Final Environmental and Social Impact Assessment/Targeted Assessment and Environment and Social Management Plan for Climate Resilient Domestic Water Supply Systems for Gasa Town, Gasa Dzongkhag

July 2024

Water and Sanitation Division

Department of Infrastructure Development

Ministry of Infrastructure and Transport

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Table of Contents

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
BLSS	Bhutan Living Standard Survey
BNB	Bhutan National Bank
BOB	Bank of Bhutan
BPC	Bhutan Power Corporation
BTFW	Border Town Foreign Workers
CAT	Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment
CBSS	Community Based Support System
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
DECC	Department of Environment & Climate Change
DI	Ductile Iron
DoA	Department of Agriculture
DoCDD	Department of Culture and Dzongkha Development
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
DPO	Dzongkhag Planning Officer
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DWMC	Dzongkhag Water Management Committee
EA	Environment Assessment
ECB	Election Commission of Bhutan
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
GBV	Gender-Based Violence
GCF	Green Climate Fund
GEF	Global Environment Facility
GFP	Gender Focal Person
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
IEE	Initial Environmental Examination
ILO	International Labour Organization
IoT	Internet of Things
IUCN	International Union for Conservation of Nature
JDNP	Jigme Dorji National Park
JDWNRH	Jigme Dorji National Referral Hospital
KII	Key Informant Interviews
LC	Least Concern
LH	Lesser Himalayan
LMP	Labor Management Plan
MoAL	The Ministry of Agriculture and Livestock
MoENR	Ministry of Energy and Natural Resources
MoF	Ministry of Finance
MoICE	Ministry of Industry, Commerce and Employment
MoIT	Ministry of Infrastructure and Transport
MoWHS	Ministry of Works and Human Settlement
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
NGEP	National Gender Equality Policy
NGO	Non-government Organization
NHDCL	National Housing Development Corporation Limited
NSB	National Statistics Bureau

NTU	Nephelometric Turbidity
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
ORC	Outreach Clinic
PA	Protected Area
PAVA	Property Assessment and Valuation Agency
PCOS	Polycystic Ovary Syndrome
PHC	Primary Health Centre
PIU	Project Implementation Unit
PMU	Project Management Unit
PPE	Personal Protective Equipment
PPG	Project Preparation Grant
PPR	Polypropylene Random Copolymer
PSC	Project Steering Committee
RBP	Royal Bhutan Police
RCC	Reinforced Cement Concrete
RCDC	Royal Centre Disease Control
RECOP	Regulation for the Environmental Clearance of Projects
REC	Regional Engineering Cluster
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
SCADA	Supervisory Control and Data Acquisition
SEP	Stakeholder Engagement Plan
SES	Social and Environmental Standards
SESP	Social and Environmental Screening Procedure
SH	Sub Himalayan
SOP	Standard Operating Procedure
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
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UOM	Unit of Measurement
UTI	Urinary Tract Infection
UWICER	Ugyen Wangchuck Institute for Conservation and Environment Research

Vu	Vulnerable
WGB	World Bank Group
WHO	World Health Organization
WMD	Watershed Management Division
WRCD	Water Resources Coordination Division
WSP	Water Safety Plan
WTP	Water Treatment Plant
WUA	Water User Association

TERMS

Dzongkha Term	**Translation**
Chhu	River/Water
Chiwog	Sub-Block (Basic Electoral Precinct)
Dessup	Guardians of Peace
Dratsang	Monastic Order
Dungkhag	Sub-District
Dzong	Fortress (Administrative Centers of each Dzongkhag)
Dzongda	District Officer
Dzongrab	Deputy District Officer
Dzongkhag	District
Gewog	Administrative Block
Khengkha	One of the Eastern Bhutanese dialects
Kidu	Welfare accorded by the moral authority of the monarch
Layap	Semi-Nomadic inhabitants of Laya Gewog
Layapkha	Dialect spoken in Laya
Lhakhang	Temple
Lhotsamkha	Language of Lhotsampas/Southern Bhutanese (Nepalease Dialect)
Lunanakha	Dialect spoken in Lunana
Mani Dungkhor	Blessed Spinning Prayer Wheel
Menchu	Medicinal Spring
Nye	Sacred Site
Rabdhey	Monastic Body
Shedra	Monastic School
Thromde	Second Level Administrative Division
Tsachu	Hot Spring
Tshogpa	Community Representative
Zhabdrung	At whose feet one submits

Executive Summary

The ESIA and ESMP is one of the three activities under Component 3 of the "Advancing Climate Resilience of the Water Sector in Bhutan" (ACREWAS), which aims to address water shortage and improve community resilience in select vulnerable regions. The objectives of the project will be achieved through multiple activities under four components: water governance; nature-based solutions for sustainable watersheds; efficient water supply, distribution, and utilization; and knowledge management.

The Gasa Water Supply Scheme under Activity 3.1.1. aims to establish a reliable, portable and safe domestic water supply system that will meet both Bhutan's Domestic Water Quality Standard and WHO guidelines, for Gasa town and its peripheral areas, under Khatoed Gewog in Gasa Dzongkhag.

Currently, the town's water supply is provided through 2 parallel pipelines, about 15 years old, and from water sources tapped by individual households and agencies that have installed water storage tanks. Some of the water pipes and storage tanks are leaking due to damage and degradation. The town faces challenges in terms of water shortages due to damaged and blocked pipes as well as water related ailments due to poor hand hygiene and unsafe drinking water.

The infrastructure components include the establishment of climate resilient water intake, weir and intake structure at Shingtalum water source, construction of a sedimentation tank/sand trap, laying of 2.3 km of transmission mainline from the Source to a new Water Treatment Plant comprising a RCC stilling chamber, slow sand filter, weir chamber, 100cum (1 number) and 150 cum (2 numbers) clear water tank, staff quarters and a laboratory. From the Water Treatment Plant, the water will be distributed to both towns through three water storage tanks and two distribution lines (4,810 meters and 790 meters). As the project intends to charge water tariff, water meters will be installed. As a parallel activity, water tariff studies are ongoing. To access the Water Treatment Plant, a 400-meter length access road of 3.5 m width is proposed that will take off from an existing road.

The water supply scheme, once successfully completed, will provide safe, reliable drinking water for Gasa Town. The existing town is expected to shift to the newly designated area at Kolikha. Aside from the significant health benefits, other benefits include improvements in student outcomes from reduced illness, reduced expenses for repairing damaged pipes or time spent unblocking pipes, more water from water storage facilities and an overall improved quality of life.

The project will provide drinking water for 182 households with a population of 744 residents and is designed to accommodate the 30-year projection of almost double the current population. The Project will also benefit Gasa Primary School that has 120 students (67M, 53F) and 14 teachers and staff (7M, 7F), 110 monks at the Dratshang, and the Hospital.

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 Social and Environment Safeguards (SES) and RGOB's Environmental Assessment Act, 2000.

Potential environmental and social impacts were assessed through field visits and consultations and described as per UNDP's 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; construction of retaining walls for slope stability; and the use of HDPE/DI/PPR pipes and fittings. The design also takes into consideration the topography. 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 0.5m by 0.6 m trenches and will be back filled with the excavated muck. The intake area, sand trap, reservoir and the Water Treatment Plant area will be secured with fencing and gate. All Water Retaining Structures/components will be constructed with reinforced cement concrete (RCC) with admixtures/water-proofing compounds.

All the UNDP SES principles and standards are triggered by the project infrastructure. 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 but the project footprint is limited to Gasa township and the peripheral areas, within one gewog. In terms of environmental impacts, the total area required to be cleared is 1.4 hectares which includes about 0.3 hectares of non-forest land, especially along the distribution pipelines. To mitigate against loss of forest cover in the Park, the Biodiversity Action Plan has been prepared. 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. With the design period of 30 years, the total water that will be abstracted is 13.645 lps which will allow more than 50% of the water to flow downstream. During the public consultation it was confirmed that there are some members of the community who collect non-wood forest products and medicinal plants, mostly for self-consumption or sale in the local market. The project activities will not hamper the seasonal collection of these products by the community as the collection of the forestry produce is not limited to the project area.

In terms of social impacts, the project will not acquire land, nor displace, or resettle any household as the intake structure, water treatment plant and treated water reservoir tanks are all located in state forest reserve land. All distribution lines have been aligned to avoid private land. Instead, sections of the water pipeline will traverse land belonging to government and non-government agencies for which prior clearance has been obtained with a request to ensure that prior information is provided to the agencies before commencing excavation work and to minimize disruption of underground cables or existing water supply pipelines. Potential risks to Community health and safety will arise due to increased truck movements carrying construction materials to the site along narrow road stretches in settlement areas, risk of social conflicts, exploitation, spread of diseases, eve teasing, Gender Based Violence and Sexual exploitation, abuse and harassment due to influx of workers. Excavated trenches, if left uncovered for long periods of time, can also pose a risk for younger children walking to school, or passersby at night. Exposure to other impacts such as dust from trench work will be limited to a few weeks at the most as the work will progress from the reservoir along the designated alignment. Measures for these range from installation of safety signs, to making the contractor responsible for repairing any damage to

government or private property at the contractor's own cost and activating the Grievance Redress Mechanism.

As with all infrastructure projects, there are potential risks and impacts associated with worker recruitment from labor management, occupational health and safety, construction related impacts on air, water quality, noise, and potential impacts on cultural sites. To mitigate these impacts, the ESIA includes a Labor Management Plan, Occupational Health and Safety plan, Code of Conduct for workers and employees, Waste Management Plan and Emergency Preparedness Plan.

All project stakeholders have been identified and mapped. These were consulted during the planning stages by the PMU, PIU and invited to the public consultation. The Stakeholder Plan will ensure that these stakeholders continue to be consulted in an appropriate manner, especially during the construction and operation phases. Focus group discussion and interviews on gender and vulnerable persons have resulted in incorporation of measures to ensure opportunities, minimize risks or discrimination and mechanisms for dealing with gender-based violence and sexual harassment cases/grievances.

There are no indigenous people from the community and only 4 vulnerable people were identified from the community. In terms of religious and cultural heritage, the site of significance is the Phulakha Monastery and the Gaden Phodrang, a religious site surrounded by prayer flags, that are in close proximity to the water pipelines and access road. The required consents and measures to minimize impacts on these structures/areas have been specified in the ESMP along with chance find procedures for artifacts, archaeological resources and human remains.

Overall, the potential adverse social and environmental risks and impacts have been identified and are found to be limited in scale, and time, are largely reversible and can be readily addressed with measures from the pre-bidding process to the operation phase. These measures are outlined in the ESMP along with responsibilities for implementation, compliance monitoring and budget requirements.

Additionally, under the ACREWAS project, there are also parallel activities that will further contribute to mitigating risks associated with watershed degradation and water sources, through field assessment and preparation of watershed management plans. Instituting tariffs for water use, creation of water user association and capacity building of responsible parties such as the district technicians, Environment Committee, and water user association members will further strengthen local capacity while also ensuring accountability for sustainable management of the water supply scheme.

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 GRM has been discussed during the public consultation and agreed upon by the Dzongkhag. Furthermore, a half-day training on the GRM process for identified GRM members was conducted during the site visit. The Contractor will be required to institute a worker GRM mechanism whilst also following the project GRM process to address community grievances in a timely manner.

དོསྒྲིག།

མཐའ་འཁོར་གནས་སྐྱངས་དང་ མི་སྡེའི་གནོད་སྐྱོན་གྱི་བརྟག་དཔྱད་ (ཨི་ཨེས་ཨའི་ཨེ་) དང་ མཐའ་འཁོར་གནས་སྐྱངས་དང་ མི་སྡེ་འཛིན་སྐྱོང་གི་འཆར་གཞི་ (ཨི་ཨེས་ཨེམ་པི་)འདི་ ཉེན་ཁ་ཡོད་པའི་ལུང་སྡོམ་གས་གདམ་ཁ་རྐྱབ་སྟེ་ ཚུམ་ལང་པ་ཡོད་མི་དང་ མི་སྡེ་གདོང་ལེན་འབད་ནི་ལུ་ དམིགས་པ་བསྟུད་མི་ "འབྲུག་རྒྱལ་ཁབ་ནང་ ཆུའི་ལས་སྡེ་གི་གནམ་གཤིས་གདོང་ལེན་ཡར་དྲག"(ཨེ་སི་ཨར་ཨི་ཥབ་ལུ་ཨེ་ཨེས)ནང་ ཆ་ཤས་ ༣ པའི་མངའ་འོག་གི་ ལས་སྡ་གསུམ་ཡོད་ས་ལས་གཅིག་ཨིན། ལས་འགུལ་འདི་གིས་དམིགས་པ་ཆུ་ ཆ་ཤས་བཞི་པའི་མངའ་འོག་ལུ་ ལས་སྡ་མང་རབས་ཅིག་འབད་ཐོག་ལས་ སྐྱབ་ཆུགས་ནི་ཨིན། དེ་ཡང་ ཆུའཕྲིན་སྐྱོང་། ཡུན་བརྟན་ཆུའི་ཤ་གི་དོན་ལུ་ རང་བཞིན་གནས་སྐྱངས་དང་འབྲེལ་བའི་ཐབས་ལམ། དོན་སྙིན་ཅན་གྱི་ཆུ་མཁོ་སྐྱོང་དང་ བཀམ་སྤེལ་ དེ་ལས་ ལག་ལེན་འཐབ་ནི། དེ་ལས་ ཆུའི་ཤེས་བྱ་ཡར་དྲག་གཏང་ནི་ཆུ་ཨིན།

མགར་ས་རྩོང་ཁག་ ཁ་སྡོད་ཆེད་འོག་ནང་ མགར་ས་ཁྲོམ་དང་ ཉེ་འདབས་ཀྱི་ས་གནས་ཆུ་གི་དོན་ལུ་ ལས་འགུལ་ ༣.༡.༡ གི་མངའ་འོག་ལུ་ཡོད་པའི་ མགར་ས་འཐུང་ཆུ་བཀམ་སྤེལ་ལས་རིམ་གིས་ འབྲུག་རྒྱལ་ཁབ་ཀྱི་ནང་འཁོད་ཆུའི་སྤུས་ཚད་དང་ འཛམ་གླིང་གསོ་བའི་འདུས་ཚོགས་ཀྱི་ལམ་སྟོན་ གཉིས་ཆ་ར་དང་འབྲེལ་མི་ བློ་གཏད་ཅན་ བསགས་ནི་འཛམ་ཀོག་ཏོ་ དེ་ལས་ ཉེན་སྐྱང་ཅན་གྱི་ ས་གནས་ནང་འཁོད་ཀྱི་ཆུ་བཀམ་སྤེལ་རིམ་ལུགས་ བཟོ་ནི་ལུ་དམིགས་གཏད་བསྐྱེད་ཨིན།

དཔེས་ནདས་པར་ ཁྲོམ་གྱི་ཆུ་བཀམ་སྤེལ་འདི་ ལོ་ངོ་༡༥ དེ་ཅིག་ལང་མི་ སྤྱལ་མཐུད་ཆུ་དུང་གཉིས་ལས་ཅིན་ དོ་ཡོད་པ་ད་ ཆུའི་ཤ་ལས་ ཁྱེམ་གྱང་རང་སོ་དང་ ལས་སྡེ་ཚུ་གིས་ འཐུང་ཆུ་གསོག་འཛོག་འབད་སའི་ ཆུ་མཛོད་ཚུ་ནང་ བཙུགས་ཏེ་ འཐུང་དོ་ཡོད་པ་ཨིན་པས། གཞི་རྟེན་མཁོ་ཆས་ཚུ་ཡང་ གནམ་གཤིས་གདོང་ལེན་འབད་ཚུགས་པའི་ བསགས་མཛོད་དང་ཆུ་བྱུག་ དེ་ལས་ ཤིང་རྟ་ལུང་མ་ཆུའི་ཤ་ལུ་ བསགས་མཛོད་ཁང་ཤུབ་ནི། ཆུ་བཅོག་སའི་བསགས་མཛོད་/ཁྱེམ་བཀག་ས། ཀི་ལོ་མི་ཏར་ ༢.༣ འབད་མི་ཆུ་ལམ་གཅོ་བོ་འདི་ ཆུའི་ཤ་ལས་ རྩེ་ས་གི་བར་བཅད་དང་སྦྲགས་ ཆུ་བཅོག་བཟོ་གྲ་གསར་པ་ཚུན་ སྤོ་བཤུད་འབད་ནི། ཁྱེམ་འགོས་ཀྱིས་སྦྲེ་ བཅོག་ས། ཆུ་བྱུག་གི་བར་བཅད། ཀིཔ་བིཀ་མི་ཏར་ ༡༠༠ (ཁཀ་༡)དང་ ཀིཔ་བིཀ་མི་ཏར་༡༥༠ (ཁཀ་༢)

འབད་མི་ གཅོང་ཆུ་བསགས་མཛོད། ལས་གཡོགས་གི་སྟོད་ཁྱམ་དང་ བརྒྱ་དཔུད་ཁང་ཚུ་ ཆུབ་ནི་ཨིན། ཆུ་བཅག་བཙོ་གྲྭ་ལས་ ཆུ་བསགས་མཛོད་གསུམ་དང་ བཀྲམ་སྤེལ་ལམ་གཉིས་རྒྱུད་དེ(མི་ཏང་ ༡༢༡༠ དང་ མི་ཏང་ ༧༥༠) ཆུ་འདི་ཁྲོམ་གཉིས་ཆར་ནང་བཀྲམ་སྤེལ་འབད་ནི་ཨིན། ལས་འགུལ་འདི་གིས་ མ་འོངས་པ་ལུ་ཆུ་ཁྲལ་བགོད་ནི་ཨིན་པ་ལས་བརྟེན་ ཆུའི་འཛལ་ཚད་མི་ཏང་བཙུགས་ནི་ཨིན། ལས་འགུལ་འདི་དང་གཅིག་ཁར་ ཆུ་ཁྲལ་གྱི་བརྒྱ་ཞེབ་འདི་ འབད་བའི་བསྒང་ཡོད་པ་ཨིན། ཆུ་བཙོག་བཙེ་གྲྭ་ནང་ སྟོད་ཆུགས་ནི་དོན་ལུ་ རྒྱ་ཚད་མི་ཏང་ ༣.༥ འབད་མི་ སྐུམ་འཁོར་ལམ་ རིང་ཚད་མི་ཏང་ ༩༠༠ ད་སྟོ་ ཡོད་པའི་སྐུམ་འཁོར་ལམ་ལས་ བརྩེན་ནི་གྲོས་འཆར་བགོད་དེ་ཡོད།

ཆུ་བཀྲམ་སྤེལ་གྱི་ལས་རིམ་འདི་ ཚར་གཅིག་མཐར་འཁྱོལ་ཅན་སྤེ་ མཇུག་བསྡུ་བའི་བསྒང་ལས་ མཁར་སྡེ་ཁྲོམ་གྱི་དོན་ལུ་ ཉེན་སྐྱོང་ཅན་དང་ ཟླ་གཏད་ཅན་གྱི་འཐུང་ཆུ་ཐོན་ཁུངས་ནི་ཨིན། དཔལ་ཡོད་པའི་ཁྲོམ་འདི་ ངོས་འཛིན་འབད་ཡོད་པའི་ ས་གནས་གསར་པ་ ཀོ་ལི་ཁ་ལུ་ སྤུ་ནི་ཨིན་མས། གསོ་བའི་འཕྲོད་བསྟེན་གྱི་ ཁེ་ཕན་གྱི་མ་དོ་བར་ གཞན་ཡང་ སློབ་ཕྲུག་ཚུ་ན་ཚ་མར་ཕབ་འབད་མི་ལུ་བརྟེན་ གྲུབ་འབྲས་ལེགས་ཤོམ་འཐོན་ནི། ཆུ་དྲུང་མེད་པ་ཐལ་མི་ ཉམས་བཅོས་འབད་ནི་དོན་ལུ་ ཟད་འགྲོ་མར་ཕབ་འབད་ནི་ ཡང་ན་ ཆུ་དྲུང་བསལ་ནི་དོན་ལུ་དང་ དུས་ཚོད་མར་ཕབ་འབད་ནི་ བསགས་མཛོད་མཐུན་ཉུན་ལས་ ཆུ་མངམ་འོངམི་ལས་བརྟེན་ སྤྱིར་བཏང་འཚོ་བ་ཡར་རྒྱས་འགྱོ་ནི་གི་ཁེ་ཕན་ཡོད་པ་ཨིན།

ལས་འགུལ་འདི་གིས་ ཁྲོམ་གུང་ ༡༡༦ དང་ མི་རྩེ་བས ༧༩༩ ལུ་ འཐུང་ཆུ་བྱེན་ནི་ཨིནམ་མ་ཚད་ ལོ་ངོ་ ༣༠ ཙྪན་ ཞོ་ཚད་དཔག་སྟེ་ ད་སྟོ་ཡོད་པའི་མི་རྩེ་བས་ལས་ ཏ་ལམ་ལོག་ལྟབ་སྟེ་ ལང་ཚུགས་པ་སྟེ་བཙོ་ཡོད་པ་ཨིན། ལས་འགུལ་འདི་གིས་ མགར་ས་སློབ་གྲྭ་ཆུང་ནང་ཡོད་པའི་ སློབ་ཕྲུག་ ༡༢༠ (ཞོ ༤༧ དང་ མོ ༤༣) དང་སློབ་དཔོན་ ༡༩ (ཞོ ༧ དང་ མོ་ ༧) དེ་ལས་ གྲྭ་ཚང་ནང་ དགེ་སློང་ ༡༡༠ དང་སྨན་ཁང་ལུ་ཡང་ ཕན་ཐོགས་འོང་ནི་ཨིན།

ཨི་ཨེས་ཨའི་ཨེ་གི་ལམ་ལུགས་ནང་ ནང་འཁོད་བསྒྲུང་ཞིབ་དང་ གློག་འཕྲིན་ཐོག་ལས་ ལས་འགུལ་ལག་ལེན་སྤེ་ཕྲན་ (པི་ཨའི་ཡུ་)ལས་ གནས་སྟུད་བསྡུ་ལེན་འབད་ནི་ དེ་ལས་ ས་གནས་བཀྲག་ཞིབ་ཀྱི་དུས་ཚོད་ནང་ གནས་སྟུད་བསྡུ་ལེན་འབད་ནི་དང་ འབྲེལ་བ་ཡོད་པའི་མི་ངོམ་ཚུ་དང་གློས་བསྡུན་འབད་ནི་ཡོད་པ་ཨིན།

ཞི་ཞེས་ཟའི་ཞེ་གིས་ ཞི་ཞེས་ཞེམ་ཞེཨ་དང་བསྡུན་ འཛ་མ་གྲིང་སྦྱི་ཆོགས་གོང་འཕེལ་ལས་རིམ་ (ཤུ་ཞེན་ཀི་པི་)མི་སྟེ་དང་ རང་བཞིན་སྲུང་སྐྱོབ(ཞེས་ཞི་ཞེས) དང་ འབྲུག་གཞུང་གི་ མཐའ་འཁོར་གནས་སྡུངས་ཀྱི་ བརྒྱ་ཞིབ་བཅའ་ཁྲིམས་ ২০০০ དང་འཁྲིལ་ཡོད་པ་ཞིན། མཐའ་འཁོར་དང་མི་སྟེ་གནས་སྡུངས་ཀྱི་ཨན་གནོད་ཚུ་ ས་གནས་ནང་འགྱོ་ཐོག་ལས་དང་ གོས་བསྡུན་ཐོག་ལས་བརྒྱ་ཞིབ་འབདད་དེ་ ཤུ་ཞེན་ཀི་པི་གི་ ཞེས་ཞི་ཞེས་དང་འཁྲིལ་བཤད་པ་རུབ་ཡོད་པ་ཞིན། ཨན་གནོད་རེ་རེ་བཞིན་དུ་ཀྱི་ སྲུངས་སྐྱོབ་ཐབས་ལམ་ཚུ་ དོན་ཚན་ ২ པ་ ནང་བཤད་དེ་ཡོད།

ལས་འགྱུལ་ཀྱི་ལས་འཆར་དེ་ཡང་ མི་སྟེའི་ངོ་ཚབ་ཚུ་དང་ གོས་བསྡུན་ཐོག་ལས་ ས་ཁོངས་བརྒྱ་ཞིབ་དང་ ས་གནས་གདམ་ཁ་རུབ་ཡོད་པ་ཞིན། གནམ་གཤིས་གདོང་ལེན་ལས་བཟོ་བཀོད་འདི་ནང་ གནམ་བྱུར་ལུ་ས་ རོགས་ཚུ་བཀག་ནི་དོན་ལུ་ ཆུ་ཀ་ཁ་ཐུག་ལུ་ ཟ་ལི་གི་ཐག་བའི་ཆུབྱག་རུབ་ནི། གྲེན་བརྒན་ཏོག་ཏོ་སྦེ་གནས་ནི་ དོན་ལུ་ རྩིག་སྐྱོར་རུབ་ནི་དང་ ཞེཅ་ཀི་པི་ཞི/ཀི་ཟའི/པི་པི་ལྷར་གྱི་ཆུའུད་དང་སྦྲེག་ཆས་ཚུ་ལག་ལེན་འཐབ་ནི་ ཞིན། བཟོ་བཀོད་འདི་ནང་ སའི་དབྱིབས་ཚུ་ཡང་བལྟ་ཡོད་པ་ཞིན། གྲེན་ཏ་ལམ་ཅིག་དང་ གྲེན་གཟར་དྲགས་ནང་ ཆུའུད་དཔྱངས་ཡོད་མི་ཁག་ཚུ་ ཆུའུད་བཏེག་ནི་ཀ་ཁ་ཚུ་དང་ རྩིག་སྐྱོར་ཚུ་རུབ་ནི་ཞིན། བཀུམ་མི་དང་གྲེན་འཛོར་མི་ཚུ་གཱ་ར་ འཕྲལ་ཤུགས་བཀག་ཆས་ཀྱི་སྲུངས་སྐྱོབ་འབདད་ནི་ཞིན། ཆུའི་ཞེབ་ཤུགས་མར་ཕབ་འབདད་ནི་ དང་ ཆུའུད་མེདཔ་གཏངནི་ དེ་ལས་ གནམ་དགུན་འཁྲེག་མི་ཆགས་ནི་ དོན་ལུ་ ཆུའུད་ཚུ་ མི་ཏང་ ০.৭ དང་ མི་ཏང་০.৫ བཙུགས་ཏེ་ ལོག་ ས་བརྐོ་ཡོད་མི་གིས་ ལོགས་བསུབ་ནི་ཞིན། ཆུབསགས་མཛོད་ས་ ཁོངས་དང་ ཆེམ་བཀག་ས་ ཆུམཛོད་ཁང་ དང་ ཆུབཅག་བཟོ་གྲའི་ས་ཁོངས་ཚུ་ རཕ་དང་སྐོ་ར་བཟོ་སྟེ་ ཉེན་སྡུངབའབད་ནི་ཞིན། ཆུབཏེག་གི་རྩིགས་བཟོ་ཚུ/ཆ་རྐས་ཚུ་ གཱ་ར་ སྐུ་བསྟེས་བསྟེསཔ་/ཆུམ་འཛུལ་བའི་ཅ་ཆས་དང་སྦྲགས་ རྩི་ས་དང་ཆེམ་རྡོ་ཏྲག་ཚུ་སྦྱོར་བའི་འདམ་(ཤུར་སི་སི་)གྱི་བཟོ་ནི་ཞིན།

ཤུ་ཞེན་ཀི་པི་གི་ ཞེས་ཞི་ཞེས་ གཞི་རྩ་དང་ ལམ་ལུགས་ཚུ་ ལས་འགྱུལ་འདི་ནང་ཚུད་ཡོད་པ་ཞིན། ཨན་གནོད་རེ་རེ་བཞིན་དུའི་ཁྲབ་ཚད་འདི་ ཚད་གཞི་གི་རེ་རེ་ལུ་ བརྒྱ་ཞིབ་དང་བཤད་པ་རུབ་ཡོད་དང་ དཀའ་ངལ་སེལ་ནི་ཐབས་ལམ་ཚུ་ཡང་ དཀའ་ངལ་སེལ་ནིའི་རིམ་པ་དང་བསྡུན་ ལས་འཆར་བཀོད་ཡོད་པ་ཞིན།

སྤྱིར་བཏང་ལུ་ ལས་འགུལ་འདི་ གཞི་རྟེན་མཚོ་ཆའི་ལྟ་གི་ གནས་སྟངས་ལས་བརྟེན་ ཉེན་ཁ་ ' རན་ཏོག་ཏོ་ གི་ནང་འཚོད་ ' འབད་མི་ནང་ཚུདཔ་ཨིན་རུང་ ལས་འགུལ་གྱི་ཤུལ་འདི་ མགར་སས་ཁྲོམ་དང་ཉེ་འདབས་ཀྱི་ ས་གནས་དང་ ཆེད་འོག་གཅིག་གི་ནང་འཚོད་ནང་ཆུངམ་གཅིག་ཨིན། མཐའ་འཚོང་གནས་སྟངས་ཀྱི་ཕན་ཐང་ ཚལ་མ་སེལ་དགོ་པའི་ས་ཁོངས་འདི་ ཉེག་ཅང་ ०.३ སྤྱི་མི་ ཚལ་མ་མེན་མི་ས་གནས་ཚུ་བརྩི་ ཡོངས་བསྡོམས་ ཉེག་ཅང་ १.९ ཨིན་དང་ དེ་ཡང་ མངའོས་ར་ ཆུ་དུང་འཐེན་ས་རྒྱུད་འདི་ཨིན་མས། གློང་ཀ་ནང་ ནགས་ཚལ་མེད་པ་གཏང་མི་འདི་གི་དོན་ལུ་ སྤྱི་ལྷན་རིགས་སྣ་དང་ལེན་འཆར་གཞི་བཟོ་སྟེ་ཡོད་པ་ཨིན། ཐབས་ལམ་ཚུ་ཡང་ སྤྱི་ལྷན་རིགས་སྣ་བརྒྱ་ཞིབ་དང་གྲོས་འབད་འབདཝ་ནི་ ལག་ལེན་འཐབ་ནི་དང་ སྤྱི་ལྷན་རིགས་སྣ་སྡུངས་སྐྱོབ་ཡར་རྒྱས་གཏང་ནི་ དང་གཅིད་རྒྱེན་ མར་ཕབ་འབད་ནི་ 'ནི་དོན་ལུ་ སྤྱི་ལྷན་རིགས་སྣ་དང་ལེན་འཆར་གཞི་སྤྲོད་སྤྲོད་སྟེ་ ལྷ་རྟོག་འབད་ནི་ཨིན། བཟོ་བཀོད་འདི་ལོ་ངོ་ ३० ཚུན་བཟོ་ཡོད་མི་དང་ བསྡུན་ ཆུ་ཡོངས་བསྡོམས་ ལི་ཏར་པར་སེ་ཀེན་ १३.७९५ བཏོན་ཚུགས་དོ་ཡོདཔ་དང་ ཆུ་རྒྱུག་ཁ་ཐུག་ ཆུ་ ५० % ལས་ལྷག་འགྱོ་བཅུག་དོ་ཡོདཔ་ཨིན། མི་དམངས་དང་གྲོས་བསྡུན་འབད་བའི་སྐབས་ མི་སེར་ལ་ལུ་ ཅིག་ ཤིང་ཚེན་པའི་ནགས་ཚལ་གྱི་ཐོན་སྐྱེད་དང་ སྐན་གྱི་སྡོ་ཤིང་ཚུ་ མངའོས་ར་ རང་ལོངས་སྤྱོད་ནི་དང་ ས་གནས་ཀྱི་ཁྲོམ་ཁར་བཙོངས་ནི་དོན་ལུ་ བསྡུ་ལེན་འབདཔ་ཨིནམ་ ཤེས་རྟོགས་བྱེད་ཡོདཔ་ཨིན། ལས་འགུལ་གྱི་ལས་སྣ་འདི་གིས་ མི་སྡེ་ལུ་ ཐོན་སྐྱེད་བསྡུ་ལེན་གྱི་དུས་ཚོད་ཁར་ གཞོད་པ་མི་འོངས་ནི་ཨིན་མས་ དེ་ཡང་ནགས་ཚལ་གྱི་ཐོན་སྐྱེད་བསྡུ་ལེན་འདི་ ལས་འགུལ་གྱི་ས་གནས་ནང་ཆུངམ་གཅིག་མེནམ་ལས་བརྟེན་ཨིན།

མི་སྡེའི་ཕན་གཞོད་ཐད་ཁར་སྤྲོད་པ་དང་ ཆུ་བསགས་མཚོད་ དང་ ཆུ་བཙག་བཟོ་གྲྭ་ དེ་ལས་ ཆུ་བཙག་བསགས་ མཚོད་ཁང་འདི་ཆུ་གར་ གཞུངས་གི་དབང་བའི་ནགས་ཚལ་ས་ཁོངས་ནང་ཚུད་ཡོདཔ་ལས་ ལས་འགུལ་གྱིས་ས་གཞི་ལེན་ནི་དང་ ས་གོ་སྤྱི་ནི་ ཡང་ཞ་ཆིམ་གུང་ཆུ་ ག་ཡང་གཞི་གསར་པ་སྤྲེ་གཏངམ་ནི་ཨིན། ཆུ་བཀམ་སྤེལ་གྱི་ལམ་ཆུ་གར་ སྤྲེར་གྱི་ས་ནང་མ་ཚུདཔ་སྤྲེ་འབག་སྟེ་ཡོདཔ་ཨིན། ཆུ་དུང་ཁག་དག་པ་ཅིག་ གཞུང་དང་ གཞུངམིན་ལས་སྟེའི་ས་ནང་ལས་བརྒལ་དགོཔ་ལས་ འདི་གི་དོན་ལུ་ ཉེ་མ་ལས་ ཞུ་བ་འབདཝ་དེ་ ཉོག་མེད་ཡི་ གུ་ཐོབ་སྟེ་ཡོདཔ་དང་ ལས་སྟེ་ལུ་ས་ཅོ་ནི་ ལྟ་འགོ་མ་བཙུགས་པའི་ཉེ་མ་ ས་འོག་ལུ་ཡོད་པའི་ སྤྲོག་ཐག་ཡང་ན་ དཔྱོ་ བཀམ་སྤེལ་འབདཝ་ཡོད་པའི་ ཆུ་དུང་ཚུ་ལུ་ བྱ་སྐབས་མ་བདེ་ཁ་མི་འཐོབ་ནི་དོན་ལུ་ སྐན་ཞུ་ཁུལ་ནི་

ཞེན་ཟེར་ཞུ་སྟེ་ཡོད། ཁྱེམ་གཞི་ཆགས་ཡོད་སའི་ འཚོང་ལམ་ཆུང་ཀུ་ཡོད་ས་ལས་ཕར་ དོ་སྐྱེལ་སྐྱམ་འཚོང་ཚུ་ བཟོ་བསྐྱན་གྱི་ཅ་ཆས་ འབག་ནི་ཡར་སེང་འགྱོ་མི་ལས་བརྟེན་ མི་སྟེའི་འཕྲོད་བསྟེན་དང་ཉེན་སྐྱེད། མི་སྟེ་མ་སྒྲིགས་པའི་ཉེན་ཁ། ལོག་སྤྱོད། ནད་གཞི་དང་ཁྲབ། ཚུལ་མིན་འདོད་སྤྱོད། ཞོ་མོའི་རྐྱབ་སྤྱོད་དང་དབང་བཅོངས་འདོད་སྤྱོད། ལས་མི་འོངམི་ལས་བརྟེན་ ལོག་སྤྱོད་དང་དབང་བཅོངས་ཚུ་འཐོན་སྲིད་ཉེན་ཁ་འོངནི་ཞེས། ས་ཆོ་ཡོད་པའི་ཆུངོང་ཚུ་ ཡུན་རིངམོ་སྒེ་མ་བསྡུབ་པ་ཅིན་ སློབ་གྲྭ་ནང་ལམ་འགྱོ་མི་ཡང་ ཕྱི་རྒྱལམ་འགྱོ་མི་ཚུ་ལུ་ ཞ་ལུ་ཆུང་ཀུ་ཚུ་ལུ་ཉེན་ཁ་བྱུངནི་ཞེན་ཞེས། གཞན་ཕན་གཏོད་ཚུ་ཡང་ ཆུངོངཆོ་མི་ལུ་ལས་བརྟེན་ ཐབཤ་འོངནི་ནི་ཞེན་མི་འདི་ བདུན་ཕྲ་དག་པ་ཅིག་ཤུངམ་གཅིག་ གཏོད་ཀྱེན་འོངནི་ཞེན་དང་ དེ་ཡང་ ལུ་འདི་ཆུ་བསགས་ མཇོད་ལས་ ཆུ་དུང་ལམ་རྒྱུད་འབག་འདི་ར་འགྱོ་ནི་འདི་གི་ཞེན། འདི་ཚུའི་ཐབས་ལམ་ཚུ་ཡང་ ཉེན་སྲུངཀི་ བརྟ་བྱང་བཙུགས་ནི་ལས་འོག་བཙུགས་ ཁག་འབག་པ་ལུ་ གཞུངདང་སྐེར་གྱི་ཅ་དངོས་ཚུ་ ག་ཅི་མེདཔ་གཏང་རུང་ ཁག་འབག་པ་ཁོང་ར་ཟད་འགྱོ་གཏང་སྟེ་ ལོག་བཟོ་ནི་དང་ བྱ་སྤྱབས་མ་བདེཕ་ཚུ་སེལ་ནི་དོན་ལུ་ཐབས་ལམ་ཚུ་བཟོ་ནི་ཞེན།

གཞི་རྟེན་གྱི་ལས་འགུལ་གཱ་ར་ནང་ ལས་མི་འཛིན་སྐྱོང་གི་ཁ་ཐུག་ལས་ ལས་མི་བཙུགས་ནི། ལུ་གཡོག་གི་ འཕྲོད་བསྟེན་དང་ཉེན་སྲུང་། བཟོ་བསྐྱན་དང་འབྲེལ་བའི་ རྒྱབ་ལུ་གཏོད་པ། ཆུའི་སྤུས་ཚད། ཉུང་སྐྱ། དེ་ལས་ ལམ་བསལ་ས་ཁོངས་ཚུ་ནང་ལུ་ ཉེན་ཁ་དང་ཞན་འབྲེལ་བའི་ ཐབས་ཤེས་ཀྱི་ཅ་དངོས་ཚུ་ གཅིག་ཁྱབ་ཀྱང་ ཐག་འབག་པ་ཁོང་ར་ཟད་འགྱོ་གཏང་སྟེ་ ལོག་བཟོ་ནི་དང་ བྱ་སྤྱབས་མ་བདེཕ་ཚུ་སེལ་ནི་དོན་ལུ་ཐབས་ལམ་ཚུ་བཟོ་ནི་ཞེན།

འབྲེལ་བ་ཡོད་པའི་ ལས་འགུལ་གྱི་མི་ཚུ་གཱ་ར་ དོས་འཛིན་འབད་དེ་སབ་ཁ་བཟོ་ཡོད་ཞེན། འདི་ཚུ་ ལས་འགུལ་འཛིན་སྐྱོང་སྟེ་ཐུན་ (པི་ཞེམ་ཡུ)དང་ པི་ཞའི་ཡུ་གིས་ མི་དམངས་གྲོས་བསྡུན་ནང་འབོ་མི་ཚུ་གིས་ འཆར་གཞི་བཟོ་བའི་གནས་ཚད་ནང་ གྲོས་བསྡུན་ཡོད་པ་ཞེན། འབྲེལ་བ་ཡོད་པའི་མི་ངོམ་འཆར་གཞི་འདི་གིས་ འབྲེལ་བའི་མི་ངོམ་ཚུ་ལུ་ འོས་འབབ་དང་ལྡན་པའི་ཐོག་ལས་ འཕྲོ་མཐུད་དེ་ར་ གྲོས་བསྡུན་འབད་ནི་ཞེས། དེ་ཡང་ མངའ་ཤོས་ར་ བཟོ་བསྐྱན་དང་ ལུ་འབད་བའི་དུས་ཚོད་ལུ་འབད་ནི་ཞེན། དམིགས་བསལ་སྟེ་ཚན་གྲོས་

བསྟན་དང་ ཞོ་མོའི་དབྱེ་བ་དང་ཉེན་ཅན་མི་ངོམ་ཚུ་མཉམ་ དྲི་ལན་འབད་མི་འདི་གིས་ གོ་སྐབས་བཟོ་དགོ་པའི་ ཐབས་དང་ ཉེན་ཁ་མར་ཕབ་ ཡང་ན་ ཕྱོགས་རིས་འབད་ནི་ དེ་ལས་ ཞོ་མོའི་རྩྭ་སྤྱོད་དང་དབང་ཆོ་ངའོད་ སྤྱོད་ཀྱི་རྩོད་གཞི/མ་དགའ་ཚུ་ མར་ཕབ་དང་གདོང་ལེན་འབད་དགོ་པའི་ གྲུབ་འབྲས་འཐོན་ཡོད་པ་ཨིན།

མི་སྡེ་འདི་ནང་ གཡུས་ཁའི་མི་ངོམ་མེདཔ་ཨིནམ་དང་ མི་སྡེ་ནང་ ཉེན་ཅན་གྱི་མི་ངོམ་ ༤ ཆུང་མ་གཅིག་ངོས་ འཛིན་འབད་ཡོདཔ་ཨིན། ཆོས་དང་ལམ་སྟོད་ཐད་ཁར་ལྷོདཔ་དེ་ ཚུ་དུང་དང་སྡུམ་འཁོར་གྱི་ཐག་ཉེས་ད་ དང་ ཤེད་གི་མཐའ་སྐོར་ཡོད་པའི་ རྩ་ཅན་གྱི་ས་གནས་འདི་ ཕུག་ལ་ཁ་ལྷ་ཁང་དང་ དགའ་ལྷན་ཞོ་བྱང་ཨིན་མས། འདི་གིས་བཟོ་བཀོད་/ས་ཁོངས་ གནོད་པ་མངམ་མི་འོང་ནི་ངོན་ལུ་ རྒྱལ་རབས་ཅན་གྱི་ཅ་དངོས་དང་ གནའ་ཤུལ་ཐོན་སྐྱེད་ དེ་ལས་ མི་གི་ཤུལ་ཚུ་མཐོང་ཚུགས་པའི་གོ་སྐབས་དང་སྦྱགས་ ཞི་ཞེས་ཞེམ་པི་ནང་ དུས་རྒྱུན་དུ་ ཐབས་ལམ་སྟོན་དགོ་པའི་སྐོར་ལས་ བཀོད་དེ་ཡོདཔ་ཨིན།

སྤྱིར་བཏང་ ཉེན་ཁ་ཚབ་ཆེན་ཡོད་པའི་ མི་སྡེ་དང་མཐའ་འཁོར་གནས་སྟངས་དང་ ཤན་གནོད་ཚུ་ ངོས་འཛིན་འབད་ཚར་ཡོདཔ་ལས་ ཉེན་ཁ་ཆུང་ཀུ་སྤེ་མཐོང་ཡོདཔ་ཨིན། དེ་ལས་ དུས་ཚོད་ཁར་དུས་མཐུན་སྤེ་ རིན་བསྟུན་མ་འབད་བའི་ཉེ་མ་ལས་འགོ་བཙུགས་ ལྟ་འབད་བའི་དུས་ཚོད་ཚུན་ ཐབས་ལམ་ཚུ་སྟོན་ཚུགས་ནི་ཨིན་མས། ཐབས་ལམ་འདི་ཚུ་ ཞི་ཞེས་ཞེམ་པི་ནང་ ལྟ་འབད་ནི་དང་བལྟ་རྟོགས་ལུ་གནས་ནི་ དེ་ལས་ དགོས་མཁོ་བའི་མ་དཔྱལ་ཚུའི་ འགན་ཁུར་ཚུ་དང་སྦྱགས་བགོད་དེ་ཡོདཔ།

དེ་མ་ཚད་ ཨེ་སི་ཡུར་ཨི་ཥབ་ལུ་ཨེ་ཞེས་ལས་འགུལ་འོག་ལུ་ ལས་སྡུ་ཅོག་འཐདཔ་ཡོདཔ་ལས་ འདི་གིས་ས་གནས་བརྟག་ཞིབ་དང་ ཚུ་ཀས་ཁོངས་འཛིན་སྐྱོང་དང་འཚར་གཞི་ཚུའི་ཐོག་ལས་ ཉེར་སྤྱ་ར་ ཚུ་ཀའི་ས་ཁོངས་མེདཔ་གཏན་མེད་དང་ ཚུ་ཀ་ལུ་ ཉེན་ཁ་མར་ཕབ་འབདཝ་ནི་ལུ་ཆ་རེའགས་འབདཝ་ནི་ཨིན་མས། ཚུ་ལག་ལེན་འཐབ་མི་ལུ་ཚུ་ཁྲལ་དང་ འཐུང་ཚུ་ལག་ལེན་ཆོགས་པ་བཟོ་མི་ དེ་ལས་ འགན་ཁུར་ཅན་གྱི་སྡེ་ཚན་དཔེར་ན་ ཐད་ཀར་གྱི་འཕྲུལ་རིག་པ་ མཐའ་འཁོར་གནས་སྟངས་ཆོགས་ཚུང་དང་ འཐུང་ཚུ་ལག་ལེན་ཆོགས་པའི་འཐུས་མི་ཚུ་ ལྷོགས་གྲུབ་ཡར་རྒྱས་ཁྱོན་ས་གནས་ཀྱི་ལྷོགས་གྲུབ་ཉེར་སྤྱ་ལྷ་ཡར་དྲགས་འགྱོ་བ་མ་ཚད་ འཐུང་ཚུ་བཀྲམ་སྤེལ་ལས་རིམ་འདི་ ཡུན་བརྟན་སྤེ་འཛིན་སྐྱོང་འཐབ་ནི་གི་ འགན་འཁྱི་སྤྲོད་ཨིན།

ཞུ་ཞེན་ངེ་པི་གི་ ཞེས་ཞི་ཞེས་ཀྱི་དགོས་མཁོ་ བཟོ་བསྒྲུན་གྱི་ལས་སྣ་ཚུ་ལུ་ འགན་འཁྲི་ཐབས་རིག་འགན་ལེན་གྱི་དོན་ལུ་ ཡུ་ཞེན་ངེ་པི་གི་ བྱ་སྤྱབས་མ་བདེ་ཁ་ཚུ་སེལ་ནི་དོན་ལུ་ཐབས་ལམ་དང་ འབྲེལ་བའི་མི་ངོམ་ འབྲེལ་གཏོགས་འཚར་གཞི་གི་ ལམ་སྟོན་དང་འཁྲིལ་ འབྲེལ་བའི་མི་ངའི་བསམ་ལན་ཐབས་ལམ(ཞེས་ཛྷུང་ ཞེམ)འདི་ བྱ་སྤྱབས་མ་བདེ་ཁ་ཚུ་སེལ་ནི་དོན་ལུ་ཐབས་ལམ་བཟོ་ཐོག་ལས་ (ཇི་ཛྷུང་ཞེམ།) དེས་ བརྟན་བཟོ་ནི་ཞིན། ཇི་ཛྷུང་ཞེམ་འདི་ མི་དམངས་གྲོས་བསྡུན་སྐབས་སུ་ བསྡུན་གྲོས་འབད་ཡོད་པ་དང་ རྫོང་ཁག་གི་ཡང་དོས་ལེན་འབད་ཡོད་པ་ཞིན། དེ་མ་ཚད་ ངོས་འཛིན་འབད་ཡོད་པའི་ ཇི་ཛྷུང་ཞེམ་འཐུས་མི་ཚུའི་ དོན་ལུ་ ཇི་ཛྷུང་ཞེམ་གྱི་བྱ་རིམ་ཐོག་ལུ་ ཉིན་མེ་ཀ་སྒྲིང་བརྡར་འབད་ཡོད་པ་ཞིན། ཁག་འབག་པ་འདི་གིས་ ཇི་ཛྷུང་ཞེམ་གྱི་ལས་མི་བཙུགས་དགོཔ་མ་ཚད་ དུས་ཚོད་ཁང་ མི་སྡེའི་མ་དག་འཕ་ཚུ་སེལ་ནི་དོན་ལུ་ ལས་འགྱལ་ཇི་ཛྷུང་ཞེམ་བྱ་རིམ་འདི་ཡང་ གནས་དགོཔ་ཞིན

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 three 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 Component 3, 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. The project targets interventions in four watersheds within three Dzongkhags (Gasa, Punakha and Tsirang) of the Punatsangchhu basin. These sites were selected based on a comprehensive assessment of socioeconomic and climate hazards as well as vulnerability analysis of water resources.

The Gasa water supply scheme falls under Output 3.1: "Climate proofing measures implemented in multi-purpose storage, conveyance, and distribution network of domestic and irrigation water". Under

this output, Activity 3.1.1. aims to establish a reliable and portable water supply system for Gasa town. This includes the installation of climate-smart infrastructure, storage and distribution of water for domestic use in both the old and new Gasa towns including the peripheral areas under Gasa Dzongkhag Throm.

This intervention, once successfully completed, will result in significant socio-economic benefits to the communities Gasa town and Khatoed gewog 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, the UNDP Social and Environment Screening Procedure identified 8 moderate and 3 low-risk risks for the project, resulting in an overall categorization of Moderate Risk to the project. The proposed ESIA approach was outlined in the Inception Report, which was submitted prior to commencement of the assignment. It follows the Project Environmental and Social Management Framework (ESMF) and adheres to the requirements of the UNDP SES and RGOB's Environment Assessment Process. The field surveys, consultations and report preparation were conducted from May 6th to June 10th, 2024. The following sections describe the methodology for the ESIA.

1.3.1. Desktop Research and Literature

All relevant national laws, rules, regulations, guidelines, standards and project documents were reviewed to understand regulatory requirements and to formulate compliance requirements and to identify gaps between national legislation and UNDP policies.

The team identified information gaps in secondary literature before the field visit and prepared questionnaires, interviews and public consultation topics. Pertinent information was then synthesized in the report.

1.3.2. Analysis of Alternatives

In consultation with the design team and based on the site observations, alternatives were assessed considering social, environmental, and economic aspects. This also included the no project/with project scenario.

1.3.3. Site Assessment and Rapid Biodiversity Surveys

Forming two teams, baseline studies were conducted to collect information on physical parameters- air, noise, water quality and soil characteristics and biodiversity from 17th to 22nd May 2024. The site visits were supported by the Dzongkhag and PIU Officials.

Vegetation sampling was carried out through the proposed drinking water line which is 2300 meters maintaining the uniform interval distance of 200 meters between the sample plots. Fixed area plots (20x20m) were established every 200+m with a total of 20 sample plots, which were surveyed following the sampling method of Wanda and Ohsawa (2006a, 2006b). Trees and shrubs above 1.3-meter height were measured and recorded. For ground vegetation quadrats (2x2m) were laid inside 20x20m plots and all ground cover including regeneration and invasive species and epiphytes was recorded. Within each 20x20m plot, mammals were recorded through direct observation, tracks, rooting, scat and nesting sites and sounds. Birds in the area were identified by direct observation, sound/calls, tracks, eggs and nests.

The findings of the baseline studies have been incorporated into the baseline chapter.

1.3.4. Stakeholder Engagement and Consultation

A stakeholder engagement plan was prepared by mapping the stakeholders (as per their interest and influence) based on the Project document, project site location, responsible parties and community. During ESIA planning both PMU and PIU were consulted, followed by stakeholder consultations with relevant Dzongkhag, Local Government, and communities from 22- 24th May 2024.

1.3.5. Gender Action Plan

The Gender analysis and planning aimed to ensure that the GAP developed for the project is mainstreamed across project implementation and in the ESMPs. This involved reviewing the Gender Analysis and Gender Action Plan Report, preparing a brief gender analysis and ensuring that the ESIA and ESMP addresses gender issues related to the water supply scheme from gender inclusion, capacity building to resolving gender related grievances at all stages of the project implementation.

1.3.6. Determining the Project Area 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 – This includes the areas in and around the project footprint from the intake structures at the water source, the water pipelines, water treatment plant and its facilities, storage reservoirs, excavation and disposal areas, worker camps and access road. This area extends almost 3 km north towards the intake and up to 500m around both the new and town Gasa towns.
- The Indirect area of influence includes areas and communities that are adjacent to the immediate area of impact. For terrestrial fauna with limited distribution, the area of influence may extend up to 2 km depending on the population dynamics and continuity of habitats. For larger mammals and birds this includes the Singtalum watershed. For aquatic species, the area of indirect influence may extend downstream and upstream in the watershed.
- The cumulative area of impact will include the entire catchment area and Khatoed Gewog where the project site is located as these areas and communities could be 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.

1.3.7. Impact Assessment and Preparation of the ESIA and ESMP

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 may be revised subject to changes in the project design or component locations.

1.3.8. Report Structure

The report is structured in accordance with the inception report submitted following the suggested outline per the targeted hybrid ESIA and ESMP format approved during the Inception phase.

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 fulfill requirements under the updated 2021 UNDP SES Policy.

Table 1. Relevant National Legislation

Sector	Legislation	Description/Requirements	Applicability to Project
Overarching	Constitution of Bhutan 2008	Article 5 of the Constitution of Bhutan is focused on environmental conservation. It outlines the responsibilities of citizens, the government and the parliament to conserve the country's biodiversity Article 1(12) states that all-natural resources, including rivers, lakes, forests, and minerals, belong to the state and their use is regulated by law.	The project will be governed by the relevant provisions of the Constitution and places the responsibility of all stakeholders to ensure minimal environmental and social impacts and abide by relevant legislation.
Environment	-Environmental Assessment Act, 2000 -National Environment Protection Act, 2007 -Regulation for The Environmental Clearance of Projects (RECOP), 2016 -Guide for Environmental Clearance Application Procedure, 2022 -Bhutan Environmental Standards, 2020	As the umbrella Act, the NEPA established the role of the National Environment Commission (NEC)[1] or its successors to protect the environment in line with the Government's Middle Path Strategy. It also established the role of the Competent Authorities for issuance of environmental clearances. It also enables the creation of an Environmental Tribunal for environmental disputes. The Act also promotes precautionary principles, polluter pay and a participatory approach during project formulation and implementation. Projects are required to comply with national environmental standards for air, noise, emission and effluent discharge. The issuance of EC is contingent on the effect of abstraction on existing users and existence of customary water use practices.	The Drinking Water scheme will extract more than 10,000lps/day and therefore as per the Guide to Environmental Clearance Application Procedure 2022, will be required to submit an Initial Examination Report for review and issuance of Environmental Clearance from the Dzongkhag Environment Committee. The assessment process must include considerations on existing/current water abstraction and downstream users. The project must ensure that mitigation measures are in place to reduce air, water and noise pollution.
Water	● The Bhutan Water Policy 2003	The Bhutan Water Policy 2003 emphasizes the conservation of all	The project must maintain 30% water flow for downstream

[1] The NEC is now the Department of Environment and Climate Change

Sector	Legislation	Description/Requirements	Applicability to Project
	● Water Act of Bhutan, 2011 ● Water Regulation of Bhutan, 2014 ● Water Policy, 2007 ● Bhutan Drinking Water Quality Standard, 2016	water resources through integrated management, including extensive soil conservation, watershed area treatment, forest conservation, and increased forest area. The Water Act of Bhutan 2011 mandates that as state property, water resources must be protected, conserved and managed economically efficiently, equitably, and in an environmentally sustainable manner. In terms of priority for water abstraction and use, the Water Act 2011 accords the highest priority for drinking and sanitation followed by agriculture, energy, industry, tourism, recreation and finally, other uses. Chapter 13 on financial provisions includes a section on Payment for Watershed Services so that the cost of conserving water in the upper watershed areas are shared by downstream users.	ecosystems and livelihoods, restrict effluent discharge, and maintain acceptable drinking water parameters according to the Bhutan Drinking Water Quality Standard, 2016. Other parallel activities of the ACREWAS Project will assess the possibility of implementing water tariffs for users to ensure proper utilization of water, maintenance and sustainability. .
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 provides the basis for land tenure in Bhutan. The Act allows the government to acquire land of significant national importance, granting affected individuals, families, or communities full compensation in the form of substitution or cash, based on the ● Notification on Revision of PAVA Compensation Rates 2022 ● Land Compensation Rates 2022 ● Chiwog-wise Land Compensation Rates 2022	The project components are on government land. Where the water pipeline is aligned along private land the project will seek consent from the landowners.
Climate Change	● Climate Change Policy of the Kingdom of Bhutan, 2020 Regulation on Substances that Deplete the Ozone Layer and Hydrofluorocarbons, 2021	The Climate change Policy promotes carbon neutral development, building resilience and adapting to climate change through and integration into relevant policies, plans and effective and coordinated action.	The project aims to improve Bhutan's people's resilience and sustainable economic well-being by supporting climate adaptation interventions in the water sector, including catchment restoration, climate-proofing of infrastructure, and strengthening local government capacities.
Forest	Forest and Nature Conservation Act, 2023	The Act mandates a forestry permit for any activity within State Reserved Forest Land (SRFL) from the	As the project site is located on State Reserve Forest land, the required Forestry Clearance will be

Sector	Legislation	Description/Requirements	Applicability to Project
	Forest and Nature Conservation (Amendment) Rules and Regulations, 2020	Department of Forest and Park Services (DOFPS). The Act delineates the level of authority between various offices for forest clearance from the Range Division to the Department. The recent amendment provides for forest clearances to be valid for a period of project or activity. The Act prohibits the killing, capture, collection, cultivation or trade in any wild flora and fauna, unless with a permit which is mostly issued only for scientific purposes. The Act 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	sought from the Jigme Dorji National Park Office, where the project is located. Provisions will be included in the ESMP to minimize damage to the forest and to ensure no illegal activities such as poaching, collection of floral species or fishing is carried out. .
Biodiversity	The Biodiversity Act of Bhutan, 2022 The Biodiversity Rules and Regulations, 2023	The Act recognizes and protects traditional knowledge, innovation and practices of local communities associated with biodiversity. It aims to ensure the conservation and sustainable use of biodiversity and promote the equitable sharing of benefits derived from the use of genetic resources.	The Project will not undertake activities that will require the use of biodiversity, although the types of biodiversity in the project area will be documented during the ESIA.
Governance	The Local Government Act of Bhutan, 2009	The Act delineates the roles and responsibilities of local government vis-à-vis the central government. .	Each Dzongkhag has an Environmental Officer who is responsible for ensuring that 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.
Accountability	Civil Liability Act, 2023	The Civil Liability Act ensures accountability across all stakeholders	The project has ensured that the roles and responsibilities of all stakeholders have been articulated during project design and project commencement. The Grievance Redress Mechanism will provide an avenue for transparent and timely resolution of all grievances.
Waste	● Waste Prevention and Management Act of Bhutan, 2009	The Act regulates waste collection, storage, transportation, disposal, import, and export in Bhutan. It promotes waste segregation, reuse, recycling, and environmentally sound disposal.	During the project, the Contractor must be responsible for all domestic and construction waste. He must follow Dzongkhag waste disposal norms and seek the necessary

Sector	Legislation	Description/Requirements	Applicability to Project
	● Waste Prevention and Management Regulation, 2012 (Amended 2016) ● National Waste Management strategy, 2019		approval for disposal of construction waste.
Labor and Employment	● Labor 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 Labor and Employment Act of Bhutan 2007 prohibits forced labor, child labor, discrimination, sexual harassment, and wrongful dismissal. It also addresses employee compensation and benefits, Occupational Health, and Safety (OHS), and outlines employer requirements and employee rights and responsibilities. The Regulation pertains to employment of foreign workers and provision of OHS for specific activities.	The project's contractors, employees and workers will be subject to the terms and conditions of this Act, ensuring their wellbeing and security, proper working conditions, emergency management and addressing worker grievances. These provisions will be included in the ESMP and the contractors' bid documents.
	● National Policy for Women, 2009 ● National Gender Equality Policy (NGEP), 2020 ● The Domestic Violence Prevention Act of Bhutan, 2013 ● Penal Code of Bhutan, 2004 Civil and Criminal Procedure Code of Bhutan, 2001	The National Gender Equality Policy ensures equal opportunities for all genders, promoting their full potential and equitable access to social, economic, and political developments The Domestic Violence Prevention Act aims to address domestic violence issues and ensure the protection of victims. The Penal Code includes provisions related to crimes and violence against women and girls while the Civil and Criminal Procedures contain provisions related to legal procedures for addressing Gender-based crimes. Additionally, the Labor and Employment Act prohibits sexual harassment and the Regulations on Working Conditions	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. The contractor will be required to ensure gender friendly worker accommodation, prohibits sexual harassment, discrimination and ensure gender equality in terms of equal pay for equal work. To ensure that gender issues are addressed, focus group discussions will be part of stakeholder consultations and relevant recommendations will be included into the ESMP

Sector	Legislation	Description/Requirements	Applicability to Project
		safeguard labor rights, gender equality, and safe workplace conditions.	
Vulnerable Groups	● The National Youth Policy, 2011 The National Policy for Persons with Disabilities of Bhutan, 2019	The National Youth Policy aims to offer youth comprehensive education and training, employment and information while the National Policy for Persons with Disabilities in Bhutan aims to ensure equal rights and opportunities for the marginalized and improve their lives. ,	The project will actively involve disabled individuals in project preparation, discussions, and decision-making events throughout its implementation.
Disaster	Disaster Management Act of Bhutan, 2013 Dzongkhag Disaster Management Planning Guidelines 2014	The act aims to enhance institutional capacity for disaster management, mainstream disaster risk reduction, and promote integrated, coordinated disaster management with community participation. It requires each Dzongkhag to prepare Dzongkhag Disaster Management Plans as per the Guidelines, including hazard mapping and planning and implementation of disaster interventions, and mitigation measures accordingly. The Act also requires agencies to mainstream disaster risk reduction into their development plans, policies, programs and projects and ensure that contingency plans and disaster management activities are implemented.	Within the Dzongkhag, a Dzongkhag Disaster Management Committee is headed by the Dzongdag (District Head), who is responsible for coordinating and managing all disaster management operations under the direction and supervision of the National Disaster Management Authority. The water scheme's design and material choices are means to mitigate risks from natural hazards and disasters.
Heritage	Cultural Heritage Bill of Bhutan 2016 Environment Act 2000	This pertains to the conservation and protection of movable cultural property owned by government, community, or private individuals. For the management and protection of Heritage Sites, The Department of Culture is responsible for preparing a management plan in consultation with the Dzongkhag Administration. Similarly, buffer zones for Designated Heritage sites are determined. Building or an Important Cultural Site The bill requires the discovery of any cultural property from below ground to be reported to the Department of Culture through the Dzongkhag. For the use of Intangible Heritage, Prior Informed Consent is required along with acknowledgement for the use of Intangible Heritage. The EA Act requires the proponent to notify if there are any heritage sites	During the planning phase, the presence of significant National, District and Community Religious and Heritage sites as well as intangible heritage will be documented.

Sector	Legislation	Description/Requirements	Applicability to Project
		present within a 50 meters buffer of the project area.	

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 2. 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, and sensitive ecosystems.

Table 3. 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 4. National drinking water quality standards

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 5. 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 6. 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

2.3. 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. 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].

Local Government. There are 20 Dzongkhags[4] governed by a Dzongdag[5]/Governor supported by the Dzongrab (deputy Governor) with various offices covering all sectors (education, agriculture, livestock, health, 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. Each Dzongkhag comprises of Gewogs[8], that are further divided into 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] Sound pressure level (SPL)

[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;

[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

2.4. Process of Obtaining Environmental Clearance

Based on the mandate provided by the National Environmental Protection Act, 2007 (NEPA) Competent Authorities designated by the Department of Environment and Climate Change are authorized to screen, review and issue or deny environmental clearance. The issuance of environmental clearance is dependent on (i) project type/activity and (ii) project location.

All project proponents are required to check their projects against the list of activities into 'Green' 'Blue' or Red Categories. Activities listed under the 'Green' Category do not require environmental clearances, while 'Blue' Category activities require an Initial Environmental Examination (IEE) report, and 'Red' Category activities require Environmental Impact Assessments. The Drinking Water Supply Project for Gasa falls under the 'Blue' Category, and accordingly an IEE has been prepared and Environmental Clearance accorded by the Gasa Dzongkhag Environment Committee.

2.5. UNDP Principles and Standards

UNDP is committed to promoting the following principles (collectively, the SES Programming Principles) a) that no one is left behind, b) human rights, c) gender equality and women's empowerment, d) sustainability and resilience, and e) accountability of UNDP Project-Level Standards. Based on the Social and Environmental Screening Procedure (SESP), 8 Project-level standards are applicable to the project requiring social and environmental assessment. The summary of UNDP's Social and Environmental Safeguards are drawn from the SESP.

Table 7. Application of UNDP Principles and Standards

Principles and Standards	Rating	Applicability
Principle 1: Leave no one behind	Moderate	The project preparation phase ensured that all residents of Gasa Township benefit from the project.
Principle 2: Human rights	Moderate	During the project preparatory phase, vulnerable populations and socio-cultural groups were identified and adequately consulted to seek their views regarding the project.
Principle 3: Gender equality and women's empowerment	Moderate	The GAP reinforces the Project's efforts in enhancing women's empowerment and Gender equity by mainstreaming concerns through the project activities. During the preparation of the ESIA focus group discussions with women focusing on existing constraints and possible interventions and opportunities for gender inclusion. The project will also ensure that gendered indicators and transformative results are monitored, and sex-disaggregated data maintained.
Principle 4: Sustainability & Resilience	Moderate	The project infrastructure must be both climate resilient as well as sustainable in terms of water availability and ecosystem resilience.
Principle 5: Accountability	Moderate	The project will support the strengthening district level water management committees and creation of water user groups 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 site is located within a national park, with species that are listed in Schedule II and II of the Forest and Nature Conservation Act. 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.

Principles and Standards	Rating	Applicability
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, as the project site is prone to extreme cold in winter and project infrastructure are at risk of being damaged by rain induced landslides or earthquakes. Impact of climate change and disaster risks to the project infrastructures will be managed and mitigated by incorporating climate-resilient design features, choice of materials and burial of pressurized pipes to prevent external damage and ensure durability.
Standard 3: Community Health, Safety and Security	Moderate	This standard is applicable as the project activities require an influx of workers from outside the District, mingling with the local population and increasing community exposure to communicable diseases. Also, as construction activities are in settlement areas, there is always the risk of accidents and damage to public and private property, or conflict between workers and the community for various reasons.
Standard 4: Cultural Heritage	Low	This standard is applicable as the project components, especially the access road and the distribution lines will pass close to religious sites requiring cultural consent. Construction activities may cause disturbance during religious occasions. Excavation works associated with the project might lead to 'chance find', requiring these procedures to be duly followed.
Standard 5: Displacement and Resettlement	Moderate	The project has been designed to avoid private land, so there will be no changes to land tenure or economic displacement or resettlement due to the project. However, land belonging to government and non-government agencies will be impacted temporarily during trench excavation for which agency consent has been secured.
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 programs.
Standard 7: Labor and Working Conditions	Moderate	Applicable, as workers may also experience occupational health and safety issues at work if contractors do not provide appropriate living accommodation facilities with safe drinking water or necessary safety equipment and gear. There is also the risk of underage employment, discrimination, payment issues and risks associated with the infrastructure activities, workplace concerns or worker conflicts with no mechanism for resolving internal grievances or ensuring appropriate behavior.
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 Standards and National legislation

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

Table 8. Gap assessment between UNDP Principles and Standards and National Legislation

Principle/ Standard	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 aims to establish a civil society free from oppression, discrimination, and violence, based on the rule of law, human rights, dignity, and fundamental freedoms	UNDP's Overall Principle 1 on Leave No One Behind aims to address five factors of discrimination, geography, vulnerability to shocks, governance and socio-economic status that must be addressed by the project. 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 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 so all people irrespective of status or vulnerability benefit equitably from development. UNDP Principle 2 ensures that the projects undertaken by them recognize 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 marginalized individuals and groups to realize their rights and ensure their participation throughout UNDP's programming cycle 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 aims to establish a civil society free from oppression, discrimination and violence, based on the rule of law, human rights and dignity, and fundamental rights and freedom.	UNDP's Principle 3 promotes gender equality and women's empowerment through projects, addressing structural changes, removing barriers, and ensuring meaningful participation of women in decision-making and grievance resolution. This is more specific as compared to the Constitution and National Gender Policy and thus will be applied throughout the Project life cycle.
Principle 4	Sustainability and Resilience	Sustainable management, protection, conservation, maintenance and	Constitution of the Kingdom of Bhutan 2008 Regulation for Environmental	The National Environment strategy enshrines the concept of sustainable development and the middle path.	UNDP Principle 4 focuses on strengthening societies' resilience to shocks, disasters, conflict, and emergency situations by sustainably managing

Principle/ Standard	UNDP SES	Requirement	National Law	Requirement	Comparative Analysis
		rehabilitation of natural habitats and their associated biodiversity and ecosystem functions are fundamental to UNDP's efforts to develop and implement sustainable development pathways.	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)	All environment related acts are focused more on sustainability and less on resilience of communities.	natural habitats and biodiversity. It aims to address poverty, inequality, and vulnerabilities while enhancing natural capital, addressing interconnections among issues related to environment, human rights, conflict, crises, and vulnerability and seeking appropriate measures to mitigate these risks.
Principle 5	Account ability	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 consultations are mandated by the Environment Assessment (EA) Act 2000 which in turn ensures transparency and accountability during project formulation and implementation.	UNDP Principle 5 ensures accountability and transparency by program and project stakeholders through enabling active community participation in decision-making, ensuring transparency on programming interventions through sharing of information, with mechanisms for communicating and addressing concerns/grievances, and ensuring effective monitoring and reporting on social and environmental risk management measures throughout the project life cycle. Hence, through the application of this Principle, accountability and transparency can be ensured throughout the Project life cycle.
Standard 1	Biodiver sity Conserv ation and Sustaina ble Natural Resourc	UNDP seeks to maintain and enhance the goods and services provided by biodiversity and ecosystems in order to secure livelihoods, food,	Forest and Nature Conservation Act (FNCA) 1995 EA Act, 2000	The national IEE process for the project is quite simplistic in terms of assessment requirements, which in turn results in generic mitigation measures being adopted to	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.

Principle/ Standard	UNDP SES	Requirement	National Law	Requirement	Comparative Analysis
	e Manage ment	water and health, enhance resilience, conserve threatened species and their habitats, and increase carbon storage and sequestration.		mitigate project risk and impacts.	Hence, Standard 1 of UNDP SES shall be complied with to ensure that the risks and impacts related to the project activities are identified and appropriate mitigation measures are developed.
Standard 2	Climate Change Mitigatio n 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	Climate change adaptation and mitigation are based on CC policy, priorities and international commitments while disaster planning is guided by the Department of Disaster. .	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	Commu nity 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 in general while the Local Government Act of Bhutan (2009) promotes decentralization and devolution of power and authority to the Local Governments that represent the interests of the local community.	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 labor. The contractor will adhere to the national regulation while setting up the sanitary facilities for workers in the

Principle/ Standard	UNDP SES	Requirement	National Law	Requirement	Comparative Analysis
					construction area. In addition, the proponent will also comply with UNDP Standard 3 requirements to ensure appropriate services for the laborers are provided to minimize 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 development activities. UNDP seeks to ensure equal participation, access and contribution of women and men in protecting and sharing the benefits of Cultural Heritage.	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 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.	Section 54 requires the discovery of valuable cultural properties discovered from below ground during the construction of 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	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.

Principle/ Standard	UNDP SES	Requirement	National Law	Requirement	Comparative Analysis
		acceptable requirements.			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 populations are to be adequately compensated if affected and stakeholder engagement and grievance mechanisms 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	Constitution of the Kingdom of Bhutan 2008	There is a gap in national legislation.	Standard 6 ensures that projects undertaken by UNDP avoid 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

Principle/ Standard	UNDP SES	Requirement	National Law	Requirement	Comparative Analysis
		improving their well-being.			consent (FPIC) where their rights, lands, territories, resources, and traditional livelihoods may be affected.
Standard 7	Labor and Working	Project activities seek to enhance employment	Labor & Employment Act 2007	Labor administration in the country is guided by the Labor and	The national regulation is restrictive in its scope and fails to adopt measures consistent with the international good practice and WBG's EHS guidelines. Standard 7 of UNDP shall be complied with by the contractor to ensure that the laborers are provided with a safe and healthy working environment, considering the risks inherent to the particular sector (including gender bias). Also, UNDP ensures the safety of communities by requiring that design and construction of structural elements are carried out by competent 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. Standard 7 of UNDP shall be complied with as it ensures the application of preventive and protective measures consistent with the international good practice and standards such as the World Bank Group's (WBG) Environmental, Health, and Safety (EHS) Guideline as well as compliance with the principles and standards embodied in the International Labor Organization's (ILO) fundamental conventions.

Principle/ Standard	UNDP SES	Requirement	National Law	Requirement	Comparative Analysis
	Conditions	promotion benefits, development outcomes and sustainability by ensuring sound worker-management relationships and cooperation in their design and implementation.	Regulation on Occupational Health, Safety and Welfare (OHSW) 2012	Employment Act of the Kingdom of Bhutan, 2007 and its regulations	
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.	National standards and the Waste Prevention and Management Act are restrictive as these do not cover resource efficiency or specify how to minimize pollution. Standard 8 shall be complied with as it ensures that pollution prevention and control technologies and practices, consistent with international good practice, are 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 9. 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	2015
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

#	International Agreements/Conventions	Accessed/ Ratified/became a party or member
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 area lies within Khatoed Gewog in Gasa Dzongkhag. While the Dzongkhag has four Gewogs, the project is located within Khatoed Gewog, which is the smallest Gewog in Gasa. The Dzongkhag administration and Gasa township lie within this Gewog.

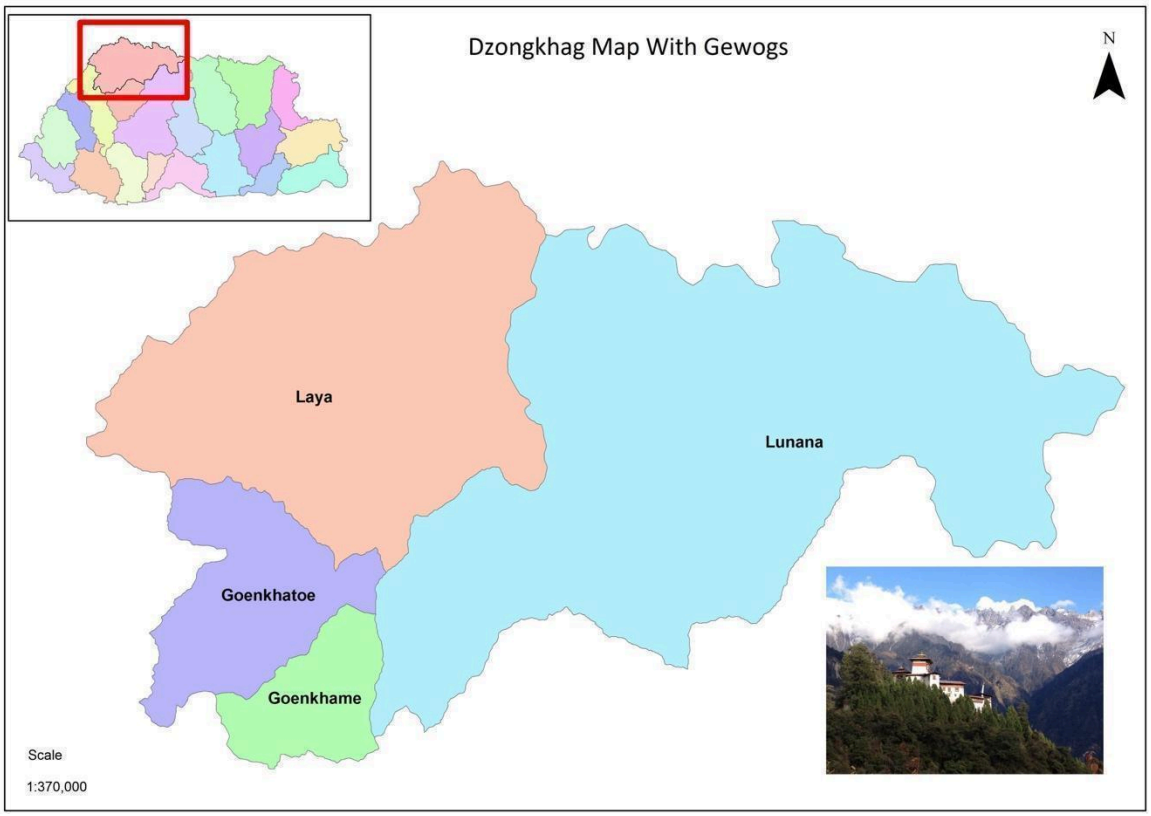


Figure 1. Map of Bhutan indicating project location

Source[11]

[11] Gasa Dzongkhag. www. Gasa.gov.bt

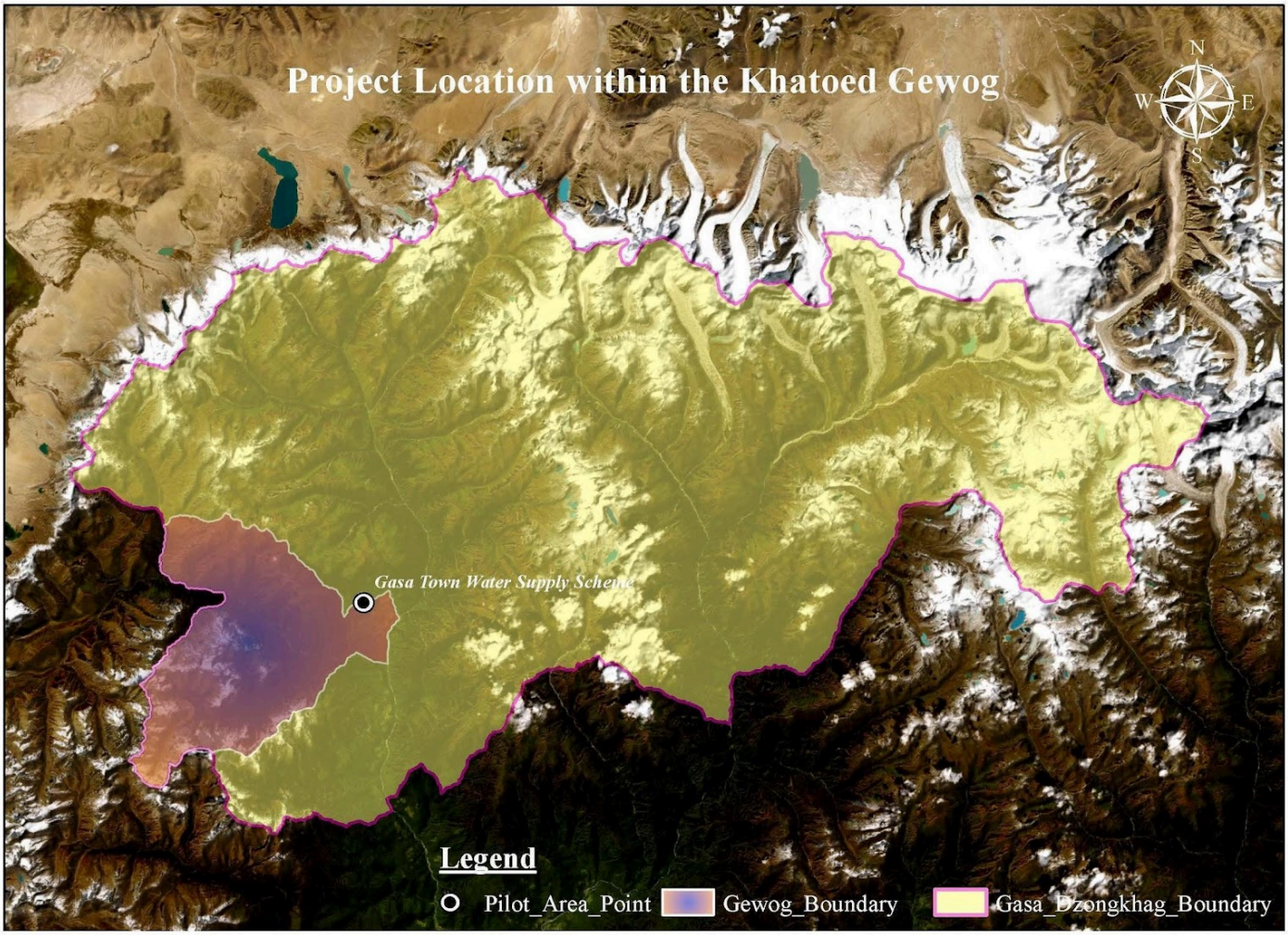


Figure 2. Project location within Khatoed Gewog

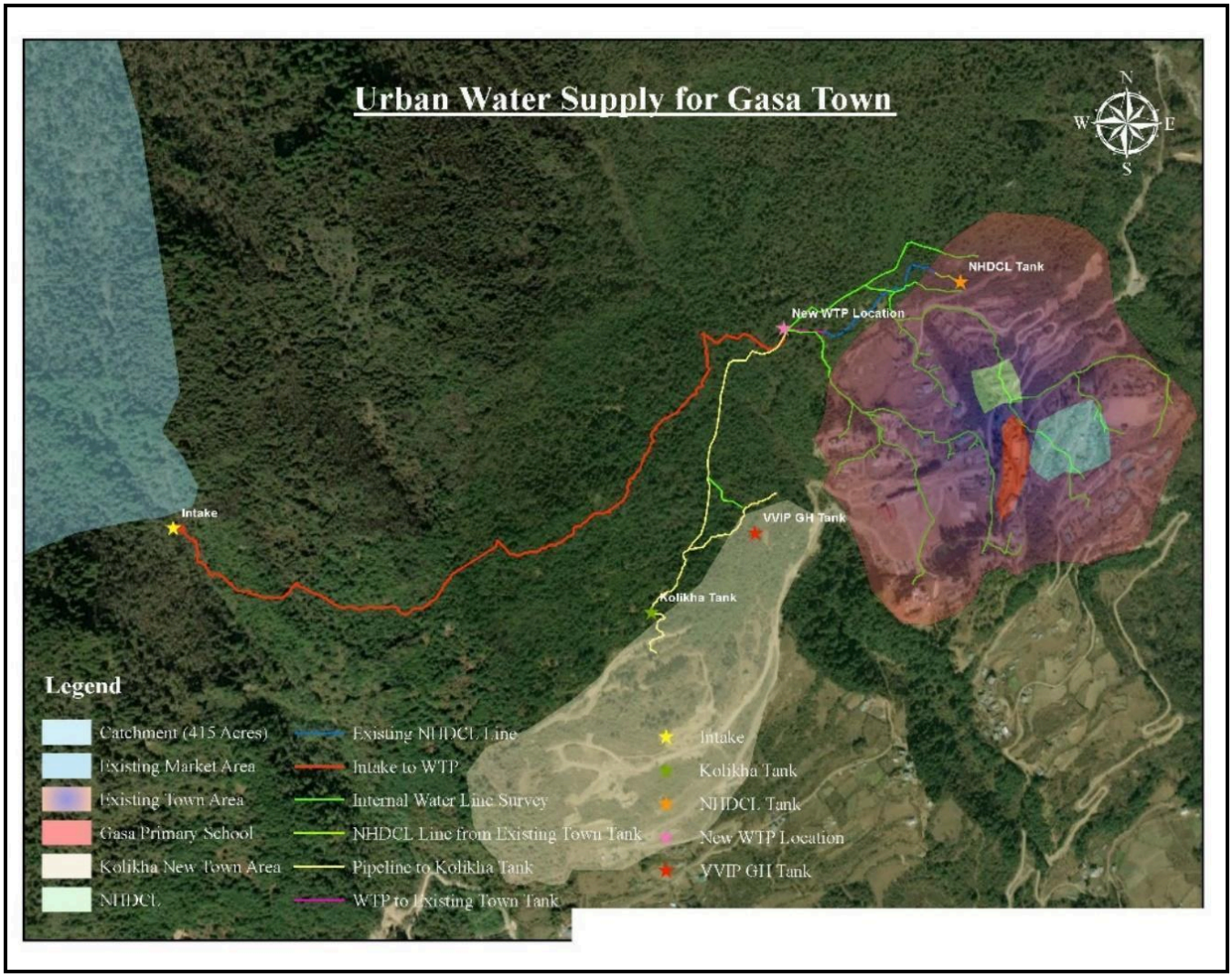


Figure 3. Project components with proposed and existing distribution lines

3.2. Description of Project Components

The project will establish a reliable and portable water supply system for both the old and new Gasa towns. This includes the installation of climate resilient water intake weir and intake structure at Shingtalum water source, laying of 2.3 km of transmission mainline to install 90/100 mm diameter HDPE/DI/PPR pipe, construction of a Water Treatment Plant, that includes staff quarters and laboratory, three water storage tanks, laying of distribution mainlines and distribution network and installation of water meters and construction of water meter chamber.

Table 10. Project components

Infrastructure	Size	Location	Sensitive E & S features
Construction of RCC Intake weir, intake structure, Gabion Wall and Barbed wire fencing with gate	Intake structure with protection works 5mtr Width, Sides in incline direction 5mtr on both the sides* Approximate depth 1.5mtr	Shingtalum water source	The site lies within the multiple use zone of the JDNP. The area is mostly cool broadleaf forest consisting mostly of *Rhododendron*

Construction of a RCC Sand trap/plain sedimentation tank with barbed wire fencing and gate	11*3.2*2.3 (mtr) Length/Width/Height	250m away from the intake location along the pipeline route near the existing NHDCL collection tank	*arboreum, Prunus nepalensis, Betula utilis*, and Juniperus species trees. There are no sensitive social receptors as the nearest settlement is more than 2.3km away.
Providing and laying of new raw water main transmission pipeline	Length – 2.3km. Diameter - 90/100mm diameter HDPE/PPR/ DI including necessary fittings such as air release valves and scour valves along with the construction of valve chambers. Trenching -0.5m width with a depth of 0.6m. Clearance width – 1m	From the source to WTP area	The main transmission line will pass through the multiple use zone of the JDNP and will traverse cool broadleaf forest and comprises of Juniperus indica, *Lyonia ovalifolia, Quercus semecarpifolia, Daphniphyllum himalayense, Daphniphyllum himalayens*e in addition to Rhododendrons and other shrub species. There are no settlements in the vicinity of the main transmission line.
Construction of Water Treatment Plant, WTP (Capacity 0.6MLD)	The WTP will comprise of (All dimensions in meter) Stilling chamber (1.8*1.8*1.5 depth) 2 bedded Slow sand filters (10.3x6.9x3.1 depth) 2 numbers of Weir Chambers (2.15x1.8 x 2.1 height) 2 numbers Clear water tank (150cum capacity each) Staff quarters (8.85*6.65) Lab/office (8.75*7.0) Gate valve chambers (0.9X0.9X0.9) Sand wash area 9.0X 3.5)	A few meters below Gaatsho lake, above Phulakha village and the existing rectangular water reservoirs	The site is located about Cool broadleaf forest dominated largely by Rhododendrons and shrubs. The site falls on the boundary of Gasa town about 100 m from the boundary of Phulakha village. There are no environmentally sensitive receptors, and the closest house is about 250m away.
Construction of service water tank	100 Cum capacity. Barbed Wire Fencing and Gate - (Area 20 m x 20 m)	Above Kolikha town area	Both sites are located in cool broadleaf forest about 50m from the Kholikha township and will therefore fall in the multiple use zone. The second tank will be located above the Royal Guest House. There are no sensitive receptors at the moment because the town development has not commenced and there are no settlements in the vicinity of the tank.
Construction of service water tank	10 cum capacity for Royal Guest House	Above Royal Guest house	
Construction of service water tank	12cum FCR for NHDCL (Approximate)	Existing NHDCL Tank site	The existing tank will be replaced by a new tank. The site is located near the NHDCL colony

Distribution Pipeline 1	Length – 4810meters, diameter - 100/90/75/63/50/40/32/25mm dia. Type of pipe – HDPE/PPR	From proposed distribution tank above the old town	within settlement areas so sensitive receptors during construction period are those offices, school, houses located close to the distribution line within settlement
Distribution Pipeline 2	Length – 790 mtr, Diameter - 63 dia, Type of pipe – HDPE/PPR	From existing reservoirs to Kolikha town	
Installation of water meter and construction of Water meter chambers	Installation of water meter and construction of water meter chambers 0.75*0.75*(depth varies)	Individual structure	.
Construction of access road to WTP site	3.5 width, 400m length	To WTP	The road will traverse cool broadleaf forest, mostly rhododendron and juniper species. There are no sensitive environmental or social receptors as the road alignment does not pass close to any houses or offices. No private land will be impacted but there is a Nye that lies about 50m from the alignment.

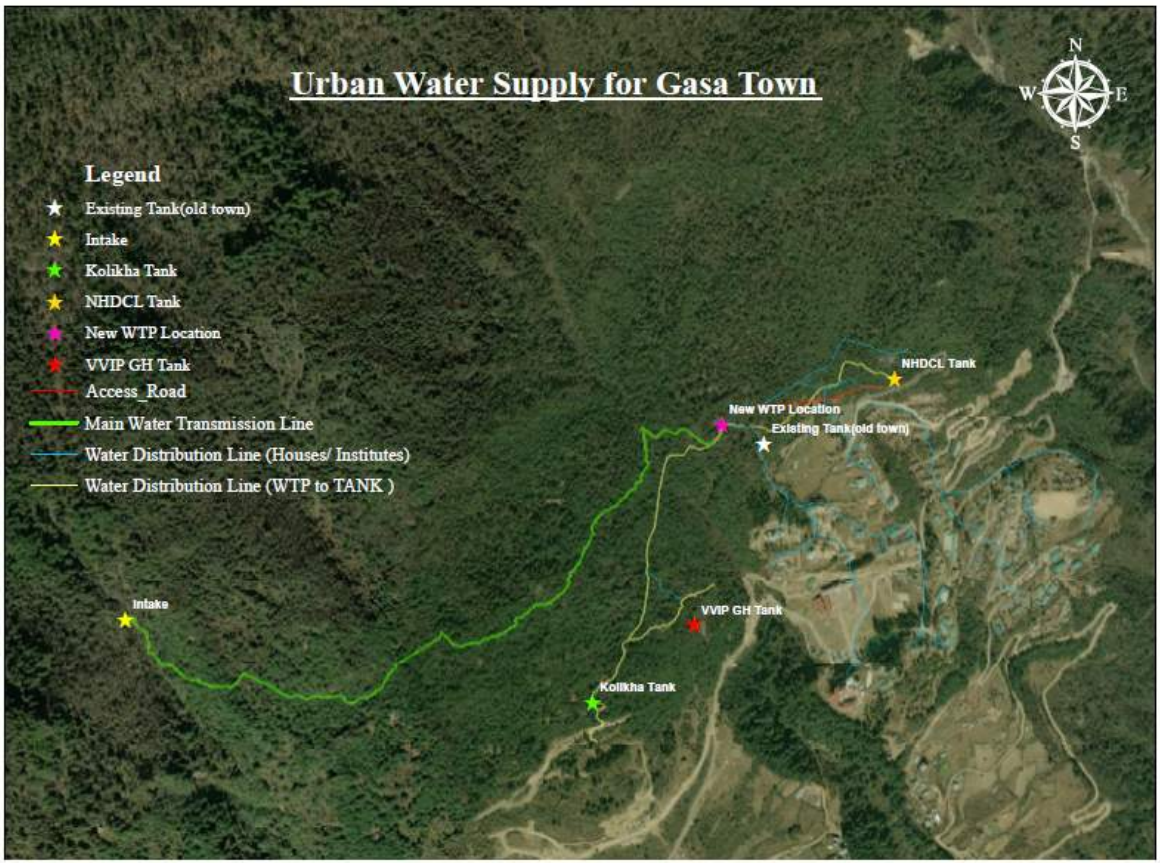


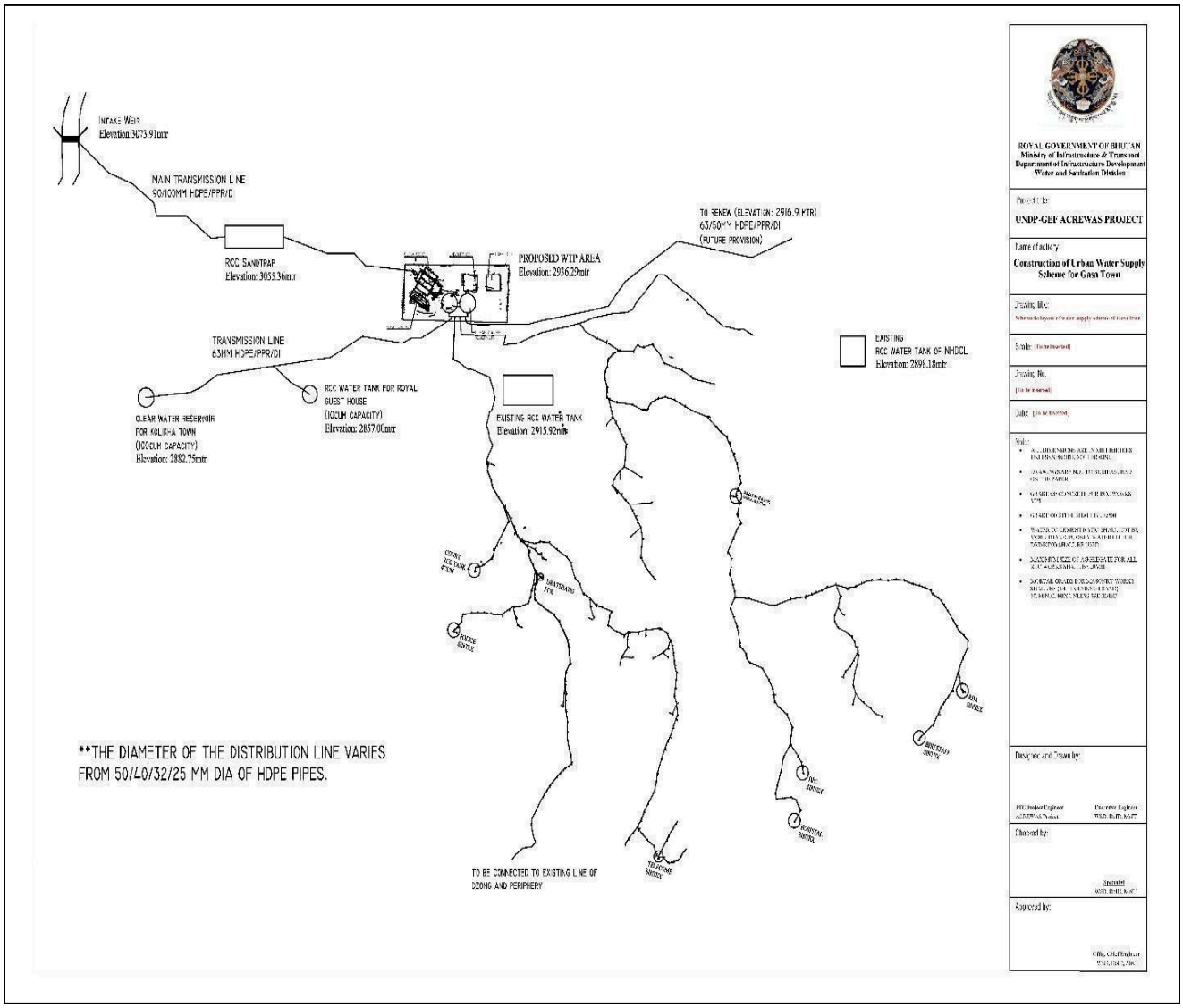
Figure 4. Aerial view of MTL, DTL and access road for the project

The distribution is planned in four zones as shown in the table below.

Table 11. Zonation of the water supply scheme

Zone 1 – Dzong Area	Zone 2 – Phulakha Area	Zone 3 – Old town Tank to be renovated/ or construct new if not suitable in size	Zone 4 – New town (Kolikha)
Dzong Court, Army/Police Dratshang Government residences	5 households Provision for Empty private plots Government residences	NDHCL housing Guest house, JNDP Office Nursery, Old town Hospital School	Workshop Agriculture farm 16 private plots

Figure 5. Project schematic layout



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. In areas where it is impossible to dig manually, especially in rocky stretches, blasting will be used.

Climate resilient components incorporated:

Intake weir, intake structure, Sand Trap/Plain Sedimentation Tank, Reservoirs & Pipeline:

- Reinforced cement concrete (RCC) water intake, Sand Trap, and RCC Service Reservoirs
- Gabion walls proposed downstream of intake structures across the stream
- RRM Retaining Walls are proposed to retain the Structures.
- HDPE/PPR/DI pipes and fitting.
- The trenching depth proposed 0.5m x 0.6m depth to avoid pipe breakage and to protect from freezing during winters.
- Suspended pipes to be supported with pipe support pillars.
- All bends and slopes will be protected by thrust blocks.

3.3. Water Discharge and Projected Demand

As per the data provided by PMU, the identified water source is currently being abstracted by the municipality through 2 pipes (15.095lps). Upon completion of the project, the municipal water pipeline (8.350lps) will be removed while the other water pipeline (6.745 lps) will be retained. With the design period of 30 years, 6.89lps will be abstracted through a new water pipeline. Thus, the total water that will be abstracted is 13.645 lps. Thus 54.55% of the discharge will be released as downstream flow.

Table 12. Water discharge rates, projected demand and resulting downstream flow

Supply/Demand	Volume (lps)
Source discharge flow (Without eflow consideration) Measurement conducted on May,2021 as per WMD Watershed Assessment Report	30.00
Water requirement (30 years design period)	6.89
Water discharge through NHDCL line	6.745
Total water abstraction (new + 1 old pipeline)	13.64
Balance downstream flow	16.365
% Downstream flow	54.55%

3.4. Project Beneficiaries

The project beneficiaries include residents of both the old and new town. Currently, with the two towns, there are only 182 households with a population of 744 residents. In 30 years, this is expected to increase to 520 households and a population of 2,762 for both towns.

Table 13. Current and projected households and populations

Sl.No	Location	Current Households	Current Population	Projected Households 30 years	Projected population 30 years
1	Old town	180	740	240	1,217
2	Proposed New town	2	4	280	1,545
	TOTAL	182	744 (779 in 2017*)	520	2,762

*Source: MoIT, 2024, * Source: Annual Dzongkhag Statistics, 2023.*

Once the new town is fully established, it is expected that most of the population will move from the old to the new town (425/587= 72%). The old pipeline to the town will be replaced while the pipeline to the NHDCL colony will be retained for the fire Hydrant. The Project will also benefit Gasa Primary School that has 120 students (67M, 53F) and 14 teachers and staff (7M, 7F), 110 monks at the Dratshang, and the Hospital. Although the school does not have boarding facilities, water is required to prepare food as students are provided with two meals per day. Water is also essential for sanitation purposes and to hold the annual prayers. The school also has an ECCD with 30 children. The Dratshang provides accommodation and food for 110 monks. As the only Hospital in the District, it has 15 staff and on average treats 555 patients per month. All three stakeholders- School, Dratshang and Hospital have requested for separate water tanks.

3.5. Project Cost and Schedule

The project cost is estimated at Nu. 75 million. The cost is inclusive of all investments including the intake structures, distribution line, water treatment facilities and installation of Supervisory Control and Data Acquisition (SCADA) within the WTP office. The construction package is expected to be advertised by August-September for a period of 24 months with an operation and maintenance (O&M) period of 2 years. The project will implement conservation activities under other project components. This includes participatory water resource assessment and preparation of River Basin Management Plan for Punatsangchhu river basin, Dzongkhag Water Masterplan, Local Forest Management Plan for Shingtalum watershed, and Community-based watershed and forest management plans for two community forests (Rangzhin Kuenphen CF, and Tashi Thogmen CF, Shingtalum) in Gasa. To improve resilience, sustainability, and quality of water service delivery, the project will strengthen water governance especially at the Dzongkhag and community level for climate-smart water and watershed management. Additionally, the project is also currently assessing the possibility of introducing a water tariff system in Gasa. The Dzongkhag Environment Committee will be strengthened to bear the role of water management committee at Dzongkhag level and a Water User Association will be created for water management at the local level.

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. Project's benefits will start from the third year.

4. BASELINE INFORMATION

4.1. Physical Environment

4.1.1. Location

Among the 20 Dzongkhags (districts) in Bhutan, Gasa's location has been of historical significance as the point of entry of Zhabdrung Ngawang Namgyel's arrival into Bhutan via Tibet in 1616. Located in the northwestern parts of the country amongst some of the highest mountain peaks, Gasa Dzongkhag spans over an area of 3,081.77 sq. km. at an altitude ranging from 1,500 masl. to 4,500 masl[12]. The district borders Thimphu, Punakha and Wangduephodrang to the south and China (Autonomous Region of Tibet) to the North. Previously, Gasa was a Dungkhag (sub district) under Punakha Dzongkhag and gained its District status after a separation in 1992[13]. Gasa Dzongkhag is a six-hour drive from the capital city of Thimphu via Punakha Dzongkhag. There are four Gewogs (Blocks) in Gasa – Laya, Lunana, Khatoed and Khamaed. These are further divided into 20 Chiwogs and 909 Households[14]. The entire district falls within the Jigme Dorji National Park (JDNP) and the district's Thromde (second-level administrative division) is in Khatoed Gewog which is where the project is located.

Khatoed Gewog. Khatoed Gewog spans an area of 326 sq. km with 80% under forest cover[15]. Khatoed Gewog is further divided into 5 Chiwogs (sub blocks) – Chhogley_Phulakha, Mani, Baychu_Tshedpgang, Tsheringkha, and Remi[16]. The project area falls within both the old and new (Kolikha) Gasa towns including the peripheral areas under Gasa Dzongkhag. The new town will be located in Kolikha over an area of 212.5 acres[17].

[12] RGoB, Dzongkhag Website, Gasa http://www.gasa.gov.bt/index.php/gasa-dzongkhag
[13] MoWHS, Development Plan-Gasa Thromde (2015-2030)
[14] NSB, Dzongkhag At a Glance (2023), Gasa
[15] RGoB, Dzongkhag Website, Gasa, Khatoed http://www.gasa.gov.bt/gewogs/khatoed
[16] ECB (2011) http://www.election-bhutan.org.bt/2011/finaldelimitation/gasa.pdf
[17] MoWHS, Development Plan-Gasa Thromde (2015-2030)

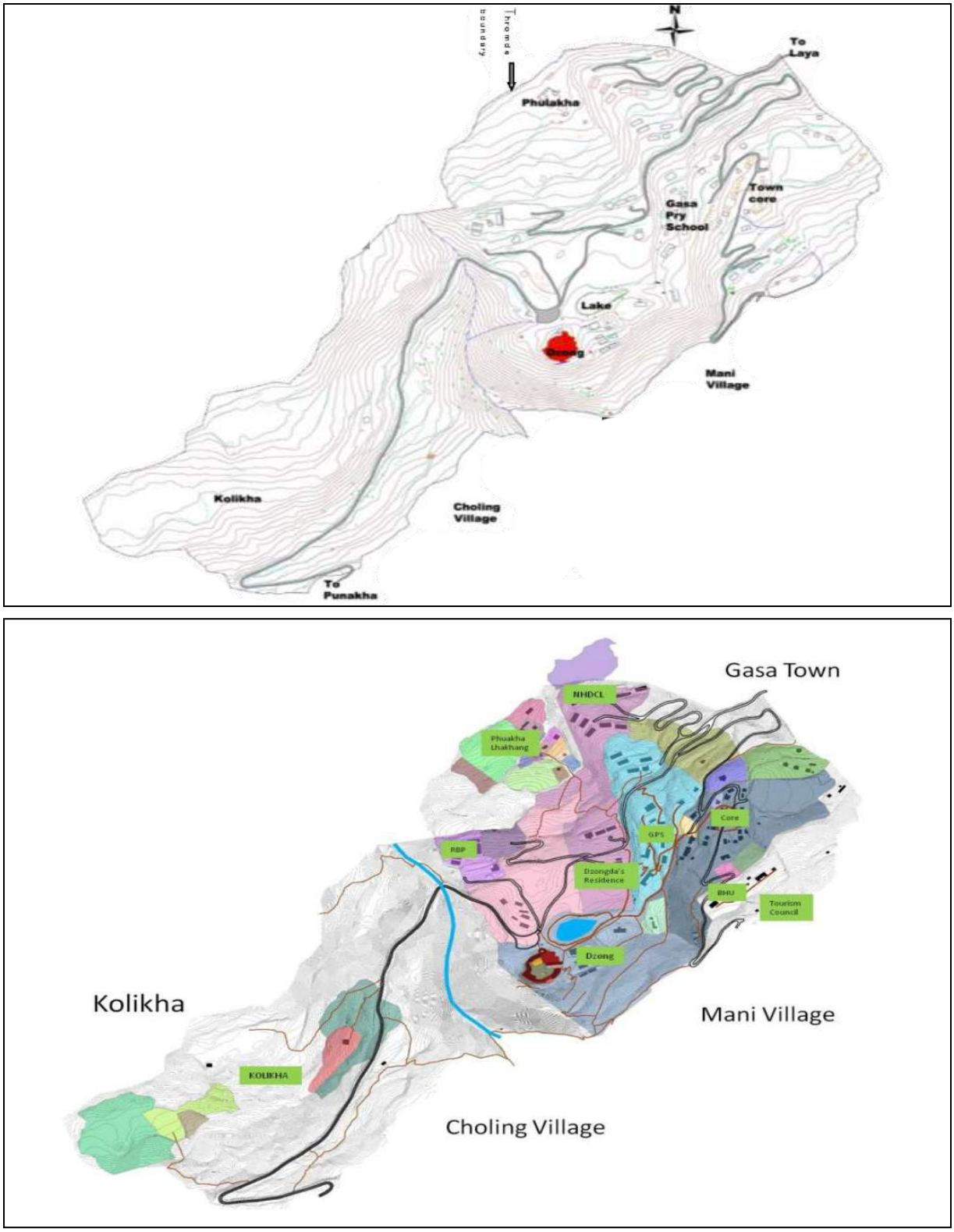


Figure 6. Map showing Gasa township[18]

[18] MoWHS (2016), Development Plan-Gasa Thromde (2015-2030)

4.1.2. Topography, Geology and Soils

Shaped by the geological uplift, lithological formations and rivers, the topography of Bhutan is dominated by several uneven and rugged crested mountain peaks in the northern region. The central region of the country is made up of deep and gentle valleys along rivers while the southern foothills are comprised of alluvial plains along the borders of India[19]. 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 include 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[20].

A number of high peaks like "Gangchey Ta", "Masang Gang", "Kulagangri'' lie along the northern borders of Gasa Dzongkhag. The project area lies at about an altitude of 2,700 masl. that in turn influences the climate condition ranging from temperate to alpine with extended cold winters and short, pleasant summers while the northern parts experience heavy snowfall[21]. Khatoed Gewog is located in the southern parts of Gasa.

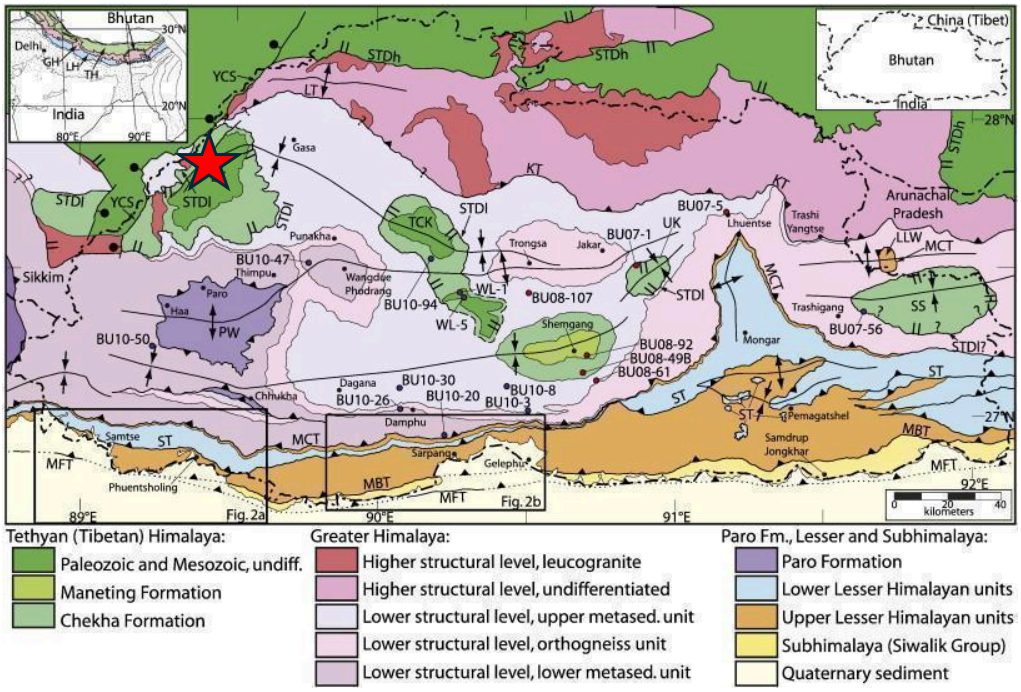


Figure 7. Major techno stratigraphic units and tectonic structures (project area marked as star)[22]

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

[20] 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

[21] MoWHS (2016), Development Plan-Gasa Thromde (2015-2030)

[22] Journal of the Geological Society, McQuarrie et al (2013), The geology and tectonics of central Bhutan

Table 14. Tectostratigraphic zones, formations and prominent lithologies in Gasa

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
	Orthogneiss Unit	Orthogneiss, 1.5 km thick in western Bhutan, < 5 km in eastern Bhutan

With a total area of 3075.08 km^2, Gasa comprises four dominant soil types out of which the Eutric Cambisols is the most dominant. This soil generally occurs in alpine areas where land is mostly covered by alpine scrubs, shrubs, meadows, and moraines. Towards the northernmost parts of the Dzongkhag where the land is covered in snow and glaciers, Haplic Acrisols and Haplic Lixisols are dominant. Towards the cool temperate zones in lower-central and southern areas of Gasa, the Dystric Cambisols is common. The land in these areas is where the project is located and is mostly covered in forests and conducive for agriculture. The map below indicates the district area and soil compositions[23].

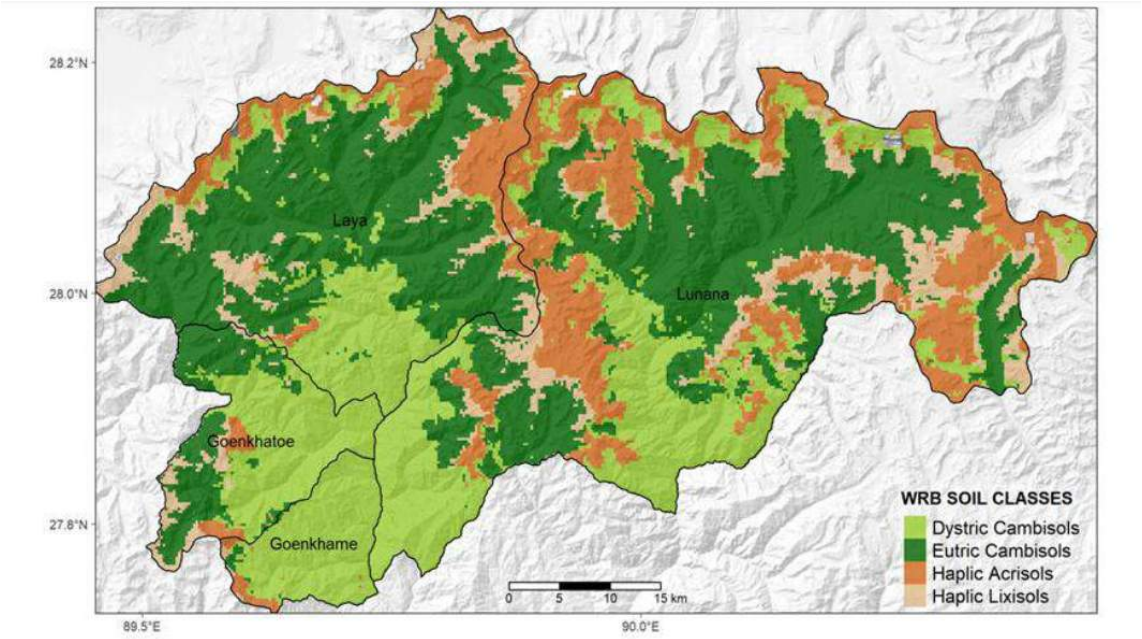


Figure 8. Gasa soil compositions

Source: National Soil Services Centre, DoA, MoAL (2023)

Three soil samples were collected from the project site in May 2024 and analyzed at the National Soil Services Centre. The soil samples indicate that the soil texture is mostly loamy sand, sandy loam and sandy clay loam and is acidic in nature. The soil has moderate to high carbon content, indicating a high level of organic matter, low to medium nitrogen, low phosphorus and low potassium levels. Please refer to the Soil Data Report in Annex 9.

[23] MoAL (2023), Technical Report on the Generation of National Soil Map of Bhutan Using Digital Soil Mapping Techniques, Report No. SS 28

4.1.3. Climate and Air Quality

Bhutan experiences a monsoon type of climate with four distinct seasons of spring, summer, autumn and winter. Rainfall occurrence is comparatively higher in the southern region in the months between July to September. The highest total annual rainfall on record is of 7220.3 mm with an annual average of 1900-2000 mm[24]. Gasa is located in the northern region of Bhutan with an alpine climate of warm summers and extended winters. Khatoed Gewog experiences relatively harsher winters compared to the northern gewogs of Laya and Lunana. The Gewog experiences cold snowy winters and warm rainy summers with the highest extreme temperatures ranging from a minimum of -6̊C and a maximum temperature of 23̊C[25] The annual average temperature and rainfall of the Gewog are indicated in Annex 17.

Air Quality. 24-hour data on air quality was collected at Gasa town on 16th – 17th May 2024 using the air quality monitor (Model 1 AQM-09 Oceanus). The site selected to collect the baseline air quality data was old gasa township. This was based on two aspects: All other prominent infrastructures such as intake structure, WTP and reservoir tanks are in forest areas, away from settlement. As the distribution lines will traverse the settlement area, where excavation work will cause dust and smoke from worker camps will contribute to air pollution, the site for the air quality was selected within the settlement area. Another reason for the site selection is because of the need for electrical connectivity to run the equipment. Since Gasa has a very low population, lacks both developmental activities or industries and has very low traffic, the air quality as indicated in Annex 8 is very good with very low levels of Total Suspended Particulate Matter, PM 2.5 and PM 10. Similarly, the concentrations of SO2, NO2 and CO are below detection limits, indicating these pollutants are either absent or in negligible quantities

Noise levels were also measured during the same period for 24-hour continuous sampling using AQM-09 Integrated sound level meter. As expected, Gasa town's noise levels are within permissible limits, due to the quiet environment and low population. The results are provided in Annex 8.

4.1.4. Hydrology and Water Quality

There are four major river systems in Bhutan – Amo Chhu, Manas, Punatsang Chhu and Wang Chhu. Pho Chhu (157 glacial lakes, 20.98 km2) and Mo Chhu (66 glacial lakes, 4.25 km2) originate in Gasa and are the two major tributaries/sub basins of Punatsang Chhu with the highest number of glaciers[26]. Most of the river discharge is fed by rainfall, supplemented by an estimated 2-12% glacial melt and another 2% from snow melt. The combined outflow of the rivers is estimated at 70,576 million m3 per annum or 2,238 m3/s[27].

[24] NCHM, Bhutan State of the Climate (2017)

[25] NCHM, Bhutan State of the Climate (2017)

[26] NCHM, CSD (2021), Bhutan Glacial Lake Inventory

[27] NECS, WRCD (2016) National Integrated Water Resources Management Plan

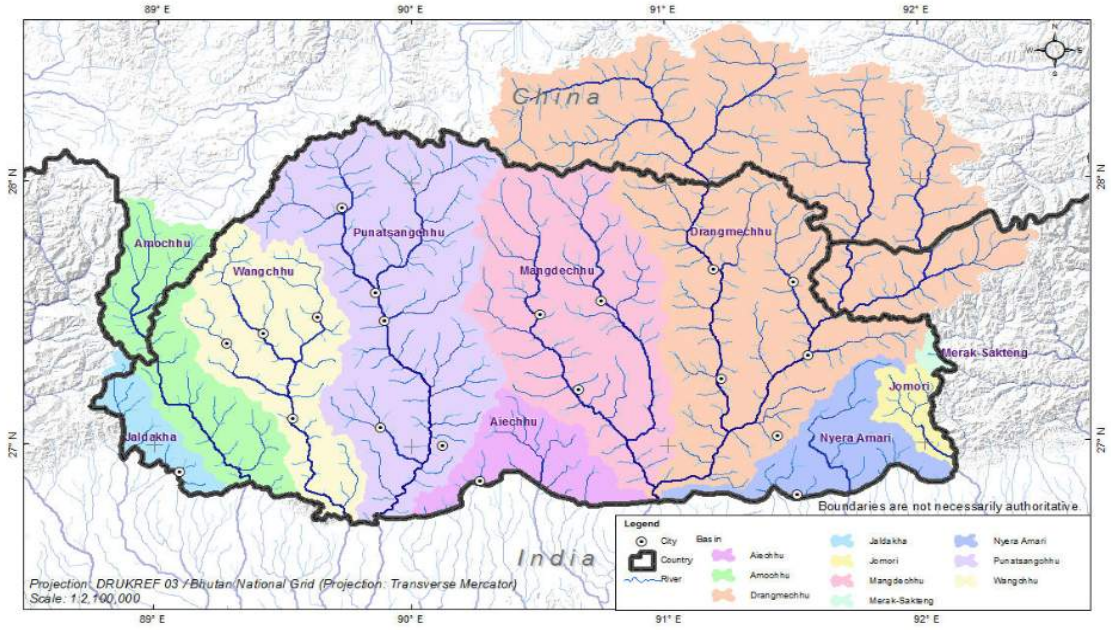


Figure 9. Hydrological basins in Bhutan

Source: NECS, WRCD, National Integrated Water Resources Management Plan (2016)

The Shingtalum watershed covers an area of approximately 10,489 ha, of which 9578 ha falls within the catchment area. The watershed was selected based on an assessment conducted by the Watershed Management Division in 2021. The assessment reported the lean season discharge to be 30 litres per second and concluded that the water source can adequately cater to the water requirements of the upcoming new town at Kolikha in addition to providing water for the old Gasa Town[28]. The letter from the Dzongkhag regarding the selection of the water source is attached in Annex 2.

Water Quality. Water samples were taken from the Singtalum stream on 21st May 2024 and tested by an independent laboratory in Thimphu (Ecolab). The results indicate the water quality is good, with all parameters well within national acceptable limits. The results can be found in Annex 6.

4.1.5. Natural Hazards and Disaster

A 2015 geotechnical study details the Gasa hazard zonation mapping for the Gasa township development (taking into consideration slope, geological conditions and flood areas) indicate that almost half of the district (48%) falls under high hazard where development is not allowed and 21% falls under medium hazard where restricted development is permitted. Based on this zonation, the existing town, Phulakha Village and proposed New Town fall within the Low-Medium hazard area[29]. Gasa Dzongkhag has been affected by disasters over the past 20 years, including the 2011 Sikkim earthquake, which damaged 18

[28] Watershed Management Division, DoFPS, 2022. Watershed Management Intervention Document for the Advancing Climate Resilience of Water Sector in Bhutan (ACREWAS) Project Landscape

[29] MoWHS (2016), Development Plan-Gasa Thromde (2015-2030)

households, the Dzong and the highway. Another recurrent natural hazard is windstorms that occur between October-December. The windstorm in 2014 caused extensive damage to rural homes and government infrastructure blowing 6 roofs. Since the town does not lie close to any major river, there is no flood risk to both towns. However, there is always the risk of rainfall or earthquake induced landslides on steep slopes. The risk of fires is high because of the high probability of occurrence during the dry season, limited road connectivity and limited resources to control forest fires which can have devastating impacts. The first recorded fire incident was in 2006, more details are listed in Annex 15.

4.2. Ecological Environment

4.2.1. Protected Area and Wetland

Protected Areas (PA) in Bhutan consist of five national parks, four wildlife sanctuaries, one strict nature reserve and eight biological corridors. The Jigme Dorji National Park (JDNP) is the second largest PA with an area of 4,374 sq.km. and includes the entire district of Gasa and parts of Paro, Punakha and Thimphu as can be seen in Figure 10.

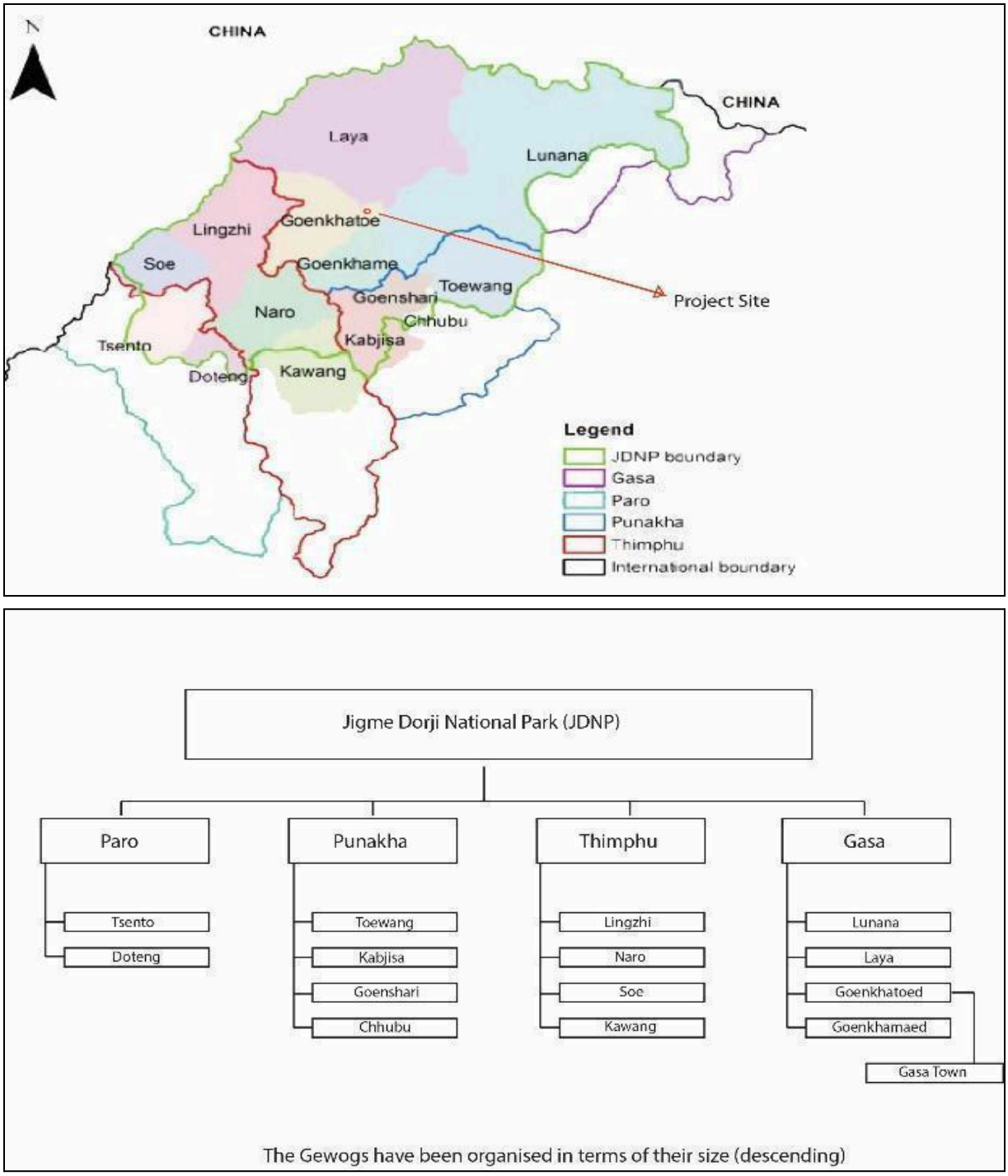


Figure 10. Map and Table showing JDNP Park Sections in four districts

Management prescriptions for the zones vary accordingly: the 'core zones' are non-negotiable areas where no development is permitted, 'transition zones' where traditional/legal use-rights are permitted for fixed period, 'buffer zone' that provide a buffer for core and transition zones and where human interventions are less intensive than in 'multiple-use zones' which include settlements, built-up areas,

private registered lands and resource allocation areas for the park residents[30]. Khatoed Gewog and Gasa town fall in the Multiple Use Zone which covers 19.49% of the Park[31] as shown in the Map below.

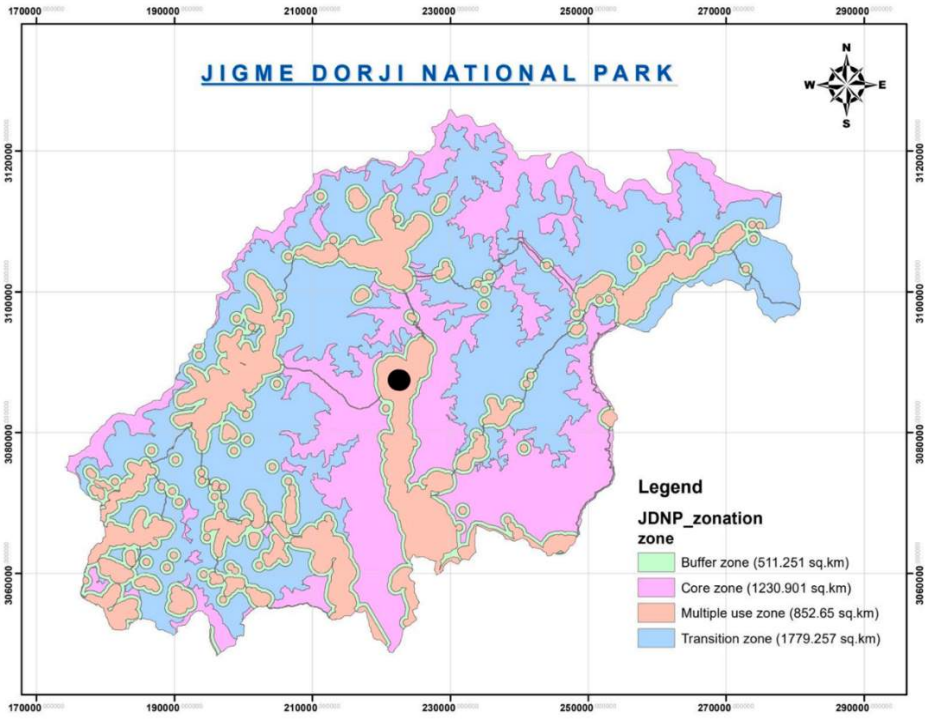


*Figure 11. Map showing management zones in JDNP (*Source: MoAF, Conservation Management Plan of JDNP (2021-2031)

Forest Cover, Scrub and Meadows

The second National Forest Inventory 2023 estimates the national forest cover at 69.71 % compared to 71.13 % in the first National Forest Inventory in 2016. This is a significant reduction of 36%[32]. Gasa has the smallest area with forest cover (21%) accounting for a total of 65,468.32 ha[33] with almost 88% of the district in the Apline zone and 9.8% in the cool temperate agroecological zone**.** Fir forest dominates at higher altitudes, followed by mixed conifer forest and cool to warm broadleaf forest at the lower altitudes. Scrub cover accounts for 69,547.95 ha and meadows cover 10,985.12 ha mostly at the higher altitudes[34]. The project area comprises cool broadleaf forest. To determine the environmental impacts, rapid biodiversity surveys in the project site were planned, coordinated, and conducted from the water intake, along the main transmission line, to the water treatment area and reservoir tanks.

Forest and Vegetation. The cool broadleaf forest is quite pristine and undisturbed, especially towards the intake area. A total of 15 tree species (of which 6 were Rhododendrons), 41 shrubs, 31 herb/ground and 5 epiphytes species were recorded in the survey plots. The most common trees are *Quercus*

[30] DoFPS, 2020. Protected Area Zonation Guidelines of Bhutan

[31] MoAF, Conservation Management Plan of JDNP (2021-2031)

[32] DoFPS. 2016. National Forest Inventory Repor. Stocktaking Nations Forest Resources.

[33] DoFPS. 2023. Bhutan State of the Forest Report.

[34] NSB, 2023. Proportion of Geographical Area by Agro-Ecological Zones and Dzongkhag in the Statistical Yearbook of Bhutan

semicarpofolia, Juniperus indica, Daphniphyllum himalayense, Lyonia ovalifolia, Rhododendron arboreum, Corylus ferox, Betula utilis, Prunus nepalensis, Enkianthus deflexus, followed by *Ilex dipyrena, Fraxinus, Taxus baccata, Prunus rufa Rhododendron keysii. Lindera spp, Salix spp* and *Pieris formosa.* The most common shrub species are *Daphne bholua, Berberis* spp, *Daphniphylly himalayense, Piptanthus nepalensis, Spirea spp, Viburnum erubescens, Ribes laciniatum Schisandra neglecta, Vaccinium corymbosum and Cotoneaster mycrophyllus.* The ground cover is dominated by *Frageria nubicola, Ophiopogon* spp., *Ligularia spp.* Important species such *as Panax psuedoginseng, Paris polyphylla* and *Taxus baccata* were observed both within and outside the surveyed plots, while Cordyceps was also recorded in the area but outside the survey plots. Regeneration of six species (*Piptanthus nepalensi, Daphne bholua, Juniperus indica, Schisandra neglecta, Taxus baccata and Corylus ferox* were also noted. 16 of the floral species recorded are included in Schedule II and Schedule III of the FNCA, 2023 and subject to permits for collection/harvesting. Several species have medicinal values, are used for arts and craft, self-consumption or as fodder. The notable species among these are *Panax psuedoginseng, Paris polyphylla, Cordeyceps sinensis and Taxus baccata* that were also noted outside the sample plots

In summary, the forest is in pristine state with minimal signs of human disturbance especially from the intake to the new treatment plant with little or no invasive species. The floral list is included in Annex 10. Approximately 1 hectare of vegetation (including areas for worker camps if required) will need to be cleared for various project components as shown in the table below:

Table 15. Vegetation to be cleared for various project components

No.	Type of Infrastructure	Area	m2	Remarks
1	Intake structure	10mx 5m	50	Requires vegetation clearance in SRFL (trees and shrubs)
2	Sand tank with barbed wire fencing and gate.	11m x3.2m	35.2	Requires vegetation clearance in SRFL (trees and shrubs
3	raw water main transmission pipeline	2.3km x 1m	2300	Requires vegetation clearance in SRFL (trees, shrubs and ground cover
4	Distribution Pipeline 1	4810m x1m	4810	Settlement area (shrubs and ground cover)
5	Distribution Pipeline 1	790 mx 1m	790	Settlement area (shrubs and ground cover)
6	Water Treatment Plant with lab and office	70 decimals	2832.48	Requires vegetation clearance in SRFL (trees, shrubs and ground cover)
7	Service water tank	10 decimals	404.64	Requires vegetation clearance in SRFL (trees, shrubs and ground cover)
8	Service water tank	10 decimals	404.64	Requires vegetation clearance in SRFL (trees, shrubs and ground cover)
9	Service water tank	10 decimals	404.64	Requires vegetation clearance in SRFL (trees, shrubs and ground cover)
10	Access road to WTP site	400mx 3.5m	2100	Requires vegetation clearance in SRFL (trees, shrubs and ground cover)
11	Establishment of worker camps	will depend on number of workers		Depends on site selection by contractor

4.2.2. Wildlife and Birds

Wildlife: Although Gasa has rich diversity in terms of wildlife, due to the proximity to the settlement areas, only 3 mammal species were recorded. These were identified either through direct observation, sound or scats, pellets, dungs and burrow during the field survey. Barking Deer and Sambar were recorded in the plots as well as outside whereas rooting signs of Wild Pig were recorded along the route to the water source. The Sambar is Vulnerable and listed in Schedule II, but the Barking Deer and Wild Pig are both Least Concern Species, although the Barking Deer is listed in Schedule III of the Forest and Nature Conservation Act 2023. The wildlife list is included in Annex 10.

Avifauna: In total 38 bird species were recorded during the survey. The most common birds are the Large-billed Crow, Red-billed Chough, Kalij Pheasant, White-throated Laughingthrush, Rufous Sibia and

Buff-barred Warbler. All the species are listed as Least Concern as per the IUCN Red List status but 9 of these are included in Schedule III of the FNCA as shown in the table below.

Table 16. Bird species listed in the Forest and Nature Conservation Schedule

#	Common name	Scientific name	IUCN Status	FNCA 2023
1	Large hawk cuckoo	*Hierococcyx sparverioides*	LC	Schedule III
2	Kalij pheasant	*Lophura leucomelanos*	LC	Schedule III
3	Plantive cuckoo	*Cacomantis merulinus*	LC	Schedule III
4	Eurasian cuckoo	*Cuculus canorus*	LC	Schedule III
5	Red billed chough	*Pyrrhocorax pyrrhocorax*	LC	Schedule III
6	Large- billed crow	*Corvus macrorhynchos*	LC	Schedule III
7	Lesser cuckoo	*Cuculus poliocephalus*	LC	Schedule III
8	Oriental cuckoo	*Cuculus optatus*	LC	Schedule III
9	Tufted duck	*Aythya fuligula*	LC	Schedule III

4.3. Socio-economic Aspects

4.3.1. Demography

According to the data provided by the Dzongkhag, the population of Gasa is 3,200 (1701M and 1499F). Gasa has the lowest population density of 1.3 per sq.km among all 20 districts. Of the total population, 16.5% or 528 inhabitants (300 Male and 228 Female) live in Khatoed Gewog. The Gewog reported a birth rate of 6 births and 1 death registered in 2023[35]. Gasa Township forms part of Khatoed Gewog.

The population data indicated that there are more male inhabitants in Gasa compared to females. Domestic violence in the community is not prevalent and neither is gender discrimination, however. incidents are reported to RBP where there is almost a 50% representation each of both male and female officers[36]. The top five gender related cases treated by the hospital are antenatal care for pregnant women; benign prostate hyperplasia, breast and cervical cancer screening; and PCOS[37]. The current gender roles are in coherence with the traditions in the Bhutanese context. Women are homemakers, and care for the family. The deviation is only in terms of business activities and education whereby women run businesses/shops and manage finances. Traditionally and up until the recent past, inheritance was passed down to the women in the family which now has changed with both men and women receiving shares of the inheritance. Most women are not the "labor" types. It is also important to note that most of the females have a strong respect for ties to their villages and their traditions.

Having a Creche would be a good intervention by allowing women needed to run errands or participate in additional work, training and meetings as sources of additional income while their infants were taken care of in a safe environment. However, the prospects are limited due to the low population number[38].

In terms of decision making, the women and men share equal ground. Girls have equal rights to education which is prioritized. At the consultation, there was an equal representation of men and

[35] *Questionnaire filled in by the DPO post session, received via email*

[36] KII, Hospital Respondent, Questionnaire, Gasa Hospital

[37] KII, Gasa Hospital Respondent, Questionnaire

[38] KII, Gender and Community Consultations, Gasa, 22nd May 2024

women with a mix of farmers, home makers, business owners, government officials etc. However, it is assumed, in the socio-cultural context, there are indications of self-censorship. There is a lone female Tshogpa member and so far, there have been no female representatives running for office during national elections. The comprehensive Gender Assessment is available in Annex 11.

4.3.2. Socio-cultural Groups

The inhabitants of Gasa Town are a majority of original Gasa inhabitants of 60% with the remaining 40% who have settled in Gasa from other districts. The language spoken in the district is mostly Dzongkha (40%) within which a smaller percentage speak the local dialects of Layapkha and Lunanakha, Lhotsamkha (10%) and Khengkha (10%)[39].

4.3.3. Land Use, Agriculture and Industry

The entire district including the Project area falls under the JDNP which is the second largest Protected Area (PA) in the country. The Project area of influence covers State Reserve Forest Land (SRFL) and Institutional Land that fall within the low hazard zone (31% of the total area) where development activities are allowed[40]. Khatoed Gewog and Gasa town fall within the Multiple Use Zone which covers 19.49% of the Park as indicated in Fig 12 above.

The existing land uses in Gasa Town include Institutional (government and corporate offices, Gasa Primary School, Royal Bhutan Police, Hospital), Mixed Use (commercial and residential), Gasa Dzong, Phulakha Lhakhang and Phulakha village (5 households), and recreational areas (football ground, rhododendron garden around the lake at Gasa Dzong). The natural setting is complemented by human scale structures that are built along contours in most of the developed flat areas in the Gewog.

Since the Old Town of Gasa is the commercial core, most of the modern facilities and administration, banking outlets are located here. Khatoed Gewog has 21 shops, 8 restaurant, 2 government guesthouses, 2 homestays, a Mani Dungkhor, an EV charging station, NHDCL housing colony, a hospital, a school with an ECCD on site, a park range office, 7 corporate office outlets including banking, and a football ground. The list has been collated from three different sources and is available in Annex 14.

The land ownership pattern includes a majority of institutional ownership within the town area and private ownership within Phulakha village. The Kolikha (New Town) area has plots under different agency ownership with one under private ownership. As the identified area for the expansion of Gasa Town, the Dzongkhag Administration has activated the area for development in a minimal area while ensuring environmental and social factors are taken into account as a priority. Project components (intake, main water transmission line, water treatment plant and its facilities, reservoir tanks and access road) fall entirely on government owned land. The distribution lines will traverse institutional land belonging to the District Court, Dratshang, NHDCL, BPC and Gasa Primary School). The clearance from these agencies

[39] KII, Community Consultation, 22nd May 2024

[40] MoWHS (2016), Development Plan-Gasa Thromde (2015-2030)

has been secured and provided in Annex 5. The access road will take off from the road leading to the RENEW office.

The altitude in Gasa is not conducive for agriculture and livestock is the preferred engagement. The district houses the highest number of Equine (Horse, Mule, Donkey) in Bhutan indicative of the access, endurance, activity and transportation needs of the inhabitants[41]. Some of the problems they persistently face challenges for feed and nutrition, infrastructure and climate, human-wildlife conflict, and labor and expertise[42]. Most agricultural practices are limited to subsistence farming and therefore the Gasa inhabitants do not indulge in large-scale agricultural practices. This is specifically influenced by the district's geographical characteristics. The inhabitants of Khatoed Gewog mainly practice subsistence farming and they grow potatoes, mustard greens, green onion and other varieties of hardy vegetables[43].

There are a total of 104 Service Industries in Gasa of which 84 are Small Scale and the remaining 20 are Cottage Industries with 3 agro-based and 1 forest based production and manufacturing industries[44]. After Cordyceps collection was formalized for certain groups of inhabitants, this has been a major economy driver in recent times[45]. There are 33 Civil Servants[46] in Khatoed Gewog while most other occupations are of private businesspeople, monks, and homemakers[47].

4.3.4. Drinking Water, Sanitation, Electricity and Waste

Drinking Water: All 918 households in Gasa have functional piped drinking water supply[48] with access to improved water source at 100%[49]. Currently the water supply for the town is provided through 2 main water pipelines, belonging to the NHDCL and the Dzongkhag constructed prior to 2009, which is about 15 years old. A number of households and institutes tap the current water source with their own pipelines as observed during the site visit. The pipes were observed to be either buried, semi buried, or overland. Sections of broken and damaged pipes can be seen jutting out of the ground. There are two existing water tanks for the Dzongkhag and one for NHDCL that are more than 15 years old and damaged. The hospital has three plastic storage tanks, and the school has two.

The school faces significant challenges of water shortages. In the summer, the quality and quantity of water is compromised due to blockage of pipes by sediments. A water filtration system was contributed to the school by the Rotary Club of Thimphu to ensure clean drinking water for the students. Additionally, an accident compromised the current storage facility at the school. One of the two plastic water tanks has been punctured causing continuous leakage, creating a challenge for storage and ultimately a shortage. Although the school doesn't have boarding facilities, they do provide two meals

[41] NSB, Agricultural Statistics Division (2022)

[42] KII, Community Consultation, Gasa, 22nd May 2024

[43] KII, Gender Consultation, Gasa, 22nd May 2024

[44] MoICE, DoI (2023)

[45] MoWHS (2016), Development Plan-Gasa Thromde (2015-2030)

[46] Dzongkhag Website, Gasa, Khatoed, http://www.gasa.gov.bt/index.php/gewogs/khatoed

[47] KII, DPO, Gasa

[48] KII, GAO, Updated Annual Statistics (2023), Gasa, 24th May 2024

[49] NSB, BLLS (2022)

per day for the students. The school also holds their annual puja, and the shortage of water is a persistent concern[50].

Water related ailments in Khatoed Gewog include common colds, UTIs, and acute gastroenteritis. The resident doctor indicated that most of the ailments were caused due to poor hand hygiene and unsafe drinking water consumed directly from taps. She also mentioned that these conditions were exacerbated by limitations to treated water supply and lack of accessibility to hand washing stations. On an additional note, the hospital faces dire constraints regarding the quality and quantity of water supply despite the three plastic water tanks at the hospital premises. In the summer season, debris, rodents, and frogs clog up the pipes causing shortages in supply. In the winter months taps remain dried up due to reduction in water pressure[51].

Sanitation: Sanitation facility coverage in Gasa is 86.9%. 99% of the urban population and 83.1% of the rural population in Gasa have access to improved sanitation facilities[52]. Out of 918 households, 879 have pour flush latrine facilities[53].

Electricity: Gasa Dzongkhag has the highest use of solar energy (20.5%) with the remaining 79.5% connected to the national grid. The reason for the high use of solar energy is more due to accessibility and infrastructure rather than a preference for green energy.

Waste: The waste disposal site for Khatoed Gewog is located in Remi Chiwog which is 4km away from Gasa Dzong. The waste collection truck collects waste from the Gewog on a weekly basis (every Monday). The type of waste collected is general solid household waste. Hazardous waste is disposed of in an incinerator at the hospital while wet/food waste is used as organic fertilizer for kitchen gardens and crop fields[54].

4.3.5. Education, Health and Banking

There are seven educational government owned institutions/facilities in Gasa, 3 Extended Classrooms (ECR) with 48 students, 2 Primary Schools with 165 students, 1 Middle Secondary School with 157 students, and 1 is a Higher Secondary School with 120 students. The number of ECCDs is the lowest in Gasa with 112 children enrolled[55]. Gasa Primary School is located in Khatoed Gewog and is included in the list of beneficiaries. There are a total of 120 students (67 Male and 53 Female), 9 teaching staff (5 Male, 4 Female) and 5 administrative staff (2 Male, 3 Female).

Out of the total four ECCDs in the district, one ECCD located at the Gasa Primary School premises in Khatoed Gewog with one female facilitator and 37 students (20 Male, 17 Female)[56]. The staff and students of the ECCD are included in the beneficiary list. There are no private education centers in the

[50] KII, School Representative, Community Consultation, Gasa, 22nd May 2024

[51] KII, Hospital Respondent, Questionnaire, Gasa Hospital

[52] NSB, BLSS Report (2022)

[53] KII, GAO, Updated Annual Statistics (2023), Gasa, 24th May 2024

[54] KII, Community Consultation, Gasa, 22nd May 2024

[55] NSB, Statistical Yearbook 2023

[56] KII, GAO, Response via Text, Gasa, 24th May 2024

district. The number of ECCDs is the lowest in Gasa with 112 children enrolled[57]. Out of the total four ECCDs in the district, one ECCD located at the Gasa Primary School premises in Khatoed Gewog with one female facilitator and 37 students (20 Male, 17 Female)[58]. The staff and students of the ECCD have been included in the beneficiary list.

Health. There are a total of 9 health facilities in Gasa – 1 hospital, 3 Primary Health Centres (PHC), and 5 Outreach Clinics (ORC) – 4 with shed and 1 without shed[59]. The Gasa Hospital is located in Khatoed Gewog and is included in the beneficiary list for the project. It is staffed by 1 doctor, 3 nurses and 11 support staff. The hospital provides general outpatient and inpatient treatment, community health services, lab services and investigations, radiological services, traditional medical services and dental services. A pharmacy unit is also located at the hospital premises. Serious cases are referred to Bajo Hospital or JDWNR Hospital in Thimphu. The hospital caters to an average of 555 patients per month for illness varying from common cold, UTI, acute gastroenteritis, hypertension, and diabetes[60].

4.3.6. Roads, Transportation and Vehicles

The district has 8.1km of Dzongkhag Road, 1.1km of Thromde Road, 21.5km of Gewog connectivity road and 4.1km of farm road[61]. The total road distance from Gasa to Punakha is 72.7 km. Since there is one bus transport service (Druk Dragon Transport) available in Gasa that frequents Thimphu to Gasa (three times a week), there are challenges for travelers when the bus breaks down[62]. There is only 1 registered taxi in the district. A total of 180 private cars are registered in Gasa, most of which belong to Layaps who park their vehicles in Gasa Town area due to road inaccessibility to Laya[63].

For material transportation, the highway from Punakha to Gasa will be utilized. Since the road only leads to Gasa Dzongkhag, the traffic is limited to residents, staff and visitors especially as there is only 1 bus service to Gasa. Within Gasa town, the approach road to Phulakha Lhakhang, houses and NHDCL housing will be used. While not all residents own a vehicle, this may cause some congestion for local commuters especially during school and office drop and pick up times (7.30-9.30 AM and 3-5.30AM).

From the approach road belonging to RENEW, a 400m approach road has been incorporated for material transportation to the WTP site. To the intake site at Singtalum, there will be no access road and all materials will have to be carried by porters or mules and yak.

[57] NSB, Statistical Yearbook 2023

[58] KII, GAO, Response via Text, Gasa, 24th May 2024

[59] MoH, Annual Health Bulletin (2023)

[60] KII, Hospital Respondent, Questionnaire, Gasa Hospital

[61] Dzongkhag Website, Gasa (2024)

[62] KII, Druk Dragon Transport Representative, Thimphu, 30th May 2024

[63] KII, Community Consultation, Gasa, 22nd May 2024

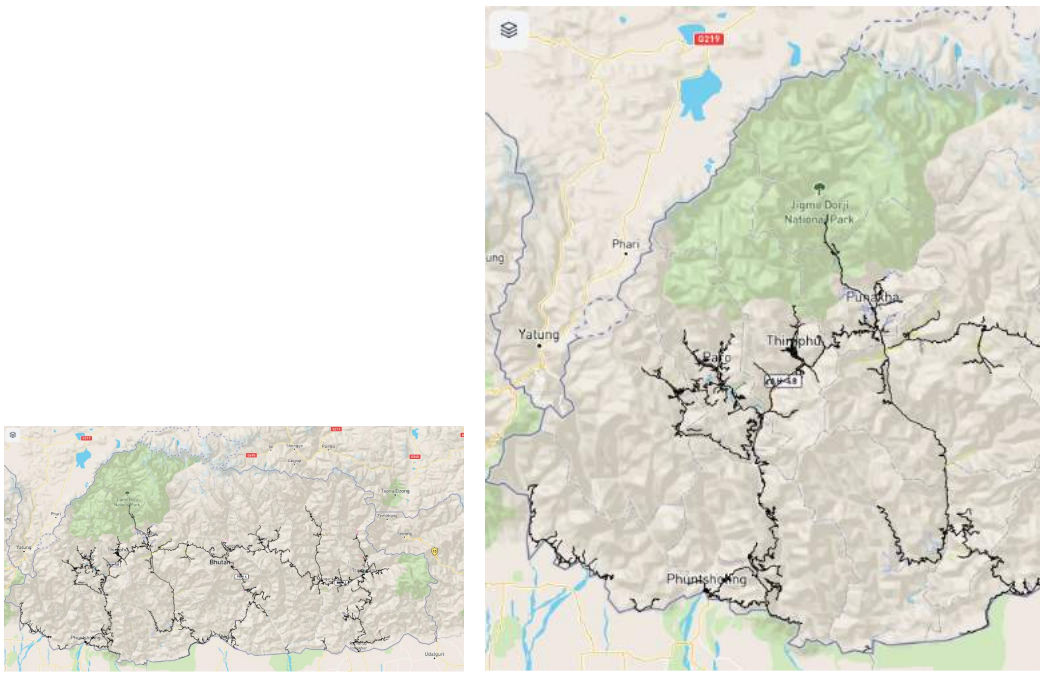


Figure 12. Transport route from Thimphu and Punakha and the South to Gasa[64]

Within the town area, traffic is very low and mostly confined to 7.30-9.30AM and 3-5.30PM when the dozen or so office goers drive to work or drop off their children to school. Since the school is very close to town, children mostly walk along the footpath to school.

[64] Source: National Biodiversity Centre, Bhutan Biodiversity Portal. (www. http://biodiversity.bt) retrieved on 30 June 2024

Figure 13. Map of Gasa town indicating transportation route (in black) to the project site

4.3.7. Tourism

There are no records maintained for international tourists by the district[65], while the latest available data is from the Tourism Council of Bhutan for 2018. Despite its potential, the district has recorded the least number of international tourists. Limited development, lack of accessibility and accommodation availability are indicated as key factors limiting the number of tourists to the district[66]. Attractions in the district include the Laya Trek, The Royal Highland Festival in Laya, Snowman Race, the Snowman Trek and Gasa Tsachu in Khatoed [67]. Dzongkhag data reveals a significant decline in numbers with 5,754 local tourists in 2020 to 855 in 2023[68] that are attributed to COVID and the flood that washed away the popular hot spring (Gasa Tsachu). Most local tourists are visitors to the Gasa Tsachu (numbers available in Annex 13).

Gasa Tsachu. Khatoed Gewog is home to the Gasa Tsachu (hot spring) which is a popular destination for local tourist since it is believed that these springs provide therapeutic benefits that can heal various ailments[69]. There have been 2 floods that have washed away the Tsachu in with the most recent one occurring in 2021.

[65] KII, DPO, Gasa

[66] TCB, Bhutan Tourism Monitor (2018)

[67] MoWHS, Development Plan-Gasa Thromdre (2015-2030)

[68] KII, DPO, Gasa

[69] MoWHS (2016), Development Plan-Gasa Thromde (2015-2030)

4.3.8. Safety

Compared to other districts, crime rates are very low in Gasa, but this seems to be increasing over the years from 2 criminal incidents in 2018 to 26 cases in 2022[70]. In Gasa, 1 suicide case was recorded in 2013 and another in 2017[71]. Vehicular accidents have increased from 2 reported in 2018 and 8 reported in 2022[72].

4.3.9. Physical Cultural Resources and Intangible Heritage

Gasa is believed to have derived its name from "Garsa" which translated to "Land of Blacksmith"[73]**.** A majority of Gasa's inhabitants are Buddhist. There are few but significant heritage sites and cultural practices that are both tangible and intangible.

Gasa Dzong was built in the 17th century as a defense fortress and called Tashi Tongmon Dzong. At the entrance, a lake surrounded by rhododendrons adds to the scenic features of the Dzong. The Twin Trees of Singye Galem near the Dzong hold endearing significance to the popular story of Gasa Lamey Singye and Changyul Galem.

Phulakha Lhakhang is one of the most significant religious/cultural heritages in Gasa. It is located towards the upper northern parts across the Dzong and is believed to have been built in the 7th Century

The first day of the Gasa Tsechu is commemorated at the Lhakhang[74] where the anticipated event is the viewing and blessings from a 17th century statue of Zhabdrung housed in the inner sanctum that is barely 2 feet high but has a considerable weight[75]. About 10 minutes' walk towards the upper left area of the Lhakhang is a sacred Nye (religious site) called Gadoen Phodrang. The Nye is located about 50m from the newly proposed access road and very close to the future proposed RENEW distribution line. There is no immediate plan to construct the RENEW office, so only an outlet has been maintained as a provision for future requirements.

The Mani Dungkhor is located in the heart of the old town. It is used for religious circumambulation and recreational activities.

The distribution lines will be within the vicinity of both structures as indicated in Figure 14.

[70] RBP (2022), Statistical Yearbook

[71] RBP (2017), Statistical Yearbook 2017

[72] RBP, (2022), Statistical Yearbook 2022

[73] MoWHS, Development Plan-Gasa Thromdre (2015-2030)

[74] KII, Community Consultation, Gasa, 22nd May 2024

[75] KII, Phulakha Lam, Site Visit, 24th May 2024

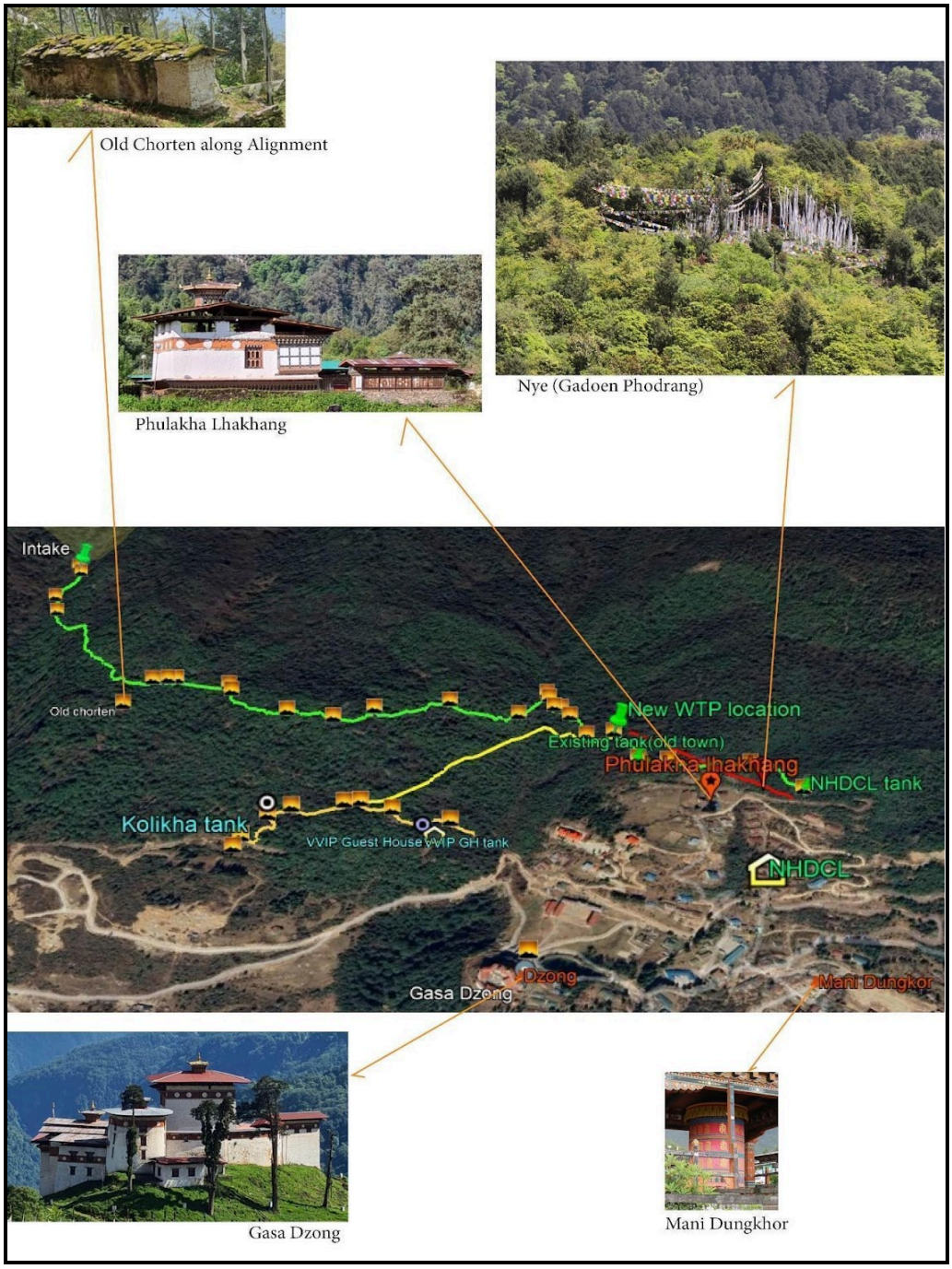


Figure 14. Map showing project area and physical cultural sites.

Intangible Heritage. Religious ceremonies are part of the intangible cultural practices in Gasa. These include the Moenlam Chenmo (great prayer festival) held annually exceeding 5 days; 5 days of Kanjur (recorded teaching of the Buddha) recitation held after the harvest season; and offerings and prayers for protection to appease the Local Deity of Gasa (Gasa Sungchey) that is usually held for 7 days in

December[76]. The inhabitants of Khatoed Gewog exuberate an inherent respect for their natural surroundings. There are several undocumented yet revered beliefs specifically to maintain cleanliness and positivity in certain areas, they have a committed outlook towards their religious practices which in turn promotes compassion towards each other further enhancing a sense of community.

[76] KII, Community Consultation, Gasa, 22nd May 2024

5. STAKEHOLDER IDENTIFICATION AND CONSULTATIONS

5.1. Stakeholder Mapping

The Stakeholder Engagement Plan (SEP) identified four broad groups in the project area. These have been categorized into Direct and Indirect Stakeholders.

Direct Stakeholders: Stakeholders involved in project supervision, implementation and monitoring, operation and maintenance works, landowners and project beneficiaries and households living near the project components.

Indirect Stakeholders: JDNP, material suppliers, transporters, NGOs and donor.

5.2. Objective of Stakeholder Consultations

Consultations with various stakeholders was conducted to a) seek information on project design, layout, need, alternatives, project beneficiaries and impacts, b) fill in data gaps and seek prior information on Indigenous and Vulnerable Persons for planning purposes, c)present and discuss the latest project design and GRM process and provide an opportunity for the community to voice their concerns and actively participate in the Environmental and Social Safeguard (ESS) planning process.

5.3. Consultations

Prior information on the consultation including the date, venue and objectives was provided through the MoIT, Gasa Dzongkhag and the town representatives who were requested to ensure that members of the vulnerable community were also invited to the consultation. Two consultations were conducted from 22nd to 24th May 2024. The meeting was coordinated by the Planning Officer and chaired by Dasho Dzongda. Participants included Dasho Dzongrab representatives from the local government, municipality, monk body, and Dzongkhag sector officers (environment, ICT, livestock, agriculture, RBP, forest), and members of the local community. Pictures from the consultation are provided in Annex 19.1.

Table 17. Details of the consultations

Date and time	Type of consultation	Location	Male	Female	Total
22nd May 2024 9AM-5PM	District Level and Community Consultation	Gasa Dzong, Conference Hall	24	15	39
24th May 2024 9AM-3:30PM	Capacity Building & Training (GRM)	Gasa Dzong, Conference Hall	8	3	11

During the first day consultation, focus group discussions were carried out with women, vulnerable persons, men, and government officers. Capacity building training was organized on the morning of the 24th on roles and responsibilities, compliance monitoring and reporting and GRM. Following this, one on one consultation was conducted with vulnerable persons. The project team also visited the Park office

to inform about the project, the ESIA study and to seek information on the park. Consultations were also conducted with the Lam of Phulakha Lhakhang and with Dzongkhag staff and landowners during the site visit.

5.4. Summary of Consultations

The key comments, issues and recommendations raised during the consultation are summarized in the table below. For more details on the discussions, the minutes of the meetings are included in Annex 17.

Table 18. Summary of the points raised during the consultations

Topic	Concerns, Issues, and Recommendations	Remarks
Project design	Request from the School, Dratshang and Hospital for separate water tanks.	Included in the ESMP for PMU to consider
Population projection	It was confirmed that the scheme has considered development aspects like new infrastructure, and provision for expansion. Both towns have been included as it is expected that once the new town is developed not all residents will move to the new town. - Mani Village is not currently within the scope of the project although it is near the project area.	Project beneficiaries updated
Design Elements and E-Flow	Confirmed that the length of the main water pipeline is 2.3 km and the access road to WTP is 400m There are two possibilities for the NHDCL distribution line which will be decided upon in consultation with NHDCL prior to construction.	Project design updated
Contractor Selection and Accountability	Concerns were expressed on contractors work quality and ability to complete the work on time The proposal to use Dessups instead was discussed at length, with the PIU providing clarification on why contractors would be better suited for the construction work.	Quality assurance requirements included in ESMP
Indigenous People	This was discussed at length, and it was confirmed that there are no IP in the project site.	Included in ESIA
Vulnerable People	The DPO indicated that there is one inhabitant that would fall under the vulnerable category. During the focus group, vulnerable persons were identified and consulted	Separate individual meeting was arranged after the community consultation
Clearances	Types of clearances were discussed. Pending ones are under process	Those received are included in the Annexs
Waste Management	Support for waste management was solicited from the project	To be discussed separately with PMU
Blasting requirements	The Engineer confirmed that provisions for blasting will be carried out in steep and rocky sections	Blasting measures included in ESMP

Topic	Concerns, Issues, and Recommendations	Remarks
Impacts on Private Land	During the design phase, it was determined that the water pipelines would travers land belonging to 5 households, for which the Dzongkhag has requested these households to participate in the field verification exercise.	Site visit carried out and confirmed that no private land will be impacted
Project benefit and impacts	Community members expressed their views on the project's benefit and impacts. The community is grateful and looks forward to the project. A concern was raised on impacts to the existing water supply due to construction work at the intake site.	Mitigation measures included in the ESMP
GRM	Discussion and finalization of GRM Committee members at the community and Dzongkhag level	Included in GRM chapter
GBV and Gender Focal	Clarification was sought on whether Gender Focal and the GRM were specific only to the project or to the Dzongkhag as a whole.	Clarification was provided on this
RENEW presence	Information was shared that the RENEW office was supposed to be constructed a few years ago but for some reason that has not happened.	Added to the ESMP
Water user association (WUA)	The local representative confirmed that there are 6 to 7 WUAs in the Gewog but the town does not have one as all water source related concerns and management are taken care of by the Municipality.	Added to the ESMP
Tangible and Intangible cultural heritage	Information on cultural heritage and intangible heritage sought from community members. Accounts of the sacredness of the Phulakha Lhakhang and the peripheral area were mentioned and concerns regarding religious and superstitious beliefs with adherence to tangible and intangible heritage and beliefs.	Added to the ESMP – Contractor Requirements
Water tariff	It was suggested that tariff needs to be applied based on use and without discrimination on ability to pay	
Compliance monitoring	Discussion on the difficulty in daily supervision and monitoring due to lack of presence and capacity of staff in Gasa. Suggestion to use the local/gewog monitoring committee, training needs and requirement for a clear mandate to minimize duplication and confusion between various stakeholders and the contractor. Provision of payments for the community monitoring members was also discussed and was clarified that only working lunch could be provided	Included in the ESMP
Capacity and Training Needs	Need for more training of all GRM, especially dealing with GBV cases	Included in ESMP
Current drinking water	Discussion on tests previously carried out and test results	Included in ESIA

Topic	Concerns, Issues, and Recommendations	Remarks
Water safety during Operation	Discussion on future requirements to ensure water quality including water safety plan, expertise, capacity, equipment and budget constraints	Included in ESIA
Creche to support women and children	The proposal for a creche was discussed but concerns on the need for this, the low population, existing ECCD numbers, and cost of operation and maintenance.	
Training for local contractors	Suggestion to train local contractors to enhance capacity to undertake such projects and reduce reliance on external contractors due to difficulties experienced in the past.	

6. ANALYSIS OF ALTERNATIVES

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

6.1. The Do Nothing Alternative

The do-nothing alternative is not a viable alternative because Gasa's peri-urban areas lack sufficient safe drinking water. Without the project the residents will continue to struggle with limited water storage facilities making it difficult to cope during the lean season. Residents will struggle with issues related to water quality and quantity due to climatic conditions such as cold winters leading to frozen pipes and blockage of pipes with sediments during the summer. Maintaining and repairing existing structures are limited due to lack of time, manpower and financial resources. Institutions and agencies lack financial and technical capacity to repair damaged structures resulting in wastage of the limited water.

6.2. Alternatives Relating to Water Sources

There are no alternatives to the source. The current water supply is also being tapped from the Singtalum water source. The only other water sources available is a lake above Phulakha village, which is too small and seasonal in nature. Another source at the Zamjana watershed catchment was found to be too small, degraded and is highly dependent on rainfall. It would also require traversing steep topography (over 45 degrees)[77].

6.3. 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. Avoiding impacts to forest and land belonging to the government and non-governmental agencies, road crossings are unavoidable because of the spread of the settlement. There are no plans to construct an access road to the water source. For the access road to the WTP, the alternative is 'no road' or alternative' 2' which will run very close to the Phulakha Lhakhang and therefore has been avoided.

6.4. Alternatives in Terms of Design and Technology

The selected design is based on the water discharge studies and the current abstraction rate. With the design period of 30 years, 13.64lps will be abstracted for the project which is estimated to be adequate given the population projects. This will retain 54.55% of the water as environmental flow. The scheme will replace exposed water pipelines by burying pipes underground to secure them from tampering, damage due to climatic conditions and natural hazards. Construction of gabion walls downstream of intake structures across the stream will ensure that the intake structure is not blocked with debris. Bioengineering and slope stabilization along steep slopes, through pipe support systems will also mitigate the risk of landslides. Controlled blasting will be utilized in steep areas.

The design does not include construction of an access road to the intake structure and material transportation is expected to be carried out manually. The alternative to this – construction of an access road will increase the project footprint and increase environmental impacts due to higher requirements

[77]Watershed Management Division, DoFPS, 2022. Watershed Management Intervention Document for the Advancing Climate Resilience of Water Sector in Bhutan (ACREWAS) Project Landscape

for forest clearance. The WTP structure and design also includes installation of Supervisory Control and Data Acquisition (SCADA) for real time monitoring.

6.5. Cost Benefit Analysis

According to the cost benefit analysis conducted for the project, without this investment, the project infrastructure is estimated to last up to 30 years but with the investment in climate-proofing, the project infrastructure has a lifespan of 70 years. Project's benefits will start from the third year.

7. SOCIAL AND ENVIRONMENTAL RISKS AND IMPACTS

7.1. Pre-construction Phase

7.1.1. Project Design- Sustainability of the Water Source

Presently, the Shingtalum water source which has been identified is also being tapped as the water source for the township, with a current abstraction rate of 15.095lps through two pipelines. Currently, there is a lot of wastage in the existing system due to overflows, damaged pipes or tanks and water is also sourced by individuals from the same water sources. The project will remove one of the two existing water pipelines (to the town) upon completion of the construction work. Through the consolidation of all the water pipes, improved treatment and systematic distribution, the water requirement for the project based on the 30-year design period will be 13.64lps (6.89lps from the new pipeline + 6.745 lps from the remaining water pipeline that will be used for fire hydrants/firefighting only.

The design was presented to the community during the public consultation and the primary concern of the community was regarding the impact of construction activities on the quality and quantity of the water supply during the construction phase. This is discussed under Construction phase 6.2.

The project will implement conservation activities under other project components. This includes participatory water resource assessment and preparation of River Basin Management Plan for Punatsangchhu river basin, Dzongkhag Water Masterplan, Local Forest Management Plan for Shingtalum watershed, and Community-based watershed and forest management plans for two community forests (Rangzhin Kuenphen CF, and Tashi Thogmen CF, Shingtalum) in Gasa. To improve resilience, sustainability, and quality of water service delivery, the project will strengthen water governance especially at the Dzongkhag and community level for climate-smart water and watershed management. Additionally, the project is also currently assessing the possibility of introducing a water tariff system in Gasa. The Dzongkhag Environment Committee will be strengthened to bear the role of water management committee at Dzongkhag level and a Water User Association will be created for water management at the local level. Inclusion of members may become contentious if the selection of water user association members is not socially inclusive and if the terms of reference of the association are not thoroughly planned for.

Mitigation. PIU must carry out annual discharge measurements, especially during lean seasons, to understand water availability trends and PMU must ensure that budget is allocated for this. The PMU will be supporting the implementation of measures identified after the watershed management plan has been prepared. The establishment of the water user association will be carried out as a parallel activity of the ACREWAS project. The establishment of the water user association must ensure social inclusion of all water users, especially vulnerable persons, women and youth who can be mobilized to take on key responsibilities. The terms of reference for the water user association must clearly specify the tenure, mandates and roles and responsibilities of the members. The GRM process outlined in section 9.1 must also ensure that any concerns by the water user association are also addressed.

7.1.2. Project Design – Infrastructure Components

The project design includes construction of intake structures, raw water pipeline, water treatment plant, with lab/office and a permanent access road, 3 new treated water reservoir tanks and distribution lines,

for both towns. The existing water tank will be retained to provide water for the fire hydrant and as back up during repair of the newly constructed system. Of the 740 beneficiaries, 35% of these are staff and students in Gasa Primary School, monks in the Dratshang or work in the Hospital, which treats at least 555 patients per month. All project components from intake structures to distribution lines are on government land or institutional land. There are no Environmental and Social Impacts envisioned during the design and pre-construction stage as the design has been presented to all stakeholders and their consensus /approval to traverse institutional land has been granted by all relevant offices. Wherever the distribution lines initially were traversing private land, these have been realigned so that the water pipelines are on government land. No private land will be impacted due to any of the project components, but the distribution lines will cross access roads in several areas, causing temporary inconvenience during the excavation work.

All three stakeholders: Gasa Primary School, Dratshang and the Hospital face issues with water shortage due to inadequate or damaged tanks and have requested separate water tanks.

Mitigation. While this may require additional budget and incorporation into project design, provision of separate tanks will greatly enhance the educational outcomes of the students and monks and improve health and hygiene of patients, while ensuring greater appreciation and support for the water supply scheme by its beneficiaries.

7.1.3. Impacts on Aquatic Ecosystems and Ecosystem Functionality and Downstream Impacts

The water requirement in addition to the current abstraction rate will leave more than 50% of the water to flow downstream. Therefore, the project complies with the water act 2011 that requires maintaining 30% discharge as environmental flow.

Mitigation. Ensure that 30% environmental flow is maintained in the streams for ecological purposes in the future when more water may be abstracted depending on need.

7.1.4. Protected Areas and State Forest Reserve Land

While Gasa Dzongkhag falls entirely inside the Jigme Dorji National Park, Gasa Thromde/town area and the peripheral areas fall in the multiple use zone of the park. These zones include settlements, built up areas, private registered land and areas for resource allocation for communities. Based on the design, the water source, water treatment plant (WTP) structures, including the tank, staff quarters and laboratory, access road to the WTP and treated water reservoir tanks fall within state reserve forest land. The project area will not encroach on community forest. The total area required for the land is 1.4 hectares, of which approximately 1 hectare falls on forest land. While the forest area to be cleared is less than 0.01% of the cool broadleaf forest area in Gasa Dzongkhag, the concern is the steady loss of forest cover to developmental activities and the associated impacts of construction projects within forested areas. Impacts to the forest include loss of forest cover, habitat, fragmentation and degradation.

Mitigation. In compliance with the Forest and Nature Conservation Act 2023 and its regulation the Forest Clearance (FC) for the water supply scheme and WTP have been secured, while the FC for the access road is under process. To minimize the risk of losing valuable species and loss of forest cover, the project must ensure that no road is constructed, without prior approval of the park, to the intake site to facilitate material transportation.

The PMU must consult the Park and Department of Forest and Park services to determine and allocate budget to pay the Royalty for tree felling as well support the implementation of the Biodiversity Action Plan including measures for restoration of degraded areas after completion of the construction activities.

Both the EC and FC must be shared with the contractor for compliance. Measures to be undertaken by the contractor to minimize impacts on the protected area are described under the Construction Phase.

7.1.5. Consents and Permits and Clearance Requirements

The project comprises of three separate activities: a) construction of the water supply scheme with intake structures, reservoir tanks, raw water transmission pipeline, and treated water distribution pipelines; b) construction of the water treatment plant with staff quarters, laboratory facilities and storage tank, and c) construction of the access road to the WTP. While the EC for the water supply scheme was also approved in September 2023 (Annex 3.1), this is only valid for a year and will need to be renewed at least 3 months prior to its expiry. Also, the EC does not include the WTP and access road. As required under the EA Act 2000, consent and clearances from respective institutions/agencies – (Dratshang, Police, District Court, NHDCL, BPC, Gasa Primary School) has been secured for the distribution lines to date.

Mitigation. To ensure compliance with the Environment Act 2000 the following must be secured prior to the construction:

- Renew the EC for the water supply scheme
- Seek the consent from RENEW for the access road take-off to the WTP site.

During the field visit, it was verified that the water pipeline will not impact any private land. However, if at any time in the future, the pipelines are realigned, the consent from the private land holder must be acquired.

7.1.6. Project Disclosure and Information Sharing and Reporting

The project has ensured Prior informed consent protocols were followed. The project was first presented to the Dzongkhag, relevant stakeholders and the community during the project preparation stage. During the design stage, the PMU conducted public consultations on 1st March 2024 to share information on the project design, layout and locations and to seek the views of all concerned. During the ESIA preparation, a second round of consultations was conducted from 22-25 May 2024. During the consultations in May, the team ensured that vulnerable persons were identified and consulted separately to seek their views on the project. During the ESIA presentation, there were requests for additional water storage tanks which the PIU has agreed to discuss further with the PMU.

The Grievance Redress Mechanism was also deliberated upon and finalized, and representatives were requested to further spread the word to the community on the GRM process.

Mitigation. If there are any changes to the project design, the PMU and PIU must communicate these changes and updates to the Dzongkhag and project stakeholders. In all future consultations, the Dzongkhag must ensure that vulnerable persons are informed of the project schedule, potential project risks and the GRM process. Official notification of the GRM Committee Members detailing their Terms of

Reference must be shared with the nominated officers/representatives at the Dzongkhag and Gewog level, for implementation. As members are replaced, new members must be briefed on the GRM process. Information on the GRM must be further disseminated to the public and other government and non-government agencies via the Gewog/Municipal representatives and Dzongkhag/Gewog chat groups.

To ensure that all stakeholders are updated or consulted, the PMU and PIU must follow the Stakeholder Engagement Plan.

7.1.7. Contractor Selection, Cost Estimation and Bidding Process

During the project consultations, concerns were raised regarding contractor's ability to execute projects in remote locations based on experience with delay in projects, subcontracting non-compliance and the need to train local contractors who are better suited for remote work and benefit the local population. However, the risk with local contractors is that they do not have the capacity to implement water supply projects, especially construction of water treatment plants. There is also the risk that contractors may not be aware of UNDP SES, national legislation, Environmental and Forestry Clearance terms and conditions and ESMP budgeting requirements.

Mitigation. The PMU and PIU must ensure the following

- Include the provisions of the ESMP into the contract documents
- Conduct pre-bid meetings with interested contractors to brief them on ESMP budgeting and the need to comply with all national legislation and clearances.
- Conduct contractor training on the ESMP requirements, documentation and reporting procedures, Grievance Redress Mechanism.

The Contractor must review the ESMP and ensure that all required measures are budgeted to avoid lapses and non-compliance during implementation

7.2. Construction Phase

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

Use of substandard materials, improper construction, inadequate trenching and pipelaying may compromise the structural integrity and project sustainability. Because the Engineering team is in Punakha and is supervising multiple projects, it will be challenging to provide constant oversight, guidance and monitoring.

Mitigation. The PMU/PIU will be responsible for ensuring that a Quality Control/assurance plan is prepared and duly complied with by the contractor to ensure quality assurance through site supervision, material testing and corrective measures where required. The contract agreement must assign full liability to the contractor with penalties/ sanctions for substandard work. The engineering team must train and instruct the Dzongkhag technicians to supervise, monitor and guide the contractor. The PIU will be responsible for coordinating the supervision and monitoring for quality control and assurance for providing guidance to the contractor as required

7.2.2. Compliance Monitoring and Effectiveness of Mitigation Measures

Since the nature of the job necessitates the contractor to move camp or create multiple camps, especially if there are different teams at the intake site, WTP, and for the trenchwork and pipelaying, contractors must be routinely checked to verify that the ESMP is followed. Where mitigation measures

are not effective, or where unanticipated incidents occur, mitigation measures must be modified to suit the situation.

Mitigation. During contractor orientation, the contractors Environment Health and Safety person/focal must be trained in self- monitoring, documentation and reporting on ESMP activities as part of the monthly progress report. Any unanticipated incident must be immediately reported to the PIU for their immediate action/guidance. From time to time, the PMU must review the contractor reports to assess compliance to the ESMP and effectiveness of proposed mitigation measures and make necessary changes based on community feedback and evolving situations. The contractor must report any unanticipated incident and must be immediately reported to the PIU, who must in turn report to the PMU for their immediate action/guidance.

7.2.3. Recruitment of Workers and Labor Management

The contractor will need to recruit skilled and semi-skilled workers, that will comprise of both foreign or nationals' workers from within or outside the Dzongkhag. Worker recruitment risks include underage recruitment, gender discrimination, delayed or underpayment of wages, conflict among workers or lack of mechanisms for resolving grievances.

Mitigation. Contractors must follow UNDP standard 7 on Labor and working conditions, labor laws, rules, and regulations—such as those prohibiting child labor or discrimination, equal pay for equal work, and restrictions on forced labor—the PMU must make sure that these provisions are included in the bidding and contract papers. The contractor must follow the Labor Management Plan outlined in Chapter 9 (section 4) and establish a worker grievance procedure that enables all employees and workers to promptly and transparently settle issues. The contractor may improve the Code of Conduct for workers, brief workers and ensure compliance with sanctions for inappropriate behavior.

7.2.4. Worker Facilities

Construction workers run the risk of being provided with inadequate accommodation, unhygienic sanitation facilities and unsafe drinking water or inadequate lighting.

Mitigation. The Contractor must abide by both UNDP Standard 7 as well as National 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. The specific standards and guidelines will be provided in the bidding documents. The contractor may explore the possibility of renting local houses/buildings instead of constructing employee accommodation to reduce project footprint while reducing time and money in constructing worker camps. Standard 7 of UNDP shall be complied with by the contractor to ensure that the laborers are provided with a safe and healthy working environment, considering the risks inherent to the particular sector (including gender bias).

7.2.5. Worker Health and Safety

Workers may be made to work in risky situations or poor working conditions, lacking adequate tools, PPE or emergency medical supplies. While traveling or working in forested areas, if wildlife is abruptly disturbed, workers are at risk of being attacked.

Mitigation. At the minimum, the Contractor must follow the health and safety plan outlined in section 9.3 that requires a health and safety focal, hazard assessment and related safety measures, briefings,

PPE, first aid, emergency transportation and management, compensation for accidents, sharing of emergency contact information, documentation and reporting. The contractor may improve this plan and the Emergency Preparedness Plan, brief workers on both and ensure compliance.

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

UNDP standard 7 requires that contractors ensure the safety of communities by requiring that design and construction of structural elements are carried out by competent 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. Much of the infrastructure work will be carried out away from settlement areas except for the storage tanks and distribution lines. The Contractor will have site supervisors on site and will also be monitored by the PIU so potential risks can be identified and prevented.

Worker camps will be located within the town area as most of the construction activities are within this area. Gasa is a very small community that has not been exposed to many developmental activities compared to other larger cities and towns. The influx of nationals from outside the area and foreign workers could result in social conflicts, exploitation, spread of diseases like HIV/AIDS and risk of GBV and SEA, especially young girls. Additionally, the placement of worker camps could negatively impact the physical environment, especially if the sanitation facilities are not well maintained and waste is not adequately managed. Children and women may also be at risk of eve teasing, sexual harassment or abuse by workers.

Mitigation. To minimize interaction and conflict with the local community, the contractor must ensure that worker camps do not encroach on private property without the consent of the property owner. To reduce the risk of diseases, the contractor must ensure that foreign workers are screened for communicable diseases such as HIV/AIDs, Malaria and Dengue prior to arrival at the site. Worker camps must be self-contained and regularly cleaned and waste is managed according to the waste management plan to prevent the spread of diseases due to unhygienic living conditions. Workers must be instructed to avoid trespassing onto private property and required to follow the Code of Conduct. As new workers are inducted, they must be briefed on the definition of sexual harassment, eve teasing, gender-based violence and warned on sanctions for inappropriate conduct. The contractor must follow the GRM process and immediately address any grievances/complaints received from the public.

7.2.7. Women, Youth, Vulnerable Groups and Gender Mainstreaming

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. The project's positive impacts will be felt by every individual and household are long as all sections of society have access to safe drinking water. While the 98.22% of the rural population of Gasa is reported to have access to safe drinking water supply and sanitation, assessments carried out during the project preparatory phase and validated during the public consultations in March and May 2024, indicate the local population faces many issues with water availability and quality as described in the baseline chapter.

Gasa has the second highest annual mean household income, after Thimphu [78] and the highest employment rate (99.4%) [79]. With only 0.6% unemployment, it is expected that Gasa will have less vulnerable people or unemployed youth. Prior to the field visits, the Dzongkhag representative confirmed only 1 vulnerable person in the community. However, during the field visit, 4 were identified through focus group discussions and one on one consultations. Each of these have varying situations causing them to be vulnerable as shown in Annex 18. Two of the vulnerable persons participated in the public consultation and were also consulted separately during the focus group discussion. The third person (male) was consulted individually as he could not attend the meeting. It was not possible to consult the third person as she is mentally challenged and mute. She is, however, a Kidu recipient and is provided free accommodation, food and support from the district and the community. On the other hand, the male single parent with the autistic child will gain the most from the project because his water supply has dried out and since he cannot leave his child alone to explore alternative water sources. There are no NGOs in the Gewog or Dzongkhag that can provide support or assistance.

Although the women are vulnerable, their water problem is no different from the rest of the community. Reports from Gasa Hospital indicate that water-related diseases, such as common colds, urinary tract infections (UTIs), and acute gastroenteritis, are prevalent. These findings emphasize the importance of consistent access to clean water for the community.

Applying the UNDP principles to ensuring that no one is left behind and promotion of human rights, the project has ensured that vulnerable and marginalized persons are identified and consulted. The project must seek to improve the living condition of vulnerable people, especially the autistic family by ensuring safe drinking water supply so that they can also enjoy the same rights and opportunities as the rest of the population. While women in Gasa share equal responsibility with men in decision-making processes within their homes and communities, women still largely follow traditional gender roles managing their households and farming. Political representation of women remains limited, with only one female Tshogpa and no female candidates in national elections. While the crime rate is relatively low, it has been increasing over the years. Loss of face and fear of word spreading across the small community lends itself to self-censorship among women. The male gender focal inhibits women from disclosing sensitive information or submitting grievances. According to the Gender Focal Person who is a male, the only grievance he received in the past was from another male. Also, according to one participant, women face trust issues regarding women's fairness in decision-making in politics. This indicates a need for cultural shifts to support women's political participation.

Influenced by strong cultural ties to their villages, women generally do not engage in labor-intensive roles, preferring business and household management. Gender inclusion can be promoted by encouraging and ensuring women's participation in non-labor-intensive roles such as compliance monitoring and water user groups. This reflects a need for tailored capacity-building programs that align with women's skills and preferences.

While there have been no cases of domestic violence or gender-based discrimination within the community. The arrival of project workers may increase the risk of GBV, sexual exploitation, and harassment. There have been no cases of domestic violence or gender-based discrimination within the

[78] NSB. 2022. Bhutan Living Standards Report

[79] NSB. 2022. Labor Force Survey Report

community. Disagreements are typically addressed by the Royal Bhutan Police (RBP), which has a balanced representation of male and female officers. This balanced representation ensures that women feel comfortable reporting issues. However, it is important to note that two middle-aged divorced women committed suicide in the past decade, highlighting a potential need for mental health support and counselling services, particularly the elderly and divorced women.

There are ample role models for women in the project site. Several officers in the Dzongkhag (Planning, Agriculture, Finance), the Doctor at the Hospital, the Gewog Administrative Officers and 50% of the Royal Bhutan Police staff are women.

The Dzongkhag has coordinated with the National Commission for Women and Children (NCWC), RENEW (Respect, Educate, Nurture and Empower Women), and the Royal Bhutan Police (RBP) to address these concerns. A helpline (113) is available for reporting such incidents. However, the absence of a fully operational RENEW office, which was intended to provide such support, underscores this need. The presence of collaborative arrangements with local law enforcement and support agencies is a proactive measure to address GBV. Ensuring that these mechanisms are accessible and trusted by the community is essential for their effectiveness.

Like other Dzongkhags, several young and financially able persons from the Dzongkhag have left to pursue their education or work in the city or abroad. Others are engaged as Desuups or volunteers. During the public consultation, the Municipal Representative expressed more confidence in the Desuups than in local contractors to execute the project. Every now and then, the Dzongkhag organizes Youth Support Programs and events whenever possible to improve the development of young people. These programs are organized during school vacation and provide opportunities for learning and socialization. Briefings during these events cover many important topics from Community Based Scouting, briefings about RENEW, first aid and traffic rules and are mixed with cultural programmes and talent contests[80].

Suggested Measures for Youth

- During the pre-bid consultation, the PMU should encourage the Contractor to provide work opportunities to unemployed youth in the project area
- Ensure representation and participation of youth and vulnerable groups[81] at all stages of the project.
- Encourage Youth to become members of the Water User Association or employ youth on a part time basis to carry out monitoring activities, or operation and maintenance work and provide training for the same.
- Support and encourage youth to take on leadership roles within community organizations, and provide capacity-building opportunities to do so
- Organize awareness programs to cover topics such as benefits of safe drinking water, health and hygiene, water conservation measures for school students, along with gender related topics such as GBV, Sexual harassment and the process of reporting of such incidents for students and monks at the ECCD, Gasa Primary School as well as the Dratshang

Suggested Measures for Vulnerable Persons.

[80] Gasa Dzongkhag. http://www.gasa.gov.bt/news/2nd-youth-support-programme-gasa

[81] 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

- Conduct awareness program for all project related staff on identification and consultation techniques to ensure inclusivity and participation of vulnerable persons at all stages of the project cycle
- Ensure that the water supply is available to all vulnerable persons, especially those most needing it the most.
- Invite relevant expert agencies to conduct awareness programs on mental health, and for counseling services.
- Explore the possibility of assistance for physically challenged/disabled persons from relevant agencies.

Suggested Measures for Gender Mainstreaming

- Conduct leadership and women's empowerment training for the women in the community
- Support and encourage women to take on leadership roles within community organizations, including water management committees and provide capacity-building opportunities to do so
- Schedule meetings at times and locations that are convenient for women so that women can fully participate in these meetings
- Sensitize men and community leaders on importance of Gender equality and the benefits of women's participation and seek their support to promote gender inclusion
- Regularly assess the effectiveness of these measures and adjust with progressive mitigation measures based on community feedback and changing needs
- Ensure that the GRM is accessible to females by always maintaining a female member in the GRM committee and as and when new members are nominated to the GRM committee, ensure that they are trained in procedures related to GBV and sexual harassment grievances.
- Nominate a female gender focal to complement the work of the existing gender focal officer, to allow women to be more forthcoming and comfortable to discuss gender-related incidents

7.2.8. Forest Clearance and Impacts on Biodiversity

Vegetation will be removed in forested areas for the construction of the water tanks, trenches for pipelaying, access road, WTP facilities, staff quarters and lab/office while worker camps will be sited in areas where little or no vegetation needs to be felled. The total area forest required to be cleared is approximately 1 hectare. While the forest area to be cleared is less than 0.01% of the cool broadleaf forest area in Gasa Dzongkhag, the concern is the steady loss of forest cover in Gasa due to developmental activities and the associated impacts of construction projects within forested areas.

The Sambar was the only Vulnerable species recorded during the survey, which only provides a snapshot of species occurrence. Therefore, just because no endangered, rare or threatened species were recorded, this does not imply that these species are not present. However, several floral and bird species listed in Schedule II and III of the FNCA 2023, which cannot be collected, possessed, or traded except with a permit were recorded. There is the risk that valuable species will be collected indiscriminately once workers are aware of their value leading to overharvesting of the species.

Mitigation. To minimize the impact on state forest reserve land and to species in the area, the following measures are proposed.

- Process for Forest clearance for 400m of access road to the WTP site and ensure that road is not constructed to the intake site to facilitate material transportation.

- Share the Environmental Clearance and the Forestry clearance with the contractor
- Support the implementation of the Biodiversity Action Plan (Section 9.2)
- Consult the Park and Department of Forest and Park services to determine and allocate budget to pay the Royalty for the felling of trees as well support the implementation of the Biodiversity Action Plan including measures for restoration of degraded areas after completion of the construction activities
- Ensure that PIU conducts compliance monitoring to check that the contractor abides by the terms and conditions of the Environmental, Forest Clearance and the BAP

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. 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 caused by construction activities/workers.
- Adopt environmentally friendly construction techniques to ensure minimal damage to the surroundings.
- The contractor shall ensure reuse excess soils for beneficial purposes such as raising the level of low-lying areas and ensure proper disposal of excess excavated materials, carrying out slope stabilization to reduce soil erosion. Excess soil must not be disposed indiscriminately downslope or allowed to runoff into the stream.

7.2.9. Impact to Community Health and Safety Due to Increase in Traffic Due to Material Transportation

Construction materials such as cement, aggregates, sand, pipes and equipment will have to be transported to the various sites. The project's scale will limit material requirements, causing minimal impact on traffic, disturbance, and air emissions during construction, as Gasa's traffic is low, and roads are buffered by vegetation. However, the risk of accidents may be high along narrow road stretches and sharp bends. Until the new township is developed, there will be ample space for material storage and parking in the recently leveled Kolikha township, but this will require prior permission from the Dzongkhag. Due to the lack of an access road to the intake site, materials will be transported manually by horses and porters, potentially causing disturbance to surrounding vegetation.

Mitigation: To minimize the impacts due to the increase in traffic, material transporters must adhere to the speed limit to avoid accidents and conduct regular vehicle maintenance to prevent smoke belching. Transport vehicles must have back sirens to alert workers or the public when moving. The contractor must brief porters to avoid cutting trees and to store materials in already cleared areas. Also, the communities along the transport route must be informed on construction traffic and duration and material transporters must avoid busy travel times along the routes within Gasa Town, especially school

and office arrival and departure times. These communities as part of the project area will be informed on the existing GRM procedure and can submit grievances if travel routes are obstructed or material transportation

7.2.10. Construction Camps and Work at the Water Source and Near Streams

Activities at the water source include construction of contractor camps, intake channel, collect tank, gabion wall and fencing works and excavation work near the stream. Since the intake structure will be constructed upstream of the existing intake for the town water supply, construction activities can cause temporary contamination to the town water supply due to increase in sediments and construction waste. This was a concern raised during the public consultation as well.

Mitigation. The contractor must ensure the following:

- Ensure that debris and construction work upstream of the intake does not pollute or compromise the quality of the water for downstream users.
- Maintain at least 30m distance between worker camps, especially sanitation facilities and material stores and the stream.
- Adopt environment friendly construction techniques[82] to ensure minimal damage to the surroundings and the stream.
- install soak pits to collect effluent from the worker camps instead of releasing this directly into the stream
- Ensure that all waste (non-Hazardous and Hazardous) is stored in demarcated areas within the project site and transported for disposal as per the waste management plan.

7.2.11. Excavation of Trenches and Pipelaying in Settlement Areas

Initially during the design stage, it was assumed that the trench and pipelaying would impact the private land belonging to 5 households in Phulakha Village. However, during the site visit along with the five households, it was determined that no private land will be impacted. Therefore, there is no need to seek clearance from private land holders. While the intake structure, WTP and treated water reservoir tanks are all located in state forest reserve land, the trenchwork for the distribution pipelines will traverse both land belonging to government and non-governmental agencies and disrupt existing pipelines belonging to agencies such as NHDCL and BPC, causing water shortage. Trench excavation will be cut across access roads and pathways causing temporary inconvenience to vehicles and passersby, especially if excavated material is not stored safely. Trenches, if left uncovered for long periods of time, can also pose a risk for younger children walking to school, or passersby at night. Dust will be generated from trenchwork or from piles of excavated soil on windy days.

[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.

Mitigation. The PIU has already sought the necessary consent from institutional/agencies for trenching and pipelaying. However, to minimize disruption to the water supply, proper coordination and prior information must be provided to all stakeholders before commencing work. This will allow them to inform their staff, residents and students accordingly, and make alternative arrangements for water supply and storage until the water pipelines are restored. Trench work and pipe laying along access roads and pathways, must be completed as soon as possible to reduce hindrance to travelers and passersby. Unwanted excavated soil must not be left obstructing narrow pathways and must be covered near offices or residential areas to reduce dust generation. Safety signage and barricades must be installed where trenches are constructed near the school and pathways and trails must not be obstructed with material or equipment.

The contractor will be responsible for repairing any damage to government or private property at the contractor's own cost. To ensure that all grievances are addressed, the contractor must disseminate information on the GRM focal point to the PIU and community and follow the Grievance Redress Mechanism. To minimize dust, the contractor must adopt dust suppression on windy days with water and maintain a water sprinkling logbook in auditable format.

7.2.12. Religious and Cultural Sites and Religious and Cultural Practices

The town has several religious, spiritual and cultural sites as identified in the baseline chapter. The most significant of these is the Phulakha Lhakhang and the Gaden Phodrang, a very significant sacred site, about 130m from Lhakhang. The distribution lines will be laid about 10m from the eastern wall of the Lhakhang and the sacred site.

Mitigation. Since these are very significant sites, it is imperative that clearance from the Dratshang/ Department of Culture and Dzongkhag Development is sought prior to award of the construction activity. Once the approval is sought, care must be taken to ensure that the site is not damaged. Also, the contractor must provide prior information on the work schedule near these sites to the Lam of the Lhakhang and ensure that the work does not cause any disturbance during religious festivals or prayers.

Furthermore, in case any artifacts, archaeological or humans are found, the contractor must follow the chance find procedure. To respect local practices, the PIU and Contractor should avoid organizing meetings and trainings during festivals or occasions when the community is occupied with their traditional/cultural activities

7.2.13. Blasting

Blasting will be carried out along steep slopes that lie along the water pipeline alignment. This will disturb wildlife and communities due to the noise and vibration. The dust, fumes and rockfall may also be a hazard to workers (and the community) and increase the potential for landslides in the surrounding area with unintended consequences on the stability of the terrain.

Mitigation Measure: The contractor must ensure the following:

- Follow silent/controlled blasting techniques that minimize vibrations, dislodging fragmentation of rock fragmentation.
- Comply with the Explosives Rules, 1989 in terms of permits, procurement, transportation, storage, security personnel, safety precautions, maintenance of records and blasting procedures.

This includes ensuring that a competent person/blaster with a shotfirer's certificate and experience in preparing and carrying out blasting work is utilized.
- Ensure the safety of all blasters through proper provisioning of the requisite PPE.
- Ensure the safety of other workers during blasting operation through use of warning signs and audible signals before the commencement of blasting.
- Report any loss or theft of explosives immediately to the permit issuing authority and to the nearest police station.
- Immediately remove all remaining explosives from the site upon completion of blasting.
- Prepare Emergency Preparedness and Response Plan and follow emergency procedures to evacuate injured persons immediately to a health facility in case of accidents.
- Inform the community when the blasting work is going to commence so that all are aware about this and place an alarm prior to blasting work

7.2.14. Soil Erosion and Landslides

It is anticipated that by the time the contract is awarded, the monsoons will be receding, reducing the risk of soil erosion and landslides, as the rains will be less intense. No landslides were observed along the entire main water pipeline alignment, which is densely vegetated. However, blasting in steep rocky areas (to create the water pipeline trenches) and improper soil disposal from trench construction could lead to soil erosion.

Mitigation: In areas where blasting is carried out, the design includes slope stabilization with retaining walls and pipes supported with pillars. Therefore, aside from following the design, the only additional measures to be undertaken by the contractor include constructing temporary drains along exposed areas to channelize runoff and reduce erosion and checking newly cut fragile slopes for landslides in case of heavy downpour.

7.2.15. Road Construction

A 400m access road will be constructed to the Water Treatment Plant from the road leading to the NHDL colony, which will take off from the road to land belonging to RENEW (Respect, Educate, Nurture and Empower Women) - a National non-profit organization. The alignment will traverse cool broadleaf forest under state forest land for which forest clearance is required as well as environmental clearance. The road will not impact private property. Road construction will generate noise, require slope stabilization, management of excavated soil to minimize soil erosion and dust mitigation during excavation works. As the alignment passes close to the Phulakha Lhakhang and the Gaden Phodrang, the road construction must be planned to minimize impacts on PCRs and disturbance during religious prayers. The existing water pipeline to NHDCL passes through the same area and will be at risk of damage during road construction. While the consent from NHDCL has been secured, proper coordination and care must be taken to minimize disruption of the water supply.

Mitigation. The PIU must ensure the following

- Seek environmental and forest clearance for road construction,
- inform and seek approval from the Dratshang/ Department of Culture and Dzongkhag Development on the proposed road alignment
- Secure the consent from RENEW for the road take off.
- Inform NDHCL about the access road and its impact to the water pipeline

The Contractor must follow the mitigation measures

- Slope stabilization in steep areas
- Ensure the proper reuse of and disposal of excess soil from road construction
- Suppress dust by spraying water
- Provide prior information to NHDL before excavation work so that provisions can be made to store water temporarily until the water supply is reconnected
- Ensure that all damaged pipelines are immediately repaired, and the water supply is restored at the earliest possible

7.2.16. Construction of the WTP

The WTP facility construction is expected to commence once the access road has been constructed. These activities will require clearance of forest and vegetation, material delivery and storage, excavation works and construction of various structures (stilling chamber, slow sand filters, Weir Chamber, Clear water tank, site office/ laboratory and staff quarters). As the site is located more than 300m from Phulakha village and is surrounded by dense vegetation, impacts of dust and noise and material storage will be minimal. The excess excavated soil can be reused for leveling works so no soil disposal will be required. Water for construction will be sourced from nearby streams with the permission of the water user/Dzongkhag/Gewog/Municipal representative as required.

Mitigation. The contractor must:

- Seek approval from Dzongkhag/Gewog/Municipal or water users to tap water and avoid damaging existing water pipelines by following the same protocols as described above for access roads.
- Implement water conservation measures such as installation of water tanks, use of faucets to minimize wastage, conduct regular checks and fix leakages.
- Follow the waste management plan to ensure minimal damage to the surrounding environment,

7.2.17. 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. As per the project design, the new water pipelines are intended to replace the municipal water pipes. Old unused pipelines in forest and settlement areas are not biodegradable and can persist for several years, causing microplastic contamination, soil fertility issues, environmental degradation and aesthetic impacts.

Mitigation: Once the infrastructure work is completed, the PIU must ensure the restoration of all cleared sites. The Dzongkhag along with the park should remove all replaced and unused pipes and reuse, recycle or dispose of these as construction debris. The Contractor must dismantle site offices and worker camps, fill in pit latrines, remove all waste from the worksite and worker camps and dispose of these at the landfill site.

7.3. Operation and Maintenance Phase

7.3.1. Operation of the Water Treatment Plant – Chemical Use and Waste Generation

The WTP is a multi-stage water purification system that relies on physical filtration and biological mechanisms to clean the water. Once the velocity of the incoming water is reduced and large particles settle to the bottom, the water is purified as it percolates through the slow sand filter where fine particles, organic material, and microorganisms are removed. The weir chamber helps to control flow rate and aeration and the purified water is stored in the treated tank before it is distributed.

To disinfect the water, chlorine compounds (bleaching powder/liquid chlorine) which require safe handling, storage and usage may cause health hazards to the handlers. The WTP will also require trained operators and technicians to operate, monitor and test the water quality from time to time in the laboratory and monitor chlorine residuals in distribution systems. Also, sludge is generated during the sedimentation process and will require removal or disposal.

Mitigation. PIU must ensure that the required personnel are provided to man the water treatment plant, and that personnel are trained in the handling, storage and use of appropriate levels of chlorine. Workers must be provided with the appropriate PPE for such activities. Sludge must be disposed of at the landfill site and not disposed of indiscriminately.

7.3.2. Wear and Tear of the Infrastructure

During the operation phase, proper management of the water supply scheme, especially the infrastructure components is critical to minimize wear and tear and reduce maintenance costs, especially the water treatment plant. Poor Operations & Maintenance processes will also result in unsafe drinking water.

Measures for maintenance of the infrastructure include the following:

- Appoint/designate and train technicians in regular maintenance works. The project may explore hiring and training of local unemployed youth to carry out regular check and maintenance work.
- Allocate budget for operation and maintenance from the water user fees
- Implement the water tariff to generate income for maintenance and operation

7.3.3. Disaster and Natural Hazards

The risk to the water supply scheme in the project area is mainly from earthquakes and landslides that could be triggered by heavy rain on steep slopes that could damage the infrastructure. Otherwise, there are no risks due to flooding or windstorms. While the design of the infrastructure has mitigated this risk to some extent through burial of the pipes and construction of gabion walls, natural hazards and their impacts cannot be predicted.

Mitigation. The project must incorporate measures to immediately build back better after disasters and natural hazards. To do so, maintenance staff must be provided with inspection protocols to be implemented following any serious hazard/disaster from conducting inspection of the water infrastructure after a natural hazard/disaster to carrying out repair and maintenance so that the infrastructure is resilient and does not break down as easily. For large scale damage, the PMU must be approached for both technical and financial assistance.

7.3.4. Compliance with National Drinking Water Standards

The Project must ensure compliance with National Drinking Water Standards through constant monitoring of the water quality. This requires making the laboratory fully operational or utilizing the services of the BHU. Currently the BHU does have the technicians to conduct the water quality testing. A Water Safety Plan has been proposed for the 13FYP, that includes the procurement of equipment and establishment of a water safety committee, but the budget is not guaranteed.

Mitigation. Under the ACREWAS project, installation of Supervisory Control and Data Acquisition (SCADA) within the WTP office will be carried out. The laboratory must be equipped and manned by a trained technician or the Ministry of Health must be requested to transfer a technician to the BHU so that water quality can be tested regularly, and remedial actions can be taken to ensure safe drinking water**.**

7.3.5. Cumulative Impacts

For Gasa township, future development activities are dependent on the availability of financial resources. With the Gewog, future developmental plans include small infrastructure development such as construction of bus terminal, children's park, open gym, public toilets installation of streetlights, road improvement and maintenance[83]. However, these activities will not be implemented at the same time and in the same location as the Shingtalum water supply scheme so there will be no cumulative impact due to these activities.

While the water supply scheme has been designed based on population projection, when the township development activities commence, the demand for construction water will increase especially if there are simultaneous building constructions. The water abstraction will however not change because the abstraction level will be limited due to the size of the water pipes. Thus, there will be no cumulative impact on the water source. However, the thromde must explore alternative sources for these construction activities so that drinking water is not utilized for this, unless there is surplus water, and users are willing to pay for water usage.

[83] Source. Gasa Dzongkhag ESIA consultation, June 2024

8. ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

8.1. ESMP

The Environment and Social Management Plan (ESMP) aims to mitigate the negative environmental and social risks and impacts that have been identified in the previous chapter. The ESMP is aligned with national legal policies, acts and regulations and the existing institutional framework, as well as UNDP's Social and Environmental Standards, and GEF safeguards. It outlines key players, timelines, and monitoring responsibilities for these measures from the design to the operation phase. The ESMP table's budget is an estimate, with potential variations, but is not expected to significantly change.

To make the ESMP easier for each responsible party, the activities have been segregated into PMU, PIU and the Contractor. All activities by the PMU are subject to review by the PSC, while the activities assigned to the PIU are subject to supervision, guidance and review by the PMU. In turn, the PIU comprising the Engineering Cluster and Dzongkhag will be responsible for the supervision and compliance monitoring of the Contractor.

The ESMP section relevant to the contractor must be included in the bid documents so that the ESMP cost can be provisioned in the contractor's bid cost. The Table below summarizes the project impacts and mitigation measures by project phase.

Table 19. ESMP activities for the PMU and PIU to be supervised by PSC

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility
Pre-construction Phase				
Project design	Beneficiaries	Risk that inadequate water tanks will not resolve existing water shortage issues for the School, Dratshang and Hospital	-Explore possibility of adding three separate water tanks for the School, Dratshang and Hospital	PMU
Project design-selection of water source and water abstraction	Water source Shingtalum	Future higher variability in stream flows and climate change could lead to a shortage in raw water supply and an increased risk of water sources drying up	-Support the implementation of measures identified after the watershed plan is prepared. -Seek alternative sources if needed	PMU in consultation with DoW, DoFPS and donor
		Impacts on aquatic ecosystems and ecosystem functionality and downstream impacts	-Currently more than 50% of the eflow will be maintained. In the future, if more water is required, ensure that 30% environmental flow is always maintained in the streams for ecological purposes.	PMU
		Future higher variability in stream flows and climate change could lead to a shortage in raw water supply and an increased	- Carry out annual discharge measurements, especially during lean seasons to understand water availability trends -Support the implementation of measures identified after the	PMU/PIU

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility
		risk of water sources drying up	watershed assessment and watershed management plan is prepared. -Seek alternative sources if needed	
Project design-location of project components	Protected areas and Forest cover	Impact on 1 hectare of forest in the multiple zones of Jigme Dorji National Park	- Ensure that no road is constructed, without prior approval of the park, to the intake site to facilitate material transportation. -Share the EC and FC with the contractor and ensure compliance - Consult the Park and Department of Forest and Park services to determine and allocate budget to pay the Royalty for the felling of trees as well support the implementation of the BAP including measures for restoration of degraded areas after completion of the construction activities.	PIU
Project changes, schedule and GRM	Project disclosure and information	Risk of project stakeholders not being updated on project changes, schedule or informed on GRM process	-Communicate changes to project design and updates on project schedule and activities to the Dzongkhag and project stakeholders - Issue official notification on the GRM Committee members and ensure that when these members are replaced, their replacements are briefed on the GRM procedure. - Disseminate information on the GRM to the public and other government and non-government agencies via the Gewog/Municipal representatives and Dzongkhag/Gewog chat groups, especially those living along the transport routes and along the distribution lies. - To ensure that all stakeholders are updated or consulted, follow the Stakeholder Engagement Plan and ensure that vulnerable persons are informed of the project activities, potential project risks and the GRM process.	PMU/PIU
Contractor selection	Gasa Thromde	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	-Include the provisions of the ESMP into the contract documents -Conduct pre-bid meetings with interested contractors to brief them on ESMP budgeting and the need to comply with all national legislation and clearances. -Conduct contractor training on the ESMP requirements, documentation and reporting procedures, Grievance	PMU/PIU

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility
		construction and risk of subcontracting	Redress Mechanism and brief on quality assurance	
Construction phase	Project site	Risk of poor construction quality and use of substandard materials	- conduct routine monitoring to ensure quality construction through use of standard materials, construction quality, safety and compliance. - train and instruct the Dzongkhag technicians to supervise, monitor and guide the contractor. - The contract agreement must assign full liability to the contractor with penalties/ sanctions for substandard work.	PMU/PIU
Construction Phase				
Construction activities	Project site	Risk of non-compliance with UNDP SES and ESMP	-During contractor orientation, train the contractor's focal person in self-monitoring, documentation and reporting on ESMP activities as part of the monthly progress report and ensure that all unanticipated incidents are reported immediately to the PIU for their immediate action/guidance. -Review contractor reports to assess compliance to the ESMP and effectiveness of proposed mitigation measures and make necessary changes based on community feedback and evolving situations.	PMU/PIU
Project activities	Youth	Lack of opportunities for youth	-During the pre-bid consultation, the PMU should encourage the Contractor to provide work opportunities to unemployed youth in the project area -Ensure representation and participation of youth and vulnerable groups[84] at all stages of the project. -Encourage Youth to become members of the Water User Association or employ youth on a part time basis to carry out monitoring activities, or operation and maintenance work and provide training for the same. - Support and encourage women and youth to take on leadership roles within community organizations, including water	PMU and PIU

[84] 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

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility
			management committees and provide capacity-building opportunities to do so -Support awareness programs to cover topics such as benefits of safe drinking water, health and hygiene, water conservation measures for school students, along with gender related topics such as GBV, Sexual harassment and the process of reporting of such incidents for students and monks at the ECCD, Gasa Primary School as well as the Dratshang. -	
Project activities	Vulnerable persons/families	Lack of opportunities for vulnerable persons/families	-Conduct awareness program for all project related staff on identification and consultation techniques to ensure inclusivity and participation of vulnerable persons at all stages of the project cycle -Ensure that the water supply is available to all vulnerable persons, especially those most needing it the most. - invite expert agencies such as the PEMA to conduct awareness programs on mental health, and RENEW for counseling services -Explore the possibility of assistance for physically challenged/disabled persons from agencies such as Ability Bhutan.	PMU and PIU
Project activities	Women	Lack of opportunities for women	-Conduct leadership and women's empowerment training for the women in the community - Support and encourage women to take on leadership roles within community organizations, including water management committees and provide capacity-building opportunities to do so - Seek the assistance of professionals/NGOs to provide capacity building for Dzongkhag Gender Focal Person on how to ensure gender inclusion in project activities and involvement and benefit sharing. -Schedule meetings at times and locations that are convenient for women so that women can fully participate in these meetings	PMU and PIU

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility
			-Sensitize men and community leaders on importance of Gender equality and the benefits of women's participation and seek their support to promote gender inclusion -Regularly assess the effectiveness of these measures and adjust with progressive mitigation measures based on community feedback and changing needs -Ensure that the GRM is accessible to females by always maintaining a female member in the GRM committee and as and when new members are nominated to the GRM committee, ensure that they are trained in procedures related to GBV and sexual harassment grievances. -Nominate a female gender focal to complement the work of the existing gender focal officer, to allow women to be more forthcoming and comfortable to discuss gender-related incidents	
Tree felling and construction activities in SRFL	Forest habitat and biodiversity	-Impacts on biodiversity and wildlife habitat Risk of non-compliance with the EC and Forestry clearance	-Ensure that no road is constructed to the intake site to facilitate material transportation. -Share the Environmental Clearance and the Forestry clearance with the contractor -Support the implementation of the Biodiversity Action -Consult the Park and Department of Forest and Park services to determine and allocate budget to pay the Royalty for the felling of trees as well support the implementation of the Biodiversity Action Plan including measures for restoration of degraded areas after completion of the construction activities -Ensure that PIU conducts compliance monitoring to ensure that the contractor abides by the terms and conditions of the Environmental and Forest Clearance and the BAP	PMU and PIU
Operation Phase				
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.	PMU and PIU

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility
			-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.	
Source sustainability	Water source	Risk of water source contamination or drying up	Support DoW and DOFPS to implement Watershed and local forest management plans	PMU
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	PMU and PIU
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 - Promote the efficient use of water through water user groups	PIU

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility
			-Promote household efficient water conservation practices	
Restoration of degraded habitats	Forest cover and Biodiversity	Loss of forest cover and biodiversity	Provide support to DOFPS to implement restoration activities	PMU and PIU

Table 20. ESMP activities for the Contractor to be supervised by PIU and PMU

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility for supervision
Pre-construction Phase				
Bidding	Project site	Risk that ESMP measures are not budgeted into contract cost	Contractor must review the ESMP and ensure that all required measures are budgeted to avoid lapses and non-compliance during implementation	PMU/PIU
Recruitment of workers	Contractor's employees and workers	Risk of non-compliance with national labor laws and rules	Comply with the requirements of the national legislation on recruitment, management and health and safety of all workers and the Labor Management Plan. -Establish a worker grievance redress mechanism to resolve workers conflicts and grievances - The contractor may improve the Code of Conduct for workers, brief workers and ensure compliance with sanctions for inappropriate behavior.	PIU
Recruitment of workers	Contractor's employees and workers	Risk of inadequate facilities for workers	must abide by schedule III of the Regulation on occupational health and safety for the construction industry 2022 to provide appropriate gender friendly accommodation, with ample and safe drinking water, electricity, and sanitation facilities with separate toilets for females. Water supplied should meet drinking water quality standards. Water quality testing must be carried out regularly. Explore the possibility of renting local houses/buildings instead of constructing employee accommodation to reduce project footprint.	PIU
	Employees and workers	Risks to the occupational health & safety of employees and workers	To reduce the risk of diseases, the contractor must ensure that worker camps are self-contained and regularly cleaned and waste is managed according to the waste management plan. - At the minimum, the Contractor must follow the Occupational Health and Safety Plan, which requires a health and safety policy, a health and safety focal, hazard assessment and related safety measures, briefings, PPE, first	PIU

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility for supervision
			aid, emergency transportation and management, compensation for accidents, sharing of emergency contact information, documentation and reporting. -The contractor may improve the Code of Conduct for workers and Emergency Preparedness Plan, brief workers and ensure compliance.	
Worker recruitment	Public and local community	Impact due to influx of workers	-Ensure that worker camps do not encroach on private property without the consent of the property owner. -Ensure that foreign workers are screened for communicable diseases such as HIV/AIDs, Malaria and Dengue prior to arrival at the site. -Ensure worker camps are self-contained and regularly cleaned and waste is managed according to the waste management plan to prevent the spread of diseases due to unhygienic living conditions. -Instruct Workers to avoid trespassing onto private property and to require them to abide by the Code of Conduct. -As new workers are inducted, brief them on the definition of sexual harassment, eve teasing, gender-based violence and warn them on sanctions for inappropriate conduct. -Follow the GRM process and immediately address any grievances/complaints received from the public.	PIU
Tree felling and construction activities in SRFL	Forest habitat and biodiversity	-Impacts on biodiversity and wildlife habitat Risk of non-compliance with the EC and Forestry clearance	-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. Maintain fire	PIU and Park Management

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility for supervision
			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 caused by construction activities/workers. -Adopt environmentally friendly construction techniques to ensure minimal damage to the surroundings. -Reuse excess soils for beneficial purposes such as raising the level of low-lying areas along with soil stabilization measures and avoid dumping soil downslope	
Material transportation and storage	Project site	Increase in risk of accidents along narrow road stretches, pollution and disturbance to surrounding vegetation due to manual haulage	-Material transporters must adhere to the speed limit to avoid accidents and conduct regular vehicle maintenance to prevent smoke belching. -Transport vehicles must have back sirens to alert workers or the public when moving. -communities along the transport route must be informed on construction traffic and duration -and material transporters must avoid busy travel times along the routes within Gasa Town, especially school and office arrival and departure times. -For manual transportation, contractor must brief porters to avoid cutting trees and to store materials in already cleared areas.	PIU
Construction camps and work at the Water Source and near streams	Water users	Pollution of streams and reduced water quality for users	-Ensure that debris and construction work upstream of the intake does not pollute or compromise the quality of the water for downstream users. -Maintain at least 30 m distance between worker camps, material stores and the stream -Adopt environment friendly construction techniques[85] to ensure	PIU

[85] 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.

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility for supervision
			minimal damage to the surroundings and the stream. -Install soak pits to collect effluent from the worker camps instead of releasing this directly into the stream -Ensure that all waste (non-Hazardous and Hazardous) is stored in demarcated areas within the project site and transported for disposal as per the waste management plan.	
Water requirements	Existing water sources and water users	Requirement of water for construction activities	-Seek approval from Dzongkhag/Gewog/Municipal or water users to tap water and avoid damaging existing water pipelines by following the same protocols as described above for access roads. Implement water conservation measures such as installation of water tanks, use of faucet to minimize wastage, conduct regular checks and fix leakages.	PIU
Excavation of trenches and pipeline in settlement areas and along access roads and pathways	Institutional land holders and community	Hindrance and disturbance to government and non-government land holders and community	-Provide prior information to all stakeholders before commencing work to allow them to make alternative arrangements for water supply and storage until the water pipelines are restored. -Complete trenchwork and pipelaying along access roads and pathways, as soon as possible to reduce hindrance to travelers and passersby. -Avoid leaving surplus excavated soil along narrow pathways -Install safety signage and barricades near the school and pathways and trails -The contractor will be responsible for repairing any damage to government or private property at the contractor's own cost. -Disseminate information on the GRM focal point to the PIU and community and follow the Grievance Redress Mechanism. -To minimize dust suppression on windy days with water and maintain a water sprinkling logbook in auditable format.	PIU

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility for supervision
Excavation near sites of religious and cultural significance	Socio-cultural groups	Excavation of pipelines may impact cultural and religious sites and disturb religious and cultural practices	- provide prior information on the work schedule near these sites to the Lam of the Lhakhang and ensure that the work does not cause any disturbance during religious festivals or prayers. -In case any artifacts, archaeological or humans are found, follow the chance find procedure -To respect local practices, avoid organizing meetings during festivals or occasions when the community is occupied with their traditional/cultural activities.	PIU
Blasting	Forest, slopes	Risk of impacts due to blasting on the natural environment and workers	-Follow silent/controlled blasting techniques that minimize vibrations, dislodging fragmentation of rock fragmentation. -Comply with the Explosives Rules, 1989 in terms of permits, procurement, transportation, storage, security personnel, safety precautions, maintenance of records and blasting procedures. This includes ensuring that a competent person/blaster with a shotfirer's certificate and experience in preparing and carrying out blasting work is utilized. -Ensure the safety of all blasters through proper provisioning of the requisite PPE. -Ensure the safety of other workers during blasting operation through use of warning signs and audible signals before the commencement of blasting. -Report any loss or theft of explosives immediately to the permit issuing authority and to the nearest police station. -Immediately remove all remaining explosives from the site upon completion of blasting. - Follow Emergency Preparedness and Response procedures to evacuate injured persons immediately to a health facility in case of accidents. -Inform the community when the blasting work is going to commence so that all are aware about this and place an alarm prior to blasting work	PIU

Activity	Key receptor	Risk/impact evaluation	Mitigation measures	Responsibility for supervision
Construction activities	Project sites	Risk of soil erosion and landslides	-include construct temporary drains along exposed areas to channelize runoff and reduce erosion -check newly cut fragile slopes for landslides in case of heavy downpour.	PIU
Road construction	Project site	Impacts on the natural environmental and water users	Stabilize steep with bioengineering -Reuse excavated soil for leveling works to minimize disposal -Suppress dust by spraying water -Provide prior information to NHDL before excavation work so that provisions can be made to store water temporarily until the water supply is reconnected -Ensure that all damaged pipelines are immediately repaired, and the water supply is restored at the earliest possible	PIU
Construction of the WTP	Project site and water sources	Construction water requirements and risk of damage to existing water pipes	-Seek Dzongkhag/Gewog approval to tap water -avoid damaging existing water pipelines and follow the same protocols on existing water pipelines -Follow the waste management plan to ensure minimal damage to the surrounding environment	PIU
Completion of construction work	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 of these as per prevailing practices in the Gewog.	PIU
	Water pipelines	Risk of locating pipelines during O&M	- As built drawing with GPS coordinates must be provided to the PIU/PMU. This will be maintained by the PIU for O & M purposes.	PIU

8.2. Implementation of the ESMP

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

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 to facilitate the procurement, construction and implementation and operation of the project through the PIU (Dzongkhag and REC). 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 cover the cost of establishing a plantation and its maintenance for 5 years.
- Support in conducting 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 (Gasa Dzongkhag) during project design, pre-construction and for ensuring quality control during the construction phase in collaboration with the Gasa Dzongkhag.

Project Implementation Unit

The PIU 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 an 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

The PIU must monitor the implementation of the Environmental and Social Management Plan (ESMP) and prepare and submit compliance reports while the contractor is responsible for daily monitoring and monthly reports. Monitoring must be carried out in the form of site visits, daily records and based on the indicators and the frequency provided in the table below.

Table 21. Environment and Social Monitoring Plan

Activity	Method of Measurement/Indicators	Frequency	Responsibility	
Pre-construction Phase				
Project design	Discharge studies to determine that environmental flow maintained and source sustainability analysis	One time	PMU	PSC
Clearance and Approvals	Number and types of clearances and consents obtained	One time	PIU	PMU
Incorporation of EMP into bid documents	This ESMP must be included in bid document	One time	PMU	PSC
Incorporation of budget for ESMP and OHS in contract	Contractor bid document	One time	Contractor	PIU
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	Quality control and assurance to be monitored by the PIU	Three times	PMU and Contractor	PMU
Consents and Permits	Tree marking by DOFPS, and number of trees felled	One time	Contractor	PIU
Recruitment of workers	-- Number of skilled and unskilled workers (foreign/national; by gender) - 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	Quarterly	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 - Warning signs at risky/hazardous areas - Accident registers with incidents and actions taken	Quarterly	Contractor	PIU

Activity	Method of Measurement/Indicators	Frequency	Responsibility	
	- Number of fire extinguishers installed at site - Type and no. of trainings (training record, participant list and photos) - 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	Quarterly	PIU	PMU
Impact on downstream users and current water users	- Number of grievances from downstream users/Gasa residents	One time	PIU	PMU
Water supply and conservation	- Measures taken during periods of shortage (e.g. storage tanks/drums) and water conservation measures - Ocular observations of leaking pipes - approval to tap water for construction	Quarterly	Contractor	PIU
Waste management of worker camps, construction sites	- Number and types of waste collection receptacles - 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	Quarterly 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 - Reuse of excess soil -Ocular observation of soil disposal over slopes and disposal areas	Quarterly or as necessary	Contractor	PIU
Site drainage	- Site drainage construction and maintenance - Ocular observation of site drainage	Quarterly	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 access road, blockage of drains and footpaths)	Quarterly/ as and when required	Contractor	PIU
Material storage	- Number of material storage sheds - Ocular observation on material storage at site	Quarterly	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	Quarterly /as and when required	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

Activity	Method of Measurement/Indicators	Frequency	Responsibility	
	- number of complaints from the Park			
Soil erosion and landslides	- Ocular observation of site conditions - presence of temporary drains along exposed areas - retaining walls in landslide prone areas	Quarterly	PIU	PMU
Impact on water pipelines	- Grievance Record and No. of grievances due to damage to water pipelines - Ocular observation of excavation work	Quarterly	PIU	PMU
Impact on Physical Cultural Resources	# Grievances regarding cultural resources -Ocular observation of excavation work /road construction near Dzong, Lake and Phulakha Lhakhang and chorten	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	Annually	Municip ality	PIU
Water shortage	- Number of complaints by community on water shortage - Water usage report - Water discharge measurements	Quarterly	Municip ality	PIU
Safe drinking water	- Number of water tests carried out and test results	Semi-annual ly	Municip ality	PIU
Natural hazard and disasters	- Inspection results out after natural hazards or disaster - Repair work or restoration of damaged infrastructure	Quarterly	Municip ality	PIU
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	Annually	Municip ality	PIU
Accountability and Grievances	- Number of grievances and actions taken	Quarterly	Municip ality	PIU
Restoration activities	- Number and types of restoration activities - Area of land restored	One Time	PIU	PMU
Waste management from the water treatment Plant	Record of sludge management and disposal	Quarterly	Municip ality	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.

10.1.1. GRM Objectives

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.

10.1.2. 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: a) The complaint must 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, b) the complaint must specify the kind of impact has occurred or may occur, and how the project has caused or may cause the impact, c) The complaint must indicate that those filing the complaint are the ones who have been impacted, or are at risk of being impacted and that the representative is doing so at the request of the complainant, d) there is adequate information for GRM staff to decide on the first three questions.

10.1.3. GRM Process

The GRM process is designed to act as a problem-solving mechanism but not a substitute for the legal processes. It must be accessible, practicable, effective, transparent and time bound to enable resolution of grievances on terms that are mutually acceptable to all parties involved and respect 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).

For the GRM to be accessible to all persons/parties, it must be communicated or disclosed through appropriate oral communication/consultations or outreach or in writing through official notification and

posted on Project websites in both Dzongkhag and English. The GRM comprises four tiers, from the Contractor at the lowest level to the PSC at the highest level.

Grievance Redressal Committees must be created through an official notification and all members informed and trained to carry out their responsibilities.

Table 22.GRM levels/tiers

1- Gewog	2-Dzongkhag	3-PMU	4- PSC
Chair: Gup Vice chair: Mangmi GRM focal: Gewog Adm. Officer Members: ● Municipal Tshogpa(s) ● Relevant Sector Head ● Dzongkhag Planning Officer ● Site Engineer or Representative from Regional Engineering Custer.	Chair: Dzongdag Vice chair: Dzongrab GRM focal: Planning Officer Members: ● Environment Officer ● Gender Focal ● Relevant Sector Head ● Representative from Regional Engineering Custer ● Site Engineer, ● Environment Officer, Relevant Heads, DRO, DHO	Chair: Director/DG (DoID) Vice chair: Chief GRM focal: Project Focal Members: ● ESS officer ● Component Manager. ● Project Focal Officer; and ● Finance/Accounts Officer. ● Legal Officer ● Dzongkhag Planning Officer	Chair: PSC Chair Vice chair: GRM focal: Members: ● Secretary ● Project Dzongkhags ● MOF ● UNDP ● Director (Member Secretary

Level 1. 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 must receive, acknowledge and address all relevant grievances 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 2. Grievance Resolution at the Gewog Level

- The GRM Focal must formally acknowledge receipt of the grievance and inform the aggrieved person/party that the grievance has been received, registered and reviewed for eligibility and will be discussed at the GRM Committee meeting, within 3-5 working days, if found eligible
- If the grievance is genuine and relevant to the project, then consult with the Chair of the Committee and convene a GRM meeting

- The Committee must seek to resolve the grievance as soon as possible, minutes of the meeting must be documented, and the outcome shared formally with the aggrieved person.
- The committee may also choose to refer the grievance to the next level, if deemed appropriate or if the Committee is unable to decide on an outcome.
- The GRM 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).
- The maximum period for addressing the grievance is 10 working days.

Level 3. Grievance Resolution at the Dzongkhag Level: Follow the same process as Level 2. However, the 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.

Level 4. Grievance Resolution at the PSC Level: Follow the same process as Level 2. However, the 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.

10.1.4. Gender Based Violence Grievances

For Gender related grievances, GBV cases cannot be put up to the GRM committee. The GRM Focal must uphold the confidentiality of the grievance by not disclosing personal details to any other person. The GRM Focal must consult the RENEW Focal Person so that the case can be addressed accordingly- in terms of counseling, prosecution etc. In the Case of Gasa, the Gewog Administrative Officer as well as the District Planning Officers are females, so there is no requirement of additional measures. However, if the two female officers are transferred, the project must ensure that the replacement is a female and is trained to take up the role.

10.1.5. 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.
- Follow the GRM procedure, prioritize and resolve the grievance objectively and at the earliest possible time or within 10 working days.
- Consult the GRM committee at the lower level, the aggrieved person/party, and the Contractor to adequately confirm whether the grievance is project related
- Ensure adequate communication with the aggrieved person, ensure proper documentation and record of all meetings and outcomes for review at any time.
- Orient every new member on the GRM process, as it is likely that members will be transferred during the project duration.
- Submit updated grievance information to the PIU for inclusion in the monitoring report
- For Gender related grievances, uphold the confidentiality of the grievance by not disclosing personal details and follow the grievance procedure for Gender Related Grievances.
- Ensure that the quorum (at least 3 members) is maintained during GRM committee meetings.

10.2. Biodiversity Action Plan

10.2.1. Introduction

Covering an area of 4,374.06 sq.km, the Jigme Dorji National Park encompasses 14 gewogs within 4 Dzongkhags. Of the total area, only 2.84% is forested (287.35 sq.km or 28,734.55 hectares). The latest national forest inventory [86] indicates that there is 26,747.41 square kilometers (2,674,741.16hectare) of forest cover. This is 69.7% of the country's total land area. As reported in the baseline chapter, between the 2nd National Forest Inventory in 2023 and the First Inventory, the forest cover in Gasa has reduced quite substantially from 36% forest cover to 21 % [87] in less than a decade.

In terms of location, the Gasa towns and the surrounding area fall in the multipurpose zone of the Jigme Dorji National Park. The total township covers an area of 212.5 acres (0.86 sq.km), which is 0.019% of the JDNP.

As presented in the baseline chapter, the biodiversity survey was conducted along the water pipeline alignment and at the sites identified for the water treatment and storage tanks. The cool broadleaf forest is quite pristine and undisturbed, especially towards the intake area. A total of 15 tree species, 41 shrubs, 31 herb/ground and 5 epiphytes species were recorded in the survey plots. There are six species of Rhododendrons and 17 of the floral species are included in Schedule II and Schedule III of the FNCA, 2023 and subject to permits for collection/harvesting. Several species have medicinal values, are used for arts and craft, self-consumption or as fodder. The notable species among these are Panax *psuedoginseng, Paris polyphylla, Cordeyceps sinensis and Taxus baccata* that were also noted outside the sample plots. The Species listed in FNCA 2023 are provided in Annex 10.

No rare or endangered wildlife species was recorded aside from the Sambar, which is Vulnerable as per the IUCN Red List, and all bird species were also Least Concern. The list of floral, fauna and bird species are included in Annex 10. Although mammal species may not have been recorded during the site visit, their presence cannot be ruled out due to the short survey duration and the difficulty in spotting footprints due to the daily afternoon rains.

Area requirement by project component. The total area required for the land is 1.4 hectares which includes about 0.3 hectares of settlement land. Therefore, the total forest area required to be cleared is approximately 1 hectare.

Table 23. Infrastructure components and land requirements

Type of Infrastructure	Area	m2	Remarks	Forest Clearance
Intake structure	10mx 5m	50	SRFL	FC dated 16 April 2024, granted for 4629m x2.5m= 11,572.5m2
Sand tank with barbed wire fencing and gate.	11m x3.2m	35.2	SRFL	
raw water main transmission pipeline	2.3km x 1m	2300	SRFL	
Distribution Pipeline 1	4810m x1m	4810	SRFL and settlement	
Distribution Pipeline 1	790 mx 1m	790	SRFL and settlement	
Total area		7985.2m2		

[86] DoFPS, 2022. Forest Cover Mapping Report. 2022

[87] DoFPS. 2016. National Forest Inventory Report. Stocktaking Nations Forest Resources.

Water Treatment Plant with lab and office	70 decimals	2832.48	SRFL	FC dated 3 June provided for 0.120 acres only
Service water tank	10 decimals	404.64	SRFL	FC dated 14 June provided 400m X 3.5m
Service water tank	10 decimals	404.64	SRFL	
Service water tank	10 decimals	404.64	SRFL	
Access road to WTP site	400m x 3.5m	2100	SRFL and settlement	
	14131.6 m2	14131.6		

10.2.2. Project Impacts and Mitigation

While the forest area to be cleared is less than 0.01% of the cool broadleaf forest area in Gasa Dzongkhag, the concern is the steady loss of forest cover to developmental activities and the associated impacts of construction projects within forested areas. The risks from project activities are summarized below. These include:

a. Tree felling and vegetation clearance for infrastructure components
b. Damage to vegetation from haulage of construction materials and storage areas
c. Construction of and waste generation from site offices, worker camps resulting in degradation of the watershed in case of unsanitary conditions
d. Abstraction of water for drinking and construction
e. Blasting impacts on slopes and vegetation beyond the pipeline corridor causing forest fragmentation
f. Excavation of trenches requiring soil storage, reuse and disposal
g. Influx of workers in forested areas increasing the risk of poaching, and indiscriminate collection of floral species for self-consumption or sale.
h. Disturbance and accidents to wildlife due to construction activities or in self defense
i. Risk of fire in areas where electricity is not available especially at the intake area or due to unsafe electrical connections
a. Invasive species being introduced in the area after clearance

The communities already collect and sell mushrooms, ferns, cordyceps, Paris polyphylla and edible orchids. The project activities, if not carried out in an environmentally conscious manner will further exacerbate the destruction and degradation of wildlife habitat, deplete wildlife and floral species, and aggravate waste management problems. With the influx of foreign and local workers from outside Dzongkhag There is a risk that workers and employees may be tempted to collect and sell these non-wood forest products, especially Cordyceps. To ensure the long-term sustainability of these NWFPs, the Park has created five NWFP management groups[88] but there is none in Khatoed Gewog and species-specific management framework for scarce NWFPs are required. Additionally, the water source assessment conducted by the Department of Forest and Park Services in 2022[89] reported two threats to

[88] JDNP management plan.

[89]WMD, DoFPS (2022), Watershed Management Intervention Document for the Advancing Climate Resilience of Water Sector in Bhutan (ACREWAS) Project Landscape

the Singtalum watershed: degradation in the lower watershed due to shifting cultivation, timber and fuelwood extraction and littering by Cordyceps and NWFP collectors and illegal poachers in the upper watershed areas of Shingtalum.

Parallel to the water supply activity, the ACREWAS Project will be supporting the preparation of watershed management plan, promotion of water conservation, sustainable use and maintenance of the water supply scheme, that will ensure sustainability of both the infrastructure and the water source. It is important to ensure that trends and causes for change in water sources are monitored annually, so that appropriate management interventions can be undertaken.

10.2.3. The Biodiversity Action Plan and its Objectives

The Biodiversity Action Plan has been prepared keeping in mind that Gasa has the least forest cover in the country, which is mostly at the lower altitude areas, where most development activities now and in the future will take place. The Action Plan also recognizes that the Park has limited financial and human resources, and any new development activity will increase the requirement for additional patrolling of the construction activities to ensure minimal environmental impacts. The BAP presents the objectives, project risks, measures, and actions to enhance and conserve biodiversity in accordance with the mitigation hierarchy to avoid, minimize, mitigate, potentially significant adverse environmental impacts of the water supply project.

Objectives of the BAP. The BAP aims to ensure that the project complies with the UNDP Principles and standards and all relevant National legislation, through risk identification, avoidance, minimization, and mitigation. Specifically, the objectives of the BAP include the following:

- Minimize the loss of forest cover and ensure continuity of forest landscape
- Protect and conserve Critically Endangered, Endangered, Vulnerable or Near Threatened species
- Study, monitor and conserve the watershed to ensure the long-term sustainability of the water supply.

While the Biodiversity Action is limited to actions required to be undertaken to mitigate the impacts of the water supply scheme, under other components and activities, activities to ensure the protection of the watershed will be implemented with the park. This includes the preparation of a watershed forest management plan for the Shingtalum watershed and community forest management plans for the catchment area.

Table 24. Activities to be undertaken by PMU and PIU

Activity	Mitigation measure	Phase	Budget
ESMP compliance and monitoring	Conduct a pre-bid meeting to inform the contractor of the ESMP provisions compliance requirements and the need to budget for these Ensure that there is a mechanism for sanctions in case of non-compliance with the ESMP (e.g. delayed payments if mitigation measures are not implemented and sites are not cleaned up). This can be carried out in consultation with the park authority.	Preconstruction	NA
	Coordinate with Dzongkhag for supervision and compliance monitoring to ensure that mitigation measures are implemented, documented, and reported by the contractor and the supervision and monitoring team	Preconstruction phase	NA
	Payment of royalty for forest clearance	Preconstruction phase	Will depend on the forest clearances.
Unanticipated impacts	Ensure that corrective actions are carried out by the contractor and that the contractor is fully liable for any damage to the environment caused by construction activities	Construction phase	Cost to be borne by the contractor
Watershed management and sustainability of the water source	Provide support to the park for watershed management activities in terms of monitoring water quality and discharge	Construction phase	PIU to implement
Degradation of forest habitat	Monitor contractor's camps and construction activities to ensure that no waste is left in the forest, and prohibit indiscriminate felling of trees and vegetation clearance, especially for establishing worker camps.	Construction phase	PIU to implement
	Ensure restoration of cleared areas through consultation with JDNP	Post-construction phase	PIU in consultation with local forest office

Table 25. Activities to be undertaken by the Contractor

Activity	Mitigation measure	Phase	Budget
Establishment of worker camps	Locate worker camps in areas where trees do not need to be felled. If tree felling is required, seek forestry clearance from the park. Maintain 15 m from water courses and have in place measures to prevent direct discharge of sewage into the streams Incorporate the cost of transporting waste to the waste disposal site.	Preconstruction phase	Contractors cost
Tree felling and forest clearance	Ensure strict compliance with the Forest Clearance and ensure that only those trees marked by the forest personnel are cut	Construction phase	Contractors cost
Worker briefings	Brief workers on the following -penalties for illegal activities such as tree felling, poaching, illegal harvesting of medicinal plants and use of fire hazards, -proper material haulage methods to minimize damaging trees and vegetation during transportation/material haulage as much as possible -against tampering with cavities in trees as these may be nesting sites of birds -risk of from wandering off into the forest such as wildlife encounters and risk of injury to people or wildlife (in case of self-defense)	Construction phase	Contractors cost
Minimize forest fire risk	Maintain fire extinguishers or adequate water pipes, tanks, buckets etc. at worker camps inside the forest as a precautionary measure	Construction phase	Contractors cost
Excavation work	Reuse excess excavated soil for beneficial purposes such as raising the level of low-lying areas and stabilization of slopes where soil is disposed.	Construction phase	Contractors cost
Blasting	Follow silent/controlled blasting techniques that minimize vibrations and disturbance to wildlife	Construction phase	Contractors cost
Construction activities in forested areas	Limit construction work to daylight hours	Construction phase	Contractors cost
Wildlife conservation	Immediately inform the Park office, in case wildlife is injured	Construction phase	Contractors cost
	Record all wildlife sightings and encounters	Construction phase	Contractors cost
Completion of construction activities	Dismantle, clean up and removal of all waste from worker camps, prior to moving onto the next site	Post- construction phase	Contractors cost

Table 26. Activities to be undertaken by the Park

Activity	Mitigation measure	Phase	Budget
Biodiversity assessment and conservation	Conduct biodiversity survey before construction and assess the possibility of ex-situ conservation of the plant species, or replanting these elsewhere	Pre and post construction phase	Part of Local Forest Management Plan
Compliance with the provisions of the forest clearance and for illegal activities	Conduct smart patrolling to monitor construction activities and check for indiscriminate tree felling, illegal activities such as poaching, harvesting of medicinal plants, pollution of water sources and. waste disposal/management by the contractor	Construction phase	As part of patrolling activities
Watershed conservation	Conduct assessment of the water source, prepare watershed management plan and implement management interventions as required	Construction phase	As part of other activities under the ACREWAS project
	Preparation of a local forest management plan for the Shingtalum watershed.		
Completion of construction activities at a site	Ensure that the contractor is responsible for cleaning all campsites.	Construction phase	As part of patrolling activities
Prevent spread of invasive species	Conduct checks along cleared areas to detect invasive species early and implement programs to prevent their establishment and spread	Construction and Operation phase	As part of patrolling activities
Restoration of degraded areas	Plant trees as well as shrub species in barren and degraded areas to compensate for the loss of forest cover.	Construction phase	Part of Local Forest Management Plan

10.3. Occupational Health and Safety Plan

The Labor & Employment Act 2007; Regulation on Occupational Health, Safety, and Welfare 2022; and Regulation on OHS for the Construction Industry 2022 are in line with UNDP standards 7 and will apply to the project and as such requires the Contractor to ensure proper labor 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. These measures are detailed below.

10.3.1. 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.

10.3.2. 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 the 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.

10.3.3. 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.

10.3.4. 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.

10.3.5. 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.

10.3.6. 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. The Labor Management Plan

This Labor Management Plan (LMP) has been developed to manage labor risks during the construction period. It aims to ensure that all labor-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 labor practices, foster a healthy work environment, and enhance the overall well-being of the project's workforce.

The objectives of the labor management plan are as follows:

1. Ensure compliance with relevant labor 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.

10.4.1. Compliance with Labor Laws and Regulations

The contractor must ensure compliance with relevant labor 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 labor 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.

10.4.2. 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.

10.4.3. 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.

10.4.4. 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.

10.4.5. 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.

10.4.6. Code of conduct (CoC)

The Contractor must maintain labor 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 is provided in the next section.

10.5. 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

10.6. Chance Find Procedures

10.6.1. Scope

This procedure is applicable to all activities conducted by the contractor that have the potential to uncover heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during the construction activities. The procedure outlines the roles and responsibilities and the response times required from both the project staff, and any relevant heritage authority.

10.6.2. Induction/Training

All personnel, especially those working on earth movements and excavations, shall be inducted on the identification of potential heritage items/sites and the relevant actions required of them with regards to this procedure during the induction and regular toolbox talks.

10.6.3. Standard Operating Procedure

In case of discovery of the physical cultural resources by a person, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during the excavation or construction, the following steps shall be undertaken by the contractor, PIU and PMU:

- 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.

10.6.4. Management of Replicable and Non-replicable Heritage

Replicable Heritage. Where tangible cultural heritage encountered is replicable and not critical, the following mitigation measures shall be applied:

Avoidance.

- Minimization of adverse impacts and implementation of restoration measures, in situ.
- Restoration of the functionality of the cultural heritage, in a different location.
- Permanent removal of historical and archaeological artifacts and structures.
- Compensation of loss where minimization of adverse impacts and restoration is not feasible.

Non-replicable Heritage. Most cultural heritage is best protected by in situ preservation, since removal is likely to result in irreparable damage or even destruction of the cultural heritage. Non Replicable cultural heritage must not be removed unless all the following conditions are met:

- There are no technically or financially feasible alternatives to removal;
- The overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and any removal of cultural heritage must be conducted using the best available technique advised by relevant authority and supervised by archaeologists.

10.6.5. Human Remains Management Options

The handling of human remains believed to be archaeological in nature requires communication according to the same procedure described above. The following measures are to be adopted:

Avoidance. The development project shall be redesigned to completely avoid the found remains based on the assessment undertaken by the concerned authorities.

Exhumation

- Exhumation of the remains shall be considered in a manner appropriate to the concerned authorities. This shall involve the predetermination of a site suitable for the reburial of the remains. Certain ceremonies or procedures may need to be followed before the construction activities can recommence in the area of the discovery.
- Emergency contact details of the concerned Department and contact persons shall be maintained by PMU and contractor in case of the chance find.

10.6.6. Record Keeping

It is pertinent that all finds must be registered. Photolog, copies of communication with decision making authorities, conclusions and recommendations/guidance, implementation reports are to be recorded and maintained by the PMU.

10.7. Stakeholder Engagement Plan

10.7.1. Purpose

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.

10.7.2. 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.

- **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).

10.7.3. Previous Stakeholder Engagement

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

10.7.4. Future Stakeholder Engagement

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

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 the table below.

Table 27. 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/PIU
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/PIU
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/PIU
Project community	Project activities involving the construction of drinking water supply	Translate 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/PIU
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 construction of drinking water supply	Conduct a meeting only for vulnerable groups to inform them about the project design, ESMP, project timeline and GRM	Once, Pre-construction	PIU and Gup
		Inform about the project in Dzongkha to vulnerable communities especially those not able to attend the meeting Inform about the project timeline, GRM and contact numbers of GRM	Once, Pre-construction	PIU and Gup

Stakeholder Group	Specific Interest (Project Activities)	Mode of Engagement (including participation, communication, reporting/monitoring, dissemination roles)	Period	Responsibility
		focal persons via social media chat groups[90]		
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	Bi-annual 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	Quarterly	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 Ensure members of vulnerable groups are included in water user groups		PMU, PIU and local government
	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

[90] 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
	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 in consultation with DoW.
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/DoFPS
		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/DoFPS
		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/DoFPS
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
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

Stakeholder Group	Specific Interest (Project Activities)	Mode of Engagement (including participation, communication, reporting/monitoring, dissemination roles)	Period	Responsibility
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

10.8. Waste Management Plan

The waste management plan aims to reduce, reuse, recycle, and dispose of construction-generated waste in compliance with the Waste Prevention and Management Act of Bhutan 2009 and the Waste Prevention and Management Regulation 2012 (amended 2016).

The contractor will be required to segregate the waste as shown below:

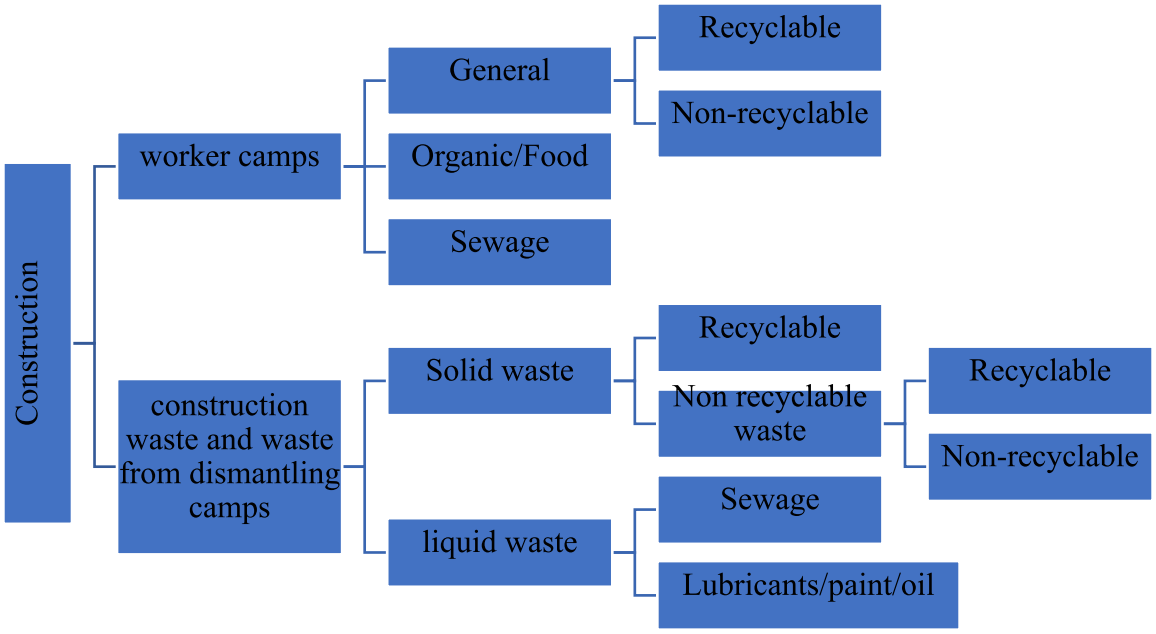


Figure 15. Waste segregation requirements

The contractor is required to educate workers on proper waste management, waste segregation, storage, and waste disposal, considering the project's construction and general waste.

1. **Organic Waste –** Since this is biodegradable, this 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.

2. **Reusable Waste –** This includes water storage tanks, pipes and camp construction work camp construction materials such as used CGI sheets, glass and sanitary fixtures and old reusable PPE. The contractor must take these back for reuse in future projects.
3. **Recyclable Waste –** This includes plastics, bottles, paper/cardboard which must be taken out of Gasa to be sold/given to the nearest recycling collector.
4. **Non-Recyclable Waste –** This includes unusable construction materials such as broken parts, concrete, packaging materials, broken or unusable pipes. These can be disposed of at the landfill site.
5. **Hazardous Waste –** This includes cleaning chemicals, paint, oil, electronic waste, batteries which are toxic and harmful to both the environment and human health. These must be disposed of separately with the guidance of the Environment Officer.
6. **Liquid waste** – This 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 of 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.
7. **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.

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.

Segregation. 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.

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.

Transportation. If trucks are leaving Gasa empty, these can be used to transport the waste to the landfill site. However, the waste must be covered with tarpaulin during transportation to prevent spillage on the way to the disposal site.

10.9. Emergency Preparedness Plan

10.9.1. Emergencies

Emergencies at the site include any accident, natural hazards, or disasters that required medical attention, rescue or evacuation to the hospital. The Emergency Preparedness Plan is aimed at ensuring the safety of all contractor staff and workers in case of an emergency and to minimize work disruption due to emergencies. The plan comprises the following elements: hazard assessment, designating a responsible focal and an emergency team.

10.9.2. Hazard Identification/Assessment

At the outset, the contractor should conduct site specific hazard identification and assessment to identify potential work hazards for workers and hazards to the community. These hazards may occur during transportation, material handling, blasting, excavation, pipe installation, construction of temporary structures and material storage. Based on the hazard assessment, the contractor must put in place measures to address or minimize these hazards.

Table 28. Measures for natural hazards and disasters

Activity (example)	Type of hazard/risk	Measures to minimize hazard/risk
Transportation		
Material handling		
Excavation		
Blasting		

10.9.3. Responsible Person and Team

The Contractor must nominate the site supervisor as the Emergency Response Focal Person responsible for coordinating response measures. He must be instructed on his role and responsibility in case of accidents, natural hazards or disasters. He may identify a team to be mobilized in case of an emergency.

10.9.4. Communication

To ensure clear communication during emergencies, establish a clear protocol for immediate notification and response and ensure that all workers are briefed. The list of emergency contacts (local authorities, medical facilities and project staff) must be posted at the site office and shared with all staff and workers via the project chat group.

10.9.5. First Aid and Transportation

Ensure that a well-stocked first aid kit is always available at all sites for treatment of minor ailments and keep a vehicle on standby for transporting any seriously injured or ill person to the nearest health centre or hospital as required.

10.9.6. Measures

Measures for natural hazards and disasters are provided in the table below. This is a guide and may be adapted to suit the situation.

Table 29. 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 Tsogpa or Dzongkhag 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 injured 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 health care centre/hospital	Mobile for emergency communication Transportation for evacuation of injured 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. 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 health care centre/hospital Call the Royal Bhutan Police for assistance if persons are trapped under a landslide and inform the Dzongkhag who will in turn mobilize emergency assistance.	PPE First aid box Mobile for emergency communication Transportation for evacuation of injured 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. Designate an assembly point for all workers to congregate so that all workers can be accounted for.	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 for search and rescue operation and inform the Gup who will in turn mobilize emergency assistance.	Mobile for emergency communication Transportation for evacuation of injured person

11. CONCLUSION AND RECOMMENDATION

The targeted assessment has been conducted as per the UNDP SES, project ESMF and as per National laws, rules and regulations. The ESIA and ESMP have been prepared based on the design of the project that was presented to the local community during the consultation and cover pre-construction, construction to operation period phases. 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. The scheme is designed to provide water for both the existing as well as the proposed new township with a population projected for 30 years.

The project, once successfully completed, will significantly contribute to alleviating the issue of domestic water scarcity that is currently being faced in Gasa town and its periphery. It will have improved educational outcomes of school students and monks through reductions in water borne diseases, whilst saving time and money for all other users who have been plagued with water shortage due to blockage or damaged pipes and poor water quality due to high turbidity.

The project has been designed in accordance with FPIC principles, as outlined in the UNDP SES policy which has been adopted to undertake comprehensive consultation with communities during the project preparation phase. As an ongoing process, community consultation was again undertaken during the ESIA preparation phase from May 22nd to 24th 2024, and it is expected that the community will continue to be consulted and informed of changes in project design, project activities and schedule.

The major project components include the water intake structure, main water transmission line, water treatment plant, an access road and distribution pipelines. 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 supported above ground in land-slide prone areas.

The impacts during the construction are predictable, temporary in nature, lasting only for 2 years and to some extent reversible. The project has been rated as ‘Moderate’ due to the nature of project activities. The entire project footprint is 1.4 hectares, which includes 1.1 hectares of state reserve forest land. The remaining 0.3 hectares lies within the Gasa town settlement area, but there is minimal disruption to the beneficiary communities’ livelihoods and daily activities. The areas of concern regarding the construction phase are mainly in these primary areas – impacts due to construction activities, worker health and safety, influx of construction workers and its impact on the community and environment, waste management and capacity constraints. While the project site is located within the Jigme Dorji National, which encompasses the entire district of Gasa, this falls within the ‘multiple use zone’ wherein developmental activities are permitted subject to forestry clearance by the park authority. Although the construction works will be conducted within a small area of forest land, Gasa has a significantly low forest cover and there is the risk of indiscriminate collection of certain forest items like medicinal plant species for example. Therefore, it is imperative to ensure that adequate monitoring and timely restoration measures are undertaken to minimize risks of loss of forest cover and impacts to biodiversity.

Another key concern is the risk of invasive species being introduced after forest clearance and due to project activities. All these risks and impacts are addressed through the Biodiversity Action Plan (BAP)

which was shared with the Park Management and their comments incorporated. The budget for the implementation of the BAP remains to be discussed between the PMU and the Park and therefore has not been allocated as there are many activities (forest management plan, watershed management plan, smart patrolling) that will be carried out in parallel and therefore can also be budgeted under those activities.

Actual construction impacts are limited to selected areas which are located in the forest, the distribution lines do not impact any private land but will impact land belonging to agencies (government and non-government) for which, the applicable consents have been secured. While consent has been secured, the excavation works for the access road, construction of WTP and the distribution lines will impact existing water pipelines belonging to some of these agencies thereby affecting the current water supply to these agencies (particularly NHDCL and BPC). It is therefore crucial to ensure the affected supply is restored as soon as possible.

The social risk associated with the project centers around the influx of workers from outside the district (both foreign and national). Since Gasa is a very small community with limited development activities in the past, extended exposure to the influx of workers over two years will influence challenges for the community. Workers will be staying at the sites and familiarizing themselves with the place while mixing and interacting with the locals, therefore increasing the potential risk of GBV and other social and gender-related risks. Another risk to the community living along the access routes may arise from material transportation, especially along narrow corridors. For all of the risks and impacts, applicable mitigation measures have been proposed.

One of the key constraints of the project is in terms of supervision and compliance monitoring due to the distance between Punakha and Gasa with the Cluster Engineer being stationed at Punakha. Additionally, the existing capacity within Gasa for GRM, gender inclusion and assistance for vulnerable people is limited. Therefore, it is crucial for the project to provide support in these areas through capacity building and third-party assistance through NGO's. As with all infrastructure projects and contracts, there are risks associated with recruitment, health and safety and grievance resolution, which have been addressed through the labor and OHS management plans.

Waste management is a concern during both the construction and operational phases. Gasa has only one waste management site that is located 4 km away from Gasa Dzong and the town does not have any recycling facility or agent. It is very important that budget provisions are made to ensure that waste is adequately managed and disposed of following the protocols of the waste management plan. The contractor must incorporate the cost of transporting the waste to the landfill site while segregating and transporting recyclable waste to the nearest facility in Punakha.

At this point, it is unclear whether these activities will be contracted out as multiple construction packages. The mitigation measures outlined are applicable to any contractor who is awarded the tender whereby the ESMP will be provided to the contractor(s) who acquires the contract(s).

The main concerns during the operation phase mainly include sustainability of the water source and wear and tear of the infrastructure and risk of natural hazards. These risks will be mitigated through Parallel conservation activities under other project components, especially the participatory water

resource assessment and preparation of community-based watershed and forest management plans will be carried out.

To improve resilience, sustainability, and quality of water service delivery, the project will strengthen water governance especially at the Dzongkhag and community level for climate-smart water and watershed management through the creation of a water user group/association and provide training and capacity building for operation and maintenance.

12. ANNEXES

Annex 1.1. Participant list- Dzongkhag and Community Consultation, 22 May 2024

Pg 1/3

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DZONGKHAG ADMINISTRATION: GASA

PLANNING & MONITORING UNIT

Stakeholder Consultative Meetings with the Beneficiaries 22/05/2024

Sl. No	Name	Designation	Organization	Signature
1,	Jigme Namgyel	Dzongdag	DAG	
2,	Tshewang Namgyel	Sr. Dzongrab	DAG	
3,	Thinley Wangdi	Gup	Khatoed	
4,	Dawa Tenzin	Dungchen	Dratshang	
5,	Deki P. Yonten	Consultant	PCS	
6,	Sangay Tashi	Khatoe mangmi	Khatoe	
7)	Singye Dorji	Tshogpa	Gasa	
8)	Dhusha	Choli Phulakha Tshogpa	Gasa	
9)	Namgay	Tshogpa	-11-	
10,	Chado Tshering	Tshogpa	-11-	
11)	Phub Gyelmo	Phulakha	-11-	
12)	Sonam Dema	Tshogpa	-11-	
13)	Pema Zangmo	-11-	-11-	
14)	Pema	-11-	-11-	
15)	Dawa Lhamo	-11-	-11-	
16,	Rinzin Pema	-11-	-11-	
17)	Tshechu	-11-	-11-	
18)	Dorjee	-11-	-11-	
19)	Kuenzang Lham	-11-	-11-	

Dzongdag: 02-688022 Fax: 688140, Dzongrab: 02-688023 Planning Office: 02-688035

དགའ་ས་རྫོང་ཁག།
བཀྲིས་མཐོང་སྨོན་རྫོང་།

DZONGKHAG ADMINISTRATION: GASA
PLANNING & MONITORING UNIT

Stakeholder Consultative Meetings with the Beneficiaries

22/05/2024

Sl. No	Name	Designation	Organization	Signature
20. 1	Tshering Wangchuk	Teacher	Gasa P.S	
21. 2	Namu Yorken	Sporting Staff	Gasa BNBL	
22. 3	Chencho Lhamo	Teller	BDBL, Gasa	
23. 4	Pema Zangmo	Shop Keeper	Gasa Town	
24. 5	Rinzin Pem	Shopkeeper	Gasa Town	
25. 6	Pemo	Shopkeeper	Gasa Town.	
26. 7	Kinga Tshering.	BOBL	Gasa	
27. 8	Tshering Nyedup	AEO	Gasa Dzo. Adm	
28.	Singye Wangchuk.	ICT	"	
29.	Khelhu	PA-D	DAG	
30.	Pema	DzEO	DAG	
31.	Deki Yangzom	DT Secretary	DAG	
32.	Thinley Jamtsho	ADLO	DAG	
33.	Kinga Singye	Land Record	DAG	
34.	Sita Maya Mapchan	Accountant	DAG.	
35.	Sangay	~~Phulakhar~~ Farmer	Khatoed Phulakhar	
36.	Chimi Tshogyel (M)	B.E	Khatoed.	
37.	Moni Raj Limboo	A.E	R.E.C	
38.	Tobgay	E.E	R.EC	

Dzongdag: 02-688022 Fax: 688140, Dzongrab: 02-688023 Planning Office: 02-688035

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བཀྲིས་མཐོང་སྨོན་རྫོང་།

DZONGKHAG ADMINISTRATION: GASA
PLANNING & MONITORING UNIT

Stakeholder Consultative Meetings with the Beneficiaries 22/05/2024

Sl. No	Name	Designation	Organization	Signature
59	Namgay	Tshogpa	Khaloe	
40	Sonam (M)	"	"	
41	Sujata Raika	DSO	Gasa Adm	
42	Wangchuk	FO	JDNP	
43	Joezang Dawa	JC.	RBP.	
44	Dawa Zam	Tshogpa	Gasa	
45	Jigme Yangki	"	"	
76	Karma Uzeli	DAO	[illegible]	
7?	Munna Subba	Asst. IAA	DAG	
48	Leki Thinley	BM	RICBL	
49	Sonam Chogyal	[B]SP	Gasa	
50.	Sangay Gyeltshen	JSP	Gasa	
51.	Tshering Gyeltshen	Operator	Gasa	
52	Yeshi Gyempo	JSP	Gasa	
53.	Dorji Choedrup	JSP	"	
54.	Kuenzang Dorji	GSP	"	
55	Tsheten Wangdi	JSP		
56	Sonam Wangmo	Researcher	PCS	
57	Yangchen Dema	Researcher	PCS	

Dzongdag: 02-688022 Fax: 688140, Dzongrab: 02-688023 Planning Office: 02-688035

Annex 1.2. Participant lists- Capacity Building and Training (GRM), 24 May 2024

Pg. 1/1

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DZONGKHAG ADMINISTRATION: GASA

PLANNING & MONITORING UNIT

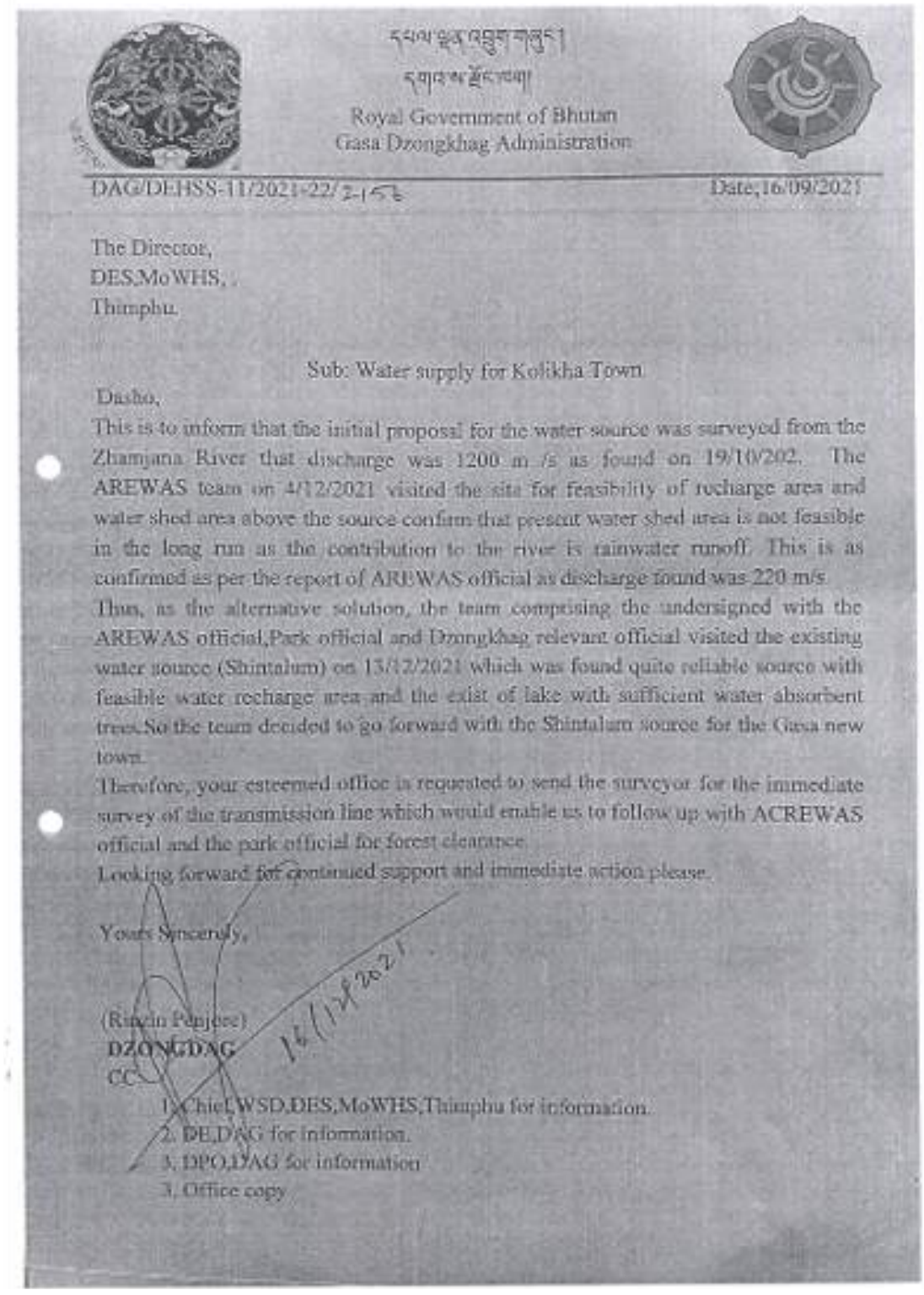
Capacity building session on ESIA, ESMP and GRM

24/05/2024

Sl. No	Name	Designation	Organization	Signature
1	Jigme Namgyel	Dzongdag	Gasa	
2	Dawa Tenzin	Dungchen	Dratshang	
3	Tobgay	EE	RGEC	
4	Moni Raj Limboo	A.E	RGEC	
5	Tshering Ngedup	A.E.O	Gasa Dzongkhag	
6	Sonam Wangmo	Researcher	PCS	
7	Phub	Tshogpa	Chde-phulela	
8	Kinley Khandu	Sr. LMO	Khatoed	
9	Sangay Tashi	Mangmi	Khatoed	
10	Sita Maya Mafelan	Accountant	Dzongkhag Administration	
11	Kinga Singye	LRA	DAG	
12	Dawa Gyeltshen	DPHO	Health	
13	Dorji Wangmo	MCO	DAG	
14	Deki Yonten	Consultant	PCS	
15	YANGCHEN S S	Researcher	PCS	
16.	Chobi Tshering	DRO	DAG	

Dzongdag: 02-688022 Fax: 688140, Dzongrab: 02-688023 Planning Office: 02-688035

Annex 2. Letter from Dzongkhag on Water Source Selection



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Royal Government of Bhutan
Gasa Dzongkhag Administration

DAG/DEHSS-11/2021-22/2-156 Date,16/09/2021

The Director,
DES,MoWHS, ,
Thimphu.

Sub: Water supply for Kolikha Town

Dasho,

This is to inform that the initial proposal for the water source was surveyed from the Zhamjana River that discharge was 1200 m /s as found on 19/10/202. The AREWAS team on 4/12/2021 visited the site for feasibility of recharge area and water shed area above the source confirm that present water shed area is not feasible in the long run as the contribution to the river is rainwater runoff. This is as confirmed as per the report of AREWAS official as discharge found was 220 m/s.

Thus, as the alternative solution, the team comprising the undersigned with the AREWAS official,Park official and Dzongkhag relevant official visited the existing water source (Shintalum) on 13/12/2021 which was found quite reliable source with feasible water recharge area and the exist of lake with sufficient water absorbent trees.So the team decided to go forward with the Shintalum source for the Gasa new town.

Therefore, your esteemed office is requested to send the surveyor for the immediate survey of the transmission line which would enable us to follow up with ACREWAS official and the park official for forest clearance.

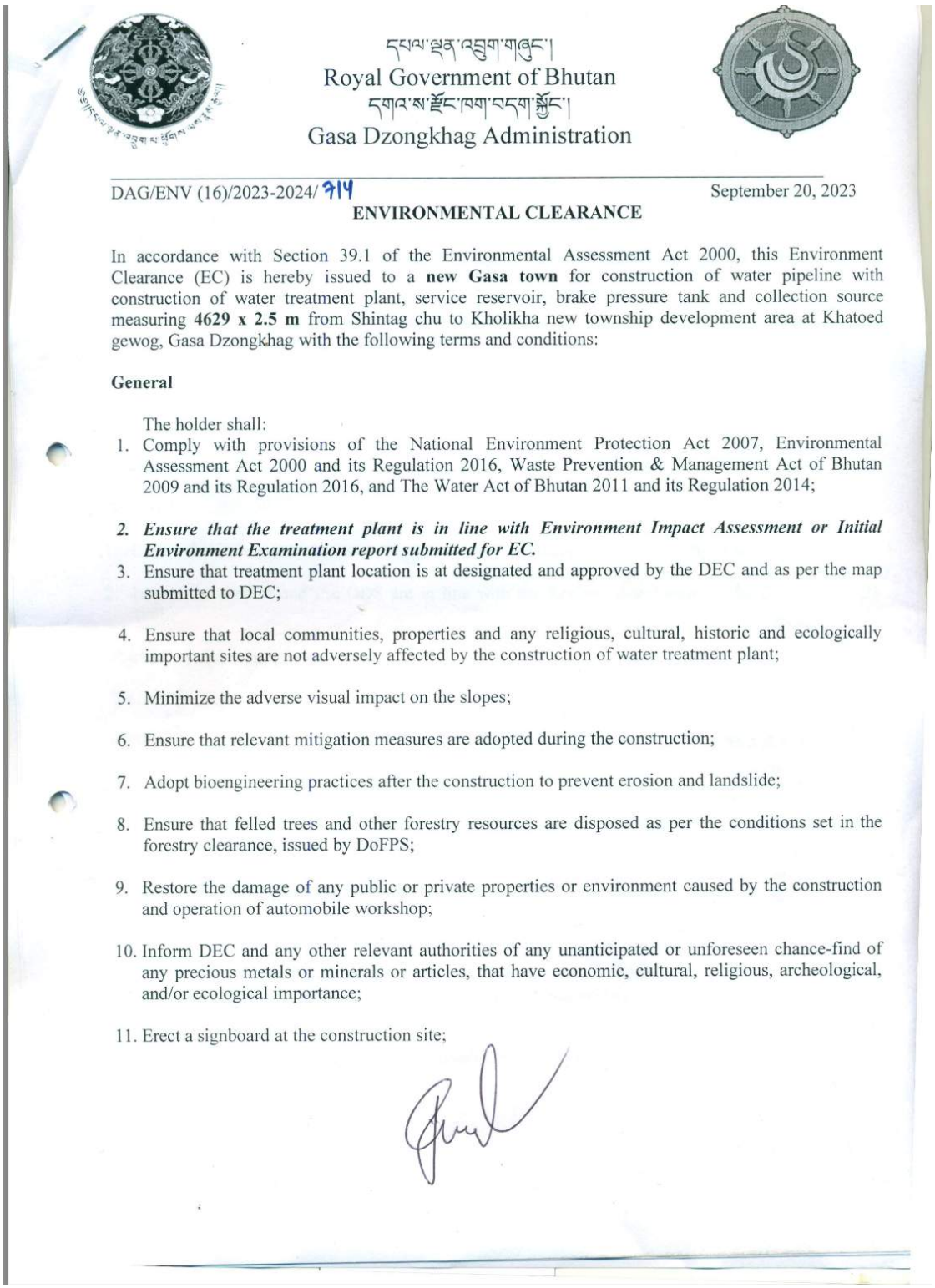
Looking forward for continued support and immediate action please.

Yours Sincerely,

(Rinzin Penjore)
DZONGDAG
CC:
1. Chief,WSD,DES,MoWHS,Thimphu for information.
2. DE,DAG for information.
3. DPO,DAG for information
3. Office copy

Annex 3.1. Environmental Clearance for the Water Supply Scheme

Page 1/4



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Royal Government of Bhutan
དགའ་སྡོང་ཐག་བདག་སྒྲོང་།
Gasa Dzongkhag Administration

DAG/ENV (16)/2023-2024/ 714 September 20, 2023

ENVIRONMENTAL CLEARANCE

In accordance with Section 39.1 of the Environmental Assessment Act 2000, this Environment Clearance (EC) is hereby issued to a **new Gasa town** for construction of water pipeline with construction of water treatment plant, service reservoir, brake pressure tank and collection source measuring **4629 x 2.5 m** from Shintag chu to Kholikha new township development area at Khatoed gewog, Gasa Dzongkhag with the following terms and conditions:

General

The holder shall:

1. Comply with provisions of the National Environment Protection Act 2007, Environmental Assessment Act 2000 and its Regulation 2016, Waste Prevention & Management Act of Bhutan 2009 and its Regulation 2016, and The Water Act of Bhutan 2011 and its Regulation 2014;
2. ***Ensure that the treatment plant is in line with Environment Impact Assessment or Initial Environment Examination report submitted for EC.***
3. Ensure that treatment plant location is at designated and approved by the DEC and as per the map submitted to DEC;
4. Ensure that local communities, properties and any religious, cultural, historic and ecologically important sites are not adversely affected by the construction of water treatment plant;
5. Minimize the adverse visual impact on the slopes;
6. Ensure that relevant mitigation measures are adopted during the construction;
7. Adopt bioengineering practices after the construction to prevent erosion and landslide;
8. Ensure that felled trees and other forestry resources are disposed as per the conditions set in the forestry clearance, issued by DoFPS;
9. Restore the damage of any public or private properties or environment caused by the construction and operation of automobile workshop;
10. Inform DEC 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;
11. Erect a signboard at the construction site;

12. The holder shall not disturb any other private lands or State Reserve Forest (other than approved) during the construction;

13. The holder shall ensure that any dispute arising due to above construction shall be the responsibility of the proponent;

14. A copy of this EC shall be kept at the site and is made available upon demand by the DEC/Competent Authorities/NECS;

Environmental standards

1. The holder shall comply with the existing Environmental Standards 2020.

Import and use of secondhand equipment and ODS

The holder shall:

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

Protection and management of water resources

The holder shall:

1. Ensure that the tower construction does not disrupt the water flow and pollute the water bodies;
2. Ensure that 30 meters or 100 feet buffer is maintained from the water resources at all times;
3. Ensure that no debris or any other wastes are dumped into any water bodies that could lead to pollution of the water sources.

Waste prevention and management

The holder shall:

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

3. Construction area after work should be made clean of all wastes. Dumping of waste in to SRF land is strictly prohibited.

Management of excavated materials and run-off

The holder shall:

1. Dispose-off excess excavated materials generated during construction of tower only at the pre-identified approved dumpsite;
2. Put appropriate measures to avoid erosion and landslides;
3. Ensure that dust generated by the construction of tower is managed.

Implementation plan

The holder of this clearance shall be responsible to implement the terms and condition of this clearance. In case, if construction work is contracted to Contractor, proper terms and condition may be drawn with the contractor to fulfill the terms and condition of this Environment Clearance. The holder shall prepare a detailed implementation plan focusing on the implementation of terms and conditions of this EC and submit to DEC.

Monitoring and reporting

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 environmental focal person;
2. Report the implementation of EC terms and conditions to DEC as per the section 59 of the RECOP, 2016.

Renewal and modification

The holder shall:

1. Ensure that renewal of this EC is processed at least 3 months prior to its expiry along with a copy EC and a report on the implementation of its terms and conditions (if the construction is not complete)

2. Obtain prior approval from DEC/NECS for any modification to the existing proposal/application as per the section 28.3 of Regulation for the Environmental Clearance of Projects, 2016.

Reservation

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

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.

3. 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 for a period of **one year** from date of issue of this EC. ***This clearance is limited to environmental component only. The applicant may process and obtain rest of the approvals/clearances for the proposed activity from concerned authority as per the rules in force.***

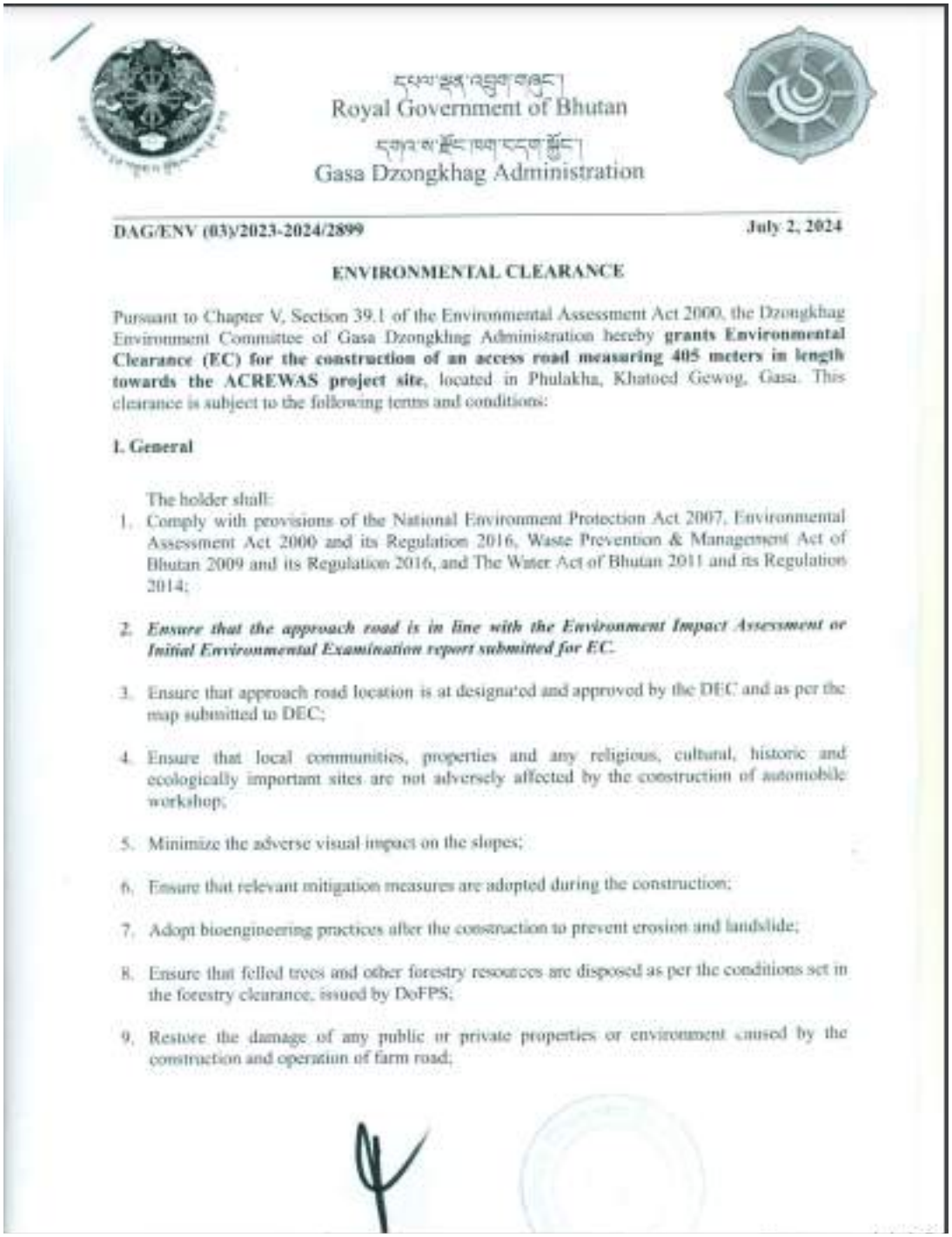
(Jigme Namgyel)
Chairperson, DEC

Copy to:

1. Chief Environment Officer, EACD, Department of Environment and Climate Change, MoENR, Thimphu for information.
2. The CFO, Jigme Dorji National Park, Damji, Gasa for information.
3. Gup, Gewog Administration, Laya, for information.
4. Office copy.

Annex 3.2. Environmental Clearance for the Access Road

Page 1/5



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Royal Government of Bhutan
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Gasa Dzongkhag Administration

DAG/ENV (03)/2023-2024/2899 **July 2, 2024**

ENVIRONMENTAL CLEARANCE

Pursuant to Chapter V, Section 39.1 of the Environmental Assessment Act 2000, the Dzongkhag Environment Committee of Gasa Dzongkhag Administration hereby **grants Environmental Clearance (EC) for the construction of an access road measuring 405 meters in length towards the ACREWAS project site**, located in Phulakha, Khatoed Gewog, Gasa. This clearance is subject to the following terms and conditions:

I. General

The holder shall:

1. Comply with provisions of the National Environment Protection Act 2007, Environmental Assessment Act 2000 and its Regulation 2016, Waste Prevention & Management Act of Bhutan 2009 and its Regulation 2016, and The Water Act of Bhutan 2011 and its Regulation 2014;
2. ***Ensure that the approach road is in line with the Environment Impact Assessment or Initial Environmental Examination report submitted for EC.***
3. Ensure that approach road location is at designated and approved by the DEC and as per the map submitted to DEC;
4. Ensure that local communities, properties and any religious, cultural, historic and ecologically important sites are not adversely affected by the construction of automobile workshop;
5. Minimize the adverse visual impact on the slopes;
6. Ensure that relevant mitigation measures are adopted during the construction;
7. Adopt bioengineering practices after the construction to prevent erosion and landslide;
8. Ensure that felled trees and other forestry resources are disposed as per the conditions set in the forestry clearance, issued by DoFPS;
9. Restore the damage of any public or private properties or environment caused by the construction and operation of farm road;

10. Inform DEC 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;

11. Erect a signboard at the construction site;

12. The holder shall not disturb any other private lands or State Reserve Forest (other than approved) during the construction;

13. The holder shall ensure that any dispute arising due to above construction shall be the responsibility of the proponent;

14. A copy of this EC shall be kept at the site and is made available upon demand by the DEC/Competent Authorities/NECS;

II. Environmental standards

1. The holder shall comply with the existing Environmental Standards 2020.

III. Water use and management

The holder shall:

1. Ensure that activity does not disrupt the water flow and pollute the water bodies; and

2. Ensure that a 30 meter or 100 feet buffer is maintained from the water resources at all times.

IV. Import and use of secondhand equipment and ODS

The holder shall:

1. Ensure that import and use secondhand equipment and machineries are strictly prohibited;

2. Ensure that import and use ODS are in line with the Revised Regulation on the Control of ODS 2008.

V. Protection and management of water resources

The holder shall:

1. Ensure that the tower construction does not disrupt the water flow and pollute the water bodies;

2. Ensure that 30 meters or 100 feet buffer is maintained from the water resources at all times;

3. Ensure that no debris or any other wastes are dumped into any water bodies that could lead to pollution of the water sources.

VI. Waste prevention and management

The holder shall:

1. Manage wastes generated from the tower construction with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management;

2. Ensure that import and use of hazardous wastes are strictly prohibited;

3. Construction area after work should be made clean of all wastes. Dumping of waste into SRF land is strictly prohibited.

VII. Management of excavated materials and run-off

The holder shall:

1. Dispose-off excess excavated materials generated during construction of road only at the pre-identified approved dumpsite;

2. Put appropriate measures to avoid erosion and landslides;

3. Ensure that dust generated by the construction of the road is managed.

VIII. Implementation plan

The holder of this clearance shall be responsible to implement the terms and condition of this clearance. In case, if construction work is contracted to Contractor, proper terms and conditions may be drawn with the contractor to fulfill the terms and condition of this Environment Clearance. The holder shall prepare a detailed implementation plan focusing on the implementation of terms and conditions of this EC and submit to DEC.

དཔལ་ལྡན་འབྲུག་གཞུང་།
Royal Government of Bhutan
དགའ་ས་རྫོང་ཁག་བདག་སྐྱོང་།
Gasa Dzongkhag Administration

IX. Monitoring and reporting

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 environmental focal person;
2. Report the implementation of EC terms and conditions to DEC as per the section 59 of the RECOP, 2016.

X. Renewal and modification

The holder shall:

1. Ensure that renewal of this EC is processed at least 3 months prior to its expiry along with a copy EC and a report on the implementation of its terms and conditions (if the construction is not complete)
2. Obtain prior approval from DEC/NECS for any modification to the existing proposal/application as per the section 28.3 of Regulation for the Environmental Clearance of Projects, 2016.

Reservation

1. The DEC/NECS may stop the activity or impose additional terms and conditions, as may be deemed necessary;
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.
3. 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 offense and the proponent shall be liable in accordance with the Environmental Assessment Act 2000 and/or existing environmental laws.

Validity
This EC is issued with validity from **2/07/2024 till 2/07/2025 (One Year).**

དཔལ་ལྡན་འབྲུག་གཞུང་།
Royal Government of Bhutan
དགའ་ས་རྫོང་ཁག་བདག་སྐྱོང་།
Gasa Dzongkhag Administration

This Environmental Clearance is issued solely pursuant to the Environmental Assessment Act, 2000 and its Regulations and in no way intends to overrule or alter the provisions of any law or rules in force. The Holder of this EC shall be responsible to adhere to the requirements under other laws and the issuing authority assumes no liability resulting from non-compliance or omission of any laws or rules.

Sincerely,

(Ji[illegible]e Namgye[illegible])
Chairperson, DEC

Dzongdag
Dzongkhag Administration
Gasa

Copy to:

1. Chief Environment Officer, EACD, Department of Environment and Climate Change, MoENR, Thimphu for information.
2. The CFO, Jigme Dorji National Park, Damji, Gasa for information.
3. Gup, Gewog Administration, Khatoed, for information.
4. Office copy.

Annex 4.1. Forestry Clearance for Water Pipeline

དཔལ་ལྡན་འབྲུག་གཞུང་། ནུས་ཤུགས་དང་རང་བཞིན་ཐོན་སྐྱེད་ལྷན་ཁག། ནགས་ཚལ་དང་གླིང་ག་ཞབས་ཏོག་ལས་ཁུངས།
ནགས་ཚལ་ལྟ་རྟོག་དང་བརྡ་དོན་སྡེ་ཚན།

Royal Government of Bhutan
Ministry of Energy & Natural Resources
Department of Forests & Park Services

Application ID: **841496**

16 April 2024

FORESTRY CLEARANCE FOR WATER PIPELINE WHERE FELLING OF TREE IS REQUIRED

This forestry clearance is issued for **Water Pipeline where felling of tree is required** measuring **4,629.00 m X 2.50 m** under **Khatoe** Gewog, **Gasa** Dzongkhag for the following applicant:

Name	CID	Household Number	Thram Number	Village	Gewog	Dzongkhag
Dzongkhang Administration						

The proposed area contains:

Trees	
Species	**Volume**
Betula alnoides	0.38 m3
Quercus semecarpifolia	5.26 m3
Quercus semecarpifolia	3.70 m3
Cupressus corneyana	7.53 m3
Cupressus corneyana	0.80 m3

Therefore, this clearance is **issued** based on the field inspection report submitted by: **[Sonam Younten (Sr. FR-III)]** dated **15 Apr 2024** on the following conditions:

Specific Terms and Conditions

1. Since the proposed activity falls within 100ft from the edge of water bodies, extracted soil to be managed/dumped properly

General Terms and Conditions

1. This clearance is issued from the forestry perspective only.
2. Department of Forest and Park Services shall not be responsible for any dispute arising during the implementation of the activity.
3. This clearance is not transferable.
4. This clearance shall not restrict easement.
5. The validation of this clearance is subject to obtaining other relevant clearances.
6. Additional clearance should be sought before any deviation in the location/alignment/size of the proposed State-Reserved Forest land (SRFL).
7. Any damage caused to public/private life and property shall be borne by the clearance holder.
8. Any waste generated from the activity should be properly disposed of as per the existing Waste Prevention & Management Regulations.

Reservations:

1. DoFPS may impose additional terms and conditions as may be deemed necessary
2. The clearance shall be revoked without any liability on part of DoFPS if the holder of this clearance violates any of the above terms and conditions.

Annex 4.2. Forestry Clearance for Reservoir Tank Construction

དཔལ་ལྡན་འབྲུག་གཞུང་། ནུས་ཤུགས་དང་རང་བཞིན་ཐོན་སྐྱེད་ལྷན་ཁག། ནགས་ཚལ་དང་གླིང་ཀ་ཞབས་ཏོག་ལས་ཁུངས།
ནགས་ཚལ་ལྷ་རྟོག་དང་བརྡ་དོན་སྡེ་ཚན།

Royal Government of Bhutan
Ministry of Energy & Natural Resources
Department of Forests & Park Services

Application ID: **848969**

03 June 2024

FORESTRY CLEARANCE FOR OTHERS (ACQUISITION OF THE SRF LAND FOR RESERVOIR TANK CONSTRUCTION FOR GASA TOWNSHIP WATER PROJECT ABOVE PHULAKHA LHAKHANG)

This forestry clearance is issued for **Others** measuring **Area: 0.120 acre** of the State Reserved Forest Land (SRFL) at **Phulakha** under **Khatoe** Gewog, **Gasa** Dzongkhag for the following applicant:

Name	CID	Household Number	Thram Number	Village	Gewog	Dzongkhag
Dzongkhang Administration						

The proposed area contains:

Trees	
Species	Volume
Juniperus recurva	9.02 cft
Juniperus recurva	6.93 cft

Therefore, this clearance is **issued** based on the field inspection report submitted by: **[Sonam Younten (Sr. FR-III)] [Tashi (Forest Ranger-II)] [Kelzang Dorji (Surveyour)] [Pema Rinzin (Engineer)]** dated **03 Jun 2024** on the following conditions:

Specific Terms and Conditions

1. Construction to be carried within the acquired land.

General Terms and Conditions

1. This clearance is issued from the forestry perspective only.
2. Department of Forest and Park Services shall not be responsible for any dispute arising during the implementation of the activity.
3. This clearance is not transferable.
4. This clearance shall not restrict easement.
5. The validation of this clearance is subject to obtaining other relevant clearances.
6. Additional clearance should be sought before any deviation in the location/alignment/size of the proposed State-Reserved Forest land (SRFL).
7. Any damage caused to public/private life and property shall be borne by the clearance holder.
8. Any waste generated from the activity should be properly disposed of as per the existing Waste Prevention & Management Regulations.

Reservations:

1. DoFPS may impose additional terms and conditions as may be deemed necessary
2. The clearance shall be revoked without any liability on part of DoFPS if the holder of this clearance violates any of the above terms and conditions.

This is an electronically generated document. No signature(s) required. Document generated on 05 June 2024 at 02:57 PM.

Annex 4.3. Forestry Clearance for Access Road

Royal Government of Bhutan
Ministry of Energy & Natural Resources
Department of Forests & Park Services

Application ID: 849277 14 June 2024

FORESTRY CLEARANCE FOR ROAD

This forestry clearance is issued for **Road** measuring **400.00 m X 3.50 m** under **Khatoe** Gewog, **Gasa** Dzongkhag for the following applicant:

Name	CID	Household Number	Thram Number	Village	Gewog	Dzongkhag
Dzongkhag Administration, Gasa						

The proposed area contains:

Trees	
Species	**Volume**
Juniperus recurva	16.7 cft
Juniperus recurva	17.9 cft
Juniperus recurva	10.4 cft
Juniperus recurva	5.4 cft
Juniperus recurva	3.4 cft
Juniperus recurva	5.6 cft
Juniperus recurva	6 cft
Juniperus recurva	5.1 cft

Therefore, this clearance is **issued** based on the field inspection report submitted by: **[Tashi (Fr-II)] [Sonam younten (Sr.FR III)]** dated **11 Jun 2024** on the following conditions:

Specific Terms and Conditions

1. The concerned authority needs to adhere with the terms and conditions of the NoC letter issued from Gasa Rabdhey. The FR clearing needs to be done with proper marking. Debris disposal to be taken care.

General Terms and Conditions

1. This clearance is issued from the forestry perspective only.
2. Department of Forest and Park Services shall not be responsible for any dispute arising during the implementation of the activity.
3. This clearance is not transferable.
4. This clearance shall not restrict easement.
5. The validation of this clearance is subject to obtaining other relevant clearances.
6. Additional clearance should be sought before any deviation in the location/alignment/size of the proposed State-Reserved Forest land (SRFL).
7. Any damage caused to public/private life and property shall be borne by the clearance holder.
8. Any waste generated from the activity should be properly disposed of as per the existing Waste Prevention & Management Regulations.

Reservations:

1. DoFPS may impose additional terms and conditions as may be deemed necessary
2. The clearance shall be revoked without any liability on part of DoFPS if the holder of this clearance violates any of the above terms and conditions.

This is an electronically generated document. No signature(s) required. Document generated on 20 June 2024 at 05:07 PM.

Annex 4.4. Forestry Clearance for Water Treatment Plant

Royal Government of Bhutan

Ministry of Energy & Natural Resources

Department of Forests & Park Services

Application ID: **850128** 14 June 2024

FORESTRY CLEARANCE FOR OTHERS (FC FOR THE WATER TREATMENT PLANT LAND ACQUISITION.)

This forestry clearance is issued for **Others** measuring **Area: 0.700 acre** of the State Reserved Forest Land (SRFL) at **Phulakha** under **Khatoe** Gewog, **Gasa** Dzongkhag for the following applicant:

Name	CID	Household Number	Thram Number	Village	Gewog	Dzongkhag
Dzongkhang Administration						

The proposed area contains:

Trees	
Species	Volume

Therefore, this clearance is **issued** based on the field inspection report submitted by: **[Sonam Younten (Sr. FR-II)]** dated **14 Jun 2024** on the following conditions:

Specific Terms and Conditions

1. This FC is not applicable for WTP area extension and additional FR removals. The FC is based on the Map of the area as per the Dzongkhag survey office mapped during the previous water pipeline alignment survey.

General Terms and Conditions

1. This clearance is issued from the forestry perspective only.
2. Department of Forest and Park Services shall not be responsible for any dispute arising during the implementation of the activity.
3. This clearance is not transferable.
4. This clearance shall not restrict easement.
5. The validation of this clearance is subject to obtaining other relevant clearances.
6. Additional clearance should be sought before any deviation in the location/alignment/size of the proposed State-Reserved Forest land (SRFL).
7. Any damage caused to public/private life and property shall be borne by the clearance holder.
8. Any waste generated from the activity should be properly disposed of as per the existing Waste Prevention & Management Regulations.

Reservations:

1. DoFPS may impose additional terms and conditions as may be deemed necessary.
2. The clearance shall be revoked without any liability on part of DoFPS if the holder of this clearance violates any of the above terms and conditions.

Annex 5. Clearance from Stakeholders

Annex 5.1. Bhutan Power Corporation

Pg 1/2

འབྲུག་གློག་མེ་ལས་འཛིན།།

Bhutan Power Corporation Limited

(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)

Registered Office, Thimphu

Distribution &Customer Services Department

Electricity Services Sub-Division

Gasa: Bhutan

06/BPC/ESSD-Gasa/clearance /2024/ 33 31/05/2024

The Dasho Dzongdag.
Dzongkhag Administration.
Gasa Dzongkhag.
Gasa : Bhutan

Subject:- **Clearance for Gasa Township Water Suppply Scheme.**

Respectede Dasho,

This to submit here with that Bhutan Power Corporation limited, Electricity Supply Subdivision , Gasa have NO OBJECTION in execution of the ACREWAS project.

However this office would like to request proper coordination during execavation work as there is one crossing of water pipeline with our under ground cable of Electric Vehicle Charging Station at Gasa town.

Enclosed is the map of ACREWAS project with the pont of intersection of water pipeline and our UG cable network for Dasho's kind information.

Thanking you,

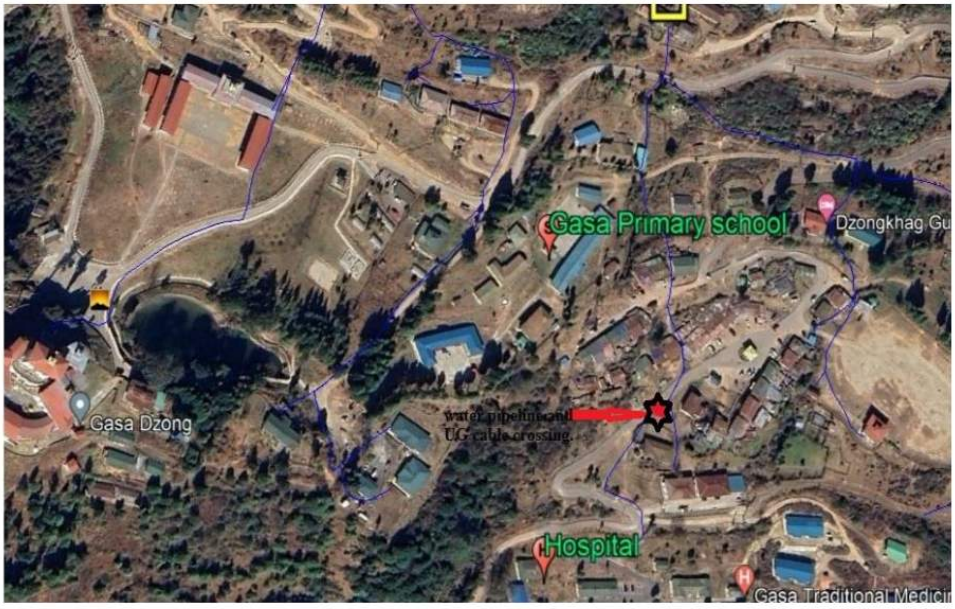
Yours sincerely,

Sub-Divisional Manager
Electricity Services Sub-Division
Bhutan Power Corporation Ltd
Gasa Bhutan

Copy to: Sr. Dvisional Manager, ESD, BPC Punakha, for kind information.

web: www.bpc.bt Phone No: 02-688165, ; Email:essdgasa@bpc.bt

འབྲུག་གློག་མེ་ལས་འཛིན།།
Bhutan Power Corporation Limited
(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)
Registered Office, Thimphu
Distribution &Customer Services Department
Electricity Services Sub-Division
Gasa: Bhutan



web: www.bpc.bt Phone No: 02-688165, ; Email:essdgasa@bpc.bt

Annex 5.2. Clearance from District Court

རྫོང་ཁག་ཁྲིམས་ཀྱི་འདུན་ས།

དགའ་ས།

DISTRICT COURT

GASA

༄། དཔལ་ལྡན་འབྲུག་པའི་ཁྲིམས་ཀྱི་འདུན་ས།

ROYAL COURT OF JUSTICE

Gathrim(Adm-24)2024/ 578

Date:30.05.2024

Dasho Dzongda,
Dzongkhag Administration,
Gasa, Bhutan.

<u>Subject: No Objection Letter</u>

Dasho,

With best compliments, the Gasa District Court would like to convey our wishes to Dzongkhag Administration Gasa for your continued effort in developmental activities and moving at the great pace.

In reference to your letter No. DAG/ACREWAS/2023-2024/2542, dated 28th May 2024, regarding the Gasa Township Water Supply Scheme under ACREWAS project including Water Treatment Plant funded by UNDP/GEF and requirement of clearance from the stake holders.

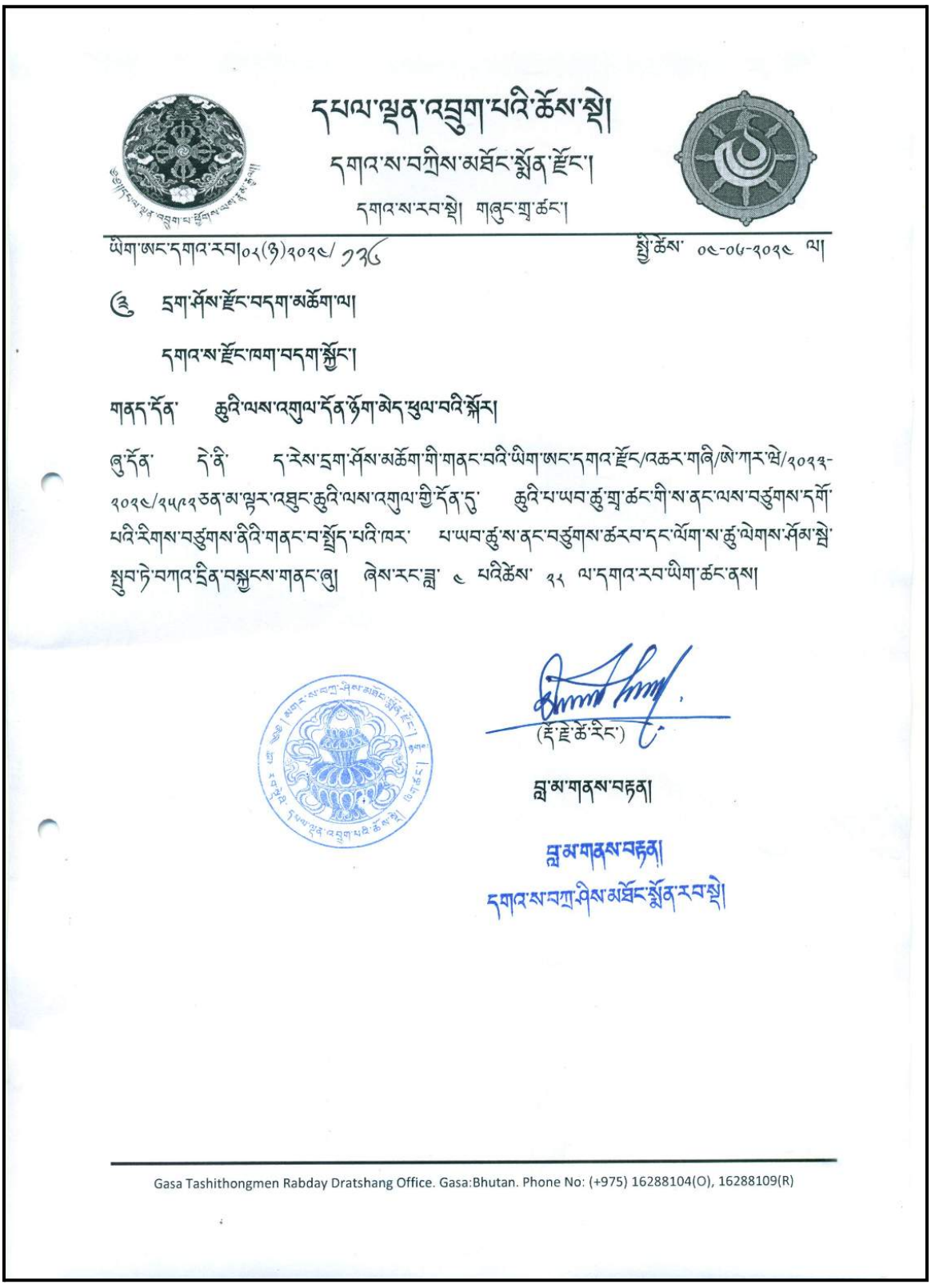
The Gasa District Court has no objection in carrying out the work and will always support the project and cooperate to accomplish the work at the earliest. We would also like to request the concern agent to notify us before the work starts in the District Court Area.

Tanking you,

(Tashi Dorji)

Judge
District Court, Gasa

Annex 5.3. Clearance from Dratshang



དཔལ་ལྡན་འབྲུག་པའི་ཚེས་སྡེ།

དགའ་ས་བཀྲིས་མཐོང་སློན་རྫོང་།

དགའ་ས་རབ་སྡེ། གཞུང་གྲྭ་ཚང་།

ཡིག་ཚང་དགའ་རབ།০২(৯)২০২৯/ ১৩৫ ཚྲི་ཚེས་ ০৯-০৬-২০২৯ ལ།

ཞུ། དག་ཤོས་རྫོང་བདག་མཆོག་ལ།

དགའ་ས་རྫོང་ཐག་བདག་སྐྱོང་།

གནད་དོན་ ཆུའི་ལས་འགུལ་དོན་ཉེ་གཅེད་སྒུལ་བའི་སྐོར།

ཞུ་དོན་ དེ་ནི་ ད་རེས་དྲག་ཤོས་མཆོག་གི་གནང་བའི་ཡིག་ཚང་དགའ་རྫོང་/འཚར་གཞི/ཚེ་གར་ཁེ/২০২২-২০২৯/২৬/১২ཅན་མ་ལྟར་འཐུང་ཆུའི་ལས་འགུལ་གྱི་དོན་དུ་ ཆུའི་པ་ཡབ་ཆུ་སྣ་ཚང་གི་ས་ནང་ལས་བཙུགས་དགོ་པའི་རིགས་བཙུགས་ནིའི་གནང་བ་སྤྲོད་པའི་ཁར་ པ་ཡབ་ཆུ་ས་ནང་བཙུགས་ཚར་བར་ལོག་ས་ཆུ་ལེགས་ཤོམ་སྤེ་སྐྱབ་ཏེ་བཀའ་དྲིན་བསྐྱངས་གནང་ཞུ། ཞེས་རང་ཟླ་ ৫ པའི་ཚེས་ ২২ ལ་དགའ་རབ་ཡིག་ཚང་ནས།

(རྡོ་རྗེ་ཚེ་རིང་)

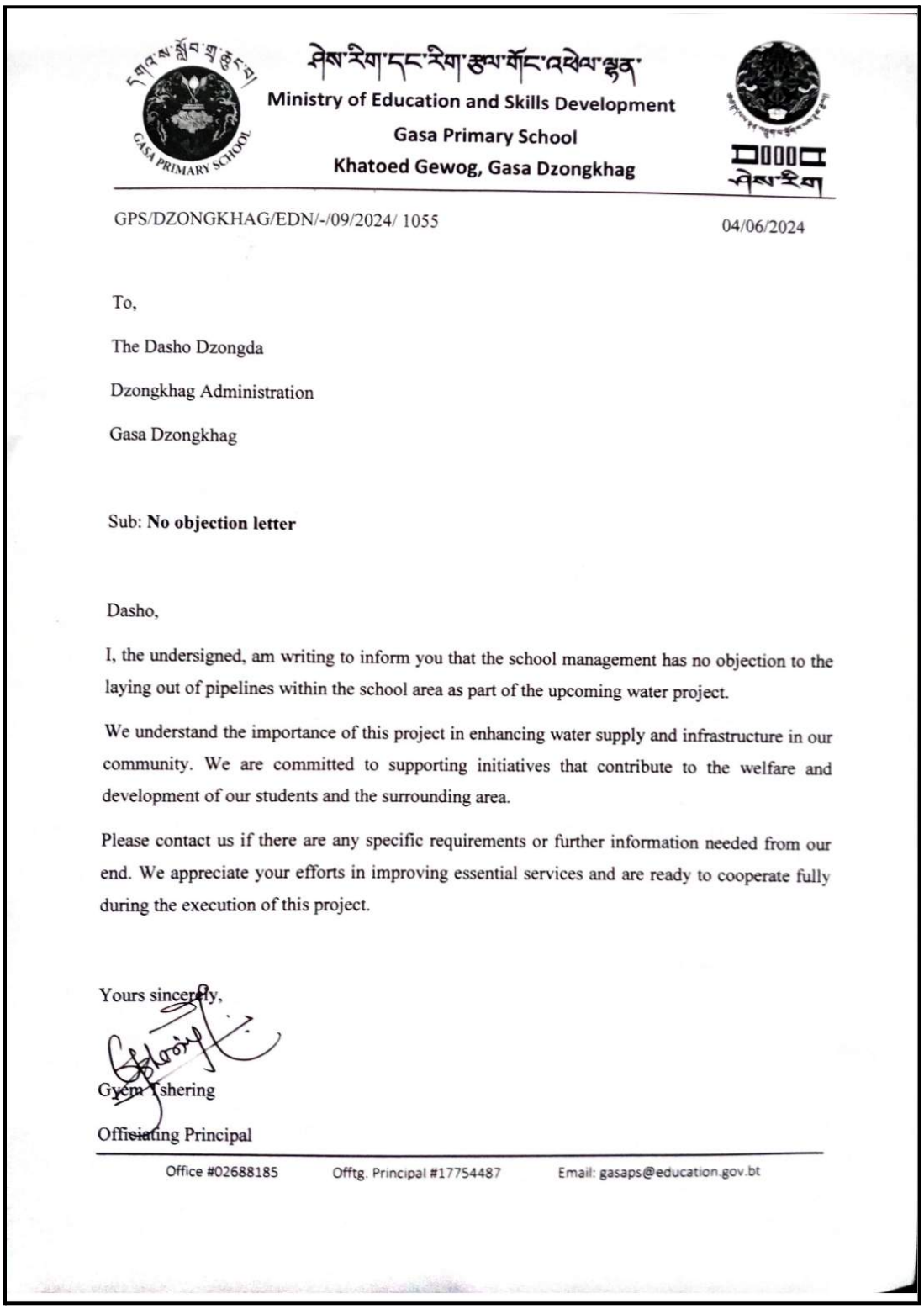
བློ་མ་གནས་བརྟན།

བློ་མ་གནས་བརྟན།

དགའ་ས་བཀྲ་ཤིས་མཐོང་སློན་རབ་སྡེ།

Gasa Tashithongmen Rabday Dratshang Office. Gasa:Bhutan. Phone No: (+975) 16288104(O), 16288109(R)

Annex 5.4. Clearance from Gasa Primary School



ཨེས་རིག་དང་རིག་རྩལ་གོང་འཕེལ་སྡེབ་

Ministry of Education and Skills Development

Gasa Primary School

Khatoed Gewog, Gasa Dzongkhag

GPS/DZONGKHAG/EDN/-/09/2024/ 1055 04/06/2024

To,

The Dasho Dzongda

Dzongkhag Administration

Gasa Dzongkhag

Sub: **No objection letter**

Dasho,

I, the undersigned, am writing to inform you that the school management has no objection to the laying out of pipelines within the school area as part of the upcoming water project.

We understand the importance of this project in enhancing water supply and infrastructure in our community. We are committed to supporting initiatives that contribute to the welfare and development of our students and the surrounding area.

Please contact us if there are any specific requirements or further information needed from our end. We appreciate your efforts in improving essential services and are ready to cooperate fully during the execution of this project.

Yours sincerely,

Gyem Tshering

Officiating Principal

Office #02688185 Offtg. Principal #17754487 Email: gasaps@education.gov.bt

Annex 5.5. Clearance from NHDCL

ཀྲྱལ་ཡོངས་ཁྱིམ་བཟོ་གོང་འཕེལ་ལས་འཛིན་ཚད།

National Housing Development Corporation Limited
Thimphu: Bhutan

No. NHDCL/RED/GM-17/2024/ 4436

June 4, 2024

Dasho Dzongda
Dzongkhag Administration
Gasa

Subject: No Objection Letter

Dasho,

Greetings from National Housing Development Corporation limited (NHDCL).

This has reference to your letter No.DAG/ACREWAS/2023-2024/2573 dated May 29, 2024 regarding the requirement of no objection letter from this office for the Gasa Township Water Supply Scheme under ACREWAS project.

In this context we are pleased to inform you that NHDCL do not have any objection in case if the distribution line and trenches falls/passes through NHDCL property so far there is no disruption in the existing water supply lines to the housing colony.

Further we would like to request Dzongkhag Administration to consider and provide water supply from this project to NHDCL housing colony.

Thanking you for your unwavering support and cooperation.

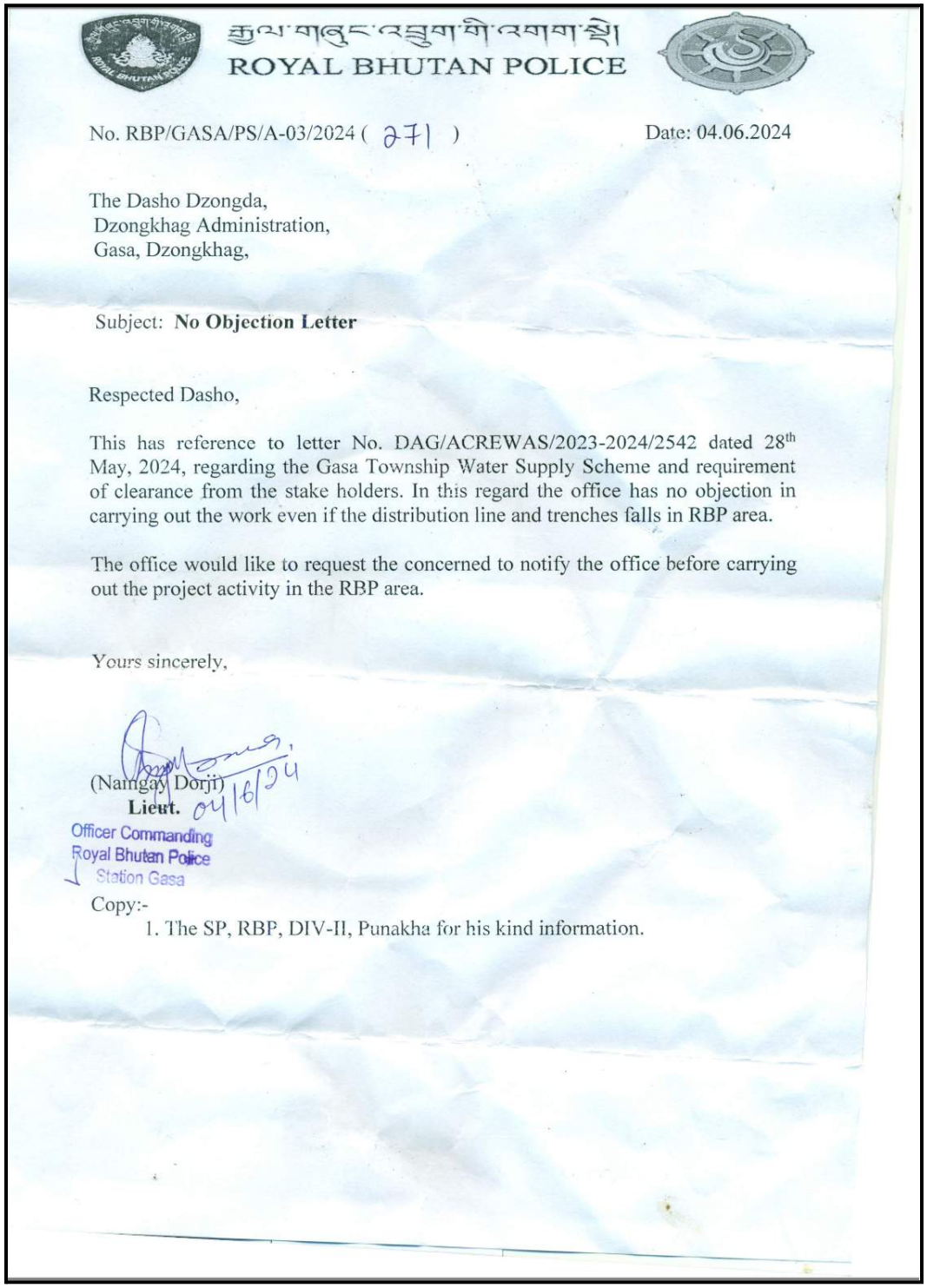
Yours Sincerely
For NHDCL

(Pradeep Katwal)
General Manager

Copy: CEO, NHDCL for kind information.

Head office: Post Box No.1439. Tel # (PABX: 00975-2- 323147/332734/332735). Fax: 331703. Website: www.nhdcl.bt

Annex 5.6. Clearance from Royal Bhutan Police



རྒྱལ་གཞུང་འཇྲུག་གི་འགག་སྡེ།
ROYAL BHUTAN POLICE

No. RBP/GASA/PS/A-03/2024 (271) Date: 04.06.2024

The Dasho Dzongda,
Dzongkhag Administration,
Gasa, Dzongkhag,

Subject: **No Objection Letter**

Respected Dasho,

This has reference to letter No. DAG/ACREWAS/2023-2024/2542 dated 28th May, 2024, regarding the Gasa Township Water Supply Scheme and requirement of clearance from the stake holders. In this regard the office has no objection in carrying out the work even if the distribution line and trenches falls in RBP area.

The office would like to request the concerned to notify the office before carrying out the project activity in the RBP area.

Yours sincerely,

(Namgay Dorji)
Lieut. 04/6/24
Officer Commanding
Royal Bhutan Police
Station Gasa

Copy:-
1. The SP, RBP, DIV-II, Punakha for his kind information.

Annex 6. Results of the Water Quality Test

Water Sample Test, Gasa (21/05/24 at 7:05 AM

SN	Parameters	Ref. Method	Unit of measurement	Result	National Standards, 2020
1	pH	Electrometric using 900p multi-parameter		7.54	6.5-8.5
2	Total dissolved Solid (TDS)	TDS meter using 900p multi-parameter	mg/l	53.86	500
3	Dissolved Oxygen (mg/L)	DO meter using 900p Multi-parameter	mg/l	7.92	6
5	Electrical Conductivity	Conductivity meter	µs/cm	98.14	800
6	Temperature	Thermometer	° C	19.63	---
7	Resistivity	Using 900p multi-parameter	Ohm/cm	0.010	---
9	Total Suspended solids (TSS)	Gravimetric method	mg/l	0.64	25
10	Total coliform	Membrane filtration	MPN/100ml	BDL	0
11	Fecal Coliform	Membrane filtration	MPN/100ml	BDL	0
12	BOD	Respirometric	mg/L	0.32	2
13	COD	Dichromate method	mg/L	0.86	5
14	Color	Colorimeter	Hz	0.16	15
15	Turbidity	Nephelometric	NTU	0.16	5
16	Lead (Pb)	HI93740-01	mg/L	BDL	0.01
17	Arsenic (As)	Color comparison method (AQAS408)	mg/L	BDL	0.01
18	Mercury (Hg)	HI9348-01	mg/L	>0.0001	0.006
19	Chloride (Cl-)	H193738-01 US EPA method	mg/L	0.56	---
20	Phosphate (PO4-)	HI93728-01	mg/L	>0.04	0.5
21	Ammonia (NH3)	HI93751-01	mg/L	>0.05	0.05
22	Total Hardness	HI93719-01& HI93720-01	mg/L	0.47	200
23	Magnesium (Mg)	HI937520-01	mg/L	0.03	---

Report No.:	BES/DKW/272
Name of Customer:	M/s Phuensum Consultancy
Date of sample Collection:	21.05.2024
Time of sample collection:	7.05 AM
Sample Collected by:	Bhutan Ecolab Team
Sample volume:	3 litres
Date of Result Dispatch:	27.05.24

SN	Parameters	Ref. Method	UOM	Result	National Standards, 2020
1	pH	Electrometric using 900p multi-parameter		7.54	6.5-8.5
2	Total dissolved Solid (TDS)	TDS meter using 900p multi-parameter	mg/l	53.86	500
3	Dissolved Oxygen (mg/L)	DO meter using 900p Multi-parameter	mg/l	7.92	6
5	Electrical Conductivity	Conductivity meter	µs/cm	98.14	800
6	Temperature	Thermometer	° C	19.63	---
7	Resistivity	Using 900p multi-parameter	Ohm/cm	0.010	---
9	Total Suspended solids (TSS)	Gravimetric method	mg/l	0.64	25
10	Total coliform	Membrane filtration	MPN/100ml	BDL	T. Coliform-50
11	Fecal Coliform	Membrane filtration	MPN/100ml	BDL	Fecal Coliform-20
12	BOD	Respirometric	mg/L	0.32	2
13	COD	Dichromate method	mg/L	0.86	5

14	Color	Colorimeter	Hz	0.16	2

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Annex 7. Results of the Noise Level Test

BHUTAN ECOLAB SERVICES

BHUTAN ECOLAB SERVICES, PEKARZHING, P/LING.

INSPIRING ENVIRONMENTAL SERVICES...

Type of Analysis:	Ambient noise level
Sampling Location:	Gasa Town (27.90711; 89.73147)
Date of Sampling:	16-05-24 to 17-05-24
Duration of Sampling:	24 hours
Report No.:	SLM/476
Sample No.:	BESLM/444
Sample Description:	Ambient Noise level
Date of Result Dispatched:	21-05-24

Test Report					
Analysis					
Sl.No	**Parameters**	**UOM**	**Result (Avg)**	**Max.P.L**	**Test Ref. Method**
1	Ambient Noise Level	Db	46.78	65 (Day)	24 hours continuous sampling using AQM-09 Integrated sound level meter
			45.12	55 (Night)	
Note: Noise level Limits, National Environment Commission Secretariat (NECS), 2020					

EQUIPEMENT OF USED SPECIFICATION:

4) Equipment Name: Air Quality Monitor
5) Model No.: AQM-09
6) Make: Oceanus

Prepared by:

For Bhutan Ecolab Services

[Authorized Signatory]

2

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Annex 8. Results of the Air Quality Test

BHUTAN ECOLAB SERVICES, PEKARZHING, P/LING.

INSPIRING ENVIRONMENTAL SERVICES...

Name & Address of the Customer:	M/s Phuensum Consultacny, Thimphu, Bhutan
Type of Analysis:	Ambient air Quality
Sampling Location:	Gasa Town
Date of Sampling:	16-05-24 to 17-05-24
Duration of Sampling:	24 hours
Report No.:	BES/24/542
Sample No.:	BES/542
Sample Description:	Ambient Air
Date of Result Dispatched:	21-05-24

SL.No	Parameters	UOM	Result	Max.P.L (NECS Standards 2020)
			Project Area	
1	TSPM	µg/m³	12.866	200 (24hr Avg.)
2	PM-2.5	µg/m³	8.41	60 (24hr Avg)
3	PM-10	µg/m³	10.79	100 (24hr Avg)
4	Conc. Of Sulphur Dioxide (SO2)	µg/m³	BDL	80 (24 hr avg.)
5	Conc. Of Nitrogen Dioxide (No2)	ppm	11.11	80 (24hr avg.)
6	Conc. Of Carbon Monoxide (CO)	ppm	BDL	2000 (8hr avg.)
7	Atmospheric Pressure	mbar	731.08	
8	Wind Speed (WS)	m/sec	0.217	
9	Temperature	° C	18.92	
10	Relative Humidity	%	65.84	
11	Elevation	m.a.s.l	2750	
12	Geo-coordinates		27.90711; 89.73147	

EQUIPEMENT OF USED SPECIFICATION:

1) Equipment Name: Air Quality Monitor
2) Model No.: AQM-09
3) Make: Oceanus

Prepared by:

For Bhutan Ecolab Services;

[Authorized Signatory]

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Annex 9. Soil Data Report for Gasa

*Soil Data Report for Gasa**

Lab.No	Sample Description	pH	%		mg/kg				C:P Ratio	N:P Ratio	C:K Ratio	Texture by Hand
		H2O	C	N	CN Ratio	P Avail Bray	P Avail Olsen	K Avail				
87353	Sample 1	6.00 M	1.70 M	0.05 vL	33.50 H	28.87 M	ND	86.30 L	0.06	0.00	0.02	LS
87354	Sample 2	5.21 L	5.30 vH	0.32 M	16.56 M	2.45 vL	ND	37.41 vL	2.16	0.13	0.14	SL
87355	Sample 3	5.32 L	3.30 H	0.24 M	13.64 L	0.90 vL	ND	18.30 vL	3.65	0.27	0.18	SCL

**Data Collected was analyzed by the National Soil Services Center*

Annex 10. Biodiversity List

Species listed in FNCA 2023

	Scientific name	Common name	Schedule
1	*Paris polyphylla*	Daiswa polyphylla	II
2	*Panax psuedoginseng*	Himalayan ginseng	II
3	*Acer campbellii*	Himalayan maple	II
4	*Taxus baccata*	Common yew	II
5	*Juniperus indica*	Juniper	II
6	*Rhododendron arboreum*	Rhododendron	III
7	*Lyonia ovalifolia*	Fetterbush	III
8	*Rhododendron keysii*	Rhododendron	III
9	*Rhododendron barbatum*	Rhododendron	III
10	*Rhododendron cinnabarinum*	Rhododendron	III
11	*Lyonia ovalifolia*	Fetterbush	III
12	*Rhododendron keysii*	Rhododendron	III
13	*Rhododendron triflorum*	Rhododendron	III
14	*Rhododendron arboreum*	Rhododendron	III
15	*Daphne bholua*	Paper Daphne	III
16	*Rhododendron lindleyi*	Rhododendron	III
17	*Cordeyceps sinensis*	Yartsa Goenpo	

Wildlife recorded during the Survey

Sl no	Common name	Scientific name	Type of evidence	Frequency	IUCN status	FNCR, 23
1	*Barking Deer*	*Rusa unicolor*	Dung	2	Vu	II
2	*Sambar*	*Muntiacus muntjak*	Dung	2	LC	III
3	*Wild Pig*	*Sus scrofa*	Dung/Rooting	Outside the plots	LC	

Tree species recorded in the vegetation plots

Sl no	Family	Scientific name	Common name	National legislation	IUCN status	Use
1	Ericaceae	*Rhododendron arboreum*	Rhodo	Schedule III	Lc	Ph, Arts and Crafts
2	Rosaceae	*Prunus nepalensis*	Bird Cherry		NE	Ph, Arts and Crafts
3	Betulaceae	*Betula utilis*	Birch	Schedule II	Lc	Ph
4	Fagaceae	*Quercus semicarpofolia**	Kharsu		Lc	Arts and Crafts
5	Cuppressaceae	*Juniperus indica*	Juniper	Schedule II	Lc	Ph, Fo
6	Daphniphyllaceae	*Daphniphyllum himalense**	Himalayan Daphne		Lc	Fo, Arts and Crafts
7	Ericaceae	*Lyonia ovalifolia**	Fetterbush	Schedule III	Lc	Ph

8	Oleaceae	*Fraxinus spp*	Flowering ash		LC	Ph
9	Taxaceae	*Taxus baccata**	Common yew	Schedule II	Lc	Ph, Fo
10	Betulaceae	*Corylus ferox*	Himalayan hazelnut		Lc	Ph, Fo
11	Aquifoliaceae	*Ilex dipyrena*	Himalayan Holly		Lc	Ph, Arts and Crafts
12	Rosaceae	*Prunus rufa*	Himalayan cherry		Lc	Ph, Arts and Crafts
13	Ericaceae	*Enkianthus deflexus*	Himalayan red bell		Lc	Ph, Fo,
14	Ericaceae	*Rhododendron keysii*	Rhodo	Schedule III	Lc	Fo,Fe
15	Salicaceae	*Salix spp*	Sallows		Lc	Fo, Ph

**- Is abundant throughout the plot and in the area*

Shrub species recorded in the vegetation plots

Sl no	Family	Scientific name	Common name	National legislation	IUCN status	Use
1	Thymelaeaceae	*Daphne bholua*	Paper Daphne	Schedule III	Lc	Ph, Arts and Crafts
2	Buxaceae	*Sarcococca saligna**	Christmas box		Lc	Ph, Arts and Crafts
3	Adoxaceae	*Viburnum erubescens**	Reddish viburnum		Lc	Ph
4	Scrophulariaceae	*Buddleja convelei*	Butterfly bush		Lc	Arts and Crafts
5	Schisandraceae	*Schisandra neglecta*	Magnolia vine		Lc	Ph, Fo
6	Grossulariaceae	*Ribes laciniatum**	Gooseberry		Lc	Fo, Arts and Crafts
7	Celastraceae	*Euonymus spp*	Spindle tree		Lc	Ph
8	Ericaceae	*Rhododendron barbatum*	Rhodo	Schedule III	Lc	Ph
9	Berberidaceae	*Berberis spp*	Barberry		Lc	Ph, Fo
10	Oleaceae	*Osmanthus sauvis*	Sweet olive		Lc	Ph, Fo
11	Caprifoliaceae	*Lycesteria formosa*	Himalayan honeysuckle		Lc	Ph, Arts and Crafts
12	Fabaceae	*Piptanthus nepalensis*	Evergreen laburnum		Lc	Ph, Arts and Crafts
13	Rosaceae	*Rosa sericea*	Silky rose		Lc	Ph, Fo,
14	Poaceae	*Yushania mycrophylla*			Lc	Fo,Fe
15	Adoxaceae	*Viburnum mullaha*	Starry Viburnum		Lc	Fo, Ph
16	Ericaceae	*Vaccinium nummularia*	Himalayan whortleberry		Lc	Fo, Arts and Crafts
17	Ericaceae	*Vaccinium corymbosum*	Blueberry		Lc	Ph, Fo, Fe
18	Ericaceae	*Rhododendron cinnabarinum*		Schedule III	Lc	Ph, Fo, Fe
19	Rosaceae	*Spirea spp*	Steeplebushes		Lc	Ph, Arts and Crafts
20	Saxifragaceae	*Astilbi rivularis*	Falsegoat's beard		Lc	Ph
21	Ericaceae	*Lyonia ovalifolia*	Fetterbush	Schedule III	Lc	Ph, Arts and Crafts
22	Ericaceae	*Gaultheria fragrantissima*	Fragrant winter green		Lc	Ph, Fo, Fe
23	Sapindaceae	*Acer campbellii*	Himalayan maple	Schedule II	Lc	Arts and Crafts
24	Ericaceae	*Enkianthus deflexus*	Himalayan red bell		Lc	Ph, Fo,
25	Aquifoliaceae	*Ilex dipyrena*	Himalayan Holly		Lc	Ph, Arts and Crafts
26	Ranunculaceae	*Clematis montana*	Mountain clematis		Lc	Ph
27	Lardizabalaceae	*Decaisnea insignis*	Dead man's finger		Lc	Fo
28	Pinaceae	*Tsuga dumosa*	Himalayan hemlock		Lc	Arts and Crafts
29	Hypericaceae	*Hypericum spp*	Goatweed		Lc	Ph
30	Ericaceae	*Rhododendron keysii*	Rhodo	Schedule III	Lc	Fo,Fe

31	Oleaceae	*Ligustrum spp*	Privet		Lc	Ph
32	Rosaceae	*Prunus nepalensis*	Bird Cherry		Lc	Ph, Fo, Fe
33	Smilacaceae	*Smilax spp*	Greenbriers		Lc	Ph
34	Theaceae	*Eurya spp*	East asian eurya		Lc	Fe
35	Ericaceae	*Pieris formosa*	Taiwan pieris		Lc	Ph
36	Rosaceae	*Rubus spp*			Lc	Ph, Fo
37	Betulaceae	*Corylus ferox*	Himalayan hazelnut		Lc	Ph, Fo
38	Lardizabalaceae	*Holbelia latifolia*	Sausage vine		Lc	Ph, Fo
39	Elaeagnaceae	*Elaeagnus parviflora*	Thorny olive		Lc	Ph, Fo
40	Rosaceae	*Cotoneaster mycrophyllus*	Little leaf cotoneaster		Lc	Ph, Fo
41	Ericaceae	*Rhododendron triflorum*		Schedule III	Lc	Ph
42	Cuppressaceae	*Juniperus indica*	Juniper	Schedule II	Lc	Ph, Arts and Crafts
43	Rutaceae	*Zanthoxylem spp*	Prickly ash		Lc	Ph, Fo
44	Oleaceae	*Jasminium spp*	Yellow jasmine		Lc	Ph
45	Lamaiceae	*Elsholtzia fruticosa*	Shrubby mint		Lc	Ph
46	Symplocaceae	*Symplocus paniculata*	Sapphire berry		Lc	Ph, Fo
47	Hydrangeaceae	*Philadelphus spp*	Fuzzy mock orange		Lc	Ph,
48	Rosaceae	*Neillia rubiflora*			Lc	Ph, Fo
49	Ericaceae	*Rhododendron arboreum**	Rhodo	Schedule III	Lc	Ph, Arts and Crafts
50	Daphniphyllaceae	*Daphniphyllum himalense**	Himalayan Daphne		Lc	Fo, Arts and Crafts

Herb species recorded the vegetation plots

Sl no	Family	Scientific name	Common name	National legislation	IUCN status	Use
1	Polygonaceae	*Aconogonum molle**	Thrumbula		Lc	Ph, Fo, Fe
2	Urticaceae	*Pilea spp*	Clearweed		Lc	Ph
3	Balsaminaceae	*Impatiens spp*			Lc	Ph
4	Athyriaceae	*Diplazium spp*	Fern		Lc	Ph, Fo, Fe
5	Liliaceae	*Cardiocrinum giganteum*	Gaint himalayan lily		Lc	Ph
6	Liliaceae	*Clintonia udensis*	Bead lily		Lc	Fo
7	Asteraceae	*Ainsliaea aptera*			Lc	Ph
8	Rubiaceae	*Rubia manjith**	Indian madder		Lc	Ph, Arts and Crafts
9	Asparagaceae	*Ophiopogon spp*	Mondo grass		Lc	Ph
10	Asteraceae	*Ligularia spp**	Leopard plant		Lc	Ph
11	Araliaceae	*Panax psuedoginseng*	Himalayan ginseng	Schedule II	NE	Ph, Fo
12	Violaceae	*Viola spp*			Lc	Ph
13	Lycopodiaceae	*Lycopodium clavatum*	Staghorn club moss		Lc	Ph, Arts and Crafts
14	Rosaceae	*Frageria nubicola*	Strawberry		Lc	Ph, Fo
15	Rubiaceae	*Galium spp*	Catchweeds		Lc	Ph
16	Geraniaceae	*Geranium spp*			lc	Ph
17	Ranunculaceae	*Thalictrum spp*	Meadow rues		Lc	Ph
18	Gentianaceae	*Crawfordia speciosa*	Showy gentian vine		Lc	Ph,
19	Ericaceae	*Pyrola spp*	Wintergreens		Lc	Ph
20	Rosaceae	*Rubus calycinus*	Wild raspberry		Lc	Ph

21	Asteraceae	*Senecio diversifolia*			Lc	
22	Orchidaceae	*Cephalanthera longifolia*	Orchid		Lc	Ph
23	Lamiaceae	*Salvia spp*	Common sage		Lc	Ph
24	Asteraceae	*Aster spp*	Michaelmas daisies		Lc	Ph
25	Gentianaceae	*Swertia spp*	Bitter stick		Lc	Ph
26	Ophiogloossaceae	*Bortrychium spp*	Moonworts		Lc	Ph, Fo, Fe
27	Astweraceae	*Anaphalis spp*	Pearl		Lc	Ph
28	Apocynaceae	*Vincetoxicm hirundinaria*	White swallow wort		Lc	Ph
29	Asteraceae	*Circium spp*	Creeping thistle		Lc	Ph
30	Rosaceae	*Potentilla spp*	Shrubby cinquefoil		Lc	Ph, Fo, Fe
31	Melanthiaceae	*Paris polyphylla*	Daiswa polyphylla	Schedule II	Vu	Ph, Fo Fe

Epiphytes recorded in the vegetation plots

Sl no	Family	Scientific name	Common name	National legislation	IUCN status	Use
1	Orchidaceae	*Bulbophyllum spp*			LC	
2	Ericaceae	*Vaccinium nummularia*	Himalayan whortleberry		NE	
3	Araliaceae	*Gamblea ciliata*			LC	
4	Polypodiaceae	*Drynaria spp*	Oakleaf baasket fern		LC	
5	Ericaceae	*Rhododendron lindleyi*	Rhodo	Schedule III	Th	

Bird species recorded during the biodiversity survey

#	Common name	Scientific name	IUCN Status	FNCA 2023
1	White capped water redstart	*Phoenicurus leucocephalus*	LC	
2	Grey-crested tit	*Lophophanes dichrous*	LC	
3	Buff-barred warbler	*Phylloscopus pulcher*	LC	
4	Blue whistling thrush	*Myophonus caeruleus*	LC	
5	White-collared blackbird	*Turdus albocinctus*	LC	
6	Rufous-necked laughingthrush	*Pterorhinus ruficollis*	LC	
7	Streaked laughingthrush	*Trochalopteron lineatum*	LC	
8	Oritental turtle dove	*Streptopelia orientalis*	LC	
9	Drongo cuckoo	*Surniculus velutinus*	LC	
10	Large hawk cuckoo	*Hierococcyx sparverioides*	LC	Schedule III
11	Hume's warbler	*Phylloscopus humei*	LC	
12	Great barbet	*Megalaima virens*	LC	
13	Kalij pheasant	*Lophura leucomelanos*	LC	Schedule III
14	Plantive cuckoo	*Cacomantis merulinus*	LC	Schedule III
15	Eurasian cuckoo	*Cuculus canorus*	LC	Schedule III
16	Rufous sibia	*Heterophasia capistrata*	LC	
17	Spotted nutcracker	*Nucifraga caryocatactes*	LC	
18	Red billed chough	*Pyrrhocorax pyrrhocorax*	LC	Schedule III
19	Large- billed crow	*Corvus macrorhynchos*	LC	Schedule III
20	Gray backed shrike	*Lanius tephronotus*	LC	

21	Common hoope	*Upupa epops*	LC	
22	Chestnut-crowned laughingthrush	*Trochalopteron erythrocephalum*	LC	
23	Spotted laughingthrush	*Garrulax ocellatus*	LC	
24	Red-tailed minla	*Minla ignotincta*	LC	
25	Lemon-rumped warbler	*Phylloscopus chlorontus*	LC	
26	Plain mountain finch	*Leucosticte nemoricola*	LC	
27	Chestnut-headed tesia	*Cettia castaneocoronata*	LC	
28	Lesser cuckoo	*Cuculus poliocephalus*	LC	Schedule III
29	Oriental cuckoo	*Cuculus optatus*	LC	Schedule III
30	Blyths leaf warbler	*Phylloscopus reguloides*	LC	
31	Nepal fulvatta	*Alcippe nipalensis*	LC	
32	Mrs gould's sunbird	*Aethopyga gouldiae*	LC	
33	Long-tailed minivet	*Pericrocotus ethologus*	LC	
34	Green-backet tit	*Parus monticolus*	LC	
35	White throated laughingthrush	*Garrulax albogularis*	LC	
36	Tufted duck	*Aythya fuligula*	LC	Schedule III
37	Verditer flycatcher	*Eumyias thalassinus*	LC	
38	Russet Sparrow	*Passer rutilans*	LC	

Annex 11. Comprehensive Gender Assessment

Review of the Gender Action Plan

The Gender Action Plan is comprehensive and well-aligned with international gender equality frameworks. It is well-structured, covering awareness raising, capacity building, gender mainstreaming, participation, empowerment, and evidence building. It would benefit if the GAP helped address some of the gender equity challenges that the ACREWAS project will encounter in the project area. For example, wage disparity between males and females in and around the project area is a concern. The GAP could recommend that this project will pay equal pay for equal work regardless of gender. This will set a model for other projects to follow. The GAP could also recommend that the project follow inclusive recruitment practices that advance gender diversity while promoting female participation in the workforce for the project.

The GFP plays a key role in promoting gender equality and gender mainstreaming in the project. The GFP's tasks and responsibilities have been spelled out in the GAP. However, if the GFP is to fulfill his/her responsibilities effectively he/she will have to undergo regular training sessions on gender equality and gender-responsive planning and refresher courses. This can include workshops, seminars, and other professional development opportunities to enhance and upgrade their skills and knowledge.

Key Themes

Water Supply Issues and Community Anticipation: The community members expressed a strong anticipation for the benefits of a reliable and safe water supply. Currently, they face challenges due to seasonal variations in water availability. In the summer, the water supply is abundant, but frequent blockages caused by sediment lead to shortages. These blockages must be manually cleared, temporarily restoring the supply until the next blockage. In the winter, extreme cold and heavy snowfall occasionally result in shortages that last up to a day. Despite these issues, community members indicated that they are willing to pay reasonable tariffs for a sustainable and reliable water supply in the future.

Gender-Based Violence, Harassment, and Support Systems: There have been no cases of domestic violence or gender-based discrimination within the community. Disagreements are typically addressed by the Royal Bhutan Police (RBP), which has a balanced representation of male and female officers. This balanced representation ensures that women feel comfortable reporting issues. However, it is important to note that two middle-aged divorced women committed suicide in the past decade, highlighting a potential need for mental health support and counseling services for women. The absence of a fully operational RENEW office, which was intended to provide such support, underscores this need.

The arrival of project workers may increase the risk of GBV, sexual exploitation, and harassment. The Dzongkhag has coordinated with the National Commission for Women and Children (NCWC), RENEW (Respect, Educate, Nurture and Empower Women), and the Royal Bhutan Police (RBP) to address these concerns. A helpline (113) is available for reporting such incidents.

The presence of collaborative arrangements with local law enforcement and support agencies is a proactive measure to address GBV. Ensuring that these mechanisms are accessible and trusted by the community is essential for their effectiveness.

Women's Representation in Decision-Making and Committees: Women in Gasa share equal responsibility with men in decision-making processes within their homes and communities. They manage businesses, handle finances, and take care of household responsibilities. However, political representation of women remains limited, with only one female Tshogpa member and no female candidates in national elections. Cultural norms and self-censorship appear to play a role in this limited representation. Trust issues regarding women's fairness in decision-making were also mentioned, indicating a need for cultural shifts to support women's political participation.

Division of Household and Agricultural Labor: Traditional gender roles are evident in Gasa, with men typically handling outdoor work and women managing indoor tasks and businesses. Women also tend kitchen gardens for self-consumption, growing crops like mustard, potatoes, broccoli, and chives. While responsibilities are generally shared, tasks requiring heavier manual labor are usually performed by men. This division of labor reflects both cultural norms and practical considerations related to physical strength.

Impact of Traditional Gender Roles and Cultural Norms: Traditional gender roles and cultural norms deeply influence gender dynamics in Gasa. Women are primarily homemakers and caregivers, but they also engage in business activities and manage finances. Despite these traditional roles, there are progressive aspects, such as women's ability to choose their spouses and the community's commitment to equal educational opportunities for girls. However, the limited political representation of women and the persistence of traditional labor divisions indicate areas where further progress is needed.

Educational Opportunities for Men and Women: Educational opportunities in Gasa are provided equally to boys and girls. The community prioritizes education for all children, and there is no reported gender-based discrimination in access to education. This commitment to equal education reflects a progressive approach within the traditional framework of the community.

Health Issues Related to Water Supply: No major health issues related to unsafe drinking water were reported. However, the Pro Doc states that there is a high incidence of e-coli contamination, suggesting a need for improved water purification systems and hygiene awareness. Reports from Gasa Hospital indicate that water-related diseases, such as common colds, urinary tract infections (UTIs), and acute gastroenteritis, are prevalent. These findings emphasize the importance of consistent access to clean water and health education for the community.

Opportunities for Women in Project Activities: Women in Gasa generally do not engage in labor-intensive roles, preferring business and household management. They have strong cultural ties to their villages and are less likely to migrate for alternative opportunities. This reflects a need for tailored capacity-building programs that align with women's skills and preferences. Ensuring women's participation in project activities, particularly in non-labor-intensive roles, can enhance their engagement and empowerment.

Promoting balanced representation in the workforce and decision-making processes can enhance gender diversity. This includes providing equal opportunities for women, which can boost their income and financial independence.

Recruitment policies and wage disparity: There is a noted gender preference in recruitment and significant wage disparity between males and females, particularly in farm and construction work in

Gasa. For example, males get paid Nu. 200.00 more per day than females for farm work and for construction work males get paid Nu. 400.00 more per day than females.

Implementing inclusive recruitment policies and ensuring gender diversity in leadership roles can empower women and foster an inclusive work environment. These steps are fundamental to achieving long-term gender equity in the project. Gender preference in recruitment and wage disparity are critical issues that perpetuate gender inequality. Addressing these disparities through policy reforms and enforcement of equitable wage practices is necessary for promoting gender equality in the workforce.

Capacity Development Gaps and Needs: There is a significant gap in female participation in the construction phase of projects. Including female representatives in the Grievance Redress Mechanism (GRM) committee at the local level is essential. Tailored training programs and capacity-building initiatives can help bridge this gap and promote gender participation in various project activities.

Impact of the Project on Women's Lives: The community expressed concerns about subcontracting practices affecting project quality and timely completion. Past experiences with subcontractors have led to worries about similar issues in the current project. Ensuring transparency and accountability in project implementation, and involving community members directly, can help address these concerns and ensure that the project benefits are realized in a timely manner.

Community Safety and Crime Rates: The community is generally perceived as safe, with minimal crime reported. However, the RBP Statistical Yearbook indicates a rising trend in crime rates, with the number of criminal incidents increasing from 2 in 2018 to 26 in 2022. This rising trend necessitates proactive safety measures, such as strengthening community policing and implementing safety initiatives to mitigate potential risks and maintain the community's sense of safety.

Control of Resources Within and Outside Homes: Women predominantly control resources within homes, managing household finances and daily needs. Men, on the other hand, control resources outside the home, including land and business assets. This division of resource control reflects traditional gender roles but also highlights women's significant role in household management and financial decision-making.

However, one setback that was identified, in many cases, is the financial dependence of women on their spouses as an important gender issue. Addressing financial dependence through life skills training and economic empowerment programs is crucial for enhancing women's independence and reducing gender inequality. These initiatives should be a key component of the project's gender action plan.

Gender Action Plan and Grievance Redress Mechanism for gender issues: The Gender Action Plan (GAP) for this project is integrated with the Grievance Redress Mechanism (GRM). The Dzongkhag has established a committee responsible for resolving project-related issues, including gender-specific concerns. The Gender Focal person in Gasa is actively involved in this process, ensuring that gender issues are addressed during project implementation.

The integration of GAP with GRM indicates an inclusive approach to addressing grievances. However, the effectiveness of this mechanism depends on the active participation and awareness among community members about the available channels for reporting and resolving gender-related issues. The establishment of a dedicated committee for gender grievances is a positive step. Its effectiveness will

depend on its accessibility, transparency, and responsiveness to the concerns raised by community members.

Gender Focal Point: There is a Gender Focal Point in Gasa. The GFP's primary role is to ensure informed decision-making without gender bias and to provide equal opportunities for all project benefits. The GFP is also responsible for addressing gender-based issues throughout the project duration.

The GFP's role is crucial for fostering an inclusive environment. However, the extent of engagement and the authority of the GFP in decision-making processes are vital for the success of gender mainstreaming efforts.

Capacity Gaps and Needs for the Gender Focal Point: The GFP plays a key role in promoting gender equality and gender mainstreaming in the project. The GFP recognizes the need for refresher courses to enhance service effectiveness. Continuous capacity building for the GFP is essential to maintain and improve the effectiveness of gender mainstreaming efforts. Regular training and development opportunities should be provided to ensure the GFP remains equipped to address emerging gender issues.

Anticipated challenges in gender mainstreaming and promoting gender equality: The GFP anticipates challenges in workforce selection and wage disparity between men and women. These challenges highlight systemic issues that need to be addressed to achieve gender equality. The project must implement strategies to ensure fair recruitment practices and equitable wage structures to mitigate these challenges.

Areas of Concern and Recommendations

1. *Mental Health Support*

- Establish counseling services and support systems for vulnerable women, particularly the elderly and divorced women.
- Revive and operationalize the RENEW office to provide necessary mental health services.

2. *Female Representation*

- Encourage and support more women to participate in decision-making bodies.
- Address cultural barriers and self-censorship that limit women's political participation.

3. *Capacity building*

- Provide tailored training programs for women to engage in project activities, particularly in non-labor-intensive roles.
- Ensure female representation in the GRM committee and other project-related bodies.
- Introduce life skills training and economic empowerment initiatives to support financially dependent women, promoting their independence and participation in the workforce.
- Regular training and refresher courses for the GFP are essential. This can include workshops, seminars, and other professional development opportunities to enhance their skills and knowledge.

4. *Water Supply and Hygiene*

- Conduct hygiene awareness campaigns to educate the community on the importance of treated water and sanitation practices.

5. *Safety Measures*

- Strengthen community policing and safety initiatives to address the rising crime rates.

- Implement proactive measures to maintain the community's sense of safety and security.

6. *Strengthen the Grievance Redress Mechanism*

- Ensure the committee is well-publicized, accessible, and trusted by the community. Regular reviews and updates to the process can enhance its effectiveness.

7. *Address wage disparity*

- Implement policies to ensure equal pay for equal work. Regular audits and enforcement of these policies can help mitigate wage disparities.

8. *Inclusive recruitment practices*

- Develop and enforce recruitment policies that promote gender diversity. Provide training and support to encourage women's participation in all project activities.

9. *Gender-based violence*

- Strengthen collaboration with local law enforcement and support agencies. Ensure the community is aware of and trusts the helpline and other support mechanisms.

The consultations in Gasa revealed a balanced yet complex gender dynamic. While there are areas of equality, traditional roles and cultural norms still influence gender participation and representation. Addressing the identified gaps through targeted interventions, will enhance gender equity and contribute to the overall development and well-being of communities in Gasa.

Annex 12. Annual Average Temperature and Rainfall

Region/Station	Annual Avg. Max. Temp.	Annual Avg. Min. Temp.	Annual Total Rainfall (mm)	No. of Days with Tmax>=30	No. of Days with Tmin<=0	No. of Days with Rainfall>=0.1mm
Gasa/Khatoed	15.7	5	2428.4	0	97	217
	Lowest among 20 stations	Lowest among 20 stations	Highest among 20 stations			Highest among 20 stations

Source: JDNP Management Plan

Annex 13. Data from DPO for Tourist Arrivals in Gasa

Tourist Arrivals in Gasa (July 2019 to July 2023)

Month/Year	Local Tourists	International Tourists
July 2019 – July 2020	5,754	No records maintained by the Dzongkhag*
July 2020 – July 2021	4,111	
July 2021 – July 2022	373	
July 2022 – July 2023	855	

Annex 14. Categories of Establishments in Khatoed Gewog

Different Categories of Establishments, Sites and Infrastructure in Khatoed Gewog[91]

Category	Number	Type	Location	Comments
Establishment				
Shops	31	Private	Old Town	1 snooker hall, 1 salon, others are mostly general shops
Restaurants	8	Private	Baychu, Phulakha, Mani	
Guesthouse	2	Government	Old Town	
Farmhouse/Homestay	2	Private	Old Town	One is located above the road near Phulakha Village
NHDCL Housing Colony	Multiple	Government	Old Town	
Hospital	1	Government	Old Town	
Gasa Primary School	1	Government	Old Town	The ECCD is located at the school premises
EV Charging Station	1	Government	Old Town	
Tourism Office	1	Government	Old Town	
Park Range Office	1	Government	Old Town	
BPC Office	1	Corporate	Old Town	
Bhutan Telecom Office	1	Corporate	Old Town	
TashiCell Office	1	Corporate	Old Town	
BoB Office	1	Corporate	Old Town	Has ATM Facility
BNB Office	1	Corporate	Old Town	
BDBL	1	Corporate	Old Town	Has ATM Facility
Bhutan Post Office	1	Government	Old Town	
RICBL	1	Corporate	Old Town	
RBP Office	1	Government	Above Gasa Dzong	
District Court	1	Government	Above Gasa Dzong	
Dratsang	1	Monastic	Above Gasa Dzong	
Historical/Cultural Sites				
Mani Dungkhor	1	--	Old Town	
Chortens	35	--	All Chiwogs	
Crematorium	1		Remi	
Hot Spring	1	--	Baychu	Gasa Tsachu
Lake	2	--	Mani, Remi	
Lhakhang	3	Government	Baychu, Phulakha, Remi	Including Phulakha Lhakhang

[91] KII, Community Consultation Gasa, 22nd May 2024; BSDS (2023); Site Visits in Gasa

Lhakhang	1	Private	Remi	Rabsel Goemba
Menchu	11	--	All except in Phulakha	
Nye	1	--	Phulakha	
Rabdhey/Shedra	1	--	Mani	
Temple*	3	--	Baychu, Remi, Tsheringkha	
Infrastructure				
Archery Range	1	--	Baychu	E-Zom Archery Range
Motorable Bridge	9	--	All Chiwogs	
Football Ground	1	--	Mani	
Waste Disposal Site	1	--	Remi	4.5km from Gasa Dzong
Workshop	1	Private	Kholikha	Established in 2020

Annex 15. Incidents of Hazards and Natural Disasters

Incidents of Hazards and Natural Disasters in the past 10 years in Gasa[92]

Dzongkhag	Year	Incident	Event	Affected Gewogs
Gasa	2012	Extreme Rainfall, Flashflood, Mudslides	Heavy Rainfall washed away feeder road to Gasa, blockages of boulders, uprooted trees, and other debris, cutting off vehicular and pedestrian traffic. The flood started at 3am on the first morning washing away two concrete bridges and a suspension bridge cutting off one village from another. No casualties were reported. A cowshed was washed away with a cow in it. Power lines were disrupted for more than 10 days, cutting off communications and mobile networks. Paddy fields, irrigation channel, farm roads, drinking water supply schemes and crops were damaged	Khamaed, Khatoed
Gasa	2015	GLOF, Lemthang Tsho in Laya	Cordycep collectors in Laya alerted the Gup about the lake outburst. Effects were downstream in	Laya

[92] NCHM, Compendium of Climate and Hydrological Extremes in Bhutan since 1968 from Kuensel

			Punakha and Wangduephodrang. No casualties were reported in Laya where there were 40 temporary settlements collecting cordyceps. Six wooden bridges were washed away including the only bridge connecting Laya to the rest of Gasa.	
Gasa	2021	Flood	Gasa Tsachu was washed away including the Tsachu Public Pond, Royal Pond, VIP Pond, Disability Room, 2 Agriculture Outlets, Jangchub Chorten and Mani Dungkhor[93].	Khatoed, Khamaed
Gasa	2021	Heavy Rainfall	5.3 acres of crops were damaged in Khamaed. 0.4 acres of crops were damaged in Khatoed. Dining hall and kitchen of Lunana PS was damaged.	Khamaed, Khatoed, Lunana

Khatoed Gewog Hazard Assessment Table[94]

Hazard/Natural Disaster	Secondary Hazard	When it could occur	Probability of Occurrence	History of incidents	Impacts
Fire		Dry Season	High	2006, 2008	Damage to old and antique structures.
Flash Flood	Landslide	June, July and August	High	2009, 2016, 2017	Washed away Tsachu, shops, bridges and electric poles

[93] KII, DPO, Gasa

[94] Gasa Dzongkhag Draft Disaster Management Plan and Contingency Plan (2017)

Earthquake	Landslide, structure fire	Anytime	Unpredictable	2011	Damaged 18 HHs, highway and Dzong
Windstorm		October, November and December	Medium	2014	Rooftops of 6 HHs blown away
Hailstorm		March, April and May	Less	2015	Agricultural products (potatoes, greens) damaged

Annex 16. Gender Consultation

Community Consultation_Gender Group

22nd May 2024

Gasa Dzong

Attendees:

12 (11 Female and 1 Male)

Aged 26 to 80

Occupations:

6 run Businesses at the Old Town

2 office staff at BDBL and RICBL

4 home makers

Overview

We spoke to community members from Pulakha Village and the Old Town. In attendance were 3 elderly females, two of whom fall under the vulnerable category – one is an elderly single female headed household and the other is elderly taking care of two other elderly members in the same household. All community members expressed their anticipation for the project benefits in terms of a reliable and safe water supply. Currently, they don't have extreme water constraints, however, the challenges faced are derivative of seasonal occurrences. In summer, although there is an abundance of water, the blockage of pipes with sediments occurs causing shortage in the water supply. The blockages must be cleared out manually after which the supply resumes as usual till sediments block the pipes again. In winter, there are rare incidents of shortages that last up to a day. This is caused only in times of extreme cold temperatures and heavy snowfall. With the intervention of this project ensuring a more reliable and sustainable supply, those present mentioned that if the tariff for future water supply is reasonable, they wouldn't mind paying.

1. **Gender based violence, harassment, exploitation, etc**

The women unanimously stated that there haven't been any domestic violence related cases nor discrimination based on gender. They added that if and when there are disagreements, their first point of contact is the RBP where there is almost a 50% representation each of both male and female officers. One factor they all repeatedly mentioned was the fact that their community was so small and so closely knit that anyone and everyone would immediately know or hear of any issues or disagreements – it is important to note that although not mentioned at this discussion, in a separate group discussion with the men it was revealed that there were 2 suicide cases both related to middle-aged women (54 years in 2013 and 45 years in 2017 both of whom were divorcees). Although the reason for the suicides is unknown this indicates a need for counselling for women. There have been no reported cases of suicides since then. A RENEW office was due to be built. The initial phase for clearing the site was carried out but

the project was halted immediately after. No specific reason was mentioned and requires further investigation. Kindly refer to the Gender Focal questionnaire for additional information.

2. Women's representation in committees and decision-making bodies, in and outside homes.

3. Division of household and agriculture work, are women more overburdened than men.

4. Local traditional gender roles and cultural norms and beliefs that impede women's participation and empowerment.

5. Education opportunities favour men or women currently as per local practices.

**highlighted questions have related answers as listed in the answers below*

In terms of decision making, the women and men share equal ground. Girls have equal rights to education which is prioritized. At the consultation, there was an equal representation of men and women with a mix of farmers, home makers, business owners, government officials etc. However, it is assumed, in the socio-cultural context, there are indications of self-censorship. There is a lone female Tshogpa member and so far, there have been no female representatives running for office during national elections. An interesting comment was made by one of the attendees who mentioned that they don't trust women in comparison to men when it comes to fairness in decision-making. The social structure is a bit complex, most men are out at work, and women handle the businesses, take care of the homes, and manage the finances. There are close to no divorce cases in the community, at least from what was mentioned by the attendees. 50-50 shared responsibility between men and women.

The current gender roles are in coherence with the traditions in the Bhutanese context. Women are homemakers, and care for the family. The deviation is only in terms of business activities and education whereby women run businesses/shops and manage finances, they can choose whom they marry, and girls have equal rights to education. The women at the consultation confirmed that they do not discriminate by gender in terms of their children's education.

Although the women mentioned that they share the workload equally with men, they pointed out that work that requires heavier manual labor is more suited for the men. The traditional gender roles were mentioned – "outdoor work is for the men and indoor work is for the women" – however, indoor work is not only limited to cooking and cleaning and tending to the family's needs. Almost all the households have a kitchen garden where they grow mustard, potatoes, broccoli, and chives for self-consumption. These are tended to by the women in the family.

6. Disparities in wages and payment and gender bias in recruitment.

NA

7. Health issues due to unsafe drinking water (water borne and hygiene and sanitation related issues).

As per the attendees' comments, there have been no health issues pertaining to unsafe drinking water. It has been reported in the Pro Doc that there is a high incidence of e-coli in the water (validating reports NA), during the consultation it was also mentioned that a water purification system was installed for the

school with support from the Rotary Club of Thimphu to ensure clean drinking water for the students. The women mentioned that children most often drank water directly from the accessible taps at the school premises. This also indicates a need for awareness initiatives from the school on the benefits of consuming treated water. Reports from the Health Care Center indicate that there are 555 patients on average at the Gasa Hospital every month. From these cases, water related diseases/sicknesses include common cold, UTI, Acute gastroenteritis.

8. Opportunities for women in project activities and benefits that may accrue.

Most women are not the "labor" types. Most of them run businesses in the Old Town and they have the additional responsibility of caring for their family's needs (the stereotypical roles of women). It is also important to note that most of the females have a strong respect for ties to their villages and their traditions. The respondents in the Gender group mentioned that there are not many migrating for alternative opportunities. Among those present 3 women had daughters working in Thimphu. The older members of the community reflect the common Bhutanese commitment to remaining within their comfort zones which is most often the place where they are born.

9. Capacity development gaps and needs to promote gender participation and mainstreaming.

There is an evident gap in terms of female participation relative to the construction phase. The GRM committee requires female representatives at the most local level and the consultant mentioned that this would be a vital requirement and must be addressed.

10. Impact of the project on women, both negative and positive.

The main concern indicated was regarding the work being awarded to a Contractor. The women mentioned that from past experience, contractors would get the contract which they would then subcontract (which would ripple on to sub-contractors further sub-contracting the work). This, they said have had multiple implications on the quality and completion of projects and they worried that the same would happen for this project as well. A suggestion from the Mangmi during the consultation was to contract the work to Dessups, to this the Engineer from the Engineering Cluster clarified why construction work of this nature, scope and specifications would not be suited for Dessups, specifically focusing on the facts of the terrain and expertise required for the work. Contracting the Dessups would require additional support and facilities including monthly payments.

11. How does the project contribute to women's safety?

Generally, the whole setting in the community encourages a sense of safety. The dzongkhag itself is a small one and evidenced during the field visits, conversations with locals, consultations, ocular observations – on the surface it is a safe place. Children are out and about, women drive or run businesses, the elderly associate with all other members of the community, there is minimal vehicular traffic and a low crime rate.

Although the women mentioned that there were no crimes in their communities, the RBP Statistical Yearbook 2022 indicates an upward trajectory of crime rates in Gasa. In 2018 2 cases of criminal incidents were recorded in Gasa which rose to 8 in 2019, 14 each in 2020 and 2021. The 2022 data shows that incidence has almost doubled from the previous year with 26 cases reported. Comparative data shows that this amounts to about 0.77% of the National total of 3,502. Although the percentage of

reported criminal incidents in Gasa is almost negligible, this must be viewed in the context of its population density of the Dzongkhag which is 4,156 (NSB, 2017).

12. Who controls resources within and outside homes?

Mostly women within homes. Mostly men outside homes.

13. On-going inheritance practices.

Traditionally and up until the recent past, inheritance was passed down to the women in the family. The tradition now has changed with both men and women receiving shares of the inheritance.

Annex 17. Minutes of the Meetings

1/2

Minutes of the Capacity Building & Training (GRM), Conference Hall, Gasa Dzongkhag

9 AM- 3.30PM 24th May 2024

Number of Participants: 11 (8M 3F)

Consultant Presentation

The Consultant started with some questions to fill in the gaps of data:

Inheritance. Members clarified that in the past the inheritance was passed on to the next generation female(s) since they remained at home and the males left after marriage to their wives' homes. This practice has now evolved entitling both male and female to equal shares of inheritance.

Source of water for Soechu Mineral Water Production. The has a different source (Jachu Sakha) in Chhogley_Phulakha Chiwog and is not sourced from Shingtalum. The factory is located on government land, run by a private owner with incentives for the community in the form of shares (post-profit). The community agreed to share the water source for this initiative since there was enough water supply based on the understanding that it would be shared as long as it was enough for the community. The business license is under Gasa Dzongkhag and currently the business is running at a loss which is borne by the private company. The community's HHs as well as the four Gewogs have been provided an assurance by agreement of shares after profits. The water source is currently taken care of by the relative community.

Water user association. The Mangmi of Khatoed responded that there are about 6 to 7 WUAs in the Gewog. Each Chiwog has a WUA. Gasa Town doesn't have a WUA since all water source related concerns and management are taken care of by the Municipality. There is a plan to create a WUA for Gasa Town.

WUAs and Future Tariff. It is the Dzongkhag's responsibility to create a WUA and streamline the processes pertaining to management and monitoring of source and relative attributes. The Mangmi mentioned that the Tariff needs to equally apply to all without discrimination of how much is paid by whom. The Consultant advised that a Tariff amount should be declared after proper consultation and that the payment would be based on a metered system. The Environment Office reinstated that it would apply exactly like the electricity, where you pay for what you use as per the meter readings

Contractor Selection and Accountability. The Consultant explained the requirements of the contract would include all related compliance components prior to the tender being advertised. This was also in response to the concerns raised during the previous consultation held on 22nd May 2024.

Cultural Heritage. Accounts of the sacredness of the Phulakha Lhakhang and the peripheral area were mentioned. For this, the Consultant asked if there would be any concerns regarding religious and superstitious beliefs with adherence to tangible and intangible heritage and beliefs. The Consultant mentioned possible interruptions during religious, cultural celebrations in and around the Lhakhang, waste management in the vicinity during the construction phase, blasting and anticipated risks and

disturbances. The Mangmi for Khatoed provided the assurance that it wouldn't be an issue if "Soekha" offerings were made prior to the works initiated and then continuously made every morning and reverence was always conducted during the holy days. He added that as long as the construction and works and related activity was carried out mindfully, it would not be an issue.

Responsibility for IEE preparation. The Consultant enquired about the road and environment clearances and whose responsibility it would be to put up the applications as well as the past process followed. The Environment Officer mentioned that it is all done by Planning Division (DRO) if it is Gewog-related. He also added that it is more efficient and timelier as opposed to it being done by the Engineering Cluster which had its layer of complexities. Furthermore, he mentioned that the current environment clearance is valid for 1 year as per standard practice.

Vulnerable people. The consultant explained the meaning of Vulnerable people and informed about the vulnerable person and requested the Dratsang Representative to set up a meeting with the person.

Monitoring. The Mangmi voiced his concerns regarding trenching and other externalities mentioning that after the work is completed the workers will leave but the gewog and its inhabitants will remain subject to post construction risks brought about by poor monitoring of possible reckless activity (not following prescribed guidelines). The Consultant asked the PIU regarding the monitoring plans.

The Engineer informed that the Monitoring would be carried out by the Cluster to which the Cluster Engineer agreed indicating that he is the Project Manager and would be overlooking the process and progress. Additionally, it was mentioned that additional monitoring will be helpful (a committee in the community) since timely interventions were sometimes met will constraints. They also added that they could provide training for the community committee for monitoring.

The consultant enquired if the community would be willing to create a committee for supplementary monitoring and if they'd expect incentive for doing so. Furthermore, she added that a clear TOR would be required to mitigate issues that the Contractor would face in terms of too many interventions by multiple monitoring bodies. She suggested that the Dzongkhag would need to discuss the requirements for a monitoring community committee to streamline interventions and for the PIU to include a budget for such. The Mangmi responded saying that if there was no budget then they'd have to do it for free as a sense of community responsibility but that it would be ideal to at least include a DSA.

The DPO mentioned that they could involve the community for monitoring as well due to the nature of the works. They may not be able to provide a DSA but can manage budget provisions for working lunches for the community monitoring members. Depending on what the Dzongkhag would decide, the Consultant asked for the update to be provided so that it could be included in the recommendations for a monitoring budget in the ESMP.

Waste Management. The Consultant emphasized that since the construction works will be duration-specific at each location, workers will be moving frequently after completion of one site to the next there setting temporary camps which makes monitoring for waste management crucial.

The Lake above Phulakha Lhakhang. The Consultant enquired if the Ga Tsho (lake) had any religious or cultural significance. The Mangi responded that there was no significance associated with the lake and that it was a seasonal lake.

GRM Committee. The Consultant explained why DPO was included in both levels of the GRM Committees and the importance of documentation at every level starting with the initiation of the complaint.

She added that the officiating members must be clearly identified/designated. The DPO responded that this was to ensure that clear and specific details were provided from one level to the next in terms of a grievance. After deliberation the GRM committee members were finalized as

Gewog Level: Gup, Mangmi, GAO, Tshogpa (1), Relevant Sector (MoIC, Hospital), DPO

Dzongkhag Level: Chair (Dzongda), Deputy (Dzongrab), DPO or officiating rep., Gender Focal, Site Engineer, Environment Officer, Relevant Heads (DRO, DHO), Tshogpa Thuenmi. *Gup can be removed if not relevant (since he's already at the Gewog Level).

The consultant enquired about how many members would be required for the committees, to which it was agreed that a minimum of 3 members would be required. The Gender Focal for Gasa is a male. This could either add a complexity wherein women may not be as comfortable to reveal her grievance (GBV). However, if positively received, this might be the beginning of a new trend for an added perspective to have both a male and female Focal for GBV cases. The consultant emphasized the importance of maintaining confidentiality for GBV cases and ease of access to the designated officer for GBV related cases like the Gender Focal.

Capacity and Training Needs. The Gender Focal Officer voiced the need for more training on all GRM components to ensure that officers are well equipped to address any GRM related issues and cases. The last training he attended was for 5 days at Punakha in 2022. He mentioned that there have been no cases since his training. During the training he had mentioned the need for an awareness program conducted by NCWC and RENEW for Gasa, however, he was informed that the awareness programmes had already been conducted previously and therefore he was unable to secure any support for his suggestion. As a male focal office, he felt that his gender may be the reason that no cases had been reported. Furthermore, he added that there was one case that was reported where the victim was a male, and the case was referred to the RBP. He suggested a female Gender Focal would be essential in managing the role for women to be more forthcoming and comfortable to discuss gender-related incidents.

School counsellors. The Consultant enquired whether there were counsellors at the school requires counsellors, counselling training, a safe space for counselling where women can go in times of need. The participants confirmed that there is no counsellor at the school

Water Quality and E Coli. The Consultant mentioned that the Pro Doc had indicated incidence of E Coli in the current water source. She enquired if there were any reports to substantiate this and when the last test was carried out. The Engineer informed that water quality testing was carried by the RCDC in Thimphu in 2023. The results were shared with PMU. He however said the results were questionable given that the sample collected was not immediately tested due to constraints with equipment, storage and expertise. A sample was collected and kept at the office for 3 to 4 days before the test. The first

sample showed an E Coli content of 87 while a second sample indicated a content of 1. The Consultant also mentioned that water sampling will be conducted as part of the ESIA studies too.

Vulnerable Persons. The Consultant stressed on the importance of addressing concerns for all beneficiaries including vulnerable groups further emphasising on the overarching standard of "Leave No One Behind". Additionally, she mentioned that if capacity needs are required to be developed for staff in terms of screening for vulnerabilities, these would also be incorporated into the recommendations

Water quality testing during the operation period. The Consultant enquired asked how the integrity and quality of water would be monitored and maintained if there were no expertise and equipment for assessments. The Health Officer mentioned that they currently lacked expertise or the equipment for lab testing and therefore could not provide a definitive answer. The Health Officer was confident that post completion of the project, due to the interventions like the WTP, filtrations etc, the issue of contamination and quality would not persist. He mentioned that this has been incorporated into the FYP under the Water Safety Plan. The plan includes equipment requirements and a committee formed for which as budget has also been proposed. The DPO however, added that although the budget has been proposed, it is not guaranteed.

The DPO and the Engineer requested that the requirements for a water safety plan be added to the ESMP.

2/2

Minutes of the Dzongkhag & Community Consultations, Conference Hall, Gasa Dzongkhag

9 AM, 22nd May 2024

Total number of Participants: 39 (24M 15F)

Welcome and Background by Dzongkhag Planning Officer (DPO). The DPO welcomed all present (Refer to Participant List). She provided a background on the objectives of the session and related it back to a previous meeting held. She reiterated the funding purpose and the requirement of the ESMP for the project. She introduced the Consultant and outlined the agenda for the day.

Welcome Address by Dasho Dzongdag. Dasho Dzongdag welcomed all participants and emphasized the importance of informing and consulting regarding the project. He established the premise for the risks and benefits pertaining to the project and reiterated the significance of smaller consultation sessions while pointing out the limits of human resources for data collection.

Presentation by Cluster Engineer Representative. The engineer presented the technical Components and gave an overview of the layout of the project and project beneficiaries.

Presentation by the consultant on the ESIA. The consultant presented on the objectives of the consultation, ESIA process, site visit, consultation, project timeline, the responsibilities, and the requirements of the project.

Key discussions

Project timeline and schedule. The engineer clarified that the project implementation period is 24 months. He explained to the participants that this depends on when the ESIA report can be submitted and approved. The procurement process involves advertisement and review for 2 months. The water supply scheme will take around 18 months and the construction of water storage tank it will take around 12 months.

Beneficiaries and population projection. The Engineer clarified that the population population is estimated for 15 years based on the of 38% growth for 15 years and full growth in 30 years. Once complete, the residents of the Old Town will be relocated to the New Town.He also mentioned that Mani Village is not currently within the scope of the project although it is near the project area. However, if there is enough supply and no water shortages in the future, there may be a consideration to extend the supply to Mani Village as well.

Explanation of the Zoning system. The Engineer mentioned that there are 4 Zones in total. Zone 1 – RBP, District Court, Dratsang, Dzong and Government Quarters. Zone 2 – Phulakha area, currently 5 beneficiary HHs, Government Quarters, empty private plots (these have also all been included in the projected population). Zone 3 – Old Town area, NHDCL housing, Guest House, Nursery, BHU, School (the current NHDCL tank will be refurbished for supply, if the tank's storage capacity is too small then it will be reconstructed/adjusted to fulfill the capacity requirements for the proposed supply). Zone 4 – New Town in Kolikha, Workshop (below the road), 16 existing plots (below the road). The Engineer also mentioned that from the WTP, one distribution line will be for the town and another for the VIP Guest

House in addition to those mentioned in the Zones. There are two possibilities for the NHDCL distribution line from either of the two tanks – this will be decided upon as per the best convenience during construction. He asked for the community's input in terms of any prospective inconveniences regarding this since they know the area better than the PIU.The last point of supply is for the hospital.

Trench size. The Engineer explained that HDPE (110 mm, 1 ft wide 2 ft deep) but will require 1 meter clearance for transportation. The Engineer also mentioned that from the WTP, one distribution line will be for the town and another for the VIP Guest House in addition to those mentioned in the Zones. He also mentioned that Mani Village is not currently within the scope of the project although it is near the project area. However, if there is enough supply and no water shortages in the future, there may be a consideration to extend the supply to Mani Village as well. There are two possibilities for the NHDCL distribution line from either of the two tanks – this will be decided upon as per the best convenience during construction. He asked for the community's input in terms of any prospective inconveniences regarding this since they know the area better than the PIU.The last point of supply is for the hospital.

Blasting. The Engineer mentioned that provisions for controlled blasting have been included.

Request of additional water tanks. The School represented requested for a separate water tank solely for the school citing the following reasons and constraints, namely seasonal issues with the quality and quantity of water and shortages due to blockage of pipes by sediments in the summer season. Through the Rotary Club of Thimphu, the school had received a water filtration system so the water is treated, but the issue is regarding storage facility. Currently the syntax tank has been punctured causing continuous leakage of the water and creating a challenge for storage and ultimately a shortage. Although the school doesn't have boarding facilities, students are provided two meals. The school also holds their annual puja and the shortage of water is a persistent concern.

Lam Neten, Dratshang also expressed similar concerns regarding the issues with water supply and stressed the need for a reservoir tank. In response, the Engineer enquired about the number of students at the school (120+35 staff) and the number of monks at the Dratsang (110). He assured them that the School and Dratsang numbers have been included in the beneficiary list. He also provided a reassurance that they would include the need for reservoirs in their report.

Similarly, the representative from the Hospital also submitted a required for a reservoir tank as there are only 3 Syntax tanks but no permanent storage tanks for the Staff Quarters and for the BHU. Bottom line is, if absolutely required, they will forgo the 2 required for the Staff Quarters and prioritize the one for the BHU. The Engineer stated that if the need arises for building a permanent storage tank needs to be built, the location selection is a challenge due to the distribution requirements. Therefor, 2 – 3 smaller tanks might need to be constructed.

Road construction. The Engineer clarified that for the intake structure and main water pipeline, since the HDPE pipe will be used no access road will be required. For the WTP, an access road of 400m is planned.

Project design. The pipeline estimates have changed from 1.9 km to 2.3 km.The current flow is 33.3 ltr/sec with e-flow maintained at 50%**Current flow is 66 ltr/sec but only 50% is currently being tapped

Road crossings. The Engineer clarified that there are distribution lines that will be at road crossings and some that minimally traverse private plots. He assured that they would minimize the traversing as far as possible to avoid inconvenience to the people and to the roads. Furthermore, he stated that it was the

PIU's responsibility to ensure mindful construction of the pipe laying and all this would be followed strictly as per the protocols. The Consultant requested for this to be explained further during the site visit scheduled for 24th May 2024.

Contractor Selection and Accountability. The Mangmi of Khatoed expressed his concerns relevant to past experiences with contractors and implications on completion and compromise on quality of the construction work. He further proposed that Dessups should be contracted to ensure efficiency, fairness, and integrity with the works to be carried out.

Women in the Gender Consultation also expressed similar views. From experience, contractors would get the contract which they would then subcontract (which would ripple on to sub-contractors further subcontracting the work). This, they said, had multiple implications on the quality and completion of projects and they worried that the same would happen for this project.

The Engineer clarified why construction work of this nature, scope and specifications would not be suited for Dessups, specifically focusing on the facts of the terrain and expertise required for the work. Contracting the Dessups would require additional support and facilities including monthly payments and therefore may be subject to additional funding beyond the scope of the project.

The Consultant reassured them that all work would need to be carried out as per the contractual documents and guidelines, a breach of which would entitle repercussions for the contractor. She further stressed that training and consultation would follow once the contract was awarded, and this would ensure strict accountability for the process, progress and completion of the work as per the contract document which is in coherence with the Law. She further stressed the requirements of regular reports that will be required as per the process and requirements of the funding body.

Indigenous People. The Consultant enquired about the presence of any IPs in the project area. Additionally, she explained what the meaning of IP is and the importance of FPIC protocols to be followed as per the UN SES.

The DPO mentioned that there were no IPs in the project area. The Dzongdag also confirmed that there are no IPs in the project area.

Clearances. The Consultant requested all Clearances to be forwarded to her. The Engineer assured that the Environmental Clearance has been received and the validity is for the duration of the project. The Engineer said that they will need to check the exact alignment but

The Consultant encourage community members present to express any concerns there might have regarding the distribution lines.

GRM. Dasho Dzongdag enquired if the Gender Focal and the GRM were specific only to the project or to the Dzongkhag as a whole and it was clarified it is applicable to the whole project. The Consultant suggested that a female representative must be identified for the project GRM. She added that this representative needn't be part of the Committee, however, identification of a female and progressive training on GRM/GBV would be pivotal. She also stressed on identifying anyone who would take over the role in the future should the trained Gender focal leave so that the required and necessary training and briefing would be in place.

Mangmi mentioned that there was currently no Gender Focal and that he was the POC for any Gender related issues that he would then forward on to RENEW. He added that a RENEW office was due to be built. The initial phase for clearing the site was carried out but the project was halted immediately after. No specific reason was mentioned and requires further investigation.

The consultant explained that more details about the GRM will be discussed during the training session to be held on 24th May 2024.

Construction impacts on current water supply. The Tshogpa mentioned the concern for implications of the current supply during the construction phase. The Engineer assured that the current supply would not be affected, and all mitigation measures will be implemented to ensure the consistency of the current source.

Annex 18. Vulnerable Persons in the Project Area

	Gender	Age	Vulnerable Status	Current situation
1	Female	80+	Old, married	Taking care of two other elderly family members both 70+, her husband and her brother. They have ample land but are not able to cultivate it because of lack of help as the children are out of station. Thus the land has been left fallow.
2	Female	70 +	Old, widowed, living on her own	She lives alone and fends for herself but she has no source of income and is dependent on her extended family for support.
3	Female	70 +	Old, single, mentally challenged and mute	She is a kidu recipient, and all her needs are taken care of by the Kidu Office with assistance from the community. The Kidu office pays for her meals at a local canteen and has provide her with housing. She previously lived at the Tsachu but was moved to the Old Town after the flood. She voluntarily collects trash from the town area and is largely responsible for its cleanliness. Local community members sometimes feed and bathe her but find it difficult if difficult to take care of her because she is mentally challenged and mute
4	Male	3 yrs	Autistic, widowed father	The single father is employed and earns a reasonable salary. However, he has a 3-year autistic child that requires special attention. Since the does not have any support system, the child greatly restricts his movement and influences all his decisions. Although the father would like to enrol him in the ECCD, the child is still unable to speak.

Annex 19. Pictures

Annex 19.1 Dzongkhag & Community Consultations on 22nd May 2024

Participants Engaging with Questions

Consultant and Social FGD

Participants during the FGD for Gender

Elderly Representatives from Khatoed Gewog

Dratsang Representative voicing concerns

Consultant with the Participants of Gender Group

Dzongkhag & Community Participants

School Representative Voicing Concerns

Annex 19.2. Biodiversity Survey Pictures


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13
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16


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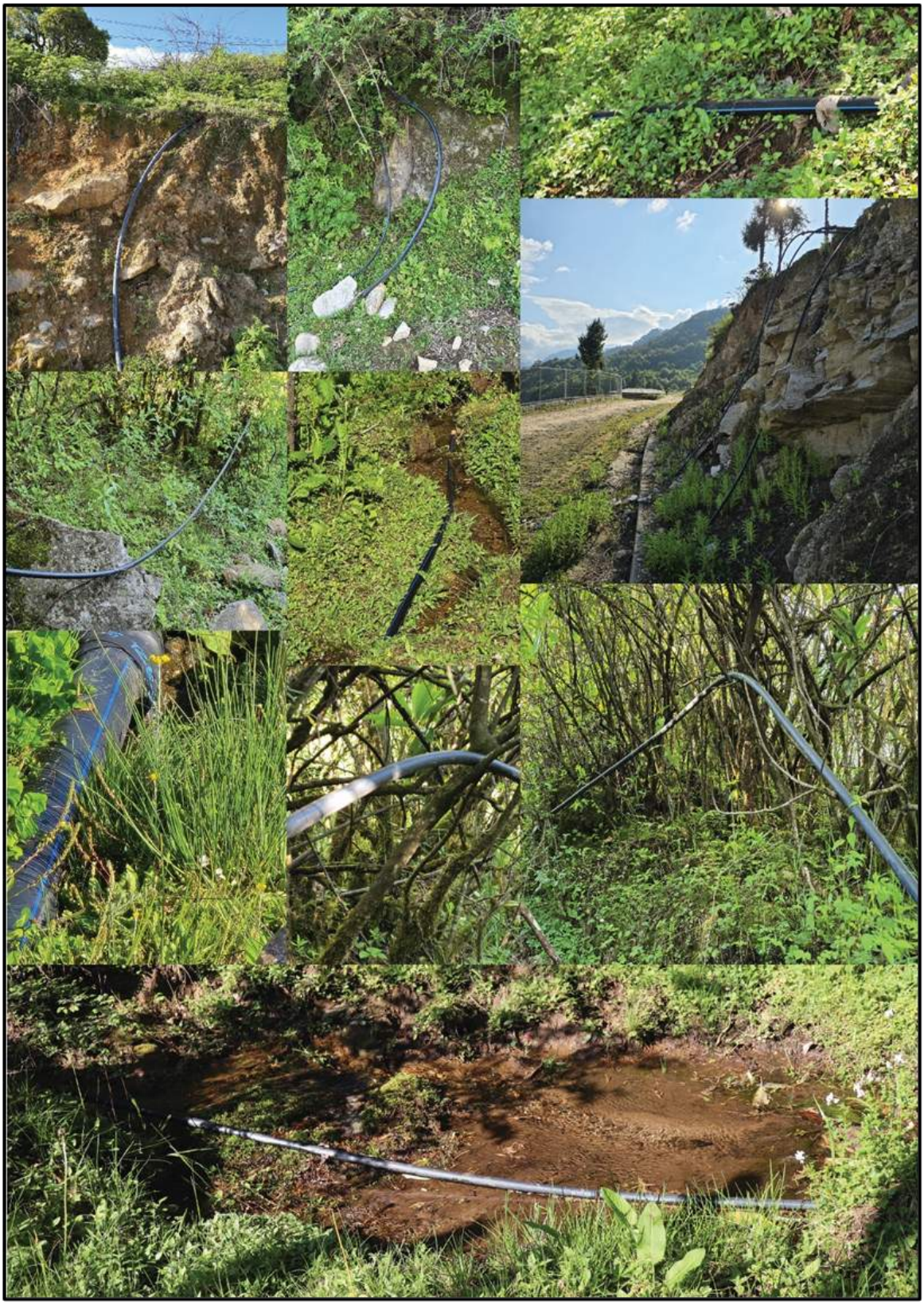
Singye Galem Trees Near Gasa Dzong

Lake in Front of Gasa Dzong

Annex 19.4. Pictures from Site Visit (24th May 2024)



Pipes Along the Forest and Roads

RCC Reservoir with Fencing above Gasa Dzong

Existing water reservoir

Birds Sighted During Site Visits

Large-Billed Crow

White-Throated Laughingthrush

Oriental Turtle Dove

Blue Whistling Thrush

Rufous Sibia

Large Hawk Cuckoo

Red-Billed Chough

Tufted Duck

Russet Sparrow

Oriental Magpie Robin

Black Bulbul

Verditer Flycatcher

Chestnut Crowned Laughingthrush

Grey Bushchat

Annex 19.5 Pictures of Kolikha Town Area

New Town Area Levelled

Annex 19.6. Gasa Town


View of Gasa Town

View of Gasa Town (South End)

Mani Dungkhor in the Center of Town

Private Vehicles Parked in Gasa Town

View of Gasa Primary School from Gasa Town

Annex 19.7. Phulakha Village

View of Phulakha Village and NHDCL Colony with Gasa Dzong in the Distance

Residents of Phulakha Village

Annex 19.8. Existing Water Tanks at School and Hospital

2 of 3 Sintex Tanks at the Hospital

1 of 3 Sintex Tanks at the Hospital

2 Sintex Tanks at Gasa Primary School