Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS) Project, Bhutan

Gelephu-Tareythang Road

Environmental and Social Impact Assessment Report (ESIA) – Executive Summary (For Disclosure and Consultation)

Department of Surface Transport (DoST), Ministry of Infrastructure and Transport (MoIT), Royal Government of Bhutan (RGoB)

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Disclaimer:

This Environmental and Social Impact Assessment (ESIA) for the Gelephu-Tareythang Road forms part of the environmental and social (E&S) due diligence for the Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS) Bhutan Project. The ESIA was prepared by the Department of Surface Transport (DoST), Ministry of Infrastructure and Transport, Royal Government of Bhutan, and follows Good International Industry Practices (GIIP) and the Bank's Environmental and Social Framework (ESF).

The review of this ESIA is a key part of the Bank's due diligence process and is currently ongoing. This ESIA may still contain gaps to fully address all pertinent E&S issues in the project. Any gaps in this ESIA will be filled through supplemental studies, assessments, and/or plans that will be completed in a reasonable timeframe to ensure compliance with the ESF.

For the benefit of potentially project affected people (PAP) and other interested stakeholders, and in alignment with the Bank's Policy on Access to Information this ESIA is being disclosed as soon as it became available. The disclosure of this ESIA, however, should not be considered as a final clearance of the ESIA by the World Bank.

CONTENTS

INTRODUCTION

The Royal Government of Bhutan (RGoB), with World Bank financial support, is preparing the Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS) Bhutan project as part of the ACCESS Multi-Phase Programmatic Approach (MPA). The ACCESS Bhutan Project's objective is to enhance the efficiency and resilience of trade and transport along selected corridors in Bhutan.

The ACCESS Bhutan Project has the following three components:

- **Component 1 - Digital Systems for Trade:** This component will provide digital solutions and automation to eliminate manual and paper-based processes. It includes the four subcomponents. Subcomponent 1.1 implements a National Single Window (NSW) to consolidate certificate, license, and permit services into a single platform. Subcomponent 1.2 strengthens digital enablers, including integrating national digital IDs, improving data accuracy with a single source of truth (SSOT), and supporting systems like IoT and data analytics. Subcomponent 1.3 enhances cybersecurity to ensure safe digital trade operations. Subcomponent 1.4 improves digital connectivity and data resilience through competitive internet bandwidth procurement, expanding high-speed internet access, and upgrading government data centers for secure cloud services and disaster recovery.
- **Component 2 – Green and Resilient Infrastructure:** This component will enhance regional corridors and gateways that are the backbone of the physical and economic integration of the region. It includes 3 subcomponents. Subcomponent 2.1 focuses on green and resilient road connectivity through the construction of the Gelephu-Tareythang Road, feasibility studies including environmental and social assessments for other missing links along the Southern East-West Highway (SEWH), upgrades to the Road Asset Management System, and piloting performance-based road maintenance contracts. Subcomponent 2.2 involves assessing multimodal transport options, including Inland Waterway Transport (IWT) and railways. Subcomponent 2.3 promotes human-wildlife coexistence by implementing the Biodiversity Management Plan, conserving ecological corridors and protected areas, reducing human-wildlife conflicts, and supporting wildlife studies and training programs.

  Component 3 – Institutional and Policy Strengthening: This component will provide technical assistance and capacity building to support trade, digital, and transport connectivity. It has 3 subcomponents. Subcomponent 3.1 provides project implementation support through experts in procurement, financial management, environmental and social safeguards, and monitoring and evaluation. Subcomponent 3.2 offers capacity building and training for implementing agencies in transport, digital development, and other priority areas. Subcomponent 3.3 delivers technical assistance to develop and enhance policies, laws, and regulations that facilitate cross-border digital trade and transport.

The proposed infrastructure works will focus specifically on the Gelephu to Tareythang Road, which aims to reduce trade and transport costs through better connectivity, improved resilience, and reduced travel time. Among all the proposed components of ACCESS, only the Gelephu – Tareythang Road (Component 2.1) is categorized as a high-risk activity from an environmental and social (E&S) perspective and a full environmental and social assessment is required. Other project activities under the ACCESS Bhutan Project are categorized as low to moderate risk, and

their E&S management and mitigation follows domestic regulation and World Bank ESF requirements, proportionate to their risk levels.

This Executive Summary summarizes the key findings and recommended actions of the ESIA for Gelephu-Tareythang Road (hereinafter referred to as the "Project").

LEGAL AND INSTITUTIONAL FRAMEWORK

APPLICABLE LEGISLATION TO THE PROJECT

The key relevant national regulations include the Environmental Assessment Act (2000) and the Regulation for Environmental Clearance of Projects (2002). Under these acts, an Environmental Impact Assessment (EIA) is to be submitted to the Department of Environment and Climate Change (DoECC) for the Project for an Environmental Clearance (EC). A Waste Management Plan is required under Bhutan's Waste Prevention and Management Act (2009). The Water Act of Bhutan 2011 regulates the extraction and discharge of water resources, water use permit is required. Under the Land Act of Bhutan (2007), land use approval from the Department of Forests and Park Services, Ministry of Energy and Natural Resources (MoENR) must be obtained if the project is in or near forested areas. Alongside environmental and biological legislation, relevant social legislation includes the National Gender Equality Policy (NGEP) 2020, the Domestic Violence Prevention Act of Bhutan 2013, Regulations on Working Conditions 2022, and Land Acquisition and Compensation Rules and Regulations 2022.

To meet these legislative requirements, the implementing agency, Department of Surface Transport (DoST) must prepare and submit the necessary applications and assessments as specified in each relevant law and regulation. Close coordination with DoECC, the Ministry of Agriculture and Forests, local authorities, and other regulatory bodies will be crucial to obtaining all required permits and approvals.

Bhutan is also a signatory and party to Multilateral Environmental Agreements (MEAs) governing climate change, ozone depletion, biodiversity conservation, cultural heritage, human rights, and hazardous waste management. In particular, Bhutan and India have a strong relationship with cooperation in the field of biodiversity and environmental conservation including memorandums of Understanding (MoU) on the Field of Forestry and Biodiversity, MoU for Conservation of the Manas Tiger Reserve, and the South Asia Co-operative Environment Programme (SACEP) 1981.

APPLICABLE WORLD BANK ENVIRONMENTAL AND SOCIAL FRAMEWORK

All new projects funded by the World Bank through Investment Project Financing must adhere to the ESF1. The ESF sets out the ten Environmental and Social Standards (ESS) that Borrowers must follow throughout the project life cycle. The ESSs relevant to the Project include:

- ESS 1. Assessment and Management of Environmental and Social Risks and Impacts
- ESS 2. Labor and Working Conditions
- ESS 3. Resource Efficiency and Pollution Prevention and Management
- ESS 4. Community Health and Safety
- ESS 5. Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

[1] World Bank Environmental and Social Management Framework (https://thedocs.worldbank.org/en/doc/837721522762050108-0290022018/original/ESFFramework.pdf)

- ESS 6. Biodiversity Conservation and Sustainable Management of Living Natural Resources
- ESS 7. Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities
- ESS 8. Cultural Heritage
- ESS 10. Stakeholder Engagement and Information Disclosure

To comply with these ESSs, the DoST has engaged the services of ERM Siam ("ERM") to develop the following E&S instruments for the Project and key findings are summarized in this document:

- ESIA including the Environmental and Social Management Plan (ESMP)
- Biodiversity Management Plan (BMP)
- Stakeholder Engagement Plan (SEP)
- Resettlement Action Plan (RAP)

In addition, applicable World Bank Group Environmental Health and Safety (EHS) Guidelines, notably the General EHS Guidelines and EHS Guidelines for Toll Roads and World Bank good practice and guidance notes on labor influx, Gender and GBV, and cumulative impact assessment are considered in the development of E&S assessments and management plans.

PROJECT DESCRIPTION

The Gelephu-Tareythang Road is a part of the road link along the southern east-west highway (SEWH) to facilitate the airport, dry port and multimodal transport hub in Gelephu. The road is situated in Sarpang Dzongkhag (District), centrally located in southern Bhutan. The alignment crosses the lower-lying natural terrain of Sarpang, and it passes through parts of Gelephu Thromde and partly through three (03) Gewogs: Chhuzanggang Gewog, Umling Gewog and Tareythang Gewog. The location of the road is shown in Figure E1.

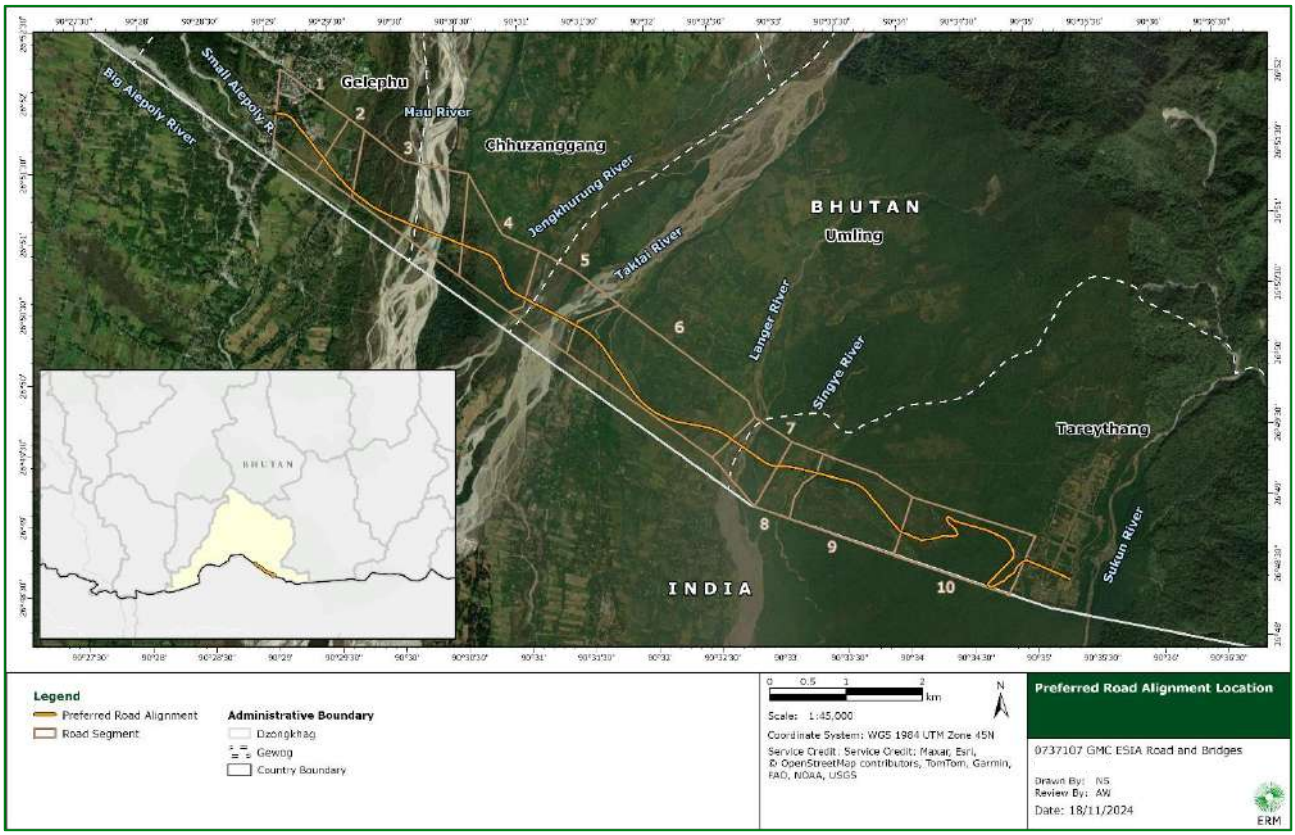

FIGURE E1 LOCATION OF THE PROJECT

The Project will include the following components:

- **Road Works**: Approximately 10.2 km of new greenfield highway (3.8 km section of this highway near Gelephu consists of dual carriageway and 9.8 km section is single carriageway) and a 3.4 km of widening existing highway at the tail end of the section near Tareythang.
    - **4-Lane Dual carriageway**: The total road width is 18 meters, with each side of the dual carriageway having a width of 7.5 meters, comprising two lanes, each 3.75 meters wide. A central median, 2.0 meters wide, separates the opposing directions of traffic and will be landscaped. This road design includes 0.5-meter-wide shoulders on either side of the carriageways. In addition, a 3.0-meter-wide cycleway or footpath on one side of the road is included to provide a secure pathway for pedestrians and cyclists. The right of way (ROW) of this road is 40 m and the design speed is 60 km/hr.
    - **2-Lane Single carriageway**: The road width is 8.5 meters, with one 3.5-meter lane in each direction and a 0.5-meter shoulder on each side. With the inclusion of a cycleway/footpath, the total road width is 11.5 meters. The ROW is 30m and the design speed is 60 km/hr.
- **Five Bridges**:
    - The Mau River bridge design spans a total of 1,005 meters, crossing both the river and floodplains, including a 250-meter elephant corridor with a vertical clearance of 8.15 meters (minimum 5.8 meters at the East abutment). The bridge will

support two lanes of traffic in each direction and provide pedestrian access on one side. The design features a concrete box girder deck with 80-meter spans over the river and 50-meter spans on each side.

- The other four bridges include: the Jengkhurung River and Taklai River Bridge (780 meters), the Langer River Bridge (390 meters) and the Singye River Bridge (382.5 meters). These bridges accommodate one traffic lane in each direction and include pedestrian access on one side. The bridge design features a concrete box girder deck with 60-meter spans and a consistent deck depth of 3 meters. The proposed form of this bridge is a concrete box girder with typical spans of 60 m in length. Those bridges have vertical clearance of 5-15 meters to allow movement of elephants.

- **River Training Works**: To control erosion on the riverbanks and limit the extent of flooding, gabion basket walls are proposed upstream and downstream of the highway at all bridge crossings. For the Mau River, river training measures will extend approximately 300 meters upstream and 100 meters downstream on the eastern side, and 500 meters upstream and 250 meters downstream on the western side. For the other rivers, river training is planned for 400 meters upstream and 100 meters downstream.
- **Two Interchanges**: The 10.2 km greenfield alignment will connect to existing roads through two interchanges (T-junctions) at each end, in Gelephu and Tareythang. Provisions are included for future interchanges with the Gelephu Mindfulness City (GMC) developments at Chhuzanggang Gewog and Umling Gewog.
- **Culverts and Small Bridge Crossings**: A minor bridge (80-m long near Gelephu STP plant) and culverts for cross-drainage along the alignment.
- **Ancillary Facilities**: A number of ancillary facilities will be required, including haul roads, quarry sites, crushing and batching plants, borrow pits, work areas, worker camps, and disposal areas.

Associated Facilities: These include facilities or activities that are not funded by the World Bank, but are directly and significantly related to the Project; carried out or planned to be carried out contemporaneously with the Project; and necessary for the Project to be viable and would not have been constructed, expanded, or conducted if the Project did not exist (ESF). The WB ESF requires associated facilities to meet the requirements of the Environmental and Social Standards (ESSs). For this project road, no associated facilities are identified as per the definition and criteria set forth under ESS1.

ANALYSIS OF ALTERNATIVES

Without Project Alternative. The "Without Project Alternative" suggests that existing roads cannot provide safe and efficient access to regional connectivity including to the Gelephu Mindfulness City (GMC), which is in the process of being planned and designed with support at the highest level of the Royal Government of Bhutan. The current journey is 45 km between Gelephu and Tareythang and takes about 1 hour and 20 minutes on narrow, single-lane roads through steep terrain. The route includes several one-way bridges with sections prone to landslides, especially near the River Mau. Additionally, riverbed crossings at the Langer, Taklai, and Jengkhurung Rivers can become impassable during the wet season, forcing all traffic onto

the existing road. These conditions make the current roads unsuitable for providing safe and efficient access along the southern East-West Highway. The Project aims to create a direct, high-quality road link between Gelephu and Tareythang, supporting the planned international airport, dry port, and multi-modal transport hub in Gelephu. It will connect various phases of the GMC developments, address the challenges of narrow, winding, and landslide-prone roads, and ensure resilient river crossings to prevent mobility disruptions during flooding. While the "Without Project Alternative" would avoid the environmental and social impacts of the proposed project, it would not meet Bhutan's needs for improved trade and transport efficiency and resilience in the south.

Alternate Alignments. Three basic alignments were considered within a 1 km wide area between the Indian border and the steeper mountain slopes. These three alignments (northern, southern, and central routes) were evaluated for environmental, social, and engineering factors. The preferred route is a combination of the southern route which transitions to the northern route to fit into the existing road. This route minimizes river channel crossing distances, reducing the extent of bridge structures; the river channel crossing for the Mau River is 490 m compared to the northern, central and southern routes which are 500 m, 540 m and 490 m respectively. The preferred route will generate an estimated 20.07 ha natural habitat loss compared to the northern, central and southern routes which cause 20.3, 23.18 and 19.61 ha loss respectively. The use of the existing corridor near Tareythang will reduce disturbance and will have a lower impact of biodiversity compared to opening a new road though mature woodland which would increase fragmentation.

Alternate Bridge Designs. Bridge designs were a key consideration among the design alternatives. For the Mau River Crossing, a concrete box girder was chosen over the steel truss due to the greater reliance on local materials, lower construction complexity and lower cost. For the Jengkhurung, Taklai, Langer, and Singye Rivers Crossings, the concrete box girder, with a typical span of 60m, was preferred for shorter channel crossings due to reduced hydraulic impact, greater robustness, and easier maintenance, over the concrete beam and slab with 40m spans**.**

Alternate Wildlife Crossings. The entire southern plains of Bhutan serve as corridors for Asian elephants, leaving no viable alternative for the Project that would avoid impacting these wildlife corridors. For the elephant crossing at the Mau River bridge, alternatives were evaluated based on bridge length, vertical clearance, and alignment to ensure adequate passage within the natural elephant corridor. Options considered included varying the length and height of the bridge to balance floodplain span requirements with adequate clearance for elephants on the eastern riverbank. Ultimately, the selected design incorporated a 250-meter-wide corridor with an average vertical clearance of 8.15 meters, ensuring that the bridge structure would not impede elephant movement. This option was favored for its effectiveness in providing both flood management and wildlife passage.

BASELINE E&S CONDITIONS

Baseline Studies. Comprehensive baselines studies were carried out based on literature review, field surveys and sampling, as summarized below. The areas for baseline studies considered potential direct, indirect and cumulative impacts that may affect key environmental and social receptors or components.

- **Water, Soil, Air and Noise Quality:** Surface water sampling was undertaken 20-21 August 2024 at five locations, with a total of ten grab water samples collected.

Groundwater sampling was conducted on 20-21 August 2024 at two sites with a total of four grab water samples collected. Soil quality testing at seven sites was carried out to understand the impacts on the soil, especially on the fertile soil, with samples collected at 10-15 cm depth from surface. Air quality monitoring for PM_{10} and $PM_{2.5}$ was undertaken for 23 days in the wet season at three locations, and NO_x, NO_2 and SO_2 monitoring using diffusion tubes was undertaken for approximately 30 days at six locations. Baseline noise sampling was conducted at seven locations along the road corridor.

- **Terrestrial Biodiversity:** For terrestrial biodiversity the following surveys were undertaken: 71 vegetation plots of 20x20m for flora, 33 grids with a total of 58.65 km of transect for birds, 33 grids with a total of 58.65 km of transect for herpetofauna, 41.9 kilometers of transects for Large and medium-sized mammals and a total of 40 camera traps installed for mammals.
- **Aquatic Biodiversity:** For aquatic biodiversity the following surveys were undertaken: five aquatic plots for fish sampling, five aquatic plots for macroinvertebrate sampling using kick sampling method, five aquatic plots for water quality using electrometric and instrumental analysis.
- **Social:** For the social baseline, alongside review of key documents, key information interviews with 47 participants were undertaken and 18 focus group discussions with adolescent girls, women, and men with a total of 143 participants were conducted.

PHYSICAL ENVIRONMENT

Physiography. Gelephu is located in Bhutan's southern Lesser Himalayan foothills, featuring low-lying plains, braided river systems, and rolling hills. Land in the area is classified into zones for agriculture, conservation, urban development, and forest management. Gelephu is an urbanized area with surrounding agricultural lands and natural conservation zones.

The project is partially situated within a floodplain and passes over several rivers, including the Mau, Jengkhurung, Taklai, Langer, and Singye. It is positioned on a river terrace and the surrounding gentle slopes leading to the base of the mountains, with altitudes around 200 m above sea level (masl) in the plain and 400 masl at the summit of the hill. The Mau River is very flat and prone to flooding. Chhuzanggang Gewog, situated east of the Mau River, has ground levels between 210 m and 230 m, rising to 260 m in the north. East of the Taklai River, the ground rises steeply from 220m to 280m. The Langer River is located in a flat, wide area. East of the Singye River, ground levels rise through Tareythang before descending steeply to the Sukun River. In Tareythang, the terrain is characterized by a steep ridge with elevations decreasing from around 280 m to 230 m.

Climate. Influenced by the southwest monsoon, Gelephu has a warm, humid climate with heavy rainfall from June to September. Annual temperatures range between 20°C and 25°C, with the summer months of July-September usually around 27°C though extremes 43°C have been recorded. Winter months (November-February) usually have temperatures of 18-23°C, though temperatures down to 6°C have been recorded. The rainfall patterns of Bhutan are determined by the Southwest monsoon circulation, with a seasonal cycle that results in wet summers that extend from June to September. The average yearly precipitation in the southern foothills ranges between 2,500 and 5,500 mm. In 2023, August had the highest rainfall with approximately 1800mm recorded at the Bhur station in Sarpang.

Floods and Natural Hazards. The Project area is faced with natural hazards due to its location and environment, including seismic activity, heavy monsoon rainfall from June to September causing floods, and severe landslides due to loose sediments. The region's sub-tropical climate supports diverse vegetation, such as chir pine and broadleaf forests, which makes occasional forest fires a potential risk.

Hydrology. The rivers in the Project area include the Mau, Jengkhurung, Taklai, Langer, and Singye. The rivers in the project area are mainly braided rivers with shifting channels and sand/boulder deposits. The Mau River, a significant tributary originating from Bhutan's Black Mountains, joins the Manas River in Assam. The Project area lies within the Aiechhu Basin, a subbasin of the Brahmaputra River, which generates 6,989 million m^3 in annual flow and extends to the Indian border. Seasonal variations in river discharges are notable, with the Mau River experiencing peak flows during the monsoon season, reaching 1,500–3,300 m^3/s, and significantly lower flows in the dry season, between 40 and 135 m^3/s.

Water and Soil Quality. Surface water, groundwater, and soil samples from the Project Area were analyzed in a laboratory and compared to Bhutan's national standards and WHO guidelines. Coliform levels in water samples exceeded "Very Good" conditions but remained within "Good" or "Moderate" ranges, while other parameters were within acceptable limits. Soil samples, tested for texture, fertility, and cation exchange capacity, met international standards and USEPA's Eco-SSLs for mammals. Sediment analysis from the Mau River indicated a high sand content, suggesting a potential risk of soil erosion.

Air Quality. The baseline air quality in Gelephu is generally good, with low pollutant levels. The highest pollution is in Gelephu Thromde, particularly during the dry season due to wind-blown dust from the Mau River. Monitoring data shows that PM10 and PM2.5 levels are well within WB EHS guidelines, with average concentrations of 4.14 $\mu g/m^3$ and 4.73 $\mu g/m^3$, respectively, significantly below the limits. Levels of NO_2, SO_2, and NO_x are also below the standards with average ambient concentrations of 3.21 $\mu g/m^3$ (NO_2), 3.4 $\mu g/m^3$ (NO_x), and 0.242 $\mu g/m^3$ (SO_2). Overall, the air quality meets acceptable standards for human health, and the airshed is not considered degraded.

Noise Quality. Baseline noise levels in Gelephu comply with Bhutan's national standards and WB EHS Guidelines, varying by location and influenced by nearby noise sources. Monitoring stations in residential, industrial, and public areas show that noise levels in residential outskirts and rural locations are within acceptable limits, while industrial zones meet higher thresholds.

BIODIVERSITY BASELINE

Ecological Appropriate Area of Analysis (EAAA). The geographic area of influence for the biodiversity consideration has been considered as an Ecological Appropriate Area of Analysis (EAAA) in accordance with good international industry practices. The terrestrial EAAA incorporates habitats and species of conservation concern in line with ESS6 principles, focusing on the protection of critical habitats and maintaining ecological connectivity. This includes subtropical forests contiguous with Royal Manas National Park and the Sarpang-Gelephu Foothills which are critical for supporting species such as the Asian Elephant (*Elephas maximus*) and Gee's Golden Langur (T*rachypithecus geei)*. To the west, the EAAA includes a mix of modified habitats, such agricultural, rangeland, and forested areas (5 km from the road alignment, and to the east, the EAAA extends to the adjacent habitat in the Royal Manas National Park that supports elephant movement, as shown by field survey data indicating travel patterns through Umling Gewog and towards Phibsoo Wildlife Sanctuary. On the southern side, the EAAA extends 2 km covering the

Ripu and Chirang Reserve Forests in India. It is understood that certain species are transboundary, and where relevant these impacts are considered in the ESIA.

The aquatic EAAA covers both upstream and downstream sections of the Mau and Taklai Rivers. Siltation during high-water seasons, like the monsoon, could temporarily hinder the migration of species to upstream spawning sites. The delineation considers various habitat niches used by local fish species, such as smaller hill streams for spawning, deep waters, backwater pools, secondary channels, and areas with gravel and boulders.

Ecological Context. The project's footprint is predominantly covered by agriculture and forests, with other land-use types occupying much smaller portions. While the forest has experienced minor disturbances, it continues to support a natural assemblage of species and to maintain its natural ecological function.

Dominating much of the northern part of the project area, sub-tropical forests are found at altitudes ranging from 150 to 398 meters. The sub-tropical forests have dense canopy cover with a rich diversity of evergreen and deciduous trees, shrubs, and thick undergrowth, including species such as Indian mahogany (*Chukrasia tabularis),* Red cedar *(Acrocarpus fraxinifolius),* Tree of heaven *(Ailanthus grandis),* Red silk-cotton tree (*Bombax ceiba),* Lampate (*Duabanga grandiflora),* Sal tree (*Shorea robusta),* Naked-flowered tree *(Tetrameles nudiflora)*. These forests typically occur in warm, humid conditions and support a wide variety of wildlife, including insects, birds, mammals, and reptiles.

Interspersed within the forests and riverbanks, grasslands are composed primarily of tall grasses, such as Elephant grass (*Miscanthus spp),* Cogongrass (*Imperata spp)* and Sugarcane (*Saccharum spp)*, which are adapted to periodic disturbances like flooding, grazing, and fires. Grasslands are crucial habitats for herbivores as well as predators.

Warm broadleaf forests are composed of a mixture of deciduous and evergreen trees, such as Chinese alangium (*Alangium chinense),* Himalyan alder (*Alnus nepalensis),* Alder-leaved birch (*Betula alnoides),* Java cedar (*Bischofia javanica),* Beautyberry tree (*Callicarpa arborea),* Indian chestnut (*Castanopsis indica),* Clammy cherry (*Cordia obliqua),* Bhutan green bamboo (*Dendrocalamus hookeri),* Blue evergreen hydrangea (*Dichroa febrifuga),* Mauwa (*Engelhardia spicata),* African dream herb (*Entada spp.)* and Nilgiri helix (*Helicia nilagirica)*. The canopy cover is moderately dense, allowing sufficient light for a diverse understory.

Natural/ Modified Habitat. The project area is predominantly covered by agriculture and forests, with other land-use types occupying much smaller portions, i.e., bare ground, built-up, successional rangeland, and riparian rangeland. Anthropogenic impacts in the region are considered pervasive. This has led to extreme fragmentation of the land, with agriculture and human settlements interspersed with areas of rangeland. Even though the western forest, contiguous with Phibsoo Wildlife Sanctuary, and southern forest, contiguous with Royal Manas National Park, have experienced disturbances, they can be considered Natural Habitats.

Legally Protected Areas and Internationally Recognized Areas of High Biodiversity Value. The project is in proximity to several legally protected areas and internationally recognized areas of high biodiversity value, as defined under ESS6. Within a 50 km radius of the project site, these areas include:

Legally Protected Areas:

- Ripu and Chirang Reserve Forests (2 km from the Project Road);
- Royal Manas National Park (<1 km from the Project Road);

- Manas Wildlife Sanctuary (24 km from the Project Road);
- Phibsoo Wildlife Sanctuary (30 km from the Project Road); and
- Biological Corridor 3 (9 km from the Project Road).

Internationally Recognized Areas of High Biodiversity Value:

- Ripu and Chirang Reserve Forests in India (2 km to the Project);
- Royal Manas National Park, designated as an Important Bird Area (IBA) (<1 km from the Project Road);
- Manas National Park in India, designated as both IBA and Alliance for Zero Extinction (24 km from the Project Road);
- Phibsoo Wildlife Sanctuary IBA (30 km from the Project Road); and
- Sarpang-Gelephu Foothills IIBA (3 km from the Project Road).
- Manas Wildlife Sanctuary in India (24km from Project Road).

Species. The terrestrial (12 July – 29 August 2024) and aquatic baseline (5 - 8 August 2024) surveys yielded the following findings:

- **Flora:** The flora survey found 127 species of trees and shrubs, 69 species of herbs, 59 species of regenerating plants, and 37 species of epiphytes. There are two (02) species of conservation concern, i.e., Teak (*Tectona grandis*, IUCN EN) and Kebella (*Aporosa cardiosperma,* IUCN VU). These two (02) species were found in plot 1 of the Quadrat survey towards Tareythang gewog of the preferred road alignment. Nine (09) plants were identified as invasive species.
- **Birds:** The avifauna survey findings suggest that the study area is relatively diverse in terms of bird species, with a total of 158 bird species recorded. Among these, the presence of Great Hornbill (*Buceros bicornis*, FNCRR, IUCN VU, CITES I), Wreathed Hornbill (*Rhyticeros undulatus*, IUCN VU), River Lapwing (*Vanellus duvaucelii*, FNCRR, IUCN NT) and Peregrine Falcon (*Falco peregrinus*, IUCN LC, CITE I) was recorded.
- **Herpetofauna:** the presence of 12 amphibian species and 39 reptile species was recorded, though four (04) amphibian species and five (05) reptile species could not be identified to the species level. There were 3 species of conservation concern, i.e., Tricarinate Hill Turtle (*Melanochelys tricarinata*, IUCN EN, CITES I), King Cobra (*Ophiophagus hannah*, IUCN VU, CITES II), Burmese Python (*Python bivittatus*, IUCN VU).
- **Terrestrial mammal:** The camera trap survey and transect survey recorded the presence of 13 mammal species with six (06) species only encountered through the camera trap. Among the recorded species, species of conservation significance include:
    - Hog Deer (*Axis porcinus*, IUCN EN),
    - Dhole (Cuon alpinus, IUCN EN),
    - **Asian Elephant (*Elephas maximus*, IUCN EN),**
    - Bengal Tiger (*Panthera tigris ssp. Tigris*, EN),
    - **Gee's Golden Langur (*Trachypithecus geei*, IUCN EN and endemic to Bhutan),**
    - Gaur (*Bos gaurus*, IUCN VU),
    - Sambar (*Rusa unicolor*, IUCN VU), and
    - Smooth-coated Otter (*Lutrogale perspicillata*, IUCN VU).
- **Fish:** Fish diversity recorded a total of 32 species with 29 species in Mau River and 24 species in Taklai river. Two IUCN VU species were found, i.e., Reticulated Loach (*Schistura reticulofasciata*) and Mrigal Carp (*Cirrhinus cirrhosus*) but Mrigal Carp is considered invasive in Bhutan.

- **Macroinvertebrate:** A total of 11 families under nine (09) orders were recorded. Among these, the presence of Mayfly fauna e.g., *Baetis spp.* indicated a clean freshwater condition.

Critical Habitat. Critical habitat is defined as areas with high biodiversity importance or value as per ESS6. The Project Road's footprint is not located within any legally protected areas or internationally recognized areas of high biodiversity value. However, several endangered species were identified during baseline studies, as indicated above. Among those, Asian Elephant and Gee's Golden Langur are likely to trigger ESS6 requirements of implementing measures to achieve net gain of critical habitat features. To this end, a critical habitat assessment is being carried out and a BMP inclusion of measures to achieve the net gain is being developed. Specifically,

- **Asian Elephant:** The Asian Elephant is distributed throughout the southern belt of Bhutan along the border with India (Samtse, Chhukha, Dagana, Phibsoo Wildlife Sanctuary, Sarpang, Royal Manas National Park, Samdrup Jongkhar, Jomotshangkha Wildlife Sanctuary, Chirang Ripu RF, and the Manas National Park); elevation ranging between 100 m to above 2000 m (Nature Conservation Division, 2018). During the transect survey, there were two direct sightings of two herds of elephants consisting of 37 individuals, which is equivalent to 4.86% - 6.12% of the National population. In addition to direct sightings, evidence of Asian Elephants' occurrence such as droppings, feeding signs, tracks, and scrapes as well as camera trap data suggest the frequent occurrence of Asian elephants in and around Project area. The species triggers Critical Habitat because (i) the Project area plays an important role in supporting the movement of the species, (ii) the habitat within the EAAA supports a substantial national population of this species. The loss of habitats in the Project area and its vicinity can result in elephants altering their movement routes.
- **Gee's Golden Langur**: The Gee's Golden Langur is distributed along the southern belt of Bhutan, particularly in forests contiguous with Royal Manas National Park and Phibsoo Wildlife Sanctuary. Despite disturbances, the forests within the EAAA provide critical habitats for this restricted-range species. Field surveys conducted in July 2024 confirmed the presence of 23–93 individuals across 7 survey grids, accounting for 0.35%–1.55% of the global population and 1.7% of the national population. Two distinct groups of Langurs were observed on opposite sides of the Mau River, approximately 13 km apart, suggesting separate populations within the survey area. These findings indicate that Gee's Golden Langur is present in stable numbers in the project area. The species triggers Critical Habitat because (i) the Project Area contains a substantial national population of this species, thus the terrestrial EAAA may even contain habitat for a bigger population, (ii) species' vulnerability as a restricted-range species to the fragmentation effects. For further details, refer to the biodiversity baseline and critical habitat assessment in the main report

SOCIO-ECONOMIC BASELINE

Demography. The project is located in Sarpang District in the southern part of Bhutan, bordering the Indian state of Assam. The Social Study Area, which consider both direct and indirect impact areas, comprised of Gelephu Thromde, and six (06) Gewogs Gelephu Gewog, Samtenling Gewog, Umling Gewog, Chhuzanggang Gewog, Serzhong Gewog, and Tareythang Gewog. The Social Study Area has a population of approximately 25,869 people, and a total of 5,881 households. The Gewogs and Thromde in the Social Study Area are characterized by an

average household size of four persons per household. This makes up 56% of the population of the Sarpang District.

Socio-cultural Dynamics. The Social Study Area is diverse, featuring various socio-cultural and linguistic groups. Buddhism is prominent in the area followed by Hinduism. The key groups include Ngalongs, Sharchop, and Lhotshams.

Economics and Livelihoods. The highest urban density in the Social Study Area is in Gelephu Thromde, which has many commercial establishments like shops and small businesses. The Project also passes through two smaller urban areas, Umling and Tareythang, which have fewer businesses and more pop-up stalls. In Sarpang District, the labor force participation is 64.5% for females and 73.9% for males. Agriculture, particularly paddy cultivation, is a primary income source, supported by irrigation for 9,822.3 acres. Many households near Gelephu Thromde engage in small businesses and service jobs. Women often face limited employment opportunities and rely on informal labor and youth out-migration is high due to limited local opportunities. Vulnerable employment for females has worsened in Bhutan since 1991 with vulnerable employment among women being 82.7% and among men is 61.6% in Bhutan for 2022. Additionally, the Social Study Area sees an influx of lower-wage workers from India, facilitated by a contracting system. According to the Bhutan Poverty Analysis Report (2022), Sarpang District has a poverty incidence of 5% and Gelephu Thromde has a poverty incidence of 7.8%. The Labor Force Survey Report (2022) shows that Sarpang District has an unemployment rate of 9.1% with a youth unemployment rate of 44.2%.

Communities cultivate crops such as maize, millet, paddy, areca nuts, ginger, and rice. With regards to list of forest products and services, it was found that the users rely on the community forests for firewood, Non-timber Forest Products, plywood, timber, bamboo, fodder, mushrooms, brooms, and similar, though the dependence on community forest products by households varied under each Gewog.

Social and Physical Infrastructure. Bhutan has a free healthcare system that covers almost 90% of the population within 2 hours of travel distance and the health infrastructure includes primary, secondary, and tertiary facilities. The Central Regional Referral Hospital in Gelephu Thromde is a key facility, supported by other hospitals and clinics. Major health concerns are non-communicable diseases, high alcohol consumption, and rising rates of Hepatitis B and kidney issues. The Social Study Area has several public schools and vocational training institutions but lacks a local college. While electricity and internet access are generally good, water supply is challenging, especially in dry seasons. However, women in rural areas face vulnerabilities and lack of opportunities to access comprehensive health services particularly those that cater specifically to women's sexual and reproductive needs. Women from rural areas have a 17% higher unmet need for family planning than those from urban areas. It was found that in Tareythang Gewog women faced nutrition issues in the past because maize was the only crop that could be grown, limiting access to diverse nutrients.

In Bhutan, the primary level Net Primary Enrolment Rate is almost 100% for both boys and girls. The survival rate for girls at the primary level stands at 95.3% exceeding that of boys at 86.5%. Furthermore, there is an equal representation of girls at the secondary level, however, according to World Bank 2022 data, only 65.8% of girls and 53.6% of boys' complete lower secondary school. Despite such parity at the primary and secondary level, the enrolment of girls at the tertiary level remains low (19.1% as compared to 23.7% of boys). Consultations revealed that as the level of education increases, girls' participation declines, with dropout rates being

relatively high due to reasons such as poverty, early pregnancy, and domestic responsibilities. Girls tend to pursue general education more than technical or professional courses.

Cultural Heritage. A total of 26 cultural heritage resources were identified in the Social Study Area, with 17 being a temple/monastery or other religious structures that are relevant to both the Buddhist and Hindu religions (such as Tharpaling Dratshang and Hindu Mandir) and the remainder of the cultural heritage resources are community forests. Community forests are formally designated as per the Forest and Nature Conservation Act 2023.

Concerning intangible cultural heritage, around ten (10) key festivals have been identified in Sarpang District, which range from local to national level celebrations. For instance, community members in Samtenling Gewog, the Dungkarling community forest had a 'Devithan' or sacred site, which is an open space in the forest. A sacred tree was found in the Chhuzanggang community forest, access to which was restricted.

The Social Study Area includes 15 community forests, covering approximately 1,840.594 hectares. Except for Gelephu Thromde, classified as a municipality, and Serzhong Gewog, each Gewog has community forests within or around its boundaries. One community forest was found to have sacred sites which were of cultural relevance to the local population. Sacred sites within community forests include sacred trees, natural springs, or open spaces near water bodies.

Gender. Of the total population in the Social Study Area, 51% are male whereas 49% of the population is female. The Gewogs and Thromde in the Social Study Area have an average sex ratio of 112 males per 100 females, which is higher than the sex ratio of Sarpang District, which is 109.2. Adult literacy is lower among women than men, with a gender gap of 15.3, which is wider than the South Asia regional gap of 14.6.

With respect to violence against women, Bhutan saw an increase in domestic violence cases during the COVID-19 lockdowns. According to a 2021 report, around 900 domestic violence cases were reported to the National Commission for Women and Children (NCWC) between 2016 and 2021. However, underreporting is still a major concern due to societal stigma, fear of retaliation, and deeply rooted social and cultural gender-based norms.

Consultations with stakeholders in the Social Study Area highlighted that gender-based violence is a concern due to numerous factors such as the prevalence of alcoholism in households. Traditional gender norms and roles still influence women's mobility, decision-making, and economic participation. With regards to land ownership, consultations with stakeholders revealed that in modern times there is more equal inheritance between men and women.

ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS

All impacts were categorized in terms of their magnitude and significance. The following sections summarize the environmental and social risks and impacts of the Project by each relevant World Bank environmental and social standard.

ESS 1. ASSESSMENT AND MANAGEMENT OF ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS

Key Impacts and Risks of the Project: The E&S risk category of the Project is assessed as high as per the World Bank ESF based on the potential impacts and risks on the environment and community and the magnitude and capacity of DoST to manage these impacts. The Project's key E&S impacts and risks are summarized here, while details are provided under respective ESSs below. These impacts and risks include; (i) dust, air, and noise pollution from construction

activities, equipment, and traffic; (ii) soil damage and erosion from heavy equipment compaction, potential fuel and chemical leaks, and improper waste disposal; (iii) erosion and sedimentation with associated impacts to aquatic habitats and agricultural lands; (iv) slope failures resulting from excavation works on the hill slopes; (v) risk of flooding and habitat disruption from construction near rivers and poorly designed road drainage systems; (vi) biodiversity impacts through habitat loss, fragmentation, and disturbances to wildlife, increasing human-wildlife conflict and affecting ecosystem services; (vii) land acquisition may require resettlement and disrupt livelihoods, particularly impacting women through loss of land rights; (viii) increased risks of gender-based violence; and (ix) clearing of approximately 28.76 hectares of community forests within the ROW will affect households that depend on these forests. The significance of these impacts, both before and after (residual) the implementation of mitigation measures, is assessed based on their severity (categorized as high, substantial, moderate, or low, and color-coded) and is presented in Table 1 across the construction and operational stages of Project implementation.

Mitigation Measures and E&S Instruments: To manage the above E&S impacts and risks, the Project has conducted a comprehensive E&S assessment and prepared several Environmental and Social (E&S) instruments with detailed mitigation measures following the principles of mitigation hierarchy. These instruments include

(i) an Environmental and Social Impact Assessment (ESIA) with a Cumulative Impact Assessment (CIA) to address impacts of other regional development initiatives, and an Environmental and Social Management Plan (ESMP) outlining strategies for managing impacts during construction and operation;

(ii) a Biodiversity Management Plan (BMP) includes a critical habitat assessment and strategies for species and habitat conservation to achieve net gain measures;

(iii) a Climate Change Risk Assessment (CCRA) identifies climate risks and proposes mitigation and adaptation measures;

(iv) a Stakeholder Engagement Plan (SEP) ensures ongoing community participation;

(v) Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) Action Plan to safeguard women, children, LGBT+ and others at risk and promote respectful and safe environment gender-based violence related risks to all gender and age-based violence- including LGBT+;

(vi) a Gender Action Plan (GAP) focuses on promoting gender equality, empower women, LGBT+ to address gender disparities and for an inclusive participation with awareness on gender-based violence and reporting process, and;

(vii) a Resettlement Action Plan (RAP) outlines measures to manage land acquisition and resettlement impacts. These instruments collectively form a robust framework for managing E&S risks and ensuring sustainable Project outcomes. The E&S instruments will be disclosed on the DOST and the World Bank's external website.

E&S Risk Management Capacity: The Department of Surface Transport (DoST) will play a pivotal role in ensuring that E&S considerations are integrated into every stage of the project. The dedicated E&S team within DoST will be responsible for monitoring compliance with the ESMP, addressing any unforeseen risks and impacts, and ensuring the project's adherence to all regulatory and financing requirements throughout both the construction and operation phases. Both contractors and supervision engineer's team will also have dedicated E&S teams

for the implementation of the ESMP. The DOST has developed an Environmental and Social Commitment Plan (ESCP) and agreed with the Bank on the actions, measures, and timelines necessary to ensure compliance with the ESSs throughout the project lifecycle.

Table 1: Significance of Road Project Impacts during Construction and Operational Phases

Impact/Risks	**Significance before Mitigation Measures**	**Residual Significance after Mitigation**
Construction Phase Impacts and Risks		
ESS 1 related		
Overall E&S impacts of the road Project	High	Low
ESS 2 related		
Labour and working conditions	Substantial	Low
Worker health and safety	High	Moderate
OHS risks during construction	High	Moderate
ESS 3 related		
Dust from earthworks and vehicular movement	Substantial	Low
Emissions from construction equipment and traffic	Substantial	Negligible
Noise and vibration from construction	Substantial	Moderate
Alteration of natural water flows	Substantial	Moderate
Erosion and sedimentation	Moderate	Low
Water quality degradation/pollution	Moderate	Low
Soil compaction and damage	Moderate	Low
Contamination of soil and groundwater	High	Moderate
Waste generated by workers	Substantial	Low
Waste from site clearance and exaction	Substantial	Low
Hazardous material waste	Substantial	Low
Spills from oils and chemicals	High	Moderate
Greenhouse gases emissions	Moderate	Low
ESS 4 related		
Labor influx and in-migration	Substantial	Moderate
Social cohesion from labor influx	Substantial	Moderate
Community infrastructure and wellbeing	Substantial	Moderate
Community health and safety risks	Substantial	Moderate
Sexual exploitation and abuse, and sexual harassment	Substantial	Moderate
Increased traffic during construction	Substantial	Moderate
Traffic accidents from construction traffic	High	Low
Natural hazard such as seismic hazards	High	Substantial
Climate- change induced risks - flood	High	Low
ESS 5 related		
Physical and economic displacement	High	Moderate
ESS 6 related		
Terrestrial habitat loss (0.19 km2)	Moderate	Low
Habitat degradation and spread of invasive species	Moderate	Low
Disturbance to terrestrial wildlife	Low	Negligible

Impact/Risks	Significance before Mitigation Measures	Residual Significance after Mitigation
Impact on aquatic habitat	Moderate	Low
Human-wildlife conflict	High	Moderate
ESS 8 related		
Cultural heritage resources	Low	Negligible
Cross-cutting to all standards		
Gender and inclusion impacts related to all standards	High	Moderate
Operational Phase Impacts and Risks		
Impact on air quality from traffic during operation	Negligible	Negligible
Noise and vibration from traffic during operation	High	Moderate
Alteration of natural flows and Pollution from road and bridge surfaces	Moderate	Low
Habitat fragmentation for threatened mammals	High	Moderate
In-migration – SEA/SH risks	Substantial	Moderate
Air and noise impacts on the community	Moderate	Moderate
Cultural heritage resources	Moderate	Low

ESS 2. LABOR AND WORKING CONDITIONS

Project Workers. The Project workforce includes about 50 direct workers under the DOST, as well as about 2,000-2,500 construction workers to be engaged by the Contractors. The contracted workers comprise of 600-700 skilled laborers and 1,400-1,800 unskilled laborers. The workforce will consist of a mix of workers from the project area, elsewhere in Bhutan, and from abroad, particularly in India.

Potential labor Risks. The potential labor risks, other than Occupational Health and Safety (OHS) risks, include child labor, forced labor, and health risks due to inadequate working conditions. Vulnerable groups and migrant workers are particularly at risk. Other concerns include lack of formal contracts, excessive working hours, discrimination in hiring, delayed or insufficient payments, and potential association with contractors or agents who do not adhere to legal and international labor standards, heightening the risk of labor exploitation. Labor Management Procedures, a Health and Safety Management Plan, Grievance Redress Mechanism (GRM) for workers, Code of Conduct, the Accommodation Management Plan and the ESMP will define measures for managing these labor risks.

Labor Influx. The influx of labor poses risks to local social dynamics and increases the risk of SEA/SH incidents and tensions within local communities due to perceived or actual competition over local resources, especially when local people rely heavily on forest products.

The influx of workers may strain existing infrastructure and services, such as healthcare and education, potentially diminishing their quality and availability. Management plans, such as an Influx Management Plan, SEA/SH plan and the ESMP, shall address workplace safety, training, and health screenings. The project necessitates stringent monitoring and adherence to these policies to protect workers effectively.

The Project is expected to generate significant employment opportunities during construction, with a peak workforce of approximately 2,500, including a mix of skilled and unskilled laborers from the local area, Bhutan, and India. While the influx of workers from India may dominate the

labor force due to lower wage rates, there remains potential for local workers to participate. A positive impact on the local economy is anticipated due to an increase in business opportunities, benefiting local businesses such as restaurants and shops. The Project also presents opportunities for women's economic empowerment through formal employment. However, the Project may also lead to a temporary depletion of local skilled labor as workers may leave their current jobs for better-paying project roles.

Workers Health and Safety - Occupational Health and Safety (OHS). There are several health and safety-related issues that workers are likely to be exposed to on any large-scale development. Without appropriate safeguards in place, these issues can lead to accidents, injuries, and fatalities. These include accidents and injuries that may occur as a result of construction activities if safe work practices are not followed. Occupational diseases are also a risk to workers that are caused or aggravated by exposure to workplace hazards and are often categorized into the following groups - musculoskeletal disorders, mental disorders, noise-induced hearing loss, infectious and parasitic disease, respiratory diseases, contact dermatitis, cardiovascular diseases, and occupational cancer. These diseases often develop as a result of poor working conditions and poor hygiene. Some occupational diseases manifest shortly after exposure, while others take longer to manifest after exposure.

Mitigation measures include the development of an Occupational Health and Safety Management Plan that applies to all workers, including contract workers and community workers. Induction and ongoing training for all workers regarding health and safety to be provided on the wearing of appropriate PPE, good hygiene practices and information relating to infectious diseases, and the management of risks and hazards. Other measures include provisioning of appropriate PPE, completion of Job Hazard Analysis before the start of the construction activities, maintenance of equipment and sufficient lighting. Medical assessment of workers is critical for workers before they mobilize on site. In addition, provisioning of health/medical care to workers is required, as well as communication and coordination with local health authorities.

Most critically, the setting up of a GRM for workers will be implemented to enable workers to report issues anonymously.

A workforce code of conduct will be developed and enforced, outlining requirements for safeguarding workers' health and wellbeing, promoting respectful behavior, and ensuring safety and productivity. The Project will also implement a Workforce Management Plan (WMP) aligned with international standards, ensuring non-discriminatory employment practices, timely payment, and clear contracts. Partnerships with local organizations will support community development and address social challenges, while gender-specific design principles will enhance safety within Project facilities. Safe, anonymous reporting avenues will be provided for grievances and incidents, ensuring a supportive environment for all workers.

ESS 3. RESOURCE EFFICIENCY AND POLLUTION PREVENTION AND MANAGEMENT

Resource Efficiency. Estimates of the materials required for the Project include: 52,510 m^3 general fill, 14,880 m^3 boulders/rock fill, 400 m^3 bitumen, 14,060 tonnes of cement, 25,600 tonnes of sand, 139,570 tonnes of aggregates, 9,350 tonnes of steel reinforcement, 1,370 tonnes prestressing steel, and 260 tonnes steel wire. The construction materials, such as cement, asphalt, aggregates, and other required materials will be sourced locally from government-recognized cement manufacturing, batching, asphalt, and quarry plants located near the project area where possible. A reduction in the total volume of excavated materials

requiring offsite disposal will be achieved as far as possible by optimizing the reuse of suitable material on-site. Mitigation Resource efficiency measures will include minimizing excavation requirements, balancing cut and fill, evaluating the potential for maximizing the reuse of material, considering silt mulching of vegetation to reduce bulk, and reviewing opportunities for possible use within landscaping. Following good practice, accurate site records should be maintained throughout the construction works detailing the quantities of materials generated on-site, reused on-site, and disposed off-site, together with disposal routes/locations.

Erosion and Sediment Control. In the project area, where the terrain ranges from moderate to steep slopes, topsoil is susceptible to risk of erosion. Construction activities such as land clearing, earthworks, as well as construction of piers and foundations in the river crossings which can lead to disruption of the riverbed, increases the risk of soil erosion and sediment runoff. It will be important to minimize the disturbance of steep slopes, which are especially susceptible to erosion. The Project will implement the following measures to conserve soil resources at the site: prohibit the Contractor from clearing or disturbing any land beyond those approved by the Authorities; install and maintain approved erosion control measures before initiating land disturbing activities to protect soil resources; remove, store, and cover topsoil, along with associated leaf litter and organic matter, for postconstruction land stabilization; and apply the stockpiled topsoil to help stabilize disturbed areas and promote the re-establishment of local native vegetation. The Contractor will need to prepare an Erosion and Sediment Control Plan, and a Grievance Mechanism will need to be in place for communities to inform the Authorities and Contractor of any erosion and sedimentation issues.

Pollution Prevention. Construction impacts from the project include dust from earthworks, noise pollution, soil erosion and sediment runoff, slope stability, soil loss, stormwater carrying pollutants and wastewater leading to contamination of surface waters, alteration of hydrological patterns, damage to soils (such as compaction), contamination of soil and groundwater, waste disposal, handling of hazardous and non-hazardous waste which pose risks to water quality and public health, and emissions from vehicles and plant. Mitigation measures to address dust and air pollution will include dust suppression techniques, such as regular watering of exposed surfaces, covering construction materials, and ensuring proper maintenance of machinery to minimize emissions. Noise from construction activities will be minimized by restricting noisy operations to daylight hours, regular equipment maintenance, and conducting noise monitoring at key locations. The project will implement erosion control measures and construct sediment retention structures to reduce sediment flow into water bodies.

During operation, there may be a risk of pollution from vehicle residues and road user litter. Mitigation includes the installation of oil-water separators in areas with heavy traffic or rest stops to capture vehicle pollutants and prevent contamination of nearby water sources and conducting regular water quality monitoring at runoff discharge points to detect pollutants and initiate corrective actions if contamination is detected.

Waste Management. The Project will generate a variety of solid wastes, primarily domestic solid waste and construction debris. Waste materials have the potential to cause adverse environmental impacts during generation, storage, transport, and disposal. The principal adverse effects relate to dust, water quality, general health and safety, and visual impacts. The quantities of waste estimated are: 1,250 kg/day of domestic solid waste, 1,000 kg/day of construction solid waste, 5.8 kg/day hazardous waste from oil-soaked rags and grease waste, 4.35 L/day liquid hazardous waste and 11.9 kg/day hazardous waste from non-oil and grease-related hazardous waste. The Engineering Procurement and Construction (EPC) contractor is responsible for

developing a Waste Management Plan and submitting it to DoST for approval before construction which includes the proper disposal of domestic waste through weekly transport to the Gelephu landfill, as well as effective segregation of food waste, which should be composted or sent to a vermicompost treatment area. Additionally, hazardous waste containers must be separated and returned to the vendor for proper disposal, with hazardous materials stored and managed safely ensuring compliance with environmental regulations. Other mitigation measures include prohibiting the burial or burning of waste, storing waste correctly, transporting waste by an approved collector, identifying or building a sanitary landfill to manage the waste, minimizing excavation requirements, balancing cut and fill, reusing waste, providing spill kits, checking storing tanks and training staff in waste management.

ESS 4. COMMUNITY HEALTH AND SAFETY

Health and Safety Risks During Construction. There are a range of health and safety hazards associated with the Project that may present risks to the communities, including the use of heavy machinery, transportation of goods and traffic on roads, and changes in the prevalence of infectious diseases. The construction phase will generate significant waste, potentially overwhelming local systems. Noise, dust, and vibrations from construction activities could diminish the area's amenity value, affecting residents' quality of life.

Impact on Local Resources from Labor Influx. The influx of population and project activities may strain existing healthcare services, with access to adequate healthcare a contributing factor to the effective management of infectious diseases. Migration pressures may also put pressure on water resources due to potential competition with local communities for access to seasonal water sources.

Measures for the community include water, waste and transport management plans and implement and maintain a community GRM, so that stakeholders can raise issues and concerns.

GBV/SEA-SH Risks. The Project will generate an influx of people in the area – through direct and indirect employment. It is expected that this increased population will predominantly be men from outside the local area. Existing instances of gender-based violence, often linked to alcohol abuse, could be exacerbated by the influx of workers, as increased alcohol consumption and the presence of individuals unfamiliar with local social norms may heighten tensions and create conditions where such violence becomes more frequent. The influx of workers could also create social tensions, leading to an unsafe environment for local women if proper protections are not enforced.

The Project could exacerbate gender inequalities by increasing the unpaid domestic and care work burden on women. If male family members take up jobs generated by the Project, women may be left to manage both domestic responsibilities and additional unpaid work. This added strain could limit their ability to pursue employment or educational opportunities, reinforcing traditional gender roles and marginalizing women.

In addition, the disruption caused by the Project could also exacerbate existing barriers to education for women and girls. Girls may be pulled out of school to contribute to household labor, a situation that would limit their future prospects and increase their vulnerability.

To meet regulatory and international standards, the Project will implement a comprehensive Community Development Plan (CDP), SEA/SH Action Plan (SAP) and Gender Action Plan (GAP) that prioritizes employment for women in the project area. This includes setting clear hiring goals and providing targeted training and support to ensure equitable opportunities for all.

Additionally, incentives will be provided to women's groups for literacy programs, financial and digital literacy training, and the development of women-managed market spaces. These initiatives aim to empower women, create sustainable livelihoods, and strengthen the local economy.

ESS 5. LAND ACQUISITION, RESTRICTIONS ON LAND USE AND INVOLUNTARY RESETTLEMENT

Land Acquisition. While efforts will be made to minimize physical and economic displacement, impacts on livelihoods and access to community resources are anticipated. The land acquisition process will involve both permanent and temporary acquisition of approximately 226 plots for road, bridge, and ancillary facilities construction. This will impact various land use types, including agriculture and community forests, built-up areas, and forests, leading to physical displacement of approximately 11 households, and economic displacement of owners of approximately 226 plots. The total land area of community forests within the ROW is 28.76 ha, which includes Phunsumthang (4.90 ha), Taklaithang (21.15 ha) and Chuzhingtae (2.71 Ha) blocks. The Department of Surface Transport (DoST) will develop a Resettlement Action Plan (RAP) following World Bank's ESS5. Mitigation measures will include providing compensation, facilitating relocation, and ensuring access to essential services, with ongoing monitoring to address issues related to land acquisition, resettlement, and livelihood restoration effectively.

Physical Displacement. There are approximately 226 land plots that are subject to land acquisition. Approximately 18 structures are located within the ROW, of which 11 structures in Gelephu Thromde are households. As physical relocation disrupts the socio-cultural and economic environment, affected persons will be relocated within their villages and Gewogs.

Economic Displacement. The project is expected to cause both permanent and temporary economic displacement, particularly affecting agricultural and pastoral activities and community forest activities and livelihoods. It is estimated that the land use of the plots that will be directly affected by the Project are primarily agricultural, which includes rice paddies and maize, vegetables and areca nut plantations. Permanent displacement may occur when individuals lose access to essential land or resources, requiring Livelihood Restoration Plans (LRPs) to help them regain stable incomes. Temporary displacement may result from restricted access to forests and grazing lands during construction. The project may also impact small commercial establishments and community forests. To mitigate these impacts, the project will provide fair compensation for lost assets, support for vulnerable groups, and training for new skills, while ensuring continued access to essential services and markets, aiming to restore livelihoods to pre-displacement levels.

ESS 6. BIODIVERSITY CONSERVATION AND SUSTAINABLE MANAGEMENT OF LIVING NATURAL RESOURCES

Loss of Natural Habitat. A total of 0.19 km^2 of terrestrial habitat will be lost during land clearance for the construction of the Project. The direct habitat loss consists of 0.07 km^2 natural habitat and 0.12 km^2 modified habitat.

Fragmentation. The connectivity of the southerly terrestrial ecological corridor between Phibsoo Wildlife Sanctuary and Royal Manas National Park as well as habitats immediately south of the Bhutanese-India border (especially India's Manas National Park) is expected to be negatively impacted as a result of this project. The habitat loss of the Project can cause the loss of connectivity and fragmentation of habitats for Asian Elephant and Gee's Golden Langur.

Risk of Poaching. The presence of large-scale construction labor can be a source of poaching. The code of conduct with the construction workers mandates termination of employment for any hunting or collecting natural resources, and workers will be trained and made aware of biodiversity protection.

Impact on aquatic habitat and species. The Project construction will impact aquatic habitats. Increased sedimentation from earthworks could degrade water quality by raising total suspended solids (TSS) and decreasing dissolved oxygen (DO) levels, potentially harming fish and macroinvertebrate species and overall ecological river integrity. River training works will impact the riparian and floodplain habitats.

Biodiversity Management Plan (BMP)

A BMP aiming to address potential project impacts and cumulative impacts on biodiversity is being developed and will be finalized upon completion of detailed design, with an aim of achieving net gain of critical habitat features. An important element of BMP is the offset/net gain strategies and actions to achieve no net loss/net gain in line with ESS6 requirements. Those strategies and actions have been incorporated into the project design as subcomponent 2.3. Core components of a Net Gain Framework described in the BMP are summarized in below:

Component 1: Habitat Enhancement and Corridor Development

- Habitat Quality Improvement: Enhancing resources within protected areas through grassland development, nursery establishment, and invasive species management.
- Migration Corridor Pilot: Initial corridor development on available government land, with plans for potential expansion requiring additional funding. The corridor will focus on two (2) key elements:
- Elephant corridor: The plan for the elephant corridor establishment is under preparation to address the loss of habitat connectivity supporting the Asian Elephant. The Mau River Bridge is extended on the eastern side to allow for the passage of elephants. The elephants use the riverways for passage, therefore, to maintain this passage during the wet season, the initial design has incorporated a minimum of 250 m wide elephant corridor on eastern riverbank, with an average vertical clearance of 8.15 m, and a minimum clearance of 5.80 m at the East abutment in line with Good International Industry Practice (GIIP). These passageways/ corridors will potentially mitigate some habitat fragmentation impacts to the Asian Elephant populations, by retaining connectivity between the forested patches on the south and north of the road alignment.
  - Langur crossing: Establish vegetated canopy bridge/ feeder ropes/ glider poles for arboreal species, i.e., Gee's Golden Langur to support the movement of species. Frequent monitoring should be undertaken on the usage of canopy bridges by Gee's Golden Langur.
- Resource Availability: Development of waterholes and mineral licks to support wildlife within protected zones, reducing the incentive to move into human-occupied areas.

Component 2: Human-Wildlife Conflict (HWC) and Co-Existence Strategy Development and Implementation

- HWC Strategy Development: Formulate a detailed strategy to guide HWC mitigation efforts, integrating community feedback and expertise from forest services.
- Community Hard Barriers: Install hard barriers to safeguard agricultural lands, property and lives.

- Quick Response Team (QRT) Support: Enhancing the capacity of QRTs to respond effectively to HWC incidents.
- Early Warning Systems: Deployment of systems for early detection of elephants to alert and prepare communities.
- Basic Infrastructure Rehabilitation: Support for repairing critical infrastructure frequently damaged during HWC events, such as water pipes and storage tanks

Component 3: Partnerships and Capacity Building

- Training Programs: Conducting training sessions with the QRT and local communities on effective HWC management, based on the HWC strategy to be developed.
- Partnerships and Collaborations: Engage and collaborate with other organizations and agencies to address the transboundary elephant movement

The BMP will also include comprehensive measures for the management, mitigation and monitoring of habitats and species during construction and operation/maintenance of road and bridges. The measures to minimize impacts during construction include prohibiting clearing vegetation outside of designated areas, translocate the species of conservation interest where the species are found within the designated clearance area, and training construction staff on threatened species that may be encountered and fauna rescue outlined within the *Fauna Shepherding Protocol.* During operation, measures include establishing wildlife crossings and canopy bridges, installation of appropriate information signages at strategic wildlife crossings, compensatory reforestation, monitoring the use of corridors/canopies/culverts by elephants and roadkill, Gee's Golden Langur and Trilaminate Hill Turtles, clearing blockages if any along the animal trails or movement routes and implementing speed limits for vehicles to reduce wildlife road kills.

ESS 7. INDIGENOUS PEOPLES/SUB-SAHARAN AFRICAN HISTORICALLY UNDERSERVED TRADITIONAL LOCAL COMMUNITIES

The preliminary assessment conducted during project preparation based on the criteria detailed in the ESS7 (paragraphs 8 and 9) has not identified the presence of Indigenous Peoples in the project area.

ESS 8. CULTURAL HERITAGE

The Project activities will not have any direct impacts on the cultural heritage in the project area, but the noise and vibration from construction activities may have some short-term impacts on those sites that are located near construction sites. Two (2) community forests would be directly affected by the Project's construction due to physical disturbance, with effects on intangible heritage due to the importance of areas for communities.

None of the 17 identified Lhakhangs (temples) will need to be relocated due to construction activities. Intangible cultural heritage locations with cultural, artistic, or religious significance, traditional knowledge, and practices could be impacted by restricted access during the construction phase. However, no intangible cultural heritage practices will be directly impacted due to the Project.

Indirect impacts are also anticipated due to environmental changes around cultural heritage sites. These include visual intrusion, where new structures such as bridges and embankments may alter the aesthetic and historical context of the sites. Noise generated by construction activities could introduce disruptive auditory elements, impacting the setting of cultural heritage

resources. Dust from construction may further affect the environment, potentially compromising the visual and physical integrity of these cultural sites. Additionally, temporary or permanent restrictions on access could limit traditional community interactions with specific cultural sites, particularly throughout the construction phase. While no direct impacts are expected during the operational phase, some indirect impacts may persist.

Proposed mitigation measures included a Cultural Heritage Management Plan which addresses measures for access management, ongoing monitoring, stakeholder engagement, and procedural guidance for unexpected discoveries. Other measures include community engagement, community grievance mechanism, detailed site-specific surveys, chance finds procedures, temporary barriers and dust control, and visual and noise monitoring which aim to minimize adverse effects on cultural heritage resources and ensure compliance with national and international standards. Effective mitigation could significantly lessen indirect impacts, enhancing the preservation of Bhutan's cultural heritage throughout the Project's lifecycle.

ESS 10. STAKEHOLDER ENGAGEMENT AND INFORMATION DISCLOSURE

Affected Parties. The World Bank ESS10 – Stakeholder Engagement and Information Disclosure definition of stakeholder has been referred to for the purpose of this analysis. It refers to ***stakeholders*** as individuals or groups who are affected or likely to be affected by the Project as **Project Affected Parties (PAPs)**. The following stakeholders have been identified as PAPs:

- Local Communities
- Landowners
- Land Users (Farm labor/Tenant Farmers/livestock Rearers)
- Community Forest Users
- Small Businesses/Shops/Restaurants/fish farms
- Vulnerable groups – Single/widowed women Headed Households, Senior Citizens, Households Below the Poverty Line (BPL), Persons with Disabilities, and households with limited landholdings.

Other Interested Parties. The World Bank ESS10 – Stakeholder Engagement and Information Disclosure definition of stakeholder has been referred to for this analysis. It refers to ***stakeholders*** as individuals or groups who may have an interest in the Project as **Other Interested Parties OIPs)**. The following stakeholders have been identified as OIPs:

- Local government bodies/administration - Dzongkhag and Dungkhag Administration, Thromde (municipality) and Gewogs (Blocks)
- Institutional Stakeholders
- Local Journalists/Media
- Academicians
- International and national Non-Government Organizations (NGOs)/Civil Society Organizations (CSOs) such as SNV Netherlands Development Organization Bhutan, Disabled People's Organization of Bhutan (DPOB), World Wildlife Fund (WWF) Bhutan, Bhutan Youth Development Fund (YDF), Bhutan Ecological Society (BES), Respect Educate Nurture and Empower Women (RENEW), Ability Bhutan Society, Tarayana Foundation, Draktsho Vocational Training Center for Special Children and Youth, Royal Society for Protection of Nature, Loden Foundation, SABAH Bhutan and other organizations are Bhutan Red cross society and RENEW Micro Finance.

- Social Infrastructure - Schools/Colleges, Health Centres, Religious Organizations, etc.
- Government Bodies/Regulatory Authorities
- Gelephu Mindfulness City (GMC) Management
- National Land Commission Secretariat (NLCS)
- Ministry of Energy and Natural Resources (MoENR) – Department of Forests and Park Services (DoFPS)
- Ministry of Energy and Natural Resources – Department of Environment and Climate Change (DoECC)
- Natural Resources Development Corporation (NRDCL)
- National Commission for Women and Children
- Royal Bhutan Police
- Ministry of Education and Skills Development
- Others

Vulnerable groups. Based on the ESS10 guidance, the analysis has identified the following as vulnerable groups.

- Persons with disabilities (PWD)
- LGBTI+
- Single/widowed women-headed household, youth-headed household
- Youth
- Other disadvantaged groups with facing low socio-economic outcomes

Proposed Stakeholder Engagement. A SEP is being developed for DoST and it is a **"living document"** that will be updated and refined from time to time instead of the exact scale and nature of project-related activities based on the relevant phase, that is, planning, construction, and operation phases. Overall, the SEP will enable stakeholder engagement to be undertaken in a systematic manner, where designated personnel will implement specific measures to enable the various stakeholder groups to express their individual views, opinions, concerns, grievances, etc., while allowing the DoST to appropriately respond to them in a time bound manner.

Institutional Setup. For the management of the Environmental and Social aspects of the Project, DoST will establish a Project Implementation Unit (PIU) and engage Contractors to build the road and bridges and a Supervision Engineer to oversee the Contractors' Work. The overall responsibility for the implementation of the SEP lies with DoST, in close coordination with contractors, during the construction and operations phases.

Training. Training shall be provided to all the staff at the Project level, in handling both internal and external stakeholders as per the modalities defined in the SEP, to allow for systemic engagement with stakeholders and avoid grievances. The training shall also cover the understanding of grievance mechanisms, relevant to their exposure and responsibilities for managers, all other employees, contractors, and visitors, which shall include as a minimum:

- Expected behaviors and accepted practices when interacting with workers and stakeholders to avoid a grievance in the first instance.
- Mechanisms are available for workers to lodge grievances.
- Mechanisms are available for workers and other external stakeholders to lodge a grievance.

- Roles and responsibilities for handling and resolving grievances (including key internal and external stakeholder contacts), and
- Recording and tracking procedures.

Reporting. During the lifecycle of the Project, the performance of the SEP and GRM shall be reviewed on a bi-annual basis. For the review of the Project, the designated Project staff will prepare reports to be submitted to the Project management team and the Director General of DoST, on a quarterly basis. During the operations phase, the reports will be submitted on an annual basis.

Grievance Redressal. Given no existing communication strategies, GRM, or similar policies in place, to build upon and strengthen the same to meet the objectives and principles identified, DoST will ensure that the receiving and addressing of grievances is given as much importance as the other Project activities and guarantee the availability of fixed resources to facilitate the same. To ensure compliance with the objectives, DoST will internally discuss and assign personnel, as well as provide the budgetary requirements for managing the implementation of GRM. The GRM will be divided into the following two (2):

- Internal Grievances: The types of grievances that would be taken into consideration by the Project under the ambit of this GRM include terms of appointment/employment settled and agreed before the start working day, annual performance appraisal/confirmation process, grievance of, or arising out of, disciplinary action or appeal against such actions, grievances arising out of termination or dismissal, a grievance related to any discontent or dissatisfaction with any aspect of DoST, Grievance Redressal Process for Internal Grievance.

  Internal grievances will also include labor and contractor/vendor-related grievances. A dedicated plan for managing contractors and vendors shall ensure that the vendor complies with all applicable laws covering environment, safety, labor rights including decent work conditions and remuneration, and human rights (including child labor, forced or compulsory labor, and non-discrimination). The plan shall also include provisions for checks if there have been any non-compliances, notices, or fines by the regulator covering these aspects in the last few years.

- External Grievances: External grievances are those grievances received from external stakeholders such as business-affected families, customers, local communities, administrative setup, and others. Some of the common external grievances factored under the GRM are risks to community, health & safety (e.g., traffic), accidents (e.g., involving livestock), unethical behavior by contractor personnel or their subcontractors, noise/dust/air emissions or any other impact on environment caused by project or sub-contractors, unpleasant odor, expectations of local employment and sourcing of material/services from local service providers, issues related to cultural conflicts or opportunity conflicts owing to presence of migrant workers in the community or the nearby areas, any attempts to conceal the mentioned grievances.

Steps include receipt and recording of grievances, reviewing and investigating grievances, grievance resolution, monitoring, reporting, and reviewing procedures, monitoring indicators, institutional setup, training of Project staff, and grievance forms.

Stakeholder Consultations Conducted and Feedback Received

Three rounds of consultations were undertaken. The first round was undertaken during the scoping phase of the Project, from 18 to 24 July 2024. This served to help better understand the local context, including the stakeholders present in the project-impacted area.

A second site visit was conducted from 30 August to 3 September 2024 to collect primary data, including information to inform the identification of risks and impacts associated with the project. As part of the site visit key informant interviews and focused group discussions were undertaken with community members representing various demographics of the project impact area. This included women, adolescent girls, youth groups, NGOs, business owners, farmers/cultivators, teachers, and healthcare practitioners.

The consultations served to assess current stakeholder understanding of the project, stakeholder engagement preferences, grievance tools currently being used, and strategies needed to ensure that vulnerable groups can access stakeholder engagement opportunities. Some of the key discussion points include awareness about the Project, access to services, the profile of communities, gender norms and attitudes in the community, facilities in the impact area, capturing the occupational profile of the communities, average income levels, discussions and opinions of NGOs, CBOs, level of Project's engagement with vulnerable groups, among others.

Additionally, the GMC Governor undertook an additional stakeholder consultation on 27 September 2024, at various locations in the Project area, such as in Gelephu Thromde, Umling Gewog and Gelephu Gewog. It is estimated that about 70% of the landowners in the Project area attended the consultations. Moreover, elected officials of the local governments attended. Landowners from nearby areas were also encouraged to participate in the consultations. Key points discussed were disclosure about the Project, existing compensations, potential resettlement options, compensation rates (based on market value and not the existing rate as given under Land Act 2007), and consideration of exceptional cases for benefits under the land acquisition and resettlement process. Further, pertinent questions raised by the communities were also answered by the Governor and relevant officials.

Some of the key queries received during the course of the consultations were largely regarding land rates and compensations. Other feedback received during the consultations was largely noted to be positive, wherein the communities stated that they would be happy to provide their lands for the large good of the economy, such as for the GMC and the road project. Some of the communities enquired about work opportunities in the Project.

The third consultation was from 13 October 2024 to 31 October 2024 by the Social Specialist, DoST and Gender Expert, World Bank. They conducted consultations with diverse stakeholders in Thimphu and Gelephu from the government, private, and CSOs. The discussions focused on the easiness of business and trade, targeted skilling and capacity building of women, existing challenges for businesses, clearing agents and traders, especially women, and understanding of general gender issues and concerns in the community and skills and capacity of service providers.

The consultations are still ongoing, and another set of consultations with the communities and stakeholders of the project areas will be held in early December 2024.

CUMULATIVE IMPACT ASSESSMENT

A preliminary cumulative assessment (CIA) was conducted as part of this ESIA. The Valued Environmental and Social Components (VECs) identified are air quality, ambient noise, water resources, habitat fragmentation, wildlife movement and human-wildlife conflict, and community forests and livelihoods. The CIA highlights the potential cumulative impacts of other developments in the area, such as the GMC, Gelephu International Airport, Railway and Dry Port,

Municipal Boundary Wall and external stressors such as climate change, natural disasters, and in-migration on these VECs.

Key cumulative impacts from the Project, other developments and external stressors include: increased ambient noise from development activities and increased construction and operational traffic; potential alterations to water resources due to construction and land use changes leading to erosion, sedimentation, and reduction in water quality; habitat fragmentation and barriers to movement from development affecting wildlife movement, reducing the niched in which wildlife thrive and potentially leading to heightened human-wildlife conflict. The project's implications extend to land acquisition, resulting in physical and economic displacement for local communities, particularly those reliant on agriculture and community forests. Development in the area will cumulatively cause disruption to local livelihoods and change the economic landscape. The interconnectedness of these issues is further amplified by the anticipated growth of the GMC, which will intensify pressures on local ecosystems and infrastructure.

The BMP will be a key project-driven measure to contribute to mitigation of cumulative impacts on the corridor and biodiversity values. Alongside other Project mitigation measures, implementation of strategic management plans, holistic approaches to mitigation, and commitments to collaboration between stakeholders will be key to successful mitigation. The project will foster collaboration by participating, to the extent feasible and practicable, in working groups and/or government initiatives. Mitigation measures include information sharing between planned development projects and making efficiencies where there is temporal and spatial overlap, collaboration on GMC objectives to increase public transport use and the uptake of electric vehicles, implementing real-time hydrological monitoring and collaboration on early warning systems, and engaging local communities on mitigation measures and fostering community development.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

An ESMP has been prepared for the Project as part of the ESIA, which provides a consolidated summary of all the E&S commitments relevant to the Project. The document proposes a set of management, mitigation, and monitoring measures and notes who is responsible for their implementation.

Many management plans have been highlighted which will be necessary to effectively implement the mitigation and management measures committed by the Project throughout the construction and operation and include:

- Construction E&S Management Plan - containing Dust Management Plan, Air Quality Management Plan, Water Management Plan (with Water Use/Extraction Plan and Stormwater Management Plan), Waste Management Plan, Hazardous Material Spill Response Plan and Employee Grievance Mechanism.
- Occupational Health and Safety Management Plan.
- Emergency Preparedness and Response Plan (or Emergency Response Plan), including Fire Prevention Plan.
- Traffic Management Plan.
- Biodiversity - Biodiversity Management Plan and Invasive Species Management Plan.
- Stakeholder Engagement Plan (SEP) (with Community Grievance Mechanism), Resettlement Action Plan (RAP) (with Livelihood Restoration Plan), Gender Action Plan (GAP), Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) Plan, Influx

Management Plan, Local Content Plan (with Recruitment Policy), Community Development Plan, Labor Management Plan (with Human Resources Policy, Accommodation Management Plan, and a Code of Conduct), and Supply Chain Management Plan.

INSTITUTIONAL ARRANGEMENTS

Project Management Unit (PMU). The DoST will implement the Project through a dedicated Project Implementation Unit (PIU) focused on the project. The ESMP of Project will also be implemented by DoST, with construction contractors responsible for mitigation requirements. DoST will oversee compliance with ESMP, monitor E&S performance of Contractors, engage with affected communities, and manage the project's grievance program, amongst other E&S responsibilities. DOST must ensure that the Project is constructed and operated in conformance with World Bank standards and ESCP commitments, as well as legislations of Bhutan. This will require the implementation of robust compliance monitoring and an enforcement program, incorporating adaptive management practices. An Institutional Strengthening Management Plan will be implemented with interventions such as staffing, capacity building, and budget requirements. The PIU will engage a full-time environmental specialist to help implement the ESMP, who will also be supported by the following:

- Social Development Specialist to address social and resettlement concerns, liaise with local communities.
- Gender-based violence consultant to organize awareness and training on gender-based violence, trafficking, and communicable diseases.
- Department of Forests and Park Services (DoFPS) to address biodiversity impacts and for implementation of additional conservation measures towards achieving Net Gain.

Supervision Engineer. The Supervision Engineer ensures the effective implementation of the ESMP by monitoring compliance, conducting site inspections, reporting on E&S performance, conducting required E&S training, and coordinating with the Project Implementation Unit and contractors. They also provide recommendations for corrective actions and support training to build capacity for managing environmental and social risks throughout the project. The Supervision Engineer's E&S staffing will include an environmental specialist, a social specialist, an OHS specialist, and a biodiversity specialist.

Contractor. The contractor's role in the ESMP involves ensuring that all environmental and social safeguards are implemented during project construction. This includes following the mitigation measures outlined in the ESMP, managing waste, minimizing disruptions to local communities, and ensuring safety standards are met. The contractor is responsible for training their staff on environmental and social best practices, monitoring compliance, and reporting any issues to the Project Implementation Unit. They must also work closely with the Supervision Engineer to address any environmental or social concerns during the project's execution. The Contractor's E&S staffing will include an environmental specialist, a community liaison officer, an OHS Specialist and adequate Site supervisors.

Capacity Building. Environmental and social training will ensure all project personnel understand and adhere to the ESMP requirements. The selected Consultant will have expertise in the WB ESF and ESH guidelines. Training will be tailored for different groups, including managers, skilled workers, unskilled laborers, and camp staff. Capacity building will strengthen the PIU staff's skills in environmental management and social development, focusing on

environmental quality, labor conditions, and social issues. Contractors will also provide similar training to their staff for effective ESMP implementation.

Reporting. The reports required during construction are summarized in the table below.

Report	Description	Responsible Party	Frequency of Reporting
Environmental and Social Monitoring Reports	These reports document the ongoing monitoring of environmental and social impacts, implementation status of proposed mitigation measures, monitoring against KPIs set and compliance status against ESMP, requirements.	The contractor, with input from the Supervision Engineer. The PIU with the input from the Supervision Engineer	Monthly reports by Contractors ad Supervision Engineer Quarterly reports by PIU.
Incident/Non-compliance Reports	These reports document any incidents, accidents, or non-compliance with environmental and social safeguards, investigation report and any status of proposed corrective actions taken.	The contractor, with oversight from the Supervision Engineer and PIU.	As and when incidences/ non-compliances are identified.
Health, Safety, and Environmental (HSE) Reports	These include details on workplace safety, environmental management practices, and health conditions and statistics on the project operations, such as volume of waste generated, lost time injury (LTI) rates, first aid kit incidences etc.	The contractor, under the supervision of the Supervision Engineer.	Monthly during construction.
Training and Capacity Building Reports	These track the training sessions provided to project staff, contractors, and local workers on environmental and social issues.	The contractor, with support from the PIU and any appointed environmental or social specialists.	Quarterly during construction.

Report	Description	Responsible Party	Frequency of Reporting
Grievance Redress Mechanism (GRM) Reports	These documents any complaints or grievances raised by local communities or workers, detailing how they were resolved.	The contractor, in coordination with the PIU.	Monthly during construction

Monitoring and Evaluation: The Project will establish both an internal and external system, to ensure that affected households and communities maintain or improve their livelihoods throughout the project lifecycle. The process emphasizes consultations, inclusivity, and the meaningful involvement of local communities, with a focus on community development programs that address the needs of impacted groups, particularly vulnerable populations and gender-specific concerns. Efforts will include increasing women's involvement and addressing their vulnerabilities related to land security and safety.

BUDGET FOR IMPLEMENTATION OF ESMP

The total cost of the ESMP implementation of Project is estimated to be USD $8.25 million, which will be further reviewed, consulted with stakeholders and updated in the updated ESIA/ESMP by Project appraisal.

PROJECT TIMELINE

The detailed engineering design of Project will start in the first quarter of 2025. The construction works are expected to begin in the first quarter of 2026 and are anticipated to be completed within five years.