

Initial Environmental Examination

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NEPAL: Electricity Grid Modernization Project Part 2

Prepared by Nepal Electricity Authority, Government of Nepal for the Asian Development Bank.

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Appendix 1: Recommendation Letters from Line Agencies

Appendix 1a: IEE Approval Letter for Dandakhet-Rahughat 132kV Transmission Line


	<p>नेपाल सरकार उर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय विद्युत विकास विभाग</p>	<p>फोन नं. ४४११०७४, ४४१११३३ ४४११३६८, ४४११५०९ ४४४५७७५, ४४३४११९ ४४३९३६२</p> <p>फ्याक्स ४४४३९०३</p> <p>पोष्ट बक्स नं. २५०७</p> <p>सानोगीचरण काठमाडौं, नेपाल</p> <p>मिति: २०७६/०६/१६</p>
<p>पत्र संख्या :- ०७६/७७ च.नं. १०१६</p>	<p>वातावरण शाखा नेपाल सरकार उर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय विद्युत विकास विभाग १०१६</p>	
<p>विषय:- प्रारम्भिक वातावरणीय परिक्षण प्रतिवेदन स्वीकृति सम्बन्धमा ।</p>		
<p>श्री वातावरण तथा सामाजिक अध्ययन विभाग नेपाल विद्युत प्राधिकरण ।</p> <p>उपरोक्त सम्बन्धमा तह्राबाट पेश भएको प्रस्तावित डौडाखेत-राहुघाट १३२ के.भी. विद्युत प्रसारण लाइन आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (IEE) श्री उर्जा, जलस्रोत तथा सिंचाइ मन्त्रालयको मिति २०७६/०६/१६ को सचिवस्तरीय निर्णय अनुसार निम्न शर्तहरू कार्यान्वयन गर्ने गरी स्वीकृत भएको व्यहोरा निर्देशानुसार अनुरोध छ ।</p> <p>शर्तहरू:</p> <ol style="list-style-type: none"> १. आयोजना निर्माण एवं संचालनको समयमा प्रतिवेदनमा पहिचान भएका प्रभावहरूको अन्वावा हान्य पहिचान र आकलन नभएका प्रभावहरू देखिएमा वा देखिने सम्भावना भएमा उक्त प्रतिकूल प्रभावहरूलाई समेत प्रस्तावकले आफ्नै खर्चमा निराकरण गर्नु पर्नेछ । २. स्वीकृत प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदनमा उल्लेख भए अनुसारको वातावरणीय अनुगमन योजनालाई आधार बनाई प्रस्तावको निर्माण कार्यको मध्यमा "मध्यवर्धी" र निर्माण कार्य सम्पन्न भएपछि "अन्तिम" आन्तरिक वातावरणीय अनुगमन प्रतिवेदन उर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय तथा विद्युत विकास विभागमा पेश गर्नु पर्नेछ । ३. प्रतिवेदनमा आयोजनाको विस्तृत डीजाइनमा समावेश गर्नुपर्ने गरि प्रस्ताव गरिएका निराकरणका उपायहरू विस्तृत डीजाइनमा अनिवार्य रुपमा समावेश गर्ने साथै निर्माणको चरणमा निर्माण व्यवसायीले पालना गर्ने गरि प्रस्ताव भएका तथा निर्माण व्यवसायीको दायित्व भित्र पर्ने प्रभाव निराकरण लगायतका सम्पूर्ण दायित्वहरू निर्माण व्यवसायी सँग गरिने सम्झौतामा अनिवार्य रुपमा समावेश गर्नुपर्ने र तिनको पालना गनुनिश्चिन गर्नुपर्ने । ४. स्वीकृत प्रारम्भिक वातावरणीय परिक्षण प्रतिवेदनमा उल्लेखित आयोजनाको संरचना तथा क्रियाकलापहरूको स्थान, डिजाइन, आकार, वा प्रकारमा उल्लेखनिय परिवर्तन गर्नु परेमा सोको जानकारी उर्जा मन्त्रालय तथा विद्युत विकास विभागमा पेश गरि थप अध्ययन गर्ने विषयहरूका बारेमा अनुमति लिनु पर्ने छ । 		
<p>बोधार्थ:</p> <p>श्री उर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय, सिंहदरबार, काठमाडौं श्री बन तथा वातावरण मन्त्रालय, सिंहदरबार, काठमाडौं श्री रहुंगंगा गाउँपालिका, म्याग्दी श्री बेनी नगरपालिका, म्याग्दी श्री मालिका गाउँपालिका, म्याग्दी श्री धौलागिरी गाउँपालिका, म्याग्दी श्री मंगला गाउँपालिका, म्याग्दी</p> <p>(स्वीकृत प्रतिवेदनको एक थान यसै साथ संलग्न छ)।</p>		

Translation

This Letter Dated October 3, 2019 with the subject related to acceptance of IEE by Department of Electricity Development. The proposed Dandakhet Rahughat 132kV Power Transmission Line Projects acceptance through Ministry of Energy, Water Resources and Irrigation's through Secretary Level Decision on September 29, 2016 under following conditions:

1. Proponent should mitigate identified as well as identified/anticipated adverse impacts of the IEE for the project during construction and operation on its own cost.
2. Internal Environmental Monitoring Report to be submitted to MoEWRI and DoED during the mid-construction and after completion of the project. This needs to be done in accordance to Approved IEE's EMP.
3. In the project's report final mitigation measures to be included in the detail design needs to be included. Also, the construction contractor's mitigation measures responsibilities needs to be incorporated in the contract agreement and needs to be implemented.
4. If in the approved IEE report's project related infrastructure, activities, place, design, structure or type needs major changes MoEWRI along with DoED needs to be notified and further study or investigation for this needs to be followed only after permission is granted.


Appendix 1b: Recommendation Letter from Chure Conservation and Development Committee



नेपाल सरकार

राष्ट्रपति चुरे-तराई मधेश संरक्षण विकास समिति

खुमलटार, काठमाडौं



प.स.: ०६५०६६
च.नं.: ४५०

मिति : २०७५/१०/२९

विषय:- सहमति सम्बन्धमा ।

नेपाल विद्युत प्राधिकरण

वातावरण तथा सामाजिक अध्ययन विभाग

दस्तावेज नं. ७७२०

मिति: ०६६/११/२५

श्री वन तथा वातावरण मन्त्रालय,
जैविक विविधता तथा वातावरण महाशाखा,
सिंहदरबार, काठमाडौं ।

प्रस्तुत विषयमा नेपाल विद्युत प्राधिकरणको प्रस्तावित ३७ कि.मि. लामो घोराही-माडीचौर १३२ के.भी. विद्युत प्रसारणको सर्वेक्षण र EIA गर्न सहमति/अनुमति माग गरेको सम्बन्धमा यस समितिको उल्लेखित राय सहित वन तथा वातावरण मन्त्रालयमा पठाउने भन्ने सचिवालयको निर्णय अनुसार सकार्वाय फाइल पठाइएको व्यहोरा निदेशानुसार अनुरोध छ ।

शर्तहरू

- वातावरणीय प्रभाव मूल्यांकन (EIA) प्रतिवेदनमा पूर्णरूपले चुरे सम्बन्धि विस्तृत विवरणहरूको विश्लेषण हुनुपर्ने।
- चुरे क्षेत्रको भौगोलिक, भौगर्भिक स्थिति, कमलौ बनावट र वातावरणीय संवेदनशीलतालाई विचार गरी अध्ययन गर्ने।
- वन क्षेत्र, जलस्रोत, सिम क्षेत्र र प्राकृतिक र जैविकरूपले महत्वपूर्ण क्षेत्रमा नकारात्मक प्रभाव नपर्ने गरी विकल्पहरूको खोजि गर्ने वन क्षेत्रको जग्गा प्रयोग गर्नु परेमा नेपाल सरकारबाट भूसाधारण नियन्त्रण गर्ने।
- जैविक विविधता र वातावरणमा कम हानी पुग्ने र कम वन क्षेत्र नोक्सान हुने गरी अध्ययन गर्ने।
- दुर्लभ वन्यजन्तु र वनस्पतिको संरक्षणको लागि विशेष कार्यक्रम EMP मा समावेश गर्ने।
- चुरे क्षेत्रबाट आउने Massice Sediment Load लाई ध्यानमा राखी Structural Design गर्ने गराउने।
- भूकम्पिय प्रभाव (Seismic Zone, Main Frontal Thrust र Main Bountry Thrust:MBT) ले गर्दा हुने जोखिमको अध्ययन गर्नुपर्ने।
- Tower राख्ने स्थलको जमिनको लेभल मिलाउनु पर्ने भएमा Cutfill गर्ने कार्यलाई संरक्षणमूलक बनाउन निश्चित मापदण्ड उल्लेख गर्नुपर्ने।
- EIA अध्ययन प्रतिवेदन तयार गर्ने काममा हुने सार्वजनिक सुनुवाय कार्यक्रममा यस समितिको प्रतिनिधिको उपस्थिति गराउनु पर्ने, प्रतिवेदन यस समितिमा उपलब्ध गराउनु पर्ने साथै यस समितिबाट दिइएका मुद्दाहरू समेत उल्लेख गरी अन्तिम प्रतिवेदन तयार गर्नुपर्ने।

सोपान

श्री नेपाल विद्युत प्राधिकरण,
वातावरण तथा सामाजिक अध्ययन विभाग,
खारपाटी, भक्तपुर ।

नेपाल विद्युत प्राधिकरण

वातावरण तथा सामाजिक अध्ययन विभाग

श्री वातावरण अध्ययन विभाग श्री सामाजिक अध्ययन विभाग श्री अनुमति विभाग	श्री वातावरण विभाग श्री सेवा विभाग श्री वि.स.
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१. सेवा नम्बर २. सेवा नम्बर ३. परिचय नम्बर
४. फाइल नम्बर ५. दस्तावेज नम्बर

मिति: २०७५/१०/२९

उप-सचिव (पा.)

उप सचिव (प्रा.)

☎ ५५३१३११, ५५२६७७७ फ्याक्स : ५५३७५११ website : www.chureboard.gov.np, email : mail@chureboard.gov.np

Translation:

This acceptance letter dated February 19, 2019 is from Chure Board for NEA Ghorahi - Madichaur TL EIA. Based on Project Manager for this TL this letter is considered as the permission letter from the Board. The 9 conditions put forward by the Board are:

- The EIA should have a detailed description of Chure Area
- The Chure's geological state, its fragility and environmental sensitivity needs to be considered while doing study.
- Study to be done with minimization of adverse impact to biodiversity and forest land.
- Minimize impact on Forest, Wetland and Environmentally Important Site also take permission from Government of Nepal to use Forest Land.
- Include special provision for rare wildlife and forest vegetation in the EMP.
- Structural design should include the possibility of massive sediment load that can occur from Chure Region.
- Seismicity Related Study (Seismic Zone, Main Frontal Thrust and Main Boundary Thrust) needs to be done.
- In areas where tower foundation land needs to be levelled specific standards needs to be incorporated for cut and fill process.
- Chure Board Representative needs to be present in Public Hearing and EIA finalization presentation and above recommended measures needs to be incorporated.

Appendix 2 – National Ambient Air, Water, Noise, and Emission Standards

TABLE 2.1: NATIONAL AMBIENT AIR QUALITY STANDARDS (MICROGRAMS PER CUBIC METER)

Parameters	Averaging Time	Ambient Concentration (maximum) $\mu\text{g}/\text{m}^3$	Test Methods
Total Suspended Particulates	Annual	-	
	24-hours ^a	230	High Volume Sampling and Gravimetric Analysis
PM10	24-hours ^a	120	High Volume Sampling Gravimetric Analysis, TOEM, Beta Attenuation
Sulphur Dioxide	Annual ^b	50	Ultraviolet Fluorescence, west and Gaeke Method
	24-hours ^a	70	Same as Annual
Nitrogen Dioxide	Annual	40	Chemiluminisence
	24-hours ^a	80	Same as Annual
Carbon Monoxide	8 hours ^a	10,000	Non Dispersive Infrared Spectrophotometer (NDIR)
Lead	Annual ^b	0.5	High Volume Sampling, followed by Atomic absorption spectrometry
Benzene	Annual ^b	5 ^e	Gas Chromatographic Technique
PM2.5	24-hours ^a	40	PM2.5 sampling gravimetric analysis
Ozone	8 hours ^a	157	UV spectrophotometer

Notes:

^a 24 hourly values shall be met 95% of the time in a year. 18 days per calendar year the standard may be exceeded but not on two consecutive days

^b In any specified place twice in one week continuously for 24 hours and in a week data taken for a minimum of 104 times yearly average is considered as above.

TABLE 2.2: GENERIC STANDARD: TOLERANCE LIMIT FOR INDUSTRIAL (WASTEWATER) EFFLUENTS DISCHARGED INTO INLAND SURFACE WATERS AND PUBLIC SEWERS

S N	Parameters	Industrial waste into Inland Surface Waters	Wastewater into inland Surface Waters from CWTP*	Industrial Effluents into Public Sewers*
1	TSS, mg/l	30-200	50	600
2	Particle size of TSS	Shall pass 850-micron Sieve	Shall pass 850-micron Sieve	
3	pH Value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
4	Temperature °C ¹	<40	<40	45
5	TDS, mg/L, max			2100
6	Color and Odor			
7	BOD for 5 days at 20 degree C, mg/L Max	30-100	50	400
8	Oils and grease, mg/L, Max, Max	10	10	50
9	Phenolic compounds, mg/	m1	1	10
10	Cyanides (as CN), mg/L, Max	0.2	0.2	2
11	Sulfides (as S), mg/L, Max	2	2	2

S N	Parameters	Industrial waste into Inland Surface Waters	Wastewater into inland Surface Waters from CWTP*	Industrial Effluents into Public Sewers*
	Sulphates (SO ₄), mg/L, Max			500
1 2	Radioactive materials: a. Alpha emitters, c/ml, Max	10 ⁻⁷	10 ⁻⁷	
	b. Beta emitters, c/ml, Max	10 ⁻⁸	10 ⁻⁸	
1 3	Insecticides	Absent	Absent	Absent
1 4	Total residual chlorine, mg/L	1	1	1000 as chlorides
1 5	Fluorides (as F), mg/L, Max	2	2	10
1 6	Arsenic (as AS), mg/L, Max	0.2	0.2	1
1 7	Cadmium (as, Cd), mg/L, Max	2	2	2
1 8	Hexavalent chromium (as Cr), mg/L, Max	0.1	0.1	2
1 9	Copper (as Cu), mg/L, Max	3	3	3
2 0	Lead (as Pb), mg/L, Max	0.1	0.1	0.1
2 1	Mercury (as Hg), mg/L, Max	0.01	0.01	0.01
2 2	Nickel (as Ni), mg/L, Max	3	3	3
2 3	Selenium (as Se), mg/L, Max	0.05	0.05	0.05
2 4	Zinc (as Zn), mg/L, Max	5	5	5
2 5	Sodium, %, max			
2 6	Ammoniacal nitrogen, mg/L, Max	50	50	50
2 7	COD, mg/L, Max	250	250	1000
2 8	Silver, mg/L, Max	0.1	0.1	0.1
2 9	Mineral Oils, mg/L, Max			10
3 0	Inhibition of nitrification test at 200ml/l			<50%

Source: MOEN, 2010

Notes: CWTP= Combined Waste Water Treatment Plant; Under enforcement since BS 2058/1/17 (30 April 2001); *Under enforcement since BS 2060/3/9 (23 June 2003); ¹ Shall not exceed 40°C in any section within 15 m downstream from the effluent outlet

Table 2.3: Nepal Noise Standards Leq (dB)

Area	Day	Night	Remarks ^a
Industrial	75	70	Passenger car at 65 miles per hour at 25 feet registers 77 dB
Commercial	65	55	50 dB(A) is typical of conversation in a restaurant or office
Urban Residential	55	50	50 dB(A) is typical of conversation at home, large electrical transformers at 100 feet
Rural Residential Area	45	40	
Mixed Residential Area	63	55	
Peaceful Area	50	40	
Water Pump			Max: 65 dB
Diesel Generator			Max: 90 dB
Entertainment Means			Max: 70 dB

Note ^a: <http://www.industrialnoisecontrol.com/comparative-noise-examples.htm>

Table 2.4 Currently Operational Diesel Generator Emission Standards

Category (kW)	CO	HC	NOx	PM
kW<8	8	1.3	9.2	1.0
8<19	6.6	1.3	9.2	0.85
19<37	6.5	1.3	9.2	0.85
37<75	6.5	1.3	9.2	0.85
75<130	5	1.3	9.2	0.7
130<560	5	1.3	9.2	0.54

Table 2.5 Imported Diesel Generator Emission Standards

Category (kW)	CO	HC+NOx	PM
kW<8	8	7.5	0.8
8<19	6.6	7.5	0.8
19<37	5.5	7.5	0.6
37<75	5	4.7	0.4
75<130	5	4	0.3
130<560	3.5	4	0.2

Table 2.6 Light and Over 2.5 Ton Commercial Vehicle Emission Standards

Limit Values, Grams per Kilometer			
Type of Vehicle	Mass of CO	Mass of HC	Mass of NOx
L CV (RM=<1305 Kg)	2.3	0.2	0.15
L CV (1305>RM< or =1760 Kg)	4.17	0.25	0.18
L CV (RM > 1760 Kg)	5.22	0.29	0.21

Table 2.7: Emission Standards for Over 3.5 Tons Passenger Heavy Vehicle

Limit Values, Grams per Kilowatt hour per meter				
Mass of CO	Mass of HC	Mass of NOx	Mass of PM	Smoke
2.1	0.66	5	0.1	0.8

Table 2.8: Parameters of National Drinking Water Quality Standards applicable for Rural Surface Water Supply Systems

Category	Parameter	Unit	Maximum Concentration Limits	Remarks
Physical	Turbidity	NTU	5(10)	
	pH		6.5-8.5*	
	Color	TCU	5(15)	
	Taste & Odor		Non objectionable	
	Electrical Conductivity	µS/cm	1500	
Chemical	Iron mg/l 0.3(3)			
	Manganese	mg/l	0.2	
	Chromium	mg/l	0.05	
	Fluoride	mg/l	0.5-1.5*	
	Ammonia	mg/l	1.5	
	Nitrate	mg/l	50	
	Total Hardness	mg/l	500	
	Calcium	mg/l	200	
	Residual Chlorine	mg/l	0.1-0.2*	In systems using chlorination
Microbiological	E-Coli	MPN /100 ml	0	
	Total Coliform	MPN /100 ml	0 in 95% samples	

* These values represent minimum and maximum concentration limits.

() In case of no alternative, the values kept under parentheses will apply.

Table 2.9: Parameters of National Drinking Water Quality Standards

Category	Parameter	Unit	Maximum Concentration Limits	Remarks
Physical	Turbidity	NTU	5(10)	
	pH		6.5-8.5*	
	Color	TCU	5(15)	
	Taste & Odor		Non objectionable	
	TDS	mg/l	1000	
	Electrical Conductivity	μS/cm	1500	
Chemical	Iron mg/l 0.3(3)			
	Manganese	mg/l	0.2	
	Arsenic	mg/l	0.05	
	Cadmium	mg/l	0.003	
	Chromium	mg/l	0.05	
	Cyanide	mg/l	0.07	
	Fluoride	mg/l	0.5-1.5*	
	Ammonia	mg/l	1.5	
	Nitrate	mg/l	50	
	Copper	mg/l	1	
	Total Hardness	mg/l as CaCO ₃	500	
	Calcium	mg/l	200	
	Zinc	mg/l	3	
	Mercury	mg/l	0,001	
	Aluminum	mg/l	0.2	
	Residual Chlorine	mg/l	0.1-0.2*	In systems using chlorination
Microbiological	E-Coli	MPN /100 ml	0	
	Total Coliform	MPN /100 ml	0 in 95% samples	

* These values represent minimum and maximum concentration limits.

() In case of no alternative, the values kept under parentheses will apply

Appendix 3 - Environmental Audit Report of Existing Facilities with CAP

1. INTRODUCTION

1.1 Objectives of the Environmental Audit

1. The Nepal Electricity Grid Modernization Project (EGMP or the Project) is categorized as an environment “B” project per ADB’s Safeguard Policy Statement (2009). For Category B projects, an Initial Environmental Examination (IEE) is required to address the anticipated impacts of the project and to suggest appropriate mitigation measures. An IEE report was prepared for the Project based on the table of contents provided in Appendix 1 of ADB’s Safeguard Policy Statement (2009).

2. In addition, for projects involving facilities and/or business activities that already exist or are under construction before ADB’s involvement, ADB requires relevant external experts to conduct an Environment Audit. For a project involving an upgrade or expansion of existing facilities, as is the case for 35 substations under the EGMP (34 substations proposed for automation and 2 substations proposed for transmission capacity expansion – one substation Ghorahi will be both upgraded and expanded so 35 substations are existing facilities) the requirements for environmental assessment and planning apply in addition to the Environmental Audit.

3. The Environmental Audit will determine the existence of any areas where the substations may cause or are causing environmental risks and impacts. The existing facilities must comply with the ADB’s Safeguard Policy Statement (2009) and applicable national laws and regulations on environment, health, and safety. Where existing facilities are found not to be in accordance with the environment safeguard principles and requirements applicable to the Project, a Corrective Action Plan (CAP) is to be prepared, including implementation schedule and sufficient budget, to bring the existing facilities into compliance.

4. The Environment Audit has been conducted with the aim of assessing the 35 existing substations’ compliance with:

- (i) National (Nepal) laws and regulations on environment, health, and safety. These include, but are not limited to, Electricity Act, 2049; Environment Protection Act, 2076, Soil and Watershed Conservation Act, 2039; Solid Waste Management Act, 2068; 8.4.7 Labor Act, 2074; and Child Labor (Prohibition and Regulation) Act, 2056; and
- (ii) Environmental safeguards according to ADB’s Safeguard Policy Statement (2009) and IFC EHS Guidelines.

1.2 The Purpose of the Environmental Audit

5. The purposes of the Environmental Audit is:

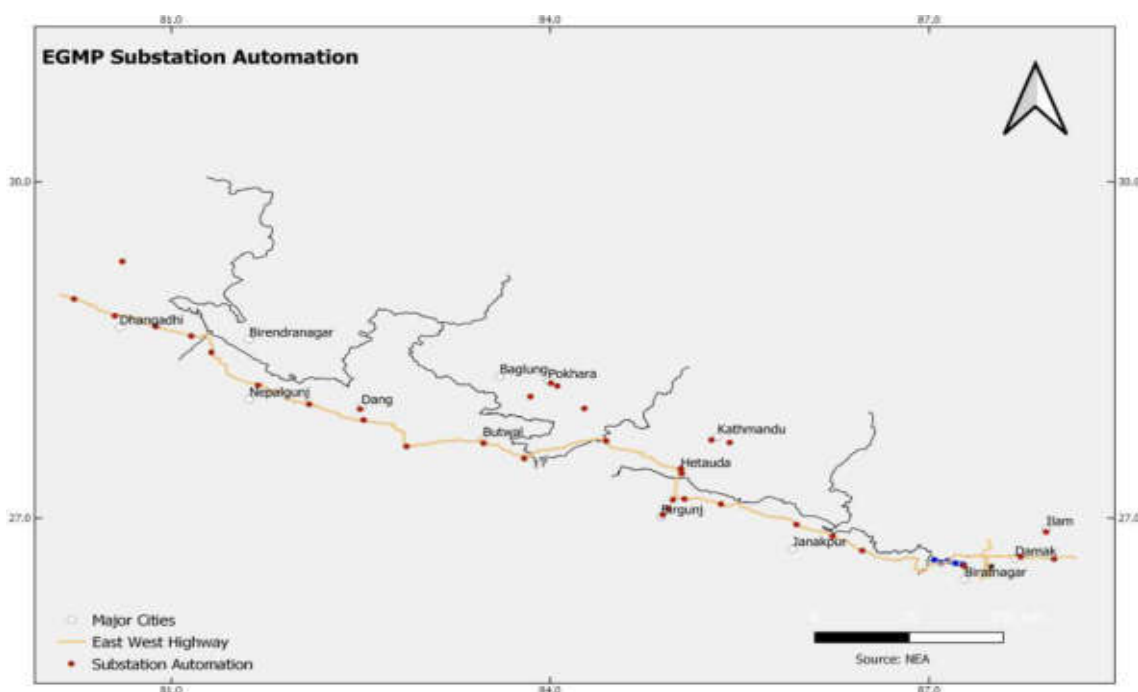
- (i) to identify past and present inadequacies in environmental management, and health and safety issues in the existing facilities, i.e. substations;
- (ii) to determine the need for remedial actions necessary to bring the existing facilities into compliance with environment safeguard principles and requirements applicable to the Project, including the ADB’s Safeguard Policy Statement (2009) and IFC EHS Guidelines; and

- (iii) to recommend actions to be taken to improve and strengthen NEA's environmental, health, and safety management.

1.2.1 Scope of Work Involving Existing Facilities

6. The EGMP involves expansion and strengthening of the transmission and distribution system of Nepal. The Project outputs involve increasing the capacity of 2 existing transmission substations (namely Ghorahi 132/33/11kV substation and Barhabise 220/132kV substation), and the automation of 34no. existing substations (220/132/33/11kV) all over the country (outside of the Kathmandu Valley). The 34no. substations identified for automation are Attariya, Bhurigaun, Birganj, Ghorahi, Kohalpur, Kusum, Lamki, Mahendranagar, Mirchaiya, Pahalmanpur, Parwanipur, Pathlaiya, Sayaule, Simara, Suichatar, Syangja, Anarmani, Bardhghat, Bhaktapur, Bharatpur, Butwal, Chanauta, Chapur, Damak, Damauli, Dhalkebar, Duhabi, Godak, Hetauda, Kamane, Lahan, Lamahi, Lekhanath, and Pokhara. Figure 3.A show the locations of these substations. The automation system activities involve the installation of hardware (panels, monitors, fittings etc.) and software connected to existing substation systems.

Figure 3.A: Location of the Substations Proposed for Automation



7. The scope of work at Barhabise substation involves a bay extension by installation of two 132 kV bays within the existing substation boundary which is currently under construction by NEA as part of an existing ADB project for which IEE was completed.¹ Similarly the scope

¹ Nepal: Power Transmission and Distribution Efficiency Enhancement Project; IEE: <https://www.adb.org/sites/default/files/project-documents/50059/50059-002-iee-en.pdf>; and Environmental Monitoring Report: <https://www.adb.org/sites/default/files/project-documents/50059/50059-002-emr-en.pdf>

of work at Ghorahi substation involves a bay extension by installation of two 132 kV bays within the existing substation boundary which is already in operation.

8. The Environmental Audit focused on the existing 220/132/33/11kV substations earmarked for expansion and automation under the EGMP – one substation Ghorahi will be both upgraded and expanded so 35no. substations have been audited. These existing facilities are located on NEA land in five provinces of Nepal. Therefore, all these works will be done within the premises of the existing substations of NEA.

1.2.2 Method and Approach

9. The Environmental Audit was conducted based on desk-based review of available documents followed by virtual discussions with NEA project managers and information collection through audit checklist. Due to COVID-19 pandemic, site visits were not possible. Therefore, information was collected through customized questionnaire filled in by the respective project managers of substations supported by Google-earth maps and site photographs. All available relevant in-house documents were reviewed, including the following:

- (i) Project proposal, NEA's existing management system, standard operating procedures, and training on environment, health, and safety, and
- (ii) Records on health and safety and compliance with respect to site specific safety management by NEA's engineering and procurement staff and construction contractors.

10. The Environmental Audit took place in the months of May and June 2020. It was undertaken by an independent environmental expert engaged by ADB under TA budget. Information for all 35 substations has been collected, reviewed and the critical environment, health and safety issues have been analyzed by the expert based on the Audit Checklists which were completed by the respective project managers of substations to identify areas of strength in each substation, and areas that need corrective actions to meet the required standard.

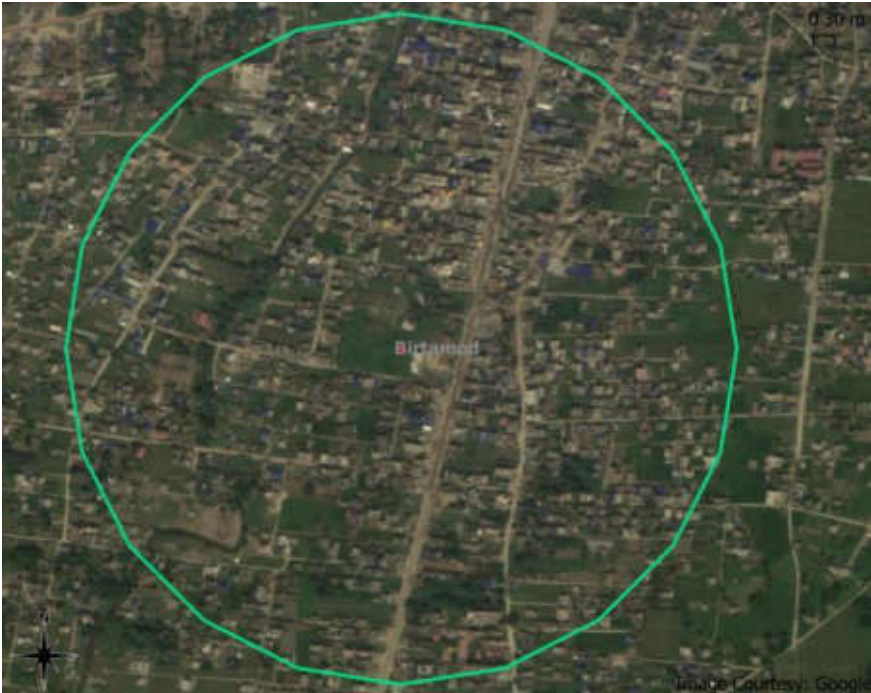
11. The Audit Checklist (Annex 1) which was provided to project managers of substations by the independent environmental expert identifies critical issues as per the following criteria deduced from the standards and guidelines mentioned above:


- General environmental management,
- Waste management practices,
- Hazardous material management,
- Occupational health and safety management, and
- Community health and safety management.

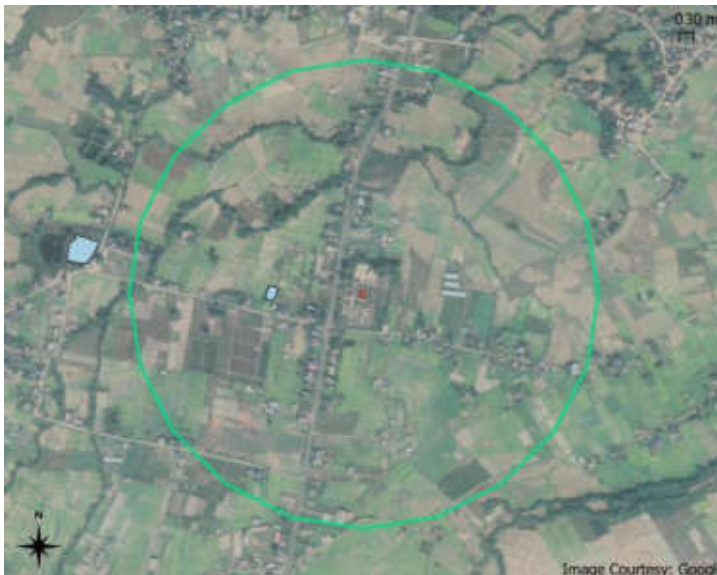
12. Telephonic interviews were also held with NEA field staff responsible for management of the 35 substations.

13. The general conditions along with key observations from these substations are discussed in the subsequent section.


2. FINDINGS OF THE ENVIRONMENT AUDIT 35 SUBSTATIONS

Sl. No.	Audit Findings	Substation needs improvements in the following areas
1.	<p>Anarmani Substation: This is a 132/33/11kV AIS SS with two 132/33kV 30 MVA and two 33/11 kV 16.6 MVA capacity. It is located in Birtamod Municipality of Ward No. 3 of Jhapa District next to Birtamod Bhadrapur Road. The SS occupies 24,161 m² and is in residential area and there are houses within 50m. It employs 10 technical 2 non-technical staff.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits. Staff have been trained for</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.

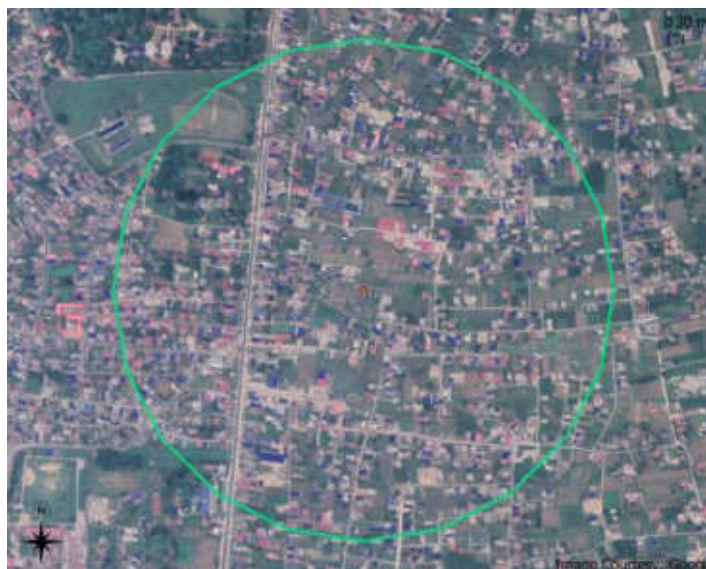
	<p>first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	
2.	<p>Attariya Substation. This Substation (SS) is a 132/33/11kV Air Insulated Substation (AIS) with two 132/33kV 30 MVA and one 33/11 kV with 16.6 MVA capacity. It is located in Godawari Municipality of Ward No. 1 of Kailali District next to the Mahakali/Bhimdatta Highway. The SS occupies 13,266 m² and is next to a residential area and within 50m are houses. There are no school and community buildings within 100m. It employs 10 technical 2 non-technical staff. East of the SS within 500m there is cultivated land and to the south west corner of the SS wetland pondage is observed. A river exists 523 m east of the SS boundary. It is 1.6 km to the Laljhadi Corridor that links Sulkaphanta Wildlife Reserve through Mohana Corridor to Dudhwa National Park in India.</p>  <p>Image Courtesy: Google</p>	<ul style="list-style-type: none"> • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.

	<p>Among the hazardous materials the SS stores is new transformer oil, and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials, storage site does not have adequate impermeable layer and a spill containment bund of 110% capacity is also not there. The old transformers have labels and are Polychlorinated Biphenyl (PCB) free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists. While the staff there have been trained for first aid SS lacks first aid kits. Firefighting equipment is installed but alarm system is lacking. The community health and safety has been taken care of using fencing with 24/7 guards on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to Personal Protective Equipment (PPE). No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	
3.	<p>Bardhghat Substation: This is a 132/11kV AIS SS with one 132/11kV 22.5 MVA and one 132/11 kV 7.5 MVA capacity. It is located in Bardhaghat Municipality of Ward No. 5 of Nawalparasi District next to Tirveni Road. The SS occupies 15,773 m² and is in semi residential area with houses within 50m of the SS. It employs 10 technical 2 non-technical staff. Beyond SS there is an irrigation canal at a distance for 200m west across the road, a stream 180 next to the canal, and 60m and 130m there are fishponds west of the SS.</p> 	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects.

	<p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • Clean cooking and eating facilities should be provided for worker.
4.	<p>Bhaktapur Substation: This is a 132/33/11kV AIS SS with two 30kV 16 MVA one 15 kV 21.95 MVA and one 22.5 kV 12.12 MVA capacity. It is located in Bhaktapur Municipality of Ward No. 1 of Bhaktapur District next to Nagarkot Road. This SS occupies 10,204 m² and is in a semi residential area and there are houses within 50m of the SS. It employs 10 technical 2 non-technical staff. Beyond SS within the 500m there are 3 public ponds at a distance for 150m to 300m and a stream 340m south of the SS.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects.


	 <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • Clean cooking and eating facilities should be provided for worker.
5.	<p>Bharatpur Substation: This is a 132/33/11kV AIS SS with two 132/33kV 30 MVA one 132/11 kV 15 MVA and one 132/11 kV 22.5 MVA capacity. It is located in Bharatpur Metropolitan City of Ward No. 11 of Chitawan District 120m east of Bharatpur Bypass Road. The SS occupies 8,747 m² and is in residential area and there are house within 50m. It employs 10 technical 2 non-technical staff. Beyond SS at 370m there is a sports ground. Also, the SS is located in Bharandabhar</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement.


Corridor. However, the forest of the corridor is 1.6km east of the SS (this biological corridor connects Chitwan National Park to Forests of the Hills). Bharatpur Airport is 1.5km south west of the SS. The SS is located in Chure Hills Conservation Area.

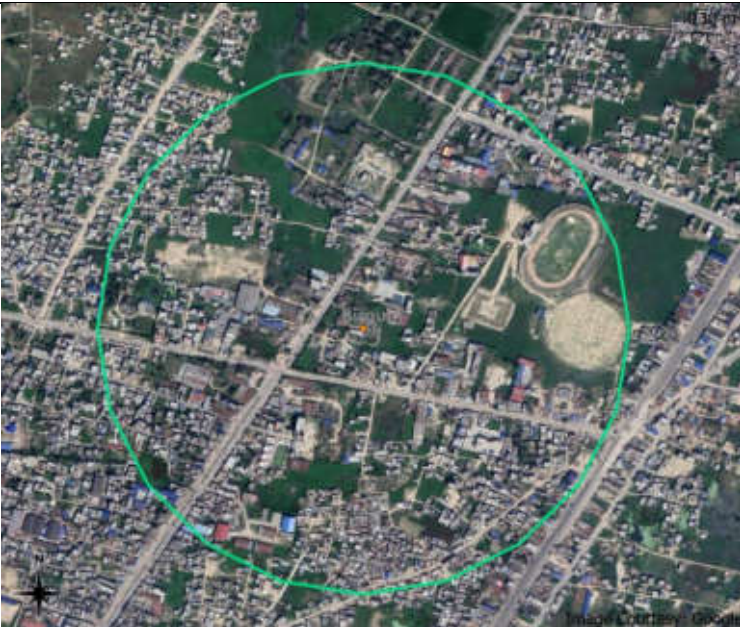


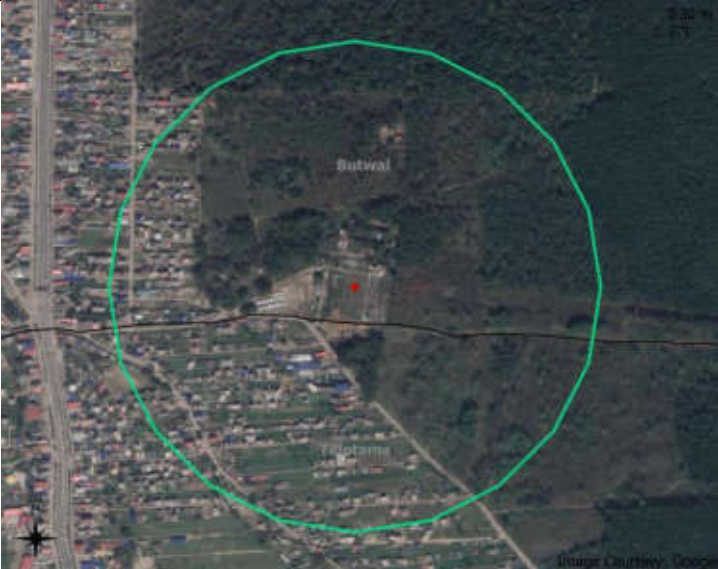
Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.


- Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided.
- First aid kits and PPE should be provided.
- Emergency response system including alarm system should be provided.
- Warning signage should be provided, consider shield to prevent electromagnetic fields.
- Provide training on emergency response.
- Workers should be provided training on proper use of PPEs and general health and safety aspects.
- Clean cooking and eating facilities should be provided for worker.

6.	<p>Bhurigaun Substation: This is a 132/33/11kV AIS SS with 132/33kV 30 MVA and 33/11 kV with 8 MVA capacity. It is located in Thakurbaba Municipality of Ward No. 2 in Bardiya District next to the East West Highway. The SS occupies 6,244 m² and is next to a residential area and within 50m of houses. It employs 12 technical 3 non-technical staff. East and west of the SS there is road and beyond it within 500m there is cultivated land. A river exists within 500 m east of the SS boundary. It is located in buffer zone of Bardiya National Park and in the Bardiya National Park International Bird Area, it is 1.2 km away from the National Park boundary.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are new transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Storage site lacks adequate impermeable layer and a spill containment bund of 110 % capacity is also not there. The old transformers have labels and are Polychlorinated Biphenyl (PCB) free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists. Staff have been trained for first aid but lacking first aid kits. The SS has experienced pest problem and control measures were taken. Firefighting equipment is installed with alarm system. The community health and safety has been taken care of using fencing with 24/7 guards on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on</p>	<ul style="list-style-type: none"> • General housekeeping and waste management needs improvement. • Designed, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Training on emergency response should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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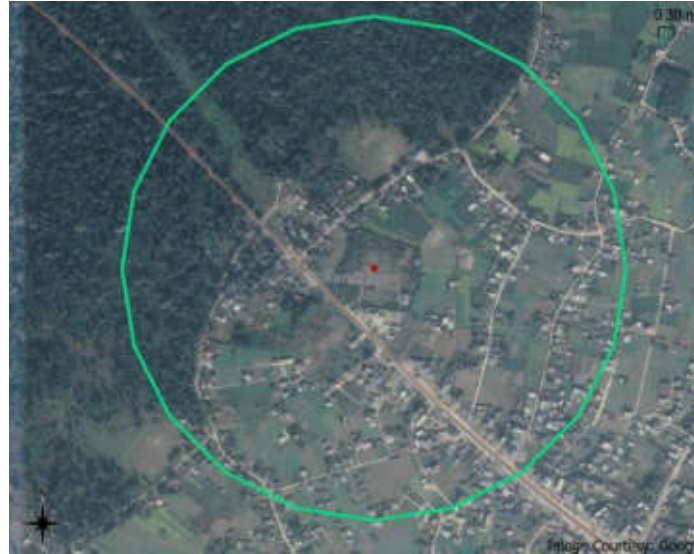
	working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.	
7.	<p>Barhabise Substation: This is a 220/132kV GIS SS with 4no. 220/132kV single phase autotransformers and 1 nos. 132/11kV transformer. It is located in Pokhara Lekhnath Metropolitan City of Ward No. 10 of Kaski District next to Prithivi Highway. The SS occupies 70,647 m² and is partially in agricultural area with undulating terrain with ground elevation of 1202.312m above sea level. The substation is under construction. Beyond SS within the 500m is agricultural and community forests. There are 10 structures within 100m of SS site including house within 50m of the SS.</p>  <p>The construction work is ongoing at the substation. There is a designated waste storage area within the substation site including hazardous waste storage facility. Diesel is being stored for vehicles and excavators. Transformers are mounted on an impermeable platform and it has a spill containment bund. Firefighting equipment and emergency plan are available at site. Slope stability issue was experienced by the site. Toilets facilities are available. The health and safety of workers needs improvement.</p>	<ul style="list-style-type: none"> Follow EMP under ADB project, ensuring protection work against landslide/slope stability is provided and that workers are provided training on proper use of PPEs and general health and safety aspects (corrective action for this substation to be undertaken through the existing ADB project)
8.	<p>Birganj Substation: This is a 66/33/11kV AIS SS with two 66/33kV 12.1 MVA and two 66/11 kV with 30 MVA capacity. It is located in Birgunj Metropolitan City of Ward No.13 of Parsa District next to the Tribhuvan Highway. The SS occupies 4,095 m² and is next to a residential area and within 50m are houses. It employs 10 technical 2 non-technical staff. A sports stadium exists north east of the SS boundary at 300m distance.</p>	<ul style="list-style-type: none"> Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. Oil leakage from transformers needs to be addressed, together with proper spill management.

	 <p>Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks a dedicated labelled area for storing such materials. Storage site does not have adequate impermeable layer and a spill containment bund of 110 % capacity is also not there. The old transformers have labels and are PCB free. The SS has a history of oil leakage and does not have spill control means. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists. SS lacks first aid kits but the staff have been trained for first aid. The SS has experienced pest problem and control measures were taken. Firefighting equipment is installed but lacks alarm system. The community health and safety has been taken care of using fencing with 24/7 guards on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary</p>	<ul style="list-style-type: none"> • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Training on emergency response should be provided. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
9.	<p>Butwal Substation: This is a 132/33/11kV AIS SS with three 132/33kV 63 MVA and two 33/11 kV 16.6 MVA capacity. It is located in Butwal Submetropolitan City of Ward No. 10 of Rupandehi District 550m east of Sihddartha highway. The SS occupies 12,597 m² and is in residential area and there are houses within 50m. It employs 12 technical 3 non-technical staff. Beyond SS within the 500m is forest land to the north and east. Endangered wildlife are observed in the local area.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement.

	 <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval centralized mechanism is installed. The lighting and ventilation exists but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPEs should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
10.	<p>Chanauta Substation: This is a 132/33/11kV AIS SS with one 132/33kV 30 MVA, one 132/33 kV 12.5 MVA, one 33/11kV 8 MVA and one 33/11 kV 3 MVA capacity. It is located in Shivaraj Municipality of Ward No. 5 of Kapilvastu District next to the Krishnanagar Chandrauta Road. The SS occupies 14,550 m² and is in semi residential area. There are houses within 50m of the SS. It employs 12 technical 3 non-technical staff. Beyond SS within the 500m is cultivated land.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and

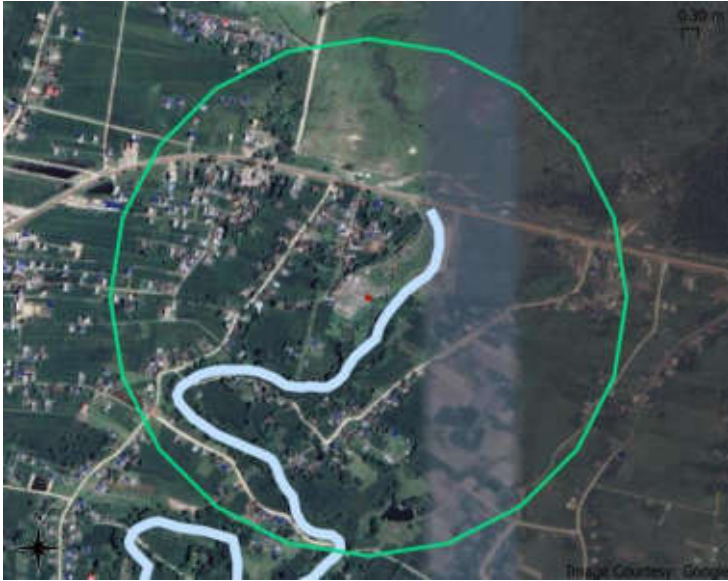
	 <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks a dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff there have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<p>proper handling of hazardous materials including transformer oil should be provided.</p> <ul style="list-style-type: none"> • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
11.	<p>Chapur Substation: This is a 132/33/11kV AIS SS with two 132/33kV 30 MVA and one 33/11 kV 8 MVA capacity. It is located in Chandrapur Municipality of Ward No. 4 of Rautahat District at East West Highway. The SS occupies 22,053 m² and is in semi residential area. There are houses within 50m of the SS. It employs 10 technical 2 non-technical staff.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement.

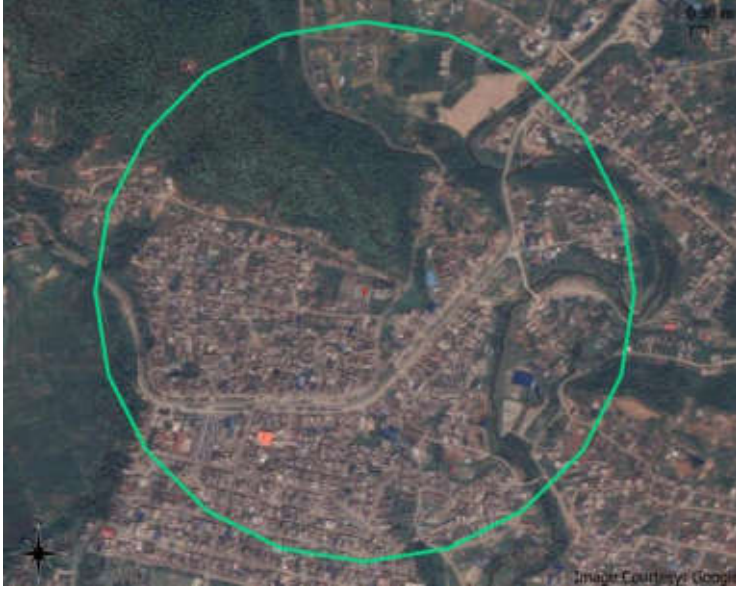
Beyond SS within the 500m is cultivated and forest land. Endangered wildlife are observed in the local area. The Substation falls in Chandranigahapur Corridor and the Corridor Forest is 230m west of the SS.





Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff there have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.


- Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided.
- First aid kits and PPE should be provided.
- Emergency response system including alarm system should be provided.
- Warning signage should be provided, consider shield to prevent electromagnetic fields.
- Provide training on emergency response.
- Workers should be provided training on proper use of PPEs and general health and safety aspects.
- Clean cooking and eating facilities should be provided for worker.


12.	<p>Damak Substation: This is a 132/33/11kV AIS SS with one 132/33kV 30 MVA and one 33/11 kV 16.6 MVA capacity. It is located in Kamal Rural Municipality of Ward No. 5 of Jhapa District 220m south of the East West Highway. The SS occupies 6,334 m² and is in a residential area. There is a river and houses within 50m of the SS. The eastern boundary wall of the substation is a riverbank. It employs 10 technical 2 non-technical staff. Beyond SS within the 500m is cultivated land, north across the highway is river. Endangered wildlife are observed in the local area.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff there have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed with alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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13.	<p>Damauli Substation: This is a 132/33/11kV AIS SS with two 132/33kV 30 MVA one 33/11 kV 16.6 MVA and one 33/11 kV 3 MVA capacity. It is located in Byas Municipality of Ward No. 4 of Tanahu District 115m east of Prithivi highway. The SS occupies 5,227 m² and is in residential area, there are houses within 50m of the SS. It employs 8 technical 2 non-technical staff. Beyond SS within the 500m is forest land to its north, rest is residential area. Local wildlife are observed in the substation area.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits. Staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided with alarm system. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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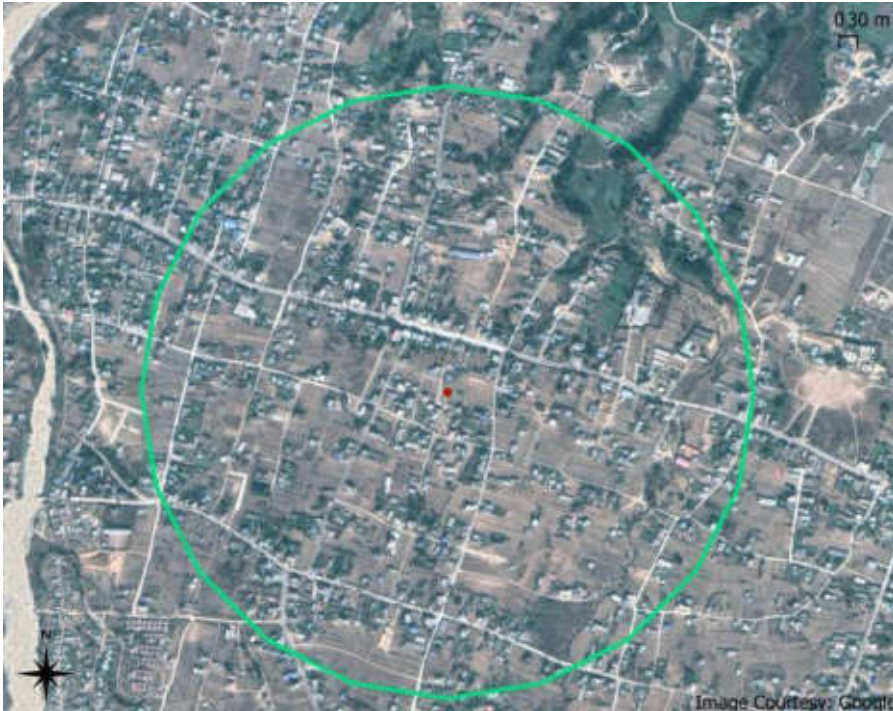
14.	<p>Dhalkebar Substation: This is a 132/33/11kV AIS SS with one 132/33kV 30 MVA, one 132/33kV 63 MVA, 33/11 kV 8 MVA and one 33/11 kV 16.6 MVA capacity. It is located in Mithila Municipality of Ward No. 7 of Dhanusha District 400m north of the East West Highway. The SS occupies 77,657 m² and is in a partial residential area, there are houses within 50m of the SS. It employs 12 technical 3 non-technical staff. Beyond SS within the 500m is cultivated land and at the western SS boundary there is river.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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	activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.	
15.	<p>Duhabi Substation: This is a 132/33/11kV AIS SS with three 132/33kV 63 MVA and two 33/11 kV 16.6 MVA capacity. It is located in Duhabi Municipality of Ward No. 3 of Sunsari District 360m west of Dharan Road. The SS occupies 11,817 m² and is in residential area, there are houses within 50m. It employs 12 technical 3 non-technical staff. Beyond SS within the 500m is residential area and cultivated land.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff there have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.

	health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.	
16.	<p>Ghorahi Substation: This is a 132/33kV AIS SS with 132/33kV 30 MVA capacity. It is located in Ghorahi Sub Metropolitan City of Ward No. 3 of Dang District next to the Ghorahi Lamahi Highway. The SS occupies 23,493 m² and is next to semi residential area and within 50m are houses. It employs 8 technical 2 non-technical staff. East and west of the SS there is road and beyond it within 500m there is cultivated land. A river exists 160m of the SS boundary. It is located in the Chure Hill Conservation Area.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. An adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also required. The old transformers have labels and are Polychlorinated Biphenyl (PCB) free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists. SS lacks first aid kits while the staff there have been trained for first aid. The SS has experienced pest problem and control measures were</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Training on emergency response should be provided. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.


	<p>taken. Firefighting equipment is installed with alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	
17.	<p>Godak Substation: This is a 132/33/11kV AIS SS with two 132/33kV 30 MVA and one 33/11 kV 8 MVA capacity. It is located in Illam Municipality of Ward No. 10 of Illam District next to Lodiya road. The SS occupies 11,487 m² and is in partially residential area. There are houses within 50m. There is a river 70m to the west. It employs 10 technical 2 non-technical staff. Beyond SS within 500m is cultivated land, residential area and grass land to its east. It falls in Important Bird Area Mai Valley Forests.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed, storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.


	<p>Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	
18.	<p>Hetauda Substation: This is a 132/66/11kV AIS SS with two 132/66kV 45 MVA and two 66/11 kV 10 MVA capacity. It is located in Hetauda Submetropolitan City of Ward No. 1 of Makwanpur District next to the Tribhuvan Highway and 90m east of a river. The SS occupies 20,509 m² and is partially in residential area, partially in hill, close to river and there are houses within 50m. It employs 12 technical 2 non-technical staff. Beyond SS within the 500m of the SS residential area, forest, and river. It is located in Chure Hills Conservation Area.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists. The SS lacks first aid kits while the staff there have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.

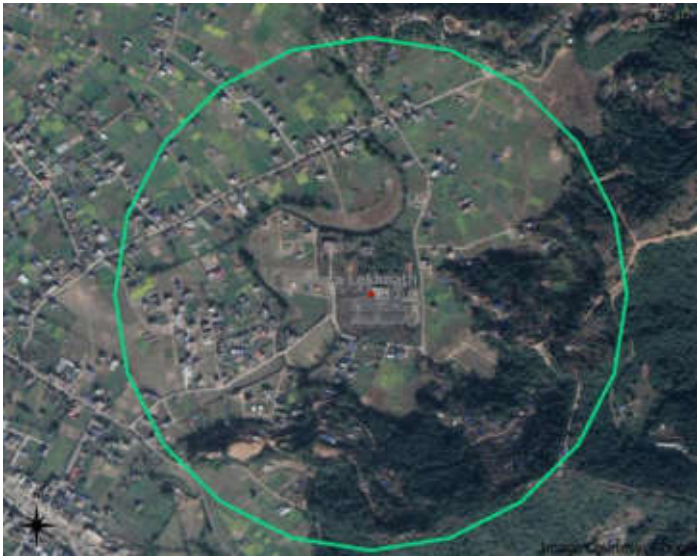
	<p>Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	
19.	<p>Kamane Substation: This is a 132/33/11kV AIS SS with one 132/33kV 30 MVA one and one 33/11 kV 16.6 MVA capacity. It is located in Hetauda Submetropolitan City of Ward No. 8 of Makwanpur District 100m south of Hetauda Phaparbari Road. The SS occupies 7,354 m² and is partially in residential area, there are houses within 50m of the SS. It employs 10 technical 2 non-technical staff. Beyond SS within the 500m of the SS is forest land to its north, rest is residential area. It is located in Chure Hills Conservation Area.</p> 	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.

	<p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff there have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	
20.	<p>Kohalpur Substation: This is a 132/33/11kV AIS SS with two 132/33kV 30 MVA capacity, 33/11kv 3 MVA and 33/11kV 16.6 MVA. It is located in Kohalpur Municipality of Ward No. 11 of Banke District next to the Ratna Highway. The SS occupies 14,560 m² and is next to residential area and within 50m are houses. It employs 10 technical 2 non-technical staff. Beyond SS within 500m there is cultivated land. The Buffer Zone of Banke National Park is 1.1 km away from the SS and it is 1.2 km west from Kamdi Corridor Forest that connects Banke National Park to Suhelwa Wildlife Sanctuary.</p> 	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects.

	<p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists. SS lacks first aid kits while the staff there have been trained for first aid. The SS has experienced pest problem and control measures were taken. Firefighting equipment is installed with alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • Clean cooking and eating facilities should be provided for worker.
21.	<p>Kusum Substation: This is a 132/11kV AIS SS with 132/11kV 12.5 MVA capacity. It is located in Rapti Sonari Rural Municipality of Ward No. 1 of Banke District with 500m north of East West Highway. The SS occupies 17,723m² and is 200 m away from residential area. It employs 8 technical 2 non-technical staff. Beyond SS within 500m there is mostly forest land, it is situated within Banke National Park and Dang Deukhuri Foothill Forests and West Rapti Wetlands IBA as well as Chure Conservation Area. Towards the east within 93m is a river.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Training on emergency response should be provided. • Workers should be provided training on proper use of PPEs and general health and safety aspects.

	 <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are new transformer oil and along with it unused end of life equipment, chemicals, and oils and it lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is required. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval centralized mechanism is installed. Adequate lighting and ventilation exists. SS lacks first aid kits but staff have been trained for first aid. The SS has experienced pest problem and control measures were taken. Firefighting equipment is installed with alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • Clean cooking and eating facilities should be provided for worker.
22.	<p>Lahan Substation: This is a 132/33/11kV AIS SS with one 132/33kV 63 MVA and two 33/11 kV 16.6 MVA capacity. It is located in Lahan Municipality of Ward No. 1 of Siraha District 350m south of East West Highway. The SS occupies 21,060 m² and is partially in residential area. There are houses within 50m of the SS. It employs 12 technical 2 non-technical staff. Beyond SS within the 500m is cultivated land. There is a drain 220 m east of the SS and based on consultation during a</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and

	<p>previous project in 2019 substation in-charge informed that during monsoon season water floods the ground level rooms inside substation.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also required. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<p>proper handling of hazardous materials including transformer oil should be provided.</p> <ul style="list-style-type: none"> • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
23.	<p>Lakhanatri Substation: This is a 132/11kV AIS SS with one 132/11kV and one 33/11 kV 22.5 MVA capacity. It is located in Pokhara Lekhnath Metropolitan City of Ward No. 27 of Kaski District next to Kaligandaki Road. The SS occupies 21,180 m² and is partially in residential area, there are houses within 50m of the SS. It employs 12 technical 3 non-technical staff.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement.


	<p>Beyond SS within the 500m is cultivated land and forest. The area falls in Lake Cluster of Pokhara Valley Ramsar Site and is 90m south of a river.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are Polychlorinated Biphenyl (PCB) free. The switchgear has SF6 and its retrieval centralized mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • Designated, suitably designed, storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
24.	<p>Lamahi Substation: This is a 132/33/11kV AIS SS with two 132/33kV 63 MVA one 132/33 kV 30 MVA and one 33/11 kV 16.6 MVA capacity. It is located in Lamahi Municipality of Ward No. 5 of Dang District 140m north of the East West Highway. The SS occupies 13,600 m² and is in residential area. There are houses within 50m of the SS. It employs 12</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement.

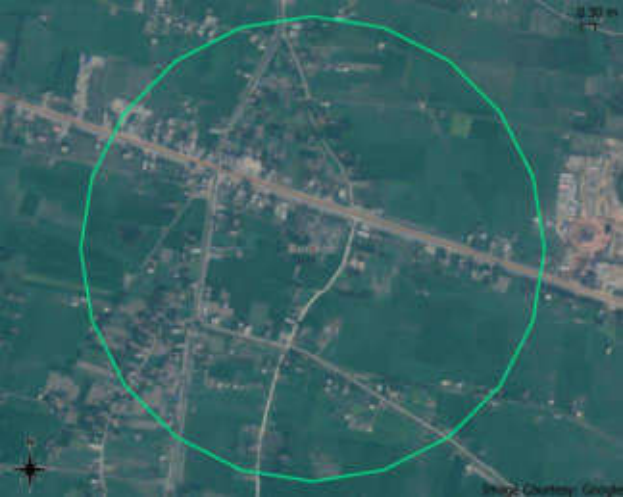
technical 3 non-technical staff. Beyond SS within the 500m is forest land to its north, rest is residential area. The area falls in Lamahi Corridor and also the area falls under IBA: Dang Deukhuri Foothills and west Rapti Wetlands Region. It is located in Chure Hills Conservation Area.





Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are Polychlorinated Biphenyl (PCB) free. The switchgear has SF6 and its retrieval centralized mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.

- Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided.
- First aid kits and PPE should be provided.
- Emergency response system including alarm system should be provided.
- Warning signage should be provided, consider shield to prevent electromagnetic fields.
- Provide training on emergency response.
- Workers should be provided training on proper use of PPEs and general health and safety aspects.
- Clean cooking and eating facilities should be provided for worker.

25.	<p>Lamki Substation: This is a 132/33/11kV AIS SS with two 132/33kV 15 MVA, one 33/11 16.6 MVA capacity. It is located in Lamkichuha Municipality of Ward No. 1 of Kailali District 67m south of East West Highway. The SS occupies 4,988m² and is in residential area. It employs 9 technical 2 non-technical staff. There are houses as close as 50 m from the SS. Beyond SS within 500m there is mostly residential land. The Substation is 680 m west of Karnali Corridor forest and 9.3km west of Bardiya National Park.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are new transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks a dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also required. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval centralized mechanism is installed. Adequate lighting and ventilation exists. SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem and control measures were taken. Firefighting equipment is installed with alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Training on emergency response should be provided. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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26.	<p>Mahendranagar Substation: This is a 132/33/11kV AIS SS with one 132/33kV 15 MVA, one 132/33 kV 10 MVA and 33/11 7.5 MVA capacity. It is located in Bedkot Municipality of Ward No. 9 of Kanchanpur District south of Mahendra Highway. The SS occupies 5,737m² and is in residential area. It employs 10 technical 2 non-technical staff. There are houses as close as 50 m from the SS. Beyond SS within 500m there is mostly cultivated land. In this cultivated land within 500m there are 9 water pondage areas, 5 on the side of the substation and 4 across the highway (ranging in area from 0.02 to 0.19 ha. Also 150m west of the substation is an irrigation canal. It is located in Suklaphanta Wildlife Reserve BZ and Suklaphanta Wildlife Reserve IBA. The Bharmadev Corridor Forest is 3km north of the substation.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are new transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks a dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also required. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists. SS lacks first aid kits while the staff have been trained for first aid. SS has experienced pest problem and control measures were taken. Firefighting equipment is installed with alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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27.	<p>Mirchaiya Substation: This is a 132/33/11kV AIS SS with one 132/33kV 30 MVA, and 33/11 8 MVA capacity. It is located in Mirchaiya Municipality of Ward No. 1 of Siraha District 530m north of Mahendra Highway. The SS occupies 22,327m² and is in residential area. It employs 10 technical 2 non-technical staff. There are houses as close as 50 m from the SS. Beyond SS within 500m there is mostly cultivated land. In this cultivated land, 178m east of the SS there is a river. At a distance of 188m east there is orchard.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are new transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also required. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists. SS lacks first aid kits while staff have been trained for first aid. SS has experienced pest problem and control measures were taken. Firefighting equipment is installed with alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
28.	<p>Pahalmanpur Substation: This is a 132/33/11kV AIS SS with one 132/33kV 30 MVA, and 33/11 8 MVA capacity. It is located in Ghodaghodi Municipality of Ward No. 10 of Kailali District 208m south of East West Highway. The SS occupies 20,201m² and is in residential area. It employs 10 technical 2 non-technical staff. Beyond SS up to 150m on east and west</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement.

	<p>there is cultivated land but beyond that till 500m there is forest land. This whole area is Basanta Corridor and connects to Dudhwa National Park of India. Also, the SS is 6.3km west of Ghodaghodi Lake Ramsar Site.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also required. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval centralized mechanism is installed. Adequate lighting and ventilation exists. SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed with alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
29.	<p>Parwanipur Substation: This is a 132/66/11kV AIS SS with three 132/11kV 22.5 MVA and two 132/66 kV with 63 MVA capacity. It is located in Jitpur Simara Sub-metropolitan City of Ward No. 23 that is 280m east of Tribhuvan Highway. The</p>	<ul style="list-style-type: none"> • Designated, suitably designed storage areas and proper handling of


SS occupies 22,327 m² and is next to residential area and cultivated land and within 50m houses exist. It employs 10 technical 3 non-technical staff. A river exists within 280m to the south.





Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate spill containment bund of 110 % capacity is required. The old transformers have labels and are PCB free. The SS has history of oil leakage and does not have spill control means. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but SS lacks first aid kits. Staff have been trained for first aid. The SS has experienced pest problem with rat and snake and control measures were taken. Firefighting equipment is installed but lacks alarm system. The community health and safety has been taken care of using fencing with 24/7 guards on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.


hazardous materials including transformer oil should be provided.

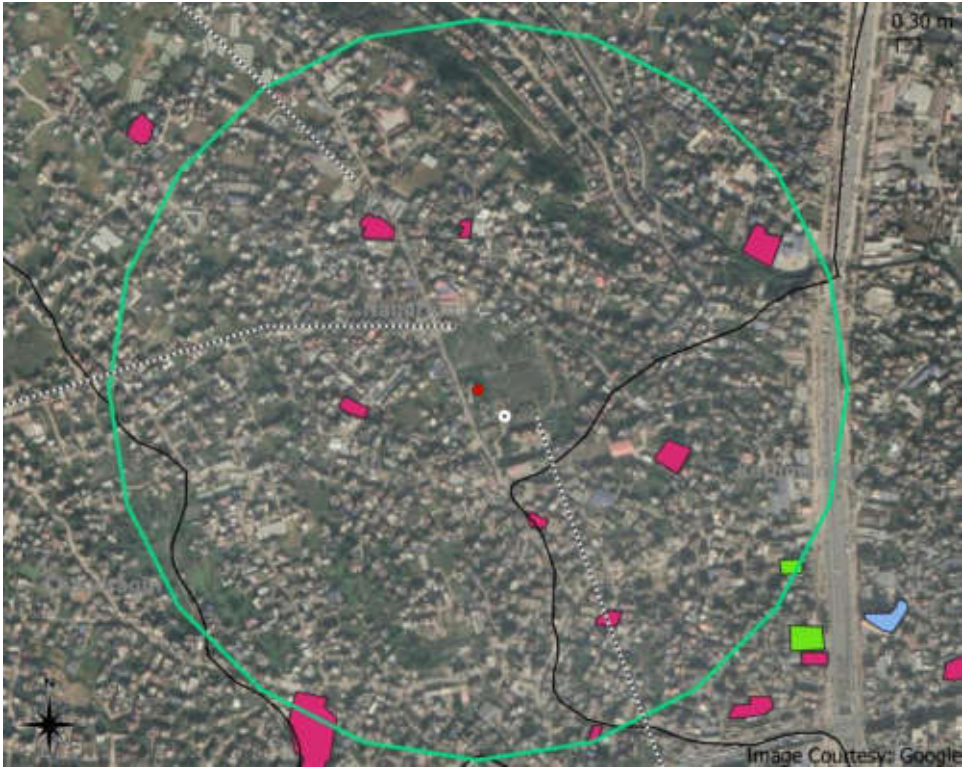
- Oil leakage from transformers needs to be addressed, together with proper spill management.
- First aid kits and PPE should be provided.
- Emergency response system including alarm system should be provided.
- Warning signage should be provided, consider shield to prevent electromagnetic fields.
- Provide training on emergency response.
- Workers should be provided training on proper use of PPEs and general health and safety aspects.
- Clean cooking and eating facilities should be provided for worker.


30.	<p>Pathlaiya Substation: This is a 132/11kV AIS SS with one 132/11kV 22.5 MVA capacity. It is located in Jitpur Simara Submetrolopitan City of Ward No. 1 of Bara District next to the East West Highway. The SS occupies 20,731m² and is in forest area (its boundary wall formd the boundary of Parsa National Park). It employs 8 technical 2 non-technical staff. Beyond SS within the 500m there is forest land. Endangered species of wildlife are encountered in this area.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but SS lacks first aid kits. Staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitable designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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31.	<p>Pokhara Substation: This is a 132/11kV AIS SS with two 132/11kV 30 MVA capacity. It is located in Pokhara Lekhnath Metropolitan City of Ward No. 10 of Kaski District next to Prithivi Highway. The SS occupies 21,180 m² and is partially in residential area, there are houses within 50m of the SS. It employs 10 technical and 2 non-technical staff. Beyond SS within the 500m of the SS is residential area. The area falls in Lake Cluster of Pokhara Valley Ramsar Site. Pokhara Airport is 1.5km south east of the SS site.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are Polychlorinated Biphenyl (PCB) free. The switchgear has SF6 and its retrieval centralized mechanism is installed. Adequate lighting and ventilation exist but the SS lacks first aid kits while the staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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32.	<p>Sayaule Substation: This is a 132/33/11kV AIS SS with one 132/33kV 30 MVA capacity. It is located in Amargadhi Municipality of Ward No. 1 of Dadeldhura District 260m south to the Mahakali Highway. The SS occupies 2,052m² and is in residential and cultivated land area. It employs 8 technical 2 non-technical staff. Beyond SS within the 500m of the SS there is forest land.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF₆ and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits. Staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to Personal Protective Equipment (PPE). No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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33.	<p>Simara Substation: This is a 66/11kV AIS SS with two 66/11kV 15 MVA capacity. It is located in Jitpur Simara Sub metropolitan City of Ward No. 2 of Bara District 360m west to the Tribhuvan Highway. The SS occupies 5,026m² and is in residential area and there are houses within 50m of the SS. It employs 10 technical 3 non-technical staff. There is a Shree Nepal Secondary School 170m south west and 200m south west there is Simara College (no schools within 100m). Also, 200m south east of the SS there is Surya Nepal Industry. Also, the SS is 800m west of Simra Airport. It is situated in Parsa National Park Buffer Zone and Parsa Wildlife Reserve IBA.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also required. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits. Staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably design storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.
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	with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.	
34.	<p>Suichatar Substation: This is a 132/66/11kV AIS SS with three 132/66kV 37.8 MVA and two 66/11 kV 18 MVA capacity. It is located in Nagarjun Municipality of Ward No. 10 of Kathmandu District 460m Ring Road. The SS occupies 14,770 m² and is in s residential area and there are houses within 50m of the SS. It employs 12 technical 3 non-technical staff. Beyond SS there are schools at a distance for 150m to 490m and a hospital 480m south west of the SS (no schools within 100m).</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks a dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits. Staff have been trained for</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.

	<p>first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.</p>	
35.	<p>Syangja Substation: This is a 132/33/11kV AIS SS with three 132/33kV 30 MVA and one 33/11 kV 8 MVA capacity. It is located in Putalibazar Municipality of Ward No. 11 of Syangja District next to Siddhartha Highway. The SS occupies 17,723 m² and is in a small residential area, 260m south of a river and 130m east of a stream. It employs 10 technical 2 non-technical staff. Beyond SS within the 500m there are cultivated land and hill.</p>  <p>Tripping hazard issue occurs in the substation area with materials thrown around. Among the hazardous materials the SS stores are transformer oil and along with it unused end of life equipment, chemicals, and oils. It lacks dedicated labelled area for storing such materials. Adequate impermeable layer on storage site is necessary and a spill containment bund of 110 % capacity is also needed. The old transformers have labels and are PCB free. The switchgear has SF6 and its retrieval mechanism is installed. Adequate lighting and ventilation exists but the SS lacks first aid kits. Staff have been trained for first aid. The SS has experienced pest problem (with rat and snake) and control measures were taken. Firefighting equipment is installed but no alarm system. The community health and safety has been taken care of using fencing with 24/7 guard on closed gates but lacks warning signage and shield to prevent electromagnetic fields. The emergency preparedness of the substation is considered to be very poor to handle disaster/accidents. The occupational health and</p>	<ul style="list-style-type: none"> • General housekeeping and waste management need improvement. • Designated, suitably designed storage areas and proper handling of hazardous materials including transformer oil should be provided. • First aid kits and PPE should be provided. • Emergency response system including alarm system should be provided. • Warning signage should be provided, consider shield to prevent electromagnetic fields. • Provide training on emergency response. • Workers should be provided training on proper use of PPEs and general health and safety aspects. • Clean cooking and eating facilities should be provided for worker.

	safety of staff is observed to be requiring attention as staff are trained on electrical equipment but lack skills on working with heights and do not have access to PPE. No asbestos is recorded in the site. The sanitation and welfare activities are taken care of with functional toilets and clean drinking water. However, a clean cooking and eating facility is necessary.	
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14. Across all 34 existing substations (excluding under construction Barhabise) improvements are needed in the following general areas:

- i) There are trip hazards with materials such as scrap metal scattered around the substations. Given this is a recurrent issue it is evident that there is no waste management system, including handling and ultimate disposal of scrap metal. Substation facilities should designate special segregated areas/points for solid and hazardous waste collection and collect all unwanted scraps for safe disposal. Wastes such as pieces of cables, switch gears and other waste should have special bins/areas for storage. Further, a corporate system for managing waste generated from substations needs to be standardized and institutionalized across all substations.
- ii) Handling and storage of hazardous material – i.e. transformer oil – needs to be improved. At all substations there is a lack of designated, suitably designed storage areas and NEA standard design should be updated to require this as standard. Storage in barrels should be in covered area on impermeable platforms with bunds to avoid risks of spillages; in the short term if no such facility exists, they should be kept on drip trays.
- iii) The spillage oil from transformers needs to be addressed and prevented by carrying out regular preventive maintenance of transformers and ensuring valves, nuts and bolts are tightly secured; and the rubber seals of the radiators of the transformers are regularly replaced (another source of oil leakage) by substation staff. While not large in volume, the spilled oil falls on the concrete transformer platform and travels to ground. The elevated platforms should expand beyond the footprint of the transformer and retrofitted with elevated impermeable bunds of 110% capacity above the highest known flood level, to contain any oil spillage. However, first priority should be prevention and management of spillage, which can be achieved through regular checks and preventive maintenance and having spill kits available on site.
- iv) First aid kits and PPE need to be provided at the substation sites for use by the staff -- periodic checks of safety kits at the substations should be recorded and information on the same should be monitored as per SOPs.
- v) The emergency response system including alarm system should be installed as standard.
- vi) On the substation boundary fence and on high risk electrical equipment within the site warning signage should be provided, depending on exposure it should also be considered to use shield to prevent workers being exposed to electromagnetic fields.
- vii) Substation staff need to be well trained to deal with disaster/accident particularly given Nepal being prone to natural hazards and potential for accident to occur given electricity infrastructure; there were no written Environment, Health and Safety Plans or trainings to prepare staff for emergencies.
- viii) Workers should be provided training on proper use of PPEs and general health and safety aspects -- trainings should include and highlight the importance of worker health and safety.
- ix) Adequate sanitation and welfare facilities for employees on duty need to be provided within the substation building including toilets with running water, but also kitchen, dining and rest areas, and an adequate supply of drinking water that meets national standards.

3. CORRECTIVE ACTION PLAN (CAP)

15. Table 3.B presents the corrective action plan for all substations. The corrective actions required at each substation will be verified on site and NEA will complete a detailed report submitted to ADB confirming the completion of the included actions, for clearance before any project works commence.

Table 3.B Corrective Action Plan for all Existing Substations

S. No	Issue	Corrective Action	By whom	By when	Budget (source)
1a	General housekeeping and waste management, handling and storage of hazardous material needs improvement (corporate level)	<ul style="list-style-type: none"> Develop and cascade to all SS for implementation a standardized housekeeping and waste management system/procedure in accordance with national laws and regulations and the EHS Guidelines on Hazardous Materials Management and Waste Management. System/procedure to include avoiding or minimizing the generation waste materials, as far as practicable. Where waste generation cannot be avoided but has been minimized, the preference should be recovery and reuse. Where waste cannot be recovered or reused, reputable, legitimate, licensed contractors must be appointed to treat, destroy, and dispose of it in an environmentally sound manner. Develop as part of system/procedure a checklist for SS managers on correct storage and disposal of transformer oils, other fuel, oil, and chemicals, old transformers, scrap metals, electronic wastes, municipal solid wastes, and wastewater etc. Provide training to all SS managers on implementation of the housekeeping and waste management system/procedure and use of the checklist (document training and attendance by SS managers) 	NEA ESSD to implement	Before any project works commence	NEA operational budget, may be supported by PSC international environment expert.
1b	General housekeeping and waste management, handling and storage of hazardous material needs improvement	<p>In short-term:</p> <ul style="list-style-type: none"> Identify and demark in the SS compound an appropriate area for waste storage yard and for storage of oil barrels, fuel etc. Implement housekeeping and waste management system/procedure to include the (i) segregation of all solid and hazardous waste generated; and 	NEA SS Managers to implement, for audit by NEA ESSD	Short-term actions before any project works utilizing substation commence; long-term actions by project	SS operational budget.

S. No	Issue	Corrective Action	By whom	By when	Budget (source)
	(substation level)	<p>(ii) environmentally sound storage of all solid and hazardous materials and waste in dedicated, labelled areas <u>within</u> the premises of substations.</p> <ul style="list-style-type: none"> If covered, impermeable 110% bunded area is not currently available on site immediately store all barrels of transformer oil, other fuel, oils, and chemicals temporarily on the drip trays; ideally undercover. <p>In long-term:</p> <ul style="list-style-type: none"> Construct a dedicated, covered, bunded impermeable area to 110% for storage of barrels of transformer oil, other fuel, oils, and chemicals to prevent leakage into the ground 		completion	
2	Transformer oil spillage needs to be addressed (substation level)	<p>In short term:-</p> <ul style="list-style-type: none"> Carry out preventive maintenance of transformers and ensure valves, nuts and bolts are fully functional and tightly secured, ensure rubber seals of radiators are intact, continue to do so on a regular basis. Provide in a signed, accessible location on-site sufficient absorbent materials (e.g. sorbents, dry sand, sandbags) for soaking up oil spills Soak up existing oil spills and, as required, remove soil to depth 30cm for 1m beyond footprint for disposal to hazardous landfill site by reputable, legitimate, licensed contractor keeping photographic records and waste transfer notes. Extra gravel to at least 30cm depth extending 1m beyond footprint to be placed to intercept and prevent any further oil percolation into the ground. Soil and groundwater investigation to be undertaken by suitably qualified consultant to confirm extent of any contamination across/beneath SS from oil leaks and spills and additional remedial measures required. <p>In long-term:-</p> <ul style="list-style-type: none"> Existing concrete foundations to be retrofitted so that an impermeable platform extends 1m beyond the footprint and incorporate elevated impermeable bunds to 110% capacity above the highest known 	NEA SS Managers to implement, for audit by NEA ESSD	Short-term actions before any project works utilizing substation commence; long-term actions by project completion	SS operational budget.

S. No	Issue	Corrective Action	By whom	By when	Budget (source)
		<p>flood level.</p> <ul style="list-style-type: none"> Implement any additional remedial measures identified by consultant following the testing of soil and groundwater. 			
3a	First aid kits and PPE, training in use of PPE and health and safety and emergency procedures in event of illness, accident, fire, or natural hazard to be provided (corporate level)	<ul style="list-style-type: none"> Source first aid kits and PPE for distribution to SS Managers -- PPE (footwear, masks, protective clothing, and goggles in appropriate areas) to be provided to the staff in accordance with Table 2.7.1. Summary of Recommended Personal Protective Equipment According to Hazard in EHS Guideline on OHS Periodic checks of first aid kits and PPE at substations should be carried out, recorded and information on the same should be monitored. Develop as part of health and safety system/procedure a checklist for SS managers on correct content of first aid kit, PPE to be provided at SS, need for renewal if out of date etc. Develop as part of health and safety system/procedure an incentive/disciplinary system to ensure use of PPE by workers at SS, such as use of written warnings etc. Provide training to all SS managers on use of the checklist and incentive/disciplinary system, as well as on (i) proper use of PPEs - the importance of safety needs to be stressed to effect behavioral/attitudinal change, (ii) general health and safety aspects, and (iii) emergency procedures in event of accident, fire or natural hazard to be given on a train-the-trainer basis (document training and attendance by SS managers) Provide training to all SS managers on the development and implementation of emergency preparedness and response plans for (i) environmental incident, (ii) health and safety incident in accordance with the General EHS Guidelines 	NEA ESSD to implement	Before any project works commence	NEA operational budget, may be supported by PSC international environment expert.
3b	First aid kits and PPE, training in use of PPE, health and safety and emergency	<ul style="list-style-type: none"> Ensure appropriately equipped first aid kits available at first aid stations in each working area and building to be signed and easily accessible; to include list of equipment and use 	NEA SS Managers to implement, for audit by	Before any project works utilizing substation	SS operational budget.

S. No	Issue	Corrective Action	By whom	By when	Budget (source)
	procedures in event of illness or accident to be provided (substation level)	<p>by dates as well as poster of the first aid procedures and emergency contact details/local hospital.</p> <ul style="list-style-type: none"> • Ensure appropriate PPE is available at the substation and is actively used by staff by implementing the incentive/disciplinary system. • Provide training to all SS staff (including housekeeping staff) on (i) proper use of PPEs the importance of safety needs to be stressed to effect behavioral/attitudinal change, (ii) general health and safety aspects, and (iii) emergency procedures in event of accident (document training and attendance by SS managers) • Ensure that a first aider is always provided on-site; this can be a member of staff trained in emergency procedures to follow in event of accident. 	NEA ESSD	commence	
3c	Emergency response systems need to be improved notably fire alarms need to be provided, training in emergency procedures in event of fire or natural hazard to be provided (substation level)	<ul style="list-style-type: none"> • Develop and implement emergency preparedness and response plans for (i) environmental incident, (ii) health and safety incident in accordance with the General EHS Guidelines to include details of emergency equipment on site, NEA designated Team, nearest doctors, hospital, fire station, monthly testing of fire alarms, emergency preparedness and response training plan, and quarterly emergency fire/earthquake/flood simulation drills with records. • Provide training to all SS staff (including housekeeping staff) on emergency procedures in event of fire or natural hazard, including undertaking emergency fire/earthquake/flood simulation drills (document training and attendance by SS managers) • In buildings, all rooms to be installed with fire/smoke detectors with visible and audible alarm. • In each working area and building provide fire extinguishers and other manual firefighting equipment maintained in good working order and readily accessible – number to be adequate for size of premises, equipment installed, physical and chemical properties of substances present, and the maximum number 	NEA SS Managers to implement, for audit by NEA ESSD	Before any project works utilizing substation commence	SS operational budget.

S. No	Issue	Corrective Action	By whom	By when	Budget (source)
		<p>of people present.</p> <ul style="list-style-type: none"> Ensure that a fire marshal is provided on-site at all times; this can be a member of staff trained in emergency procedures to follow in event of fire. 			
4	Health and safety risk reduction measures	<p>Short-term:-</p> <ul style="list-style-type: none"> Install warning signs (in written and graphic form using ISO electrocution symbols) on substation boundary fence and on high risk electrical equipment within the site Measure EMF levels at the substation to confirm that international good practice reference levels for workers/adjacent residents per IFC EHS Guidelines not exceeded If reference levels exceeded provide workers with personal monitor so they can measure and manage their EMF exposure <p>Long term:-</p> <ul style="list-style-type: none"> If EMF exposure risk identified because of measurements install shield to prevent workers being exposed 	NEA SS Managers to implement, for audit by NEA ESSD	Short-term actions before any project works utilizing substation commence; long-term actions by project completion	SS operational budget.
5	Welfare Facilities for SS Staff	<ul style="list-style-type: none"> Provide SS staff with access to indoor kitchen facilities (if cooking on-site) and a clean eating and rest area that has an adequate supply of drinking water. Supply of potable drinking water meeting national standards to be available to SS staff. 	NEA SS Managers to implement, for audit by NEA ESSD	Before any project works utilizing substation commence	SS operational budget.
6	Biodiversity (bird electrocution risk)	<ul style="list-style-type: none"> For existing substations which are already located in protected area, protected area buffer zones or IBA, PSC assess the electrocution risk to birds from any lower voltage wires and/or jumpers at incoming and outgoing connections and where risk is deemed to be high retrofit with "bird sensitive" design measures where technically feasible 	NEA SS Managers to implement, for audit by NEA ESSD	By project completion.	SS operational budget.

Appendix 4 – Due Diligence of Associated Facility

Balefi Corridor 132 kV DC Transmission Line

A. Introduction

1. Balefi corridor 132 kV DC Transmission Line is considered to be an associated facility of the Pangtang substation which will be connected to the grid at the under construction Barhabise GIS 220/132/11 kV substation through a 18.161 km long 132 kV transmission line from Jugal Rural Municipality (RM) to Barhabise Municipality, known as Balefi Corridor. It is being developed by Transmission Directorate of NEA, thus NEA has full control over implementation.

B. Findings of Due Diligence

B.1 Current Status of the Implementation

2. The project was approved by the government and contract has been awarded on May, 2020. However, due to ongoing COVID-19 pandemic the mobilization of the contractor is delayed. The project implementation period is 36 months for construction and commissioning phase.

B.2 Salient Features

3. Transmission line will be double circuit with vertical arrangement comprising unbundled BEAR conductor. The ruling span between tower structures is 300m. The right of way (RoW) is 18m (9m on each side from the centerline) for 132kV line as per the Electricity Regulation, 2050 (1993). Transmission line technical design and physical features are given in Table 4.A.

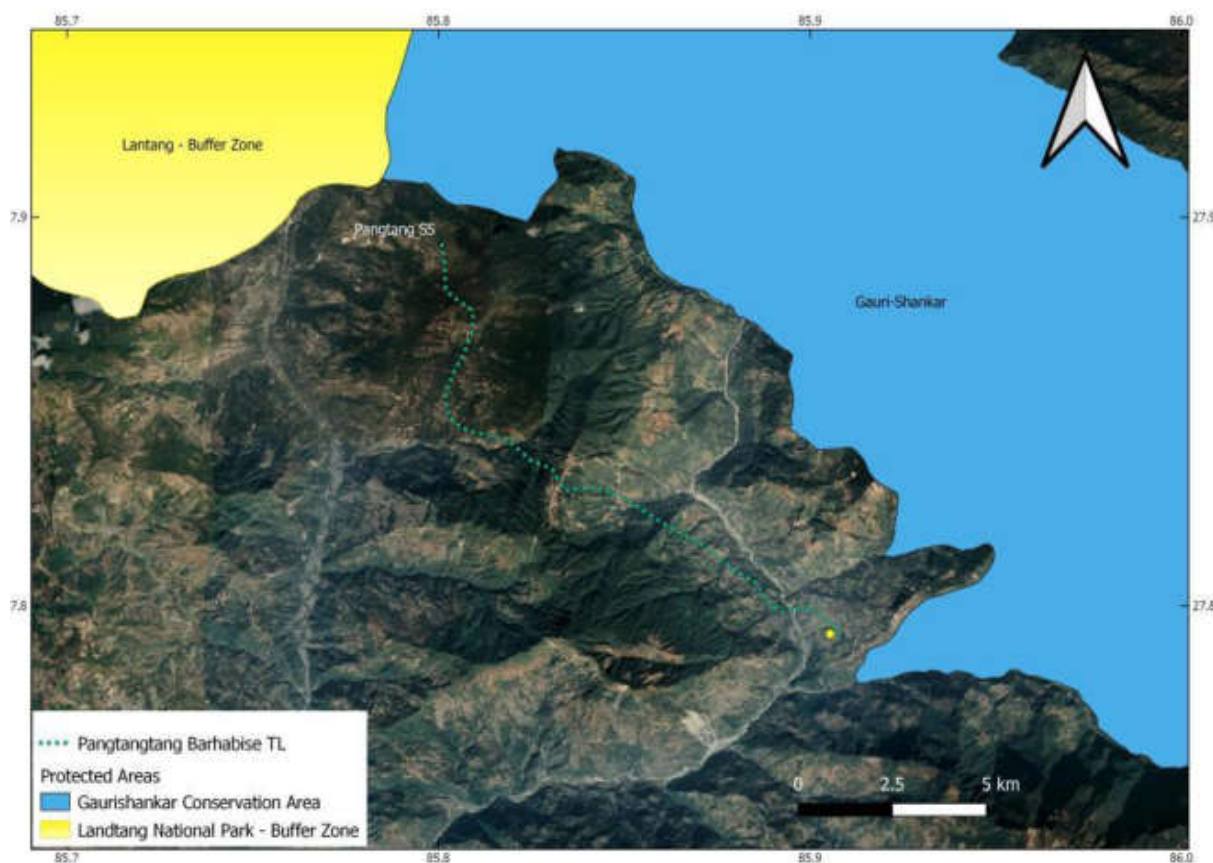
**Table 4.A: Physical and Technical Parameters of
Balefi Corridor 132 kV Transmission Line**

General Feature	Description
Project	Balefi Corridor 132kV Transmission Line Project
Affected Province	Province 3
Affected Districts	Sindhupalchowk
RM/Municipality	Jugal RM, Barhabise Municipality.
Technical Feature	Description
Total length	18.167km
Right of way	18m

Number of angle points	32
Basic span	300m
Area required for one tower	0.0144 ha (12m x 12m)
Height of tower	Average 32m
Ground clearance of conductor	<p>Minimum 6.1 m at the maximum sag condition</p> <ul style="list-style-type: none"> • Road 7m • Power cable with voltage 3.5m • Communication line crossing 3.5 m • Residential Area: 7m • Power line above/below - 3.5m • Phase to phase -3.75 m
Voltage level	132kV
No. of circuits	Double circuit
Tower type	Lattice
Conductor	"Bear"
Insulator	Cap and Pin type
Earth wire	Optical Fiber Ground Wire (OPGW) type
Foundation type	Pad and Chimney
Estimated project cost	Nepali Rupee (NRs.) 850 mil

B.3 Location

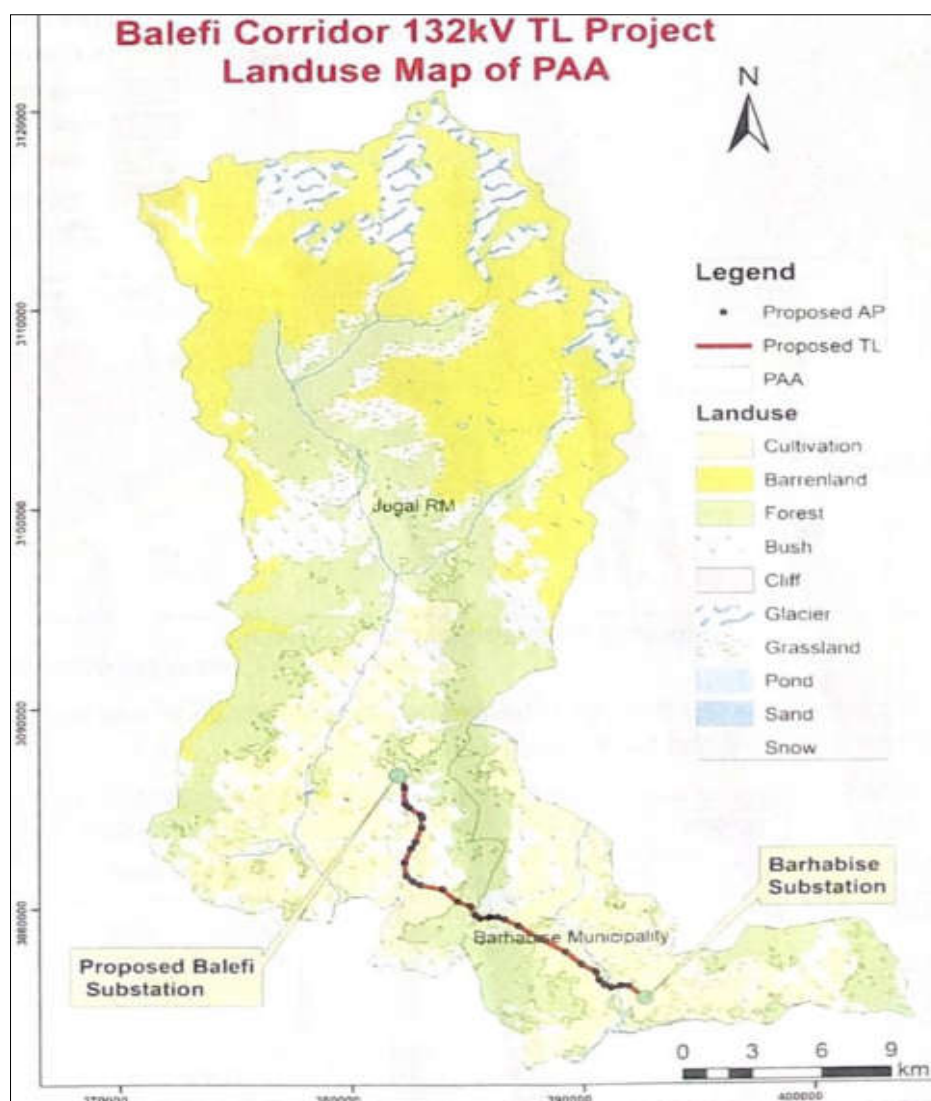
4. The transmission line is located in Province 3 of the Central Nepal. The alignment starts from the proposed Pangtang 132kV substation (a project component) located at Jugal RM and terminates at the under construction substation at Barhabise of Barhabise Municipality of Sindhupalchowk District (Figure 4.A).

Figure 4.A: Location Map

5. The alignment consists of 32 angle points starting from AP-1 at Pangtang to AP-34 at Sano Palati at Barhabise Municipality (former Barhabise VDC) in Sindhupalchowk District crossing six previous VDCs (Pangtang, Hagam, Gumthang, Maneshwora, Ramche and Barhabise) and two currently named Rural Municipality or Municipality of one District. The main land use pattern of the project area is forest, cultivated land, and barren land – it crosses approximately 39.94% cultivated land, 28.58% forest, 27.64% barren land and 3.84% others (water bodies, road crossings etc.) (Figure 4.B). The elevation of the alignment ranges from 957.817 to 2,532.305 masl. The alignment avoids densely populated areas, major structures, and protected areas. It crosses roads, rivers, rivulets, and other 132kV transmission lines and 33/11kV distribution lines. Major crossings are Bhote Koshi (river) and the Arniko Highway.

6. About 5.192 km length of the line (28.58%) is in forest land, there are no protected areas or key biodiversity areas along it. Gauri-Shankar Conservation Area and the buffer zone of Lantang National Park are however within about 5km at certain locations along the alignment.

Figure 4.B: Land Use Map of Transmission Line Alignment



B.4 National EIA and Statutory Requirements

7. Transmission lines above 132kV under Rule 3 Schedule 2, Clause F, Sub clause 1(a) of Environment Protection Rules 2077 BS (earlier EPR 2054 Rule 3, Schedule 1, Clause F, Sub clause 1(c) published in Nepal Gazette dated 2065/11/26) require obligatory IEE. Accordingly, NEA conducted the IEE and disclosed it to the public on February 2019. The IEE has been approved by the Ministry of Energy, Water Resources and Irrigation with its letter dated September 9, 2019. Approval Letter is attached in Annex 4.1. Following are the conditions and recommendations of the approval:

- (i) During implementation if additional impact is observed or is probable project proponent in its own cost will minimize/mitigate such impact.

- (ii) Based on approved IEE's EMP during the mid-construction stage of the project and after completion of the construction Department of Electricity Development Board needs to be provided with the Monitoring Reports.
- (iii) Recommended mitigation measures in the IEE to be incorporated in the detail design of the project need to be incorporated and mitigation and corrective measures recommended to be followed by the construction contractor need to be included in the contract agreement with the contractor and also has to be strictly implemented.
- (iv) If there are any changes to be considered for the infrastructure, site activities, design, size or type other than that included in the approved IEE study they need to be presented to DoED and permission needs to be taken.
- (v) Conditions set by Department of Soil Conservation need to be abided.

B.5 Surveys, Investigations and Studies Performed





8. As part of the national IEE, NEA has carried out site specific surveys, investigations, and studies, including consultation with stakeholders and affected communities. The methodology was mainly guided by the Nepal's EPR, 2054 and National EIA Guidelines, 2050. Terms and conditions received from the then Ministry of Environment were followed during the IEE process. Literature review, Geographic Information System (GIS) analysis, walkthrough survey, scoping meetings, and public consultation, were some important tools used for data collection. Field studies were done in February and April 2019. Key Informant Interviews (KII) and Focus Group Discussions (FGD) were conducted during the field studies to support the baseline data. Stakeholders from relevant government offices of affected districts have also been consulted.

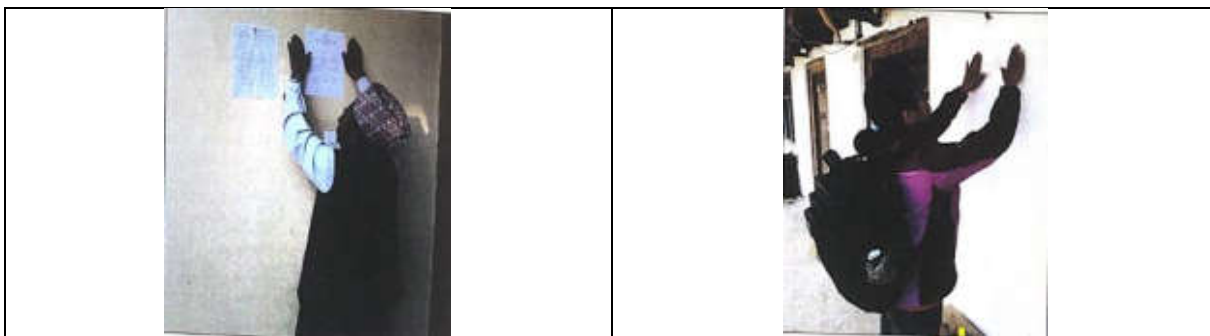
9. Biodiversity surveys carried out included measurement of forest resource and identification of fauna along the transmission line route. Census enumeration of trees was made in the forest. This was done together with officials from relevant divisional forest offices. Data on wildlife was collected by direct observation at different project sites and adjacent areas with various land use types (e.g. forest areas, grassland, agriculture land etc.). KII and literature review was also used to document the information on wildlife. The indirect evidences such as scats/droppings, calls and cliffs were also used for identification of mammals and birds in the area (Table 4.B).

Table 4.B: Methods for Collection of Data related to Biological Environment

SN	Components	Required Data	Methods for Data Collection
1	Forest Vegetation	<ul style="list-style-type: none"> Forest Type Forest Management 	<ul style="list-style-type: none"> Literature Review Site Visit
2	Terrestrial Flora	<ul style="list-style-type: none"> List of Major Plant Species NTFPs Ethnobotanical users 	<ul style="list-style-type: none"> Field Investigation Enumeration Group Meetings
3	Terrestrial Fauna	<ul style="list-style-type: none"> Type of Wild Animals Type of Birds Types of Reptiles Types of Amphibians 	<ul style="list-style-type: none"> Literature Review Field Investigation/Observations Group Meetings Photographs
4	Species Conservation Status	<ul style="list-style-type: none"> Availability and status of rare, endangered and protected species of flora and fauna 	<ul style="list-style-type: none"> Verification of collected list of flora and fauna with GoN laws, IUCN red list and CITES Appendices

Figure 4.C: Photographs of Consultations

Focus Group Discussion in village along the alignment 	Public Consultation in village along the alignment 
Consultations with Local Community 	HH survey conducted at SS area 
Affixing of Public Notice	Affixing Public Notice



B.5 Alternative Analysis

10. NEA has considered different alternatives for the transmission line ranging from no action alternative to different design alternatives. Three different alternative transmission line alignments (routes) were analyzed. The final route selection was done on the basis of its minimal impact on forest and settlements as compared to other alternative routes. Attempts were made to select the shortest route, which was economically and environmentally suitable.

B.7 Consultations and Information Disclosure

11. The project carried out 24 consultation meetings in the project areas where 221 people participated. Consultations were also carried out with community forest user groups (CFUG) and Municipalities.

There were also group discussions, interaction meetings organized in the project site at Jugal RM on 2074/12/08 (22 March 2018) as per the provision of EPR, 1997. The interaction program was chaired by the President of Jugal RM Mr. Ghem Narayan Shrestha and Vice President MS Srijana Tamang. Similarly, at Barhabise Municipality on 2074/12/07 (26 March 2018) under the chair of Ward President Mr. Prem Lama.

12. A brochure with relevant information about proposed project was prepared in Nepali Language and distributed to the participants of the public hearing program. Request letters were sent to the concerned government line agencies for their participation in the program. The date, venue and the time of the program was also mentioned in the letter. The interactions meetings were attended by 12 participants in Jugal and 7 participants in Barhabise. NEA made its best efforts to address the queries and concerns of the participants.

B.8 Key Impacts and Risks/Mitigation

13. Altogether 37 households (HH) will be affected by the project. Of these, 32 will lose their land and 5 will lose structures. 1 HH will lose land (more than 50% of his total land). Of the project affected HH, 20% are of ethnic background. Altogether 8 Structures consisting of 4

houses, 2 Cowsheds/sheds and 2 toilets. Impacts and risks of the project are similar to the impacts and risks of the 3 new transmission lines under the project.

14. Biodiversity assessment carried out reveals that in relation to natural and critical habitat there are no major additional impacts and risks that have not already been considered by the project.

15. Altogether, 9 community forests (CF), 3 Leasehold Forests and some government forests will be affected. 10.107 ha of forest land will be impacted (for CF it will be 7.191 ha, for Leasehold Forest 1.6128 ha, and for Government Forest 1.188 ha). The total number of estimated trees to be cut is 6,691. Key tree species found along the alignment are Angeri (*Lyona sp.*), Needlewood Tree (*Schima wallichii*), Chimal (*Rhododendron spp.*), Ipil Ipil (*Leucaena leucocephala*), Indian Chestnut (*Castanopsis indica*), Khasru (*Quercus sepeccarpifolia*), Khirro (*Sapium insigne*), Kholme (*Symplocos sp.*), Himalayan yew (*Taxus wallichiana*), Mauwa (*Engelhardia spicata*), Indian cottonwood (*Bombax cieba*), Nepalese Alder (*Alnus nepalensis*), Toona ciliata (*Toona ciliata*) etc. Of the the trees to be cut, 23.88% are *Schima wallichii* and 16.86% are *Alnus nepalensis*. The loss of biodiversity due to loss of forest land will be a permanent and long term impact.

16. Based on field surveys/consultations for the national IEE main mammals reported to occur in the project area include Rhesus Monkey (*Macaca mulatta*), Common Langur (*Semnopithecus entellus*), Common Leopard (*Panthera pardus*), Indian muntjac (*Muntiacus muntjak*), Golden Jackal (*Canis aureus*), Wild boar (*Sus scrofa*), Indian crested porcupine (*Hystrix indica*), Asiatic black bear (*Ursus thibetanus*), Goral (*Naemorhaedus goral*) etc. Common birds in the project area include House Sparrow (*Passer domesticus*), Magpai (*Cissa erythrorhyncha*), Kalij pheasant (*Lophura leucomelanos*), Red-vented bulbul (*Pycnonotus cafer*), Himalayan monal (*Lophophorus impejanus*), Spiny Babbler (*Turdoides nipalensis*), Crimson Horned Pheasant (*Satyr tragopan*), Buff-spotted Flameback (*Chrysocolaptes lucidus*), Spotted Dove (*Streptopelia chinensis*), Barn Swallow (*Hirundo rustica*), etc. Some herpetofauna in project area are wall lizard (*Hemidactylus spp.*), Pit viper (*Trimeresurus albolabris*), Burmese python (*Python bivittatus*), Indian False Cobra (*Pseudoxenodon macrops*), Bengal Monitor Lizard (*Varanus bengalensis*), and Asiatic Water Snake (*Xenochropis piscator*). Altogether national IEE has reported 16 mammals, 14 birds and 8 herpetofauna being NT, LC or VU as being found in the wider area. In terms of Critical Habitat triggers, although no CR/EN species were identified by the national IEE it is possible given the presence of forest land the project area will be similar to other transmission lines under the project, with presence critically endangered vulture species (in low densities) needing to be mitigated by providing bird divertors.

Table 5-9: Conservation Status of Reported Species

S. N.	Local/Common Name	Scientific Name	Conservation Status		
			NPWCA, 2029	CITES Appendix	IUCN
Mammals					
1	Rhesus Monkey	Macaca mulatta	-	II	LC
2	Common Langur	Semnopithecus entellus	-	-	LC
3	Chituwa (Common Leopard)	Panthera pardus	-	I	VU
4	Bandel	Sus scrofa	-	-	LC
5	Dumsi	Hystrix indica	-	-	LC
6	Ratuwa Mirga (Barking Deer)	Muntiacus muntjak	-	-	LC
7	Kalo Bhalu (Bear)	Ursus thibetanus	-	I	VU
8	Shyal (Jackal)	Canis aureus	-	-	LC
9	Ghoral	Naemorhedus goral	-	I	NT
10	Himalayan Thar	Hemitragus jemlahicus	-	-	NT
11	Ban Biralo (Jungle Cat)	Felis chaus	-	II	LC
12	Chamera	Pteropus giganteus	-	II	LC
13	Malsapro	Martes flavigula	-	-	LC
14	Nyaurimusa	Herpestes edwardsii	-	-	LC

Balefi Corridor 132kV TL Project			Existing Environmental Condition		
15	Lokharke	<i>Funambulus spp.</i>	-	-	LC
16	Rat	<i>Rattus rattus</i>	-	-	LC
Birds					
1	Danphe	<i>Lophophorus impejanus</i>	P	I	LC
2	Kande bhyakur	<i>Turdoides nipalensis</i>	-	-	LC
3	Bhangera	<i>Passer domesticus</i>	-	-	LC
4	Lampuchhre	<i>Cissa erythrorhyncha</i>	-	-	NA
5	Kalij	<i>Lophura leucomelanos</i>	-	-	LC
6	Munal	<i>Tragopan satyra</i>	P	III	NT
7	Kath phoruwa	<i>Chrysocolaptes lucidus</i>	-	-	LC
8	Jureli	<i>Pycnonotus cafer</i>	-	-	LC
9	Haleso	<i>Treron phoenicoptera</i>	-	-	LC
10	Dhukur	<i>Streptopelia chinensis</i>	-	-	NA
11	Kag	<i>Corvus splendens</i>	-	-	LC
12	Saraun	<i>Sturnus spp.</i>	-	-	LC
13	Parewa	<i>Columba livia</i>	-	-	LC
14	Gauthali	<i>Hirundo spp.</i>	-	-	LC
Herpetofauna					
1	Common garden lizard	<i>Calotes versicolor</i>	-	-	NA
2	Wall lizard	<i>Hemidactylus frenatus</i>	-	-	LC
3	Bengal Monitor Lizard	<i>Varanus bengalensis</i>	-	I	LC
4	Pit viper	<i>Trimeresurus albolabris</i>	-	-	LC
5	Andho sarpo	<i>Ramphotyphlops braminus</i>	-	-	-
6	Water snake	<i>Xenochrophis braminus</i>	-	-	LC
7	Ajingar	<i>Python bivittatus</i>	P	II	VU
8	Indian false cobra	<i>Pseudoxenodon macrops</i>	-	-	LC

Note: EN- Endangered; VU- Vulnerable; NT- Near Threatened; LC- Least Concerned; (DD- Data Deficient)
Source: DNPWC, 2071 – Flora and Fauna of Nepal in CITES Annexes: www.iucnredlist.org

17. Mitigation proposed for biodiversity conservation are minimizing cutting of trees/vegetation as far as practical, replacement plantation at ratio of 1:25 per legal provisions as a compensatory measure for the loss of trees, manual clearance of vegetation from the RoW, strict provisions for construction workers to prohibit use of fuel woods for cooking, contract provisions and penalties for illegal felling of trees or hunting/poaching by contractor workers. Purchase and sale of illegal hunted animals and birds will be banned. Contractors are to provide specific instructions and trainings to all its staff and workforce on biodiversity conservation. Instructional and awareness raising training to forest user groups and local people to promote awareness on conservation activities and income generation from Non Timber Forest Products are provided for.

B.8 Environmental Management

18. A detailed fully costed environmental management plan (EMP) has been developed as part of the national IEE. The EMP includes mitigation and monitoring plans as well as institutional arrangement for its implementation. The EMP has set aside \$453,665 (excluding land cost, 6.37% of the total project cost) for environmental management. Of this a total of \$297,629 has been set aside for biodiversity mitigation. This includes \$290,296 for the purchase of land for compensatory plantation, fencing, compensation for loss of private trees and management of the saplings for five years. Likewise, \$5,867 has been allocated for Instructional Awareness on NTFP and \$1,467 has been set aside for Awareness Raising on Biodiversity Conservation.

C. Conclusions and Recommendations

19. The associated facility has been designed and is being implemented in compliance with the national policies and regulations for environmental, health and safety. NEA has conducted IEE and the national IEE clearance has been granted by the Ministry of Energy, Water Resources and Irrigation of Nepal thus procedurally the associated facility has been planned in a manner broadly consistent with ADB's Safeguard Policy Statement (2009) requirements (Table 4.C).

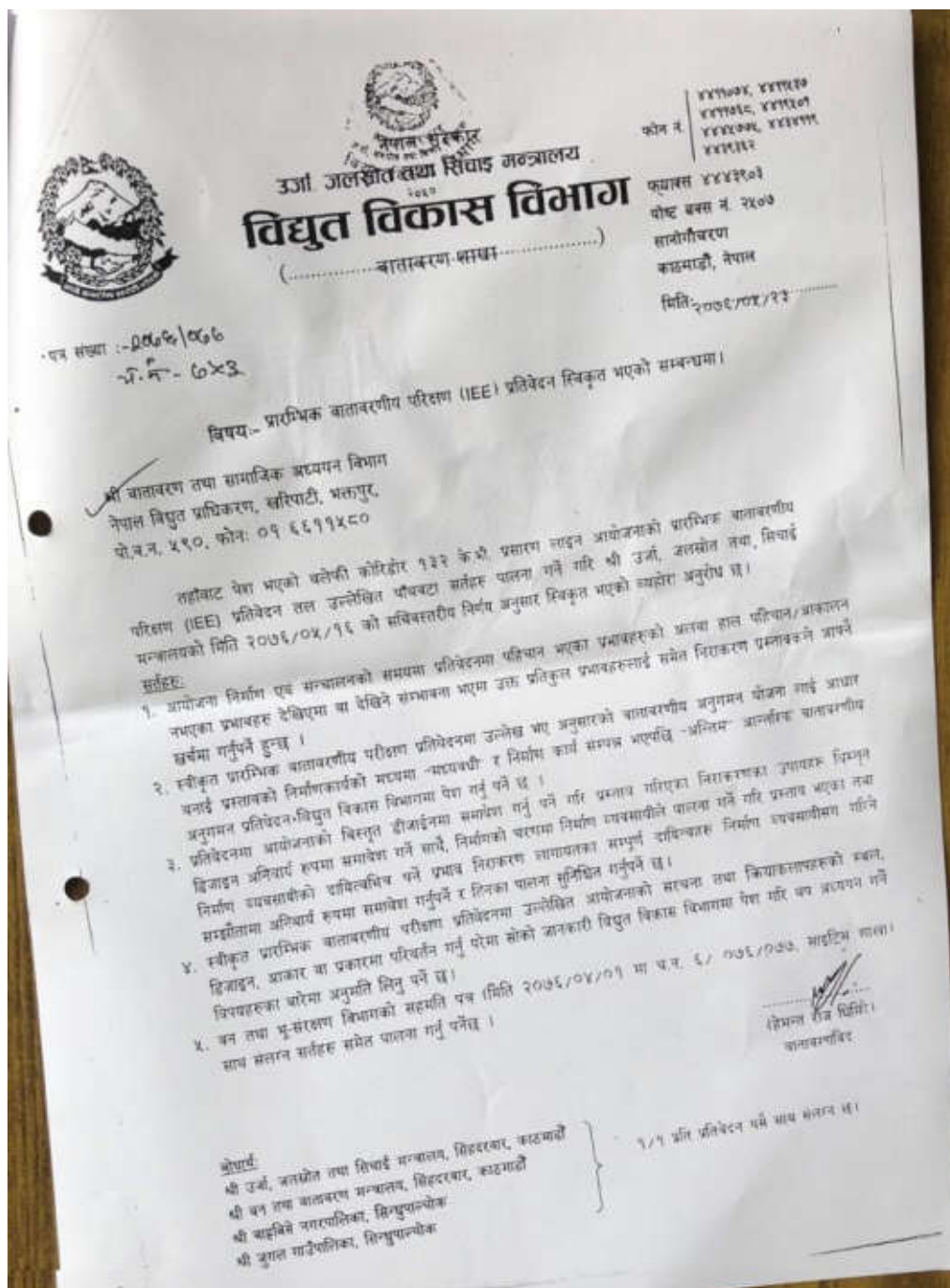
20. It is concluded that the impacts and risks of this associated facility are in line with the impacts and risks of the 3 new transmission lines under the project. It is considered, that with the implementation of appropriate mitigation impacts can be minimized to an acceptable level, such that there will be no significant irreversible adverse impact. However, there are some gaps in terms of mitigation currently proposed such as no bird divertors on the Bhote Koshi (river) crossing etc.

21. To ensure the transmission line will be consistent with ADB's Safeguard Policy Statement (2009) requirements it is recommended NEA will apply the project EMP to it, with its

implementation supervised and monitored by PMD as part of the project. NEA will ensure that project level EMP is retrospectively included in the scope of the contractor's work for this transmission line.

Table 4.C: Consistency of Balefi Corridor 132 kV Transmission Line with Project Requirements

SPS Requirements	Consistent with Project Requirements
Environmental Assessment	Yes, approved national IEE was prepared by team of environment specialists
Planning and Management	Yes, EMP for the project included in national IEE
Information Disclosure, Consultation and Participation	Yes, the national IEE was disclosed and consultations were undertaken as documented in the report
Grievance Redress	Yes, GRM included in national IEE
Monitoring and Reporting	Yes, monitoring plan included as part of EMP in national IEE although is not as comprehensive as project EMP
Unanticipated Environmental Impacts	Yes, NEA commit to dealing with such events in the EMP
Biodiversity Conservation	Partial, impacts on forest land but no protected areas or KBA are directly impacted, mitigation included in EMP including compensatory reforestation at 1:25 ratio but inclusion of bird divertors 500 m either side of ridge or valley crossings including Bhote Koshi (river) crossing and waste dumps is not considered and it is not as comprehensive as project EMP
Pollution Prevention and Abatement	Partial, impacts anticipated but mitigation included in EMP although is not as comprehensive as project EMP
Health and Safety	Partial, impacts anticipated but mitigation included in EMP although is not as comprehensive as project EMP
Physical Cultural Resources	Partial, impacts anticipated but no internationally or nationally important PCR affected, mitigation included in EMP although is not as comprehensive as project EMP



Annex 4.2: Consultations with User Groups

I. Jugal Rural Municipality Ward no. 5 Date: March 22, 2018

Concerns:


- Project should be implemented with minimal impact on Cultural Resources and to Local People.


नेपाल प्रमुख अध्येक्षक प्रमुख, रहेको बनेको कार्यालय १३२ वी, वी, इमारत भन्ने नामको कार्यालयको
गर्दा आयोगको उपस्थितिमा गाउँपालिका, नगरपालिका वा स्थानीय बासिन्दाहरूको समक्षमा विद्यमान रहेको
समाचारिक विषयसम्बन्धी जानकारी प्राप्त गर्न सामाजिक, आर्थिक, बस्तुस्थिति, जग्गा, जग्गा, बातावरण
तथा सामाजिक अध्ययन विभाग, परम्परागत आर्थिक बातावरणीय परीक्षण (IEE) को कार्यसूची (ToR) तयार
गर्ने निर्देशनामा छिट्टै/एक साताभित्रको अध्ययन होस् तथा स्थानीयबासी, सरकारी/वाणिज्य विध, विन्न
मिति, समय र स्थानमा छलफल गर्न निम्न तालिमबाट सम्मेलन गरियो।

स्थान: जिला, चित्तपुरा गाउँपालिका, नगरपालिका, मुगल वडा नं. ५
थर: ८५ मिति: २०६४/१२/०८

आयोगको बैठकको प्रस्तावित सारथमा -

क्र.सं.	नाम थर	पद/पेशा	ठेगाना/सम्बन्ध	सम्पर्क नं.	हस्ताक्षर
१	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
२	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
३	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
४	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
५	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
६	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
७	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
८	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
९	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
१०	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
११	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ
१२	रामेन्द्रप्रसाद श्रेष्ठ	डा.प्रा.प्र.प्रा.प्रा.	मुगल गा.पा.	९८५१००२	रामेन्द्रप्रसाद श्रेष्ठ

रायसुभाष, 

ॐ शास्त्रिक र, सामाजिक तथा मानवसंसाधन विकासको लागि
उत्साह गर्ने गरी आयोजनाको निर्माण गर्नु पर्ने हुन्छ।
ॐ स्थानीय स्तरमा लगायतको भत्ता काट्ने गरी काम
अर्थात् बहालमा ल्याइने ल्याउने र्णो ल्याउने। 

II. Jugal Rural Municipality Ward no. 6 Date: March 23, 2018

Concerns

- Skill Development Training to be Provided
- Employment opportunities to be provided to local people

[illegible]

III. Barhabise Municipality Ward No. 7 Date: March 23, 2018

Concerns

- Development work to be carried out without causing adverse effect to local people and their property.

नेपाल विद्युत प्राधिकरण
बारा जिल्ला विकास विभाग

गर्दा आयोजना उपनिवेश गाउँपालिका/सुदूरपश्चिम को स्थानिय कार्यवाहकसँग त्यस क्षेत्रमा विद्युतमा गरेको समसामयिक विषयवस्तुमा आवश्यक छनकल गरी सामाजिक-आर्थिक बस्तुस्थिति बारेमा त्रि वि. प्रा. बातावरण तथा सामाजिक आयोजना विभाग, धनकुटाबाट प्रारम्भिक बातावरणीय परिक्षण (AEE) को कार्यसूची (ToR) तयार गर्ने निर्देशनामा खटिएको बातावरणीय आयोजना टोली तथा स्थानीयवासी, श्रोतकारवाहाहरू बिच निम्न भित्ति, समय र स्थानमा छनकल गरी निम्न राखनुभएको कालन गरियो।

स्थान : जिल्ला सुदूरपश्चिम गाउँपालिका/सुदूरपश्चिम बाँझबिही वडा नं ६
 ठाउँ : बाँझबिही मिति : २०६८/१२/०९
 आयोजनाको मोजकको इस्तान्ति संरचना : श्री पञ्चकल्या आधुनिक निरालय

उपस्थिति

क्र.सं.	नाम वर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१	बन्धु पराजुली	उ.प्र.	बाँझबिही - ६	९८०२६१०२१	
२	रमान रामाङ	रिजिस्ट्रार	"	९८९९०२९९०	
३	कृष्ण अधिकारी	कुलुङ	"	९८२९६२०२०	
४	रम कर्णाल नेपली	"	"	-	
५	विजय सुब्बा	समाजिक कार्यकर्ता	"	९८००८९९९	
६	पुनम प्रसाद उपरजाय	समाजिक कार्यकर्ता	"	९८६०८२९९	
७	रम कर्णाल नेपली	"	"	-	
८	पुनम सुब्बा सुब्बा	समाजिक कार्यकर्ता	"	-	
९	नय राम अधिकारी	कुलुङ	"	९८०९६९९९	
१०	रम कर्णाल सुब्बा	समाजिक कार्यकर्ता	"	९८९९९९९९	
११	शोभा राना	समाजिक कार्यकर्ता	काठमाडौं		
१२	बन्धु पराजुली	समाजिक कार्यकर्ता	काठमाडौं		

राखनुभएको
 यस श्री पञ्चकल्या आधुनिक निरालयमा (शान्तिमरुत) जहाँ
 गौरी गार्ह सञ्चालनाको सञ्चालनस्थलमा समुदाय स्थानीय
 विकास सँगै सञ्चालित, स्थल विद्यालय काँडेबिही हललाई
 काँडे सपनि श्री सन्त जर्म अविह दुने सुता लागे।

२०६८/१२/०९

IV. Jugal Rural Municipality Ward No. 4: Date: March 22, 2018 (also for Pangtang SS)

बातावरण तथा सामाजिक अध्ययन विभाग
बर्तौली, बाँकेपुर

बर्तौली - बाँकेपुर १३२ के.पी. प्रसारण लाइन आयोजनाको
प्राथमिक बातावरणीय परीक्षण (IEE) को कार्यमुची (ToR) को लागि तयार गरिएको

आयोजना सेवा माइने बन्, बन्जुबन् र बन्सुगि सम्बन्धि प्रभावानी अनुसन्धि-२०७४

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बर्तौली-बाँकेपुर १३२ के.पी. प्रसारण लाइन आयोजना कार्यन्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकामा रहेको बन्, बन्जुबन् तथा वैदिक बातावरणको सम्पत्तिमा बाँकेपुर, बाँकेपुर तथा बाँकेपुर तलाक प्रमाणित प्रमाणित बातावरणीय परीक्षण (Initial Environmental Examination - IEE) को कार्यमुची तयार गर्ने सितामाला छिट्टाछाँटा बातावरणीय अध्ययन टोली तथा स्थानीयबासी, संरक्षकवाहक विषय विषय मिति, बन्सुगि र बन्सुगि छानकन गरी निम्न प्रभावानी अनुसन्धि विवरण संकलन गरियो।

स्थान : बिन्ना : मधुप्रदेश गाउँपालिका/नगरपालिका बुङ्गा वडा नं. ४/५ सुनैपोखरी
मिति : २०७४/१२/०८ समय : १०:०० AP No. ०३ / RoW AP १० AP ०३)
आयोजनाको नजिकको प्रस्तावित सरचना (Substation/Switchyard)

क्र.सं.	विवरण विवरणको नाम वा	उमेर	स्थानीय डेटा	सामुदायिक बन्/सम्पत्ति	वर/पेशा	सम्पर्क नं.	हस्ताक्षर
१	बन्सुगि		बुङ्गा गाउँपालिका	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
२	बन्सुगि		बुङ्गा गाउँपालिका	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
३	बन्सुगि		बुङ्गा गाउँपालिका	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
४	बन्सुगि		बुङ्गा गाउँपालिका	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
५	बन्सुगि		बुङ्गा गाउँपालिका	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
६	बन्सुगि		बुङ्गा गाउँपालिका	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
७	बन्सुगि		बुङ्गा गाउँपालिका	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
८	बन्सुगि		बुङ्गा गाउँपालिका	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
९							
१०							

बातावरणीय अध्ययन टोलीका सदस्यहरू

क्र.सं.	विवरण विवरणको नाम वा	डेटा	वर/पेशा	सम्पर्क नं.	हस्ताक्षर
१	बन्सुगि	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
२	बन्सुगि	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	
३	बन्सुगि	बुङ्गा गाउँपालिका	बन्सुगि	९८४९०२०४०९	


बन्सुगि विवरण

बन्सुगि विवरण

बन्सुगि विवरण

[illegible]

VII. Jugal Rural Municipality, Dallepokhari Ward No. 4, Date: March 2013.



नेपाल पर्यावरण विकास बोर्ड

वातावरण तथा सामाजिक अध्ययन विभाग

चरिएटी, भक्तपुर

बलेफी - बाइबिस १३२ के.पी. इशारण साइन आयोजनाको
प्रारम्भिक वातावरणीय परीक्षण (EIE) को कार्यपत्र (ToR) का लागि तयार गरिएको

आयोजना क्षेत्रमा पाइने वन, वन्यजन्तु र वनस्पति सम्बन्धि प्रश्नावली अनुसूची-२०७४

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बलेफी-बाइबिस १३२ के.पी. इशारण साइन आयोजना आयोजनाकर्ता
गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाहरूमा रहेको वन, वन्यजन्तु तथा जैविक वातावरणको
बन्सुम्पति बारेमा ने वि प्रा, वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय
परीक्षण (Initial Environmental Examination - IEE) को कार्यपत्रको तयार गर्ने निम्तिवातामा छरिएरएका
वातावरणीय अध्ययन टोली तथा स्थानीयवासी, बलेश्वरवाताहरू विच निम्न चिनि, वन्य र वन्यतामा छरिएका
गरी निम्न प्रश्नावली अनुसूची विवरण संकलन गरियो।

स्थान: जिम्मा विद्युत प्राधिकरण गाउँपालिका/नगरपालिका मुग्लिन वडा नं. छठ ४/५ नैनीताल
मिति: २०७४/१२/०८ समय
आयोजनाको चिह्नको प्रस्तावित सरपना AP No. ०३ / RoW AP to AP ०३)
(Substation/Switchyard)

क्र.सं.	विवरण दिनेको नाम वा	उमेर	स्थानी ठेगाना	वास्तविक वन/वन्यता	वड/पेशा	सम्पर्क नं.	हस्ताक्षर
१	बैरा लामा		मुग्लिन गाउँपालिका	मुग्लिन गाउँपालिका	कृषक	९८४४०२०४०९	
२	नन्द लाल श्रेष्ठ		मुग्लिन गाउँपालिका	कृषक	गृहकर्ता		
३	सुभाषा श्रेष्ठ		मुग्लिन गाउँपालिका	कृषक	गृहकर्ता		
४	चन्द्र लामा		मुग्लिन गाउँपालिका		गृहकर्ता	९८४४०२०४०९	
५	गुरु श्रेष्ठ		मुग्लिन गाउँपालिका	कृषक	गृहकर्ता	९८४४०२०४०९	
६	नन्द श्रेष्ठ		मुग्लिन गाउँपालिका	कृषक	गृहकर्ता	९८४४०२०४०९	
७	लाल देवी श्रेष्ठ		मुग्लिन गाउँपालिका	कृषक	गृहकर्ता	९८४४०२०४०९	
८							
९							
१०							

वातावरणीय अध्ययन टोलीका सदस्यहरू

क्र.सं.	विवरण दिनेको नाम वा	ठेगाना	वड/पेशा	सम्पर्क नं.	हस्ताक्षर
१	कल्पिता श्रेष्ठ	ने.वि.प्रा. भक्तपुर	कर्मचारी	९८४४०२०४०९	
२	प्रकाश श्रेष्ठ	ने.वि.प्रा. भक्तपुर	कर्मचारी	९८४४०२०४०९	
३	कुमार श्रेष्ठ	ने.वि.प्रा. भक्तपुर	कर्मचारी	९८४४०२०४०९	

नेपाल विद्युत प्राधिकरण

संस्थापक महाप्रबन्धक

संस्थापक महाप्रबन्धक

संस्थापक महाप्रबन्धक

Photos courtesy: NEA

Appendix 5 - Details of Analysis of Alternatives for New Transmission Lines

A. Introduction

1. Some of the major alternatives considered during the national EIA/IEE of the new transmission lines were:

- (i) Design alternatives;
- (ii) Construction alternatives; and
- (iii) Route alternatives including no project/no forest/no protected area.

B. Design Alternatives

2. Different design alternatives for tower structure, tower foundation and its protection, ruling span and voltage level have been considered:

- To simplify the erection procedures and make the project cost-effective lattice type of tower structure has been selected. Lattice type of towers are appropriate for the terrain and conditions of Nepal since they do not require large flat surface.
- In the rocky area along the alignments, rock bolt foundation is preferred to normal concrete foundation due to its less excavation, drilling advantage and low environmental impact. Conventional pad and chimney type concrete foundation will be constructed elsewhere.
- Design of the tower and foundation are dependent on the selection of ruling span. The number of tower can be minimized by increasing the ruling span but it leads to heavier and higher tower structures to maintain the necessary ground clearances whereas shorter ruling span means increased number of towers which will further lead to increase land acquisition.

C. Construction Alternatives

1. Manual excavation will be adopted since it provides opportunity for the local employment and will have less impact on topography, low disturbance to surrounding areas and does not require a wide access road. Mechanical excavation requires motorable access roads and causes more impact to environment, including air and noise pollution. However, concreting will be done using mixer and vibrator to maintain the quality.

2. Erection will be done manually. Helicopter stringing is an alternative, but such method would be costly. Moreover, use of a helicopter will create noise pollution and may disturb the fauna of the area.

D. Route Alternatives

3. Comparative studies for the feasibility of the different routes was done by NEA, based on the following guidelines:
 - Existing access facility;
 - Located on geologically stable ground;
 - Total length of the transmission line;
 - Minimum number of angle point (AP) towers for the transmission line;
 - Avoid highly productive land or expensive RoW;
 - Minimum number of river crossing, highways, and overhead power line and telecommunication lines;
 - Avoid settlements areas or densely populated area; minimum number of affected households;
 - Avoid forest crossings and protected areas; and
 - Effect on other development projects, be it in planned, proposed, feasibility stage, construction stage or operation stage.
4. Alignments presented in Chapter III of the IEE may vary slightly as alternatives assessment is desk-based and adjustments are made for the preferred options during detailed route surveys on the ground.

D.1 Dandakhet-Rahughat 132kV Transmission Line

5. If the transmission line is not implemented then there will be no project induced loss of vegetation, cultivated area and other environmental and socio-economic impacts. But such an alternative would result in deficit of power in Myagdi district. Besides, the construction of the project will also reduce system loss and provide reliable power to the load centers of Nepal. This project will also be helpful for the expansion of rural electrification program. The likely increase in electricity supply to local people will help to switch energy consumption trend and reduce pressure on local vegetation. Socio-economic conditions of the local people are likely to be increased through employment opportunities and income generation activities related to power access.
6. Table 5.1 presents the analysis summary of 3 route alternatives considered for Dandakhet-Rahughat 132kV Transmission Line.

Table 5.1: Alternative Route Analysis for Dandakhet-Rahughat Line

Sl. No.	Items	Route-1	Route-II	Route-III
1	No. of APs	37	40	36
2	Total length in km	23.5	29.7	24.616
3	No. of Crossing of existing lines (220kV, 11kV and LT)	15	13	25
4	Number of major river crossings	13	18	6
5	Forest area(ha)	14	12	23.166
6	No. of structure crossings	4	3	2
7	No. of earthen road crossings	20	19	39
8	Advantages	Although shorter most part of the route pass through the settlement area.	Most part of the route is quite far from settlement area.	Shortest route, access facility is good, minimum settlement area.
9	Disadvantages	The line passes over large forest area and few barren and cultivated area.	The line passes over less forest area and have less river crossings	The line passes less over forest area and few barren and cultivated area
10	Order of Priority	2	3	1

7. Based on the exercise carried out and comparison made within the identified alternatives, Route III (24.616km) was recommended as this route has better existing access facilities, passes through less settlement area, and has less major river crossings with appropriate locations of angle points and less elevation difference between consecutive points. It is not practically possible to avoid forest to connect Dandakhet to Rahughat, a no forest option. Yet, because of technical and social considerations, the option with greatest forest area has been selected (an additional 11ha of forest area is crossed by ROW compared to least forest option).

8. For Route III, although the alignment passes greatest forest area, it has been routed along valleys and at ridges to avoid forest clearance, the locations for the Angle Points have been selected at elevated spots to avoid felling and trimming of the trees. Optimum standard ruling span of 350m has been adopted. Efforts to avoid the dense forest area in alignment have been made; and the compensatory plantation in accordance with national regulations will be provided.

B.2 Ghorahi-Madichaur 132kV Transmission Line

9. If the transmission line is not implemented then there will be no project induced loss of vegetation, cultivated area and other environmental and socioeconomic impacts. But such an alternative would result in deficit of power in western part of the country. Besides, the construction of the project will also reduce system loss and provide reliable power to the load centers of Nepal. This project will also be helpful for the expansion of rural electrification program. The likely increase in electricity supply to local people will help to switch energy

consumption trend and reduce pressure on local vegetation. Socioeconomic conditions of the local people are likely to be increased through employment opportunities and income generation activities.

10. Table 5.2 presents the analysis summary of 3 alternatives considered for Ghorahi-Madichaur 132kV Transmission Line.

Table 5.2: Alternative Route Analysis for Ghorahi-Madichaur Line

Sl. No.	Items	Route-1	Route-II	Route-III
1	Total Length	34.9	38.5	36.5
2	Access Facility	Access facility is close to alignment at most of the sections	Access facility is poor compared to other routes.	Access facility is close to alignment at most of the sections.
3	No. of major river crossing	7	12	4
4	No. of settlement crossing	6	8	4
5	No. of major road crossing	4	7	4
6	Forest along the route (km)	17	14	15
7	Advantages	Shortest route, access facility is good.	Less forest area compared to other route	Access facility is good, minimum settlement area.
8	Order of Priority	2	3	1

11. Based on the exercise carried out and comparison made within the identified alternatives, Route-III (36.549km) was recommended as this route has better existing access facilities so no requirement of constructing new access roads, crosses minimum settlement areas as well as having less number of major road crossings. It is not practically possible to avoid forest to connect Ghorahi to Madichaur, a no forest option. Yet because of technical and social considerations, the least forest length was not selected (additional 1km of forest length compared to least forest option).

12. For Route III, although the alignment passes forest length, the alignment has been routed along valleys and at ridges to avoid forest clearance, the locations for the Angle Points have been selected at elevated spots to avoid felling and trimming of the trees. Optimum standard ruling span of 330m has been adopted. Efforts to avoid the dense forest area in alignment have been made; and the compensatory plantation in accordance with national regulations will be provided.

13. Practically it is not possible to avoid Chure Hills Conservation Area (protected area) for a transmission line to connect Ghorahi to Madichaur since the former is located within the conservation area. However, within the protected area the alignment has been routed through agricultural land in the river valley to avoid forest clearance taking place within the protected area.

D.3 Borang-Naubise (Ratmate) Transmission Line

14. If the transmission line is not implemented then there will be no project induced loss of vegetation, cultivated area and other environmental and socio-economic impacts. But such an alternative would result in deficit of power in western part of the country. Besides, the construction of the project will also reduce system loss and provide reliable power to the load centers of Nepal. This project will also be helpful for the expansion of rural electrification program. The likely increase in electricity supply to local people will help to switch energy consumption trend and reduce pressure on local vegetation. Socio-economic conditions of the local people are likely to be increased through employment opportunities and income generation activities.

15. Table 5.3 presents the analysis summary of 3 alternatives considered for Borang-Naubise (Ratmate) Transmission Line.

Table 5.3: Alternative Route Analysis for Borang- Ratmate Line

Sl. No.	Items	Route-1	Route-II	Route-III
1	No. of APs	69	50	56
2	Total length in km	49	43.5	49.5
3	Access facility	Most of the part is accessible with highway or village road (High)	Most of the part is accessible (Moderate)	Most of the part is accessible (Less)
4	No. of Crossing of existing lines (HT and LT)	20	-	-
5	No. of major River crossings	6	10	10
6	No. of road crossing	83	18	22
7	No. of settlement crossing	8	10	13
8	Forest crossing in km	12.8	12	11
9	Marshy and unstable area	Not seen in the field	-	-
10	Advantages	Most of the route is accessible to existing road and minimum settlement crossing, road crossing and river crossing.	Shortest route	Most of the route is close to existing road and medium forest crossing
11	Disadvantages	Road crossing is maximum and long route as compared to route-II	Maximum forest and river crossing and route passes from steep slope	Longest route alignment with maximum road and settlement crossing
12	Order of priority	1	2	3

16. Based on the exercise carried out and comparison made within the identified alternatives, Route-I (49km) was recommended as this route has better existing access facilities, crosses minimum settlement areas as well as having less number of major river crossings. It is not practically possible to avoid forest to connect Borang to Ratmate, a no forest option. Yet because of technical and social considerations, option with greatest forest length

has been selected (an additional 1.8km of forest is crossed by ROW compared to least forest option).

17. For Route I, although the alignment passes greatest forest length, the alignment has been routed along valleys and at ridges to avoid forest clearance, the locations for the Angle Points have been selected at elevated spots to avoid felling and trimming of the trees. Efforts to avoid the dense forest area in alignment have been made; and the compensatory plantation in accordance with national regulations will be provided.

Appendix 6 - Water Resources Capacity Details Along Three New Transmission Lines

1. The transmission line components of the project cross over several rivers; their respective flow varies seasonally and depending on precipitation. The seasonal precipitation pattern in Nepal is highly variable. Nearly 80% occurs during the monsoon (June-September), 8% fall in post-monsoon (October-January) and 12% during the pre-monsoon period². The mean, maximum and minimum flow using FLO1K³ for 55 years along the alignment at the location where the transmission line crosses major rivers from 1960 to 2015 are presented in the Figures and Tables in this section.

A. Rahughat 132kV Transmission Line

2. Along the Dandakhet-Rahughat 132kV transmission line (component 1), between angle point (AP) 3 to 4 the line crosses Rahuganga Khola at 28.3773°N, 83.5642°E. The maximum annual river flow varied from 0.343m³/s in 2015, to 0.642m³/s in 1988. The linear trend of the maximum flow is negative with a slope of -0.0008. The mean annual flow here varies between 0.088m³/s in 2015 to 0.199m³/s in 1988. The linear trend of river flow is negative and the slope of the line is -3.72864E-05. The minimum annual flow varied between 0.015m³/s in 2015 to 0.033m³/s in 2003. The linear trend of the flow is positive with a slope of 2.72727E-05. Between AP 29 to 30 at 28.4218°N, 83.3846°E the transmission line crosses Dhukhu Khola. The maximum annual river flow varied from 76.046m³/s in 1992, to 141.3m³/s in 1962. The linear trend of the maximum flow is negative with a slope of -0.06. The mean annual flow here varies between 24.141m³/s in 1992 to 50.918m³/s in 1962. The linear trend of river flow is negative and the slope of the line being -0.04. The minimum annual flow varied between 4.33m³/s in 1992 to 10.45m³/s in 1963. The linear trend of the flow is negative with a slope of -0.02. Between AP 29 to 35 at 28.4494°N, 83.3828°E the transmission line crosses Myagdi Khola. The maximum annual river flow varied from 0.348m³/s in 1971, to 0.5m³/s in 1977. The linear trend of the maximum flow is positive with a slope of 0.0003. The mean annual flow here varies between 0.052m³/s in 1964 to 0.106m³/s in 1973. The linear trend of river flow is positive and the slope of the line being 0.0002. The minimum annual flow varied between 0.005m³/s in 1964 to 0.02m³/s in 2013. The linear trend of the flow is positive with a slope of 8.02E-05. Figure 1 and Table 5.1.

² Chalise S.R. et al. 1996, Hydrology of the Hindu Kush-Himalayas, A Report of the Regional Workshop, March 23-24, Kathmandu, ICIMOD.

³ Barbarossa, V., Huijbregts, M., Beusen, A. et al. FLO1K, global maps of mean, maximum and minimum annual streamflow at 1 km resolution from 1960 through 2015. Sci Data 5, 180052 (2018). <https://doi.org/10.1038/sdata.2018.52>

Figure 1: River Flow of Major Along Traversed by Dandakhet-Rahughat 132kV Transmission Line

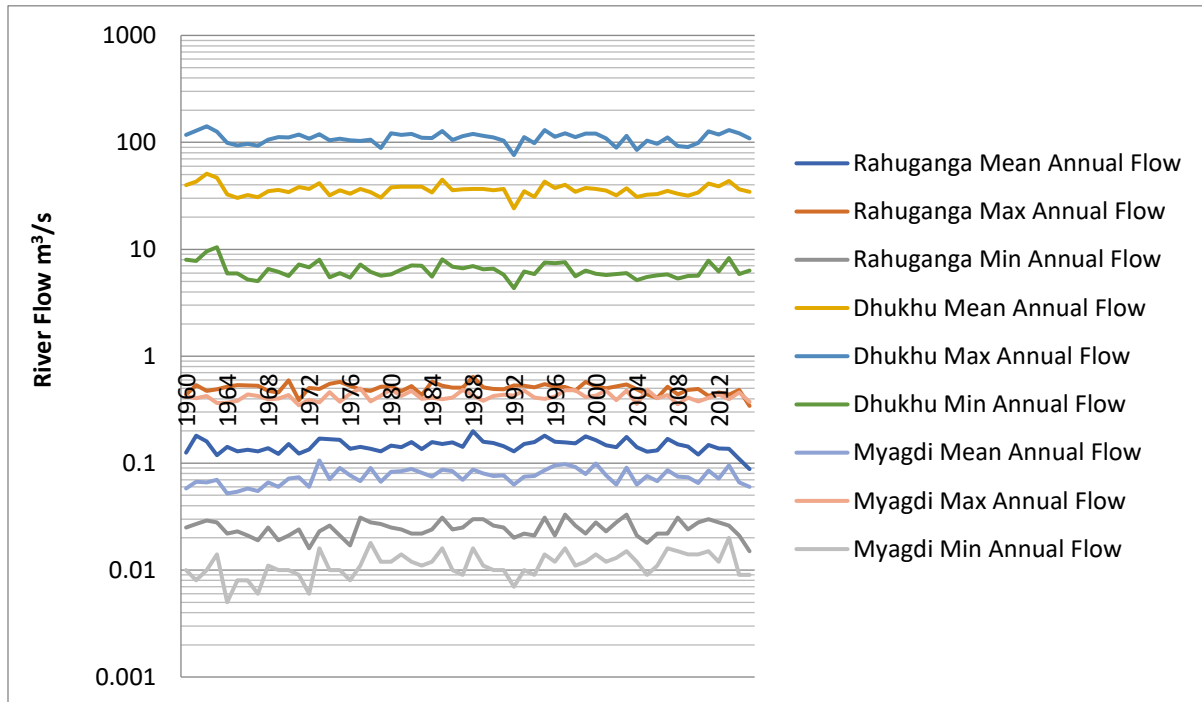


TABLE 6.1: RIVER FLOW ALONG MAJOR RIVERS CROSSED BY DANDAKHET-RAHUGHAT 132KV TRANSMISSION LINE AT RESPECTIVE APS FROM 1960 TO 2015

Year	Rahuganga Khola from AP 3 to 4			Dhukhu Khola from AP 29 to 30			Myagdi Khola from AP 29 to 35		
	Mean Annual Flow m ³ / sec	Max Annual Flow m ³ / sec	Min Annual Flow m ³ / sec	Mean Annual Flow m ³ / sec	Max Annual Flow m ³ / sec	Min Annual Flow m ³ / sec	Mean Annual Flow m ³ / sec	Max Annual Flow m ³ / sec	Min Annual Flow m ³ / sec
1960	0.125	0.436	0.025	39.93	117.452	7.994	0.058	0.422	0.01
1961	0.181	0.538	0.027	42.924	128.801	7.763	0.067	0.405	0.008
1962	0.16	0.474	0.029	50.918	141.3	9.595	0.066	0.426	0.01
1963	0.119	0.492	0.028	46.641	125.686	10.45	0.07	0.365	0.014
1964	0.142	0.519	0.022	32.555	98.774	5.934	0.052	0.368	0.005
1965	0.129	0.535	0.023	30.277	93.297	5.946	0.054	0.383	0.008
1966	0.133	0.533	0.021	32.256	96.627	5.212	0.058	0.439	0.008
1967	0.129	0.528	0.019	30.707	93.072	5.039	0.055	0.426	0.006
1968	0.138	0.474	0.025	35.024	106.213	6.533	0.066	0.397	0.011
1969	0.122	0.457	0.019	35.889	111.822	6.139	0.06	0.403	0.01
1970	0.151	0.597	0.021	34.126	111.522	5.644	0.072	0.432	0.01
1971	0.123	0.387	0.024	38.089	117.946	7.226	0.074	0.348	0.009
1972	0.134	0.504	0.016	36.703	108.269	6.763	0.06	0.39	0.006
1973	0.17	0.494	0.023	41.532	119.343	7.982	0.106	0.369	0.016
1974	0.167	0.55	0.026	31.895	104.552	5.476	0.071	0.462	0.01
1975	0.165	0.575	0.021	35.763	108.241	5.995	0.09	0.376	0.01
1976	0.136	0.528	0.017	33.063	104.615	5.429	0.077	0.445	0.008
1977	0.142	0.489	0.031	36.59	102.718	7.21	0.068	0.5	0.011
1978	0.136	0.474	0.028	34.194	106.004	6.162	0.09	0.378	0.018
1979	0.129	0.519	0.027	30.478	88.283	5.668	0.067	0.427	0.012
1980	0.146	0.523	0.025	38.04	121.185	5.842	0.083	0.486	0.012
1981	0.141	0.472	0.024	38.429	117.612	6.457	0.084	0.426	0.014

Year	Rahuganga Khola from AP 3 to 4			Dhukhu Khola from AP 29 to 30			Myagdi Khola from AP 29 to 35		
	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec
1982	0.157	0.524	0.022	38.448	119.609	7.063	0.088	0.474	0.012
1983	0.135	0.433	0.022	38.341	110.352	6.993	0.081	0.398	0.011
1984	0.157	0.58	0.024	34.079	109.662	5.542	0.075	0.409	0.012
1985	0.151	0.529	0.031	44.672	127.512	8.037	0.087	0.397	0.016
1986	0.156	0.507	0.024	35.625	105.432	6.851	0.084	0.409	0.01
1987	0.142	0.508	0.025	36.373	114.181	6.622	0.07	0.485	0.009
1988	0.199	0.642	0.03	36.628	120.325	6.968	0.087	0.43	0.016
1989	0.158	0.513	0.03	36.712	114.98	6.499	0.08	0.382	0.011
1990	0.154	0.493	0.026	35.77	111.39	6.582	0.076	0.424	0.01
1991	0.144	0.49	0.025	36.574	103.419	5.798	0.077	0.436	0.01
1992	0.129	0.534	0.02	24.141	76.046	4.33	0.063	0.429	0.007
1993	0.151	0.53	0.022	35.034	111.797	6.206	0.075	0.479	0.01
1994	0.157	0.511	0.021	30.827	98.07	5.849	0.076	0.41	0.009
1995	0.181	0.549	0.031	42.941	130.561	7.52	0.086	0.398	0.014
1996	0.158	0.518	0.021	37.544	112.79	7.391	0.095	0.418	0.012
1997	0.156	0.516	0.033	40.051	121.568	7.583	0.098	0.482	0.016
1998	0.153	0.476	0.026	34.465	112.067	5.583	0.092	0.482	0.011
1999	0.178	0.576	0.022	37.392	120.558	6.334	0.079	0.417	0.012
2000	0.164	0.523	0.028	36.658	120.96	5.916	0.099	0.428	0.014
2001	0.147	0.5	0.023	35.397	108.931	5.742	0.077	0.478	0.012
2002	0.141	0.521	0.028	31.953	88.992	5.853	0.063	0.389	0.013
2003	0.176	0.545	0.033	37.286	114.841	5.991	0.091	0.479	0.015
2004	0.141	0.491	0.021	30.888	85.262	5.15	0.063	0.357	0.012

Year	Rahuganga Khola from AP 3 to 4			Dhukhu Khola from AP 29 to 30			Myagdi Khola from AP 29 to 35		
	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec
2005	0.128	0.438	0.018	32.351	103.668	5.516	0.076	0.486	0.009
2006	0.132	0.407	0.022	32.843	96.569	5.719	0.068	0.405	0.011
2007	0.169	0.518	0.022	35.122	111.291	5.837	0.086	0.433	0.016
2008	0.15	0.439	0.031	33.142	92.482	5.314	0.075	0.354	0.015
2009	0.143	0.485	0.024	31.633	90.637	5.63	0.074	0.409	0.014
2010	0.12	0.495	0.028	33.87	98.649	5.665	0.065	0.378	0.014
2011	0.148	0.424	0.03	41.121	127.023	7.848	0.085	0.408	0.015
2012	0.137	0.457	0.028	38.679	118.342	6.202	0.072	0.439	0.012
2013	0.136	0.436	0.026	43.496	129.922	8.248	0.095	0.397	0.02
2014	0.109	0.483	0.021	36.421	121.718	5.87	0.066	0.458	0.009
2015	0.088	0.343	0.015	34.34	108.584	6.347	0.06	0.374	0.009

B. Ghorahi-Madichaur 132kV Transmission Line

3. For Ghorahi-Madichaur 132kV transmission line (component 2), the line crosses Madi River between AP 3 to 4 at 28.1907°N, 82.6822°E. The maximum annual river flow varied from 4.147m³/s in 1966, to 11.375m³/s in 1963. The linear trend of the maximum flow is negative with a slope of -0.005. The mean annual flow here varies between 1.019m³/s in 1966 to 3.803m³/s in 1973. The linear trend of river flow is negative and the slope of the line being -0.0005. The minimum annual flow varied between 0.086m³/s in 1966 to 0.389 m³/s in 1973. The linear trend of the flow is negative with a slope of -0.0002. Between AP 21 to 22 at 28.0749°N, 82.6245°E the transmission line crosses River Arun. The maximum annual river flow varied from 0.331m³/s in 2015, to 0.599m³/s in 1997. The linear trend of the maximum flow is positive with a slope of 0.0002. The mean annual flow here varies between 0.064m³/s in 1965 to 0.181m³/s in 1973. The linear trend of river flow is positive and the slope of the line being 7.71E-05. The minimum annual flow varied between 0.006m³/s in 1966 to 0.028m³/s in 1973. The linear trend of the flow is positive with a slope of 1.17E-05. At AP 44 at 27.9909°N, 82.5225°E the transmission line crosses River Balim. The maximum annual river flow varied from 1.935m³/s in 1966, to 5.643m³/s in 2013. The linear trend of the maximum flow is negative with a slope of -0.004. The mean annual flow here varies between 0.496m³/s in 1966 to 1.722m³/s in 1973. The linear trend of river flow is negative and the slope of the line being -0.0008. The minimum annual flow varied between 0.029m³/s in 1966 to 0.15m³/s in 1973. The linear trend of the flow is positive with a slope of 6.66E-05. Figure 2 and Table 5.2.

Figure 2: River Flow of Major Along Traversed by Ghorahi-Madichaur 132kV Transmission Line

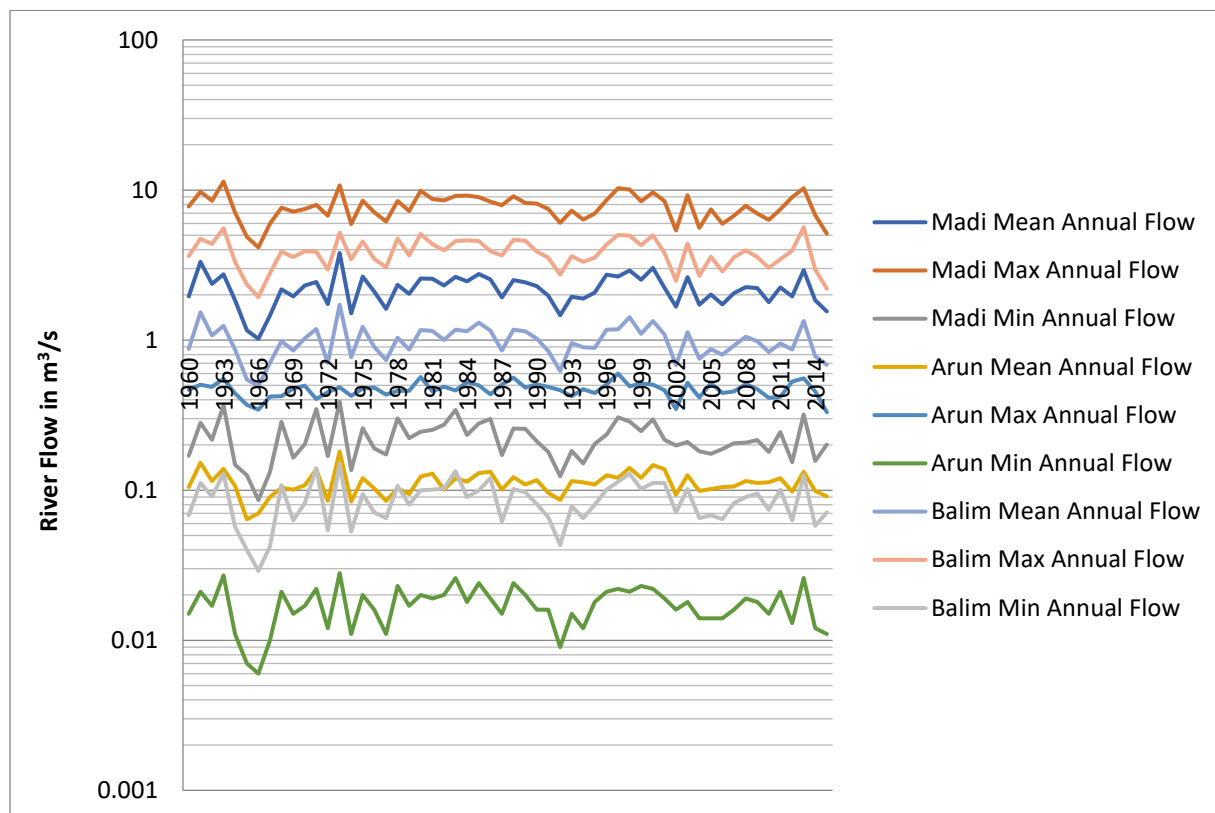


TABLE 6.2: RIVER FLOW ALONG MAJOR RIVERS CROSSED BY GHORAH-MADICHAUR 132KV TRANSMISSION LINE AT RESPECTIVE APS FROM 1960 TO 2015

Year	Madi from AP 3 to 4			Arun from AP 21 to 22			Balim at AP 44		
	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec
1960	1.958	7.762	0.17	0.105	0.466	0.015	0.874	3.629	0.068
1961	3.324	9.742	0.281	0.152	0.504	0.021	1.533	4.727	0.112
1962	2.366	8.487	0.217	0.115	0.488	0.017	1.076	4.367	0.091
1963	2.745	11.375	0.367	0.139	0.554	0.027	1.245	5.578	0.129
1964	1.841	7.072	0.148	0.107	0.441	0.011	0.864	3.322	0.057
1965	1.163	4.885	0.126	0.064	0.371	0.007	0.546	2.345	0.04
1966	1.019	4.147	0.086	0.07	0.344	0.006	0.496	1.935	0.029
1967	1.456	5.946	0.132	0.09	0.421	0.01	0.706	2.785	0.042
1968	2.18	7.632	0.286	0.104	0.422	0.021	0.983	3.893	0.108
1969	1.957	7.189	0.165	0.101	0.475	0.015	0.853	3.579	0.063
1970	2.309	7.489	0.202	0.108	0.498	0.017	1.029	3.915	0.082
1971	2.445	7.974	0.348	0.137	0.405	0.022	1.188	3.889	0.14
1972	1.74	6.742	0.169	0.085	0.45	0.012	0.703	2.955	0.054
1973	3.803	10.762	0.389	0.181	0.485	0.028	1.722	5.206	0.15
1974	1.51	5.936	0.136	0.084	0.425	0.011	0.768	3.454	0.053
1975	2.652	8.482	0.259	0.12	0.476	0.02	1.227	4.545	0.094
1976	2.104	7.105	0.19	0.103	0.483	0.016	0.899	3.465	0.071
1977	1.611	6.159	0.173	0.085	0.433	0.011	0.737	3.061	0.065
1978	2.331	8.439	0.301	0.103	0.459	0.023	1.037	4.75	0.107
1979	2.035	7.249	0.222	0.094	0.46	0.017	0.867	3.668	0.08
1980	2.577	9.88	0.245	0.123	0.568	0.02	1.166	5.105	0.1
1981	2.556	8.715	0.253	0.129	0.454	0.019	1.153	4.357	0.101

Year	Madi from AP 3 to 4			Arun from AP 21 to 22			Balim at AP 44		
	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec
1982	2.314	8.539	0.273	0.101	0.49	0.02	1.001	3.958	0.103
1983	2.637	9.116	0.343	0.12	0.462	0.026	1.176	4.57	0.134
1984	2.467	9.198	0.233	0.114	0.525	0.018	1.144	4.62	0.09
1985	2.757	8.941	0.278	0.13	0.499	0.024	1.309	4.569	0.1
1986	2.538	8.351	0.298	0.133	0.435	0.019	1.156	3.906	0.12
1987	1.929	7.939	0.171	0.101	0.507	0.015	0.854	3.674	0.062
1988	2.513	9.085	0.258	0.122	0.561	0.024	1.173	4.661	0.102
1989	2.426	8.221	0.256	0.109	0.483	0.02	1.145	4.584	0.097
1990	2.293	8.124	0.212	0.117	0.507	0.016	1.023	3.891	0.081
1991	1.974	7.454	0.18	0.096	0.487	0.016	0.843	3.544	0.066
1992	1.463	6.059	0.124	0.086	0.464	0.009	0.624	2.73	0.043
1993	1.945	7.281	0.183	0.115	0.422	0.015	0.956	3.629	0.078
1994	1.89	6.347	0.151	0.113	0.47	0.012	0.896	3.329	0.065
1995	2.079	6.985	0.203	0.109	0.443	0.018	0.889	3.542	0.08
1996	2.728	8.592	0.235	0.126	0.507	0.021	1.174	4.335	0.101
1997	2.647	10.303	0.306	0.121	0.599	0.022	1.181	5.025	0.114
1998	2.906	10.063	0.287	0.141	0.493	0.021	1.421	4.97	0.129
1999	2.53	8.394	0.248	0.121	0.514	0.023	1.1	4.294	0.102
2000	3.024	9.654	0.297	0.147	0.505	0.022	1.338	5.001	0.112
2001	2.236	8.431	0.217	0.138	0.465	0.019	1.091	3.805	0.112
2002	1.673	5.382	0.198	0.093	0.347	0.016	0.681	2.493	0.071
2003	2.626	9.22	0.209	0.126	0.52	0.018	1.131	4.404	0.102
2004	1.719	5.602	0.182	0.099	0.414	0.014	0.75	2.683	0.065

Year	Madi from AP 3 to 4			Arun from AP 21 to 22			Balim at AP 44		
	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec
2005	2.011	7.434	0.175	0.102	0.517	0.014	0.869	3.597	0.068
2006	1.73	5.947	0.188	0.105	0.444	0.014	0.802	2.865	0.064
2007	2.056	6.731	0.205	0.106	0.454	0.016	0.92	3.563	0.082
2008	2.259	7.829	0.207	0.115	0.509	0.019	1.054	3.968	0.09
2009	2.222	6.979	0.216	0.112	0.471	0.018	0.984	3.571	0.095
2010	1.786	6.313	0.18	0.113	0.412	0.015	0.831	3.023	0.074
2011	2.247	7.446	0.244	0.12	0.419	0.021	0.952	3.458	0.101
2012	1.957	8.946	0.154	0.098	0.529	0.013	0.867	3.946	0.063
2013	2.929	10.281	0.319	0.133	0.556	0.026	1.341	5.643	0.126
2014	1.843	6.798	0.157	0.099	0.456	0.012	0.78	2.952	0.058
2015	1.554	5.113	0.201	0.091	0.331	0.011	0.685	2.195	0.071

C. Borang-Ratmate 220kV Transmission Line

4. The Borang-Ratmate 220kV transmission line (component 3) crosses the Kitan Khola between AP 26 to 27 at 28.0313°N, 84.9673°E; its maximum annual river flow varied from 1.044m³/s in 1996, to 0.538 m³/s in 2015. The linear trend of the maximum flow is negative with a slope of -0.002. The mean annual flow here varies from 0.133 m³/s in 1969 to 0.264 m³/s in 1962. The linear trend of the mean river flow is negative and the slope of the line being -0.0054. The minimum annual flow varied between 0.016m³/s in 1992 to a maximum of 0.037 m³/s in 1977. The linear trend of the flow is negative with a slope of -7.1E-06. Likewise, between AP 33 to 33A at 28.0047°N, 84.9259°E the transmission line crosses the Lapan Khola. The maximum annual river flow varied from 0.609m³/s in 2015, to 1.075 m³/s in 1963. The linear trend of the maximum flow is negative with a slope of -0.002. The mean annual flow here varies from 0.13 m³/s in 1992 to 0.308 m³/s in 1962. The linear trend of river flow is negative and the slope of the line being -0.0003. The minimum annual flow varied between 0.011m³/s in 1992 to a maximum of 0.034 m³/s in 1977. The linear trend of the flow is positive with a slope of 2.08E-05. Between AP 42 to 43 at 27.9506°N, 84.9546°E the transmission line crosses Thoppal Khola. The maximum annual river flow varied from 5.46m³/s in 1992, to 12.187 m³/s in 1961. The linear trend of the maximum flow is negative with a slope of -0.01. The mean annual flow here varies between 1.539 m³/s in 1992 to 3.215 m³/s in 1999. The linear trend of river flow is positive and the slope of the line being 0.0007. The minimum annual flow varied between 0.0146m³/s in 1992 to a maximum of 0.0331 m³/s in 1962. The linear trend of the flow is negative with a slope of -1.3E-06. Between AP 59 to 65 at 27.8513°N, 85.0286°E the transmission line crosses River Trishuli. The maximum annual river flow varied from 393.055m³/s in 2009, to 723.07m³/s in 1990. The linear trend of the maximum flow is negative with a slope of -1.08. The mean annual flow here varies between 141.7m³/s in 2009 to 241.37m³/s in 1990. The linear trend of river flow is negative and the slope of the line being -0.39. The minimum annual flow varied between 29.1m³/s in 1992 to a maximum of 56.497m³/s in 1973. The linear trend of the flow is negative with a slope of -0.12. Figure 3 and Table 5.3.

FIGURE 3: FLOW OF MAJOR RIVERS ALONG TRAVERSED BY BORANG-RATMATE 220kV TRANSMISSION LINE

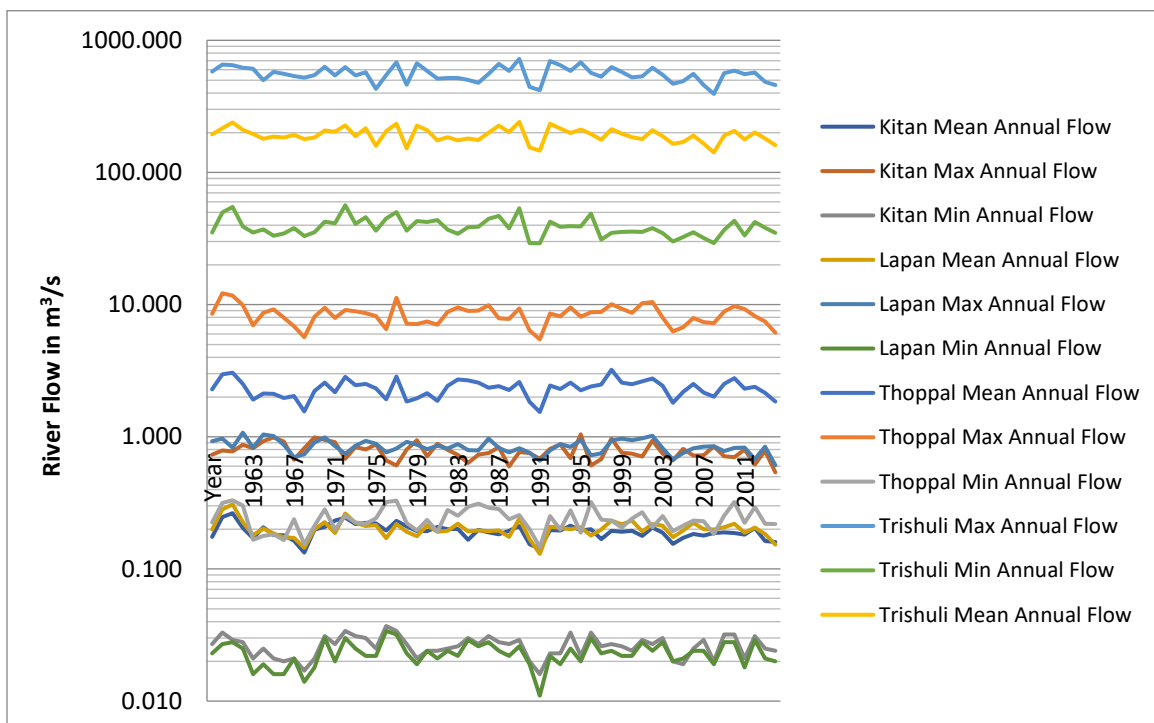


TABLE 6.3: RIVER FLOW ALONG MAJOR RIVERS CROSSED BY BORANG-RATMATE 220KV TRANSMISSION LINE AT RESPECTIVE APS FROM 1960 TO 2015

Year	Kitan Khola From AP 26 to 27			Lapan Khola from AP 33 to AP 33A			Thoppal Khola from AP 42 to AP 43			Trishuli from AP 59 to AP 65		
	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec
1960	0.175	0.731	0.027	0.199	0.928	0.023	2.290	8.504	0.225	194.175	581.295	35.069
1961	0.247	0.788	0.033	0.283	0.967	0.027	2.966	12.187	0.315	216.676	656.471	49.862
1962	0.264	0.776	0.029	0.308	0.827	0.028	3.052	11.684	0.331	239.111	647.751	54.749
1963	0.204	0.870	0.028	0.226	1.075	0.025	2.515	9.928	0.302	210.671	620.551	39.118
1964	0.171	0.817	0.021	0.180	0.827	0.016	1.908	6.977	0.166	195.730	608.889	35.018
1965	0.207	0.927	0.025	0.202	1.041	0.019	2.131	8.657	0.178	179.643	499.971	37.141
1966	0.181	0.992	0.021	0.186	1.010	0.016	2.114	9.222	0.183	186.919	576.580	33.237
1967	0.180	0.922	0.020	0.173	0.871	0.016	1.970	7.954	0.165	184.013	557.015	34.608
1968	0.164	0.672	0.021	0.172	0.702	0.021	2.029	6.854	0.237	192.359	536.873	38.059
1969	0.133	0.818	0.017	0.145	0.738	0.014	1.554	5.678	0.154	178.897	522.611	32.968
1970	0.199	0.990	0.021	0.200	0.904	0.018	2.227	8.118	0.213	183.641	544.794	35.376
1971	0.208	0.945	0.031	0.226	0.992	0.030	2.567	9.476	0.282	207.753	629.255	42.448
1972	0.232	0.911	0.027	0.187	0.851	0.020	2.175	7.928	0.199	203.041	541.204	41.314
1973	0.245	0.680	0.034	0.262	0.739	0.030	2.835	9.121	0.253	227.264	627.202	56.497
1974	0.218	0.837	0.031	0.223	0.856	0.025	2.457	8.930	0.225	188.080	542.959	40.813
1975	0.224	0.801	0.030	0.211	0.932	0.022	2.516	8.622	0.220	215.571	574.435	45.873
1976	0.221	0.876	0.025	0.215	0.886	0.022	2.321	8.193	0.242	159.233	429.013	36.257
1977	0.195	0.661	0.037	0.171	0.760	0.034	1.923	6.512	0.321	205.782	545.681	44.831
1978	0.231	0.606	0.034	0.219	0.814	0.032	2.850	11.270	0.329	233.631	683.505	50.050
1979	0.210	0.799	0.027	0.191	0.917	0.023	1.854	7.147	0.222	152.087	461.327	36.369

Year	Kitan Khola From AP 26 to 27			Lapan Khola from AP 33 to AP 33A			Thoppal Khola from AP 42 to AP 43			Trishuli from AP 59 to AP 65		
	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec
1980	0.193	0.941	0.021	0.177	0.872	0.019	1.951	7.134	0.196	225.796	668.931	43.002
1981	0.193	0.714	0.024	0.214	0.807	0.024	2.134	7.439	0.235	209.448	585.069	42.179
1982	0.208	0.884	0.024	0.191	0.856	0.021	1.867	7.053	0.191	175.240	513.879	43.739
1983	0.200	0.796	0.025	0.194	0.814	0.024	2.430	8.827	0.279	184.649	519.303	36.974
1984	0.201	0.729	0.026	0.220	0.879	0.022	2.714	9.545	0.253	175.018	517.330	34.317
1985	0.166	0.634	0.030	0.192	0.794	0.029	2.677	8.939	0.296	181.339	501.259	38.685
1986	0.198	0.731	0.027	0.195	0.788	0.026	2.572	8.989	0.313	176.205	477.669	38.890
1987	0.189	0.753	0.031	0.193	0.970	0.028	2.349	9.900	0.290	199.575	557.100	44.593
1988	0.183	0.835	0.028	0.195	0.825	0.024	2.423	7.878	0.284	226.057	662.042	47.008
1989	0.194	0.595	0.027	0.175	0.763	0.022	2.255	7.771	0.238	201.783	585.908	37.705
1990	0.211	0.766	0.029	0.240	0.818	0.026	2.598	9.390	0.255	241.374	723.070	53.507
1991	0.154	0.752	0.020	0.168	0.759	0.019	1.837	6.372	0.200	154.894	444.886	29.255
1992	0.142	0.683	0.016	0.130	0.659	0.011	1.539	5.460	0.146	146.556	419.465	29.100
1993	0.197	0.809	0.023	0.209	0.787	0.022	2.444	8.573	0.251	233.166	695.937	42.384
1994	0.195	0.874	0.023	0.204	0.880	0.019	2.293	8.156	0.199	215.049	647.033	38.855
1995	0.213	0.690	0.033	0.200	0.839	0.025	2.576	9.537	0.278	199.215	585.571	39.215
1996	0.196	1.044	0.022	0.207	0.949	0.020	2.244	8.084	0.188	211.473	680.445	39.017
1997	0.200	0.607	0.033	0.179	0.724	0.030	2.400	8.784	0.321	195.361	566.964	48.675
1998	0.168	0.676	0.026	0.199	0.749	0.023	2.486	8.805	0.236	176.891	531.834	31.044
1999	0.194	0.969	0.027	0.232	0.934	0.024	3.215	10.081	0.233	212.242	628.451	34.975
2000	0.191	0.757	0.026	0.217	0.967	0.022	2.567	9.331	0.206	196.364	577.654	35.581

Year	Kitan Khola From AP 26 to 27			Lapan Khola from AP 33 to AP 33A			Thoppal Khola from AP 42 to AP 43			Trishuli from AP 59 to AP 65		
	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec	Mean Annual Flow m3 / sec	Max Annual Flow m3 / sec	Min Annual Flow m3 / sec
2001	0.194	0.745	0.024	0.233	0.944	0.022	2.498	8.660	0.240	184.566	524.922	35.608
2002	0.178	0.709	0.029	0.192	0.975	0.028	2.620	10.262	0.269	179.225	531.930	35.467
2003	0.205	0.938	0.027	0.218	1.021	0.024	2.757	10.454	0.207	209.606	620.651	37.918
2004	0.188	0.745	0.030	0.212	0.817	0.028	2.429	7.949	0.251	188.553	548.343	34.670
2005	0.155	0.664	0.020	0.174	0.673	0.020	1.806	6.261	0.193	164.240	468.695	30.088
2006	0.172	0.810	0.019	0.195	0.752	0.021	2.187	6.749	0.213	170.173	491.113	32.473
2007	0.184	0.719	0.025	0.224	0.817	0.024	2.519	7.920	0.233	190.228	558.044	35.212
2008	0.179	0.725	0.029	0.200	0.844	0.024	2.166	7.387	0.230	165.354	459.692	31.901
2009	0.187	0.848	0.020	0.199	0.848	0.019	2.008	7.238	0.184	141.700	393.055	29.264
2010	0.189	0.711	0.032	0.207	0.777	0.028	2.518	8.861	0.253	189.909	563.954	36.660
2011	0.187	0.700	0.032	0.220	0.825	0.028	2.779	9.728	0.321	206.237	588.388	43.116
2012	0.182	0.800	0.021	0.188	0.828	0.018	2.314	9.259	0.223	177.841	555.832	33.415
2013	0.204	0.616	0.031	0.205	0.676	0.029	2.388	8.188	0.293	201.150	571.121	42.314
2014	0.163	0.784	0.025	0.184	0.844	0.021	2.154	7.460	0.220	180.352	485.342	38.229
2015	0.160	0.538	0.024	0.153	0.609	0.020	1.847	6.122	0.219	161.122	459.937	34.883

Appendix 7: Rapid Critical Habitat Assessment

Nepal Electricity Grid Modernization Project: Rapid Critical Habitat Assessment

Drafted for the Asian Development Bank by John Pilgrim Limited – 27th July 2020

Author: John D. Pilgrim

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1 Executive Summary

This document is a rapid Critical Habitat Assessment for five transmission line components of the proposed Electricity Grid Modernization Project in Nepal. These components are henceforth collectively referred to in this report as “the Project” but the broader project also includes other components not included in the assessment. It supports NEA’s Initial Environmental Examination (IEE) (2020) for the broader project which is proposed for financing by the Asian Development Bank (ADB).

Based on information available for this rapid assessment, and acting on a precautionary basis, the overall Project Areas of Analysis are considered to be possible or actual Critical Habitat for 40 biodiversity features: nine mammals; five birds; four reptiles; five frogs; 11 fishes; and six protected and/or internationally-recognized sites (Table 1). The linear and disjunct nature of the Project, multiple Areas of Analysis, and potential to impact flying species (which in some cases may have their main habitat some way from Project infrastructure) increases the number of biodiversity features which qualify the area as Critical Habitat.

This does not mean that the Project is likely to impact all of these features. Significant impacts are only likely, before mitigation, for five: four birds and one internationally-recognized site. Nonetheless, on a precautionary basis the features listed in Table 1 should all be considered priority biodiversity for the Project to avoid, mitigate and – if necessary – offset impacts upon.

While some protected areas do not qualify as Critical Habitat (Section 4.6), the ADB SPS (2009) does require all Project components overlapping protected areas (2a - Ghorahi-Madichaur; 9a - Pathlaiya-Dhalkebar; and 9b - Duhabi-Kusaha) to: (i) act in a manner consistent with defined protected area management plans; (ii) consult protected area sponsors and managers, local communities, and other key stakeholders on the proposed project; and (iii) implement additional programs to promote and enhance the conservation aims of the protected area. Such measures would also be appropriate – and are required by IFC (2019) – for Project components overlapping Key Biodiversity Areas (the same three components listed above).

This assessment also considers significant impacts (Section 5), mitigation (Section 6) and offset requirements (Section 7) for Critical Habitat. Owing to time constraints, this assessment does not attempt to identify the presence or distribution of Natural Habitat in the Project area, or threats to it from Project activities.

Significant direct habitat loss is not anticipated in any Critical Habitat-qualifying site, and legally-required reforestation (if carried out at a ratio of 1:25) is anticipated to be sufficient to fully compensate for habitat loss impacts near the Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area. There is also potential for mortality of Critically Endangered vultures from electrocution on Project infrastructure but, pending detailed design, significant residual impacts are not anticipated. The most significant impact is thus collision of threatened birds with transmission lines. To minimize and compensate for this, a combination of mitigation and offsets is recommended:

- If possible, reroute Ghorahi-Madichaur transmission line (2a) to west side of river to avoid crossing the outer boundary of the KBA (Section 6.3.2);
- Mark all Project transmission lines with bird flight diverters 500 m either side of ridge or valley crossings and waste dumps (Section 6.3.3);
- Mark with bird flight diverters the Pathlaiya-Dhalkebar transmission line (9a) within the Parsa National Park, the Duhabi-Kusaha transmission line (9b) within the Koshi Tappu Wildlife Reserve Buffer Zone, and the Ghorahi-Madichaur transmission line (2a) for as much of its length as possible, ideally the entire length (Section 6.3.3);
- Consider, during detailed design, use of transmission towers with horizontal rather than vertical conductor alignment for the Dandhakhet–Rahughat (1a), Ghorahi-Madichaur (2a) and Ratmate-Lapang-Borang (3a&b) transmission lines (Section 6.3.4);

- Offset residual mortality of Critically Endangered vultures by marking with bird flight diverters ≥90 km of non-Project powerlines within Vulture Safe Zones.

TABLE 1. SUMMARY OF CRITICAL HABITAT-QUALIFYING BIODIVERSITY BY PROJECT TRANSMISSION LINE COMPONENT (FOR FURTHER DETAILS, SEE TABLE 7, SECTION 4.7). THOSE FIVE IN BOLD ARE OF HIGHEST PRIORITY FOR PROJECT MITIGATION CONSIDERATIONS.

Biodiversity type	Name	Cumulatively across Project	Transmission line component					Significant Project impacts likely without mitigation
			1a	2a	3a & b	9a	9b	
1. Mammal	Csorba's Mouse-eared Myotis <i>Myotis csorbai</i>	✓	?		?			No
2. Mammal	Mandelli's Mouse-eared Myotis <i>Myotis sicarius</i>	?				?		No
3. Mammal	Tiger <i>Panthera tigris</i>	✓				✓		No
4. Mammal	Red Panda <i>Ailurus fulgens</i>	✓	?		✓			No
5. Mammal	Himalayan Muskdeer <i>Moschus leucogaster</i>	?	?		?			No
6. Mammal	Gaur <i>Bos gaurus</i>	✓				✓		No
7. Mammal	Wild Water Buffalo <i>Bubalus arnee</i>	✓					✓	Possibly
8. Mammal	Nepalese Field Mouse <i>Apodemus gorkha</i>	✓	✓					No
9. Mammal	Hispid Hare <i>Caprolagus hispidus</i>	?		?		?	?	No
10. Bird	Bengal Florican <i>Houbaropsis bengalensis</i>	✓					✓	Yes
11. Bird	Red-headed Vulture <i>Sarcogyps calvus</i>	?	?					Yes
12. Bird	White-rumped Vulture <i>Gyps bengalensis</i>	✓	?	✓			✓	Yes
13. Bird	Slender-billed Vulture <i>Gyps tenuirostris</i>	✓	?	✓				Yes
14. Bird	Grey crowned Prinia <i>Prinia cinereocapilla</i>	✓						No
15. Reptile	Spotted Pond Turtle <i>Geoclemys hamiltonii</i>	?				?		No
16. Reptile	Elongated Tortoise <i>Indotestudo elongata</i>	?				?	?	No
17. Reptile	Three-keeled Land Tortoise <i>Melanochelys tricarinata</i>	?					?	No
18. Reptile	Three Keeled Mountain Lizard <i>Japalura tricarinata</i>	✓						No
19. Frog	<i>Hylarana chitwanensis</i>	✓				✓	?	No
20. Frog	Torrent Paa Frog <i>Nanorana ercepeae</i>	?		?				No

Biodiversity type	Name	Cumulatively across Project	Transmission line component					Significant Project impacts likely without mitigation
			1a	2a	3a & b	9a	9b	
21. Frog	Narayanghat Whipping Frog <i>Polypedates zed</i>	✓				✓		No
22. Frog	<i>Sphaerotheca maskeyi</i>	✓				✓		No
23. Frog	<i>Sphaerotheca swani</i>	✓				✓		No
24. Fish	Kalabans <i>Bangana dero</i>	?					?	No
25. Fish	<i>Chagunius chagunio</i>	?	?		?	?	?	No
26. Fish	Annandale Garra <i>Garra annandalei</i>	?	?					No
27. Fish	Large Razorbelly Minnow <i>Salmostoma bacaila</i>	?					?	No
28. Fish	<i>Tor putitora</i>	?				?		No
29. Fish	Rainbow Minnow <i>Psilorhynchus gracilis</i>	?				?		No
30. Fish	<i>Erethistoides ascita</i>	?					?	No
31. Fish	<i>Pseudecheneis eddsi</i>	✓	?		?			No
32. Fish	Stone Carp <i>Psilorhynchus pseudecheneis</i>	?		?				No
33. Fish	River Stone Carp <i>Psilorhynchus sucatio</i>	?				?	?	No
34. Fish	<i>Sisor rheophilus</i>	✓				?		No
35. Site	Annapurna Conservation Area Key Biodiversity Area	?	?					No
36. Site	Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area	✓		✓				Yes
37. Site	Koshi Tappu Wildlife Reserve and Koshi Barrage Key Biodiversity Area	✓					✓	No
38. Site	Langtang National Park and Key Biodiversity Area	✓			✓			No
39. Site	Parsa National Park and Parsa Wildlife Reserve Key Biodiversity Area	✓				✓		No
40. Site	Shivapuri-Nagarjun National Park	✓			✓			No

✓ = actually or likely qualifies area as Critical Habitat; ? = possibly qualifies area as Critical Habitat. Both based on available information.

2 Introduction

2.1 Purpose and objectives

This document supports the Initial Environmental Examination (IEE) for the Electricity Grid Modernization Project in Nepal (NEA 2020), which has been categorized as “B” for environmental safeguards. Owing to time constraints,

the scope of this assessment was restricted to five transmission line components of the broader project perceived as of higher risk. It does not include other components of the broader project, such as new and upgraded substations (which are all in agricultural land and/or existing facilities: E. Marsden *in litt.* 2020) or associated facilities. This restricted scope is henceforth referred to as “the Project”, and thus comprises five geographically-distinct pieces of infrastructure:

- Component 1a - Construction of 25km long 132 kV overhead transmission line from Dandhakhet – Rahughat;
- Component 2a - Construction of 40 km long 132 kV overhead transmission line from Ghorahi to Madichaur;
- Components 3a&b - Construction of 25 km long 220 kV overhead transmission line from Ratmate to Lapang and 23 km long 132 kV overhead transmission line from Lapang to Borang;
- Component 9a - Upgrading conductor (DC) on 102km 132kV Pathlaiya- Dhalkebar transmission line; and
- Component 9b - Upgrading conductor (DC) on 28km 132kV Duhabi-Kusaha transmission line.

The Project is proposed for financing under an ADB loan. The ADB Safeguard Policy Statement (ADB 2009) requires assessment of whether a project is planned in an area that may qualify as Critical Habitat. This document provides that assessment, and summarizes impacts, mitigation and offset options for significant impacts on Critical Habitat-qualifying biodiversity.

2.2 Approach

This CHA was rapidly developed through a desktop review of existing documentation related to the Project and other existing grey and published literature. It aligns with the ADB SPS (ADB 2009) and International Finance Corporation Performance Standard 6 and its accompanying Guidance Note (IFC 2012, 2019).

Except where necessary, this document does not repeat information available in the Initial Environmental Examination (NEA 2020).

Owing to time constraints, this assessment does not attempt to identify the presence or distribution of Natural Habitat in the Project Areas of Analysis (AoAs).

2.3 Key constraints and information gaps

The main constraint facing this assessment was extremely limited time. As a result, some aspects usually included in such assessments have been excluded (such as assessment of nationally-threatened species under Criterion 1). Further, simple AoAs with limited ecological relevance were defined, and assessment of species’ populations in the Project AoAs was less rigorous than usual. These weaknesses impact the assessment but, as it is precautionary throughout and addresses infrastructure with limited footprint impacts, are unlikely to fundamentally alter its conclusions.

At the time of this assessment, locations of Project infrastructure were available, but only limited information about Project design. There was also almost no Project-specific baseline information available for Critical Habitat-qualifying species (such as vultures, and their movements across proposed transmission line corridors) or their habitats (such as the quality of forest to be cleared for rights of way).

This assessment should be viewed as preliminary, in light of all of these significant information gaps, and should be updated when more information becomes available to fill them.

3 Areas of analysis

Critical Habitat assessment ideally takes place across sensible ecological or political units that are sufficiently large to encompass all direct and indirect impacts from the project. These areas of analysis (AoAs) are thus often much broader than the direct project footprint. AoAs may be separate or combined, depending on the ecology of the biodiversity concerned.

Given the rapid desktop nature of this assessment and the linear and disjunct nature of the Project, defining ecologically-appropriate areas of analysis was challenging. Some of the highest risk species in the Project area are vultures, which can regularly forage up to 500 km from breeding sites. Considering such large areas in a Critical Habitat assessment would, however, provide results of limited relevance to Project mitigation and management, particularly considering that components of this Project are managed quite independently. As a compromise between providing sufficiently fine-scale information that it is relevant to each Project component and assessing areas that are sufficiently large enough to acknowledge the mobility of at-risk species, AoAs were defined using a buffer of 25 km either side of each transmission line component. The total area of the Project AoAs was thus more than 21,000 km². This is an unusually large area, reflecting the linear and disjunct nature of the Project.

Identification of these AoAs does not mean that the project has any obligations across them. The aim of this Critical Habitat Assessment is to identify whether the broad units qualify as Critical Habitat and, if so, for which biodiversity features. This information helps to prioritize impact assessment and to focus mitigation efforts.

4 Assessment of biodiversity which may qualify the area as Critical Habitat

Each of the following sections considers candidate Critical Habitat-qualifying biodiversity identified within the Integrated Biodiversity Assessment Tool (IBAT: www.ibat-alliance.org) or other literature as actually or potentially present. In each case, reasons are identified for each biodiversity feature likely meeting or not meeting Critical Habitat. Two categories of biodiversity that might qualify the area as Critical Habitat were only considered briefly here, and should be assessed further by social experts – specifically areas that provide key ecosystem services and areas with biodiversity that has significant social, cultural or economic importance to local communities.

4.1 Critically Endangered and Endangered species

Critically Endangered, Endangered, and (per IFC 2019) Vulnerable species and relevant subspecies were included in an initial screening if their IUCN range maps overlapped Project AoAs. Threat status is taken from the global IUCN Red List (IUCN 2020). Comparison with IUCN Red List Extent of Occurrence maps identified the potential for 70 Critically Endangered, Endangered, or Vulnerable species to occur in the Project AoA. This total of 70 candidate species was reduced to 16 after a quick screen of IUCN distribution maps against quantitative thresholds for Critical Habitat (IFC 2019) – based on the extremely limited extent of their global distribution known or likely to be within the AoA, it was very unlikely that the other 50 (Table 2) would meet these thresholds. The remaining 20 are considered in more detail below.

Nepal also has a National Red List for birds, aligned with IUCN categories and criteria (Inskipp *et al.* 2017). For a full Critical Habitat Assessment, it would also be necessary to review all 68 Critically Endangered and 38 Endangered species in that list, to assess whether any of those qualify the Project as Critical Habitat. Such an exercise was not feasible here, given the rapid nature of this assessment.

1. Mandelli's Mouse-eared Myotis (*Myotis sicarius*)

This species is considered globally Vulnerable and is poorly known, with records from only seven locations (Srinivasulu & Srinivasulu 2019). Just over 15% of its distribution, as mapped by Srinivasulu & Srinivasulu (2019), falls within the Project AoAs – particularly the area around the Pathlaiya- Dhalkebar line (almost 9% in this AoA). However, with such limited information on this species' distribution, it is challenging to assess whether (per IFC 2019) it would merit upgrading to Endangered should all populations within the Project AoAs be lost. Assuming an even distribution of locations, 15% of seven locations would equate to just one location lost, close to the ≤5 locations that would merit uplisting to Endangered on the IUCN Red List. As such, **on a precautionary basis, Mandelli's Mouse-eared Myotis might possibly qualify the Pathlaiya-Dhalkebar transmission line component, and thus the Project as a whole, as Critical Habitat under Criterion 1.** Nonetheless, *Myotis* species are likely to have a low collision risk with transmission lines and towers (unlike, e.g., wind turbines).

2. Tiger (*Panthera tigris*)

This species is considered globally Endangered (Goodrich *et al.* 2015). In at least one location within the Project AoAs, Parsa National Park (Section 4.6), the population of Tiger is likely sufficient to qualify the site as Critical Habitat. Therefore, ***Tiger qualifies the Pathlaiya-Dhalkebar transmission line AoA as Critical Habitat under Criterion 1.***

3. Red Panda (*Ailurus fulgens*)

This species is considered globally Endangered (Glatston *et al.* 2015), and more than 1% of its mapped distribution as mapped by IUCN falls within the Project AoAs. During a rapid assessment of this type, without time to check detailed distributional data within each AoA, it is precautionary to assume that ***Red Panda might qualify the Project overall as Critical Habitat under Criterion 1.*** It is even less clear whether any particular Project AoA is particularly important to this species. On a precautionary basis, as the only Project AoAs overlapping >0.5% of the species' mapped range, it is considered that ***Red Panda might possibly qualify the Dandhakhet–Rahughat and Ratmate-Lapang-Borang transmission line AoAs as Critical Habitat under Criterion 1.*** The latter AOA overlaps Langtang National Park, which qualifies as Critical Habitat for this species (Section 4.6).

4. Himalayan Muskdeer (*Moschus leucogaster*)

This species is considered globally Endangered and has a distribution centered on the Nepal Himalaya (Timmins & Duckworth 2015), with more than 11% of its mapped global range overlapping the Project AoAs – including >1% within each of the Dandhakhet–Rahughat and Ratmate-Lapang-Borang AoAs. During a rapid assessment of this type, without time to check detailed distributional data within each AoA, it is precautionary to assume that **Himalayan Muskdeer might qualify the Dandhakhet–Rahughat and Ratmate-Lapang-Borang transmission line AoAs, and thus also the Project overall, as Critical Habitat under Criterion 1.** Nonetheless, this is a very high altitude species, known only from above 2,500 m. As such, the Project (which is entirely below 2,100 m altitude: NEA 2020) is very unlikely to impact this species.

5. Hog Deer (*Axis porcinus*)

This species is globally Endangered, and largely restricted in Nepal to protected areas (Timmins *et al.* 2015), with over 3% of its mapped global range overlapping the Project AoAs. Populations are known to occur within at least two Project AoAs (within Parsa National Park and Koshi Tappu Wildlife Reserve), but these are small in comparison to the populations at Suklaphanta, Bardiya and Chitwan (Timmins *et al.* 2015). Further, some Indian protected areas – notably Kaziranga – hold large populations of this species. As such, it is unlikely that >1% of the population of this species occurs within any of the Project AoAs, and it thus does not qualify the Project as Critical Habitat under Criterion 1.

6. Gaur (*Bos gaurus*)

This species is considered globally Vulnerable (Duckworth *et al.* 2016). In at least one location within the Project AoAs, Parsa National Park (Section 4.6), the population of Gaur is likely sufficient to qualify the site as Critical Habitat. Therefore, **Gaur qualifies the Pathlaiya-Dhalkebar transmission line AoA as Critical Habitat under Criterion 1.**

7. Wild Water Buffalo (*Bubalus arnee*)

This globally Endangered species is only known to remain in Nepal within Koshi Tappu Wildlife Reserve, where 220 individuals were counted in 2008 (Kaul *et al.* 2019). A more recent estimate there is of over 430 individuals (Paudel 2016), and these animals now also regularly feed in agricultural land outside of the reserve (e.g., Limbu & Karki 2003) – thus potentially in areas where Project activities will take place). As the global population is believed to be less than 4,000, even the earlier estimate represented >5% of the global population and **Wild Water Buffalo thus qualifies the Duhabi-Kusaha transmission line AoA, and therefore also the Project as a whole, as Critical Habitat under Criterion 1.**

8. Hispid Hare (*Caprolagus hispidus*)

This species is considered globally Endangered (Aryal & Yadav 2019), and more than 11% of its mapped global range overlaps the Project AoAs – notably almost 6% within the Pathlaiya-Dhalkebar AoA, and more than 2% each in the Ghorahi-Madichaur and Duhabi-Kusaha AoAs. It is known to have a restricted and fragmentary distribution within this overall mapped range, restricted to grasslands (Aryal & Yadav 2019). However, during a rapid assessment of this type, without time to check detailed distributional data within each AoA, it is precautionary to assume that ***Hispid Hare might qualify the Pathlaiya-Dhalkebar, Ghorahi-Madichaur and Duhabi-Kusaha transmission line AoAs, and thus also the Project overall, as Critical Habitat under Criterion 1.***

9. Bengal Florican (*Houbaropsis bengalensis*)

This Critically Endangered species exists in two disjunct populations (BirdLife International 2020n), with approximately 450-500 adult birds estimated to remain in Nepal and North-East India (Collar *et al.* 2017) and 119–156 remaining in Cambodia (Mahood *et al.* 2019). The Duhabi-Kusaha transmission line overlaps a KBA which likely supports >0.5% of the global population of this Critically Endangered species (Sections 4.6-4.7). The ***Duhabi-Kusaha transmission line AoA, and thus the Project as a whole, therefore likely qualifies as Critical Habitat under Criterion 1 for Bengal Florican.***

10. Greater Adjutant (*Leptoptilos dubius*)

This Endangered species traditionally occurred in the non-breeding season in southern (central and eastern) Nepal (BirdLife International 2020o), but is now recorded there extremely rarely (e.g., Paudel 2017). As such, despite >1% of its known range overlapping Project AoAs, this species does not qualify the Project as Critical Habitat under Criterion 1.

11. Red-headed Vulture (*Sarcogyps calvus*)

This species is considered globally Critically Endangered, with a global population that could be as low as 3,750 – much of which is in India (BirdLife International 2020q). Despite dramatic declines, small numbers persist in central and western Nepal (Bhusal & Paudel 2016). Dandakhet-Rahughat overlaps a protected area/KBA which may support >0.5% of the global population of this species (Sections 4.6-4.7). The ***Dandakhet-Rahughat transmission line AoA, and thus the Project as a whole, potentially qualifies as Critical Habitat under Criterion 1 for Red-headed Vulture.***

12. White-rumped Vulture (*Gyps bengalensis*)

This Critically Endangered species suffered extremely rapid declines across South Asia (BirdLife International 2020l), with a recent population estimate of about 6,000 individuals in India (Prakash *et al.* 2019). To qualify as Critical Habitat per IFC (2019), the AoA would have to regularly support 0.5% of the global population, i.e. at least 30 birds. Ghorahi-Madichaur is close to a KBA and protected area which supports such concentrations; Duhabi-Kusaha overlaps a protected area/KBA which likely also supports globally-significant concentrations; and Dandakhet-Rahughat overlaps a protected area/KBA which may also support globally-significant concentrations (Sections 4.6-4.7). The ***Ghorahi-Madichaur, Duhabi-Kusaha and Dandakhet-Rahughat transmission line AoAs, and thus the Project as a whole, therefore actually, likely, or potentially qualify as Critical Habitat under Criterion 1 for White-rumped Vulture.***

13. Slender-billed Vulture (*Gyps tenuirostris*)

This Critically Endangered species is now largely restricted to northern India, southern Nepal and north/central Bangladesh (BirdLife International 2020m), with a remaining population estimated at only 1,500-3,750 individuals. To qualify as Critical Habitat per IFC (2019), an AoA would have to regularly support 0.5% of the global population and at least five reproductive units, i.e. at least 10 birds in five adult pairs. Ghorahi-Madichaur is partially in a KBA and a protected area which are likely to support such concentrations. Dandakhet-Rahughat overlaps a protected area/KBA which may also support globally-significant concentrations (Sections 4.6-4.7). The ***Ghorahi-Madichaur and Dandakhet-Rahughat transmission line AoAs, and thus the Project as a whole, therefore may qualify as Critical Habitat under Criterion 1 for Slender-billed Vulture.***

14. Grey-crowned Prinia (*Prinia cinereocapilla*)

This globally Vulnerable species has a fragmented global range in northern India, Nepal and Bhutan (BirdLife International 2020p), with >19% mapped within the Project AoAs – including >12% in the Pathlaiya-Dhalkebar AoA and >6% in the Duhabi-Kusaha AoA. While common within its range, it is quite conceivable that the loss of all habitat within these AoAs (per IFC 2019, however unlikely that is in practice) would result in the uplisting of this species to Endangered. Nonetheless, it is not likely that the loss of all habitat within any single AoA would result in such an uplisting. As such, ***Grey-crowned Prinia qualifies the Project as a whole, but not any single Project AoA, as Critical Habitat under Criterion 1.***

15. Spotted Pond Turtle (*Geoclemys hamiltonii*)

This globally Endangered species occurs in lowland standing water bodies (Praschag *et al.* 2019), and has about 1.3% of its global range mapped within the Project AoAs. If 0.5% of its population occurs within the AoAs, they would qualify as Critical Habitat (IFC 2019). During a rapid assessment of this type, without time to check detailed distributional data within each AoA, it is precautionary to assume that ***Spotted Pond Turtle might qualify the Project overall as Critical Habitat*** under Criterion 1. It is even less clear whether any particular Project AoA is particularly important to this species. On a precautionary basis, as the only Project AoA overlapping >0.5% of the species' mapped range, it is considered that ***Spotted Pond Turtle might possibly qualify the Pathlaiya-Dhalkebar transmission line AoA as Critical Habitat under Criterion 1.***

16. Three-striped Roofed Turtle (*Batagur dhongoka*)

This lowland river species is considered globally Critically Endangered, because it is undergoing a rapid decline (Das *et al.* 2019). While it is known from India and Bangladesh, the few records from Nepal require confirmation (Das *et al.* 2019). As such, despite a >1% overlap of its mapped range with Project AoAs, this species is not currently predicted to qualify the Project as Critical Habitat under Criterion 1.

17. Elongated Tortoise (*Indotestudo elongata*)

This species is considered globally Critically Endangered, because it is undergoing a rapid decline owing to extensive collecting (Rahman *et al.* 2019). It is rare across its wide range, and so it is extremely challenging to identify sites likely to qualify as Critical Habitat for this species. On a precautionary basis, given records from these sites, it is considered that both ***Koshi Tappu Wildlife Reserve and Parsa National Park might possibly hold globally-significant populations and so qualify the Pathlaiya-Dhalkebar and Duhabi-Kusaha transmission line AoAs as Critical Habitat under Criterion 1 for Elongated Tortoise.***

18. Three-keeled Land Tortoise (*Melanochelys tricarinata*)

This species is considered globally Endangered, because it is undergoing a rapid decline owing to extensive collecting (Rahman *et al.* 2019). It has a relatively restricted range, but is rare across it, and so it is very difficult to identify sites likely to qualify as Critical Habitat for this species. On a precautionary basis, given records from this site, it is considered that ***Koshi Tappu Wildlife Reserve might possibly hold globally-significant populations and so qualify the Duhabi-Kusaha transmission line AoA as Critical Habitat under Criterion 1 for Three-keeled Land Tortoise.***

19. *Tor putitora*

This Endangered fish species is distributed throughout, and beyond, Nepal (Jha *et al.* 2018). Although very threatened across this wide range, its current distribution is obscured by its large range and (re)introductions to a number of locations within it. Almost 2% of its known and predicted distribution as mapped by IUCN falls within the Project AoAs. During a rapid assessment of this type, without time to check detailed distributional data within each AoA (particularly those relating to key locations for spawning), it is precautionary to assume that ***Tor putitora might qualify the Project overall as Critical Habitat under Criterion 1.*** It is even less clear whether any particular Project AoA is particularly important to this species. On a precautionary basis, as the only Project AoA overlapping >0.5% of the species' mapped range, it is considered that ***Tor putitora might possibly qualify the Pathlaiya-Dhalkebar transmission line AoA as Critical Habitat under Criterion 1.***

20. *Chloropetalia selysi*

This dragonfly species is considered globally Vulnerable (Dow 2009). More than 6% of its distribution as mapped by IUCN falls within the Project AoAs. However, this mapped distribution is perhaps only half of the true picture, as the species is also known from as far east as eastern Nagaland (Joshi 2014). It is thus unlikely that even the theoretical loss of all populations within the Project AoAs would merit the uplisting of this species to Endangered (per IFC 2019). This species thus does not qualify the Project as Critical Habitat under Criterion 1.

TABLE 2. GLOBALLY-THREATENED SPECIES WITH VERY MARGINAL OCCURRENCE, IF PRESENT AT ALL, IN THE PROJECT AOAS

Biodiversity type	Common name	Scientific name	IUCN Category
1. Mammal	Dhole	<i>Cuon alpinus</i>	EN
2. Mammal	Clouded Leopard	<i>Neofelis nebulosa</i>	VU
3. Mammal	Leopard	<i>Panthera pardus</i>	VU
4. Mammal	Snow Leopard	<i>Panthera uncia</i>	VU
5. Mammal	Fishing Cat	<i>Prionailurus viverrinus</i>	VU
6. Mammal	Asian Small-clawed Otter	<i>Aonyx cinereus</i>	VU
7. Mammal	Smooth-coated Otter	<i>Lutrogale perspicillata</i>	VU
8. Mammal	Sloth Bear	<i>Melursus ursinus</i>	VU
9. Mammal	Asiatic Black Bear	<i>Ursus thibetanus</i>	VU
10. Mammal	Four-horned Antelope	<i>Tetracerus quadricornis</i>	VU
11. Mammal	Sambar	<i>Rusa unicolor</i>	VU
12. Mammal	South Asian River Dolphin	<i>Platanista gangetica</i>	EN
13. Mammal	Greater One-horned Rhino	<i>Rhinoceros unicornis</i>	VU
14. Mammal	Indian Pangolin	<i>Manis crassicaudata</i>	EN
15. Mammal	Chinese Pangolin	<i>Manis pentadactyla</i>	CR
16. Mammal	Asian Elephant	<i>Elephas maximus</i>	EN
17. Bird	Eastern Imperial Eagle	<i>Aquila heliaca</i>	VU
18. Bird	Steppe Eagle	<i>Aquila nipalensis</i>	EN
19. Bird	Tawny Eagle	<i>Aquila rapax</i>	VU
20. Bird	Greater Spotted Eagle	<i>Clanga clanga</i>	VU
21. Bird	Indian Spotted Eagle	<i>Clanga hastata</i>	VU
22. Bird	Indian Vulture	<i>Gyps indicus</i>	CR
23. Bird	Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>	EN
24. Bird	Egyptian Vulture	<i>Neophron percnopterus</i>	EN
25. Bird	Baer's Pochard	<i>Aythya baeri</i>	CR
26. Bird	Common Pochard	<i>Aythya ferina</i>	VU
27. Bird	Great Hornbill	<i>Buceros bicornis</i>	VU
28. Bird	Black-bellied Tern	<i>Sterna acuticauda</i>	EN
29. Bird	Wood Snipe	<i>Gallinago nemoricola</i>	VU
30. Bird	Asian Woollyneck	<i>Ciconia episcopus</i>	VU
31. Bird	Lesser Adjutant	<i>Leptoptilos javanicus</i>	VU

Biodiversity type	Common name	Scientific name	IUCN Category
32. Bird	Saker Falcon	<i>Falco cherrug</i>	EN
33. Bird	Cheer Pheasant	<i>Catreus wallichii</i>	VU
34. Bird	Swamp Francolin	<i>Francolinus gularis</i>	VU
35. Bird	Sarus Crane	<i>Antigone antigone</i>	VU
36. Bird	Lesser Florican	<i>Sypheotides indicus</i>	EN
37. Bird	Yellow-breasted Bunting	<i>Emberiza aureola</i>	CR
38. Bird	Bristled Grassbird	<i>Chaetornis striata</i>	VU
39. Bird	White-throated Bushchat	<i>Saxicola insignis</i>	VU
40. Bird	Finn's Weaver	<i>Ploceus megarhynchus</i>	VU
41. Bird	Jerdon's Babbler	<i>Chrysomma altirostre</i>	VU
42. Reptile	Mugger	<i>Crocodylus palustris</i>	VU
43. Reptile	King Cobra	<i>Ophiophagus hannah</i>	VU
44. Reptile	Burmese Python	<i>Python bivittatus</i>	VU
45. Amphibian		<i>Nanorana rostandi</i>	VU
46. Fish		<i>Wallago attu</i>	VU
47. Freshwater snail		<i>Tricula mahadevensis</i>	VU
48. Dragonfly		<i>Chloropetalia selysi</i>	VU
49. Plant		<i>Oryza malampuzhaensis</i>	VU
50. Plant	Atlas Daisy	<i>Anacyclus pyrethrum</i>	VU

4.2 Endemic or restricted-range species

Nepal is a mountainous country situated within the Himalaya, a mountain range with very high levels of endemism (e.g., Stattersfield *et al.* 1998; Wikramanayake *et al.* 2002), though plant endemism within Nepal is relatively low (Tiware *et al.* 2019). Owing to time constraints, this assessment only focused on species assessed under the IUCN Red List, as these can be rapidly screened for restricted-range species. It is thus quite likely that additional restricted-range species occur in the Project area. Given the nature of the Project, however, there is a low likelihood of significant Project impacts to any such species – the major Project risks are to high-flying species, such as bats and birds.

Following the IFC PS6 Guidance Note (IFC 2019), species were considered restricted-range if their global extent of occurrence was 50,000 km² or less (for terrestrial vertebrates) or, for riverine species, if their global range had less than 500 km linear geographic span. Comparison with IUCN Red List Extent of Occurrence maps identified the potential for 30 restricted-range species to occur in the Project AoA. This total of 30 candidate species was reduced to 17 after a quick screen of IUCN distribution maps against quantitative thresholds for Critical Habitat (IFC 2019) – based on the extremely limited extent of their global distribution known or likely to be within the AoA, it was very unlikely that the other 13 (Table 3) would meet these thresholds. The remaining 17 are considered in more detail below.

Several bird species which occur in the Project AoAs have previously been considered restricted-range by BirdLife International but are now known to have Extents Of Occurrence (EOO) >50,000 km² (e.g., Spiny Babbler *Acanthoptila nipalensis* and Grey-crowned Prinia *Prinia cinereocapilla*). Likewise, some other species have a small stated EOO on the IUCN Red List, but calculation of more accurate EOOs using minimum convex polygon methods reveal EOOs >50,000 km² (e.g., Crump's Mouse *Diomys crumpi*: Molur & Laginha Pinto Correia 2016). None of these species are considered further here, as they cannot be considered restricted-range species in the sense of IFC (2019).

1. Csorba's Mouse-eared Myotis (*Myotis csorbai*)

This restricted-range bat species is known only from 1,300-1,700 m elevation in the Kathmandu Valley and Pokhara area of central Nepal (Csorba & Thapa 2016), with almost 27% of its mapped range overlapping the Project AoAs – including >10% in the Ratmate-Lapang-Borang AoA and >9% in the Dandhakhet–Rahughat AoA. On a precautionary basis, it is possible that >10% of the global population of this species thus occurs in both of those AoAs. As such, ***Csorba's Mouse-eared Myotis may qualify the Ratmate-Lapang-Borang and Dandhakhet–Rahughat transmission line AoAs, and certainly the Project overall, as Critical Habitat*** under Criterion 2.

2. Nepalese Field Mouse (*Apodemus gorkha*)

This restricted-range species is known only from high elevations (2,200-3,600 m) in central Nepal (Kennerley & Pearch 2016), with >27% of its mapped range overlapping the Project AoAs – including >21% in the Dandhakhet–Rahughat AoA. Although it occurs in elevations above the Project, and is thus unlikely to be significantly impacted, ***Nepalese Field Mouse qualifies the Dandhakhet–Rahughat transmission line AoA, and thus the Project overall, as Critical Habitat*** under Criterion 2.

3. Three Keeled Mountain Lizard (*Japalura tricarinata*)

This restricted-range species occurs in northern India and eastern Nepal. (Manthey & Macey 2010), with >13% of its mapped range overlapping the Project AoAs – but the largest single overlap being <7% in the Ratmate-Lapang-Borang AoA. It is unlikely that any single AoA holds >10% of the global population of this species but ***Three Keeled Mountain Lizard qualifies the Project overall as Critical Habitat*** under Criterion 2.

4. Torrent Paa Frog (*Nanorana ercepeae*)

This restricted-range species is known only from high altitudes (2,200-2,600 m) in western Nepal (Ohler *et al.* 2004b), with almost 10% of its mapped range overlapping the Ghorahi-Madichaur AoA. On a precautionary basis, it is possible that >10% of the global population of this species thus occurs in the AoA. As such, ***Torrent Paa Frog might possibly qualify the Ghorahi-Madichaur transmission line AoA, and thus the Project overall, as Critical Habitat*** under Criterion 2.

5. *Sphaerotheca maskeyi*

This restricted-range frog species is known only from the central and eastern Himalayan foothills of Nepal (Ohler *et al.* 2004a), but its distribution is poorly known and it is expected to occur more widely. More than 27% of the currently known distribution overlaps the Project AoAs, almost all within the Pathlaiya-Dhalkebar AoA. On a precautionary basis, it is possible that >10% of the global population of this species thus occurs in the AoA. As such, ***Sphaerotheca maskeyi likely qualifies the Pathlaiya-Dhalkebar transmission line AoA, and certainly the Project overall, as Critical Habitat*** under Criterion 2.

6. *Sphaerotheca swani*

This restricted-range frog species is only known from the vicinity of Dharan, just north-east of Koshi Tappu (Dutta *et al.* 2004a). All or most of its known range and population thus falls within the Duhabi-Kusaha AoA. Given this, ***Sphaerotheca swani likely qualifies the Duhabi-Kusaha transmission line AoA, and thus the Project overall, as Critical Habitat*** under Criterion 2.

7. *Hylarana chitwanensis*

This restricted-range frog species is only known from the southern lowlands of Nepal (Dutta *et al.* 2004b), with more than 38% of its mapped range overlapping the Project AoAs – including >27% within the Pathlaiya-Dhalkebar AoA. Based on available information, ***Hylarana chitwanensis likely qualifies the Pathlaiya-Dhalkebar transmission line AoA, and thus the Project overall, as Critical Habitat*** under Criterion 2. With >10% of its range within the Duhabi-Kusaha AoA, it is precautionary to assume that ***Hylarana chitwanensis might also qualify the Duhabi-Kusaha transmission line AoA as Critical Habitat***.

8. Narayanghat Whipping Frog (*Polypedates zed*)

This restricted-range species is only known from the southern lowlands of Nepal (Ohler & Shrestha 2004), with >50% of its mapped range overlapping the Pathlaiya-Dhalkebar AoA. During a rapid assessment of this type, it is thus precautionary to assume that ***Narayanghat Whipping Frog qualifies the Pathlaiya-Dhalkebar transmission line AoA, and thus the Project overall, as Critical Habitat*** under Criterion 2.

9. *Erethistoides ascita*

This restricted-range fish species is only known from tributaries of the Ganges River in the lowlands of south-eastern Nepal (Ng 2010a), with almost 12% of its mapped range (which includes large areas of predicted occurrence in neighboring India) overlapping the Project AoAs – including >7% within the Duhabi-Kusaha AoA and >4% within the Pathlaiya-Dhalkebar AoA. During a rapid assessment of this type, with limited fine-scale information on this species' distribution, it is precautionary to assume that ***Erethistoides ascita may qualify the Project overall as Critical Habitat*** under Criterion 2. The species is not certainly known from the Pathlaiya-Dhalkebar AoA but a significant percentage of its known distribution occurs within the Duhabi-Kusaha AoA. As such, ***Erethistoides ascita might possibly qualify the Duhabi-Kusaha transmission line AoA as Critical Habitat***.

10. *Pseudecheneis eddsi*

This restricted-range fish species is only known from the Ganges River drainage in the highlands of central Nepal (Ng 2010b), with over 22% of its mapped range (which includes large areas of predicted occurrence) overlapping the Project AoAs – including >12% within the Ratmate-Lapang-Borang AoA and almost 10% within the Dandhakhet–Rahughat AoA. In both cases, this overlap seems to relate to predicted, rather than known, occurrence. Nonetheless, during a rapid assessment of this type, it is precautionary to assume presence, and therefore that ***Pseudecheneis eddsi* may qualify the Ratmate-Lapang-Borang and Dandhakhet–Rahughat transmission line AoAs, and certainly the Project overall, as Critical Habitat** under Criterion 2.

11. *Sisor rheophilus*

This restricted-range fish species is known from the Ganges River drainage in Uttar Pradesh, but predicted to also occur upstream in Nepal (Ng 2010b), with almost 18% of its mapped range (which includes large areas of predicted occurrence) overlapping the Project AoAs – including >15% within the Pathlaiya-Dhalkebar AoA. This overlap only seems to be predicted - rather than known – occurrence. Nonetheless, during a rapid assessment of this type, it is precautionary to assume presence, and therefore that ***Sisor rheophilus* may qualify the Pathlaiya-Dhalkebar transmission line AoA, and certainly the Project overall, as Critical Habitat** under Criterion 2.

12. *Chloropetalia selysi*

This dragonfly species is considered globally Vulnerable and mapped by IUCN as having a range of just over 30,000 km² (Dow 2009), suggesting this is a restricted-range species (per IFC 2019). More than 6% of its distribution as mapped by IUCN falls within the Project AoAs. However, this mapped distribution is perhaps only half of the true picture, as the species is also known from as far east as eastern Nagaland (Joshi 2014). This species may thus not have a restricted range (per IFC 2019) and is unlikely to have >10% of its population in the Project AoAs. This species thus does not qualify the Project AoAs as Critical Habitat under Criterion 2.

TABLE 3. RESTRICTED-RANGE SPECIES WITH VERY MARGINAL OCCURRENCE, IF PRESENT AT ALL, IN THE PROJECT AoAs

Biodiversity type	Common name	Scientific name	IUCN Category
1. Amphibian		<i>Nanorana rostandi</i>	VU
2. Fish	Kalabans	<i>Bangana dero</i>	LC
3. Fish	Annandale garra	<i>Garra annandalei</i>	LC
4. Fish		<i>Psilorhynchus nepalensis</i>	LC
5. Fish	Stone Carp	<i>Psilorhynchus pseudecheneis</i>	LC
6. Fish		<i>Trichogaster chuna</i>	LC
7. Fish		<i>Amblyceps mangois</i>	LC
8. Fish		<i>Pseudolaguvia muricata</i>	DD
9. Fish	Spiny Eel	<i>Macrogathus aral</i>	LC

Biodiversity type	Common name	Scientific name	IUCN Category
10. Insect		<i>Chloropetalia selysi</i>	VU
11. Insect		<i>Anotogaster basalis</i>	DD
12. Insect		<i>Macromia sombui</i>	DD
13. Insect	Chuling Khola Pygmy Grasshopper	<i>Formosatettix gorkhanus</i>	LC

4.3 Migratory or congregatory species

Many freshwater species and birds in Nepal are migratory, owing to the country's high topographic variability and seasonal availability of resources at higher altitudes. Not all of these geographically aggregate on migration, in the sense that this Critical Habitat criterion is intended for application (IFC 2019). For example, vultures in Nepal are typically altitudinal migrants over a broad front. Such species are not considered in more detail in this section as they are not considered likely to qualify sites as Critical Habitat as migratory/congregatory species *per se*.

While more than 270 migratory bird species were identified during this assessment (Table 4), IBAs were taken as representative of priority areas for migratory and congregatory species. Ten IBAs for migratory birds have been identified in Nepal (Baral & Inskipp 2005), of which two are overlapped by the Project AoAs, both by the Duhabi-Kusaha AoA. First, Koshi Tappu Wildlife Reserve and Koshi Barrage IBA was listed as holding important concentrations (>1% of the biogeographic population) of migratory Ferruginous Duck *Aythya nyroca*, Painted Stork *Mycteria leucocephala*, Black-necked Stork *Ephippiorhynchus asiaticus*, Black-headed Ibis *Threskiornis melanocephalus*, Spot-billed Pelican *Pelecanus philippensis*, Oriental Darter *Anhinga melanogaster* and Black-bellied Tern *Sterna acuticauda* (BirdLife International 2020f). The site is very unlikely, however, to hold sufficient concentrations of these species to qualify as Critical Habitat (>1% of the *global* population). Second, Dharan Forests IBA was listed as holding important breeding concentrations (>1% of the biogeographic population) of migratory Lesser Adjutant *Leptoptilos javanicus*. Recent maximum counts of this species at this site appear to be of 19 individuals (Acharya & Ghimire 2012) and 26 individuals (Basnet & Sapkota 2008). Even assuming all of these are mature individuals, these fall some way short of representing >1% of the global population, and thus do not qualify the area as Critical Habitat (per IFC 2019).

For species other than birds, migratory and congregatory species were identified by consultation of IUCN Red List accounts. These comprised 12 bat and 26 fish species. Criterion 3 is focused on short-term aggregations of individuals, which cannot easily be identified (unlike Criteria 1 and 2) by assessing the percentage of a species' range in an AoA. Nonetheless, given the very rapid nature of this assessment, a rapid screening of migratory and congregatory species was undertaken to focus the assessment on those species which do overlap the Project AoAs by more than 1%. Through this process, all 12 migratory/congregatory bat and 17 migratory/congregatory fish species were considered unlikely to qualify the Project AoAs as Critical Habitat (Table 4), and nine fish species were considered in more detail (below). This assessment remains precautionary, as global good practice is to only identify Critical Habitat for migratory species where an area represents a particular bottleneck along the migration flyway, is used as a resting area during migration, or is an area that migratory habits would lead to regular interaction with Project infrastructure (Sercx *et al.* 2018). This latter factor is not relevant for the fish species listed below as no Project infrastructure directly impacts freshwater habitats.

Given the blunt screening necessary during this rapid assessment, it is possible that some species in Table 4 may qualify the Project AoAs as Critical Habitat under Criterion 3. It is unlikely, however, that the Project poses

significant risk to these species as it has a relatively small footprint and few of the bat species (with some exceptions such as Indian Flying Fox) are very susceptible to collisions with powerlines

1. Kalabans (*Bangana dero*)

This migratory species is considered globally of Least Concern, and is known from the Ganga and Brahmaputra drainages of northern and northeastern India, Nepal and Bangladesh (Vishwanath 2010a), with >4% of its mapped range overlapping the Project AoAs – almost 4% of which is in the Duhabi-Kusaha AoA. During a rapid assessment of this type, it is precautionary to assume this figure indicates potential migratory concentrations, and therefore that the ***Duhabi-Kusaha transmission line AoA, and thus also the Project area overall, might possibly represent Critical Habitat for Kalabans*** under Criterion 3.

2. *Chagunius chagunio*

This migratory species is considered globally of Least Concern, and is known from the Ganga and Brahmaputra drainages of northern and northeastern India, Nepal and Bangladesh (Vishwanath 2010b), with >7% of its mapped range overlapping the Project AoAs – including >1.8% in the Dandhakhet–Rahughat and Ratmate-Lapang-Borang AoAs, and >1.3% in the Pathlaiya-Dhalkebar and Duhabi-Kusaha AoAs. During a rapid assessment of this type, it is precautionary to assume these figures indicate potential migratory concentrations, and therefore that ***four Project AoAs, and thus also the Project area overall, might possibly represent Critical Habitat for Chagunius chagunio*** under Criterion 3.

3. Annandale Garra (*Garra annandalei*)

This migratory species is considered globally of Least Concern, and is known from India, Nepal and Bangladesh (Rayamajhi & Jha 2010), with >5% of its mapped range overlapping the Dandhakhet–Rahughat AoA. During a rapid assessment of this type, it is precautionary to assume these figures indicate potential migratory concentrations, and therefore that the ***Dandhakhet–Rahughat transmission line AoA, and thus also the Project AoAs overall, might possibly represent Critical Habitat for Annandale Garra*** under Criterion 3.

4. Large Razorbelly Minnow (*Salmostoma bacaila*)

This migratory species is considered globally of Least Concern, and is known from Pakistan, Nepal, Bangladesh and northern India (Rema Devi & Dahanukar 2011), with >1.7% of its mapped range overlapping the Duhabi-Kusaha AoA. During a rapid assessment of this type, it is precautionary to assume these figures indicate potential migratory concentrations, and therefore that the ***Duhabi-Kusaha transmission line AoA, and thus also the Project AoAs overall, might possibly represent Critical Habitat for Large Razorbelly Minnow*** under Criterion 3.

5. *Tor putitora*

This species is globally Endangered, so is considered under Critical Habitat Criterion 1 (Section 4.1). It is also a migratory species, so is considered here under Criterion 3.

This species is an altitudinal migrant, known patchily from a large part of the southern Himalaya (Jha *et al.* 2018), with almost 2% of its mapped range overlapping Project AoAs – though no significant amount in any single AoA. During a rapid assessment of this type, it is nonetheless precautionary to assume this figure indicates potential migratory concentrations within the Project area, and therefore that ***the Project area overall might possibly represent Critical Habitat for Tor putitora under Criterion 3.***

6. Rainbow Minnow (*Psilorhynchus gracilis*)

This species is an altitudinal migrant, considered globally of Least Concern, and known from northeastern India, Nepal and Bangladesh (Dahanukar 2010a), with almost 3% of its mapped range overlapping Project AoAs – notably >1.4% in the Pathlaiya-Dhalkebar AoA. During a rapid assessment of this type, it is precautionary to assume these figures indicate potential migratory concentrations, and therefore that the ***Pathlaiya-Dhalkebar transmission line AoA, and thus also the Project AoAs overall, might possibly represent Critical Habitat for Rainbow Minnow*** under Criterion 3.

7. Stone Carp (*Psilorhynchus pseudecheneis*)

This migratory species is considered globally of Least Concern, and is known from eastern Nepal and northern India (Dahanukar 2010b), with >4% of its mapped range overlapping Project AoAs – including almost 4% in the Ghorahi-Madichaur AoA. During a rapid assessment of this type, it is precautionary to assume these figures indicate potential migratory concentrations, and therefore that ***the Ghorahi-Madichaur transmission line AoA, and thus also the Project AoAs overall, might possibly represent Critical Habitat for Stone Carp*** under Criterion 3.

8. River Stone Carp (*Psilorhynchus sucatio*)

This species is an altitudinal migrant, considered globally of Least Concern, and known from northeastern India, Nepal and Bangladesh (Dahanukar 2010c), with almost 4% of its mapped range overlapping Project AoAs – notably >2% in the Pathlaiya-Dhalkebar AoA and >1.2% in the Duhabi-Kusaha AoA. During a rapid assessment of this type, it is precautionary to assume these figures indicate potential migratory concentrations, and therefore that the ***Pathlaiya-Dhalkebar and Duhabi-Kusaha transmission line AoAs, and thus also the Project AoAs overall, might possibly represent Critical Habitat for River Stone Carp*** under Criterion 3.

9. Deocata Pipefish (*Microphis deocata*)

This globally Near Threatened migratory species is known from the Ganges and Brahmaputra river drainages in India (West Bengal, Bihar, Assam, Uttar Pradesh) and Bangladesh, and predicted from Nepal – where almost 1.4% of its mapped range overlaps three Project AoAs (Pollom 2017). Since the mapped range in Nepal appears to be entirely predicted (freshwater species are mapped at a watershed level), and the total extent is only just above Critical Habitat thresholds for migratory species, this species is not considered likely to qualify the Project AoAs as Critical Habitat.

TABLE 4. MIGRATORY AND/OR CONGREGATORY SPECIES WITH MARGINAL OCCURRENCE, IF PRESENT AT ALL, IN THE PROJECT AOAS

Biodiversity type	Common name	Scientific name	IUCN Category
1. Bat	Long-winged Tomb Bat	<i>Taphozous longimanus</i>	LC
2. Bat	Greater False Vampire	<i>Megaderma lyra</i>	LC
3. Bat	Small Long-fingered Bat	<i>Miniopterus pusillus</i>	LC
4. Bat	Schreiber's Bent-winged Bat	<i>Miniopterus schreibersii</i>	NT
5. Bat	Indian Flying Fox	<i>Pteropus giganteus</i>	LC
6. Bat	Leschenault's Rousette	<i>Rousettus leschenaultii</i>	LC
7. Bat	Intermediate Horseshoe Bat	<i>Rhinolophus affinis</i>	LC
8. Bat	Least Horseshoe Bat	<i>Rhinolophus pusillus</i>	LC
9. Bat	Lesser Mouse-eared Myotis	<i>Myotis blythii</i>	LC
10. Bat	Kashmir Cave Bat	<i>Myotis longipes</i>	DD
11. Bat	Himalayan Whiskered Myotis	<i>Myotis siligorensis</i>	LC
12. Bat	Lesser Asiatic Yellow House Bat	<i>Scotophilus kuhlii</i>	LC
13. Bird	Eurasian Sparrowhawk	<i>Accipiter nisus</i>	LC
14. Bird	Cinereous Vulture	<i>Aegypius monachus</i>	NT
15. Bird	Eastern Imperial Eagle	<i>Aquila heliaca</i>	VU
16. Bird	Steppe Eagle	<i>Aquila nipalensis</i>	EN
17. Bird	Black Baza	<i>Aviceda leuphotes</i>	LC
18. Bird	Upland Buzzard	<i>Buteo hemilasius</i>	LC
19. Bird	Japanese Buzzard	<i>Buteo japonicus</i>	LC
20. Bird	Long-legged Buzzard	<i>Buteo rufinus</i>	LC
21. Bird	Western Marsh-harrier	<i>Circus aeruginosus</i>	LC
22. Bird	Hen Harrier	<i>Circus cyaneus</i>	LC
23. Bird	Pallid Harrier	<i>Circus macrourus</i>	NT
24. Bird	Pied Harrier	<i>Circus melanoleucos</i>	LC
25. Bird	Montagu's Harrier	<i>Circus pygargus</i>	LC
26. Bird	Greater Spotted Eagle	<i>Clanga clanga</i>	VU
27. Bird	Griffon Vulture	<i>Gyps fulvus</i>	LC
28. Bird		<i>Gyps himalayensis</i>	NT
29. Bird	Himalayan Griffon	<i>Gyps himalayensis</i>	NT
30. Bird	White-tailed Sea-eagle	<i>Haliaeetus albicilla</i>	LC

Biodiversity type	Common name	Scientific name	IUCN Category
31. Bird	Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>	EN
32. Bird	Booted Eagle	<i>Hieraaetus pennatus</i>	LC
33. Bird	Egyptian Vulture	<i>Neophron percnopterus</i>	EN
34. Bird	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	LC
35. Bird	Crested Serpent-eagle	<i>Spilornis cheela</i>	LC
36. Bird	Osprey	<i>Pandion haliaetus</i>	LC
37. Bird	Northern Pintail	<i>Anas acuta</i>	LC
38. Bird	Common Teal	<i>Anas crecca</i>	LC
39. Bird	Mallard	<i>Anas platyrhynchos</i>	LC
40. Bird	Greylag Goose	<i>Anser anser</i>	LC
41. Bird	Bar-headed Goose	<i>Anser indicus</i>	LC
42. Bird	Baer's Pochard	<i>Aythya baeri</i>	CR
43. Bird	Common Pochard	<i>Aythya ferina</i>	VU
44. Bird	Tufted Duck	<i>Aythya fuligula</i>	LC
45. Bird	Ferruginous Duck	<i>Aythya nyroca</i>	NT
46. Bird	Lesser Whistling-duck	<i>Dendrocygna javanica</i>	LC
47. Bird	Falcated Duck	<i>Mareca falcata</i>	NT
48. Bird	Eurasian Wigeon	<i>Mareca penelope</i>	LC
49. Bird	Gadwall	<i>Mareca strepera</i>	LC
50. Bird	Goosander	<i>Mergus merganser</i>	LC
51. Bird	Red-crested Pochard	<i>Netta rufina</i>	LC
52. Bird	Northern Shoveler	<i>Spatula clypeata</i>	LC
53. Bird	Garganey	<i>Spatula querquedula</i>	LC
54. Bird	Ruddy Shelduck	<i>Tadorna ferruginea</i>	LC
55. Bird	Common Shelduck	<i>Tadorna tadorna</i>	LC
56. Bird	Pacific Swift	<i>Apus pacificus</i>	LC
57. Bird	Silver-backed Needletail	<i>Hirundapus cochinchinensis</i>	LC
58. Bird	Alpine Swift	<i>Tachymarptis melba</i>	LC
59. Bird	Kentish Plover	<i>Charadrius alexandrinus</i>	LC
60. Bird	Lesser Sandplover	<i>Charadrius mongolus</i>	LC
61. Bird	Long-billed Plover	<i>Charadrius placidus</i>	LC
62. Bird	Grey-headed Lapwing	<i>Vanellus cinereus</i>	LC
63. Bird	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	LC
64. Bird	Northern Lapwing	<i>Vanellus vanellus</i>	NT
65. Bird	Oriental Pratincole	<i>Glareola maldivarum</i>	LC
66. Bird	Ibisbill	<i>Ibidorhyncha struthersii</i>	LC
67. Bird	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	LC
68. Bird	Whiskered Tern	<i>Chlidonias hybrida</i>	LC
69. Bird	Caspian Tern	<i>Hydroprogne caspia</i>	LC
70. Bird	Brown-headed Gull	<i>Larus brunnicephalus</i>	LC
71. Bird	Lesser Black-backed Gull	<i>Larus fuscus</i>	LC
72. Bird	Pallas's Gull	<i>Larus ichthyaetus</i>	LC

Biodiversity type	Common name	Scientific name	IUCN Category
73. Bird	Black-headed Gull	<i>Larus ridibundus</i>	LC
74. Bird	Little Tern	<i>Sternula albifrons</i>	LC
75. Bird	Black-winged Stilt	<i>Himantopus himantopus</i>	LC
76. Bird	Common Sandpiper	<i>Actitis hypoleucos</i>	LC
77. Bird	Dunlin	<i>Calidris alpina</i>	LC
78. Bird	Temminck's Stint	<i>Calidris temminckii</i>	LC
79. Bird	Common Snipe	<i>Gallinago gallinago</i>	LC
80. Bird	Wood Snipe	<i>Gallinago nemoricola</i>	VU
81. Bird	Solitary Snipe	<i>Gallinago solitaria</i>	LC
82. Bird	Pintail Snipe	<i>Gallinago stenura</i>	LC
83. Bird	Black-tailed Godwit	<i>Limosa limosa</i>	NT
84. Bird	Jack Snipe	<i>Limnocyttus minimus</i>	LC
85. Bird	Eurasian Curlew	<i>Numenius arquata</i>	NT
86. Bird	Eurasian Woodcock	<i>Scolopax rusticola</i>	LC
87. Bird	Wood Sandpiper	<i>Tringa glareola</i>	LC
88. Bird	Common Greenshank	<i>Tringa nebularia</i>	LC
89. Bird	Green Sandpiper	<i>Tringa ochropus</i>	LC
90. Bird	Marsh Sandpiper	<i>Tringa stagnatilis</i>	LC
91. Bird	Common Redshank	<i>Tringa totanus</i>	LC
92. Bird	White Stork	<i>Ciconia ciconia</i>	LC
93. Bird	Black Stork	<i>Ciconia nigra</i>	LC
94. Bird	Greater Adjutant	<i>Leptoptilos dubius</i>	EN
95. Bird	Lesser Adjutant	<i>Leptoptilos javanicus</i>	VU
96. Bird	Painted Stork	<i>Mycteria leucocephala</i>	NT
97. Bird	Common Woodpigeon	<i>Columba palumbus</i>	LC
98. Bird	Oriental Turtle-dove	<i>Streptopelia orientalis</i>	LC
99. Bird	Black-capped Kingfisher	<i>Halcyon pileata</i>	LC
100. Bird	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>	LC
101. Bird	Blue-tailed Bee-eater	<i>Merops philippinus</i>	LC
102. Bird	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	LC
103. Bird	Asian Emerald Cuckoo	<i>Chrysococcyx maculatus</i>	LC
104. Bird	Chestnut-winged Cuckoo	<i>Clamator coromandus</i>	LC
105. Bird	Jacobin Cuckoo	<i>Clamator jacobinus</i>	LC
106. Bird	Common Cuckoo	<i>Cuculus canorus</i>	LC
107. Bird	Indian Cuckoo	<i>Cuculus micropterus</i>	LC
108. Bird	Lesser Cuckoo	<i>Cuculus poliocephalus</i>	LC
109. Bird	Oriental Cuckoo	<i>Cuculus saturatus</i>	LC
110. Bird	Large Hawk-cuckoo	<i>Hierococcyx sparveroides</i>	LC
111. Bird	Fork-tailed Drongo-cuckoo	<i>Surniculus dicruroides</i>	LC
112. Bird	Square-tailed Drongo-cuckoo	<i>Surniculus lugubris</i>	LC
113. Bird	Amur Falcon	<i>Falco amurensis</i>	LC
114. Bird	Saker Falcon	<i>Falco cherrug</i>	EN

Biodiversity type	Common name	Scientific name	IUCN Category
115. Bird	Merlin	<i>Falco columbarius</i>	LC
116. Bird	Lesser Kestrel	<i>Falco naumanni</i>	LC
117. Bird	Peregrine Falcon	<i>Falco peregrinus</i>	LC
118. Bird	Oriental Hobby	<i>Falco severus</i>	LC
119. Bird	Eurasian Hobby	<i>Falco subbuteo</i>	LC
120. Bird	Common Quail	<i>Coturnix coturnix</i>	LC
121. Bird	Demoiselle Crane	<i>Anthropoides virgo</i>	LC
122. Bird	Common Crane	<i>Grus grus</i>	LC
123. Bird	Watercock	<i>Gallicrex cinerea</i>	LC
124. Bird	Spotted Crake	<i>Porzana porzana</i>	LC
125. Bird	Slaty-legged Crake	<i>Rallina eurizonoides</i>	LC
126. Bird	Eastern Water Rail	<i>Rallus indicus</i>	LC
127. Bird	Baillon's Crake	<i>Zapornia pusilla</i>	LC
128. Bird	Lesser Florican	<i>Sypheotides indicus</i>	EN
129. Bird	Paddyfield Warbler	<i>Acrocephalus agricola</i>	LC
130. Bird	Black-browed Reed-warbler	<i>Acrocephalus bistrigiceps</i>	LC
131. Bird	Blunt-winged Warbler	<i>Acrocephalus concinens</i>	LC
132. Bird	Blyth's Reed-warbler	<i>Acrocephalus dumetorum</i>	LC
133. Bird	Clamorous Reed-warbler	<i>Acrocephalus stentoreus</i>	LC
134. Bird	Thick-billed Warbler	<i>Arundinax aedon</i>	LC
135. Bird	White-browed Tit-warbler	<i>Leptopoeile sophiae</i>	LC
136. Bird	Oriental Skylark	<i>Alauda gulgula</i>	LC
137. Bird	Hume's Lark	<i>Calandrella acutirostris</i>	LC
138. Bird	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	LC
139. Bird	Black-winged Cuckooshrike	<i>Lalage melaschistos</i>	LC
140. Bird	Long-tailed Minivet	<i>Pericrocotus ethologus</i>	LC
141. Bird	Scarlet Minivet	<i>Pericrocotus flammeus</i>	LC
142. Bird	Grey-chinned Minivet	<i>Pericrocotus solaris</i>	LC
143. Bird	Sikkim Treecreeper	<i>Certhia discolor</i>	LC
144. Bird	Bar-tailed Treecreeper	<i>Certhia himalayana</i>	LC
145. Bird	Rusty-flanked Treecreeper	<i>Certhia nipalensis</i>	LC
146. Bird	Ashy Drongo	<i>Dicrurus leucophaeus</i>	LC
147. Bird	Yellow-breasted Bunting	<i>Emberiza aureola</i>	CR
148. Bird	Rock Bunting	<i>Emberiza cia</i>	LC
149. Bird	Chestnut-eared Bunting	<i>Emberiza fucata</i>	LC
150. Bird	Crested Bunting	<i>Emberiza lathami</i>	LC
151. Bird	Pine Bunting	<i>Emberiza leucocephalos</i>	LC
152. Bird	Little Bunting	<i>Emberiza pusilla</i>	LC
153. Bird	Black-faced Bunting	<i>Emberiza spodocephala</i>	LC
154. Bird	Eastern Goldfinch	<i>Carduelis caniceps</i>	LC
155. Bird	Common Rosefinch	<i>Carpodacus erythrinus</i>	LC
156. Bird	Spot-winged Rosefinch	<i>Carpodacus rodopeplus</i>	LC

Biodiversity type	Common name	Scientific name	IUCN Category
157. Bird	Vinaceous Rosefinch	<i>Carpodacus vinaceus</i>	LC
158. Bird	Yellow-breasted Greenfinch	<i>Chloris spinoides</i>	LC
159. Bird	Common Chaffinch	<i>Fringilla coelebs</i>	LC
160. Bird	Brambling	<i>Fringilla montifringilla</i>	LC
161. Bird	Gold-naped Finch	<i>Pyrrhoptes epauletta</i>	LC
162. Bird	Tibetan Siskin	<i>Spinus thibetanus</i>	LC
163. Bird	Red-rumped Swallow	<i>Cecropis daurica</i>	LC
164. Bird	Asian House Martin	<i>Delichon dasypus</i>	LC
165. Bird		<i>Hirundo rustica</i>	LC
166. Bird	Barn Swallow	<i>Hirundo rustica</i>	LC
167. Bird	Eurasian Crag Martin	<i>Ptyonoprogne rupestris</i>	LC
168. Bird	Pale Sand Martin	<i>Riparia diluta</i>	LC
169. Bird	Brown Shrike	<i>Lanius cristatus</i>	LC
170. Bird	Isabelline Shrike	<i>Lanius isabellinus</i>	LC
171. Bird	Long-tailed Shrike	<i>Lanius schach</i>	LC
172. Bird	Grey-backed Shrike	<i>Lanius tephronotus</i>	LC
173. Bird	Bristled Grassbird	<i>Chaetornis striata</i>	VU
174. Bird	Pallas's Grasshopper-warbler	<i>Locustella certhiola</i>	LC
175. Bird	Lanceolated Warbler	<i>Locustella lanceolata</i>	LC
176. Bird	Chinese Grasshopper-warbler	<i>Locustella tacsanowskia</i>	LC
177. Bird	Spotted Grasshopper-warbler	<i>Locustella thoracica</i>	LC
178. Bird	Oriental Paradise-flycatcher	<i>Terpsiphone affinis</i>	LC
179. Bird	Indian Paradise-flycatcher	<i>Terpsiphone paradisi</i>	LC
180. Bird	Blyth's Pipit	<i>Anthus godlewskii</i>	LC
181. Bird	Olive-backed Pipit	<i>Anthus hodgsoni</i>	LC
182. Bird	Richard's Pipit	<i>Anthus richardi</i>	LC
183. Bird	Rosy Pipit	<i>Anthus roseatus</i>	LC
184. Bird	Buff-bellied Pipit	<i>Anthus rubescens</i>	LC
185. Bird	Long-billed Pipit	<i>Anthus similis</i>	LC
186. Bird	Tree Pipit	<i>Anthus trivialis</i>	LC
187. Bird	White Wagtail	<i>Motacilla alba</i>	LC
188. Bird	Grey Wagtail	<i>Motacilla cinerea</i>	LC
189. Bird	Citrine Wagtail	<i>Motacilla citreola</i>	LC
190. Bird	Western Yellow Wagtail	<i>Motacilla flava</i>	LC
191. Bird	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	LC
192. Bird	Siberian Rubythroat	<i>Calliope calliope</i>	LC
193. Bird	Himalayan Rubythroat	<i>Calliope pectoralis</i>	LC
194. Bird	Bluethroat	<i>Cyanecula svecica</i>	LC
195. Bird	Large Blue-flycatcher	<i>Cyornis magnirostris</i>	LC
196. Bird	Blue-throated Blue-flycatcher	<i>Cyornis rubeculoides</i>	LC
197. Bird	Tickell's Blue-flycatcher	<i>Cyornis tickelliae</i>	LC
198. Bird	Pale Blue-flycatcher	<i>Cyornis unicolor</i>	LC

Biodiversity type	Common name	Scientific name	IUCN Category
199. Bird	Verditer Flycatcher	<i>Eumyias thalassinus</i>	LC
200. Bird	Red-throated Flycatcher	<i>Ficedula albicilla</i>	LC
201. Bird	Snowy-browed Flycatcher	<i>Ficedula hyperythra</i>	LC
202. Bird	Red-breasted Flycatcher	<i>Ficedula parva</i>	LC
203. Bird	Rusty-tailed Flycatcher	<i>Ficedula ruficauda</i>	LC
204. Bird	Ultramarine Flycatcher	<i>Ficedula superciliaris</i>	LC
205. Bird	Slaty-blue Flycatcher	<i>Ficedula tricolor</i>	LC
206. Bird	Little Pied Flycatcher	<i>Ficedula westermanni</i>	LC
207. Bird	White-bellied Redstart	<i>Hodgsonius phaenicuroides</i>	LC
208. Bird	Indian Blue Robin	<i>Larvivora brunnea</i>	LC
209. Bird	Blue-capped Rock-thrush	<i>Monticola cinclorhyncha</i>	LC
210. Bird	Blue Rock-thrush	<i>Monticola solitarius</i>	LC
211. Bird	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	LC
212. Bird	Ferruginous Flycatcher	<i>Muscicapa ferruginea</i>	LC
213. Bird	Dark-sided Flycatcher	<i>Muscicapa sibirica</i>	LC
214. Bird	Small Niltava	<i>Niltava macgrigoriae</i>	LC
215. Bird	Rufous-bellied Niltava	<i>Niltava sundara</i>	LC
216. Bird	Desert Wheatear	<i>Oenanthe deserti</i>	LC
217. Bird	Isabelline Wheatear	<i>Oenanthe isabellina</i>	LC
218. Bird	Blue-capped Redstart	<i>Phoenicurus coeruleocephala</i>	LC
219. Bird	Eversmann's Redstart	<i>Phoenicurus erythronotus</i>	LC
220. Bird	Blue-fronted Redstart	<i>Phoenicurus frontalis</i>	LC
221. Bird	Hodgson's Redstart	<i>Phoenicurus hodgsoni</i>	LC
222. Bird	Black Redstart	<i>Phoenicurus ochruros</i>	LC
223. Bird	Grey Bushchat	<i>Saxicola ferreus</i>	LC
224. Bird	White-throated Bushchat	<i>Saxicola insignis</i>	VU
225. Bird	Common Stonechat	<i>Saxicola torquatus</i>	LC
226. Bird	Golden Bush-robin	<i>Tarsiger chrysaeus</i>	LC
227. Bird	Orange-flanked Bush-robin	<i>Tarsiger cyanurus</i>	LC
228. Bird	Himalayan Bush-robin	<i>Tarsiger rufilatus</i>	LC
229. Bird	Black-naped Oriole	<i>Oriolus chinensis</i>	LC
230. Bird	Indian Golden Oriole	<i>Oriolus kundoo</i>	LC
231. Bird	Slender-billed Oriole	<i>Oriolus tenuirostris</i>	LC
232. Bird	Fire-capped Tit	<i>Cephalopyrus flammiceps</i>	LC
233. Bird	Tickell's Leaf-warbler	<i>Phylloscopus affinis</i>	LC
234. Bird	Green-crowned Warbler	<i>Phylloscopus burkii</i>	LC
235. Bird	Lemon-rumped Leaf-warbler	<i>Phylloscopus chloronotus</i>	LC
236. Bird	Smoky Warbler	<i>Phylloscopus fuligiventer</i>	LC
237. Bird	Dusky Warbler	<i>Phylloscopus fuscatus</i>	LC
238. Bird	Sulphur-bellied Warbler	<i>Phylloscopus griseolus</i>	LC
239. Bird	Hume's Leaf-warbler	<i>Phylloscopus humei</i>	LC
240. Bird	Yellow-browed Warbler	<i>Phylloscopus inornatus</i>	LC

Biodiversity type	Common name	Scientific name	IUCN Category
241. Bird	Large-billed Leaf-warbler	<i>Phylloscopus magnirostris</i>	LC
242. Bird	Western Crowned Leaf-warbler	<i>Phylloscopus occipitalis</i>	LC
243. Bird	Buff-barred Warbler	<i>Phylloscopus pulcher</i>	LC
244. Bird	Blyth's Leaf-warbler	<i>Phylloscopus reguloides</i>	LC
245. Bird	Siberian Chiffchaff	<i>Phylloscopus tristis</i>	LC
246. Bird	Greenish Warbler	<i>Phylloscopus trochiloides</i>	LC
247. Bird	Whistler's Warbler	<i>Phylloscopus whistleri</i>	LC
248. Bird	Indian Pitta	<i>Pitta brachyura</i>	LC
249. Bird	Western Hooded Pitta	<i>Pitta sordida</i>	LC
250. Bird	Nepal Cupwing	<i>Pnoepyga immaculata</i>	LC
251. Bird	Altai Accentor	<i>Prunella himalayana</i>	LC
252. Bird	Maroon-backed Accentor	<i>Prunella immaculata</i>	LC
253. Bird	Black Bulbul	<i>Hypsipetes leucocephalus</i>	LC
254. Bird	White-throated Fantail	<i>Rhipidura albicollis</i>	LC
255. Bird	Pale-footed Bush-warbler	<i>Hemitesia pallidipes</i>	LC
256. Bird	Aberrant Bush-warbler	<i>Horornis flavolivaceus</i>	LC
257. Bird	Brownish-flanked Bush-warbler	<i>Horornis fortipes</i>	LC
258. Bird	Wallcreeper	<i>Tichodroma muraria</i>	LC
259. Bird	Yellow-bellied Fairy-fantail	<i>Chelidorhynch hypoxanthus</i>	LC
260. Bird	Grey-headed Canary-flycatcher	<i>Culicicapa ceylonensis</i>	LC
261. Bird	Spot-winged Starling	<i>Saroglossa spilopterus</i>	LC
262. Bird	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	LC
263. Bird	Green Cochoa	<i>Cochoa viridis</i>	LC
264. Bird	Orange-headed Thrush	<i>Geokichla citrina</i>	LC
265. Bird	Pied Thrush	<i>Geokichla wardii</i>	LC
266. Bird	Black-throated Thrush	<i>Turdus atrogularis</i>	LC
267. Bird	Tibetan Blackbird	<i>Turdus maximus</i>	LC
268. Bird	Chestnut Thrush	<i>Turdus rubrocanus</i>	LC
269. Bird	Rufous-throated Thrush	<i>Turdus ruficollis</i>	LC
270. Bird	Tickell's Thrush	<i>Turdus unicolor</i>	LC
271. Bird	Scaly Thrush	<i>Zoothera dauma</i>	LC
272. Bird	Great White Egret	<i>Ardea alba</i>	LC
273. Bird	Eurasian Bittern	<i>Botaurus stellaris</i>	LC
274. Bird	Little Egret	<i>Egretta garzetta</i>	LC
275. Bird	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	LC
276. Bird	Black Bittern	<i>Ixobrychus flavicollis</i>	LC
277. Bird	Yellow Bittern	<i>Ixobrychus sinensis</i>	LC
278. Bird	Dalmatian Pelican	<i>Pelecanus crispus</i>	NT
279. Bird	Spot-billed Pelican	<i>Pelecanus philippensis</i>	NT
280. Bird	Glossy Ibis	<i>Plegadis falcinellus</i>	LC
281. Bird	Eurasian Wryneck	<i>Jynx torquilla</i>	LC
282. Bird	Great Crested Grebe	<i>Podiceps cristatus</i>	LC

Biodiversity type	Common name	Scientific name	IUCN Category
283. Bird	Black-necked Grebe	<i>Podiceps nigricollis</i>	LC
284. Bird	Short-eared Owl	<i>Asio flammeus</i>	LC
285. Bird	Northern Long-eared Owl	<i>Asio otus</i>	LC
286. Bird	Great Cormorant	<i>Phalacrocorax carbo</i>	LC
287. Fish	Indian Mottled Eel	<i>Anguilla bengalensis</i>	NT
288. Fish	Shortfin Eel	<i>Anguilla bicolor</i>	NT
289. Fish	Marbled Eel	<i>Anguilla marmorata</i>	LC
290. Fish	Minor Carp	<i>Labeo bata</i>	LC
291. Fish		<i>Notopterus notopterus</i>	LC
292. Fish	Dwarf Snakehead	<i>Channa gachua</i>	LC
293. Fish	Bighead goby	<i>Drombus globiceps</i>	LC
294. Fish		<i>Pseudapocryptes elongatus</i>	LC
295. Fish	Amur Goby	<i>Rhinogobius brunneus</i>	DD
296. Fish	Striped Bass	<i>Morone saxatilis</i>	LC
297. Fish	Long-whiskered Catfish	<i>Sperata aor</i>	LC
298. Fish	Stinging catfish	<i>Heteropneustes fossilis</i>	LC
299. Fish	Silong Catfish	<i>Silonia silondia</i>	LC
300. Fish		<i>Ompok bimaculatus</i>	NT
301. Fish		<i>Ompok pabo</i>	NT
302. Fish		<i>Wallago attu</i>	VU
303. Fish	Spiny Eel	<i>Mastacembelus armatus</i>	LC

4.4 Unique assemblages of species that are associated with key evolutionary processes

As noted in Section 4.2, the Himalaya is an area of very high endemism. Nonetheless, many of these species have relatively long linear distributions within the Himalaya (so, for example, Nepal has surprisingly few endemic species). No information was available during this rapid assessment to suggest that any of the Project transmission line components fall within more localized areas of particularly high endemism. Unique assemblages of species associated with key evolutionary processes thus appear unlikely to qualify the Project area as Critical Habitat.

4.5 Areas having biodiversity of significant social, economic, or cultural importance to local communities (including ecosystem services)

During this rapid assessment, no information was available from the Project on ecosystem services. It is beyond the scope of this rapid assessment to collect additional information on ecosystem services, and then to assess which may qualify the project area as Critical Habitat.

4.6 Legally protected areas and international recognized areas

IFC (2019) states that ‘...certain internationally recognized areas of high biodiversity value may be recognized as Critical Habitat and should be given special attention during assessments...’ including ‘Areas that meet the criteria of the IUCN’s Protected Areas Categories Ia, Ib and II...’. At least 14 protected areas overlap, or fall within, the Project AoAs (Table 5: IBAT⁴) – counting separately the overlapping Koshi Tappu Wildlife Reserve and Ramsar

⁴ www.ibat-alliance.org.

protected sites, and protected areas and their buffer zones (which are listed separately by the Government of Nepal).

As IUCN Category II protected areas of high biodiversity value, ***Langtang National Park, Parsa National Park and Shivapuri-Nagarjun National Park qualify as Critical Habitat***. The other protected areas are IUCN Category IV or VI and so do not meet Critical Habitat criteria as protected areas alone – though some do owing to the biodiversity that they hold (see below).

Official protected area data⁵ appear to omit other sites which have been designated for some time, such as the Chure Hills Environmental Protection Area (this is also referred to as the Chure Hills Conservation Area but has a different protected area status to a conservation area: details in, e.g., Bishwokarma *et al.* 2016; Government of Nepal 2017; NEA 2020). It is thus possible that additional protected areas overlap the Project AoAs. However, it is likely that most of these are relatively recent sustainable use and/or co-management areas which would represent IUCN Category VI sites. Likewise, information on protected forests was not readily available during this assessment, but it is recognized that some of these are also likely to overlap the Project AoAs. Protected forests in Nepal likely equate to IUCN Category VI sites. None of these Category VI sites qualify as Critical Habitat as protected areas alone.

While many of these protected areas do not qualify as Critical Habitat *per se*, three Project components overlap protected areas: Pathlaiya-Dhalkebar overlaps the Parsa National Park and Chure Hills Environmental Protection Area, Duhabi-Kusaha overlaps the Koshi Tappu Wildlife Reserve Buffer Zone, and Ghorahi-Madichaur overlaps the Chure Hills Environmental Protection Area. For these, the ADB SPS (2009) requires the Project to: (i) act in a manner consistent with defined protected area management plans; (ii) consult protected area sponsors and managers, local communities, and other key stakeholders on the proposed project; and (iii) implement additional programs to promote and enhance the conservation aims of the protected areas. Such measures would also be appropriate – and are required by IFC (2019) – for Project components overlapping Key Biodiversity Areas (the same three components listed above).

The digital map of Koshi Tappu Ramsar Site available online (e.g., at www.protectedplanet.net) shows it overlapping Project infrastructure. However, this map is inaccurate – the correct boundary for the site is available from the Ramsar website⁶, and does not overlap Project infrastructure. Further, official data available at www.protectedplanet.net appear to be out of date for Parsa National Park, which was extended to the south-east in 2015 (Erickson-Davis 2015) and upgraded from a Wildlife Reserve in 2017 (Government of Nepal undated).

TABLE 5. PROTECTED AREAS OVERLAPPING, OR FALLING WITHIN, THE PROJECT AOAS

Name	Type	IUCN Category	Critical Habitat as a protected area alone?	Project components overlap	Transmission line components within 25 km
Annapurna	Conservation Area	VI	No, but likely as a KBA (Table 6)	No	1a: Dandakhet-Rahughat
Bara	Conservation Area	VI? 7	No	No	9a: Pathlaiya- Dhalkebar

⁵ E.g., at www.protectedplanet.net.

⁶ <https://rsis Ramsar.org/RISapp/files/237/pictures/NP380map.pdf>.

⁷ The IUCN management category for Bara Conservation Area does not appear to have been declared, but it is here assumed to be the same as for other conservation areas in Nepal.

Name	Type	IUCN Category	Critical Habitat as a protected area alone?	Project components overlap	Transmission line components within 25 km
Chure Hills	Environmental Protection Area	VI	No, but partly as the Dang Deukhuri Foothill Forests and West Rapti Wetlands KBA (Table 6)	Yes	2a: Ghorahi – Madichaur 9a: Pathlaiya- Dhalkebar 9b: Duhabi-Kusaha
Dhorpatan	Hunting Reserve	VI	No	No	1a: Dandakhet-Rahughat
Jiang Cun (PRC)	Nature Reserve (provincial-level)	IV?	No	No	3a-b: Borang-Lapang-Ratmate
Koshi Tappu	Ramsar Site	IV?	No, only as a KBA (Table 6)	No	9b: Duhabi-Kusaha
Koshi Tappu	Wildlife Reserve	IV	No, only as a KBA (Table 6)	No	9b: Duhabi-Kusaha
Koshi Tappu	Wildlife Reserve Buffer Zone	VI	No, only as a KBA (Table 6)	Yes	9b: Duhabi-Kusaha
Lake Cluster of Pokhara Valley	Ramsar Site	IV?	No	No	1a: Dandakhet-Rahughat
Langtang	National Park	II	Yes, and as a KBA (Table 6)	No	3a-b: Borang-Lapang-Ratmate
Langtang	National Park Buffer Zone	VI	No, only as a KBA (Table 6)	No	3a-b: Borang-Lapang-Ratmate
Manaslu	Conservation Area	VI	No	No	3a-b: Borang-Lapang-Ratmate
Parsa ⁸	National Park	II	Yes	Yes	9a: Pathlaiya- Dhalkebar
Shivapuri-Nagarjun	National Park	II	Yes	No	3a-b: Borang-Lapang-Ratmate

IFC (2019) also states that ‘...certain internationally recognized areas of high biodiversity value may be recognized as Critical Habitat and should be given special attention during assessments...’ including ‘Key Biodiversity Areas (KBAs), which encompass Important Bird and Biodiversity Areas (IBAs)...’. Eight internationally-recognized KBAs overlap, or fall within, the Project AoAs (Table 6). All of these are considered Important Bird Areas (IBAs), and all except Dhorpatan and Jiang Cun are also KBAs for species other than birds. A number of the sites are considered IBAs/KBAs owing to assemblages of biome-restricted species, a criterion not considered as triggering Critical Habitat (IFC 2019) and thus not discussed further here.

TABLE 6. IMPORTANT BIRD AREAS/KEY BIODIVERSITY AREAS OVERLAPPING, OR FALLING WITHIN, THE PROJECT AOA

Name	Also a protected area?	Reference	Critical Habitat as an IBA/KBA alone?	Project components overlap
Annapurna Conservation Area	Yes	BirdLife International (2020a)	Yes?	No

⁸ Parsa has been upgraded to an IUCN Category II National Park (Government of Nepal undated).

Name	Also a protected area?	Reference	Critical Habitat as an IBA/KBA alone?	Project components overlap
Dang Deukhuri Foothill Forests and West Rapti Wetlands	Partly	BirdLife International (2020b)	Yes	Yes ⁹
Dharan Forests	No	BirdLife International (2020c)	No	No
Dhorpatan Hunting Reserve	Yes	BirdLife International (2020d)	No	No
Jiang Cun (PRC)	Partly	BirdLife International (2020e)	No	No
Koshi Tappu Wildlife Reserve and Koshi Barrage	Yes	BirdLife International (2020f)	Yes	Yes
Langtang National Park	Yes	BirdLife International (2020g)	Yes	No
Parsa Wildlife Reserve ¹⁰	Yes	BirdLife International (2020h)	Yes	Yes ¹¹
Shivapuri-Nagarjun National Park	Yes	BirdLife International (2020i)	No, only as a protected area (Table 5)	No

1. Annapurna Conservation Area Key Biodiversity Area

This site **may represent Critical Habitat for three Critically Endangered vultures**. On a precautionary basis, recent records of up to 12-15 White-rumped Vulture *Gyps bengalensis* together at nearby Pokhara suggest that >0.5% of the global population may persist at Annapurna (Hurtado & Dhakal 2019; BirdLife International 2020l). Likewise, a scattering of records¹² of Slender-billed Vulture *Gyps tenuirostris* in and around the site in recent years suggest the potential for more than 10 individuals to be present, representing >0.5% of the global population (BirdLife International 2020m) and thus meeting Critical Habitat thresholds. It is more tenuous, but also possible on a precautionary basis, that scattered records – of up to seven individuals together (Wild Bird Club Malaysia 2017) – in and around the site suggest the potential for more than 20-50 Red-headed Vulture *Sarcogyps calvus* to occur there, representing >0.5% of the global population (BirdLife International 2020q).

Conversely, it does not appear that Pallas's Fish-eagle *Haliaeetus leucoryphus* (despite being listed as IBA-qualifying for the site by BirdLife International 2020a) would qualify the site as Critical Habitat. Panda *Ailurus fulgens* is listed as qualifying Annapurna as a KBA by BirdLife International (2020r). It does represent one of 11 subpopulations in Nepal (Jnawali *et al.* 2012), but habitat suitability within this site is mostly low (Bista *et al.* 2017) and the species occurs at many more sites to the east of Nepal. As such, Annapurna is unlikely to represent Critical Habitat for Red Panda under current criteria (IFC 2019).

The site holds an important population of Cheer Pheasant *Catreus wallichii* (BirdLife International 2020a,k). Nonetheless, even the loss of the site would be unlikely to result in up-listing of this Vulnerable species to Endangered (per IFC 2019), and neither this species nor Spiny Babbler *Acanthoptila nipalensis*, Hoary-throated

⁹ Based on an unpublished expanded boundary obtained from Bird Conservation Nepal.

¹⁰ The existing name for this IBA/KBA is used, despite the protected area since being upgraded to a national park (Government of Nepal undated).

¹¹ The published IBA/KBA (BirdLife International 2020h) only currently includes the previous protected area boundary, before expansion, but will be updated in future (per Bird Conservation Nepal).

¹² At www.ebird.org.

Barwing *Sibia nipalensis*, Nepal Cupwing *Phoebe pygmaea immaculata*, or White-throated Tit *Aegithalos niveogularis* now qualify as restricted-range species.

BirdLife International (2020a,r) list a number of other Vulnerable species which do not meet Critical Habitat criteria (IFC 2019) because they would not merit up-listing to Endangered if the site was lost (Mainland Serow *Capricornis sumatraensis*, Snow Leopard *Panthera uncia*, Sunda Clouded Leopard *Neofelis diardi* [formerly considered part of Clouded Leopard *Neofelis nebulosa*], Sloth Bear *Melursus ursinus*, Himalayan Black Bear *Ursus thibetanus*, Wood Snipe *Gallinago nemoricola*, Greater Spotted Eagle *Clanga clanga*, Eastern Imperial Eagle *Aquila heliaca*, and the frog *Nanorana rostandi*).

2. Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area

This area is substantially overlapped by part of the Chure Hills Environmental Protection Area. Very little information exists on the biodiversity of this area, in part owing to the security situation (BirdLife International 2020b). It is clear, however, that it is important for vultures, and it **represents Critical Habitat for at least one, and potentially two, Critically Endangered vulture species**. As a result, Dang District was declared the first Diclofenac Free District in Nepal in 2010 (Nepali *et al.* 2019). In 2003, a partial survey found 51 occupied White-rumped Vulture *Gyps bengalensis* nests, and it appears that more than 80 have been recorded in Dang District since (Rana *et al.* 2019). These represent the largest population in Nepal, and the species also remains common just across the international border (Tiwari 2017).

Shrestha & Devkota (2011) also recorded 21 Slender-billed Vulture *Gyps tenuirostris* from the area in 2009. Though there have been many fewer recent records, the species has also bred at the site (Bhusal *et al.* 2019), and up to four have been recorded recently just across the international border (Tiwari 2017). On a precautionary basis, it is possible that more than 10 individuals may be present at the site, representing >0.5% of the global population (BirdLife International 2020m) and thus meeting Critical Habitat thresholds.

The site is also listed as important for Red-headed Vulture *Sarcogyps calvus* (BirdLife International 2020b). To qualify the area as Critical Habitat, >0.5% of the global population of this Critically Endangered species would need to occur there (IFC 2019). Based on the most recent global population estimates (BirdLife International 2020q), this equates to at least 18 or 19 adults. Shrestha & Devkota (2011) recorded 10 in 2009, but there appear to be few recent records of significant numbers at the site – or in neighboring India¹³. It thus seems unlikely that this site qualifies as Critical Habitat for this species.

BirdLife International (2012r) also lists this site as a KBA for Smooth-coated Otter *Lutrogale perspicillata* and Tiger. The former does not meet Critical Habitat criteria (IFC 2019) because it is unlikely to merit up-listing to Endangered if the site was lost. The latter is unlikely to still occur at this site in significant numbers, as it was not identified as a source site for the species (Walston *et al.* 2010).

The Ghorahi-Madichaur transmission line is proposed to pass through an area which is included in a recently-revised (unpublished) boundary for this KBA (I. Thapa, Bird Conservation Nepal, pers. comm. to ADB, 2020).

3. Dharan Forests Key Biodiversity Area

This qualifies as a KBA but does not appear to represent Critical Habitat. It holds a breeding population of Lesser Adjutant that is important at a biogeographic, but not global, level (Section 4.3). Three Critically Endangered

¹³ E.g., at www.ebird.org.

vulture species (Red-headed, White-rumped and Slender-billed) have all also been recorded there, but not in numbers high enough to qualify the site as Critical Habitat.

4. Dhorpatan Hunting Reserve Key Biodiversity Area

This qualifies as a KBA but does not appear to represent Critical Habitat. It holds an important population of Cheer Pheasant *Catreus wallichii*, representing up to 7% of the species' global population (BirdLife International 2020d,k). Nonetheless, even the loss of the site would be unlikely to result in up-listing of this Vulnerable species to Endangered (per IFC 2019), and neither this species nor Hoary-throated Barwing *Sibia nipalensis* now qualify as restricted-range species.

5. Jiang Cun Key Biodiversity Area (PRC)

This site is largely overlapped by a provincial-level nature reserve. It was identified as an IBA solely for biome-restricted species (BirdLife International 2009). It thus does not meet Critical Habitat criteria (IFC 2019).

6. Koshi Tappu Wildlife Reserve, Buffer Zone and the 'Koshi Tappu Wildlife Reserve and Koshi Barrage' KBA

This site likely **represents Critical Habitat for two Critically Endangered bird species**. A recent population estimate of 43 Bengal Florican *Houbaropsis bengalensis* in/around Koshi Tappu represents almost 1% of the remaining global adult population (Collar *et al.* 2017; Mahood *et al.* 2019). Recent records of up to 40 White-rumped Vulture *Gyps bengalensis* together suggest that >0.5% of the global population may persist here (Biggs 2018; BirdLife International 2020l).

This site also **qualifies as a KBA and Critical Habitat for Wild Water Buffalo**, given significant populations hosted there (Section 4.1). Given limited information on their populations and distributions, **it is possible that the Critically Endangered Elongated Tortoise** *Indotestudo elongata* **and Endangered Three-keeled Land Tortoise** *Melanochelys tricarinata* **occur at the site in globally-significant numbers, qualifying it as Critical Habitat**. There does not seem to be any evidence, however, that the Critically Endangered Red-crowned Roofed Turtle *Batagur kachuga* (listed from Koshi Tappu by BirdLife International 2020r) occurs here in significant numbers.

BirdLife International (2020f,r) also list a number of other Critically Endangered or Endangered species for which the site appears unlikely to now meet Critical Habitat thresholds (South Asian River Dolphin *Platanista gangetica*, Baer's Pochard *Aythya baeri*, Lesser Florican *Sypheotides indicus*, Greater Adjutant *Leptoptilos dubius*, Black-bellied Tern *Sterna acuticauda*, Red-headed Vulture *Sarcogyps calvus*, Slender-billed Vulture *Gyps tenuirostris*, Pallas's Fish-eagle *Haliaeetus leucoryphus*, Yellow-breasted Bunting *Emberiza aureola* and Gharial *Gavialis gangeticus*).

Likewise, the site is also important for a number of Vulnerable species (BirdLife International 2020f) which do not meet Critical Habitat criteria (IFC 2019) because they would not merit up-listing to Endangered if the site was lost (Fishing Cat *Prionailurus viverrinus*, Smooth-coated Otter *Lutrogale perspicillata*, Swamp Francolin *Francolinus gularis*, Lesser Adjutant *Leptoptilos javanicus*, Indian Spotted Eagle *Clanga hastata*, Greater Spotted Eagle *Clanga clanga*, Eastern Imperial Eagle *Aquila heliaca*, Grey-crowned Prinia *Prinia cinereocapilla*, Bristled Grassbird *Chaetornis striata*, Kashmir Flycatcher *Ficedula subrubra*, White-throated Bushchat *Saxicola insignis*, Finn's Weaver *Ploceus megarhynchus*, Mugger *Crocodylus palustris* and Crowned River Turtle *Hardella thurjii*).

The Duhabi-Kusaha transmission line already extends through this KBA, in the Koshi Tappu Wildlife Reserve Buffer Zone, and is due to be upgraded during the Project.

7. Langtang National Park Key Biodiversity Area

This site is listed as important for the Critically Endangered Red-headed Vulture *Sarcogyps calvus* and Yellow-breasted Bunting *Emberiza aureola* (BirdLife International 2020g), but there appear to be very few recent records of either species from the area¹⁴.

BirdLife International (2020r) also lists the site as important for the Endangered Red Panda *Ailurus fulgens*. The site is believed to hold just over 24% of the population of this species in Nepal, which in turn is believed to hold just under 2% of the global population (Government of Nepal 2010). On a precautionary basis, the site may thus hold >0.5% of the global population. Therefore, **Langtang may well qualify as Critical Habitat for Red Panda.**

This is an important site for the Vulnerable Wood Snipe *Gallinago nemoricola* (BirdLife International 2020g,r), but this and other Vulnerable species stated to qualify this site as a KBA (Asiatic Black Bear *Ursus thibetanus*, Sunda Clouded Leopard *Neofelis diardi* [formerly considered part of Clouded Leopard *Neofelis nebulosa*]). Greater Spotted Eagle *Clanga clanga* and Eastern Imperial Eagle *Aquila heliaca*) do not meet Critical Habitat criteria (IFC 2019) because they would not merit up-listing to Endangered if the site was lost

The site also holds good numbers of two species - Hoary-throated Barwing *Sibia nipalensis* and Nepal Cupwing *Pnoepyga immaculata* – which previously qualified as restricted-range species (BirdLife International 2020g), but are now known to be more widespread.

Langtang is also an IUCN Category II protected area of high biodiversity value and thus represents Critical Habitat on that basis (see above).

8. Parsa Wildlife Reserve Key Biodiversity Area

The existing name for this IBA/KBA is used here for consistency, despite the site being since upgraded to a national park (Government of Nepal undated). In 2013, this site held 69 Gaur *Bos gaurus* (Duckworth *et al.* 2016), representing 0.3-1.1% of the estimated global number of adults of this species. As such, it is quite likely that **Parsa represents Critical Habitat for Gaur**. Likewise, in 2016, Parsa was estimated to hold at least 17 Tiger *Panthera tigris* (Lamichhane *et al.* 2018), representing over 0.7% of the estimated global number of adults of this species (Goodrich *et al.* 2015). As such, it is quite likely that **Parsa represents Critical Habitat for Tiger**.

Given limited information on their populations and distributions, **it is possible that the Critically Endangered Elongated Tortoise *Indotestudo elongata* occurs at the site in globally-significant numbers, qualifying it as Critical Habitat.**

Small numbers of White-rumped Vulture *Gyps bengalensis* and Slender-billed Vulture *Gyps tenuirostris* are still regularly recorded at neighboring Chitwan National Park, but it seems unlikely that a large enough population of either species currently persists at Parsa to qualify it as Critical Habitat. Likewise, given the small population of Asian Elephant *Elephas maximus* in Nepal compared to the global population, it is highly unlikely that Parsa qualifies as Critical Habitat for these species.

The site is also important for several Vulnerable species (BirdLife International 2020h,r) which do not meet Critical Habitat criteria (IFC 2019) because they would not merit up-listing to Endangered if the site was lost (Four-horned Antelope *Tetracerus quadricornis*, Dhole *Cuon alpinus*, Sloth Bear *Melursus ursinus*, Indian Rhinoceros *Rhinoceros*

¹⁴ E.g., at www.ebird.org.

unicornis, Lesser Adjutant *Leptoptilos javanicus*, Great Hornbill *Buceros bicornis*, and Grey-crowned Prinia *Prinia cinereocapilla*).

The Pathlaiya-Dhalkebar transmission line already runs through the edge of a recent extension to the national park, it was constructed before the extension was designated, and is due to be upgraded during the Project. This extension is not included in the current boundary for the KBA, though this will change when the boundary is updated in the future (per Bird Conservation Nepal). Parsa is also an IUCN Category II protected area of high biodiversity value and thus represents Critical Habitat on that basis (see above).

9. Shivapuri-Nagarjun National Park Key Biodiversity Area

Among other things, this site has been considered an Important Bird Area for Spiny Babbler *Acanthoptila nipalensis* (BirdLife International 2020i). This was previously considered, but no longer qualifies as, a restricted-range species (BirdLife International 2020j). The site is also important for two Vulnerable mammals (BirdLife International 2020r) which do not meet Critical Habitat criteria (IFC 2019) because they would not merit up-listing to Endangered if the site was lost (Asiatic Black Bear *Ursus thibetanus* and Sunda Clouded Leopard *Neofelis diardi* [formerly considered part of Clouded Leopard *Neofelis nebulosa*]).

While not representing Critical Habitat for specific IBA/KBA values, Shivapuri-Nagarjun is an IUCN Category II protected area of high biodiversity value and thus represents Critical Habitat on that basis (see above).

4.7 Summary

Based on available information during this rapid assessment, and acting on a precautionary basis, the overall Project Areas of Analysis qualify as Critical Habitat, owing to the presence of nine mammals, five birds, four reptiles, five frogs and 11 fishes, all known or suspected to occur at globally significant levels, as well as the presence of six internationally-recognized sites (protected areas and/or Key Biodiversity Areas) (Table 7).

TABLE 7. CRITICAL HABITAT-QUALIFYING BIODIVERSITY IN THE PROJECT AOAs

Biodiversity type	Name	Critical Habitat criterion qualified ¹⁵						Justification
		1	2	3	4	5	6	
1. Mammal	Csorba's Mouse-eared Myotis <i>Myotis csorbai</i>		✓					>10% of the global population of this restricted-range species is likely to occur in the overall Project AoAs.
2. Mammal	Mandelli's Mouse-eared Myotis <i>Myotis sicarius</i>	?						Loss of habitat across the Project AoAs might possibly merit uplisting of this Vulnerable species to Endangered.
3. Mammal	Tiger <i>Panthera tigris</i>	✓						>0.5% of the global population of this globally Endangered species is likely to occur in the Project AoAs.
4. Mammal	Red Panda <i>Ailurus fulgens</i>	✓						>0.5% of the global population of this globally Endangered species may well occur in the Project AoAs.
5. Mammal	Himalayan Muskdeer <i>Moschus leucogaster</i>	?						>0.5% of the global population of this globally Endangered species may well occur in the Project AoAs.

¹⁵ ✓ = actually or likely qualifies area as Critical Habitat; ? = possibly qualifies area as Critical Habitat. Both based on available information.

Biodiversity type	Name	Critical Habitat criterion qualified ¹⁵						Justification
		1	2	3	4	5	6	
6. Mammal	Gaur <i>Bos gaurus</i>	✓						>0.5% of the global population of this globally Endangered species is likely to occur in the Project AoAs.
7. Mammal	Wild Water Buffalo <i>Bubalus arnee</i>	✓						>5% of the global population of this globally Endangered species occurs in the Project AoAs.
8. Mammal	Nepalese Field Mouse <i>Apodemus gorkha</i>		✓					>10% of the global population of this restricted-range species may occur in the overall Project AoAs.
9. Mammal	Hispid Hare <i>Caprolagus hispidus</i>	?						>0.5% of the global population of this globally Endangered species might occur in the Project AoAs.
10. Bird	Bengal Florican <i>Houbaropsis bengalensis</i>	✓						Duhabi-Kusaha transmission line AoA overlaps a KBA which likely supports >0.5% of the global population of this Critically Endangered species.
11. Bird	Red-headed Vulture <i>Sarcogyps calvus</i>	?						Dandakhet-Rahughat transmission line AoA overlaps a PA/KBA which may support >0.5% of the global population of this Critically Endangered species.
12. Bird	White-rumped Vulture <i>Gyps bengalensis</i>	✓						Ghorahi-Madichaur transmission line AoA overlaps a KBA which supports >0.5% of the global population of this Critically Endangered species. Duhabi-Kusaha transmission line AoA overlaps a PA/KBA which likely also supports globally-significant concentrations. Dandakhet-Rahughat transmission line AoA overlaps a PA/KBA which may also support globally-significant concentrations.
13. Bird	Slender-billed Vulture <i>Gyps tenuirostris</i>	✓						Ghorahi-Madichaur transmission line AoA overlaps a KBA and PA which are likely to support >0.5% of the global population of this Critically Endangered species. Dandakhet-Rahughat transmission line AoA overlaps a PA/KBA which may also support globally-significant concentrations.
14. Bird	Grey crowned Prinia <i>Prinia cinereocapilla</i>	✓						Loss of habitat across the Project AoAs could conceivably merit uplisting of this Vulnerable species to Endangered.
15. Reptile	Spotted Pond Turtle <i>Geoclemys hamiltonii</i>	?						>0.5% of the global population of this globally Endangered species might occur in the Project AoAs.
16. Reptile	Elongated Tortoise <i>Indotestudo elongata</i>	?						>0.5% of the global population of this globally Critically Endangered species might occur in the Project AoAs.
17. Reptile	Three-keeled Land Tortoise <i>Melanochelys tricarinata</i>	?						>0.5% of the global population of this globally Endangered species might occur in the Project AoAs.
18. Reptile	Three Keeled Mountain Lizard <i>Japalura tricarinata</i>		✓					>10% of the global population of this restricted-range species is likely to occur in the overall Project AoAs.
19. Frog	<i>Hylarana chitwanensis</i>		✓					>10% of the global population of this restricted-range species is likely to occur in the overall Project AoAs.
20. Frog	Torrent Paa Frog <i>Nanorana ercepeae</i>		?					>10% of the global population of this restricted-range species might possibly occur in the Project AoAs.
21. Frog	Narayanghat Whipping Frog <i>Polypedates zed</i>		✓					>10% of the global population of this restricted-range species is likely to occur in the Project AoAs.

Biodiversity type	Name	Critical Habitat criterion qualified ¹⁵						Justification
		1	2	3	4	5	6	
22. Frog	<i>Sphaerotheca maskeyi</i>		✓					>10% of the global population of this restricted-range species is likely to occur in the overall Project AoAs.
23. Frog	<i>Sphaerotheca swani</i>		✓					>10% of the global population of this restricted-range species is likely to occur in the Project AoAs.
24. Fish	Kalabans <i>Bangana dero</i>			?				>1% of the global population of this migratory species might possibly occur in the Project AoAs.
25. Fish	<i>Chagunius chagunio</i>			?				>1% of the global population of this migratory species might possibly occur in the Project AoAs.
26. Fish	Annandale Garra <i>Garra annandalei</i>			?				>1% of the global population of this migratory species might possibly occur in the Project AoAs.
27. Fish	Large Razorbelly Minnow <i>Salmostoma bacaila</i>			?				>1% of the global population of this migratory species might possibly occur in the Project AoAs.
28. Fish	<i>Tor putitora</i>	?		?				>1% of the global population of this globally Endangered migratory species might occur in the Project AoAs.
29. Fish	Rainbow Minnow <i>Psilorhynchus gracilis</i>			?				>1% of the global population of this migratory species might possibly occur in the Project AoAs.
30. Fish	<i>Erethistoides ascita</i>		?					>10% of the global population of this restricted-range species might possibly occur in the overall Project AoAs.
31. Fish	<i>Pseudecheneis eddsi</i>		✓					>10% of the global population of this restricted-range species is likely to occur in the overall Project AoAs.
32. Fish	Stone Carp <i>Psilorhynchus pseudecheneis</i>			?				>1% of the global population of this migratory species might possibly occur in the Project AoAs.
33. Fish	River Stone Carp <i>Psilorhynchus sucatio</i>			?				>1% of the global population of this migratory species might possibly occur in the Project AoAs.
34. Fish	<i>Sisor rheophilus</i>		✓					>10% of the global population of this restricted-range species is likely to occur in the overall Project AoAs.
35. Site	Annapurna Conservation Area and Key Biodiversity Area						?	May support >0.5% of the global population of the Critically Endangered Red-headed, White-rumped, and Slender-billed Vultures.
36. Site	Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area and Chure Hills Environmental Protection Area						✓	Supports >0.5% of the global population of the Critically Endangered White-rumped Vulture, and likely also >0.5% of the global population of the Critically Endangered Slender-billed Vulture.
37. Site	Koshi Tappu Wildlife Reserve and Koshi Barrage Key Biodiversity Area						✓	Likely supports >0.5% of the global population of two Critically Endangered bird species (Bengal Florican and White-rumped Vulture), the Endangered Wild Water Buffalo, and possibly also threatened reptiles (Elongated Tortoise and Three-keeled Land Tortoise).
38. Site	Langtang National Park and Key Biodiversity Area						✓	An IUCN Category II protected area of high biodiversity value, which may well support >0.5% of the global population of the Endangered Red Panda.

Biodiversity type	Name	Critical Habitat criterion qualified ¹⁵						Justification
		1	2	3	4	5	6	
39. Site	Parsa National Park and Parsa Wildlife Reserve Key Biodiversity Area						✓	An IUCN Category II protected area of high biodiversity value, which likely supports >0.5% of the global population of two Endangered mammal species (Gaur and Tiger), and possibly also the Critically Endangered reptiles Elongated Tortoise.
40. Site	Shivapuri-Nagarjun National Park						✓	An IUCN Category II protected area of high biodiversity value.

5 Potential Project impacts on Critical Habitat

The Project will have a relatively small direct footprint, comprising land clearance for towers and rights of way for 113 km of transmission line (for components 1a, 2a, 3a and 3b). Limited loss of habitat under this footprint is extremely unlikely to significantly impact any Critical Habitat-qualifying species. Likewise, significant fragmentation impacts on Critical Habitat-qualifying species are unlikely as normal practice is to allow scrub and small trees to re-establish within transmission line rights of way, facilitating movement of all priority terrestrial species. It is possible that Bengal Florican (at Koshi Tappu Wildlife Reserve and its Buffer Zone) would avoid areas near powerline infrastructure, resulting in *de facto* habitat loss, based on data from related species elsewhere (e.g., Lane *et al.* 2001; López-Jamar 2010; Silva *et al.* 2010; Raab *et al.* 2011). Nonetheless, the transmission line in that location is only an upgrade of existing infrastructure and there are no recent records of this species from the area directly around that infrastructure (Baral *et al.* 2013), so this potential impact is not considered likely to be significant.

Although the AoAs for three of these components overlap Critical Habitat-qualifying sites (Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area, Koshi Tappu Wildlife Reserve and Koshi Barrage Key Biodiversity Area, and Parsa National Park/Parsa Wildlife Reserve Key Biodiversity Area), in only one case is new infrastructure planned – for component 2a. In that case, the Ghorahi-Madichaur line is proposed to pass through the edge of the recently-revised (unpublished) and extended Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area (I. Thapa, Bird Conservation Nepal, pers. comm. to ADB, 2020).

Significant indirect impacts on all Critical Habitat-qualifying species and sites are possible owing to disturbance, firewood or timber collection, hunting, fishing, or fires started by construction workers. Nonetheless, these risks are not likely at levels that would cause significant (population-level) impacts to any of the species.

Electrocution can cause a risk to bird species which perch on powerline infrastructure, usually if they can touch both live and earthed infrastructure components at the same time. Such a risk is greatest for birds of prey, which regularly perch on transmission towers and similar infrastructure. Nonetheless, standard insulator length on most transmission lines is longer than the wingspan of even the largest priority species (the vultures) for this Project. As such, pending confirmation of detailed design for this Project, it is not likely that electrocution poses significant risks to Critical Habitat-qualifying species, except where the transmission lines descend to substations. These locations often have a number of easily-bridged gaps between live and earthed infrastructure components and thus pose a significant risk to birds of prey, such as the three Critical Habitat-qualifying vultures for this Project.

The greatest Project impact is potentially mortality from collision with overhead transmission lines. Although a range of bird species suffer mortality from collisions with wires, floricans and vultures are particularly susceptible to collisions with power lines (Martin & Shaw 2010), which may cause unsustainable rates of mortality in such long-lived, rare birds with low natural mortality (e.g., Wildlife Institute of India 2018). This type of impact might have significant impacts on Critical Habitat-qualifying birds for components 1a, 2a and 9b (Table 1). Priority bats for this Project are *Myotis* species, which usually have limited collision risk with powerlines.

6 Mitigation of significant Project impacts on Critical Habitat

This section assesses options for mitigation of the most likely significant impacts on Critical Habitat-qualifying biodiversity (Section 5). Other mitigation is appropriate and necessary for potential impacts on this biodiversity, such as measures to reduce disturbance to threatened species, or to minimize worker hunting, fishing and collecting. These measures are not discussed in detail here, as they are already covered by the IEE (NEA 2020).

6.1 Direct habitat loss in the Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area

The extent of impacts from the Ghorahi-Madichaur transmission line on the Dang Deukhuri Foothill Forests and West Rapti Wetlands KBA appears small, but may be significant. On a precautionary basis, it is assumed that <1% (<400m) of the 40 km line will pass through the outer edge of the KBA based on the recently-revised (unpublished) boundary for this KBA (I. Thapa, Bird Conservation Nepal, pers. comm. to ADB, 2020). The alignment of this short section of transmission line should be reviewed during detailed design, to consider re-siting of angle point towers such that the line falls entirely outside of the KBA.

Whether alignment of the transmission line is altered or not, there will be no significant loss of habitat within the KBA (as the section crossed is agricultural land). Given importance of the broader Ghorahi-Madichaur AoA for vultures, however, Project mitigation for habitat loss is considered here. NEA (2020) state that there will be clearance of >4,674 trees¹⁶ on 33.8 ha of Forest Department land under the proposed RoW with 1.55ha of this for transmission towers. Specific surveys to assess forest quality in this area have not been undertaken, but these densities of trees to be felled equate to >150 trees/ha and so would be considered “mid-range forests” for Nepal (Rijal 2019). Elsewhere in Nepal, tree densities can exceed 2,000 trees/ha (Kunwar & Sharma 2004). Compared to this benchmark, on a precautionary basis, forests to be cleared are considered to be 50% of natural quality. As such, clearance can thus be envisaged as 33.8 ha (total area of vegetation clearance) × 0.5 (quality of vegetation) = 16.9 Quality Hectares (QH) of forest. Low regrowth will occur along the right of way, but not under the towers. For the sake of this assessment, this is conservatively estimated to only achieve 10% of natural forest quality. Remaining impacts here can thus be envisaged as 16.9 QH (clearance impacts) - (32.27 ha (area under the right of way) × 0.1 (quality of regrowth)) = 13.67 QH of forest.

Approximately 1.55 ha of land will be purchased to replace permanently acquired forest land under towers, and planted with 1,600 trees/ha (=c.2,480 trees) (NEA 2020). Although a regulatory requirement, this may broadly be considered an offset action. As only larger trees will be compensated, and planted trees will not all grow to the size of those felled by the Project, gains from this offset activity are coarsely estimated to reach 25% of natural forest quality within the Project lifetime. These reforestation gains can thus be envisaged as 1.55 ha (area of reforestation) × 0.25 (quality of reforestation by end of Project life) = 0.39 QH of forest.

Additional compensatory reforestation will be carried out in accordance with national legislation (NEA 2020), going beyond legal requirements for a 1:10 replanting ratio to use a previous higher 1:25 ratio for 4,674 trees (=116,850 trees). Reforestation sites will be identified in consultation with the local District Forest Office and Forest User Groups. Again, this may broadly be considered an offset action. The area of reforestation is unclear, so is assumed here to be the same as that outlined above (1,600 trees/ha), thus 73.03 ha. As only larger trees will be compensated, and planted trees will not all grow to the size of those felled by the Project, gains from this offset activity are again coarsely estimated to reach 25% of natural forest quality within the Project lifetime. These reforestation gains can thus be envisaged as 73.03 ha (area of reforestation) × 0.25 (quality of reforestation by end of Project life) = 18.26 QH of forest.

¹⁶ 2,527 trees >30cm diameter at breast height (dbh) and 2,174 poles (10-30cm dbh), with crown cover varying from 20-50%.

Total predicted gains from reforestation activities ($18.26+0.39 = 18.65$ QH) thus comfortably exceed total predicted impacts (13.67 QH), resulting in no residual impact of direct habitat loss on Critical Habitat.

6.2 Electrocuting of vultures on transmission lines

During detailed design, international good practice for “bird sensitive” design (APLIC 2006) should be incorporated into the three new transmission lines. Further, in upgrading the transmission lines “bird sensitive” design (APLIC 2006) should be retrofitted to the extent this is technically feasible. Detailed designs should be reviewed by an expert experienced in “bird sensitive” design to confirm this is the case before approval by NEA. Insulators/isolators between live and earthed components of infrastructure, and between phase conductors, should be over 2.7 m horizontally and over 1.8 m vertically (BirdLife International undated; APLIC 2006). Attention should also be paid to insulating lower voltage wires and/or jumpers near substations, which pose a high electrocution risk. If transmission and associated lines are appropriately isolated/insulated throughout, significant residual impacts on vultures from electrocution are unlikely.

6.3 Mortality of Bengal Florican and vultures through collision with transmission lines

Several options are available for mitigating transmission line collision risk (Sections 6.3.1-6.3.4). More detailed guidance is available from APLIC (2012). It may be most appropriate and pragmatic to reroute or mark much of some higher risk transmission line sections, such as on the Ghorahi-Madichaur transmission line (Section 6.3.2), and then to mark medium risk sections elsewhere (Section 6.3.3), as summarized in Table 8. However, none of the mitigation options is perfect, and so residual collision impacts will be expected for components 1a and 2a, and need to be offset (Section 7). Net collision impacts for 9b will, however, be positive, if the Project adds mitigation to a stretch of line which currently has no such mitigation.

During detailed design, international good practice for “bird sensitive” design (APLIC 2012) should be incorporated into the three new transmission lines. Further, in upgrading the transmission lines “bird sensitive” design (APLIC 2012) should be retrofitted to the extent this is technically feasible. Detailed designs should be reviewed by an expert experienced in “bird sensitive” design to confirm this is the case before approval by NEA.

TABLE 8. SUMMARY OF RECOMMENDED MITIGATION FOR COLLISION MORTALITY

Transmission line component	Alignment review to re-site angle point towers	Mark lines 500 m either side of ridge or valley crossings and waste dumps	Additional marking necessary	Use horizontally-aligned transmission towers
1a Dandhakhet–Rahughat		Essential		Consider
2a Ghorahi-Madichaur	If possible, to west side of river to avoid KBA	Essential	Desirable for as much of the line as possible, ideally the entire length	Consider
3a-b Ratmate-Lapang-Borang		Desirable		Consider
9a Pathlaiya-Dhalkebar		Desirable	Within Parsa National Park	
9b Duhabi-Kusaha		Essential	Within the Koshi Tappu Wildlife Reserve Buffer Zone	

6.3.1 Burying highest risk powerlines

The best option to mitigate against mortality through collision with powerlines is to bury (“underground”) them. Although burying may still result in temporary habitat loss and so additional direct Project footprint (Section 7.1), it will not result in bird mortality. Nonetheless, burying high voltage transmission lines is very expensive and so

only usually deployed as a mitigation measure in cases of extreme threat to species (often where required by national legislation).

6.3.2 Alignment review for highest risk powerlines, to re-site angle point towers

Minor alignment review can be preferable to burying lines (Section 6.3.1) as it can be considerably less expensive. Given the priority of the area for vultures, it would be appropriate to undertake an alignment review during detailed route survey by the contractor for the Ghorahi-Madichaur transmission line, to consider re-siting of angle point towers such that the line falls entirely outside of the Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area (Section 6.1).

6.3.3 Marking medium risk powerlines

New or upgraded transmission lines for the Dandhakhet–Rahughat, Ghorahi-Madichaur and Duhabi-Kusaha Project components pose particular collision risks to vultures. The highest risks are where powerlines cross ridges or valley bottoms (regular routes for vulture flights), or near any waste dumps (attractive to vultures as sources of food) or vulture restaurants. In such cases, at minimum, lines should be marked to reduce the risk of collisions – to 500 m either side of these features would be a pragmatic measure. Alternatively, where feasible, waste dumps may be relocated to avoid attracting vultures near to transmission lines. Given the particularly high risks posed by the Ghorahi-Madichaur transmission line, as it is near Nepal’s largest remaining vulture populations, it would be appropriate to mark as much of this line as possible, ideally the entire length.

In addition, planned upgrades along the Duhabi-Kusaha transmission line within the Koshi Tappu Wildlife Reserve Buffer Zone should, at minimum, be marked to reduce the risk of collisions by Bengal Florican and White-rumped Vulture. Further east, risks are likely lower for floricans. On a precautionary basis, though not currently posing a significant threat to vultures, it would also be appropriate to mark the Pathlaiya-Dhalkebar transmission line upgrade within the Parsa National Park.

Appropriate marking to reduce bird collision risk involves installation of bird flight diverters on earth wires, at most 10 m apart on lines, as large as possible, of contrasting colors, and visible at night. These diverters can increase visibility and bird avoidance of powerlines. Thinner wires (such as the earth wires) pose more of a risk of collision owing to their lower visibility and position (Bernardino *et al.* 2018), and are thus the priority for marking. It is assumed that increasing the frequency of diverters on powerlines will further reduce collision rates, e.g. a frequency of one diverter every 1.5 m is recommended for high-risk lines for Little Bustard in Portugal (J.-P. Silva pers. comm. 2011).

Bird flight diverters can be both visual and auditory markers of power lines. The most common visual markers are balls or large PVC spirals (e.g. “Swan Deflectors” of 1 m length and 30 cm diameter; Figure 1a). The most common auditory markers are “flappers” – these are usually smaller (and so less visible) but make a noise when they blow in the breeze. Noise-generating flappers may be particularly important on the Duhabi-Kusaha transmission line for floricans, which show poor visual detection of power transmission lines (Martin & Shaw 2010). Diverters which are visible at night may also be important on that line – related species migrate both by day and at night (O. Combreau pers. comm. 2011).

An extensive recent review found a mean reduction of mortality of just 50.4% for various types of flight diverter (Bernardino *et al.* 2019). Therefore, **at best, the Project can only plan for <50% reduction in predicted vulture and florican mortality on Project transmission lines with bird flight diverters**. Cheaper flapper-type diverters have had rapid and high rates of failure in some contexts (Dashnyam *et al.* 2016), so it is important that high quality, reliable (ideally guaranteed) flapper-type bird flight diverters are installed. Experts usually recommend the FireFly

by Hammarprodukter¹⁷ (Figure 1b), which is available at least in neighboring India and can be installed easily by drone. This diverter rotates, reflects UV light, glows in the dark, and has been extensively tested.

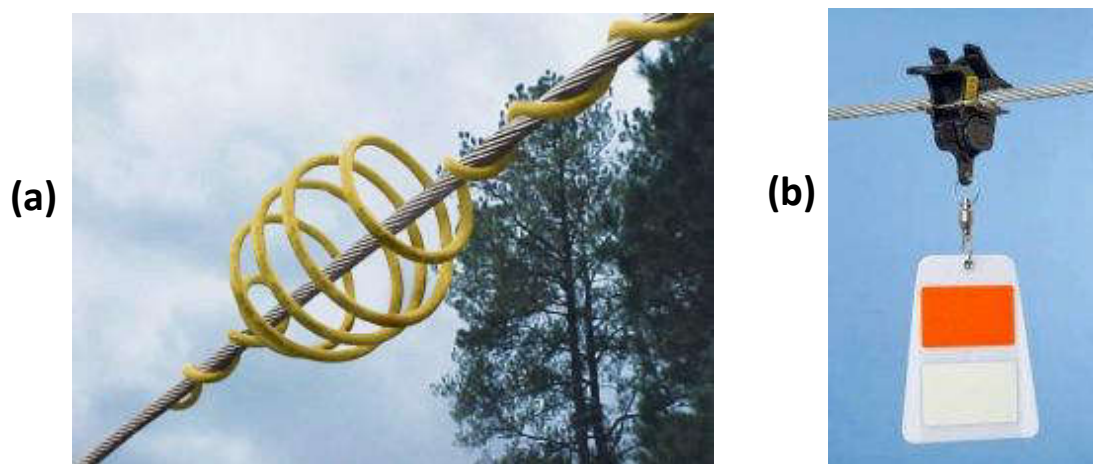


FIGURE 1. EXAMPLES OF BIRD FLIGHT DIVERTERS: (A) SWAN DEFLECTOR; AND (B) FIREFLY.

6.3.4 Using transmission towers with horizontal rather than vertical line alignment

A common design for transmission towers is to have three vertically-aligned live wires and a higher earth wire (e.g., Figure 2a) and this is the design proposed for new transmission lines under the Project. For migrating birds, the vertical alignment of wires essentially presents four opportunities for collision (including the earth wire). Alternate designs with horizontal alignment or bundling of live wires are also available (e.g., Figure 2b), and are likely to significantly reduce collision risks (e.g., APLIC 2012), by providing only two vertical opportunities for collision. This mitigation option is unfeasibly expensive where only conductors are being replaced (i.e., on the Duhabi-Kusaha transmission line), and for new transmission lines will require a wider (and thus more expensive) right of way compared to a vertical alignment, but should be considered for the Dandhaket–Rahughat and Ghorahi-Madichaur transmission lines if feasible and their use is permitted under Nepalese electricity transmission legislation.

¹⁷ <http://www.hammarprodukter.com/>

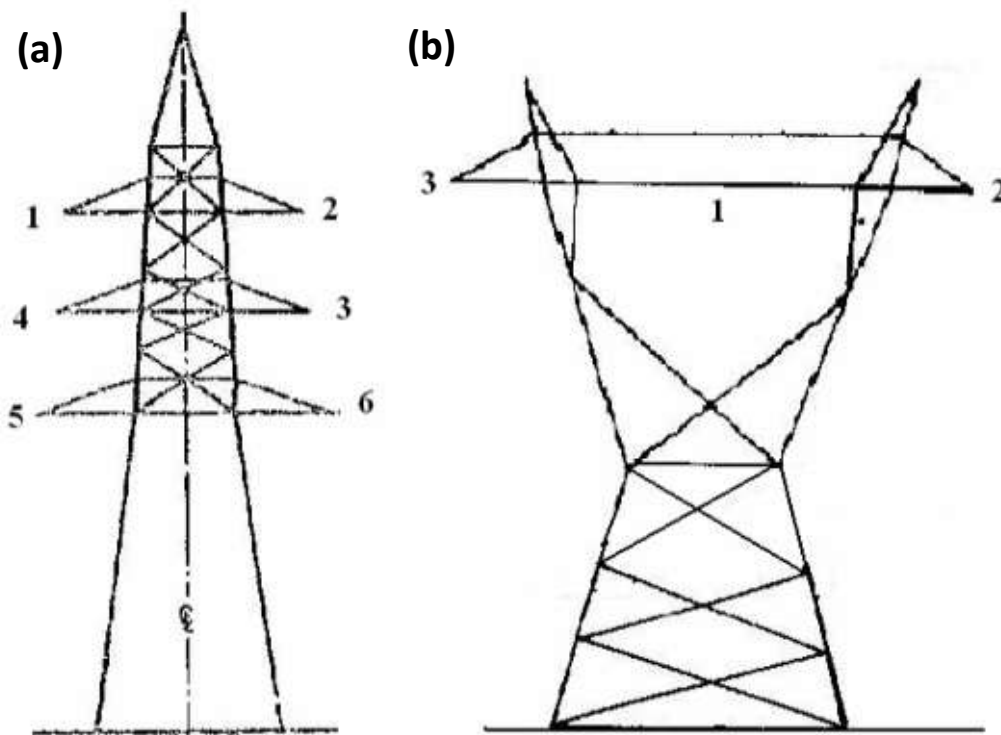


FIGURE 2. (A) VERTICALLY-ALIGNED TRANSMISSION TOWER, AND (B) HORIZONTALLY-ALIGNED TRANSMISSION TOWER (RRVPN 2007).

7 Reaching No Net Loss for vultures

No significant residual impacts on Critical Habitat are anticipated from direct habitat loss (Section 6.1), electrocution of vultures (Section 6.2), or other Project impacts (Section 5), except mortality of vultures owing to collision with the transmission lines (Section 6.3). These residual impacts need to be offset to reach No Net Loss in line with ADB safeguard requirements (ADB 2009). Offsetting residual mortality from Project transmission lines is best addressed through a like-for-like offset aiming to reduce mortality on non-Project powerlines.

Significant residual impacts are expected for components 1a and 2a (Section 6.3). Assuming marking of transmission lines is implemented as recommended in Table 8, including for the whole of the Ghorahi-Madichaur transmission line, this can be expected to reduce predicted mortality by c.50% (Section 6.3.3). There are no baseline data from which to assess likelihood of vulture collisions along the lines, so it is precautionary to assume such a risk throughout their entire length. If marking either side of high-risk features covers a negligible extent of the Dandhakhet–Rahughat transmission line (another precautionary assumption), this means that 25 km would be unmarked and pose full risks whilst 40 km (Ghorahi-Madichaur) would ideally be marked and thus pose half predicted risks. Overall, this equates to full risks along 45 km of line. To compensate for such a residual impact, **bird flight diverters could be put in place along 90 km of existing transmission lines within vulture habitat** (which, with 50% effectiveness, would equate to 45 km of full risk removal). Such an offset would best be

implemented by NEA within the network of Vulture Safe Zones being established by Bird Conservation Nepal and others.

Bird Conservation Nepal has proposed a number of other valuable measures to support vulture conservation, including design and implementation of habitat conservation plans for vultures, strengthening the Vulture Safe Zone Program, and raising local communities' awareness (I. Thapa, Bird Conservation Nepal, pers. comm. to ADB, 2020). These are not specifically included here, as their outcomes are difficult to quantify as offsets against anticipated impacts of the Project. They are, however, appropriate to align with, promote and enhance the conservation aims and effective management of the KBA. As such, support to these measures should be considered for at least the Ghorahi-Madichaur transmission line in the Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area, given its importance for vultures.

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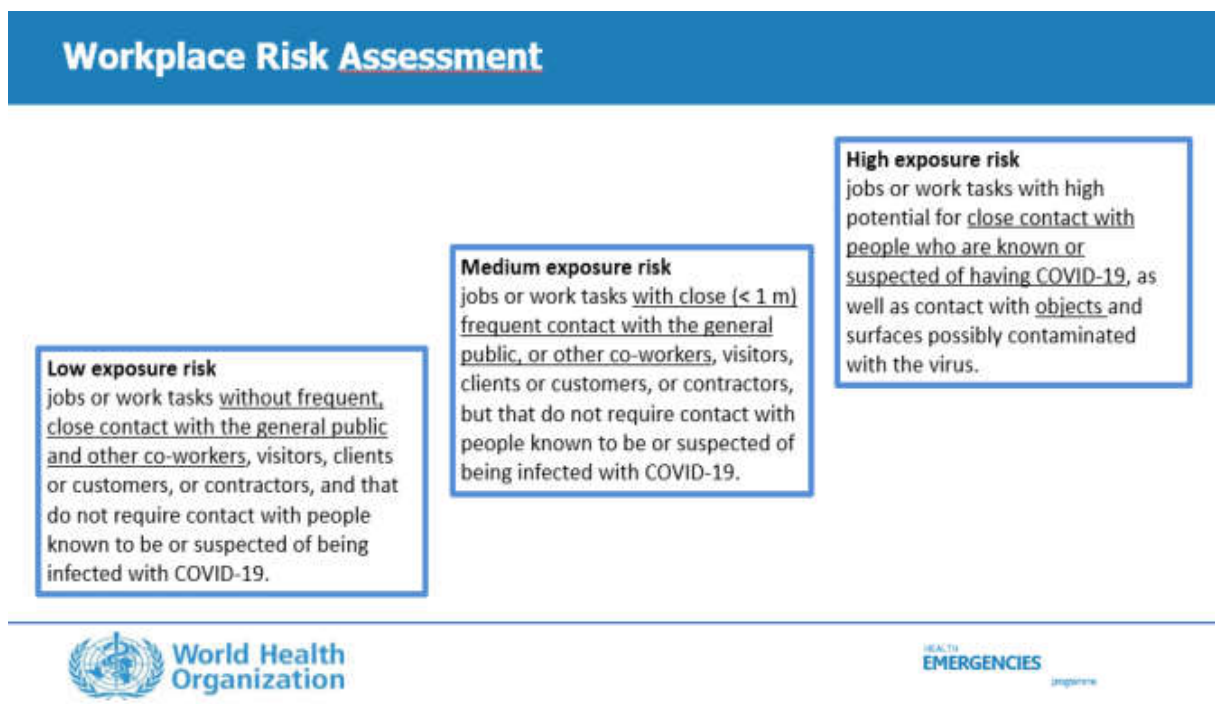
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Appendix 8 – Guidelines on COVID-19 Preparedness Measures

Risk of Exposure

The World Health Organization (WHO) notes that COVID-19 is transmitted primarily through respiratory droplets or contact with contaminated surfaces such that the risk of occupational exposure depends on the probability of coming into (i) close, less than 1m, or frequent contact with people who may be infected and (ii) contact with contaminated surfaces. The nature of pre-construction consultations and survey work and construction works required for the project mean that the WHO occupational exposure risk will be at least a medium risk.



The following factors will increase the risk of community and/or workers exposure if COVID-19 is circulating in either the local community where workers live/travel from or where the location where the project will be implemented,

- Underlying health conditions; asthma, chronic kidney or lung disease, diabetes, liver disease, serious heart conditions, serious obesity etc.
- Local health care capacity for testing, in-patient and intensive care facilities limited and remote from health care facilities
- Poor sanitation and welfare facilities on-site, in the worker accommodations and for local communities
- Large-scale construction camps
- Construction workers likely to be coming from outside local community and/or state
- Transient workforce, moving frequently between the local communities
- Construction workers likely to be residing within the local communities

However, the national government is monitoring incidences of COVID-19 including identifying hotspots designated as containment zones and has various requirements (SOP) to be followed by companies and the public as well as a tracking app (COVIDNP APP). As of 21 July 2020, Nepal has reported sporadic cases or localized clusters of cases, most of them associated with returnees from abroad, yet no widespread community transmission. The terai region and Kathmandu valleys, in which some project subcomponents are located, have been some of the most affected areas to date. Most of the lockdown restrictions have been lifted on 22 July 2020, however

international travel and borders will remain closed till 16 August 2020. The risks will need to be reviewed on an ongoing basis as the COVID-19 pandemic evolves over the project implementation period.

COVID-19 Preparedness

To demonstrate how the project will address the above risks COVID-19 will be included as part of the health and safety plan. The health and safety plan will need to include details of the current risk, day to day measures to be taken on-site, trainings, roles and responsibilities, an emergency procedure to follow in the event anyone develops symptoms including flow chart and contact details for local health facilities, screening checklists etc. It will need to demonstrate how government requirements will be followed by NEA and their contractor. In addition to any government requirements applicable at the time the following measures should be considered:

- During pre-construction activities social distancing of at least 1m will be maintained by all those working in the field, in order to reduce the risk of exposure as far as possible.
- Check and follow the government advice for the local community where planning to undertake consultations, surveys, and/or construction works
- Confirm the local health authority and liaise with them in advance to identify the current status of COVID-19 in the local community and any advice to be followed.
- Develop an emergency procedure to follow in the event anyone in the field develops symptoms including flow chart and contact details of local health facilities; this is to cover self-monitoring of symptoms, isolation, testing and quarantine, and transfer and admittance to hospital as a situation requires.
- Provide awareness raising activities for those being deployed to the field to cover hand hygiene, symptoms, risk, and procedures to follow if symptoms occur – keep records of all trainings.
- Ensure those going in the field are provided with accommodation that allows social distancing of at least 1m, is regularly cleaned, and with adequate sanitation and welfare facilities to enable them to undertake hand washing etc.
- Ensure temperature and medical checks are undertaken before deploying anyone to the field, especially for anyone travelling from outside the local community and/or state.
- Provide those going in the field with adequate supplies of PPE including soap, hand sanitizer, paper tissues, masks, thermometer to check own temperature etc.
- For consultations consider if rather than one large public meeting a series of smaller focus groups or face-to-face consultations could serve the same purpose without compromising the requirement to undertake meaningful consultations.
- Clean and disinfect the venue including objects and surfaces before and after any event.
- Consider the use of outdoor venues in order to maximize ventilation, space chairs at least 1m apart and ensure there are no bottlenecks to avoid close contact.
- If health authorities advise COVID-19 is circulating in the local community then advise participants in advance that if they have any symptoms or feel unwell, they should not attend.
- On arrival at the public meeting check the temperature of participants and require them to self-declare free of COVID-19 symptoms and not in recent contact with anyone who has had symptoms before being allowed into the venue.
- Those that cannot attend should be given the option of a telephone consultation or similar if they have an interest or concern about the project, to avoid them feeling obliged to attend for their voice to be heard.
- Provide awareness raising posters and have a hand wash station at the entry equipped with clean water, soap, and hand sanitizer for participants to use.
- Pre-order enough PPE, including soap, paper towels, paper tissues, hand sanitizer, and surgical masks for all participants to use; if not nationally mandated, at minimum, masks must be worn by all participants that cannot maintain social distancing or are elderly or otherwise medically vulnerable.
- If using microphones, ensure that they are wiped down with alcohol at least 70% concentration before passing it on.

- If food and drink is provided, try to provide pre-ordered individual packed food to avoid cross-contamination
- Identify an area where someone feeling unwell or has symptoms can be safely isolated, in case of serious case have a vehicle on call in which patient can be safely transferred to a local health facility with a driver who has full PPE and is trained to deal with potential cases and deep clean the vehicle afterwards.
- Emergency procedure to include for participants reporting symptoms and contacting other participants if anyone tests positive later, for contact tracing purposes ensure that all participants including support workers such as caterers or cleaners provide their contact details: telephone, address etc.
- Disposal of hygiene related waste in garbage bins with sealed lids lined with plastic bags, for onwards disposal in accordance with national regulations

During construction activities social distancing of at least 1m will be maintained by construction workers to members of the local communities in which they are undertaking work with awareness raising posters and notices so that local community members understand social distancing with them must be maintained. However, it may not be possible to maintain social distancing of 1m with other construction workers given tasks to be undertaken. If the tasks cannot be reconfigured to enable this, additional measures must be taken to reduce the risk of transmission between them:

- Daily temperature reading and self-certification check to be undertaken by the construction workers before leaving accommodation to confirm fit for work and having no COVID-19 symptoms.
- Posters and signages to be displayed on-site and at accommodation with daily toolbox talks to provide COVID-19 reminders on hygiene, emergency procedures etc.
- Enhanced cleaning and disinfection (using sodium hypochlorite (bleach) of surface at concentration 0.1% or alcohol at least 70% concentration for surfaces which can be damaged by sodium hypochlorite) of objects and surfaces that are regularly touched on-site and in construction worker accommodation including materials and equipment, shared rooms, surfaces, floors, toilets, and, washing facilities etc.
- Minimizing face-to-face and skin-to-skin contact by construction workers, orientate tasks so working side by side or facing away from each other rather than face on, and always assign construction workers to the same small working gang and the same accommodation, so as to limit social interaction between them
- Enhanced hand hygiene - regular hand washing with soap and water or alcohol-based hand sanitizer, including before entering and on leaving accommodation, on arriving and leaving site, and before putting on and after taking off any PPE
- Provide appropriate PPE and training on its proper use – masks, gloves, eye protection as applicable
- Provide medical insurance for all construction workers and sick leave to avoid them turning up for work when symptomatic due to no work-no pay situation

Further Sources of Information

- ADB <https://www.adb.org/publications/safety-well-being-workers-communities-covid-19>
- WHO Advice for the Public <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
- WHO Technical Guidance <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance>
- WHO Guidance for Schools, Workplace and Institutions <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/guidance-for-schools-workplaces-institutions>

Appendix 9 - Public Consultation Details

A. Consultations Carried Out During IEE - Through Consultation Questionnaire

1. Major drawbacks that acted as obstacles during the IEE survey and consultation works include:
 - COVID-19 pandemic caused difficulties gathering people.
 - Local people not being open and providing enough time because of social distancing.
 - In Banglachuli Rural Municipality the Ward Chief himself was infected with the virus and the whole village was under contact tracing that caused hindrance in doing consultation work in that location.
 - The earthen road being inaccessible because of monsoonal rains caused difficulties in reaching all parts for consultation works.

2. Survey and consultation for Dandakhet Rahughat transmission line were attempted from June 21st to 27th however because of COVID-19 the project location was inaccessible and instead the survey was done in a representative neighboring region. The locals were aware of the project as earlier IEE studies were done and consultation was carried out. The area observes bird migration (Local Name: Karyang Kurung) in the month of November (these birds usually migrate at a great height) and no electrocution and collision related injury or death have been recorded in the area. No biodiversity will be impacted in the area according to local perception. However, mention of invasive alien plant species such as *Eupatorium adenophorum* is mentioned causing degradation of forest land in the area. Eagle, vulture as well as Hispid Hare is also observed in the area. In areas within 10km from the project site land subsidence problem have been observed by one survey respondent. They are aware of safety issues related to electricity and project infrastructure. Support toward development work by local people is observed, although it should be noted that the respondents are from a neighboring region and not the directly project affected area.

3. Survey and consultation for Ghorahi Madichaur transmission line were carried out from July 30th to June 2nd 2020. Locals were supportive towards the project. Wildlife found in 10km range of the project area includes Tiger, Leopard, Ghoral, Wild Boar, Fox, Deer, Musk Deer, Dhole, Hispid Hare, Pheasant and Vulture. Temple of importance within 10km of the project is Bageshwori Temple, Shiva Temple. Some commercially valuable tree species found here include *Shorea robusta*, *Dalbergia sossou*. Locals are aware of safety risks related to electricity infrastructure. Some respondent believed birds colliding with wire is possible. One respondent mentioned that movement of wild boar, leopard, deer in Kalika Community Forest and Sworgadwary Community Forest do occur (near Balim Khola, but the transmission line avoids this forest land and follows the bank of the river) and also showed concern for possible forest fire. One respondent mentioned a school, primary health post approximately 50 from the project site. One respondent close to Sworgadwary Community Forest near Balim Khola mentioned that Wildlife Related Damage and Injury occur for instance crop depredation by deer, wild boar, monkey and injury by leopard. Recommendations include use of local people for work and working procedure to include standard construction procedure avoiding agricultural private land and spring water sources, project to manage forest guards for protecting the forest, compensatory plantation of cut trees in the forest, the RoW clearance in Community Managed Forest to be done under the Community Forest User Group and funds to the User Groups should be provided by the project for cutting and transporting logs.

Meeting of Ward at Belkotgadhi Municipality: Meeting on 6/27/2020 at Belkotgadhi Municipality, Nuwakot District (Borang Ratmate Transmission Line)

Attendees:

- a. Hem Nidhi Nepal, Ward Chief, Belkotgadhi Municipality
- b. Bhai Ram Nepal, Coordinator for Local Conflict, Belkotgadhi Municipality
- c. Santa Bahadur Tamang, Coordinator for Local Conflict, Belkotgadhi Municipality
- d. Yurani Aryal, Belkotgadhi Municipality

4. Recommendation made: concerns on the private land to fall under the alignment and towers and compensation of the land to be in accordance to the market price and its valuation, for instance based on its closeness to road. Also suggests avoiding settlement and agricultural land and instead aligning the line over government land or forest land (consultation attendance attached).



Table 9.A: Consultations Carried Out for EGMP During IEE through Questionnaire

SN	Name	Designation	Address	Date	Comment	Gender
Dandakhet Rahughat Transmission Line (Component 1)						
1	Samundra Sharma	Local	Phalebas	6/26/2020	Questionnaire	Male
2	Bhawani Prasad Shrestha	Farmer	Phalebas	6/27/2020	Questionnaire	Male
3	Bhoj Kumar Shrestha	Businessman	Phalebas	6/21/2020	Questionnaire	Male
Ghorahi Madichaur Transmission Line (Component 2)						
1	Bhim Kumar Budha		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Male
3	Bhupendra Giri		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Male
3	Om Bahadur Budha		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Male

SN	Name	Designation	Address	Date	Comment	Gender
4	Purwa Bahadur Budha		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Male
5	Devi Ram Bista		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Male
6	Dev Raj Subedi		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Male
7	Hima B.K		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Female
8	Loka Budha		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Female
9	Khim Bahadur Budha		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Male
10	Padam Khatri		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
11	Pampha Pokhrel		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Female
12	Ganesh B.K		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
13	Mane Nepali		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
14	Chum K.C		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
15	Khatbir B.K		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
16	Indra B.K		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Female
17	Binod Gotam		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
18	Madan Gharti		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
19	Kamal B.K		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
20	Man Bd. B.K		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
21	Nasiram Pun		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male

SN	Name	Designation	Address	Date	Comment	Gender
22	Dil Bd. Bindu		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
23	Surya Mani Chyameta		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
24	Pal Bd. B.K		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
25	Chudamani Pandey		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
26	Liladhar Gatak		Tyang Tyang River, Banglachuli-1	6/30/2020	Consultation Meeting	Male
27	Chawilal Pun		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Male
28	Bhup Bahadur Rawat		Takura, Banglachuli-2	7/2/2020	Consultation Meeting	Male
29	Siman Sarki		Ghorahi-4	7/2/2020	Consultation Meeting	Male
30	Keshav Rajiw		Ghorahi-4	7/2/2020	Consultation Meeting	Male
31	Nawerchan Thapa		Ghorahi-4	7/2/2020	Consultation Meeting	Male
32	Srom Adhikary		Ghorahi-4	7/2/2020	Consultation Meeting	Male
33	Kalman Adhikary		Ghorahi-2	7/2/2020	Consultation Meeting	Male
34	Narayan Pd. Adhikary		Ghorahi-2	7/2/2020	Consultation Meeting	Male
35	Sharad K.C		Ghorahi-2	7/2/2020	Consultation Meeting	Male
36	Dadndapani Ghimire		Ghorahi-2	7/2/2020	Consultation Meeting	Male
37	Gir Bd. Karki		Ghorahi-2	7/2/2020	Consultation Meeting	Male
38	Yami Pun		Ghorahi-2	7/2/2020	Consultation Meeting	Female
39	Dev Bd. B.K		Ghorahi-2	7/2/2020	Consultation Meeting	Male

SN	Name	Designation	Address	Date	Comment	Gender
40	Govinda Adhikary		Ghorahi-2	7/2/2020	Consultation Meeting	Male
41	Gyan Garti		Ghorahi-2	7/2/2020	Consultation Meeting	Male
42	Besh Bd. Ghartu		Ghorahi-2	7/2/2020	Consultation Meeting	Male
43	Dan Bd. Gharti		Ghorahi-2	7/2/2020	Consultation Meeting	Male
44	Devi Adhikary		Ghorahi-2	7/2/2020	Consultation Meeting	Female
45	Buhiram Choudhari		Ghorahi-2	7/2/2020	Consultation Meeting	Female
46	Damodar Thapa		Ghorahi-2	7/2/2020	Consultation Meeting	Female
47	Shreedhar Adhikary	Local	Ghorahi-4	7/3/2020	Consultation Meeting	Male
48	Gobardhan Thapa	Local	Ghorahi-4	7/3/2020	Consultation Meeting	Male
49	Bhim Bahadur Sarki	Local	Ghorahi-4	7/3/2020	Consultation Meeting	Male
50	Mr. Sumit Srestha	Electrical Engineer	NEA	July-15	Consultation Meeting	Male
51	Mr. Krishna Prasad Joshi	GMTL EIA Report Team	NEA	Jul-24	Consultation Meeting	Male
52	Mr. Binod	GMTL EIA Report Team	NEA	Jul-27	Consultation Meeting	Male
53	Mr. Suraj Regmi		NEA Barhabise SS Engineer	Jun-20	Consultation Meeting	Male
54	Mr. Ganesh Kumar Shah		Substation Automation NEA	Jun-20	Consultation Meeting	Male
55	Mr. Amir Maharjan		DNPWC, Park Warden Parsa National Park		Consultation Meeting	Male
56	Mr. Ram Dew Choudhary		DNPWC, Park Warden, Koshi Tappu Wildlife Reserve		Consultation Meeting	Male
57	Mr. Prakash Poudel		Chure Board, Geologist, PTMCCB	Jul-20	Consultation	Male

SN	Name	Designation	Address	Date	Comment	Gender
58	Mr. S.K. Nepal	Principal	Kuleshwor Secondary School	Jul-20	Consultation	Male
Borang Ratmate Transmission Line (Component 3)						
1	Hem Nidhi Nepal	Ward Chief	Belkotgadhi Municipality	6/27/2020	Consultation Meeting and Questionnaire	Male
2	Bhair Ram Nepal	Coordinator for Local Conflict	Belkotgadhi Municipality	6/27/2020	Consultation Meeting	Male
3	Santa Bahadur Tamang	Coordinator for Local Conflict	Belkotgadhi Municipality	6/27/2020	Consultation Meeting	Male
4	Yurani Aryal		Belkotgadhi Municipality	6/27/2020	Consultation Meeting	Female
5	Prashant Tamang	Politician		6/23/2020	Questionnaire	Male
6	Hem Bahadur Chhettree			6/24/2020	Questionnaire	Male

B. Consultations Carried out During IEE with Key Stakeholders

Meeting with Bird Conservation Nepal (BCN) on 6/28/2020, Kathmandu.

Venue: Office of BCN, Lazimpat, Kathmandu Nepal,

Presence:

- a. Ms. Ishana Thapa, CEO, BCN.
- b. Mr. Binod Manadhar, Engineer, NEA
- c. Mr. Asish Dhakal, Environment Specialist, Consultant ADB

The meeting was done to disseminate information on Electricity Grid Modernization Project Components and receive information on the sensitivities of project location.

Follow up Consultation Meeting with BCN on 7/7/2020, Kathmandu.

Venue: Office of BCN, Lazimpat, Kathmandu Nepal,

Presence:

1. Ms. Ishana Thapa, CEO, Bird Conservation Nepal
2. Mr. Asish Dhakal, National Environment Specialist, EGMP IEE preparation team
3. Mr. Deepak Bahadur Singh, Senior Environment Officer, ADB

The meeting was organized with BCN to have clarity on their recommendations provided after the first consultation of 28 June 2020 attended by NEA, BCN and the team preparing the project IEE. Discussion was focused on the specific queries raised by ADB. The BCN very patiently responded to all the queries.

The *issue and response matrix* is presented in the following Table 1.

FIGURE 1: DANG DEUKHURI IBA MAP PROVIDED BY BCN ON CONSULTATION ON JULY 3, 2020



Figure 2: Ghorahi Madichaur TL alignment in relation to Community Forest and Vulture Nests Provided by BCN on July 3, 2020



FIGURE 3: MAP PROVIDED BY BCN OF BIRJU LAKE ON JULY 3, 2020

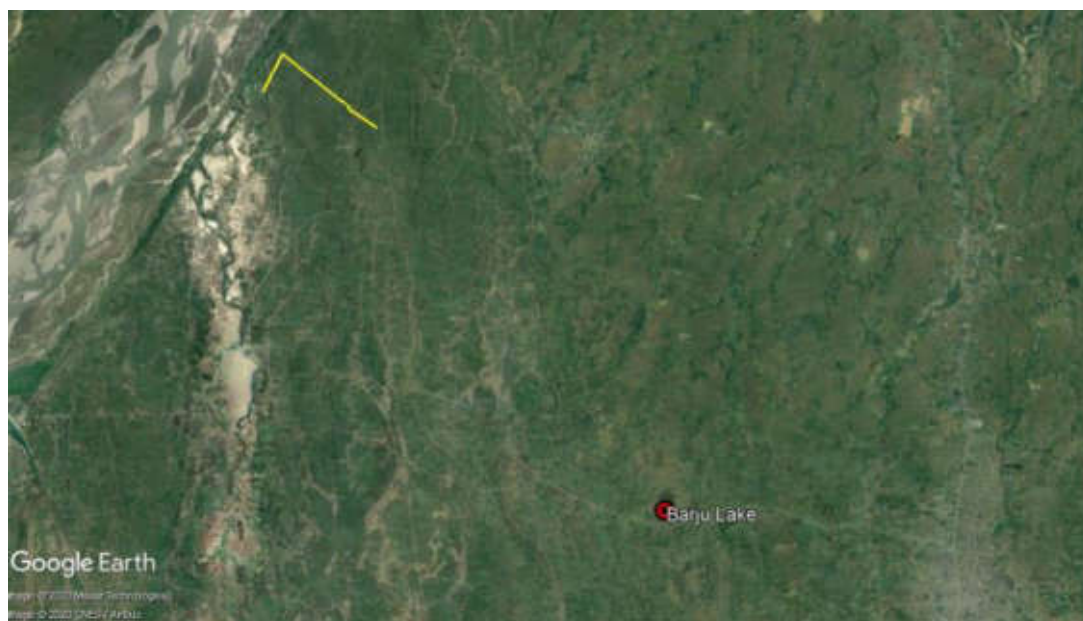


Table 1. Issues and Response Matrix

Issues Discussed	Response and Agreed Action
<ul style="list-style-type: none"> - IBA had been identified by screening but based on the Birdlife International map was 5-6km to the south of the line; I understand from Asish-ji this is being extended by BCN to include Charinge Community Forest. So we will reflect this in the IEE, but helpful if we can get the GIS of new boundary so we can more accurately check distances etc. 	<ul style="list-style-type: none"> - BCN has agreed to send the map once their concerned staff is back to office. - BCN agreed that the proposed boundaries of IBA are considered on map by also following geographical elements such as river, community forest boundary, settlement areas etc. Hence, Charinge CF boundary was included in the IBA map. Based on this and since the TL passes through short distance of outer periphery of the vulture IBA, the impact on the birds may not be as significant as being inside the are.
<ul style="list-style-type: none"> - From an analysis of critical habitat triggers it would appear that Dang district is a critical habitat for the slender billed, white rumped, and red headed vultures as these are all critically endangered – have taken the “Area of Analysis” for this as Dang district to include the existing IBA, Charinge Community Forest, and Bijauri vulture restaurant – grateful if BCN can confirm if (i) these are all the key locations within Dang district, or there are others? (ii) if they consider any other districts contiguous with Dang in terms of habitat for supporting vultures, especially the forest areas to the north? 	<ul style="list-style-type: none"> - 2 restaurants in Bijauri. - According to the annual survey conducted by the BCN, no other areas are found to have a visible presence of the birds with nesting and feeding ground. - Vultures cover wide range of area. Previously it was thought they cover 100 sq. km. flight area. However, the tagging and satellite monitoring carried out on 61 vultures have shown them to be covering more than 500 sq km flight area. Few were found to reach up to Kashmir and fly back to Nepal.
<ul style="list-style-type: none"> - Critical habitat is triggered for these vultures as Dang district supports >0.5% of the population and >5 breeding units of CR/EN species – from this research these criteria are exceeded https://www.researchgate.net/profile/Bishnu_Devkota3/publication/270127061_Status_of_Critically_Endangered_Vultures_in_Dang_Deukhuri_Foothill_Forests_and_West_Rapti_Wetlands/links/55c275bc08aea2d9bdbfeaa1/Status-of-Critically-Endangered-Vultures-in-Dang-Deukhuri-Foothill-Forests-and-West-Rapti-Wetlands.pdf?origin=publication_detail for the district as a whole, but do they have any other survey data, especially for number of adults nesting within the Charinge Community Forest? 	<ul style="list-style-type: none"> - Vulture sighting in congregation or nesting sites were not recorded inside Charinge Community Forest. - BCN will soon confirm us the information on the existing number of birds and nests after checking their database.
<ul style="list-style-type: none"> - Given we are in critical habitat, under SPS, need to comply with two requirements (i) no measurable impact that impairs the district’s high biodiversity value or its ability to function as an ecosystem – in this case believe we can meet this because within Dang district we are primarily in modified habitat, (ii) no measurable reduction in vultures’ population and no loss of vultures’ habitat – there will be no loss of their habitat but we need mitigation and monitoring due to risk posed to them by presence TL. 	<ul style="list-style-type: none"> - Studies have shown that the major impact on vulture population is from the scavenging of dead cattle treated with Diclofenac (a painkiller). Impact on their population due to habitat loss or feeding ground are not considered as a major cause. - BCN has been supporting in implementation of Vulture Safe Zone program in which government agencies and international organizations such as Royal Society for Protection of Birds, UK has been supporting. The project could contribute in some activities under the program in the concerned area such

Issues Discussed	Response and Agreed Action
	<p>as in awareness generation, construction of artificial wetland and other elements needed by the bird.</p> <ul style="list-style-type: none"> - Avoid cutting of nesting trees species (14 species of tall trees have been identified to be used by Vulture) - If unavoidable, do not cut the tree during nesting period - Wires of TL shall be greater than wing span of the Vulture - Preferable if the nesting and feeding ground are on one side of the TL alignment. - Use of reflector along the TL - Use measures to discourage Vultures to nest on TL Towers
<ul style="list-style-type: none"> - Proposed mitigation is 	
<ul style="list-style-type: none"> o to shift as far west as we can from the Charinge Community Forest and river, making sure TL is outside extended IBA boundary -- although given alignment has to run in valley which is buffer zone between Chure Hills we are limited to extent of movement. 	<ul style="list-style-type: none"> - Avoid is nesting and feeding areas if along the alignment. - If possible slightly shift to avoid nesting trees if any along the alignment. - If unavoidable, do not cut the tree during nesting period
<ul style="list-style-type: none"> o to ensure the TL incorporates all bird friendly design measures including divertors but also insulated conductor and ensuring towers are safe for perching and roosting vultures, following international good practice promoted by Birdlife International etc. Detailed design incorporating all these measures to be cleared by ADB before works, and also request they prepare site-specific biodiversity management plan to deal with below mitigation. 	<ul style="list-style-type: none"> - Consider wingspan of the birds and design the separation of the conductors. - Use perch management techniques. - BCN has international expertise in conservation of birds. They indicated their willingness to support in implementing mitigation measures and monitoring & management of Vulture conservation efforts during project implementation. For this purpose, the project needs to allocate some resources.
<ul style="list-style-type: none"> o possibility to create a new vulture restaurant to the east of the TL, to minimize the need for them to fly across the line between Charinge Community Forest and Bijauri vulture restaurant – grateful for their views on feasibility of this, potential location, and how is best to establish it. 	<ul style="list-style-type: none"> - Give preference to keep feeding and nesting ground in one side of the TL alignment - Operation of Vulture Restaurant is associated with many physical, environmental and social complexities. Current number of restaurants are sufficient. Rather project can support in strengthening the Vulture Safe Zone Program in the existing areas.
<ul style="list-style-type: none"> o minimizing the felling of the large trees in the forest land to the north, like kapok that vultures use for nesting and ensuring that these tree species are prioritized in compensatory afforestation – grateful for their views on whether there are any areas in extended IBA boundary which would benefit from being a focus of such afforestation? 	<ul style="list-style-type: none"> - Afforestation with required species of birds such as <i>Bombax cebia</i>, <i>Acacia sps.</i> and other 14 species identified by BCN. - BCN said they can review the area and recommend site for afforestation where the Vultures could nest.

Issues Discussed	Response and Agreed Action
<ul style="list-style-type: none"> ○ awareness raising within NEA and with community – potentially could be done together with BCN, think they have already done a lot of work on this so grateful for any ideas on gaps still to fill and how to go about it 	<ul style="list-style-type: none"> - Awareness does a huge impact. The population of Vultures has slightly increased since the restriction on use of Diclofenac by the government. - BCN can support the project in conducting awareness generation activities.
<ul style="list-style-type: none"> ○ pre-construction surveys, and post-construction surveys of vultures within Dang district to confirm no decrease in the population – in this respect grateful for any recommendations of surveyors and if they could indicate potential cost of such a survey as would be very helpful for budgeting 	<ul style="list-style-type: none"> - BCN is carrying out annual survey of birds in the area. - BCN can retrofit any project need to monitor and document the bird population.
<ul style="list-style-type: none"> ○ for critical habitat assessment SPS requires we have to involve experts in the species, so can they recommend any vulture experts, international working in Nepal, and national? 	<ul style="list-style-type: none"> - BCN have been doing routine and annual Vulture Survey throughout Nepal and publish scientific journal and technical papers. - BCN, Saving Asia's Vulture from Extinction, Birdlife International, Royal Society for Protection of Birds UK, and the Vulture Regional Steering Committee (RSC) for vulture protection through coordination among the governments of South Asia are among few agencies and platforms working for conservation of Vulture in Nepal. The Chitwan National Park has a Vulture Breeding Center. Hence, sufficient scientific knowledge and expertise is available within country for Vulture scientific research and conservation of the bird.
<ul style="list-style-type: none"> - On Koshi Tappu Ramsar, for the Birju lake this is 10km to the south. I know they said they could not share flight data they are working on but could we ask their view on: 	
<ul style="list-style-type: none"> ○ do the migratory birds generally follow the river corridor when migrating north-south? 	<ul style="list-style-type: none"> - Common assumption is the birds follow the river corridor as their flight path
<ul style="list-style-type: none"> ○ if the migratory birds at this location are flying north from India, and/or are from the Himalayas south, in which case they may cross the transmission line on their migration? 	<ul style="list-style-type: none"> - Not much information is available. - Since no major casualty of birds have been identified in the transmission line alignment, we assume the existing TL has not significantly caused bird casualties.
<ul style="list-style-type: none"> ○ Confirmation that they do not have any concerns with other components, or if any suggestions for us? Other main locations where see bird mitigation as being needed is where we have river crossings, and through forest habitat. 	<ul style="list-style-type: none"> - BCN have no record of long-range migratory birds injury and death because of TL. - The migratory birds fly from great height, and stops only in recognized locations for rest. - The migratory birds mostly stick to their established flight path and resting place- mostly wetland.

Issues Discussed	Response and Agreed Action
	<ul style="list-style-type: none"> - BCN conducts annual monitoring along the East West Highway since last 12 years. They have not recorded major bird casualties due to transmission line along the Koshi corridor.

Meeting with Department of National Park and Wildlife Conservation: Meeting on 6/28/2020 at Babarmahal, Kathmandu.

Attendees:

- a. Mr. Shyam Kumar Shah, Management Officer.
- b. Mr. Binod Manadhar, Engineer, NEA
- c. Mr. Asish Dhakal, Environment Specialist, Consultant ADB

On 6/29/2020 consulted with NEA Project Management Directorate Mr. Rajan Kandel and DNPWC Deputy Director General Dr. Ram Chandra Kandel as well as Management Officer.

Meeting with President Chure Terai Madhesh Conservation Development Board: Meeting on 6/28/2020 at Khumaltar, Lalitpur.

Attendees:

- a. Mr. Rajan Regmi, Under Secretary.
- b. Mr. Asish Dhakal, Environment Specialist, Consultant ADB

Meeting with Department of Archeology, 7/19/2020

Attendees:

Dr. Suresh Suras Shrestha
Mr. Asish Dhakal, Environment Specialist, Consultant ADB

Meeting with Nagarjun Sub Division Forest Office, Swayambhu, 7/15/2020

Attendees:

Ms. Shobha Adhikary
Shreya Pathak
Mr. Asish Dhakal, Environment Specialist, Consultant ADB

Meeting with IUCN Nepal, 7/16/2020

Because of COVID-19 Communicated through phone at the organisation gate to Mr. Amit Pudel

Meeting with WWF Nepal, 7/23/2020,

Attendees:

Mr. Promod Neupane
Mr. Asish Dhakal, Environment Specialist, Consultant ADB

C. List of Consultation Participants:

FIGURE 4: BCN

Electricity Grid Modernization Project


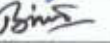
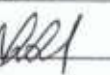
SN	Name	Designation	Organization	Contact No.	Signature
1	ISHANA THAPA	CEO	BCN	9851052705	
2	Bimal Manandhar	Engineer	NEA	9841193819	
3	Amit Dhakal	Consultant, ADB		9841560509	
4					

FIGURE 5: DNPWC

Electricity Grid Modernization Project

SN	Name	Designation	Organization	Contact No.	Signature
1	Rajan Regmi	Under-Secretary	PCTMCIR	9841355351	
2	Amit Dhakal	Consultant ADB		9841560509	
3					

FIGURE 6: CHURE

Electricity Grid Modernization Project

SN	Name	Designation	Organization	Contact No.	Signature
1	Arish Dhekhal	Environmental Consultant		9871560589	AD
2	Shyama K. Shaha	mgrt off	Asperce	9802039250	Shyama
3	A				
4					

FIGURE 8: GHORAHÍ MADICHAUR ATTENDANCE SHEETS

आज मिला ३०/०५/२०२० को दिन बोरमली मण्डिर पर ३२
 ५५ मण्डिरमण्डिर मण्डिर मण्डिर मण्डिर मण्डिर
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मण्डिर

क्र.सं.	नाम	मण्डिर	मण्डिर/मण्डिर	मण्डिर
१	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
२	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
३	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
४	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
५	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
६	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
७	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
८	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
९	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
१०	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
११	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
१२	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
१३	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर
१४	मण्डिर मण्डिर	मण्डिर	२०/५	मण्डिर मण्डिर

Summary of Key Issues During NEA Consultation

I. Consultation at Dandakheth Rahughat Transmission Line

Concerns

1. Project related work to be carried out without directly causing adverse impact to people and community.
2. Training on Awareness and Safety to be provided to locals to help address the adverse impact caused by the project.
3. Adequate compensation and facility to project affected household.
4. Support the project as it will support in the development of this region.
5. Construction work to be done on offseason of farming.
6. Upgrade the foot trail next to the proposed substation to a standard road.
7. The project affected area needs to be supported by the project in areas of education, health and local road development.



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित डाँडाखेत-राहुघाट १३२ कं.भी प्रसारण लाईन आयोजना कार्यन्वयन गर्दा आयोजना प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरूका बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदनको कार्यसूची (ToR) तयार गर्ने सिलसिलामा छटिआएका वातावरणीय अध्ययन टोली तथा स्थानियवासी, सरोकारवालाहरु बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुझाव संकलन गरियो।

स्थान : जिल्ला : म्याग्दी नगरपालिका/गाउँपालिका : मोस्ले - २ (साविकको गा.वि.स. कटियाचौर)
वडा नं./ठारु : कटियाचौर मिति : २०७४/११/२४ समय :

उपस्थिती

क्र.सं.	नाम घर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	श्रीधर पाण्डे	कृषि	मोस्ले-२ कटियाचौर	९८०२८९२४४६	राधिका
२.	श्रीमती पवित्रा	कृषि	मोस्ले-२ राहुघाट	९८०६९९८९८८	विमला
३.	कुलमाया झाडी	"	मोस्ले-२ कटियाचौर	९६४९९५२४४०	कुलमाया
४.	पवित्रा	"	"	९८०४१२२१२३	पवित्रा
५.	अंशुमती झाडी	विद्यार्थी	"	-	अंशुमती
६.	मीना त्रि.क.	"	"	-	मीना
७.	ब्रजम जोशी	नेमी	ने.वि.प्रा.		ब्रजम
८.	कविता जोशी	"	"		कविता
९.	नगेन्द्र भुसाल	"	"		नगेन्द्र
१०.	सिता परियार	कृषि	मोस्ले-२		सिता

रायसुझाव :

- आयोजनाले ठाउँवासी तथा समुदायलाई प्रत्यक्ष प्रभाव नपार्नेमा आयोजना निर्माणमा लाग्ने गर्छ।
- सचेतनामूलक तथा सुझाव समीक्षा : तालिम गरी स्थानियवासीलाई आयोजनाको निर्माणबाट उचित लाभ प्राप्त हुने गरी चलाइनुपर्ने।





नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित डाँडाखेत-राहुघाट १३२ के.भी.प्रसारण लाईन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरूका बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदनको कार्यसूची (TOR) तयार गर्ने सिलसिलामा छटिआएका वातावरणीय अध्ययन टोली तथा स्थानियवासी, सरोकारवालाहरू विच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुझाव संकलन गरियो।

स्थान : जिल्ला : भक्तपुर नगरपालिका/गाउँपालिका : भक्तपुर (साविकको गा.वि.स.
वडा नं./ठाउँ : ६ ईश्वरचैत्य मिति : २०७४/११/२४ समय :

उपस्थिती

क्र.सं.	नाम घर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	हेमि गुरुङ	गृहणी	भालिका - ६, डाँडाखेत	९८४४८६२२	
२.	शिव ओतम	कृषि	भालिका - ६, डाँडाखेत	९८६६९९४६०	
३.	हिम बहादुर गुरुङ	कृषि	भालिका - ६, डाँडाखेत	९८६०४९६६९	
४.	राजकुमार का.हाल	डाँडाखेत	कोहमाती - १०, बुरुनामरे	९८४१०३८९	
५.	नन्द प्रसाद गुरुङ	कृषि	भालिका - ६, डाँडाखेत	९८४९३६३	
६.	सुदि बहादुर गुरुङ	कृषि/गृहणी	भालिका - ६, डाँडाखेत	९६४६६०९२२	
७.	डा. लक्ष्मी शाही	अहेयका (Hydro empire)	छालागरी-४	९८२१०४५४६४	
८.	दिल व. माझी			९८६१०६६९६३	
९.	एम.डी. लक्ष्मी प्रसाद			९८४१००१०६	
१०.	प्रतम पौडेल				

रायसुझाव :

- १) प्रस्तावित लाईन तथा सडकपायसाई उच्चत मुआवजा तथा सदुपयोग दिनुपर्ने।
- २) आयोजनाको निर्माण बाह्र सौ हेक्टर नै विकास भएको विकास गर्नमा सहयोग गर्ने।





नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित डाँडाखेत-राहुघाट १३२ के.भी.प्रसारण लाईन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरूका बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदनको कार्यसूची (TOR) तयार गर्ने सिलसिलामा खटिआएका वातावरणीय अध्ययन टोली तथा स्थानियबासी, सरोकारवालाहरु बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुझाव संकलन गरियो।

स्थान : जिल्ला : सुनसरी नगरपालिका/गाउँपालिका : सुनसरी-३ (साविकको गा.वि.स.
वडा नं./ठाउँ : आकाश मिति : २०७३/११/२६ समय :
SS-2020 उपस्थिती

क्र.सं.	नाम थर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	प्रकाश शर्मा	हुसी	राष्ट्र पिछेडा	९८५५५५५५	
२.	विनोद राई	हुसी	राष्ट्र पिछेडा	९८५७६५८७७६	
३.	गोकुल पौडेल	हुसी	राष्ट्र पिछेडा	९८५३३६५५५०	
४.	भक्त मल्ल	"	सुनसरी-३	९८०५२११९३	
५.	हेम ब. कार्की	"	"	९८५७७५९५२०	
६.	गोकुल शर्मा	"	"	९८०९०९७७७	
७.	गो. व. शर्मा	"	"	९८५७७५८५२	
८.	इश्वर चन्द	गणसभा	"	९८२३८१७७७	
९.	ब्रजम पौडेल	नौकी	ने. वि. प्रा.		
१०.	कविता पौडेल	"	"		

रायसुझाव :

- १) उचित सुझाव दिनुमा विकल्पको काममा अगाडि नरहने।
- २) आयोजनाको शुक्ल कहिले देखा हुने हो र सो क्षेत्री गर्न पाउने कि नपाउने सो को जानकारी हुने हो।
- ३) Substation area को हेउको फुल ग्रान्ड लाई कलान गरे





नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित डाँडाखेत-राहुघाट १३२ के.भी.प्रसारण लाईन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरूका बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदनको कार्यसूची (ToR) तयार गर्ने सिलसिलामा छटिआएका वातावरणीय अध्ययन टोली तथा स्थानियबासी, सरोकारवालाहरु बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुझाव संकलन गरियो।

स्थान : जिल्ला : सुनसरी नगरपालिका/गाउँपालिका : सुनसरी - १ (साविकको गा.वि.स. कविपार्श्व-१)
बडा नं./ठार : सिन्धुखोला मिति : २०७४/११/२६ समय :

उपस्थिती

क्र.सं.	नाम घर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	शम शम्शेर शम्शेर	कृषक	कविपार्श्व-२	९८४७६९०९४	प.सा.हा.डा.
२.	दिपक शम्शेर	व्यापार	"	९८४७७२२९०२	
३.	शशीश बगिचा		"	९८२९२७७००९	
४.	माकुरी	कृषक	"	-	
५.	अमृत के.व. शम्शेर	व्यापार	"	९८४७६३८४०९	
६.	पिन शम्शेर शम्शेर		"	९८४७७२२९००	
७.	रमा शम्शेर	गृहिणी	"		
८.	सुदिता बगिचा	"	"		
९.	सुनम चौधरी	नौकरी	ने.वि.प्रा.		
१०.	कविता चौधरी	"	"	९८	

प.व. देवेन्द्र अधिकारी कृषक कविपार्श्व-१
रायसुझाव गर्नेहरूको संख्या नौकरी ने.वि.प्रा.





नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित डाँडाखेत-राहुघाट १३२ के.भी.प्रसारण लाईन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरूका बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदनको कार्यसूची (TOR) तयार गर्ने सिलसिलामा छटिआएका वातावरणीय अध्ययन टोली तथा स्थानियवासी, सरोकारवालाहरू विच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुझाव संकलन गरियो।

स्थान : जिल्ला : ४.२१.२८१ नगरप्रर्मिका, गाउँपालिका : २.छुटांगो साविकको गा.वि.स. पिप्ले - १
वडा नं./खंड : ३/ २.तोत्रीर मिति : २०७४/११/२८ समय : ३:३०...

उपस्थिती

क्र.सं.	नाम थर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	कृष्ण रिजाल	कृषि	२.छुटांगो-२ कोशी	९८१२९९९६	कृष्ण रिजाल
२.	विष्णु कार्की	लघुव्यापारी	"	९८४६६३६६१६	विष्णु कार्की
३.	नेत्र बहादुर मल्ल	नौकरी	"	९८४६६३६९२	नेत्र बहादुर मल्ल
४.	तौप कुमारी शर्मा	कृषि (हल)	"	"	
५.	जबिता मल्ल	शिक्षक	"	९८४६६६३२	जबिता मल्ल
६.	गोविन्द ब. मल्ल	कृषि	"	९८६७६७९५३२	गोविन्द ब. मल्ल
७.	हुमना मिश्र ठकुरी	गृहिणी	"		हुमना मिश्र ठकुरी
८.	कविता पौड्याल	नौकरी	ने.वि.प्रा.	९८५९३८२६९०	कविता पौड्याल
९.	राम पौड्याल	"	"		राम पौड्याल
१०.	राजकुमार शर्मा	कृषि	२.छुटांगो-३		राजकुमार शर्मा
पव.	कमल पौड्याल श्रेष्ठ	"	"		

रायसुझाव :

आयोजनाको किम्वदन्त प्रसारित क्षेत्रको विकासको लागि
शिवा, स्वास्थ्य तथा स्थानिय बाटोको विकासको लागि
सहयोग गर्नुपर्ने।





नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित डाँडाखेत-गहुघाट १३२ के.भी प्रसारण लाईन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरूका बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदनको कार्यसूची (ToR) तयार गर्ने सिलसिलामा खटिआएका वातावरणीय अध्ययन टोली तथा स्थानियवासी, सरोकारवालाहरु बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुझाव संकलन गरियो।

स्थान : जिल्ला : दाङ नगरपालिका/गाउँपालिका : मालिका (साविकको गा.वि.स. विम-४)
वडा नं./अड्डा : ६ डाँडाखेत मिति : २०७४/११/१७ समय : ०९:०० बजे

उपस्थिति

क्र.सं.	नाम धर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	मुक्त बल्लभ शर्मा	कृषि	मालिका-६ गु.२.वा.३३३	९६४६६९२२६०	<i>[Signature]</i>
२.	बिदाम बल्लभ शर्मा	कृषि	मालिका-६	९८४६६३३५३२	<i>[Signature]</i>
३.	अम बल्लभ शर्मा	कृषि	मालिका-६	९६४६६०४३०६	<i>[Signature]</i>
४.	लक्ष्मी आमा	कृषि	मालिका-६	९८०६९२३८९२	<i>[Signature]</i>
५.	कमल प्रसाद शर्मा	कृषि	मालिका-६	९८२९२२२२४६	<i>[Signature]</i>
६.	सुमीरा शर्मा	कृषि	मालिका-६	९८०६९२३८९२	<i>[Signature]</i>
७.	अम प्रसाद शर्मा	कृषि	मालिका-६	९८२९२२२२४६	<i>[Signature]</i>
८.	प्रमोद पौडेल	नोचनी	ने.वि.प्रा.		<i>[Signature]</i>
९.	नगेन्द्र खत्री	"	"		<i>[Signature]</i>
१०.	कविता पौडेल	"	"		<i>[Signature]</i>


पप. नर ब. शर्मा ०५०५०५०५ मालिका-६.

रायसुझाव :



२०७४

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 वातावरण तथा सामाजिक अध्ययन विभाग

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित डाडाखेत-राहुघाट १३२ के.भी.प्रसारण लाईन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित क्षेत्रमा पर्न सक्ने वातावरणीय प्रभावहरूका बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदनको कार्यसूची (TOR) तयार गर्ने सिलसिलामा छुट्टिआएका वातावरणीय अध्ययन टोली तथा स्थानियवासी, सरोकारवालाहरु विच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुझाव संकलन गरियो।

स्थान : जिल्ला : २३१/३६१ नगरपालिका/गाउँपालिका : २६३/३३१ (साविकको गा.वि.स. सिल्ले - १)
वडा नं./ठाउँ : ३/३३३३३३ मिति : २०७४/११/२८ समय :

उपस्थिती

क्र.सं.	नाम घर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	अर्ण ठा. शाही	कृषि (पह)	अर्ण ठा. - ३		पूर्णक/डाडा
२.	लाल ठा. शाही	अर्ण ठा.	"	९८४७६७०८४७६७०८४	
३.	देवी भल्ल	"	"		देवी
४.	देवी "	"	"	९८४७६७४९९९८४७६७	देवी
५.	झिना खत्री	"	"	९८०५९०३९७९	झिना
६.	सुवास शाही	कृषि	"	९८०८८३९०८८	
७.	राम डी. पहाडिगाँउ अर्ण	वातावरणविद		९८४९८०३०४	
८.	प्रताप जोशी	नोमी	ने.वि. प्रा.		
९.	नगेन्द्र भुल्ल	"	"		
१०.	कविता चौधरी	"	"		

रायसुझाव :





नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित डाँडाखेत-राहुघाट १३२ के.भी.प्रसारण लाईन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित क्षेत्रमा पर्ने सबै वातावरणीय प्रभावहरूका बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदनको कार्यसूची (ToR) तयार गर्ने सिलसिलामा छटिआएका वातावरणीय अध्ययन टोली तथा स्थानियवासी, सरोकारवालाहरु बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुझाव संकलन गरियो।

स्थान : जिल्ला : मेची नगरप्रालिका/गाउँपालिका : भारिलेख (साविकको गा.वि.स. ५/५)
बडा नं./ठार : लेखेखंड-६ मिति : २०७४/११/१२ समय :

उपस्थिति

क्र.सं.	नाम घर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	दिपा जौतामे	दिछाछी	लेखेखंड - ६	९८२९३३३६९२	
२.	रामुना	"	"	९८०८८३६३९८	
३.	सुनिता	"	"	९८०६९२९३२२	
४.	प्रोङ्कली	अहिनी	"		
५.	सान्तर गुञ्जु	किराची	"	९८०८८२४३०९	
६.	सुनील गुञ्जु	"	"	९८६९२९३२२२	
७.	सोम वहादुर गुञ्जु	कृषि	"	"	
८.	सान्तर गुञ्जु	"	"	"	
९.	नर गुमायी गुञ्जु	"	"	"	
१०.	मीलाल मुखेदी	कृषि	"	९८६६६६६९	

रायसुझाव :

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डाँडाखेत - राहुघाट १३२ के.भी. प्रसारण लाइन आयोजना

प्रारम्भिक वातावरणीय परीक्षण (कार्यसूची)



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
हरिपाटी, भक्तपुर

डाँडाखेत - राहुघाट १३२ के.भी. प्रसारण लाइन आयोजनाको
प्रारम्भिक वातावरणीय परीक्षण (IEE) को कार्यसूची (ToR) का लागि तयार गरिएको

आयोजना क्षेत्रमा पाइने वन, वन्यजन्तु र वनस्पति सम्बन्धि प्रस्तावनी अनुसूची -२०७४

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको डाँडाखेत-राहुघाट १३२ के.भी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाहरूमा रहेको वन, वन्यजन्तु तथा जैविक वातावरणको वस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परीक्षण (Initial Environmental Examination - IEE) को कार्यसूची तयार गर्ने सिलसिलामा छटिआएका वातावरणीय अध्ययन टोली तथा स्थानीयवासी, सरोकारवालाहरू बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न प्रस्तावनी अनुरूप विवरण संकलन गरियो।

स्थान : जिल्ला : सुनसरी गाउँपालिका/नगरपालिका : सुनसरी वडा नं./ठाउँ : २

मिति : २०७४.११.२१.०२ समय :

आयोजनाको नजिकको प्रस्तावित संरचना AP No. / RoW AP to AP
(Substation/Switchyard)

क्र.सं.	विवरण दिनेको नाम घर	उमेर	स्थायी ठेगाना	सामुदायिक वन/संस्था	पद/पेशा	सम्पर्क नं.	हस्ताक्षर
१	सुदामी सुवेदी	२०	मंगला-२	रानीभर हरेपाका सा.व. सचिव	सचिव	९८०४२२६०९४	<i>Sej</i>
२	कमलना शर्मा	३९	"	रानीभर हरेपाका सा.व. सचिव	सचिव	९८०३०३०३०५	<i>Manika</i>
३	पद्मनाथ सुवेदी	३४	"	रानीभर हरेपाका सा.व. सचिव	सचिव	९८०४२०२३३९	<i>Manika</i>
४	सालीग्राम विजयकर्मा	नकाँ बनयकर्मा	"	रानीभर ला.व. सचिव	सचिव	९८०४२३२८८८	<i>Sano</i>
५	विष्णु चौडाल	"	मंगला-२	उपभोक्ता, रानीभर सा.व. उपभोक्ता	उपभोक्ता	-	<i>Manika</i>
६	शान्त नृगामी खड्का	"	"	रानीभर सा.व. उपभोक्ता	उपभोक्ता	-	<i>Manika</i>
७	रघुनाथ खोपरे	"	मानिका-१	खोपरे लक्ष्मण सा.व. उपभोक्ता	उपभोक्ता	९८८६८२६६०५	-
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१०							

वातावरणीय अध्ययन टोलीका सदस्यहरू

क्र.सं.	विवरण दिनेको नाम घर	ठेगाना	पद/पेशा	सम्पर्क नं.	हस्ताक्षर
१	कविता फडमात	ने.वि.प्रा. काठमाडौं	वातावरणविद	९८८६८२६६०५	<i>Manika</i>
२	नवीन्द्र प्रहारी	ने.वि.प्रा. काठमाडौं	वातावरणविद	९८८६८२६६०५	<i>Manika</i>
३	पुष्पम चौडाल	ने.वि.प्रा.	वातावरणविद	९८८६८२६६०५	<i>Manika</i>

नेपाल विद्युत प्राधिकरण

वातावरण तथा सामाजिक अध्ययन विभाग


नेपाल सरकार
वातावरण तथा जल विभाग
२०७४

I. Consultation at Ghorahi Madichaur Transmission Line

Concerns

1. Community Forest area affected by the project needs to coordinate while cutting of trees in the forest and compensatory plantation activities with Community Forest User Groups.
2. Forest Area falling under the RoW needs to be planted with medicinal plants and other NTFP after construction phase.
3. Fodder and Grass plantation to be expanded in affected forest land.
4. Replantation to be done in open areas of the affected forest land.
5. Support the Forest in Fencing of its boundary.
6. Preference to be provided for local employment for the project related work.
7. Training on removal of Invasive Alien Species of plants prevalent in Shiva Community Forest, Banglachuli Ward No. 1.
8. In addition to CFUG, involvement of Local Development Committee, Ward Office and Division Forest Office during cutting and replantation works in forest land.
9. At Gordhara of Ghorahi Sub-metropolitan City, Ward. No. 4 of Dang District measures to stop hunting and poaching of wildlife needs to be implemented and training on control of Wild Boar and Monkeys to solve Human Wildlife Conflict needs to be carried out by the project.
10. Electrification of houses in Ghorahi Sub-metropolitan City Ward No. 2. Improve the reliability of electricity supply of eliminating load shedding (power cuts).
11. Training to Forest User Groups on forest management, forest fire control, wildlife management, livelihood and nursery.
12. Adequate compensation for affected household.

[illegible]

घोराही-मादिचौर १३२ की सी. प्रसारण लाइन आयोजना	वातावरणीय प्रभाव मूल्यांकन
 नेपाल विद्युत प्राधिकरण वातावरण तथा सामाजिक अध्ययन विभाग काठमाडौं, भक्तपुर	
घोराही-मादिचौर १३२ के.वी. प्रसारण लाइन आयोजनाको वातावरणीय प्रभाव मूल्यांकन (EIA) को लागि तयार गरिएको आयोजना क्षेत्रमा पाइने वन, वन्यजन्तु र वनस्पति सम्बन्धि प्रस्तावनी तथा रायसुझावहरूको अनुमति	
नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको घोराही-मादिचौर १३२ के.वी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोज्य प्रभावित गाउँपालिका/नगरपालिकाहरूमा रहेको वन, वन्यजन्तु तथा वैश्विक वातावरणको वस्तुस्थिति बारेमा ने.वि. प्राधिकरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट वातावरणीय प्रभाव मूल्यांकन (Environmental Impact Assessment) तयार गर्ने विमर्शनामा छटिबोल्का वातावरणीय अध्ययन टोली तथा वन उपभोक्ता समूह, स्थानीयका सरोकारवालाहरू बिच निम्न मिलि, समय र स्थानमा छलफल गरी निम्न प्रस्तावनी अनुरूप बिबरण तथा रायसुझाव संकलन गरियो।	

घोराही-मादिचौर १२१ के.पी. प्रसारण लाइन आयोजना
घोराही-मादिचौर १२१ के.पी. प्रसारण लाइन आयोजना कार्यन्वयन गर्दा कायदे प्रभावित गाउँपालिका/नगरपालिकाहरूमा रहेको बन, बन्धनबन्ध तथा वैश्विक वातावरणको बस्तुस्थिति बारेमा नेपाल वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुर

घोराही-मादिचौर १२१ के.पी. प्रसारण लाइन आयोजना कार्यन्वयन गर्दा कायदे प्रभावित गाउँपालिका/नगरपालिकाहरूमा रहेको बन, बन्धनबन्ध तथा वैश्विक वातावरणको बस्तुस्थिति बारेमा नेपाल वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट वातावरणीय प्रभाव मूल्यांकन (Environmental Impact Assessment) तयार गर्ने निम्नलिखितमा छिटोछाट्टै वातावरणीय अध्ययन टोली तथा बन उपभोक्ता समूह, स्थानीयका सरकारीबाहादुर बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न प्रस्तावनी अनुसूची विवरण तथा रायसुझाव संकलित गरियो। कुनिसु, रायसुझाव बन अध्ययनको नयाँ-३ पृष्ठमा।

स्थान: भिन्ना : पुर्वाञ्चल गाउँपालिका/नगरपालिका: बुढा न.छडे १ (पुर्वाञ्चल)
मिति: २०७३.०५.०५ समय: १२:३०
आयोजनाको नजिकको प्रस्तावित संरचना (AP No./S. to AP... to AP...) (Substation/Switchyard...)

क्र.सं.	विवरण दिनेको नाम	स्थानीय ठेगाना	सामुदायिक बन/संस्था	पद/पेशा	सम्पर्क नं.	हस्ताक्षर
१	शिवप्रसाद श्रेष्ठ	सुर्खेत-१	आदिवासी स.स.	सचिव	९७५५११५५	
२	जति	"	आदिवासी स.स.	सचिव	९७५५११५५	
३	श्रीका	"	"	सचिव	"	
४	तन्वीराम	"	"	सचिव	"	
५	पुष्पा	"	"	सचिव	"	
६	सुमना	"	"	सचिव	"	
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वातावरणीय अध्ययन टोलीका सदस्यहरू

क्र.सं.	विवरण दिनेको नाम	पद/पेशा	सम्पर्क नं.	हस्ताक्षर
१	पुष्पा श्रेष्ठ	सचिव	९७५५११५५	
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रायसुझाव: १) आयोजना नजिकै जहाँ कम्पन बलुआ रेतको ढाँचा रहेको छ, त्यसको नयाँ ढाँचा बनाई राख्नुपर्ने। २) बन अध्ययनको नयाँ-३ पृष्ठमा। ३) बान्नाको नयाँ ढाँचा बनाई राख्नुपर्ने। ४) बान्नाको नयाँ ढाँचा बनाई राख्नुपर्ने। ५) बान्नाको नयाँ ढाँचा बनाई राख्नुपर्ने। ६) बान्नाको नयाँ ढाँचा बनाई राख्नुपर्ने। ७) बान्नाको नयाँ ढाँचा बनाई राख्नुपर्ने। ८) बान्नाको नयाँ ढाँचा बनाई राख्नुपर्ने। ९) बान्नाको नयाँ ढाँचा बनाई राख्नुपर्ने। १०) बान्नाको नयाँ ढाँचा बनाई राख्नुपर्ने।

नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

[illegible]

घोराही-माडिचौर १३२ के.पी. प्रसारण लाइन आयोजनाको
वातावरणीय प्रभाव मूल्यांकन (EIA) को लागि तयार गरिएको
आयोजना क्षेत्रमा पाइने वन, वन्यजन्तु र वनस्पति सम्बन्धी प्रभावको तथ्यांक तालिका

नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
धरिपाटी, भक्तपुर

घोराही-माडिचौर १३२ के.पी. प्रसारण लाइन आयोजनाको
वातावरणीय प्रभाव मूल्यांकन (EIA) को लागि तयार गरिएको
आयोजना क्षेत्रमा पाइने वन, वन्यजन्तु र वनस्पति सम्बन्धी प्रभावको तथ्यांक तालिका

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको घोराही-माडिचौर १३२ के.पी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा बायो
प्रभावित गाउँपालिका/नगरपालिकाहरूमा रहेको वन, वन्यजन्तु तथा वैज्ञानिक वातावरणको बस्तुस्थिति बारेमा नैरि।
वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट वातावरणीय प्रभाव मूल्यांकन (Environmental Imp
Assessment) तयार गर्ने क्रमसमयमा बटुवाएका वातावरणीय अध्ययन टोली तथा वन उपभोक्ता समूह, स्थानीयका
सरोकारवालाहरू बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न प्रभावको अनुरूप विवरण तथा तथ्यांक तयार
गरियो।

स्थान: जिल्ला: बाँके गाउँपालिका/नगरपालिका: बोर्लाही वडा नं./ठाउँ: १/बोर्लाही
मिति: २०७३-०८-२६ समय: गाउँ

आयोजनाको नजिकको प्रस्तावित संरचना (AP No. / RoW AP. to AP.) (Substation/Switchyard.)

क्र.सं.	विवरण दिनेको नाम	स्थानीय ठेगाना	सामाजिक वन/बोस्वा	पद/पेशा	सम्पर्क नं.	हस्ताक्षर
१	जुनै नैरि	बोर्लाही	वन	प्रशासक	९८६५४९०९	
२	गिरि कुमर कुमर	११	११	११	९८०६२४५९	
३	दल नैरि	११	११	११	९८०६२४५९	
४	२०१ नैरि	११	११	११	९८०६२४५९	
५	दल नैरि	११	११	११	९८०६२४५९	
६	विन नैरि	११	११	११	९८०६२४५९	
७	२०१ नैरि	११	११	११	९८०६२४५९	
८						
९						
१०						

वातावरणीय अध्ययन टोलीका सदस्यहरू

क्र.सं.	विवरण दिनेको नाम सर	ठेगाना	पद/पेशा	सम्पर्क नं.	हस्ताक्षर
१	प्रदीप कार्की	बोर्लाही	ईन्जिनियर	९८६५४९०९	
२					
३					

तथ्यांक: प्रस्तावित लाइन पार गर्ने स्थानहरूको विवरण
नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

घोराही-माईचौर १३२ के.पी. प्रसारण लाइन आयोजना
वातावरणीय प्रभाव मूल्यांकन (EIA) को लागि तयार गरिएको
आयोजना क्षेत्रमा पर्ने वन, वन्यजन्तु र वनस्पति सम्बन्धि प्रभावको तथ्यांक

नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
भरिपाटी, भक्तपुर

घोराही-माईचौर १३२ के.पी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा वायो
प्रभावित गार्दीयनिका/नगरपालिकाहरूमा रहेको वन, वन्यजन्तु तथा वैदिक वातावरणको वस्तुस्थिति बारेमा वि.वि.
वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट वातावरणीय प्रभाव मूल्यांकन (Environmental Impact
Assessment) तयार गर्ने सिर्जनामा सहभागी वातावरणीय अध्ययन टोली तथा वन उपभोक्ता समूह, स्थानीयका
सरकारवालाहरू बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न प्रभावको अनुकूल विवरण तथा रायसुझाव संक
लियो ।

स्थान: जिल्ला: बाँके गार्दीयनिका/नगरपालिका: सुनसरी वडा नं./ठाउँ: १ सुनसरी
मिति: २०७३.०८.०८ समय: १०:००
आयोजनाको नजिकको प्रस्तावित शरणा (AP No. / RoW AP No. to AP No.) (Substation/Switchyard.....)
AP ३३, माईचौर, बाँके जिल्ला

क्र.सं.	विवरण दिनेको नाम	स्थानीय ठेगाना	सामुदायिक वन/संस्था	पर/पेसा	सम्पर्क नं.	हस्ताक्षर
१	मुन्नामाने गौरी	बाँके जिल्ला	वि.वि. (१) ११-५-१२	सुनसरी/माईचौर	९८५६५८३८३	
२	कुमल कान्छागौरी	" १	" १	सुनसरी	९८५६५८३८३	
३	विष्णुमाने कान्छागौरी	" १	मैत्रेय वि.वि. (१) ११-५-१२	सुनसरी	९८५६५८३८३	
४	गोर्खा सुभाष गौरी	" १	"	सुनसरी	९८५६५८३८३	
५	दिपक रजाल	" १	"	सुनसरी	९८५६५८३८३	
६	सुनसरी कान्छागौरी	" १	वि.वि. (१) ११-५-१२	सुनसरी	९८५६५८३८३	
७	सुनसरी सुभाष	" १	" १	सुनसरी	९८५६५८३८३	
८	गोर्खा सुभाष गौरी	" १	" १	सुनसरी	९८५६५८३८३	
९	सुनसरी नेपाल	" १	" १	सुनसरी	९८५६५८३८३	
१०	कुमल कान्छागौरी	" १	" १	सुनसरी	९८५६५८३८३	

वातावरणीय अध्ययन टोलीका सदस्यहरू

क्र.सं.	विवरण दिनेको नाम वर	ठेगाना	पर/पेसा	सम्पर्क नं.	हस्ताक्षर
१	पुनर्वात वर	बाँके जिल्ला	सुनसरी	९८५६५८३८३	
२					
३					

रायसुझाव: १) सुनसरी वातावरणीय अध्ययन टोली १ जना वन उपभोक्ता समूहको अध्यक्षको अध्यक्षतामा रहेको टोलीले वातावरणीय अध्ययन टोलीको प्रतिवेदनको बारेमा जानकारी लिएको छ।

२) सुनसरी वातावरणीय अध्ययन टोली १ जना वन उपभोक्ता समूहको अध्यक्षको अध्यक्षतामा रहेको टोलीले वातावरणीय अध्ययन टोलीको प्रतिवेदनको बारेमा जानकारी लिएको छ।

३) सुनसरी वातावरणीय अध्ययन टोली १ जना वन उपभोक्ता समूहको अध्यक्षको अध्यक्षतामा रहेको टोलीले वातावरणीय अध्ययन टोलीको प्रतिवेदनको बारेमा जानकारी लिएको छ।

नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग

४) सुनसरी वातावरणीय अध्ययन टोली १ जना वन उपभोक्ता समूहको अध्यक्षको अध्यक्षतामा रहेको टोलीले वातावरणीय अध्ययन टोलीको प्रतिवेदनको बारेमा जानकारी लिएको छ।

घोराही-मादिचौर १३२ के.पी. प्रसारण लाइन बायोबना
बातावरणीय प्रभाव मूल्यांकन (EIA) को लागि तयार गरिएको
बायोबना क्षेत्रमा पाइने वन, वन्यजन्तु र वनस्थीत शस्यपशु प्रजातिलाई तथा राखसुम्नाहरूको अनुसूची

नेपाल विद्युत प्राधिकरण
बातावरण तथा सामाजिक अध्ययन विभाग
झरपाटी, भक्तपुर

घोराही-मादिचौर १३२ के.पी. प्रसारण लाइन बायोबना कार्यन्वयन गर्दा बायोप
प्रभावित गाउँपालिका/नगरपालिकाहरूमा रहेको वन, वन्यजन्तु तथा वैश्विक बातावरणको वस्तुस्थिति बारेमा ने.वि.
बातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट बातावरणीय प्रभाव मूल्यांकन (Environmental Imp
Assessment) तयार गर्ने निर्देशनमा छिट्टाछिट्टा बातावरणीय अध्ययन टोली तथा वन उपभोक्ता समूह, स्थानीयका
सरोकारवालाहरू बिच निम्न भित्ति, समय र स्थानमा छलफल गरी निम्न प्रस्तावको अनुरूप विवरण तथा राखसुम्नाव संके
गरियो।

स्थान: बिज्ला : ५५५ गाउँपालिका/नगरपालिका: घोराही ५४ नं. वडा नं. ५/५ जिल्ला: लुम्बिनी
मिति: २०७३.०८.२० समय: १५:३०
बायोबनाको नजिकको प्रस्तावित संरचना (AP No. / RuW AP No. to AP ...) (Substation/Switchyard.....)
३५२ ३६ ९५५

क्र.सं.	विवरण दिनेको नाम	स्थानीय ठेगाना	सानुचारिक वन/संस्था	पशु/पेसा	सम्पर्क नं.	हस्ताक्षर
१	गोविन्द, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
२	बम, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
३	गोपाल, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
४	गोपाल, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
५	गोपाल, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
६	गोपाल, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
७	गोपाल, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
८	गोपाल, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
९	गोपाल, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
१०						

बातावरणीय अध्ययन टोलीका सदस्यहरू

क्र.सं.	विवरण दिनेको नाम	ठेगाना	पशु/पेसा	सम्पर्क नं.	हस्ताक्षर
१	गोपाल, बुद्ध भण्डारी	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५	५५५-५ नं. ५
२					
३					

राखसुम्नाव:

१. यस अध्ययनका तथ्याङ्कहरू र यसका तथ्याङ्कहरूको आधारमा तयार पारिएको बायोबना कार्यन्वयन गर्दा बायोप प्रभावित गाउँपालिका/नगरपालिकाहरूमा रहेको वन, वन्यजन्तु तथा वैश्विक बातावरणको वस्तुस्थिति बारेमा ने.वि. बातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट बातावरणीय प्रभाव मूल्यांकन (Environmental Imp Assessment) तयार गर्ने निर्देशनमा छिट्टाछिट्टा बातावरणीय अध्ययन टोली तथा वन उपभोक्ता समूह, स्थानीयका सरोकारवालाहरू बिच निम्न भित्ति, समय र स्थानमा छलफल गरी निम्न प्रस्तावको अनुरूप विवरण तथा राखसुम्नाव संके गरियो।

[illegible]

पोली-सुद्वीपीय १३२ के.पी. प्रशासन कार्यलय

वातावरणीय प्रभाव मूल्यांकन

नेपाल विद्युत प्राधिकरण वातावरण तथा सामाजिक अध्ययन विभाग हरिपट्टी, भक्तपुर

घोराही-माईबूँद १३२ के.पी. प्रशासन लाइन आयोजनाको
वातावरणीय प्रभाव मूल्यांकन (EIA) को लागि तयार गरिएको

आयोजना क्षेत्रमा पाइने वन, वन्यजन्तु र वनस्थिति सम्बन्धि प्रस्तावको तथा रायभूमाचलको अनुसूची

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको घोराही-माईबूँद १३२ के.पी. प्रशासन लाइन आयोजना कार्यान्वयन गर्दा आयोज्य प्रभावित नागरिका/नगरपालिकाहरूमा रहेको वन, वन्यजन्तु तथा वनस्थिति वातावरणको अनुसूचित बारेमा नेपाल वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट वातावरणीय प्रभाव मूल्यांकन (Environmental Impact Assessment) तयार गर्ने निम्ति निम्नमा बटुटाएका वातावरणीय अध्ययन टोली तथा वन उपयोक्ता समूह, स्थानीयका सरकारी/आजीविका बिच निम्न विधि, समय र स्थानमा छलफल गरी निम्न प्रस्तावको अनुसूची बिरण तथा रायभूमाचल संक गरेको ।

घोराही उपमहानगरपालिका

स्थान: विन्ना : १३२ के.पी. घोराही/नगरपालिका: बडा नं./ठेला नं. ५०२६

मिति: १३०८/०८/०८ समय:

आयोजनाको निसर्कको प्रस्तावित संरचना (AP No. / RoW AP. to AP. /) (Substation/Switchyard. /)

क्र.सं.	बिरण विनेको नाम	स्थानी टोला	सामुदायिक वन/संस्था	पद/पेशा	सम्पर्क नं.	इस्ताख
१	जोसेफ अर्जुनी	१	नगरपालिका	होस्ट	९८५५५५५	१३०८/०८/०८
२	जुन अर्जुनी	२	१	अध्यक्ष	९८५५५५५	१३०८/०८/०८
३	जुन अर्जुनी	३	१	अध्यक्ष	९८५५५५५	१३०८/०८/०८
४	नारायण प्र. शर्मा	४	१	१	९८५५५५५	१३०८/०८/०८
५	शर्मा प्र. शर्मा	५	१	१	९८५५५५५	१३०८/०८/०८
६	शर्मा प्र. शर्मा	६	१	१	९८५५५५५	१३०८/०८/०८
७	शर्मा प्र. शर्मा	७	१	१	९८५५५५५	१३०८/०८/०८
८	शर्मा प्र. शर्मा	८	१	१	९८५५५५५	१३०८/०८/०८
९	शर्मा प्र. शर्मा	९	१	१	९८५५५५५	१३०८/०८/०८
१०	शर्मा प्र. शर्मा	१०	१	१	९८५५५५५	१३०८/०८/०८

वातावरणीय अध्ययन टोलीका सदस्यहरू

क्र.सं.	बिरण विनेको नाम	ठोला	पद/पेशा	सम्पर्क नं.	इस्ताख
१	शर्मा प्र. शर्मा	१	अध्यक्ष	९८५५५५५	१३०८/०८/०८
२	शर्मा प्र. शर्मा	२	अध्यक्ष	९८५५५५५	१३०८/०८/०८
३	शर्मा प्र. शर्मा	३	अध्यक्ष	९८५५५५५	१३०८/०८/०८

रायभूमाचल: १३२ के.पी. प्रशासन लाइन आयोजनाको घोराही उपमहानगरपालिकाको वन, वन्यजन्तु तथा वनस्थिति सम्बन्धि प्रस्तावको अनुसूची बिरण तथा रायभूमाचल संक गरेको ।

नेपाल विद्युत प्राधिकरण वन (स्थानीय कार्य) प्रकृति संरक्षण विभाग तथा वातावरण तथा सामाजिक अध्ययन विभाग

मात्र मात्र ३०/०८/०८ वडाको पत्र

[illegible]



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
भरिपाटी, भक्तपुर

पोस्टाई-माईपौर १३२ के.पी. प्रसारण माइन मापोजमाको
प्रारम्भिक मातावरणीय परीक्षण (IEE) को लागि तयार गरिएको
मापोजमा योजना माइने वन, वन्यजन्तु र कवस्थीत सम्पत्ति प्रभावकी तथा राखनमाहङकी अनुसंधान

[illegible]

स्थान: जिल्हा : ८४ पाठ्यक्रम: नवम पाठ्यक्रम: भाषा: - ४ वक्रा व. छात्र: ४

दिनांक 20.08.2020 समय

उपरोक्तको लागि कुनै प्रस्तावित संख्या (AP No. / ReWAP to AP / Substation/Switchyard)

क्र.सं.	विद्यार्थी विद्येको नाम	स्थानी देगना	आधुनिक बर/हस्ता	पद/पेशा	सम्पर्क नं.	व्यवसाय
१	मिश्र अ.रा. २००१	पलास/५	विष्णुदेव पलास	गृहणी	९८५७८११९	१
२	जि.रा. २००१	६	१.१	"	९८५७८१५२	२
३	जि.रा. १२ भा.६	५	देवराज पलास	"	९८५७८११९	३
४	मिश्र अ. रा. २००१	" २	विष्णुदेव पलास	गृहणी	९८५७८१५२	४
५	जि.रा. अ. रा. २००१	३/५	विष्णुदेव पलास	"	९८५७८१५२	५
६						
७						
८						
९						
१०						

बालाबरणीय अध्यायन टोनीका सदस्यहरु

क्र.सं.	विद्यार्थी विनेको नाम वा	डेपुटा	पद/पेशा	सम्पर्क नं.	इलाका
१	विनायक लामा	N/A - E15	महानगरपालिका	९८२२२०८२	१
२					
३					

सायसुभाष

9) 1932 के भी प्रमाण सिद्ध हो जाय कि तब 92 फिट भिन्न
केवल जहाँ परसे ही उचित मुद्रापात्र पाइने सम्भव है
भने जहाँ की प्रती ४ फीट के प्रती मुद्रापात्र किन्तु पर
1) स्थिति स्वयं जहाँ वाप 90 स्वयं २ स्वयं परने भाने 10 फीट
अपने स्वयं जहाँ स्वयं स्वयं स्वयं स्वयं स्वयं स्वयं
स्वयं स्वयं स्वयं स्वयं स्वयं स्वयं स्वयं स्वयं स्वयं स्वयं

संस्था विद्युत प्रमाणित
विद्युत

WUOLAH THE HONORABLE MAN

12/12/2012 12:12:12



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
धरिपाटी, काठमाडौं

धोराही-माडीपौर १३२ के.पी. प्रशासन भाइन माओजनाकी
प्रारम्भिक मातामरपीथ परीक्षण (HIE) को लागि तयार गरिएको
माओजना लेखमा पाइने वन, कपजन्तु र कलमती समर्थ प्रजावर्गी तथा सत्यभाइइको अनुसंधान

नेपाल विद्युत प्राधिकरण प्रशासन क्षेत्री धौलागिरी-माडीचौर १३२ के.पी. प्रशासन साइन कार्यालय कार्यालय
तर्फे उपरोक्त पदमाथि मातृपुर्णित सम्पूर्ण विद्यार्थीहरूमा रहेको भए, नगन्तुन तथा प्रविष्टि सातारहेको
सम्बन्धित कोठा नैविष्ट, कार्यालय तथा साह्यिकहरूको अवलोकन विषयमा, यस्ताहरूलाई प्रविष्टि-कार्यालयमा नै
पढिपत्रमा (Inland) एन्टरप्राइसमाथि Examination—(ईई) तयार गर्ने विनियमितमा यीहरूमाथि सातारहेको
अनुपम ठोका तथा तर्फे उपरोक्त विषय, माथि-माथि, सरोकारमाथि विषय विनियम, व्यवस्थापन तथा
अनुपम धरि निम्न प्रस्तावनी अवस्था सम्बन्धित तथा सम्पूर्णमाथि सातारहेको विषय।

स्थान, जिल्ला : OS गाउँपालिका, नगरपालिका भैरहनी - २ वडा नं. छाई ☒
मिति २०७३.०९-१० सम्वत् _____
आवेदनको नोटसको प्रमाणीत गरिएको (AP No / ReW AP to AP) (Substition/Switchyard)

क्र.सं.	विद्यार्थी विनोदको नाम	स्थायी ठेगाना	आधुनिक बच/हस्ता	पद/पेशा	सम्पर्क नं.	सुताधार
१	मि. अ. र. २००१	पौर्वांच	लिपि लिपि	२५०१	९९९९९९९९	१
२	मि. अ. र. २००२	६	६	६	९९९९९९९९	२
३	मि. अ. र. २००३	५	५	५	९९९९९९९९	३
४	मि. अ. र. २००४	४	४	४	९९९९९९९९	४
५	मि. अ. र. २००५	३	३	३	९९९९९९९९	५
६	मि. अ. र. २००६	२	२	२	९९९९९९९९	६
७	मि. अ. र. २००७	१	१	१	९९९९९९९९	७
८	मि. अ. र. २००८	०	०	०	९९९९९९९९	८
९	मि. अ. र. २००९	०	०	०	९९९९९९९९	९
१०	मि. अ. र. २०१०	०	०	०	९९९९९९९९	१०

सामाजिक न्याय आयोग टोलीचा सदस्य

क्र.सं.	विद्यार्थी विनोद नाम पर	छात्रा	पद/पेशा	समर्थन नं.	हस्ताक्षर
1	विनोद छात्रा	NEA - 65	महाराष्ट्र	92422000	
2					
3					

रायमुखायः

- [illegible]

श्रीमान् विष्णु अर्जुन
शिवम्

II. Consultation for Borang Naubise TL

Local Concerns

1. Equal Compensation for RoW and Tower Pad Landholders
2. Removal of trees, plantation and trainings should be organized in coordination with Federal Government and Ward Offices
3. Skill Development Training, Tree Cutting in Forest Land to be done under observation of Community Forest User Groups Ranger
4. Make Arrangements for Volleyball Ground with Net.
5. Project Affected Land Price needs to be in sync with the market price of the land.
6. Training on Pisciculture to be provided.
7. Training of Livestock Farming and Forest Management in Project Affected Area.
8. Guarantee of Electricity Supply and arrangement of insurance.
9. Support on other infrastructure development works of the Project Affected Area.
10. Free supply of electricity.
11. The project's AP 27 falls 50 m inside school area, which does not have compound. Therefore, adequate and strict safety measures to be followed during construction period of the project.
12. Provide Library and associated facility to the affected school of AP 27.
13. Take into account Local Environment, Social and Cultural Area's Conservation and Development.
14. At Kintang Phedi of Ward No. 4 of Khaiyabas RM of Dhading District expansion of commercial market is taking place. Hence taking this factor into account the price of land in this area needs to be compensated.
15. Lapang, Ward no. 7 of Tripurasundari RM has very productive land with two crops of paddy, one crop of maize and one crop of wheat annually with irrigation facility. Therefore, acquisition of such highly productive land needs to be compensated taking such factors into account.



नेपाल विद्युत प्राधिकरण
सिन्धुली तथा सामाजिक अध्ययन विभाग
खरिपाटी, भक्तपुर

नेपाल विश्व प्रकृतिप्रेम प्रस्तावक रहेको कोटाह - जीबिस (रासमटे) २२० के.मी. प्रशासन साइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित सातौंतालिका/नगरपालिकाकार स्वास्थि वासिन्दलहरूमा स्वास्थि वासिन्दाहरूमा त्यस क्षेत्रमा विद्यमान रहेको समसामयिक विषयवस्तुमा अवधारणा छलफल गरी सामाजिक-तापिक बस्तुविनिमय गर्नेमा नेतिन, वातावरण तथा सामाजिक क्षेत्रमा विद्यमान, अक्षरपूरा प्रारम्भिक वातावरणीय परिधिमा (HSE) तयार गरी विनिमयमा बटिमा बटिमा वातावरणीय क्षेत्रमा तथा नेतिन वातावरणीय, अक्षरपूरा वातावरणीय विषय विनिमय गरी, तयार गरी वातावरण छलफल गरी विनिमय रायनुमात्र संकलन गरियो ।

स्थान : जिला कुवाकोट गाउँपालिका लुम्बिनी साकेट पन्ना नं ४

डा. प्रमोदसिंह ठाकुराणकर २०७३/०२/१८

आयोजनाको मजिस्ट्रेटको प्रस्तावित संरचना :- **सम्पूर्ण**

उपस्थिति

क्र.सं.	नाम वर	पद/पेशा	ठेगाना/संस्था	सामक नं.	हस्ताक्षर
१	रामजी अशिकाने	अध्यक्ष	तुलसीदास पाठशाला	५८८११४८७	
२	चंद्रनिधि धिनिरे	वडाहाथव	॥	५८७०८५७०	
३	श्रीधरराज धिनिरे	बुद्धिजिवी	॥	—	
४	कृष्ण श्रेष्ठ	कृषक	॥	—	
५	जुलमान श्रेष्ठ	डाईकर	॥	—	
६	हरिच. पौडेल	श्रव प्रतनिधि	॥	—	
७	राजु श्रेष्ठ	वडा सदस्य	॥	—	
८	बाबुराज आदारी	कुसुम	॥	—	
९	रामेश्वर पौडेल	बुद्धिजिवी	॥	—	
१०	अमरा कु. पौडेल	समानकारी	गोदावरी	५८७१४४४	
११					
१२					

रायसुभाय,

1. यह आयोजना निर्माण में कमरा लाष्टुनी पर्वे अज्जाधनी रु. डावर-
प्याड पर्वे अज्जाधनीलाई दमान कपले दमय सपिध् युक्तयमा-
अज्जाको मुखौकन गरी (डातप्रतिशत) कार्य जाधि वलाउने राय
सकाव लिखा छैन।

२. सब कथन ब्रह्मा रोपण तथा विभिन्न तालिम सम्बन्ध कार्यक्रम-
संचालन गर्ने स्थानिय दफ्तर तथा कार्यालय सँग सम्बन्ध-
गोष्ट मात्र कार्य गर्ने छैन ।

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नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बीराह-रातमाटे २२० के.भी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थानिय बासिन्दाहरूसँग त्यस क्षेत्रमा विद्यमान रहेको समसामयिक विषयवस्तुमा आवश्यक छलफल गरी सामाजिक-आर्थिक वस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) तयार गर्ने निम्नसितामा छिट्टै आएका वातावरणीय अध्ययन टोली तथा स्थानीयबासी, सरकारीबान्सा बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न शयसुचाक सकलन गरियो ।

स्थान : जिल्ला : २५६५ गाउँपालिका/नगरपालिका : अतिथिवास वडा नं. ४

ठाउँ : अतिथिवासी मिति : २०६५/१२/२२

आयोजनाको नजिकको प्रस्तावित संरचना :-

उपस्थिती

क्र.सं.	नाम वर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१	एक.वा.का.मन्त्र	अध्यक्ष	अतिथिवासी	९७५५५५५५	
२	सुवेदी	सुवेदी	११	९७५५५५५५	
३	सुवेदी	११	११	—	
४	सुवेदी	११	११	—	
५	सुवेदी	११	११	९७५५५५५५	
६	सुवेदी	११	११	—	
७	सुवेदी	११	११	—	
८	सुवेदी	११	११	९७५५५५५५	
९	सुवेदी	११	११	—	
१०	सुवेदी	११	११	—	
११	सुवेदी	११	११	—	
१२	सुवेदी	११	११	—	

शयसुचाव,

१. शयसुचाको लागि दिनुपर्ने ।
२. जग्गाको हस्तगत दिनुपर्ने ।
३. उपरोक्त समीतको सेक्टर रोडमा रूख काट्नु पर्ने ।
४. अतीकल ग्राडिन्टको साथसाथै हानीको व्यवस्था गर्नुपर्ने हु ।

(Signature)



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
बरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बोरालु-रातमाटे २२० के.भी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थानिय वासिन्दाहरूसँग त्यस क्षेत्रमा विद्यमान रहेको समसामयिक विषयवस्तुमा आवश्यक छलफल गरी सामाजिक-आर्थिक वस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) तयार गर्ने भिसिसिलामा खटिई आएका वातावरणीय अध्ययन टोली तथा स्थानीयवासी, सरकारीवाला विषय विम्व.मिति, समय र स्थानमा छलफल गरी निम्न रायसुझाव संकलन गरियो।

स्थान : जिल्ला : धनकुटा गाउँपालिका/नगरपालिका : रवनिमाकास वडा नं. ४

ता. : गणेश चिमाख १६ मिति : २०७४/११/१५

आयोजनाको नजिकको प्रस्तावित संरचना :-

उपस्थिती

क्र.सं.	नाम घर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	सुर्म बहादुर तामाङ	अध्यक्ष	रवनिमाकास	९८१९३१२०९	<i>[Signature]</i>
२.	सानु तामाङ	सचिव	"	९८४०२९२६	<i>[Signature]</i>
३.	सुर्म बहादुर तामाङ	कोषध्यक्ष	"	९८४२६२४८४	<i>[Signature]</i>
४.	मान बहादुर तामाङ	सदस्य	"	९८४२४११४९	<i>[Signature]</i>
५.	उत्तम बहादुर तामाङ	"	"	९९६३१८०३३	<i>[Signature]</i>
६.	दिरा बहादुर तामाङ	"	"	९८६९२५००७४	<i>[Signature]</i>
७.	डोर्बो ज्ञानारी तामाङ	"	"	९९६०१२९५९	<i>[Signature]</i>
८.	सानु तामाङ	"	"	-	सानु तामाङ
९.	रोजिना चुम्डा	"	"	-	रोजिना
१०.	चन बहादुर तामाङ	"	"	-	चन
११.	तुला बहादुर तामाङ	"	"	-	तुला
१२.	सेर बहादुर तामाङ	"	"	-	सेर

१३. ज्ञानेश बुढा (प्रेमी) ने.वि.प्रा. *[Signature]* ०९६६१२०० (मध्यम)

झी खेल्नेत सामुदायिक सनकाट उपखण्ड गर्ने निर्णय गरियो।

क्षेत्री पुर्णी अनिवारे हुनु पर्ने।

अध्यक्ष श्री सुर्म बहादुर तामाङ

[Signature]



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खरिपाटी, बलुवा

मेधावत विद्युत प्राधिकरण प्रस्तावक रहेको बीराथ-सतभटे २२० क्वी. प्रसारण लाइन आयोजना कार्यान्वयन गर्न आयोजना प्रभावित जिल्लाधिकार/समास्थापिकाका स्थायिक मामिलावलीहरू तथा सेवा/विद्यमान रहेको सामाजिक/विषयवस्तुमा आधारित छलफल गरी सामाजिक-आर्थिक वस्तुविस्तार बारेमा वे.वि.प्र., सातबर तथा सामाजिक आययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिखण (IEE) तयार गरी निम्नलिखित छलफलबाट आएको वातावरणीय आययन ऐनले तोक्यो तथा स्वीकृतपश्चात्, बरोबरवाता विधि निम्न छिनि, समग्र र स्थानमा छलफल गरी निम्न व्यवस्थापन अन्वयन गरियो।

स्थान : जिला : रायपुर गाउँपालिका / नगरपालिका : सुनसरी वडा नं. १

छात्र: कुल्लुवा देवी मिति: २०७५/१२/२०

आषाढमासको साँझको प्रस्तावित संरचना :-

उपस्थिती

क्र.सं.	नाम धर	पद/पेशा	ठेगाना/संस्था	सम्पर्क न.	हस्ताक्षर
1.	मो.कर. अचिठ्ठ	वडा सदस्य	नेपावली 9	97415213	
2.	अचिठ्ठ अचिठ्ठ	किसान	—	97415213	
3.	अचिठ्ठ अचिठ्ठ	किसान	कनिकावास 8	84	
4.	अचिठ्ठ अचिठ्ठ	नेपावली	—	8	
5.	अचिठ्ठ अचिठ्ठ	किसान	—	8	
6.	अचिठ्ठ अचिठ्ठ	किसान	नेपावली 9	97415213	
7.	अचिठ्ठ अचिठ्ठ	किसान	—	9	
8.	अचिठ्ठ अचिठ्ठ	किसान	कनिकावास 8	8	
9.	अचिठ्ठ अचिठ्ठ	नेपावली	—	8	
10.	अचिठ्ठ अचिठ्ठ	किसान	—	8	
11.	अचिठ्ठ अचिठ्ठ	नेपावली	—	8	
12.	अचिठ्ठ अचिठ्ठ	किसान	—	8	

१२. अगस्त कुमल गैरी ने. वि. डा. ७९६५२०

[illegible]



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
धरिपट्टी, भक्तपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बीटाइ-सतमाटे २२० के.वी. प्रसारण लाइन बायोबला आर्थोन्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थानिय बासिन्दासँग त्यस क्षेत्रमा विद्यमान रहेको सामाजिक विषयवस्तुमा आवश्यक छलफल गरी सामाजिक-सांस्कृतिक वस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परीक्षण (HE) तथापनि गर्ने विस्तारमाथि छिट्टै आफ्नै वातावरणीय अध्ययन टोली तथा स्थानीयवासी, सरकारीसँग विषय निम्न मिति, समय र स्थानमा छलफल गरी निम्न रायसुझाव संकलन गरिने।

स्थान : विज्या : धरिपट्टी गाउँपालिका/नगरपालिका : रानीगाउँ वडा नं. ३
छाई ३३२ क्षेत्रीय मिति : २०७७/११/१९

आयोजनाको नजिकको प्रभावित संस्था :-

उपस्थिति

क्र.सं.	नाम वर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	बिनाई तामाङ	होर्षी	डुङ्गे १०-२		
२.	बुढी तामाङ	बिस्मय	डुङ्गे १०-२	९८६६-१६८९२	डुङ्गे
३.	डाक्टर तामाङ	आचार्य	डुङ्गे १०-३	९८६३६२२१	
४.	इनापल्लु तामाङ	होर्षी	डुङ्गे १०-२		
५.	सुपु भाग्य तामाङ	होर्षी	डुङ्गे १०-३		सुपु भाग्य
६.	कुमा तामाङ	होर्षी	डुङ्गे १०-२		कुमा तामाङ
७.	ताप्ली तामाङ	होर्षी	डुङ्गे १०-२		ताप्ली
८.	ताप्ली तामाङ	होर्षी	डुङ्गे १०-२		ताप्ली
९.	बीता बस्ती	NEA	NEA		बीता
१०.	विनाई तामाङ	NEA	NEA		विनाई
११.	बसु भाग्य तामाङ	होर्षी	डुङ्गे		बसु भाग्य
१२.	बसु भाग्य तामाङ	होर्षी	डुङ्गे		बसु भाग्य

रायसुझाव:

- १) आयोजना क्षेत्रमा प्रभावित परीवारलाई मुस्काम बनाई (डुङ्गे ३३२) स्थिति
- २) वातावरण नजिकैको क्षेत्रमा नभएकोले (होर्षी) स्थिति (होर्षी) होर्षी होर्षी
- ३) प्रभावित क्षेत्रमा प्रभावित तथा नभएको (होर्षी) तामाङ (होर्षी)



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
धरिपट्टी, बक्तपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बोरान्ग-रातमाटे २२० के. वी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थानिय बासिन्दाहरूसँग त्यस क्षेत्रमा विद्यमान रहेको समसामयिक विषयवस्तुमा आवश्यक छलफल गरी सामाजिक-आर्थिक वस्तुस्थिति बारेमा ने.वि.प्रा. वातावरण तथा सामाजिक अध्ययन विभाग, बक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) तयार गर्ने निश्चयनामा खटिई आएका वातावरणीय अध्ययन टोली तथा स्थानीयबासी, सरकारीबाला बिच निम्न भित्ति, समय र स्थानमा छलफल गरी निम्न रायसुम्नाव संकलन गरियो ।

स्थान : जिल्ला छादिङ्ग गाउँपालिका/नगरपालिका: रुक्मिणीबास वडा नं. ४
छाई : छाप्सा मिति : २०६८/१२/१९

आयोजनाको नजिकको प्रस्तावित संरचना :-

उपस्थिती

क्र.सं.	नाम घर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	कुशी नामाङ	इ.इ.टी.	छाप्सा ४	९८४०४२६४२९	
२.	दिदि नामाङ	ब्यापारी	छाप्सा ४		
३.	सुता नामाङ	समाज सेवि	छाप्सा ४		
४.	साङ नामाङ	मुवा	छाप्सा ४		
५.	जान्गी नामाङ	अध्यापक	छाप्सा ४		
६.	कुका नामाङ	प्रीडाको	छाप्सा ४		
७.	साई नामाङ	कार्दार	छाप्सा ४		
८.	अजय गुरुङ्ग	अध्यापक	छाप्सा ४		
९.	रोता खत्री	ने.वि.प्रा.	छाप्सा ४	९८४०४२६४२९	
१०.	विताय प्याङ्गले	ने.वि.प्रा.	छाप्सा ४	०९८४०४२६४२९	
११.					
१२.					

रायसुम्नाव,

१. राय आयोजनाबाट प्रभावित ठाउँ जोगा छोट विहाना दैविध्वनि
छाप्सा ४ नम्बर ठाउँमा छलफल गरिने
२. नयाँ कक्षाकोठो बन्ने-बिहाना रोपण गर्दा हानिकारक रोग
मिलेला-गर्नुपर्ने
३. विद्युत तार बन्दाको गर्दाको विहानाको बन्नेछाउँ गर्नुपर्ने।
४. जग्गाको दैविध्वनि विहानाको गर्नुपर्ने



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
धरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बोराम्हा-रातमाटे २२० के. वी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थानिय बासिन्दाहरूसँग त्यस क्षेत्रमा विद्यमान रहेको समसामयिक विषयवस्तुमा आवश्यक छलफल गरी सामाजिक-आर्थिक वस्तुस्थिति बारेमा भे वि. प्रा. वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) तयार गर्ने शिर्षकसहितको सटिफाइ आएका वातावरणीय अध्ययन टोली तथा स्थानीयवासी, सरकारीबाला बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न रायसुझाव संकलन गरियो।

स्थान : जिल्ला : नुवाकोट गाउँपालिका/नगरपालिका : तारकेश्वर (भो. ५) वडा नं. ३

छाउँ तारकेश्वर-३ मिति : २०७४/११/२५

आयोजनाको नजिकको प्रस्तावित संरचना :-

उपस्थिति

क्र.सं.	नाम वर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	सुरेमान श्रेष्ठ	उपप्रमुख	तारकेश्वर-३ वडा समिति	९८४४४४४	
२.	गुठीमान श्रेष्ठ	स्थानीयवासी	"	९८४४४४४	
३.	कृष्णमान श्रेष्ठ	"	"	९८	
४.	हेम्बराज ठगल	कृषक	"	—	
५.	राजकुमार विक	निर्वाही	"	—	
६.	राजेश ठगल	"	"	—	
७.	कुशीमान श्रेष्ठ	पि.ए.	"	—	
८.	विमला श्रेष्ठ	शिक्षक	तारकेश्वर-३	९८४४४४४	
९.	सुन्दर प्रेमश्री	कृषक	"	९८४४४४४	
१०.	समानु कार्का श्रेष्ठ	उपनिर्वाह	"	९८४४४४४	
११.	रोता खत्री	समाजिक कार्यकर्ता	NEA	०१६६१५८०	
१२.	/	/	/	/	/

रायसुझाव:

फाइल भएको जनजङ्गल मा विद्युत लाइन अर्गुनु पर्ने, उपस्थित
५२ वा जग्गा परेमा क्षेत्री पुगी अर्गुनु पर्ने



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खटिघाटी, भक्तपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बोराङ्ग-रातमाटे २२० के.भी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थानिय वासिन्दाहरुसंग त्यस क्षेत्रमा बिद्यमान रहेको समसामयिक विषयवस्तुमा आवश्यक छलफल गरी सामाजिक-आर्थिक वस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) तयार गर्ने सिलसिलामा खटिई आफ्ना वातावरणीय अध्ययन टोली तथा स्थानीयबासी, सरकारीबाला बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न रायसुझाव संकलन गरियो।

स्थान : जिल्ला धनकुटा, गाउँपालिका/नगरपालिका तिनकुटा वडा नं. १४
छाउँ : रातमाटे मिति : २०७२/१२/१६

आयोजनाको नजिकको प्रस्तावित सरचना :-

उपस्थिती

क्र.सं.	नाम बटु	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	सबिका ब्रैट	अध्यक्ष	विप्लववादी	९८६७३५५	सबिका
२.	लक्ष्मी ब्रैट	उपाध्यक्ष	"	"	लक्ष्मी
३.	प्रेम लक्ष्मी ब्रैट	सचिव	"	"	प्रेम
४.	बम लक्ष्मी ब्रैट	सदस्य	"	९८६०१६३५५३	बम
५.	गोमा ब्रैट	सदस्य	"	९८६०५४३५	गोमा
६.	पद्मलक्ष्मी ब्रैट	सदस्य	"	"	"
७.	पुष्पमाया ब्रैट	सदस्य	"	"	"
८.	रोता ब्रैट	नमिनी	NEA	०१६६१९८०	रोता
९.	/	/	/	/	/
१०.	/	/	/	/	/
११.	/	/	/	/	/
१२.	/	/	/	/	/

रायसुझाव:

- १) लागुनोडो जग्गाको मुद्दाबन्दा दिनुपर्ने।
२) बटान गरिएका रुखको वलिपूर्ति दिनुपर्ने।
- सबिका



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खगिछरी, बलपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रोको बोराङ्ग-रातमाटे २२० के.वी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थानिय वासिन्दाहरुसंग त्यस क्षेत्रमा विद्यमान रहेको समसामयिक विषयवस्तुमा आवश्यक छलफल गरी सामाजिक-आर्थिक वस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, बलपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) तयार गर्ने सिलसिलामा छिट्टै आयोजन वातावरणीय अध्ययन टोली तथा स्थायीबासी, सर्वेकारबाना बिच निम्न भित्ति, समय र स्थानमा छलफल गरी निम्न रायसुझाव संकलन गरियो।

स्थान : जिल्ला : धादिङ्ग, गाउँपालिका/नगरपालिका : त्रैजालती खोलाको बडा नं. ५

आउँ : २०७५/१२/२२ मिति : २०७५/१२/२२

आयोजनाको नजिकको प्रस्तावित संरचना :-

उपस्थिती

क्र.सं.	नाम घर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	कुम्हा वडा/बडा/बडा/बडा	बडा/बडा/बडा/बडा	बडा/बडा/बडा/बडा	९८३६७०८९९	बडा/बडा/बडा/बडा
२.	आफ्नो बजला/बजला/बजला	बजला/बजला/बजला	बजला/बजला/बजला	९८५९०८२५५	बजला/बजला/बजला
३.	बजला/बजला/बजला	बजला/बजला/बजला	बजला/बजला/बजला	९८३९९३३२९	बजला/बजला/बजला
४.	बजला/बजला/बजला	बजला/बजला/बजला	बजला/बजला/बजला	९८३३६५९८	बजला/बजला/बजला
५.	बजला/बजला/बजला	बजला/बजला/बजला	बजला/बजला/बजला	९८५९०८२५५	बजला/बजला/बजला
६.	बजला/बजला/बजला	बजला/बजला/बजला	बजला/बजला/बजला	—	बजला/बजला/बजला
७.	बजला/बजला/बजला	बजला/बजला/बजला	बजला/बजला/बजला	—	बजला/बजला/बजला
८.	बजला/बजला/बजला	बजला/बजला/बजला	NEA	—	बजला/बजला/बजला
९.	बजला/बजला/बजला	बजला/बजला/बजला	—	—	बजला/बजला/बजला
१०.	बजला/बजला/बजला	बजला/बजला/बजला	—	—	बजला/बजला/बजला
११.	—	—	—	—	—
१२.	—	—	—	—	—

रायसुझाव:

१. आयोजना बाट प्रभावित जग्गा/रुखविहल घर गोठ परेडान्नाई उचित मोजात दिनु पर्ने।
२. वृद्धारोपण स्थानिय डो सहआयोजना गर्नु पर्ने
३. प्रभावित मेशमा खर्च भए भो सहयोग गर्नु पर्ने



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धरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बोराम्हा-रातमाटे २२० के.भी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थानिय बासिन्दाहरूसँग त्यस क्षेत्रमा विद्यमान रहेको समसामयिक विषयबस्तुमा आवश्यक छलफल गरी सामाजिक-आर्थिक बस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) तयार गर्ने निम्नलिखितमा खटिई आएका वातावरणीय अध्ययन टोली तथा स्थानीयबासी, सरकारीवाला बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न रायसुझाव संकलन गरियो।

स्थान : जिल्ला : ६३६६६ गाउँपालिका/नगरपालिका : नैजराति वडा नं. ४

ठाउँ : ३६६६६ मिति : २०७४.११.२०

आयोजनाको नजिकको प्रस्तावित संरचना :-

उपस्थिती

क्र.सं.	नाम वर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	दिपक अधिकारी	उपाध्यक्ष	नैजराति - ४	९८०३११०५९३	
२.	मेखनारा रिजाल	उपाध्यक्ष	"	९८५२२५३३७५	
३.	विश्व देव श्रेष्ठ	उपाध्यक्ष	"	९८५११८६६५३	
४.	राजु कुमर	कृषि	"	—	
५.	मकल बल्लभ	उपाध्यक्ष	"	९८५३५६१८५	
६.	सन्तोष श्रेष्ठ	उपाध्यक्ष	मेखनारा - ४	९८६३५७७३६	
७.	जोति सापकाँडा	नर्स	"	९८६३३२५५३	
८.	विष्णु कुमर श्रेष्ठ	उपाध्यक्ष	"	९८५३६६३२३	
९.	होम व. कुमर	कृषि	"	९८ —	
१०.	बीता खत्री	ने.वि.प्रा.	उपाध्यक्ष	०९८६९२२०	
११.	रिजाल बालुवा	ने.वि.प्रा.	उपाध्यक्ष	०९८६९२२०	
१२.	—	—	—	—	—

रायसुझाव:

१) उपरोक्त दफितीको रोखामा कुल गरनु पर्ने।
नि.कुमल वसीको सुझाव प्रदान गर्ने।

०६/१२/२० ०६/१२/२०



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वातावरण तथा सामाजिक अध्ययन विभाग
धरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बौराहू-रातमाटे २२० के.भी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थानिय बासिन्दाहरुकसंग त्यस क्षेत्रमा विद्यमान रहेको समसामयिक विषयवस्तुमा आवश्यक छलफल गरी सामाजिक-आर्थिक वस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) तयार गर्ने सिलसिलामा छटिई आएका वातावरणीय अध्ययन टोली तथा स्थानीयबासी, सरोकारवाला विषय निम्न मिति, समय र स्थानमा छलफल गरी निम्न रायसुकाब संकलन गरियो।

स्थान : जिल्ला : काभ्रे गाउँपालिका/नगरपालिका : रुद्रापथ वडा नं. ०४

छटि : दा.रा.अ.प.लि.स.स. मिति : ०५६८/१९१/०५

आयोजनाको गतिकको प्रस्तावित संरचना :-

उपस्थिती

क्र.सं.	नाम वर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	हरि ति. सुम्न	वडा अध्यक्ष	रुद्रापथ-४	९०९१००५९३२	
२.	सुर्पे क. तामाङ	वडा सदस्य	११		
३.	मानु व. तामाङ			९८४३२१११११	
४.	इतर तामाङ		११	९९६९७०९९९	
५.	सुभाष तामाङ			९२६१९३९३५	
६.	सुभाष तामाङ				
७.	अर्जुन तामाङ			९८६९७०९९९	
८.	सुब्बा तामाङ		११ - ५	९९६९७०९९९	
९.					
१०.					
११.					
१२.					

रायसुकाब:

वडाध्यक्ष, वडा, जसमा कतिपय पुजाइन् सक्छन्, कतिपय वरिष्ठ
हाउसका उचित सुझावहरू तथा भुइयाउमा व्यवस्था गरिद
आवश्यक छ।

वडा अध्यक्ष

२०० फर १६



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
धरिपाटी, मकपुर

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको बोराङ-रातमाटे २२० के.भी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाका स्थायित्व बासिन्दाहरूमा त्यस क्षेत्रमा विद्यमान रहेको समसामयिक विषयवस्तुमा आवश्यक छलफल गरी सामाजिक-आर्थिक वस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, मकपुरबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) तयार गर्ने निर्णयनामा बाटिर्दै आएका वातावरणीय अध्ययन टोली तथा स्थानीयवासी, सर्वेकारहरूका बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न रायसुम्काव संकलन गरियो।

स्थान : जिल्ला : धरिपाटी गाउँपालिका/नगरपालिका : नेपालतीर्थलजोषा नं. १

डाई : ५०७०३ मिति : २०६८/१२/२२

आयोजनाको गतिबिधीको प्रस्तावित संरचना :-

उपस्थिति

क्र.सं.	नाम वर	पद/पेशा	ठेगाना/संस्था	सम्पर्क नं.	हस्ताक्षर
१.	रमेशकुमार	नि.म.पि/प्रिण्टिङ	नेपालतीर्थलजोषा-१	९९९३५११२३	
२.	रमेशकुमार धरिपाटी	प्रा.पि/शिक्षण	" "	९९९३५११२३	
३.	गिता साप्राप्रजार	प्रा.पि/प्रिण्टिङ	" "	९९९३५११२३	
४.	गारजी बस्ती (अधिकारी)	प्रा.पि/प्रिण्टिङ	" "	९९९३५११२३	
५.	सरस्वती अधिकारी	प्रा.पि/प्रिण्टिङ	" "	९९९३५११२३	
६.	राम प्रसाद, जिपही	प्रा.पि/प्रिण्टिङ	" "	९९९३५११२३	
७.	मुक्ति प्रसाद, लखेल	प्रा.पि/प्रिण्टिङ	" "	९९९३५११२३	
८.	गोमा अर्जुन (अधिकारी)	प्रा.पि/प्रिण्टिङ	" "	९९९३५११२३	
९.	गंगा अधिकारी दिङ्ग	प्रा.पि/प्रिण्टिङ	" "	९९९३५११२३	
१०.	बाबु अधिकारी	गणेश	" "	९९९३५११२३	
११.	गणेश अधिकारी ने.वि.प्रा.	गणेश	" "	९९९३५११२३	
१२.					

रायसुम्काव,

- १) यस आयोजना कै RAP-२७ यस विद्यालयको २० मि. मित्र पर्ने देखिएको र हाल स्कुलको कम्पाउण्ड तर्फको हुर्दो अनिवार्य निर्माणको क्रममा सुरक्षा व्यवस्था गर्नुपर्ने।
- २) आयोजना मित्र २० मिटरमा अवस्थित यस विद्यालयलाई लाईलासी तथा पूर्वधार निर्माण सहजै गर्नुपर्ने।
- ३) वातावरणीय तथा भौतिक क्षेत्र, सामाजिक तथा सांस्कृतिक क्षेत्रको संरक्षण तथा विकास ध्यान दिनुपर्ने।



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
धरिपाटी, बलुपुर

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स्थान : जिला : बाँके गाउँपालिका : नारायणी त्रिपुरा खुदरी पृष्ठ नं. ५०

सद: नरपद: रररर मररर १०००/१११०

आधीजनाको लीजको पुस्तायित संरचना :-

सुषमिष्यती

क्र.सं.	नाम वर	पद/पेशा	ठेगाना/संस्था	समयक व.	हस्ताक्षर
१	राम व. नेपाल	कृषि	पिप्रापुरी-६ ललितपुर	—	राम व.
२	जोरा व. नेपाल	"	"	—	जोरा व.
३	जयराज व. नेपाल	कर्मचारी	"	—	जयराज व.
४	दत्त व. नेपाल	"	"	—	दत्त व.
५	राजु व. दल	समाजसेवी	"	—	राजु व.
६	सुभाष व. अधिकारी	"	"	—	सुभाष व.
७	रजु व. प्रधान	किसान	"	—	रजु व.
८	सुभाष व. अधिकारी	सौराष्ट्र पत्रिका प्रिन्टर	"	—	सुभाष व.
९	सुभाष व. अधिकारी	देहा	"	—	सुभाष व.
१०	राम व. लुप्रेनेडा	समाजसेवी	"	—	राम व.
११	रजु व. अधिकारी	समाजसेवी	"	—	रजु व.
१२	रजु व. अधिकारी	समाजसेवी	"	—	रजु व.

જામણી - સર્વોપજાત

सुखसुभाषः

1. दशरथ, जिन्हा त्रिपासुकी जा. वा. वाचन ६ लपयसु तेंवो को आशोधनांत प्रस्ताव जेको लज्जामें खण ७ संतो बाडुस सवें जते ५ सवई सणम इत्यफन हुने दशरथाचो सिन्हांस वसति समुर्वा सुखिया कळी. २. अमाचो परोणको जेज्या वेंचेंमोअन कन अर्को हुन जेनो जेज्या जेंद निराल सिर्वा जेंद मलीम अर्को ३. कालको बलें मुडवना फिरोम मे अज्या मलीम सवें हुन/जुन मुन्याम सलका पळ्ळु हुने भरमा जेज्या खनीहदले जेज्या कुपलवर्ध पावो हुन हुनेह ४. ५.

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Appendix 10 - EMP Mitigation and Monitoring Plans

Table 10.A Environmental Mitigation Plan

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
Project-wide EMP							
Detailed design and pre-construction preparations							
General							
Compliance with national regulations and international good practice guidelines.	Environment, health, and safety impacts and risks of the project in general	<ul style="list-style-type: none">NEA and Contractor to ensure compliance with national and international regulatory framework as set out in Section II of the IEE, including ADB Safeguard Policy Statement (2009), IFC EHS General Guidelines (April 2007), and IFC EHS Guidelines for Electric Power Transmission and Distribution (April 2007) plus other applicable environment, health and safety laws and regulations in force during project implementation, in addition to any further mitigation measures set out in this EMP.	No breaches of national regulations and/or international good practice guidelines.	PMD to comply with requirements throughout project implementation. PMD supervise and monitor contractor to ensure their compliance with delegated requirements.	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.	Contractor to comply with requirements throughout contract implementation.	NEA counterpart funds Part of PSC budget Part of contract cost, include costs of implementing EMP as BOQ line
Grievance Redress Mechanism (GRM).	Environment, health, and safety impacts and risks of the project on affected persons; including construction workers and affected local communities	<ul style="list-style-type: none">NEA with support of Contractor to establish multi-level GRM as per Section VII of IEE, including identification of GRM Officers at all GRM levels and Grievance Redress Committee members.NEA and Contractor to carry out community awareness raising during community meetings and one-to-one discussions about the GRM with directly affected persons before the commencement of works including details of how to submit a grievance to either NEA and/or the Contractor, consultations are to be documented.NEA and Contractor to disseminate GRM contact details verbally and by SMS as well as through distribution of leaflets, and prominently posting GRM arrangements on noticeboards located at the project sites and at local NEA offices, project substations, community centers etc.Contractor to carry out awareness raising amongst workers about the GRM at the start of their employment on-site, including details of how to submit a grievance to either NEA and/or the	<p>GRM operationalized upon loan effectiveness, affected persons are aware of its existence and are actively using GRM to raise their grievances.</p> <p>100% of grievances received are resolved in a timely manner by NEA and Contractor.</p> <p>Details of GRM operationalization including photos of awareness raising activities to be submitted in first monitoring report, records and</p>	PMD to comply with requirements throughout project implementation. PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.	Contractor to comply with requirements throughout contract implementation.	NEA counterpart funds Part of PSC budget Part of contract cost, include costs of implementing GRM as BOQ line

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<p>Contractor. Disseminate GRM contact details verbally and by SMS as well as through noticeboards located at temporary construction workers camps and construction site offices.</p> <ul style="list-style-type: none"> Contractor to ensure that throughout construction, signage is prominently visible detailing site and office contacts in case of grievance. NEA and Contractor to encourage affected persons to make use of the GRM yet clarify that this does not prevent them from pursuing any legal action, if they feel that it is needed. NEA and Contractor to inform communities about the ADB Accountability Mechanism and their possibility to resort to it if any of their grievance is not resolved by the project's GRM. NEA and Contractor to keep record of grievances received and their resolution as report on these, as per Section VII of the IEE. 	grievances and their resolution specified in subsequent monitoring reports.				
Environment safeguards staffing – see also site specific measures for additional staffing requirements	Environment, health, and safety impacts and risks of the project in general	<p>PMD:</p> <ul style="list-style-type: none"> NEA to establish a formal, fully functional environment and social safeguard safeguards unit within PMD and provide requisite facilities and equipment to enable its operation. NEA to assign / start appointing suitably qualified and experienced environmental safeguards team, under the direction of the safeguards unit, to support EMP implementation and be responsible for undertaking regular on-site supervision and monitoring of the project. The environmental safeguards team for the project will comprise: (i) a full-time Senior Environment Officer, (ii) a full-time Senior Health and Safety Officer, (iii) a full-time Senior Biodiversity Officer, (iv) 8 full-time Junior EHS Field Officers, who are to be based on-site during the construction period, and (v) a full-time Community Engagement/GRM Officer. PMD and environment safeguards team to oversee EMP implementation, providing guidance on corrective action as required, and recording construction activities and environment, health, and safety conditions on-site through photos and notes. 	<p>PMD environment and social safeguard safeguards unit has been established.</p> <p>100% of required staffing has been recruited to oversee EMP implementation during detailed design, pre-construction, construction, and operation & maintenance.</p> <p>PMD environment safeguards team and PSC shall be ready and on-board upon loan effectiveness.</p>	PMD to comply with requirements by establishing environment and social safeguard safeguards unit within PMD and appointing required staff for the duration of the project. PMD to supervise and monitor contractor to ensure their compliance with these requirements.	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.	Contractor to comply with requirements and appoint required staff for the duration of their contract.	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of safeguards staffing as BOQ line</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<ul style="list-style-type: none"> PMD officers to undertake at least monthly supervision visits as well as periodic “spot check” site visits by senior officers to all contract packages/lots whilst directing their supervision efforts towards the most environmentally sensitive components of the project. <p>PSC:</p> <ul style="list-style-type: none"> NEA to recruit PSC, including international environment safeguard specialist, international health and safety specialist international biodiversity specialist, international heritage specialist, as well as national equivalents in accordance with TOR agreed with ADB. PSC to assist PMD to oversee EMP implementation, providing NEA and Contractor with guidance on corrective action as required, and recording construction activities and environment, health, and safety conditions on-site through photos and notes. PSC to visit all contract packages/lots at least semiannually during ongoing construction works whilst directing their supervision efforts towards the most environmentally sensitive components. <p>Contractor:</p> <ul style="list-style-type: none"> Contractor to employ as part of the team delivering each package/lot at least one suitably qualified and experienced, dedicated, environment officer and at least one suitably qualified and experienced, dedicated, health and safety officer responsible to be based on-site and monitor and supervise safeguards implementation on a day to day basis for the duration of the works. Contractor to nominate a community engagement/GRM officer as part of the team delivering each package/lot to be based on-site and keep affected persons informed of the status of works and be available to receive and deal with any grievances at the project site level, for all new transmission lines this will be a dedicated officer. 	<p>Contractor environment safeguards team appointed upon commencement of contract, CVs for approval of environment safeguard team submitted as part of bid or subsequently for approval of NEA before field mobilization.</p> <p>List of staff and copies of CVs to be submitted in first monitoring report, any updates/changes in staffing specified in subsequent monitoring reports.</p>				

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<ul style="list-style-type: none"> Contractor's environment safeguard team to oversee EMP implementation, providing guidance on corrective action as required, and recording construction activities and environment, health, and safety conditions on-site through photos and notes. Contractor's environment safeguard team will be based on-site, but for packages/lots with multiple components the contractor's environment safeguard team should ensure adequate time (at least two visits per month) is spent at all ongoing construction sites. Contractor to ensure each active construction site or team has a project manager based on-site full-time who is nominated to the role of EHS Supervisor with responsibility for ensuring EMP implementation by their site/team, acting on the advice of, and reporting to the environment safeguards team on compliance. Project manager will be supported by full time OHS steward(s) for each construction site/team who will supervise all works. NEA and Contractor should not discriminate and should proactively encourage the employment of suitably skilled women on the project. 					
Environment safeguards for existing facilities.	Environment, health, and safety impacts and risks related to existing facilities, 36no. substations	<ul style="list-style-type: none"> NEA to ensure that prior to start of work by contractor at existing substation sites all existing facilities meet national laws and regulations and are consistent with the SPS requirements. NEA to implement the project-level Corrective Action Plan (CAP) set out in Appendix 3 of the IEE for all existing facilities. PSC to visit existing substations and verify the gaps identified by desk-based audit (Appendix 3) and thus detailed substation-specific corrective actions NEA need to implement at each of the 35no. substations. For existing substations which are already located in protected area, protected area buffer zones or IBA, PSC to assess the electrocution risk to birds from any lower voltage wires and/or jumpers at incoming and outgoing connections and where risk is deemed to be 	<p>100% of existing facilities meet national laws and regulations and are consistent with the SPS requirements prior to contractor being given access to substation site.</p> <p>Report on substation-specific corrective actions cleared by ADB prior to issue of bidding documents.</p>	PMD to comply with requirement to implement CAP prior to allowing Contractor access to existing substation sites.	PSC to supervise, monitor, and assist PMD in ensuring compliance with CAP including preparation on-site verification and reporting	n/a	<p>NEA budget as per CAP in Appendix 3</p> <p>Part of PSC budget</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<p>high then they will be retrofitted by NEA with “bird sensitive” design measures where technically feasible.</p> <ul style="list-style-type: none"> • PSC to submit a report, including photos, confirming the gaps and substation-specific corrective actions to be implemented at each of the 35no. substations to ADB for clearance. • If asbestos is identified but does not need to be disrupted and appears in good condition, consider leaving it where it is, as main health risks occur when asbestos is moved. • If any asbestos was found to be present and it will be disturbed by construction works, it must be removed following national requirements and international good practice per EHS General Guidelines on OHS and disposed of as hazardous waste material. • On completion of corrective actions by NEA, PSC to revisit substation to confirm the status. • PSC to submit a report, including photos, on the status of corrective actions, compliance with national laws and regulations, and consistency with SPS requirements to ADB for clearance, NEA must receive ADB clearance of this report before contractor given access to a substation. 	Report on the successful completion of CAP cleared by ADB prior to contractor being given access to substation site.				
Environment safeguards for associated facility	Environment, health, and safety impacts and risks related to associated facility of new substation Balefi Corridor 132 kV DC Transmission Line..	<ul style="list-style-type: none"> • Project components having associated facilities unable to avoid significant irreversible impacts post-mitigation on protected areas, natural and critical habitat do not qualify for financing under this project. • NEA will ensure all associated facilities of the project comply with national laws and regulations, and are consistent with SPS requirements by requiring them to comply with this EMP. • NEA will engage in policy dialogue with Government of Nepal on conducting SEA of the full Transmission System Master Plan 2020-2040 (July 2018) as well as SEA of hydropower related master plans in relation to the induced environmental impacts of improving the country-wide transmission system. 	100% of associated facilities meet national laws and regulations and are consistent with the SPS requirements, no associated facilities will result in significant irreversible impacts post-mitigation on protected areas, natural and critical habitat, and undertake all possible measures to mitigate them if it does affect such areas.	PMD to comply with requirements for associated facilities and supervise and monitor the associated facilities contractor appointed by them to ensure their compliance with these requirements.	PSC to supervise, monitor, and assist PMD in ensuring compliance of associated facilities and assist with supervision and monitoring of associated facilities contractor.	n/a	NEA budget for implementation of associated facilities Part of PSC budget

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<p><u>Balefi Corridor 132 kV DC Transmission Line:</u></p> <ul style="list-style-type: none"> NEA will not commence any works for the Balefi Corridor 132 kV DC Transmission Line until the final EMP for the ADB project has been retrospectively incorporated into the contract documentation. The contractor will be required to comply with the same requirements as for new transmission lines under the project/Component 1, supervised and monitored by NEA. PMD and environment safeguards team to oversee EMP implementation on the Balefi Corridor 132 kV DC Transmission Line, providing guidance on corrective action as required, and recording construction activities and environment, health, and safety conditions on-site through photos and notes. 	<p>Contract documentation for associated facilities includes the final EMP for the project, reflecting and site-specific requirements for the associated facilities in question.</p> <p>Monitoring reports include findings in relation to all associated facilities of the project.</p>				
Protected area management consultation and biodiversity management – see also site-specific EMP for components 1-3, 9a and 9b	Impacts on biodiversity supported by Parsa National Park, Koshi Tappu Wildlife Reserve buffer zone, Chure Hill Conservation Area, and designated forest land from transmission line construction and upgrading	<ul style="list-style-type: none"> NEA will ensure that except for components 3, 9a and 9b, and existing substations to be automated at Kusum, Ghorahi, Mahendranager, Bhurlguan, Lamahi, Pokhara, Lakhanatri, Simra, Godak, Bharatpur, Hetauda, and Kamane, all other project components will be situated outside the boundaries and buffer zones of current or proposed protected areas and/or key biodiversity areas. NEA will not award any contract for any project components listed above until ADB SPS (2009) protected area management requirements have been confirmed as met by ADB. NEA to continue to consult with protected area management of projected areas/buffer zones in which existing substations are located to secure written confirmation they have no concerns about the proposed works given that these are all internal to the existing substations. NEA to continue to consult with and secure written confirmation from the protected area management of Parsa National Park, Koshi Tappu Wildlife Reserve buffer zone, and Chure Conservation Area as to (i) actions required to ensure works are in accordance 	<p>Project meets the SPS requirements for legally protected areas before issue of related bidding documents.</p> <p>Final IEE/EMP documents consultations and reflects the mitigation measures required by and support for promotion/enhancement measures agreed with the protected area management</p> <p>Avian Protection Plan developed and cleared by ADB before the issue of related bidding documents.</p>	<p>PMD to comply with requirements prior to issue of bidding documents, approval of detailed design and before the commencement of works.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor. National Biodiversity Expert to help develop capacity of NEA and be responsible for reviews of Contractor's documentation.</p>	<p>Contractor to comply with requirements prior to approval of detailed design and before the commencement of works.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Indicative costs for purchase of bird divertors (excluding their installation) and reforestation and support for the promotion and enhancement or protected areas are included in EMP budget table</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<p>with their management plans and (ii) measures NEA can support to promote and enhance their conservation aims.</p> <ul style="list-style-type: none"> • NEA to ensure the final IEE/EMP for clearance by ADB reflects the mitigation measures required by and support for promotion/enhancement measures agreed with the protected area management. • NEA will not issue any bidding documentation involving Components 1-3, 9a and 9b until an Avian Protection Plan cleared by ADB has been incorporated into the final IEE/EMP. • NEA to review the technical and economic feasibility and the environmental and social cost-benefits of adopting horizontal versus vertical tower arrangement, which have conductor cables arranged at one height (single level arrangement) and the neutral cable only slightly higher, in order to reduce collision risk. • NEA to prepare an Avian Protection Plan setting out technical details of how the detailed designs for new and upgraded transmission and distribution line components will incorporate or retrofit “bird-sensitive” design in accordance with the critical habitat assessment and international good practice (e.g. APLIC, 2006 and 2012) and how monitoring of any electrocutions and collisions during operation & maintenance will be undertaken. • To minimize electrocution risk, “bird sensitive” design measures will include insulators/isolators between live and earthed components of infrastructure, and between phase conductors, being over 2.7 m horizontally and over 1.8 m vertically, bird guards to prevent perching or nesting by birds, and considering insulating any lower voltage wires and/or jumpers at substation connections. • To minimize collision risk bird divertors, at most 10 m apart, as large as possible, of contrasting colors, and visible at night, will be installed as specified for each transmission line plus 500m either side of all ridge/valley crossings and waste dumps, or waste 	<p>Detailed designs minimize biodiversity impacts, comply with the measures set out in the Avian Protection Plan reflecting international good practice for “bird sensitive” design and respond to any concerns raised by Bird Conservation Nepal.</p> <p>Site-specific biodiversity management plan including reforestation plan, as per national regulation but at least 1:25 ratio cleared by ADB prior to start of any works.</p>				

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<p>dumps will be relocated by NEA in consultation with local communities before the start of any works. The spacing between them will not be more than 5 to 10m (5 m within protected areas).</p> <ul style="list-style-type: none">• NEA will include in the Avian Protection Plan installation of bird flight diverters on an additional 90 km of existing transmission lines located within vulture safe zone and suitable vulture habitat, to offset potential collision risk impacts on vultures.• NEA to ensure the final IEE/EMP for clearance by ADB includes the Avian Protection Plan.• Required cost for purchase of the bird divertors will be included in the contractor's cost, the contractor will also be required to install them. <ul style="list-style-type: none">• Contractor will comply with the measures set out in the Avian Protection Plan for “bird sensitive” design in developing their detailed designs.• Contractor’s detailed designs will be reviewed by the PSC International Biodiversity Specialist to confirm that all the measures required by the Avian Protection Plan and international good practice (APLIC, 2006 and 2012) have been adequately incorporated before approval of detailed designs and that the detailed designs have responded to any concerns raised by Bird Conservation Nepal.• Contractor will employ field ecologists under supervision of their biodiversity officers during detailed route surveys of components 1-3, 9a and 9b to:<ul style="list-style-type: none">– Perform a habitat survey in order to confirm area and type of modified and natural habitat situated beneath the towers and right of ways.– Perform a detailed survey of the number and species of trees and the quality of forest cover lost, to calculate the compensatory reforestation required for the detailed design.					

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<ul style="list-style-type: none"> – Specific attention will be paid to identifying tall trees of value to vultures for which the project area is critical habitat and are to be retained where possible. – Confirm areas (ridge/valley crossings and waste dumps) for marking of transmission lines in accordance with the critical habitat assessment. – During the detailed route surveys the ecologist will also record any fauna observed in the project area. • If tall trees of value to vultures, high quality forest habitat (>200 trees/ha) or other natural habitat is identified as impacted during the detailed route surveys, Contractor to identify means by which tree and habitat loss can be minimized through detailed design e.g. realignment, and/or construction methods. • Contractor to minimize the need to cut trees within the RoW including by placing towers on hilltops and ridges as far as possible to avoid the felling trees in the gullies and valleys, increasing conductor height etc. • Cutting trees in ROW outside tower footprints will be kept to an absolute minimum and only be permitted when it is required for laying and stringing of conductors, to meet safety clearance requirements under the Electricity Rules and manage risk of forest fire. • In preference to being cut, trees in ROW that can survive it will be pruned in preference to being cut, such that they might reestablish quicker following works. • Trees to be selectively felled are to be identified, species and location confirmed, counted, marked, and harvested manually (i.e. with hand-held equipment) using appropriate forestry techniques to minimize impacts on adjacent vegetation and limit habitat fragmentation with involvement of local District Forest Office (DFO) and Community Forest Groups. Details to be reported in periodic monitoring reports. 					

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<ul style="list-style-type: none">• Important tree species to retain as identified by DFO will be marked separately and protected during the construction.• Contractor to ensure detailed design of transmission lines incorporates lightening protection to minimize forest fire risks• Detailed design will need to include firefighting provision at substations with development of emergency response plan with basic fire training and training drills undertaken for substation staff in event of forest fire.• Detailed design will have minimum height from ground level 6.1 m sufficient for safe passage fauna (i.e. the lowest point of a conductor between two adjacent towers to be above 6.1m from the ground)• Detailed design to include fitting of transmission towers in forest areas and within 500m radius of them with anti-climbing devises for primates (langur)• Contractor’s detailed designs will be reviewed by the PSC International Biodiversity Specialist to confirm biodiversity impacts have been minimized before approval of detailed designs.• NEA and Contractor to develop reforestation plan using ratio as per national regulation but at least 1:25 trees and acquisition and reforestation of land equivalent to forest land lost beneath the project footprint to enable the project components to demonstrate “no net loss of biodiversity” – reforestation plan to be included in the site-specific biodiversity management plan, and will inform tree nursery establishment and reforestation implementation.• Tree nursery establishment will need to be upon loan effectiveness allowing time for seedling growth, planting, and management for a period of 5-years (unless it is determined seedings can be purchased from the existing nurseries for the entire project).• If it is decided to establish a nursery then nursery sites will be selected in consultation with the respective Division Forest Offices and affected Community Forest Groups.					

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<ul style="list-style-type: none"> NEA to train Community Forest Groups for micro-nursery establishment, procure improved tree seeds and provide required technical support for nursery set-up and operation. NEA will determine the number and species of seedlings to be produced by the micro-nurseries for the project, plan to grow at least 120% of seedlings required under the project so as to replace any trees that do not survive transplantation. 					
Protected area management consultation and physical cultural resources management – see also site-specific EMP for component 9c	Impacts on physical cultural resources of Kathmandu Valley World Heritage Site (Swayambhu) and Janaki temple at ward no 1, Kalimati, Dang district from transmission line construction and upgrading	<ul style="list-style-type: none"> NEA will ensure that all project components are sited and designed to avoid significant damage to physical cultural resources. NEA will not award any contract for Component 9c protected area management and physical cultural resources requirements have been confirmed as met by ADB for the Kathmandu Valley World Heritage Site (Swayambhu). NEA will take the services of a suitably qualified and experienced archaeologist (either external or DOA expert) to undertake, to a TOR agreed with ADB, a heritage assessment for works in the current and proposed boundaries of the Kathmandu Valley World Heritage Site (Swayambhu) including consideration of accident scenario. NEA to consult with communities who utilize the two WHS monuments located beneath the transmission line and incorporate their views into the heritage assessment. NEA to consult with and secure written confirmation from the Department of Archaeology as to actions required to ensure 150m upgrade of the Suichatar-Balaju 66kV transmission line is in accordance with the integrated management plan. NEA to ensure the final IEE/EMP reflects the mitigation measures agreed with the protected area management and recommended by the heritage assessment. Contractor will confirm during detailed route surveys that except for component 9c, (i) all other project 	<p>Suichatar-Balaju 66kV transmission line meets the SPS requirements for physical cultural resources before issue of bidding documents.</p> <p>Final IEE/EMP documents consultations and reflects the mitigation measures agreed with the protected area management.</p> <p>Detailed designs minimize impacts on identified physical cultural resources and respond to concerns raised by their users.</p> <p>Site-specific heritage management plan cleared by ADB prior to start of any works.</p>	<p>PMD to comply with requirements prior to issue of bidding documents, approval of detailed design and before the commencement of works.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor. International Heritage Expert to help develop capacity of NEA and be responsible for reviews of Contractor's documentation.</p>	<p>Contractor to comply with requirements prior to approval of detailed design and before the commencement of works.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
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		components are situated outside the boundaries or buffer zones of current or proposed World Heritage Sites or any other area of national or local archeological or cultural significance, (ii) other than the Janaki temple under component 3 no other physical cultural resources of local importance fall within the right of way of transmission lines.					
Meaningful consultations with affected people and other concerned stakeholders.	Environment, health, and safety impacts and risks of the project in general, community could be disrupted and disturbed by works hence they need to be consulted and kept well informed about the project and its progress	<ul style="list-style-type: none"> NEA with the support of the PSC to prepare detailed communication/consultation plan upon loan effectiveness. NEA will not award any contract for project components until meaningful consultation requirements are confirmed as met by ADB. NEA to undertake additional meaningful consultations covering all project components with affected people and other concerned stakeholders such as Rural Municipalities, Community Forest Organizations and Government Forest Authority as detailed in Section VI prior to the issue of bidding documents utilizing the agreed questionnaires. In particular, ensure all local affected communities within 500m of substations, transmission and distribution lines have been informed of the project through NEA local offices and contact with village heads, have had the opportunity to be actively involved in the design process and that any concerns raised have been duly addressed. For Kathmandu Valley component (9c) assistance through the Kathmandu Valley Development Authority may be sought. For all new substations requiring permanent water supply etc. NEA to consult with and seek the agreement of local communities to use any community resources to identify any potential conflict. If additional demand may place stress on community resources plan for alternative sourcing for these resources for project needs. NEA to ensure the final IEE/EMP documents the consultations undertaken and demonstrates how concerns raised have been responded to. 	<p>Detailed communication/consultation plan reflecting final EMP requirements developed upon loan effectiveness.</p> <p>Meaningful consultations for all project components undertaken, documented, and reported on in final IEE.</p> <p>Local communities and other concerned stakeholders kept informed throughout project implementation.</p> <p>Details of ongoing consultations, including photos and records of participants (including gender) documented and included in monitoring reports.</p>	<p>PMD to comply with requirements prior to issue of bidding documents and before the commencement of works.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor. International Environment Expert to help develop capacity of NEA and prepare detailed communication /consultation plan.</p>	<p>Contractor to comply with requirements prior to the commencement of works, and then continue to remain actively involved with the local communities through ongoing consultations throughout contract duration.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

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		<ul style="list-style-type: none"> During detailed route surveys, Contractor to consult one-on-one with all affected persons within ROW of transmission and distribution lines as well as all persons occupying properties in close proximity to the substations up to 500m and within the ROW up to 50m of the transmission line alignment, to seek their views and respond to individual environment, health, and safety concerns about alignment. Contractor to coordinate with Community Forest Organizations and Government Forest Authority when ROW of transmission or distribution lines falls under such areas. Obtain no objection from private landowners, Community Forest Organizations, Government Forest Authority, and protected area management. Contractor to consult with and seek the agreement of local communities on their proposed locations for any temporary construction workers camps, site offices, storage areas, and areas for waste management, etc. Contractor to consult with and seek the agreement of local communities to temporarily use any community resources (e.g. water supplies) during construction to identify any potential conflict, if additional demand may place stress on community resources plan for alternative sourcing for these resources for project needs. Contractor to communicate at least four weeks (one month) prior to the commencement of works, advance notice to local communities within 500m of substations, transmission, and distribution lines verbally through NEA local offices and contact with village heads and through notices, pamphlets or similar in Nepali about the agreed schedule of and details of planned construction works in their area to help manage any disruption and disturbance and potential conflicts with local communities. Contractor to continue to undertake one-on-one consultation with affected persons, especially those within ROW of transmission and distribution lines and 					

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		<p>within at least 20m of new substations who will be most impacted to keep them fully informed of the nature of works and latest schedule, notifying them at least four weeks (one month) prior to the commencement of works of intended start date and schedule.</p> <ul style="list-style-type: none"> NEA and Contractor to ensure, in the context of the COVID-19 pandemic, that all consultations are carried out following latest national COVID-19 requirements and WHO social distancing and hygiene guidelines as detailed in Appendix 8 of the IEE. Consultations undertaken during project implementation will be documented as reported in either final/updated IEE or attached to periodic monitoring reports. 					
Obtain national EIA/IEE approvals, Forest Clearance, and other EHS permits and licenses	Environment, health, and safety impacts and risks of the project in general	<ul style="list-style-type: none"> NEA to ensure all national EIA/IEE required are approved by the responsible authority prior to the start of any bidding process. Contractor to comply with the conditions of the national EIA/IEE, if there is any conflict between the measures set out in this EMP and the national EIA/IEE conditions most stringent provision will take precedence. NEA to ensure required national Forest Clearance is obtained prior to the start of any works where forest areas cannot be avoided. Contractor to acquire all other national EHS permits and licenses required by national laws and regulations, ensuring that these are all obtained before start of related works, including enabling works. 	<p>National EIA/IEE clearances obtained prior to the issue of bidding documents.</p> <p>100% of applicable clearances, permits and licenses obtained prior to the start of works.</p> <p>Copies of clearances, permits and licenses to be submitted with monitoring reports.</p>	<p>PMD to comply with requirements prior to issue of bidding documents and start of any works.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.	Contractor to comply with requirements prior to the commencement of works, and to comply with any conditions imposed throughout contract duration.	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

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Update and disclose IEE prior to contract award, update as required to reflect detailed designs.	Environment, health, and safety impacts and risks of the project in general	<ul style="list-style-type: none"> NEA to update the IEE to reflect additional meaningful consultation, baseline data collection, assessment, and management plans for ADB clearance and disclosure <u>prior to contract award</u>. NEA to review the final IEE following the completion of the detailed designs and update it, as required, to reflect the detailed design for all project components, and obtain ADB's clearance before the commencement of any works, including enabling works. If a change in project scope or design occurs during project implementation or if unanticipated impacts are identified at any point during project implementation NEA to inform ADB and, if deemed appropriate, NEA will update the IEE for clearance and disclosure by ADB. NEA to locally disclose in a timely manner the final IEE, any subsequent updates to it, and other environmental safeguards documentation by posting them on the NEA website and ensuring full copies of the latest IEE and its executive summary translated into Nepali are available at all local NEA offices and project substations. Notices will also be placed on noticeboards at the project sites and local NEA offices and pamphlets should be distributed in the project areas in Nepali, informing of the main findings of the IEE and the availability of the IEE and reports with notice given that help with their translation into Nepali and affected persons' dialects will be extended free of charge on request. 	<p>Updated IEE cleared and disclosed by ADB prior to contract award.</p> <p>IEE updated, as required, to reflect the detailed design for all project components prior to the start of any works.</p> <p>Final IEE, any subsequent updates to it, and other environmental safeguards documentation are locally disclosed.</p>	<p>PMD to comply with requirements prior to issue of bidding documents and before the commencement of works.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance. PSC to support PMD in finalizing and updating IEE/EMP documentation.</p>	<p>Contractor to immediately inform NEA if any unanticipated impacts are identified at any point and make a copy of the latest IEE available at the project sites.</p>	<p>NEA counterpart funds, including costs of printing</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>
Bidding and contract documentation, contractor, and subcontractor management.	Environment, health, and safety impacts and risks of the project in general	<ul style="list-style-type: none"> NEA to ensure the final EMP cleared by ADB is included prior to the issue of bidding documents and contract award. NEA will ensure the requirement to comply with the final EMP forms an integral and binding part of the contract, including appropriate incentives and/or penalties for (non-)compliance related to their environment, health, and safety management. 	<p>Final EMP cleared by ADB and related provisions included in all bidding and signed contract documentation.</p>	<p>PMD to comply with requirements prior to issue of bidding documents and during procurement process.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance, reviewing</p>	<p>Contractor to comply with requirements throughout contract implementation, ensuring adequate budget</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs</p>

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		<ul style="list-style-type: none"> Contractor will preferably have in place corporate environment, health and safety policies and corporate environment, health, and safety management system certifications, such as, ISO 14001 for environment, ISO 45001 for health and safety, or equivalents. Contractor will comply with all relevant provisions of the final EMP and any updates to it following detailed designs or in response to any unanticipated impacts, they will be responsible for implementing and budgeting for all the measures required. Contractor will comply with any corrective action plan required and cover the costs where corrective action is required due to non-compliance on behalf of the contractor, its subcontractors or third parties. Contractor will ensure all its subcontractors and third parties, irrespective of being formally or informally employed, also comply with the final EMP and any updates to it, as well as their own CEMP and H&S Plan, and that this responsibility is cascaded down any chain involved. Contractor will not engage in any activities described on the ADB Prohibited Investment Activities List in Appendix 5 of ADB's SPS (2009) Contractor to ensure no persons under 18 are employed on the project. Contractor will put in place appropriate incentives and/or penalties for (non-)compliance by workers related to PPE, prohibition on firewood and NTFPs collection and fishing, hunting, or poaching by workers. 	No breaches of final EMP by contractor, subcontractor or third parties with prompt corrective action taken if it is required.		bidding and contract documents to ensure they reflect requirements.	for implementing final EMP is included in their contract cost.	of implementing EMP as BOQ line
Trainings and awareness raising activities.	Environment, health, and safety impacts and risks of the project in general.	<ul style="list-style-type: none"> NEA with the support of the PSC to prepare detailed training plan upon loan effectiveness elaborating how training and awareness raising activities required by the final EMP will be conducted. <p>EHS management:</p> <ul style="list-style-type: none"> NEA with support of the PSC to conduct training sessions on EMP implementation for all those with management responsibilities under it to clarify 	<p>Detailed training plan reflecting final EMP requirements developed upon loan effectiveness.</p> <p>Trainings and awareness raising delivered in</p>	PMD to comply with requirements throughout project implementation, including conducting training sessions and ensuring relevant staff attendance.	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of	Contractor to comply with requirements throughout contract implementation, including conducting training sessions and ensuring	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

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		<p>national and ADB SPS (2009) requirements, requirements at each stage of the project, roles and responsibilities, and, record keeping and reporting requirements.</p> <ul style="list-style-type: none"> NEA with support PSC to conduct training sessions on GRM operationalization for all those with responsibilities under it, including the nominated PMD Community Engagement/GRM Officer, and all members of the grievance redress committee. Contractor to ensure all members of its project management team, environment safeguards team, design team, construction management team, and community engagement/GRM officers attend NEA trainings. Training of all PMD and O&M staff on the climate change impact of SF6, alternatives, H&S risks during O&M due to presence of toxic byproducts, leakage minimization, and environmentally sound and safe disposal of old RMUs with SF6 <p>Construction workers:</p> <ul style="list-style-type: none"> Contractor to conduct training for construction management and provide all workers and visitors on-site, irrespective of them being formally or informally employed by contractor, subcontractor or third-party with an environmental, health and safety induction before being allowed on-site including do's and don'ts in relation to construction site, temporary workers camps, local communities, forests, protected areas, etc. Contractor to ensure topics covered by training and induction will include but not be limited to: good housekeeping at all times; environmentally sound waste management practices; hygiene and communicable disease prevention including COVID-19 and HIV/AIDS; snake and rodent bites and precautionary measures for avoidance i.e. avoid work after rain, flood, and in the crop ripening seasons, caution while putting hands in holes; sexual exploitation, abuse and harassment prevention; culturally acceptable practices; biodiversity 	<p>accordance with the plan.</p> <p>Contractor and construction workers fully aware of their responsibilities under EMP through training.</p> <p>Details of training and awareness raising sessions, including photos and records of participants (including gender) documented and included in monitoring reports.</p>	PMD supervise and monitor contractor to ensure their compliance with delegated requirements.	the contractor. PSC to develop training materials for NEA, act as resource person to deliver them, and ensure relevant specialists' attendance.	relevant staff attendance.	Indicative costs for trainings and awareness raising are included in the EMP budget table

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		<p>conservation awareness; fire safety prevention; prohibition on firewood and NTFPs collection by workers; prohibition on fishing, hunting, or poaching by workers; heritage conservation awareness; chance find procedures; OHS, including use of PPE; etc.</p> <ul style="list-style-type: none"> Contractor to conduct training for construction management and regular drills involving workers irrespective of them being formally or informally employed by contractor, subcontractor or third-party on emergency preparedness and response procedures in case of an environmental or health and safety incident including spillage, fire, natural disaster, disease outbreak etc. Training for construction management will include modules on first aid and fire safety including include training on how to use first aid and firefighting equipment provided on-site and the scenario of potential or confirmed COVID-19 infection on-site. Contractor to continue to deliver short environmental, health and safety refresher sessions to construction management and all workers on a monthly basis throughout construction period, and cover pertinent environmental, health and safety topics on daily basis in toolbox talks. Contractor to ensure workers with a specific role have attended specialized health and safety trainings related that role e.g. first aiders, fire safety officers, as well as ensuring workers have task-specific trainings for working at height, working with electricity, etc. <p><u>Community awareness:</u></p> <ul style="list-style-type: none"> Contractor to undertake construction safety community awareness raising activities in local affected communities within 500m of substations, transmission, and distribution lines prior to construction. NEA to undertake electrical safety community awareness raising activities in local affected communities within 500m of substations, transmission and distribution lines prior to construction, awareness raising activities to be 					

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		repeated on completion of construction; to include electrocution risks, EMF, corona noise, etc.					
Detailed design.	Environment, health, and safety impacts and risks of the project in general	<ul style="list-style-type: none"> NEA and Contractor to address all site-specific measures detailed in this EMP with regards biodiversity and physical cultural resources as well as other sensitive receptors during the detailed design, as well as ensuring the detailed designs reflect international engineering best practice/ good EHS practices. Contractor's detailed designs will be reviewed by the PSC to confirm that all measures required by the final EMP have been adequately incorporated and that they reflect international engineering best practice/good EHS practice before they are approved by NEA. <p>Disaster risk management:</p> <ul style="list-style-type: none"> During detailed route survey identify presence of any unstable land, steep slopes, or floodplain. Detailed design will avoid locating any project components on unstable land and/or steep slopes. For project components that are fully or partially located on slopes or in hilly terrain, detailed design to incorporate slope stability measures e.g. bioengineering such as planting grass and trees combined with retaining walls and adequate drainage, designs to be checked by an independent expert to confirm international good practice for slope stability design is followed. Select an appropriate foundation design for substations and towers considering climatic factors such as wind, and geological factors such as seismic risk in the project component locations. Given high seismic risk across the project area, design of all substation and tower foundations and any structural components (e.g. buildings) to consider seismic zone, main frontal thrust, main boundary thrust etc. and be checked for seismic safety by the design team as well as by an independent expert, separate to the design team, to confirm that 	NEA approved detailed designs minimize impacts and risks on environment, health and safety during construction and operation & maintenance stages.	<p>PMD to comply with requirements prior approval of detailed design.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor. PSC to review detailed design and confirm in accordance with final EMP and reflective of international engineering best practice/good EHS practice.	Contractor to comply with requirements prior to approval of detailed design.	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

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		<p>international good practice seismic design standards are met.</p> <ul style="list-style-type: none"> • Buildings, poles, towers and conductors to incorporate climate adaptation measures as per the CVRA, including to withstand extreme temperatures and gale force wind speeds, at minimum equal to upper end of gale conditions on Beaufort scale (40 knots) given 30 knots experienced during the 31 March 2019 tornado event in Nepal. • Substation and tower foundations to be located above maximum flood level (allowing for climate change) and incorporate adequate drainage design to avoid waterlogging during the wet season. • Consider placement of equipment within substations to avoid water logging in operation & maintenance. • Drainage will be designed so that discharge from substation site is no more than greenfield runoff rates; so as not to exacerbate flooding on land which is outside of the substation/downstream. • Consider use of gabion wall and embankments (dykes) including bioengineering options at substations may be at risk of flooding • Detailed design to avoid locating any towers in riverbed using special span arrangement and tower design at crossing locations to keep tower footing away from the riverbanks. • If towers must be located in floodplain foundation must be 2m about the maximum flood level of the river crossing and detailed design to incorporate appropriate measures to avoid foundation or tower itself being washed away during peak flow events (allowing for climate change and considering massive sediment load in flood flows) -- designs to be checked by an independent expert to confirm that international good practice is being followed. • Consider use of gabion wall and embankments (dykes) including bioengineering options at locations where transmission lines cross or run parallel to rivers to protect riverbanks 					

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		<p><u>Pollution risk management:</u></p> <ul style="list-style-type: none">• Use of PCBs will be prohibited in all new transformers and any other project facilities or equipment provided by the project.• Equipment purchased by NEA or Contractor for use on the project is to be accompanied by letter from the manufacturer stating that it is guaranteed PCB free and to be labelled as PCB free before its installation.• Contractor to provide NEA with material data sheets for insulating oil meeting technical specifications for use in new transformers.• During detailed route survey identify presence of any surface waterbodies including rivers/ponds and groundwater sources including springs/wells/pumps and confirm if any are used by local communities for drinking water.• Contractor to coordinate with Department of Water Resources and Irrigation where ROW crosses rivers and water channels to obtain their no objection.• Detailed design of substations to locate new transformers; storage areas; and septic tanks/soakaways ideally 500m from any surface waterbodies and groundwater sources but at least 100m to reduce pollution risk. If closer placement is required due to substation’s proximity to surface waterbodies and groundwater sources, further assessment to be carried out by Contractor to demonstrate using source-pathway-receptor model that there will be no adverse impact on aquatic ecology or human health.• Detailed design of transformers and fuel, oil chemical, and waste storage areas to incorporate impermeable concrete surface bunded to 110% volume which is not connected to the drainage system to collect spills and leaks; ideally storage areas to be 500m to water sources (surface water and groundwater wells, springs etc.) but if this is not possible minimum distance is to be 100m.• Detailed design of fuel, oil chemical, and waste storage areas to provide for a covered storage area of sufficient size to accommodate all anticipated storage					

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		<p>requirements, ensure storage areas have the ability to be locked, are well-ventilated and will not reach extreme temperatures.</p> <ul style="list-style-type: none">• Substation detailed design to incorporate adequate drainage; no drainage water will be permitted to discharge direct to surface water, oil interceptors are to be fitted on all drainage to catch oil spill.• Detailed design of substations to minimize cut and fill in order to reduce the extent of earthworks and thus dust generation during construction.• Detailed design to balance cut and fill in areas where leveling required to minimize generation of spoil requiring disposal.• Detailed design of substations to ensure operation noise will be limited to the following as 1 hour LAeq: (i) 70 dB(A) at the site boundary; (ii) at residential properties, 55 (day) and 45 (night) dB(A) in urban areas and 45 (day) and 40 (night) dB(A) in rural areas as defined by Nepal regulations; and (iii) at “peace areas” such as schools as defined by Nepal regulations, 50 (day) and 40 (night) dB(A) – if these levels are already exceeded by the background, the Contractor will ensure that the noise standards are met by the project design alone and/that substation operation will not result in an increase of 3dB(A) above background levels.• Detailed design of transformers and other noise sources to locate them as far as practical from the substation site boundary since noise diminishes with distance, at minimum given transformer noise is generally in the range 60-80 dBA they are to be located at least 10m from substation site boundary – if this is not possible Contractor must carry out noise calculations (modelling) to demonstrate that site boundary levels can be met.• If any properties are within 100m of the substation site boundary then baseline measurements must be carried out during detailed design and noise calculations (modelling) considering low frequencies					

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		<p>associated with transformer hum undertaken by the Contractor to demonstrate that these noise levels will be met.</p> <ul style="list-style-type: none"> If noise levels cannot be met through siting alone detailed design to incorporate acoustic barrier designed to international good practice around either the noise source and/or substation site boundary to attenuate noise to level such that noise levels will be met. <p>Health and safety:</p> <ul style="list-style-type: none"> Use of any asbestos containing materials is prohibited. Include in the design of all substations and transformers within the substation a secure wall or fence with lockable entry featuring written and visual warning signs to include the ISO 7010 "Hazard Type: Electrical Symbol" warning of the risk of electrocution. Include in the design of all poles and towers anti-climb features together with posting of written and visual warning signs to include the ISO 7010 "Hazard Type: Electrical Symbol" warning of the risk of electrocution. Contractor to ensure detailed design of transmission lines incorporates lightening protection to minimize forest fire risks. Detailed design of substations to include fire safety measures including detector, alarm, and firefighting equipment in accordance national regulations and IFC EHS Guidelines on OHS. Indoor work areas at substations to be well ventilated and well-lit in accordance national regulations and IFC EHS Guidelines on OHS. Detailed design of substations to ensure EMF levels within the substation boundary are within international good practice levels as per International Commission on Non-Ionizing Radiation Protection (ICNIRP) 					

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		<p>https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf) (reference and peak values) for the occupational exposure; in areas where EMF levels could be exceeded posting of written and visual warning signs.</p> <ul style="list-style-type: none">Detailed design of substations, transmission, and distribution lines to ensure EMF levels at all regularly occupied properties is within international good practice levels as per International Commission on Non-Ionizing Radiation Protection (ICNIRP) (reference and peak values) applicable to the public exposure.Use of shielding equipment/materials to decrease electromagnetic field exposure.Establish applicable right of way and safety clearance corridor in accordance with the Electricity Rule. During detailed route survey identify the presence and use of any structures found in the (i) right of way and (ii) safety clearance corridor. Consider re-siting of angle point towers such that any structures are outside the ROW or if not possible outside the safety clearance corridor. If it is not possible to avoid regularly occupied structures in the safety clearance corridor these are to be relocated with adequate compensation in accordance with the Resettlement Plan. Such properties must be relocated, and applicable compensation provided by NEA prior to the start of any works. Consider grounding roofs and other metallic surfaces on any properties remaining within ROW to avoid induced current and electricity related accidents.During detailed route survey identify presence of any existing utilities such as power lines, communications, streetlights, as well as through consultation with service providers (electric, water, gas, telecoms etc.)In cases where excavation works may be needed underground utility scans using a Cable Avoidance Tool (CAT) or equivalent must be undertaken by the Contractor to identify any services.					

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		<ul style="list-style-type: none"> Contractor to coordinate with operators where ROW crosses existing utilities to obtain no objection. Detailed design to consider the risk of damage to utilities and allow for sufficient vertical and horizontal safety clearances to minimize health and safety risks as per the Electricity Rules, and crossings for communications as per Electricity Regulation 1993. Pit latrines and disposal of untreated sanitary wastewater to surface or groundwater is prohibited. Detailed design of substations to include adequate sanitation and welfare facilities for all NEA workers to be posted at or visiting the substations including indoor kitchen, eating and sleeping facilities (if applicable) and adequate number of indoor toilets/washrooms with a hot and cold running water supply which are connected to either existing sewerage system or to septic tank with soakaway. Disposal of worker generated waste (e.g. plastic bottles) on-site is prohibited and adequate waste storage areas to be incorporated into the detailed design. Composting of food waste may be permitted on-site if detailed design incorporates enclosed composting facilities (enclosed to avoid attraction of vermin etc.) located away from accommodation and any properties outside the site boundary. Incineration may be permitted on-site if detailed design incorporates an enclosed, small volume solid waste incinerator with stack and pollution control that is designed for residence time and temperatures that minimize incomplete combustion for waste disposal at substation, to reduce the volume of solid waste to be removed off-site given lack of suitably engineered and licensed sanitary waste facilities in rural municipalities. Source of drinking water that meets drinking water standards to be provided to substations. If substation is in district which suffers from arsenic contamination of drinking water, groundwater must not be used, and alternative source must be identified. If any surface or groundwater sources are proposed for use in 					

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		<p>substations, Contractor is to undertake a baseline water quality sampling per EMoP (Table 10.B) to confirm its suitability for use. If drinking water standards are not met, detailed design to consider alternative source or include water treatment facilities at the substation to facilitate safe drinking water supply.</p> <ul style="list-style-type: none"> Provide a dedicated shelter to security guards, shielding them from rain, wind, and extreme (hot and cold) temperatures. <p>Greenhouse gas emissions:</p> <ul style="list-style-type: none"> Use of chlorofluorocarbons (CFCs) including halon is prohibited. Detailed design of GIS substations will comply with international norms and standards for handling, storage, and management of SF6. SF6 insulated equipment will be tested and guaranteed by the supplier at less than 0.1% leakage rate. SF6 emergency response plan to be prepared by contractor for construction, NEA in relation to operation to deal with event of an accidental leak. 					
Planning for on-site environment, health, and safety management.	Environment, health, and safety impacts and risks of the project during construction in general.	<ul style="list-style-type: none"> NEA and Contractor to address all site-specific measures detailed in this EMP with regards biodiversity and physical cultural resources as well as other sensitive receptors before commencing construction works, including any enabling works, ensuring that all pre-construction preparations reflect international engineering best practice/good EHS practices. Contractor's pre-construction documentation will be reviewed by the PSC to confirm that all measures required by the final EMP have been adequately incorporated and that they reflect international engineering best practice/good EHS practice before they are approved by NEA. Contractor to prepare and submit a Construction Environmental Management Plan (CEMP) to NEA for approval, for each work package/lot. CEMP to include 	CEMP and topic- and site-specific sub-plans including CPPP, CWMP, CTMP, BMP, HMP, CFP, CHSMP, CEPRP all prepared and approved prior to any construction works, including enabling works.	<p>PMD to comply with requirements including approval of Contractor's pre-construction documentation, seeking review and comment of other concerned stakeholders as appropriate e.g. for protected areas etc.</p> <p>PMD to supervise and monitor contractor to ensure their compliance</p>	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor. PSC to review Contractor's pre-construction documentation and confirm in accordance	Contractor to comply with requirements prior to any construction works, including enabling works.	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

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		<p>details on how the Contractor plans to implement the construction mitigation measures specified in the final EMP, and the relevant parts of the IFC EHS General Guidelines including the Construction and Demolition section, and IFC EHS Electric Power Transmission and Distribution Guidelines. The CEMP will also identify the temporary construction facilities needed and their location e.g. laydown and storage areas, workers facilities, etc.</p> <ul style="list-style-type: none"> Contractor to keep CEMP as a living document, to be updated as required and re-approved by NEA if any changes in construction methods, site conditions etc. <p><u>Land take:</u></p> <ul style="list-style-type: none"> Ensure relocation and compensation of any affected persons within the ROW has been paid and ensure effective relocation of any households living within the safety clearance corridor (Electricity Rules) has taken place prior to any construction work. <p><u>Biodiversity management:</u></p> <ul style="list-style-type: none"> Contractor to strictly locate all temporary construction facilities outside of forest areas as well as outside of boundaries and buffer zones of current or proposed protected areas and/or key biodiversity areas, all temporary workers camps are to be located at least 500m for protected, key biodiversity or forest areas. Location of related project facilities is to be identified by contractor, PSC international biodiversity expert to review if locations are suitable prior to NEA approval. Include in CEMP or site-specific BMP emergency fauna rescue and handling procedure, including contacts of protected area management, nearest veterinary etc. <p><u>Physical cultural resources management (chance finds):</u></p> <ul style="list-style-type: none"> Contractor to strictly locate all temporary construction facilities outside of proposed and current World Heritage Site boundary and at least 		<p>with delegated requirements.</p> <p>PMD to ensure checklist of all pre-construction measures is cleared before giving go ahead for works to Contractor.</p>	<p>with final EMP and reflective of international engineering best practice/good EHS practice. PSC to verify checklist of all pre-construction measures is cleared before NEA gives go ahead for works to Contractor.</p>		

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		<p>100m from any identified physical cultural resource e.g. temple.</p> <ul style="list-style-type: none"> NEA to develop a Chance Find Procedure (CFP) to be followed by contractor as part of their CEMP prior to commencement of any works, including enabling works, to address the event any physical cultural resources (including fossils) are found during works. CFP is to include the following procedures: <ul style="list-style-type: none"> If suspected physical cultural resources are encountered, halt all works at the find site immediately. The find should be assessed by a competent DOA Official, and procedures to avoid, minimize or mitigate impacts to such physical cultural resources to be agreed in writing with them. Work will not resume until the procedures to avoid, minimize, or mitigate impacts to the physical cultural resources have been agreed with DOA and confirmed by them in writing to have been implemented in full. If avoidance is not feasible, and no alternatives to removal of the physical cultural resources exist, thorough cost-benefit assessment need to be carried out to assess whether the project works should continue or stop at site. If the project benefits outweigh the anticipated cultural heritage loss from removal from site, following clearance of ADB the physical cultural resources are to be removed and preserved using the best available technique in accordance with relevant national heritage protection laws and regulations as well as international best archeological practice. Records to be maintained of all finds, including chain of custody instructions for movable finds. 					

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		<ul style="list-style-type: none"> Construction workers must be made aware of the chance-find procedure and the types of finds (including fossils) to be reported through training and induction before the commencement of any works. <p>Pollution risk management:</p> <ul style="list-style-type: none"> The Contractor will prepare for NEA approval a construction pollution prevention plan (CPPP) as part of the CEMP covering dust and emissions to air management, noise management, the protection of water resources and environmentally sound and safe storage, use, and disposal of all fuels, chemicals and oils used on site and an emergency preparedness and response plan in the event of any leaks or spills in accordance with national laws and regulations and the EHS General Guidelines prior to commencement of any works. The Contractor will prepare for NEA approval a Construction Waste Management Plan (CWMP) as part of the CEMP for dealing with all solid and hazardous waste generated in an environmentally sound and safe manner in accordance with national laws and regulations and the EHS General Guidelines section on Waste Management prior to the start of any works. Contractor to undertake air quality monitoring per the EMoP (Appendix 10, Table 10.B) to confirm current background levels in the project area at least one week prior to the commencement of any actively on-site. Plan construction works in the vicinity of waterbodies, considering erosion issues and surface water pollution risk. If any surface waterbodies or groundwater sources within 100m, Contractor is to undertake a baseline water quality sampling per EMoP (Table 10.B) to 					

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		<p>confirm their current water quality status at least one week prior to the commencement of any actively on-site.</p> <ul style="list-style-type: none">Contractor to schedule, as far as practical, earthworks at substation sites and installation of towers during the dry season to minimize exposed areas subject to erosion by surface water runoff.To inform development of the CPPP in relation to noise management, the Contractor will be required to measure and confirm the distance from their construction works to sensitive receptors during the detailed design, to confirm if the noise standards can be met based on their construction methods or temporary acoustic barriers are required.Contractor to undertake noise monitoring per EMoP (Table 10.B) to confirm current background noise levels in the project area at least one week prior to the commencement of any actively on-site.Construction methods to ensure construction noise will be limited to the following as 1 hour LAeq: (i) 70 dB(A) at the site boundary; (ii) at residential properties, 55 (day) and 45 (night) dB(A) in urban areas and 45 (day) and 40 (night) dB(A) in rural areas as defined by Nepal regulations; and (iii) at “peace areas” such as schools as defined by Nepal regulations, 50 (day) and 40 (night) dB(A).If noise levels may be exceeded, Contractor to erect temporary acoustic barrier around either the noise source and/or site boundary to attenuate noise to level such that noise levels will be met.For any sites where blasting may be necessary for substation or tower foundations, Contractor to identify properties at risk of vibration damage, undertake a through structural survey, supported by photographic evidence of any properties at risk, and determine whether such buildings may require the installation of vibration monitors during construction					

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		<p>to monitor movement.</p> <p>Health and safety:</p> <ul style="list-style-type: none"> For each package/lot, the Contractor is to undertake a H&S risk assessment through a facilitated workshop to be attended by PMD, PSC and the Contractor during the detailed route survey so that it can inform both the detailed design and pre-construction preparations. H&S risk assessment to consider both occupational and community H&S risks resulting from the construction and operation & maintenance stages of the project. Informed by the H&S risk assessment, Contractor to prepare a Construction Health and Safety Management Plan (CHSMP) for each package/lot including site-specific measures as needed for each construction site. CHSMP will address both occupational and community H&S risks and adherence to national health, safety labor laws and regulations. Measures reflected in the CHSMP will be in accordance with the EHS General Guidelines sections on Occupational and Community Health and Safety and the Electric Power Transmission and Distribution Guidelines. Contractor to keep CHSMP as a living document, to be updated as required and re-approved by NEA if any changes in construction methods, site conditions, in response to accident, near miss etc. In the absence of NEA records to confirm transformers are PCB free (ones installed post-1990 should have records, NEA to facilitate access to data archive) all existing transformers already in-situ must be assumed by the Contractor for health and safety purposes to contain PCBs and if needing to be disturbed by them the oil must be sampled and analyzed following UNEP Guidelines for the Identification of PCB and Materials Containing PCB and a health and safety risk assessment and plan prepared referring to the measures in UNEP (2002) 					

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		<p>PCB Transformers and Capacitors: From Management to Reclassification and Disposal. Provide workers with training on PCBs and their safe handling and disposal.</p> <ul style="list-style-type: none">Label any equipment or container containing PCBs found in existing transformers and other project equipment and unless being retained in-situ replace it with new PCB free equipment under the project. NEA must ensure appropriate transport, storage, decontamination, and disposal of redundant contaminated units; disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCBs. A hazardous waste management plan to be prepared for handling PCBs.Assess surrounding soil exposed to PCB leakage from equipment removed or retained in-situ and implement appropriate removal and / or remediation. <ul style="list-style-type: none">CHSMP to include a Construction Emergency Preparedness and Response Plan (CEPRP) including communication systems and protocols to report an emergency situation (health emergency, work-related accident, traffic accident, accident involving the community, natural disaster, fire especially forest fire, virus outbreak etc.).Contractor to coordinate with DFO or community forest groups for definition of additional measures in CEPRP where works are to be carried out in proximity to forested areas and there is risk of forest fire to plan for.Contractor to set up an accident reporting system for any health and safety incidents (near miss, minor, lost time, fatal) involving workers or community to be reported to PMD within 24 hours of occurrence with a response plan detailing the incident and how its reoccurrence will be avoided. NEA to then report any lost time or fatal incidents to ADB within 48 hours. Record of all incidents and response taken should include date, time, details of incident, treatment given and outcome, and lessons learnt for the future.CHSMP and its CEPRP are to be submitted for approval of NEA prior to commencement of any					

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		<p>works, including enabling works.</p> <ul style="list-style-type: none">In undertaking H&S risk assessment and preparing CHSMP and CEPRP adequate attention will be given to the risks associated with COVID-19 pandemic and other communicable viral diseases. National restrictions for containing the spread of COVID-19 must be complied with and Government of Nepal (https://covid19.mohp.gov.np/) and ADB guidance (https://www.adb.org/publications/safety-well-being-workers-communities-covid-19) is to followed, as well as further guidance detailed in Appendix 8. Contractor will provide adequate sanitation and welfare facilities including hand washing and clean PPE in sufficient quantity are provided on-site and at accommodation; Contractor will also consider the ability of communities to comply with protective measures such as regular handwashing and the local health care facilities’ capacity to deal with any infections agreeing with the with nearest Health Center and/or Hospital for emergency cares of workers. Particular attention must be paid to accommodation of workforce given the transient nature of work on transmission and distribution lines, to avoid spreading any virus between communities. CEPRP must include response flow chart and contact details to deal with any construction worker or community member being diagnosed with COVID-19 during the course of the works. To limit contacts and hence contamination risk, the same workers should be grouped in accommodation, transport, and work teams. Medical insurance will be provided by Contractor for all workers with sick leave allowance to ensure symptomatic workers do not attend site; Contractor will avoid no-work-no-pay policies, whereby by fear of not getting paid workers would be tempted to report to work and hide any symptoms, creating more risk for the wider workforce and community. Given the unprecedented nature of responding to COVID-19, public health officials/experts must be consulted in					

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		<p>undertaking the risk assessment and management planning for COVID-19.</p> <p><u>Traffic management:</u></p> <ul style="list-style-type: none">For all works on or adjacent to public roads, the Contractor will prepare for NEA approval a Construction Traffic Management Plan (CTMP) appropriate to the pedestrian and vehicular traffic flows on the road as part of the CEMP in consultation with relevant local authorities/traffic police to ensure proper execution of traffic controls including where temporary blockage of the road during installation is required for health and safety purposes and ensure that highly visible guides, advance warning signs or flag persons are in place to direct pedestrian and vehicular traffic. <p><u>Damage to crops, structures, and utilities:</u></p> <ul style="list-style-type: none">Contractor to schedule works affecting agricultural land outside the cropping season.Contractor to maximize use of existing substation compounds for temporary construction facilities (e.g. laydown and storage areas, workers facilities etc.)Contractor to locate temporary construction facilities as much as possible on uncultivated land (not natural habitat) to minimize disturbance to cultivated landsContractor to locate temporary construction facilities (e.g. laydown and storage areas, workers facilities etc.) at least 500m away from residential areas/villages, at least 500m from surface waterbodies, groundwater wells, and 100m from other sensitive receptors (e.g. individual houses, schools, clinics, temples, etc.) avoiding land which is steeply sloping or waterloggedConstruction methods to be selected to minimize risk of damage to roads, utilities, structures, drains etc.Contractor to plan for using appropriate scaffolding or overhead bamboo frames during stringing works crossing roads, utilities, structures, or drains to minimize traffic disruption, accident risk, and property damage.					

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		<ul style="list-style-type: none"> For existing roads, utilities, structures, drains etc. photographic and/or structural pre-condition surveys are to be completed by the Contractor and agreed with NEA and property owners prior to any works, including enabling works. These must be documented in a pre-project condition report submitted to NEA, which will serve as baseline in case any damage to property occurs Contractor will be required to restore any property damage that is caused by their works to at least pre-project condition at their own cost. Contractor to avoid blasting and other vibration inducing activities as much as possible; in locations where this is unavoidable Contractor to identify properties within the zone of influence and undertake pre-construction structural surveys to identify level of risk. Risk may be high if structures previously damaged during earthquake and not repaired. If risk of structural damage to properties identified due to current condition, consider alternative construction method or temporary relocation of occupants during works if at risk. Consider need to install monitors during construction to monitor structural movement. Structural or cosmetic damage to be repaired by Contractor to at least pre-project condition at their own cost. 					
Employment of staff for construction	Temporary employment opportunities, both skilled and non-skilled laborers will be required.	<ul style="list-style-type: none"> Contractor to abide by the Nepal Labor Code and labor regulations Contractor must prohibit child labor (under 18 years old). Contractor should not discriminate in employment Contractor should proactively encourage employment from local communities where appropriately skilled. Contractor should proactively encourage employment of women on the project where appropriately skilled. GRM will be available to workers for receiving and handling complaints about unfair treatment or unsafe living or working conditions, ensuring no coercion nor reprisal. 	No child labor has been recruited, as per detailed record of employment, and gender/age/origin analysis, provided in monitoring reports.	PMD to comply with requirements throughout project implementation. PMD supervise and monitor contractor to ensure their compliance with delegated requirements.	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.	Contractor to comply with requirements throughout contract implementation.	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

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		<ul style="list-style-type: none"> Provide health/accident insurance for all workers (formal and informal) for the duration of their contracts. Contractor to allow a minimum number of sick leave as per Nepal law or 10 days per year, whichever is the higher. 					
On-site enabling works, construction works, testing and commissioning of project components							
Biological Environment							
On-site pre-construction and construction activities	Impacts on biodiversity supported by Parsa National Park, Koshi Tappu Wildlife Reserve buffer zone, Chure Hill Conservation Area, and designated forest land from transmission line construction and upgrading	<ul style="list-style-type: none"> Comply with CEMP and site-specific BMPs during construction works NEA will implement the promotion/enhancement measures agreed with the protected area management in parallel with construction works. NEA and the Contractor will continuously liaise with the protected area management to keep them informed of progress on construction. In forest and protected areas, the Contractor will act in accordance with the agreed site-specific BMP as well as in manner consistent with the protected area management plan. Contractor's environment safeguard team to oversee all activities in protected, key biodiversity and forest areas with Contractor engaging security to ensure workers do not engage in prohibited activities. Ensure clear demarcation of the working area and avoid encroachment outside the agreed corridor of impact. For existing transmission line components, Contractor will strictly restrict all works to the existing RoW in protected and forest areas. For new transmission line components, Contractor will strictly restrict all works to the proposed RoW within protected and forest areas. Unnecessary use of machinery to be avoided in protected, key biodiversity and forest areas to minimize disturbance to fauna. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding biodiversity-related grievances from local communities.</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.	Contractor to comply with requirements throughout construction	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Indicative costs for purchase of bird divertors (excluding their installation) and reforestation and support for the promotion and enhancement or protected areas are included in EMP budget table</p>

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		<ul style="list-style-type: none"> • In protected, key biodiversity and forest areas and within 500m of their respective boundaries, • Contractor will not allow any works to be undertaken from 1 hour before sunset to 1 hour after sunrise to avoid disturbance to the fauna. • No lighting is to be used in protected areas or forest areas. • Trees are to be cleared during non-breeding season - vultures breeding season (Jan-March), if this not possible due to weather restrictions on access, trees cleared during breeding season to be checked by ecologist for nests prior to clearance, if present harvesting to be postponed until the young have fledged. • Felled trees and any NTFPs recovered during works will be handed over for use by the community forest groups according to the national laws and regulations. • NEA to follow working directives of government and purchase land or deposit money in district forest office account for reforestation implementation. • Plantation designs for each specific reforestation site identified will be developed after consultation with the respective Division Forest Offices and affected Community Forest Groups. • Reforestation implementation to be undertaken in accordance with agreed reforestation plan at standard ratio of 1,600 seedlings per ha, unless otherwise indicated by DFOs and Community Forest Groups due to local site conditions or species requirements. • Reforestation sites will be selected in consultation with the respective Division Forest Offices and affected Community Forest Groups, to be in similar climate range and soil type as deforested section as much as possible; proximity to existing protected or forest areas will be preferred to extend species habitat range. • Species composition will be locally native and follow the composition of corresponding forest section 					

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		<p>deforested under the project; Community Forest Groups’ preferences will also be considered in selection of species as well as species which contribute to habitat for fauna, especially tree providing suitable vulture habitat.</p> <ul style="list-style-type: none">• NEA will purchase the seedlings raised from the micro-nurseries for the project's reforestation program.• Revegetate any disturbed areas beyond footprint of substation and tower foundations to at least original condition through revegetation using native species etc.• Except for substations mentioned as requiring new access track in the IEE, construction of new access track is not allowed, especially forest land. Use will be made of existing access roads and tracks for transporting tower materials and machinery, in locations where access is restricted use of manual labor to transport, install and string the towers and lines traversing uncultivated land (not natural habitat) as much as possible to avoid damage to crops• Prior to excavation for tower foundation, area will be checked by ecologist for any signs of burrows etc. If determined to be occupied, only manual digging under the supervision of ecologist will be permitted.• Excavated pits will be robustly fenced or covered so as to prevent fauna accidentally falling in, further an escape ramp will be provided to allow their escape – particularly in protected and forest areas.• Keep written record, supported by photographs, of any animal casualties, including a cause of death if known.• In wet conditions, minimize use of heavy machinery and consider temporary installation of removable steel plates to protect soil and its vegetation cover.• Strict prohibition on construction workers to enter protected or forest areas outside of their working hours unless an existing resident within a buffer zone.					

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On-site pre-construction and construction activities	Changes in topography/ terrain as a result of earthworks, primarily at substations	<ul style="list-style-type: none"> Comply with CEMP during construction works Contractor to examine stability of tower locations before excavation. Minimize natural slope disturbances, as much as possible, during construction of tower foundations and in the excavations done to open the track of access roads to new substations across agricultural land. Balance cut and fill in the areas where leveling of sites is required. Carry out landscaping at each tower location, including bioengineering and slope protection work. On completion of works re-vegetate disturbed areas to avoid soil erosion. Restore temporarily used sites to at least their pre-project condition following works. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding topography/ terrain related grievances from local communities.</p> <p>No landslides due to project works.</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout construction.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>
On-site pre-construction and construction activities	Changes in ambient air quality - dust and suspended particulate matter from earthworks, and other pollutants from vehicular emissions, may affect ambient air quality with impacts on the health of workers and community.	<ul style="list-style-type: none"> Comply with CEMP, CPPP, and the IFC EHS General Guidelines in relation to air quality and avoid the occurrence of pollution incidents as far as practicable Require construction equipment and vehicles to meet national emissions standards, see Appendix 2 of IEE. Perform regular checks, upkeep, and maintenance of construction equipment and vehicles to keep them in good working order as per the manufacturer's specifications to meet emission standards. Keep log of maintenance undertaken. Sprinkle water during earthworks to avoid dust being dispersed by wind, cover with materials like gravel to minimize re-suspension of dust. Stockpiles of spoil and other dust generating materials to be kept to a minimum necessary to undertake works for the day Cover stockpiles with tarpaulin. Locate stockpiles at least 500m from residential property to avoid inconvenience to avoid inconvenience from fugitive 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>Monitoring confirms ambient air quality within national standards or no worsening of the</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout construction, keep required maintenance records and undertake ambient air quality monitoring in accordance with the EMoP</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

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		<p>dust and ensure they are enclosed by a fence or similar to minimize windblown dust. Minimize double handling and drop loads.</p> <ul style="list-style-type: none"> Trucks transporting any loose spoil being removed from substation sites to local approved disposal sites will be covered to reduce dust. Trucks importing fill material must be covered, all trucks used to be serviced and meet Nepal emission standards, belching of black smoke to be prohibited. Position any stationary emission sources (e.g. diesel generators, compressors, etc.) as far as practical from sensitive receptors (houses, schools, clinics, temples, etc.) Impose speed limits on construction vehicles to minimize exhaust and dust emissions along areas where sensitive receptors are located (houses, schools, clinics, temples, etc.). Trucks transporting loose material will be covered. Limit engine idling to maximum 5 minutes. Sprinkle excavations, earthen access road, and material stockpiles with water during the construction period to mitigate dust related issues due to frequent movement of construction vehicles as necessary i.e. 2-3 times per day but more often if needed during excavations, dry and windy conditions that enable dust to be easily mobilized and the dust to be visible. Clean dust from the access road after construction work is completed. Strictly prohibit the burning of wastes generated by project-related activities. Ensure workers working in close proximity to or having long exposure to vehicle exhausts and earthworks are provided with clean N95 dust masks to avoid inhalation or particulate matter and other pollutants. 	<p>baseline situation if already exceeded.</p> <p>No outstanding air quality-related grievances from local communities or workers.</p>				
On-site pre-construction and construction activities	Changes in ambient noise and vibration levels - mobilization of heavy equipment and machinery, use of construction vehicles, and construction activities	<ul style="list-style-type: none"> Comply with CEMP, CPPP, and the IFC EHS General Guidelines in relation to noise and avoid the occurrence of pollution incidents as far as practicable Schedule construction activities so as to minimize nuisance to sensitive receptors (houses, schools, 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own</p>	<p>Contractor to comply with requirements throughout construction, keep required</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
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	may increase ambient noise level. Exposure to high levels of ambient noise may affect hearing of workers or cause anxiety and disturbance to community.	<ul style="list-style-type: none"> clinics, temples, etc.) i.e. avoid works at night, on weekend, during holidays, school exam periods, etc. Select construction techniques and low noise generating machinery and equipment e.g. less than 55dBA sound pressure level at 1m, and stage noisy works to limit their duration to minimize noise and vibration Construction noise must be noise limited to the following as 1 hour LAeq: (i) 70 dB(A) at the site boundary; (ii) at residential properties, 55 (day) and 45 (night) dB(A) in urban areas and 45 (day) and 40 (night) dB(A) in rural areas as defined by Nepal regulations; and (iii) at “peace areas” such as schools as defined by Nepal regulations, 50 (day) and 40 (night) dB(A) – if these levels are exceeded the Contractor will be required to implement additional noise mitigation such as placing temporary acoustic barriers around the works site to ensure that the noise standards are met and/or the construction works do not result in an increase of 3dB(A) above background levels. Use of blasting and other vibration inducing activities are to be avoided. Structural or cosmetic damage caused by vibration to be repaired by Contractor to at least pre-project condition at their own cost. Require construction equipment and vehicles to meet national standards, see Appendix 2 of IEE– all trucks should carry fitness certificates issued by the Nepal Road Traffic Authority and renewed annually under the applicable regulations of Nepal. Fit all vehicles, machinery and equipment used in construction with exhaust silencers where the manufacturer’s design allows this Perform regular checks and maintenance of construction equipment and vehicles to keep them in good working order as per the manufacturer’s specifications to meet emission standards. Keep log of maintenance undertaken. Position any stationary emission sources (e.g. diesel generators, compressors, etc.) as far as practical from 	<p>implemented by NEA and Contractor as determined through regular site checks, etc.</p> <p>Monitoring confirms ambient noise within national standards or no worsening of the baseline situation if already exceeded.</p> <p>No outstanding noise or vibration-related grievances from local communities or workers.</p>	contractor to ensure their compliance with delegated requirements.	compliance and assist with supervision and monitoring of the contractor.	maintenance records and undertake noise monitoring in accordance with the EMoP	Part of contract cost, include costs of implementing EMP as BOQ line

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		<p>sensitive receptors (houses, schools, clinics, temples, etc.)</p> <ul style="list-style-type: none"> Prohibit use of horn by construction vehicles Limit vehicle movement and offloading of construction materials to daytime in areas where sensitive receptors are located (houses, schools, clinics, temples, etc.) transport of materials and spoil by truck will be limited to the daytime without hooting. Noisy construction activity (especially piling works) will take place between 6 am to 6 pm. Residents will be informed will in advance of the construction schedule for noisy activities. Impose speed limits on construction vehicles to minimize noise emissions along areas where sensitive receptors are located (houses, schools, clinics, temples, etc.). Limit engine idling to maximum 5 minutes. Provide appropriate PPE (acoustic ear plugs or earphones capable of reducing noise levels to 80dB(A) for hearing protection) to any workers subjected to noise levels of 80dBA for more than 8hours per day and ensure they wear it e.g. if using breakers. No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C) or average maximum sound levels of 110dB(A). Periodic medical hearing checks to be performed on workers exposed to high noise levels. 					
On-site pre-construction and construction activities	Changes in quality of surface and groundwater – due to sediment laden runoff or spills/leaks of fuel, oil and chemicals used in construction works.	<ul style="list-style-type: none"> Comply with CEMP, CPPP, and the IFC EHS General Guidelines in relation to water quality and avoid the occurrence of pollution incidents as far as practicable. Follow General EHS Guidelines in relation to water quality for the use and storage of fuel, oil, and chemical including prevention and control of hazards associated with spill prevention, emergency response, spill clean-up and remediation. Establish dedicated fuel, oil, and chemicals stores on impermeable bunded area of 110% volume to avoid spills and leaks contaminating soil and affecting water quality 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout construction.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

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		<ul style="list-style-type: none"> • Avoid storage of fuel, oil, and chemicals in areas within 500m to water sources (surface water and groundwater wells, springs etc.) to avoid direct contamination or contamination through run off, if this is not possible minimum distance is to be 100m. • Place all equipment that may leak fuel or oil on drip trays it not sited on impermeable surface with 110% bunded capacity • Undertake refueling only on areas of hard protected soil, preferably bunded, at least 500m from surface water, but if this is not possible minimum distance to be 100m, with all drainage directed through oil interceptors • Provide spill response kit with sufficient absorbent materials (e.g. sorbents, dry sand, sandbags) on-site for soaking up any fuel, oil, or chemical leaks/spills. • For transformers, follow the Spill Prevention Control and Countermeasures (SPCC) plan as recommended by United States Institute of Electrical and Electronics Engineer Inc. (IEEE) standard 908. • Undertake construction during the dry season as much as possible to minimize exposed areas subject to erosion by surface water runoff. • Undertake all construction 100m either side of river crossings and in floodplain during the dry season to avoid flood risk, leading to accidents and/or water contamination. • Works over or near watercourses will adopt protection measures to guard against loss of soil that would result in the turbidity of water. • Implement measures to prevent landslides to avoid contamination of rivers by soil. • Minimize soil erosion and surface water runoff by reducing the extent of earthworks, revegetating earthworks on completion, and covering stores of sand and spoil with tarpaulin. • Ensure sediment laden runoff shall not discharge directly to surface water but shall be discharged through sedimentation basin and oil interceptor. • If water from excavations is pumped it must either be disposed of to an adjacent defined area of ground for 	No outstanding water quality-related grievances from local communities or workers.				

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		<p>percolation, or to waiting tanker trucks for proper disposal, it must not be disposed of to surface water.</p> <ul style="list-style-type: none"> Do not allow washing of equipment or vehicles in surface water and ensure all washing water is discharged to sedimentation basin and oil interceptor instead of directly to surface water. Cement will be stored in rented private storage facilities; enclosed and not exposed to the elements. Do not undertake any concrete mixing within 500m of surface water, if this is not possible minimum distance to be 100m. Provide portable sanitary facilities for construction workers, so as to avoid surface and ground water pollution. Locate these at least 500m away from surface waterbodies including rivers/ponds and groundwater sources including springs/wells/pumps, away from waterlogged land and shallow groundwater. Strict prohibition on open defecation and urination by construction workers; no use of pit latrines for worker camps. Toilets and washing facilities to be connected to existing sewerage system, septic tank (with soak pit) or as portable self-contained units for disposal of wastewater off site to sewage treatment works. No untreated wastewater is to be discharged direct to surface water or the ground. Construct adequate drainage with oil interceptors for all new substation sites according to detailed design; install adequate bunding to transformers and storage areas. 					
On-site pre-construction and construction activities	Use of raw materials and generation construction waste	<ul style="list-style-type: none"> Comply with CWMP and with IFC EHS General Guidelines in relation to waste management. Import all materials from existing licensed sources and keep records of all materials used, and sources. Storage yards will be fenced. Prior to the start of works the contractor will ensure the waste management system is established at the construction sites and workers camps. Separate waste containers (drums, bins, skips or bags) will be provided for different types of waste. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks,</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and</p>	<p>Contractor to comply with requirements throughout construction, keep records in accordance with the EMoP</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

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		<ul style="list-style-type: none"> Sensitize workers on good housekeeping and the environmentally sound storage and disposal of construction and wastes, and importantly not to leave garbage lying around. Collect and segregate construction wastes including scrap metal, oil, and solid waste; ensure all workers are familiar with this segregation and arrange garbage bins to collect these wastes so they are not thrown on the floor Store all the wastes produced in an environmentally sound manner in designated, labelled area with separate waste containers (drums, bins, skips or bags) for each distinct type of waste. Store solid waste in enclosed bins to contain leachate and avoid vermin. Encourage recovery of recyclable wastes that could be reused or sold to recyclers, rather than disposing of it. Prohibit use of waste (e.g. empty cement bags and containers, plastic, wooden planks) for backfilling – only inert spoil may be used for backfilling to avoid need for off-site disposal (any excess inert spoil is to be disposed of at suitably licensed waste facilities). Prohibit burning of construction wastes. Prohibit dumping of construction wastes on-site, into drains, rivers, in agricultural fields etc. Provide weekly toolbox talk to remind of the importance of waste disposal, prohibition of disposal on the road, in drains etc., prohibition on burning of wastes, and open defecation and urination. Develop a procedure/system to penalize through escalating fines or similar any construction workers who breach these requirements. Contractor may compost biodegradable kitchen scraps on site if of small volume in enclosed composting facilities (enclosed to avoid attraction of vermin etc.) located ideally 500m but at least 100m from water sources (surface water and groundwater wells, springs etc.). 	<p>photographic record etc.</p> <p>No outstanding material use or waste-related grievances from local communities or workers.</p> <p>100% wastes removed off site have been disposed of by licensed waste contractors who reused/recycled or disposed of it to suitably licensed waste management facility, as confirmed by documented full-cycle transfer notes.</p>		monitoring of the contractor.		

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		<ul style="list-style-type: none"> Document all wastes removed off site using transfer notes, to be taken by licensed waste contractors who should reuse/recycle or dispose of the waste to suitably licensed and engineered waste management facilities according to type – for solid waste disposal this will need to be to Kathmandu, and for hazardous waste this will need to be to a neighboring country since no such facilities currently exist in Nepal. Excavated spoil that cannot be reused to a licensed disposal site as suitable for accepting inert wastes ensuring no solid or hazardous wastes are comingled with the inert excavated spoil Collect solid waste and dispose of it to suitably engineered and licensed sanitary waste facilities– in Kathmandu as no such facilities are existing in rural municipalities. Ensure any hazardous waste such as oily rags or old drums disposed of in suitably licensed hazardous waste facilities– out of country since no such facilities in Nepal. 					
Socio-economic Impacts							
On-site pre-construction and construction activities	Changes to land use as substation compound and tower footing land is permanently lost and temporary crop loss during installation within the ROW	<ul style="list-style-type: none"> Compensate private land required for the project through acquisition or rental in agreement with the land and/or property owners. Permanent land acquisition and crops or private trees lost due to construction will be compensated according to the Resettlement Plan. Phase activities according to the agricultural cycle to allow farmers to harvest standing crops. Except for substations as mentioned in the IEE, no construction of access track is allowed, use will be made of existing access roads and tracks for transporting tower materials and machinery, in locations where access is restricted use of manual labor to transport, install and string the towers and lines traversing uncultivated land (not natural habitat) as much as possible to avoid damage to crops On completion of works restore all temporarily used sites to at least their pre-project condition following works; this will involve cleaning site of any debris or 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding resettlement / economic-displacement / land-related grievances</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout construction.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Budget for compensation included in Resettlement Plan</p>

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		<p>wastes, left over material and soil/rocks/sand, contaminated soil although this should have been avoided through EMP measures; revegetation if required; drainage if required; local topographical adjustments; addition of good quality soil if the latter was eroded/removed by construction works; etc.</p> <ul style="list-style-type: none"> Follow detailed design drawings and implement careful construction practices to avoid damage to existing structures (e.g. buildings) and roads, utilities, drains etc. Contractor to repair and/or compensate for any unforeseen damage to at least pre-project condition in conjunction with relevant local authorities and/or property owner at cost to the contractor Safe access to property will be maintained and alternative signed routes and access will be provided where there are temporary diversions or blockages. Locate stockpiles away from properties and only in designated areas where no access will be blocked. 	<p>from local communities.</p> <p>100% of land used for temporary facilities returned to initial condition upon finalization of construction works.</p>				
On-site pre-construction and construction activities	<p>Occupational health and safety of workers at risk due to the hazards created during the construction period, e.g. movement of heavy equipment, vehicles, and machineries, working conditions, etc.</p> <p>Workers may be exposed to occupational health risks and safety hazards, regarding site clearance for pre-construction and during construction relating to working with electricity and working at height, as well as from handling PCBs or asbestos in upgrade works at existing substations.</p>	<ul style="list-style-type: none"> Comply with CHSMP and with IFC EHS General Guidelines in relation to occupational H&S. Ensure health and safety supervisor is on site at all times (implies an alternate off on leave or on sick). Require subcontractors and workers to confirm they have seen and understood the requirements of the CHSMP before proceeding with their work. Provide worker training on H&S and daily/weekly briefings led by site-appointed Health and Safety Officer. PPE to be provided for all workers (regardless formal and informal, directly contracted or subcontracted) in accordance with Table 2.7.1. Summary of Recommended Personal Protective Equipment According to Hazard in IFC EHS Guidelines on OHS. Enforce disciplinary system (e.g. immediate removal from site) for non-compliance with PPE requirements and other H&S measures (e.g. social distancing for COVID-19). 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding OHS related grievances</p> <p>No fatalities or lost time incidents, if they do occur to be reported to NEA board and management</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor. PSC international health and safety expert to work closely with PMD health and safety staff to ensure knowledge</p>	<p>Contractor to comply with requirements throughout construction, maintain records of health and safety incidents per the EMoP and maintain copies of training records.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Budget for compensation included in Resettlement Plan</p>

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		<ul style="list-style-type: none"> Check health condition of workers on daily basis, for example, use of self-certification forms and temperature checks before being allowed on the construction site with more thorough monthly health checks by qualified medical professional. Check the load of the vehicles before use, all drivers, and passengers to fasten seatbelt and comply with all transportation-related H&S laws and regulations Examination of all equipment and tools' quality and the presence of operational safety features before use Implementation of safety measures while excavating to avoid collapse e.g. shoring if soil unstable Untrained workers will not be permitted to work with live electricity or at height. Observe IFC EHS Guideline on Electric Power Transmission and Distribution requirements for working with live power lines; only allow suitably trained workers that meet the requirements set out in above-referred IFC guideline to work on live power lines with strict adherence to safety standards including those listed in said guidelines; these workers must have training record of attending suitable training course on electrical safety and be provided with and wear the appropriate PPE for their role. Ensure proper grounding and deactivation of any live power lines during construction work or before any work in close proximity to the lines and that this has been checked and certified by the on-site Health and Safety Officer in advance. Measure exposure levels to electromagnetic fields (EMF) and provide workers working in zones where EMF levels are above reference levels with personal EMF monitoring device to be attached onto their PPE. Require workers to observe the minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working around power lines. Observe IFC EHS Guideline on Electric Power Transmission and Distribution requirements for 	<p>within 24h and to ADB within 48h.</p> <p>100% of H&S incidents including near miss recorded, immediately investigated, and corrective action taken to prevent repeat</p>		transfer and development of knowledgeable health and safety team at NEA.		

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		<p>working at height; only allow suitably trained and qualified workers to work at height, these workers must have training record of attending suitable training course and be provided with and wear the appropriate PPE for their role. Require workers to test the structural integrity of towers prior to proceeding with the work. Use fall protection measures when working on towers, i.e. mobile elevated working platform, and all workers at height are required to wear body harness. Ensure sufficient harnesses and gear are available on site for all workers, that workers are trained to use such harness and are obligated to use the latter at all times when working at height.</p> <ul style="list-style-type: none"> • Unless transformers have been certified PCB free workers must wear suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst working with transformers. Eye wash station and water supply to shower to be provided during works due to risk of PCB coming into contact with skin. • Ensure good housekeeping in the premises at all times, including on construction site, workers camps, storage areas, etc. Perimeter is to be kept neat and tidy, with no trip hazards on the ground e.g. open channels, materials, equipment, trash laying around. Do not leave hazardous conditions (e.g. unlit open excavations without means of escape) overnight unless no access by public can be ensured. • During construction works, ensure qualified first aider and trained fire marshal is available on-site at all times with an appropriately equipped first aid kit and appropriate fire extinguisher and other firefighting equipment immediately available for use. • Provide an ambulance for more serious cases to transport the patient to the hospital for treatment • Prepare signboards reminding of health and safety measures and procedures to follow in case of 					

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		<p>accident, including key contact details (ambulance, doctor, hospital, etc.)</p> <ul style="list-style-type: none">Keep a log of all incidents, near-misses and accidents and include these in monthly monitoring reports submitted to NEA and periodic monitoring reports to ADBTemporary construction camps will include proper sanitation, alternative fuel to firewood, clean eating area, water supply, and secure storage of domestic solid wastes for disposal off site to suitably licensed waste management facilities.Pit latrines prohibited, and adequate number (about 1 toilet per 10 workers, can refer to EBRD guidance note on workers’ accommodation) of toilets and washing facility with hot and cold running water. Toilets to be connected to existing sewerage system, septic tank, or as portable self-contained units for disposal of wastewater off site to sewage treatment works to be provided.Toilets to be equipped with soap and hand sanitizer.There should be an indication of whether toilet and washing facility is “in use” or “vacant” if not gender segregated.Toilets should be cleaned at least twice daily to ensure they are kept in a hygienic condition.Prevent standing water as it may become a breeding habitat for mosquitoes etc.Provide workers with access to a shaded rest area on-site.Provide workers with a clean eating area for breaks and lunchtime.Provide all construction workers will an adequate supply of potable drinking water meeting national standards. Groundwater used must be appropriately treated and only be used where it will not put stress on local water resources. Where a risk of arsenic contamination is identified, prohibit the use of groundwater as a source of the drinking water.If ground or surface water is used for drinking water, it must first be tested to confirm it meets drinking					

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		<p>water standards and continue to be regularly tested every week. If drinking water standards are not met, potable water shall be imported to site.</p> <ul style="list-style-type: none"> If workers are not local to the area use may be made of existing accommodation facilities but if a construction camp is provided it must be adequately equipped with sufficient toilets, hand washing facilities, showers or baths, food preparation and clean eating area, etc. 					
On-site pre-construction and construction activities	Community health and safety - at increased H&S risk from communicable diseases as workers coming from elsewhere, including COVID-19, social disturbances related to workers camps, traffic, electricity infrastructure etc.	<ul style="list-style-type: none"> Comply with CHSMP and with IFC EHS General Guidelines in relation to community H&S. Installation of barriers (a temporary fence ideally solid fence) at construction areas with hazard warning signs to deter people from accessing the construction site Do not leave hazardous conditions (e.g. unfenced and unlit open excavations without means of escape) overnight unless no access by public can be ensured Define construction schedule for sections along or crossing roads in coordination with local authorities/traffic police particularly where road closures required. Implement CTMP during construction works with advance warning signs or flag persons to ensure traffic safety of construction workers and road users, in coordination with traffic police. Road safety and warning signs must be posted at 500m, 100m, and immediately in advance of the works at least two weeks prior to the works commencing to inform the public of the temporary blockage. Access to the construction site will be under traffic controls when trucks enter and exit. Require all project drivers to abide by Nepal road safety regulations at all times. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding CHS related grievances</p> <p>No project-related accident reported within community - if they do occur to be reported to NEA board and management within 24h and to ADB within 48h.</p> <p>100% of H&S incidents including near miss recorded, immediately investigated, and corrective action</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p> <p>PSC international health and safety expert to work closely with PMD health and safety staff to ensure knowledge transfer and development of knowledgeable health and safety team at NEA.</p>	<p>Contractor to comply with requirements throughout construction, maintain records of health and safety incidents per the EMOF.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Budget for compensation included in Resettlement Plan</p>

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		<ul style="list-style-type: none"> Use of scaffold and bamboo frames to support stringing to protect structures, roads, utilities etc. as well as pedestrians, vehicles, and the conductor itself. Restore the utilities immediately after all necessary works carried out to minimize public inconvenience Construction workers including subcontractors will be given awareness raising in HIV/AIDS, other communicable diseases including COVID-19, and sexual, exploitation, abuse and harassment with strict penalties (e.g. immediate removal from site) for any non-compliance of workers to an agreed code of practice Avoid ponding of water during construction to avoid habitat creation of vector borne diseases e.g. malaria. Keep a log of all incidents, near-misses and accidents and include these in monthly monitoring reports submitted to NEA and periodic monitoring reports to ADB 	taken to prevent repeat				
On-site pre-construction and construction activities	Loss of physical cultural resources (PCR) - chance find procedures will be implemented in case of chance find (including fossils).	<ul style="list-style-type: none"> Comply with CEMP and chance find procedure; implement as soon as any monuments or artefacts encountered during construction activities. Strictly ensure no chance finds are tampered with. Brief workers on chance find protocol and on apply penalties applying for tampering with them. Contractor to declare a chance find to DOA and NEA within 24h of find. PMD to report on any chance find having occurred within 48h to ADB. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding PCR related grievances</p> <p>100% of chance finds were reported to DOA and dealt with in</p>	<p>PMD to comply with requirements during construction.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout construction.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Budget for compensation included in Resettlement Plan</p>

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			accordance with chance find procedure				
Operation & Maintenance							
General maintenance	Environment, health, and safety impacts and risks of the project in general	<ul style="list-style-type: none"> During maintenance activities, mitigation measures applicable to the construction stage are also applicable to NEA maintenance activities and workers. Regular visual and technical inspection of condition and maintenance as required to be carried out by NEA daily at substations to check any leaking oil from transformers or any SF6 leak both of which are to be immediately addressed. Regular visual and technical inspection of condition and maintenance as required to be carried out by NEA quarterly for transmission lines and distribution lines to check: minimum vertical clearance (6.1m) is maintained; integrity of the towers and wires is in good condition, including bird diverters, insulation, anti-climbing devices; electrical safety warning signs and lighting arrestors; missing or corroded parts are immediately identified and replaced; and, any vegetation growth that may damage or threaten the integrity of the lines etc. Keep photographic records and log of all inspections and actions taken in response. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA as determined through regular site checks, photographic record etc.</p> <p>No outstanding operation & maintenance related grievances</p> <p>Project infrastructure maintained in working order and good condition at all times.</p>	PMD to implement EMP in collaboration with NEA operation & maintenance teams on site.	n/a	n/a	NEA's operational budget.
Biological Environment							
Reforestation and general maintenance of ROW	Impacts on biodiversity supported by Parsa National Park, Koshi Tappu Wildlife Reserve buffer zone, Chure Hill Conservation Area, and designated forest land from transmission line	<p>Protected Areas:</p> <ul style="list-style-type: none"> NEA will continue to implement the promotion/enhancement measures agreed with the protected area During inspections of power lines count fauna carcasses encountered, if any, record species and assess cause of death (e.g. electrocution/collision). <p>Restoration and reforestation:</p> <ul style="list-style-type: none"> NEA to nurture revegetated areas in disturbed hilly terrains during 5 years after construction. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA as determined through regular site checks, photographic record etc.</p>	PMD to implement EMP in collaboration with NEA operation & maintenance teams on site.	n/a	n/a	Indicative costs for reforestation included in EMP budget table.

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
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		<ul style="list-style-type: none"> NEA to take care of planted sites for period of 5 years and subsequently handover to the concerned DFO and Community Forest Group. NEA is responsible for taking care of the reforestation areas; alternatively, NEA may choose to delegate the management of the plantation areas to the local DFO / Community Forest Group with support from the project for 5 years. Project will continue to perform regular monitoring of these sites, which is to be included in the semi-annual safeguards monitoring reports submitted to ADB. A Tree losses are to be immediately replaced with new saplings. <p><u>Maintenance and vegetation control:</u></p> <ul style="list-style-type: none"> Regularly visually inspect the lines to spot any low hanging lines to ensure 6.1 m clearance is kept at all times above ground for safe passage of terrestrial fauna and that "bird sensitive" design features including bird divertors have not be lost or damaged, immediately undertake maintenance work if required. Prohibit the use of herbicides, pesticides or burning to control any vegetation growth or to manage vegetation waste, in substations and along ROW. Regularly trim trees located within the RoW that are above 5 m high, at least once every two years, following maximum clearance as per Electricity Regulation, 1993 During maintenance activities, all EMP requirements for construction phase, in particular strict prohibitions on workers are applicable. Tree trimming and ROW vegetation clearance in general to be carried out manually (by human labor and using hand-held equipment) and in protected and forest areas to be cut/trimmed are to be selected in presence and with approval of concerned protected area management, DFO and Community Forest Group representative. Promote if protected area management and forest officials in concurrence ecofriendly vegetation removal methods, while ensuring no disturbance to pre-existing habitat, for instance through the use of goats for clearing overgrown bushes and small trees 	<p>Reforestation resulted in no-net loss of biodiversity as a result of the project.</p> <p>No outstanding biodiversity-related grievances from local communities.</p>				

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		<p>(under strict supervision) around high voltage power lines is known to be more effective as it is faster, cheaper and more ecofriendly. These animals can reach difficult places that are challenging for people to access and can eliminate the need of fuel for cutting devices.</p> <ul style="list-style-type: none"> Schedule tree clearance/trimming in ROW in protected and forest area outside bird breeding season (in particular, vultures breeding season is Jan-March). In such areas, trimming of trees to be carried out in presence of and under supervision of ecologist. 					
Physical Environment							
GIS substations	Climate change from fugitive emission of SF6	<ul style="list-style-type: none"> Keep record of all gas insulated switchgear and gas insulated transformers, including presence, if any, and quantity of SF6 in these. Provide SF6 leakage detection kit at each substation. NEA to monitor SF6 emissions through inventory control and accounting per the requirements set out in the EMoP. Proper handling and storage procedures to be implemented in accordance with equipment suppliers' specifications and best practices. Check for SF6 gas leakage in every shift of the operation. Maintain SF6 leakage records in every substation and report in periodic monitoring reports to ADB. Define a safe SF6 retrieval arrangement, with appropriate handling, storage, disposal process for end of life equipment in accordance international good practice. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA as determined through regular site checks, photographic record etc.</p> <p>SF6 leakage below 0.1% per annum</p>	PMD to implement EMP in collaboration with NEA operation & maintenance teams on site.	n/a	n/a	NEA's operational budget.
Substation operation	<p>Noise in the form of buzzing or humming can often be heard around transformers or power lines producing corona.</p> <p>Transformer oil spill and leakage.</p>	<ul style="list-style-type: none"> Maintain transformers and other noise generating equipment to ensure noise to be limited to the following as 1 hour LAeq: (i) 70 dB(A) at the site boundary; (ii) at residential properties, 55 (day) and 45 (night) dB(A) in urban areas and 45 (day) and 40 (night) dB(A) in rural areas as defined by Nepal regulations; and (iii) at "peace areas" such as schools as defined by Nepal regulations, 50 (day) and 40 (night) dB(A). 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA as determined through regular site checks, etc.</p>	PMD to implement EMP in collaboration with NEA operation & maintenance teams on site.	n/a	n/a	NEA's operational budget.

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		<ul style="list-style-type: none"> Transformers to be routinely inspected and maintained to avoid spills and leakage. Collect and segregate O&M wastes including scrap metal, oil, and solid waste; ensure all workers are familiar with this segregation. Store all the wastes produced in an environmentally sound manner in designated, labelled area with separate waste containers (drums, bins, skips or bags) for each distinct type of waste. Store solid waste in enclosed bins to contain leachate and avoid vermin. Encourage recovery of recyclable wastes that could be reused or sold to recyclers, rather than disposing of it. Prohibit open/uncontrolled burning of wastes. Prohibit dumping of O&M wastes on-site, into drains, rivers, in agricultural fields etc. NEA may compost biodegradable kitchen scraps on site if of small volume in enclosed composting facilities (enclosed to avoid attraction of vermin etc.) located ideally 500m but at least 100m from water sources (surface water and groundwater wells, springs etc.). Incineration may be permitted on-site if enclosed, small volume solid waste incinerator with stack and pollution control that is designed for residence time and temperatures that minimize incomplete combustion for waste disposal at substation is available. Document all wastes removed off site using transfer notes, to be taken by licensed waste contractors who should reuse/recycle or dispose of the waste to suitably licensed and engineered waste management facilities according to type – for solid waste disposal this will need to be to Kathmandu, and for hazardous waste this will need to be to a neighboring country since no such facilities currently exist in Nepal. Collect solid waste and dispose of it along with municipal waste to suitably engineered and licensed 	<p>Monitoring confirms ambient noise within national standards or no worsening of the baseline situation if already exceeded.</p> <p>No outstanding O&M-related grievances from local communities</p>				

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
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Presence of electrical infrastructure and need for maintenance	Occupational safety risks (project maintenance workers) and community safety risks	<ul style="list-style-type: none"> Ensure adequate sag and tension always maintained. Maintain warning / advisory signs in good and visible condition on all dangerous equipment. Maintain the good condition of non-climb features on transmission towers. Maintain the good condition of boundary fences, regularly check the security fence for any gaps and repair. Keep boundary gates locked at all times (except when workers are in-coming or exiting) but at times when the gate is unlocked, ensure one staff is always present to control any unauthorized entry. Consider employing security personnel to guard the premises where the risk of entry for theft might be high. Carry out periodic safety related awareness raising in neighboring communities regarding living in proximity to power lines and substations, including but not limited to, electrocution risks and effects of EMF; include information to the community regarding potential corona noise heard during operation. NEA to ensure all substation staff and maintenance workers have received appropriate OHS trainings for their role <p>EMF:</p> <ul style="list-style-type: none"> Monitor electromagnetic field strength workers are exposed to and ensure occupational exposures are within the limits of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) reference level. If EMF limits are often reached, provide workers with personal radiation monitors that shall set off an alarm when exposure limits are reached. Monitor electromagnetic field strength where regularly occupied properties are in the ROW and ensure public exposures are within the reference levels of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines. <p>Housekeeping:</p> <ul style="list-style-type: none"> Keep the substation neat and tidy at all times. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA as determined through regular site checks, photographic record etc.</p> <p>No outstanding H&S related grievances</p> <p>All fatalities reported to government within 24h and to ADB within 48h.</p> <p>No project-related accident reported.</p>	PMD to implement EMP in collaboration with NEA operation & maintenance teams on site.	n/a	n/a	NEA's operational budget.

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
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		<ul style="list-style-type: none">Remove any trip hazards on the ground, e.g. open channels, materials, equipment, trash laying around.Carry out regular pest control where pests are a risk; favor natural pest control measures when possible.Display clear emergency exits signs (in working order, if light signs, ensure works) and keep exits clear of any blockage.Visually inspect for any standing water on site, and when identified, remove or provide appropriate drainage to remove in timely manner; ensure drainage system is not blocked and fully operational.Maintain all lights in working order.Ensure all vents are free of blockages and regularly maintained. <p><u>Emergency situations:</u></p> <ul style="list-style-type: none">Ensure a recent, full, first aid kit and adequate firefighting equipment is available on site at all times, stored in clearly labelled and easily accessible area.Replace the first aid equipment timely as required to keep all equipment within its expiry date.Service the firefighting equipment timely as required to keep all equipment in dateProvide first aid and firefighting training to select, volunteer staff; at least one staff having recently carried out first aid and firefighting training must be present on site at all times. Refreshers are to be provided once a year.Hang posters showing first aid procedures especially for electrocution, and fire procedures, as well as listing all emergency contacts. Display the emergency phone number and location of doctor and hospital in a clear and easily accessible location.Keep an accident log and make accident logbook available on site upon request.Monitor closely in case of extreme weather events and be ready to act immediately.Ensure any buildings on site are structurally sound if any earthquake occurs, check building soundness prior to allowing workers back on site.					

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
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Site-specific EMP							
Component 1 - Dandakhet - Rahughat	<ul style="list-style-type: none"> Impacts from forest habitat fragmentation and restrictions on faunal movement Loss of trees Regular trimming (alternate years) of tall trees growing in RoW during operation to maintain safety distances, only small shrubs and trees can establish up to 5m Use of firewood/timber/non-timber forest products (NTFPs)/hunting or poaching of fauna by the workers (no commercially important NTFPs) Risk of forest fires in dry season Disturbance to fauna during works Primate (e.g. langur) electrocution Bird electrocution and collision 	<ul style="list-style-type: none"> For Dandakhet substation provide flood protection measures e.g. embankment (dyke) or floodwall or heightening the grounds of the substation as well as improving the drainage system to drain surface water runoff. Contractor to employ a suitably qualified and experienced, dedicated, biodiversity officer for each contract package involving new transmission lines - to be based on-site and provide trainings and awareness raising activities, monitor and supervise all construction works in protected areas and forest land on a full-time basis for their duration. Install bird divertors in accordance with the general requirements of the Avian Protection Plan, this includes 500m of proposed crossing of the Rahuganga Khola which is tributary of Kali Gandaki River near Galeshwar. Contractor to develop site-specific biodiversity management plan (BMP) detailing mitigation and monitoring measures as required for approval by NEA and clearance by ADB prior to the commencement of any works, including enabling works. BMP will set out how impacts on biodiversity will be minimized through the detailed design, construction methods, siting of temporary construction facilities, restrictions on construction workers etc. NEA to deliver awareness raising on bird electrocution and collision with power lines and adopting international good practice for "bird sensitive" design to those with design responsibilities, with the invite extended to line agency government officials responsible for environmental clearance. NEA to support awareness raising program in association with the Department of National Parks and Wildlife Conservation (DNPWC) for Community Forest Groups within the ROW of transmission and 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding site specific-related grievances from local communities.</p>	<p>PMD to comply with requirements during detailed design, preconstruction, construction, and operation & maintenance.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout detailed design, preconstruction, construction.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Indicative costs for purchase of bird divertors (excluding their installation) and reforestation are included in EMP budget table</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<p>distribution lines on sustainable use of non-timber forest products and biodiversity conservation, to commence pre construction and continue for 3 years into operation.</p> <ul style="list-style-type: none"> NEA in association with Bird Conservation Nepal (BCN) to support vulture conservation awareness raising activities for local communities, particularly those within 500m, to commence pre construction and continue for 3 years into operation. Purchase land as required under national regulations to replace the permanently acquired forest land under towers, planted at ratio of 1,600 trees per ha in addition to compensatory reforestation at 1:25 ratio. 					
Component 2 - Ghorahi - Madichaur	<ul style="list-style-type: none"> Impacts from construction passing through river valley in Chure Hills Conservation Area Outside of protected area, impacts from forest habitat fragmentation and restrictions on faunal movement Loss of trees Regular trimming (alternate years) of tall trees growing in RoW during operation to maintain safety distances, only small shrubs and trees can establish up to 5m Use of firewood/timber/non-timber forest products (NTFPs)/hunting or poaching of fauna by the workers (no 	<ul style="list-style-type: none"> Consider use of gabion wall and embankments (dykes) including bioengineering options on Balim Khola. NEA to employ ecological third-party services to TOR agreed with ADB for works under component 2 located in Chure Conservation Area to undertake pre- and post-construction vulture surveys, provide trainings and awareness raising activities, monitor and supervise on a full-time basis all construction works in the protected areas for their duration, act as liaison with the protected area management, and, support implementation of promotion/enhancement measures agreed with protected area management. Ecologists will be delegated veto power by NEA to suspend the Contractor's works if needed due to an unanticipated impact/risk or non-compliance with requirements until corrective action is taken. Contractor to employ a suitably qualified and experienced, dedicated, biodiversity officer for each contract package involving new transmission lines – to be based on-site and provide trainings and awareness raising activities, monitor and supervise all construction works in protected areas and forest land on a full-time basis for their duration. In addition, for component 2 they will help liaise with the protected area management, and support implementation of 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding site specific-related grievances from local communities.</p>	<p>PMD to comply with requirements during detailed design, preconstruction, construction, and operation & maintenance.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout detailed design, preconstruction, construction.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Indicative costs for purchase of bird divertors (excluding their installation) and reforestation and support for the promotion and enhancement or protected areas are included in EMP budget table</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
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	<p>commercially important NTFPs)</p> <ul style="list-style-type: none">• Risk of forest fires in dry season• Disturbance to fauna during works• Primate (e.g. langur) electrocution• Bird electrocution and collision, particularly given Dang Deukhuri Foothill Forests and West Rapti Wetlands IBA	<p>promotion/enhancement measures agreed with them.</p> <ul style="list-style-type: none">• NEA to comply with existing facility requirements for Ghorahi substation• Contractor to undertake alignment review during detailed route survey for the Ghorahi-Madichaur transmission line, to consider re-siting of angle point towers, if possible, such that routing within Chure Conservation Area falls entirely to the west of the river and entirely outside Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area.• Install bird divertors in accordance with the general requirements of the Avian Protection Plan for the entire length of Ghorahi – Madichaur transmission line given presence of critically endangered vulture and Dang Deukhuri Foothill Forests and West Rapti Wetlands IBA, within Dang district spacing to be at maximum of 5m, spacing on rest of route maximum 10m.• NEA to continue to consult with Bird Conservation Nepal sharing detailed designs of transmission lines within 5km of Dang Deukhuri Foothill Forests and West Rapti Wetlands Key Biodiversity Area and Koshi Tappu Wildlife Reserve for review and comment.• Avoid all construction during vultures breeding season (Jan-March).• During detailed route survey to, minimize cutting of the tall species of trees used by vulture as far as practical.• Pre-construction and post-construction surveys of the breeding vulture population in Dang district.• Contractor to develop site-specific biodiversity management plan (BMP) detailing mitigation and monitoring measures as required for approval by NEA and clearance by ADB prior to the commencement of any works, including enabling works. BMP will set out how impacts on biodiversity will be minimized through the detailed design, construction methods, siting of temporary construction facilities, restrictions on construction workers etc.					

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<ul style="list-style-type: none">• NEA to support awareness raising program in association with the Department of National Parks and Wildlife Conservation (DNPWC) for Community Forest Groups within the ROW of transmission and distribution lines on sustainable use of non-timber forest products and biodiversity conservation, to commence pre construction and continue for 3 years into operation.• NEA in association with Bird Conservation Nepal (BCN) or similar organization specialized in bird conservation to support vulture conservation awareness raising activities for local communities, particularly those within 500m, to commence pre construction and continue for 3 years into operation.• NEA to support habitat conservation plan for vultures which the project area is critical habitat namely White-rumped Vulture (<i>Gyps bengalensis</i>), Red-headed Vulture (<i>Sarcogyps calvus</i>), Slender-billed Vulture (<i>Gyps tenuirostris</i>) with an emphasis on Dang Dekhuri Foothill Forest and West Rapti Wetland and nearby Charinge Community Forest e.g. construction of artificial wetland and other habitat elements needed by vulture, strengthening the Vulture Safe Zone Program , to commence pre construction and continue for 3 years into operation. It will be developed in coordination with key agencies in Nepal e.g. DNPWLC as well as the Bird Conservation Nepal.• Contractor to undertake alignment review during detailed route survey for the Ghorahi-Madichaur transmission line, to consider re-siting of angle point towers such that routing in vicinity of the Janaki temple is located as far as possible from it, ideally outside the ROW but at minimum ensuring the entire temple compound falls well outside safety clearances under the Electricity Rules.• To inform the alignment review NEA and Contractor to consult with communities who utilize Janaki temple to seek their views on the routing and reflect their concerns in the detailed design, consultations are to be documented.					

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
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		<ul style="list-style-type: none"> Purchase land as required under national regulations to replace the permanently acquired forest land under towers, planted at ratio of 1,600 trees per ha in addition to compensatory reforestation at 1:25 ratio. Use local, native species of community and/or ecological value for afforestation: in this location will focus on trees, such as, <i>Bombax cebia</i>, <i>Acacia sp.</i> etc., which provide suitable nesting habitat for vultures. 					
Component 3 – Borang - Lapang - Ratmate	<ul style="list-style-type: none"> Impacts from forest habitat fragmentation and restrictions on faunal movement Loss of trees Regular trimming (alternate years) of tall trees growing in RoW during operation to maintain safety distances, only small shrubs and trees can establish up to 5m Use of firewood/timber/non-timber forest products (NTFPs)/hunting or poaching of fauna by the workers (no commercially important NTFPs) Risk of forest fires in dry season Disturbance to fauna during works Primate (e.g. langur) electrocution Bird electrocution and collision 	<ul style="list-style-type: none"> For Lapang substation provide flood protection measures e.g. embankment (dyke) or floodwall or heightening the grounds of the substation as well as improving the drainage system to drain surface water runoff. Contractor to employ a suitably qualified and experienced, dedicated, biodiversity officer for each contract package involving new transmission lines –to be based on-site and provide trainings and awareness raising activities, monitor and supervise all construction works in protected areas and forest land on a full-time basis for their duration. Install bird divertors in accordance with the general requirements of the Avian Protection Plan, this includes 500m either side of the Trisuli River crossing as well as 500m either side of all other ridge/valley crossings and waste dumps at maximum 10m spacing of divertors Contractor to develop site-specific biodiversity management plan (BMP) detailing mitigation and monitoring measures as required for approval by NEA and clearance by ADB prior to the commencement of any works, including enabling works. BMP will set out how impacts on biodiversity will be minimized through the detailed design, construction methods, siting of temporary construction facilities, restrictions on construction workers etc. NEA to support awareness raising program in association with the Department of National Parks and Wildlife Conservation (DNPWC) for Community Forest Groups within the ROW of transmission and distribution lines on sustainable use of non-timber 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding site specific-related grievances from local communities.</p>	<p>PMD to comply with requirements during detailed design, preconstruction, construction and operation & maintenance.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout detailed design, preconstruction, construction.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Indicative costs for purchase of bird divertors (excluding their installation) and reforestation are included in EMP budget table</p>

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				PMD	PSC	Contractor / Subcontractor	
		<p>forest products and biodiversity conservation, to commence pre construction and continue for 3 years into operation.</p> <ul style="list-style-type: none"> Contractor to undertake alignment review during detailed route survey for the Borang-Lapang transmission line, to consider re-siting of angle point towers such that routing in vicinity of the school referred to in the IEE is located as far as possible from it, ideally outside the ROW but at minimum ensuring the entire school compound falls well outside safety clearances under the Electricity Rules. NEA will provide fencing to school found along Borang-Lapang transmission line, so the school compound is clearly demarked. PMD to recruit the necessary third party to build a fence around the school grounds NEA will provide awareness raising on electrical safety to pupils of school found along Borang-Lapang transmission line, given unless it can be moved outside the ROW pupils may play in close proximity to it (climbing on towers, flying kites, etc.). The opportunity to carry out along with these activities additional simple talks on electricity and electricity networks is recommended, which could raise children's interest in science, with special consideration of gender inclusion and girls' interest in science. Purchase land as required under national regulations to replace the permanently acquired forest land under towers, planted at ratio of 1,600 trees per ha in addition to compensatory reforestation at 1:25 ratio. 					
Component 4 – Pangtang SS	Impacts of existing and associated facility	<ul style="list-style-type: none"> NEA to comply with existing facility requirements for Barhabise substation NEA to comply with associated facility requirements for Balefi Corridor 132 kV DC Transmission Line NEA and associated facilities contractor to comply with requirements for new transmission lines (e.g. Component 1) including developing site-specific biodiversity management plan (BMP) detailing 	<p>Compliance with national laws and regulations.</p> <p>Compliance of associated facilities with ADB SPS (2009) requirements</p>	PMD to comply with requirements during detailed design, preconstruction, construction, and operation & maintenance.	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with	n/a	<p>NEA counterpart funds, budget for associated facilities</p> <p>Part of PSC budget</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		mitigation and monitoring measures as required for approval by NEA and clearance by ADB prior to the commencement of any works, including enabling works. BMP will set out how impacts on biodiversity will be minimized through the detailed design, construction methods, siting of temporary construction facilities, restrictions on construction workers etc.	Mitigation measures successfully implemented by NEA and associated facilities Contractor as determined through regular site checks, photographic record etc. No outstanding site-specific related grievances from local communities.	PMD to supervise and monitor their associated facilities contractor to ensure their compliance with delegated requirements.	supervision and monitoring of the associated facilities contractor.		
Component 5 - Keraun	Distribution line connecting to Keraun substation to be defined.	<ul style="list-style-type: none"> For alignment of Keraun 33 kV new distribution line which is still to be determined, as far as is practical, Contractor is to route alignment within road RoW and carefully select routing to avoid all forest land and natural habitat, to avoid existing structures (e.g. schools, hospitals, residential properties, physical cultural resources) falling in the RoWs or at minimum within the safety clearance corridor, and to minimize interference with existing roads, agricultural crops, utilities, drains, surface waterbodies, and groundwater wells, etc. Update IEE to reflect the final alignment of 33 kV lines for clearance and disclosure by ADB before any works commence. 	<p>Route alignment and detailed design of Keraun 33kV new distribution line meets national laws and regulations and complies with ADB SPS (2009) requirements</p> <p>No outstanding site specific-related grievances from local communities.</p>	<p>PMD to comply with requirements during detailed design, preconstruction, construction, and operation & maintenance.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.	Contractor to comply with requirements throughout detailed design, preconstruction, construction.	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>
Component 6	<p>Impacts from retrofitting of existing substations within boundaries of existing sites.</p> <p>Substations in Protected Area/IBA: Kusum, Ghorahi, Mahendranager, Bhurlguan, Lamahi, Pokhara, Lakhanatri, Simra, Godak,</p>	<ul style="list-style-type: none"> NEA to comply with existing facility requirements for all existing substation. For Kusum, Ghorahi, Mahendranager, Bhurlguan, Lamahi, Pokhara, Lakhanatri, Simra, Godak, Bharatpur, Hetauda, and Kamane NEA to retrofit substations with high electrocution risks with “bird sensitive” design measures where technically feasible 	<p>Existing substations meet national laws and regulations and comply with ADB SPS (2009) requirements</p> <p>No outstanding site specific-related</p>	PMD to comply with requirements during detailed design, preconstruction, construction, and operation & maintenance.	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and	Contractor to comply with requirements throughout detailed design, preconstruction, construction.	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
	Bharatpur, Hetauda, and Kamane Lahan SS: During monsoon season water floods the ground level rooms inside substation.	<ul style="list-style-type: none"> For Damak substation ensure that flood and erosion protection adequate given right bank is formed by a riverbank For Lahan substation provide flood protection measures e.g. embankment (dyke) or floodwall or heightening the grounds of the substation as well as improving the drainage system to drain surface water runoff. 	grievances from local communities.	PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.	monitoring of the contractor.		
Component 9a – Pathlaiya - Dhalkebar	<ul style="list-style-type: none"> Impacts from restringing of existing lines within protected area – Parsa National Park and Chure Hills Conservation Area Re-clearance of forest land under existing RoW which is already subject to regular trimming (alternate years) of tall trees growing in RoW during operation to maintain safety distances, only small shrubs and trees established up to 5m Use of firewood/timber/ NTFPs/hunting or poaching of fauna by the workers (no commercially important NTFPs) Risk of forest fires in dry season Disturbance to fauna during works Primate (e.g. langur) electrocution from 	<u>Detailed design and pre-construction:</u> <ul style="list-style-type: none"> NEA to employ ecological third-party services to TOR agreed with ADB for works under component 9a and located in Parsa National Park, and Chure Conservation Area to provide trainings and awareness raising activities, monitor and supervise on a full-time basis all construction works in the protected areas for their duration, act as liaison with the protected area management, and, support implementation of promotion/enhancement measures agreed with protected area management. Ecologists will be delegated veto power by NEA to suspend the Contractor's works if needed due to an unanticipated impact/risk or non-compliance with requirements until corrective action is taken. Contractor to employ a suitably qualified and experienced, dedicated, biodiversity officer for components 9a and 9b (e.g. one officer for each component, unless undertaken sequentially) to be based on-site and provide trainings and awareness raising activities, monitor and supervise all construction works in protected areas and forest land on a full-time basis for their duration, help liaise with the protected area management, and support implementation of promotion/enhancement measures agreed with them. Retrofit to ensure minimum height from ground level of 6.1 m is ensured all along the wire (lowest point between two towers) to ensure sufficient clearance for safe passage ground fauna. 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding site-specific-related grievances from local communities.</p>	<p>PMD to comply with requirements during detailed design, preconstruction, construction and operation & maintenance.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout detailed design, preconstruction, construction.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Indicative costs for purchase of bird divertors (excluding their installation) and reforestation and support for the promotion and enhancement or protected areas are included in EMP budget table</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
	upgraded line using the existing towers <ul style="list-style-type: none"> Bird electrocution and collision 	<ul style="list-style-type: none"> Ensure no increase in number (6no.) or smaller diameter of conductors which would increase collision risk. Install bird divertors in accordance with the general requirements of the Avian Protection Plan, this includes all 8.4km transmission line within the Parsa National Park, plus 7.1km section along Bagmati River Corridor/Chure Conservation Area, and an additional 6.2km and 8.5km re Chure Conservation Area at a maximum 5m spacing of divertors, as well as 500m either side of all ridge/valley crossings and waste dumps at a maximum 10m spacing of divertors. Contractor to develop site-specific biodiversity management plan (BMP) detailing mitigation and monitoring measures as required for approval by NEA and clearance by ADB prior to the commencement of any works, including enabling works. BMP will set out how impacts on biodiversity will be minimized through the detailed design, construction methods, siting of temporary construction facilities, restrictions on construction workers etc. NEA to support awareness raising program in association with the Department of National Parks and Wildlife Conservation (DNPWC) for Community Forest Groups within the ROW of transmission and distribution lines on sustainable use of non-timber forest products and biodiversity conservation, to commence pre construction and continue for 3 years into operation. Use existing Pathlaiya substation as a site office and storage area. Do not set up any other site office, storage area, and worker camps and other related project facilities within protected area or on forest land; locate worker camps, if any, at least 500m away from protected area and from the forest's external edge. 					

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
Component 9b – Duhabi-Kusaha	<ul style="list-style-type: none"> Impacts from restringing of existing lines through agricultural land, modified habitat but 6km located within protected area – Koshi Tappu Wildlife Reserve buffer zone Hunting or poaching of fauna by workers, including within Koshi Tappu Wildlife Reserve Disturbance to fauna during works, including fauna in adjacent wildlife reserve Bird electrocution and collision, from existing lines but which are upgraded – adjacent to Ramsar site 	<ul style="list-style-type: none"> NEA to employ ecological third-party services to TOR agreed with ADB for works under component 9b located in Koshi Tappu Wildlife Reserve buffer zone to provide trainings and awareness raising activities, monitor and supervise on a full-time basis all construction works in the protected areas for their duration, act as liaison with the protected area management, and, support implementation of promotion/enhancement measures agreed with protected area management. Ecologists will be delegated veto power by NEA to suspend the Contractor's works if needed due to an unanticipated impact/risk or non-compliance with requirements until corrective action is taken. Contractor to employ a suitably qualified and experienced, dedicated, biodiversity officer for components 9a and 9b (e.g. one officer for each component, unless undertaken sequentially) to be based on-site and provide trainings and awareness raising activities, monitor and supervise all construction works in protected areas and forest land on a full-time basis for their duration, help liaise with the protected area management, and support implementation of promotion/enhancement measures agreed with them. Retrofit to ensure minimum height from ground level of 6.1 m is ensured all along the wire (lowest point between two towers) to ensure sufficient clearance for safe passage ground fauna. Ensure no increase in number (6no.) or smaller diameter of conductors which would increase collision risk. Install bird divertors in accordance with the general requirements of the Avian Protection Plan, this includes all 6.7km transmission line within the Koshi Tappu Wildlife Reserve buffer zone (between tower 1 to 18 and 1km section between tower 18 to 20) at a maximum 5m spacing of divertors, as well as 500m either side of all ridge/valley crossings and waste dumps at a maximum 10m spacing of divertors; in buffer zone of Koshi Tappu Wildlife Reserve the 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding site-specific related grievances from local communities.</p>	<p>PMD to comply with requirements during detailed design, preconstruction, construction, and operation & maintenance.</p> <p>PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.</p>	<p>PSC to supervise, monitor, and assist PMD in ensuring their own compliance and assist with supervision and monitoring of the contractor.</p>	<p>Contractor to comply with requirements throughout detailed design, preconstruction, construction.</p>	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs of implementing EMP as BOQ line</p> <p>Indicative costs for purchase of bird divertors (excluding their installation) and reforestation and support for the promotion and enhancement or protected areas are included in EMP budget table</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<div>divertors must incorporate night-time visibility option due to night-time movements of the birds.</div> <ul style="list-style-type: none"> • Avoid all construction within Koshi Tappu Wildlife Reserve buffer zone to be outside bird migratory period in order to minimize disturbance to birds. • Contractor to develop site-specific biodiversity management plan (BMP) detailing mitigation and monitoring measures as required for approval by NEA and clearance by ADB prior to the commencement of any works, including enabling works. BMP will set out how impacts on biodiversity will be minimized through the detailed design, construction methods, siting of temporary construction facilities, restrictions on construction workers etc. • NEA to support awareness raising program in association with the Department of National Parks and Wildlife Conservation (DNPWC) for local communities e.g. on sustainable livestock grazing and opportunities for alternative tourism-orientated (e.g. bird watching) livelihoods to help promote biodiversity conservation and for better ownership of conservation efforts within the wildlife reserve itself, to commence pre construction and continue for 3 years into operation. • NEA in association with Bird Conservation Nepal (BCN) to support vulture conservation awareness raising activities for local communities, particularly those within 500m. • Establish site office, storage area, and worker camps and other related project facilities strictly outside the Koshi Tappu Wildlife Reserve buffer zone, at least 500m away from its boundary. 					
Component 9c – Kathmandu Valley	<ul style="list-style-type: none"> • Impacts from restringing existing line in a dense urban area, passing through Kathmandu Valley World Heritage Site (Swayambhu) 	<ul style="list-style-type: none"> • NEA to take the services of a third-party archeologist (either consultant and/or DOA expert) as agreed with ADB in relation to component 9c and upgrading the Suichatar-Balaju 66kV transmission line within the Kathmandu Valley World Heritage Site (Swayambhu) to provide trainings and awareness raising activities, monitor and supervise on a full-time basis all 	<p>Compliance with national laws and regulations.</p> <p>Mitigation measures successfully implemented by NEA</p>	PMD to comply with requirements during detailed design, preconstruction, construction, and operation & maintenance.	PSC to supervise, monitor, and assist PMD in ensuring their own compliance and	Contractor to comply with requirements throughout detailed design, preconstruction, construction.	<p>NEA counterpart funds</p> <p>Part of PSC budget</p> <p>Part of contract cost, include costs</p>

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<p>construction works in the current and proposed World Heritage Site boundary for their duration to ensure no damage to monuments, and act as liaison with UNESCO, the Department of Archaeology and community users. The archaeologist will be delegated veto power by NEA to suspend the Contractor's works if needed due to an unanticipated impact/risk or non-compliance with requirements until corrective action is taken to address this.</p> <ul style="list-style-type: none"> Contractor to employ a suitably qualified and experienced, dedicated, heritage officer for component 9c to be based on-site and provide trainings and awareness raising activities, monitor and supervise all construction works in the World Heritage Site on a full-time basis for their duration to ensure no damage to monuments, and help liaison with UNESCO, the Department of Archaeology and community users. NEA will obtain all necessary national approvals from the Department of Archaeology in order to undertake works within Kathmandu Valley World Heritage Site (Swayambhu) NEA and Contractor will follow the requirements of the Department of Archaeology and recommendations of the heritage assessment in implementing works within the current and proposed boundary Kathmandu Valley World Heritage Site (Swayambhu) Contractor to develop site-specific heritage management plan (HMP) detailing mitigation and monitoring measures for approval by NEA and clearance by ADB prior to the commencement of any works, including enabling works, on the Suichatar-Balaju 66kV transmission line. HMP will set out how impacts on the Kathmandu Valley World Heritage Site (Swayambhu) will be minimized through the detailed design, construction methods, siting of temporary construction facilities, restrictions on construction workers etc. 	<p>and Contractor as determined through regular site checks, photographic record etc.</p> <p>No outstanding site specific-related grievances from local communities.</p>	PMD to supervise and monitor contractor to ensure their compliance with delegated requirements.	assist with supervision and monitoring of the contractor.		of implementing EMP as BOQ line

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<ul style="list-style-type: none"> Contractor to carry out detailed line route survey of the existing alignment during detailed design to identify any structures situated within the right of way and/or safety clearance corridor. Contractor will undertake a detailed pre-construction photographic record of all structures in 66kV transmission line RoW of 18m, in case of any damages claim during the works. Contractor to identify any regularly occupied properties that are encroaching in the existing safety clearance corridor which will need to be relocated by NEA, in accordance with the project's Resettlement Plan. Contractor to identify any trees situated within the right of way and/or safety clearance corridor that will need to be cut, quantify any public and private tree loss by number, size (including seedlings, saplings, poles, and trees) and species. Contractor to identify other over ground utilities crossed during detailed line route survey including other transmission lines and undertake a detailed pre-construction photographic record of all over ground utilities in 66kV transmission line RoW of 18m, in case of any damages claim during the works. Contractor to identify in consultation with service providers appropriate measures to minimize period of disruption to utilities and reduce health and safety risks during installation. If services must be disrupted Contractor (via service providers if appropriate) to notify affected communities well in advance of any power outage etc. Contractor will undertake a detailed pre-construction photographic record of all physical cultural resources including WHS monuments within the right of way of 66kV transmission line, detailed condition survey of WHS monuments located within the ROW must be undertaken if one is not already available from Department of Archaeology 					

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<ul style="list-style-type: none">• If monuments are used by community and access must be restricted to ensure health and safety Contractor to notify affected communities well in advance, and time works to avoid any such restrictions during important festivals etc.• During pre-construction, Contractor will undertake a condition survey of all tower foundations to confirm they are sound, paying particular attention to the condition of foundations in the Kathmandu Valley World Heritage Site (Swayambhu) parts of which have been subject to landslide. If there is a risk of tower failure due to foundation condition remedial works to be undertaken prior to restringing works.• Contractor to plan for using appropriate scaffolding or overhead bamboo frames during stringing works crossing utilities, roads, and structures to minimize traffic disruption and risks of accident. For transmission lines running along streets a temporary road closure is to be requested for duration of restringing works in that location to protect the road users.• Contractor to provide appropriate scaffolding or overhead bamboo frames to monuments within Kathmandu Valley World Heritage Site (Swayambhu) located within ROW of 66kV transmission line (12m)• Department of Archaeology must be informed of and agree to construction schedule in order that they can facilitate on-site supervision.• Prior to the start of any works, NEA and Contractor to provide trainings and awareness raising activities to all workers to inform them of (i) presence of and precautions to be taken for works in Kathmandu Valley World Heritage Site (Swayambhu) and (ii) chance find procedures.• Transport equipment and when roads are involved to undertake stringing only during non-rush hours i.e. avoid the hours of 6am to 8 am and 4pm to 6 pm.• NEA archaeologist and Contractor’s heritage officer to monitor and supervise on a full-time basis all					

Project component or activity	Impact or risk to be mitigated	Mitigation measure(s)	Performance indicators	Institutional responsibilities (including implementation, supervision, and monitoring)			Budget/source
				PMD	PSC	Contractor / Subcontractor	
		<p>construction works in the current and proposed World Heritage Site boundary for their duration to ensure no damage to any monuments.</p> <ul style="list-style-type: none"> Contractor must immediately stop work if requested by Department of Archaeology or NEA's archaeologist and before resuming works agree and implement appropriate corrective action for dealing with unanticipated impact or non-compliance. Contractor will be responsible for repairing at their costs any damage to utilities, roads, and structures prior to completion of their contract. Contractor will be responsible for repairing at their cost any damage to physical cultural resources including WHS monuments within the right of way of 66kV transmission line. Repairs to WHS monuments would need to be undertaken under the instruction of Department of Archaeology by appropriately qualified and experienced restoration contractors using appropriate materials and construction techniques etc. 					

Table 10.B: Minimum Provision for Quantitative Environmental Monitoring (EMoP)

Environmental Parameters to be Monitored	Location	Time / Frequency / Duration	Methods of measurements	Performance Standard / quantitative targets	Institutional responsibilities (including implementation, supervision, and monitoring)			Equipment and Costs
					PMD	PSC	Contractor / Subcontractors	
Detailed design and pre-construction preparations								
Ecology: vulture population in relation to component 2	Dang district	One time for baseline establishment, during vulture breeding season (Jan-March)	TOR to be agreed with ADB, as per international good practice	No reduction in vulture population over baseline population established during detailed design.	PMD to recruit qualified ecological third-party services to carry out survey works. PMD to supervise surveys and to report survey results to ADB.	PSC to provide guidance to PMD on TOR and assist with review of survey reports.	n/a	Equipment budget to be included in third party bid.
Air quality: SPM, PM10, PM2.5, SO2, and NO2	Nearest receptor within 100m of substations for components 1-5 and 7. Sample of six receptors in representative locations in 100m of each new transmission line.	One time for baseline establishment prior to the start of any activity on site	To be measured as 1-hour and 24-hour averages along with meteorological data- temperature humidity, wind speed, and wind direction-over a fortnight during dry season.	No exceedance of national ambient air quality standards (or no worsening if exceeded) at sensitive receptors	PMD to supervise contractor and to report quarterly to ADB	PSC to assist PMD in supervision	Contractor to undertake measurements and report to PMD.	Professional, calibrated, portable outdoor air quality monitoring sensors Part of contract cost, include costs of implementing EMP as BOQ line
Noise level: dB(A)	Site boundary and nearest receptor within 100m of substations for components 1-5 and 7. Sample of six receptors in representative locations in 100m of each new	One time for baseline establishment prior to the start of any activity on site	1hr LAeq over a 48-hour period including workday and weekend using professional, calibrated portable monitoring devices.	No exceedance noise standards specified in Table 10.A (or less than 3dBA increase if already exceeded) at site boundary and sensitive receptors	PMD to supervise contractor and to report quarterly to ADB	PSC to assist PMD in supervision	Contractor to undertake measurements and report to PMD.	Portable real-time calibrated decibel (dB) meter Part of contract cost, include costs of implementing EMP as BOQ line

Environmental Parameters to be Monitored	Location	Time / Frequency / Duration	Methods of measurements	Performance Standard / quantitative targets	Institutional responsibilities (including implementation, supervision, and monitoring)			Equipment and Costs
					PMD	PSC	Contractor / Subcontractors	
Ecology: tree clearance - record keeping	All trees and forest land	Monthly reporting	Record all (if any) trees removed during construction	Tree clearance undertaken in accordance with forest clearance provisions	PMD to supervise contractor and to report quarterly to ADB	PSC to assist PMD in supervision	Contractor to keep records, including plans and photos, and report monthly to PMD.	Part of contract cost, include costs of implementing EMP as BOQ line
Ecology: compensatory reforestation - record keeping	Site(s) selected for reforestation	Monthly reporting	Record native tree saplings species replacements planted (including species, size, and economic value)	Reforestation plan at 1:25 ratio successfully implemented.	PMD to supervise contractor and to report quarterly to ADB	PSC to assist PMD in supervision	Contractor to keep records, including plans and photos, and report monthly to PMD.	Part of contract cost, include costs of implementing EMP as BOQ line
Air quality: SPM, PM10, PM2.5, SO2, and NO2	Nearest receptor within 100m of substations for components 1-5 and 7. Sample of six receptors in representative locations in 100m of each new transmission line; additional locations at request PMD/PSC in event visible dust pollution or grievance received during construction	Once during active construction involving earthworks, and then as requested by PMD/PSC in event of visible dust pollution or grievance received during construction.	To be measured as 1-hour and 24-hour averages along with meteorological data- temperature humidity, wind speed, and wind direction-over a fortnight during dry season.	No exceedance of national ambient air quality standards (or no worsening if exceeded) at sensitive receptors	PMD to supervise contractor and to report quarterly to ADB	PSC to assist PMD in supervision	Contractor to undertake measurements and report monthly to PMD.	Professional, calibrated, portable outdoor air quality monitoring sensors Part of contract cost, include costs of implementing EMP as BOQ line

Environmental Parameters to be Monitored	Location	Time / Frequency / Duration	Methods of measurements	Performance Standard / quantitative targets	Institutional responsibilities (including implementation, supervision, and monitoring)			Equipment and Costs
					PMD	PSC	Contractor / Subcontractors	
Noise level: dB(A)	Site boundary and nearest receptor within 100m of substations for components 1-5 and 7. Sample of six receptors in representative locations in 100m of each new transmission line; additional locations at request PMD/PSC in event noise pollution concerns or grievance received during construction	Once during active construction involving noisy activities, and then as requested by PMD/PSC in event of noise pollution concerns or grievance received during construction.	1hr LAeq over a 48-hour period including workday and weekend using professional, calibrated portable monitoring devices.	No exceedance noise standards specified in Table 10.A (or less than 3dBA increase if already exceeded) at site boundary and sensitive receptors	PMD to supervise contractor and to report quarterly to ADB	PSC to assist PMD in supervision	Contractor to undertake measurements and report monthly to PMD.	Portable real-time calibrated decibel (dB) meter Part of contract cost, include costs of implementing EMP as BOQ line
Water quality	Surface waterbodies or groundwater sources within 100m	Only required if requested by PMD/PSC in event water pollution concerns or grievance received during construction.	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h. Water quality tests by accredited laboratory (physical, chemical, and bacteriological tests) to include pH, turbidity, color, TSS, DO, BOD, fecal coliform. If used as source of drinking water to also test against Nepal drinking water standards	No pollution incident affected surface or groundwater quality	PMD to supervise contractor and to report quarterly to ADB	PSC to assist PMD in supervision	Contractor to undertake measurements and report monthly to PMD.	Part of contract cost, include costs of implementing EMP as BOQ line

Environmental Parameters to be Monitored	Location	Time / Frequency / Duration	Methods of measurements	Performance Standard / quantitative targets	Institutional responsibilities (including implementation, supervision, and monitoring)			Equipment and Costs
					PMD	PSC	Contractor / Subcontractors	
Ecology: bird diverters	Transmission lines in components 1-3, 9a and 9b	Quarterly	Visual check of line and record number of missing bird diverters that need to be replaced and maintenance activities	100% of bird diverters in place and in good condition, or immediately replaced when lost or damaged	PMD (supported by third party if needed) to undertake monitoring and report semi-annually to ADB.	n/a	n/a	NEA operational budget
Ecology: vulture population	Dang district	One-time following construction, and one-time after five years of operation, during vulture breeding season (Jan-March)	TOR to be agreed with ADB, as per international good practice	No reduction in vulture population over baseline population established during detailed design.	PMD to recruit qualified ecological third-party services to carry out survey works. PMD to supervise surveys and to report survey results to ADB.	n/a	n/a	Equipment budget to be included in third party bid.
Ecology: bird electrocution and collision	Length of transmission line in Chure Hill Conservation Area and Buffer Zone of Koshi Tappu Wildlife Reserve	One-time following construction, and one-time after five years of operation, during vulture breeding season for Chure Hill Conservation Area and migratory season for Buffer Zone of Koshi Tappu Wildlife Reserve	Records of bird electrocution and collision from carcass monitoring surveys. TOR to be agreed with ADB, as per international good practice Power outage reports due to same. Interviews with local community to identify if any unrecorded incidents	Zero bird electrocution and collision incidents.	PMD to recruit qualified ecological third-party services to carry out survey works. PMD to supervise surveys and to report survey results to ADB.	n/a	n/a	Equipment budget to be included in third party bid.
Ecology: Compensatory reforestation	Compensatory reforestation sites	Annually for 5-years	Visual check of condition of tree survival	100% survival of compensatory reforestation, or replacement of trees that did not survive each year	PMD (supported by third party if needed) to undertake monitoring and report semi-annually to ADB.	n/a	n/a	NEA operational budget

Environmental Parameters to be Monitored	Location	Time / Frequency / Duration	Methods of measurements	Performance Standard / quantitative targets	Institutional responsibilities (including implementation, supervision, and monitoring)			Equipment and Costs
					PMD	PSC	Contractor / Subcontractors	
GHG emissions: SF6 leakage	All GIS substations	Daily, as part of daily shift checks.	Record of all SF6 leakage and any SF6-related maintenance activities in GIS substations.	Leakage <0.1% and records of undertaking a regular maintenance	PMD (supported by third party if needed) to undertake monitoring and report semi-annually to ADB.	n/a	n/a	Portable SF6 leakage detector - one per site (around \$100 each)
Noise level: dB(A)	Site boundary and nearest receptor within 100m of substations for components 1-5 and 7.	Once at the completion of construction	1hr LAeq over a 48-hour period including workday and weekend using professional, calibrated portable monitoring devices.	No exceedance noise standards specified in Table 10.A (or less than 3dBA increase if already exceeded) at site boundary and sensitive receptors	PMD (supported by third party if needed) to undertake monitoring and report semi-annually to ADB.	n/a	n/a	Portable real-time calibrated decibel (dB) meter (\$1000 per site)
Health and Safety: accident records	For all project components	Monthly	Keep records of health and safety incidents, compile records from substations and carry out interviews with workers and the community to identify if any unrecorded incidents occurred	Zero lost time incidents or fatalities (among workers and community) All near miss, minor, lost time, and fatal incidents having adequate response plan, with lessons learnt for future.	PMD to keep accident records and report semi-annually to ADB, report any lost time incident or fatality within 48h to ADB	n/a	n/a	NEA operational budget
Health and Safety: electromagnetic field (EMF)	Transmission lines with regularly occupied properties in ROW Substations	Once at the completion of construction at transmission lines. Daily monitoring for workers at substations working in close contact EMF.	EMF spot checks along length of transmission lines at locations with regularly occupied properties in ROW Continuous check for substation workers working in close contact with EMF, through personal EMF monitor carried by worker at all times while working on live equipment.	No exceedance of ICNIRP reference levels	PMD (supported by third party if needed) to undertake monitoring and report semi-annually to ADB.	n/a	n/a	Portable site EMF detector, personal EMF radiation exposure monitoring equipment for workers (around \$100 each)

Environmental Parameters to be Monitored	Location	Time / Frequency / Duration	Methods of measurements	Performance Standard / quantitative targets	Institutional responsibilities (including implementation, supervision, and monitoring)			Equipment and Costs
					PMD	PSC	Contractor / Subcontractors	
Health and Safety: drinking water supplies	Substations	Once at the completion of construction, then annually retest.	Drinking water quality tests against Nepal drinking water standards by accredited laboratory (physical, chemical, and bacteriological tests including arsenic levels) Alternatively, evidence that drinking water meeting national standards is being imported for workers consumption is to be provided	Drinking water provided meets national drinking water standards	PMD to appoint third-party laboratory to undertake testing and report results semi-annually to ADB	n/a	n/a	Budget around \$200 per sample for third-party laboratory testing

Appendix 11 - Outline of an Environmental Monitoring Report

The borrower is required to prepare and submit to ADB semiannual monitoring reports that describe compliance with environment safeguards loan covenants, PAM, contract, progress with implementation of the project EMP, quantitative monitoring results, environment, health and safety incidents and responses, grievances and responses, potential or actual non-compliance issues, and corrective actions. A sample Table of Contents that can be adapted as necessary is provided below.

TABLE OF CONTENTS

Part I – Introduction

- Project description, including organogram of relationships with Contractors, owner, lender, etc.
- Design, pre-construction, construction, and operational activities and project progress during previous 6 months
- Confirm if any changes in design and construction (e.g. alignment, construction methods) during previous 6 months
- Confirm if any changes in project organization and Environmental, Health and Safety management team during previous 6 months

Part II – Loan Covenants

- Status of compliance with environment safeguard loan covenants and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required.

Clause	Covenant	Status of compliance to date (full, partial, none, ongoing)	Comment/further action required including timeline

Part III – PAM

- Status of compliance with environment safeguard/monitoring section of PAM and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required.

Para	Details	Status of compliance to date (full, partial, none, ongoing)	Comment/further action required including timeline

Part IV – Contract

- Status of compliance with environment safeguard section of Contracts and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required.

Clause	Details	Status of compliance to date (full, partial, none, ongoing)	Comment/further action required including timeline

Part V – EMP and CAP

- Site inspections and audits completed – summarize the number and type of site visits, persons involved, and checklists/reporting format used (sample of checklists and reports to be included as an appendix)
- Status of compliance with EMP and CAP measures and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required.
- Copies of clearances, CEMP, construction method statements, and other documentation produced in accordance with EMP and CAP during the previous 6 months should be included as an appendix.
- Copies of training records related to EMP and CAP during the previous 6 months should be included as an appendix.

Item	Measure	Status of compliance to date (full, partial, none, ongoing)	Comment/further action required including timeline

Part VI - Environmental Monitoring

- Environmental monitoring results – summarize the previous six months quantitative monitoring activities and data obtained in accordance with the EMoP and provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified. Typically this section will include the results of:
 - Noise and vibration surveys
 - Water quality surveys
 - Air quality surveys
 - Flora and fauna surveys
 - Health and safety incident records
- Corrective actions are required to ensure any exceedances will be prevented in the future.
- Graphs can be used in this section to show trends; however, large tables of data or multiple graphs should be attached as an appendix. Calibration and QA certifications of monitoring equipment and laboratories analyzing samples should be included as an appendix.

Part VII – Consultation and Grievances

- Consultation – report on any ongoing consultation undertaken, and main issues raised by consultees; detailed consultation records should be included as an appendix.

Date	Format/Venue	Participants (Occupation, M/F)	Main Issues Raised
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- Grievances - list any complaints received, however minor, and responses taken to them; detailed grievance records and response reports should be included as an appendix.

Part VIII - Environmental Management

- Report on any unanticipated impacts and updates to IEE/EMP that were required during the previous 6 months, status of delivery of documents, required amendments, consultation and disclosure undertaken etc.
- Environment, health and safety incidents – summarize details of the responses taken to incidents that arose; detailed response reports should be included as an appendix.
- Non-compliance notices – summarize details on the number of notices given out, the issues covered, and status of compliance with them.
- Corrective action plans – summarize non-compliances identified and if non-compliance, report on timeliness for the preparation and completion of corrective action plan if not already included in above.

Annexes

- Sample checklists and reports
- Clearances and documentation
- Training records
- Photographs
- Detailed monitoring data
- Calibration and QA certificates
- Consultation records
- Grievance records
- Environment, health and safety reports

Appendix 12 – Forest Tables

Dadakheth-Rahughat 132kV TL Project

Impact Assessment

• **Tree loss**

As far as standing trees are concerned, based on the field study in the study period, a total of about 2936 trees are estimated to be clear felled from forests during project construction period as depicted in table below.

Table 6-7: Component Wise loss of trees from Forests

S. N.	TL alignment		Name/ Type of Forest	Location	Loss of vegetation (no. of trees > 10cm DBH)			Major Trees Species	Remarks
	From	To			Tree	Pole	Total		
1	SS	AP 4	Rahughat Salleri CF	Rahuganga RM	130	195	325	Khote salla, Khanyau, Tuni, Ghokro	
2	AP 3	AP 4	Patarebagar CF	Rahuganga RM	42	14	56	Salla, khanyu, Ghokro	
3	AP 4	AP 5	Ghatan Thulo Salleri CF	Beni*	21	18	39	Salla, Utis	
5	AP 5	AP 6	Kandekhor CF	Beni*	15	7	22	Mauwa, Chilaune	
6	AP 5	AP 8	Nilpahara CF	Beni*	75	134	209	Salla, Gurans, Katus, Chilaune, Utis	
8	AP 7	AP 8	Gadimahila CF	Beni*	1	23	24	Utis	
9	AP 7	AP 8	Gajane CF	Beni*	10	15	25	Salla	
10	AP 7	AP 8	Deuralidanda CF	Beni*	8	34	42	Utis, Mauwa	
11	AP 10	AP 11	Government Forest	Beni*	12	93	105	Machaino, Mauwa, Khanyau, Tuni, Utis	
12	AP 11	AP 13	Chipletauco CF	Beni*	17	30	47	Sindure, Chilaune	
13	AP 12	AP 14	Dhaulepatal CF	Mangala RM	25	90	115	Sindure, Forsa, Kutmero	
14	AP 14	AP 17	Simalchaur CF	Mangala RM	33	128	161	Sindure, mauwa, chiuri, Khanyu	
15	AP 16	AP 21	Kesari Sammeni CF	Mangala RM	173	308	481	Chilaune, Chiuri, Salla, Mauwa, Sindure, Tuni	
16	AP 22	AP 23	Ranivhir Thadopakha CF	Mangala RM	82	70	152	Ghokro, Sindure, Tiju, Tuni	
17	AP 23	AP 26	Dobilla Lamsung CF	Malika RM	65	292	357	Chilaune, Forsa, Gayo, Khanyu, Salla, Sindure, Tiju, Utis	
18	AP 25	AP 26A	Dhadkharka CF	Malika RM	10	101	111	Mauwa, Utis, Chilaune	
19	AP 26	AP 28	Sano Dhairani CF	Malika RM	36	214	250	Chilaune, Salla, Mauwa Tuni	
20	AP 28	AP 31	Bhagwati CF	Malika RM	22	145	167	Khirro, Malato, Mauwa, Salla, Sindure, Utis	
21	AP 30	AP 33	Khakse Ratovhir CF	Malika RM	30	158	188	Chilaune, Khirro, Malato, Mauwa, Sindure	
22	AP 31	AP 32	Dharapani CF	Dhaulagiri RM	16	44	60	Mauwa, Tuni	
Total					823	2113	2936		

Source: Field Survey 2019

Table 5-4: Project Affected Community Forest and National Forest

S.N.	Name of CF	Address	AP to AP information	Impacted Area (ha)	Pole	Tree	Total
Dang	Shiva CF	Bangalachuli-1	AP 21 to AP 24	1.863	161	162	323
	Gauniku Darsankot CF	Bangalachuli-1	AP 26 to AP 27	0.782	31	58	89
	Ghorle Samar Sopakate	Bangalachuli-1	AP 26 to AP 27	0.824	51	99	150
	National Forest	Bangalachuli-1	AP 28 to AP 29	0.576	22	103	125
	Sunelee CF	Bangalachuli-2	AP 29 to AP 30	1.386	89	59	148
	Dharapani	Bangalachuli-2	AP 30 to AP 31	1.197	101	95	196
	Jaipadevi	Ghorahi SMC-4	AP 32 to AP 33	0.470	51	48	99
	Salleri	Ghorahi SMC-4	AP 32 to AP 34	2.455	139	305	444
	Deurali CF	Ghorahi SMC-4	AP 34 to AP 36	0.833	80	90	170
	Sworgadwary	Ghorahi SMC-4	AP 35 to AP 36	0.580	59	93	152
	Kalika	Ghorahi SMC-4	AP 36 to AP 37	0.995	45	132	177
	National Forest	Sworgadwary-3	AP 4 to AP 6	1.5245	118	69	185
	Chhedapokhari CF	Sworgadwary-3	AP 5 to AP 7	2.4536	345	214	559
Pyuthan	Bartan Malarani CF	Sworgadwary-3	AP 7 to AP 8	0.945	65	53	118
	Pragatisil CF	Sworgadwary-2	AP 8 to AP 10	2.6748	225	184	409
	Dhaulagiri CF	Sworgadwary-2	AP 10 to AP 11	1.2086	84	52	136
	Bharke CF	Sworgadwary-2	AP 11 to AP 14	3.7916	176	209	385
	Kalika CF	Sworgadwary-2	AP 14 to AP 16	2.1504	45	116	161
	Laliguras CF	Sworgadwary-1	AP 15 to AP 16	0.6977	55	85	140
	National Forest	Sworgadwary-1	AP 16 to AP 20	5.2342	160	216	376
	Haryali CF	Sworgadwary-1	AP 20 to AP 22	0.97	67	85	152
	Total			33.811	2147	2527	4674

Table 5-5: Tree Loss in Terms of Plant Species

S. N	Scientific Name	Local Name	Loss of Regeneration		Loss of tree (number)		Total	Remarks
			Seedling per ha.	Sapling per ha.	Pole class	Tree class		
1	<i>Shorea robusta</i>	Saal			493	664	1157	
2	<i>Pinus roxburghii</i>	Salla			610	834	1444	
3		Ayer			75	51	126	
4	<i>Quercus lanata</i>	Banj			43	92	135	
5	<i>Syzygium cumini</i>	Jamun			47	124	171	
6	<i>Aesandra butyracea</i>	Cheuri			45	128	173	
7	<i>Buchanania latifolia</i>	Piyar			2	4	6	
8	<i>Desmodium oojenense</i>	Sadhan			89	94	183	
9		Tilka			89	3	92	
10	<i>Cantunopsis indica</i>	Katus			44	39	83	
11	<i>Alnus nepalensis</i>	Utis			0	5	5	
12	<i>Madhuca longifolia</i>	Mauwa			23	28	51	
13		Raju			0	3	3	
14		Baidar			18	5	23	
15	<i>Pyrus pashia</i>	Mayal			75	60	135	
16	<i>Terminalia sp.</i>	Saj			106	112	218	
17		Tendru			20	73	93	
18	<i>Myrica esculenta</i>	Kafal			97	41	138	
19	<i>Rhododendron arboreum</i>	Laliguras			31	29	60	
20		Sainpa			86	92	178	
21	<i>Toona ciliata</i>	Tooni			9	4	13	
22	<i>Cinnamomum tamala</i>	Tejpat			13	5	18	
23	<i>Cinnamomum zeylanicum</i>	Dalchini			6	6	12	
24	<i>Zanthoxylum armatum</i>	timur			25	0	25	
25		Kaligedi			15	0	15	
26	<i>Fraxinus floribunda</i>	Lakuri			1	1	2	
27		Charikal			1	0	1	
28	<i>Brassaiopsis polyacantha</i>	Chuletro			15	0	15	
29	<i>Megnifera sp.</i>	Aanp			0	2	2	
30	<i>Ficus benghalensis</i>	Bar			0	4	4	
31	<i>Ficus religiosa</i>	Pipal			0	3	3	
32		Panipipal			0	1	1	
33	<i>Quercus sp.</i>	Phalant			0	7	7	
34	<i>Bambox ceiba</i>	Simal			0	2	2	
35		Faret			0	5	5	
36		Gaderi			60	3	63	
37	<i>Semecarpus anacardium</i>	Bhalayo			5	3	8	
38	<i>Dalgerbia sissoo</i>	Sissoo			1	0	1	
39	<i>Mallotus philippensis</i>	Rohini			3	0	3	
Total					2147	2527	4674	

Note: Seedling 0-4 cm DBH; Sapling 4-10 cm DBH; Pole Class 10-30 cm DBH; Tree Class >30cm DBH

Table 6-6: Forest-wise Tree Loss

Darkha Sub-Division						
Name of forest	Location	Pole (no.)	Tree (no.)	Standing wood volume		Remarks
				Timber (cu. m)	Fuel wood (chatta)	
Yangchet forest	Ruby Valley- 4	114	32	13.32	2.86	GF
Belchet forest	Khaniyabas-4	135	15	23.31	3.25	CF
Darkha Forest	Khaniyabas-3	379	22	26.92	6.03	GF
Forest	Khaniyabas-4	266	35	17.28	6.28	GF
Lamidada Devasthan	Natrawoti-2	449	14	14.59	5.02	CF
Tatopani Gomchet	Khaniyabas-2	752	34	41.58	10.87	CF
Ramche Sallaghari	Khaniyabas-5	123	2	5.59	1.65	CF
Rala	Khaniyabas-3	72	5	3.81	1.50	CF
Paleko Maranghat Chihandada	Netrawoti-2	124	0	4.16	1.51	CF
Nimanjong	Netrawoti-2	696	28	60.20	10.67	GF
Sub-Total		3110	187	210.75	49.65	
Salyantar Sub-Division						
Simlepakha CF	Tripurasundari-2	65	7			CF
Nilkantha Sub-Division						
Oshoban	Nilkantha-14	118	6	4.07	2.67	CF
Kalika	Nilkantha-14	76	27	10.15	1.69	CF
Karkale	Nilkantha-14	33	20	8.69	1.09	CF
Govt. Forest	Nilkantha-14	145	15	3.91	2.28	GF
Sub-Total		372	68	26.83	7.74	
Ratmate Division (Nuwakot district)						
Nagthan	Taruka-8	24	6	2.92	4.20(cu.m)	CF
Newarpani Dhodpakha	Budhasing-5,6	250	25	15.55	46.34(cu.m)	CF
Satyadevi	Taruka-9	243	36	42.15	13.68(cu.m)	CF
Batuwa Pakha	Budhasing-2	877	33	0.28	5.46(cu.m)	CF
Thawan chhatiswon	Taruka-1,2,4,5	37	0	30.69	130.93 (cum)	CF
Sub-Total		1431	100	91.59	200.61(cu.m)	
Total		4978	362			

Note: GF= National Forest, CF= Community Forest

Source: Field Survey, 2019

Table 6-5: Species wise tree loss in the forest

S. N.	Botanical Name	Local Name	Loss of Vegetation				Total	Percent age (%)
			Loss of Regeneration		Loss of tree (number)			
			Seedling per ha.	Sapling per ha.	Pole class	Tree class		
1.	<i>Schima wallichii</i>	Chilaune	3284.62	1115.38	995	88	1083	20.28
2.	<i>Terminalia chebula</i>	Harro			2	0	2	0.04
3.	<i>Ficus infectoria</i>	Kabro			0	1	1	0.02
4.	<i>Fraxinus floribunda</i>	Lakuri			0	1	1	0.02
5.	<i>Madhuca longifolia</i>	Mauwa			115	4	119	2.23
6.	<i>Shorea robusta</i>	Sal			2895	97	2992	56.03
7.	<i>Bambax ceiba</i>	Simal			5	5	10	0.19
8.	<i>Albizia lebbeck</i>	Siris			4	4	8	0.15
9.	<i>Picrasma javanica</i>	Tiju			12	0	12	0.22
10.	<i>Sapium insigne</i>	Khirro			15	0	15	0.28
11.	<i>Terminalia sp.</i>	Saj			20	0	20	0.37
12.	<i>Pinus roxburghii</i>	Salla			593	127	720	13.48
13.	<i>Alnus nepalensis</i>	Utis			112	21	133	2.49
14.	<i>Lyonia ovalifolia</i>	Angeri			5	0	5	0.09
15.		Guyalo			6	0	6	0.11
16.	<i>Myrica esculenta</i>	Kafal			59	2	61	1.14
17.	<i>Eugenia jambolana</i>	Jamun			12	0	12	0.22
18.	<i>Castanopsis indica</i>	Katus			93	4	97	1.82
19.		Kyamunu			4	0	4	0.07
20.	<i>Bauhinia variegata</i>	Koiralo			1	0	1	0.02
21.	<i>Toona ciliata</i>	Tooni			4	0	4	0.07
22.	<i>Magnifera indica</i>	Aanp			12	6	18	0.34
23.	<i>Aegle marmellos</i>	Bel			1	0	1	0.02
24.	<i>Choerospondias axillaris</i>	Lapsi			0	1	1	0.02
25.	<i>Semecarpas anacardium</i>	Bhalayo			5	1	6	0.11
26.	<i>Eurya acuminata</i>	Jhingane			1	0	1	0.02
27.	<i>Lagerstroemia parviflora</i>	Botdhanero			1	0	1	0.02
28.	<i>Rhododendron sp.</i>	Guras			2	0	2	0.04
29.		Maleto			2	0	2	0.04
30.	<i>Ficus sp.</i>	Bar			0	1	1	0.02
31.	<i>Michelia champaka</i>	Chanp			0	1	1	0.02
Total					4976	364	5340	100.00

Source: Field Survey, 2019