Environmental and Social Impact Assessment and Environment and Social Management Plan for Climate Resilient Domestic Water Supply Systems for Toedpisa and Barp (including Lobesa Township) Gewogs in Punakha

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LIST OF ACRONYMS

ACREWAS	Advancing Climate Resilience of the Water Sector
AOI	Area of Influence
BAP	Biodiversity Action Plan
BDBL	Bhutan Development Bank Limited
BHU	Basic Health Unit
BIL	Bhutan Insurance Limited
BNB	Bhutan National Bank
BOB	Bank of Bhutan
BPT	Break Pressure Tank
BTFW	Border Town Foreign Workers
CAT	Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CF	Community Forest
CFMG	Community Forest Management Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNR	College of Natural Resources
CoC	Code of Conduct
CRPD	Convention on the Rights of Persons with Disabilities
CSA	Climate Smart Agriculture
CSD	Convention on Biological Diversity
CSO	Civil Society Organization
DE	District Engineer
DEMC	Dzongkhag Environment Management Committees
DI	Ductile Iron
DoA	Department of Agriculture
DoCDD	Department of Culture and Dzongkha Development
DECC	Department of Environment & Climate Change
DoFPS	Department of Forests and Park Services
DoI	Department of Infrastructure
DoID	Department of Infrastructure Development
DoL	Department of Land
DoL	Department of Livestock
DoW	Department of Water
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DWMC	Dzongkhag Water Management Committee
EA	Environment Assessment
EC	Environmental clearance
ECCD	Early Childhood Care and Development
ECR	Extended Classroom
EHS	Environmental Health and Safety
ESIA	Environment and Social Impact Assessment
ESMF	Environmental and Social Management Framework

ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Safeguards
FC	Forest Clearance
FCR	Ferro Cement Reservoir
FGD	Focused Group Discussion
FNCA	Forest and Nature Conservation Act
FNCRR	Forest and Nature Conservation Rules and Regulations
FPIC	Free Prior and Informed Consent
FYP	Five Year Plan
GAP	Gender Action Plan
GAO	Gewog Administrative Officer
GBCL	Green Bhutan Corporation Limited
GBV	Gender-Based Violence
GCF	Green Climate Fund
GEF	Global Environment Facility
GH	Greater Himalaya
GI	Galvanized Iron
GLOF	Glacial Lake Outburst Flood
GRM	Grievance Redress Mechanism
HDPE	High Density Polyethylene
HH	Household
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
ICERD	International Convention on the Elimination of All Forms of Racial Discrimination
IoT	Internet of Things
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
JSWNP	Jigme Singye National Park
LCMP	Land Cover Mapping Project
LEA	Labour and Employment Act
LG	Local Government
LH	Lesser Himalayan
LMP	Labour Management Plan
MoAL	The Ministry of Agriculture and Livestock
MoENR	Ministry of Energy and Natural Resources
MOF	Ministry of Finance
MoIT	Ministry of Infrastructure and Transport
MTR	Mid-term Review
NAP	National Adaptation Plan
NCD	Nature Conservation Division
NCHM	National Centre for Hydrology and Meteorology
NCWC	National Commission for Women and Children
NECS	The National Environment Commission Secretariat
NEPA	National Environmental Protection Act
NFE	Non-formal Education
NWFP	Non-Forest Wood Products
NGEP	National Gender Equality Policy

NGO	Non-government Organization
NIWRMP	National Integrated Water Resources Management Plan
NRDCL	Natural Resources Development Corporation Limited
NSB	National Statistics Bureau
NWFP	Non-Wood Forest Product
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
OHSW	Occupational Health, Safety and Welfare
OP-CRC-AC	Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict
OP-CRC-SC	Optional Protocol to the Convention on the Rights of the Child and the sale of children, child prostitution and child pornography
PES	Payment for Ecosystem Services
PIU	Project Implementation Unit
PMU	Project Management Unit
PPE	Personal Protective Equipment
PPG	Project Preparation Grant
PSC	Project Steering Committee
PUC	Pollution Under Control Certificate
RBP	Royal Botanic Park
RCC	Reinforced Cement Concrete
RECOP	Regulation for the Environmental Clearance of Projects
RENEW	Respect, Education, Nurture and Empower Women
RGOB	Royal Government of Bhutan
RICB	Royal Insurance Corporation of Bhutan
RNR	Renewable Natural Resources
RSTA	Road Safety and Transport Authority
RWSS	Rural Water Supply Scheme
SEP	Stakeholder Engagement Plan
SES	Social and Environmental Screening
SES	Social and Environmental Standards
SESP	Social and Environmental Screening Procedure
SH	Sub Himalayan
SMART	Spatial Monitoring and Reporting Tool
SMP	Spoil Management Plan
SOBR	State of the Basin Report
SOP	Standard Operating Procedure
SRF	State Reserved Forest
SRFL	State Reserved Forest Land
SRM	Stakeholder Response Mechanism
TH	Tethyan Himalaya
ToR	Terms of Reference
UNDAF	United National Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UWICER	Ugyen Wangchuck Institute for Conservation and Environment Research

UWIFORT	Ugyen Wangchuck Institute for Forestry Research and Training
WHO	World Health Organization
WMD	Watershed Management Division
WSP	Water Safety Plan
WUA	Water User Association
WUG	Water User Group

EXECUTIVE SUMMARY

The "Advancing Climate Resilience of the Water Sector in Bhutan" project aims to improve the resilience of communities in climate-vulnerable regions by addressing water shortages and declining quality. The project will restore critical catchments, provide drinking water for communities, businesses and institutions, replicate existing PES schemes, and promote climate-proofing of water infrastructure using IoT and digital technologies. The project consists of four components: water governance, nature-based solutions for sustainable watersheds, efficient water supply, distribution, and utilization, and knowledge management.

Component 3 of the Project aims to improve water infrastructure's adaptive capacity to climate-induced water shortages and quality deterioration through climate-proofing, private sector engagement, and technology deployment.

Under Activity 3.1.2, the project aims to climate proof domestic water supply systems for Toedpisa and Barp including Lobesa township in Punakha comprising of one reliable and consolidated collection tank at intake point, four water storage tanks, one water treatment plant of 1 MLD and piped water conveyance length of 30.78km from Okalum water source to Thinleygang and Lobesa town with distribution points along the pipeline connected to the existing distribution network.

The project will establish a consolidated and reliable system for delivery of water through the construction of RCC intake structure/weir at Okalum water source, sand trap, 4 RCC Reservoirs (2 measuring 200 cum, 1 measuring 150 cum and 1 measuring 50 cum), and providing and laying of 2 main water supply transmission pipelines totaling 43.58 km.

The first water pipeline from the source to Thinleygang for Toedpisa Gewog will be distributed to Thinleygang and Gemsa village. The second water pipeline will extend from the source to the water treatment plant (WTP) at Darshing Top for Barp Gewog. From the WTP, the water will be distributed to 2 reservoirs (measuring 200cum each) at Darshing Top and lam Serpo's Lhakhang.

From the first 200 cum reservoir at Darshing Top the water will be distributed to Lobesa core area and Dashiding Higher Secondary School. From the second 200 cum reservoir above Lam Serpo's Lhakhang, water will be distributed to the existing tank at the College of Natural Resource, Dorangthang nunnery and the existing tank at Lobesa school.

The Water Treatment Plant is an ancillary facility, that will be constructed under Design, Build and Operate Model through a separate financing mechanism.

The ESIA approach includes desk review, data collection from PIU via email, data collection during field visits and consultations with relevant stakeholders. The ESIA conforms with the ESMF, the requirements as per UNDP SES and RGOB's Environmental Assessment Act, 2000. Potential environmental and social impacts were assessed through the field visits and consultations and described as per UNDP SES. For each impact, mitigation measures are described in Chapter 8.

The project design process included field assessments and site selection in consultation with community representatives. Climate resilient designs include the construction of gabion walls upstream of intake to block debris during monsoon season; retaining walls for slope stability; and the use of HDPE/DI pipes and fittings. The design also takes into consideration the topography

and on moderate to steep slopes, sections of the suspended pipes will be supported with pipe support pillars and retaining walls. All bends and slopes will be protected by thrust blocks. To reduce the water pressure, minimize pipe breakage and prevent freezing during winter, the pipeline will be laid in 1.2 m wide by 1.5 m deep trenches and will be back filled with the excavated muck. The intake area, sand trap, reservoir and the break pressure tanks will be secured with fencing and gate. All Water Retaining Structures/components will be constructed with reinforced cement concrete.

The project will provide drinking water for 9,885 people from 896 households in Barp and Toepisa Gewogs. Successful interventions will yield significant socio-economic benefits to communities including safe reliable water, improved sanitation, and health. The new water pipeline will replace all existing ones and will implement a systematic Operation and Maintenance system through training of water user groups.

All the UNDP SES are triggered by the project. The extent of the impacts against each standard has been assessed and described accordingly and mitigation measures have been proposed according to the mitigation hierarchy.

Overall, the project is 'Moderate' risk, due to the nature of the infrastructure work. The potential adverse social and environmental risks and impacts are limited in scale, are largely reversible and can be identified with a reasonable degree of certainty. These impacts are readily addressed through application of recognized good international practice, mitigation measures and stakeholder engagement during project implementation. Mitigation measures involve conducting biodiversity assessments, preparation, implementation, and monitoring of a robust biodiversity action plan to minimize any potentially significant adverse impact and enhance biodiversity conservation, including other related environment and social mitigation measures.

The Okalum source and 668 m of the water pipeline are located within the Royal Botanic Park Garden. As the major portion of the project infrastructure is within state forest land and community forest (250 m pipeline), almost 94% of the water pipeline will traverse through forest land, mostly State Reserve Forest.

Through the field assessment and in consultation with the forest officer, five mammal species and 37 bird species were documented. Of the species recorded, the Asiatic Black Bear and the Sambar Deer are listed as Vulnerable under the IUCN Red List and are also listed in Schedule II of the FNCA. All the birds recorded fall under the Least Concern category of the IUCN Red List. There are no fish species recorded in the stream.

Towards the settlement, sections of the water pipeline will traverse private land for which prior clearance from the community has been obtained. The project will not acquire land, will not displace, or resettle any households and will not alter land tenure arrangements. The excavation work along the alignment will traverse 24 private plots, where it is anticipated that landowners will be marginally impacted only during the 18-month construction period.

During the public consultation it has been confirmed that there are no communities in the project areas that depend largely on forestry resources as a source of livelihood. The project activities will not hamper the seasonal collection of non-timber forest resources by the communities.

While contractors may prefer to employ local people for material haulage and excavation work and other manual work because they are more accustomed to the difficult terrain and are more

physically able than foreign laborers, locals do not have the necessary technical skills for other work such as construction of intake channels, pipe jointing or masonry work. It is anticipated that semi-skilled and skilled workers would be sourced from outside the area.

The Contractor is to ensure worker health and safety protocols are complied with by adhering to relevant labour laws and regulations, identifying hazards, providing safe drinking water, PPE, first aid, training/awareness emergency response protocols, grievance mechanisms and ensuring compliance with the code of conduct.

During the operation phase, it is envisaged that risks related to poor drinking water quality, damage to infrastructure damage from natural hazards and disaster, tampering and the need for accountability and appropriate water sharing management mechanisms might occur.

Under Activity 2.2.1 of the ACREWAS project a new PES scheme will be established for Okalum watershed between catchment communities of Toedpisa Gewog and downstream communities of Toedpisa and Barp Gewogs and institutions within the gewogs including Lobesa township. The PES scheme will promote sustainable management of the water catchment in the project area, ensure adequate drinking water as well as an innovative financing mechanism for sustainable watershed management under output 1.3. The project will also strengthen water governance and local institutions to support climate-resilient water management through the preparation of catchment level local forest management plans based on resource assessment and mapping.

In preparing the ESMP, project impacts are categorized into pre-construction, construction, and operation phases. Mitigation measures were developed to reduce adverse negative effects, in consultation with UNDP, PMU, PIU and the community.

The ESMP outlines mitigating measures, responsibilities, and budget requirements to effectively manage all potential environmental and social issues likely to occur during the different phases of project implementation.

The Environmental Monitoring Plan describes the indicators for compliance monitoring along with responsibilities. The key responsibilities of the PSC, PMU, PIU, and Gewogs for the implementation of the ESMP have also been outlined.

As required under the UNDP SES, to guarantee an Accountability Mechanism for the construction activities, the Stakeholder Response Mechanism (SRM) will be ensured through the establishment of a Grievance Redress Mechanism (GRM), which is based on the UNDP guidance on Grievance Redress Mechanism and the Stakeholder Engagement Plan. The Contractor will be required to follow the Occupational Health and Safety Plan, Labor Management Plan, Waste Management Plan, Emergency Preparedness Plan and Chance Find Procedures as well. The Biodiversity Action Plan requires the involvement of the Department of Forest, the Department of Livestock, Contractor, and allocation of budget from the project to implement activities proposed.

The GRM aims to offer accessible grievance resolution procedures for project-related grievances and disputes among affected individuals, communities, and stakeholders. It follows the UNDP SES guidance on eligibility and describes the terms of reference for the GRM committees.

1. INTRODUCTION

1.1. Background

The project **"Advancing Climate Resilience of the Water Sector in Bhutan" (ACREWAS**) forms a core part of Bhutan's national plan to provide integrated water supply for four Dzongkhags in Bhutan. The project aims to enhance the resilience of communities to climate change-driven impacts on water resources and water infrastructure in some of the most climate vulnerable regions in the country. The project addresses the shortages and declining water quality, which has a direct bearing on increased vulnerabilities of livelihoods, food production and human health that depend on the renewable natural resources (RNR) sector, particularly for those communities that are dependent on forest resources. The overall objective of the project is to enhance the resilience and sustainable economic well-being of the people of Bhutan by supporting climate adaptation interventions in the water sector.

The project will

- Restore, manage, and protect critical catchments to stabilize and enhance water yields by enhancing their resilience to extreme events and extended dry seasons.
- Provide irrigation water for farmers and support them in adopting climate resilient agricultural practices.
- Replicate existing Payment for Ecosystem Services (PES) schemes to sustain the management of critical catchments.
- Promote climate proofing of water infrastructure and remove barriers to adaptation solution using tools that leverage the Internet of Things (IoT) and digital technologies.

1.2. Project Components

The project will be implemented through four components.

- Component 1: Water governance and institutions
- Component 2: Nature-based solutions for sustainable & climate- resilient watersheds and livelihood enhancement
- Component 3: Efficient, adequate, and sustainable supply, distribution, and utilization of water
- Component 4: Knowledge management

The outcome under Component 3 aims to enhance adaptive capacity of water infrastructure to climate-induced water shortages and quality deterioration through climate-proofing, private sector engagement, and technology deployment**.**

Under Output 3.1: Climate proofing measures implemented in multi-purpose storage, conveyance, and distribution network of domestic and irrigation water, the project will accrue domestic water, irrigation, and watershed benefits to 37,334 individuals (17,869 females) in the three Dzongkhags[1].

[1] ACREWAS Project Document.

Under Activity 3.1.2, the project aims to climate proof domestic water supply systems for Toedpisa and Barp Gewogs including Lobesa township in Punakha comprising of one reliable and consolidated collection tank at intake point, four water storage tanks, one water treatment plant of 1 MLD and piped water conveyance length of 43.58 km from Okalum water source to Thinleygang and Lobesa town with distribution points along the pipeline connected to the existing distribution network.

Currently there are several water users abstracting water from the Okalum stream, with pipelines laid overland. Some of these are damaged, leaking and require constant repair and maintenance. The water is also insufficient to meet the current demand with many households and institutions suffering from acute shortage of water. The problem has been further exacerbated by the increasing population in Lobesa town and within the two gewogs.

This intervention, once successfully completed, will result in significant socio-economic benefits to the communities in Lobesa town, Barp and Toedpisa Gewogs allowing them to avail safe drinking water and live healthier lives with adequate water for washing and sanitation.

1.3. ESIA Approach and Methodology

During the project preparation phase, a detailed analysis of the project's overall social and environmental risks was conducted and presented in the UNDP Social and Environment Screening Procedure (SESP). The SESP identified 11 risks, of which 8 were scored as moderate and 3 were scored as low, resulting in an overall categorization of Moderate Risk to the project. The environmental and social safeguards screening was also carried out and an Environmental and Social Management Framework (ESMF) prepared. The ESMF provided the framework and procedures for screening, assessing, and managing the potential social and environmental impacts of the project interventions, to ensure full compliance with UNDP SES requirements during project implementation.

The ESMF requires the project to assess the environmental and social impacts and risks though and Environment and Social Impact Assessment (ESIA) study. Based on the ESIA, the Environmental and Social Management Plan (ESMP) is to be prepared to ensure that the relevant risks and impacts identified are adequately addressed through mitigation measures and a system for monitoring these risks and impacts are established.

The ESIA has been prepared based on project documents, field investigations and stakeholder consultations to meet the requirements for environmental assessment process and documentation as per UNDP SES and RGOB's Environmental Assessment Act, 2000. The approach was outlined in the Inception Report submitted prior to commencement of the assignment.

The preparation of this report followed the subsequent stages over a period of one and half months (1st October to 15th November 2023). Details of the Stakeholder engagement have been provided in Chapter 5.

1.3.1. Desktop Research and Literature

All relevant national laws, rules, regulations, guidelines and standards and project documents were reviewed to understand better national regulatory requirements and to formulate the Chapter pertaining to legal framework compliance requirements in terms of national and international conventions, agreements, and obligations. Gaps between national legislation and international policies of the UNDP were identified so that compliance measures for the higher standard could be incorporated. All relevant data required to compile the baseline chapters for each subproject location were reviewed (physical, ecological, economic development and socio-cultural aspects). Based on the desk review and a set of data requirements, questionnaires and topics for various stakeholder's consultations and community meetings were prepared.

Additional data was obtained through field visits, secondary data sources, verification of data in the fields and through consultations with relevant stakeholders and officials. Data collected through desktop reviews, field assessments and consultations were analyzed and verified through PIU, PMU and UNDP.

1.3.2. Analysis of Alternatives

Alternatives were considered for the project site and assessed in consultation with the Project Management Unit including the 'no action/without project scenario', from the point of view of social, environmental, and economic aspects.

1.3.3. Site Assessment and Rapid Biodiversity Surveys

To determine the environmental impacts, rapid biodiversity surveys at the water source and water pipeline alignment were conducted from 8th to 14th October 2023. The site visits were supported by the Dzongkhag and Gewog Officials and the surveyors were accompanied by Dzongkhag staff and community members knowledgeable about the project component locations.

The focus of the assessments was to determine whether the project components would impact the following: a) Protected areas, critical habitats b) Endangered, rare, threatened, or vulnerable wildlife and bird species, and c) Community Forest. The findings of the survey are incorporated into the baseline chapter on existing environmental conditions, land use, forest cover, topography, and biodiversity.

Photo 1. Site Visit to the Okalum Water Source

Photo 2. Site Visit to the Darshingding WTP Site

1.3.4. Stakeholder Engagement and Consultation

A consultation/stakeholder engagement plan was prepared by mapping the stakeholders (as per their interest and influence). This was prepared prior to the field visit in consultation with the PMU and UNDP. Stakeholder consultations were conducted with relevant Dzongkhag, Local Government, and communities on 18th and 19th October 2023.

Consultative meetings/discussions are detailed in Chapter 8. The consultations were supported by the Dzongkhag and Gewog Officials.

As per the ESMF, the Stakeholder Engagement Plan developed during the project's design phase will guide all actions pertaining to SES implementation. The FPIC protocol developed in the SEP has been followed. Details are covered in Annex 10.

1.3.5. Gender Action Plan

As directed in the ToR, the Gender analysis and planning process were aimed to ensure that the GAP developed for the project is mainstreamed across project implementation and in the ESMPs. The Gender assessment and planning process included the following:

- Review of the Gender Analysis and Gender Action Plan Report (July 2022): The Gender Analysis and Gender Action Plan developed in July 2022 was reviewed and updated based on the discussions at the project site.
- Brief Gender Analysis Report: The results of the above exercise were used to prepare a brief gender analysis as part of the main report, including demographic profiling with gender break-up in the project site.
- Gender Action Plan: Based on the review exercise above, the Gender Action Plan for the project site was revised keeping in view the recommendations from the Gender Analysis

and Gender Action Plan Report of July 2022. The revised Gender Action Plan also addresses the compliance monitoring and report requirements as well as the capacity development needs.

1.3.6. Determining the Area Project of Influence

A project's area of influence encompasses the following according to UNDP Social and Environmental Standards 2021.

- The primary project site(s) and related facilities (intake structure, water pipelines, reservoirs, canals, disposal areas),
- Areas and communities potentially affected by cumulative impacts from the project or from other developments in the geographic area.
- Areas and communities potentially affected by induced impacts from unplanned but predictable developments or activities caused by the project, which may occur later or at a different location.

Table 1. Project Area of Influence.

Area of Influence	Description	Area
Direct Area of Influence	This Direct AoI includes the direct footprint of the Project facilities (both temporary and permanent installations and extend to a 5 m radius (land distance). For terrestrial flora, the direct impact zone is the immediate area near the project components.	Intake area at Okalum, Toedpisa Gewog and water pipelines through 2 gewogs.
Indirect Area of Influence	For aquatic biodiversity, the area of indirect influence may extend downstream and upstream in the watershed. For mobile terrestrial fauna species or those with limited distribution, the area of influence may extend depending on the population dynamic and continuity of habitats up to 2 km.	State Forest Reserve Land in Toedpisa Gewog and State Forest Reserve Land and settlement in Barp Gewog.
Cumulative Area of Influence	Includes all project gewogs.	Toedpisa and Barp Gewogs.

1.3.7. Impact Assessment and Preparation of the ESIA and ESMP

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The ESIA includes an assessment of the direct, indirect, and cumulative environmental and social impacts as per UNDP SES, during project planning, design, construction, and operation within the project area of influence.

Based on the impact assessment, appropriate mitigation measures were determined and proposed to address the risks and impacts in accordance with the mitigation hierarchy in the

ESMP. Implementation and monitoring responsibilities and capacity requirements were also identified.

The ESIA and ESMP is based on the project design and layout obtained till 30th October 2023, and may be revised subject to changes in the project design or component locations.

1.4. Report Structure

The report is structured in accordance with the inception report submitted and approved by UNDP following the suggested outline per the targeted hybrid ESIA and ESMP format. The Project Management Unit (PMU) and Project Implementation Unit (PIU) have supported the report preparation.

2. LEGAL AND INSTITUTIONAL FRAMEWORK

2.1. National Legislation, Standards and Guidelines

This section reviews the existing legislation in Bhutan related to the environment and social context and that are relevant to the project. It examines whether the existing legal framework in Bhutan is adequate to address project impacts and fulfil requirements under the updated 2021 UNDP SES Policy.

Table 2: Relevant National Legislation

Sector	Legislation	Requirements	Applicability to Project
Overarching	Constitution of Bhutan 2008	Article 5 of the Constitution of Bhutan is entirely devoted to the environment. It places responsibilities on every Bhutanese and on the royal government and requires the parliament to conserve the rich biodiversity of Bhutan. As per Article 1(12), all rivers, lakes, forests and mineral resources belong to the state and their use is regulated by law.	The ACREWAS sub-project will abstract water from distant water sources located in forests through pipes which will be buried. Felling of trees, soil disturbance through excavation and soil and dust pollution are the temporary, short-term impacts foreseen. As such the project will be governed by the Constitution as well as several other Acts.
Environment	● National Environment Strategy, 2020 ● Environmental Assessment Act, 2000 ● Regulation for The Environmental Clearance of Projects (RECOP), 2016 ● National Environment Protection Act, 2007 ● Bhutan Environmental Standards, 2010; and Drinking Water Quality Standards, 2016 ● Guide for Environmental Clearance Application Procedure, 2022	The National Environment strategy enshrines the concept of sustainable development. It is structured around four chapters namely water, air, life, and land. It provides a framework to monitor every sector and enhances the implementation and operationalization of the existing legislation from government to local level.	The Environmental Assessment Act is applicable to this sub-project considering foreseeable impacts on the surrounding environment. The project will require an environmental clearance which will have to be updated during project implementation. The Dzongkhag Environment Committee is authorized to issue the Environmental Clearance to the Gewog, the applicant in the case of this project.

		The Environment Assessment Act outlines procedures for assessing the potential impact of projects on the environment and formulates policies and measures to reduce potential adverse effects on the environment. Based on the above premise, environmental clearance is required prior to the execution of any project that may entail adverse impacts on the environment.	
Governance	• The Local Government Act of Bhutan, 2009 • Civil Liability Act, 2023	The Act delineates the roles and responsibilities of local government vis-à-vis the central government. The Civil Liability Act ensures accountability across all stakeholders.	Since its enactment, environmental conservation has been decentralized to the gewogs and municipalities to ensure activities taken up within their jurisdiction are consistent with environmental laws and policies to reduce risks to public health and contribute to local socioeconomic development. The project will be implemented in Gewogs and thus these local governments will be responsible for processing and monitoring the project.
Land	• Land Act of Bhutan, 2007 • Rules and Regulations for Lease of Government Reserved Forest Land & Government Land, 2018 • Land Exchange Rules and Regulations, 2022	The Land Act was enacted to manage, regulate and administer the ownership and use of land for the socio-economic and environmental wellbeing of the country. The Act intends to achieve this through efficient and effective land administration, security of land tenure, equal opportunity to land, facilitation of operation of land market, effective use of land resources and conservation of the ecosystem.	In this project, most of the pipeline will be aligned on government land. The structures will also be constructed on government land. However, in the case where pipes have to be aligned across private land, the local government has to seek the permission of the landowner and negotiate access across his/her plot of land to the pipeline/channel. In most cases, the owner accords consent, and the pipeline/channel is aligned.

Gender Equality	• National Gender Equality Policy (NGEP), 2020 • The Domestic Violence Prevention Act of Bhutan, 2013 • Inheritance Act of 1980 • Loan Act of 1981 • The Land Act of Bhutan, 2007 • The Constitution of the Kingdom of Bhutan, 2008 • Penal Code of Bhutan, 2004 • Civil and Criminal Procedure Code of Bhutan, 2001 • Labour and Employment Act, 2007 & Regulations on Working Conditions, 2012 • Disaster Management Act, 2013 • National Policy for Women, 2009 • National Plan of Action for Gender Equality 2019-2023 • Education Sector Plan - Bhutan Education Blueprint 2014-2024 • Strategic Framework for Gender Responsive Planning and Budgeting, 2014	The National Gender Equality Policy promotes equal opportunities for women and men, boys and girls to achieve their full potential and benefit equitably from the social, economic and political developments. The Domestic Violence Prevention Act of Bhutan covers the prevention of physical, sexual, psychological, and economic and emotional violence. These are aimed at addressing domestic violence issues and ensuring the protection of victims. The Inheritance Act guarantees equal inheritance rights to men and women. The Loan Act determines that women are eligible to possess land and collateral for getting a loan. The amended Land Act establishes that the minimum age for registering land is 18 years for both women and men. The Constitution of Bhutan includes provisions related to Gender equality and women's rights, ensuring that women have equal rights in various aspects of life.	Under the project, Gender analysis has been carried out and a Gender Action Plan prepared for the project which ensures that women's needs in the project have been identified and a strategy and action plan for their participation in the project prepared.

		The Penal Code includes provisions related to crimes against women and girls and aims to address violence and discrimination. The Civil and Criminal Procedures contain provisions related to legal procedures for addressing Gender-based crimes. The Labour and Employment Act prohibits sexual harassment. The Regulations on Working Conditions provides for the protection of labor rights, Gender equality in the workplace, and appropriate and safe conditions at the workplace. The Disaster Management Act underlines the importance of women's participation in making decisions related to disaster management and risk reduction. The National Policy for Women outlines the government's commitment to promote Gender equality and women's rights in Bhutan. The National Plan of Action for Gender Equality aims to advance Gender equality and the empowerment of	

		women and is aligned with international commitments and conventions including CEDAW. The Education Sector Plan - Bhutan Education Blueprint, includes strategies for promoting Gender equality in education and ensuring that girls have equal access to education. The Strategic Framework for GRPB provides guidance to implement GRPB and identifies institutional arrangements, advocacy, awareness-raising and capacity-building, collection of sex-disaggregated data, Gender analysis of sectors, and development of Gender-sensitive indicators as main strategies.	
Vulnerable Groups	• The National Youth Policy, 2011 • The National Policy for Persons with Disabilities of Bhutan, 2019	The National Youth Policy sets out goals to provide youth with proper education and training opportunities, provide access to information in respect of employment opportunities and to other services. The National Policy for Persons with Disabilities of Bhutan ensures that the vulnerable and marginalized group enjoy the same rights and opportunities as the rest of the population and seeks	The Policies and Acts aim to empower persons with disabilities, mainstream disability initiatives in plans, policies, and programmes in all sectors, improve access to opportunities and services for persons with disabilities, improve the socio-economic condition of persons with disabilities, promote health and living of disabled persons through sports, recreation, and cultural participation and to remove stigmatization and discrimination of people towards disabled persons. This project too will encourage and make arrangements to ensure the participation of disabled persons identified during the project preparation phase in discussions and decision-making events in the course of the project implementation.

		to improve the lives of persons with disabilities.	
Labour and Worker Health, Safety and Management	• Labour and Employment Act, 2007 • Regulations on Working Conditions, 2022 • Regulation on Foreign Workers Management, 2022 • Regulation on Occupational Health, Safety and Welfare, 2022 • Regulation on Occupational Health and Safety for Construction Industry, 2022 • Revised National Workforce Wage Rate, 2015 • Guideline for the Approval, Employment, and Management of Border Town Foreign Workers (BTFW), 2022	The legislations have been enacted to govern the employment and working conditions for all persons employed and working within the Kingdom of Bhutan. The Regulation on Occupational Health, Safety and Welfare (OHSW) establishes the standards on occupational health, safety and welfare on premises, instruments, vessels, appliances, apparatus, tools, devices, electrical safety, and other hazardous conditions in general. In line with this regulation, a specific Regulation on Occupational Health and Safety for Construction Industry was released for construction sites in line with the relevant provisions of the OHSW Regulation.	In the context of this project, since there will be as many as 50 workers working directly in the project, terms and conditions of their employment are governed by the provisions of this Act to ensure their wellbeing and security. Also, children according to this Act, will not be employed in project activities which entail working in physical conditions and terrain as well as operating tools and implements which may pose a risk to their physical person (article 9).
Forest and Biodiversity	• Forest and Nature Conservation Act, 2023 • Forest and Nature Conservation Rules, 2000 (revised 2006, 2017) • Forest and Nature Conservation (Amendment) Rules and Regulations, 2020 • The Biodiversity Act of Bhutan, 2022 • The Biodiversity Rules and Regulations, 2023	The Act enables the DoFPS to institute mechanisms for Payment for Environmental Services, to enhance resilience against climate change impacts and for green accounting and financial plough back to enhance conservation and sustainable management of forest resources.	As the project site is located on State Reserve Forest land, a Forestry Clearance is mandatory according to the Forest and Nature Conservation Act 2023 and Forest and Nature Conservation Rules 2023. Section 55 enables the Government to implement and execute any developmental activity of national importance in the Community Forest. In such a case, fair compensation as determined by the DoFPS must be paid to the Community Forest Management Group.

		Sections 51-56 covers the establishment and management of Community Forest. The Act prohibits the killing, capture, collection, cultivation or trade in any wild flora and fauna, unless with a permit.	
Climate Change	• Climate Change Policy of the Kingdom of Bhutan, 2020 • Regulation on Substances that Deplete the Ozone Layer and Hydrofluorocarbons, 2021	There are four policy objectives: Pursue carbon neutral development, build resilience to climate change, ensure means of implementation and effective and coordinated actions. The policy provides strategic guidance to ensure that Bhutan remains carbon neutral, adapts to climate change in an efficient and effective manner through adequate means of implementation (finance, technology, capacity building and awareness) and integration into relevant plans and policies.	This project addresses the shortages and declining water quality, which has a direct bearing on increased vulnerabilities of livelihoods, food production and human health. The project endeavors to climate proof the domestic water supply for as many as 10,000 beneficiaries.
Water	• Water Act of Bhutan, 2011 • Water Regulation of Bhutan, 2014 • Water Policy, 2007 • Bhutan Drinking Water Quality Standard, 2016	According to the Water Act of Bhutan, every individual must have access to safe, affordable, and sufficient water for basic human needs. The Act prioritizes water use as follows: 1) water for domestic and sanitation 2) water for agriculture 3) water for energy 4) water for industry 5) water for tourism and recreation and 6) water for other uses.	The project must ensure that at least 30% of the water flow is maintained as the minimum environmental flow to sustain livelihoods and ecosystems downstream. The Act also restricts the discharge of effluent directly or indirectly to any water resource. The project must ensure that as per the Bhutan Drinking Water Quality Standard, 2016, the acceptable parameters for drinking water is maintained through periodic water testing.

Waste	• Waste Prevention and Management Act of Bhutan, 2009 • Waste Prevention and Management Regulation, 2012 (Amended 2016) • National Waste Management strategy, 2019	The Act covers all forms of waste whether solid, liquid, or gaseous, hazardous, or non-hazardous, organic, or inorganic and from all sources. It covers the collection, storage, transportation, disposal, as well as import and export of waste in Bhutan. It promotes reducing the generation of waste at source and promotes waste segregation, reuse, recycling, and environmentally sound disposal.	During the project, the Contractor must be responsible for dealing with the domestic waste generated by the 30 to 50 workers employed by him. He will also have to find suitable ways to dispose of construction waste.
Road Safety	• Road Act, 2013 • Road Safety and Transport Regulations, 2021	The Road Act mandates all vehicles to be registered and drivers to have the appropriate driving license. Vehicular emission levels in the country must follow National standards and are to be carried out annually for private vehicles after which a "Pollution under Control Certificate" (PUC) is issued.	As vehicles will be transporting construction materials and workers to the project site, the following provisions apply: • Barricade and install suitable warning signs and lights if the construction work is being carried on or is located where any vehicular traffic may cause danger to workers. • Vehicles must comply with the requirements of the Road Safety and Transport Authority and the driver must hold a valid driving license.
Disaster and Natural Hazards	Disaster Management Act of Bhutan, 2013	This act mandates the establishment and strengthening of institutional capacity for disaster management, mainstreaming disaster risk reduction, and ensuring an integrated and coordinated disaster management through community participation.	Under Section 24 and 25, every Dzongkhag must constitute a Dzongkhag Disaster Management Committee, headed by the Dzongdag (District Head), which (Sections 30, 31) is responsible for coordinating and managing all disaster management operations under the direction and supervision of the National Disaster Management Authority.

		The national Disaster Management authority headed by the Prime Minister is the apex body for disaster management.	
Heritage	Movable Cultural Property Act of Bhutan 2005	The Movable Cultural Property Act of Bhutan pertains to the conservation and protection of movable cultural property owned by government, community, or private individuals. "Valuable Cultural Properties" refers to all items with artistic, historical, cultural, religious, social, archaeological, or technical value and interest and have been grouped into 13 categories.	The Act requires the discovery of valuable cultural properties discovered from below ground during the construction of roads, buildings or any other related works, this discovery be immediately reported to the Department of Culture through the concerned Dzongkhag.

2.2. National standards

The National Drinking Water Quality Standards, 2016 and the Bhutan Environmental Standards 2020 sets the minimum standards for ambient air quality, noise, vehicle emissions and sewerage effluents, among others. The relevant standards are summarized in the tables below.

Table 3: Ambient Air Quality Standards

Parameter	**Averaging Period***	**Bhutan's Ambient Air Quality Standard, 2020**(µg/m^3)**		
		Industrial Area	Mixed Area*	Sensitive Area**
TSP	24-hour	500	200	100
	Annual	360	140	70
$PM_{2.5}$	24-hour	60	60	60
	1-year	40	40	40
PM_{10}	24-hour	200	100	75
	Annual	120	60	50
SO_2	24-hour	120	80	30
	Annual	80	60	15
	10-minute	-	-	-
NO_2	24-hour	120	80	30
	Annual	80	60	15
	1-hour	-	-	-
CO	8-hour	5,000	2,000	1,000
	1-hour	10,000	4,000	2,000
	15-minute	-		
Ozone	8-hour	100	100	100
Ozone	1-hour	180	180	180

* Mixed Area means area where residential, commercial or both activities take place.
** Sensitive Area means area where sensitive targets are in place like hospitals, schools, sensitive ecosystems.

Table 4: Noise Level Standards

Receptor/ Source	**National Noise Standard Guidelines, 2012*** (dB)	
	Day*	**Night****
Industrial area	75	65
Mixed area	65	55
Sensitive area	55	45

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

Table 5: Effluent Standards

Parameters	**Unit**	**NEC Standards, mg/l [a]**
Biochemical Oxygen Demand	mg/l	30.0
Total Suspended Solids	mg/l	100
Fecal Coliform	CFU/100ml	1,000
pH	pH scale	6.5 - 9.0
Chemical Oxygen Demand	mg/l	125

Source: Environmental Standards, NEC 2020
[a] Standards for Sewage Treatment Plant Effluent

Table 6: National Drinking Water Quality Standards, 2016

Group	National Drinking Water Quality Standards, 2016* (for Urban Drinking Water Supply)		
	Parameter	Unit	Max. Concentration Limits
Physical	Turbidity	NTU	5
	pH		6.5 - 8.5
	Color (TCU)	Hazen Unit	15
	Taste and Odor		Non- objectionable
Chemical	Iron	mg/l	0.3
	Manganese	mg/l	0.4
	Arsenic	mg/l	0.01
	Fluoride^	mg/l	1.5
	Lead	mg/l	0.01
	Nitrate	mg/l	50
	Calcium	mg/l	75
	Mercury	mg/l	0.006
	Residual Chlorine	mg/l	0.2 - 0.5
	Sulphate	mg/l	250
Microbiological	E-coli	CFU/100ml	0

Table 7: Motor Vehicle Emission Standards

Fuel Type	Vehicle registered prior to Jan 1, 2005	Vehicle registered after Jan 1, 2005	Vehicle registered prior to Jan 1, 2021	Vehicle registered after Jan 1, 2021 (Approval type: Euro 6/BS VI)
Petrol (%CO)	4.5%	4.0%	4.0%	0.5%
Diesel (%HSU)	75%	70%	70%	50%

Table 8: Vehicular Noise Level Limits

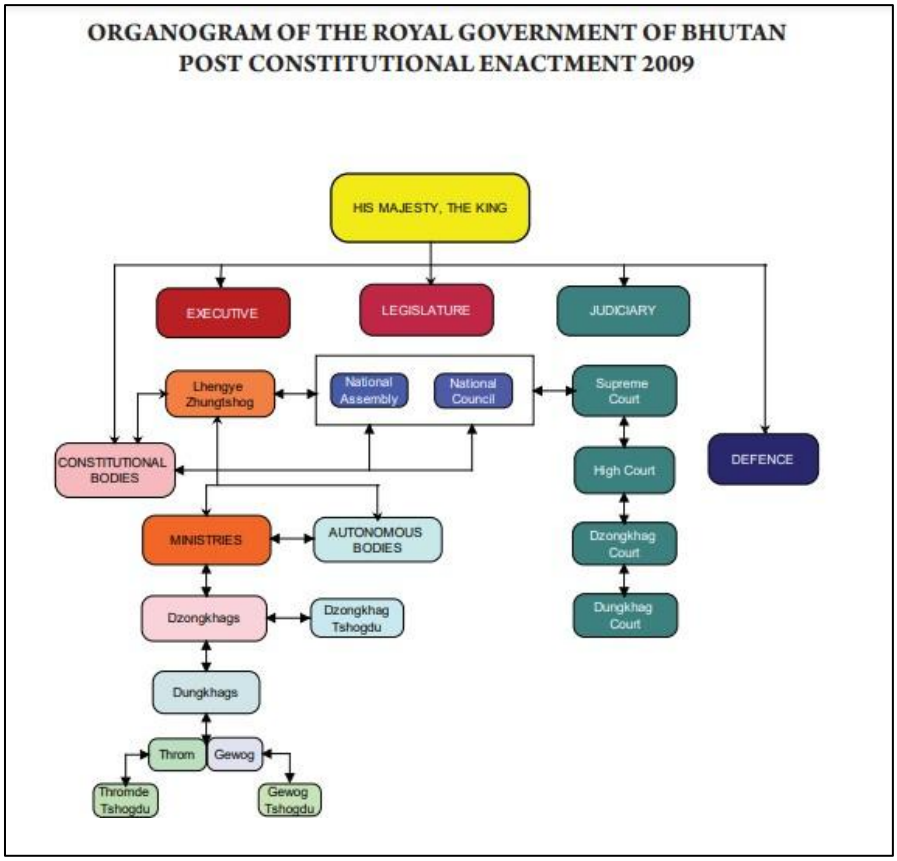
Sl. #	Type of Vehicle	Noise level limits dB(A)[2]
	Two-Wheeler	
1.1	Displacement up to 80cc	75
1.2	Displacement more than 80cc but up to 175cc	77
1.3	Displacement more than 175cc	80
2	Vehicles used for carriage of passengers and capable of having not more than nine seats including the driver's seat	74
3	Vehicles used for carriage of passengers and capable of having more than nine seats, including the driver's seat and a maximum gross vehicle weight (GVW) of more than 3.5 tonnes	
3.1	With engine power less than 150 KW	78
3.2	With engine power more than 150 KW	80
4	Vehicles used for carriage of passengers and capable of having more than nine seats, including the driver's seat: vehicles used for carriage goods	
4.1	With maximum GVW not exceeding 2 tonnes	76
4.2	With maximum GVW greater than 3 tonnes but not exceeding 3.5 tonnes	77
	Vehicles used for carriage of transport of goods with a maximum GVW exceeding 3.5 tonnes	
5.1	With engine power less than 75 KW	77
5.2	With engine power more than 75 KW or above but not less than 150 kv.	78

[2] Sound pressure level (SPL)

2.3. Institutional Framework

Bhutan is a Democratic Constitutional Monarchy with three independent branches of government: Legislative, Executive, and Judiciary, with the King as Head of State, Parliament as the highest body, and the Prime Minister as the Chief Executive.

Figure 1. Organogram of the Government of Bhutan



Source: National Statistics Bureau, Statistics Yearbook of Bhutan 2020

Before 2022, there were 10 Ministries. In 2022, with the new Civil Service Reform Act, the 10 ministries were reorganized with the objective of enhancing governance[3]. The Ministries are detailed in the table in Annex 10.

Local Government. There are 20 Dzongkhags4 each of which Each Dzongkhag has Dzongdag[5]/Governor supported various sector heads (education, agriculture, livestock, health,

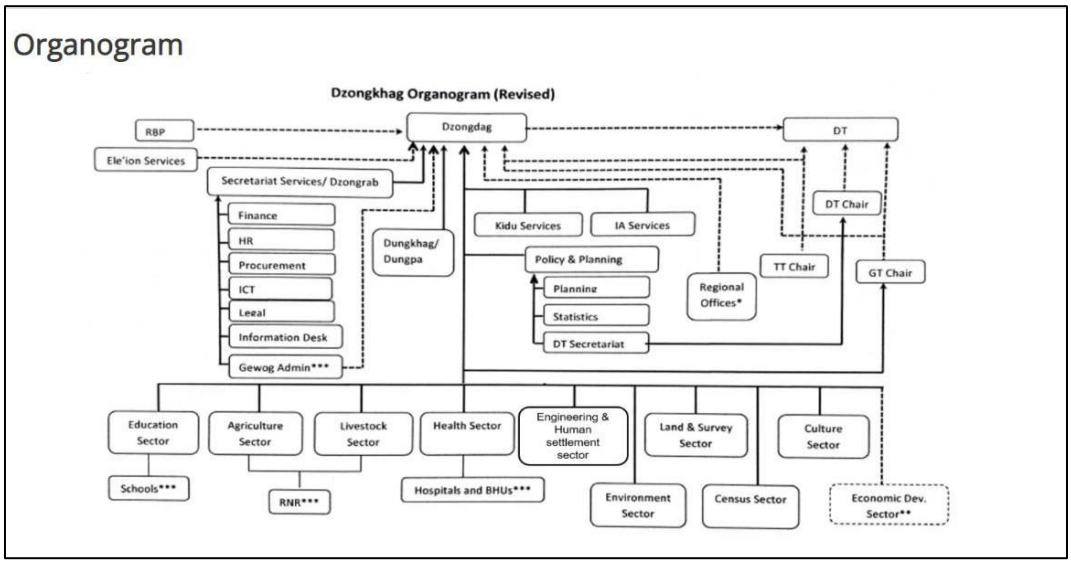
[3] Source: https://kuenselonline.com/civil-service-reform-bill-proposes-reducing-ministries-to-9

[4] 'Dzongkhag' means District

[5] 'Dzongdag' means the chief executive of a dzongkhag or any official for the time being exercising the functions of the office of dzongdag;

engineering, land, environment, and culture). Each Dzongkhag has a Local Government comprising the Dzongkhag Tshogdu[6], and Thromde Tshogde[7] and are governed by the Local Government Act 2009.

Figure 2. Dzongkhag Organogram



Source: Tsirang Dzongkhag (http://www.tsirang.gov.bt/)

Each Dzongkhag comprises of Gewogs[8], the lowest administrative structure that comprises of Chiwogs[9] and villages. Each Gewog has a Local Governments comprising the Gewog Tshogde[10] which is governed by the Local Government Act 2009.

2.4. Process of obtaining Environmental Clearance

The National Environmental Protection Act, 2007 (NEPA) established the role of the Competent Authorities within Ministries, Thromdes or Districts to screen, review and issue or deny environmental clearance, a mandatory requirement for any development activity. Approval or issuance of environmental clearance is dependent on (i) project type/activity and (ii) project location, which in turn dictates the level of environmental sensitivity and assessment required, the Competent Authority that will review, and the required clearance process to be followed.

Project Category. Proponents must check with the list of activities for which Competent Authorities can screen and issue Environmental Clearance. Projects categorized as 'Green' are exempted from the Environmental Assessment (EA) process. Projects categorized as 'Blue' require the preparation of IEE by the proponent and subsequent approval by relevant competent authority prior to issuance of an environmental clearance. Project categorized as 'Red' required an Environmental Impact Assessment (EIA) that will be reviewed and assessed by DECC.

[6] Local Government Council at the district level/District Assembly

[7] Municipal Council

[8] Block or local constituency for the election of Gup and Mangmi to the Gewog Tshogde

[9] Lowest territorial constituency consisting of a group of villages, for the election of Tshogpa to the Gewog Tshogde

[10] Local Government Council at the Gewog level/Gewog Assembly

Since the project is a 'Blue Category, a national IEE has been prepared and EC sought from the District Environment Committee, the Competent Authority for this activity.

2.5. UNDP Principles and Standards

UNDP is committed to promoting the following principles (collectively, the SES Programming Principles):

- that no one is left behind
- human rights
- gender equality and women's empowerment
- sustainability and resilience
- and accountability of UNDP Project- level Standards

UNDP has 8 Project-level standards that are applicable to the project. The applicability of these is based on the Social and Environmental Screening Procedure (SESP) and social and environmental assessment requirements.

The implementation of the project will generate concrete positive impacts related to social and economic development, food security, and environmental sustainability. Project approaches will address structural social and economic issues in order to ensure that benefits can be extended to all targeted groups, while being sensitive to the specific needs and requirements of each group, with specific attention to gender, vulnerable people and socio-cultural groups.

The summary of UNDP's Social and Environmental Safeguards are drawn from the SESP.

Table 9: Application of UNDP Standards

Principles and Standards	Rating	Applicability
Principle 2: Human rights	Moderate	The project has identified vulnerable populations and socio-cultural groups who could be left out of the benefits of the project. During the community consultations, people from all socio-cultural groups in the project areas were adequately consulted in participatory consultative sessions.
Principle 3: Gender equality and women's empowerment	Moderate	The strategic needs of men and women was examined through a Gender analysis conducted by the Gender expert and Gender Action Plan (GAP) prepared during the Targeted Assessment. The GAP reinforces the Project's efforts in enhancing women's empowerment and Gender equity by mainstreaming concerns through the project activities. Furthermore, the project is designed to be Gender responsive by focusing on interventions such as encouraging women participation and capacity building in natural resource and water management committees. The project will also ensure that gendered indicators and transformative results are monitored, and sex-disaggregated data maintained.
Principle 4: Sustainability & Resilience	Moderate	Waste from construction such as cement bags, pipe pieces, broken concrete etc. will be generated as will household waste from worker camps which are non-hazardous. Such waste may enter into water bodies. If there are natural hazards, structures constructed under the project could be washed away if project infrastructure is not designed well or executed as per design or if not protected. This could lead to failure of the system to tap and deliver water to consumers. Failure of structures could result in water leakage from pipes and tanks leading to soil erosion, flooding and landslides.
Principle 5: Accountability	Moderate	The project will support the strengthening of water governance and coordination system by supporting the establishment of river basin and district level water management committees with clearly defined roles and responsibilities and linkages to enhance larger system accountability, to ensure that users are equally accountable.
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management	Moderate	Applies as the project sites are in modified, natural, and possibly critical habitats and is dependent on the ecosystem services and includes agricultural production and livestock farming. The project follows FPIC principles throughout the process of implementation and ensures in-depth engagement with stakeholders for inclusive planning and design of the interventions.
Standard 2: Climate Change and Disaster Risks	Moderate	Despite climate proofing of infrastructure as measures to prepare for any untoward climatic events, infrastructure developed under the project can be damaged by natural calamities which may occur such as episodes of excessive rain which could trigger floods and landslides. Further, nature-based interventions like spring revival, watershed improvements which will be instituted by the project can be affected by droughts or excessive rain. Impact of climate change and disaster risks to the project infrastructures will be managed and mitigated by incorporating climate-resilient design features. All pressurized pipes to be used for water conveyance will be properly buried beneath the ground to prevent external damages and ensure durability.

Standard 3: Community Health, Safety and Security	Moderate	This standard is applicable as the project activities would entail increase of health and safety concerns amongst the communities wherein active construction activities would be undertaken including an increase of diseases with an inflow of migrant workers to the project area and the accidental collapse or failure of project structural elements.
Standard 4: Cultural Heritage	Low	This standard is applicable as the project will entail excavation work. Soil will be excavated for trenches to lay pipes. Even though no physical and tangible structure of cultural significance will be affected due to the project activities, nevertheless, the excavation works associated with the project might lead to 'chance find'. In an unlikely event of chance finding, where artifacts are unearthed, procedures for chance finds will be duly followed.
Standard 5: Displacement and Resettlement	Moderate	Verified during field consultation there is not going to be any eviction of people, impacts on or changes to land tenure arrangements, however, economic displacement during the construction phase is possible, but the PIU has assured minimal or no economic displacement will be ensured keeping in mind plantation/harvesting seasons to avoid disruption to their work/livelihood.
Standard 6: Indigenous Peoples	Low	In Bhutan, the concept of 'indigenous peoples' is not used but people are differentiated as 'socio-cultural groups'. Since development needs are articulated at village level and all households are fully involved in the development process during prioritization of development needs and activities and implementation. Members of all socio-cultural groups are hence included in all phases of development and also receive equal access and benefits to the outputs of development programmes.
Standard 7: Labour and Working Conditions	Moderate	Workers may also experience occupational health and safety issues at work if contractors do not provide appropriate living accommodation facilities or necessary safety equipment. Contractors may employ children and women at site and women may be paid less than their male counterparts. Recruited workers may spread communicable diseases. Workplace concerns, conflicts, and inaccessibility to internal grievance redress mechanisms by the workers may lead to discontent among workers. Due to these aspects, this Standard is applicable to the Project.
Standard 8: Pollution Prevention and Resource Efficiency	Moderate	Construction activities and excavation works require both construction materials, water, and electricity and will generate both construction and household waste and pollutants from vehicles, machines, and construction worker camps, thus, triggering the applicability of this standard.

2.6. Comparison of UNDP Principles and National Legislations

The UNDP Principles and standards as prepared in the ESMF was reviewed and the gaps are summarized below.

Table 10: Gap Assessment Between National Legislation and UNDP Principles and Standards

	UNDP SES	Requirement	National Law	Requirement	Comparative Analysis
Overall Principle 1	Leave No One Behind	As an overarching programming principle, leaving no one behind requires UNDP to prioritize its programmatic interventions to address the situation of those most marginalized, discriminated and excluded, and to empower them as active agents of the development process.	• Constitution of the Kingdom of Bhutan 2008	The State shall endeavor to create a civil society free of oppression, discrimination and violence, based on the rule of law, protection of human rights and dignity, and to ensure the fundamental rights and freedoms of the people.	UNDP's Overall Principle 1 on Leave No One Behind discusses five factors of discrimination, geography, vulnerability to shocks, governance and socio-economic status that needs to be attained when applying this Principle in projects. The principle's broad approach of providing intersection of factors and reinforcing the ethos of inclusiveness Is to be adopted throughout the project life cycle.
Principle 2	Human Rights	UNDP recognizes the centrality of human rights to sustainable development, poverty alleviation and ensuring fair distribution of development opportunities and benefits, and is committed to supporting "universal respect for, and observance of, human rights and fundamental freedoms for all".	• Constitution of the Kingdom of Bhutan 2008 • Land Act 2007 • Childcare & Protection Act of Bhutan 2013 • National Policy for Persons with Disabilities 2019	The State shall endeavor to create a civil society free of oppression, discrimination and violence, based on the rule of law, protection of human rights and dignity, and to ensure the fundamental rights and freedoms of the people.	The Constitution of Bhutan guarantees equal and effective protection of the law and protection against discrimination on grounds of race, sex, language, religion, politics, or other status. The standard planning processes of needs assessment, design of projects and implementation are applied uniformly across the country. All people irrespective of status or vulnerability therefore benefit

					equitably from development. UNDP Principle 2 ensures that the projects undertaken by them recognizes the centrality of human rights through fair distribution of development opportunities and benefits. UNDP seeks to support governments to adhere to their human rights obligations and empower individuals and groups, particularly the most marginalized, to realize their rights and to ensure that they fully participate throughout UNDP's programming cycle through the application of this Principle. Thus, this Principle will be adopted throughout the Project life cycle.
Principle 3	Gender Equality & Women's Empowerment	The promotion of Gender equality and the empowerment of women are central to the mandate of UNDP and intrinsic to its human rights-based approach to development programming.	● Constitution of the Kingdom of Bhutan 2008 ● National Gender Equality Policy 2020	The State shall endeavor to create a civil society free of oppression, discrimination and violence, based on the rule of law, protection of human rights and dignity, and to ensure the fundamental rights and freedoms of the people.	UNDP's Principle 3 ensures that the projects undertaken by them promote gender equality and empowerment of women. UNDP strengthens interventions tackling structural changes and removes the institutional, societal, political and legal barriers to accelerate gender equality and women's empowerment. They strive to close the gender gap by focusing on

					empowering and creating agency for women and men. UNDP's requirement for Principle 3 provides a broader approach to gender equality and women's empowerment than the Constitution and National Gender Equality Policy. Thus, the Principle 3 will be adopted for its specific requirement of meaningful participation of women in project decision-making and engagement in paid work during the construction work.
Principle 4	Sustainability and Resilience	Sustainable management, protection, conservation, maintenance and rehabilitation of natural habitats and their associated biodiversity and ecosystem functions are fundamental to UNDP's efforts to develop and implement sustainable development pathways.	• Constitution of the Kingdom of Bhutan 2008 • Regulation for Environmental Clearance of projects 2016 • Bhutan Environmental Standards 2010 (revised 2020) • National Environmental Protection Act 2007 • Water Act and the Water Regulation of Bhutan 2014 • Waste Prevention and Management Act of Bhutan 2009 • Bhutan Environmental Standards 2010 (revised 2020)	The National Environment strategy enshrines the concept of sustainable development. It is structured around four chapters namely water, air, life, and land. The Environment Assessment Act outlines procedures for assessing the potential impact of projects on the environment and formulates policies and measures to reduce potential adverse effects on the environment. Based on the above premise, environmental clearance is required prior to the execution of any project that may entail adverse impacts on the environment.	Legislation is backed up with adequate personnel at all levels for impact assessment and regulation. Project will capitalize on the environmental staff in the districts as well as support from engineers, foresters etc. for environmental protection activities of impacts emanating from the project. UNDP Principle 4 strengthes the resilience of societies to the impact of shocks, disasters, conflict and emergency situations, and the sustainable management, conservation and rehabilitation of natural habitats (and their associated biodiversity and

					ecosystem functions) are fundamental to Organisation's efforts to develop and implement sustainable development pathways. UNDP seeks to address poverty and inequality and to reduce vulnerabilities while maintaining and enhancing natural capital. Through the broad approach advocated by the Principle, this Principle ensures that through the Project resilience of communities and nation can be built. This includes identifying and addressing the interconnections among issues related to the environment, human rights, conflict, crises and vulnerability, where relevant and providing appropriate mitigation measures to mitigate the risks identified.
Principle 5	Accountability	UNDP does not support activities that do not comply with national law and obligations under international law, whichever is the higher standard (hereinafter "Applicable Law").	● Constitution of the Kingdom of Bhutan 2008 ● Audit Act of Bhutan 2018 ● Audit Rules and Regulations 2020	The Audit Act guides practices to institute transparency, integrity, and accountability in the government as well as other stakeholder organizations.	. Public consultation needs to be carried out as per Article 16 of the Environment Assessment (EA) Act 2000, and Section 41 of the Regulation for Environmental Clearance of Projects (RECOP) 2016. This ensures Transparency and accountability during

					project formulation and implementation. UNDP Principle 5 promotes accountability to programme and project stakeholders by (i) enabling active local community engagement and participation in decision-making, particularly those at risk of being left behind; (ii) ensuring transparency of programming interventions through provision of timely, accessible and functional information regarding supported activities, including on potential environmental and social risks and impacts and management measures; (iii) ensuring stakeholders can communicate their concerns and have access to rights-compatible complaints redress processes and mechanisms; and (iv) ensuring effective monitoring–and where appropriate, participatory monitoring with stakeholders–and reporting on implementation of social and environmental risk management measures. Hence, through the application of this Principle, accountability and

					transparency can be ensured throughout the Project life cycle.
Standard 1	Biodiversity Conservation and Sustainable Natural Resource Management	UNDP seeks to maintain and enhance the goods and services provided by biodiversity and ecosystems in order to secure livelihoods, food, water and health, enhance resilience, conserve threatened species and their habitats, and increase carbon storage and sequestration.	Forest and Nature Conservation Act (FNCA) 1995	If the project site is located on State Reserve Forest land, a Forestry Clearance is mandatory according to the Forest and Nature Conservation Act 2023 and Forest and Nature Conservation Rules 2023.	UNDP SES Standard 1 ensures that the assessment of the impacts on the natural resources, biodiversity and ecosystem services should be undertaken as an integral part of ESIA studies so that adequate mitigation measures can be adopted to offset the risks and impacts identified. The National Act and subsequent regulations require clearances for activities on SRFL, dictate compensation for community forest groups, and limit activities on protected areas. However, it is restrictive is ensuring that an assessment of the impacts on the natural resources, biodiversity and ecosystem services should be undertaken as an integral part of ESIA study. Hence, Standard 1 of UNDP SES shall be complied with to ensure that that the risks and impacts related to the project

					activities are identified so that appropriate mitigation measures are developed.
Standard 2	Climate Change Mitigation and Disaster risks	UNDP supports countries to integrate low-emission, climate-resilient objectives into national and sectoral development plans, identify priority mitigation and adaptation measures, implement measures to reduce vulnerability and increase adaptive capacity and resilience.	• National Environmental Protection Act 2007 • Climate Change Policy of the Kingdom of Bhutan 2020 (Final Draft) • Disaster Management Act of Bhutan 2013 • Disaster Management Rules & Regulations 2014	All government agencies and institutions must assess priorities and needs on mitigation and adaptation and integrate such actions within their plans and programs.	The policy provides strategic guidance to ensure that Bhutan remains carbon neutral, adapts to climate change in an efficient and effective manner through adequate means of implementation (finance, technology, capacity building and awareness) and integration into relevant plans and policies. The Disaster Management Act, 2013 provides for establishment and strengthening of institutional capacity for disaster management, mainstreaming of disaster risk reduction, and for integrated and coordinated disaster management focusing on community participation. It underlines the importance of women's participation in making decisions related to disaster management and risk reduction. UNDP Standard 2 ensures that projects undertaken by them are sensitive to climate change and disaster risks in order to strengthen resilience and to

					achieve sustainable development outcomes. Through this Standard, the mitigation measures and Management Plans as developed as part of the ESMP, has ensured that risks and impact envisaged are duly well taken care of during the project cycle.
Standard 3	Community Health, Safety and Security	This Standard addresses the need to avoid or minimize the risks and impacts to community health, safety and security that may arise from project-related activities, with particular attention given to disadvantaged and marginalized groups.	• Constitution of the Kingdom of Bhutan 2008 • Local Government Act of Bhutan 2009 • Road Safety and Transport Act 1999 • Road Safety and Transport Regulations 2021	Article 5(2) of the Constitution of Bhutan requires the Government to ensure a safe and healthy environment. The Local Government Act of Bhutan (2009) promotes decentralization and devolution of power and authority to the Local Governments that represent the interests of local communities.	Section 213 requires that all national agencies conduct periodic consultations with the Local Government before any project or program is implemented in their area, as well as involve Local Governments both in the planning and implementation of national projects. UNDP SES Standard 3 ensures that the projects avoid or minimize the exacerbation of impacts caused by natural or man-made hazards, such as landslides or floods that could result from land use changes due to the project activities. In addition, UNDP also ensures that the projects are gender-sensitive and considers the risks on the health and

					safety of the women and children. Standard 3 shall be complied with to ensure that the community health & safety aspects are evaluated and mitigated during the various phases of the project cycle. UNDP ensures that the projects avoid or minimize transmission of communicable diseases that may be associated with the influx of temporary or permanent project labour. The contractor will adhere to the national regulation while setting up the sanitary facilities for workers at the construction area. In addition, the proponent will also comply with UNDP Standard 3 requirements to ensure appropriate services for the labourers are provided to minimise the impact generated by the facilities on the environment.
Standard 4	Cultural Heritage	UNDP recognizes the importance of Cultural Heritage for current and future generations and seeks to ensure that Cultural Heritage is protected in the course of	• The Movable Cultural Property Act of Bhutan 2005	The Movable Cultural Property Act of Bhutan 2005 pertains to the conservation and protection of movable cultural	Section 54 requires the discovery of valuable cultural properties discovered from below ground during the construction of

		development activities. UNDP seeks to ensure equal participation, access and contribution of women and men in protecting and sharing the benefits of Cultural Heritage.		property owned by government, community, or private individuals. Such property is required to be listed and registered with photographs and maintained by the Lhakhang and the concerned Dzongkhag.	roads, buildings or any other related works, to be immediately reported to the Department of Culture through the concerned Dzongkhag. Standard 4 ensures that all cultural heritage is protected from damage, inappropriate alteration, disruption, removal or misuse; preservation and safeguards are maintained, promotion of equitable sharing of benefits from the use of Cultural Heritage is assured and meaningful consultation with stakeholders regarding preservation, protection, utilization and management of Cultural Heritage is promoted. The Act is restrictive in its approach of considering international conventions and regulations in terms of conserving and preserving cultural heritage. Standard 4 is to be complied with as it ensures that the Cultural Heritage is preserved, protected and promoted in project activities in a manner consistent with UNESCO

					Cultural Heritage conventions or any other national or international legal instruments that might have a bearing on the use of Cultural Heritage.
Standard 5	Displacement & Resettlement	UNDP will seek to avoid physical and economic displacement in its Projects. In exceptional circumstances and where avoidance is not possible, displacement may occur only with full justification, appropriate forms of legal protection and compensation, and according to acceptable requirements.	• Constitution of the Kingdom of Bhutan 2008 • Land Act 2007 • Land Compensations Rates 2017	There is a gap in national legislation.	Avoidance of land is not mentioned specifically in the provision of the Land Act. The government uses the Property Assessment & Valuation Agency Land and Cash Crop Compensation Rates 2017 to calculate the compensation, which is way below the market rates for land, and therefore is not a 'fair' compensation which the Land Act purports to provide to affected people. Affected people who must relocate currently do so incurring substantial costs at their own expenses since relocation and transitional costs are not included in current procedures. People whose land and property are affected will face adverse economic impacts as well since land or property may be used for cultivation and houses for rental or running businesses. Since the laws do not aid economic displacement, the laws do not specifically target vulnerable persons

					which may lead to social exclusion. The current laws do not provide for this so the project must ensure meaningful consultations and institution of a grievance redressal mechanism for the project. UNDP Standard 5 ensures that physical displacement (i.e. relocation or loss of shelter), whether full or partial and permanent or temporary, or economic and occupational displacement (i.e. loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of project-related land or resource acquisition or restrictions on land use or access to resources (including through project externalities such as pollution and impacts to biodiversity or ecosystem services) that people depend on for physical, economic, social, cultural, or spiritual well-being are well compensated if impacted. The tenant of this Standard is to be adhered to in the Project as it ensures that all affected population are to be adequately compensated if affected and

					stakeholder engagement and grievance mechanism are to be implemented so that accountability and transparency can be attained throughout the Project life cycle.
Standard 6	Indigenous Peoples	The promotion and protection of the rights of indigenous peoples, especially concerning their lands, territories, traditional livelihoods, cultures and resources, are necessary to achieve UNDP's goals of advancing human rights, respecting indigenous peoples identities and improving their well-being.	● Constitution of the Kingdom of Bhutan 2008	There is a gap in national legislation.	Standard 6 ensures that projects undertaken by UNDP avoids adverse impacts on the rights of indigenous peoples, their lands, territories, resources, to mitigate and remedy residual impacts, and to ensure provision of just and equitable benefits and opportunities for indigenous peoples in a culturally appropriate manner. While the Constitution is broad, the UNDP's Standard 6 is specific as it ensures the full and effective participation of indigenous peoples, with the objective of securing their free, prior, and informed consent (FPIC) where their rights, lands, territories, resources, traditional livelihoods may be affected.
Standard 7	Labour and Working Conditions	Project activities seek to enhance employment promotion benefits, development outcomes and sustainability by ensuring sound worker-management	● Labor & Employment Act 2007 ● Regulation on Occupational Health, Safety	Labor administration in the country is guided by the Labor and Employment Act of the Kingdom	Standard 7 shall be complied with to ensure that workers' health & safety aspects are

		relationships and cooperation in their design and implementation.	and Welfare (OHSW) 2012	of Bhutan, 2007 and its regulations such as the Regulations on Working Conditions, 2022; Regulation on Foreign Workers Management, 2022; Regulation on Occupational Health, Safety and Welfare, 2022; and the Regulation on Occupational Health and Safety for Construction Industry, 2022.	evaluated and mitigated during the various phases of the project cycle. Structural elements shall be designed and constructed by competent professionals and certified or approved by the competent authorities or professionals. For projects with structural elements or components whose failure or malfunction may threaten the safety of the communities, UNDP ensures that the plans for project supervision, operation, and maintenance are developed and monitored. Independent expertise on the verification of design, construction, and operational procedures is used and periodic safety inspections are carried out. This shall be complied with by the contractor for all structures that would be constructed as part of the project. Standard 7 of UNDP shall be complied with by the contractor to ensure that the labourers

					are provided with safe and healthy working environment, considering the risks inherent to the particular sector (including gender bias) and specific classes of hazards in the work areas as the national regulation is restrictive in terms of encompassing risks inherent to various sectors and classes of hazards in the work areas. Standard 7 of UNDP shall be complied with as it ensures that the steps are taken to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work and ensures the application of preventive and protective measures consistent with the international good practice, as reflected in internationally recognized standards such as the World Bank Group's (WBG) Environmental, Health, and Safety (EHS) Guidelines. The national regulation is restrictive in its

					scope and fails to adopt measures consistent with the international good practice and WBG's EHS guidelines. Thus, UNDP Standard 7 is to be complied with as it ensures compliance with national labour and occupational health and safety laws, with obligations under the international law, and consistency with the principles and standards embodied in the International Labour Organization's (ILO) fundamental conventions.
Standard 8	Pollution Prevention and Resource Efficiency	Pollution prevention and resource efficiency are core elements of a sustainable development agenda and UNDP Projects must meet good international practice in this regard.	● National Sanitation and Hygiene Policy, 2020 ● Waste Prevention and Management Act, 2009	Requires compliance with National Environmental Standards, 2020 that covers compliance with the maximum permissible levels for air, drinking water quality, noise.	UNDP's Standard 8 ensures that the projects avoid the release of pollutants, and when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release. This applies to the release of pollutants into the air, water, and land due to routine, non-routine, and accidental circumstances. The Waste Prevention and Management Act is

					restrictive as it discusses how effluents should be treated. Standard 8 shall be complied with as it considers minimisation and/or control mechanism in terms of controlling the intensity and mass flow of the pollutant's release. UNDP Standard 8 ensures that pollution prevention and control technologies and practices, consistent with international good practice, are applied during the project life cycle. The technologies and practices applied shall be tailored to the hazards and risks associated with the nature of the project.

2.7. International Conventions

The table below summarizes relevant international treaties and conventions ratified by Bhutan.

Table 11: Relevant International Agreements and Conventions.

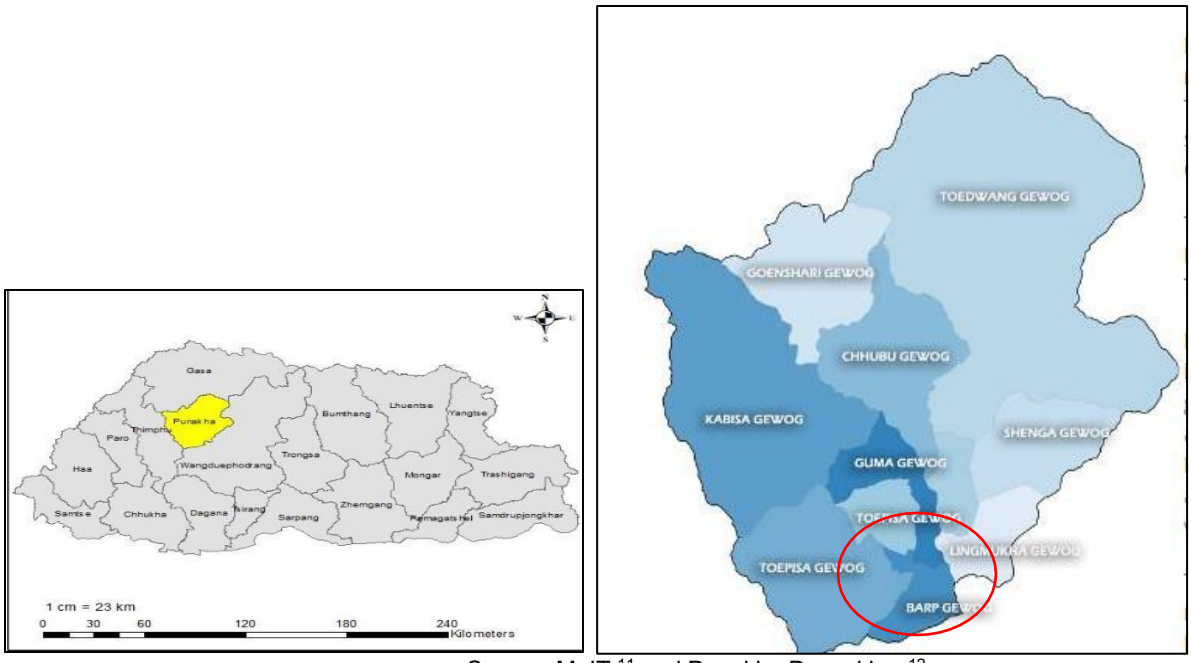
#	International Agreements/Conventions	Accessed/ Ratified/became a party or member
1	Convention on Biological Diversity	1995
2	Vienna Convention for the Protection of the Ozone Layer	2004
3	The Montreal Protocol on Substances that Deplete the Ozone Layer	2004
4	The Kigali Amendment to the Montreal Protocol	2019
5	United Nations Framework Convention on Climate Change (UNFCCC)	1995
6	Kyoto Protocol	2002
7	Paris Agreement	2017
8	The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	2002
9	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	2002
10	RAMSAR Convention on Wetlands	2012
11	Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris 1972)	2001
12	The Cartagena Protocol on Biosafety to the UN Convention on Biological Diversity	2002
13	International Plant Protection Convention	1994
14	FAO International Treaty on Plant Genetic Resources for Food and Agriculture	2003
15	Convention on safeguarding of the Intangible Cultural Heritage	2005
16	International Convention on the Elimination of All Forms of Racial Discrimination (ICERD)	2005
17	Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)	1981
18	Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT)	1990
19	Convention on the Rights of Persons with Disabilities (CRPD)	2005
20	Optional protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict (OP - CRC - AC)	2009
21	Optional Protocol to the Convention on the Rights of the Child and the sale of children, child prostitution and child pornography (OP - CRC - SC)	2009

3. DESCRIPTION OF THE PROJECT

3.1. Project location

The project site is in Thinleygang Chiwog under Toedpisa Gewog and Lobesa, Tshokorna and Gamakha-septokha Chiwogs in Barp Gewog in Punakha Dzongkhag.

Map 1.Map Showing Punakha Dzongkhag and Project Gewogs.



Source. MoIT [11] and Punakha Dzongkhag[12]

[11] MOIT. Flood hazard assessment for Punakha Dzongkhag. Retrieved from https://www.moit.gov.bt/wp-content/uploads/2019/02/

[12] http://www.punakha.gov.bt/en/about-dzongkhag

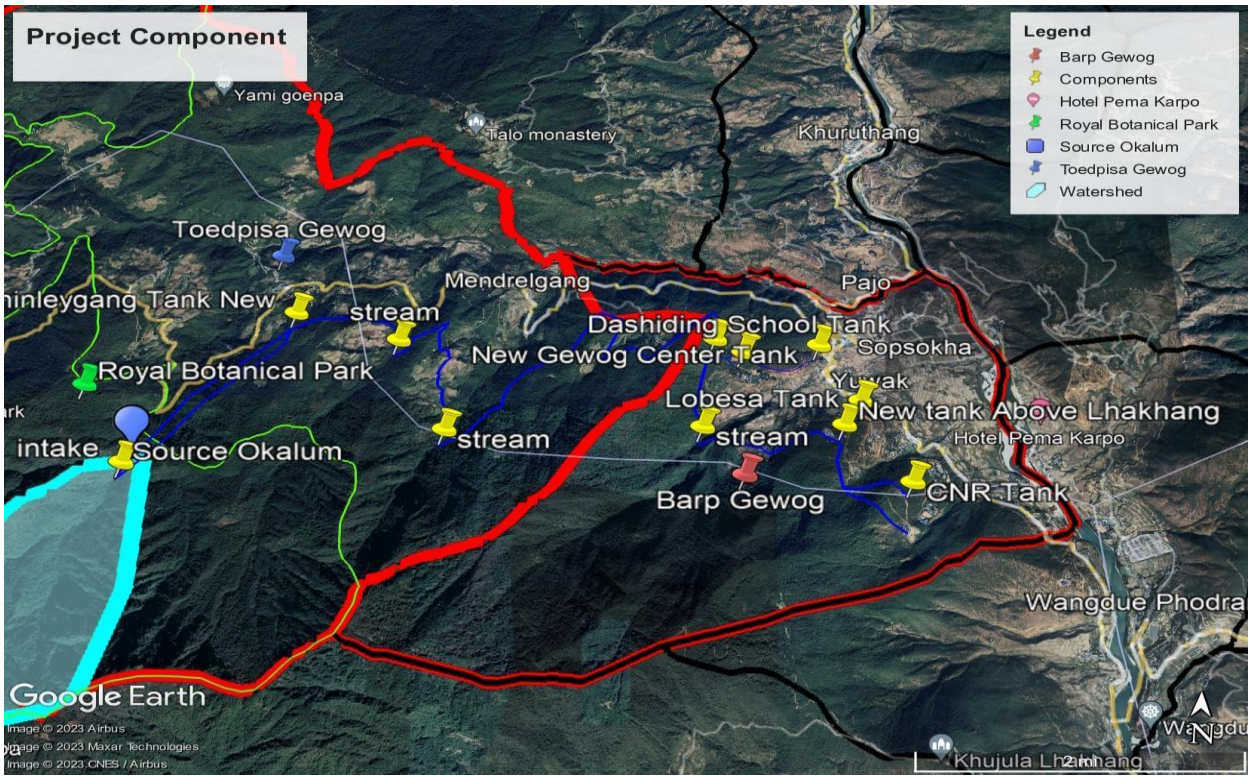
3.2. Description of project components

The project will establish a consolidated and reliable system for delivery of water from the Okalum source in Thinleygang Chiwog to Lobesa Chiwog in Punakha Dzongkhag. It will include climate proofing a total of 43.58 km of two water transmission lines from the existing Okalum water source to a reservoir in Thinleygang and a reservoir and Water Treatment Plant (WTP) to be developed at Darshing Top. The Thinleygang reservoir will continue to supply water to the existing users and the village of Gemsa. From the WTP at Darshing Top, the water will be distributed to the reservoirs at the Dashiding Higher Secondary School, above the Gewog office and above Lam Sep's monastery. The reservoir at Lam Sep's monastery will distribute water to the Lobesa School area, CNR and the nunnery at Dorangthang.

The Water Treatment Plant is an ancillary facility, that will be constructed under Design, Build and Operate Model through a separate financing mechanism.

Photo 3 a-c. At the Source – Okalum Stream

As


Project Component
Legend
Barp Gewog
Components
Hotel Pema Karpo
Royal Botanical Park
Source Okalum
Toedpisa Gewog
Watershed
Yami goenpa
Talo monastery
Khuruthang
Toedpisa Gewog
Mendrelgang
Pajo
stream
Dashiding School Tank
New Gewog Center Tank
Sopsokha
Royal Botanical Park
Lobesa Tank
New tank Above Lhakhang
intake
Source Okalum
stream
stream
Hotel Pema Karpo
Barp Gewog
CNR Tank
Wangdue Phodra
Google Earth
Image © 2023 Airbus
Image © 2023 Maxar Technologies
Image © 2023 CNES / Airbus
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Map 2.Map Showing the entire water pipeline

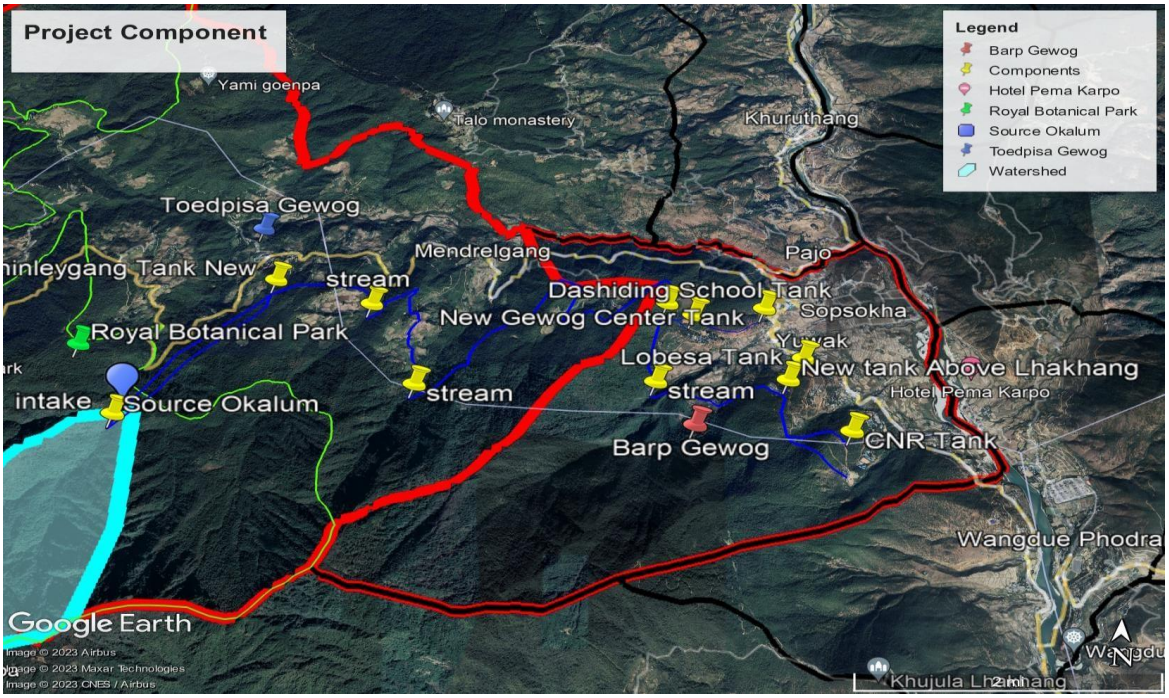
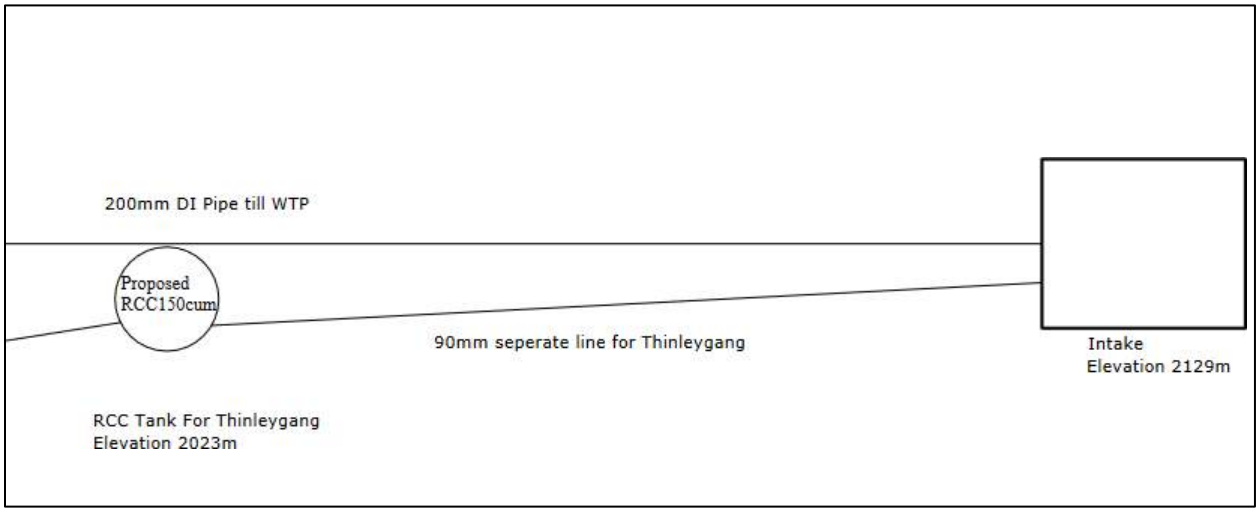
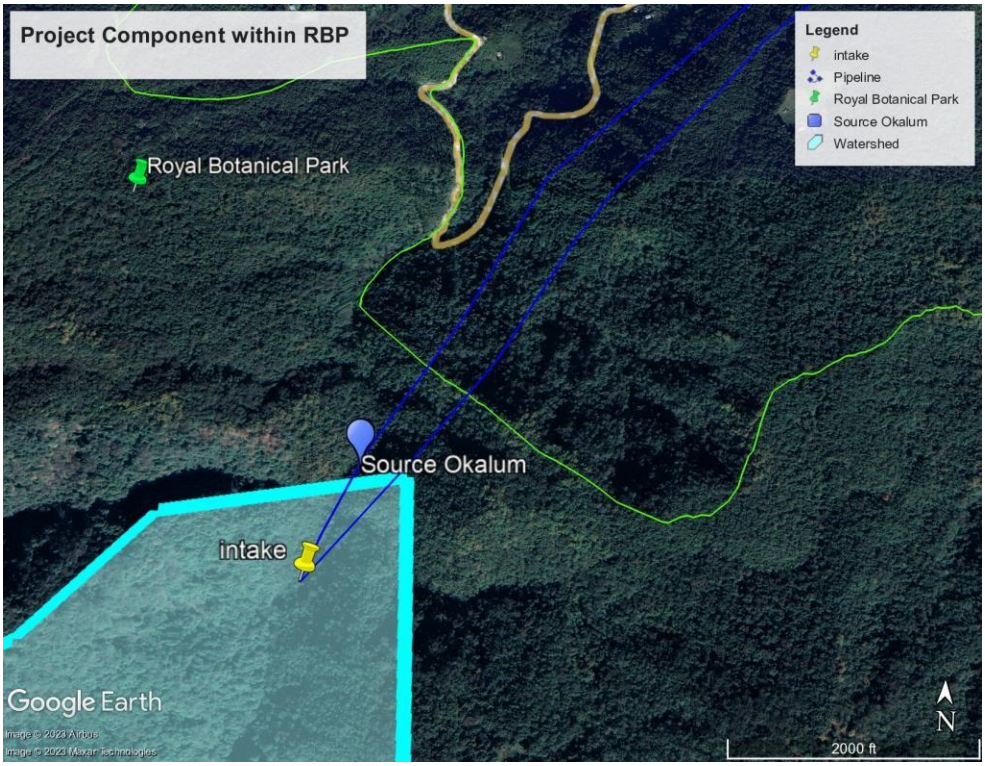


Figure 1. Project Layout from the intake to Thinleygang



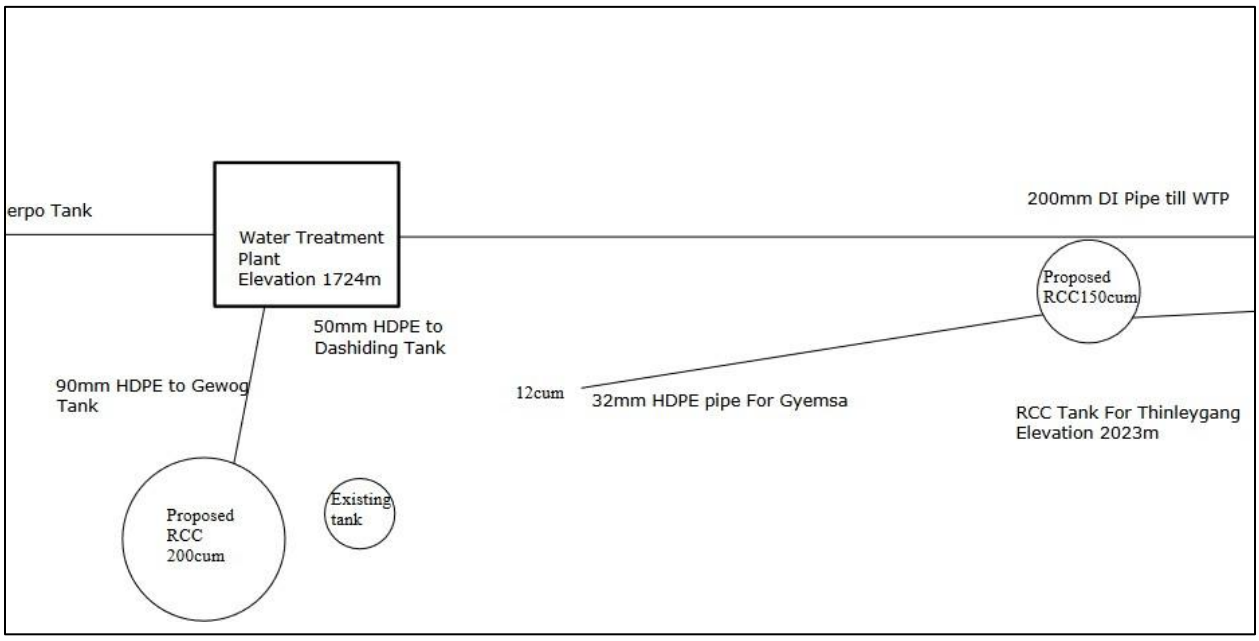
The first water pipeline from the source to Thinleygang for Toedpisa Gewog will be distributed to Thinleygang and Gyemsa village.

Map 3.Map Showing Thinlegyang Pipeline



The second water pipeline will extend from the source to the water treatment plant (WTP) at Darshing Top for Barp Gewog.

Figure 2. Project Layout from the Intake to WTP



From the WTP, the water will be distributed to 2 reservoirs of 200 cum capacity each at Darshing Top and Iam Serpo's Lhakhang.

From the first 200 cum reservoir at Darshing Top the water will be distributed to Lobesa core area and Dashiding School.

Map 4.Map Showing the Middle Water Pipeline Alignment

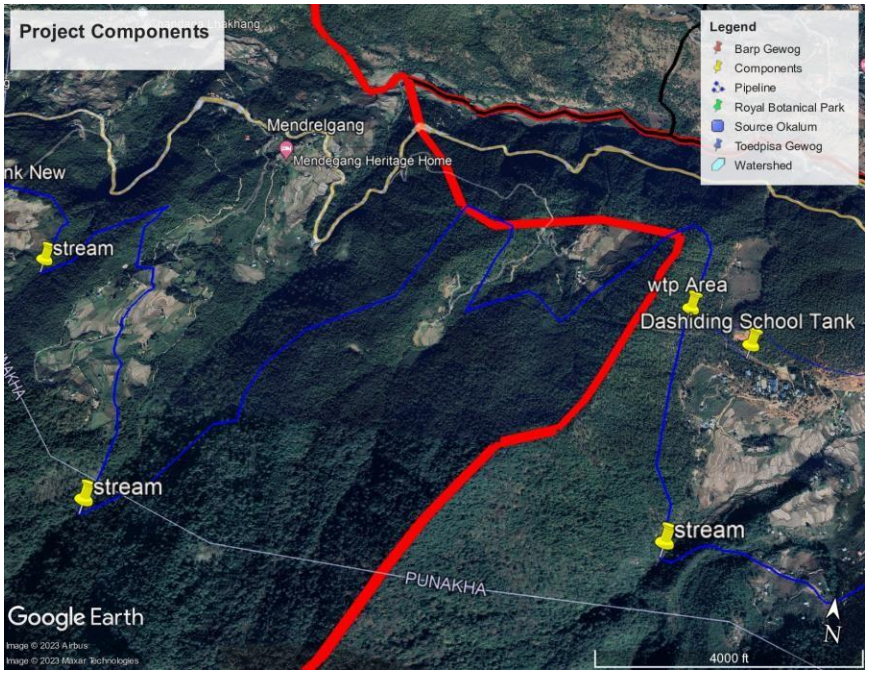
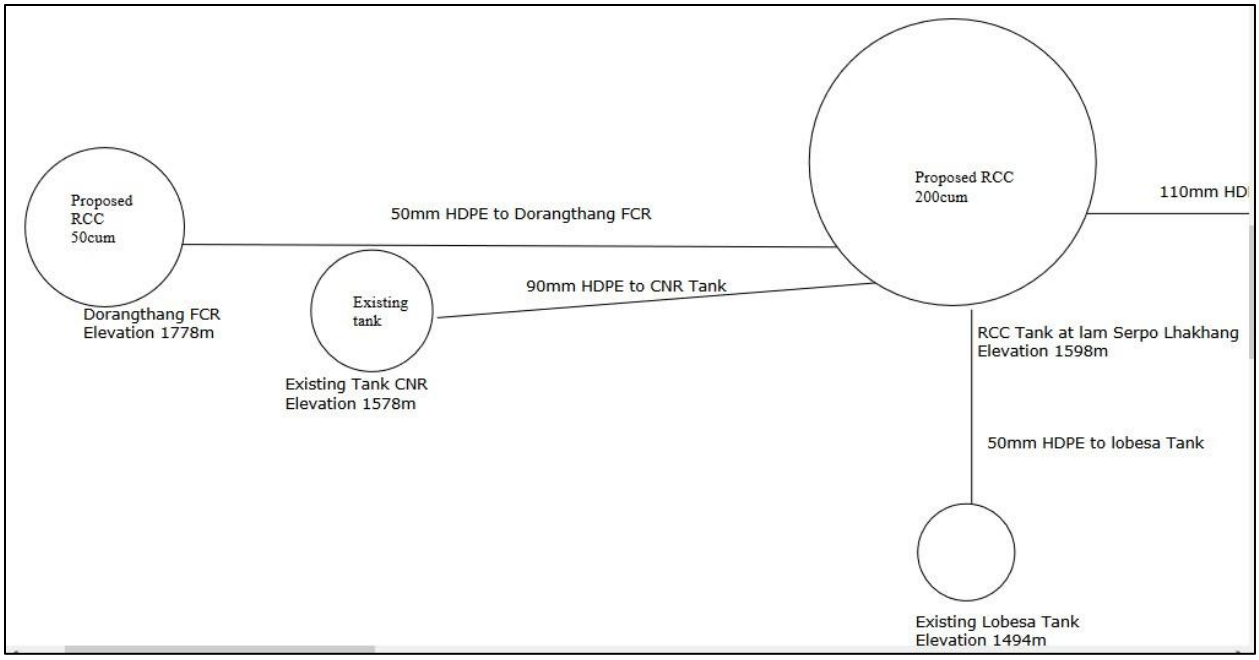


Photo 4. Location of the WTP

From the second 200 cum reservoir above Lam Serpo's Lhakhang, water will be distributed to the existing tank at the College of Natural Resource, Dorangthang nunnery and the existing tank at Lobesa school.

Figure 3. Project Layout from the RCC Reservoirs to CNR and the Nunnery



Map 5.Map Showing Water Pipeline in Barp Gewog

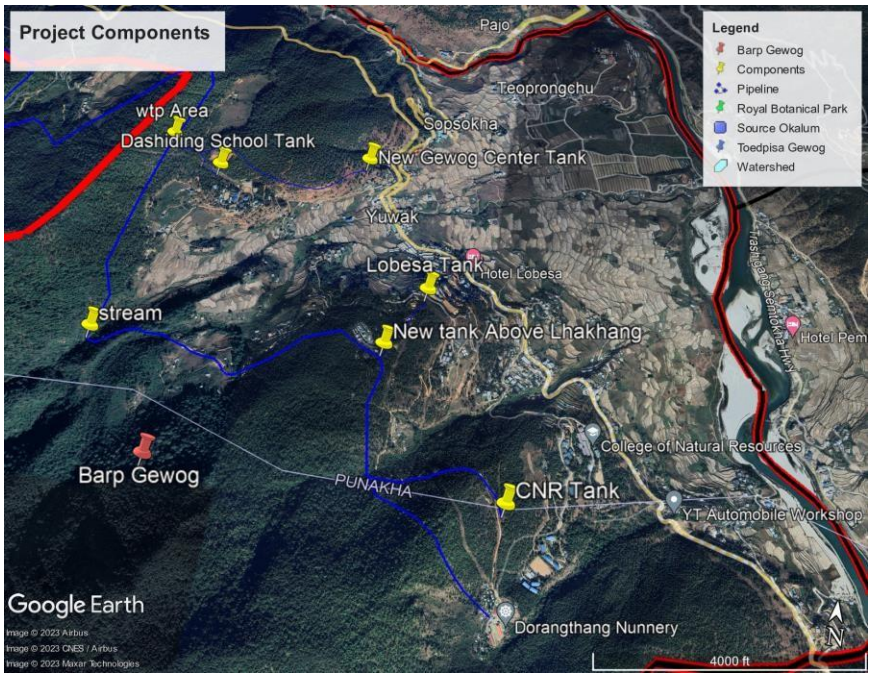


Photo 5. The Existing Water Tanks at CNR

Currently, there are multiple pipes (at least 5) tapping water from the Okalum stream. 2 pipelines of 4' feed the reservoir for the College of Natural Resources (CNR), 1 pipeline for the Lobesa area and another pipeline for the nunnery at Wolakha in Guma Gewog. A side stream that flows into the Okalum is tapped for Thinleygang Chiwog. The new water pipeline will follow a new alignment and will replace all existing ones and will implement a systematic Operation and Maintenance system through training of water user groups.

The current water discharge measurements were carried out on the 15 of September 2023. The total discharge of the stream was 99lps yield of which the project will abstract 38 lps This leaves 61lps for other downstream users and e-flow. This is more than the required 30% mandated e-flow rate as shown in the table above. During the construction, the contractor will abstract water for construction activities and for domestic purposes, but these will be temporary lasting only until the completion of civil works at the water source. Depending on the location of worker camps, the contractor will extract water from the nearest stream.

Table 12: Water Discharge Rates, Projected Demand and Downstream Flow.

Supply/Demand	
Source discharge flow	**99**
Drinking water requirement	**38**
Irrigation water requirement	**0**
Total water demand	**38**
Balance downstream flow (%)	**62%**

With climate-proofing technology, the infrastructure lifespan is estimated at 70 years. However, the project's water transmission and distribution system has been designed based on the population and water demand projections for 30 years only. In the same way, the design for the BPTs and reservoirs is based on projections for 15 years only. This projection includes 5 years of the implementation period (including the construction period). Project's benefits will start from the third year.

The total length of the water pipeline is 43.58 km of which almost 92% (40 km) passes through SRFL. 600 m of the pipeline, starting from the source, lies within the boundaries of the Royal Botanic Park while 250 m of the pipeline will traverse through the Community Forest. A trench measuring 1.2 m wide and 1.5 m deep will be dug to fit the 200 mm diameter pipe. A working corridor of 3 m is anticipated but there will be no requirement to cut trees beyond 1.2 m trench width. The pipe sizes for the drinking water distribution lines from the WTP range from 50 mm to 110 mm. The total area required for other infrastructure (intake area, sand trap, reservoir, break pressure tanks and take off chambers) is 0.8 hectares. Given the length of the pipelines and the trench dimensions and the area required for the infrastructure (0.8 Ha), the total area of forest to be cleared is 7.8 hectares.

The Contractor will be required to inform the nearest forest office who will then mark the trees, which are then cut and removed by the Natural Resource Development Corporation, or by the contractor depending on the availability of the NRDCL. The timber within the CF will be utilized by the CFMG, while the timber within the SFRL can be obtained by the community upon approval from the Forest Office. According to the Forest Clearance only 7 trees will be cut down. The trees that will require to be felled include *Pinus roxburghii*, *Pinus wallichiana, Castanposis hystrix, Daphniphyllum himalense*, *Quercus griffithii,* and *Schima wallichii*. Forest clearance for the additional alignment is under process.

Most of the pipelines will be buried underground but in landslide prone areas and stream crossings the pipeline will be installed above the ground. In some areas, suspended pipes will be supported with pipe support pillars and all bends and slopes will be protected by thrust blocks. All structures will be made of Reinforced Cement concrete.

During the construction, the contractor will abstract water for construction activities and for domestic purposes, but these will be temporary lasting only until the completion of civil works at the water source. Depending on the location of worker camps, the contractor will extract water from the nearest stream. At the source, there is no provision for electricity, so the contractor will either use solar lamps or a generator, but in other locations closer to the settlements, the contractor will tap electricity from the existing powerlines with the approval of the Bhutan Power Corporation.

All the major infrastructure components such as the reservoir tanks are in SRFL. No land or households will be acquired, and no household will be dislocated or resettled by the project and there will be no changes to land tenure arrangements. The trench (1.2 m wide by 1.5 m high) for the distribution pipeline for laying of pipes will be excavated and will traverse 1.4 km of private land cultivated in 24 private plots[13].
Depending on how long these trenches are left open and the length of the trench through individual property, vegetable and crop production will be affected, resulting in reduced income or food insecurity and impact those poor farmers totally dependent on their farm harvest.

It is estimated that at least 20-30 workers will be at the project site, at any given time. The Contractor may opt to construct one worker camp or a few of them at various sites to carry out works simultaneously on State Forest Reserve Land, or in the settlement areas, especially for laying of distribution pipelines. The Contractor may also choose to rent local houses depending on availability and proximity to the project site.

Other parallel activities.
The project will implement soil conservation and erosion control structures along water conveyance lines, protective walls around water off takes and fencing and vegetative/bio-engineering measures around reservoirs under Component 2 of the project. Participatory water resource will be conducted to develop watershed development plans for implementation by local institutions and Dzongkhag Water Masterplans for the project Dzongkhags and River Basin Management Plan for Punatsangchhu river basin. This will facilitate the adoption of integrated approaches to water resource governance and management and enable water security, and disaster and climate change resilience, at both Dzongkhag and basin levels.

To improve resilience, sustainability, and quality of water service delivery, the project will strengthen water governance, and provide institutional and community level capacity for climate-smart water and watershed management. These activities will be conducted in parallel to the construction work so that by the time the infrastructure is completed, the required governance, institutional arrangements, and capacities to take over the operation and management of the scheme, is in place.

[13] Information from Tshogpa

Table 13. Details of the Project Components

Component	From	To	Size	Location
Construction of RCC intake, RCC weir and Barbed wire fencing with Gate (Type-I and Type-II)	at the water source at Okalum		400 sq.m	Royal Botanic Park Toedpisa Gewog
Construction of RCC sand trap and Barbed wire fencing with Gate	Close to the water source at Okalum		400 sq.m	State forest reserve land Toedpisa Gewog
Raw water transmission mains. -Providing & Laying of Water Supply Main Pipeline Thinleygang	Okalum water source	Thinleygang tank for Toedpisa Gewog (150 cum)	200 mm DI pipe till new proposed WTP and laying 90 mm HDPE pipe till Thinleygang using same trench line Length= 5 km	State forest reserve land Toedpisa Gewog
Water storage	RCC Reservoir 1 at Thinleygang		150 cum Area-15 sq.m	State forest reserve land Toedpisa Gewog
Distribution main till Gemsa village from proposed new tank	From Thinleygang new proposed tank (150 cum)	Gemsa village	32 mm HDPE pipe Length= 5 km	State forest reserve land Toedpisa Gewog
Raw water transmission mains. -Providing & Laying of Water Supply Main Pipeline till new WTP	Okalum water source	New Water Treatment Plant Area for (2MLD)	200 mm DI Pipes & Fittings Length -17.38 km	State forest reserve land Barp Gewog
RCC BPT (10 cum) and Barbed wire fencing with Gate			BPT - 10 cum GI Pipes and fittings Area-15 sq.m	State forest reserve land Barp Gewog
Water distribution main pipeline	New Water Treatment Plant	Dashiding School	50 mm HDPE 10PN Length -0.5 km	State forest reserve land Barp Gewog
Water distribution main pipeline	New Water Treatment Plant	Gewog Tank	90 mm HDPE 10PN Length-1.6 km	State forest reserve land Barp Gewog
Water distribution main pipeline	New Water Treatment Plant	New RCC Reservoir (200 cum) at Lam Serpo Lhakhang	110 mm HDPE PN10 Length -3.5km	State forest reserve land Barp Gewog
Water storage	Existing RCC Reservoir Dashiding near Gewog Office, Barp Gewog		150 cum Area-25 sq.m	State forest reserve land Barp Gewog
Water storage	New RCC reservoir at Lam Serpo Lhakhang		200 cum Area-30 sq.m	Barp Gewog

Component	From	To	Size	Location
Water distribution pipeline	From RCC reservoir at Lam Serpo Lhakhang	Existing tank and CNR	size 90 mm HDPE 10PN Length -1.8 km	State forest reserve land and settlement Barp Gewog
		Tank above Lobesa school	50 mm HDPE 10PN Length-0.8 km	
		New RCC tank at Dorangthang Nunnery	50 mm HDPE 10PN Length -2 km	State forest reserve land Barp Gewog
Water storage	New RCC tank at Dorangthang Nunnery		50 cum Area-15 sq.m	State forest reserve land Barp Gewog
Water storage	12 cum FCR at Gemsa		12 cum Area-10 sq.m	State forest reserve land Barp Gewog

All Water Retaining Structures/components to be RCC structure except the ancillary units. Figure 1 depicts the layout of the project components.

Climate resilient components incorporated:
Intake, Collection Tank, Sand Trap, Break Pressure Tank, Reservoir & Pipeline:

- Reinforced cement concrete (RCC) water intake, Sand Trap, Break Pressure Tanks (BPTs) and RCC Service Reservoirs
- Gabion walls proposed upstream of intake to block debris during monsoon seasons
- Retaining Walls are proposed to retain the Structures.
- HDPE/DI pipes and fitting.
- Trenching depth proposed 1.5 m to avoid pipe breakage and to protect from freezing during winters.
- Suspended pipes to be supported with pipe support pillars.
- All bends and slopes should be protected by thrust blocks.

3.3. Project Beneficiaries

The project is expected to provide drinking water for 9,885 persons from 896 households. This includes several schools and institutions in the area.

Table 14. Project Beneficiaries

Gewog	Reservoir	Beneficiaries	Persons	Households
Barp Gewog	CNR WTP	CNR + HH	1500	59
		Drashiding HSS +HH	600	20
		Drashingdingkha +HH	232	20
	WTP Above Gewog Office	Lobesa LSS +HH	921	1
		Septokha village +HH	109	20
		Sebjekha village +HH	115	26
		Gamakha village +HH	112	21
		Yuwaka +HH	480	72
		Tshokoma +HH	390	51
		Royal Project Chimpang +HH	162	90
		Chimipang +HH	300	32
		Chimi Lhakhang +HH	106	1
		Lobesa Core + Dorangthang Nunnery +HH	2505	165
		Lower Gamalungma +HH	250	50
			7782	628
Toedpisa Gewog	Thinleygang	Thinleygang +HH	341	76
		Tokha +HH	174	25
		Tongcheykha+HH	27	2
		Thinleygang Lhakhang +HH	17	5
		Dechntsemo CS +HH	260	5
		Thinleygang LSS +HH	477	8
		BHU +HH	7	3
		Gyemkha +HH	400	72
		Mendrelgang +HH	400	72
			2103	268
			9885	**896**

2,606 students and 175 teaching and support staff from the College of Natural Resources and four schools will also benefit from assured water for drinking and washing. Additionally, the revised design will benefit 75 nuns in Dorangthang nunnery.

3.4. Project Cost and Schedule

The project cost is estimated at Nu. 73 million. The project is planned to be constructed in early 2023 and completed within a period of 18 months with an operation and maintenance (O&M) period of one year (2024-2026).

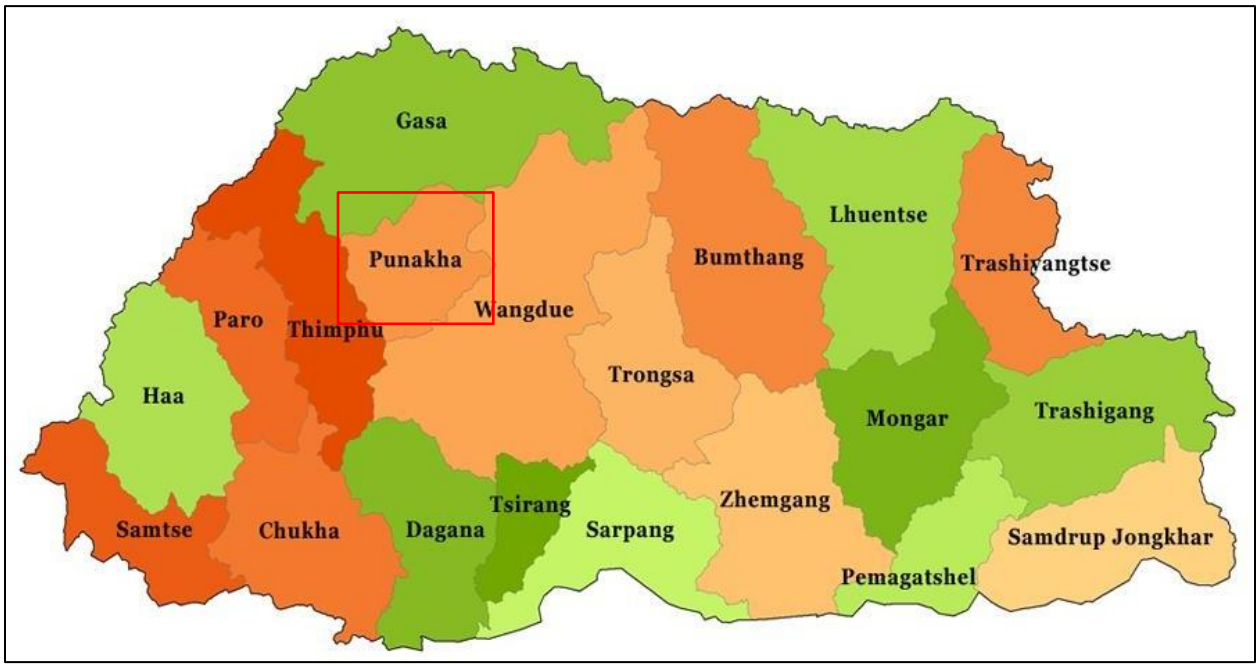
4. BASELINE INFORMATION

4.1. Physical Environment

4.1.1. Location

Punakha is bordered by Thimphu Dzongkhag to the west, Gasa to the north and Wangdue Phodrang towards the south and east. Punakha Dzongkhag was once the winter capital of the Kingdom. It is now the winter residence of the Je Khenpo[14] and the Central Monastic Body. The dzongkhag has an area of 1,107.7 sq km.

Map 6. Bhutan Map with Project Dzongkhag



Source: Ministry of Foreign Affairs, RGOB[15]

The Dzongkhag consists of eleven gewogs, namely Barp, Chubu, Dzomi, Goenshari, Guma, Kabjisa, Lingmukha, Shengana-Bjemi, Talo, Toedpisa and Toedwang[16].

The main administrative center is Khuruthang town which is about 4 km away from the Dzongkhag Headquarters and the Dzong[17]. Khuruthang also houses the offices of corporate organizations like Bhutan Post, Bank of Bhutan (BOB), Royal Insurance Corporation of Bhutan (RICB) and Bhutan Development Bank Limited (BDBL).

[14] Chief Abbot of the Central Monastic Body of Bhutan

[15] Ministry of Foreign Affairs. https://www.mfa.gov.bt/bhutan-at-glance/

[16] RGOB, Dzongkhag Administration, Punakha, http://www.punakha.gov.bt/en/about-dzongkhag

[17] Administrative center of Punakha District in Punakha

Barp Gewog: Barp Gewog lies among the southernmost reaches of Punakha. The Gewog shares its borders with Talo, Guma, and Lingmukha Gewogs to the north, Toedpisa Gewog to the east and Wangdue Phodrang district to the west and south.

The Gewog covers an area of about 24.6 sq. km (approx.) as per LCMP 2010 with elevations ranging from 1400 meters to 1800 masl. Barp Gewog consists of five chiwogs namely Tshokorna, Chasa, Eusakha, Euwakha, Gamakha with 723 households[18].

Photo 6 a,b and c. Barp Gewog

Toedpisa Gewog: Teodpisa Gewog lies in the southeast of Punakha. The Gewog shares its borders with Talo, Guma, and Kabjisa Gewogs to the north, Barp Gewog to the west, Thimphu district to the east, and Wangdue Phodrang district to the south.

Toedpisa Gewog was previously under Thimphu Dzongkhag until it was merged with Punakha Dzongkhag on 15th January 2008. The Gewog has 285 households and a population of 1,363 inhabitants. The total area of the Gewog is 102.8 sq.km (approx.) as per LCMP 2010 with an elevation ranging from 1,709 m to 3,200 masl. The Gewog has five chiwogs and five Tshogpas[19]. Some of the far-flung villages in Toedpisa Gewog are Begana, Bemsisi, Dra Karpo, and Tahogang[20].

[18] Dzongkhag website, http://www.punakha.gov.bt/en/gewogs/barp

[19] GYT Chathrim, 2002, *'Tshogpa'* means a representative of a village, or a cluster of villages.

[20] RGoB, Punakha Dzongkhag website, http://www.punakha.gov.bt/en/gewogs/toepisa

Photo 5 a and b. Toedpisa Gewog

Map 7. Map showing Barp and Toedpisa Gewogs

Source: Department of Survey and Land Records, 2009, RGOB

4.1.2. Topography, Geology and Soil

The topography in the country is shaped by the geological uplift and the lithological formations and the rivers. In the northern regions, the High Himalayas dominate with several mountain peaks and ranges with uneven and rugged crests. Within the central regions, there are both gentle and deep E-W and N-S valleys along the rivers. Towards the foothills, there are alluvial plains along the southern borders[21].

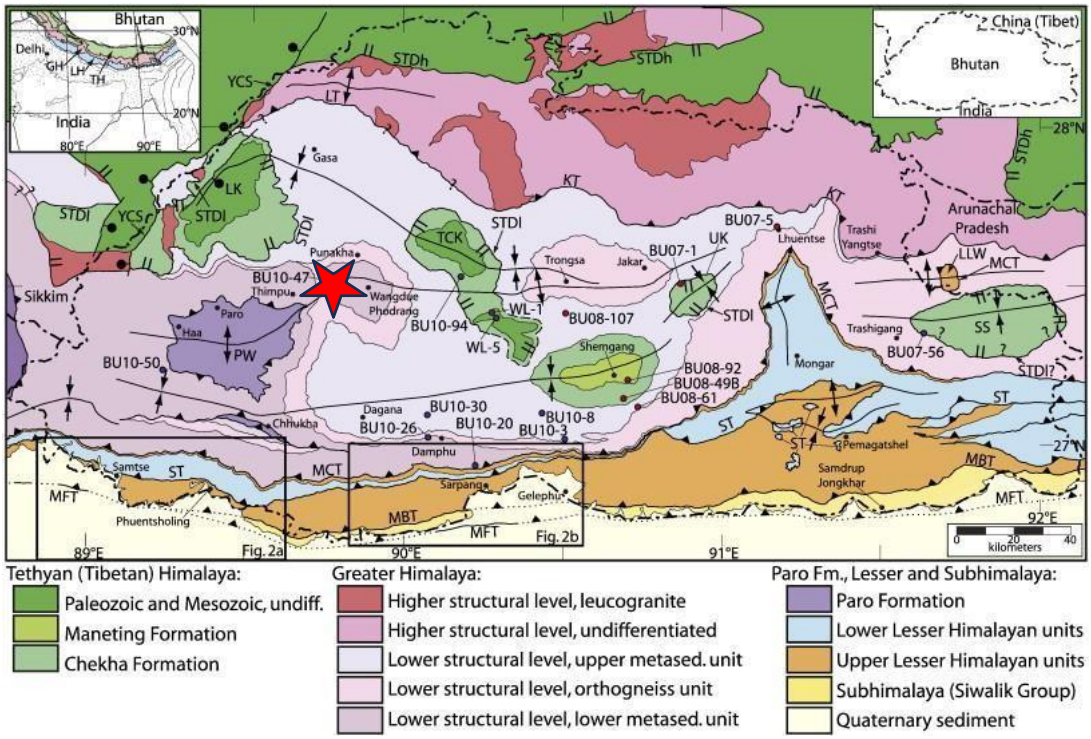
Like much of the rest of Bhutan, the terrain of Punakha consists of deep forested mountains cut by fast flowing rivers and streams, running down to wider floodplains at lower altitudes with agricultural practices on both terraced and unterraced slopes. The altitude in the Dzongkhag ranges from 1,200 to 5,400 masl. The area is underlain mainly by the Thimphu and Chekha Formation of rocks. Thimphu Formation dates from the pre-Paleozoic age and is high grade metamorphic rock with types like gneiss and quartzite. Chekha Formation is found mostly in the

[21] Cencho, et al. 2003. Physiographic zonation of Bhutan. Journal of Bhutan Studies

Shengana Gewog region, is from the Paleozoic age and is low-moderate metamorphic rock with types like phyllite, quartzite, and granite[22].

The Himalayan fold-thrust belt/orogenic belt is traditionally divided into four from south to north. These include the Sub Himalayan (SH), Lesser Himalayan (LH), Greater Himalaya (GH), and Tethyan Himalaya (TH). Their bounding fault systems includes the Main Frontal thrust, the Main Boundary thrust, the Main Central thrust and the South Tibetan Detachment system. All the major tectonostratigraphic units and the tectonic structures within the Himalayan orogenic belt are exposed in Bhutan. The Himalayan Orogeny's tectonostratigraphic sequences were defined by metamorphic grade changes due to the abrupt juxtaposition of higher-grade rocks over lower grade rocks, evolving as these orogeny-structures propagated southward during India's collision with Eurasia[23].

Map 8. Major Techno Stratigraphic Units and Tectonic Structures (project area marked as a star)



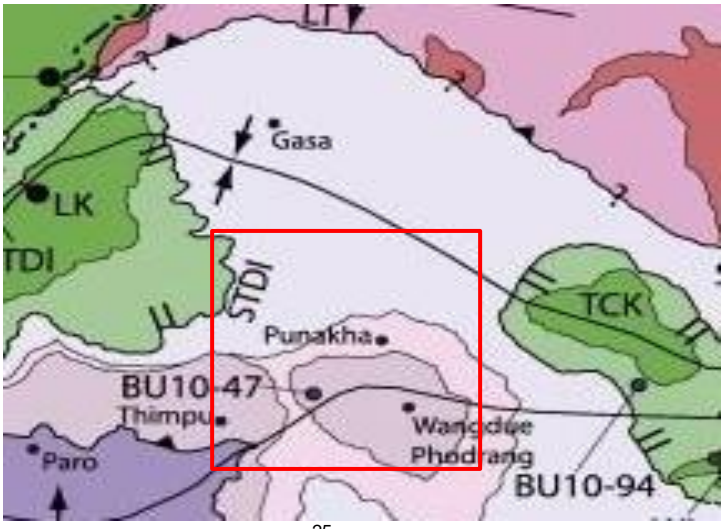
Source: McQuarrie et al, 2013[24]

[22] Technical report on the semi-detailed soil survey of the arable lands of Punakha Dzongkhag 2003, https://www.nssc.gov.bt/wp-content/uploads/2021/04/punakha.pdf

[23] Duba, Kinzang, "Crustal Structure of the Bhutanese Himalaya: New Insights from a Gravity Analysis in Western and Central Bhutan" (2018). MSU Graduate Theses. 3240. https://bearworks.missouristate.edu/theses/3240

[24] McQuarrie et al, 2013. Documenting basin scale, geometry and provenance through detrital geochemical data: Lessons from the Neoproterozoic to Ordovician Lesser, Greater, and Tethyan Himalayan strata of Bhutan. Gondwana Research 23(4):1491–1510.
DOI:10.1016/j.gr.2012.09.002

Map 9. Techno Stratigraphic Zones and Formation



Source: McQuarrie et al, 2013[25]

The maps show that Punakha encompasses 3 distinct soil formations within the region.

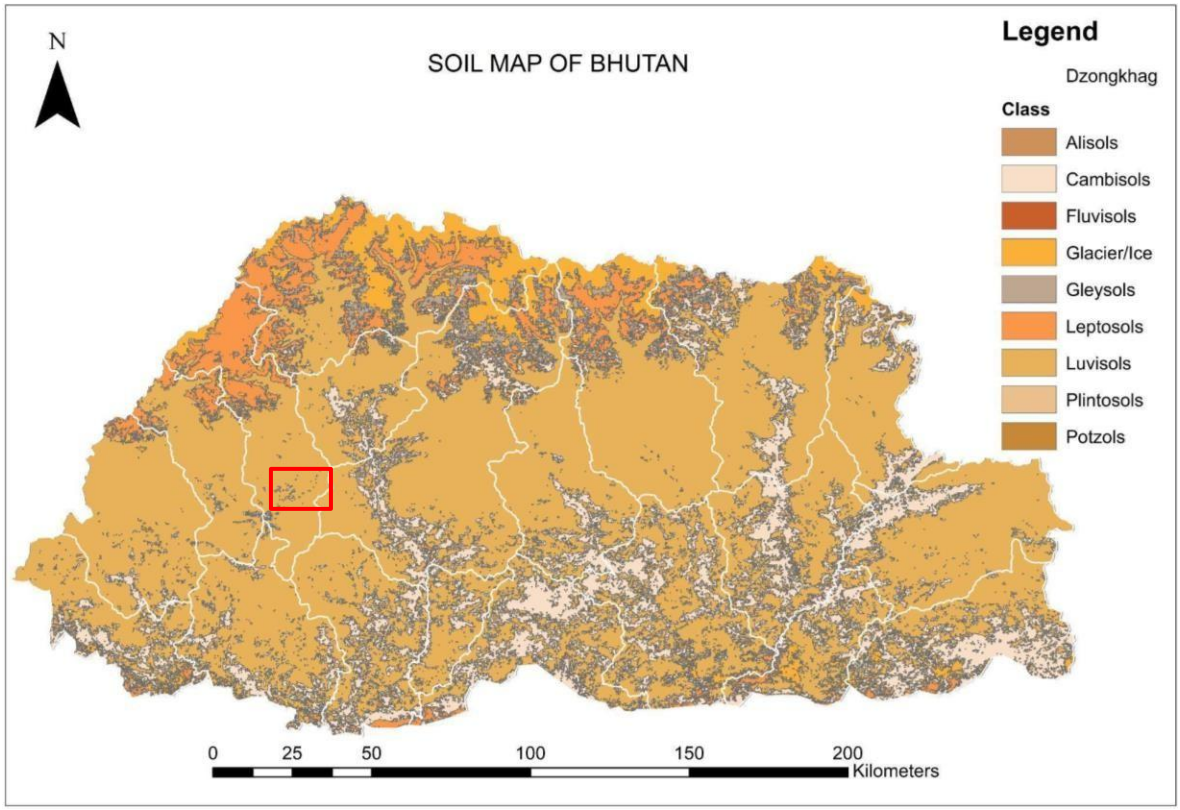
[25] McQuarrie et al, 2013. Documenting basin scale, geometry, and provenance through detrital geochemical data: Lessons from the Neoproterozoic to Ordovician Lesser, Greater, and Tethyan Himalayan strata of Bhutan. Gondwana Research 23(4):1491–1510.
DOI:10.1016/j.gr.2012.09.002

Table 15. Tectonostratigraphic Zones, Formations and Prominent Lithologies in Punakha.

Tectonostratigraphic zone	Formation	Prominent lithologies
Greater Himalayan Zone	Lower structural level, Upper metasedimentary unit	Medium- to thick-bedded, micaceous quartzite interlayered with paragneiss and schist
Greater Himalayan Zone	Orthogneiss Unit	Orthogneiss, 1.5 km thick in western Bhutan, < 5 km in eastern Bhutan
Greater Himalayan Zone	Lower metasedimentary unit (BU10-47)	Upper amphibolite to granulite-facies paragneiss with rare quartzite layers. 6.5-7 km in western Bhutan, a few 100 m in central Bhutan

Source: data compiled McQuarrie et al, 2013[26]

Map 10. Soil Map of Bhutan (project area marked as a red box)



Okazaki (1987)[27] suggested that there are five major soil groups that are vertically distributed according to the altitude. Punakha Dzongkhag contains six main types of soil which are main river alluvia, fan alluvia, colluvium, old landscape deposits, aeolian, and gully wash. Another type of deposit that should be mentioned is lacustrine. Many soils are formed in layered mixtures of

[26] McQuarrie et al, 2013. Documenting basin scale, geometry, and provenance through detrital geochemical data: Lessons from the Neoproterozoic to Ordovician Lesser, Greater, and Tethyan Himalayan strata of Bhutan. Gondwana Research 23(4):1491–1510.
DOI:10.1016/j.gr.2012.09.002

[27] Okazaki M. (1987): Soils of the Bhutan Himalaya. In: Life Zone Ecology of the Bhutan Himalaya (M. Ohsawa ed.), Laboratory of Ecology, Chiba University, Tokyo, Japan; pp. 145-184.

different materials. The most common combinations are aeolian surface deposits over and mixed with alluvium and colluvium, colluvium over fan alluvium at base of foot slopes inside valleys, side valley fan deposits over river alluvium of middle and low main river terraces at the front edges of some fans, and thin layers of main river alluvium over locally derived fan alluvium and alluvium[28].

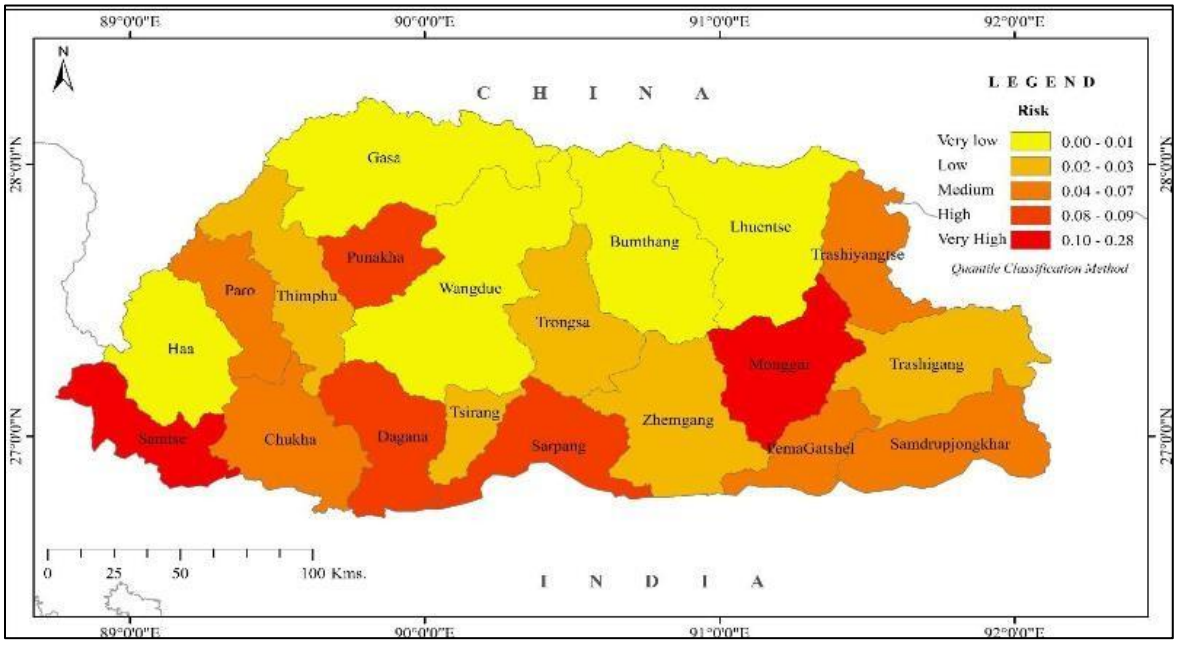
4.1.3. Climate and Air Quality

With an annual maximum temperature of 33℃ and minimum temperature of 12.6℃ in 2023, the geographical area of Punakha ranges from humid sub-tropical, warm temperate, cool temperate to alpine zones with 36.7% lying within the warm temperate zone and 29.4% within the cool temperate zone between 1,200 to 5,400 masl.

The district's temperate climate is characterized by adequate rainfall during the summer monsoon season (July to September). During the monsoon, the district receives annual rainfall precipitation measuring 688.80 mm[29].

As per the NEC[30], Punakha ranks among the five topmost districts at risk from climate impacts in Bhutan because of its existing socio-economic vulnerabilities, climate hazards and population density as shown in Map below.

Map 11. Climate Risk/Impact Index Map



[28] Technical report on the semi-detailed soil survey of the arable lands of Punakha Dzongkhag 2003, https://www.nssc.gov.bt/wp-content/uploads/2021/04/punakha.pdf

[29] Weather and Climate Services Division, NCHM, SYB 2023

[30] NEC, 2020.Climate Change vulnerability analyses and mapping for National Adaptation Plan (NAP) formulation process in Bhutan

With 100% electrification, the use of wood for cooking is limited to cooking for livestock feed. Additionally, as most of the settlements are located at lower elevations where it is much warmer, the use of wooden stoves for heating is also almost negligible. Additionally, with the Dzongkhag being 100% electrified, there is little to no use of firewood for cooking and for warmth.

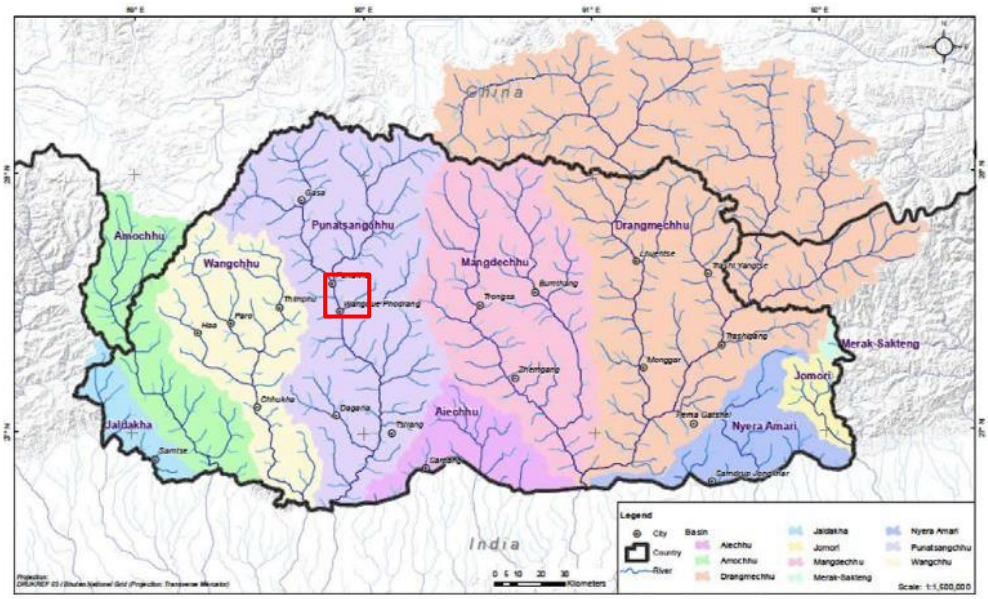
There is no available air quality data for the Dzongkhag, but with 83.6% of the region being under forest cover, and with very little percentage of it being built-up (0.27%), it can be surmised that the overall air quality of the Dzongkhag is good.

Air pollution would be mostly concentrated around the townships of Lobesa and the areas around the Primary National Highway which bypasses the Dzongkhag where there is a higher frequency of vehicular traffic.

4.1.4. Hydrology

There are five major river basins in the country: Amo Chhu, Wang Chhu, Punatsang Chhu, Mangde Chhu and Drangme Chhu[31]. Two of these (Amo Chhu and Drangme Chhu) originate in China. The rivers are mostly fed by rainfall, supplemented by an estimated 2% - 12% glacial melt and another 2% from snow melt. Other smaller rivers include Jaldakha, Aiechhu, Nyere-Amari, Jomori/Dhansari, and Merak-Sakteng. The combined outflow of the rivers is estimated at 70,576 million m3 per annum or 2,238 m3/s. (UWICER, 2018[32], NWRIM).

Map 12. Hydrological Basins and their Boundaries (project area marked as a red box)



Source: NEC, 2016[33]

[31] NEC, 2016. National Integrated Water Resources Management Plan (NIWRMP)

[32] UWICER, 2018. Bhutan Water Facts

[33] NEC, 2016. National Integrated Water Resources Management Plan, 2016.

The Punatsangchhu flows through Punakha Dzongkhag. Never Na and Toepi Rong Chhu streams flow through Barp Gewog and Toepi Rong Chhu stream flows through Toedpisa Gewog[34].

Table 16. Current Water Sources, Status and Constraints in Barp and Toedpisa Gewogs.

Gewog	Source & Location for Drinking Water	Source & Location for Irrigation Water	Status	Constraints
Barp	1. Okalum (Toedpisa Gewog) 2. Chimtse Chhu (Yoekha Chiwog) 3. Drub Chhu (Yoekha Chiwog)	1. Toepi Rong Chhu (Toedpisa Gewog) 2. Lungchephu Chhu (Gangmakha Chiwog)	All sources are inadequate for drinking and irrigation purposes	● Damage to the pipe and obstruction during heavy rain. ● Due to the river being in the valley, it is difficult to extract water. ● The source is drying up. ● Debris from the road falls into the channel. ● Increase in population, pipe mismanagement by new settlers in the area.
d	1. Okalum (Thinleygang Chiwog)	2. Okalum (Thinleygang Chiwog)	All sources are inadequate for drinking and irrigation purposes.	● Old pipes and requires maintenance.

Source: KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023.

Table 17. WUA/WUG, Members and Mandates (Barp and Toedpisa).

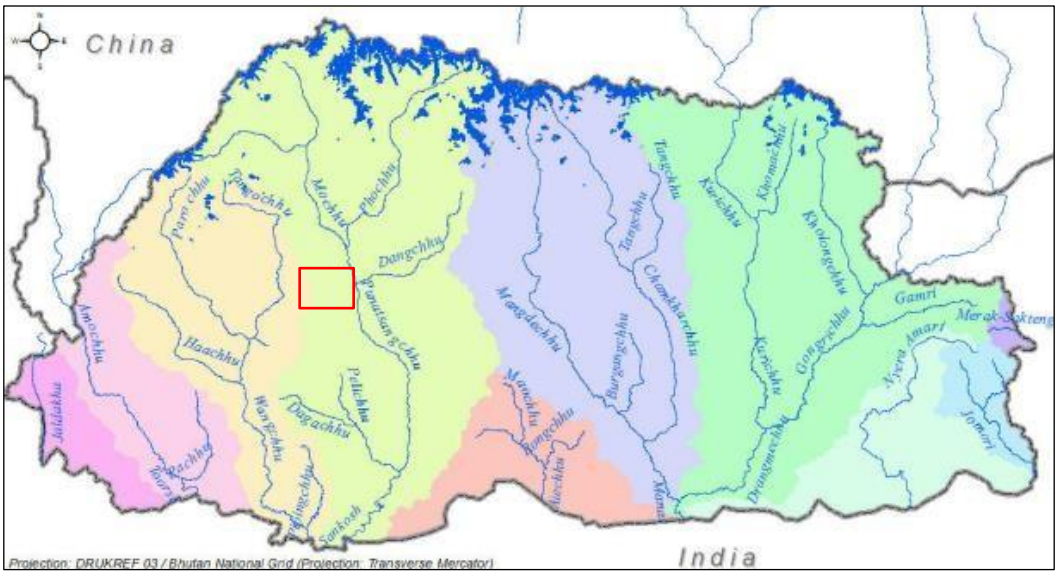
Gewog	Water User Association/Group	Members (#HHs)	Female Members	Mandates of the Association
Barp	1 WUA per village	Each HH takes turns every year and 2-3 members per HH	Mostly men with 10% female members	● The water Tshogpa (caretakers) maintains and takes care of the source and if any issues arise, either they solve it or request help from the community or Gewog if it is severe. ● No collection of money is done for repair or maintenance and caretakers are not paid. ● The caretakers visit the source once a month.
Toedpisa	1 WUA per source	4 members per WUA	Mostly men with 10% female members	● The mandate that they function by is the proper management and maintenance of the water source and the pipes. ● Caretakers are paid Nu.200 per month from each HH.

Source: KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023.

[34] NECS, National Water Resources Inventory (NWRI) 2018

Glaciers are found within the elevation range of 4,050 to 7,230 masl. Of the total, there are 466 glaciers in Punatsangchhu basin[35].

Map 13. Map showing Glaciers in Bhutan (project area marked in red box)



Source: NEC, 2016

4.1.5. Water Quality

Water quality samples were tested in Thimphu by the Royal Centre for Disease Control, Ministry of Health, in September 2023. The baseline indicates higher than usual turbidity (0.7) and E-Coli count (66) was detected in the water. E-coli count greater than 50 indicates that the water is grossly polluted with fecal matter. Further investigations to ensure the safety and quality of the drinking water supply is necessitated as the same water may be used by the Contractor for worker facilities (especially while working near the source).

Table 18. Drinking Water Quality Testing Laboratory Result, Okalum Source, 15.09.2023.

Sl.No	Parameters	Unit	Max Permissible Limit	Test Results
Physical Parameter				
1	Colour (TCU)	Hazen Unit	15	
2	Odour		Un-objectionable	
3	Taste		Un-objectionable	
4	pH		6.5 - 8.5	7.6
5	Turbidity	NTU	5	0.7
General Chemical Parameter				
1	Calcium	mg/l	Recommended <75	4.45
2	Residual Chlorine	mg/l	0.2 - 0.5	
3	Iron	mg/l	Recommended <0.3	0.0039
4	Manganese	mg/l	0.4	0
5	Sulphate	mg/l	Recommended < 250	0

[35] UWICER, 2018. Bhutan Water Facts.

General Parameters of Health Concern				
1	Fluoride	mg/l	1.5	0.08
2	Nitrate	mg/l	50	0.8
3	Arsenic	mg/l	0.01	Not tested
4	Lead	mg/l	0.01	0
5	Mercury	mg/l	0.006	Not tested
Microbiological Parameters				
	E-coli	CFU/100ml sample	0	66

Source: Bhutan Drinking Water Quality Standard, 2016, National Environment Commission, Royal Government of Bhutan, 2016 and Royal Centre for Disease Control, Ministry of Health

4.1.6. Natura Hazards and Disaster

Punakha Dzongkhag is prone to both natural and man-made disasters. This includes earthquakes, windstorms, fires, GLOFs, landslides, and vehicle accidents. The most notable disaster was the 1994 flood which affected much of the dzongkhag. It damaged most of the rural households, schools, Lhakhangs[36], and other government infrastructures. Yearly, disasters like fires and windstorms caused damage to houses and crops resulting in serious implications to the livelihood of the people.

Barp – As of 2018, there have been 10 incidents of forest fires which have destroyed about 8 acres of forestland and 2 households have been affected as well. Windstorms have affected 4 households since 2018. COVID 19 was mentioned during the community consultation that disrupted the economy for most communities.

Toedpisa – The Gewog experiences flood hazards every year that cause damage to the water pipes and the source. The local communities recommended the need for a water reservoir to prevent such issues in the future[37].

[36] Lhakhang is a Buddhist Temple.

[37] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

Table 19. Hazard Assessment of Punakha

Hazards	Secondary Hazard	When it could occur	Probability of Occurrence	History/Past disaster	Impact
Earthquake	Fire, Landslide, Flood	Any time	High	2009, 2011, 2015	Government and Private properties were affected
Flash Floods	Erosion, Landslide, Falling boulders, Swelling River	Summer (July-September)	High	2013	More than 30 acres of wetland damaged
Structural Fire		Anytime (during the dry season)	Medium	Yearly	Lhakhangs and private houses were affected
Forest Fire	Structure fire	Winter (Nov-March)	High	Yearly	Hectares of forest are destroyed
GLOF	Erosion, Landslides	Any time (especially during the summer)	High	1957, 1960, 1968, 1994, 2015	• Part of Punakha Dzong destroyed • 12 houses damaged • 816 of acres of dry land and 965 acres of • pastureland damaged • 4 bridges washed away • 2 chortens destroyed • 17 lives lost
Windstorm	Fire	Anytime (especially during the winter)	High	2013, 2017, 2018, 2019	Roofs of the government and private structures blown off

Source: DMCP, Punakha 2019.

4.2. Ecological Resources

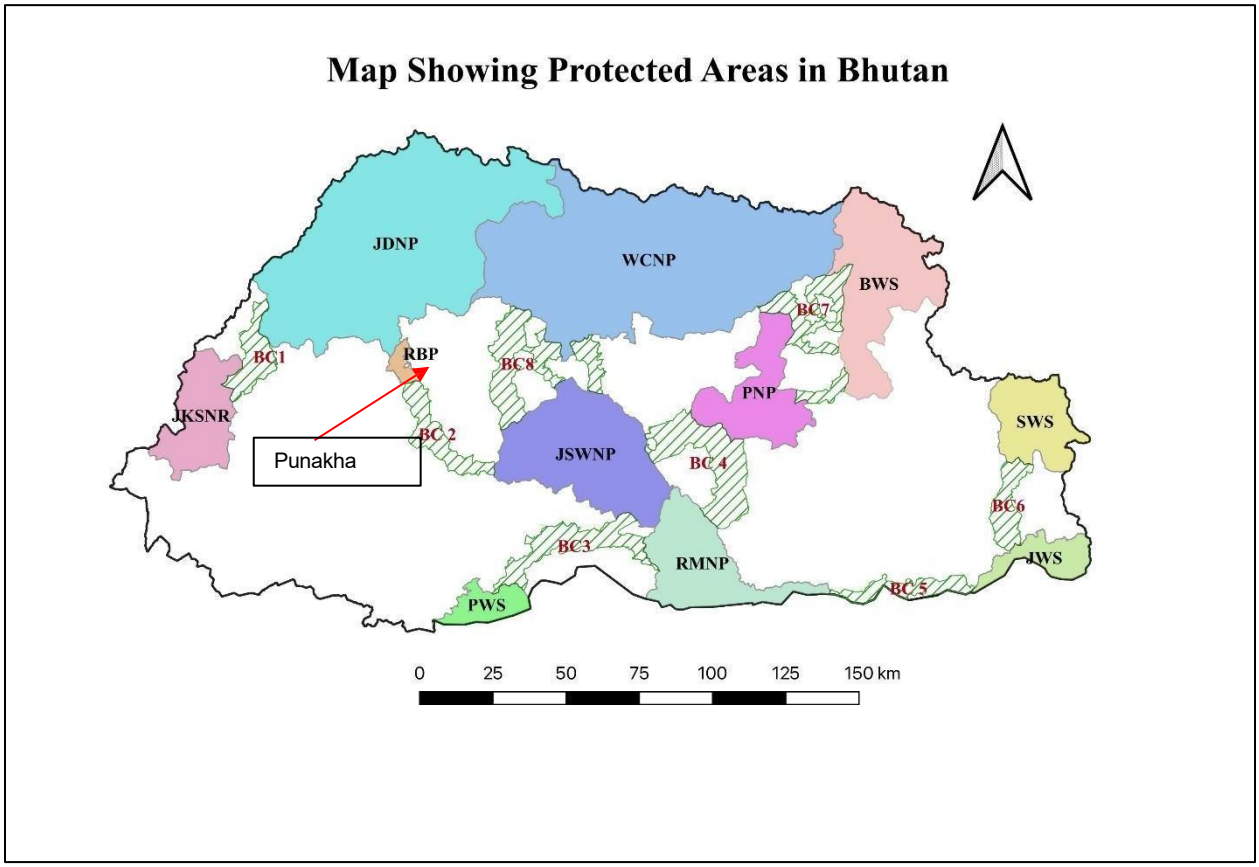
4.2.1. Protected Area and Wetland

51% of the country is under protected area status. This includes 5 national parks, 4 Wildlife Sanctuaries, 1 Strict Nature Reserve, 1 Royal Botanic Park and 8 Biological Corridors (BC)[38]. Punakha Dzongkhag falls under Jigme Dorji National Park (JDNP) and Royal Botanic Park (RBP). Among the gewogs under the project area, only parts of Toedpisa Gewog fall under the Royal

[38]DOFPS, 2019. Forest Facts and Figures

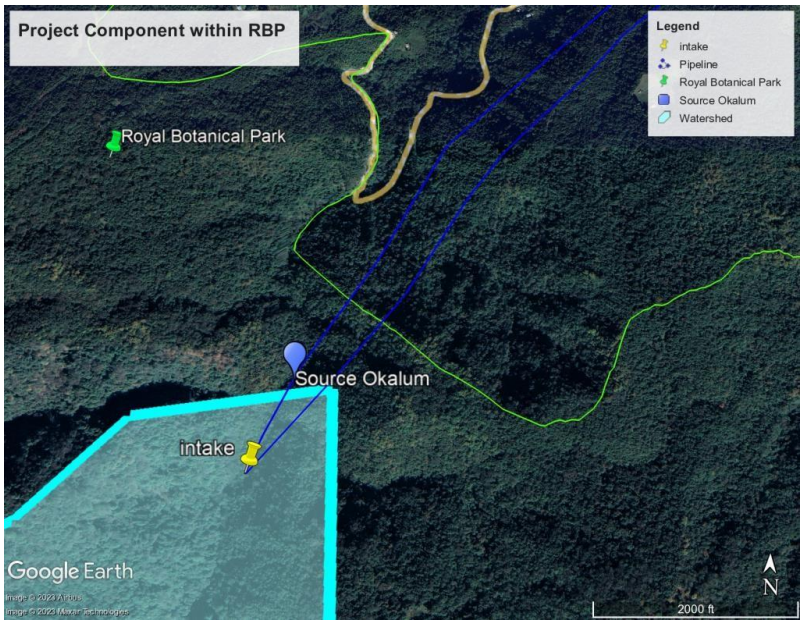
Botanic Park (RBP) with about 600 m of the pipeline from the Okalum source within RBP's boundary. There are no wetlands in the project area.

Map 14. Protected Area System of Bhutan and Project Area



Source: DOFPS. 2022 and google earth.

Map 15. Project Component within the PA



Source: Map Prepared Based on kmz File from DOFPS and MoIT

4.2.2. Forest Cover

Bhutan has a forest cover of 69.7%[39] out of which Punakha covers 91,894.9 Ha. Out of the total Dzongkhag area of 109,878 Ha, 91,894.9 Ha of Punakha is under forest cover – this constitutes 83.6% of the district's total area. The varieties in forest cover include broadleaf (54.08%), chirpine (7.61%), fir (4.93%), and mixed conifer (17.01%)[40].

Out of the total 91,893.9 Ha of forest cover in Punakha, 11,155.47 Ha are under forest cover across Barp Gewog (73.53%) and Toedpisa Gewog (91.96%). This constitutes 12.14% of the total forest cover in the two gewogs[41]. The forest in Barp Gewog is mostly broadleaf and chirpine forests while Toedpisa Gewog has broadleaf and mixed conifer forests.

The project comprises mostly of broadleaf forest. Towards the source, the forest is virtually untouched except for the numerous water pipelines extending all the way to the settlement from the source. The existing pipeline alignment will not be utilized, and all the existing pipes will be removed upon completion of the construction.
Common trees include *Castanopsis hystrix, Daphniphyllum himalense, Quercus glauca, Quercus griffithii, Rhus chinensis, Debregeasia longifolia, Carpinus spp, Lyonia ovalifolia.* There are also areas with *Chirpine (Pinus roxburghii).* Common Shrub species include *Aconogonon molle, Berberis aristate, Desmodium spp, Dichroa febrifuga, Indigofera dosua* and *Inula cappa.* The

[39] DOFPS, 2023. National Forest Inventory 2023.

[40] DOFPS, Land Use Land Cover Map, 2016

[41] NLCS, Land Use Land Cover, 2016

ground cover comprises mostly of *Pilea spp*, *Elatostema lineolatum, Swertia chirata, Artimisia vulgaris, Hedychium* spp and grass (*Cyperus spp.*).

The vegetation list in summarized in Annex 8.

Photo 7. Forest near the source

Photo 8. Forest in Barp Gewog

Community Forest: Punakha has a total of 45 CFs spread over an area of 4,870.01 Ha[42] in its 11 gewogs. There has been a decline in the number of CFs from 56 in 2018 (covering 5,105.16 Ha) to 45 in 2022 (covering 4,870.01 Ha).

There is one community forest group in Barp Gewog[43], and two community forests within Toedpisa Gewog (Jaluag CF with 10 members (7M and 3F) covering 7 acres and Limjakha CF with 12 members (9M and 3F) covering 7 acres[44].

The total length of the water pipeline is 43.58 km of which almost 92% (40 km) passes through SRFL. 600 m of the pipeline, starting from the source, lies within the boundaries of the Royal Botanic Park while 250 m of the pipeline will traverse through the Community Forest. During the public consultation it has been confirmed that there are no communities in the project areas that depend largely on forestry resources as a source of livelihood.

The trench size for the pipeline is 1.2 m wide by 1.5 m deep for which a working corridor of 3 m is anticipated although no trees will be cut beyond 1.2m. The Contractor will be required to inform the nearest forest office who will then mark the trees, which are then cut and removed by the Natural Resource Development Corporation, or by the contractor depending on the availability of the NRDCL. The timber within the CF will be utilized by the CFMG, while the timber within the SFRL can be obtained by the community upon approval from the Forest Office. According to the Forest Clearance only 7 trees will be cut down. The trees that will require to be felled include *Pinus roxburghii*, *Pinus wallichiana, Castanposis hystrix, Daphniphyllum himalense*, *Quercus griffithii,* and *Schima wallichii*. Forest clearance for the additional alignment is under process.

4.2.3. Biodiversity

Nationwide, the high forest cover provides natural habitats for many species. There are around 5,600 species of vascular seed plants, of which 94% are native. and 200 species are used for medicinal purposes. 282 species under 156 genera of Bryophytes and 350 species of fungi and 287 lichens have been recorded. About 129 species of mammals are known to occur in the country, including 26 globally threatened species, including 11 of the 36 globally recorded felid species. 736 species of birds including 30 globally threatened species. 750 species of Butterflies, 158 species of amphibians and reptiles and 120 species of fish have been recorded so far[45]

Large mammals in the project area were identified by direct observation or by the identification of tracks, droppings, excavations, pug marks, feeding, damage, and resting locations such as sets, holes, or nests. The presence of mammals was also recorded through interviews with local people. Wildlife species commonly found in the forest along the alignment and at the source include Barking Deer, Wild Boar, Sambar Deer, and Assamese Macaque. The only species of concern is the Himalayan Black Bear/Asiatic Black Bear, which is Vulnerable in IUCN Red list and included in Schedule II of the Forest and Nature Conservation Rules of Bhutan. A juvenile snake was also observed on the way to the source, although it could not be identified. According to the community members, wild pigs and monkeys are a source of crop depredation.

[42] Annual Dzongkhag Statistics 2023, NSB
[43] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023
[44] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023
[45] NBC website https://nbc.gov.bt/species-diversity/

Table 20. Wildlife Recorded During the Site Visit

#	Common name	Scientific name	Other evidence	IUCN Status	FNCA 2023
1	Barking deer	Muntiacus muntjak	Dropping, footprint and sound		
2	Wild pig	*Sus scrofa*	Footprint, rooting,		
3	Himalayan Black Bear	*Selenarctos thibetanus*	Mark on trees	V	Schedule I
4	Sambar deer	*Rhus unicolor*	Droppings		
5	monkey	*Assamese macaque*	Direct sighting		
6	unidentified	*Snake*	Direct sighting		

E- Endangered; Vulnerable- Vulnerable; NT- Near Threatened; LC- Least Concern,

Birds: Bird species occurring in the project area were observed and recorded during the site visit. A total of 37 species were recorded. Of these the most common species include the Laughing Thrush, Drongos (Ashy and Black), Tit, Common Myna, Red-Vented Bulbul, Grey Treepie, Rufous Sibia and Rock Pigeon. The total list of birds recorded is provided in Annex 8. No endangered, vulnerable, or threatened species were recorded during the field visit.

Bhutan has 3 RAMSAR sites. These are located in in Khotokha and Phobjikha under Wangduephodrang Dzongkhag and Bumdeling under Trashi Yangtse Dzongkhag [46]. There are no RAMSAR sites in Tsirang Dzongkhag. The project site does not fall along any migratory routes of species. No stream ecology was conducted as part of the field visit and no fish was observed in the stream during the field visit.

4.3. Socio-Economic Aspects

4.3.1. Demography

The estimated population of Punakha in 2021 was 30,380 inhabitants (14,383 male and 15,997 female) with a population density of 27.37 households per sq. km. There are 11 Gewogs (Blocks), 55 Chiwogs (Sub Blocks), 368 villages and 74 Gungtongs[47] in the Dzongkhag. Population data for the two project Gewogs are listed in the Table below.

Barp – The Gewog is 24.6 sq.km in size and consists of 5 Chiwogs, 42 villages, 723 HHs and a total population of 8,379 (4,251M and 4,128F)[48].

Toedpisa – The Gewog is 40 sq.km in size and consists of 5 Chiwogs, 468 HHs, and a total population of 5,338 (1,780M and 3,558F)[49].

[46] Ministry of Agriculture and Forest 2014. National Biodiversity Strategy and Action Plan

[47] *Gungtong* is as an empty house that has been abandoned.

[48] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

[49] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

Table 21. Population Data

Location	Area km²	Chiwog	Villages	#HH	Gungtong	Male	Female	Total Population	Population density per KM²
Barp	24.6	5	42	723	nil	4,251	4,128	8,379	340.6
Toedpisa	40	5	15	468	nil	1,780	3,558	5,338	133.45

Source: KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

The Population and Housing Census of 2017, reported that around half (45.2%) of Bhutan's population experienced internal migration, moving from one village or town to another gewog. Western Bhutan experienced population gains from positive net migration, while the eastern dzongkhags experienced negative net migration. In 2017, 14,936 lifetime migrants resided in Punakha Dzongkhag, with 12,586 from other Dzongkhags/Thromdes, while 9,132 migrated to other Dzongkhags/Thromdes. Urban-to-urban migration is 5.2%, rural-to-urban migration was 6.6%, and rural-to-rural migration was 28.2%[50].

While there is only a 10% increase in population at the Dzongkhag level (from 27,350 in 2017 to 30,380 in 2021), the population in the two projects increased by 43% in Barp Gewog (from 4,746 in 2017 to 8,379 in 2021) and by 56% in Toedpisa Gewog (from 2,329 in 2017 to 5,388 in 2021)[51]. This indicates that in-migration from outside the Dzongkhag or Gewog has increased significantly.

Gender

The project's target population encompasses 8 chiwogs across 2 gewogs, totaling 13,717 residents, comprising 6,031 males and 7,686 females, and a total of 1,191 households.

In 2022, Bhutan was positioned at 126th out of 146 countries in the Global Gender Gap Index with a score of 0.648[52]. By 2023, Bhutan significantly improved its rank, moving up to the 103rd position globally with a score of 0.682[53]. Notably, within the South Asia region, Bhutan's standing advanced from 5th place to the 2nd place when compared to 8 countries in the region. Based on the Focus Group Discussion (FGD) conducted, a similar consistent trend of progress is evident in all the villages where project beneficiaries reside. The FGD participants reported that the long-standing practice of inequal property inheritance based on gender has undergone transformation. Although the inheritance Act of 1980 and the Land Act of Bhutan 2007 provision equal rights over land to both men and women, property inheritance now aligns with the principle of children who remain at home to care for their aging parents.

The two project beneficiary gewogs, Barp and Toedpisa, exhibit nearly perfect gender representation within their respective decision-making committees. In Toedpisa Gewog, women members constitute 66% of the committee, while in Barp Gewog, women make up 50% of the

[50] NSB, 2017, Population and Housing Census of Bhutan

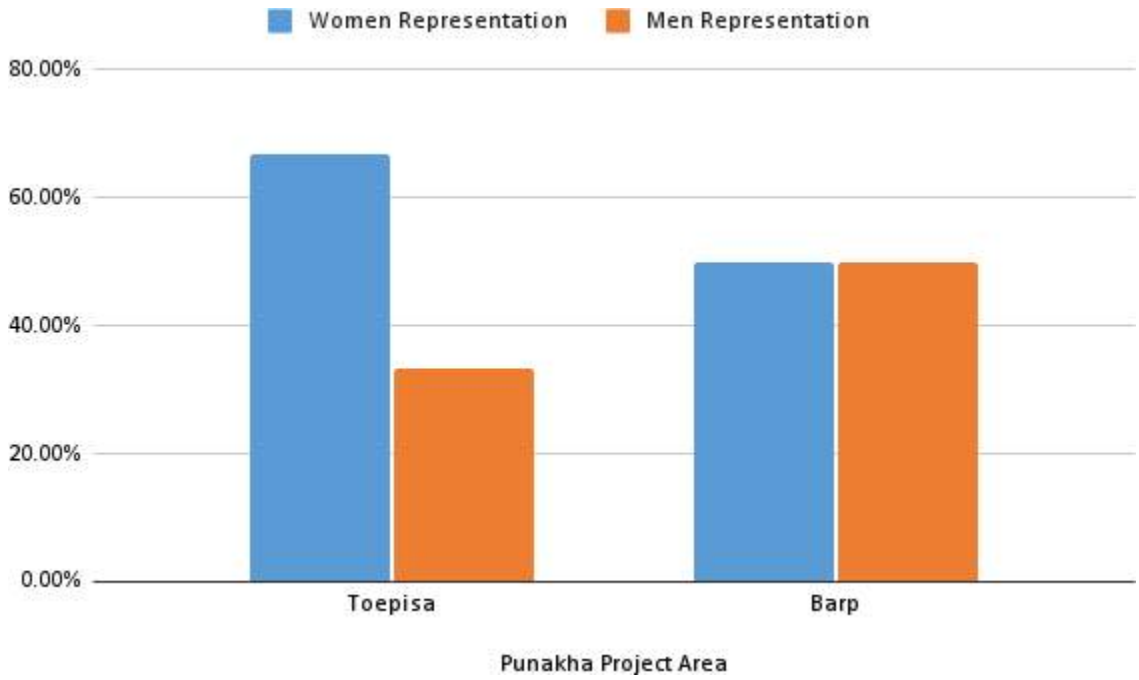
[51] NSB 2017 and 2021, Population and Housing Census of Bhutan and Annual Dzongkhag Statistics.

[52] *Global Gender Gap Report 2022*. WEF, 2022.

[53] *Global Gender Gap Report 2023*. WEF, 2023.

committee. The figures are quite impressive when compared to the national representation of women in decision-making positions. The women seem to enjoy equal participation as noted during the FGDs convened in these gewogs.

Figure 2. Gender Representation in the 2 Project Gewogs



The local leaders have also received training opportunities for gender-equality organized by RENEW. There is also a plan to seek additional support from RENEW during the project implementation phase. With such a strong base on gender-equality, so far, no official records of GBV (Gender-based Violence) are reported in these villages although at the national level more than two in every five women (44.6%) experienced one or more forms of partner violence in their lifetime with 9.3% and 3.7% of them experiencing severe forms of physical and sexual violence respectively[54].

Since the villages in these gewogs grapple with acute shortage of water, the community experiences sanitation-related issues which has a prominent impact on women and girls. Nevertheless, there is no recorded instance of sanitation-related diseases causing significant health concerns within the community.

One of the pressing issues highlighted during a recent Focus Group Discussion (FGD) in Toedpisa Gewog was the challenges faced by women and girls in maintaining proper hygiene, especially during their menstrual cycle.

The scarcity of water exacerbates the difficulties faced by women and girls in managing their menstrual hygiene. Insufficient access to clean water makes it challenging to maintain adequate personal hygiene during menstruation. This includes difficulties in washing and changing sanitary

[54] *Gender Equality in Bhutan*. UNFPA. 2020.

materials, which are essential for the health and well-being of women and girls. Inadequate menstrual hygiene management can lead to health issues, discomfort, and may even deter girls from attending school regularly, further limiting their educational and social opportunities.

As a result, addressing the water scarcity issue is not only crucial for meeting basic daily needs but also for promoting the health and dignity of women and girls in the community. By improving water access and sanitation facilities, the community can significantly alleviate these challenges, contributing to the overall well-being and empowerment of women and girls in the communities.

4.3.2. Socio-Cultural Groups

As reported under the section on demography, 54% of the population in Punakha Dzongkhag migrated into the Dzongkhag before 2017. Since then, the population in the two project gewogs has increased by 43% in Barp Gewog and 54% in Toedpisa Gewog, indicating an upward increase in in migration from other districts.

The influx of people into Punakha can be attributed to Punakha town being a tourist destination, the two Punatsangchhu projects and the presence of the College of Natural Resources that significantly increase the economic opportunities and population of Lobesa town. Additionally, both Toedpisa and Barp gewog lie along the national highway connecting western Bhutan to the East as well as to the South. This has boosted the local economy with increasing number of vegetable vendors and restaurants/hotels along the highway.

While the resident population is still dominantly Ngalop (westerners), while the in-migration has resulted in a wide mix of socio-cultural groups, with Sharchops (easterners), Lhotsampas (southerners), as well as Bumthaps (central Bhutan) and many others that speak their own dialects. There are no indigenous groups in the two project gewogs or in Punakha Dzongkhag[55].

4.3.3. Land use, Agriculture and Industry

With 83.6% of the Dzongkhag under forest cover, cultivated agriculture covers about 4,696.6 Ha of the region and built-up area is comprised of 296 Ha. Lobesa town is the central hub of the region alongside Khuruthang town with the remaining villages and communities spread across the Dzongkhag. Economic opportunities provided by the construction of Punatsangchhu Hydroelectric Project I and II will boost the local economy, trade and commerce and employment potential. The Hydroelectric Projects are more than 30-50km away from the project site.

In 2021, there were 1,495 trade industries, hotels, and restaurants, 874 industries, and 66 construction industries in Punakha. There are 11 livestock extension centers, 3 fisheries, 15 poultry farms, 1 milk processing unit, and 22 piggeries[56].

[55] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023
[56] RGOB, Punakha Dzongkhag website, DAG http://www.punakha.gov.bt/en/dzongkhag-glance.

Barp Gewog has 65% of the population working as farmers, 20% as government/corporate employees, 10% owning businesses, and 5% who are unemployed. Toedpisa Gewog has 75% of the population working as farmers, 15% as government/corporate employees, 3% owning businesses, and 7% are unemployed. Barp Gewog has 130 shops while Toedpisa Gewog has 25[57].

Table 22. Livelihood Data for Project Gewogs.

Gewog	Farmers	Government/Corporate employees	Businesses/ Enterprises	Unemployed
Barp	65%	20%	10%	5%
Toedpisa	75%	15%	3%	7%

Source: KII, Community Consultation, Barp Gewog Center, 19th October 2023.

The conducive climatic condition enables people to produce surplus rice, fruits and vegetables which are sold in neighboring Dzongkhags i.e., Thimphu and Wangdue Phodrang. The Dzongkhag is one of the largest producers of rice in the country. Farmers also grow vegetables and fruit to supplement their income owing to the district's favorable location, soil, and climatic conditions. The main cash crops grown here are paddy, wheat, maize, and mustard. Though mandarin and guava[58] are among the main fruits grown in the Dzongkhag, other fruits like persimmon, peaches, plums, pears, avocado, and apricots are grown as well as a variety of vegetables such as chilies, radish, cabbage, brinjal, and tomatoes[59].

Barp - The principal cereal crop in the Gewog is paddy followed by spring wheat. Most households derive cash income from the sale of fruits, vegetables, and rice. The fertile Lobesa valley offers a promising opportunity for farm mechanization.

Toedpisa - Since the East-West highway passes through the Gewog, people can market their products easily, and to facilitate this there are several market sheds constructed along the highway.

[57] Source: KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

[58] DDM, Dzongkhag Disaster Management and Contingency Plan 2019 https://www.ddm.gov.bt/wp-content/uploads/downloads/dmcp/DDMCPFINAL_Punakha_2019.pdf#:~:

[59] RGoB, Punakha Dzongkhag website http://www.punakha.gov.bt/en

4.3.4. Drinking Water, Sanitation and Waste

The Dzongkhag has the Tongzhuna[60] surface water (29 lps) peripheral to the old town and 2 borewells (2.74 and 2.35 MLD) in Khuruthang town which supplies drinking water to Uma Resort, PP Palace, Phaduna, Zomlingthang Palace and its periphery, Changyul, Punakha Dzong, Royal Bhutan Police & its periphery, Punakha Central School (PCS) and Khuruthang town (24 hours by Tongzhuna and 6 hours by the borewell in Khuruthang)[61].

Barp - The Gewog has piped water supply throughout but lacks infrastructure in terms of PIT/VIDP/Flush latrines with about 540 households facing shortages[62]. 100% of the Gewog has latrines facilities, and 50% of the region has water supply. 60% of the households are connected to functional piped water. 20% of the households have animal sheds and 90% have garbage pits. The waste is collected by the municipality[63].

Toedpisa - All the households are electrified and about 96% of the household have access to a clean drinking water supply[64]. The Gewog has 100% latrine facilities for the community, 99% of the households have water supply with functional piped water. 77% of the households have animal sheds, and 10% of the households have garbage pits. There are no waste disposal facilities within the Gewog. Waste is collected by the Gewog monthly and disposed of to Limukha[65]. When required, assistance from the municipality is requested if the waste exceeds their handling capacities.

Table 23. Water, Sanitation and Waste of the Gewogs (Barp and Toedpisa)

Gewog	Latrine %	Water Supply %	HHs with functional piped water %	HHs with animal shed %	HHs with garbage pit %
Barp	100	50	60	20	90
Toedpisa	100	99	99	77	100

Source: KII, Community Consultation, Barp Gewog Center, 19th October 2023.

Currently there are several water users abstracting water from the Okalum stream, with pipelines laid overland. Some of these are damaged, leaking and require constant repair and maintenance. The water is also insufficient to meet the current demand with many households and institutions suffering from acute shortage of water not because of inadequate water at the source, but

[60] Tongzhuna is a place where the water supply is extracted from.

[61] Annual Information Bulletin, 2021, MoWHS.

[62] RGOB, Punakha Dzongkhag website, http://www.punakha.gov.bt/en.

[63] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

[64] RGOB, Punakha Dzongkhag website, http://www.punakha.gov.bt/en.

[65] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

because of inadequate water infrastructure. The problem has been further exacerbated by the increasing population in Lobesa town and within the two gewogs.

Photo 9 a – g. Existing Water Storage Tanks and Pipelines

4.3.5. Education, Health and Banking

Education: Punakha has 5 Higher Secondary Schools (HSS), 2 Middle Secondary Schools (MSS), 4 Lower Secondary Schools (LSS) and 10 Primary Schools (PS). Other educational institutions include 7 Non-Formal Education Centers (NFE), 21 Early Childhood Care and Development Centers (ECCD), 4 Extended Classrooms (ECR), and the College of Natural Resources (CNR)[66].

[66] RGoB, Punakha Dzongkhag Website http://www.punakha.gov.bt/

Health: The Dzongkhag has 1 Hospital, 7 Grade 2 Basic Health Units (BHUs), 1 Sup-post, 10 Outreach Clinics (ORC), and 2 Indigenous Units. The health facilities are manned by 5 Doctors, 1 Physiotherapist, 24 Nurses, 1 Pharmacist, 1 Clinical Officer, 22 Health Assistants (HA), 19 Technicians, 1 Medical Lab Technologist, 58 Village Health Workers, 2 Indigenous Physicians, 3 Sowa Menpas (Indigenous Medical Technicians), and 64 Administrative/Support Staff. The Dzongkhag also has 4 ambulances[67].

Banking and Credit: Corporate financial institution services in Khuruthang town in Punakha is catered to by Bank of Bhutan (BOB), Bhutan Development Bank Limited (BDBL), Royal Insurance Corporation of Bhutan (RICBL). Bhutan Post has an office here that caters to the postal needs of inhabitants in the Dzongkhag. BOB and Bhutan National Bank (BNB) have Agents and outlets in Barp Gewog with ATM facilities while BOB and BDBL have Agents Toedpisa Gewog. RENEW also provides credit services to Toedpisa Gewog.

Table 24. Education, Health and Banking Infrastructure and Services in the Two Gewogs

Gewog	Educational Institutions	Health Facilities	Banking Services	Additional Information
Barp	1 CNR 1 LSS 1 HSS 1 ECCD	1 Sub-Post*	1 BOB Agent + ATM 1 BNB Agent + ATM	*Health services are availed from Punakha, Wangdue Phodrang and Thimphu. The Sub-post provides maternal and child health care including primary health care.
Toedpisa	1 PS 1 LSS 1 HS 1 ECCD	1 BHU 1 ORC	1 BDBL Agent 1 BOB Agent 1 RENEW Credit & Saving Service	

Source: KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023 and AES 2023.

Table 25. Educational Institutes, Students, and Staff Numbers

Gewog	Name of Education centers	Total students	Teachers	Total Staff	Total population
Barp	Khuruthang Technical Training Institute	390 (275M, 115F)	19 (7M, 12F)	19	409
	College of Natural Resources	684 (271M, 413F)	61 (44M, 17F)	61	745
	Lobesa Lower Secondary School	889 (437M, 452F)	46 (22M, 24F)	46	935
	Dashiding Higher Secondary School	382 (185M, 197F)	29 (24M, 5F)	29	428
	Ugyen Academy	884 (480M, 404F)	55 (40M, 15F)	55	939
	Lekher Daycare	20	2	2	22
Toedpisa	Mendrelgang Early Childcare	21(11M,10F)	2 (2M)	2	23
	Tahogag Primary School	33 (11M, 22F)	5 (2M, 3F)	5	38

[67] NSB, Annual Dzongkhag Statistics 2022.

	Thinleygang Lower Secondary School	431 (218M, 213F)	23 (14M, 9F)	23	454
	Dechentsemo Central School	220 (99M, 121F)	16 (7M, 9F)	16	236

Source: KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023 and AES 2023.

4.3.6. Roads and Transportation

The Dzongkhag has a relatively good network of feeders and farm roads that provide easy access for farmers to market their produce. Such accessibility has reduced the walking distance to less than one hour from the roadhead for over 98% of the people. Table 26 details the types and length of roads in Punakha.

Barp – The Gewog is one of the most accessible gewogs in the region with Punakha Dzongkhag headquarters only about 12 km away. There are 12 km of Dzongkhag Road, 16 farm roads measuring 32 km, and 750 m of GC road[68].

Toedpisa – The Gewog has 16 farm roads totaling 63.50 km in length, and 20 km of National Highway.

Table 26. Length of Roads (Km) by Type as of June 2022 for Punakha Dzongkhag

Dzongkhag	Primary National Highway	Secondary National Highway	Dzongkhag Road	Thromde Road	Farm Road	Access Road	GC Road	All Roads
Punakha	53	30.10	39.81	4.41	522.88	103.87		754.07
Barp Gewog	0	0	12	0	32	0	0.75	44.75
Toedpisa Gewog	20	0	0	0	63.50	0	0	83.5

Source: Statistical Yearbook, NSB 2023 and KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023 and AES 2023.

There will be no new access road constructed for the project. The project sites will be accessed through existing access roads and trails to the water source and reservoir areas. All construction materials will be manually hauled to the respective locations (source, reservoir, trench, and worker camps)

4.3.7. Tourism

With numerous religious and cultural sites including important heritage sites, Punakha Dzongkhag is a sought-after tourist destination for both international as well as domestic tourists. The Punakha Dzong, Chimi Lhakhang, Talo Dzong, Khamsum Yulley Namgyal Chorten, Koma

[68]KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

Tshachhu[69] and Chhubu Tshachhu, are amongst the major tourist attractions. Recreational activities include rafting and camping that provide additional economic benefits related to Tourism in the district. As per the Bhutan Tourism Monitor 2020, prior to the COVID 19 pandemic, Punakha recorded 77,443 tourists in 2020[70]. In terms of tourist accommodation, Punakha hosts a variety of well-equipped facilities ranging from budget hotels, homestays, campsites to 4-star hotels.

4.3.8. Physical Cultural Resources

Within the Dzongkhag, the tangible cultural infrastructure includes 1 Dzong, 27 Government owned Lhakhangs, 38 Community owned Lhakhangs, 23 Privately owned Lhakhangs, and 1 archery ground[71]. The Dzongkhag has 17 religious institutions and 93 religious monuments as per the Dzongkhag website[72].

Barp – The renowned Chimi Lhakhang which is located in the Gewog is a tourist hotspot as well as a place of sacred reverence for Bhutanese. The Lhakhang is located 10 km from Punakha near Sopsokha Village. A 20-minute walk along a muddy and dusty path through fields of mustard and rice, leads to a hillock where the Lhakhang is situated. Prayer flags are lined all along the road from an adjacent village hamlet known as Yowakha, along a stream leading up to the Lhakhang[73]. In November, a Thongdrel[74] is unveiled and a day-long religious event takes place at Chimi Lhakhang. It is believed that all sins are purified upon viewing the Thongdrel[75]. There are also other Buddhist monasteries like Gamakha Lhakhang and Lam Serpo's Lhakhang in the Gewog including Dorangthang Nunnery.

Toedpisa – The Shingkhar Lam Lhakhang, Mendrelgang Lhakhang, Thinleygang Lhakhang, a Chorten[76], and an archery ground, are located in the Gewog. Some important festivals and religious events that take place here are the migration of the Zhung Dratsang[77] to the winter residence in Punakha, Thongdrel Mani Dungdrup, and the Rhododendron festival[78].

[69] *Tshachhu* is a hot spring known to have healing benefits.

[70] Tourism Council of Bhutan, Bhutan Tourism Monitor 2020

[71] NSB, Annual Dzongkhag Statistics 2022 https://www.nsb.gov.bt/publications/annual-dzongkhag-statistics

[72] RGOB, Punakha Dzongkhag website, Dzongkhag at a Glance, http://www.punakha.gov.bt/index.php/en/dzongkhag-glance

[73] RGOB, Punakha Dzongkhag website, http://www.punakha.gov.bt/en

[74] A *Thongdrel* is a large ornamental religious image usually unveiled during important religious festivals.

[75] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

[76] A Chorten is a Buddhist Stupa.

[77] The *Zhung Dratsang* is the Central Monastic Body.

[78] KII, Community Consultations at Barp Gewog Centre (Barp and Toedpisa Gewogs), 19th October 2023

Photo 10 a and b. Thinleygang Lhakhang (Toedpisa Gewog) and Lam Serpo's Lhakhang (Barp Gewog)- Project Beneficiaries

5. STAKEHOLDER IDENTIFICATION AND CONSULTATIONS

5.1. Background

The Stakeholder Engagement Plan (SEP) developed for the project serves as a management tool to guide stakeholder engagement during the whole project lifecycle, including targeted assessment process. The SEP identified four broad groups in the project area. These have been categorized into Direct and Indirect Stakeholders.

Table 27. Project Stakeholders.

Direct Stakeholders	Indirect Stakeholders
Communities, specifically including farmers (both women and men) as well as vulnerable groups.	Research Agencies
Project Steering Committee especially the Department of Forest and Park Services, Department of Environment & Climate Change and the Department of Water under the Ministry of Energy and Natural Resources (MoENR), and the Ministry of Agriculture and Livestock (MoAL).	National NGOs/CSOs
Project Management Unit under MoIT	Multilateral Agencies
Project Implementation Unit	UNDP
Dzongkhag Administration	
Local Government	
Local agencies directly responsible for O&M of water infrastructure, agricultural extension, and forestry.	
Water Users' Associations, their committees, and other community-based organizations responsible for managing water resources and catchments and organizations of farmers.	
Entrepreneurs and private sector players involved in the O&M of water distribution networks.	

5.1. Stakeholder Mapping

For the Environmental and Social Impact Assessment these groups were classified into the following:

Direct Stakeholders. This includes:

1. Individual households and the local communities. While these communities will be positively impacted by the project in terms of assured access to water for drinking and irrigation and may be potentially employed by the project, other members will be directly impacted by the project either permanently or temporarily. This may be through:

- temporary loss or potential loss in revenue (community forest group) if the timber cannot be extracted and sold,
- labor standards, salaries/wages and occupational health and safety risks (those employed by the contractor),
- risk of losing marginal potential cropping opportunity (for private landowners where trench work is carried out),
- temporary inconveniences/social disturbance due to the project construction activities (air, dust and noise pollution, excavation across access roads, sharing limited water with the contractor).

2. Disadvantaged and Vulnerable Groups Including **Women -** Households were considered as vulnerable if they belong to a) a household whose head of household is under the age of 18 or over 65; b) single-parent household run by a woman (either divorced or widowed), c) household living below the poverty-line i.e., with income less than Nu. 6,300 per person per month, d) a household that has persons that are impaired by a disability, d) a household that has only minors (under the age of 18) or elderly persons (over 65) with no income.

3. Project Steering Committee with members from Responsible Partner Agencies, the Department of Forest and Park Services and the Department of Water, and the Ministry of Agriculture and Livestock as these are responsible for implementing activities for watershed management and improved cropping practices.

4. Dzongkhag Administration and all the relevant sector heads responsible for ensuring sustainable development in the Dzongkhag (Dzongkhag Planning, Engineering, Environment, Land, Agriculture, Forest, Culture Officers).

5. Gewog Administration and local agencies involved in directly responsible for O&M of water infrastructure, agricultural extension, and forestry.

6. Water user groups

7. Entrepreneurs and private sector players involved in the O&M of water distribution networks.

Indirect Stakeholders

This includes interested individuals, groups, or organizations with an interest in the project, because of the project location, its characteristics, impacts, or matters related to public interest. This includes NGOs/CSOs, Multilateral agencies and UNDP.

5.2. Objective of the Stakeholder Consultations

To ensure environmentally sound and sustainable economic development and acceptability of the project and its potential impacts, consultations were conducted with stakeholders mentioned below to seek clarification on various aspects of the project design and layout, to fill in data gaps and to obtain their views.

UNDP – to share and seek the approval of the proposed ESIA, work schedule, seek project related information, seek clarity on the institutional framework for project management implementation, and supervision as well as seek assistance in planning the stakeholders consultations and site visits.

Other stakeholders (Interested parties)

Project Management Unit – to seek clarity on project components, project design (sustainability of project) and project implementation schedule.

Dzongkhag Planning Officer - to seek assistance in arranging the Dzongkhag and community consultations, discussions with relevant officers, site visits and access project related information (status of permits and clearances, to seek information on private plots that will be affected by the water distribution pipelines).

Cluster Engineer – to seek clarity on project components, project location and project beneficiaries and to determine the project area of influence, and discuss the alternatives considered to reduce anticipated impacts.

Community including WUA members and CF members – to share the project design and layout, schedule and share the Grievance Redress Mechanism as well as provide an opportunity for the community to voice their concerns and actively participate in the Environmental and Social Safeguard (ESS) planning process.

Dzongkhag Consultation - The main objective of the stakeholder consultation at the Dzongkhag was to disseminate information on the ESIA process, UNDP principles and standards, national regulatory requirements and the need to follow Free Prior and Informed Consent principles for inclusive planning and design of the interventions. The meeting provided an opportunity for the Dzongkhag and Gewog stakeholders to share their views and concerns or recommendations regarding any aspect of the project (design, layout, environmental and social impacts, project stakeholders, and the grievance redress mechanism). Dzongkhag support was solicited to fill in the gaps on information requirements to ensure a comprehensive targeted assessment and to better understand the existing human resources and capacity needs for successful implementation, supervision, and compliance monitoring of the ESMP during project implementation. Additionally, the consultations were also aimed at planning community consultations, and conducting Gender assessment to ensure Gender mainstreaming in the ESMP and the GRM. The views and recommendations have been taken into consideration and incorporated into the ESIA and ESMP.

Community Consultation - The main objective of the community consultation was to inform the community on the ESIA process, the project design and construction activities so that the relevant communities know what to expect during the construction process and how to report unanticipated impacts through the GRM.

The meeting also sought to provide an opportunity for beneficiaries, affected parties and vulnerable groups to share their views and concerns on the project and their input in developing appropriate mitigation measures. Additionally, the meeting provided an opportunity to seek information on the project area, water users' association and to validate the baseline information.

Participants at the meeting also included members of the Water Group from Thinleygang and members from the Community Forest Group.

5.3. Consultation approach and participation

Prior information on the consultation including the date, venue and objectives was provided through the UNDP, Punakha Dzongkhag and the Gewog Representatives who were requested to ensure that members of the vulnerable community were also invited to the consultation. The Gups in turn relayed the information through their social media channels to the beneficiaries, affected persons, and vulnerable groups.

Two public consultations were conducted from 18th to 19th October 2023. The details of the participants are listed in Table 28.

The Dzongkhag Consultation held on 18th October 2023 began with an introductory session with the entire group of participants which included the Punakha Dzongdag, Dzongkhag Sectoral Heads, Local Government Representatives, Chief Forest Officer and Ranger, Lobesa Forest Range, PIU and officers from the Regional Engineering Cluster. It was decided that the progressive Community Consultation for Barp Gewog and Toedpisa Gewog would take place on 19th October 2023 at the Barp Gewog Centre.

Photo 11. Dzongkhag Consultation at Punakha on 18/10/2023.

The Community Consultation was held on 19th October at Barp Gewog Centre. The session began with introductory presentations by the DE and the Consultant that culminated in a Q & A after which the attendees were divided into two subgroups for their respective gewogs of Barp and Toedpisa for community mapping activities with a separate group each created for Gender and Vulnerable Persons for Gender and vulnerability discussions to encourage their participation and seek their views on the project. This was done to ensure a comprehensive method of inquiry and thorough information dissemination.

Photo 12 a – d. Dzongkhag consultation at Barp Gewog on 19/10/2023.

Table 28. Details of Consultations.

Date and time	Type of consultation	Location	Participants	Male	Female	Total
18th October 2023 9AM-5PM	District level consultation	Punakha Dzongkhag	Punakha Dzongdag, Dzongkhag Sectoral Heads, Local Government Representatives, Chief Forest Officer and ranger, Lobesa Forest Range, Dzongkhag Engineers, Cluster Engineer,	24	6	30
19th October 2023 9.30AM-2 PM	Community consultation	Barp Gewog Centre	Dzongkhag Engineers, Dzongkhag Agriculture Officer, Local Government Staff, Representatives and Community Members from Toedpisa and Barp Gewogs, Staff from Department of Forest and Park Services, Basic Health Unit Staff, CNR Staff, Representatives from Religious Institutes.	46	10	56

5.4. Summary of Consultations

The key comments, issues and recommendations raised during the consultation are summarized in the table below.

Table 29. Summary of Consultation at the Dzongkhag.

Concerns, Issues, and Recommendations	Clarification	Future Steps
Community Forests (CF) affected by the project and compensation. 250 m of the pipeline runs through Community Forest.	It was clarified that the pipeline crossed only a small part of a CF. The Forestry Official highlighted that since the Forestry Clearance was issued (June 19, 2022) before the adoption of the FNC Act 2023, compensation for Community Forest is not required. It was also pointed out that the validity of the Forestry and Environmental Clearance (May 5, 2022) was until project completion.	
Water Users' Associations (WUA). It was highlighted that water management and good practices was crucial for the success of the project, therefore WUAs might be useful for promoting and monitoring good water management.	There are no WUAs in the Lobesa area currently, but the project will establish WUAs as a mechanism for better water management and practices until the municipality comes up with a fee system. There is an informal water group (Chairman, Tshogpa, 2 caretakers in Thinleygang. The group functions under informal guidelines describing the roles and responsibilities of the watermen etc.	Included in the ESMP
Discussion on whether the pipeline cut across the highway.	The pipeline will not cross the highway. During the design phase, this was not considered as an option as it was difficult to seek clearance to create trenches along the national highway. Also, constructing the pipeline along the highway would risk tampering.	
Adequate water supply for the present population and provisions for the future. A repeated concern was that the project would only feed the existing water delivery system, especially the reservoir at the CNR and other existing storage systems. The PIU emphasized that no auxiliary distribution points would be supported by the project from these tanks. Participants voiced that the tank at CNR was hardly adequate to supply water to its own campus. CNR is a little township within itself and currently it has two 4-inch pipes feeding the two 15,000 litre tanks. Dashingding Higher Secondary School has a 4-inch pipe. Another 4-inch pipe feeds the Lobesa township supply, but with this supply, the area still faces shortages. Therefore, the project will not be adequate for the larger population if it would	The Cluster Engineer clarified that the prevailing problem was accentuated because of poor water management and poor maintenance of the pipelines leading to huge water losses during transport. He further clarified that the project was based on water demand and population projections for the next 30 years. He added that the project was not designed to set up distribution networks as these might infringe upon the implementation of the Lobesa Local Area Plan which was scheduled for the 13th Five Year Plan. He also explained that the average consumption was calculated at 130 liters per day per person whereas their projected water needs were calculated for as high as 235 liters per person per day. Therefore, it felt that the delivery of water to the existing systems would be enough to feed into the existing network of pipes.	PIU and PMU have revised the design after the meeting.

Concerns, Issues, and Recommendations	Clarification	Future Steps
only feed water into the CNR reservoir as there is no guarantee that CNR would release water to other residents. An independent reservoir for other users in the area, especially in the RNR colony is vital.	The Dzongdag highlighted that the potential expansion of CNR itself might have to be considered and recommended that CNR be included in the consultation meeting as well	
Tank at Thinleygang. The Tshogpa from Thinleygang informed the meeting that a reservoir tank had been proposed at Thinleygang during previous consultations for the project. This tank would benefit more than 200 households The design only indicates a T-point for Thinleygang. He also highlighted that the area for constructing the reservoir was already identified during the survey.	The PIU indicated that as per the minutes of previous meetings, only the provision of a T-point for Thinleygang was recorded. However, the Cluster Engineer will discuss this with the PMU in Thimphu.	PIU and PMU have revised the design after the meeting and field visit
Another issue raised was supply of water to the nunnery at Dorangthang. The nunnery has about 75 resident nuns. The institute is currently plagued with water shortage issues.	The PIU clarified that the design technology currently did not allow the water to be transported so far up to the nunnery.	PIU and PMU have revised the design after the meeting.
Issues regarding solid waste management were also raised. Punakha Dzongkhag currently has only one waste collection truck that goes around collecting waste from the gewogs for delivery to the waste disposal site. Waste in the Lobesa area is collected twice a week. Waste from Thinleygang is collected every month and transported 27 km to the disposal site.	The Dzongdag proposed that support for waste management could also be another element of the project as Punakha Dzongkhag extends from Dochula but has no infrastructure for waste management.	To be discussed with PMU.
Creation of Engineering Cluster.	Dasho Dzongdag informed the meeting that with the creation of the Engineering Cluster, the Dzongkhag has to depend on the Cluster Engineers who report directly to the MoIT and not the Dzongkhag. As such there may be some gaps in ensuring that the concerns of the Dzongkhag are incorporated into the project design. Therefore, there is a need to close the gap between the Regional Engineer Cluster and the Dzongkhag to avoid conflict and to ensure the concerns of the Dzongkhag are addressed during project design.	
Water requirement for Gemkha. Gemkha village in Thinleygang lies along the alignment of the pipeline but has been excluded from the distribution.	The Engineer clarified that incorporating many outlets along the length of the pipeline would not only reduce the efficiency of the water delivery system but incur higher maintenance. Therefore, taking this into account, the water supply for	

Concerns, Issues, and Recommendations	Clarification	Future Steps
	Gemkha will be addressed through an independent RWSS project during the 13th FYP.	
Status of clearances.	Community clearances have been obtained (10 April 2022 from Toepisa Gewog and 4 May 2022 from Barp Gewog) Forestry Clearance (obtained on June 19, 2022) Environmental Clearance (obtained on May 5, 2022). Addditional Forest Clearance will be processed due to the change in design and additional water pipeline alignment.	
Testing for water quality at source.	Water testing was carried out in September 2023 The community was informed that the contractor will be required to ensure that water for domestic purposes will be tested, and that water quality testing will be carried out during construction.	
Grievance Redress Mechanism.	There were no questions or clarifications on the GRM.	

Table 30. Summary of Consultation with at Barp Gewog

Concerns, Issues, and Recommendations	Clarification	Future Steps
Concerns were expressed on whether the proposed design and layout was adequate enough to bring about the projected benefits.	The Engineer informed the participants that the project had been in the pipeline for 2 years now. Several consultations were already conducted during the survey and design and the project was now ready for implementation in December.	
There are about 75 nuns at Dorangtha nunnery who face acute water shortages.	The Engineer informed the participants that the Nunnery was not incorporated into the design.	Project design was revised to incorporate the Nunnery in the design.
The Water Chairman from Thinleygang pointed out that during the first meeting held between Gups, CNR, Dashingding School and Thinleyg ang Chiwog was included and Toedpisa Gewog was promised Nu.1 Lakh per year for water source protection activities but as per the design Thinleygang only gets a T point and Toep community did not agree to this. Furthermore, community clearance from 2 households that were affected by the project was attained after they were assured that they would get water from Gemsa Lhakhang along the pipeline. He highlighted that during the previous consultation with a UNDP Consultant, it was proposed that a separate pipeline for Thinleygang from their present source be included along with a reservoir to distribute water to the BHU area.	The Engineer confirmed that a reservoir would be built at Thinleygang instead of only a T point.	
It was highlighted that the Okalum source also feeds paddy fields in Toedpisa and the nunnery at Wolakha in Guma Gewog. It was pointed out that communities in the source area like Tokha village were not included in the project.	The Engineer clarified that the water flow at Okalum was 61 liters per second in winter and 120 to 180 liters per second in the summer months. Only 50% of the lean season flow would be tapped by the project. The water extraction was estimated after current downstream use by farmers and the nunnery at Wolokha were taken into consideration	
Gemkha village raised a concern of the risk of pipes bursting as the alignment ascends upwards in their area. The issue of water supply for the village was also raised.	The PIU clarified that the technical specifications for the pipes and the design considered all these factors. Regarding water for the village, the Engineer from the Regional Engineering Cluster clarified that during the survey stage, Gemkha was not included as a recipient from the pipeline as it would reduce the water pressure. Gemkha will be included under the RWSS project.	RWSS for Gemkha.
There was a query on whether the project would construct a new pipeline or refurbish	It was clarified that the main objective of the project was to climate proof the water delivery system	

Concerns, Issues, and Recommendations	Clarification	Future Steps
the old pipeline. If the design is new, then the concern was regarding communities had been left out.	through the use of new technology (pipes). Connecting every household along the pipeline would lead to tremendous drops in pressure and maintenance issues.	
The Tsopga informed the meeting that Aum Dechen, one of the landowners, was not willing to give consent for the pipeline traversing her land.	The Engineer clarified that it may be possible to realign the pipeline without affecting her land. The Toedpisa Gup also informed the meeting that the project benefits many and that one-person objecting should not deter the project. He informed the attendees that he would consult with Aum Dechen. As a last resort the project will follow the existing legislation such as the Land Act.	
Water for Gemsa Gemsa has 9 households, a retreat and a small school. The area has no other water source and should be covered by the project.	The Engineer clarified that the area was already being considered under the RWSS project for the 13thFYP.	
The current source for Thinleygang is independent of the Okalum source and was recommended to be kept as it is. It was highlighted that several issues and alternatives such as these were discussed in previous meetings but were not documented in the minutes.	The Engineer explained that this alternative was not considered due to the cost implications.	
Reservoir above Lam Serpo Lhakhang.	It was shared by the Barp Gup that a tank was proposed above the Lhakhang for effective distribution to the greater Lobesa area to maximize project beneficiaries.	The design has has incorporated thiis.
Campsites and waste management.	One participant highlighted that campsites,waste disposal and waste management need to be addressed as they might be several campsites. Contractors should be informed that they must remove all their waste as the local government has no resources or capacity to address this.	Incorporated in ESMP.
Protection of existing infrastructure.	One participant mentioned that the contractor should be responsible for fixing any damage to existing infrastructure such as farm roads, irrigation canals etc.	Incorporated in ESMP
Monitoring. The participants felt that regular monitoring was imperative to ensure that the project was completed on time and to the highest standards. Therefore, the PIU and PMU must be accountable, especially during project monitoring.	Contractor should work with the gewogs so that the gewogs can play a role in monitoring as well. Source protection should also be the contractor's responsibility as major infrastructure construction would happen.	Incorporated in ESMP

Concerns, Issues, and Recommendations	Clarification	Future Steps
	Contract labourers also need to be made aware of source protection, waste management and rules and regulations regarding poaching etc. Gups can be called to conduct such awareness programs. The DoFPS conducts monthly monitoring, therefore they should also be included in such activities.	
The Consultant sought the views of the community on the Environmental and Social impacts of the project and elaborated on the worker OHS requirements, influx of workers, impacts on vulnerable communities and Contractor liability to pay for unanticipated damages caused by the Contractor. The Consultant also stressed on the need for Gender disaggregated data for the schools and institutions.		
Participation of women and vulnerable persons in the community consultation. The consultant stressed on the importance of women participation in consultative meetings because women are engaged mostly in household/domestic chores and impacted most when there are water problems.	The Gup stated that for women to participate, firstly there needs to be interest. He said that women were not as confident and had their reservations, therefore they did not participate equally like the men did. The Gup said that if the women are not interested, they cannot force them to attend these types of meetings. At most meetings, often only 20% of participants are women, even though the Gewog provides equal opportunity for all to attend. The Gup requested the women in the meeting to spread the word that women should participate more. The Tshogpa of Toedpisa Gewog stated that although he informed different households, women were not interested, stating that they had no time to attend the meeting and that they women had already made plans for work in the field.	
GRM process and the need for Gender representation in the GRM committee. The Consultant enquired on whether there are provisions to resolve Gender grievances. It was also stressed there are risks to young females and therefore an avenue should be available for them to seek redress. The Consultant requested the participants to explain the importance of women's participation in meetings and for representation in the GRM.	The Gup informed the participants hat when there are gender issues at the household level. The household informed the Tshogpa, who informs the Mangmi, who then intervenes to resolve these issues. One of the participants stated that if there are Gender issues then the law must be followed as so far no one has been given the authority to resolve such issues.	Recommended to include the female GAO and Tsogpa in the Gewog GRM.

Concerns, Issues, and Recommendations	Clarification	Future Steps
	The participants were informed that the Toedpisa GAO is female and Barp has a number of female Tsogpas. The Mangmi stated that as much as possible, the Gewog takes the initiative to inform and educate women and recognizes that especially in rural areas, prior information to women on associated risks is critical.	

6. ANALYSIS OF ALTERNATIVES

6.1. Alternative selection

The domestic water supply scheme has been selected based on the existing water sources, social, environmental, and economic considerations.

6.1.1. The Do Nothing Alternative

Most environmental concerns in project sites arise from climate change related extreme rain events that trigger floods, erosion and occasionally mud-slips and landslides and cause damage to existing water infrastructure. Without the project, the communities in the two gewogs will continue to face acute shortage of drinking water especially during the winter months (dry season) with little financial support to mitigate these impacts or restore damaged or worn-out infrastructure. Therefore, maintaining the status quo is not a viable option.

6.1.2. Alternatives Relating to Source.

There are no alternatives to the source as Barp Gewog does not have any other source of water. The Okalum is the nearest water source that can cater to the water demand for the 2 gewogs.

6.1.3. Alternatives Relating to Selection of Alignment

Alternatives to the selected water pipeline alignment was to route the drinking water alignment along the shortest route possible but this is not feasible due to terrain, water pressure and gradient.

Also, avoidance of impacts to forest (state reserve forest, botanic park and community forest) is unavoidable as forest coverage is over 83.6% in the district. The water source is inside the Royal Botanic Park but shifting it further downstream will have implications on the design and waterflow. Hence, the alignment was accordingly selected after assessing all the mentioned factors.

6.1.4. Alternatives in Terms of Design and Technology

The selected design will replace all existing individual water pipelines with one water supply scheme system and reduce the need for repeated maintenance by individual users as these these pipelines are exposed on open ground, and some are currently leaking and damaged.

The first alternative was to have one water pipeline for both gewogs. However, this alternative was replaced by alternative 2 (selected alternative) based on the community consultation with both gewogs on 19th October 2023, at the request for a separate water pipeline for Thinleygang. While this has resulted in an increase in length of the total water pipeline by 16 km, separate water pipelines will avoid any potential conflict during the O&M phase as each gewog will be accountable for their own pipeline.

Also, the first alternative did not include the Dorangthang nunnery. Based on the community consultations on 19th October, the design was amended to incorporate a separate water pipeline to benefit 75 nuns.

DI pipes were chosen to resist high pressure due to the irregularity of the terrain and resist minor landslides. These pipes are more climate resilient than regular pipes. Trenching allows for the proper functioning of the water pipe by supporting the weight of the pipes and keeping them in place. Also, water loss through illegal tapping will be minimized as these cannot be seen easily or tampered with. Laying pipes overland will expose the pipes to climatic conditions and risk damage caused by people or due to natural hazards.

According to the cost benefit analysis conducted for the project, without this investment, the project infrastructure is estimated to last up to 15 years but with the investment in climate-proofing, the project infrastructure has a lifespan of 70 years. This projection includes 5 years of the implementation period (including 2 years of the construction period). Project's benefits will start from the third year.

The population projection is for 30 years, which means that after 30 years, if the population increases, then either alternative sources will have to be explored or the design altered to accommodate the increase in water demand.

7. SOCIAL AND ENVIRONMENTAL RISKS AND IMPACTS

7.1. Preconstruction

7.1.1. Project Design- Selection of Water Source and Water Abstraction

Currently, there are five pipelines from the Okalum catchment feeding Thinleygang, the larger Lobesa area, CNR, Dashingding Higher Secondary School, and the nunnery at Wolakha in Guma Gewog. The source for Thinleygang is a smaller stream on the left bank of the Okalum stream. During the peak season the Okalum source has a flow of 99 l/s. The project will extract 38 l/s leaving 62 l/s of the total flow for other downstream communities and ecosystems.

The requirement of 38 l/s is based on the projected water demand for domestic use as per the population projection of 30 years. The average water consumption is also calculated for as high as 235 liters per person per day.

The project will provide assured access to communities dependent on small streams from sustainable water source, through soil conservation and erosion control structures along water conveyance lines, protective walls around water off takes and fencing and vegetative/bio-engineering measures around reservoirs under Component 2 of the project. Participatory water resource will be conducted to develop watershed development plans for implementation by local institutions and Dzongkhag Water Masterplans for the project Dzongkhag and River Basin Management Plan for Punatsangchhu river basin. This will facilitate the adoption of integrated approaches to water resource governance and management and enable water security as well as disaster and climate change resilience at both Dzongkhag and basin levels.

To improve resilience, sustainability, and quality of water service delivery, the project will strengthen water governance, and provide institutional and community level capacity for climate-smart water and watershed management. These activities will be conducted in parallel to the construction work so that by the time the infrastructure is completed, the required governance, institutional arrangements, and capacities to take over the operation and management of the scheme, is in place.

However, water availability in rivers and streams in Bhutan is highly variable depending on the season and lowest during the lean season. The withdrawal rate from the water source has been determined keeping in mind current water abstraction and future population and demand projections.

Mitigation: The project must ensure the following:

- Ensure water discharge measurements are also taken during the lean season to understand the lowest flow. This can be undertaken as part of preparation of the local forest/watershed management activity, which is planned under activity 2.1.3 or under output 4.2 of the Project wherein a framework and Standard Operating Procedure (SoP) for regular reporting and sharing of data and reports on the state of river basin will be put in place to track and document water quality, quantity, availability, assets, and inventory.

- Ensure that, as required by the Water Act 2011 and the Water Regulation of Bhutan 2014, 30% environmental flow is maintained in the streams for ecological purposes for all times by monitoring the same.

7.1.2. Impacts on Water Source

Both Barp and Toedpisa Gewogs are fully dependent on the Okalum Water. Additionally, the same water source is also used to Irrigate paddy fields in Toedpisa so it is critical that water flow is maintained. However, water availability in rivers and streams in Bhutan is highly variable depending on the season and climatic conditions. As per the NEC[79], Punakha ranks among the five most at-risk Dzongkhags from climate impacts in Bhutan because of its existing socio-economic vulnerabilities, climate hazards and population density.

Objective 3 of the ACREWAS project is aimed at supporting strategies for sustainable and climate resilient water management; strengthening institutional & community level capacity for climate-smart water and watershed management; and initiating innovative financing mechanisms for both watershed management and water infrastructure (under Component 1). It will also strengthen monitoring of forest conditions, spring discharges and rainfall in the water source catchments of project sites. Furthermore, it will sensitize and create awareness to generate public action for conservation and sustainable management of water resources and publish and disseminate State of the Basin Report (SOBR) for the Punatsangchhu River Basin (under Component 4) to enable sustainability and integration of climate change adaptations.

The project will also establish a new PES agreement between catchment communities of Toedpisa Gewog and downstream communities of Toedpisa and Barp Gewogs in Punakha. Activity 2.1.3 of the Project also entails the preparation of Local Forest Management Plan for Okalum watershed.

Therefore, no further mitigation measures are required if all the above activities are carried out in collaboration with the DoFPS.

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7.1.3. Protected Areas, Forest and Biodiversity

As the intake and sections of the water pipeline is within the Royal Botanic Park, and reservoirs and pipeline are within state forest land and community forest (pipeline), the construction activities will cause forest fragmentation, leading to habitat alteration and impact species that rely on forest habits for food, shelter, and breeding, especially vulnerable species such as the Himalayan Black Bear.

Mitigation: Baseline and monitoring are critical in evaluating the impact of construction activities on forest cover and biodiversity. The baseline serves as a reference point for measuring changes and quantifying alterations and monitoring forest cover and biodiversity is vital for understanding ecosystem impacts, assessing trends, and identifying conservation measures.

[79] NEC, 2020.Climate Change vulnerability analyses and mapping for National Adaptation Plan (NAP) formulation process in Bhutan

- The PMU and the Department of Forest and Park Services should collaborate on conducting biodiversity surveys before and after construction activities to better understand the impact of construction activities and to determine ways to protect the watershed

- Implement the Biodiversity Action Plan and ensure the preparation of the local forest management plan in collaboration with DOFPS
- PMU to provide budget to procure saplings to Community Forest Management Group to replace trees cut within the Community Forest.
- The contractor must ensure that only those trees marked are cut and avoid or minimize cutting of trees to establish contractor facilities and avoid or minimize damaging trees during transportation as much as possible.

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7.1.4. Consents and permits and clearance requirements

Environmental clearance is required for construction of the project infrastructure. The consent to construct reservoirs, break pressure tanks and trenches within the community forest is required from the Community Forest Group, while the consent for tree felling is required from the Department of Forest and Park Services. Where the distribution pipelines traverse private land, the consent of private land holders is required.

Environmental Clearance and Forest Clearance are attached in Annexes 3 and 4. Environmental Clearance is valid until project completion. However, if there are major changes in the project design resulting in an increase in the forest area to be cleared, then the project must reapply Forest Clearance for the additional land area. As additional infrastructure is proposed in the new design, including a new pipeline for Thinleygang Chiwog and reservoir, the project must update the Environmental Clearance and the Forestry Clearance. The terms and conditions of both the Environmental and Forest Clearances must be adhered to.

The project must ensure that consent from private landowners includes those from absentee owners as well as new landowners (where land has been recently sold), to avoid delays or expose the construction activities. At the community consultation, one landowner had conveyed her refusal to give her approval for the alignment of the pipeline traversing her land. The Gewog will have to seek her approval or realign the pipeline so that it does not affect her land.

7.1.5. Project Disclosure and Information Sharing

The project has ensured Prior and Informed Consent (protocols were followed during project design to ensure communities, including women, vulnerable groups as well as socio-cultural groups, participate in the project by their own free will and the same was followed for the targeted assessment. However, there is still the risk that despite this, because women are the primary caregivers (especially for the young children and old parents), homemakers and are busy with farmwork, they do not have the time to attend all consultations. Also, there is the risk that persons with disabilities would face challenges with accessibility to attend the consultations as easily as the rest of the community and would have to rely on second-hand information.

During the public consultation for the two Gewogs (56 participants- 46 males, 10 females), a separate focus group discussion was held with women but there was one female participant from Toedpisa Gewog and women were not vocal during the meeting. The participation of vulnerable

persons was mostly limited to retired persons with no income. There is a risk of other marginalized and vulnerable groups not having access to primary information about project activities and having to rely on secondary information delivery that may possibly be distorted or incomplete

Mitigation: The PIU and the Gewog must ensure the following:

- Follow and implement the Stakeholder Engagement Plan.
- Ensure active representation and participation of women and vulnerable groups at all stages of the project.
- Disseminate information on the Grievance Redressal Mechanism developed for the Project on the MoIT website, official notification on the GRM committees and through Local Government (notification and social media chat groups).

7.1.6. Contractor Selection, Cost Estimation and Bidding Process

While most contractors are aware of the bidding process, there is a risk that contractors may overlook ESMP requirements, leading to non-budgeting of mitigation measures in contracts, and they may not be aware of applicable UNDP and RGOB laws or environmental and social safeguard application.

Mitigation: The PMU must ensure the following:

- That the ESMP is included in the contract documents.
- Ensure that the bidding and contract documents include specific provisions requiring Contractor to comply with all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; on (b) equal pay for equal work of equal value regardless of Gender, ethnicity or caste; and on (c) elimination of forced labor; and the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites; as well comply with applicable environmental and forestry laws and regulations.
- Conduct a pre-bid meeting with the Contractor to inform or brief them on relevant policies, standards and safeguard measures as outlined in the ESMP, that must be incorporated into the Contractor's cost including the Code of Conduct.
- After the contract is awarded, conduct contractor orientation on Environmental and Social Safeguard measures. During the orientation, ensure that topics such as relevant national laws and regulations, chance find procedure, GRM, compliance with EC and FC, Environment and Social Management Plans, contractor self-monitoring and reporting and water testing to ensure safe drinking water for workers are covered.

7.2. Construction Phase

7.2.1. Quality Control and Environmental and Social Safeguard Monitoring During Construction

Substandard materials and services in construction projects can lead to safety hazards, financial losses, delays, and compromised structural integrity, posing significant risks. Therefore, quality

control requires systematic processes to ensure that the required standards are met and to ensure the sustainability of the water infrastructure.

Mitigation: Under the Quality Assurance Plan, the PMU must form the Quality Control Team and conduct training for contractor and PIU staff on quality and Quality Assurance to ensure use of standard materials, construction quality, safety and compliance.

The Contractor is responsible for quality assurance, sourcing materials, testing them, and submitting the results to the Quality Control Team.

The PMU must ensure that the Contractor is fully responsible for supplying standard, quality materials in accordance with the specifications outlined in the bidding documents.

7.2.2. Compliance Monitoring and Effectiveness of Mitigation Measures

Environmental and social safeguard monitoring is critical to ensure that regulations, permits, and social responsibilities are followed, and to identify potential issues early, enabling timely corrective actions, and minimizing negative consequences.

Mitigation: The PMU must ensure the following:

- Environmental and Social Safeguards compliance monitoring and review ESS reports
- Monitor the implementation of the ESMP and Management Plans onsite by the Contractor.
- Continuously review the effectiveness of mitigation measures and make necessary adjustments based on community feedback and evolving needs.

7.2.3. Recruitment of Workers and OHS

The project will involve the mobilization of a Contractor, his employees (nationals) and recruitment of several workers especially during peak construction period. The construction will involve both skilled and semi-skilled workers from outside the country, from the Dzongkhag as well as from within the Gewog.

There will also be transporters and material suppliers. Some of the risks associated with recruitment of workers are recruitment of underage workers, gender discrimination, unfair worker payments, and potential health and safety impacts for employees due to inadequate accommodation or unclean sanitation facilities, unsafe working conditions and lack of PPE. As there are wildlife in the project area, workers are also at risk of being bitten by snakes or attacked by wild pigs or bears if wildlife are suddenly disturbed.

Mitigation: The PMU must ensure that bidding and contract documents include specific provisions requiring contractors to comply with all applicable labour laws and core labour standards on (a) prohibition of child labour as defined in national legislation for construction and maintenance activities; on (b) equal pay for equal work of equal value regardless of Gender, ethnicity or caste; on (c) elimination of forced labour; and on (d) the requirement to disseminate

information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites.

During the pre-bid consultation, the PMU should also encourage the Contractor to provide work opportunities for unemployed persons within the beneficiary gewog

Mitigation: The Contractor will be required to ensure the following:

- Provide workers with good quality temporary accommodation, with ample and safe drinking water, electricity and sanitation facilities with separate toilets for females. Worker camps will be self-contained, regularly cleaned and properly organized to handle waste issues as per the waste management plan.
- That adequate budget is allocated for provision of the required PPE for workers, well stocked first aid at all work sites and for emergency transportation in case of accidents at the worksite or camps.
- Compliance with the requirements of the national legislation on recruitment, management and health and safety of all workers and the Labour Management Plan.
- Nominate an Environmental Health and Safety Focal Person (or equivalent) who will have the overall responsibility to ensure safe working conditions and environment for all workers.
- Provide the required PPE for workers and ensure that workers use these.
- Provide guidance on the appropriate material haulage method, excavation and construction procedures and that workers should not be forced to work during risky weather conditions
- Conduct orientation/induction for new workers wherein workers are briefed on working procedures, health, safety, required social behavior, maintenance of worker camps, and restrictions on illegal activities in the forest, including work hours, weekly offs, wages, overtime work and wages, Grievance Redressal mechanism etc.
- Maintain a well-stocked first aid kit on site and maintain records of all accidents including measures taken.
- Provide immediate transportation to the nearest health facility for workers if required
- Provide adequate compensation to workers in case of temporary or permanent disablement or death due to work-related accidents.
- Put in place a workplace Emergency Preparedness and Action Plan and brief workers on the plan.

The Contractor must also ensure the following to address worker conflicts and grievances:

- Ensure workers comply with the Code of Conduct.
- Prohibit drinking or the consumption of any type of drugs/intoxicants during working hours.
- Resolve any conflicts between workers and impose sanctions for inappropriate conduct.
- Establish a mechanism for workers to express their grievances.

7.2.4. Community Health and Safety- Impacts Due to Influx of Workers

The influx of foreign workers may cause social conflicts and social exploitation. Additionally, foreign workers may spread communicable diseases like HIV/AIDS and there is also the risk of GBV. Siting of worker camps will also impact the quality of the immediate physical environment and disturb residents in the immediate vicinity.

The influx of foreign workers may cause social conflicts and social exploitation. Additionally, foreign workers may spread communicable diseases like HIV/AIDS and there are also the risk of GBV Siting of worker camps will also impact the quality of the immediate physical environment and disturb residents in the immediate vicinity.

Mitigation Measure. To minimize the impact on the adjacent community, the contractor should ensure the following:

- Ensure foreign workers are screened for communicable diseases such as HIV/AIDs, Malaria and Dengue prior to arrival at the site.
- Brief all workers on required social behavior and impose sanctions for inappropriate conduct.
- Provide training on GBVH to workers during the Induction Training.
- Ensure workers follow the Code of Conduct.
- Follow the GRM process and record grievances/complaints received from the public and actions taken.
- The Contractor is to identify an area away from the community and water bodies to set up the Workers Camp.
- The Worker Camp once set up is to have adequate sanitary facilities and soak pits. All discharge of water from kitchen, bathing and washing should be directed to the soak pit and the Contractor should ensure that no discharge is done in the drains and water bodies used by the community.

7.2.5. Lack of opportunities for Women, Youth and Vulnerable Groups

The PPG process has ensured that Gender elements have been considered in the project design through the project Gender analysis and preparation of the Gender Action Plan that incorporates measures to minimize/mitigate adverse Gender impacts. The provision of drinking water addresses Gender responsive activities. Gender experts have been engaged in conducting expert assessments and conducting consultations with women.

Since these gewogs have made remarkable strides in promoting Gender equality, there is a corresponding expectation that the project should uphold equal Gender representation in all project-related aspects. During the Focus Group Discussion (FGD), participants expressed their aspiration to achieve a 50% representation of both men and women in the project, recognizing the potential challenges that might arise. This aspiration may need to consider numerous other factors that could potentially pose challenges in realizing such Gender equality. Nevertheless, the project is encouraged to explore all available avenues to prioritize and integrate Gender mainstreaming throughout its various components.

The influx of both foreign and national workers from other areas may raise concerns about an increased risk of Gender-Based Violence (GBV), despite the absence of official records of such incidents in the community. Moreover, the additional population could strain the already acute water shortage. The deployment of a temporary water supply to meet the heightened demand for water may also pose potential risks to the water quality.

As the project is expected to generate job opportunities in its sub-activities, there's a concern about Gender bias in recruitment due to the traditional perception favoring men in manual labor. This belief also contributes to wage disparities.

Measures for Youth and Vulnerable Persons.

- During the pre-bid consultation, the PMU should encourage the Contractor to provide work opportunities to unemployed youth in the beneficiary chiwogs.
- Ensure representation and participation of youth and vulnerable groups[80] at all stages of the project.
- Follow and implement the Stakeholder Engagement Plan.
- Disseminate information on the Grievance Redressal Mechanism developed for the Project through the MoIT website, official notification and local government channels (notification and social media chat groups).

Measures for Gender Mainstreaming.

To tackle these Gender-related concerns in the project, a Gender-responsive approach is imperative. This approach entails considering the varied needs, roles, and viewpoints of different genders within the community. It also actively involves women in decision-making processes and ensures that project designs empower all community members while diminishing Gender inequalities in accessing clean water and sanitation. Potential mitigation measures encompass:

- To increase women's involvement in decision-making, it is advised to conduct leadership and women's empowerment training for the women in the community while also extending the awareness programmes on importance of Gender equality to both men and women in the community. Encourage women to take leadership roles in community organizations, including water management committees, and offer training to enhance their leadership skills. Schedule meetings at times and locations that are convenient for women. Consider policies that reserve a portion of decision-making positions for women. Sensitize men and community leaders to the benefits of women's participation and seek their support. Regularly assess the effectiveness of these measures and adjust with progressive mitigation measures based on community feedback and changing needs. Providing digital literacy programs in the communities can also empower women to participate in online meetings.
- Organizing GBV awareness and prevention training for all project workers, emphasizing respect and zero tolerance for GBV. This helps reduce GBV risks from both foreign and national workers. Collaborate with existing NGOs like RENEW and Tarayana to enhance local support services and further mitigate GBV risks.
- The project is expected to have an influx of project workers in the community during the project implementation period that would result in the increased demand for water. Given that there is already a shortage of water in the community, the project workers or community members might resort to temporary water sources including fetching of water from any available sources without considering health risks. Additionally, the makeshift water supply might be exposed to external contamination, even if the water itself is safe at the source. To minimize the risk of water contamination and related waterborne diseases, it's crucial to involve the community in monitoring and maintaining the system. Set up clear ways for reporting water quality concerns and seek advice from local health centers such as PHCs (Public Health Centers) and hospitals to ensure a safe water supply for the communities where possible. Encourage proper water handling and storage

[80] Marginalized/vulnerable groups include the elderly, people with disabilities, landless poor and youth, as well as minority groups who may face social and economic exclusion

practices among the water users including both the community members and the project workers.

- Adopt a Gender-friendly approach in the recruitment process that promotes and ensures Gender equality and fairness. All recruitment processes should aim to provide equal opportunities for both men and women to access employment and job roles within the project's sub-activities. Furthermore, it is also equally important to implement policies and practices that ensure equal pay for equal work, regardless of Gender.
- The presence of a woman as a women representative in the GRM committee must be ensured to promote easy access and confidentiality in GBV cases.

GRM Measures for Gender Based Violence/Sexual Exploitation, Abuse and Harassment.

The project will comply with the UNDP 'Strategy and Action Plan on response to sexual harassment and sexual exploitation and abuse (2023-2024)'. The strategy will address SH and SEA through prevention, reporting, response, victim/survivor-centered approach, and accountability.

The project will work towards the prevention of such cases through awareness raising about SH and SEA, expected standards of conduct, prohibited conduct, mechanism for reporting and available support options. Training for local government and community members will be tailored, as appropriate, to local contexts and culture to ensure maximum effectiveness. Trainings will also cover root causes of harassment and abuse, long-standing power imbalances and multiple and intersecting forms of discrimination (including issues like sexism, homophobia, racism and ageism).

PMU, PIU and the contractor will ensure zero tolerance for all kinds of sexual misconduct, and ensure that all incidences of SH and SEA are addressed quickly and effectively, while protecting the victim/survivors and ensuring confidentiality of victims and accountability of the perpetrators Withing the gewog, a focal person/community volunteer must be identified, trained, and required to abide by the SEAH protocol as well as the National SOP for GBV Prevention prepared by the National Commission for Women and Children (NCWC). The SOP is especially relevant for locations where specialized GBV services are not available or accessible.

The focal person must provide a safe atmosphere/space and serve as a confidential resource for all persons experiencing any form of harassment, discrimination, and abuse of authority. The focal person must inform the community and ensure that all people understand the support options available to them.

As per the national SOP, the focal person/community volunteers must be aware of the types of community and GBV specialized services that are available in their area and provide this information and support the survivor to access these services in line with their wishes including arranging safe transportation. In case a survivor shares any information, the focal person must follow full confidentiality as per the SOP and not coerce the survivor into making any immediate decision. Informed consent is an ongoing process wherein a survivor may retract their consent and may also refuse to receive support or services. Reporting of GBV cases is not mandatory at the first stage, especially as it violates the survivor centred approach, and places the survivor at risk.

The focal person's responsibility is complete once the survivor is linked to a helpline or case manager of a service provider such as the Dzongkhag Legal Officer, CSO and NCWC.

7.2.6. Forest Clearance and Impacts on Biodiversity

To reduce the impacts on forest cover and biodiversity during the construction period, the PMU must ensure the following:

- Ensure compliance with the Environmental Clearance and the Forestry Clearance from the Department of Forest and Park Services. Ensure that the EC and FC clearances are shared with the Contractor.
- Ensure that adequate budget to pay the Royalty for the felling of trees to the Department of Forest and Park Services is incorporated into the project cost.
- Implement the Biodiversity Action Plan developed for the Project.

The Contractor must ensure the following:

- Ensure that only those trees marked are cut and avoid or minimize cutting of trees to establish contractor facilities and avoid or minimize damaging trees during transportation as much as possible.
- Brief all workers on Forest and nature Conservation rules and penalties governing illegal felling of trees, poaching, setting forest fires and indiscriminate waste disposal in forest areas.
- Avoid using firewood for cooking in the worker camps through provision of gas or electricity for cooking. Maintain fire extinguishers or adequate water pipes, tanks, buckets etc. at worker camps inside the forest as a precautionary measure
- Ensure workers are briefed on fire hazards and trained to deal with such hazards.
- The Contractors will be fully liable for any damage caused due to fire caused by construction activities/workers.
- Adopt environment friendly construction techniques[81] to ensure minimal damage to the surrounding.
- Develop a Spoil Management Plan (SMP) to ensure proper disposal of excess excavated materials, which include minimizing haulage and disposal of excess soils, and reuse excess soils for beneficial purposes such as raising the level of low-lying areas.

7.2.7. Impact Due to Increase in Traffic Due to Material Transportation.

Material transport and storage will involve mobilization of trucks, construction equipment and storage space. This activity will generate noise, vehicle emission and dust during transport and unloading (and storage) that could affect all receptors surrounding the project sites. Where the farm roads to the village is narrow there is also the risk of accidents during material transportation.

Emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality. However, there are not many settlements along the access road, so the risk of constant exposure to vehicle emission is minimal.

[81] Environmentally friendly construction techniques include manual digging, limit excavation to the required trench width, reuse of excavated material for trench backfilling, undertake pipelaying and cover the trench as soon as possible and stabilize the soil to prevent soil erosion, use erosion control measures to reduce soil erosion, slope stabilization along erosion prone areas, construction of side drains to prevent flooding, use of bioengineering to stabilize slopes and restricting dumping of soil in streams.

Mitigation: The contractor must ensure the following:

- Identify adequate space for parking of construction equipment and vehicles and avoid material storage along roadsides. All stockpiles that will be left idle for a long time must be covered.
- Cover vehicles transporting sand, soil, and aggregates with tarpaulin to reduce the release of dust along transport routes.
- Spray dusty areas with water to reduce dust emission.
- Ensure regular maintenance of equipment to prevent smoke belching and compliance with the RSTA emission test.
- All licensed drivers must follow the required speed limits
- Avoidance of working at night to curb noise emissions.
- Transportation vehicles must install back sirens to alert workers or public when the vehicle is moving.

7.2.8. Construction Work at the Sources and Near Streams

Excavation, soil disturbance and dumping, can lead to increased sediment runoff into streams, compromising water quality, especially near stream banks and may also clog the water course.

Construction camp runoff can contain pollutants from sewage, chemicals, and waste that will pollute the aquatic ecosystem.

Mitigation: The construction of gabion walls upstream of the intake is proposed to prevent debris from being disposed of into the stream during monsoon seasons. The contractor must ensure the following:

- Ensure that debris from the construction of gabion walls proposed upstream of the intake to block debris during monsoon seasons is not disposed of into the stream.
- Maintain at least 15 m distance between worker camps and material storage from the stream.
- Follow waste management plan and ensure all waste is removed from the site when shifting worker camps.
- Adopt environment friendly construction techniques[82] to ensure minimal damage to the surroundings and the stream.
- Restrict release of effluent from the worker camps directly into the stream by directing the sewage into soakpits.
- Ensure that all waste (non-Hazardous and Hazardous) are duly stored in demarcated areas within the project site and adequately transported and disposed of at designated waste disposal areas identified by the Gewog.

[82] Environmentally friendly construction techniques include manual digging, limit excavation to the required trench width, reuse of excavated material for trench backfilling, undertake pipelaying and cover the trench as soon as possible and stabilize the soil to prevent soil erosion, use erosion control measures to reduce soil erosion, slope stabilization along erosion prone areas, construction of side drains to prevent flooding, use of bioengineering to stabilize slopes and restricting dumping of soil in streams.

7.2.9. Excavation of Trenches and Pipelaying in Settlements and Farmland

Where trenches are excavated in areas commonly accessed by community people, there may be the risk of passersby or children falling into the trenches (especially at night). Other impacts from excavation work include generation of dust and issues with blockage of pathways if excavated materials are not stored safely and neatly.

Sections of the water pipeline are designed to run along the farm road in Gemkha village where the pipeline will be laid along the sides of the farm road to avoid traversing private land. Trench excavation near farm roads can potentially cause damage and negatively impact farm road infrastructure especially during the monsoon months.

Mitigation: Disseminate Information on the GRM developed for the Project including contact details of the nominated Grievance Officer. The use of local dialect for ease of communication is recommended.

The contractor must ensure the following:

- Ensure that prior information is given to all community members via the local government regarding commencement of the construction activities.
- The contractor must schedule and ensure that excavation of trenches ahead of pipe laying and backfilling must be efficiently scheduled during winter months and minimize the period from the time of opening a trench to backfilling (unless there are exceptional circumstances agreed between the Contractors and PIU warranting a longer period). These measures must be included in the terms and conditions of the Contractors' Contractual Agreements.
- Wherever possible, pipes should be laid as soon as possible, and trenches closed up promptly to reduce safety risks and dust generation.
- Ensure that the consent of community members is sought by the contractor when selecting sites for locating constructor facilities (site office, storage sheds and worker camps) if these are located within the settlement area.
- Restrict any excavation on sites of cultural significance unless written consent is provided by the socio-cultural group.
- Avoid organizing meetings and training during festivals or occasions when the community is occupied with their traditional/cultural activities.
- Adopt an inclusive approach and ensure that no community or groups with a distinct dialect, traditional beliefs and customs is left out or impacted negatively by the project.
- Ensure that all trenches once excavated is cordoned off with hard and soft barricades
- Ensure that pathways commonly used by the local community are not restricted with construction materials and equipment.
- Ensure that adequate safety signages are displayed along the excavated trenches.

7.2.10. Religious and Cultural Sites and Religious Practices

Field visits revealed that one of the reservoirs is about a 10–15-minute walk from Lam Serpo's Lhakhang in Barp Gewog. People meditating at the Tsamkhangs (meditation huts) above the Lhakhang, might be subject to minor noise disturbances during the construction phase. The Lhakhang is self-contained with a boundary wall so it will not be impacted by the construction activities.

Aside from this, there are no other cultural heritage sites or properties along the pipeline alignment. However, in an unlikely event that artifacts or archaeological resources are encountered during the excavation, the onsite chance find procedure must be followed. The chance find procedures are detailed in section 11.5 under Chapter 11.

Mitigation: The PIU must ensure the following:

- Restrict any excavation on sites of cultural significance unless written consent is provided by the socio-cultural group.
- Avoid organizing meetings and training during festivals or occasions when the community is occupied with their traditional activities.
- Adopt an inclusive approach and ensure that no community or groups with a distinct dialect, traditional beliefs and customs is left out or impacted negatively by the project.
- Use local dialect for ease of communication.
- Disseminate Information on the GRM developed for the Project including contact details of the nominated Grievance Officer.

The contractor must consult the Gup to ascertain religious festivals days, be mindful of the religious practices and halt any work that might cause disturbances or inconveniences to the Lhakhang, at least for the duration of the festival/prayers or celebration.

Where artifacts or archaeological resources are encountered during the excavation, the onsite chance find procedure must be followed.

7.2.12. Damage During Construction or Material Transportation

As there are several existing pipelines already in the forest, there is a risk that during material transportation and travel to the water source, these pipelines may be damaged, causing leakage and water shortage to existing users.

Mitigation: The contractor must ensure the following:

- Conduct a reconnaissance walk with the Tsogpa to determine the alignment of existing pipelines and plan the travel route to the water source, away from these pipelines.
- Instruct workers to avoid damaging pipelines during material transportation
- Immediately repair any damaged pipelines at the contractor's own cost.
- Follow the GRM procedures in case of any damage to existing water infrastructure
- Information on GRM is to be disseminated to the local community including the contact details of the GRM focal point.

7.2.13. Soil Erosion and Landslides

Some sections of the water pipeline alignment fall on moderate to steep slopes (between 35- 40 degrees). These have been incorporated into the project design. In such areas, the water pipes will be supported with pipe support pillars and retaining walls. However, if these are not adequately constructed, there is a risk that pipes may be damaged, and leakages may trigger soil erosion or even landslides. Excavated soil from trench excavation along farm roads can also causing uneven surfaces and potential erosion issues.

Mitigation: The control of surface runoff is necessary in preventing erosion and landslides. It is critical that PIU conduct monthly monitoring of the works being carried out on steep slopes to ensure that structures on steep cliffs are stable and that soil is not indiscriminately thrown down slopes. The Contractor will be required to implement the following measures:

- Construct temporary drains along exposed areas to channelize runoff and reduce the erosive forces of runoff waters.
- Construct retaining walls in landslide prone areas to retain the structures. This is very crucial in the area identified for the construction of the sand trap at the source. The northwestern part of the area looks very vulnerable to erosion and landslides and mitigation is necessary to protect the proposed infrastructure. This will also need to be monitored during the construction phase to ensure that slopes have stabilized.
- Support suspended pipes with pipe support pillars.

7.2.14. Risk of Chance Find Procedures

As there probability of discovering chance finds is possible especially due to the nature of the project wherein excavation work along the pipeline alignment is required, there is the possibility that stakeholders including the Contractor, PIU, PMU are not aware of Chance Find Procedures, or their roles in ensuring adequate measures/procedures are followed to minimize damage, disturbance, and restoration of Chance Finds.

Mitigation measure: Follow Chance Find Procedure as detailed in Section 10.5.

7.2.15. Completion of Construction Works

Construction activities generate waste, which if not removed, can cause community nuisance, aesthetic issues, and become a source of potential contaminants for the environment.

Mitigation: Once the infrastructure work is completed, the PMU must follow the Biodiversity Action Plan and ensure the restoration of all cleared sites and closure of passageways to minimize human intrusion and activities in the forest.

The Contractor must ensure the following:

- Dismantle site offices and worker camps, fill in pit latrines and restore all modified areas after completion of the work.
- Remove all waste from the worksite and worker camps and dispose of these as per prevailing practices in the Gewog.

7.3. Operation and Maintenance Phase

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7.3.1. Conservation of Aquatic Ecosystem

Under Activity 2.2.1 of the ACREWAS project a new PES scheme will be established for Okalum watershed between catchment communities of Toedpisa Gewog and downstream communities of Toedpisa and Barp Gewogs and institutions within the gewogs including Lobesa township. The PES scheme will promote sustainable management of the water catchment in the project area, ensure adequate drinking water as well as ensure an innovative financing mechanism for sustainable watershed management under output 1.3. The project will also strengthen water governance and local institutions to support climate-resilient water management through the preparation of catchment level local forest management plans based on resource assessment and mapping.

As mentioned under pre-construction, the 30% minimum Eflow requirement must be maintained for all times to come by the PMU.

The project must ensure that women and vulnerable communities are included in the PES and watershed management activities

7.3.2. Wear and Tear of the Infrastructure

During the operation phase, proper management of water infrastructure is critical to ensure functionality and sustainability and community well-being. Key considerations for operation and maintenance include:

- Train water user groups and unemployed youth or interested adults as well as project staff in O&M of the infrastructure. The budget for this must be provisioned under the activity on water user groups.
- Actively seek out and hire qualified women for water management positions while ensuring that there are equal opportunity and equitable selection processes in the overall recruitment related to the management and maintenance of water supply systems. If there are any specialized skills required, it is important to provide specialized training and capacity-building programs for women interested in water management careers, focusing on building the skills and knowledge necessary for success in the field.
- Since women assume the role of primary caregiver, it is also imperative to implement flexible work arrangements that allow employees to balance work and personal life, addressing caregiving responsibilities and other commitments.

Risk of Inadequate or Poor Drinking Water Quality

It is very important that the quality of the drinking water delivered complies with the National Drinking Water Quality Standards, to prevent any health hazard to end users.

A water treatment plant is planned through separate funding to ensure that water is safe for drinking prior to distribution. Once the water is available, this must be shared equitably and managed efficiently to minimize inefficiencies in supply and usage.

Mitigation: The PIU and Gewog (of the municipality if established by then) must ensure the following:

- Monitor water usage in the future to determine water demand.

- Carry out water discharge measurements
- Establish mechanisms and assign responsibilities with water user groups to ensure accountability for monitoring and management
- Promote the efficient use of water through water user groups
- Promote efficient water conservation practices with institutions, businesses and communities.

7.3.3. Disaster and Natural Hazards

The water scheme's design and material choices have partially mitigated risks from natural hazards and disasters, but there is always a risk of unexpected infrastructure damage.

Given its location and geological conditions, Bhutan is prone to earthquakes and storms caused by regional cyclones. Due to the risk of widespread damage, the project is at high risk for earthquakes. With forest clearance and excavation, especially on steep terrain, a 'high risk' for the project is landslides which can be triggered by incessant monsoon rains, especially if bioengineering and restoration works are not carried out.

Mitigation: The project must incorporate disaster risk reduction measures into the restoration of physical infrastructure and societal systems to "build back better" after a disaster.

Following any disaster, the Gewog must ensure the following:

- Foster community engagement and involvement in earthquake preparedness and response initiatives through awareness programs.
- Immediately inspect all water infrastructure for damage after a sever natural hazard such as landslides and disasters such as earthquakes.
- Carry out minor restoration of damaged infrastructure and bioengineering works in areas where landslides may impact water pipelines in the future
- For large scale damage, request PMU for technical and financial assistance to restore the infrastructure.

7.3.4. Risk of Tampering With the Water Infrastructure

There is a risk that the newly constructed water infrastructure may be tampered with and damaged causing leakages that could trigger soil erosion or even landslides damaging farmland below.

Mitigation: As part of the water management initiative, all water users and farmers must be informed about the consequences of tampering with the water infrastructure. The water management initiative must include mechanisms to make persons accountable for tampering with the water infrastructure. These measures must be incorporated into the Gewog By-laws related to water usage and accountability.

7.5.Cumulative Impacts

There are no developmental activities ongoing in the project area, and no major infrastructure development works planned for the next five years. The Dzongkhag has prioritized small to medium scale construction.

In Toedpisa Gewog these activities will include the construction of a By-pass Road from Toebirongchu to Thinlegang; construction and renovation of RNR office and staff quarters at Toedpisa; construction of 6-Unit classroom block at Dashiding HSS; Construction of public toilet at Thinleygang; construction of five quarters and renovation of Thinleygang Lhakhang; Renovation of classrooms at Thinleygang LSS, an ECCD each at Thinleygang, Mendrelgang and Lumitsawa. Other infrastructure works include maintenance of water supply at Dashiding HSS, Siluna, Lemjekha, Tokha; maintenance of Chiwog Lhakhangs (Rinakhha, Thinleygang, Menchuna); and the construction of rural water supply scheme for Gemkha.

In Barp Gewog, infrastructure activities include the construction of a Primary Health Care Centre at Lobesa; construction of foot path at Lobesa LSS; maintenance of rural water supply schemes for all chiwogs; and improvement of Dashingding-Gamaluma farm road. Waste collection facilities will be constructed in both gewogs along the highway[83] .

The implementation of these activities is dependent on the resource allocation and prioritization by each gewog, but these are expected to be spread over the next 5 years sporadically and may or may not overlap with the construction period of this project. Therefore, the cumulative impact of these developmental activities is low.

[83] Punakha Dzongkhag, 13 FYP.

8. ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

8.1. ESMP

The objective of the Environment and Social Management Plan (ESMP) is to provide management actions to mitigate negative risks and impacts, in accordance with relevant social and environmental policy frameworks, including Bhutan's legal policies, and institutional framework, UNDP's Social and Environmental Standards, and GEF safeguards. It has been prepared based on the environmental and social impacts assessed on the project.

The ESMP specifies the means through which the adverse environmental and social risks and impacts of the sub-project associated with construction and operational activities are avoided, reduced, mitigated, or compensated. The ESMP lists the specific risks and impacts and mitigation measures and recommends institutional arrangements for implementing and monitoring the mitigation measures. Specifically, it shows what plans and actions must be carried out; the key players that will be carrying out these plans and the specific timelines for when these will be carried out. Additionally, the ESMP indicates who will be responsible for monitoring its implementation and when.

Several activities in the ESMP are to be carried out by the Gewog and Dzongkhag/PIU and PMU as well. The budget in the ESMP table is an estimation and the amounts may vary, however, it is not expected to change significantly.

For the infrastructure work, the ESMP must be included in the contractor's tender documents and the cost of mitigation measures must be estimated and provisioned in their bid. Prior to the submission of the bid, the contractor is responsible for assessing site conditions so that all requirements to be incorporated into the ESMP can be planned and budgeted accordingly.

In general, the Contractor must allocate a budget for the following:

- contractor facilities and Worker Accommodation – including temporary housings, electricity, water supply, sanitation, and barricades in areas near settlements,
- fire extinguishers or adequate water pipes, tanks, buckets etc.,
- Worker health and safety – PPE, First Aid, emergency transportation, worker compensation,
- community health and safety – barricades, warning signage, use of sign board,
- air and dust pollution – provision for adequate water pipes, storage, dust suppression methods,
- waste management – cost of transporting waste from the sites/forest/worker camps to the nearest waste disposal facility/landfill site,
- contingency budget – for repair, replacement or compensation for any unanticipated impacts that may be required by the contractor.

Additionally, to minimize the impact on private land, the Contractor/Dzongkhag must ensure minimal or no economic displacement due to construction activities disrupt private landowner and further ensure that excavation of trenches ahead of pipe laying and backfilling must be efficiently scheduled during winter months while minimizing the period from the time of opening a trench to backfilling (unless there are exceptional circumstances agreed between the Contractors

and PIU warranting a longer period). These measures must be included in the terms and conditions of the Contractors' Contractual Agreements. Table 31 summarizes the project impacts and mitigation measures by project phase.

Table 31. Environmental and Social Management Plan

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
DESIGN and PRE-CONSTRUCTION						
Project design-selection of water source and water abstraction	Water source-Okalum	Source sustainability and seasonal water availability- Shortage in raw water supply due to higher variability in stream flows in the future.	-Ensure that source sustainability analysis has been undertaken to determine the appropriate withdrawal rate from the water source keeping in mind current water abstraction and future population and demand projections. -Ensure water discharge measurements are also taken during the lean season to understand the lowest flow. This can be undertaken as part of preparation of the local forest/watershed management activity, which is planned under activity 2.1.3 or under output 4.2 of the Project wherein a framework and Standard Operating Procedure (SoP) for regular reporting and sharing of data and reports on the state of river basin will be put in place to track and document water quality, quantity, availability, assets, and inventory. -Ensure that, as required by the Water Act 2011 and the Water Regulation of Bhutan 2014, 30% environmental flow is maintained in the streams for ecological purposes for all times by monitoring the same.	PMU	PSC	Not required
Source sustainability	Water source	Risk of water source contamination or drying up	Collaborate with the Department of Forest and Park Services to prepare Watershed Management Plan and implement conservation measures prior to construction. This includes conducting assessments and community consultations to understand the current socio-economic and land use, watershed conditions, identify and quantity threats to the water source and identify measures for watershed conservation in collaboration with the community and local government. Prepare local forest management plan and implement conservation measures and prepare PES agreements between upstream communities and downstream users.	DOPFS	PMU	To be budgeted under project
Forest Clearance	Forest cover and biodiversity	Loss of forest cover and degradation	-Conduct 3 biodiversity surveys (pre-construction, mid/during construction and post construction) -Implement Biodiversity Action Plan and prepare local forest management plan	DOFPS	PMU	Expenses for sapling to be budgeted

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
			-Provide sapling to community forest group to replace trees felled along the pipeline			under project
Clearances and approvals	Project gewogs	Risk of not seeking required clearances	Formal clearances/approvals -environmental clearance (obtained Annex3) -forestry clearance (partially obtained Annex 4) -community clearance and private land holder clearance (partially obtained) -Process for Environmental clearance one month ahead if the construction is not completed by the contractor within the EC period	PMU	PSC	Not required
Project disclosure and information sharing	Community and Vulnerable communities	Risk of vulnerable groups not being informed about project activities	- Ensure active representation and participation of women and vulnerable groups at all stages of the project. - Follow and implement the Stakeholder Engagement Plan - -Disseminate information on the Grievance Redressal Mechanism developed for the Project on the MoIT website, official notification on the GRM committees and through Local Government (notification and social media chat groups).	PMU and PIU	PSC	To be budgeted under project
Contractor selection	Project gewogs	Risk that the contractor has no prior experience in water projects and / or is unaware of UNDP and RGOB applicable laws, rules and regulation or about environmental and social safeguard application during construction	-Ensure that the ESMP is include in the contract documents -Ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities, on (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste, and on (c) elimination of forced labor; and (d) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites as well comply with applicable environmental and forestry laws and regulations. -Conduct a pre-bid meeting with the contractor to inform or brief them on relevant policies, standards and safeguard measures as outlined in the ESMP, that must be incorporated into the contractor's cost. - After award of contract, conduct contractor orientation on Environmental and Social Safeguard measures. During the orientation ensure that topics such as relevant national laws	PMU	PSC PSC	50,000

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
			and regulations, chance find procedure, GRM, Compliance with EC and FC, Environment and Social Management Plans, contractor self-monitoring and report, and water testing to ensure safe drinking water for workers are covered. - Form a Quality Control team and conduct training for contractors and PIU staff on Quality and Quality Assurance to ensure use of standard materials, construction quality, safety and compliance.			
CONSTRUCTION PHASE						
Procurement of materials	Community	Risk of substandard materials	Ensure that the Contractor is fully responsible for ensuring the supply of standard, quality materials as per the specifications specified in the bidding documents.	PMU	PSC	
Project activities	Environmental and social receptors	Compliance monitoring and effectiveness of mitigation measures	-Environmental and Social Safeguards compliance monitoring and review ESS reports. -Monitor the implementation of the ESMP and Management Plans onsite by the Contractor. -Continuously review the effectiveness of mitigation measures and make necessary adjustments based on community feedback and evolving needs.	PMU	PSC	To be budgeted under project-50,000
Recruitment of workers	Contractor's employees and workers	Risks to the occupational health & safety of employees and workers	During the pre-bid consultation, the PMU should encourage the contractor to provide work opportunities to unemployed youth	PMU	PSC	NA
			The Contractor must ensure the following: -Provide workers with good quality temporary accommodation, with ample and safe drinking water, electricity and sanitation facilities with separate toilets for females. Worker camps will be self-contained, regularly cleaned and properly organized to handle waste issues as per the waste management plan. -that adequate budget is allocated for provision of the required PPE for workers, well stocked first aid at all work sites and for emergency transportation in case of accidents at the worksite or camps.	Contractor	PIU	Must be included under contractor estimate

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
			comply with the requirements of the national legislation on recruitment, management and health and safety of all workers and the Labour Management Plan. -nominate an Environmental Health and Safety Focal Person (or equivalent) who will have the overall responsibility to ensure safe working conditions and environment for all workers. -Provide the required PPE for workers and ensure that workers use these. -provide guidance on the appropriate material haulage method, excavation and construction procedures and should not be forced to work during risky weather conditions -conduct orientation/induction for new workers wherein workers are briefed on working procedures, health, safety, required social behavior, maintenance of worker camps, and restrictions on illegal activities in the forest. -maintain a well-stocked first aid kit on site and maintain records of all accidents including measures taken. -provide immediate transportation to the nearest health facility for workers if required -provide adequate compensation to workers in case of temporary or permanent disablement or death due to work accidents. -put in place a workplace Emergency Preparedness and Action Plan and brief workers on the plan The Contractor must also ensure the following to address worker conflicts and grievances: -Ensure workers follow the Code of Conduct -resolve any conflicts within workers and impose sanctions for inappropriate conduct. -establish a mechanism for workers to express their grievances.			
Construction activities	Public and local community	Impact due to influx of workers	• Ensure foreign workers are screened for communicable diseases such as HIV/AIDs, Malaria and Dengue prior to arrival at the site.	Contractor	PIU	Must be included under

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
			• Brief all workers on required social behavior and impose sanctions for inappropriate conduct. • Provide training on GBVH to workers during the Induction Training. • Ensure workers follow the Code of Conduct. • Follow the GRM process and record grievances/complaints received from the public and actions taken. • The Contractor is to identify an area away from the community and water bodies to set up the Workers Camp. • The Worker Camp once set up is to have adequate sanitary facilities and soak pits. All discharge of water from kitchen, bathing and washing should be directed to the soak pit and the Contractor should ensure that no discharge is done in the drains and water bodies used by the community.			contractor estimate
Project activities	Women, youth and vulnerable groups	Lack of opportunities for women, youth and vulnerable groups	- Ensure that vulnerable persons including females are informed about the project activities and schedule in appropriate manner and language and ensure that disabled persons not able to attend community consultations are informed directly. Provide training and awareness programs to community members, on the importance of gender equality and the value of women's and youth participation in decision-making processes, while ensuring the participation of vulnerable groups - As far as possible, consider scheduling meetings including timing and locations, that are accessible to women. - Provide capacity building for Dzongkhag Gender Focal Person and kidu officers on how to engage with vulnerable communities -Support and encourage women and youth to take on leadership roles within community organizations, including water management committees.	PMU and PIU	PSC	Training budget can be allocated under GAP

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
			-Provide capacity-building opportunities to enhance women and youth leadership skills - seek the assistance of CSO/NGOS that actively promote the rights of people with disabilities and to assist with gender issues and gender equality. - Promote gender-friendly Grievance Redress Mechanism			
Establishment of Contractor facilities (site office, employee accommodation, worker camps and storage areas)	Private land holders	Impacts from contractor facilities on private land	-wherever possible, rent local houses/buildings instead of constructing employee accommodation to reduce project footprint. - secure lease agreement or consent from private land holders if contractor facilities are located on private land	Contractor	PIU	Must be included under contractor estimate
	Public and Community	Risk of providing inadequate accommodation and facilities for workers, unsanitary conditions, pollution and waste generation	- Comply with the requirements of the national legislation on recruitment, management and health and safety of all workers - Implement the OHS Management Plan onsite - follow Labor regulations on accommodation sizes and provide workers with good quality temporary accommodation, with ample and safe drinking water, electricity, and sanitation facilities with separate toilets for females. Worker camps will be self-contained, regularly cleaned and properly organized to handle waste issues and located at least 15m from streams to reduce polluting water bodies. -Provide adequate bins for waste storage, segregation and ensure that waste is disposed as per Dzongkhag and gewog requirements - minimize risk of faulty electrical installation in offices and worker camps -follow fire safety measures as mentioned above - Ensure safe storage and handling of drinking water supply to avoid future contamination -Maintain waste generation, storage and disposal records at site for both hazardous and non-hazardous waste in auditable format	Contractor	PIU	Must be included under contractor estimate

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
Construction camps, material transportation, tree felling and construction activities in SRFL	Forest habitat and biodiversity	- The water source and 600m of the pipeline are in the Royal Botanic Park -The pipeline alignment will traverse State Reserve Forest areas and 250m of community forest areas -Impacts on biodiversity and wildlife habitat Risk of non-compliance with the EC and Forestry clearance	-Ensure compliance with the Environmental Clearance and the Forestry clearance and share these conditions with the Contractor. - Ensure that adequate budget to pay the Royalty for the felling of trees to the Department of Forest and Park Services in incorporated into the project cost -Implement the Biodiversity Action Plan and local forest management Plan	PIU and DOFPS	PMU	To be budgeted under project
	Forest habitat	Risk of damaging habitat, disturbing, or poaching wildlife, forest fire	The contractor must ensure that only those trees marked are cut and avoid or minimize cutting of trees to establish contractor facilities and avoid or minimize damaging trees during tree cutting and transportation as much as possible. - Brief all workers on forest and nature conservation rules and penalties governing illegal felling of trees, poaching, setting forest fires and indiscriminate waste disposal in forest areas. -Avoid using firewood for cooking in the worker camps through provision of gas or electricity for cooking. -Maintain fire extinguishers or adequate water pipes, tanks, buckets etc. at worker camps inside the forest as a precautionary measure - Ensure workers are briefed on fire hazards and trained to deal with such hazards. -The Contractor will be fully liable for any damage caused due to fire. - Adopt environment friendly construction techniques to ensure minimal damage to the surrounding. - Develop a spoil management plan (SMP) to ensure proper disposal of excess excavated materials, which include minimizing haulage and disposal of excess soils, and reuse	Contractor	PIU	Must be included under contractor estimate

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
			excess soils for beneficial purposes such as raising the level of low-lying areas. This must be approved by PMU.			
Material transportation and storage	Travelers, public and local community	Noise, vehicle emission and dust will be generated during transport and unloading (and storage). Risk of accidents during material transportation along narrow sections of the highway and gewog road	-Identify adequate space for parking of construction equipment and vehicles and avoid material storage along roadsides. All stockpiles that will be left idle for a long time must be covered. -Vehicles transporting sand, soil and aggregates must be covered with tarpaulin to reduce the release of dust along transport routes. -Ensure regular maintenance of equipment to prevent smoke belching and compliance with the RSTA emission test	Contractor	PIU	Must be included under contractor estimate
Construction work at the source and near streams	Streams, water bodies	Risk of polluting streams	- Ensure that debris from the construction of gabion walls proposed upstream of intake to block debris during monsoon seasons is not disposed into the stream. - Maintain at least 15m distance for worker camps and material storage -follow waste management requirements and ensure that types of waste are removed from the site when shifting worker camps. -Adopt environment friendly construction techniques to ensure minimal damage to the surrounding and the stream -Restrict release of effluent from the worker camps directly into the stream -Ensure that all waste (non-Hazardous and Hazardous) are duly stored in demarcated areas within the project site and adequately transported and disposed of at designated Waste Disposal Area.	Contractor	PIU	Must be included under contractor estimate
Excavation along private farmland	Farmers dependent on crop production	Excavation of pipelines across cropland will disturb and impact farm practices and crop yield	-Ensure that prior information is given to all community members via the local government regarding commencement of the construction activities. -The contractor must schedule and ensure that excavation of trenches ahead of pipe laying and backfilling must be efficiently scheduled during winter months and minimize the period from the time of opening a trench to backfilling (unless there are exceptional circumstances agreed between the	Contractor	PIU	Must be included under contractor estimate

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
			Contractors and PIU warranting a longer period). These measures must be included in the terms and conditions of the Contractors' Contractual Agreements. -Wherever possible, pipes should be laid as soon as possible, and trenches closed up promptly to reduce safety risks and dust generation. -Ensure that the consent of community members is sought by the contractor when selecting sites for locating constructor facilities (site office, storage sheds and worker camps) if these are located within the settlement area. -Restrict any excavation on sites of cultural significance unless written consent is provided by the socio-cultural group. -Avoid organizing meetings and training during festivals or occasions when the community is occupied with their traditional/cultural activities. -Adopt an inclusive approach and ensure that no community or groups with a distinct dialect, traditional beliefs and customs is left out or impacted negatively by the project. -Ensure that all trenches once excavated is cordoned off with hard and soft barricades -Ensure that pathways commonly used by the local community are not restricted with construction materials and equipment. -Ensure that adequate safety signages are displayed along the excavated trenches.			
Excavation work near settlements	Public and local community	Dust emission from excavation work	-adopt dust suppression on windy days with water - Maintain water sprinkling logbook in auditable format	Contractor	PIU	Must be included under contractor estimate
Excavation work near settlements	Public and local community	Risk of accidents	Install signage of the details of construction work and signage displaying safety signs and barricades along risky areas to ensure community safety.	Contractor	PIU	Must be included under contractor estimate

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
Excavation near sites of religious and cultural significance	Socio-cultural groups	Excavation of pipelines across cropland will disturb and impact cultural and religious sites and practices	PMU must ensure the following: -Ensure that prior information is given to all community members via the local government regarding commencement of the construction activities. -Restrict any excavation on sites of cultural significance unless written consent is provided by the socio-cultural group. -Avoid organizing meetings and training during festivals or occasions when the community is occupied with their traditional activities. -Adopt an inclusive approach and ensure that no community or groups with a distinct dialect, traditional beliefs and customs is left out or impacted negatively by the project. -Use local dialect for ease of communication - Disseminate Information on the GRM developed for the Project including contact details of the nominated Grievance Officer.	PIU	PMU	Must be included under contractor estimate
Excavation near sites of religious and cultural significance	Socio-cultural groups	Excavation of pipelines across cropland will disturb and impact cultural and religious sites and practices	The contractor must ensure that no work that will disrupt socio-cultural practices is carried out at these sites during religious ceremonies/prayers. - Where artifacts or archaeological resources are encountered during the excavation, the onsite chance find procedure as detailed in section 10.5 must be followed.	Contractor	PIU	Must be included under contractor estimate
Construction activities	Government or private property	Damage during construction or material transportation	- Repair any damage to government or private property at the contractor's own cost. - Disseminate information on GRM to the local community including the contact details of the GRM focal point. - Follow the Grievance Redress Mechanism	Contractor	PIU	Contractor liability
Construction activities	Government or private property	Risk of soi erosion and landslides in steep areas	-Construct temporary drains along exposed areas to channelize runoff and reduce the erosive forces of runoff water.	Contractor	PIU	Must be included under contractor estimate

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
			-Construct retaining walls in landslide prone areas to retain the structures and monitor the slopes during the construction phase. -Support suspended pipes with pipe support pillars			
Completion of construction works at each site	Government or private property	Land degradation	-Dismantle site offices and worker camps, fill in pit latrines and restore all modified areas after completion of the work. -Remove all waste from the worksite and worker camps and dispose these as per prevailing practices in the Gewog.	Contractor	PIU	Must be included under contractor estimate
	Water pipelines	Risk of locating pipelines during O&M	- As built drawing with GPS coordinates must be provided by the contractor to the PIU/PMU. This will be maintained by the PIU for O & M purposes.	Contractor	PIU	Must be included under contractor estimate
OPERATION AND MAINTENANCE PHASE						
Conservation of aquatic ecosystems and maintain ecological functionality	Aquatic ecosystems	Ensure aquatic ecosystems are sustainable and healthy for both humans and aquatic organisms.	Maintain 30% Eflow for all times to come.	PMU	PSC	To be budgeted under project
Operation and Maintenance	Water users	Wear and tear of infrastructure	-Train water user group and unemployed youth or interested adults as well as project staff in O & M of the infrastructure. -Actively seek out and hire qualified women for water management positions while ensuring that there are equal opportunity and equitable selection processes in the overall recruitment related to the management and maintenance of water supply systems. If there are any specialized skills required, it is important to provide specialized training and capacity-building programs for women interested in water management careers, focusing on building the skills and knowledge necessary for success in the field. - Since women assume the role of primary caregiver, it is also imperative to implement flexible work arrangements that allow employees to balance work and personal life, addressing caregiving responsibilities and other commitments.	PMU	PSC	To be budgeted under project

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Implementation	Supervision	Cost
Source sustainability	Water source	Risk of water source contamination or drying up	Implement PES and local forest management plan	DOPFS	PMU	To be budgeted under project
Natural hazards and disasters	Water infrastructure and community	Risk of damage to water infrastructure	-Conduct regular inspection and maintenance of the water infrastructure (cleaning/replacing of broken or non-functional parts), including the intake structures, reservoirs, and distribution network, especially after a natural hazard/disaster -Carry out minor restoration of damaged infrastructure and bioengineering works in areas where landslides may impact water pipelines in the future -For large scale damage, request PMU for technical and financial assistance to restore the infrastructure -Ensure that As built drawing is maintained and handed over to the supervising officer for O & M purposes	Dzongkhag and Gewog	PMU	To be budgeted under project
Water usage	Water users	Risk of inadequate /shortage in water supply	- Monitor water usage in the future to determine water demand. - Carry out water discharge measurements -Ensure compliance with Gewog By laws on water usage and accountability - Promote the efficient use of water through water user groups -Promote household efficient water conservation practices	PIU/Municipality	PMU	To be budgeted under project
	Water infrastructure and Farmland	Risk of tampering with the water infrastructure	As part of the water management initiative, all water users and farmers must be informed about the consequences of tampering with the water infrastructure. The water management initiative must include mechanisms to make persons accountable for tampering with the water infrastructure.	PMU, PIU, and Gewog	PSC	NA
Restoration of degraded habitats	Forest cover and Biodiversity	Loss of forest cover and biodiversity	-Implement restoration activities (minimum 2 trees for every tree cut)	DOFPS	PMU	To be budgeted under project

8.2. Implementation of the ESMP

The key responsibilities of the UNDP Country Office, PSC, PMU, PIU, and gewogs for the implementation of the ESMP are detailed below.

UNDP Country Office
The UNDP Country Office is responsible for project oversight and for ensuring full compliance with M&E requirements including project monitoring, UNDP quality assurance requirements, quarterly risk management, and evaluation requirements.
Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the UNDP POPP (including guidance on GEF project revisions) and UNDP Evaluation Policy.
Additional mandatory GEF-specific M&E requirements will be undertaken in accordance with the GEF Monitoring Policy and the GEF Evaluation Policy and other relevant GEF policies. The M&E plan and budget included below will guide the GEF-specific M&E activities to be undertaken by this project.

Project Steering Committee
The PSC will provide the overall guidance to the PMU on project implementation and address any grievances that may be brought to the PSC. The PSC will also review the PMU's compliance to the ESMP as detailed in the ESMP table.

Project Management Unit
The PMU will be responsible for the procurement, construction and implementation and operation of the project. With respect to the ESMP, the PMU will be responsible for the following:

Prior to Construction

- Ensure that institutional/management support, human and financial resources are allocated to environmental and social safeguard activities in terms of supervision, compliance monitoring and submission of required reports.
- Ensure that source sustainability analysis has been undertaken to determine the appropriate withdrawal rate from the water source keeping in mind current water abstraction and future population and demand projections.
- Ensure that as required by the Water Act 2011 and the Water Regulation of Bhutan 2014, 30% environmental flow is always maintained in the streams for ecological purposes.
- Ensure that the cost of environmental safeguard mitigation measures is included in bidding documents and contract.
- Ensure adequate budget to pay the Royalty for the plantation of twice the number of trees cut.
- Conduct a pre-bid meeting with the Contractor to inform or brief them on relevant policies, standards and safeguard measures as outlined in the ESMP, that must be incorporated into the Contractor's cost.
- After award of contract, conduct Contractor orientation on Environmental and Social Safeguard measures. During the orientation, topics such as relevant national laws and regulations, chance find procedures, GRM, Compliance with EC and FC, Contractor self-

monitoring and reporting, and water testing to ensure safe drinking water for workers are covered.
- Form a Quality Control team and conduct training for Contractor and PIU staff on Quality and Quality Assurance to ensure use of standard materials, construction quality, safety and compliance.
- Ensure that the project gewogs are included in the activities listed under other project components for water source protection, watershed management conservation activities and awareness programs.
- Ensure project disclosure and information to all project stakeholders.
- Ensure that the GRM procedure is established with GRM committee members at all levels.
- Discuss and finalize the Biodiversity Action Plan with the Department of Forest and Park Services.

During Construction

- Institute protocols and requirements to be followed by the PIU and Contractor in case of pandemics such as COVID 19, in line with the National pandemic protocols and instructions issued by the Ministry of Health.
- Review PIU monitoring reports to ensure that all the statutory and regulatory requirements have been met and are in compliance with UNDP Principles and Standard requirements.
- Report any unanticipated impacts and submit an ESMP monitoring report to the donor as required.

Regional Engineering Cluster
The Regional Engineering Cluster is responsible for providing technical support to the PIU during project design, pre-construction and for ensuring quality control during the construction phase in collaboration with the PIU.

Project Implementation Unit
The PMU will also actively engage with other Responsible Stakeholders such as the Department of Forest and Park Services and Department of Water to implement conservation, climate-smart adaptation, PES, creation of water user groups and initiation of water management activities.

The PIU will be responsible for the construction supervision and monitoring of the project. With respect to the ESMP, the PIU will be responsible for the following:

- Follow standard supervision and monitoring of the construction work and ensure use of standard materials, construction quality, safety, and compliance.
- Provide guidance to the Contractor on ESMP implementation and UNDP Principles and Standards.
- Ensure that all the statutory and regulatory requirements have been met and that environmental clearance is renewed one month prior to its expiry.
- Review the monthly report submitted by the Contractor.
- Where water pipelines are damaged due to construction or activities by a third party, ensure that the responsible parties are liable to repair the damaged pipelines at their own expense.
- Ensure all requisite corrective actions are undertaken by the Contractor.

- Report on unanticipated environmental and social impacts (including those related to the health and safety of workers such as accidents) and the corrective actions taken to avoid any repetition of such incidents.
- Follow the GRM procedure and address and grievances brought about through the GRM in a timely manner. Record and report on this in the ESMP compliance monitoring report.
- Report any Chance Finds to the PMU immediately and follow Chance Find Procedures.
- Institute protocols and requirements to be followed by the PIU and Contractor in case of pandemics such as COVID 19, in line with the National Pandemic Protocols and instructions issued by the Ministry of Health.
- Prepare and submit ESMP compliance monitoring report to the PMU.
- Constitute the Water User Group.

During Operation

- Develop and implement a Water Safety Plan (WSP).
- Carry out water quality and discharge measurements.
- Prevent contamination of the water sources through regular monitoring of the water source condition.
- Conduct regular testing of raw water quality to ensure it is still within the national drinking water quality standards and treat the water to reduce or remove contamination that could be present in order to meet the standards.
- Ensure regular maintenance (cleaning/replacing of broken or non-functional parts) of all components, including the intake structures, reservoirs, and distribution network.
- Conduct training for the water user association/groups from beneficiary chiwogs of the two gewogs in the project on O & M.
- Ensure that restoration works are carried out after natural hazards or disasters.

Gewog

The local government will be responsible for ensuring that construction activities do not negatively impact the environment or the community. With respect to the ESMP, the Local Government will be responsible for the following:

- Constitute the Grievance Redress Committee as per the GRM and Resolve any grievance by following the GRM process.
- Ensure that prior information is available to all community members (not just representatives) especially women and vulnerable persons on the GRM process as well as the construction schedule in settlement areas.
- Assist the Contractor to seek suitable locations for worker camps and ensure that waste is disposed of at a designated location.
- Assist the PIU in ensuring compliance with the ESMP.
- Ensure that construction work does not hamper any religious and cultural sites or activities through providing prior information to the contractor.
- Engage actively with the PIU in project activities especially in review and revision of gewog by-laws to ensure equitable sharing of water, water usage and accountability for any tampering with the water infrastructure, creation of and training of water user groups and promotion sustainable water management and water safety plan.

During Operation

- Implement Gewog by-laws and water safety plan.
- Ensure the equitable distribution of water to all community members and users.
- Monitor water usage in the future to determine water demand.
- Ensure community involvement in conducting water discharge measurements.
- Report any damage to the water infrastructure or issues with water shortage to the PIU.

Contractor

The Contractor will be responsible for all activities related to the construction of the project. With respect to the ESMP, the Contractor will be responsible for the following:

- Participate in pre-bid meetings and briefing/orientation on safeguard measures.
- Ensure an adequate budget is provisioned to ensure compliance with the ESMP.
- Abide by all relevant national laws and regulations and UNDP Principles and Standards requirements and obtain the necessary permits and clearances as required to implement the Project or construct worker camps, storage sheds and source the required electricity and water connections.
- Hire or designate a full-time Environment, Health and Safety Officer responsible for compliance with the ESMP.
- Comply with the Terms and Conditions of the Environmental and Forest Clearances.
- Comply with the Quality Control and Quality Assurance requirements of the Contract.
- Prepare a worker's code of practice for workers and immediately resolve any conflicts between workers, or between workers and the community.
- Prepare emergency action plan and ensure workers are aware of this.
- Provide prior information to the community on the work schedule to minimize social issues during excavation.
- Undertake necessary corrective actions in case of damage or unanticipated impacts caused during the construction process.
- Ensure regular reporting to the PIU on work progress and alert management on any potential issues or delays.
- In case of pandemics such as COVID 19, follow the prevailing National Pandemic, Protocols and instructions issued by the Ministry of Health and the Task Force, and immediately report to the PIU upon detection of positive cases among staff and workers.

Post Construction

The Contractor must:

- Dismantle site offices and worker camps, fill in pit latrines and restore all modified areas after completion of the work.
- Remove all waste from the worksite and worker camps and dispose of it as per prevailing practices in the Gewog.

9. ENVIRONMENT AND SOCIAL MONITORING

9.1. Background

The Project Management must monitor and measure the progress of implementation of the ESMP progress to ensure that environmental and social impacts as identified in the previous sections and any unanticipated ones are effectively mitigated. Specifically, the objectives of monitoring include the following:

- ensure compliance with the ESMP,
- ensure compliance with National laws, rules and regulations,
- ensure that corrective measures are undertaken where impacts occur,
- ensure that grievances of workers and community are resolved transparently on time and escalated up to the PSC if it cannot be resolved at the lower GRM committees.

Monitoring must be mostly conducted during the implementation phase. The pre-construction phase requires reporting on the status of project activities in terms of procurement, contract award and contractor meetings and orientation to the donor.

The PMU, with support from PIU, will monitor the progress of ESMP implementation and compliance and submit quarterly reports to the PMU. This will be based on site visits for physical verification and consultations with the Contractor and the Gewog. The contractor will be responsible for daily monitoring and will submit monthly reports on the ESMP along with the progress report.

Table 32. Environmental and Social Monitoring Plan

Activity	Method of Measurement/Indicators	Frequency	Responsibility	
			Implementation	Supervision
Design and Pre-Construction Phase				
30% environmental flow maintained and source sustainability analysis	Project design	One time	PMU	PSC
Clearance and Approvals	Formal clearances/approvals: -Environmental Clearance -Forestry Clearance -Community Clearance and Private Landholder Clearance -CFMG Clearance	One time	PIU	PMU
Incorporation of EMP into bid documents	EMP included in bid document	One time	PMU	PSC
Incorporation of budget for ESMP and OHS in contract	Contractor bid document	One time	Contractor	PMU
Establishment of GRM	Formal office orders designating committee members	One time	PIU and PMU	PSC
Contractor briefing/awareness on ESMP requirements	- Minutes of pre-bid meeting with contractors - Contractor's attendance sheet	One time	PMU	PSC
Project disclosure and information	- ESMP copy at contractors' site office. - Project contact number on signboards	One time	Contractor	PIU
Construction Phase				
Construction Quality Control and Assurance	- Number of trainings conducted on Quality Control and Quality Assurance - Quality Control team by PMU - Quality Assurance officer/ team by Contractor	One time	PMU and Contractor	PMU
Consents and Permits	Tree marking by DOFPS.	One time	Contractor	PIU
Recruitment of workers	- Number of workers (nationals/foreign-by Gender) - Number of skilled and unskilled workers (foreign/national; male and female) - Number of workers below age 18	During recruitment	Contractor	PIU
Worker accommodation	- Number and location of worker camps - Availability of safe drinking water, electricity and sanitation facilities (with separate toilets for males and females) - Land lease agreement between Contractor and landowner for worker camp	Monthly	Contractor	PIU
Workers' welfare (health and safety)	- PPE distribution list/records - Ocular inspection of the cleanliness of worker camps - Safety structures/barricades installed - Overtime facilities provided - Emergency action plan and protocols in place - First aid kits at site	Monthly	Contractor	PIU

Activity	Method of Measurement/Indicators	Frequency	Responsibility	
			Implementation	Supervision
	- Warning signs at risky/hazardous areas - Accident registers with incidents and actions taken - Number of fire extinguishers installed at site - Type and no. of trainings (training record) - Number of worker grievances and status			
Air pollution	- Use of electrical appliances - Ocular observation of vehicles and site conditions	Semi-annually	Contractor	PIU
Dust pollution/ minimization	- Ocular observation of dust and dust suppression measures undertaken as per ESMP - Number of complaints on dust by community/residents	Semi-annually	Contractor	PIU
Impact on stream quality	- Ocular observation of stream to check for waste, soil and effluent into streams	Monthly	PMU	PSC
Impact on downstream users	- Number of grievances from downstream users	One time	PMU	PSC
Water supply and conservation	- Number of water storage tanks - Measures taken during periods of shortage - Ocular observations of leaking pipes	Monthly or as necessary	Contractor	PIU
Waste management of worker camps, construction sites	- Number and types of waste bins installed - Number of truckloads of construction waste disposed of - Types of solid waste segregated and reused - Ocular inspection of camps and construction site - Segregation and storage of hazardous waste - Waste generation, storage and disposal records	Monthly or as necessary	Contractor	PIU
Noise pollution and disturbance to the local community	- Number of complaints received from neighboring community - Grievance log	Quarterly	Contractor	PIU
Generation of excavated soil	- Ocular observation of soil pileup at site	Monthly or as necessary	Contractor	PIU
Site drainage	- Site drainage construction and maintenance - Ocular observation of site drainage	Monthly or as required	Contractor	PIU
Congestion and blockages/obstructions	- Number of complaints on congestion caused by Construction traffic or due to excavation work on access roads - Ocular observation of road conditions (spillage of construction material along	Monthly	Contractor	PIU

Activity	Method of Measurement/Indicators	Frequency	Responsibility	
			Implementation	Supervision
	access road, blockage of drains and footpaths)			
Material storage	- Number of material storage sheds - Ocular observation on material storage at site	Monthly	Contractor	PIU
Community health and safety	- Consultation with community (minutes of meeting, participant list) - Number of safety signs - Installation of barricades - Obstruction of access routes/paths - Number of accidents - Number of complaints received	Monthly	Contractor	PIU
Biodiversity conservation	- Number of illegal activities reported/detected - Number of wildlife incidents (accidents/rescue, rehabilitation, and release) Number of trees damaged - Compliance with terms and conditions of the EC and FC	As required	Local Forest Office	PIU
Soil erosion and landslides	- Ocular observation of site conditions	Monthly	PIU	PMU
Impact on private property	- Construct temporary drains along exposed areas - Construct retaining walls in landslide prone areas	Monthly or as required	Contractor	PIU
Impact on private property	- Grievance Record - No. of grievances from private land holders - Ocular observation of excavation work on private land - Land lease agreement for contractor facilities on private land	Quarterly	PIU	PMU
Impact on Physical Cultural Resources	Grievance Record for number of grievances from community - Ocular observation of excavation work	Quarterly	PIU	PMU
Women and vulnerable groups	- Number of activities undertaken by Gender Focal Person of CSO/NGO	Quarterly	PIU	PMU
Project related grievances	- Grievance Record	Quarterly	PIU	PMU
Operation Phase				
Operation and maintenance	- Number of trainings on O & M - Maintenance records/Number of repairs carried out - Number of persons (including women) employed/engaged in O & M	Quarterly	Gewog	PIU
Water shortage	- Number of complaints by community on water shortage - Water usage report - Water discharge measurements	Quarterly	Gewog	PIU
Safe drinking water	- Number of water tests carried out and test results	Quarterly	Gewog	PIU
Natural hazard and disasters	- Inspection results out after natural hazards or disaster	Quarterly	Gewog	PIU

Activity	Method of Measurement/Indicators	Frequency	Responsibility	
			Implementation	Supervision
	- Repair work or restoration of damaged infrastructure			
Water conservation activities	- Number of awareness/trainings on conservation measures - Creation of water user groups and number of members Number and type of conservation measures implemented - Revision of Gewog by-laws	Quarterly	Gewog	PIU
Accountability and Grievances	- Number of grievances and actions taken	Quarterly	Gewog	PIU
Restoration activities	- Number and types of restoration activities - Area of land restored	One Time	PIU	PMU

10. MANAGEMENT PLANS

10.1. Grievance Redress Mechanism

As required under the UNDP SES, to guarantee an Accountability Mechanism for the construction activities, the Stakeholder Response Mechanism (SRM) will be ensured through the establishment of a Grievance Redress Mechanism (GRM), which is based on the UNDP guidance on Grievance Redress Mechanism.

The Objective of the GRM is to provide a platform for individuals, peoples, and communities affected by projects to have access to appropriate grievance resolution procedures for hearing and addressing project-related complaints and disputes with the Contractor, PIU, PMU Responsible Parties or UNDP. The grievances that may arise can encompass social and cultural issues such as disruption of services or damages to private community or government property, agricultural land or environmental concerns and issues directly or indirectly caused by project activities.

The GRM process is designed to act as a problem-solving mechanism but not a substitute for the legal processes. It is an accessible, practicable, effective, transparent and time bound process to enable resolution of grievances on terms that are mutually acceptable to all parties involved and respecting the confidentiality of the aggrieved person/party.

The Aggrieved person/representative may submit the grievance in any mode convenient to the aggrieved party (in-person, over the phone, by letter, via email, on the website).

Eligibility for GRM
The grievance may be a perceived negative economic, social or environmental impact on an individual and/or group. The foreseeable concern about the potential to cause an impact must be related to the activity being implemented. Any individual may choose to be represented by another individual or group but must grant the representative a written authorization for representation.

The UNDP SES supplement guidance on eligibility uses four broad criteria to determine eligibility:

- Does the complaint indicate that the project has caused a negative economic, social, or environmental impact on the complainant, or has the potential to cause such an impact?
- Does the complaint specify what kind of impact has occurred or may occur, and how the project has caused or may cause that impact?
- Does the complaint indicate that those filing the complaint are the ones who have been impacted, or are at risk of being impacted; or that those filing the complaint are representing the impacted or potentially impacted stakeholders at their request?
- Does the complaint provide enough information for GRM staff to decide on the first three questions?

The Grievance Redress Mechanism
The GRM must be accessible to all persons/parties and therefore must be communicated or disclosed to the communities and residents of the project Gewogs and Dzongkhag through appropriate oral communication (consultations or outreach for vulnerable communities as well as

through written means in the form of pamphlets/office orders and posted on Project and Dzongkhag websites, and Gewog and Contractor signboards) in both Dzongkhag and English. This will be carried out prior to construction based on the assessment of the number of vulnerable people within the vicinity of the project components.

Vulnerable persons have been identified during the PPG in the project areas and their details entered in a simple database which will be useful to refer to when considering including vulnerable people in project awareness campaigns, trainings and other project activities.

Not all vulnerable persons will be able to participate actively in project activities (people with disabilities and the very old) but where they can, and with some arrangements by project staff, such as facilitation of transportation, or selection of accessible venues, their participation can be facilitated. Other vulnerable persons such as unemployed youth, women heading households and the poor can be represented as well in committees.

To ensure vulnerable people are represented, the project must -

- Refer to the database of vulnerable people and ask for nominations from the vulnerable persons or request for volunteers.
- Have criteria in place to be adopted by project staff to include a few members of vulnerable groups in the WUA Committees.
- Have representatives to participate on behalf of the vulnerable groups in the Committees and serve as a medium to articulate concerns of vulnerable groups as well as to coordinate with vulnerable group members on participation in project activities.

The GRM comprises four tiers, from the Contractor at the lowest level to the PSC at the highest level. For every level, the process to be followed will remain the same, in terms of lodging, acknowledgement, time for review and resolution and recording of the grievance.

The Grievance Redressal Committee will be constituted at levels 2-4 as shown in the table below.

Table 33. GRM Levels and Committee Members

LEVEL/position	**1**	**2**	**3**	**4**
	Gewog	**Dzongkhag**	**PMU**	**PSC**
Chair	Gup	Dzongdag	Director/Director General (DoID)	PSC Chair
Vice-Chair	Mangmi	Dzongrab	Chief	PSC Members Secretary Project Dzongkhags MOF UNDP Director (Member Secretary)
GRM Focal Officer	Gewog Administrative Officer	Dzongkhag Planning Officer	Project Focal Person	
Members	• Relevant Tshogpa(s) • Relevant Sector Head • Dzongkhag Planning Officer	• Relevant Gup • Environment Officer • Gender Focal • Relevant Sector Head • Representative from Regional Engineering Custer	• ESS officer • Component Manager. • Project Focal Officer; and • Finance/Accounts Officer. • Legal Officer • Dzongkhag Planning Officer	

Gender Inclusion

The presence of a woman as a women representative in the GRM committee must be ensured to promote easy access and confidentiality in instances of GBV cases.

The Terms of Reference of the GRM Committee

The Committees shall undertake the following roles:

- Ensure the resolution of grievances in a transparent, impartial, timely and objective manner.
- The Grievance Focal Person must receive and register the grievance in the grievance log and formally acknowledge receipt of the grievance within 3-5 working days. The acknowledgement must inform the aggrieved person/party that the grievance has been logged/registered, will be reviewed for eligibility and if found eligible will be discussed at the GRM Committee meeting.
- The Grievance Focal Person must follow the eligibility criteria to determine whether the grievance should be put up to the GRM committee or referred to other grievance resolution mechanisms such as a different office (anti-corruption, audit, legal or police) or require further clarification from the aggrieved person/party to determine eligibility. The Grievance Focal Person may consult the GRM chair for advice if uncertain on eligibility. Based on the determination, the focal must either respond to the aggrieved person/party that either the complaint is not eligible, or the complaint is eligible and will be submitted to the GRM committee for review.
- Once the grievance is determined to be eligible, the Focal, with the consent of the Chair, must convene the GRM committee meeting and maintain proper record of the minutes of the meeting (signed by all members).
- The GRM must prioritize and resolve the grievance objectively and at the earliest possible time or within 10 working days.
- The GRM committee may consult the GRM committee at the lower level, the aggrieved person/party, and the Contractor to adequately confirm whether the grievance is project related.
- The Grievance Focal Person must communicate the proposed outcome to the aggrieved person/party formally (in writing in English or Dzongkhag) as well as the outcome to the Contractor/Lower GRM committee/Gewog or responsible party for any corrective action to be undertaken.
- The Grievance Focal Person must disclose information on each grievance including date received, categorization of type of grievance (personal, environment, social), status of response and resolution, while upholding the confidentiality of the grievance by not disclosing personal details.
- If a grievance cannot be readily resolved, it must be immediately escalated to the next level.

Grievance Resolution by the Contractor

- The Contractor must maintain a grievance log to record details of all grievances received (date, type of grievance, date of acknowledgement, action taken and date of response to the aggrieved person/party).
- The Contractor will review the grievance and resolve this within 10 working days.
- If the Contractor determines that the grievance is either not his/her responsibility or the grievance is not relevant to his/her activity, then the Contractor must inform the aggrieved person/party justifying the reason for not resolving the grievance in writing, and record this in the grievance log.

- If the aggrieved person/party is not satisfied with the action taken or with the Contractor's response, the grievance may be elevated to the next level.

Level 1. Grievance Resolution at the Gewog Level

The Gewog will constitute a Grievance Redressal Committee through an official notification.

- Any grievance shall be recorded in the grievance register by the Focal Officer at the Gewog with the information necessary for registration.
- If the GRM Focal determines that adequate solutions can be established within the next five working days, the Focal can decide on retaining the grievance at the first level by informing the aggrieved accordingly.
- The Focal must convene (with the consent of the Chair) the GRM committee meeting.
- The committee shall seek to resolve the grievance as soon as possible and avoid escalation within 10 working days.
- The Focal must maintain a grievance log to record details of all grievances received (date, type of grievance, date of acknowledgement, action taken and date of response to the aggrieved person/party).
- If the grievance cannot be readily resolved to the satisfaction of the aggrieved, then the grievance must be escalated to the next level.

Level 2. Grievance Resolution at the Dzongkhag Level

- The grievance shall be received by the Grievance focal officer (Dzongkhag Planning Officer) at the Dzongkhag.
- Any grievance shall be recorded in the grievance register by the focal officer with the information necessary for registration.
- If the GRM Focal determines that adequate solutions can be established within the next five working days, the Focal can decide on retaining the grievance at the first level by informing the aggrieved accordingly.
- The Focal must convene (with the consent of the Chair) the GRM committee meeting.
- The committee shall seek to resolve the grievance as soon as possible and avoid escalation within 10 working days.
- The Focal must maintain a grievance log to record details of all grievances received (date, type of grievance, date of acknowledgement, action taken and date of response to the aggrieved person/party)
- If the grievance cannot be readily resolved to the satisfaction of the aggrieved, then the grievance must be escalated to the next level.
- The committee may also choose to refer the grievance to the relevant agency/ministry, if deemed appropriate for resolution.

Level 3. Grievance Resolution at the PMU Level

- Any grievance that cannot be resolved at this tier shall be immediately referred to the PMU for resolution.
- The grievance shall be received by the Grievance focal officer at the PMU.
- Any grievance shall be recorded in the grievance register by the focal officer with the information necessary for registration.
- If the GRM Focal determines that adequate solutions can be established within the next five working days, the Focal can decide on retaining the grievance at the first level by informing the aggrieved accordingly.
- The Focal must convene (with the consent of the Chair) the GRM committee meeting.

- The committee shall seek to resolve the grievance as soon as possible and avoid escalation within 10 working days.
- The Focal must maintain a grievance log to record details of all grievances received (date, type of grievance, date of acknowledgement, action taken and date of response to the aggrieved person/party).
- If the grievance cannot be readily resolved to the satisfaction of the aggrieved, then the grievance must be escalated to the next level.
- The committee may also choose to refer the grievance to the relevant agency/ministry, if deemed appropriate for resolution.

Level 4. Grievance Resolution at the PSC Level

The grievance which cannot be resolved at the Dzongkhag level shall be immediately referred to the PSC wherein the same process as in Levels 2-3 will be repeated.

The Stakeholder Response Mechanism (SRM)

At the National Level, the Stakeholder Response Mechanism (SRM) at the UNDP Bhutan Country Office will be established prior to construction. This be responsible for receiving and resolving complaints about actual or potential environmental or social harm to affected persons arising due to project activities. To be eligible for an SRM response, the complaint must be related to the project, complainant must be able to explain the adverse socio-economic or environmental impacts from the project and indicate whether any steps were taken to resolve the grievance through the above project-level grievance mechanisms,

The SRM will minimize the risk of reprisal or retaliation by maintaining confidentiality of complainants' identity, if requested and especially so if the complaint is regarding sexual exploitation, abuse, and sexual harassment (SEAH) and respond to complainant concerns about reprisal or retaliation. In consultation with the complainant, the SRM will bring the complaint to the UNDP Accountability Mechanism at corporate level for review and action. The UNDP will be responsible for ensuring that the appropriate staff are identified and that these staff are briefed/oriented on the eligibility, procedures, and also ensure that Project stakeholders are made aware of the UNDP Accountability Mechanism.

The UNDP CO website must clear and prominently display the link to a CO Web page describing UNDP's Accountability Mechanism along with contact information for submitting a complaint to the SRM at CO level, including email, cell phone number, messaging app channel, mailing address, and fax number.

Aside from English, this information must also be provided in the national language.

10.2. Biodiversity Action Plan

The Biodiversity Action Plan (BAP)

While the country supports a wide range of forest types and vegetation zones, these are broadly divided into three distinct eco-floristic zones: Alpine zone above 4000 m, the Temperate zone between 2000 – 4000 m, and the Sub-tropical zone between 150 – 2000 m[84].

71% of land (2,730,889 ha) in Bhutan is covered by forest[85] which are managed under different management regimes; protected areas, forest management units, local forest management areas, community forests and private forests[86]. Nationwide, the high forest cover provides natural habitats for many species. There are around 5,600 species of vascular seed plants, of which 94% are native, and 200 species are used for medicinal purposes. 282 species under 156 genera of Bryophytes and 350 species of fungi and 287 lichens have been recorded. About 129 species of mammals are known to occur in the country (26 globally threatened species, including 11 of the 36 globally recorded felid species), 736 species of birds (30 globally threatened species), 750 species of butterflies, 158 species of amphibians and reptiles and 120 species of fish have been recorded so far[87].

Punakha Dzongkhag has 91,893.9 Ha of forest cover of which 11,155.47 Ha are under forest cover across Barp and Toedpisa Gewogs. This constitutes 12.14% of the total forest cover in the two Gewogs. The varieties in forest cover include Broadleaf, Chirpine, Fir and Mixed conifer[88].

There is one community forest in the project area. Wildlife species commonly found in the forest along the alignment and at the source include Barking Deer, Wild Boar, Sambar Deer, and Assamese Macaque. The only species of concern is the Himalayan Black Bear/Asiatic Black Bear, which is Vulnerable in the IUCN Red list and included in Schedule II of the Forest and Nature Conservation Rules of Bhutan. As the field visit was limited to five days, there are potentially more species that were not recorded during the rapid biodiversity survey.

The BAP presents the objectives, measures, and actions to enhance and conserve biodiversity and/or in accordance with the mitigation hierarchy to avoid, minimize, mitigate, potentially significant adverse environmental impacts to acceptable levels. The BAP must ensure that there is no reduction of any recognized Endangered, Vulnerable or Critically Endangered species and that any impacts are adequately mitigated.

Environmental Risks of the Project

Risk 1: Non-compliance with UNDP Principles and Standards and relevant National legislation
Risk 2: Reduction in forest cover, forest fragmentation and degradation of wildlife habitat due to forest clearance for various project components (construction of worker camps, intake structure, sand trap, reservoirs and laying of water pipelines in trenches)
Risk 3: Loss of wildlife from illegal poaching or accidents

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[84] National Biodiversity Centre. 2014. National Biodiversity Strategies and Action Plan of Bhutan 2014

[85] FRMD, 2016. National Forest Inventory Report Volume I, Department of Forest and Park Services, Ministry of Agriculture and Forests, Royal Government of Bhutan

[86] DOFPS, 2019. Forest Facts and Figures.

[87] NBC website https://nbc.gov.bt/species-diversity/

[88] NLCS, Land Use Land Cover, 2016

Risk 4: Disturbance to wildlife and bird species due to workers and construction activities
Risk 5: Impacts on aquatic ecosystems and loss of ecological functionality due to changes in flow regime and pollution
Risk 6: Lack of adequate human resources, capacities, and budget to implement the BAP

Objectives of the BAP.

1. Comply with UNDP Principles and standards and all relevant national legislation.
2. Minimize loss of forest cover and ensure continuity of forest landscapes.
3. Protect and conserve Critically Endangered, Endangered, Vulnerable or Near Threatened species.
4. Conserve aquatic ecosystems and maintain ecological functionality.

Given the project design and the extensive forest cover in the project area, avoidance measures are limited, but measures to minimize and mitigate all risks and threats have been outlined. Design measures to avoid environmental impacts have been discussed under project components (e.g., construction of gabion walls upstream of intake to block debris during monsoon season, construction of retaining walls to prevent landslides and fencing of water intake area).

The actions to achieve the Objectives are detailed in the Table below. The activities to be undertaken by the Contractor are embedded in the ESMP and therefore must be budgeted accordingly by the Contractor.

Implementing and Monitoring Responsibilities
The responsible partners for implementation and monitoring of the BAP are the Department of Forest and Park Services (including the Ugyen Wangchuck Institute for Forestry Research and Training (UWIFORT), the Department of Water and the Department of Agriculture. However, if there are capacity or human resource constraints within the Departments, the PMU may also opt to seek the services of the College of Natural Resources (CNR).

Within the DoFPS, the Divisional Forest Office, Wangdue Phodrang will take the lead role in implementing the activities projected in the action plan in close collaboration with the Nature Conservation Division.

Budget provisions: While some of the proposed activities are already budgeted under other project components, this will require synergy in the scheduling of activities. Other activities will require provision of budget from the project.

Table 34. Biodiversity Action Plan

	Objective	Strategy	Activities	Implementation Responsibility	Pre-construction	Construction	Post construction	Monitoring Responsibility	Report on status
1	Comply with UNDP Principles and standards	Minimize all environmental and social impacts on Forest and water courses	Conduct pre-bid meeting to ensure that the contractor provisions for all mitigation measures as required.	PMU				PSC	Once in first quarter
			Provision budget to pay for the following: 1. Payment of royalty for forest clearance 2. Restoration activities (minimum 2 trees planted for every tree cut) 3. 3 biodiversity surveys (pre-during and post construction) 4. SMART patrolling by DOFPS 5. Preparation and implementation of Watershed Management Plan	PMU				PSC	Once in first quarter
			Conduct compliance monitoring and reporting every quarter	PIU				PMU	Every quarter
			Conduct Contractor orientation/train	PMU				PSC	Once in first quarter

	Objective	Strategy	Activities	Implementation Responsibility	Pre-construction	Construction	Post construction	Monitoring Responsibility	Report on status
			ing to inform the Contractor of the relevant laws and regulations and penalties for violation of the FNCA and FNCR						
2	Maintain forest cover and intact habitat	Minimize loss of forest cover and ensure continuity of forest landscape	Ensure strict compliance with the Forest Clearance	Contractor				DOFPS	Monthly
			Adopt environment friendly construction techniques to ensure minimal damage to the surrounding	Contractor				DOFPS	Monthly
			Build temporary facilities such as worker camps and storage facilities in areas where no trees will need to be cut	Contractor				DOFPS	Monthly
			Brief workers to minimize damaging trees during transportation/ material haulage as much as possible	Contractor				DOFPS	Monthly
			Mark only those trees that are absolutely required to be removed along the working corridor	DOFPS				DOFPS	Once in first quarter
			Conduct monitoring during tree felling to ensure that only trees	DOFPS				DOFPS	Once in first quarter

	Objective	Strategy	Activities	Implementation Responsibility	Pre-construction	Construction	Post construction	Monitoring Responsibility	Report on status
			marked are felled						
			Where possible, consider root balling of trees and transferring within or around the vicinity of the site	DOFPS				DOFPS	Once in first quarter
		Minimize habitat degradation during project implementation	Develop a spoil management plan (SMP) to ensure proper disposal of excess excavated materials, which include minimizing haulage and disposal of excess soils, and reuse excess soils for beneficial purposes such as raising the level of low-lying areas	Contractor				DOFPS	Monthly
			Construct retaining walls in landslide prone areas prior to soil disposal	Contractor				PIU	Monthly
			Incorporate the cost of transportation of waste from the construction site to a designated/approved waste disposal site and ensure that no waste is left in the forest	Contractor				PMU	Monthly
			Store all fuel/oil/lubricants in sealed	Contractor				PIU	Monthly

	Objective	Strategy	Activities	Implementation Responsibility	Pre-construction	Construction	Post construction	Monitoring Responsibility	Report on status
			containers, with an impermeable flooring to prevent spillage						
			Conduct assessment of barren and degraded areas	DOFPS				PMU	Once in first quarter
			Plant trees in barren and degraded areas based on the assessment conducted during project preparation	DOFPS				PMU	Once after construction
		Minimize the risk of forest fire	Avoid using firewood for cooking in the worker camps. If unavoidable, ensure that fires are contained and maintain fire extinguishers or adequate water pipes, tanks, buckets etc. at worker camps inside the forest as a precautionary measure	Contractor				DOFPS	Monthly
			Brief workers on fire hazards and conduct training to deal with such hazards	Contractor				DOFPS	Monthly
		To ensure appropriate restoration of forest habitat	After completion of the work at a particular site, dismantle site offices, storage sheds and worker camps and restore all modified areas	Contractor				DOFPS	Every time the worker camps are moved

	Objective	Strategy	Activities	Implementation Responsibility	Pre-construction	Construction	Post construction	Monitoring Responsibility	Report on status
			and remove all waste						
			Restore degraded areas through tree plantation	DOFPS				PMU	Once after construction
3	To ensure the protection and conservation of biodiversity especially Critically Endangered, Endangered, Vulnerable or Near Threatened species	To minimize disturbance to wildlife and birds	Conduct advocacy on Forest and Nature Conservation rules and penalties for local people and contractor	DOFPS					Once, first quarter
			Brief all workers on Forest and Nature Conservation rules and penalties governing illegal felling of trees, poaching, setting forest fires and indiscriminate waste disposal in forest areas	Contractor				PIU	Monthly
			Limit construction work to daylight hours	Contractor				PIU	Monthly
			Instruct workers not to tamper with cavities in trees as these may be nesting sites of birds	Contractor				PIU	Monthly
			Restrict workers from wandering off into the forest- to minimize the risk of encounters and injury to people or wildlife (in case of self-defense)	Contractor				DOFPS	Monthly

	Objective	Strategy	Activities	Implementation Responsibility	Pre-construction	Construction	Post construction	Monitoring Responsibility	Report on status
			In case wildlife is found injured in the trench, immediately notify the nearest forest office so that rescue and rehabilitation can be carried out	Contractor				PIU	Monthly
		Generate information on species distribution and abundance	Carry out biodiversity assessment to establish a baseline of species biodiversity, distribution, and abundance, and map high-biodiversity value habitats, Carry out biodiversity assessment during and after construction	DOFPS				PMU	once, pre-construction,
			Develop the information database on biodiversity at the project site	DOFPS				PMU	Every quarter
		Enhance monitoring and surveillance	Monitor Contractor activities and conduct SMART patrolling in the project area, especially during periods when construction work is ongoing in the forest areas	DOFPS				PMU	Every quarter
		Wildlife rescue and rehabilitation	Carry out immediate rescue, rehabilitation	DOFPS				PIU	Every quarter

	Objective	Strategy	Activities	Implementation Responsibility	Pre-construction	Construction	Post construction	Monitoring Responsibility	Report on status
			and release of injured wildlife and birds						
	Maintain ecological functionality	Ensure water source is sustainable and healthy for both humans and aquatic organisms.	Maintain a distance of 15 m from water courses and have in place measures to prevent direct discharge of sewage into the streams	Contractor				PMU	Monthly
			Maintain 30% lean season environmental flow for all times	PIU				PMU	Every quarter
			Conduct water quality testing	PIU				PMU	Every quarter
			Prepare watershed management plan and implement conservation measures	DOFPS				PMU	Every quarter

10.3. Occupational, Health and Safety Plan

The Labour & Employment Act 2007; Regulation on Occupational Health, Safety, and Welfare 2022; and Regulation on OHS for the Construction Industry 2022; will apply to the project and as such requires the Contractor to ensure proper labour and working conditions.
The OHS plan is intended to aid contractors in planning for and implementing health and safety management measures during the pre-construction and construction phases.
It comprises of the key measures: health and safety policy, provision budget for OHS, health and safety officer, toolbox talks and training, hazard assessment and safety measures, provision of PPE, first aid and emergency plan, record keeping and reporting, sexual harassment and GRM for workers that will be established by the Contractor and communicated to the PMU and the CO. These measures are detailed below.

1. Health and Safety Policy

Any employer with 12 or more construction workers must prepare a written statement of health and safety policy in accordance with relevant provisions contained in Regulation on Occupational Health, Safety and Welfare 2022.

2. Budget Provision

The Contractor must provision a budget for PPE, first aid kits, emergency transportation in case of accidents, contingency budget to provide adequate compensation to workers in case of temporary or permanent disablement or death due to work-related accidents.

3. Health and Safety Officer

The management must establish and maintain a safe working environment, the contractor must nominate an Environmental Health and Safety Focal Person (or equivalent) who will have the overall responsibility to ensure safe working conditions and environment for all workers. The EHS officer be responsible for the following:

- Be stationed at the work site and ensure that a replacement is stationed at site, in case work requires the EHS officer to be absent from the site.
- Assist management in maintaining a safe working environment.
- Ensure workers follow the Code of Conduct.
- Plan and organize measures necessary for effective control of workplace accidents and personal injuries.
- Provide the required PPE for workers and ensure that workers use these.
- Carry out hazard-assessment and implement measures to ensure safe and healthy working conditions.
- Prepare an emergency action plan for disease, accidents, natural hazards and disasters.
- Organize and conduct toolbox talks and training on health and safety.
- Prohibit drinking alcohol or the consumption of any type of drug/intoxicant during working hours.
- Maintain and submit monthly records relating to accidents, diseases, and emergencies.
- Ensure that only certified persons carry out electrification work and that workers are not forced to work during risky weather conditions.
- No person under the age of 18 must be employed in construction work.

- Prepare and submit quarterly reports on OHS measures undertaken. In case of major emergencies immediately report these to the PIU.

4. Toolbox Talks, Awareness, and Training

It is important that workers are briefed and educated prior to commencement of work to ensure the health, safety, and security of all workers. These include but are not limited to the following:

- Induction or onboarding for new employees or workers on the policies, procedures, and safe work practices. This includes providing instruction and specific demonstrations on how to do the work safely. This includes appropriate material haulage method, excavation, and construction procedures.
- Toolbox talks to inform workers on site-specific hazards and safe work practices related to their work, safe operating instructions for equipment and use of fire extinguishers (if these are provided) and instructions regarding steps to be followed to fight fire outbreaks.
- Awareness and briefings on a) code of conduct and sexual harassment; b) work safety and use of PPE; c) risk of diseases, hygiene and maintenance of worker camps; and d) first aid and steps to be undertaken in case of an emergency due to natural hazards and disasters.
- Where a work-related injury is caused by an unsafe act or work practice, the EHS officer must conduct retraining for these workers.

5. Hazard Assessment and Safety Measures

Comprehensive hazard assessment is crucial to guarantee the safety of workers. Therefore, the Contractor must identify potential hazards and risks associated with the construction activity.

Based on this assessment, the necessary safety measures must be put in place to minimize hazards identified, using technical and skilled persons such as blasters and safety protocols, installation of safety signages, provision of PPE, fire extinguishers and preparation of emergency response plans.

Additionally, safety inspections must be carried out to ensure that workers are using PPE, following the guidance given during toolbox talks, and ensure proper compliance in terms of transportation, storage, and safety.

All temporary electrical installations at worker camps must be provided with earth-leakage circuit breakers.
All vehicles used at construction sites must comply with the requirements of the Road Safety regulations and all drivers must possess a valid driving license.

6. PPE, First Aid, Signs and Emergencies

Personal protective equipment (PPE) is essential for safeguarding workers' health and safety and minimizes exposure to work hazards. PPE such as helmets, goggles, masks, gloves, and boots must be provided to workers depending on the type of work they are required to carry out. The EHS officer must ensure that workers use the PPE and enforce this strictly.

A well-stocked first aid kit must always be maintained at the site, especially for minor emergencies.

In case of serious injury/emergency, the Contractor must provide immediate transportation of the injured person to the nearest hospital. The Contractor must ensure that an emergency action plan is prepared by the EHS office in case of diseases such as COVID 19, natural hazards and disasters.

7. Record Keeping and Reporting

The EHS officer must maintain a record of a) PPE issued as evidence of PPE provided to workers; b) number of workers at the site; and c) number and type of incidents, diseases and accidents and measures taken, d) trainings provided to the workers and e) Grievance Logs. The EHS officer must prepare and submit quarterly reports on OHS measures undertaken. In case of major emergencies, the EHS must immediately report these to the PIU.

10.4. Contract Labour Management Plan

This Labour Management Plan (LMP) has been developed to manage labour risks during the construction period. It aims to ensure that all labour-related activities are conducted in accordance with the guidelines set forth by National legislation. The plan outlines the key measures and strategies that will be implemented to promote fair and safe labour practices, foster a healthy work environment, and enhance the overall well-being of the project's workforce.

The objectives of the labour management plan are as follows:

1. Ensure compliance with relevant labour laws and regulations of Bhutan.
2. Promote fair employment practices, including non-discrimination, equal opportunities, and respect for workers' rights.
3. To protect project workers, including vulnerable workers such as women and persons with disabilities and prevent sexual harassment, abuse, and Gender-based violence.
4. Provide a mechanism for responding to and resolving workers' concerns and grievances.

Compliance with Labour Laws and Regulations

The contractor must ensure compliance with relevant labour laws and regulations of Bhutan. This includes avoiding the recruitment of any person under the age of 18 years as a construction worker and ensuring that workers are not subject to coercion and forced labour in any manner whatsoever. Project workers must be provided with information and documentation that is clear and understandable regarding their terms and conditions of employment, including their rights related to hours of work, wages, overtime, compensation, and benefits.

Promote Fair Employment Practices, Including Non-discrimination, Equal Opportunities, and Respect for Workers' Rights.

The contractor must not discriminate against employees or workers in connection with recruitment, leave, wages, work hours or working conditions. Contractors must ensure fairness in recruitment or workers and must not discriminate against any person on grounds of gender, race, language, religion, class status, level of income, physical capacity, age, sexual orientation and sexual identity. All workers must be given equal pay for equal work or work of equal value and granted equal leave. Workers must be given equal opportunity and fair treatment in terms of leave, disciplinary action or compensation irrespective of Gender.

Sexual Harassment, Gender-based Violence, Worker Conflicts and Grievances

To prevent the incidence of sexual harassment or Gender-based violence (GBV) to female workers, the contractor must establish a clear zero-tolerance policy for GBV or sexual harassment. Workers must be made aware of the consequences/sanctions for engaging in such behavior or for inappropriate conduct and immediately resolve conflicts between workers.

Worker Grievances

The contractor must establish a mechanism/channel for reporting any GBV, sexual harassment or worker grievances. Workers must be informed about the mechanisms and channels to submit their grievances and their right to utilize these channels. Records of grievances and how they were resolved should be maintained.

Gender Based Violence (GBV)

Contractors shall address the risk of Gender-based violence, through awareness- raising for the workforce about refraining from unacceptable conduct toward workers and local community members, specifically women, informing workers about National laws that make sexual harassment and Gender-based violence a punishable offence which is prosecuted, and reinforce the requirement for compliance with the code of conduct. Contractors must cooperate with law enforcement agencies if such cases lead to investigating complaints about Gender-based violence.

Code of conduct (CoC)

The Contractor must maintain labour relations with local communities through a code of conduct (CoC). The CoC commits all persons engaged by the Contractor, including subcontractors and suppliers, to acceptable standards of behavior. The CoC must include sanctions for non-compliance, including non-compliance with specific policies related to Gender-based violence, sexual exploitation, and sexual harassment. The CoC must be written in English and Dzongkha (for local workers) and must be signed by each worker to indicate that they have received a copy of the CoC as part of their contract, have had the CoC explained to them as part of induction process, have acknowledged that adherence to this CoC is a mandatory condition of employment and have understood that violations of the CoC can result in serious consequences, up to and including dismissal or referral to legal authorities. A copy of the CoC must be displayed in a location easily accessible to all workers.

10.5. Chance Find Procedures

Where artifacts or archaeological resources are encountered during the excavation, the onsite chance find procedure must be followed as detailed below. This must be incorporated in the Contractor's contract.

- Upon detection of any artifact or archaeological resource, the contractor must immediately stop all activity in the vicinity of the find and immediately notify the supervisor onsite and the PIU.
- The PIU in turn will photo document the chance finds and inform the PMU. The PIU will instruct the Contractor to barricade the site and secure it with personnel (if removable antiquities or sensitive remains are found) to prevent any person from entering the site and causing damage or loss of articles from the site. The PMU will inform the Department of Department of Culture and Dzongkhag Development, Ministry of Home Affairs of the discovery immediately to avoid delay in the construction work.
- The Department of Culture and Dzongkhag Development (DoCDD) may provide their assessment from the photo documentation or conduct in-person site assessment to assess the chance find in detail.
- The PMU through the PIU will then instruct the Contractor on the way forward based on the assessment by the DoCDD.
- No construction is to be carried out by the Contractor until notified by the PIU.
- The PMU must ensure that any guidance or instruction given by the DoCDD is carried out correctly.
- The PMU must ensure that there are no delays in the verification process or in notifying the contractor of the procedures to be followed.
- For significant finds as determined by DoCDD, the PMU may require the distribution pipeline to be realigned to avoid further damage to the chance find.

10.6. Stakeholder Engagement Plan (SEP)

The purpose of the SEP is to plan, coordinate and provide ample opportunities for all stakeholder groups to participate in the planning, decision making, preparation and implementation and monitoring of the ESIA activities for the Project.

The ESIA phase engagement activities focused on presenting the project details; discussing environmental and social impacts and seeking the views, concerns, and recommendations; and managing expectations and clarifications on misconceptions regarding the project. The project design and schedule have been finalized and disseminated to the local community and their concerns have been incorporated into the ESIA and ESMP.

The SEP provides a plan to keep local communities, affected persons and project stakeholders informed about ongoing project activities and provides a platform for receiving and addressing stakeholder feedback regarding the project's social and environmental performance, in a meaningful, effective and timely manner.

The project's key stakeholders include:

Group 1: Communities, Water User Associations, local government institutions, and entrepreneurs involved in water infrastructure management, as well as vulnerable groups, farmers, and private sector players involved in agricultural extension and forestry.

Group 2: Central and Local Government Agencies and Research Institutions.

Group 3: Organizations such as National Commission for Women and Children (NCWC) and Respect Educate Nurture Empower Women (RENEW) and the Tarayana Foundation.

Approach:

The SEP will be **Targeted** focusing on specific stakeholders and adapted to suit the objectives of the engagement, with special arrangements to facilitate access to information and decision-making by vulnerable groups: women, illiterate, unemployed, retired and marginalized persons.

The SEP will be:

Meaningful keeping in mind the social and cultural context, and disseminating information in a suitable language and medium, in order for these to be understood and tailored to the interests and concerns of targeted groups.

Free with no coercion allowing stakeholders to express themselves (or their representatives) openly while protecting them from the risk of reprisals.

Inclusive, Gender responsive and equitable across all sections of the targeted population by including marginalized/vulnerable groups (elderly, people with disabilities, landless poor and youth, as well as minority groups who may face social and economic exclusion).

Timely in terms of providing prior information to stakeholders regarding meetings and activities.

Ensure free and prior informed consent from communities is obtained during engagement and prior to any intervention as per the ACREWAS project SEP and documentation as per Annex D of the SEP according to UNDP SES Standard 6.

Have clear communication with two-way channels and tools that facilitate feedback from people, ensuring stakeholders know that their feedback has been considered and are aware of decisions taken based on consultations. Communication channels will be identified to ensure the stakeholder, be they members of the community, or staff in local-government or non-government agencies, are able to contact the focal persons in the Dzongkhag or national PMU. Focal persons at all levels of the project implementation structure, and within communities at all project sites will be accessible to communities.

Transparent with information pertaining to the project, including reports and training materials, shared in print and available on-line.

Documented through a record of discussions and agreements for transparency and accountability, and to ensure compliance with national requirements. This will also serve as a reference for future actions, decisions or for conflict resolution.

Dynamic in terms of continuity, coherence and execution and adapted to planned and ongoing activities according to the various project phases (pre-construction, construction and operation).

Previous Stakeholder Engagement

Previous Stakeholder engagements have been documented in the PPG and in Chapter 6 of this ESIA.

Future Stakeholder Engagement

Future stakeholder engagement will be carried out as summarized in the Table 35:

One of the risks of the project is that vulnerable and other marginalized groups may not be able to access information, benefits and access to decision-making platforms. Vulnerable groups must continue to be consulted during the implementation of the project and involved in project activities to ensure that they are not excluded from the benefits of the project as well as decision-making platforms.

Vulnerable persons have been identified during the PPG in the project areas and their details entered in a simple database which will be useful to refer to when considering including vulnerable people in project awareness campaigns, training and other project activities.

Not all vulnerable persons will be able to participate actively in project activities (people with disabilities and those who are very old) but where they can, and with some arrangements made by project staff, such as facilitation of transportation, or selection of accessible venues, their participation can be facilitated. Other vulnerable persons such as unemployed youth, women heading households and the poor can be represented as well in committees.

To ensure vulnerable people are represented, the project must:

Refer to the database of vulnerable people and ask for nominations from the vulnerable persons or request for volunteers.

Have criteria in place to be adopted by project staff to include a few members of vulnerable groups in the WUA Committees.

Have representatives to participate on behalf of the vulnerable groups in the Committees and serve as a medium to articulate concerns of vulnerable groups as well as to coordinate with vulnerable group members on participation in project activities.

The stakeholder Engagement Plan is presented in Table 35.

Table 35. Stakeholder Engagement Plan

Stakeholder Group	Specific Interest (Project Activities)	Mode of Engagement (including participation, communication, reporting/monitoring, dissemination roles)	Period	Responsibility
All Project Stakeholders	Project activities involving the construction of the water scheme	Disclose the ESIA and ESMP and GRM on MoIT website	Once, Pre-construction and if ESIA and ESMP are updated	PMU
		Provide prior information about meetings via official email	Throughout the project	PMU and PIU
	Grievance Redress Mechanism	Official notification on GRM establishment, committee members, and procedures	Once, Pre-construction	PMU and PIU and Local Government
Group 1: Primary Stakeholders				
Contractor	Environmental and Social Safeguards	Pre-bid meeting to ensure that the contractor provisions for all mitigation measures as required	Once, Pre-construction	PMU
Contractor	Environmental and Social Safeguards	Contractor orientation/training to inform the Contractor of the relevant laws and regulations and penalties for violation of the FNCA and FNCR	Once, Pre-construction	PMU
Engineering Cluster	Quality control and assurance	Conduct regular meetings and trainings (for new staff if required) with the Engineering cluster on Quality Control	As needed, during construction	PMU
PMU and PIU	Environmental and Social Safeguards	Contractor orientation/training on ESS measures and reporting requirements	Once, Pre-construction	PMU
Project community	Project activities involving the construction of drinking water supply	Translate the project design, ESMP, the project timeline and GRM into Dzongkha and make this available by posting this at the Gup's office	Once, Pre-construction	PIU and Gup
		Provide prior information about meetings via social media chat groups	As needed, all phases	PMU
Projected affected persons	Project activities involving the construction of drinking water supply	Conduct a meeting only for project affected persons to inform them about the project design, ESMP, project timeline and GRM	Once, Pre-construction	PIU and Gup
Vulnerable groups	Project activities involving the	Conduct a meeting only for vulnerable groups to inform them	Once, Pre-construction	PIU and Gup

Stakeholder Group	Specific Interest (Project Activities)	Mode of Engagement (including participation, communication, reporting/monitoring, dissemination roles)	Period	Responsibility
	construction of drinking water supply	about the project design, ESMP, project timeline and GRM		
		Distribute the project summary (Dzongkha) to vulnerable communities especially those not able to attend the meeting Inform about the project timeline, GRM and contact numbers of GRM focal persons via social media chat groups[89]	Once, Pre-construction	PIU and Gup
Project community	Recruitment opportunities	Inform about recruitment opportunities, types of work and place/location or contact to submit their application for employment through the Local Government and request them to share via social media chat groups	As needed, Pre-construction and construction	Contractor and Gup
Project community	Project disclosure	Post project signboard at work site with contact numbers of EHS officer and GRM focal in Dzongkha and English	Once, Pre-construction	Contractor
Project community	Cultural Heritage	Consult Gup or local community on festivals and religious occasions so that work can be avoided on these days	Construction	Contractor
Project community	Compliance Monitoring and reporting	Conduct meetings with project community, project affected persons vulnerable groups	Every quarter during construction	Safeguards Consultant/officer
Water user association	Review and revision of By-laws	Conduct meeting to review and revise water use by-law	Number of meetings depends on progress on review and revision	PIU and Gup
Contractor	Quality control and assurance	Conduct meetings to discuss progress reports	Monthly	PIU and Contractor
	Tree marking	Inform DoFPS on implementation and schedule tree marking	Preconstruction	Contractor
	Wildlife and bird species	In case wildlife is found injured, notify the nearest forest office so that rescue and rehabilitation can be carried out	As and when this occurs	Contractor
Group 2: Central and Local Government Agencies and Research Institutions				
Department of Water	Creation of Water User Groups	Conduct meetings with community to create water user groups	Number of meetings depends on progress with creation of group and meeting decisions	PMU, PIU and local government
		Inform vulnerable groups about creation of water user group through the Local Government and request them to share via social media chat groups		PMU, PIU and local government

[89] It is assumed that local government and their representatives have every household on their social media chat group.

Stakeholder Group	Specific Interest (Project Activities)	Mode of Engagement (including participation, communication, reporting/monitoring, dissemination roles)	Period	Responsibility
		Ensure members of vulnerable groups are included in water user groups		
	Source sustainability	Training of water user groups in monitoring and maintaining the water supply system, with proper reporting channels for any issues related to water quality or contamination	Prior to operation phase	PMU and PIU
	Operation and Maintenance of the water infrastructure	Training of water user groups in Operation and Maintenance,	Prior to operation phase	PMU and PIU
Department of Water and Department of Forest and Park Services	Watershed conservation measures	Conduct meetings to discuss activities to prepare watershed management plan and implement conservation measures	As needed	PMU and PIU
Department of Forest and Park Services and the Ugyen Wangchuck Institute for Forestry Research and Training (UWIFORT)	Forest clearance	Seek forest clearance and pay Royalty	Pre-construction	PIU
	Implementation of BAP	Conduct meetings to discuss BAP, implementation mode and budget	Pre-construction	PMU
		Conduct meetings to present survey findings, compliance monitoring and discuss conservation activities such as restoration and tree planting and how to provide benefits to CFMG	After surveys, and as and when required	PMU
		Conduct advocacy on Forest and Nature Conservation rules and penalties governing illegal felling of trees, poaching, setting forest fires and indiscriminate waste disposal in forest areas	Pre-construction/construction	PMU
Community Forest Management Group (CFMG)	Community forest	Conduct meetings to discuss activities to include CFMG as project beneficiaries, such as provision of tree saplings and assistance in creation of nurseries	During construction and operation	PIU, DOFPS
GRM committees	Project Monitoring and GRM process	Conduct GRM committee meetings with aggrieved person and contractor	As and when grievances are reported to the GRM committee and as per GRM procedure	PMU, PIU and local government
Dzongkhag and Gewog Administration	Waste management	Seek approval to dispose construction waste - both hazardous and general waste	Pre-construction	Contractor
Health Facility	Testing of water quality	Seek assistance for water quality testing	Prior to sourcing water for drinking in worker camps	Contractor
			Prior to operation phase	PIU
Department of Agriculture	Climate-smart agricultural practices	Conduct meetings to discuss activities	As needed	PMU

Stakeholder Group	Specific Interest (Project Activities)	Mode of Engagement (including participation, communication, reporting/monitoring, dissemination roles)	Period	Responsibility
Group 3: Organizations such as National Commission for Women and Children (NCWC) and Respect, Educate, Nurture, and Empower Women (RENEW) and the Tarayana Foundation.				
RENEW	GBV and sexual harassment	Seek support related to Gender-based violence and sexual harassment	During construction and operation	PMU
NCWC	GAP implementation and child protection and wellbeing	Seek support in implementing the GAP, mainstreaming Gender equality and child protection and wellbeing	During construction and operation	PMU
Tarayana	Marginalized communities	Seek support to reach out to marginalized communities, enhancing access to basic needs and services, training and enhancing livelihood opportunities	During construction and operation	PMU

10.7. Code of Conduct for Employees and workers

The following code of conduct is applicable to all employees and workers.

The company must aim to promote professionalism, competence and ethical behavior and practices. It must promote zero-tolerance to abusive, unsafe, violent, or offensive behavior while providing a safe working environment for all employees.

All staff, employees and workers must comply with the Code of Conduct and abide by all National laws, rules and regulations and other applicable standards and requirements to ensure good health, safety, and wellbeing of all personnel as well as the public and local community.

Delivery of work

- Maintain a positive attitude and respect all colleagues and workers and the public
- Work competently and diligently
- Do no consume alcohol, drugs, or illegal substances during working hours
- Notify your supervisor if you are not able to come to work

Work Safety and Emergencies

- Maintain a safe working environment by ensuring that the workplace, machinery, tools and equipment and processes are safe without any risk to the wellbeing, health, and safety of all workers
- Report any unsafe working conditions and remove yourself from the situation
- Always maintain and use the required and appropriate personal protective equipment (PPE) while at work
- Follow appropriate measures when dealing with electrical, chemical, or hazardous and explosive substances
- Report any accident at the worksite immediately to the EHS focal person
- Save the EHS focal person's number as the main point of contact during emergencies and follow emergency procedures
- Follow the Emergency Preparedness and Response Plan

Housekeeping

- Maintain cleanliness at the worksite as well as the worker camp and ensure that all waste is segregated as instructed and stored appropriately.

Environment

Poaching, hunting, fishing and cutting of trees without permit or indiscriminate waste disposal in the forest or streams is strictly prohibited. Any worker violating this will be liable as per the Forest and Nature Conservation Act 2023.

Community Health and Safety and Grievances

- No night-time construction activities including material/waste haulage near or within residential areas from 9 pm to 7 am
- Any grievances reported to you by a third party must be immediately reported to the site supervisor instead of dealing with it yourself
- Do not trespass into private homes or property
- Do not engage in prohibited conduct. This includes unwanted sexual advances, comments, jokes, derogatory language or unwanted physical contact and violence

10.8. Waste Management Plan

The waste management plan will ensure the reduction, reuse, recycling, safe transport and disposal of all types of waste generated during the construction period so that sound management practices are adopted for the safe storage, transportation and proper disposal of wastes. Waste management must be carried out in compliance with the Waste Prevention and Management Act of Bhutan 2009 and the Waste Prevention and Management Regulation 2012 (amended 2016). The Act and the Regulations prohibit the illegal dumping or release of waste into the environment. The contractor must brief all workers on good housekeeping practices, waste segregation, storage and restrict the disposal of waste into the forest or stream. The project activity will generate mostly construction, solid general waste, and liquid waste.

1. **Construction waste**

This includes pipe, concrete, sand, timber, electrical wires, packaging materials, water storage tanks and work camp construction materials such as used CGI sheets, glass and sanitary fixtures. Waste Reduction -To minimize the quantities of waste generated, the contractor must ensure accurate material ordering, handling, and storage of construction materials. Where possible, cement bags or drums must be re-used for a different purpose such as waste storage.
Waste storage. All used cement bags not reused must be tied to prevent these being blown away on windy days. All excess, broken or used or non-usable construction material must be stored at a location near the construction site until removed.
Plastics, bottles, and cardboard once segregated must be delivered to the nearest recycling collector.
Transportation. When empty material transporting vehicles leave the site, the construction waste must be transported to the nearest landfill site at the Gewog and disposed there. Construction waste must be covered with tarpaulin during transportation to prevent spillage on the way to the disposal site.

2. **General waste**

The general waste must be segregated as biodegradable and non-biodegradable waste. Non-biodegradable waste can be further segregated into plastics, bottles and cardboard and paper. For segregating and recycling materials on-site, used containers, bins or cement bags may be used. These must be distributed at specific locations at the site office and worker camps. All staff and workers must be instructed to reduce waste generation through recycling and shown how to segregate waste into plastics, biodegradable and non-biodegradable waste.
Biodegradable waste can be disposed of in a pit excavated near the site. This includes kitchen waste such as vegetables, food scrap (without meat, dairy or oily products) or paper. Layer the biodegradable waste with soil to prevent the waste from attracting rodents and reducing foul odor. All other general waste (Plastics, bottles, and cardboard) once segregated must be delivered to the nearest recycling collector.

3. **Liquid waste**

Liquid waste includes used oil and lubricants. Although these may be in small quantities, spillage, or indiscriminate disposal of these can damage the environment.
Store used liquid waste in a separate leak proof container/bucket/bin. When these are full, ensure that the containers are sealed/leak proof and transport these out with the other general waste and

dispose this in consultation with the District Environment Officer as there are no facilities for disposal of liquid waste in the district. One option may be to drop off the used lubricants at the nearest workshop as these may be reused or by the workshops or because the workshops may be better equipped to dispose of the waste lubricants.

Wastewater from the construction camps must not be allowed to flow directly into the stream. Drains must be constructed to drain the sewage into a soak pit to facilitate the infiltration and percolation of water into the surrounding soil.

Post construction. After work completion, the contractor will be required to dismantle all temporary structures and remove construction waste from the site.

10.9. Emergency Preparedness Plan

Scope
The Emergency Preparedness Plan is aimed at ensuring the safety of all contractor staff and workers in case of an emergency such as accidents, natural hazards, and disasters. The plan also aims to minimize work disruption due to emergencies. The funds for reparations will be the responsibility of the Contractor.
The plan comprises of the following elements: hazard assessment, designating a responsible focal and an emergency team.

Hazard Identification/Assessment
Hazard identification and assessment of the transportation route, material handling, excavation and blasting work, pipe installation, construction of temporary structures and material storage.

The contractor must identify potential work hazards for both workers as well as the community and put in place measures to address or minimize these hazards.

Table 36. Measures for natural hazards and disasters

Activity	Type of hazard /risk	Rating High/Medium/Low	Probability of occurrence	Measures to minimize hazard/risk
Transportation				
Material handling				
Excavation				
Blasting				
Worker camps				

Responsible person and team
The Contractor must identify a staff responsible for coordinating response measures for any emergency. The Emergency Response Focal Person must be instructed with specific roles and responsibilities such as communication, first aid, transport/evacuation, and rescue.
The Focal Person may identify a team to be mobilized in case of an emergency.
Communication
To ensure clear communication during emergencies, a clear protocol must be established for all staff and workers to follow during an emergency. This includes providing a list of emergency contacts (local authorities, medical facilities and project and contractors staff).
These emergency contacts must be posted at the site office and shared with all staff and workers.
A social chat group for the emergency team must be created for immediate notification and response.
First aid and transportation
The Contractor must ensure that a first aid kit is always available at all sites for treatment of minor ailments. This must be well stocked and replenished as required. A vehicle must be kept on standby for transporting any seriously injured or ill person to the nearest health center or hospital as required.

Natural Hazards and Disasters

As Bhutan lies in the “most active” seismic Zone V, there is always the risk of a major earthquake. Also, landslides may occur due to blasting works and there are also fire hazards due to electric short-circuit or human negligence.

There are three categorizes of Disasters in Bhutan

Disaster Type I – the disaster can be managed with available resources and is within the coping capacity of the Gewog concerned

Disaster Type II – the disaster can be managed with available resources and is within the coping capacity of the Dzongkhag concerned.

Disaster Type III – the severity and magnitude are so great that it is beyond available resources and coping capacity of the Dzongkhag concerned[90].

In case of an impending disaster situation, the Dzongkhag and Gewog administration are responsible for establishing immediate contact with likely affected areas as soon as there is early warning information and provide orders for evacuation and immediate response [91]. The Contractor must ensure that the Gewog has the contact number of the Emergency Focal Person/Site supervisor so that information can be relayed from the Gewog to the site and vice versa.

The Contractor must

- brief all workers on restrictions on setting fires and raise awareness about the risk of wildfires due to indiscriminate disposal of cigarettes butts in the forest.
- brief on emergency response procedures to be followed for different types of hazards and disasters as indicated in the table below.
- ensure workers have the contact details of the Emergency Focal Person who must be contacted first in case of an emergency
- in case of any serious natural hazard or disaster such as landslides or earthquakes, the site supervisor must immediately check to see if all workers are safe
- immediately notify the gewog in case of any serious damage to workers or persons from the community
- follow the instructions and protocols of the Gewog and Dzongkhag in case of an emergency.

[90] Punakha Dzongkhag 2019. Dzongkhag Disaster Management & Contingency Plan

[91] Punakha Dzongkhag 2019. Dzongkhag Disaster Management & Contingency Plan

Table 37. Measures for natural hazards and disasters

Hazard/Disaster	Prevention	What to do	Type of equipment required
Fire	• Brief workers on emergency response procedures to be followed • Restrict campfires • Ensure electrical safety and prevent overload • Train workers in the use of fire extinguishers (if provided) and how to control electrical fires (e.g. never use water to extinguish an electrical fire. Instead use a blanket or fire extinguisher	-Cut off the power source to the electrical equipment or appliance causing the fire. If the fire is spreading rapidly, immediately alert all workers in the vicinity and evacuate all workers from the area. Assemble all persons and conduct a headcount of all workers Call the Fire station #110 for assistance and inform the Gup who will in turn mobilize emergency assistance	• Fire extinguisher (must be regularly checked) • Water pipes, storage tanks and buckets • Mobile for emergency communication • Transportation for evacuation of injure person
Windstorm	Keep abreast on extreme weather forecasts and avoid working in such conditions	In the case of accidents immediately evacuate injured persons to the nearest heath care centre/hospital	Mobile for emergency communication Transportation for evacuation of injure person
Landslide	Brief workers on emergency response procedures to be followed Follow blasting protocols by ensuring the safety of other workers during blasting operation through use of warning signs and audible signals before the commencement of blasting. Designate a 'spotter'- person responsible for observing and warning about potential hazards during work near landslide areas especially during rainy season Ensure workers wear required PPE.	Mobilize the emergency team from among the workers Assemble all persons and conduct a headcount of all workers In the case of accidents immediately evacuate injured persons to the nearest heath care centre/hospital Call the Royal Bhutan Police for assistance if persons are trapped under a landslide and inform the Gup who will in turn mobilize emergency assistance.	PPE First aid box Mobile for emergency communication Transportation for evacuation of injure person
Earthquake	Brief workers on emergency response procedures to be followed Conduct mock drill for workers - drop, cover, and hold and instruct them to stay away from trees, large boulders, windows or heavy objects.	Mobilize the emergency team from among the workers for search and rescue. Assemble all persons and conduct a headcount of all workers Call the Royal Bhutan Police for assistance if persons are missing	Mobile for emergency communication Transportation for evacuation of injure person

Hazard/Disaster	Prevention	What to do	Type of equipment required
	Designate an assembly point for all workers to congregate so that all workers can be accounted for.	for search and rescue operation and inform the Gup who will in turn mobilize emergency assistance.	

11. CONCLUSION AND RECOMMENDATIONS

The targeted assessment has been conducted as per the UNDP SES and the ESMF. This report has been prepared based on the design of the project that was presented to the local community during the consultation.

The project's positive impacts significantly outweigh any associated risks and adverse effects on the community, and these sentiments were consistently expressed in the FGDs undertaken. This initiative will also significantly alleviate the issue of domestic water scarcity that is currently being faced in the two gewogs.

The project has been designed in accordance with FPIC principles, as outlined in the UNDP SES policy which have been adopted to undertake comprehensive consultation with communities while surveying and selection of sites for different interventions and decisions on the design and operation of water infrastructure as well as during the targeted ESIA assessment. The community must continue to be informed of the project activities and schedule so that they are aware of the project activities in advance.

Climate considerations have been incorporated into the project design, with retaining walls, HDPE/DI pipes and Reinforced Cement structures. These measures aim to mitigate risks of extreme events and natural hazards, with pipelines installed underground, or above ground in land-slide prone areas and stream crossings.

The impacts during the construction are predictable, temporary in nature and spread over two gewogs. With the pipeline traversing 24 private landholdings, the excavation and laying of the pipeline will cause temporary disruption to cropping practices and marginal possible loss of income from the sale of farm produce.

With the water source located inside the Royal Botanic Park and almost 93% of the water pipeline passing through state forest land and 0,6% through community forest, wildlife and bird habitat will be temporarily impacted and needs to be mitigated because of the presence of vulnerable species. Communities towards the source in Toedpisa gewog are expected to benefit through the PES program. and the water source will be protected through catchment level local forest management plans that will be prepared under other project activities

The impacts during the construction are predictable, temporary in nature and spread over six gewogs. With the pipeline traversing 143 private landholdings, the excavation and laying of the pipeline will cause temporary disruption to cropping practices and possible loss of income from the sale of farm produce.

As the impacts due to project design and operation will cause permanent changes in flow regime, the project must ensure to maintain the 30% lean season environmental flow in the water course for all times to come to maintain the ecological integrity of the water course.

While the project aims to fulfil the constitutional rights to basic services- access to clean water, hygiene y and economic well-being, it must continue to follow the human rights-based approach to reducing inequalities and improving the livelihoods of poor and vulnerable people.

Quality control and quality assurance during construction and capacity building of water user groups for operation and maintenance and testing of water quality to ensure safe drinking water are critical in ensuring sustainability and infrastructure resilience. The engineering cluster will play a key role in ensuing this in close collaboration with the PIU.

To improve monitoring of infrastructure failures for both volume and quality of water supplies, other activities under the project will support integration of new/improved technologies so that vulnerability of the infrastructure to climate-induced hazards or disturbances are detected and solutions provided in a timely manner. Collaboration with the private sector will be explored to promote IT-based solutions for water management including automated IOT/ICT based systems.

The project will generate employment and business opportunities for local suppliers of construction materials as well as material transporters. The socio-economic benefits of obtaining temporary employment can be significant for low-income people within and outside the district.

There are provisions under other project activities to integrate new technologies to detect climate hazards and explore collaboration with the private sector for IT-based water management solutions. The project must ensure that by the completion of the infrastructure, adequate governance and capacities are in place for enhanced infrastructure monitoring for water quality and volume, climate-smart management and improved and equitable water service delivery. Disaster risk reduction measures must include restoration of physical infrastructure and societal systems to build back better.

Specific to the implementation of environmental and social safeguard measures to mitigate any foreseen or unanticipated impacts, the roles and responsibilities of the PMU, PIU, Regional Engineering Cluster, Local Government and the contractor have been outlined. The project must promote gender-friendly Grievance Redress Mechanism and continuously review the effectiveness of mitigation measures and make necessary adjustments based on community feedback and evolving needs.

The overall conclusion of this process is that there should be no significant adverse environmental impacts because of location, design, construction, or operation of the project provided all the mitigation measures in the ESMP as well as other activities such as creation of water user group, conservation activities, climate smart practices and capacity building are also provided as planned.

If the design is revised or modified the PMU must ensure that that ESMP is updated based on final detailed design and submitted to UNDP for review.

12. ANNEXES

Annex 1. Participant list- Dzongkhag Consultation

Participant list, Dzongkhag Consultation, 18 October 2023, Punakha Dzongkhag

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Attendance for consultation meeting

Sl.no.	Name	Agency	Designation	Email address	Signature
1	Thrup Tshering	Dzongkhag	—	—	
2					
3	Gyeltshen	DFO	—	—	
4	Tshering Yangzom	Barp	Tshogpa	—	
5	Kinley Bidha	"	"	kinleybidha111@gmail.com	
6	Tenzin	"	"		
7	Dago	"	"		
8	Kinley Penjor	"	"		
9	Tshering Penjor	Toepisa	Gup.	tshering1986@gmail.com	
10					
11	Parag Dorji	Barp	Gup	barpgup@gmail.com	
12	Karma Lhenzin	Wangdue Forest Div.	CFO	Karmalhenzin@gmail...	
13	Lobzang Choda	Barp	GAO	—	
14	Tshering	Toebisa	LAO	tshering@punakha.gov.bt	
15	Ngawang Gyeltshen	Lobesa Range	Sr. Forest Ranger	ngawanggyeltshen@moenr.gov.bt	
16	Naiba Tenzin	Dzongkhag	Cultural Officer	ntenzin@punakha.gov.bt	
17	Dancho Wangmo	Legal (GCFP) Dz	Drangpon	dwangmo@punakha.gov.bt	
18	Sonam Phuntsho	DT Secty / DDM focal	DAP	SPhuntsho@punakha.gov.bt	
19	Karma Dorji Gyeltshen	EO	DDP	karmadorji1@punakha.gov.bt	
20	Sherab Chophel	DLR Dzongkhag	DLR	sherab@nlcs.gov.bt	
21	Tobgay	RRCC, Khuruthang	G.G.	tobgay@punakha.gov.bt	
22	[illegible]	[illegible]	[illegible]		
23	Norbu	Toebisa	Tshogpa	—	
24	Chechey	Barp	Mangmi	chechey304@gmail.com	
25	Pema Thinley	Goepaisa	Tshogpa		
26	Deki P. Yangden	PCS	Social & Env consultant	-	
27	Tandin	"	PCS	-	
28	Yangchen Dema D.	"	"	-	
29	Jigme Sonam	"	"	-	
30	Sonam Gyeltshen	RRCC, Khuruthang	R.G.G.	sgeltshen@punakha.gov.bt	

Annex 2. Participant lists- Community Consultation

Community Consultation
Date: 19 October 2023, Barpesa Gewog, Punakha

Barp.

Place: _____ Date: 19/10/23

No.	Name	Sex	Age	Address/Agency	Gewog	Chiwog/Village	Email/Contact	Signature
1	Ngawang Gyeltshen	M		Lobesa Rangor	Barp	Lobesa	17620368	
2	Pasang Dorji	M		Gup Barp	"	Punakha		
3	Chogchey	M		Magmi	"	Gamakha		
4	Kinley Penjor	M		Tshogpa	"	Ynewakha		
5	Dago	M		"	"	Tshogkana		
6	Tenzin	M		"	"	Chesa		
7	Tshering Yangzom	F		"	"	Gamakha		
8	Kinley Bidha	F		"	"	Usakha		
9	Namgay	M		Chimi Lhakhang	"	Ynewakha	17672617	
10	Ugyen Pem	F		Royal Project	"	"		
11	Kinley Penjor	M		Ynewakha	"	Ynewakha		
12	Thoeka	M		"	"	"		
13	Gomchen	M		"	"	"		
14	Thinley Dorji	M		"	"	"		
15	Yeshi Om	F		Usakha	"	Usakha		
16	Thangka	M		"	"	"		
17	Gomchen	M		"	"	"		
18	Dorji	M		Tshogkana	"	Tshogkana		
19	Khandu Om	F		Lobesa	"	Ynewakha		
20	Kedar Sharma	M		Lobesa Lower S. school	"	Usakha		

Annex 3. Environmental Clearance

EC-1/3

Royal Government of Bhutan
Dzongkhag Administration, Punakha

DAP/ENV/EC-4/2021-22/**8227**

5th May, 2022

ENVIRONMENTAL CLEARANCE

In accordance with Section 34.1 of the Environmental Assessment Act 2000 and Section 34 of the Water Act 2011 and as per the decision of the District Environment Committee held on 4th May, 2022. This Environmental Clearance (EC) is hereby issued to **Mr. Passang Dorji, Barp Gup for abstraction of drinking water for Barp Gewog from Okalum, Toep Gewog till College of Natural Resources, Lobesa, Barp Gewog under Punakha Dzongkhag** with the following terms and conditions:

I. General

The holder shall:

1. Comply with provisions of the National Environment Protection Act 2007, Environmental Assessment Act 2000 and its Regulation 2016, Waste Prevention & Management Act of Bhutan 2009 and its Regulation 2016, The Water Act of Bhutan 2011 and its Regulation 2014;
2. Ensure that development and operation of the activity is in line with Initial Environmental Examination report submitted for EC;
3. Ensure that local communities, properties and any religious, cultural, historic and ecologically important sites are not adversely affected by the development and operation of the activity;
4. Restore the damage of any public or private properties caused by the development and operation of the activity; and
5. Inform NECS and any other relevant authorities of any unanticipated or unforeseen chance-find of any precious metals or minerals or articles that have economic, cultural, religious, archeological, and/or ecological importance.

II. Environmental standards

The holder shall comply with the existing Environmental Standards;

III. Protection and management of water resources

The holder shall:

1. Abide by the water use priorities under the water act of Bhutan, 2011 and no claim or compensation against or government or any person(s) shall be made for consequences arising thereon; and
2. Ensure that proposed activity does not disrupt the water flow and pollute the water bodies.
3. Ensure that at least 30% of the water during lean season from source is release as it is at all times
4. Ensure that the reservoir tank is constructed at least 15 meters down from the source.
5. Ensure that the buffer zone of the stream or the river is maintained and no construction is done in that zone.

ROYAL GOVERNMENT OF BHUTAN ★ Dzongkhag Administration Punakha ★ GYALPOZHING DECHENPHODRANG DZONGKHAG

6. Ensure a regulator is installed at the abstraction point, such that in times of emergency it can be closed right from the abstraction point.

IV. Waste prevention and management

The holder shall:

1. Manage wastes generated from the development of the ground with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management; and
2. Ensure that import and use of hazardous wastes are strictly prohibited.

V. Management of excavated materials, wastewater, and run-off

The holder shall:

1. Ensure that waste water generated during development is not mixed with domestic waste, and dumped separately at pre-identified approved dumpsite; and
2. Put appropriate measures to avoid erosion and landslides caused due to run-off or during breakage of water pipelines.

VI. Implementation plan

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

VII. Monitoring and reporting

The holder shall:

1. Ensure that the effective day-to-day monitoring of the EC terms and conditions are carried out by the environmental unit or designated environment focal person;
2. Maintain proper records on wastes generated and its management, stating types, quantities and characteristic and submit to DEC annually;

VIII. Renewal and modification

The holder shall:

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

IX. Specific conditions

1. The new line will replace all water line of Barp Gewog from the source and no additional line will be provided.
2. Ensure that the new pipeline abstracts water quantity not more that current total amount.
3. Ensure that the pipeline is proper joined and is put underground.
4. The alignments through private plots must be dug and put underground properly for minimal impact to the owners.

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X. Reservation

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

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

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

Validity:

This EC is valid from **05/05/2022 to 04/05/2025** only for abstraction of drinking water for Barp Gewog from Okalum, Toep Gewog till College of Natural Resources, Lobesa, Barp Gewog, Punakha Dzongkhag.

(Thuji Tshering)
DEC Chairman / Dzongdag

To,
Passang Dorji
Gup
Barp Gewog Administration

ROYAL GOVERNMENT OF BHUTAN ★ Dzongkhag Administration Punakha ★ PUNTHANG DECHENPHODRANG DZONG

Cc:

1. The Chief Environment Officer, EACD, NECS, Thimphu for kind information
2. Chief Forest Officer, Wangdue Territorial Division, Lobesa for kind information
3. Gup, Toep Gewog for kind information
4. Dz. Environment Officer, DAP for compliance monitoring

Annex 4. Forestry Clearance

Royal Government of Bhutan
Ministry of Agriculture and Forests, Department of Forests and Park Services
Wangdue Forest Division:Lobesa

Ref No: WFD/Tech-14/2022/121 *Date: June 19th, 2022*

Sub: Forestry Clearance

The **Forestry Clearance** for **Construction of Water Pipeline for Barp Water Flagship Program** measuring **18500mx1m** from **Okolum stream** ***(Water source-2 tapping points)*** under **Thinleygang** Village, **Toep** Gewog till **Dorangthang** Village under **Barp** Gewog under **Punakha** Dzongkhag is issued in favor of **Barp Gewog Administration** under **Punakha** Dzongkhag.
The proposed activity does not pass through any prohibited/protected/restricted areas.
The proposed alignment contains **7 trees** and **0 poles** as per enumeration list. This clearance is issued as per the letter of approval from the **Department, DoFPS** vide letter no: **DoFPS/FPED/FLCS/3-3/2022-2023/63** dated **18/07/2022** and recommendation and field report of the **Range Officer, Lobesa Range Office** vide letter no: **LR/40/2021-2022/304** dated **23/05/2022** on the following conditions:

1. This clearance is limited to **forestry perspective** as per the detailed field report;
2. This clearance is not transferable;
3. The validation of this clearance shall be subject to obtaining other relevant clearances;
4. Additional clearance should be sought prior to any deviation in location/size the alignment;;
5. This Clearance shall not be liable for any dispute arising during the implementation of activity;
6. Any damage caused to public/private property shall be borne by the holder of this clearance;
7. Disposal of any forest produce shall be as per existing rules and regulations;
8. Only those trees/poles which are marked shall be removed;
9. Any waste generated from the activity should be properly disposed as per Waste Prevention & Management Regulation 2012;
10. The legal status of the land shall remain unchanged & on any occasion the land shall not be converted to private ownership;
11. This clearance shall not restrict easement;
12. **The approval is exclusively from the forestry perspective for the alignment that falls in SRF land;**
13. **Felling and disposal of trees and poles should be carried out as per the existing norm;**
14. **This office shall not be responsible in the event of unforeseen complications due to change in alignment of water pipeline;**
15. This clearance will not replace/substitute any other clearance required by any other laws;
16. The clearance shall be revoked without any liability on part of the Government if the holder of this clearance violated any of the above terms & conditions;
17. ***This Forestry clearance shall remain valid for a period of project or activity;***
18. Date of issue: **19/07/2022.**

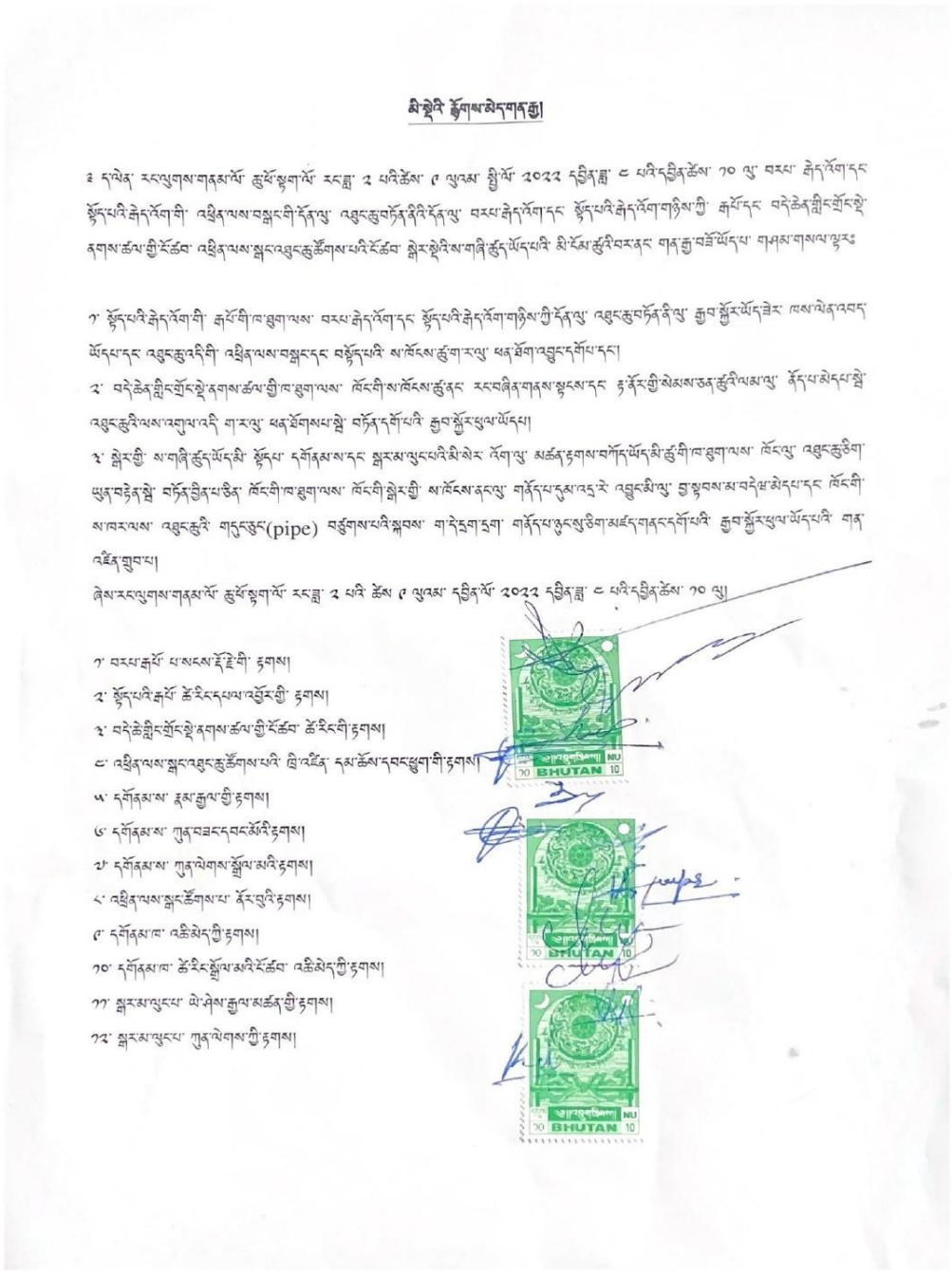
(Karma Tenzin)
Chief Forestry Officer

Mailed On
Date 19/07/2022
Time: 4:27 PM

Copy to:
1. The Dasho Dzongdag, **Punakha** Dzongkhag for kind information.
2. The Director, **DoFPS** for kind information.
3. The Gup, **Barp and Toep** Gewog(s) for information
4. The Range Officer, **Lobesa Range** for necessary action.
5. Concerned Applicant for necessary follow-up.
6. RM, NRDCL Rinpung Region for information to take over the above forest produce;

Contact: +975 2 376027 (PABX), 17110383/77110383 (CFO), 17978388 (Tsheringla) or 17258875 (Choney Yangzom)
wangdue-forest-division@googlegroups.com

Annex 5a. Community clearance- Toedpisa Gewog



མི་སྡེའི་ རྙོགས་མེད་གནང་ཆ།

༈ དཔེན་ རང་ལུགས་གནམ་ལོ་ ཆུ་མོ་སྟག་ལོ་ ཟླ་ ༢ པའི་ཚེས་ ༩ ལུ་འབབ་ སྤྱི་ལོ་ ༢༠༢༢ དབྱིན་ཟླ་ ༤ པའི་དབྱིན་ཚེས་ ༡༠ ལུ་ བརཔ་ རྒེད་འོག་དང་ སྟོད་པའི་རྒེད་འོག་གི་ འཁྱིན་ལམ་བསྐྱང་གི་དོན་ལུ་ འབྱུང་ཆུ་བཏོན་ནིའི་དོན་ལུ་ བརཔ་རྒེད་འོག་དང་ སྟོད་པའི་རྒེད་འོག་གཉིས་ཀྱི་ རྒཔོ་དང་ བདེ་ཆེན་གླིང་གྲོང་སྡེ་ནགས་ཚལ་གྱི་ངོ་ཚབ་ འཁྱིན་ལམ་སྐྱང་འབྱུང་ཆུ་ཚོགས་པའི་ངོ་ཚབ་ ཞིང་སྡེའི་ས་གཞི་ཚུད་ཡོད་པའི་ མི་ངོམ་ཚུའི་བར་ནང་ གནད་དོན་བགྲོ་ཡོད་པ་ གསུམ་གསལ་ལྟར༑

༡་ སྟོད་པའི་རྒེད་འོག་གི་ རྒཔོ་གི་ཁ་ཐུག་ལས་ བརཔ་རྒེད་འོག་དང་ སྟོད་པའི་རྒེད་འོག་གཉིས་ཀྱི་དོན་ལུ་ འབྱུང་ཆུ་བཏོན་ནི་ལུ་ རྒྱབ་སྐྱོར་ཡོད་ཟེར་ ཁས་ལེན་འབད་ཡོད་པ་དང་ འབྱུང་ཆུ་འདི་གི་ འཁྱིན་ལམ་བསྐྱང་དང་ བསྐྱོད་པའི་ ས་ཁོངས་ཚུ་ག་ར་ལུ་ ཕན་ཐོག་འབྱུང་དགོཔ་དང༌།

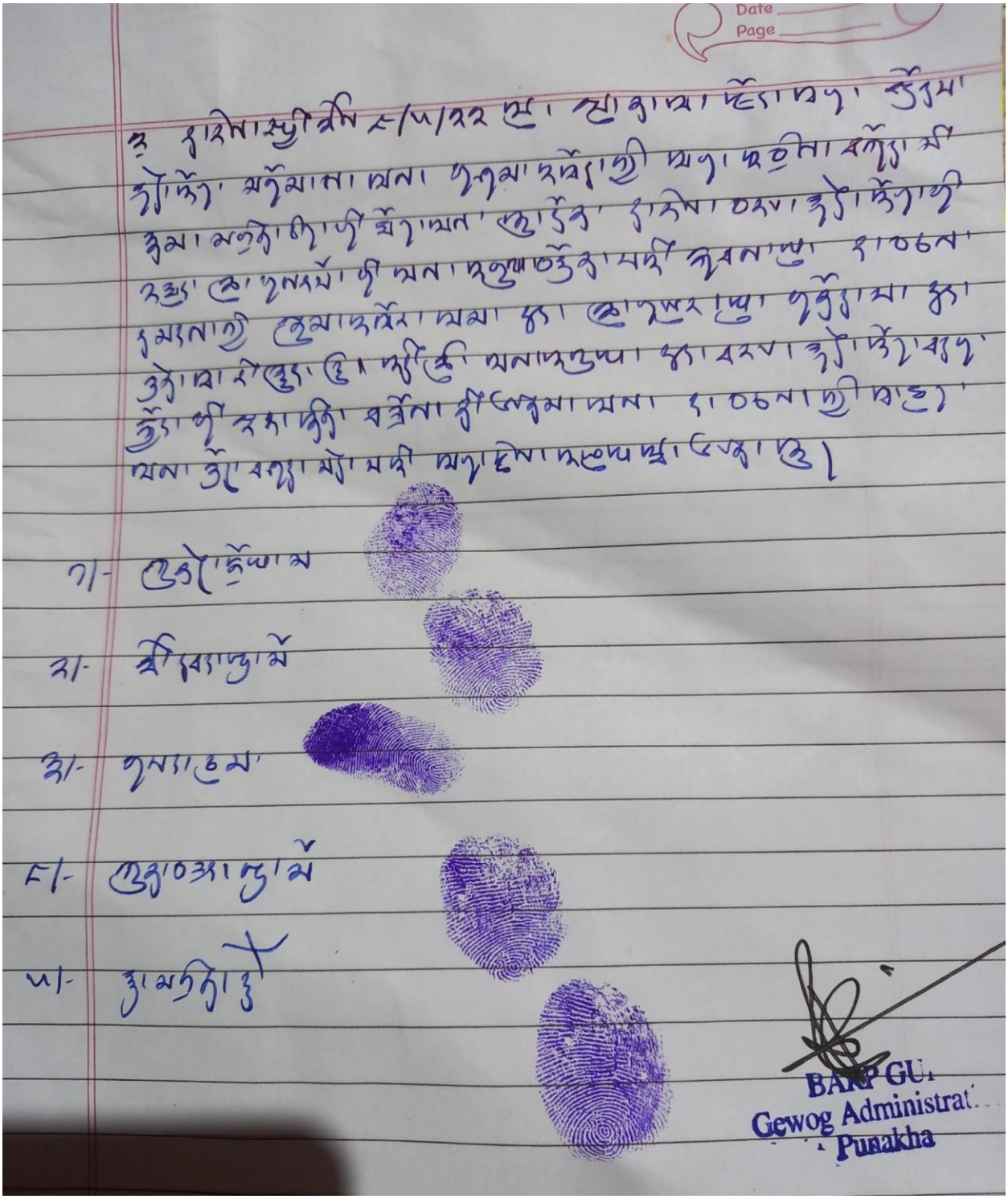
༢་ བདེ་ཆེན་གླིང་གྲོང་སྡེ་ནགས་ཚལ་གྱི་ཁ་ཐུག་ལས་ ཁོང་གི་ས་ཁོངས་ཚུ་ནང་ རང་བཞིན་གནས་སྟངས་དང་ ཧ་ཏོར་གྱི་སེམས་ཅན་ཚུའི་ལམ་ལུ་ གནོད་པ་མེད་པ་སྦེ་ འབྱུང་ཆུའི་ལས་འགུལ་འདི་ ག་ར་ལུ་ ཕན་ཐོགསཔ་སྦེ་ བཏོན་དགོཔ་འདི་ རྒྱབ་སྐྱོར་ཞུ་ཡོདཔ།

༣་ ཞིང་གི་ ས་གཞི་ཚུད་ཡོད་མི་ སྟོདཔ་ དགོནམ་ས་དང་ སྨར་མ་ལུང་པའི་མི་སེར་ འོག་ལུ་ མཚན་རྟགས་བཀོད་ཡོད་མི་ཚུ་གི་ཁ་ཐུག་ལས་ ཁོང་ལུ་ འབྱུང་ཆུ་ཅིག་ ཡུན་བརྟེན་སྦེ་ བཏོན་ཕྱིན་པ་ཅིན་ ཁོང་གི་ཁ་ཐུག་ལས་ ཁོང་གི་ཞིང་གི་ ས་ཁོངས་ནང་ལུ་ གནོད་པ་དུས་འདྲ་རེ་ འབྱུང་མི་ལུ་ བྱ་སྟབས་མ་བདེཔ་མེདཔ་དང་ ཁོང་གི་ ས་ཁར་ལས་ འབྱུང་ཆུའི་ གདུང་ཐུང་(pipe) བཙུགས་པའི་སྐབས་ ག་དེ་ཐུག་ཐུག་ གནོད་པ་ཆུང་སུ་ཅིག་མཛད་གནང་དགོ་པའི་ རྒྱབ་སྐྱོར་ཞུ་ཡོད་པའི་ གན་འཛིན་བྲིས་པ།

ཞེས་རང་ལུགས་གནམ་ལོ་ ཆུ་མོ་སྟག་ལོ་ ཟླ་ ༢ པའི་ ཚེས ༩ ལུ་འབབ་ དབྱིན་ལོ་ ༢༠༢༢ དབྱིན་ཟླ་ ༤ པའི་དབྱིན་ཚེས་ ༡༠ ལུ།

༡་ བརཔ་རྒཔོ་ པ་སངས་རྡོ་རྗེ་གི་ རྟགས།
༢་ སྟོད་པའི་རྒཔོ་ ཚེ་རིང་དཔལ་འབྱོར་གྱི་ རྟགས།
༣་ བདེ་ཆེ་གླིང་གྲོང་སྡེ་ནགས་ཚལ་གྱི་ངོ་ཚབ་ ཚེ་རིང་གི་རྟགས།
༤་ འཁྱིན་ལམ་སྐྱང་འབྱུང་ཆུ་ཚོགས་པའི་ ཁྲི་འཛིན་ དམ་ཆོས་དབང་ཕྱུག་གི་རྟགས།
༥་ དགོནམ་ས་ རྣམ་རྒྱལ་གྱི་རྟགས།
༦་ དགོནམ་ས་ ཀུན་བཟང་དབང་མོའི་རྟགས།
༧་ དགོནམ་ས་ ཀུན་ལེགས་སྒྲོལ་མའི་རྟགས།
༨་ འཁྱིན་ལམ་སྐྱང་ཚོགས་པ་ ནོར་བུའི་རྟགས།
༩་ དགོནམ་ཁ་ འཆི་མེད་ཀྱི་རྟགས།
༡༠་ དགོནམ་ཁ་ ཚེ་རིང་སྒྲོལ་མའི་ངོ་ཚབ་ འཆི་མེད་ཀྱི་རྟགས།
༡༡་ སྨར་མ་ལུང་པ་ ཡེ་ཤེས་རྒྱལ་མཚན་གྱི་རྟགས།
༡༢་ སྨར་མ་ལུང་པ་ ཀུན་ལེགས་ཀྱི་རྟགས།

Annex 5a. Community clearance- Barp Gewog



Annex 7. Results of the water quality test

དཔལ་ལྡན་འབྲུག་གཞུང་།
གསོ་བ་སྨན་ཁག།
ཐིམ་ཕུ

ROYAL GOVERNMENT OF BHUTAN
MINISTRY OF HEALTH
DEPARTMENT OF PUBLIC HEALTH
Royal Centre for Disease Control
Serbithang, Thimphu-BHUTAN
P.O BOX: 667

Drinking Water Quality Testing Laboratory Result

Royal Centre For Disease Control : Thimphu

Other Surveillance Report

Record ID	*AREC_000828*	Test Requested By	*Regional Engineering Cluster Office Punakha, GEF project (Okalum)*
Collected By	*Tobgay*	Collection Date & Time	*2023-09-15 09:00:00*
Analyzed By	*Pema Chophel and Tandin Wangmo*	Analysis Date & Time	*2023-09-15 10:30:00*

Sampling Point : **Okalum Punakha**	Source : **Others**	Acceptable Value
Alkalinity(mg/L as CaCO3)	*33.8*	*20 - 200*
Aluminium(mg/l)	*0.0162*	*0.0 - 0.9*
Conductivity(us/cm)	*30.8*	*0 - 1000*
E. Coli(CFU/100mL)	*66*	*0*
pH()	*7.6*	*6.5 - 8.5*

TDS(mg/L)	*18.9*	
Total Hardness(mg/L as CaCO3)	*26*	
Turbidity(NTU)	*0.7*	*0 - 5*
Barium(mg/L)	*0*	*0.0 - 1.3*
Boron(mg/L)	*0*	*0.0 - 2.4*
Cadmium(mg/L)	*0.0001*	*0.000 - 0.003*
Calcium(mg/L)	*4.45*	*<75mg/l*
Chromium(mg/L)	*0*	*0.00 - 0.05*
Cobalt(mg/L)	*0.0001*	*0.000 - 0.005*
Copper(mg/L)	*0.0002*	*0 - 2*
Iron(mg/L)	*0.0039*	*0.0 - 0.3*
Magnesium(mg/L)	*0.6607*	
Manganese(mg/L)	*0*	*0.0 - 0.4*

Pottassium(mg/L)	*0.7598*	
Lead(mg/L)	*0*	*0.00 - 0.01*
Nickel(mg/L)	*0*	*0.00 - 0.07*
Sodium(mg/L)	*3.71*	*<20mg/L*
Strontium(mg/L)	*0.009*	*0.0 - 4.0*
Zinc(mg/L)	*0.0002*	*0 - 3*
Fluoride(mg/L)	*0.08*	*0.0 - 1.5*
Nitrates(mg/L)	*0.8*	*0 - 50*
Sulphate(mg/L)	*0*	*0 - 250*

Remarks :

AV : Acceptable Value

Annex 8. Biodiversity list

Table 1. Flora species recorded during the field visit

#	Species name	Family name	Habit
1	*Brassaiopsis mitis*	Araliaceae	Tree
2	*Carpinus spp*	Betulaceae	Tree
3	*Castanopsis hystrix*	Fagaceae	Tree
4	*Daphniphyllum himalense*	Daphniphyllaceae	Tree
5	*Debregeasia longifolia*	Urticaceae	Tree
6	*Dichroa febrifuga*	Hydrangeaceae	Tree
7	*Hedera nepalensis*	Araliaceae	Tree
8	*Lyonia ovalifolia*	Ericaceae	Tree
9	*Pinus roxburghii*	Pinaceae	Tree
10	*Quercus glauca*	Fagaceae	Tree
11	*Quercus griffithii*	Fagaceae	Tree
12	*Rhododendron arboreum*	Ericaceae	Tree
13	*Rhus chinensis*	Rutaceae	Tree
14	*Schima wallichii*	Theaceae	Tree
15	*Symplocos ramosissima*	Symplocaceae	Tree
16	*Aconogonon molle*	polygonaceae	shrub
17	*Berberis aristata*	Berberidaceae	shrub
18	*Brassaiopsis mitis*	Araliaceae	shrub
19	*Bredelia retusa*	Phyllanthiaceae	shrub
20	*Desmodium spp*	Fabaceae	shrub
21	*Indigofera dosua*	Fabaceae	shrub
22	*Inula cappa*	Asteraceae	shrub
23	*Ligustrum confusum*	Oleaceae	shrub
24	*Luculia gratissima*	Fabaceae	shrub
25	*Myrsine capitellata*	Myrisinaceae	shrub
26	*myrsine semiserrata*	Myrisinaceae	shrub
27	*Quercus lanata*	Fagaceae	shrub
28	*Toricellia tiliifolia*	Toricelliaceae	shrub
29	*Viburnum cylindricum*	Verbenaceae	shrub
30	*Viburnum foetidum*	Verbenaceae	shrub
31	*Yushia spp*	Poaceae	shrub
32	*Artemisia vulgaris*	asteraceae	herb
33	*Barleria cristata*	acanthaceae	herb
34	*Bidens pilosa*	asteraceae	herb
35	*Cyperus spp*	cyperaceae	grass
36	*Elatostema lineolatum*	urticaceae	herb

Table 2. Avifauna recorded during the field visit

#	Common name	Scientific name	IUCN Status	FNCA 2023
1	*Dicrurus leucophaeus*	Ashy Drongo	LC	
2	*Hypsipetes leucocephalus*	Black Bulbul	LC	
3	*Dicrurus macrocereus*	Black Drongo	LC	
4	*Aethopyga saturata*	Black-throated Sunbird	LC	
5	*Aegithalos concinnus*	Black-throated Tit	LC	
6	*Myophonus caeruleus*	Blue whistling thrush	LC	
7	*Psilopogon asiaticus*	Blue-throated Barbet	LC	
8	*Cinclus pallasii*	Brown dipper	LC	
9	*Trochalopteron erythrocephalum*	Chestnut-crowned Laughing thrush	LC	
10	*Acridotheres tristis*	Common Myna	LC	
11	*Phylloscopus fuscatus*	Dusky Warbler	LC	
12	*Garrulus glandarius*	Eurasian Jay	LC	
13	*Psilopogon virens*	Great Barbet	LC	
14	*Parus monticolus*	Green-backed Tit	LC	
15	*Culicicapa ceylonensis*	Grey-headed Canary-flycatcher	LC	
16	*Dendrocitta formosae*	Grey Treepie	LC	
17	*Phylloscopus xanthoschistos*	Grey-Hooded Warbler	LC	
18	*Lophura leucomelanos*	Kalig Pheasant	LC	Schedule III
19	*Ficedula westermanni*	Little Pied Flycatcher	LC	
20	*Pericrocotus ethologus*	Long-Tailed Minivet	LC	
21	*Lanius schach*	Long-Tailed Shrike	LC	
22	*Oriolus traillii*	Maroon Oriole	LC	
23	*Streptopelia orientalis*	Oriental Turtledove	LC	
24	*Phoenicurus fuliginosus*	Plumbeous Water-redstart	LC	
25	*Pycnonotus cafer*	Red-Vented Bulbul	LC	
26	*Columba livia*	Rock Dove	LC	
27	*Yuhina occipitalis*	Rufous-vented Yuhina	LC	
28	*Heterophsia capistrata*	Rufous sibia	LC	
29	*Certhia nipalensis*	Rusty-flanked Treecreeper	LC	
30	*Enicurus schistaceus*	Slaty-backed Forktail	LC	
31	*Enicurus maculatus*	Spotted Forktail	LC	
32	*Grammatoptila striata*	Striated Laughingthrush	LC	
33	*Yuhina flavicollis*	Whiskered Yuhina	LC	
34	*Garrulax leucolophus*	White-crested Laughingthrush	LC	

35	*Sitta himalayensis*	White-tailed Nuthatch	LC	
36	*Pterorhinus albogularis*	White-throated Laughingthrush	LC	
37	*Chaimarrornis fuliginosus*	White-capped Water-redstart	LC	

Annex 9a. Participant list- Dzongkhag consultation

Attendance for consultation meeting					
Sl.no.	Name	Agency	Designation	Email address	Signature
1	Thinup Tshering	Dasho Dzongdag	—	—	
2					
3	Gyeltshen	DFO	—	—	[signature]
4	Tshering Yangzom	Barp	Tshogpa	—	[signature]
5	Kinley Bidha	"	"	kinleybidha111@gmail.com	[signature]
6	Tenzin	"	"		[signature]
7	Dago	"	"		[signature]
8	Kinley Penjor	"	"		[signature]
9	Tshering Penjor	Toepisa	Gup.	tshering1986@gmail.com	[signature]
10					
11	Parag Dorji	Barp	Gup	barpgup@gmail.com	[signature]
12	Karma Tenzin	Wangdue Forest Div.	CFO	Karmatenzin@[illegible].gov.bt	[signature]
13	Lobzang Cheda	Barp	GAO	—	[signature]
14	Tshering	Toebpaisa	LMAO	tshering@punakha.gov.bt	[signature]
15	Ngawang Gyeltshen	Lobesa Range	Sr. Forest Ranger	ngawanggyeltshen@moenr.gov.bt	[signature]
16	Norbu Tenzin	Dzongkhag	Cultural Officer	ntenzin@punakha.gov.bt	[signature]
17	Damcho Wangmo	Legal (CGCEP)DZ	Dzongkhag	dwangmo@punakha.gov.bt	[signature]
18	Sonam Phuntsho	DT Secty (DDM Fund)	DAP	sphuntsho@punakha.gov.bt	[signature]
19	Karma Dorji Jimba	EO	DEP	karmadorji7@punakha.gov.bt	[signature]
20	Sherab Chophel	~~DLR~~ Dzongkhag	DLR	sherab@[illegible]les.gov.bt	[signature]
21	Tobgay	RECC, Khuruthang	G.G.	tobgay@punakha.gov.bt	[signature]
22	[illegible]	[illegible]	[illegible]		[signature]
23	Norbu	Toebisa	Tshogpa	—	[signature]
24	Chechey	Barp ~~mangmi~~	Mangmi	chechey304@gmail.com	[signature]
25	Pema Thinley	Toepaisa	Tshogpa		[signature]
26	Deki P. Yangden	PCS	Social & Env consultant	–	
27	Tandin	"	PCS	–	[signature]
28	Yangchen Dema D.	"	"	–	[signature]
29	Jigme Sonam	"	"	–	[signature]
30	Sonam Gyeltshen	RECC, Khuruthang	B.G.G.	sgyeltshen@punakha.gov.bt	[signature]

Annex 9b. Participant list

Page 1/4

Place: MP, Hall Barp Gewog.

Date 19/10/2023

No.	Name	Sex	Age	Address/Agency	Gewog	Chiwog/Village	Email/Contact	Signature
1.	Tshering Penjor	M	37	Thinleygang	Toebisa	Limjaleka Thinleygang	tshering1925@gmail.com	
2.	Ugyen Tshering	M.	54	Dashidhang HSS.	Lobesa	Laphuna	[illegible]@education.gov.bt	
3.	Passang Dorji	M.		Lobesa	Baap	Sopsokha	baapgup@gmail.com	
4.	Sangay Dema	F	31	CNR	Barp		dchi	
5.	Karma (Khompo)	M	56	Do Rangthang Gompa	"	—		
6	Sonam Wangdi	m	70	"	"	—		
7	Ani Yeshi Om	f	43	"	"	—		
8	Ani Jimpa Pem	f	50	"	"	—		
9	Sonam Gyeltshen	m	31	RECC, Khuruthang			sgyeltshen@[illegible]	
10	Tobgay Gyeltshen	m		Dzongkhag, Punakha			gyeltshen[illegible]@Punakha.gov.bt	
12	Tobgay	m		RECC, Khuruthang			tobgay@Punakha.gov.bt	

1/4

Place: Barp Gewog meeting Hall

Date: 19/10/2023

No.	Name	Sex	Age	Address/Agency	Gewog	Chiwog/Village	Email/Contact	Signature
1.	Tshering Penjor	M	37	Gup	Toeb	T.gang	[illegible]	
2.	Kinley Gyeltshen	M		Mang up	"	"	77316345	
3.	Norbu	M		Tshokpa	"	"	17729505	
4.	Phub Namgay	M		Member	"	"	17671863	
5.	Younten	M		"	"	"	17900095	
6.	Namgay	M		"	"	"	17113167	
7.	Damcho Wangchuk (m)			"	"	"	17612965	
8.	Damcho (t)	(M)		T.L.S.S	"	"	77659406	
9.	Kinley Dyenker	(F)	39	(Tokha) Member	Toeb	T.gang	17977332	
10.	Kelzang	(M)		D.S.S.S	"	"		
11.	Sonam Wangchuk	(M)		" DCS	"	"	77160777	
12.	Karma	(M)		Tokha	"	"		
13.	Namgay Dorji	(m)		Tokha	"	"		
14								
15	Chimi	(m)		Gyemkha	"	"	17687496	
16	Namgay Dorji	(m)		Tokha	"	"	17673868	
17	Karma	(m)		Tokha	"	"	17756901	

Barp.

Place: _____ Date: 19/10/23

No.	Name	Sex	Age	Address/Agency	Gewog	Chiwog/Village	Email/Contact	Signature
1	Ngawang Gyeltshen	M		Lobesa Rangar	Barp	Lobesa	17620868	
2	Pawang Dorji	M		Gup Barp	"	Yuewakha		
3	Chuychey	M		Magistr	"	Gamakha		
4	Kinley Penjor	M		Tshogpa	"	Yuewakha		
5	Dago	M		"	"	Tshogkana		
6	Tenzin	M		"	"	Chasa		
7	Tshering Yangzom	F		"	"	Gamakha		
8	Kinley Bidha	F		"	"	Usakha		
9	Namgay	M		Chimi Lhakhang	"	Yuewakha	1726 17672617	
10	Ugyen Pem	F		Royal Project	"	"		
11	Kinley Penjor	M		Yuewakha	"	Yuewakha		
12	Thoeba	M		"	"	"		
13	Gomchen	M		"	"	"		
14	Thinley Dorji	M		"	"	"		
15	Yeshi Om	F		Usakha	"	Usakha		
16	Thangka	M		"	"	"		
17	Gomchen	M		"	"	"		
18	Dorji	M		Tshogkana	"	Tshogkana		
19	Khandu Om	F		Lobesa	"	Yuewakha		
20	Kedar Sharma	M		Lobesa Lower S. School	"	Usakha		

Place: Barp Gewog

Date: 19/10/23

No.	Name	Sex	Age	Address/Agency	Gewog	Chiwog/Village	Email/Contact	Signature
21	Lham Tshering	M		Dashiding School	Barp	Gamakha		
22	Sonam Wangchuk	M		BPC, Lobesa	Barp	Gamakha	sonamwangchuk@bpc.bt	
23	Yeshi Gyeltshen	M		Gamakha	"	"		
24	Kinley Dorji	M		Gamakha	"	"		
25	Rinchen Namgay	M		Yuwakha	"	Yuwakha		
26	Dorji Bidha	F		Gamakha	"	Gamakha.		
27	Sonam Tshering	M		DIDC, Sawmill	Barp	Tshokona	—	

Annex 10. FPIC Protocols Followed During Community Consultations

Indigenous peoples' rights are recognized by international law as well as inclusive state laws of most countries. However, there are still many States where specific mention of indigenous peoples (IP) may not occur, this is also in the case of Bhutan where there is no specific law for IP. In Bhutan, the concept of 'indigenous peoples' is not used but people are differentiated as 'socio-cultural groups'. Since development needs are articulated at village level, all households are fully involved in prioritization of development needs and activities and implementation. Members of all socio-cultural groups are hence included in all phases of development and receive equal access and benefits to the outputs of development programmes. In this context, MoIT/PMU will uphold the obligations with regard to the SES by ensuring that FPIC is implemented where required in a suitable way forward to ensure compliance with the SES with a focus on aligned communications with Government counterparts and affected people.

The Project ensures that arrangements, evidenced in a documented outcome, are concluded with the project related socio-economic groups for the equitable sharing of benefits to be derived by the project in a manner that is culturally appropriate and inclusive giving full consideration to options preferred by the groups concerned. For the Project, FPIC protocol has been considered at each stage of the community consultations allowing project-affected people to approve or reject certain proposed actions that may affect them, and that the process for reaching such a decision possess characteristic elements of FPIC.

The elements of FPIC are as follows:

FREE refers to a consent given voluntarily and absence of coercion, intimidation, or manipulation. FREE refers to a process that is self-directed by the community from whom consent is being sought, unencumbered by coercion, expectations, or timelines that are externally imposed.

PRIOR means that consent is sought sufficiently in advance of any authorization or commencement of activities. Prior refers to a period of time in advance of an activity or process when consent should be sought, as well as the period between when consent is sought and when consent is given or withheld. Prior means in the early stages of a development or investment plan, not just when the need arises to obtain approval from the community.

INFORMED refers mainly to the nature of the engagement and the type of information that should be provided prior to seeking consent and as part of the ongoing consent process.

CONSENT refers to the collective decision made by rights holders and reached through the customary decision-making processes of affected people or communities. Consent must be sought and granted or withheld according to the unique formal or informal political-administrative dynamic of each community.

While the goal of consultation processes shall be to reach an agreement (consent) between the relevant parties, this does not mean that all FPIC processes will lead to the consent and approval by the rights-holders in question. At the core of FPIC is the right of the peoples concerned to choose to engage, negotiate, and decide to grant or withhold consent, as well as the acknowledgment that under certain circumstances it must be accepted that the project will not proceed and/or that engagement must be ceased if the affected peoples decide that they do not want to commence or continue with negotiations or if they decide to withhold their consent to the project.

Since consultation is always a key component of an FPIC process, the SES define key principles for meaningful, effective and informed stakeholder consultation that apply.
In order to comply with the UNDP SES, meaningful, effective and informed stakeholder engagement was carried out during project design phase and has been reported in the Stakeholder Engagement Plan. The project designs have been modified since then taking into consideration the concerns and recommendations from these consultations.
Following the consultations, the Dzongkhag and the Local Government sought the informed consent of the communities especially the affected households whose land would be impacted during the construction phase. The consents and clearances are attached here in Annex 10.

The Stakeholder Engagement during the ESIA and ESMP preparation phase is a continuation of the FPIC consultation processes, wherein the updated project design was shared for feedback and incorporation of concerns and recommendations into the ESMP. Prior to community consultations, advanced notification of the meeting dates was sent to the Dzongkhag administration wherein it was clearly specified that participants should include the local community that would benefit from or be impacted by the Project, including affected persons and vulnerable groups.

Each meeting was organised based on prior consultations with relevant community leaders or group representatives. During the meeting at the district, the local community representatives were again briefed on the objectives of the community consultations and requested to provide prior information to all relevant community members on the objectives of the meeting and to invite them to attend the meeting. The local representatives were requested to especially ensure that affected persons, women and vulnerable groups were given prior notification regarding the meeting and to seek the confirmation of participants that they would be attending the meeting voluntarily.

The Gup and the Tsogpas confirmed that they informed all the participants regarding the meeting via their social chat groups wherein the participants had confirmed their participation prior to the meeting.

The meeting venue was selected at the Gewog meeting hall, as this is both a neutral and familiar location and readily accessible to all. The gewog centre is also spacious enough, allowing the organizers to form smaller groups for community mapping exercises and to conduct smaller group meetings to allow focused discussions.

Each meeting began with a formal introduction by the consultants, PIU and Dzongkhag staff (Agriculture, forest officers) and a presentation on the meeting agenda and objectives. The introduction also included an explanation on how the larger group would be broken up into smaller groups for community mapping and focused discussions. There were no reservations to the agenda or to the proposal for conducting mapping and breaking up into smaller groups. Participants were free to choose whichever groups they wanted to join.

The meeting was conducted in the local language Dzongkhag as well as in the local dialect (Nepali).

The project design including location of each component, the pipeline alignment, materials to be used, mode of construction and project construction timeline was presented by the Dzongkhag Engineer. He also specified which chiwogs would benefit from the project and that these were included in the project based on the community consultations during the project preparatory phase and the need for the project expressed during prior consultations. He informed the meeting that the selection of the locations for the reservoir tanks and pipeline alignment had been carried out in consultation with the Tsopga (community representative). Clarifications were provided to concerns on project design and impacts.

The consultant explained the ESIA process and informed the members that the purpose of the ESIA was to identify potential environmental and social impacts of the project. The project design was projected onto the screen (google earth) and community members were asked to share their views on potential environmental and social impacts of the project. The consultant also informed the community on potential environmental and social impacts including how the water pipeline would traverse private land which could impede cropping or access or could be risky during the construction period, and the negative impacts due to influx of workers such as GBV or sexual harassment, trespassing, and encroachment.

The participants confirmed that they are aware of the project as past consultations had already been conducted with them. They also confirmed that the affected persons have already given their written consent for the project after the previous consultations to the Dzongkhag.

The consultant explained the GRM process to the participants to seek their views on this and discussions were focused on the need for a female member to be included as part of the GRM committee or whether alternatives were required.

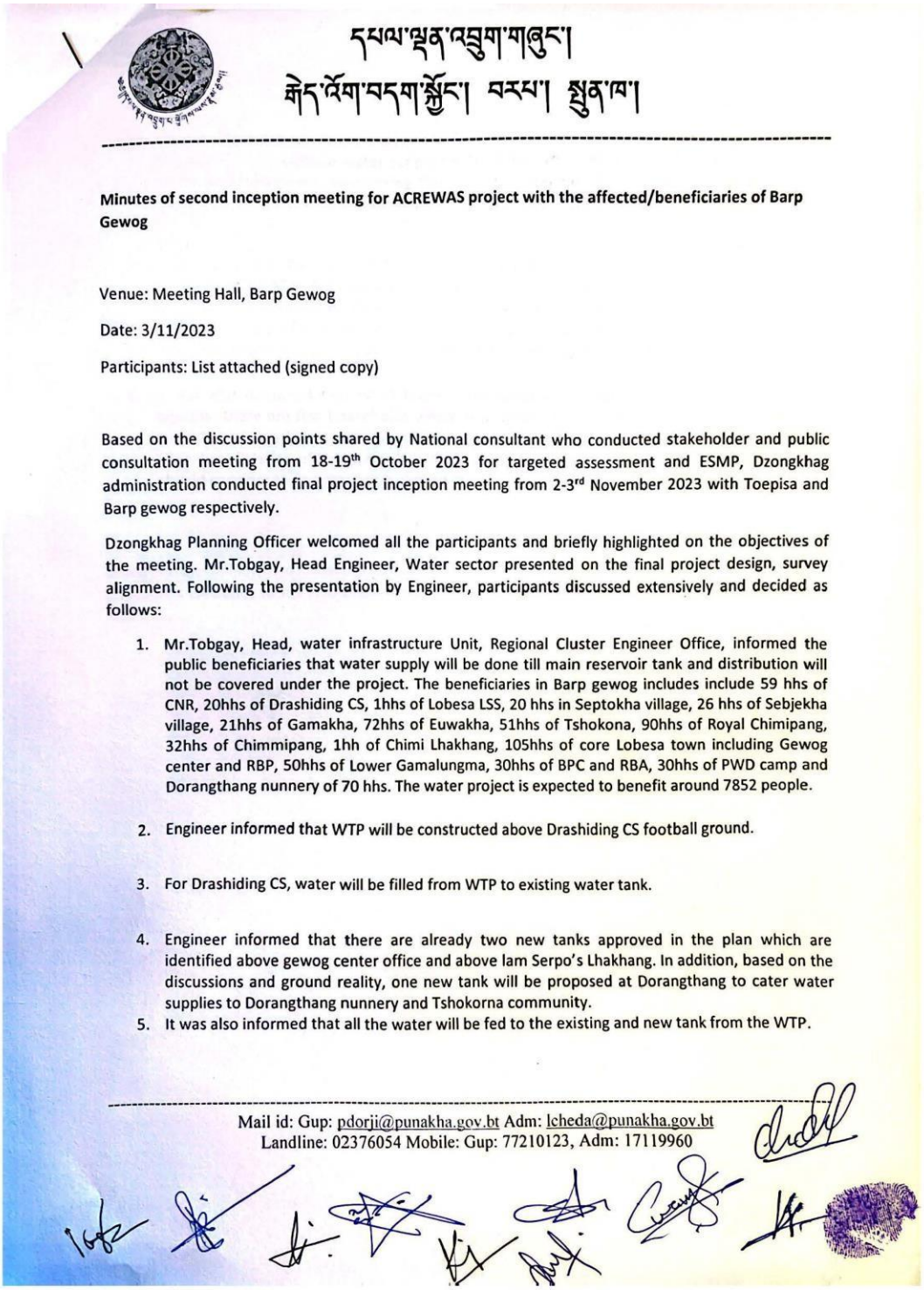
The smaller groups discussions were focused on engaging the community members in mapping the project components and identifying PCRs, settlements, school, health infrastructure, existing water sources and forest areas utilized by the communities. The seasonal calendar was also discussed wherein participants actively engaged in crops cultivated, times when they faced water shortages, human wildlife conflicts, other existing challenges and their views on the project.

During the meeting participants people spoke freely. In the meeting in Punakha, the participants voiced their concerns regarding the project design based on which the design was later modified. The meeting allowed participants and their representatives to speak on behalf of affected persons. For instance, a representative stated that a farmer in Punakha who decided not to attend the meeting sent word that she would not give her consent unless she was provided with some benefit. This was noted, and the project team has agreed to discuss this further with the concerned farmer. The design was modified taking into consideration the concerns during the community consultation. The design change has been recommunicated to the Local Government through the PIU.

Furthermore, participants who were not direct beneficiaries also expressed concerns about the risk of damage to water pipelines on their property. This concern has been noted in the ESIA and measures incorporated in the ESMP.
FIPC Protocol followed:

Key steps in project implementation	Process	Steps undertaken
Project Planning and Meetings and Stakeholder consultations	1. Engage all Chiwog Tshogpas and validate the inclusion of all chiwogs and their concerns 2. Validate and document geographic and demographic information through participatory mapping 3. Design a participatory communication plan and carry out iterative discussions through which project information will be disclosed in a transparent way - in a convenient location and at a convenient time for all chiwogs and in a language best understood by all Chiwog Tshogpas 4. Reach consent, document all Chiwogs needs that are to be included into the project, and agree on a feedback and complaints mechanism in line with GRM process described in the ESMF document	1. All relevant Chiwog Tsogpas were invited to attend the Dzongkhag consultations and to invite participants from their chiwogs for the commnunity consultation. 2. Participatory community mapping exercise was carried out for each Gewog. 3. Informatio on the consultation was disseminated through the Chiwog social chat group, with specific details on the consultation such as meeting date, time, venue and requiring community members to confirm their voluntary participation or representation. 4. The GRM process was presented and views sought on th GRM committee members, process and procedures including the timeline. All concerns raised by the participants were documented, presented and discussed with the PIU and PMU following the field visit, resulting in further alteration to the project design and beneficiaries.
At Project Implementation	5. Engage the concerned Chiwog Tsgogpas when conducting project monitoring and evaluation of the project activities and during review of annual implementation (participatory monitoring and evaluation)	Concerned Chiwog Tsogpas were invited to both the Dzongkhag and Community consultations by the Local Government. During project compliance monitoring, the Tsogpas will play a key role in project monitoring of the construction activities.
Project Closure	6. Document lessons learned and disclose information about project achievements to all project chiwogs	

Following are the Clearances received as per the FPIC Protocols followed:



དཔལ་ལྡན་འབྲུག་གཞུང་།
རྡེད་འོག་བདག་སྐྱོང་། བར། སྡུན་ཁ།

Minutes of second inception meeting for ACREWAS project with the affected/beneficiaries of Barp Gewog

Venue: Meeting Hall, Barp Gewog

Date: 3/11/2023

Participants: List attached (signed copy)

Based on the discussion points shared by National consultant who conducted stakeholder and public consultation meeting from 18-19th October 2023 for targeted assessment and ESMP, Dzongkhag administration conducted final project inception meeting from 2-3rd November 2023 with Toepisa and Barp gewog respectively.

Dzongkhag Planning Officer welcomed all the participants and briefly highlighted on the objectives of the meeting. Mr.Tobgay, Head Engineer, Water sector presented on the final project design, survey alignment. Following the presentation by Engineer, participants discussed extensively and decided as follows:

1. Mr.Tobgay, Head, water infrastructure Unit, Regional Cluster Engineer Office, informed the public beneficiaries that water supply will be done till main reservoir tank and distribution will not be covered under the project. The beneficiaries in Barp gewog includes include 59 hhs of CNR, 20hhs of Drashiding CS, 1hhs of Lobesa LSS, 20 hhs in Septokha village, 26 hhs of Sebjekha village, 21hhs of Gamakha, 72hhs of Euwakha, 51hhs of Tshokona, 90hhs of Royal Chimipang, 32hhs of Chimmipang, 1hh of Chimi Lhakhang, 105hhs of core Lobesa town including Gewog center and RBP, 50hhs of Lower Gamalungma, 30hhs of BPC and RBA, 30hhs of PWD camp and Dorangthang nunnery of 70 hhs. The water project is expected to benefit around 7852 people.
2. Engineer informed that WTP will be constructed above Drashiding CS football ground.
3. For Drashiding CS, water will be filled from WTP to existing water tank.
4. Engineer informed that there are already two new tanks approved in the plan which are identified above gewog center office and above lam Serpo's Lhakhang. In addition, based on the discussions and ground reality, one new tank will be proposed at Dorangthang to cater water supplies to Dorangthang nunnery and Tshokorna community.
5. It was also informed that all the water will be fed to the existing and new tank from the WTP.

Mail id: Gup: pdorji@punakha.gov.bt Adm: lcheda@punakha.gov.bt
Landline: 02376054 Mobile: Gup: 77210123, Adm: 17119960

6. The proposal to distribute water supply for Tshokona community from CNR was also discussed at the length. However, considering CNR as institutions with different water requirement and also foreseeing the likely management issues in the future, the proposal was dropped.

7. The meeting also discussed that the water supply pipeline project falls partially in Peljorling Community Forest under Gamakha Chiwog in Barp gewog. However, it was discussed that the alignment doesn't have major impact on the CF which requires cutting down of big trees with commercial value. Therefore, the CF proposed that the Contractors should handover the fallen tree with commercial value if any to CF management during the implementation.

8. It was also discussed that while there is not significant private land being affected by the pipeline, there are few households where the pipeline may cut across their registered private land. The affected household already issued their no objection certificate since they are also main beneficiaries of the water supply project. However, community proposed that project should consider to compensate in case of major damages to their registered private land.

Based on the fulfilment of above discussions and decisions, the affected community hereby accord community clearance to start the implementation of the project.

Mail id: Gup: pdorji@punakha.gov.bt Adm: lcheda@punakha.gov.bt
Landline: 02376054 Mobile: Gup: 77210123, Adm: 17119960

Attendance sheet Barp Gewog

3/11/2023

Sl no.	Name	Designation	Signature
1	Pasang Dorji	Gup	
2	Lobzang Chedy	GAO	
3	Tshering Yangzom	Tshogpa	
4	Kinley Bidha	"	
5	Chechey	Mangmi	
6	Kinley penjor	Tshogpa	
7	Dago	Tshogpa	
8.	Sangay Deki	CNR	
9	Ani Pema Seldon	Ogyen Gagtshel	
10.	Jigme Wangchuk	Nonnery.	17/13/08
11	Gomches	Dairying	
12	Sonam Gyeltshen	Engineer	
13	Tobgay	Engineer	
14	Gyeltshen.	Planning Hw	

ROYAL GOVERNMENT OF BHUTAN
DZONGKHAG ADMINISTRATION
PUNAKHA: BHUTAN

DAP/Plg-01/2023-24/ 1846

Date: 03/11/2023

Project Manager,
PMU, ACREWAS
MoIT, Thimphu

Sub: Submission of clearances

Dear madam,

Enclosed herewith, you will find the social clearances of the affected communities from the two gewogs of Barp and Toepisa, as well as the Environmental and Forestry clearances, for your requisite action. I am delighted to apprise you that I have concluded the final consultation and engaged in extensive discussions with the key stakeholders in both gewogs. Subsequently, I have successfully obtained community clearances.

I am pleased to report that the affected communities from both gewogs have wholeheartedly pledged their full support and cooperation for the timely execution of the water supply project. Consequently, I am writing to officially convey this message to you as we move forward with the project's execution.

Submitted for your kind information and necessary action

Thanking you

Yours sincerely

(Gyeltshen)
Dy.CPO (Focal Officer, ACREWAS project)

Copy to:
1. Dasho Dzongdag, DAP for kind information
2. CDE, Regional Cluster Engineering Office, Khuruthang, for necessary action
3. The Portfolio Manager, Environmental and Livelihood Unit, UNDP, for kind information

Tel.: Dasho Dzongdag:584110, Dasho Dzongrab:584117, HRO:584121, General:584534, Cultural Officer:584536, DCRCO:584532, Planning Officer:584524, DEO:584539, DAO:584166, DLO:584104, DE:584531, Finance Officer:584537, Environment Officer:584528, DzEO:584596, DHO:584255, Legal Officer:584223, Procurement Officer:584200, DT Secretary:584223, ICTO:584530.

Minutes of second inception meeting for ACREWAS project with the affected/beneficiaries of Toepisa Gewog

Venue: Meeting Hall, Toepisa Gewog
Date: 2/11/2023
Participants: List attached (signed copy)

Based on the discussion points shared by National consultant who conducted stakeholder and public consultation meeting from 18-19th October 2023 for targeted assessment and ESMP, Dzongkhag administration conducted final project inception meeting from 2-3rd November 2023 with Toepisa and Barp gewog respectively.

Dzongkhag Planning Officer welcomed all the participants and briefly highlighted on the objectives of the meeting. Mr.Tobgay, Head Engineer, Water sector presented on the final project design, survey alignment. Following the presentation by Engineer, participants discussed extensively and decided as follows:

1. Project Engineer confirmed that the reservoir tank for Thinleygang with a capacity of 250cum is included in the plan. The parallel pipeline for Thinleygang has been recommended as per the demand by the beneficiaries and as instructed by Director, DoIT, Ministry of Infrastructure and Transport. The same has been conveyed to the public. The public beneficiaries have been also informed that water supply will be done till main reservoir tank and distribution will not be covered under the project. The beneficiaries include 76 household from Thinleygang, 25 household of Tokha, 2 hh of Tongcheykha, 5 hhs of Thinleygang Lhakhang, 5 hhs of Dechentsemo Central School, 8 hhs Thinleygang LSS and 3hhs of Thinleygang BHU.

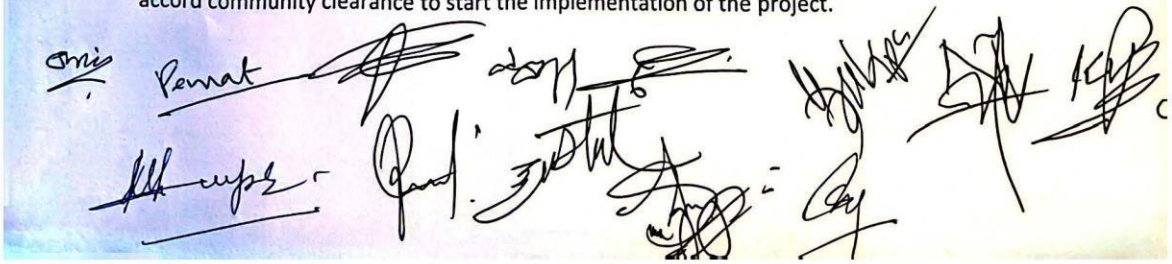
2. For Gemsa community (9hhs), it was discussed and decided to supply the water from the Thinleygang tank. It was confirmed that there is no other water source in the community. For Shongraykha village under Toepisa gewog, water supply will be covered from WTP.

3. For Gemkha community, it was decided to propose for the fund support from the project for the maintenance of existing RWSS. The PIU/Punakha cluster will work out the cost estimates and submit to PMU for approval.

4. The meeting also confirmed that the water supply pipeline project does not cut cross and affect any Community Forest (CF) under Toepisa gewog.

5. Tshogpas and community beneficiaries repeatedly raised on importance and urgent need to carry out water source protection located around Dochula.

Based on the fulfilment of above discussions and decisions, the affected community hereby accord community clearance to start the implementation of the project.



2/11/2023

Attendance sheet

Sl no.	Name	Designation	Signature
1	Tshering Penjor	Gup -	[signature]
2	Mindu.	Com	[signature]
3	Norbu, Thinleygang	Tshogpa -	[signature] Thinleygang Chiwog
4	Pema Thinley, Gyenkha	-"-	[signature] Gaenkha
5	Dawcho Wangchu	Beneficiaries	[signature] 17612985
6,	Namgay -	-"-	[signature]
7.	Chencho	-"-	[signature]
8.	Kinga Chophel -	-"-	[signature]
9.	Phub Namgay -	-"-	[signature]
10.	Kinley Penjor -	-"-	[signature]
11-	Younten Drupa	-"-	[signature]
12.	Tshering	GAO	[signature]
13.	Gyeltshen	Planning Officer	[signature]
14.	Tobgay	Engineer	[signature]
15.	Sonam Gyeltshen,	Engineer	[signature]