,9
Q4 2019	1,365	7,89	0	5,9
Q1 2020	1,365	9,255	0	5,9
Q2 2020	1,365	10,62	0	5,9
Q3 2020	1,365	11,985	0	5,9
Q4 2020	1,365	13,35	0	5,9
Q1 2021	1,365	14,715	0	5,9
Q2 2021	1,365	16,08	0	5,9
Q3 2021	1,365	17,445	0	5,9
Q4 2021	1,365	18,81	0	5,9
Q1 2022	1,365	20,175	0	5,9
Q2 2022	1,365	21,54	0	5,9
Q3 2022	1,36	22,9	0	5,9
Q4 2022	1,36	24,26	0	5,9
Q1 2023	0	24,26	0	5,9
Q2 2023	0	24,26	0	5,9
Q3 2023	0	24,26	0	5,9
Q4 2023	0	24,26	0	5,9
Q1 2024	0	24,26	0	5,9
Q2 2024	0	24,26	0	5,9
Q3 2024	0	24,26	0	5,9
Q4 2024	0	24,26	0	5,9
Q1 2025	0	24,26	0	5,9
Q2 2025	0	24,26	0	5,9



Appendix 9: Monthly Environmental Monitoring Review for 4th Quarter (October – December 2019)

Introduction

This environmental aspect is prepared in compliance with the Contractors Environmental Management Plan (CEMP) for the Phuentsholing Township Development Project (PTDP). The project is financed with support from the Asian Development Bank (ADB) & Druk Holding and Investments (DHI). DHI is the Project Owner and the Executing Agency (EA) and Construction Development Corporation Limited (CDCL), is the Implementing Agency (IA). The Civil work contract of package CW-01 has been awarded to M/s AFCONS Infrastructural Limited, India. For supervising the Contractor's works, the CDCL has appointed M/s EGIS International as Engineer.

Purpose

Based on the Environmental monitoring carried out by PIC and PIU environment team and the Environmental monthly reports submitted by the contractor during the period October to December 2019, a summary of the environmental monitoring review has been prepared. The purpose of this section provides a review of the status of environmental safeguards and monitoring activity that is being adopted and supervised at the project site.

Project Update

Mobilization of manpower, equipment, construction of office and camp area, setup of basic amenities being completed, and the project is the first stage of construction activities for river training works, such as the start of construction diaphragm-wall, first outfalls construction and the start of backfilling construction.

Works Progress

Works Progress are detailed in Chapter B3 "Implementation of physical works" of the present report.

Methodology for Environmental Monitoring

The monitoring methods used are visual inspection, informal interview of workers and residents and photographic documentation. Checklists for monitoring environmental compliances have also been developed jointly by PIC/PIU. The Environmental monitoring implementation plan had been developed as part of the CEMP and is shown as follows:

Environment Monitoring Implementation Plan					
Activities	**Locations**	**Numbers**	**Frequency**	**Remarks**	**Parameters**
Contractors Environmental Monthly Report	Zone A	12	12x /year	Contractor	As per the Outline
PIC monthly report	Zone A	12	12x /year	PIC	As per the Outline
Quarterly Report	Zone A	4	4x /year	PIC	As per the Outline
Semi-Annual Report	All PTDP Zones	2	2x /year	PIC	As per the Outline
Air Quality Monitoring	All PTDP Zones	6	2x /week	Based on site roster for each station	TSPM, PM2.5, PM10, SO2, NOX, CO
Noise	All PTDP Zones	6	Monthly	24 hours/ Work hours	Decibels- dB (A)
Noise	Zone A	3	Weekly	Instantaneous (1m, 3m, 5m)	Decibels- dB (A)
Water Quality	All PTDP	8	2x / year	April and October	pH, Color, Electrical

Monitoring	Zones				conductivity, TDS, Turbidity, Ammonia Nitrogen, Ca, Mg, Na, K, Salinity, COD, BOD, Cl, Phenol, Sulphates, Nitrate, fluoride, DO, SAR, TSS, cyanide, heavy metals, total coliform and faecal coliform
Water Quality Monitoring	Zone A	2	Monthly	By 15th of each month	
Ground Water Quality	Zone A	2	2x / year	April and October	
Soil Testing/ Ground Contamination Monitoring	Zone A	1	Monthly	By 15th of each month	Visual observation of contamination from oil, grease and other foreign materials.
Meteorology	Zone A	1	1 hourly	Monthly Weather Report. By 15th of the following month	Wind speed, Wind Direction, Temperature, Relative Humidity, Rainfall
Ecology	All PTDP Zones	All Zones	4x / year	January, April, July, and October	Terrestrial flora and fauna, Zooplankton, Phytoplankton, Benthos & fishes
Biodiversity monitoring and benchmarking study (BMBMS)	All PTDP Zones	All	4x / year - for 3 years	January, April, July, and October. To be completed by External specialist. TOR prepared by PIC Environmental Specialist	Terrestrial flora and fauna, Zooplankton, Phytoplankton, Benthos & fishes

Environmental Monitoring schedule, activities and analysis

The comprehensive schedule of environmental monitoring activities carried out from October to December 2019 is enclosed here below:

Parameters	Location	Frequency	October 2019	November 2019	December 2019	Results / Comments
Contractors Environmental Monthly Report	Zone A	12x /year	5/11/2019	3/12/2019	7/1/2020	Submitted by Contractor
PIC Monthly Report	Zone A	12x /year	22/11/2019	24/12/2019	25/01/2020	Submitted by PIC
Quarterly Report	Zone A	4x /year	Ø	Ø	15/01/2019	Submitted by PIC
Semi-Annual Report	Zone A	2x /year	Ø	Ø	Ø	Submitted by PIC
Air quality	6 location	2x /week	01/10/2019 – 31/10/2019	01/11/2019 – 30/11/2019	01/12/2019 – 31/09/2019	Results have been submitted in the contractor's monthly report.
Noise – All PTDP zones	6	Once every month	01/10/2019 – 31/10/2019	01/11/2019 – 30/11/2019	01/12/2019 – 31/09/2019	Results have been submitted in the contractor's monthly report.
Surface Water quality – All PTDP zones	10	2x / year	Ø	Ø	Ø	SW01 – SW10 will be conducted in March 2020.
Surface Water quality – Zone A	2	Monthly	19/10/2019	20/11/2019	20/12/2019	Results SW01 & SW10 has been submitted in the contractor's monthly report

Groundwater quality	Zone A	2x / year	Ø	20/11/2019	Ø	The 3rd groundwater quality was carried out in November 2019. 4th sampling to be carried in May 2020. **Refer to page 66 - 67**
Soil Testing/ Ground Contamination	Zone A	Monthly	Ø	Ø	Ø	Visual observations has been submitted in the contractor's monthly report
Meteorology	Zone A	1 hourly	01/10/2019 – 31/10/2019	01/11/2019 – 30/11/2019	01/12/2019 – 31/09/2019	Meteorology station setup place on 6th March 2019. The result has been submitted as part of the contractor's monthly report. **Refer to page 68**
Ecology	All PTDP Zones	4x / year	17/10/2019	16/11/2019	16/12/2019	Terrestrial report yet to be submitted. Ecolab has submitted the report to the Department of Forest and Park service and waiting for approval.
Biodiversity monitoring and benchmarking study (BMBMS)	All PTDP Zones	4x / year - for 3 years	Ø	Ø	Ø	8th November 2019 request for quotation was emailed to five firms. 2nd December 2019 tender submission and opening. 24th December 2019 Methodology and rate analysis from selected firm was submitted to PIU by PIC.

Based on the above environmental monitoring carried out, an in-depth analysis has been provided as follows;

Air Quality[1]

The ambient air quality monitoring is being carried out along six locations of the PTDP project premises. To ensure that the project does not cause or contributes towards the already existing pollution in Phuentsholing town, parameters like TSPM, PM 10 and PM 2.5 are being carried out at each station

[1]The air quality monitoring station (AA03 and AA06) has been shifted to NHDCL colony and near the Rigsar batching plant to assess impact on the project camp and lay down area at Zone A since Feb 2019.

twice every week. Depending on the results of the monthly tests, mitigation measure is being strictly implemented.

The PTDP project site is situated along the main Phuentsholing-Samtse highway. For the month of October four out of six locations were within the permissible limits. Location AA03 and AA06 indicated high TSPM and PM2.5. For the month of November out of the six stations, two locations namely AA01 and AA06 recorded high TSPM and PM2.5, and AA004 recorded high PM10. Otherwise all other parameters were within the permissible limits. For the month of December out of the six stations, two locations namely AA03 and AA05 recorded all parameters within the NEC's permissible limits. Location AA01, AA02 and AA06 indicated high PM10 and AA004 recorded high TSPM, PM10 and PM2.5.

As you can see on the table below a summary of the air data for the last three months is provided. Locations AA01, AA04 and AA06 have indicated high TSPM, PM10 and PM2.5 for two or all three months. Due to this, the overall combined calculation has also indicated parameters above the permissible limits. Below is an analysis

Multiple external factors are contributing towards the high level of air pollution at the four locations along with the PTDP project site:

October:

- TSPM and PM 2.5 for location AA03 (near NHDCL colony) was recorded high on 22nd October. The NHDCL colony does not fall under the project jurisdiction, but an air monitoring station was set up there to check how much of the dust pollution was caused by non-project vehicles or outside the project premises
- The Phuentsholing Chamkhuna Road has started their work which is along the AA03 station. Over the past few months there has been a drastic increase in heavy vehicles plying along the unpaved road with construction materials, which are all contributing towards the increase of pollution in the area
- Trucks are also parked along the Phuentsholing-Samtse highway, and due to congestion, the emission from vehicles are another contributor towards a high level of TSPM and PM 2.5 in location AA03. In addition, there are many workshops located along the highway and emissions from vehicles and equipment used from the workshops are another contributor to the high level of pollutants in the vicinity
- Increase in vehicular movements along the Phuentsholing – Samtse highway suspend the settled dust soaring into the air, occasionally obscuring vision temporarily
- The location of AA06, which is behind the project office site, has majority of the construction activities taking place. Rigsar and Yangkhil's boulder exporting company sites are also located near the AA06 location. Both the mentioned boulder exporting companies have been asked to complete their dredging work by the end of December 2019, due to which emission from their machines and increase in heavy vehicles plying along the newly diverted PTDP road use in transporting boulders and gravels to and from the Rigsar & Yangkhil site. All contributors towards an increase in air pollution in AA06 station
- Construction activities such as backfilling works, and the monsoon season coming to an end, settled dust is being suspended into the air as the road is unpaved, and the emission from the movement of vehicles are all factors contributing towards the sudden rise in pollutants in the locations

November:

- Location AA01 and AA04 are not in the project premises, but an air quality monitoring (AQM) is set up in the two locations as points of reference to check how much of the dust pollution was caused by non-project vehicles or outside the project premises. TSPM and PM10 for location AA01 (near B-mobile tower) was recorded high on 20th November.
- On the 15th of November at location AA04 (Chamkuna Village) had a high recording of PM10.
- On the 7th of November high level of PM10 and on the 21st of November high level of TSPM was recorded for location AA06 (Near Rigsar's batching plant).

- Location AA01 is located right near the Phuentsholing Truck parking. Movement of heavy vehicles plying on dusty roads could be one of the major causes for the high level of TSPM amd PM10 in this location. Trucks are also parked in the area, and due to congestion, the emission from vehicles are another contributor towards a high level of TSPM and PM 2.5 in location AA01
- The Phuentsholing Chamkhuna Road has started their work which is along the AA04 station. Over the past few months there has been a drastic increase in heavy vehicles plying along the unpaved road with construction materials, which are all contributing towards the increase of pollution in the area
- The location of AA06, which is behind the project office site, has majority of the construction activities taking place. Rigsar and Yangkhil's boulder exporting company sites are also located near the AA06 location. Both the mentioned boulder exporting companies have been asked to complete their dredging work by the end of December 2019, due to which emission from their machines and increase in heavy vehicles plying along the newly diverted PTDP road use in transporting boulders and gravels to and from the Rigsar & Yangkhil site. All contributors towards an increase in air pollution in AA06 station

December:

- Location AA01 and AA04 are not in the project premises, but an air quality monitoring (AQM) is set up in the two locations as points of reference to check how much of the dust pollution is caused by non-project vehicles and activities
- Location AA01 is located right near the Phuentsholing Truck parking. Movement of heavy vehicles plying on dusty roads could be one of the major causes for the high level of PM10 in this location. Trucks are also parked in the area, and due to congestion, the emission from vehicles are another contributor towards a high level of PM10 in location AA01
- The Phuentsholing Chamkhuna Road has started their work which is along the AA04 station. Over the past few months there has been a drastic increase in heavy vehicles plying along the unpaved road with construction materials, which are all contributing towards the increase of pollution in the area
- The location of AA06, which is behind the project office site, has majority of the construction activities taking place. Rigsar and Yangkhil's boulder exporting company sites are also located near the AA06 location. Both the mentioned boulder exporting companies have been asked to complete their dredging work by the end of December 2019, due to which emission from their machines and increase in heavy vehicles plying along the newly diverted PTDP road use in transporting boulders and gravels to and from the Rigsar & Yangkhil site. All contributors towards an increase in air pollution in AA06 station

Other external factors contributing towards high levels of air pollution:

- In addition to the above, natural factor such as the dust was blowing from the unpaved road into air and causing massive air pollution for the vicinity of the project.
- There are many workshops located along the highway and emissions from vehicles and equipment used from the workshops are another contributor to the high level of pollutants in the vicinity.
- Increase in vehicular movements along the Phuentsholing – Samtse highway suspend the settled dust soaring into the air, occasionally causing obscure vision temporarily.

Average Data From October – December 2019

Station Code		TSPM (µg/m3)	PM10 (µg/m3)	PM2.5 (µg/m3)	NO_X (µg/m3)	SO_2 (µg/m3)	CO (µg/m3)
	NEC Standard	200	100	-	80	80	2000
	IFC Standards	-	150	75	125	200	160

AA01 (Near B-Mobile Tower)	Maximum	201.82	107.69	60.81	BDL	BDL	BDL
	Minimum	41.80	24.70	7.56	BDL	BDL	BDL
	Average	93.52	53.54	24.37	BDL	BDL	BDL
AA02 (Near the STP plant)	Maximum	146.70	80.11	48.21	BDL	BDL	BDL
	Minimum	24.60	8.46	7.72	BDL	BDL	BDL
	Average	73.20	37.77	22.80	BDL	BDL	BDL
AA03 (NHDCL Colony)	Maximum	157.53	70.41	64.84	BDL	BDL	BDL
	Minimum	18.96	9.93	5.04	BDL	BDL	BDL
	Average	72.88	31.56	26.53	BDL	BDL	BDL
AA04 (Chamkuna Village)	Maximum	212.62	112.53	69.24	BDL	BDL	BDL
	Minimum	38.91	24.37	6.57	BDL	BDL	BDL
	Average	93.89	55.21	24.60	BDL	BDL	BDL
AA05 (Toorsa Tar Village)	Maximum	125.08	52.19	40.47	BDL	BDL	BDL
	Minimum	22.75	9.34	5.25	BDL	BDL	BDL
	Average	60.47	24.79	18.02	BDL	BDL	BDL
AA06 (Near Rigsar's Batching Plant)	Maximum	224.63	114.05	70.16	BDL	BDL	BDL
	Minimum	43.55	20.58	7.08	BDL	BDL	BDL
	Average	95.98	59.90	23.90	BDL	BDL	BDL

Mitigation Measures

Although difficult, the project in its capacity has been continuously monitoring and ensuring strict compliance on this issue, some of which is described as follows:

- Deployment of sprinkler truck and speed bumps initiated by the contractors. However, due to external activities simultaneously occurring within the project vicinity, the project corridors are covered in dust causing continuous exposure of duct to workers.

- Recommendation to provide N95 nasal masks or equivalent mask, and eye protection gear to all workers as a preventive measure.

- Site Inspectors to ensure that all workers use the provided gears while at the site.

- Construction materials at the site or being transported by truck are well covered with tarpaulin.

- Use of Bulkers in place of cement bags for Batching plant, which is currently being supplied by Dungsam Cement Corporation Limited (DCCL)

- Dust suppression measures such as temporary Speed bumps have been built along the project area and cautionary signage (speed limit) have been erected along the project area to reduce the speed of huge trucks and commuters.

- A traffic survey is also conducted every month by the contractors to study the number of times the project vehicles are using the highway in comparison to third-party vehicles. This study is conducted to ensure that project vehicles are not a major contributor to pollution.

Contractors are also ensuring that all construction materials at the site are covered in tarpaulin.

Noise

Noise quality monitoring is conducted every day over a period of 24 hours by Ecolab in six locations. The test is conducted once during the day and the other at night time. Noise test is conducted to study if the sound generated are not only produced from project activities but from natural factors and other undertakings occurring in the vicinity. The test is also to ensure that the noise generated from the project area is temporary and will not have any lasting impact after its completion. Once the noise data has been gathered any mitigation measures which need to be taken care are immediately and strictly implemented.

For the months of October out of the six locations, three locations NL02, NL03 & NL05 during the day recorded noise above the permissible limit. NL06 during the day and night recorded noise level above the permissible limits. Locations NL01 and NL04 were within the permissible limits.

For the month of November out of the locations, three locations NL02, NL05 & NL06 during the day recorded noise above the permissible limit. Locations NL01, NL03 and NL04 were within the permissible limits for both day and night test. All six locations were within the permissible limits during the night.

For the month of December three locations NL02, NL05 & NL06 during the day recorded noise above the permissible limit, and NL02 and NL06 during the night recorded noise above the permissible limits.

NL02, NL03, NL05 & NL06 were the four recurring locations which indicated noise beyond permissible limits in all three or two of the months. An overall combined calculation of the noise level for the last three months also reflect the same four locations with noise levels beyond the permissible limits. Below is an analysis.

There are multiple external factors that are contributing towards the high level of noise pollution at the three locations (NL02, NL03, NL05 & NL06) along with the PTDP project site:

- Firstly, locations NL02, NL03 and NL05 are away from the main PTDP project site. NL02 is in the NHDCL colony, NL03 is near the b-mobile tower which is located near the truck parking, and NL05 which is near Toorsa Tar village. So high level of noise indicated are not due to the PTDP project, but rather caused by other external factors and activities ongoing along the three locations. The Phuentsholing Chamkhuna road has started their work, and collecting construction materials from the Omchhu River and transporting it back and forth could be one of the reasons for the increase in noise level in the three locations. One of the major factors is the problem of vehicle congestion which has exacerbated over the past few months due to developments happening all around Phuentsholing town.
- There are also many workshops located along the highway and noise from the use of equipment are another contributor to the high level of noise in the vicinity.
- Some of the main contributors towards high noise level in NL06 are the dredging work by Rigsar and Yangkhil has resumed in full swing as they have been asked to move from the PTDP location by the end of December 2019. Noise from use of heavy machinery and constant movement of heavy vehicles with gravel and boulders are all contributors towards the rise in noise especially in location NL06.
- Since the construction of the guide wall has moved closer to the NL06 station, noise from machines like the pneumatic boring machine, to demolish the guide walls, and rigs are all

contributors towards high noise. Work which requires the use of heavy and loud machines are only allowed to function until regular working hours.

- But for the month of October, the reading for NL06 was recorded on 8th October, during which the site was closed in celebration of Diwali. So high level of noise in this location is not from any project activity but rather from the fire crackers and noise of the workmen celebrating the festival.
- On 24th December, 2019 noise level at NL06 was recorded highest. There was no ongoing work at part 4 or 5 which is closest to the noise monitoring station. In celebration of the festivities Rigsar had installed sound systems, which was in use during the evening hours, thus contributing towards the high level of noise in NL06.
- Other factors include the multiple ongoing projects happening along the three locations, construction activities such as drilling, and movement of heavy vehicles carrying construction materials, are all contributors towards the high level of noise pollution in these three locations. The noise generated during the testing are not permanent, and will not have any future impact
- Over the last few months, the project has seen a growing number of trucks parked along the Phuentsholing-Samtse highway. This is not only causing air pollution due to emission from vehicles, but congestion for daily commuters leading to constant honking, and running engines all contributing towards the rise in noise level in the vicinity.

Noise data from October – December 2019

Location		NL01	NL02	NL03	NL04	NL05	NL06
OCTOBER	DAY	63.5	77.3	69.1	59.2	69.3	73.9
	NIGHT	45.7	54.9	47.2	32.6	43.7	56.7
NOVEMBER	DAY	53.5	75.6	62.1	58.2	74.8	76.5
	NIGHT	43.1	48.7	44.3	27.5	39.5	51.7
DECEMBER	DAY	48.5	77.2	64.8	63.2	70.7	78.2
	NIGHT	43.2	63.2	45.9	33.7	49.2	57.3
AVERAGE	DAY	**55.17**	**76.70**	**65.33**	**60.20**	**71.60**	**76.20**
	NIGHT	**41.2**	**43.4**	**39.43333**	**30.53333**	**42.06667**	**66.46667**

Mitigation Measures

There are many external factors contributing to the rise in noise pollution which cannot be controlled, but sounds generated from the PTDP project activities are monitored and controlled. Contractors are advised to complete all work which requires the use of heavy machinery, which could generate loud noise during normal working hours. Contractors are also informed to ensure that all workers living in the camps do not create too much noise which could disturb the neighboring households. All project drivers are also prohibited from unnecessarily honking in the vicinity.

All workers at the site have been informed and encouraged to wear suitable gears and wear their earplugs at all times or while functioning machines which generate loud noise.

Surface Water Quality

The surface water test is conducted to ensure that the project does not pollute and impact the Amochhu River. Ten locations (SW01-SW10) have been identified to conduct the water quality test. Out of the ten locations, a monthly test is conducted for SW04 & SW05 which are points right above and below the project camp area. This is to monitor and ensure that any camp or project activities are not contributing

towards any form of pollution along that stretch of the river. Whereas a pre and post-monsoon water quality test encompassing SW01-SW10 are conducted every six months.

The surface water test was conducted for SW04 & SW05 for the months of October – December 2019. The next surface water test for all ten locations (SW01-SW10) will be conducted in March 2020.
The surface water test for SW04 & SW05 was conducted on 19th October, 20th November and 20th December 2019. The data for the month October – December reflects that all parameters are within the permissible limits except the TSS and dissolved Oxygen which is slightly above the permissible limits.

High Dissolved Oxygen in both locations are because DO in a freshwater system like the Omchhu and Amochhu river will vary depending on the season, location and water depth. Due to Phuentsholing town's geographical location at a lower altitude the rivers are able to hold more dissolved oxygen in comparison to a higher altitude. In addition, cooler water can hold more dissolved oxygen than warm water. During winter when the temperature drops, the DO concentration is higher which explains the data for the last three months. There was also indication of high TSS and one of the main causes for high TSS for the last three months is due to the disposal of materials from construction sites along the Omchhu, and industrial waste (from Karma steel) and settlements along the Omchhu are all factors contributing towards high TSS.

For the month of October, it was because materials for the Phuentsholing Chamkhuna Road was being collected from the Omchhu river the release of emission from the vehicle, and transport of chemicals from vehicle tires entering into the Omchhu could be one of the reasons for recording minutely high pH in SW05. Due to materials being collected for the PCR road from the Omchhu and backfilling materials for part 7 from the Amochhu, is disturbing the rivers, increasing the river turbidity which increases siltation and sedimentation in the river, causing both SW04 and SW05 to record high TSS.

Surface Water Quality Data For SW04 & SW05 from October – December 2019

Sl. no.	Parameter	Unit	Ambient Water Quality Standards as per NEC			IFC standards	OCTOBER		NOVEMBER		DECEMBER	
			A (Very Good)	B (Good)	C (Moderate)		SW04	SW05	SW04	SW05	SW04	SW05
1	pH		Hvljhv464 64646-	6-9	6-9	6-9	9	9.17	8.07	8.96	8.96	8.07
2	Conductivity	µs/cm	800	1000	2000	-	300	157	185	146	146	185
3	Total Dissolved Solid	mg/L	-	-	-	-	150	73	93	73	73	93
4	Temperature		-	-	-	30	26.3	21	17.62	18.04	18.04	17.62
5	Biochemical Oxygen Demand (BOD) at 27˚ C	mg/L	2	5	50	30	5.81	3.98	6.87	4.8	12.07	8.93
6	Chemical Oxygen Demand (COD)	mg/l	-	-	-	125	12.043	7.085	23.1	7.02	32.981	11.301
7	TSS	mg/l	25	100	-	50	163.6	183.5	87.3	68.3	79.08	71.06
8	Dissolved oxygen	mg/l	-	-	-	-	12.7	6.75	9.2	9.17	9.17	9.85
9	Salinity	mg/l	6	4	-	-	0.14	0.13	0.12	0.07	0.07	0.09
10	Phenol	mg/l	0.001	0.002	-	-	BDL	BDL	BDL	BDL	BDL	BDL
11	Sulphate	mg/l	25	100	-	-	2.074	0.95	1.09	0.87	2.071	0.819
12	Nitrate	mg/l	10	50	-	-	6.021	8.42	2.046	2.86	2.54	2.071
13	Fluoride	mg/l	1.0	2.0	-	-	BDL	BDL	BDL	BDL	BDL	BDL
14	SAR	Miliequa./L	-	-	26	-	0.612	0.612	0.41	0.41	2.98	0.391
15	Ammonical Nitrogen	mg/l	-	-	-	-	0.563	2.507	0.8	1.822	0.719	1.502
16	Magnesium	mg/l	-	-	-	-	0.427	0.371	0.06	BDL	BDL	BDL
17	Sodium	mg/l	-	-	-	-	8.049	12.61	2.391	6.01	3.874	8.302
18	Potassium	mg/l	-	-	-	-	1.203	2.91	0.78	1.25	0.502	2.086
19	Chloride	mg/l				-	5.04	8.013	2.35	3.87	2.882	2.918

20	**Cyanide**	**mg/l**	0.05	0.05	-	-	BDL	BDL	BDL	BDL	BDL	BDL
21	**Lead**	**mg/l**	0.002	0.02	-	-	BDL	BDL	BDL	BDL	BDL	BDL
22	**Total Coliform**	**MPN/100ml**	50	5000	10000	400	36	24	21	12	24	23
23	**Fecal coliform**	**MPN/100ml**	20	2000	5000	-	18	11	9	8	17	16
24	**Odour**	**-**	unobjectionable	unobjectionable	-	-	unobjectionable	unobjectionable	unobjectionable	unobjectionable	unobjectionable	unobjectionable
25	**Mineral Oil**	**-**	No Film	No Film	-	-	No Film	No Film	No Film	No Film	No Film	No Film

Mitigation Measures

Since the cause of high TSS and DO are due to external and natural factors, the PTDP can only ensure that our project and camp activities are not contributing towards the pollution. This can be achieved by ensuring that camp or project sites are:

- Properly collecting and disposing of all waste
- No dumping of construction materials along the riverbed or in the river
- Ensure that all construction materials are well covered
- Ensure that all restrooms in the project and campsites are well maintained so that workers are discouraged from defecating around the project vicinity or near the river
- Making sure to service the septic system at the project site and camps
- Landscaping the project office and camps with native plants

Ground Water Quality

Groundwater testing is done every six months at two tube wells which are used for drinking and domestic use in the stockyard and the campsite to prevent any form of contamination due to oil and grease spillage.

For the month of November, monitoring of groundwater contamination was conducted at two points GW01 (Camp area) and GW02 which was previously in the Office area, has now been shifted to Rigsar's campsite.

This change in location was arranged during the ADB missions visit to the Rigsar campsite on November 1st. During the visit observations of spillage of grease and oil from the workshops was noted, and noticed a high chance of it seeping into the Amochhu River and the water being used by the workers. Keeping the risk factors to the workers and the aquatic life in the Amochhu in mind, the change in location was decided. As shown in the table below all groundwater parameters are within the permissible limits stipulated by the NEC, except for Dissolved Oxygen in both locations.

Groundwater Monitoring Data for GW01 & GW02 for November 2019

SL. No.	Parameter	Unit	Ambient Water Quality Standards as per NEC			IFC standards	Groundwater Quality	
			A (Very Good)	B (Good)	C (Moderate)		GW01	GW02
1	**pH**		6.5-8.5	6-9	6-9	6-9	7.6	7.62
2	**Electrical Conductivity**	**µs/cm**	800	1000	2000	-	112	134
3	**Total Dissolved Solid**	**mg/L**	-	-	-	-	89	96.0
4	**Temperature**	**˚C**	-	-	-	-	17.8	17.8
5	**Biochemical Oxygen Demand (BOD)**	**mg/L**	2	5	50	30	0.05	0.006
6	**Chemical Oxygen Demand (COD)**	**mg/l**	-	-	-	125	0.10	0.051

SL. No.	Parameter	Unit	Ambient Water Quality Standards as per NEC			IFC standards	Groundwater Quality	
			A (Very Good)	B (Good)	C (Moderate)		GW01	GW02
7	**TSS**	**mg/l**	25	100	-	50	0.89	1.073
8	**Dissolved oxygen**	**mg/l**	6	4	-	-	12.9	16.3
9	**Salinity**	**mg/l**	-	-	-	-	0.03	0.026
10	**Phenol**	**mg/l**	0.001	0.002	-	-	BDL	BDL
11	**Sulphate**	**mg/l**	25	100	-	-	BDL	BDL
12	**Nitrate**	**mg/l**	10	50	-	-	BDL	BDL
13	**Fluoride**	**mg/l**	1.0	2.0	-	-	BDL	BDL
14	**SAR**	**Milieq ua./L**	-	-	26	-	0.03	0.015
15	**Ammonical Nitrogen**	**mg/l**	-	-	-	-	BDL	BDL
16	**Magnesium**	**mg/l**	-	-	-	-	BDL	BDL
17	**Sodium**	**mg/l**	-	-	-	-	1.34	0.062
18	**Potassium**	**mg/l**	-	-	-	-	0.02	BDL
19	**Chloride**	**mg/l**				-	BDL	BDL
20	**Cyanide**	**mg/l**	0.05	0.05	-	-	BDL	BDL
21	**Lead**	**mg/l**	0.002	0.02	-	-	BDL	BDL
22	**Total Coliform**	**MPN/100ml**	50	5000	10000	400	BDL	BDL
23	**Fecal coliform**	**MPN/100ml**	20	2000	5000	-	BDL	BDL

Analysis

The only parameters detected above the permissible limits was the Dissolved Oxygen (DO) for both GW01 and GW02.

High Dissolved Oxygen in both locations could be high because the samples were bottled from a booster pump pipeline, and oxygen from the air-water interface might have added to the oxygen level. Another factor is cooler water have a greater oxygen dissolving capacity, and given the current situation of change in climate and decrease in temperature, explains the higher oxygen level for the month of November.

Mitigation Measures

The cause of high DO are due to external and natural factors, the PTDP can only ensure that our project and camp activities are not contributing towards the pollution. This can be achieved by ensuring that camp or project sites are:

- Properly collecting and disposing of all waste
- All canisters containing oil and grease are well stored and covered
- Ensure that all construction materials are well covered
- Ensure that all restrooms in the project and campsites are well maintained so that workers are discouraged from defecating around the project vicinity or near the river
- Making sure to service the septic system at the project site and camps
- Landscaping the project office and camps with native plants

Meteorology

The metrological station was installed in March 2019. The average meteorological reading for the last three months October – December are as follows:

Months		October	November	December	
Parameters					**Overall Average**
Rainfall (mm)	**Average Readings**	4.96	0.32	0	1.76
	Minimum	2	0.5	0	0.83
	Maximum	72	9	0	27
Relative Humidity (g/m3)	**Average Readings**	-	64.97	61.47	63.22
	Minimum	32	34	37.6	34.53
	Maximum	93	91.4	89.1	91.17
Temperature (°C)	**Average Readings**	26.33	24.07	18.67	23.02
	Minimum	19.3	19.3	14.67	17.76
	Maximum	34.4	34.1	22.48	30.33
Wind Speed (Km/hr)	**Average Readings**	**-**	3.33	2.69	3.101
	Minimum	0	0	0	0
	Maximum	18.3	14.3	23.8	18.8

Water regime

The first Water Regime monitoring was conducted on 1st April 2019. Since then, pictures of the river has been taken by the contractors twice every week. This monitoring is being conducted, so that the project can record the change in waterways and water level, and examine and analyse the information to ensure that the project will not be impacted.

Below are images of the most drastic change in waterways from the month of October – December. There are not much changes in the waterways. Due to the monsoon season, with hardly any rainfall, the river has diverted back to its original course. Due to the decrease in water level, the current has decread and the water has moved away from the river bed.

The first water level monitoring was conducted on 4th May 2019. Since then, the monitoring is carried out twice every week (Mondays and Saturdays) between part 5 & 6, where construction activities are currently ongoing. This monitoring is conducted to monitor the increase and decrease in the Amochhu water level. This monitoring is also another way to foresee any warning signs of flooding in the project area.

For the month of October, an average water level change of -0.28m was noted since the initial measurement which was conducted on the 1st and the last test on the 28th October 2019.

For the month of November, an average water level change of 0.34m was noted since the initial measurement which was conducted on the 2nd and the last test on the 25th of November 2019.

For the month of December, an average water level change of 0.19m was noted since the initial measurement which was conducted on the 2nd and the last test on the 28th of December 2019.

Due to change in season, Phuentsholing has received partial rainfall and temperature has decreased, in comparison to the past few months. Due to which the river is moving away from the river bed and returning to its initial course before the monsoon.

Ground contamination

To prevent ground contamination while using oil and grease, a tray container is used to prevent ground contamination in addition to the already cemented floor in the workshop. Although the contractors are taking measures to ensure no ground contamination occurs by using tray containers to store unsealed barrels of oil and grease, there were several spots around the project sites where there was leakage of oil and grease in the ground. This could be from vehicles, spillage during movement of barrels or from overflowing of the tray containers.

Several strategies for remediation are:

- The encapsulation process to ensure that contaminants do not spread any further.

- Thermal soil process is by baking the contaminated soil so contaminants evaporate and then disposing of the soil.
- Excavate soil and take it to a disposal site away from ready pathways for human or sensitive ecosystem contact.
- Containment of the soil contaminants such as capping or paving over in place

Solid Waste Management

Colour-coded bins have been installed in the project and campsites. Blue for degradable and Green for biodegradable waste. The Phuentsholing Thromde Municipality makes a bi-weekly trip to collect waste from the project site. A monthly record is maintained by the contractors to understand the amount of waste generated.

Month	Degradable	Bio-Degradable
October	1.7 metric ton	1.5 metric ton
November	1.8 metric ton	1.6 metric ton
December	1.83 metric ton	1.7 metric ton

Ecological Study

The ecological study comprises of two components: Aquatic and Terrestrial survey. The study was proposed to be carried out every quarterly as per the CEMP. However, after the ADB mission visit on May 2019, the study was agreed to be carried out bi-annually with each study covering all 4 seasons. The study is being outsourced by AFONs to Ecolab Services.

The study is being conducted to comprehend the diversity of species (both aquatic and terrestrial) in the PTDP project area. For the months from October – December, an aquatic report was submitted in October and awaiting the submission for the second terrestrial report.

The second terrestrial walkthrough was conducted on 17th October, the third on 16th November and the fourth on 16th December 2019, with representatives from PIU, PIC and CW01. The second Terrestrial study report is yet to be submitted. The report has been submitted to the Department of Forest and Park Services, and awaiting their comments.

Aquatic Survey

The objective of the survey is to assess and determine the diversity of fish species in the Amochhu basin. The first Aquatic survey was conducted from 21st – 23rd October 2019 for which an approval was sought from Department of Forest and Park Service. Below are details are as follows:

- Electrofishing method was used to conduct this survey. Using Electro-Fisher device (DC 3 KW electro shocker. ELT 62-II D, Grass, Germany) by pulsing (12 V) DC current for about 2 to 3 second into the water, which temporarily immobilized the fish. Dip net was used to catch the fishes. Fishes were place in transparent photarium and photographed, and measured before releasing back into the river.
- Nine sites were located to conduct the fish sampling
- During the study, a total of 28 species of fishes were found. The status of these species as per the Forest and Nature Conservation Regulations of Bhutan (FNCR) and the International Union for Conservation of Nature (IUCN) were identified in the EIA report as given below:

List of fish species belonging to order Cypriniformis

Family Cyprinidae	IUCN Red List Status	Last Assessed
1. Apisdoperia sp.	Least Concern(LC)	Species not determined
2. Bariliusbarna	Least Concern(LC)	19/03/2011
3. Bariliusbendelisis	Least Concern(LC)	22/01/2010
4. Bariliusvagra	Least Concern(LC)	22/01/2010
5. Chaguniuschagunio	Least Concern(LC)	22/01/2010
6. Crossocheiluslatius	Least Concern(LC)	09/10/2009
7. Danio reio	Least Concern(LC)	09/10/2009
8. Garraannandalei	Least Concern(LC)	09/10/2009
9. Garragotyla	Least Concern(LC)	07/10/2009
10. Neolissochilushexagonolepis	Near threaten(NT)	09/10/2009
11. Neolissochilusdukai	Data deficient(DD)	01/03/2010
12. Pethiaticto	Least Concern(LC)	22/03/2010
13. Schizothoraxprogastus	Least Concern(LC)	11/05/2010
14. Schizothoraxrichardsonii	Vulnerable(VU)	14/06/2010
15. Semiplotussemiplotus	Vulnerable(UV)	Not Assessed
16. Labeodyocheilus	Near Threaten(NT)	18/03/2010
II). **Family Psilorhynchidae**		
17. Psilorhynchusbalitora	Least Concern(LC)	23/02/2010
III). **Family Balitoridae**		
18. Aborichthys sp.	Least Concern(LC)	Species not determined
IV). **Family Amblycipitidae**		
19. Amblycepsapangi	Least Concern(LC)	16/12/2009
V). **Family Sisoridae**		
20. Glyptothorax sp.	Least Concern(LC)	Species not determined
21. Glyptothorax panda	Least Concern(LC)	09/04/2010
VI). **Family Siluridae**		
22. Pterocryptis sp.	Least Concern(LC)	Species not determined
VII). **Family Nemacheilidae**		
23. Schistura sp.	Least Concern(LC)	Species not determined

List of fish species belonging to order Synbranchiformes

Family Mastacembelidae	IUCN Red List Status	Last Assessed
1. Mastacembelusarmatus	Least Concern(LC)	12/10/2009

List of fish species belonging to Order Perciformes

Family Channidae	IUCN Red List Status	Last Assessed
1. Channamelanostigma	Least Concern(LC)	Not Assessed
2. Channagachua	Least Concern(LC)	Not Assessed
2)**Family Badidae**		
1. Badisbadis	Least Concern(LC)	10/03/2010

Note: For the above tabulation (Table 3, 4 & 5) the Forest and Nature Conservation Act and Regulation 1995 and 2017 have been referred.

Note

PTDP will constantly monitor the aquatic and terrestrial ecology of the areas in and around the project site.

Please refer to the report post monsoon aquatic survey along the Amochhu river basin, Phuentsholing Chukha from 21st – 23rd October 2019, Bhutan Ecolab Services submitted with the QPR 5 and is attached in **Appendix 18**.

Appendix 10: Health and safety monitoring for 4th Quarter (October–December 2019)

Sl. No.	Monitoring activities	Refer Legend for appropriate marking	
A. OVERALL CONSTRUCTION SITES			
1	Equipment/ Machines in Proper condition and safe	0	Yes
2	First Aid and Medical facilities	0	Yes
3	Any Community / Social Concerns	0	No
4	No encroachment into the farm land/ Settlement	0	No
B. WORK STANDARDS			
1	General work area clean and tidy	0	Yes
2	Radio communications (emergency & general), call-up procedures adequate	0	Yes
3	Signage (PPE, safety & restricted access) visible, legible, good condition	0	Yes
4	Adequate signage at workshop yard entrance (e.g. Danger – Deep Excavation, Hazardous & Flammable materials, pressurized gasses, etc)	0	Yes
C. WORK ENVIRONMENT			
1	Stockpiles & materials stacked and maintained in a safe condition	0	Yes
2	Adequate lighting on-site, covered storage areas, vehicle maintenance pit	0	Yes
3	Segregated work areas and signage adequate (direction, warnings)	0	Yes
4	Dust control measures adequate (water truck & sprinklers, if necessary)	0	Checklist of sprinkler truck deployment is maintained by the driver and submitted with EMR every month
D. HAZARDOUS SUBSTANCES OR DANGEROUS GOODS			
1	Fuel storage tank within sealed area & bonded (inside wall in case of a spill)	0	Sealed tanks are well stored, and unsealed tanks have trays or tarpaulin below
2	Workers exposed to hazardous substances trained, adequate instruction provided	0	Yes
3	Health/ Safety surveillance is undertaken where appropriate	0	Yes
4	Material safety data sheet available for hazardous substances		Yes
E. TOILETS AND KITCHEN			
1	Offices, Toilets, and washrooms maintained in a sanitary condition	0	
2	Toilets, Septic Tanks and Soak Pits being used properly and cleaned regularly	0	Yes. Tanks and soak pits at the workers camp and project office is being cleaned every month. Tanks at the project sites are being cleaned every

Sl. No.	Monitoring activities	Refer Legend for appropriate marking	
			week.
3	Properly labelled garbage bins installed around the kitchen & other areas and emptied regularly	0	Yes
4	Is the garbage in good management and disposed to the Thromde collection system?	0	6 trips of solid waste trucks are completed by the Phuentsholing Thromde
5	Soak pits are proper, covered, with no overflow?	0	No overflow
6	Kitchen sewage/waste disposed of in infiltration pits, with ACF, closed system?	0	6 trips of the solid waste truck and 3 trips of sewage sludge are made by Phuentsholing Thromde
7	Adequate water supply for washbasin & flush toilets?	0	Yes. Water tankers at project sites are refilled every morning and as and when needed.
F. DUST & SMOKE			
1	No visible dust clouds from excavation/levelling activity.	0	No
2	No burning of wastes	0	Not at the project site, but there was burning of tires near NHDCL colony and from workshops
3	Waste bins facilities are available at the site	0	Blue- Degradable and Green- Non-degradable
G. GENERAL HEALTH AND SAFETY DURING CONSTRUCTION			
1	All workers trained in safety and hygiene at work? (Records)	0	Yes
2	Site supervisors/ safety officer gives weekly toolbox talks to reinforce training to all the labourers?	0	Total of 36 toolbox talks conducted in the last three months.
3	Equipment (backhoe etc.), machines, and vehicles are in proper condition with details of registration- emission certificate/ fitness certificates.	0	Yes
4	Workers equipped with PPE such as hard hats, eye and protection, ear protection, gloves, safety- shoes, and respirators	0	Contractors are handing out violation slips to workers who refuse to comply
5	High visibility clothing, including a vest to avoid “collision” in work area	0	Yes
6	Warning signs in place to shield workers from passing vehicle and segregation such as traffic cone and barrels	0	Yes
7	Fencing/ Markers installed on all areas such as excavation, concreting, and side of temporary work/pits greater than 1m deep	0	Yes
8	Information for workers and adequate awareness working near construction vehicles & equipment the operator/ driver knows where the persons are located?	0	Yes

Sl. No.	Monitoring activities	Refer Legend for appropriate marking	
9	Communicate with the driver using a radio, hand signals, etc.	0	Yes
10	Reversing siren, whistle, air-horn on vehicles or another device to warn fellow workers when they are in danger.	0	The alarm has been installed and a mock drill was conducted at the site on 27th June.
11	Flagmen in place with flags and radio fully equipped and completed training?	0	Yes
12	Proper Traffic Management Plan is available and adhered to	0	Yes. Traffic survey is conducted every month. Refer to **Appendix 5**
13	Training and awareness meetings for HIV/AIDs (STI) including the prohibition of drugs/alcohol on construction site.	0	First Heath seminar conducted from 21-23rd March. Second Health awareness campaign conducted on 16th October and 3rd Health Awareness campaign conducted on 30th December 2019.
14	First aid boxes are available and well stocked with bandages, antiseptic, etc. First Aid Register is available	0	Yes
15	Employee register with gender, nationality, skills maintained at the site	0	Yes
16	Visitor Card, Register, Briefing, and Management System adopted	0	Yes
H. ACCOMMODATION REQUIREMENTS			
1	Domestic animals controlled to avoid nuisance?	0	Yes. All construction materials are barricaded and well covered
2	Information board to employees/method notification in the campsite?	0	Yes
Sl. No.	**Monitoring activities**	**Refer Legend for appropriate marking**	
A. OVERALL CONSTRUCTION SITES			
1	Equipment/ Machines in Proper condition and safe	0	Yes
2	First Aid and Medical facilities	0	Yes
3	Any Community / Social Concerns	0	No. Although the project has had a Public consultation meeting on 13th December, and have also gone to neighbouring communities to spread awareness

Sl. No.	Monitoring activities	Refer Legend for appropriate marking	
			about safety when walking or driving around the project site.
4	No encroachment into the farm land/ Settlement	0	No
B. WORK STANDARDS			
1	General work area clean and tidy	0	Yes. Weekly house cleaning conducted by AFCONS and once a month office site cleaning by PIU and PIC.
2	Radio communications (emergency & general), call-up procedures adequate	0	Yes
3	Signage (PPE, safety & restricted access) visible, legible, good condition	0	Yes
4	Adequate signage at workshop yard entrance (e.g. Danger – Deep Excavation, Hazardous & Flammable materials, pressurized gasses, etc)	0	Yes
C. WORK ENVIRONMENT			
1	Stockpiles & materials stacked and maintained in a safe condition	0	Yes
2	Adequate lighting on-site, covered storage areas, vehicle maintenance pit	0	Yes
3	Segregated work areas and signage adequate (direction, warnings)	0	Yes
4	Dust control measures adequate (water truck & sprinklers, if necessary)	0	Checklist of sprinkler truck deployment is maintained by the driver
D. HAZARDOUS SUBSTANCES OR DANGEROUS GOODS			
1	Fuel storage tank within sealed area & bonded (inside wall in case of a spill)	0	Sealed tanks are well stored, and unsealed tanks have trays or tarpaulin below
2	Workers exposed to hazardous substances trained, adequate instruction provided	0	Yes
3	Health/ Safety surveillance is undertaken where appropriate	0	Yes
4	Material safety data sheet available for hazardous substances		Yes
E. TOILETS AND KITCHEN			
1	Offices, Toilets, and washrooms maintained in a sanitary condition	0	Women's restrooms are installed with a waste bin for disposal of sanitary pads.
2	Toilets, Septic Tanks and Soak Pits being used properly and cleaned regularly	0	Yes. Tanks and soak pits at the workers camp and project office is being cleaned every month. Tanks at the project sites are being cleaned every week.
3	Properly labelled garbage bins installed around the kitchen & other areas and emptied regularly	0	Yes
4	Is the garbage in good management and disposed to the Thromde collection system?	0	Approx 1.79 Metric tons of dry waste was generated. 6

Sl. No.	Monitoring activities	Refer Legend for appropriate marking	
			trips of solid waste trucks was completed by the Phuentsholing Thromde
5	Soak pits are proper, covered, with no overflow?	0	No overflow
6	Kitchen sewage/waste disposed of in infiltration pits, with ACF, closed system?	0	Approx1.83 Metric tons of degradable waste was generated. 6 trips of the solid waste truck and 3 trips of sewage sludge was made by Phuentsholing Thromde
7	Adequate water supply for washbasin & flush toilets?	0	Yes. Water tankers at project sites are refilled every morning and as and when needed.
F. DUST & SMOKE			
1	No visible dust clouds from excavation/levelling activity.	0	No
2	No burning of wastes	0	Not at the project site, but there was burning of tires near NHDCL colony and from workshops located along the project site
3	Waste bins facilities are available at the site	0	Blue- Degradable and Green- Non-degradable
G. GENERAL HEALTH AND SAFETY DURING CONSTRUCTION			
1	All workers trained in safety and hygiene at work? (Records)	0	Yes
2	Site supervisors/ safety officer gives weekly toolbox talks to reinforce training to all the labourers?	0	Total of 26 toolbox talks conducted this month
3	Equipment (backhoe etc.), machines, and vehicles are in proper condition with details of registration- emission certificate/ fitness certificates.	0	Yes
4	Workers equipped with PPE such as hard hats, eye and protection, ear protection, gloves, safety- shoes, and respirators	0	Contractors are handing out violation slips to workers who refuse to comply
5	High visibility clothing, including a vest to avoid “collision” in work area	0	Yes
6	Warning signs in place to shield workers from passing vehicle and segregation such as traffic cone and barrels	0	Yes
7	Fencing/ Markers installed on all areas such as excavation, concreting, and side of temporary work/pits greater than 1m deep	0	Yes
8	Information for workers and adequate awareness working near construction vehicles & equipment the operator/ driver knows where the persons are located?	0	Yes
9	Communicate with the driver using a radio, hand signals, etc.	0	Yes
10	Reversing siren, whistle, air-horn on vehicles or another device to warn fellow workers when they are in danger.	0	The alarm has been installed and a mock drill was conducted at the

Sl. No.	Monitoring activities	Refer Legend for appropriate marking	
			site on 27th June.
11	Flagmen in place with flags and radio fully equipped and completed training?	0	Yes
12	Proper Traffic Management Plan is available and adhered to	0	Yes. Traffic survey is being conducted.
13	Training and awareness meetings for HIV/AIDs (STI) including the prohibition of drugs/alcohol on construction site.	0	Conducted from 21-23rd March
14	First aid boxes are available and well stocked with bandages, antiseptic, etc. First Aid Register is available	0	Yes
15	Employee register with gender, nationality, skills maintained at the site	0	Yes
16	Visitor Card, Register, Briefing, and Management System adopted	0	Yes
H. ACCOMMODATION REQUIREMENTS			
1	Domestic animals controlled to avoid nuisance?	0	Yes. All construction materials are barricaded and well covered
2	Information board to employees/method notification in the campsite?	0	Yes

Legend: 0– No significant concern; √ Environmental or Safety concern, action to be taken. Non-Conformance or Photo was taken: yes ☑ no☒

Appendix 11: Compliance with Loan and Grant Covenants

Reference Section	Covenant	Status of Compliance
Project agreement CDCL		
Section 2.04	CDCL shall carry out the Project in accordance with plans, design standards, specifications, work schedules and construction methods acceptable to ADB. CDCL shall furnish, or cause to be furnished, to ADB, promptly after their preparation, such plans, design standards, specifications and work schedules, and any material modifications subsequently made therein, in such detail as ADB shall reasonably request.	Being complied with
Section 2.08.	(a) CDCL shall (i) provide its annual financial statements prepared in accordance with financing reporting standards acceptable to ADB; (ii) have its financial statements audited annually by independent auditors whose qualifications, experience and terms of reference are acceptable to ADB, in accordance with auditing standards acceptable to ADB; (iii) as part of each such audit, have the auditors prepare the auditors' opinion(s) on the financial statements; and (iv) furnish to ADB, no later than 1 month after approval by the relevant authority, copies of such audited financial statements and auditors' opinion(s), all in the English language, and such other information concerning these documents and the audit thereof as ADB shall from time to time reasonably request.	Audited report form 2018 submitted to ADB on December, 2019. Audit report for 2019 will be submitted by June 2020.
Section 2.14.	CDCL shall promptly notify ADB of any proposal to amend, suspend or repeal any provision of its constitutional documents, which, if implemented, could adversely affect the carrying out of the Project or the operation of the Project facilities. CDCL shall afford ADB an adequate opportunity to comment on such a proposal prior to taking any affirmative action thereon.	Being complied with
Section 2.15.	Within 6 months after the Effectiveness Date, CDCL shall create a Project website to disclose information about various matters on the Project, including procurement. With regard to procurement, the website shall include information on the list of participating bidders, name of the winning bidder, basic details on bidding procedures adopted, amount of contract awarded, the list of goods/services procured, and the process for handling complaints related to contracts and procurement.	Being complied with
Project agreement DHI		
Section 2.04.	(a) DHI shall furnish to ADB all such reports and information as ADB shall reasonably request concerning (i) the Financings and the expenditure of the proceeds thereof; (ii) the items of expenditure financed out of such proceeds; (iii) the Project; (iv) the administration, operations and financial condition of DHI; and (v) any other matters relating to the purposes of the Financings. (b) Without limiting the generality of the foregoing, DHI shall furnish to ADB periodic reports on the execution of the Project and on the operation and management of the Project facilities. Such reports shall include updates on implementation of the SAP. Such reports shall be submitted in such form and in such detail and within such a period as ADB shall reasonably request, and shall indicate, among other things, progress made and problems encountered during the period under review, steps taken or proposed to be taken to remedy these problems, and proposed program of activities and expected progress during the following period.	Being complied with
Section 2.05	(a) DHI shall (i) maintain separate accounts and records for the Project; (ii) prepare annual financial statements for the Project in accordance with financial reporting standards acceptable to ADB; (iii) have such financial statements	Being complied with

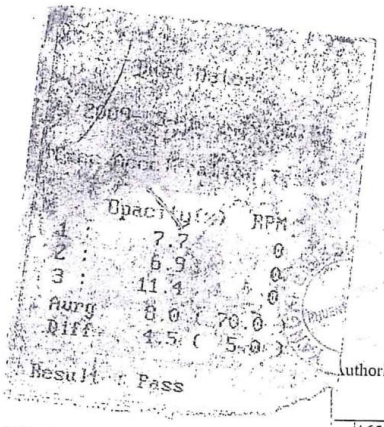
	audited annually by independent auditors whose qualifications, experience and terms of reference are acceptable to ADB, in accordance with auditing standards acceptable to ADB; (iv) as part of each such audit, have the auditors prepare a report, which includes the auditors' opinion(s) on the financial statements and the use of the Financings proceeds, and a management letter (which sets out the deficiencies in the internal control of the Project that were identified in the course of the audit, if any); and (v) furnish to ADB, no later than 6 months after the close of the fiscal year to which they relate, copies of such audited financial statements, audit report and management letter, all in the English language, and such other information concerning these documents and the audit thereof as ADB shall from time to time reasonably request. (b) ADB shall disclose the annual audited financial statements for the Project and the opinion of the auditors on the financial statements within 14 days of the date of ADB's confirmation of their acceptability by posting them on ADB's website. (c) In addition to annual audited financial statements referred to in section (a) hereinabove, DHI shall (i) provide its annual financial statements prepared in accordance with financing reporting standards acceptable to ADB; (ii) have its financial statements audited annually by independent auditors whose qualifications, experience and terms of reference are acceptable to ADB, in accordance with auditing standards acceptable to ADB; (iii) as part of each such audit, have the auditors prepare the auditors' opinion(s) on the financial statements; and (iv) furnish to ADB, no later than 1 month after approval by the relevant authority, copies of such audited financial statements and auditors' opinion(s), all in the English language, and such other information concerning these documents and the audit thereof as ADB shall from time to time reasonably request. (d) DHI shall enable ADB, upon ADB's request, to discuss the financial statements for the Project and DHI and its financial affairs where they relate to the Project with the auditors appointed by DHI pursuant to subsections (a)(iii) and (c)(i) hereinabove, and shall authorize and require any representative of such auditors to participate in any such discussions requested by ADB. This is provided that such discussions shall be conducted only in the presence of an authorized officer of DHI unless DHI shall otherwise agree.	
Loan Agreement		
Section 3.01(b)	Loan to be applied exclusively to the financing of expenditures on the Project in accordance with the provisions of this Loan Agreement and the Project Agreement.	Being complied with
Section 3.03	The Borrower shall procure, or cause to be procured, the items of expenditure to be financed out of the proceeds of the Loan in accordance with the provisions of Schedule 4 to this Loan Agreement.	Being complied with
Section 4.03	The Borrower shall take all actions which shall be necessary on its part to enable DHI and CDCL to perform their respective obligations under the Project Agreements, and shall not take or permit any action which would interfere with the performance of such obligations.	Being complied with
Schedule 4, para. 2	Works shall be procured and Consulting Services shall be selected and engaged only on the basis of the procurement methods and the selection methods set forth below. These methods are subject to, among other things, the detailed arrangements and threshold values set forth in the Procurement Plan. The Borrower may only modify the procurement methods and the selection methods or threshold values with the prior agreement of ADB, and modifications must be set out in updates to the Procurement Plan.	Being complied with
Schedule 4, para. 5	DHI shall not award any Works contract which involves environmental impacts until: (a) The Borrower's National Environment Commission has granted the final approval of the EIA; and (b) DHI has incorporated the relevant provisions from the EMP into the Works	Being complied with a) Being complied with, NEC approved the EIA

	contract.	b) C-EMP for CW-01 approved end January 2019.
Schedule 4, para. 10	Contracts procured under international competitive bidding procedures and contracts for Consulting Services shall be subject to prior review by ADB unless otherwise agreed between the Borrower and ADB and set forth in the Procurement Plan.	Being complied with
Schedule 5, para. 1	The Borrower, DHI and CDCL shall ensure that the Project is implemented in accordance with the detailed arrangements set forth in the PAM. Any subsequent change to the PAM shall become effective only after approval of such change by the Borrower and ADB. In the event of any discrepancy between the PAM and this Loan Agreement, the provisions of this Loan Agreement shall prevail.	Being complied with
Schedule 5, para. 2	The Borrower shall ensure that DHI and CDCL employ sufficient staff for the PMU and PIU for the duration of the project, with adequate and relevant expertise in the field of project management, financial management, engineering, procurement, and environmental and social safeguards implementation. The PMU Project Director and PIU Project Manager shall hold the position not less than the rank of Class 1 engineer, or equivalent, Officers, unless otherwise acceptable to ADB.	Being complied with
Schedule 5, para. 3	The Borrower, DHI and CDCL shall (a) ensure that the majority of counterpart staff assigned to the PMU and PIU are assigned to the Project on a full-time basis; and (b) undertake best efforts to ensure that they remain in their positions for a reasonable period of time, and that staff replacements do not unduly disrupt implementation of the Project. The Borrower, DHI and CDCL shall provide ADB reasonable opportunity to comment on any proposed appointment of persons to key positions in the PMU and PIU, including the Project Director for the PMU and the Project Directors for PIU.	Being complied with
Schedule 5, para. 4	The Borrower shall cause DHI and CDCL to give full, timely and efficient cooperation in issuing any licenses, permits or approvals required in connection with infrastructure work. The Borrower shall also ensure that Bhutan Power Corporation and Bhutan Telecom will provide the necessary connections in the developed areas.	Being complied with for CW-01 works To be complied with at end of the construction stage
Schedule 5, para. 5	Within 36 months of the Effective Date, the Borrower through DHI shall develop and finalize, and ensure approval by the relevant government agency and implementation of, the SAP, which shall include, among other matters: (i) the required legal, policy and operational frameworks for operation of the new township that will establish institutional arrangements for sustainable township management, including the required approval process, and the allocation of roles and responsibilities between the municipality and CDCL; (ii) the allocation of sufficient municipal and CDCL human resources; (iii) a plan on the development of the surrounding area adjacent to the newly developed township, including plans for raising grounds level for the protection for surface flooding; and (iv) a time-bound plan for the operation and maintenance of the newly developed township.	To be complied with for 2021 Q2
Schedule 5, para. 6 (Environment)	The Borrower shall ensure or cause DHI and CDCL to ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with (a) all applicable laws and regulations of the Recipient relating to environment, health and safety; (b) the Environmental Safeguards; and (c) all measures and requirements set forth in the EIA and the EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	Being complied with
Schedule 5, paras. 7 and 8 (Land Acquisition and Involuntary Resettlement)	The Borrower shall ensure that all land and all rights-of-way required for the Project are made available to the Works contractor in accordance with the schedule agreed under the related Works contract. The Borrower shall ensure that the Project does not involve any involuntary resettlement impacts within the meaning of the SPS. In the event the Project involves any such impacts, the Borrower shall take all steps required to ensure that the Project complies with the applicable laws and regulations of the Borrower and with the SPS.	Being complied with
Schedule 5, para. 9 (Indigenous Peoples)	The Borrower shall ensure that the Project does not involve any indigenous peoples' impacts within the meaning of the SPS. In the event the Project involves any such impacts, the Borrower shall take all steps required to ensure that the Project complies with the applicable laws and regulations of the Borrower and with the SPS.	Being complied with
Schedule 5, para.	The Borrower shall ensure that the core labor standards and the Borrower's applicable laws and regulations are complied with during Project implementation.	Being complied with

10	The Borrower shall include specific provisions in the bidding documents and contracts financed by ADB under the Project requiring that the contractors, among other things: (a) comply with the Borrower's applicable labor law and regulations and incorporate applicable workplace occupational safety norms; (b) do not use child labor; (c) do not discriminate workers in respect of employment and occupation; (d) do not use forced labor; (e) allow freedom of association and effectively recognize the right to collective bargaining; and (f) disseminate, or engage appropriate service providers to disseminate, information on the risks of sexually transmitted diseases, including HIV/AIDS, to the employees of contractors engaged under the Project and to members of the local communities surrounding the Project area, particularly women. The Borrower shall strictly monitor compliance with the requirements set forth above and provide ADB with regular reports.	
Schedule 5, para. 11	The Borrower shall ensure that the principles of gender equality aimed at increasing Project benefits and impact on women in the Project area are followed during the implementation of the Project. These include (a) equal pay to men and women for work of equal value; (b) enabling working conditions for women workers, and (c) taking necessary actions to encourage women living in the Project area to participate in the design and implementation of Project activities.	Being complied with
Schedule 5, para. 12	The Borrower shall make available, or cause DHI and CDCL to make available, necessary budgetary and human resources to fully implement the EMP.	Being complied with
Schedule 5, para. 13	The Borrower shall ensure, or cause DHI and CDCL to ensure, that all bidding documents and contracts for Works contain provisions that require contractors to: (a) comply with the measures relevant to the contractor set forth in the EIA and the EMP (to the extent they concern impacts or affected people during construction), and any corrective or preventative actions set forth in a Safeguards Monitoring Report; (b) make available a budget for all such environmental and social measures; (c) provide the Borrower with written notice of any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the Project that was not considered in the EIA and the EMP; (d) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and (e) reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.	a) Being complied with b) Being complied with c) Being complied with d) Being complied with e) to comply and end of works (2021 Q1)
Schedule 5, para. 14	The Borrower shall do the following: (a) submit bi-annual Safeguards Monitoring Reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission; (b) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that was not considered in the EIA and the EMP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; (c) no later than six months of the Effective Date, engage qualified and experienced external experts or qualified NGO[s] under a selection process and terms of reference acceptable to ADB, to verify information produced through the Project monitoring process, and facilitate the carrying out of any verification activities by such external experts; and (d) report any actual or potential breach of compliance with the measures and requirements set forth in the EMP promptly after becoming aware of the breach.	a)Being complied with b) Being complied with c) Being complied with d) Being complied with
Schedule 5, para. 16	The Borrower through DHI will provide all counterpart funds, land and facilities required for timely and effective implementation of the Project, including without limitation, any funds required to (a) to meet any shortfall between cost and revenues for the operation and maintenance of the facilities developed under the Project, (b) to mitigate any unforeseen environmental and social impacts, and (c) to meet additional costs arising from design changes, price escalation in construction costs and/or unforeseen circumstances. The Borrower will make the resources thus required available on an annual basis for each fiscal year. In addition to the foregoing, the Borrower shall ensure that DHI and CDCL have sufficient funds to satisfy their liabilities arising from any Works and/or Consulting Services contract.	Being complied with

Schedule 5, para. 18	The Borrower, DHI and CDCL shall ensure that the anti-corruption provisions acceptable to ADB are included in all bidding documents and contracts, including provisions specifying the right of ADB to audit and examine the records and accounts of the executing and implementing agencies and all contractors, suppliers, consultants, and other service providers as they relate to the Project.	Complied with for CW-01. To comply with CW02, 03, 04 & 05
Schedule 5, para. 19	The Borrower shall develop and implement a program for regular and periodic maintenance of the facilities to be financed by the Project in accordance with international best practices acceptable to ADB, and make adequate resources available, through budgetary allocations or otherwise, for this purpose.	To be complied with one year before operating of every infrastructure
Grant Agreement		
Section 3.01	The Recipient shall make the proceeds of the Grant available to CDCL under the Subsidiary Financing Agreement upon terms and conditions satisfactory to ADB and shall ensure the smooth implementation of the Project and that such proceeds are applied to the financing of expenditures on the Project in accordance with the provisions of this Grant Agreement and the Project Agreements.	Being complied with
Section 4.02	The Recipient shall enable ADB's representatives to inspect the Project, the Goods and Works, and any relevant records and documents.	Being complied with

Appendix 12: Emission Test Certificate for Vehicles



YANGKI AUTO EMISSION CENTER

Government Approved Agency

YANGKI AUTOMOBILES

P.O. Box 384

VEHICLE EMISSION CERTIFICATE

Authorized by Royal Government of Bhutan Vide letter No. RSTA/RS-12/2016/2231-36

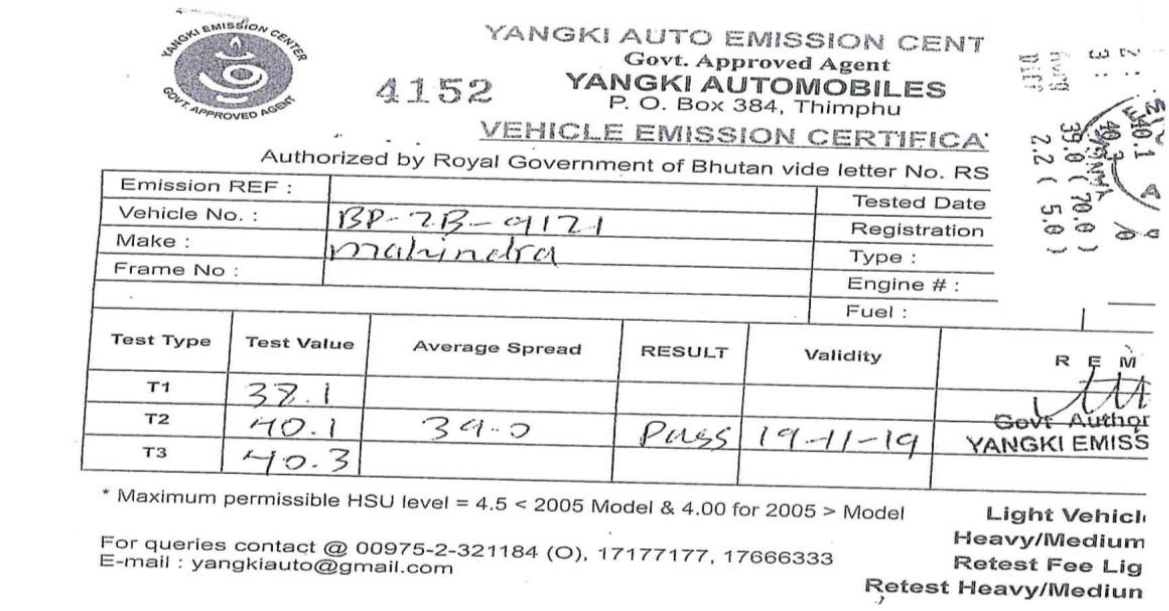
	165414	Tested Date	26/10/2018
Vehicle #	BP-2-B9820	Registration Date	26/10/2018
Make	Mahindra	Type	Light Vehicle
Chassis #	MA1RC2VK2J36880	Engine #	VKJ4J11883
		Fuel	Diesel

Test Type	Test Value	Average/Spread	Result	Validity	Remarks
T1	7.7	8	PASS	26/10/2019	
T2	6.9				
T3	11.4				
				Amount (Nu)	150.00

Maximum permissible HSU level = 75% for < 2005 Model & 70% for 2005 > Model

For queries contact @ 17666333 / 17177177, Email : yangkiauto@hotmail.com

Authorized Signatory



YANGKI AUTO EMISSION CENT
Govt. Approved Agent
4152 YANGKI AUTOMOBILES
P. O. Box 384, Thimphu

VEHICLE EMISSION CERTIFICA

Authorized by Royal Government of Bhutan vide letter No. RS

Emission REF :		Tested Date	
Vehicle No. :	BP-7B-9171	Registration	
Make :	Mahindra	Type :	
Frame No :		Engine # :	
		Fuel :	

Test Type	Test Value	Average Spread	RESULT	Validity	REM
T1	37.1				
T2	40.1	39.0	Pass	19-11-19	Govt Author
T3	40.3				YANGKI EMISS

* Maximum permissible HSU level = 4.5 < 2005 Model & 4.00 for 2005 > Model

For queries contact @ 00975-2-321184 (O), 17177177, 17666333
E-mail : yangkiauto@gmail.com

Light Vehicl
Heavy/Medium
Retest Fee Lig
Retest Heavy/Mediun

Dust Meter

2009-12- 2 21:59:39

Free Acceleration Test

Opacity(%)
1 : 40.1
2 : 37.3
3 : 37.1
Avrg 38.0 (70.0)

Result : Pass

YANGKI AUTO EMISSION CENTRE

YANGKI AUTO EMISSION CENTER

Government Approved Agency

YANGKI AUTOMOBILES

P.O. Box 384

VEHICLE EMISSION CERTIFICATE

thorized by Royal Government of Bhutan Vide letter No. RSTA/RS-12/2016/2231-36

EMISSION REF #	215108		Tested Date		24/07/2019
Vehicle #	BP-2-B0893		Registration Date		17/06/2011
Make	Mahindra		Type		Light Vehicle
Chassis #	MA1SS2BKCB2E80375		Engine #		BKB4E11250
			Fuel		Diesel
Test Type	**Test Value**	**Average/Spread**	**Result**	**Validity**	**Remarks**
T1	40.1	38	PASS	24/07/2020	
T2	37.3				
T3	37.1				
				Amount (Nu)	**150.00**

Maximum permissible HSU level = 75% for < 2005 Model & 70% for 2005 > Model

For queries contact @ 17666333 / 17177177, Email : yangkiauto@hotmail.com

Govt. Authorized Agent

YANGKI EMISSION CENTRE

Authorized Signatory

Appendix 13: Input Schedule for Independent Environmental Monitoring Expert

Provisional intermittent Input Schedule for Independent Environmental Monitoring Expert for the period July 2019 to July 2024

The schedule has been worked out as per contract agreement of 4 April 2019 signed between Construction Development Corporation Limited (CDCL) and Lam Dorji, Centre for Environment and Development

Intermittent input schedule

YEAR	MONTHS	
	January (Input days)	**July (Input days)**
2019	-	14 -31
2020	20 Jan – 5 Feb	15 -31
2021	15 - 31	15 -31
2022	15 - 31	15 -31
2023	15 - 31	15 -31
2024	15 - 31	15 -31

Total provision as per contract: 208 days

Provisional breakdown of each input:

Activities	Estimated Input (days)
Beginning of input meeting with PIU, PIC and Environment Officer; preparation and confirmation of schedule with Environment Officer, PIU	1
Field visits, inspections and Consultation/ meetings with concerned officials and stakeholders	5
Review and comments on recent SEMR	2
Environmental Audit Report writing	5
End of input meeting with PIU	1
Final Report: Incorporation of comments and feedback on Final Draft	1

Appendix 14: Health Briefing Attendance Sheet

Appendix A: Attendance sheet

	PHUENTSHOLING TOWNSHIPSHIP DEVELOPMENT PROJECT (PDTP), BHUTAN HSE TRAINING	Doc No. :HSEF/6462 /05-C Date: 30/12/19 Rev No: 0

Topics: Health Briefing / Health Awareness Session
Conducted By: Mr. Kelzang Jigme

Sr no	Name	Designation	Signature
1.	Ugyen Thinley	Intern	
2.	Sangay Choden	"	
3	Tshering Dema	"	
4.	Sangay Choeda	Asst Instructor	
5.	Karma Yangchen Tamang	Intern	
6	Leela Devi Ghalley		
7.	Saijana Pokhrel	"	
8.	Manju Sara Bohol	"	
9	Kiran Chhetri	Intern	
10.	Kinzang Thinley	Intern	
11.	Satyam Subba	"	
12.	Kavita Apna G	Engg	
13.	Hemanta Kumari Lama	AutoCAD Draughtsman	
14	Chechung Zangmo	Weight Bridge Op	
15	Nyanang Dema	Store asst	
16	Dema	Civil Supervisor	
17	Thinley Wangmo	HSE Supervisor	
18	Sarita Sinchuri	Safety	
19	Sangay Dema		
20	Yeshey Wangdi	CDCL	
21.	Vinit Mokashi	Afcons	
22.	Kinley Yangzom	Afcons	
23	Ashish Kumar	Afcons	

AFCONS	PHUENTSHOLING TOWNSHIPSHIP DEVELOPMENT PROJECT (PDTP), BHUTAN HSE TRAINING	Doc No. :HSEF/6462 /05-C Date: [illegible] Rev No: 0

Topics: Health Awareness Session
Conducted By: Mr. Kelzang Jigme

Sr no	Name	Designation	Signature
1	Sonam Dorji	Trainee/Intern	[signature]
2	Phuntsho Wangmo		[signature]
3	[illegible]	Intern	[signature]
4	Lobzang Dorji	Intern	[signature]
5	[illegible]	"	[signature]
6	[illegible]	"	[signature]
7	Tenzin Yangden	"	[signature]

Appendix 15: Photographs album

Appendix 15.1: Visitors and Particular Occasions

His majesty's secretariat office visit

MoWHS secretary visit

ADB's Mission in Timphu (May 2019)– Meeting & Presentation

ADB's Mission in PTDP Project – Site Visit

ADB's Mission in Phuentsholing – Meeting in Thromde office

HCP design consultancy site visit and meeting

DHI CEO site visit

MoEA minister's site visit

Helvetas team site visit

Monthly coordination meeting within PIU, PIC and CW01

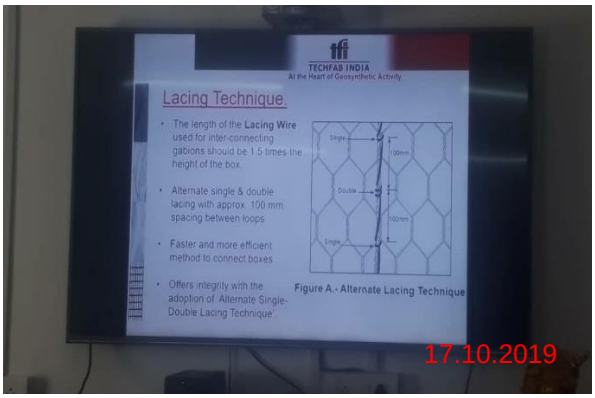
Disaster team site visit with Phuentsholing Thrompon

Director, Department of forest visit and meeting

Engineers day celebration at AFCONS mess hall

Prime Minister's site visit along with officials

Minister and officials visit from Ministry of Home and Culture affairs



Gabion wire crates presentation by TechFab India

ADB mission (Oct-Nov 2019) site visit

DHI Board Directors site visit at PTDP

Stakeholders site visit (MoF, DRC, DES, Phuentsholing Thromde, PCR, CDCL) on 30th of November 2019

Tender opening for BMBMS

Minister site visit, MoAF

Stake Holders Consultation meeting

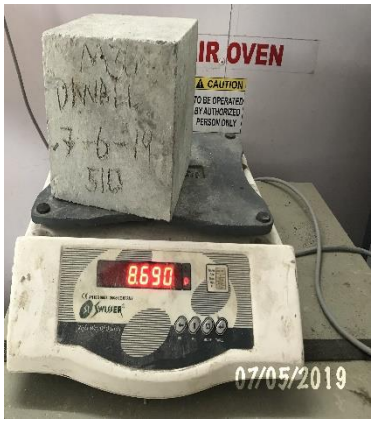
Royal Audit Authority site visit and meeting

Appendix 15.2: Work progress

- **Site laboratory Test**

Cement initial and final setting time

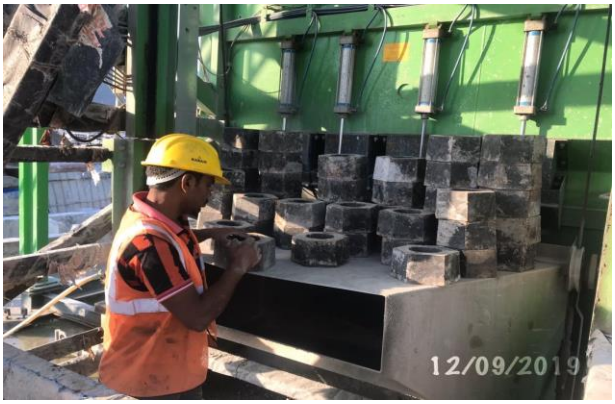
Silt content test



Concrete cube blocks testing for compressive strength

MDD test at site lab

Specific gravity test for coarse aggregate



Batching plant calibration

Coarse aggregate Impact value test

Elongation and flakiness test

Fine aggregate gradation test

Coarse aggregate gradation test

Earth filling works

Removal of unsuitable materials before earth filling work

Dumping and Spreading for earth filling work

Compacting the earth fill

OMC test after compaction

GUIDE WALL

Guide wall work: Excavations and formwork preparations for vertical wall

Guide wall work: Concreting the vertical wall

Guide wall work: Formwork and concreting for the top flange

Guide wall concreted

DIAPHRAGM WALL

Diaphragm wall excavation works

Sounding check after excavation works

Bentonite density test

Bentonite viscosity test

Bentonite pH test

Stop end installation

Rebar cage installations

PVC Weep holes installation

Slump test before concreting

Concreting the Diaphragm wall panel

Concreting the Diaphragm wall panel

Concreted panel top level check

CAST IN SITU WALL

Rebar arrangement for cast in situ wall

Rebar arrangement and level check for cast in situ wall

Preparing for formwork installation

Slump test before concreting

Concreting the cast in-situ wall panel

Concreting the cast in-situ wall panel

Using vibrator for concrete compaction

Removal of formwork for concreted panel of cast in-situ wall

Concreted panel of cast in-situ wall

PRECAST BLOCKS

Formwork preparation for precast blocks

Slump test before pouring concrete

Concrete pouring into formwork

Using vibrators for compaction of concrete

Finishing works

Removal of formworks

Curing of the precast blocks for 28 days

Stacking of precast blocks after curing

OUTFALL WORKS: OPEN OUTFALL 2

Excavations and PCC laying for the outfall structures

Concreted ducted portion of the Outfall structures

Reinforcement preparations for the open portion of outfall

Formwork installations, concreting and removal of formworks

OUTFALL WORKS: OPEN OUTFALL 3

Reinforcement arrangements, concreting and formworks for ducted portion

Concreted ducted structures and dewatering after heavy rainfall

TEMPORARY FLOOD PROTECTION

Mould preparation for concrete cube blocks

Concreting the blocks

Curing the blocks at site

Placing of concreted blocks for river protection

Two spurs infront of Existing big bund

Concrete blocks for flood protection

Concrete blocks at scourage area

Concrete blocks washed away during a heavy rain fall

Spurs at end termination at PART-8

Channel at hill side near NHDCL colony

Hume pipe above the Staff quarter and below the NHDCL colony

Appendix 15.3: Health Safety and Environment

HEALTH AND SAFETY

Fire Mock Drill to all the staff

Road safety briefing to the drivers

PPE briefings to the engineers

Briefing on lifting and rigging safety

Boats kept ready in case of flooding

Net installation on windows at workers camps

Fogging for prevention of dengue and malaria

Dengue information sharing session

Safety Award day

Earthquake mock drill

Earthquake information briefing

Hazard identification and risk assessment workshop

Accident incident and investigation workshop

Briefing session about the Importance of PPE

Briefing session about the waste management

Health and safety code of conduct training to Intern students from Colleges

Hazard identification and risk assessment briefing

Personal protective equipment's briefing

Health awareness session

ENVIRONMENT

Terrestrial survey

Aquatic survey

Surface water testing sample collection

Surface water test sampling

Cleaning campaign near the office by all the staff

Water level checking in the Amochhu river

Ground contamination control being done at the workshop area

Air monitoring and noise monitoring devices

Monthly terrestrial walk through

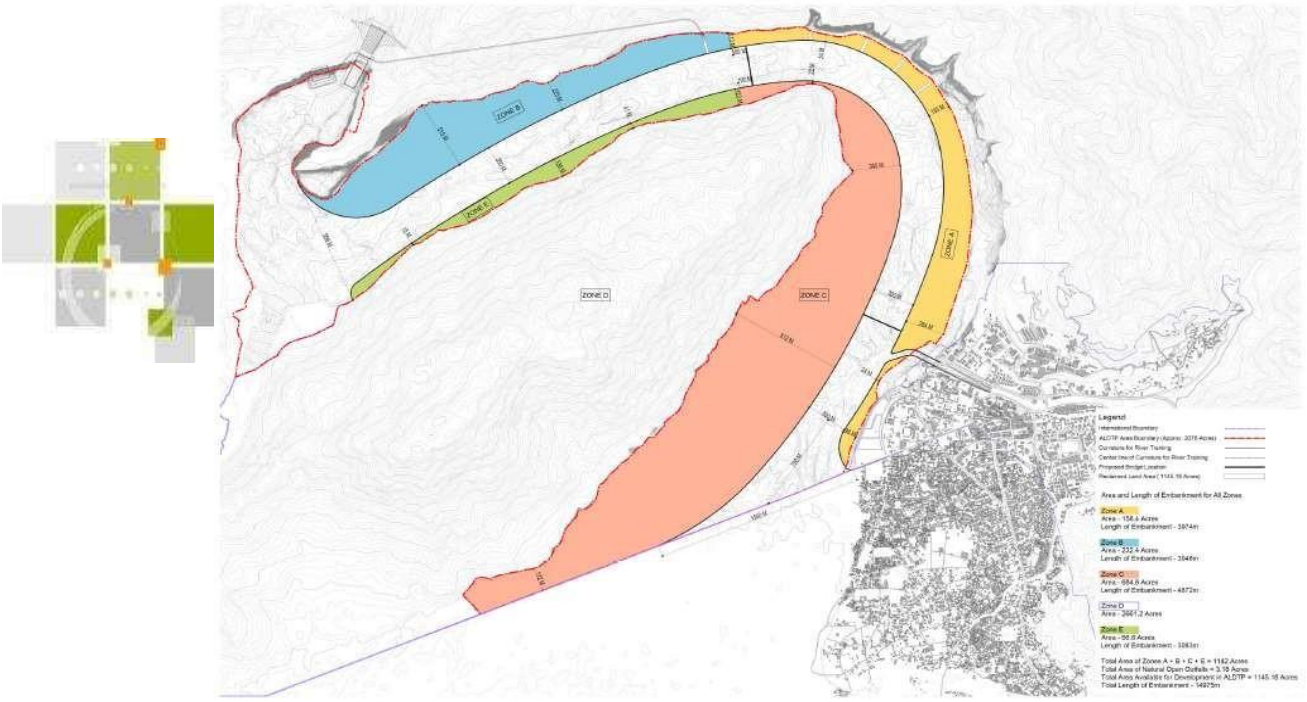
Ground contamination control

Asian Development Bank	(CDCL)	Kingdom of Bhutan

Phuentsholing Township Development Project

Project Number: 50165-002
Loan Number: 3668-BHU (COL)
Grant Number: 0573-BHU (SF)
Contract N°: PTDP-PIC-1

Project Implementation Consultant (PIC)
Risk Management Plan
[PIC Report Cataloguing N° PTDP - 046 - 15 January 2020]



egis | Gyaltshen Consultancy

Phuentsholing Township Development Project
Project Implementation Consultant
PIC Site Office, Near NHDCL Housing Colony
Amochu, Phuentsholing, Chukha

Document Quality Information

General Information

Author(s)	Mehmet Kahraman
Projects Name	Phuentsholing Township Development Project
Document Name	Risk Management Plan
Date	15 January 2020
Reference	Version 02

Addressee(s)

Sent to:		
Name	**Organisation**	**Sent on (date):**
Kamal Dhakal	Project Manager, PIU, CDCL	15 January 2020

Copy to:		
Name	**Organisation**	**Sent on (date):**
Nicolas Morrice	Project Director, Egis International	15 January 2020

History of modifications

Version	**Date**	**Written by**	**Approved by**
Version 01 (Draft)	20 May 2019	Robert Jeancenelle	
Version 02	15 January 2020	Mehmet Kahraman	

Contents

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List of Figures

Abbreviations and Acronyms

ADB	Asian Development Bank
PTDP	Phuenthsoling Township Development Bank
CDCL	Construction Development Corporation Limited
DD	Detailed Design
DHI	Druk Holdings and Investments Ltd
DMF	Design and Monitoring Framework
C-EMP	Contractor – Environmental Management Plan
CW	Civil Works
EA	Executing Agency
FIDIC	Federation Internationale des Ingenieurs – Conseil
FMA	Financial Management Assessment
HSE	Health, Safety and Environment
IA	Implementing Agency
ICB	International Competitive Bidding
NCB	National Competitive Bidding
PAM	Project Administration Manual
PIC	Project Implementation Consultant
PIU	Project Implementation Unit
PPTA	Project Preparatory Technical Assistance
PRR	Project Risk Register
QAP	Quality Assurance Plan
RBS	Risks Breakdown Structure
RMP	Risk Management Plan
RSC	Risk Scoring Matrix
SSHP	Safety Security and Health Plan
TOR	Terms of Reference

1. Introduction & Objectives

1.1. Introduction

Construction Development Corporation Limited (CDCL), a subsidiary of Druk Holdings and Investments Ltd. (DHI) is currently managing the development and operations of the Phuentsholing Township Development Project (PTDP).

The Project aims to plan and develop 464 hectares (ha) of riparian land near Phuentsholing Thromde (Municipality) located along both sides of the Amochhu River on Bhutan's south – western border with India.

Implementation of Project will be phased in accordance with demand for Development. Egis International was awarded the contract for the Project Implementation Consultant (PIC) services for Phase 1 of the project.

PTDP Zoning and Phasing is detailed in Table 1 hereafter.

Table 1 - PTDP Zoning and Phasing

Zones	Area (ha)		Riverbank Protection Length (m)	PIC Phase
A	**66 ha**		**3,974**	**PIC Phase 1**
B	94 ha		3,046	Other Phase
C	277 ha		4,872	
D	Kaileshwar Hill – Not included in the project for development			
E	27 ha		3,083	Other Phase

In accordance with the Terms of References (see in **Appendix 1** extract from scope of services), the PIC is required to provide a Risk Management Plan. This document sets out to meet this requirement and recommendations made during the ADB review mission in May 2019.

1.2. Objectives

As per TOR the objective of this document is to present a Risk Management Plan (RMP), as specified in the TOR which has been prepared in coordination with the PIU and Contractors, for this version n°01, with CW-01 AFCONS Contractor.

Risk can be defined as "an undesirable event, with a limited degree of certainty that could have a negative impact in terms of project's timing, budget, quality, safety, performance or objectives".
Then the RMP considers:

a) Risk identification: Determining risks to be considered, and documenting the characteristics of each;
b) Risk quantification: Evaluating risks to assess the range of possible outcomes;
c) Risk response: Defining enhancement steps for opportunities and responses to threats; and
d) Risk response control: Responding to changes in risk over the course of the project.

RMP will assist with proactively identifying potential risks and advising and assisting the PIU to take timely actions to enhance project performance and mitigate any adverse constraints.

The RMP focuses on the time period when PIC supports the PIU, i.e. for the PIC 60 months contract, and for the part of Project in which risk management is pertinent.

Therefore, this document is to be used for the risk management tasks associated with the PIC services:

i) Review of designs, preparation of last bid documents of Phase 1;
ii) Remaining (after PIC mobilization) procurement of civil works contracts for Phase 1;
iii) Additional studies and surveys (financed under provisional items);
iv) Works contracts to be implemented in Phase 1;
v) Preparation of Phase 2 of Project.

2. Risk Management Organization & Roles

2.1. Project Organization

The overall organization for the project is illustrated by Figure 1.

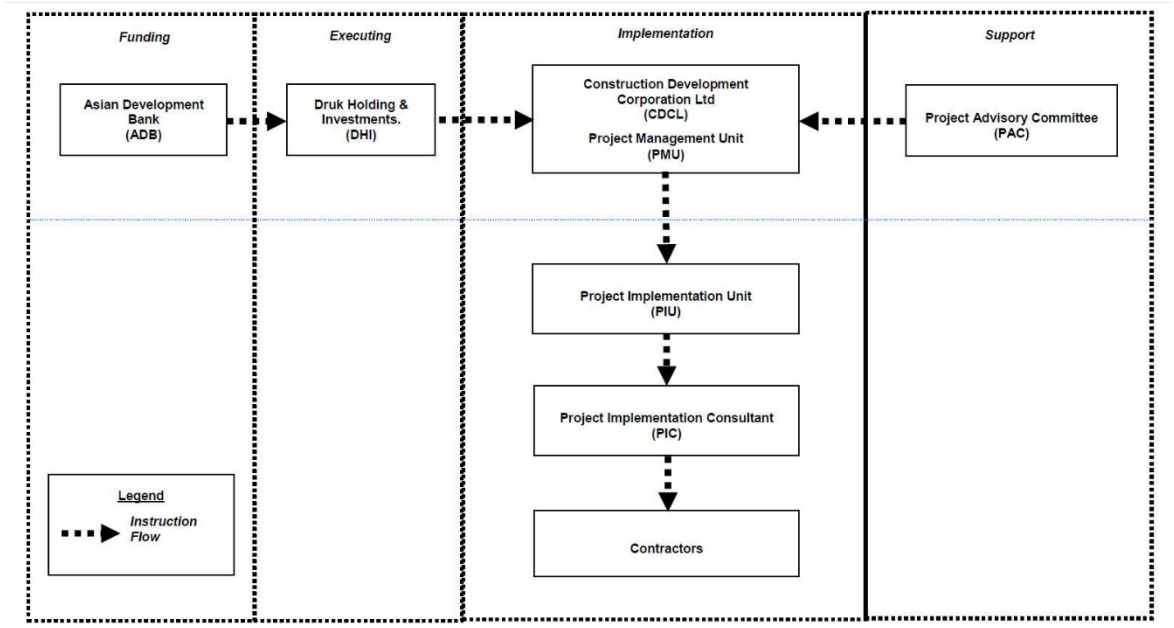

Figure 1 Project Implementation Arrangement

For more detailed references should be made to the Project Administration Manual (PAM).

2.2. Project Risk Management Organization

The project risk management organization is described by Figure 2.

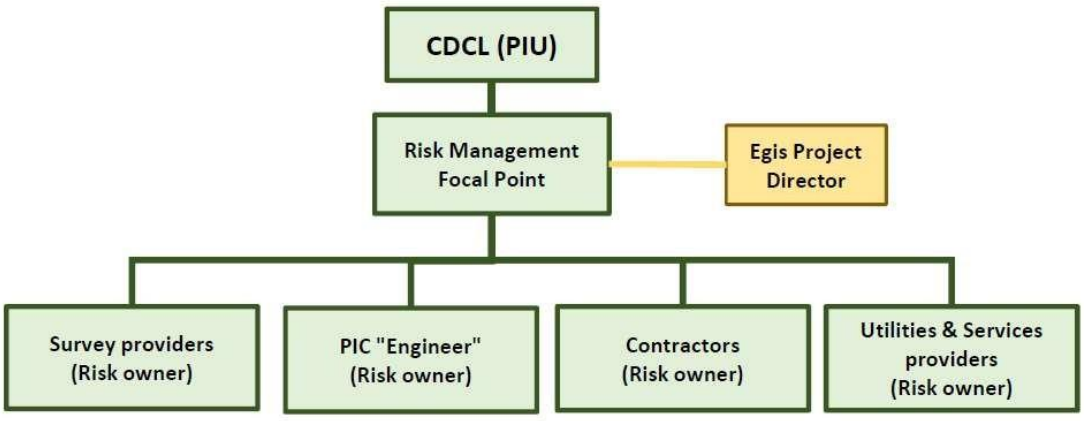

Figure 2 Project Implementation Arrangement

2.3. Egis Project Director

The role of the Project Director is to ensure the delivery of the Project. To this end he is responsible for ensuring that the project risk management procedures are properly implemented.

2.4. Egis Risk Management Focal Point

The role of the Egis Risk Management Focal Point is as follows:

- Establish and maintain the Project Risk Register for PIU and PIC;
- Organize and animate the risk reviews/workshops;
- Regular reporting on risk management issues;
- Monitor the implementation of mitigation and control strategies;
- Assist the risk owners in fulfilling their responsibilities;
- Follow up incident's management.

The Risk Management Focal Point will be managed by the PIC Team Leader

2.5. Risk Owners

Identified risk owners are:

- Borrower (DHI)
- Implementing Agency (CDCL with PIU/PMU)
- PIC (Egis)
- Contractors
- Other entities working on site (Surveys companies, utilities companies, experts and other service providers…)

During construction phase, the most critical risk owners, who must be closely monitored, are the Contractors.

PTDP Phase 1 development comprises four main civil works packages: CW-01, CW-02 (which could be split into several lots), CW-03 and CW-04, consequently the four (or more) Contractors, who are main actors, together with PIC, of Project Risk Management, are:

1. **CW-01 Contractor for River Training and Embankment Protection Components.**
   A single contractor selected under an international competitive bidding (ICB) tendering process, for a sole "Construction package".
2. **CW-02 Contractor(s) for Common Urban Infrastructure Components**
   (water supply, sewerage, roads, solid waste treatments). It should as well a single contractor or several contractors, still selected under an ICB tendering process, butt for a "Design and built" package, or Construction packages based on Lump Sum or Ad Measurement Contracts.
3. **CW-03 & CW-04 Contractors for Power Supply and Telecommunications.**
   At present stage, the type of contracts is still to be clarified as the TOR currently indicated that they are executed through force accounts and implemented by the respective agencies directly coordinated by the PIU.

2.6. Risk Owners

Risk owners are required to Monitor and report on their risks; and subsequently implement the agreed mitigation plans.

Every Risk Owners, in particular Contractors, are required to have a permanent available Risk Correspondent. Usually this task is assigned to the Health Safety and Environment Correspondent (HSE).

3. Risk Management Process

3.1. The Risk Management Process

Risk Management strategy is divided into 6 primary steps (see Figure 3):

- Context Description
- Risk Identification
- Qualitative Risk Analysis
- Quantitative Risk Analysis
- Risk Response Planning
- Risk Monitoring and Control

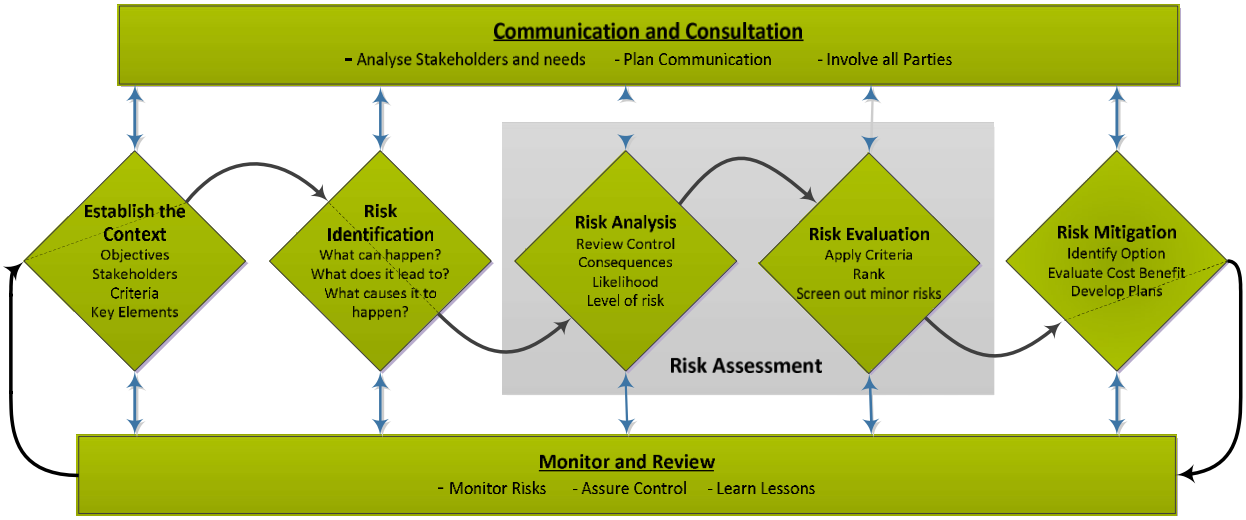

Figure 3 Egis Risk Assessment Process

3.2. Establish the Context

The significant elements of the project context are identified early in the project risk management process so as to provide the present baseline framework for the identification and assessment of risks. The context for the project includes the overall CDCL approach for the Project and Druk Holding and Investment strategic goals for area.

In terms of assessing and reporting on risks, the initial cost and programme baseline are to be those that are presently agreed with the Funding Agency (ADB).

Any changes in the overall context will require to be reflected in the on-going risk identification and monitoring efforts.

3.3. Risk Identification

The identification of potential risks is the key step in the commencement of the risk management process. The initial identification of risks is to be carried out and recorded through risk identification workshops, risk review meetings and observations reported by individuals. In present case initial risk identification has been assessed by PIC following exchanges with Employer and Contractor.

At inception stage, type of risks are grouped in major categories, the standard Risk Breakdown Structure (RBS). The proposed RBS for PTDP is included as **Appendix 2**. The RBS, along with other aids, is used to classify risks on the project.

Then, every identified risk are to be entered into the Project Risk Register (PRR, see **Appendix 4**). Other project reviews, such as design reviews, HSE reviews, and value engineering workshops will be conducted during the lifetime of the project. New critical risks identified during those sessions will be incorporated in the risk register.

Egis Team Leader is responsible to decide about the need to update the Project Risk register, and Egis Deputy Team Leader to implement.

It is to be noted that the identification, assessment and mitigation of Health, Safety and Environmental (HSE) risks, have their own project procedures and system.

But some risks, those which are assessed to have an impact on the overall project cost, programme, and quality, are nevertheless included within the risk management process.

3.4. Risk Analysis & Assessment - Scoring Matrices

Identified risks have been and for new ones, will be, analyzed and assessed, based on their possible impact on:

- Cost
- Programme
- Quality
- Major HSE risks

Guidance on how risks and opportunities are to be qualitatively assessed is provided in the table's support of the Risk Scoring Matrix (RSM).

When appropriate, quantitative assessment techniques may also be used to assess the cost and schedule impacts of identified risks. For quantitative assessments, the project baseline schedule and costs breakdown is used as the reporting benchmark.

The risk scoring and its tables support are included in **Appendix 3.**

3.5. Mitigation of Risks

Risk mitigation plans will be developed using the following possible strategies:

Table 2 - Risk Mitigation Strategies

Risk Mitigation Strategies	
Strategy	**Definition**
Avoidance	Refusing the risk consist in not performing the action that generates the risk to the project.
Mitigate the Risk	This Strategy includes three options: - Neutralize the risk source by preventive actions (Situation, behavior, technical changes...) - Reduce risk consequences by curative actions (Protect, insure.) - Change the probability by reducing exposure frequency and improving system reliability.
Transfer/Share the Risk	The risk can be transferred in whole or in part to the partner, a third party or an insurer.
Acceptance of the Risk	No specific action is defined for the risk other than monitoring.

The chosen strategy for major identified risks will be developed by way of a specific mitigation action plan. For minor identified risks, there is no specific mitigation plan, and straight forward mitigation measures are documented by way of entries in the Risk Register.

A project risk register is established to record, and track identified risks and mitigation strategies. The template for the risk register is included as **Appendix 4**. The risk are grouped into the categories listed within the Risks Breakdown Structure. For every mitigation measure proposed the entity in charge of implementing the measure is included.

For every newly risk identified, a Risk Record Sheet as per Appendix 5 must be filled.

The development of specific risk mitigation will take account of the need to consider the estimated cost of the mitigation action relative to the probable benefit from the resulting risk reduction.

3.6. Monitoring of Risks

Monitoring od identified risks and their mitigation plans will be carried out on an on–going basis by way of formal risk reviews, which will take place on a monthly basis during the monthly management meetings (PIU, PIC, Contractor).

General progress meetings, discipline reviews, value engineering workshops etc. will also be used as opportunities to monitor the evolution of risks and the implementation of mitigation measures.

4. Risk Review Meetings / Workshops

4.1. General.

The primary objectives of risk review meetings/workshops are:

- Discuss procedure matters pertaining to the risk management system.
- To bring together the relevant members of the overall project team so that they can review the project under the specific topic of risk.
- Identify, describe, categorize, rank and quantify risks.
- Allocate ownership of risks.
- Discuss possible mitigation / control strategies.
- Consider the costs associated with mitigation actions relative to the corresponding benefit from the reduction of the risk.
- Review and update the above points for risks that have already been identified.

It should be noted that it is not the intention that all of the above points are finalized for each identified risk during a specific risk review. The overall philosophy is that risk management discussions are to be open, allowing for the free exchange of information and viewpoints.

Risk reviews/workshops will be organized on a quarterly basis, or as otherwise agreed.

4.2. Attendees & Responsibilities

The key persons who may be required to attend risk reviews are as follows:

- The CDCL PIU Manager or the CDCL Risk Management Officer.
- The Project Risk Management Focal Point (Egis deputy Team Leader);
- Design Team & Contractor Risk Management Focal points (as appropriate);
- Contractors representatives (as appropriate);
- Third Party representative (as appropriate).

Individual attendees will be responsible for:

- Reviewing their areas of responsibility in advance with a view to ensuring that the appropriate staff members are present;
- Consulting other members of the project team regarding existing and newly identified risk;
- Providing a brief presentation at the commencement of each review to summarize the present status of their area of responsibility.

All other attendees will be required to actively and constructively engage with the workshops process.

5. Risk Reporting

5.1. Communication & Consult

Informal communication consultation on risk issues will be promoted through Project meetings, reports and communication channels.

5.2. Monthly Reporting

Risk Management will be included as a chapter in the overall Monthly report. The risk management chapter will deal with the following subjects:

- Schedule of items identified during risk reviews /workshops (if held during the month);
- Progress on resolving current risks;
- Review of any new incident (if any)
- Commentary on risks that have been closed;
- Risks that require to be elevated to the Client, Funding Agency, etc.;
- A summary of the top 10 risks;

The updated risk register will be included with the Monthly report.

5.3. Reporting on Risk Workshops

The outcomes of risk workshops (see previous chapter) will be reported by:

- An update of the Risk Register;
- A summary of actions for each risk owner;
- Minutes of the relevant workshops;
- Additional information and commentary as necessary.

5.4. Recording the Outcomes of Risk Reviews

During reviews, individual risk sheets shall be filled out for each newly identified risk and for the updated of previously identified risks. The template for risk record sheet included as **Appendix 5** must be used.

The Project Risk register (s) will be updated after each risk review.

5.5. Reporting on major HSE incident

Specific reporting on major HSE incident, which for example will require to take into account a new risk, will be made. A template of record and follow-up of incident is provided in **Appendix 6**

Then, for consistent newly identified risk, the Risk Record Sheet will be filled and the Risk Register sheet updated.

Appendix 1: Extracts from Terms of References

PIC Terms of references of services mention the preparation of a Risk Management Plan (RMP): within the description of Scope of services:

3.1 Task 1: Project Management

17. Project Administration

"vii) Preparing a Risk Management Plan (RMP) in coordination with the PIU and contractors. The RMP will consider: (a) risk identification : determining risks that may affect the Project , and documenting the characteristics of each; (b) risk quantification : evaluating Risks and risk interactions to assess the range of possible outcomes; (c) risk response : defining enhancement steps for opportunities and responses to threats ; and (d) risk response control: responding to changes in risk over the course of the Project .RMP will assist with proactively identifying potential risks and opportunities and advising and assisting the PIU to take timely actions to enhance project performance and mitigate any adverse constraints;"

And only within the part dedicated to reporting requirements: see extract of Table 4: List of Main Deliverables and Indicative Number of reports:

N°	*Item*	*Description*	*Due Time*
1.3	*MEM, QAP and RMP*	*The monitoring and evaluation manual (MEM) ill set out how the Project will be monitored and evaluated. This supports preparation of the PPMES. It includes the QAP and RMP and will be updated routinely as necessary.*	*4th month, updated routinely*

Besides this RMP is not mentioned. For example, no Risk Experts is mentioned in the PIC staffing.

Appendix 2: Risk Breakdown Structure

For PTDP, the risks are grouped into the following 9 major categories:

1. Project concept and design
2. Project Financing
3. Procurement Plan
4. Recruitment of consultants
5. Site availability
6. Works or Goods Procurement
7. Contract Execution and Implementation
8. Works Supervision
9. Commissioning / Handing over

Appendix 3: Risk Scoring Matrix

A Standard Risk Scoring Matrix shows in X- axis the Impact or Severity of the risk, and in Y-axis, the likelihood of the risk.

For every axis, it is proposed to classified risks impact severity and likelihood, only into three subdivisions like low, medium, high. Then the limits between each class has to be defined.

Note: The Risk scoring matrix or project risk exposure could be more detailed in dividing likelihood and Severity in more levels, like "very low, low, medium, high and very high", but this would not change its functionality.

1.X – Axis Severity

For the Impact – severity of Consequence line, usually a "Impact & Risk Type Assessment Table" is prepared, and the probability column, just rating are given.

A draft of the "Impact & Risk Type Assessment Table" customized to PTDP is shown here-after.

Table "Impact & Risk Assessment"

		Risk type			
		Cost	**Time**	**Quality**	**HSE Problem**
Impact Threshold Definitions	**High**	>=10% of Budget	Delay 4 months or more	Failure of key elements which required rework	Death or hospitable more than 6 months
	Medium	2.0% to 10% of Budget	Delay 1 to 3 months	Moderate impact on Quality which required rework	Hospitable less than 6 months Medical aid Injury
	Low	< 2.0% of Budget	Delay 1 month or less	Minor impact on Quality, which just required repair	First aid injury

2. Y – Axis – Likelihood

Rating of probability could be either a percentage on the overall duration of project, or a frequency. A proposal is shown here after in the Table "Likelihood & Probability correspondence"

Table "Likelihood & Probability correspondence"

	Probability		
Likelihood		**% on the overall Project Life**	**Possible frequency**
	High	More than 50%	Once every month or less
	Medium	25% to 50%	Less than once every month, more than once every semester
	Low	Less than 25%	Less than once every semester

3. Risk scoring Matrix

It is recommended as well not to debate on all risk classification but rather focusing on the ones which are not acceptable and undesirable, in order to have practical solutions to mitigate risks.

The proposed here below matrix, with 9 blocks, of which 6 scores risks as unacceptable and acceptable with mitigation, is already sufficiently detailed to prepare an efficient Risk Management plan

Risk Scoring Matrix figure

likelihood					
	High	3	4	5	6
	Medium	2	3	4	5
	Low	1	2	3	4
Unacceptable			1	2	3
Acceptable with mitigation			Low	Medium	High
Acceptable			Impact – Severity of Consequence		

Appendix 4: Project Risk Register

Project Phase	Risk Nº	Risk Description	Likelihood	Impact	Initial rating	Mitigation	Responsible	Final Rating
1. Project Concept and Design	1.1	Change management Team	1	3		DHI and CDCL Board member nominator for long-term period	DHI	
	1.2	Internal conflict within Management Team	2	2		Autonomy of General Manager for executive team member designation	DHI	
	1.3	Weakness of design Team	2	3		Be strict on team composition and CV description, and deliverables quality	DHI	
	1.4	Non availability of data	2	3		Comprehensive TOR for surveys and strict quality control of surveyor by design team	PMU	
	1.5	Changes in the basic design	2	2		Request commitment of Agency to Project program	DHI	
	1.6	Incorrect cost estimate	2	3		Quantities to be audited and prices to be in accordance with market. External Audit of Design Team cost estimate.	PMU	
	1.7	Complexity of project architecture	1	2		No change to project arrangements. When possible split Project into basic and functional tranches. For utilities, as far as possible, transfer construction of tertiary equipment to buyers.	PMU	
2. Project Financing	2.1	Change of financial scheme, in particular for primary infrastructure funding	1	3		Have sufficient margin on project contingencies to absorb a limited financial drift and technical adaptation (especially impacting on primary infrastructures costs)	DHI	
	2.2	Developed land market week	2	3		Make pre-commitment with possible private buyers and/or with institutional investors.	DHI	
	2.3	Increase development costs	2	2		Have strict control on investment costs and avoiding any unnecessary additional costly expense.	DHI	

3. Procurement Plan	3.1	Packaging inconsistent w/ possible Contractors financial capacities	2	2		Prior packaging, make assessment of local and regional financial Contractors capacities	PMU	
	3.2	Packaging inconsistent w/ possible Contractors technical capacities	2	3		Prior packaging, make assessment of local and regional technical Contractors capacities	PMU	
	3.3	Procurement schedule incoherent with anticipated Project implementation	1	3		Procurement plan to be adapted in case of revised schedule of progress of works, and services to be provided. Needs coordination for works packages progression.	PMU	
4. Recruitment of consultants	4.1	Non-compliance with ADB guidelines	1	3		Regularly consult ADB on required Guidelines to be followed. Keep documents which received NOL	PMU	
	4.2	Delayed in shortlisting consultants	1	3		RFI be sufficiently detailed in order to be able to prepare proposal for shortlisting	PMU	
	4.3	Delayed preparation of terms of reference and request for proposals	1	2		Be pro-active in preparing biddings documents	PIU	
	4.4	Delayed evaluation of consultant proposals	2	2		Recruit adequate staff to prepare Bid Analysis Report	DHI PMU	
	4.5	Delayed award of consultant's contract	2	2		Avoid external interference in the selection process.	PMU	
5. Site availability	5.1	Unavailability of land	2	3		Have margin to negotiate compensation to skate-holders, or split Project in additional execution tranche in order not to block overall implementation of Project	DHI	
	5.2	Obstruction to master plan, project program	1	3		Request upstream commitment of Local Authorities to Master plan, Project program and taking over core infrastructure	DHI	
	5.3	Change in local government policy	1	3		Be persuasive upon Project Goals and details, and make frequent update, permanently involve Authorities with Project progress.	PMU	
	5.4	Project limits not precisely determined	2	2		Coordination with others adjacent Projects, limits at each stage of Project (design, construction, marketing, maintenance) clearly defined	PIU	

	5.5	Conflict with riparian activities	2	2		Implement a communication plan, involving near-by stakeholders	PIU	
6. Works or Goods Procurement	6.1	Bidding documents non-complying with ADB's standard bidding documents	1	3		Regularly consult ADB on required Guidelines to be followed. Follow documents which received NOL	PMU	
	6.2	Unclear, incorrect, and incomplete and/or restrictive specification	2	2		Checking carefully specifications produced by design team	PIU	
	6.3	Restrictive financial and technical evaluation criteria	2	2		Criteria selection fitted for works, but as open as possible to widen competition	PMU	
	6.4	Unclear and/or incomplete special conditions of contracts	2	3		Be clear on fundamental PCC (securities, penalties, retention, price revision, works sectioning, safeguards, site availability,	PMU	
	6.5	Limited resources and capacities of the procurement unit/bid evaluation committee	1	2		Staff properly PMU and PIU	DHI	
	6.6	Bidders' complaints	2	2		Follow strictly bidding procedures and per bidding documents and ADB guidelines	PMU PIU	
	6.7	Constraints from local authorities	1	3		Be transparent about the Procurement process	PMU	
	6.8	Delays in award of Contracts	2	3		Detail comprehensively the various steps of procurement process, until Notice to Commence is given, and follow-up rigorously procedures.	PMU	
	6.9	Unsuccessful bidding	2	3		Have adequate budget for every procurement, have done proper analysis of possible interested Contractors capacity	DHI PMU	
7. Contract Execution and Implementation	7.1	Contract negotiations issues	2	3		Being clear on 6.2 and 6.4. Do not modify requested output and schedule	DHI	
	7.2	Delayed contract signing and effectiveness	2	3		Be strict on documentation and securities to be provided by Contractor prior negotiation. Confirm site availability, and financing plan completed and advance account in place	DHI PMU	
	7.3	Partial handing over of site	2	3		Be clear about time of Site constraints if any, and schedule of partial handing over	PMU PIU	

	7.4	Delayed Contractor's mobilization	2	3		Assist Contractor for documentation (taxes, customs, labor laws...). Notice warning if delay continues	PIU PIC	
	7.5	Contractors un-respective of Conditions of Contract	1	3		Remind regularly Contractor about his obligations, and when necessary give training on General Conditions of Contract. Notice warning as per GCC.	PIC	
	7.6	Lack of Contractor's cash flow	2	2		Pay Contactor IPC on time as per conditions of Contract	PMU PIC	
	7.7	Subcontractors defaults	2	2		Be vigilant on Subcontractors capacities and qualifications, before approval	PMU PIC	
	7.8	Materials non-availability	2	2		Check availability of resources before acceptance of Contractor programme	PIU PIC	
	7.9	Adverse climatic conditions	2	3		If possible, develop alert system to detect adverse condition, and give instruction to mitigate damage to infrastructure and Contractors installation	PIU PIC	
	7.10	Increase of logistic costs	3	1		When unexpected costs are suffered by Contractor, accept Variation Order to compensate extra costs	PMU PIC	
	7.11	Change in ground conditions	2	2		When unexpected costs are suffered by Contractor, accept Variation Order to compensate extra costs, and possibly increase construction time.	PMU PIC	
	7.12	Poorly qualified manpower	2	3		Engineer to force Contractor to fulfill his staffing obligation, and when necessary train or request personnel replacement.	PIC	
	7.13	Contractor Unsafe execution method	2	3		Engineer to force Contractor to prepare sound HSE management plan and to be firm on follow-up of plan	PIC	
	7.14	Contractors not-environmentally friendly	1	3		Engineer to force Contractor to prepare sound C-EMP management plan and to be firm on follow-up of plan	PIC	
	7.15	Third party disturbance	2	2		Avoid use of site by third parties during construction. Or give strict conditions for temporary use of site (time frame, location, HSE and environmental obligations)	PIU PIC	
	7.16	Risk impact of uncontrolled third-party activity in the vicinity of project site	2	2		Continues coordination with the parties in a positive, constructive manner / approach to give clear understanding of the potential risk during Monsoon season and be prepared with the required emergency evacuation plan as well as risk mitigation measures are in place.	PIU PIC	

8. Works Supervision	8.1	Inadequate supervision team composition and qualification	2	3		Prepare adequate TOR and adapt it for type of works and contract to be supervised, in term of qualifications, number of staff and time input of supervision team	PMU	
	8.2	Weakness of supervision team individuals	2	2		Observe strict compliance with personnel qualification requirements for Key Staff.	PIU PIC	
	8.3	Insufficient Equipment and Logistic means of supervision team	2	2		Provide sufficient means for Supervision team to be able to perform his duties (Equipment, transport facilities, office facilities…)	PMU	
	8.4	Potential Conflict of interest	2	3		Barre any personnel having direct link with Government official or implementing agency, and Contractor, who may be able to exercise any influence over the Contract and the project.	PMU PIU PIC	
	8.5	Expert unavailable as per needs	2	2		Be firm on Construction Supervision Company to fulfill his commitment on quality and availability of personnel.	PIU	
9. Commissioning and handover	9.1	Unpreparedness of local authorities to be transferred the infrastructures	2	3		Make pre-agreement of transfer prior construction and at major step of construction, in particular completion testing, involve local authorities' representatives.	PMU PIU	
	9.2	Unpreparedness of utilities companies	2	3		Make pre-agreement of transfer prior construction and at major step of construction, in particular completion testing, involve utilities companies' representatives	PMU PIU	
	9.3	Weakness of as-built documents	3	2		Engineer's to make clear on deliverable documentation and be strict on acceptance prior issuance of taking-over certificate	PIC	
	9.4	Delay due to lack of financial capacities of land buyers	2	2		Promote Project for capable Investors. When possible transfer risk to groups of buyers, and possibly adapt program. Make provision for financial charges, if marketing takes longer than expected.	DHI	

Appendix 5: Risk Record Sheet (for new identified risk)

Risk Identification Record Sheet						
Project Name:			Date:			
Project Phase:			Location:			
Project No:			Recorded by:			
Risk Characteristics						
Description of Identified Risk:						
Cause of the Risk:						
Potential Impact of the Risk on the Project:						
Initial Analysis of the Risk (without mitigation or control)						
Impact Level						
Cost		**Time**		**Quality**		**HSE**	
H		H		H		H	
M		M		M		M	
L		L		L		L	
Probability				**Impact Probability Score**			
Very Rare							
Possible							
Very Likely							
Mitigation / Control Measures						
Risk Owner:			Target date:			

Appendix 6: HSE Incident Management

	INCIDENT REPORT PTDP				**Document number**	
					Egis – RMP-0xxx	
	Revision	01	**Date**		Page	21
Prepared by:	Reviewed by:				Approved by:	

GENERAL INFORMATION	
COMPANY: SUPERVISOR:	LOCATION OF INCIDENT:
DATE:	TIME:
NAME OF INJURED: OCCUPATION: WITNESS:	

TYPE OF INCIDENT		
INJURY OR PROFESSIONAL ILLNESS	**ENVIRONMENTAL**	**EQUIPMENT DAMAGE**
☐ Death ☐ Injury with sick leave ☐ Injury with modified tasks ☐ Medical treatment ☐ First Aid	Type and quantity of substance tipped out:	Equipment damaged:
Part of body injured:	Area affected (m^2):	

INCIDENT DETAILS
OCCUPATIONAL AT TIME OF INJURY:
DESCRIPTION:
INTERVENTION / TREATMENT ADMINISTRED ET CORRECTIVE ACTION TAKEN: Works stopped….
RETURN AT WORK THE SAME DAY: ☐ Yes ☒no APPOINTMENT TASK: ☒Original ☐modified/limited ☐ not appointed
ANALYSIS OF THE CAUSES

BASIC CAUSES: ☐ Non recognition of risk ☐ Noncompliance with the procedures of safety ☐ Lack of Knowledge ☐ Inadequate leadership / supervision ☐ State of equipment	☐ PPE not wared ☐ Inadequate / improper protective equipment ☒ State of site ☐ Weather ☐ Other
CORRECTIVE ACTION TO BE TAKEN:	
COMPLETED BY: POSITION:	DATE:
FOLLOW UP OF CORRECTIVE ACTIONS	
Corrective actions implemented: ☐ Yes ☐ No Details / comments:	
FOLLOW UP OF THE INVOLVED PERSON	
Medical report: ☐yes ☒ no Date of return to work: Number of sick leave days: Number of modified tasks days:	

Technical Note

Prepared by	:	**Mehmet Kahraman** **Position: Team Leader**
To	:	**CDCL / PIU**
Date	:	**20 May 2019**
Reference	:	**TN n° 12**
Revision 01	:	**Updated on 20th January 2020**

Subject : **Project Performance Management Evaluation Method**

Present note aims to present a method to conduct regular Project Performance Management Evaluation. The related document is one of the deliverables as per PIC Contract Terms of Reference, see Table 4" List of main deliverables and indicative number of reports", item D – 1.5.

1.Description in the TOR

As per TOR point 17." Project Administration" bullet (iii), PIC shall develop:

"The design and establishment of a project performance management evaluation system (PPMES) that will allow PIU to (a) monitor and evaluate implementation of the project; (b) identify performance constraints; and (c) formulate and implement practical measures to address shortcomings. Frequent performance evaluations will be carried out based on assessment of the project. It should include secure financial management and accounting reporting, and be accessible to the PIU and ADB".

As per TOR Table 4, listing and deliverables:

"Design of the PPMES appropriate for the project. The content of the PPMES should be discussed in the inception report and agreed with the PIU and ADB prior to developing the system. The system should be flexible to allow routine changes as necessary and it should be accessible from the PIU and client's project offices. A manual will be prepared that shows users how to update and use the system".

2.Comments and Proposal

A Project Performance Management Evaluation System is usually developed to detail the Project monitoring indicators as listed is the Design and Monitoring Framework (DMF), and when there are several components and numerous implementation activities (several simultaneous civil works contracts, procurements of goods and services contracts) to weight each of them, to be able to produce a global figure showing the performance, practically the progress of Project. Therefore, the PPMES is mostly used for complex and multi components Projects, for which the Borrower needs to have a system that guides him in the global evolution of the Project. Usually a Project Management Expert is also mobilized to design the system, and assist Borrower to weight Project components, and prepare the baseline anticipated progress data.

In PDTP case, the DMF performance indicators are quite clear, immediately quantifiable and could be directly organized in types of output and weighted. Moreover, there are just sequential activities (CW-03 &

CW 04 works which follow CW-02 works which follow CW-01 works…), hence the development of a PPMES will just be a trivial development of the DMF.

The purpose of the PPMES in the PTDP context, which is a linear and sequential Project, is not clear. Indicators have already been developed and detailed in the DMF, it is therefore proposed to waive the development of PPME system, but to follow up progress of Project Implementation based directly on weighted indicators as listed in the DMF Outputs.

DFM indicators, as per the Project Output are listed in **Appendix 1.**

However, to DMF indicators, it is proposed to add two types of major component of the Project Progress, specific of any land development project:
- Implementing Agency capacity, and;
- Site possession,

which are necessary conditions to achieve the goal of an urban project.
On the other hand, consultancy services are usually not considered, since being just a support to the Implementing Agency. Then progress of consultancy services is not considered as representative of the Project progress.
Progress of Project could then be assessed through the weighting of the Project components, which are detailed, hence itemized, and at last, by the estimate of the progress of every item.
It is hereby proposed to regroup the Project components into the following 5 major components/outputs, together with the proposed weight for each of them:
- Implementing agency capacity: 5%;
- Site possession: 5%;
- Output 1 - Flood and erosion protection measures installed: 40%;
- Output 2 - Municipal infrastructure constructed: 40%;
- Output 3 - Township management systems installed: 10%.

For every component, indicators have been, either proposed, or extracted from the DMF, and for each of them, a weight assigned, in percent, in order to get a total of 100% when Project is completed. A tentative PPMES table is presented in **Appendix 2**, as example.

3. Project Performance Management Monitoring

Once Implementing Agency has, either confirmed, or corrected, the list and weights of every PPME indicators, a baseline forecast of value of every indicator can be assessed, from start to end of Project, for example per quarter, from Q3 2018 to Q2 2025, as per the Project Administration Manual. Actual progress can therefore be compared to the one scheduled, on quarterly basis, see Table as below for an estimate of progress at Q2 2019.

In this example, based on the preliminary assessment and weighting rates proposed, anticipated overall Project progress would reach11.2% on 30 June 2019, to be compared to 11.1% forecast,

Hence, once indicators, their weighting and anticipated evolution, be approved, it is suggested to update regularly the synthetic table, at least once every quarter, in order to include it within the Quarterly Progress Report.

Appendix 1: Project Outcome and Outputs from Design and Monitoring Framework

	Indicator	Progress till 31st December 2019
Outcome Phuentsholing's urban area protected from floods and expanded with improved amenities and services	By 2026: a. Phuentsholing and reclaimed land protected from 100-year flood events in the Amochhu River (2018 baseline: Phuentsholing is protected from mean annual floods) b. At least 10% of fully serviced plots tendered for development (2018 baseline: NA)	a. First assessment of the progress of achievement when cast-in-situ wall achieved. Q2/2020. b. confirmation of tender scheduleQ2/2024
Outputs 1. Flood and erosion protection measures installed	By 2025: 1a. 4 km of climate and erosion-resilient river walls constructed to protect against 100-year probable flood (2018 baseline: 0) 1b. At least 66 ha of land reclaimed (2018 baseline: 0) 1c. A flood early warning system and community-based flood management plan established and operational (2018 baseline: NA)	1a. Construction of river protection started in Jan 2019. 44% Achieved. 1b. Construction of backfilling started in Feb 2019. 15 % Achieved. Land reclaimed when walkways finished. 1c. Not yet started. FEWS to be installed from Q2/2020 to Q4/2021
2. Municipal infrastructure constructed	2a. 10 km of roads with footpaths, landscaping, and streetlights planned with at least 30% female participation (2018 baseline: 0) 2b. Water treatment plant with a capacity of 4 MLD constructed (2018 baseline: none) 2c. 12 km of new primary and secondary water mains constructed (2018 baseline: 0) 2d. 9 km of new sewer mains and 9 km of new storm drains constructed (2018 baseline: 0) 2e. A sewerage treatment plant with a capacity of 3 MLD constructed (2018 baseline: 0) 2f. A resource recovery system for solid waste management installed (2018 baseline: 0) 2g. A 630 KVA grid substation constructed (2018 baseline: 0) 2h. 16 circuit-km of 415-volt power distribution lines installed (2018 baseline: 0) 2i. 11 circuit-km of telecommunication transmission cables installed (2018 baseline: 0)	To be started with CW-02, CW-03, CW-04 & CW-ti05 start. 2a. To be assessed from Q3/2021. 2b. To be assessed from Q3/2021 2c. To be assessed from Q3/2021 2d. To be assessed from Q3/2021 2e. To be assessed from Q3/2021 2f. To be assessed from Q3/2021 2g. To be assessed from Q2/2022 2h. To be assessed from Q2/2022 2h. To be assessed from Q2/2022
3. Township management systems installed	3a. At least 80% of township management staff reported improved knowledge of modern urban management (2018 baseline: NA) 3b. An asset management system established with 100% of project infrastructure and facilities geocoded in a database (2018 baseline: NA)	3a. First assessment in the Year 2024 3b. To be assessed from Q2/2022 3a. To be assessed on Q3/2024

	3c. At least 10 potential investors attended investor outreach campaigns (2018 baseline: NA)	

Appendix 2: PTDP Proposal for Project Performance Indicators

Components / Outputs	Target quantity / Value (US$)	Proposed Weight
Implementing agency capacity		**5.0%**
Establish PMU/PIU		*3.0%*
PMU/PIU Staff training and development		*2.0%*
Site possession		**5.0%**
Site possession legal documents		*4.0%*
Third parties activities cessation		*1.0%*
Output 1 Flood protection measures installed		**40.0%**
1a. River training works on 4.5km	*4,500m*	*20.0%*
1b. Land reclamation on 66ha	*66ha*	*15.0%*
1c. Flood early warning system installed	*130,500$*	*5.0%*
Output 2 Municipal infrastructure installed		**40.0%**
2a. 10 km of urban roads built	*10,000m*	*10.0%*
2b. Water treatment plant constructed	*xxx$*	*5.0%*
2c. 12km of water distribution pipes constructed	*12,000m*	*5.0%*
2d. 9km of sewage pipes and 9 km of storm drains constructed	*18,000m*	*5.0%*
2e. Sewage treatment plant constructed	*xxx$*	*5.0%*
2f. System for solid waste management installed	*xxx$*	*2.0%*
2g. 630kva grid substation constructed	*xxx$*	*2.0%*
2h. 16km of HV power distribution lines installed	*16,000m*	*3.0%*
2i. 11 km of telecom cables installed	*11,000m*	*3.0%*
Output 3 Township management systems installed		**10.0%**
3a. Township management staff improved knowledge of urban management	*80% of staff*	*5.0%*
3b. Asset management system installed	*100% of infra*	*4.0%*
3c. Potential investors to attend investor outreach campaign	*10 investors*	*1.0%*
Overall Project Progress		**100.00%**

Appendix 3: PTDP overall progress as of Q4 2019, compared to scheduled

Components / Outputs	Target quantity / Value (US$)	Proposed Weight	Schedule Progress (Qty)	Scheduled Progress (%)	Weighted Scheduled Progress	Actual Progress (Qty)	Actual Progress (%)	Weighted Actual Progress
Implementing agency capacity		**5.00%**			**3.00%**			**3.20%**
Establish PMU/PIU		*3.00%*	*3.00%*	*100%*	*3.00%*		*100%*	*3.00%*
PMU/PIU Staff training and development		*2.00%*	*0.00%*	*0%*	*0.00%*		*10%*	*0.20%*
Site possession		**5.00%**			**5.00%**			**4.70%**
Site possession legal documents		*4.00%*	*4.00%*	*100%*	*4.00%*		*100%*	*4.00%*
Third parties activities cessation		*1.00%*	*1.00%*	*100%*	*1.00%*		*70%*	*0.70%*
Output 1 Flood protection measures installed		**40.00%**			**11.61%**			**11.16%**
1a. River training works on 4.752km	*4,752m*	*20.00%*	*2758m*	*58.00%*	*11.61%*	*2652m*	*55.81 %*	*11.16%*
1b. Land reclamation on 66ha	*66ha*	*15.00%*	*0ha*	*0.00%*	*0.00%*	*0ha*	*0.00%*	*0.00%*
1c. Flood early warning system installed	*130,500$*	*5.00%*	*0$*	*0.00%*	*0.00%*	*0$*	*0.00%*	*0.00%*
Output 2 Municipal infrastructure installed		**40.00%**			**0.00%**			**0.00%**
2a. 10 km of urban roads built	*10,000m*	*10.00%*	*0m*	*0.00%*	*0.00%*	*0m*	*0.00%*	*0.00%*
2b. Water treatment plant constructed	*xxx$*	*5.00%*	*0$*	*0.00%*	*0.00%*	*0$*	*0.00%*	*0.00%*
2c. 12km of water distribution pipes constructed	*12,000m*	*5.00%*	*0m*	*0.00%*	*0.00%*	*0m*	*0.00%*	*0.00%*
2d. 9km of sewage pipes and 9 km of storm drains constructed	*18,000m*	*5.00%*	*0m*	*0.00%*	*0.00%*	*0m*	*0.00%*	*0.00%*
2e. Sewage treatment plant constructed	*xxx$*	*5.00%*	*0$*	*0.00%*	*0.00%*	*0$*	*0.00%*	*0.00%*
2f. System for solid waste management installed	*xxx$*	*2.00%*	*0$*	*0.00%*	*0.00%*	*0$*	*0.00%*	*0.00%*
2g. 630kva grid substation constructed	*xxx$*	*2.00%*	*0$*	*0.00%*	*0.00%*	*0$*	*0.00%*	*0.00%*
2h. 16km of HV power distribution lines installed	*16,000m*	*3.00%*	*0m*	*0.00%*	*0.00%*	*0m*	*0.00%*	*0.00%*
2i. 11 km of telecom cables installed	*11,000m*	*3.00%*	*0m*	*0.00%*	*0.00%*	*0m*	*0.00%*	*0.00%*
Output 3 Township management systems installed		**10.00%**			**0.00%**			**0.00%**
3a. Township management staff improved knowledge of urban management	*80% of staff*	*5.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
3b. Asset management system installed	*100% of infra*	*4.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
3c. Potential investors to attend investor outreach campaign	*10 investors*	*1.00%*	*0*	*0.00%*	*0.00%*	*0*	*0.00%*	*0.00%*
Overall Project Progress		**100.00%**	**100.00%**		**19.61%**			**19.06%**

Post Monsoon

Aquatic Survey along the Amochhu River Basin Phuentsholing-Chukhha

21st October – 23th October 2019
Bhutan Ecolab Services
Phuentsholing

BHUTAN ECOLAB SERVICES

AFCONS INFRASTRUCTURE LTD. BHUTAN

BHUTAN ECOLAB SERVICES PHUENTSHOLING

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GLOSSARY

C

1) **Critically Endangered (CN):** A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
2) **Cypriniformis:** Is an order of ray finned fish which possess weberian apparatus. They possess only a dorsal fin in its back unlike other order.

D

3) **Data Deficient (DD):** A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

E

4) **Electro-Fishing Efficiency:** How effective the use of electro-fishing is.
5) **Endangered (EN):** A taxon is endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.

G

6) **Galvanotaxis:** Response of fish to the electric current.

L

7) **Least Concern (LC):** A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

N

8) **Near Threatened (NT):** A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
9) **Not Evaluated (NE):** A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

O

10) **Osteichthyes:**Popularly referred as bony fish, is a diverse taxonomic group of fish that have skeletons primary composed of bone tissue as opposed to cartilage.

P

11) **Perciformes:** Fish in this order have the dorsal and anal fins divided into anterior spiny and posterior soft rayed which may be partially or completely separated.

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S

12) **Synbranchiformes:** Often called swamp eels are an order of ray finned fishes that are like eel but have spiny rays.

V

13) **Vulnerable (VU):** A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.

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ABBREVIATION

1)	**CDCL**	:	Construction Development Corporation Limited
2)	**CEMP**	:	Contractors Environmental Management Plan
3)	**DC**	:	Direct Current
4)	**EIA**	:	Environmental Impact Assessment
5)	**FNCR**	:	Forest and Nature Conservation Regulation
6)	**IUCN**	:	International Union for Conservation of Nature
7)	**NRCR&LF**	:	National Research Centre for Riverine & Lake Fisheries
8)	**ADB**	:	Asian Development Bank
9)	**BES**	:	Bhutan Ecolab Services
10)	**PTDP**	:	Phuentsholing Township Development Project

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List of Persons Involved

SN	Names	Designation	Organization
1	Mr. Pushpa Raj Pradhan	Environment Manager	Construction Development Corporation Limited
2	Ms. Sonam Deki	Environmentalist	Egis International
3	Mr. Ashok Kumar	HSE-In charge	AFCONS Infrastructure Limited
4	Mr. B.K Singh	HSE Sr. Officer	AFCONS Infrastructure Limited
5	Mr. Sunny	Envs. Engineer	AFCONS Infrastructure Limited
6	Ms. Kinley Yangzom	Jr. Envs. Officer	AFCONS Infrastructure Limited
7	Mr. Yeshey Tenzin	Quality Manager	Bhutan Ecolab Services
8	Mr. Anand Bhandari	Environmental Officer	Bhutan Ecolab Services
9	Mr. Sangay Norbu	Senior ES (III)	National Research Centre for Riverine & Lake Fisheries
10	Mr. Jit Bhadur	Essential Service Provider	National Research Centre for Riverine & Lake Fisheries
11	Mr. Kellay Wangdi	Staff	Bhutan Ecolab Services
12	Mr. Tek Bhadur Ghallay	Staff	Bhutan Ecolab Services
13	Mr. Tempa	Staff	Bhutan Ecolab Services

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Anand Bhandari

1. Introduction:

Phuentsholing is located adjacent to the Bhutan and the Indian border and so, is tagged as the "economic capital" (Amochhu EIA Report, 2017) for Bhutan. In the recent years, Phuentsholing has face the problem of increasing population with limited area (Amochhu EIA Report, 2017); adding to this, the Amochhu River threatens to flood, erode and cause loss of valuable land resulting in sedimentation at lower ends of the river. Hence so, Phuentsholing Township Development Project, contracted to AFCONS Infrastructure Limited by CDCL with their consultant as Egis International are working on the Construction of River Training and Embankment Work along the Amochhu River. In the course of the construction works, it is crucial to monitor and maintain the ecological health i.e. Terrestrial and Aquatic environment within and the areas adjacent to the project site. Accordingly, this report is on the Second Aquatic Survey that was conducted along the Amochhu River and its tributaries to study the fish diversity or composition as pose to the changing seasons.

The study was conducted with the assistance of a team of fishery experts from the NRCR&LF, Haa (**Appendix 1**) under the Department of Livestock, Ministry of Agriculture and Forests. An approval from the Department of Forest for the study is attached as **Appendix 2.**

This report will be comparative to the pre-monsoon fish species diversity assessment (i.e. the first Aquatic Study)that was carried out on the 27th April to 1stof May, 2019.During which, a total of 27 species of fish were recorded which includes two endangered species namely, *Tor putitora* (Golden Masheer) and *Amblyceps arunchalensis*. The post monsoon fish diversity survey was conducted on 21st to 23rdof October, 2019. Both pre and post monsoon study was conducted along the Amochhu and its tributaries falling under the Phuentsholing Township Development Project (PTDP) i.e. approximately18 Kilometers. Fish compositions at each sample station were assessed, identified, photographed and recorded for further analysis.

1.1 How Electro-fishing Works

An Electro-fisher was used during the survey for sampling the fish species. The backpacked electro-fisher (Electro-Shocker) powered by petrol generator, equipped with positive and negative probe extended electrodes (Anode & Cathode) were used to pulse DC into the water.

DC is more effective & less traumatic on the fishes (Lamarque, 1990) and so, was preferred and recommended for the study. The use of the Electro-Shocker interrupts the neurological pathways of the fish (galvanotaxis), causing the fish to move towards the anode. The operator walks with the electro fisher unit, holding a pole-mounted anode and trailing a cathode to shock the fishes. Following the operator is a netter with dip net to capture the immobilized fishes. That is, the density of electric field increases as the fish swims towards the anode which then leaves them temporarily immobilized (Lamarque, 1990&Lamarque et al., 1971) thus making the sampling possible.

Survey with Electro-Shocker is feasible in habitats where the operators can safely walk in the river. However, the wading becomes dangerous at depths greater than 0.5 m, as it increases the chances of operator getting shocked as the operators have to use the pole under water at greater depth (Hickley, 1990).

Electro-Fishing efficiency is lower in larger streams as the fishes can avoid the electric current (Paller, 1995)and so, surveying in smaller stream is advised. However, fishes can be captured in wider streams by using multiple electro-fishing units or multiple anodes (Bayley et al., 1989). Turbidity of the water also affects the catch rate of the fishes. Catch rates are highest in intermediate turbidities because when the turbidity is low, fishes notice the operator sooner and can thus flee, while at high turbidity netters cannot see the immobilized fishes (Reynolds, 1983).

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2. Objective

i. To study and assess the fish species composition (diversity) along the Amochhu River basin that fall under the Phuentsholing Township Development Project (PTDP);
ii. Establish baseline data for fish composition
iii. Assess presence of protected fish species primarily focusing on Golden Mahseer i.e. marked as endangered in the IUCN Red list.
iv. To Study, compare and analyze the data collected thus far.

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3. Study Area Description:

Study sites were based on the EIA report for Phuentsholing Township Development Project erstwhile Amochhu Land Reclamation Township Project and the CEMP. The sampling stations allow for the even distribution of the sampling areas thus to obtain unbiased samples. Sampling stations were divided as follows:

i The main **Amochhu** with six sampling stations, which starts from Indo-Bhutan border till the Purbay Bridge (Phuentsholing - Samtse High Way Bridge).

ii The **Omchhu**–commonly known as Dortikhola with two stations, start from Amochhu - Omchhu Confluence till Crocodile farm.

iii The **Lawrichhu** which fall under Samtse Dzongkhag also covers a fish sampling station.

The survey location points are shown below in **Figure 1**

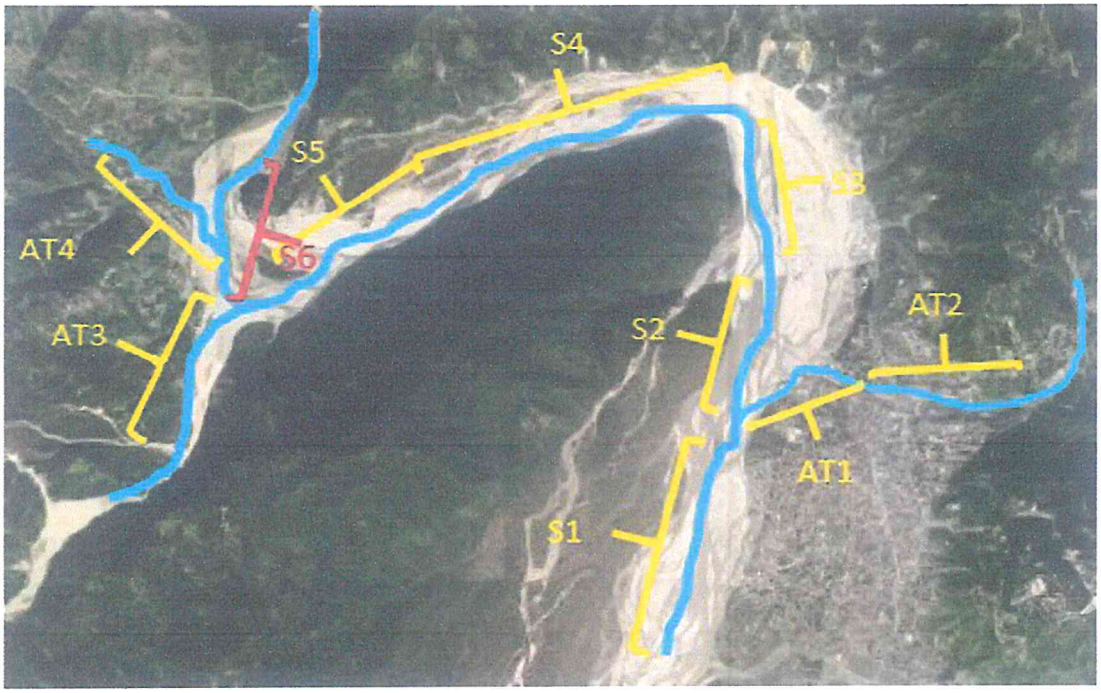

Figure 1: Geographical outlay of survey sites.

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The GPS coordinates were recorded at all sampling sites to provide distribution of species present as shown in **Table 1.**

Table 1: Details of Sample station with GPS co-ordinates

Station	Location	Coordinates		Altitude (m)	Remarks
		Start Points	End Points		
S1	Amochhu- Below Amochhu- Omchhu confluence	N26.86323 E089.36226	N26.86805 E089.37244	182	Indo-Bhutan Border
S2	Amochhu- Above Omchhu-Amochhu confluence	N26.86805 E089.37244	N26.87709 E089.37215	189	Development
S3	Amochhu-Main Construction Site	N26.87709 E089.37215	N26.88541 E089.37103	199	Main Office Area
S4	Amochhu- Above Wangchu nye (Shiv Mandir)	N26.88541 E089.37103	N26.88544 E089.36548	200	Development Site
S5	Amochhu-Below Lawrichhu-Amochhu Confluence	N26.87501 E089.97103	N26.88544 E089.33882	245	Development Site
S6	Amochhu-Below Confluence	N26.87501, E089.33882	N26.88629 E89.33504	257	Development Site
AT1	Amochhu-Omchhu Confluence	N26.86805 E089.3724	N26.86719 E089.77475	183	Below Samtse Highway Bridge
AT2	Omchhu-Crocodile Farm to new high way bridge	N26.86719 E089.77475	N26.86381 E89.39029	217	Dortikhola
AT3	Howraichhu	Tributary had dried up			
AT4	Loawrichhu-Amochhu confluence to below Tanding gup Office Samtse	N26.87501 E089.33882	N26.87808 E089.32619	222	Tanding gewog, Samtse

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4. Methods & Methodology:

The catch and release approach were adopted at all the sampling points. The fishes were caught using Electro-Fisher device (DC 3 KW electro shocker, ELT 62-II D, Grassl, Germany) by pulsing DC current into the water; this temporarily immobilizes the fish & dip net was used to catch the fishes. Generally, 12 Volts of electric current is pulsed into the water for approximately 1 to 3 seconds at various points along the sampling sites. Each fish caught was placed inside the transparent Photarium and photographed using high resolution camera before releasing back into the river. Following are the pictures taken during the survey:-

Figure 2: Showing Ecolab Team with the Experts in the field.

Figure 3: Showing Petrol generator Electro-Shocker

4.1 List of Materials used during survey:

i	German made Petrol-generator, 3 KW Electro-fisher (Electro-Shocker) device equipped with pole-mounted anode (positive electrode) & a cathode (negative electrode) with current generating range from 0 -20 A & voltage of 0-1000 V respectively
ii	Petrol
iii	Portable dip net
iv	Polyester open bags to store fish safely
v	DSLR Camera
vi	Garmin GPS
vii	Photarium
viii	Portable handheld multi-parameter water quality testing device
ix	Cloth pieces
x	Pens& pencils
xi	Field data sheets.

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The basic water parameters such as temperature, pH and dissolved oxygen were measured at all sites. The details of the basic water parameter are given in **Table 2.**

Table 2: Basic Water Parameter Data

Station	Location/name	Temperature (^{0}c)	pH	Dissolved Oxygen (DO)
S1	Amochhu –below Amochhu –Amochhu confluence	20.24	8.65	11.4
S2	Amochhu- Above Omchhu – Amochhu confluence	22.82	7.84	12.66
S3	Amochhu-Main Construction site	19.5	8.05	17.33
S4	Amochhu-Above Wangchhu nye (Shiv Mandir)	10.11	8.2	17.8
S5	Amochhu-above Wangchhunye (Shiv Mandir)	19.33	8.66	16.45
S6	Amochhu-Below Loawrichhu-Amochhu Confluence	19.2	8.35	14.02
AT1	Amochhu-Amochhu confluence to crocodile farm	25.01	8.8	14.3
AT2	Omchhu-crocodile farm to new high way bridge	24.99	8.8	14.1
AT3	Howraichhu	Tributary had dried up		
AT4	Lawrichhu-Amochhu confluence to below Tanding gup office Samtse	19.6	8.12	16.3

5. Findings:

5.1 Phytoplankton:

These are the microscopic algae that float and inhabit the upper layer of most freshwater and marine environment. They are mostly responsible for color and clarity of lakes, wetlands, rivers, streams and estuaries. They serve as primary producers to aquatic ecosystems, providing food sources for higher order organization such as zooplankton and small fishes. During the survey, phytoplankton species were found on the beds of the river at a very scare and infrequent habitations; this may be the case due to the recurrent erosion and sedimentation along the river banks.

5.2 Zooplanktons:

Zooplanktons are heterotrophic (detrivores) microscopic animals found both in freshwater and marine ecosystem. They serve as food source for fishes. Presences of amphipods (Shrimps) were found in some locations along Ammochhu in very less frequency.

5.3 Benthos:

Are the organism that lives on, in or near the seabed, riverbed or in the bottom of the lake, mostly in the sedimentary environment. During the survey, benthic species were not caught as the mesh of the nets may have been too large to catch benthic organism; this however, does not conclude the presence or the absence of benthic organism in the Amochhu River or its tributaries and therefore recommend for an explicit study to be conducted.

5.4 Fishes

During the survey, a total of 28 osteichthyic fishes belonging to four orders, eleven families and twenty genera were found. The status of the fish species has been referred from IUCN and is presented in the table below (**Table 3**).

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5.4.1: Classification of Fish Species based on their Order with IUCN Status

Note: For the tabulation (Table 3, 4, 5& 6) the Forest and Nature Conservation Act and Regulation 1995 and 2017 have been referred.

Table3: List of Fish Species belonging to Order *Cypriniformis* under its respective Family

Name of the species	IUCN Red List Status	Last Assessed
I). Family *Cyprinidae*		
1. *Apisdoperia sp.*	Least Concern(LC)	Species not determined
2. *Bariliusbarna*	Least Concern(LC)	19/03/2011
3. *Bariliusbendelisis*	Least Concern(LC)	22/01/2010
4. *Bariliusvagra*	Least Concern(LC)	22/01/2010
5. *Chaguniuschagunio*	Least Concern(LC)	22/01/2010
6. *Crossocheiluslatius*	Least Concern(LC)	09/10/2009
7. *Danio reio*	Least Concern(LC)	09/10/2009
8. *Garraannandalei*	Least Concern(LC)	09/10/2009
9. *Garragotyla*	Least Concern(LC)	07/10/2009
10. *Neolissochilushexagonolepis*	Near threaten(NT)	09/10/2009
11. *Neolissochilusdukai*	Data deficient(DD)	01/03/2010
12. *Pethiaticto*	Least Concern(LC)	22/03/2010
13. *Schizothoraxprogastus*	Least Concern(LC)	11/05/2010
14. *Schizothoraxrichardsonii*	Vulnerable(VU)	14/06/2010
15. *Semiplotussemiplotus*	Vulnerable(UV)	Not Assessed
16. *Labeodyocheilus*	Near Threaten(NT)	18/03/2010
II). Family *Psilorhynchidae*		
17. *Psilorhynchusbalitora*	Least Concern(LC)	23/02/2010
III). Family *Balitoridae*		
18. *Aborichthys sp.*	Least Concern(LC)	Species not determined
IV). Family *Amblycipitidae*		
19. *Amblycepsapangi*	Least Concern(LC)	16/12/2009
V). Family *Sisoridae*		
20. *Glyptothorax sp.*	Least Concern(LC)	Species notdetermined
21. *Glyptothorax panda*	Least Concern(LC)	09/04/2010
VI). Family Siluridae		
22. *Pterocryptis sp.*	Least Concern(LC)	Species not determined
VII). Family Nemacheilidae		
23. *Schistura sp.*	Least Concern(LC)	Species not determined

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Table 4: List of Fish Species belonging to Order *Synbranchiformes* under its respective Family

Name of the species	IUCN Red List Status	Last Assessed
VIII)Family *Mastacembelidae*		
24. Mastacembelusarmatus	Least Concern(LC)	12/10/2009

Table 5: List of Fish Species belonging to Order *Perciformes*under its respective Family

Name of the species	IUCN Red List Status	Last Assessed
IX)Family *Channidae*		
25. Channamelanostigma	Least Concern(LC)	Not Assessed
26. Channagachua	Least Concern(LC)	Not Assessed
X)Family *Badidae*		
27. Badisbadis	Least Concern(LC)	10/03/2010

Table 6: List of Fish Species belonging to Order *Siluriformes* under its respective Family

Name of the species	IUCN Red List Status	Last Assessed
XI)Family *Bagridae*		
28. Olyra sp.	Least Concern(LC)	Species not determined

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5.4.2 Fishes caught at each Sampling Sites.

Table 7: Stations with Fish Species Distribution

Station	Location/Name	*Fish Species*
S1	Amochhu – below Amochhu – Amochhu confluence	*Aborichthyssp,BadisBadis, Bariliusvagra, Bariliusbendelisis, Bariliusbarna,Channagachua,Channamelanostigma,Chaguniuschagunio, Daniorerio,Garraannandalei,Garragotyla,Pethiaticto,Psilorhynchusbalitor a, Neolissochilushexagonolepis, Schisturabeavani, Semiplotussemiplotu*
S2	Amochhu- Above Omchhu – Amochhu confluence	*Aborichthyssp, Amblycepsarunchalensis, Bariliusvagra, Bariliusbendelisis, Bariliusbarna, Garraannandalei, Garragotyla, Neolissochilushexagonalepis, Schisturabeavani, Labeodyocheilus*
S3	Amochhu-Main Construction site	*Apisdoperiasp,Aborichthyssp, Bariliusvagra, Bariliusbendelisis, Bariliusbarna, Crossocheiluslatius, Garraannandalei,Garragotyla, Neolissochilushexagonalepis, Psilorhynchusbalitora, Schisturabeavani, Schizothoraxrichardsonii,, Semiplotussemiplotus,Labeodyocheilus*
S4	Amochhu-Above Wangchunye (Shiv Mandir)	*Aborichthyssp, Bariliusbarna, Bariliusbendelisis, ,Bariliusvagra, Garragotyla, Neolissochilushexagonalepis, Garraannandalei, Schisturabeavani, Crossocheiluslatius, Mastacembelusarmatus, Glyptothorax panda, Glyptothoraxsp.Pterocryptissp, Schizothoraxprogastus,Mastacembelusarmatus*
S5	Amochhu-above Wangchunye (Shiv Mandir)	*Aborichthyssp, Bariliusbarna, Bariliusbendelisis, Bariliusvagra, Channagachua, Channamelanostigma, Crossocheiluslatius, Garraannandalei, Garragotyla, Glyptothorax panda, Glyptothoraxsp, Neolissochilushexagonalepis, Schisturabeavani, Schizothoraxprogastus,Mastacembelusarmatus,*
S6	Amochhu Below Loawrichhu-Amochhu Confluence	*Aborichthyssp, Bariliusbarna, Bariliusbendelisis, Bariliusvagra, Channagachua, Channamelanostigma, Crossocheiluslatius, Garraannandalei, Garragotyla, Glyptothorax panda, Glyptothoraxsp, Neolissochilushexagonalepis, Schisturabeavani, Semiplotussemiplotus.*
AT1	Amochhu-Omchhu confluence to below highway bridge.	*Aborichthyssp,Bariliusbarna, Bariliusbendelisis,Bariliusvagra, Crossocheiluslatius, Psilorhynchusbalitora, GarraannandaleiGarragotyla, Glyptothoraxpanda,Neolissochilushexagonalepis, Schisturabeavani, Chaguniuschagunio,*
AT2	Omchhu- Crocodile farm to new high way bridge	*Aborichthyssp, Badisbadis, Bariliusbendelisis, Bariliusbarna,,Bariliusvagra, , Channagachua, Crossocheiluslatius,Garraannandalei, Garragotyla, Danio rerio, Neolissochilushexagonalepis, Neolissochilusdukai, Schisturabeavani, , Psilorhynchusbalitora, Danio rerio,Glyptothorax panda*
AT4	Loawrichhu	*Aborichthys sp. Bariliusbarna, Bariliusbendelisis, Bariliusvagra,Garraannandalei, Garragotyla, Neolissochilushexagonalepis,Semiplotussemiplotus, Danio rerio, Glyptothorax panda*

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5.4.3 Presence of Fish Species during the Pre and Post Monsoon

The following table is a comparative representation of the fishes that was found in the 'pre' vs the "post" monsoon's Aquatic Surveys. The presence is noted as (✔) while the species that was found to be absent is left as blank.

Table 8: Fish Species Found in Different Sampling Months

SL. No	Species Name	Pre-monsoon	Post-Monsoon
1	Aborichthys sp.	✔	✔
2	Amblycepsapangi		✔
3	Amblycepsarunchalensis	✔	
4	Apisdoperia sp.		✔
5	BadisBadis	✔	✔
6	Bariliusbarna	✔	✔
7	Bariliusbendelisis	✔	✔
8	Bariliusvagra	✔	✔
9	Chaguniuschagunio	✔	✔
10	Channagachua	✔	✔
11	Channamelanostigma	✔	✔
12	Crossocheiluslatius	✔	✔
13	Danio rerio	✔	✔
14	Davarioaequipinnatus	✔	
15	Garragotyla	✔	✔
16	Garraannandalei	✔	✔
17	Glyptothorax panda	✔	✔
18	Glyptothorax sp.	✔	✔
19	Labeodyocheilus		✔
20	Lepidocephalicthysguntea	✔	
21	Mastacembelusarmatus	✔	✔
22	Neolissochilusdukai		✔
23	Neolissochilushexagonolepis	✔	✔
24	Olyra sp.		✔
25	Oreichtyscrenucliodes	✔	
26	Pethiaspp	✔	
27	Pethiaticto	✔	✔
28	Psilorhynchusbalitora	✔	✔
29	Pterocryptis sp.		✔
30	Schisturabeavani	✔	✔
31	Schizothoraxprogastus	✔	✔
32	Schizothoraxrichardsonii		✔
33	Semiplotussemiplotus	✔	✔
34	Tor Putitora	✔	

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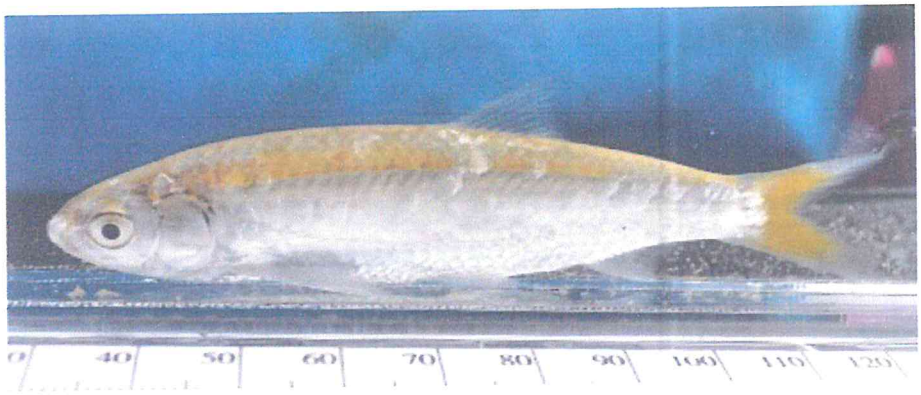
5.4.4: Photographs of Fish Species caught during the Post Monsoon Aquatic Survey

The following mentioned fishes were caught and placed inside the photarium for photographs and released into the river immediately. The Scientific names of each fishes are mentioned at the top of their respective photographs.

1. **Scientific Name:** *Apisdoperia* sp.
   Local Name: Not Found (Species not identified)



2. **Scientific Name:** *Barilius barna*
   Local Name: Barna bari

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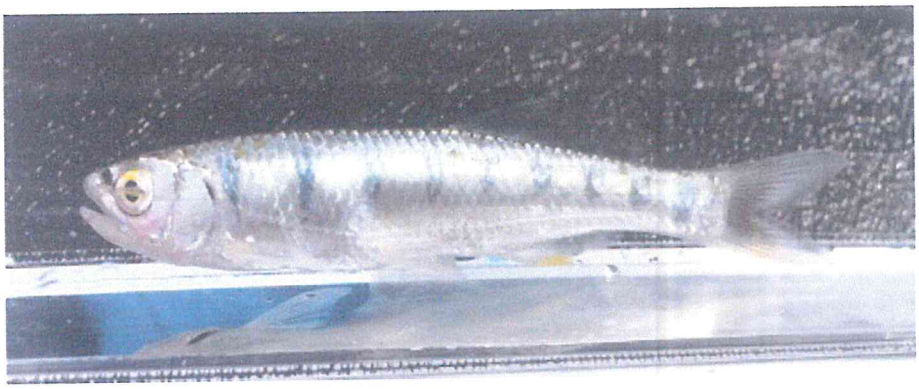
3. **Scientific Name:** *Barilius bendelisis*
   Local Name: Hemiiton's barila

4. **Scientific Name:** *Barilius vagra*
   Local Name: Barilus Vagra



5. **Scientific Name:** *Chagunius chagunio*
   Local Name: Not Found (Species not identified)

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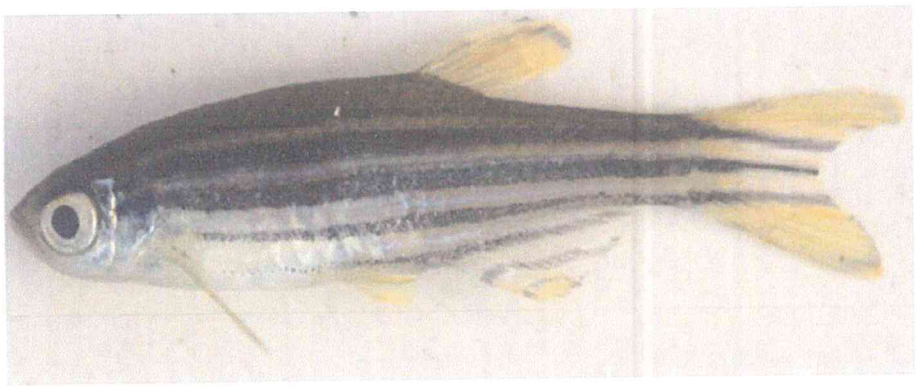
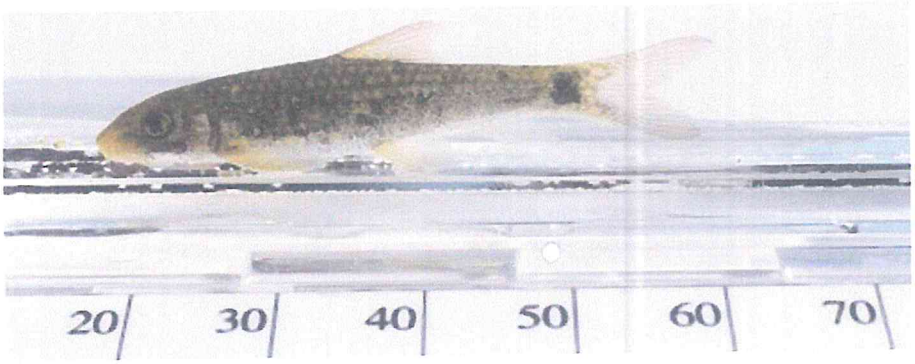
6. **Scientific Name:** *Crossocheilus latius*
   Local Name: Stone Roller/Gangetic Latia

7. **Scientific Name:** *Danio reio*
   Local Name: Zebra Fish



8. **Scientific Name:** *Garra annandalei*
   Local Name: Annandale garra



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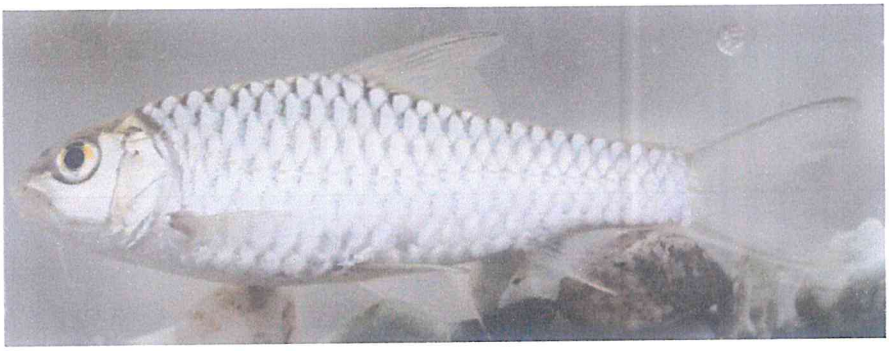
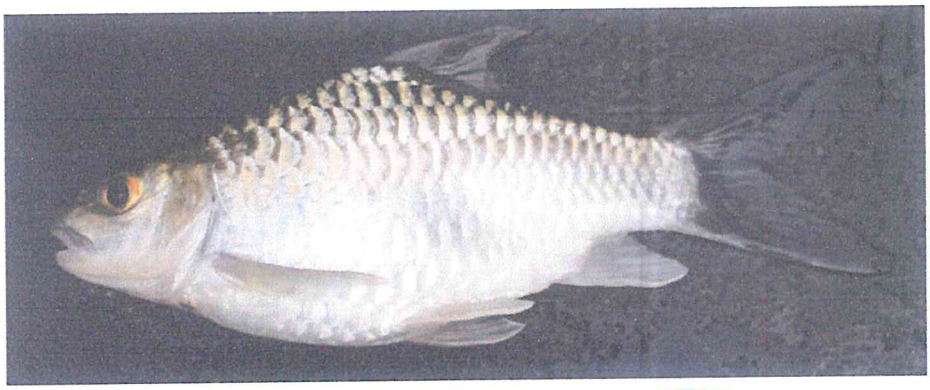
9. **Scientific Name:** *Garra gotyla*
   Local Name: Cyprinus gotyla

10. **Scientific Name:** *Neolissochilus hexagonolepis*
    Local Name: Copper Masheer



11. **Scientific Name:** *Neolissochilus dukai*
    Local Name: Neolissochilus dukai



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12. **Scientific Name:** *Pethia ticto*
Local Name: Ticto Barb

13. **Scientific Name:** *Schizothorax progastus*
Local Name: Dinnawah Snowtrout

14. **Scientific Name:** *Schizothorax richardsonii*
Local Name: Asla

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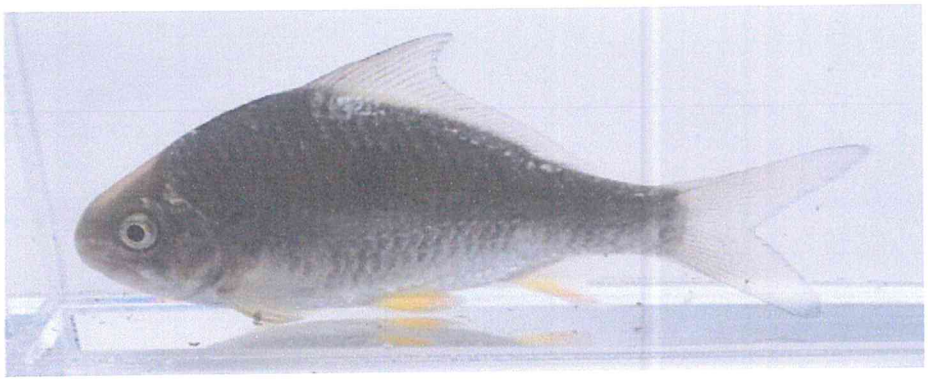
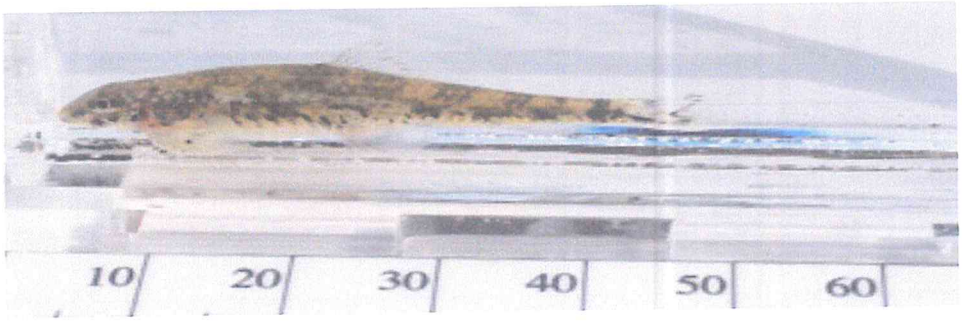
15. **Scientific Name:** *Semiplotus semiplotus*
Local Name: Simiplotus



16. **Scientific Name:** *Labeo dyocheilus*
Local Name: Ghora Mach

17. **Scientific Name:** *Psilorhynchus balitora*
Local Name: Balitora Minnow



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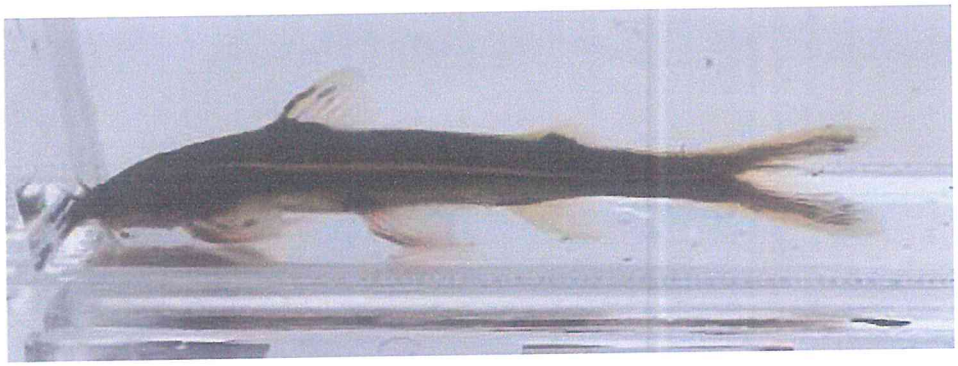
18. **Scientific Name:** *Aborichthys sp.*
Local Name: Not Found (Species not identified)

19. **Scientific Name:** *Amblyceps apangi*
Local Name: Not Found (Species not identified)

20. **Scientific Name:** *Glyptothorax* sp.
Local Name: Not Found (Species not identified)



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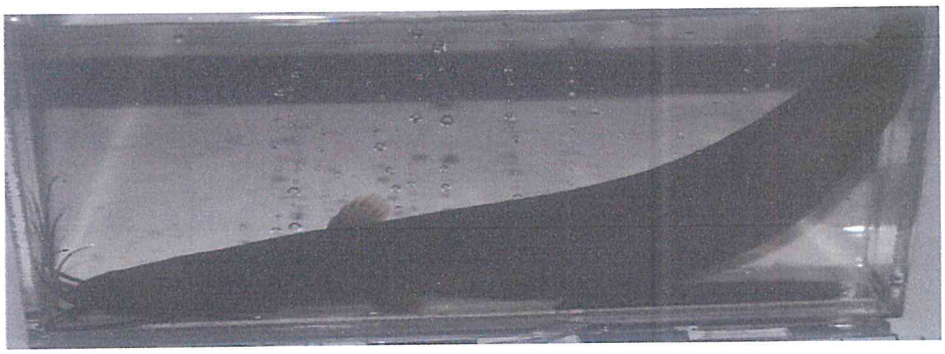
21. **Scientific Name:** *Glyptothorax panda*
Local Name: Not Found (Species not identified)

22. **Scientific Name:** *Pterocrypti ssp.*
Local Name: Cat Fish



23. **Scientific Name:** *Schistura* sp.
Local Name: Not Found (Species not identified)

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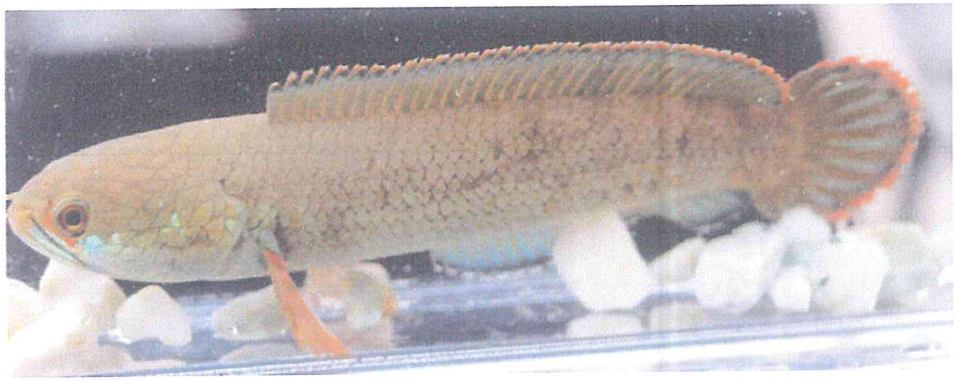
24. **Scientific Name:** *Mastacembelus armatus*
Local Name: Tire Track Eel

25. **Scientific Name:** *Channa melanostigma*
Local Name: Channa paradalis

26. **Scientific Name:** *Chann agachua*
Local Name: Snake Head



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27. **Scientific Name:** *Badis Badis*
Local Name: Blue perch or Blue Badies

28. **Scientific Name:** *Olyra sp.*
Local Name: Not Found (Species not identified)

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6. Conclusion:

For the pre-monsoon Aquatic Survey (conducted on the 27th April to 1st of May, 2019), a total of 27 species of fish were recorded which includes two endangered species namely, *Tor putitora* (Golden Masheer) and *Amblyceps arunchalensis* while for the post monsoon Aquatic survey (conducted on the 21st to 23rd of October, 2019) a total of 28 fish species were recorded during the post-monsoon study.

A total of four new species of fish i.e. *Pterocryptis spp, Amblyceps apangi, Labeo dyocheilus & Neolissochilus dukai* were caught in the post monsoon survey where as six fish species (i.e. *Pethia spp, Tor Putitora, Lepidocephalicthys guntea, Davarioa equipinnatus, Amblyceps arunchalensis & Oreichtyscre nucliodes*) that were caught during the pre-monsoon survey were found to be absent/ not caught. These absence and present of fishes from the two seasons are mainly due to the migration and spawning pattern of the fishes. *Tor Putitora* is one type of fish that swim towards the south i.e. near the Indian border during the winter season (Kuensel, dec 7, 2018) and swim up to the rocky water beds for breeding during flood and spawn over rockey and gravel substrates (WWF India).

Although Fish diversity remains fairly the same in all sampling transects, AT4 came with lowest species count which may be due to the decrease in the river volume, along with the disturbance caused due to piling of gravels form the construction activities. S1 and AT2 were found to have the highest number of species as these sites were at the confluence and undisturbed (respectively) therefore the presence of fishes were more likely.

Among the fish species, *Garra spp* was the most common catch in all sites as they are less likely to migrate and can thrive in shallower river unlike the above mentioned fishes. Fish Species like *Labeo spp., Olyra spp. & Mastacembelus spp.* were not frequently encountered. According to the experts, those species prefer deep river and thrive at greater depth where operator could not have reach out during the survey.

Collectively, a total of 34 fish species have been noted from the two Aquatic Surveys conducted i.e. for spring and autumn season, 2019.

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Appendix I: Letter to National Research Centre for Riverine & Lake Fisheries

BHUTAN ECOLAB SERVICES, PEKARZHING, P/LING.
INSPIRING ENVIRONMENTAL SERVICES...

18/10/2019

To
The Director General,
Department of Livestock,
MoAF, Thimphu.

Subject: Seek Assistance to carryout Fish sampling (21/10/2019 to 26/10/2019) at Ammochu (Phuntsholing Township Development Project).

Respected Dasho,

We would like to seek Dasho's kind approval to seek assistance from National Research Centre for Riverines and Lake Fisheries (NRCRLF) to carryout aquatic sampling. Our aim of the study is to assess the fish diversity and presence of Golden Mahseer (critically endangered fish) for conservation recommendation during and after township development.
Since, we have got study approval from Department of forest and parks services to carry out the study, we would be highly grateful if Department of livestocks could kindly assist us with technical and manpower support approval from NRCRLF,Haa.
We have contacted with technical person at NRCRLF and advised us to get an approval from Department of Livestock.
We anticipate your kind support and extend our gratitude for helping in our first aquatic survey held in March, 2019.

Thanking you,
Yours faithfully,

Yeshi Tenzin
(Quality Manager)
17449115

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Appendix 2: Clearance Letter for the Aquatic Survey

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Construction Development Corporation Limited
Head Office
Thimphu:Bhutan

CDCL/2019/PTDP/PIU/05/298 15th October 2019

Mr. R Ravichandran

Project Manager

AFCONS Infrastructure Ltd.

Subject: Approval for carrying out aquatic survey at Amochhu

Dear Sir,

This is with reference to your letter no. AFC/6462/RRC/441 dated 23rd September 2019, with regard to seeking permission from Department of Forest and Park Services (DoFPS) for carrying out aquatic survey.

In this regard, we would like to inform you to proceed with the aquatic survey since the permission from DoFPS has been obtained. However, you are requested to strictly comply with the conditions specified in the approval letter and liaise with concerned forest Range office for awareness and monitoring during the field study.

Please find attached the approval letter obtained from the concerned office, for your kind information.

Sincerely,

(Project Manager)
PIU, PTDP, CDCL

AFCONS INFRASTRUCTURE
RECEIVED
DATE 15/10/19
2:35 pm

Cc ;

1. The Project Director, PMU, PTDP, CDCL, for kind information please.
2. The Team Leader, PIC, PTDP, for information.
3. The Dy. PM, & EM, PTDP for information.

Registered Office: Jangsam Lam, Changangkha, Thimphu 11001, Bhutan
Post Box No.573 | Tel: +975-2-324360/325702 | Fax: +975-2-332973
www.cdcl.bt

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Thandari

Ministry of Agriculture and Forests
Department of Forests & Park Services
NATURE CONSERVATION DIVISION
"Managing Bhutan's Natural Heritage"

NCD/SCMS-02/2019-20/ 114

14[th] October 2019

The Chief Executive Officer,
Construction Development Corporation Limited,
Thimphu.

Subject: Approval for Aquatic Survey on the Amochhu for Phuentsholing Township Development Project

Sir,

The Nature Conservation Division, Department of Forests and Park Services, acknowledges the receipt of the report on Ecological Analysis based on aquatic survey conducted on the Amochhu during the first quarter of 2019.

Based on the subsequent request for approval as per letter No. CDCL/2018-2019/PTDP/PIU/09/276 dated 3[rd] October 2019 for the same survey, we would like to convey the approval to conduct aquatic survey in three specified micro-habitats one each at the project site, upstream, and downstream as described in the proposal. However, please note that approval is only valid for survey sites within our national jurisdiction during this season. Fish survey should strictly deploy the catch and release method using electroshocker (3kW) only or improvised nets.

We would like to request you to kindly liaise with the concerned forest offices for awareness and monitoring during the field survey.

Once the survey is completed, kindly share a copy of the report/information generated from this study to this office for our record and reference.

Thanking you,

Yours sincerely,

(Sonam Wangdi)
Chief Forestry Officer

cc.

- Director, Department of Forests and Park Services for kind information
- Chief Forestry Officer, Gedu Forest Division for kind information and necessary action

Telephone # : +975 02 325042/324131 Fax # : +975 02 335806 Post box #: 130

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