Bhutan for Life
Environmental and Social Management Plan for
Bumdeling Wildlife Sanctuary (2021)

1. Introduction

(A) Project Background

The Bhutan for Life (BFL) project aims to ensure a robust network of protected areas and biological corridors that secures human well-being, biodiversity conservation and increase climate resilience in Bhutan. The project provides a 14-year financial bridge that allows for immediate improvement in the management of Bhutan's protected areas for climate resilience, and the prompt delivery of mitigation, adaptation and biodiversity gains, while the country gradually ratchets up its own financing resources.

BFL seeks to achieve the following objectives:

- Help Bhutan remain carbon neutral by increasing forest and vegetative cover within the Protected Area System;
- Enhance the socio-economic wellbeing of communities in and in the vicinity of the PAS through climate-informed natural resources management;
- Maintain stable, thriving and diverse populations of key species contributing toward national and global biodiversity goals;
- Strengthen organizational, institutional, and financial capacity for effective management of PAS.

BFL includes five components that reflect these goals, divided into 16 milestones (or outputs) and over 80 detailed activities.

(B) Scope of ESMP

The preparation of this Environmental and Social Management Plan (ESMP) was required in order to manage the environmental and social impacts through and specific mitigation actions required to implement the project in accordance with the requirements of WWF's Social Safeguards Integrated Policies and Procedures (SIPP), the project's Environmental and Social Management Framework (ESMF), and applicable national legislation and regulations.

The ESMP provides an overview of the environmental and social baseline conditions on the routes of the proposed second segment of the project, summarizes the potential impacts associated with the proposed activities and sets out the management measures required to mitigate any potential negative impacts.

This ESMP will be implemented by BFL focal person in each park authority (PA) and biological corridor (BC), and by the contractor to be commissioned by each PA/BC for the project.

(C) Purpose of ESMP

This Site-Specific ESMP is a project-specific source document detailing the environmental and social protection requirements to mitigate and minimize the adverse impacts. The ESMP's primary purpose is to ensure that the environmental requirements and social commitments associated with the project are carried forward into implementation and operational phases of the project and are effectively managed. The specific objectives of this ESMP are as hereunder:

- Minimizing any adverse environmental, social and health impacts resulting from the project activities;
- Conducting all project activities in accordance with the relevant RGoB Laws and WWF's safeguard operational policies and guidelines;

- Preventing environmental degradation as a result of either individual subprojects or their cumulative effects;
- Enhancing the positive environmental and social outcomes of project activities;
- Ensuring that the proposed mitigation measures are feasible and cost-efficient;
- Providing an Action Plan to ensure that the project impact mitigation measures are properly implemented and monitored;
- Ensuring that all stakeholders are engaged in the project activities' preparation and implementation, and their concerns are fully addressed.

(D) Applicable law, policies, and regulation

This ESMP is developed by following the guidelines as set forth in the BFL's ESMF.

Applicable RGoB laws and policies include the Constitution of the Kingdom of Bhutan, 2008; legislation on land and moveable property (Land Act of Bhutan 2007; Land Rules, 2007; The Moveable Cultural Property act of Bhutan, 2005); legislation and regulations on forests and protected areas (National Environment Protection Act, 2007; Forest and Nature Conservation Act of Bhutan, 1995; Forest and Nature Conservation Rules and Regulations of Bhutan, 2017; National Forest Policy, 2011); legislation on water and waste prevention (Water Act of Bhutan, 2011; Waste Prevention and Management Act, 2009); legislative requirements on environmental assessment (Environmental Assessment Act, 2000 and Regulations on the Environmental Clearance of Projects, 2001); and other relevant laws (The Local Government Act of Bhutan, 2009; Livestock Act of Bhutan, 2001; The Biodiversity Act of Bhutan, 2003; The Pesticides Act of Bhutan, 2000; The Penal Code of Bhutan, 2004; National Access and Benefit Sharing (ABS) Policy (Draft), 2014).

WWF's safeguards policies that are relevant to this project are as follows: Policy on Environment and Social Risk Management; Policy on Protection of Natural Habitats; Policy on Involuntary Resettlement; Policy on Indigenous Peoples; Standard on Pest Management; Policy on Accountability and Grievance System; Standard on Physical Cultural Resources; as well as general standards on occupational and community health and safety and on energy efficiency.

In general, RGoB's laws, policies, and guidelines are in line with the WWF's environmental and social safeguards requirements. However, there are a few differences between the two systems. With regard to environmental impacts, there are no direct contradictions between the RGoB laws and regulations and the WWF's SIPP, but the requirements of the latter are more extensive. All project activities should fully comply both with the RGoB's Regulations on the Environmental Clearance of Projects, and with the procedures and mitigation measures prescribed in this ESMF. In case that the WWF's SIPP requirements are more extensive, strict, or detailed than the RGoB legislation and policies, the former will apply to all project activities. With regard to social impacts, the primary discrepancies between the RGoB laws and regulations and the WWF's SIPP refer to the status of non-title holders and informal land use, and the commitment to participatory decision-making processes. First, according to the WWF's SIPP, all users of land and natural resources (including people that lack any formal legal ownership title or usage rights) are eligible to some form of assistance or compensation if the project adversely affects their livelihoods. The RGoB laws only recognize the eligibility of land owners or formal users to receive compensation in such cases. Second, the WWF's SIPP require extensive community consultations as part of the development of various safeguards documents and during project activities. RGoB legislation does not include similar requirements. For the purposes of the BFL project, the provisions of the WWF's SIPP shall prevail over the RGoB legislation in all cases of discrepancy.

The occupational health and safety of workers in construction will be in compliance with Labour and Employment Act-2007, Regulation on Occupational Health, Safety and Welfare, 2012 and any other national documents. The list of the OHS requirements shall be attached along the Bill of Quantities (BoQ) along with an appropriate item description to allow the

bidder to quote reasonably against the item, and to enable strict compliance and ease the monitoring during the project implementation time

2. Environmental and Socio-Economic Conditions

Bumdeling Wildlife Sanctuary was gazetted in the year 1994 to safeguard ecological habitats of eastern Bhutan. The sanctuary encompasses parts of Trashiyangtse, Lhuntse and Mongar with area coverage of 1534.24Sq.Km. It shares international borders with Tibet autonomous region (China) in the north and Arunachal Pradesh State (India) in the northeast. The elevation of the sanctuary ranges from 1390 to 6400 meters above sea level (masl). Geographically, the Sanctuary consists mostly of rugged mountainous terrains, rocky peaks, permanent snow, small glaciers, glacial lakes, steep river valleys, and few plains. Almost 90% of the Sanctuary lies between 2500m and 5000m elevation. These glacial lakes and permanent snow capped mountains serve as perennial water sources for important major drainage systems such as Kholongchhu, Khomachhu and Sherichhu.

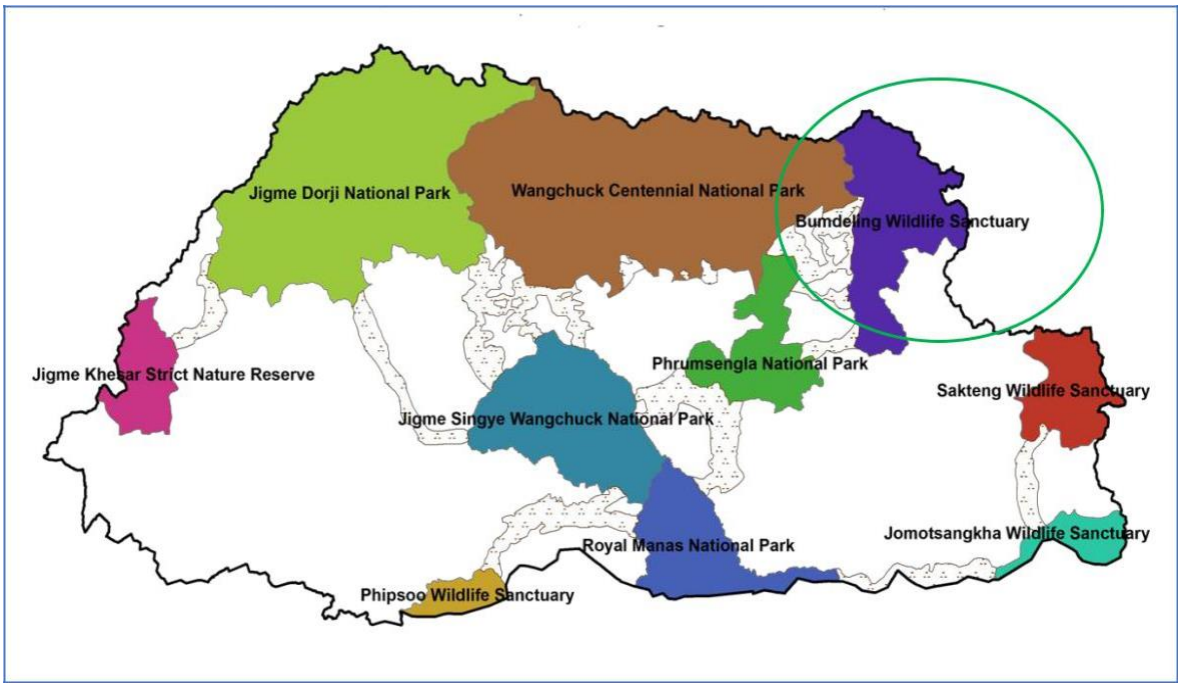


***Figure 1**: Location of Bumdeling Wildlife Sanctuary*

It covers Eastern Himalayan ecosystem ranging from warm broadleaved forest to alpine meadows and scree slopes. More than 60 per cent of the area within the PAs is covered by forest while a proportion of more than one third is covered by snow, rock and shrub.

Furthermore, the Ramsar Convention recognizes Bumdeling flood plain as an important wetland area. The Kholongchu River and its three tributaries flow through the wetland. The tributaries provide local communities with a source of water for irrigation and drinking and the main river is the site of a hydropower project 35 km south of the wetland.

The Sanctuary has about 1,119 households – mainly involved in rice in lower areas; maize and grains in the higher regions and yak herders in the high mountains. The sanctuary is of high significance in terms of the preservation of cultural and traditional practices. '*Kishuthara*' weaving (Silk textiles) and the production of wooden containers (known locally as'*Dappa*') are important sources of income. The area is also well known for its Black Necked Cranes and thus attracts tourists.

The following table shows a brief background summary about the BWS:

Table 1 Summary of BWS

No. of Mammals spp	52
No. of Plants spp.	966
No. of Birds spp (Nos)	356
No. of households	1119
Population (inside PA)	8782
No. of Dzongkhags covered	3 (Lhuentse, Mongar, Trashi Yangtse)
No. of Gewogs covered	3 (Khoma, Shermuhung, Bumdeling)
Ethnic groups	Sharchop, Kurtoes, Yangtsep, Sharchop, Yangtsep and Tshangla dialects.
Farming system	Rice, Maize, Yak Herders, Dappa makers, Daphne makers
Highlight Species	Black-necked cranes, Snow Leopard, Tiger, Asiatic wild dog, Himalayan Musk Deer, Red panda, Bumdeling floodplain is a declared Ramsar site

a) Geological and topographical condition

Geographically, the Sanctuary consists mostly of rugged mountainous terrains, rocky peaks, permanent snow, small glaciers, glacial lakes, steep river valleys, and few plains. Almost 90% of the Sanctuary lies between 2500m and 5000m elevation. Most of the Sanctuary is underlain by Gneiss with some areas with Quartzite, Graphite Schist and limestone, which contribute to the formation of different landscapes. The slopes are formed due to the accumulation of talus materials moving down the slopes due to gravity. Alluvial and colluvial formation are apparent in the narrow valleys of BWS, which consist of soil, silt, clay, sand, and gravels brought down by the action of soil and water erosion.

b) Climatic condition

The Sanctuary has warm temperate climate in the south, cool temperate climate in the centre and alpine in the northern part. In the lower parts of the Sanctuary, the maximum temperature ranges from 20°C to 30°C and minimum between 8°C to 15°C, while the centre region experiences maximum temperature of 15°C to 20°C with minimum temperature ranging between 3°C to 10°C. The North part of the Sanctuary usually remains cold with most of the time under snow cover. Maximum rainfall is received in the months of May - September. The annual rainfall ranges from 1000mm to 3500mm.

c) Hydrological condition

Bumdeling Wildlife Sanctuary has three major rivers systems flowing through it. The Kholongchhu flows in the centre of the sanctuary while Khomachhu (Lhuentse) flows from the western part of the sanctuary. Sherichhu (Mongar) form the main drainage systems flowing from the south. Numerous tributaries feed these three major drainage systems. The Major tributaries of the Kholongchhu include Shingphelchhu, Lamzangchhu, Langmalachhu, Wominangchhu and Dongdechhu. The mega hydropower project is located on the downstream of Kholongchhu. Singyedzongchhu and Roelmatengchhu are the major tributaries that feed Khomachhu while Sherichhu is fed by Phunningchhu and Nyendhachhu.

d) Flora and fauna

The floral species diversity (H') is found highest in Cool Broadleaved forest followed by Warm Broadleaved forest and Mixed Conifer forest whereas, the species diversity is lowest at Rhododendron Shrub and Dry alpine shrub regions of BWS. Due to vast altitudinal variation in the sanctuary, BWS houses varied species of floral diversity. There are 966 species of plants known to occur in BWS including130 species of trees, 31 species of ferns, 579 species of herbs, 64 species of orchids and 162 species of shrubs.

With the huge variation in altitude from 1390 - 6400masl and existence of complex vegetation zones, BWS harbours diverse biodiversity in terms of faunal presence. It provides home to critically endangered and threatened faunal species. The rapid biodiversity survey of 2018 revealed store of terrestrial, avian, herpetofauna and aquatic species that added to existing lists in BWS. BWS recorded 52 mammal species, which constitutes 25.6% of 203 mammals recorded in Bhutan. Of the 52 mammals, 11 (21.15%) species are listed in IUCN Red List (4 species are endangered, 5 species are vulnerable and 2 species are near threatened) and/or schedule I of FNCA 1995.

e) Socio-economical conditions

Major source of income for the park residents comes from sale of agriculture products (rice and vegetables such as chilli and potatoes). Non-farm activities (contract work and pottering, business and shops, weaving, salary, carpentry, farmhouse and sale of bamboo products, *Dapa* and paper products) and sale of livestock products were other sources of income for the residents of Sanctuary. In Khoma geog, weaving is the most important source of income with 30% of the respondents involved in weaving followed by agriculture (23%) and livestock (22%). This is because the people of Khoma geog are specialized in weaving and the best Bhutanese textile comes from Khoma and nearby geogs under Lhuentse Dzongkhag. The other incomes for the people of Khoma geog are bamboo weaving, *Cordyceps*, off-farm activities, performing rituals, government employment, and NWFP.

In Sherimung geog, the agriculture was the main source of cash income with 33% of the respondents involved in agriculture followed by off-farm labour (28%) and livestock (27%). The other category of income for the people of Sherimung geog includes NWFP, contribution, performing rituals, carpentry, contract works and business. In Bumdeling geog, agriculture is the main source of income with 26% of the respondents involved in agriculture works followed by livestock (25%) and off-farm labour (16%). The other categories of income source include contract works, shares, logging, NWFP and painting.

Figure 2: *Existing project sites*

3. Planned Activities in Year 2021

Activities that are planned in BWS for 2021 include the following:

1. Improvement of salt licks and water holes in Serzhong Range

The activity includes development and mapping of natural salt lick sites and waterholes used by wild animals (ungulates and tiger habitats) in Sherimuhung Gewog, Mongar Dzongkhag under BWS. This activity involves both new creation and improvement works with major digging of ground for salt lick and waterholes. The site was identified because the areas were good habitats for important species of animals (e.g prey species for mega fauna like tigers). This will help document wildlife species that use the water holes and salt licks for proper conservation. Such activities are not carried out as of date in the proposed sites. So, the site was selected to enhance the conservation works as well as to ease the documentation of wildlife evidents. However, the entire proposed sites were located extremely far from the settlements and whole area falls under the State Reserve Forest land with diverse terrain. The planned date for implementation of activity is from January 2021 to December 2021. This program includes activities such as digging, construction/creation, mapping and survey of saltlick and waterholes on the proposed sites.

The nearest community could be approximately 500-600metres away with 10 to 15 households. The proposed sites do not have access to road so the development works will be carried out manually by 6 to 7 forestry officials for duration of 6 months without involving local communities to refrain from illegal poaching of wildlife by local poachers. The creation and improvement work will use locally available resources. Water sources are near by the sites and no issues on water supply with neighboring communities since the location in dense forest and very far from the settlements as well. The proposed budget was USD 3000.

The adverse impacts are:

- Waste from development activities
- Workers health and safety
- Increased poaching due to improvement of waterholes
- Degradation of soil and vegetation around the salt licks
- Increased poaching due to creation of salt licks

Figure 4: *Developing waterholes and salt lick for wildlife*

2. Maintenance of buildings in BWS

The activity includes conducting maintenance of permanent structures to enhance the conservation works as well as to ease the service delivery to the communities residing within the vicinity of the area. Maintenance work includes maintenance of BWS head office, Range offices, guard post and check post under BWS. During the year 3 of BFL project period entire BWS head office maintenance will be carryout due to sever damages in few parts of the office building and other structures. Whereas the other remaining maintenance of Range offices, guard post and check post will be implemented during the year 4 of BFL project period. The site was identified mainly due to the fact that the old structures are urgently in need of major maintenance for sanctuary's staff to reside to conduct regular wildlife monitoring and service delivery works. Moreover, part of the office buildings, furniture and other equipments are not functional and is in need for immediate replacement to enhance effective service delivery in the sanctuary. The entire proposed sites are located far from the settlements and all area falls under the government registered land. The planned date for implementation of activity is from January 2021 to December 2021. This program includes activities such as maintenance of wall, roofing, flooring, window, door, drain, toilet, water facilities, painting and lighting system.

The nearest community from the project site is approximately 500 meters away with around 3 to 4 office structures of other agencies. The office is located in isolation away from communities. It is not the communities but the offices of other agencies (municipal, BPC, Police) which is located approximately 500 meters away from the maintenance work site (BWS Head Office). The contractor and laborers will stay within the office campus in temporary sheds through self catering. There will be no issues related to drinking water since all the workers will use existing water source from the office. The repair works will not disturb officials working in the office as the works will be carried out during holidays and off office hours. The few proposed sites do not have access to road so the maintenance works will be carried out manually by local contractors for duration of 6 months. The maintenance works will use locally available resources. Water sources used for the maintenance work is located nearby the sites and no issues on water supply with neighboring communities since the location of BWS structures are away from the settlements. The proposed budget for the maintenance work is USD 68000.

The adverse impacts are:

- Generation of waste as a result of construction activities
- Workers health and safety

Figure 5: *Condition of BWS office structures*

3. Improvement of alpine meadows

The activity includes improvement and development of alpine meadows through prescribed burning or removal of Rosa, Rhododendron species and other bushes to open up colonized grazing areas for ungulates in BWS. Improvement work includes clearing of unwanted bushes and thinning of alpine tree species. The site was identified because the selected areas are good alpine habitats for important species of animals (e.g prey species for mega fauna like

snow leopard). This activity will prevent and control the over growing invasive species and tree species in alpine grazing areas. The entire proposed sites are located extremely far from the settlements and whole area falls under the State Reserve Forest land with various terrain. The planned date for implementation of activity is from January 2021 to December 2021.
This program includes activities such as clearing of bushes, thinning of tree species and mapping of alpine grazing areas in proposed sites. Furthermore, the prescribed burning will be implemented if weather conditions favor for burning debris with proper health safety and check other environmental impact while burning process in that particular location of site.

The proposed sites located on the government land and no usage right by the community. The nearest community could be approximately 700-800metres away with 5 to 6 households (nomads). Proposed sites donot have access to road so the improvement works will be carried out by 10 local people within 2 months. Water sources are near by the sites and no issues on water supply with neighboring communities since the location of sites were very far from the settlements.
The proposed budget for the activity is USD 5000.
The adverse impacts are:

- Cutting down of trees and plants that are encroaching on the Alpine meadows negatively affects the ecosystem of the Alpine meadows
- Workers health and safety
- Risk of losing the fire during prescribed burning

Figure 6: *Alpine areas covered by unwanted species*

4. Bio-engineering works at Dungtsho lake

The activity includes improvement and revival works such as construction of protection wall, fencing, clearing, cleaning and greening of Dungtsho lake. The planned date is January 2021 to December 2021 with the planned budget of USD 15000. It is a continuation activity of 2020. It is a socially revered lake which started to dry since 2010. The communities believe that the existence of lake blesses them with good fortune and well-being besides showering them with bounty harvests. It also provides good habitats for about forty species of aquatic lives, water birds and ducks. In order to retain the water volume, the office constructed river protection wall around the lake in 2019-2020. Therefore, social clearance has been already obtained and the work has already started in 2019-2020.
For 2021, around 15 to 20 workers will be involved in using excavator to clear the bushes from the lake. Workers will commute from the nearest community and there will be no camping facility at the activity site. Since the foundation has already been built and it has been proposed to construct additional protection wall for trail/farm road passing along the Dungtsho lake. Furthermore, iron fencing will be also constructed around the lake to protect and minimize the risk of visitors falling into the lake since the lake is located very close to trail/farm road. This activity also includes greening of lake surrounding with native species to improve aesthetic value of lake and improvement of religious structures such as chorten within the vicinity of Dungtsho lake. The community contractor will take care of waste generated from the construction.

Nearest community resides within 200 m distance from the site with 369 households. Community does not depend directly on the lake for their livelihoods but the lake has spiritual value for them. The lake also has aesthetic value for tourism as it greets the valley at its entrance. Improvement and revival of Dungtsho lake does not have major adverse impacts on the natural habitat instead it helps to promote habitat for water birds and other aquatic life. The current natural habitat in and around Dungtsho lake is wetland habitat for birds and is verge of getting forested if not intervened. Therefore, improvement works need to be carried out to ensure that wetland is maintained to enhance habitat for water birds and other aquatic species. A proportionate area of the Dungtso lake that is used by the aquatic birds will be improved, however 20% to 30% of existing natural habitats with plants will be retained to ensure sound habitats for other aquatic life. Moreover, there will be no social risks or inter-community tensions since the communities residing within the vicinity has agreed and approved the social clearance for improvement and revival of Dungtsho lake.

The adverse impacts of the activity are:

- Disturbance of natural habitat
- Waste management during construction
- Water contamination as a result of construction
- Workers health and safety

Figure 7: *Improvement and revival of Dungtsho lake*

5. Waste management program in and around RAMSAR site

This activity includes construction and installation of waste bins/waste collection points in and around RAMSAR site as well as in other Range areas. The increasing amount of non-biodegradable garbage dumped along the trails and at campaign sites not only pollutes the environment but also bring potential threats to wildlife (both flora and fauna). There is risk of wild animals consuming these non-biodegradable waste products which might be sometimes be toxic. Some garbage would inhibit the natural growth of plants by occupying the space and also act as umbrella whereby sun cannot reach the plants.

Planned date for all the above activities is from January 2021 to December 2021 and budget allocated is USD 4,500. The proposed land for this activity is a State Reserve forest with major gentle sloppy terrain. Apart from construction and installation of waste bins, it also includes installation of waste signages in every location of waste collection points. Around 10 to 15 workers will be involved, mainly local people and the duration will be for 1 month. There will be no machinery used and there will be no camping for the workers as the workers will commute from the nearest community which is almost be 1 km away from the site with 360 households. The collected or filled waste bin/collection points will be disposed by forestry officials and concern gewog officials to waste disposal sites in dzongkhags every month.

The adverse environmental and social impacts will be:

- Wastes from construction activities
- Workers health and safety.
- Risk of feeding by wild animals

Figure 9: *Waste collection point and waste bin*

4. Environmental and Social Impacts and Mitigation Measures

1. Improvement of salt licks and water holes in Serzhong Range

Potential impact	Impact scale	Proposed mitigation measures	Responsible party	Costs US$ 3000
Activity: Construction of new waterholes				
Waste: soil from excavation activities and waste from construction activities	**Short term** **Minor**	• Proper containers/waste bins should be provided at the project site; • Dumping of waste in the waterholes, on the sides of the road, on private land, or in other non-designated places should be strictly prohibited. • Dumping of waste shall be prohibited on fragile slopes, forests, religious or other culturally sensitive areas or areas where livelihood is derived; • Collection, transportation and final disposal of all waste should be carried out on a daily basis and not left in the protected areas • Burning of construction waste should be prohibited.	BFL focal person in (BWS)	Waste cleaning after construction Nu.10000
Workers health and safety including COVID (Refer to the full OHS guidelines attached where ever relevant)	Short term Minor	• Comply with the workers' health and safety guidelines • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers • Ensure that workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. • Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns		Cost should be included in the activity budget

		• Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.)		
Increased poaching	Short term Minor	• Construct waterholes in areas where poaching is limited • Park authorities shall carry out increased patrolling during and after the waterhole construction	BFL focal person in (BWS)	
Activity: Improvement of salt licks				
Degradation of soil and vegetation around the salt licks	Long term Minor	• Place the salt on an environmentally-friendly platform (e.g., stone or piece of wood) to avoid direct connection with the soil and surrounding vegetation • Use environmentally-friendly salt	BFL focal person in (BWS)	
Increased poaching	Short term Minor	• Waterholes shall be constructed in areas where poaching is limited • Increased patrolling of park authorities should be carried out during and after the waterhole construction	BFL focal person in (BWS)	

2. Maintenance of buildings in BWS

Potential impact	**Impact scale**	**Proposed mitigation measures**	**Responsible party**	**Costs US$ 68,000**
Waste: generation of waste as a result of construction activities	Short term Minor	*Pre-construction:* -Awareness of waste management for the workers by the forest officials *During construction:* -Identification of the different waste at the project site (soil, Plastics, food, etc.); -Proper containers/ waste bins should be provided at the project site; -Dumping of waste on the sides of the road, on private land, or in other non-designated places should be undertaken regularly; -The options for reuse/ recycling of the generated waste streams should be taking into consideration (e.g., excavated soil, etc.); -Burning of construction waste should be prohibited; After construction: -All waste shall be removed from the project site	BFL focal person in (BWS)	Waste cleaning after maintenance works Nu.10000
Workers health and safety including COVID (Refer to the full OHS guidelines attached where ever relevant)	Short term Minor	• Comply with the workers' health and safety guidelines • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and	BFL focal person & contractor	Cost should be included in the activity budget

		food for workers shall be provided to all workers • Ensure that workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. • Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns • The other requirements such as access to water, accommodation, food, hygiene practices, etc will be taken care by the contractor. • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.)		

3. Improvement of alpine meadows

Potential impact	**Impact scale**	**Proposed mitigation measures**	**Responsible party**	**Costs US$ 5,000**
Cutting down of trees and plants that are encroaching on the Alpine meadows negatively affects the ecosystem of the Alpine meadows (e.g., grazing areas are diminished)	Long term Minor or major	• Ensure that no accidental damage is caused to local vegetation—major trees that are supposed to be cut shall be clearly marked, and only marked trees will be cut; • Removal of trees needs to be done in an environmentally sustainable way (e.g., removal of branches); • Alternative grazing areas shall be identified • Burning of trees and other plants should be avoided	BFL focal person	
Workers health and safety including COVID (Refer to the full OHS guidelines attached where ever relevant)	Short term Minor	• Comply with the workers' health and safety guidelines • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers • Ensure that workers are employed on the principle of equal opportunity and	BFL focal person in (BWS)	Cost should be included in the activity budget

		fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. • Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.)		
Risk of losing the fire during prescribed burning	Short term Minor	Prescribed burning will be implemented if weather conditions favor for burning debris with proper health safety and check other environmental impact while burning process in that particular location of site		

4. Bio-engineering works at Dungtsho lake

Potential impact	**Impact scale**	**Proposed mitigation measures**	**Responsible party**	**Costs US$ 15,000**
Disturbance of natural habitat	Long term Major	• Ensure careful sitting, alignment, design of fencing around the risky sites, and/or timing of works (seasonal) • Avoid using heavy machinery • Avoid soil excavation and noise disturbance to minimize impact on natural habitats • Ensure 20% to 30% of natural habitats for aquatic life will be maintained and will not disturbed during the improvement works	BFL focal person Contractor	
Waste management during construction	Short term Minor	• Proper containers/waste bins should be provided at the project site; • Dumping of waste in the river, in its vicinity, or in other non-designated places should be strictly prohibited. • Collection, transportation and final disposal of all waste should be carried out on a daily basis and not left in the river areas • Burning of construction waste should be prohibited.	BFL focal person Contractor	Waste cleaning after improvement works Nu.10000

Water contamination as a result of construction	Short term Minor	Avoid dumping construction materials into the lake.	BFL focal person Contractor	
Workers health and safety including COVID (Refer to the full OHS guidelines attached where ever relevant)	Short term Minor	• Comply with the workers' health and safety guidelines • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers • Ensure that workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. • Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.)	BFL focal person in (BWS)	Cost should be included in the activity budget

5. Waste management program in and around RAMSAR site

Potential impact	**Impact scale**	**Proposed mitigation measures**	**Responsible party**	**Costs US$ 4,500**
Wastes from construction activities such as soil, wood, and waste from workers	Short term Minor	*Pre-construction:* -Awareness of waste management for the workers by the forest officials *During construction:* -Identification of the different waste at the project site (soil, Plastics, food, etc.); -Proper containers/ waste bins should be provided at the project site; -Dumping of waste on the sides of the road, on private land, or in other non-designated places should be undertaken regularly; -The options for reuse/ recycling of the generated waste streams should be taking into consideration (e.g. excavated soil, etc.); -Burning of construction waste should be prohibited; After construction: -All waste shall be removed from the	BFL focal person in (BWS)	From the activity cost

		project site -All waste collected in the waste collection points and waste bins shall be cleared by forestry officials and gewog concern administration		
Workers health and safety including COVID (Refer to the full OHS guidelines attached where ever relevant)	Short term Minor	• Comply with the workers' health and safety guidelines • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers • Ensure that workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. • Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.)	BFL focal person in (BWS)	Cost should be included in the activity budget
Risk of feeding by wild animals	Short term Minor	• Ensure proper waste bins and collection points are in place and implemented • Frequent monitoring and inspection of waste bins and collection points by concerned forestry officials	BFL focal person in (BWS)	

5. ESMP Implementation Arrangements

The implementation of project activities will be carried out by the BFL focal person in BWS. The focal person will be responsible for compliance with all procedures outlined in this ESMP, as well as compliance with any requirements to obtain clearances, permits, approvals, or consent documents from relevant authorities and stakeholders.

This ESMP should be part of the contract that the PA will sign with the Contractor(s) for implementation of the planned activities in BWS in 2021. The Contractor is obligated to perform all proposed preventive or mitigation environmental and social measures in this plan and to keep the evidence of any documents related to applying these measures (e.g., letter asking the municipality for disposal of inert waste, records on OHS information session performed for all workers before start of activities, all developed EHS plans, etc.). An OHS

information session should be organized by the Contractor for all workers prior start the project activities and prior any specific tasks with high health risks.

The BWS's Supervising Engineer needs to monitor the implementation of proposed measures by the Contractor and Contractor's subcontractors with visual checking, reviewing the records of evidence that the measures have been applied and ask the Contractor to apply the measures as soon as possible. Non-compliances should be recorded and the Report on any non-compliances should be reported to the ESS officer immediately, and the ESS officer will report it to the PCU (M&E Officer). Each non-compliance should be closed with appropriate measure/s and the evidence should be kept.

Disbursement of project funds to the PA will be contingent upon their full compliance with the safeguard's requirements.

6. ESMP Monitoring Arrangements

The BFL focal person in BWS will closely monitor the implementation of all planned activities and the required mitigation measures, and ensure that they fully comply with this ESMP and with the terms and conditions included in the environment clearances issued by RGoB's national authorities.

BWS's PA is also fully responsible for the compliance of all external contractors and service providers working in the BWS with the safeguard's requirements outlined in the ESMP.

The monitoring of activities under this ESMP will be carried out in the following manner:

Sl. No	Activities	Monitoring team	Timeline		Location	Means of Verification
			Start	Complete		
1	Improvement of salt licks and water holes in Serzhong Range	Field focal	July 2021	December 2021	BWS	Weekly field visit & monthly progress report
		ESS officer	1st week sept, 2021		BWS	Monitoring report
2	Maintenance of buildings in BWS	Field focal	July 2021	December 2021	BWS	Monthly progress report
		ESS officer	3rd week sept, 2021		BWS	Monitoring report
3	Improvement of alpine meadows	Field focal	July 2021	December 2021	BWS	Monthly progress report
		ESS officer	2nd week August, 2021		BWS	Monitoring report
4	Bio-engineering works at Dungtsho lake	Field focal	July 2021	December 2021	BWS	Weekly field visit & monthly progress report
		ESS officer	3rd week sept, 2021		BWS	Monitoring report
5	Waste management program in and around RAMSAR site	Field focal	July 2021	December 2021	BWS	Weekly field visit & monthly progress report
		ESS officer	4th week August, 2021		BWS	Monitoring report

1. Improvement of salt licks and water holes in Serzhong Range

Monitoring by implementing entities:

a. Field visits at least twice—during the intervention and then monthly as part of the "SMART patrolling" activity (will be adapted based on field conditions, and also based on the availability of SMART patrolling activities).

b. Reports by the implementing entities submitted to ESS officer once during the intervention and once after the completion of work.

Monitoring by ESS officer at PCU:

c. Field monitoring by ESS officer –monitoring through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above.

d. Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

2. Maintenance of buildings in BWS

Monitoring by implementing entities:

- Field visits—at least weekly
- Monthly reports by the implementing entities submitted to ESS officer

Monitoring by ESS officer at PCU:

- Field monitoring by ESS officer – monitoring of the work once during the implementation and through field report from IAs after completion of the work.
- Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

3. **Improvement of alpine meadows**

Monitoring by implementing entities:

a. Field visits at least twice—during the intervention and within three months after the intervention

b. Reports by the implementing entities submitted to ESS officer within a week after each field visit

Monitoring by ESS officer at PCU:

c. Field monitoring by ESS officer –monitoring through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above.

d. Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

4. **Bio-engineering works at Dungtsho lake**

Monitoring by implementing entities:

- Field visits—at least weekly
- Monthly reports by the implementing entities submitted to ESS officer

Monitoring by ESS officer at PCU:

- Field monitoring by ESS officer – monitoring of the work once during the implementation and through field report from IAs after completion of the work.
- Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

5. **Waste management program in and around RAMSAR site**

Monitoring by implementing entities:

a. Field visits at least twice—during the intervention and after the intervention

b. Reports by the implementing entities submitted to ESS officer within a week after each field visit

Monitoring by ESS officer at PCU:

c. Field monitoring by ESS officer –monitoring through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above.

d. Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

7. Capacity Need and Budget

Activities under this ESMP will be implemented by the BFL focal person, supervising engineer, and a contractor that will employ workers as mentioned in the contract agreement. The budget for each activity is as follows:

1. Ecotourism Infrastructure Development from Aja to Ugyendrag via Sheridzong: USD 63000
2. Improvement of salt licks and water holes in Serzhong Range: USD 3000
3. Maintenance of Buildings:USD 68000
4. Improvement of alpine meadows: USD 5000
5. Bio-engineering works at Dungtsho lake: USD 15000
6. Waste management program in and around RAMSAR site: USD 4500

A separate budget of **Nu. 30000** will cover the implementation of the ESMP mitigation measures.

8. Consultation and Disclosure Mechanisms

This ESMP has been prepared in a participatory manner, and a community consultation was carried out from 20 to 23 February 2021 in BWS to inform local communities regarding the planned project activities mainly, guard post construction and bio-engineering work for Dungtsho lake to solicit their opinions and enable them for question to proposed mitigation measures. There were no issues and the communities all agreed to give the clearance for construction and bio-engineering around the lake since the lake was drying up.

For the remaining activities the consultation meeting with local communities and other relevant agencies will be organized before the implementation of interventions to seek their opinion and get feedback from them regarding the activities. The main motive of conducting community consultation is to make communities and other relevant agencies aware on the implementation of proposed activities and to offer opportunities of opinion expression and suggestions to the communities and the local leaders for consideration during implementation of activities. For all construction activities (ecotourism and bio-engineering works), the consultation meetings will be organized prior to the initiation of the activities so that local people are aware on implementation of the construction works and any other issues related to construction works can be discussed with them. Such forum would create an ambience to raise their voices to ensure their participatory engagement for the proposed construction activities.
Furthermore, the concern Gewog administration and relevant agencies within the respective Gewogs will be virtually met for any required communications and discussions besides consultations with the local communities for any unforeseen scenarios. The detailed minutes of the consultation meeting will be attached to this ESMP, along with a full list of participants (disaggregated by gender and age).

The minutes and evidences of the social clearance from local communities obtained for few programs are attached to this ESMP, along with a full list of participants.

9. Stakeholder Engagement Plan

The local community that resides in the vicinity of the planned BFL activities in BWS will be engaged throughout the implementation of these activities.

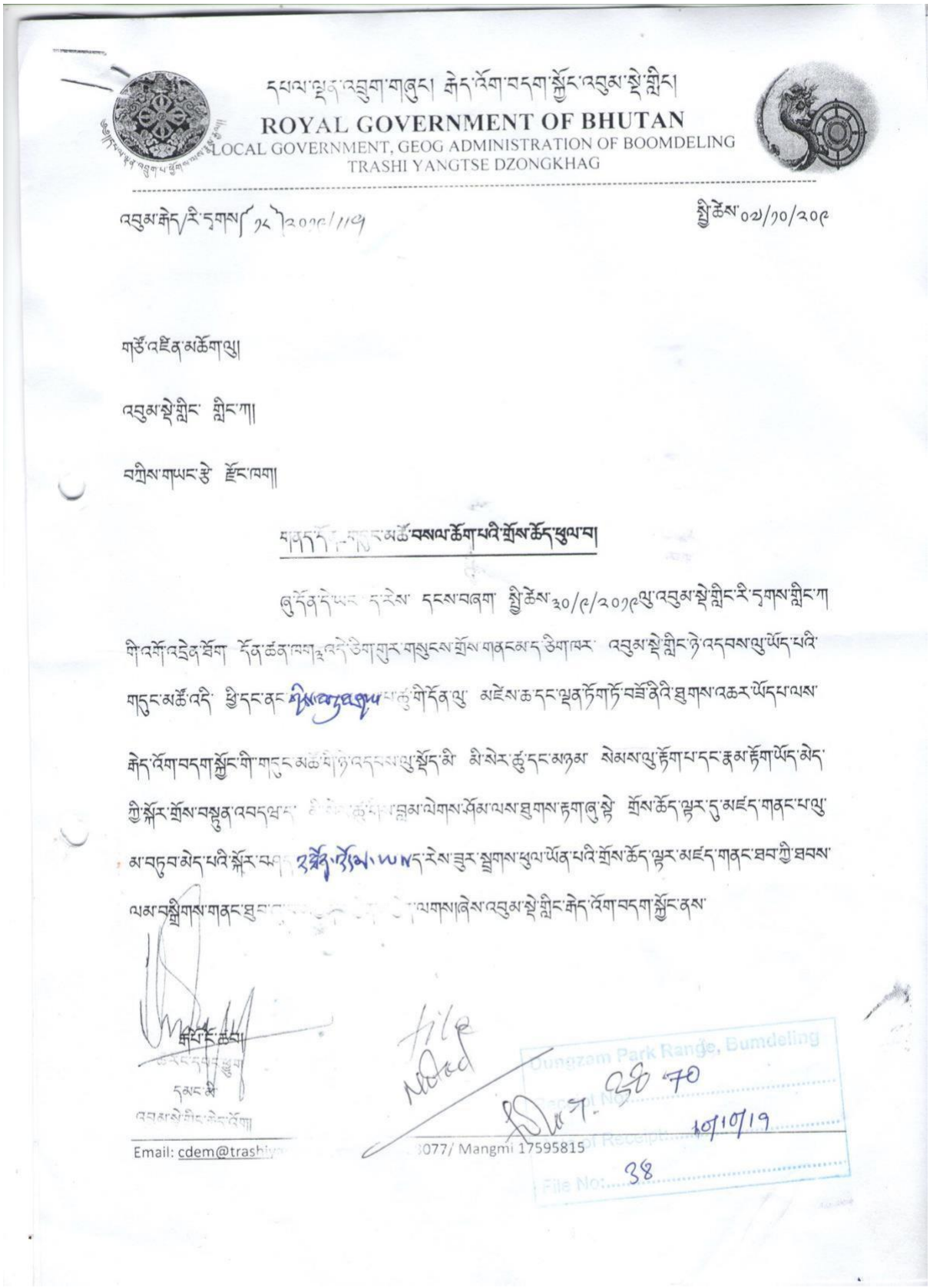
1. Ecotourism Infrastructure Development
    - Dates of consultation: 10 July, 2021
    - Agenda: Information of the eco-tourism activities and linkages with the conservation of BWS
    - Location: BWS
2. Improvement of alpine meadows
    - Dates of consultation: 15 July, 2021
    - Agenda: Social clearance for improvement of alpine meadows
    - Location: BWS
3. Bio-engineering for Dungtsho lake

- Dates of consultation: 20 July, 2021
- Agenda: Social clearance from the community as attached in ANNEX 1
- Location: BWS

4. Waste management program in and around RAMSAR site
    - Dates of consultation: 15 July, 2021
    - Agenda: Social clearance from the community for construction of waste collection points
    - Location: BWS

The BFL focal person has to submit the official minutes of consultation meetings (along with a list of participants, disaggregated by gender and age) to ESS officer within one week after the completion of the consultation. The ESS officer will submit the consultation reports to the PCU (M&E officer) one week after their receipt. The PCU (M&E officer) will report to the Secretariat on a semi-annual basis.

ANNEXURE 1: Social clearance from the community



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འབུམ་སྡེ་/བདག་སྐྱོང་/༠༣/༢༠༡༩/

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གྲོས་ཆོད།

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མིང་།

༡_ཆོས་རྡོ་རྗེ།

༢_བསམ་བརྟན།

༣_མགོན་པོ་དབང་མོ།

༤_ལྷ་མོ་ཚེ་རིང་།

Email: cdem@trashiyangtse.gov.bt/ [illegible]28077/ Mangmi 17595815

དཔལ་ལྡན་འབྲུག་གཞུང་། རྗེད་འོག་བདག་སྐྱོང་འབྲུམ་སྡེ་གླིང་།
ROYAL GOVERNMENT OF BHUTAN
LOCAL GOVERNMENT, GEOG ADMINISTRATION OF BOOMDELING
TRASHI YANGTSE DZONGKHAG

༥-བསོད་ནམས་དཔལ་སྒྲོན།

༦-པདྨ་ཚེ་དབྱངས།

༧-ཕོ་མོ།

༨--དགེ་ལྡན་སྨན་མོ།

༩-བཀྲིས་མཚོ་མོ།

༡༠-མ་ནི་དབང་མོ།

༡༡-སློབ་ ཨོན།

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ཆ་རིང་དབང་ཕྱུག
དམངས་མི
འབྲུམ་སྡེ་གླིང་རྗེད་འོག

Minutes of Meeting

Venue: Bumdeling Geog Meeting Hall
Date: 9/12/2020

Participant lists

1. Phub Thinley, Gup
2. Tshering Wangchuk, Mangmi
3. Chimi Dem, Geog Administration Officer
4. Pema Dorji, Bamdir-Womanang Chiwog Tsogpa
5. Tshering Dorji, Pangkhar-Tarphel Chiwog Tsogpa
6. Thukten Dorji, Tshaling-Gangkhardung Tsogpa
7. Tshering Wangchuk, Phanteng-Ngalimang Tsogpa
8. Sangay Drukpa, Sr. Park Ranger, Dungzam Range
9. Tshering Nidup, Geydrung

Coinciding with the monthly waste cleaning day, the Range Officer, Dungzam Park Range called short meeting with the GYT Committee members of Bumdeling geog on the 9th December mainly to discuss on the waste management issues in Bumdeling geog and following points were discussed and resolve accordingly. The meeting was chaired by Gup, Bumdeling geog administration.

Sl #	Points	Discussion	Resolutions
1	Waste Bins placed at Dungzam and Bumdeling	There are two waste collection unit placed at Dungzam and Bumdeling by Dzongkhag Envt. Section and BWS respectively. The bins are always found filled but no one take responsibility to clean/ empty it.	The Park Range Office and Geog will try to clean/ empty the bins and later SOP will be developed to keep the bins always empty.
2	Budget for Waste bins (collection unit) construction at Bumdeling	Through BFL Project, Bumdeling Wildlife Sanctuary has allocated Budget for construction of waste collection bins in Bumdeling and about 5-6 bins can be constructed as per estimation done by Site Engineer. The work can be awarded to community to encourage them in waste management program later.	Since the identified sites cover whole Bumdeling geog, the GT Committee suggested that the work can be awarded to a group of community who is willing help in cleaning of the Bins when it is filled. So, it was resolved that the village Tsogpas will inform the community and accordingly identify the group for construction and submit 'Expression of interest letter' to range Office and accordingly work will be awarded.

Minute Keeper

(Sangay Drukpa)
Sr. Park Range Officer

Noted by:

(Phub Thinley)
Gup, Bumdeling geog

Annexure. BFL: SUGGESTED OCCUPATIONAL HEALTH AND SAFETY STANDARDS

Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. Implementing entities should hire contractors that have the technical capability to manage the occupational health and safety issues of their workers, extending the application of the hazard management activities through formal procurement agreements.

This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. It is based on the IFC's Environmental, Health, and Safety Guidelines (April 30, 2007)[1] and the Occupational Health and Safety Guidelines of Bhutan's Construction Development Corporation Ltd., which relies on the national Regulation on Occupational Health, Safety and Welfare 2012, Regulation on Working Conditions 2012 and Labour Act 2007, and in compliance to Sl. No. 21 of Regulation on Occupational Health, Safety and Welfare 2012.

1. General Facility Design and Operation

Integrity of Workplace Structures

Permanent and recurrent places of work should be designed and equipped to protect occupational health and safety:

- Surfaces, structures and installations should be easy to clean and maintain, and not allow for accumulation of hazardous compounds.
- Buildings should be structurally safe, provide appropriate protection against the climate, and have acceptable light and noise conditions.
- Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls.
- Floors should be level, even, and non-skid.
- Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections.

Severe Weather and Facility Shutdown

- Workplace structures should be designed and constructed to withstand the expected elements for the region and have an area designated for safe refuge (e.g., in case of earthquake).

Workspace and Exit

- The space provided for each worker, and in total, should be adequate for safe execution of all activities, including transport and interim storage of materials and products.

Fire Precautions

The workplace should be designed to prevent the start of fires through the implementation of fire codes applicable to industrial settings. Other essential measures include:

- The workplace shall be provided with adequate means of protection and escape in case of fire.
- The workplace shall be provided with adequate number of relevant fire extinguishers.
- Workers shall wear shoes without iron or steel nails or any other exposed ferrous materials which is likely to cause sparks by friction.
- Smoking, lightening, or carrying of matches, lighters or smoking materials shall be prohibited.
- All other precautions, as are reasonably practicable, shall be taken to prevent initiation of ignition from all other possible sources such as open flames, frictional sparks, overheated surfaces of machinery or plant, chemical or physical, chemical reaction and radiant heat.
- At every workplace adequate provision of water supply for firefighting shall be provided and maintained.
- Equipping facilities with firefighting equipment (e.g., fire extinguishing bottle). The equipment should be maintained in good working order and be readily accessible. It should be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present.
- Manual firefighting equipment shall be easily accessible and simple to use.
- Fire extinguishers and emergency alarm systems that are both audible and visible should be in place.

Lavatories and Showers

- Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work in the facility (at least one for every 20 workers). Toilet facilities should also be provided with adequate supplies of hot and cold running water and soap.

Potable Water Supply

- Adequate supplies of potable drinking water should be provided to workers at the work site.

Clean Eating Area

- Where there is potential for exposure to substances poisonous by ingestion, suitable arrangements are to be made for provision of clean eating areas where workers are not exposed to the hazardous or noxious substances.

Lighting

- Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers' safety and health, and enable safe equipment operation. Supplemental 'task lighting' may be required where specific visual acuity requirements should be met.
- Emergency lighting of adequate intensity should be installed upon failure of the principal artificial light source to ensure safe shut-down, evacuation, etc.

Safe Access

- Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access.
- Equipment and installations requiring servicing, inspection, and/or cleaning should have unobstructed, unrestricted, and ready access.
- Covers should, if feasible, be installed to protect against falling items.
- Measures to prevent unauthorized access to dangerous areas should be in place.

First Aid

- The employer should ensure that qualified first-aid can be provided at all times. A sufficient number of first aid boxes or cupboards shall be provided and maintained so as to be readily available during all working hours, provided that the distance of the nearest first aid box or a cupboard stall be not more than 200m from any working place.
- First aid kits include all equipment outlined in Annex 1 to these Guidelines.
- Remote sites should have written emergency procedures in place for dealing with cases of trauma or serious illness up to the point at which patient care can be transferred to an appropriate medical facility.

Work Uniform

- The contractor shall provide a working uniform to each worker.
- All workers shall be required to attend the duty in proper uniform unless otherwise instructed by the Contractor.

Air Supply

- Sufficient fresh air should be supplied for indoor and confined workspaces. Factors to be considered in ventilation design include physical activity, substances in use, and process related emissions. Air distribution systems should be designed so as not to expose workers to draughts.
- Re-circulation of contaminated air is not acceptable. Heating, ventilation and air conditioning (HVAC) systems should be equipped, maintained and operated so as to prevent growth and spreading of disease agents (e.g. Legionnella pneumophilia) or breeding of vectors (e.g. mosquitoes and flies) of public health concern.

2. <u>Information Provision on</u> Occupational Health and Safety (OHS)

- The Contractor is responsible to hold an information session to familiarize all workers with the OHS procedures specified in these guidelines, in order to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow workers.
- The information session should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.

3. <u>Physical Hazards</u>

Physical hazards represent potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity.

Rotating and Moving Equipment

Injury or death can occur from being trapped, entangled, or struck by machinery parts due to unexpected starting of equipment or unobvious movement during operations. Recommended protective measures include:

- Designing machines to eliminate trap hazards and ensuring that extremities are kept out of harm's way under normal operating conditions. Examples of proper design considerations include two-hand operated machines to prevent amputations or the availability of emergency stops dedicated to the machine and placed in strategic locations.
- Where a machine or equipment has an exposed moving part or exposed pinch point that may endanger the safety of any worker, the machine or equipment should be equipped with, and protected by, a guard or other device that prevents access to the moving part or pinch point. Guards should be designed and installed in conformance with appropriate machine safety standards.

Noise

- No worker should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the 'allowed' exposure period or duration should be reduced by 50 percent.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.

Vibration

Exposure to hand-arm vibration from equipment such as hand and power tools, or whole-body vibrations from surfaces on which the worker stands or sits, should be controlled through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure.

Electrical

Exposed or faulty electrical devices, such as circuit breakers, panels, cables, cords and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices, such as poles or ladders, and by vehicles with metal booms. Vehicles or grounded metal objects brought into close proximity with overhead wires can result in arcing between the wires and the object, without actual contact. Recommended actions include:

- Marking all energized electrical devices and lines with warning signs
- Locking out (de-charging and leaving open with a controlled locking device) and tagging-out (warning sign placed on the lock) devices during service or maintenance
- Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools
- Double insulating / grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter (GFI) protected circuits
- Protecting power cords and extension cords against damage from traffic by shielding or suspending above traffic areas
- Appropriate labeling of service rooms housing high voltage equipment ('electrical hazard') and where entry is controlled or prohibited
- Establishing "No Approach" zones around or under high voltage power lines

- Rubber tired construction or other vehicles that come into direct contact with, or arcing between, high voltage wires may need to be taken out of service for periods of 48 hours and have the tires replaced to prevent catastrophic tire and wheel assembly failure, potentially causing serious injury or death
- Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work

Eye Hazards

Solid particles from a wide variety of industrial operations, and/or a liquid chemical spray may strike a worker in the eye causing an eye injury or permanent blindness. Recommended measures include:

- Use of machine guards or splash shields and/or face and eye protection devices, such as safety glasses with side shields, goggles, and/or a full-face shield. Frequent checks of these types of equipment prior to use to ensure mechanical integrity is also good practice.
- Where machine or work fragments could present a hazard to transient workers or passers-by, extra area guarding or proximity restricting systems should be implemented, or PPE required for transients and visitors.
- Provisions should be made for persons who have to wear prescription glasses either through the use overglasses or prescription hardened glasses.

Welding / Hot Work

Welding creates an extremely bright and intense light that may seriously injure a worker's eyesight. In extreme cases, blindness may result. Additionally, welding may produce noxious fumes to which prolonged exposure can cause serious chronic diseases. Recommended measures include:

- Provision of proper eye protection such as welder goggles and/or a full-face eye shield for all personnel involved in, or assisting, welding operations. Additional methods may include the use of welding barrier screens around the specific work station (a solid piece of light metal, canvas, or plywood designed to block welding light from others). Devices to extract and remove noxious fumes at the source may also be required.

Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result temperature stress-related injury or death. Use of personal protective equipment (PPE) to protect against other occupational hazards can accentuate and aggravate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided through implementation of engineering controls and ventilation. Where this is not possible, such as during short-term outdoor work, temperature-related stress management procedures should be implemented which include:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly
- Providing temporary shelters to protect against the elements during working activities or for use as rest areas
- Use of protective clothing
- Providing easy access to adequate hydration such as drinking water or electrolyte drinks, and avoiding consumption of alcoholic beverages

Ergonomics, Repetitive Motion, Manual Handling

Injuries due to ergonomic factors, such as repetitive motion, overexertion, and manual handling, take prolonged and repeated exposures to develop, and typically require periods of weeks to months for recovery. These OHS problems should be minimized or eliminated to maintain a productive workplace. Controls may include:

- Facility and workstation design with 5th to 95th percentile operational and maintenance workers in mind
- Use of mechanical assists to eliminate or reduce exertions required to lift materials, hold tools and work objects, and requiring multi-person lifts if weights exceed thresholds
- Selecting and designing tools that reduce force requirements and holding times, and improve postures
- Incorporating rest and stretch breaks into work processes, and conducting job rotation
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions

Working at Heights

Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling more than two meters; into operating machinery; into water or other liquid; into hazardous substances; or through an opening in a work surface. Fall prevention / protection measures may also be warranted on a case-specific basis when there are risks of falling from lesser heights. Fall prevention may include:

- Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area
- Proper use of ladders and scaffolds by trained workers
- Use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines
- Appropriate training in use, serviceability, and integrity of the necessary PPE
- Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall

Illumination

Work area light intensity should be adequate for the general purpose of the location and type of activity, and should be supplemented with dedicated work station illumination, as needed. Controls should include:

- Use of energy efficient light sources with minimum heat emission
- Undertaking measures to eliminate glare / reflections and flickering of lights
- Taking precautions to minimize and control optical radiation including direct sunlight.
- Exposure to high intensity UV and IR radiation and high intensity visible light should also be controlled
- Controlling laser hazards in accordance with equipment specifications, certifications, and recognized safety standards. The lowest feasible class Laser should be applied to minimize risks.

4. Personal safety equipment for workers

All workers are equipped with the following personal safety equipment: helmet, gloves, ordinary boots and reflective vest.

Workers that are exposed to dust should also be provided with eye protection glasses and face mask. Workers that are exposed to noise should be provided with ear plugs. Workers that need to work in the dark should be provided with hand and cap lamps.

Workers are instructed regarding safety equipment as follows:

- Always wear complete set of protective wear.
- Do not wear loose clothing, such as overhang shirt, jackets, mufflers etc.
- Tuck shirt and jacket well.
- Secure helmet with belt under the chin.
- Tuck the bottom sleeves of trouser inside safety boot.
- Dress with reflector

5. Standards for workers' accommodation[2]

1. General living facilities

- The location of the facilities is designed to avoid flooding or other natural hazards
- The living facilities are located within a reasonable distance from the worksite.
- Transport is provided to worksite safe and free.
- The living facilities are built using adequate materials, kept in good repair and kept clean and free from rubbish and other refuse.

2. Drainage

- The site is adequately drained.

3. Heating, air conditioning, ventilation and light

- Living facilities are provided with adequate heating, ventilation, and light systems including emergency lighting.

4. Water

- Workers have easy access to a supply of clean/ potable water in adequate quantities.
- The quality of the water complies with national/local requirements or WHO standards.
- Tanks used for the storage of drinking water are constructed and covered to prevent water stored therein from becoming polluted or contaminated.
- The quality of the drinking water is regularly monitored.

5. Wastewater and solid waste

- Wastewater, sewage, food and any other waste materials are adequately discharged in compliance with national and/or international standards and without causing any significant impacts on camp residents, the environment or surrounding communities.
- Specific containers for rubbish collection are provided and emptied on a regular basis.
- Pest extermination, vector control and disinfection are undertaken throughout the living facilities at least once.

6. Rooms/dormitories facilities

- Rooms/dormitories are kept in good condition.
- Rooms/dormitories are aired and cleaned at regular intervals.
- Rooms/dormitories are built with easily cleanable flooring material.
- Rooms/dormitories and sanitary facilities are located in the same buildings.
- Residents are provided with enough space.
- The number of workers sharing the same room/dormitory is minimized.
- Doors and windows are lockable and provided with mosquito screens when necessary.
- Mobile partitions or curtains are provided.
- Adequate number of furniture such as table, chair, mirror, and lamps are provided for all workers.
- Separate sleeping areas are provided for men and women.

7. Bed arrangements and storage facilities

- A separate bed is provided for every worker.
- The practice of "hot-bedding" is prohibited.
- There is a minimum space of 1 meter between beds.
- The use of double deck bunks is minimized.
- If double deck bunks are in use, there is enough clear space between the lower and upper bunk of the bed.
- Workers are provided with comfortable mattresses. Workers may be expected to use their own pillows and bed linens.
- Workers wash bed linen frequently and applied with adequate repellents and disinfectants (where conditions warrant).
- Adequate facilities for the storage of personal belongings are provided.
- Separate storages for work clothes and PPE and depending on condition, drying/airing areas are provided.

8. Sanitary and toilet facilities

- Sanitary and toilet facilities are constructed from materials that are easily cleanable.
- Sanitary and toilet facilities are cleaned frequently and kept in working condition.
- Toilets, showers/bathrooms and other sanitary facilities are designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors.
- Separate sanitary and toilet facilities are provided for men and women.
- Toilet facilities are conveniently located and easily accessible.
- Toilet facilities are environmentally friendly (e.g., pit toilet) and sewage is not disposed into the worksite.
- Open defecation in the vicinity of project sites should be prohibited.
- An adequate number of hand wash basins and showers/bathrooms facilities are provided.
- Shower facilities are provided with water heating facilities.

9. Cooking and laundry facilities

Cooking and laundry facilities should available for workers at the worksite or in close vicinity to it. These facilities should be kept in clean and sanitary conditions.

10. Leisure, social and telecommunications facilities

- Basic social collective spaces should be available to workers.
- Workers are provided with dedicated places for religious observance, as appropriate.
- The employer provides workers with local sim cards that can be used for communication on their personal cell phones.

Contents of first aid box or cup-boards

The first aid boxes or cup-boards shall be distinctively marked with white cross on a green background and shall contain the following equipment:

1. Small sterilized dressings (12)
2. Medium size sterilized dressings (6)
3. Large size sterilized dressings (6)
4. Large size sterilized burn dressings (6)
5. (1/2 oz.) Sterilized cotton wool (6 packets)
6. (2oz.) Bottle containing a two per cent alcoholic solution of iodine (1)
7. (2oz.) Bottle containing Betadine (antiseptic solution) having the dose and mode of administration indicated on the label (1)
8. Roll of adhesive plaster (1)
9. A snake bite lancet (1)
10. Torch light (1)
11. Pair of scissors (1)
12. Tablets Aspirin (5gms) 2 dozen
13. Burn Ointment (2 tubes)
14. Dettol (2 phial, about 2 ozs)
15. Bandages 4 inches wide
16. Bandages 2 inches wide
17. Triangular bandages (2)
18. Packets of safety pins (1)
19. A supply of suitable splint