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Environmental and Social Impact Assessment (ESIA) Study for the Proposed Baleh – Mapai 500 kV Transmission Line Project

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- Song District Office
- Bukit Mabong District Office
- Kanowit District Office
- Kapit District Council
- Song District Office
- Kapit District Council (Song Branch),
- Kanowit District Council
- Kapit Land and Survey Department
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- DDMC (District Disaster Management Committee) Kapit Branch
- SESCO Kapit Office
- Kapit Police
- Kanowit Police
- Song Police
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- Sarawak Forestry Corporation (SFC)
- Sarawak State Health Department (SSHD)
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Acronyms

amsl	above mean sea level
ALARP	As low as reasonably practicable
ASRs	Air Sensitive Receptors
BAKAS	Bekalan Air Luar Bandar dan Kebersihan Alam Sekitar
BMPs	Best management practices
BMTLP	Baleh-Mapai Transmission Line Project
Btg.	Batang
CD	Compact Disc
CIDB	Construction Industry Development Board
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CKSB	Chemsain Konsultant Sdn Bhd
CMCO	Conditional Movement Control Order
CA	Corporate Affairs
CIA	Cumulative Impact Assessment
DDMC	District Disaster Management Committee
DID	Department of Irrigation and Drainage
DO	District Office
DOA	Department of Agriculture
DOE	Department of Environment
DOSH	Department of Occupational Safety and Health
EBS	Environmental Baseline Sampling
ESF	Environmental and Social Framework
ELCB	Earth Leakage Circuit Breaker
EMF	Electromagnetic field
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
Fauna	The animal life of a region
FDS	Forest Department Sarawak
Flora	The plant life of a region
FPIC	Free, Prior and Informed Consent
GBVH	Gender-based Violence and Harassment
GFS	Gravity feed water supply
GRM	Grievance Redress Mechanism
Ha	Hectare
HDPE	High-density polyethylene
HEP	Hydroelectric Project
HGIIP	Hydropower Sustainability Guidelines on Good International Industry Practices
HSAP	Hydropower Sustainability Assessment Protocol
HSG	Hydropower Sustainability Guidelines
ICNRP	International Commission on Non-Ionizing Radiation Protection
IFC	International Finance Corporation

IHA	International Hydropower Association
ISC	Immigration Security Clearance
IP	Indigenous People
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
JKKK	Village security and development committees
JTK	Jabatan Tenaga Kerja Sarawak
JBALB	Jabatan Bekalan Air Luar Bandar (Sarawak Rural Water Supply Department)
JKR	Jabatan Kerja Raya
KDC	Kanowit District Council
LCDA	Land Custody and Development Authority
LOS	Level-of-service
LSD	Land and Survey Department Sarawak
MAAQS	Malaysian Ambient Air Quality Standards
MAIS	Majlis Adat Istiadat Sarawak
MDK	Kapit District Council / Majlis Daerah Kapit (MDK)
MMSD	Malaysian Meteorological Service Department
MITI	Ministry of International Trade and Industry
MKN	Majlis Keselamatan Negara Negeri Sarawak
MOF	Ministry of Finance
MOH	Ministry of Health, Malaysia
MSL	Mean sea level
MVA	Mega-Volt Amperes
MWA	The Malaysian Water Association
MZL	Mixed Zone Lands
NAL	Native Area Lands
NCL	Native Customary Land
NCR	Native customary rights
Ng.	Nanga
NGOs	non-governmental organisations
NIOSH	National Institute of Occupational Safety and Health
NREB	Natural Resources and Environment Board
NREO	The Natural Resources and Environment Ordinance
NTFPs	Non-timber products
NWQSM	National Water Quality Standards for Malaysia
OSH	Occupational Safety and Health
PCPH	Passenger cars per hour
PCU	Passenger car unit
PDRM	Polis Diraja Malaysia
PET	Project Execution Team
PKNAK	Pertubuhan Kebajikan Penduduk Antawau Kapit
PKPB	Pertubuhan Kebajikan Penduduk Baleh
PRO	Public Relations Officer

PS	Performance Standard
PST	Project Service Team
RECODA	Regional Corridor Development Authority
ROW	Right-of-way
RMC	Royal Malaysian Customs Department
RTD	Road Transport Department
RUSLE	Revised Universal Soil Loss Equation
SADIA	Sarawak Dayak Iban Association
SMD	Sarawak Museum Department
SNDU	Sarawak Dayak National Union
SBC	Sarawak Biodiversity Centre
SDMC	State Disaster Management Committee
SCORE	Sarawak Corridor of Renewable Energy
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SF	Service flow rates
SFC	Sarawak Forestry Corporation
Sg.	Sungai
SWB	Sibu Water Board
SPA	State Planning Authority
SRB	Sarawak Rivers Board
SESCO	Syarikat SESCO Berhad
TOR	Terms of Reference
UKPN	Unit Keselamatan dan Penguatkuasaan Negeri
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNIMAS	Universiti Malaysia Sarawak
UN SDG	United Nations Sustainable Development Goal
VECs	Valued Environmental and Social Components
V/C	Volume-to-capacity
VPH	Vehicles per hour
WLPO	Wild Life Protection Ordinance 1998
WWF	Wild Wildlife Fund

Glossary

Access Roads	Existing or new paths that provide vehicular access to transmission line rights-of-way for construction and maintenance activities.
Ambient	Refers to the surrounding environment and/or conditions
Baseline	Existing baseline conditions are the current conditions of an area to be affected by the proposed Project.
Bird strike mortality	Fatal collision between a bird and man-made structure, including transmission lines.
Buffer	Area of land separating two distinct land uses that act to soften or mitigate the effects of one land use on the other.
Corridor	The corridor (or route corridor) is the swathe of land within which the transmission line will lie.
Cultural resources	A broad term covering any physical, natural and spiritual properties and features that are adapted, used and created by humans, in the past and the present. Cultural resources include traditional systems of cultural practice, belief or social interaction.
Cumulative (impact)	Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.
Directly affected stakeholder	Primary: Those who are directly affected, either positively or negatively, by an organization's actions or project. This category includes those who may lose land they currently use or other assets, including houses, buildings, trees, crops or other valuable property as well as access to common resources.
Direct impacts (primary impact or first order impact)	Impacts that are caused directly by an activity and generally occur at the same time and at the place of the activity. These impacts are generally associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
Ecology	The study of interrelationships of organisms to their environment or surroundings. Ecology considers individual organisms, populations and communities, as well as large units of landscape such as forests, estuaries and river basins.
Ecosystem	Organisms together with their abiotic environment, forming an interacting system, inhabiting an identifiable space.
Endangered species	Organism threatened with extinction
Endemic species	Species of those plants and animals which are found in just one particular region and nowhere else in the world.
Engagement	Term used to describe system and processes by which proponent/operator of a facility interacts on a regular basis with its stakeholders.
Habitat	The area or environment where an organism or ecological community normally lives or occurs. The natural home of species of plants or animals.
Habitat fragmentation	The breaking up of an area of habitat into increasingly smaller blocks as a result of direct loss and/or disturbance.
Indirectly affected stakeholder	Secondary: Those who are indirectly affected by the project.

	This include people who live along the transmission line route who may be disturbed by project traffic, noise, dust, or other construction impacts, and who may also benefit from employment opportunities.
Indirect impacts	Indirect or induced changes that may occur as a result of the proposed activity (e.g., the reduction of water in a stream that supplies water to a reservoir that supplies water to community). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
Invasive flora or fauna	Plant or animal species which may spread into, and takes over, an ecosystem to the detriment of other species; often the result of a disturbance.
LiDAR	LiDAR (Light Detection and Ranging) is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth. These light pulses, combined with other data the airborne system records, generate precise, three-dimensional information about the Earth's shape and surface characteristics. See https://oceanservice.noaa.gov/facts/lidar.html
Mitigation	Actions taken during the planning, design, construction and operation of works to reduce or avoid potential adverse effects.
ROW	Right-of-way Strip of land controlled and maintained for a transmission line, road or other linear feature.
Sediment	Material, including soil and organic material, that is deposited on the bottom of a water body.
Stakeholder	Person, organisation or other legal entity concerned with or affected by an activity and its consequences. These include authorities, local communities, investors, workforce, consumers, environmental interest groups and the general public. They may have the ability to influence its location, design and the approval process.
Stakeholder Engagement and Consultation	Stakeholder engagement is the process by which an organization involves people or communities who may be affected by the decisions it makes or can influence the implementation of its decisions. They may support or oppose the decisions, be influential in the organization or within the community in which it operates, hold relevant official positions or be affected in the long term.
Traditional Knowledge	Refers to the wisdom that primarily native/indigenous peoples have accumulated during their lives, by learning from Elders and others, and from personal experience acquired while interacting with the environment.
Transmission Line	Linear arrangement of towers and conductors serves as a means of transporting electric energy from power generation facilities to substations that ultimately serve consumers.
Topography	Referring to natural features on the surface of the earth
Towers	Transmission line structures which provide support for conductors and ensure clearance from the ground.
Vegetation	General term for all plants or plant life of an area or region; it refers to the ground cover provided by plants.

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1. INTRODUCTION AND BACKGROUND

This Executive Summary presents the findings of the **Environmental and Social Impact Assessment (ESIA)** for the **Proposed Baleh-Mapai 500 kV Transmission Line Project (BMTLP)**.

Sarawak Energy Berhad (SEB) plans to design, construct and commission the proposed BMTLP for transferring and transforming energy from the 1285 MW Baleh Hydroelectric Project (Baleh HEP) to Mapai Substation. The Baleh HEP project comprises of 12 individual packages and the BMTLP falls under **Work Package 7 (BLP7)**. The main component of the BLP7 is a **177 km**, 2 x Quad conductor Drake 500 kV transmission line that will connect Baleh 500 kV Substation to Mapai 500 kV Substation. The BMTLP involves the construction of 413 towers in total – 35 are angle towers and 378 are intermediate transmission towers.

1.1 Statement of Need and Strategic Fit

The BMTLP forms a vital part of Baleh HEP as it entails the construction of 177 km 500 kV transmission line from Baleh 500 kV Substation to Mapai 500 kV Substation which will **evacuate the power** generated from Baleh HEP to the Sarawak Grid system to meet the growing energy demand from SCORE development on timely basis.

The primary objective of the Project is to contribute to the State of Sarawak's agenda of sustainable development. The State aims to eliminate the use of diesel-powered electricity supply and allow the affected areas of the proposed Project to benefit from the hydropower development in Sarawak. The electricity evacuation is aligned with the State and Malaysian Government's fuel diversification policy which promotes greater use of renewable energy for power generation.

1.2 Legislative Requirement

Development of the Proposed BMTLP is a prescribed activity which comes under item 7 of the **Natural Resources and Environment (Prescribed Activities) Order, 1994**[1] **(NREO)**. Item 7 of the First Schedule of the NREO stated the following:

> ***7. Any Other Activities Which May Damage or Have an Adverse Impact on Quality of Environment or Natural Resources of the State***

The Order requires an EIA/ESIA report to be prepared and submitted to NREB for approval before the Project can proceed for development.

1.3 International Standards and Guidelines

In order that the Project could be implemented to international standards, international environmental policies and guidelines are taken into account for the preparation of this ESIA. The relevant international standards/ practices that have been used as a guidance in preparing this ESIA are:

[1] Incorporating all amendments up to 4 November, 2004

1. IHA's Hydropower Sustainability Guidelines on Good International Industry Practice (HGIIP) and its two complementary assessment tools, namely:

   a. Hydropower Sustainability Assessment Protocol (HSAP).

   b. Hydropower Sustainability Environmental, Social, Governance Gap Analysis Tool (HESG).

2. International Finance Corporation (IFC) Policy and Performance Standards on Social and Environmental Sustainability.

2. PROJECT DESCRIPTION

2.1 Project Location

The proposed 177 km transmission line connects Baleh 500 kV Substation at Baleh HEP (1°48'34.59"N, 113°46 5.66"E) to Mapai 500 kV Substation (2°07'8.66"N, 112°16'24.65"E). The transmission line will be constructed along the northern banks of Btg. Baleh and Btg. Rajang, on a southeast-northwest-west direction, cutting across mostly secondary forests, logged over mixed dipterocarp forest, tree plantations, agriculture land including shifting cultivation areas and various rivers and streams.

Administratively, the transmission line traverses areas which fall within Kapit Division (Song, Kapit and Bukit Mabong District) and Kanowit District of Sibu Division.

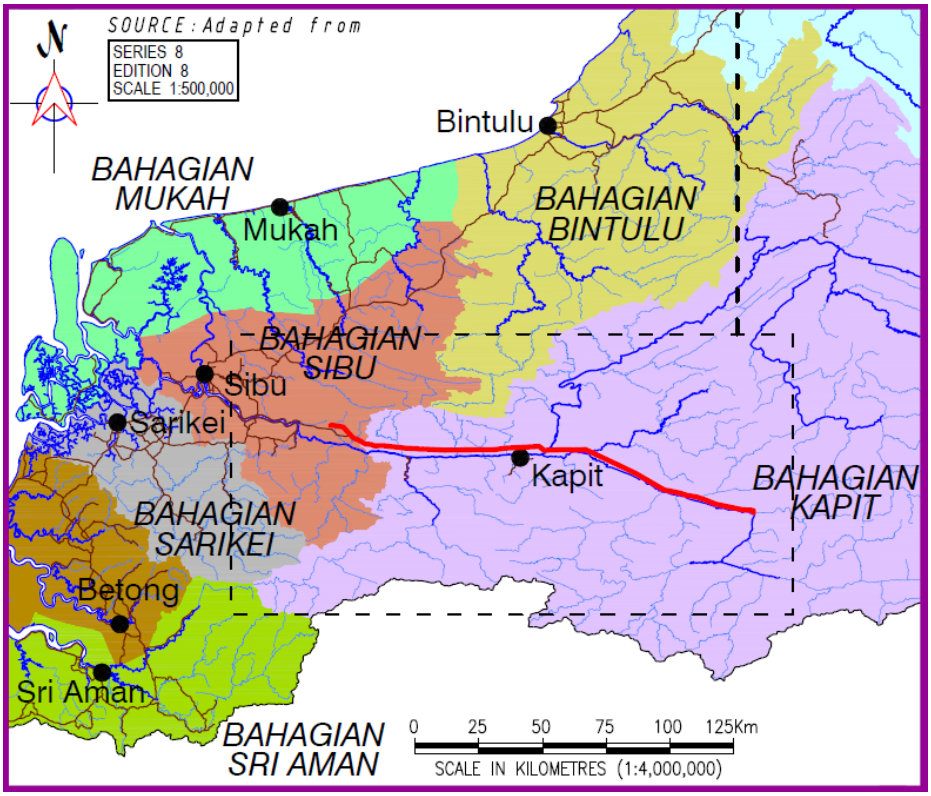


Figure ES-1: Project Location

2.2 Project Status and Schedule

The proposed BMTLP is divided into two packages. AT16 will be the interface point between Package A and Package B. Both packages are further divided into Sections (A, B, C, D and E) and construction works will commence concurrently.

Construction of the Project is anticipated to take approximately 36 months from securing the ROW, design and engineering works, and construction to operation / commissioning of the transmission line, demobilisation of construction team to handover by October 2024. The proposed construction schedule is as follow:

Packages	Line Length	Commencement Date	Completion Date	Contract Duration
A	81 km	1 Nov 2021	30 Sept 2024	35 months
B	96 km	1 Nov 2021	30 Sept 2024	34 months

Siting application have been approved by State Planning Authority (SPA) on 24th January 2020. Currently, centre line survey works is ongoing. The Proponent is also preparing the land acquisition plan for submission to Land and Survey Department (LSD). A total of 18 months is anticipated for the land acquisition process.

2.3 Project Component

The following are summary of the main project components:

Component	Basic Transmission Line Design Parameters	Descriptions
Transmission Line	Number of circuits	2
	Line length	177 km
	Line thermal rating, MVA*	2200
	Line voltage rating, kV	500
Tower Types	There are five types of lattice tower to be installed for this Project: 1. Heavy Suspension Towers (5HS) 2. Dead End-Tension Tower (5DE) / 5RA (Right Angle) 3. Light Angle-Tension Tower (5LA) 4. Medium Angle-Tension Tower (5MA) 5. 5T (Transposition Tower)	• Towers will be between 62 to 70 m high, depending on terrain and location. • The tower platform footprint is approximated at 40 m × 40 m. • 413 towers in total (35 AT and 378 intermediate)
ROW (50m)	**Minimum Vertical Clearance to be Ensured from the Line Conductors at Maximum Sag to Ground or by Various Crossings**	
	To ground	12.0 m
	Over major navigable river crossing to water at maximum high-water level including 5 m electrical clearance	50.0 m
	Over non-navigable river crossing to water at maximum high-water level	29.0 m
	To metal clad or roofed buildings or other structures upon which people may occasionally stand.	6.0 m

Component	Basic Transmission Line Design Parameters	Descriptions
	To overhead power or telecommunication lines (to cradle)	5.0 – 8.0 m
	Minimum Horizontal Clearance to be Ensured between the Line Conductors at Maximum Sag and 45 degrees Swing Angle and Object Near to the Line	
	Buildings	6.0 m
	Danger trees zone	4.3 m
	Minimum Clearance to be Ensured between the Line Conductors at Maximum Sag and 45 degrees Swing Angle and Object Near to the Line	
	Side ground clearance	12.0 m
Access Roads	Existing and abandoned logging roads	74.17 km
	Access within the ROW	177 km or slightly more
Land Requirement	Transmission line ROW including Tower footprint	885 ha (177 km x 50 m)
	Site Offices, onsite base camps, warehouse/ store, material stock yard and machine parking	0.8 ha. (0.4 ha x 2 sites)
Workers	SEB and Contractors	817
Machineries and Equipment	Vehicles	34
	Heavy Machinery	26
	Fuel Burning Equipment	20
Water Supply	Project staff, contractor facility and workers	134,805 litres/day (or 4,044 m^3/month
	Construction works	8,020 litres/day
Power Supply	SESCO and fuel powered generator sets	
Raw Materials	Concrete	45,000 m^3
	Cement	8,000 m^3
	Sand	8,000 m^3
	Gravel / Aggregate	22,250 m^3
	Steel bars	3000 tonnes

Source: Sarawak Energy Berhad, 2021

** MVA = Mega-Volt Amperes*

2.4 Project Activities

The main activities of the Project consist of the following:

Phase	Activities	Descriptions
Preparation	Engineering survey	• Linear survey along the full length of the proposed transmission line alignment, to establish accurately the topography within the proposed right-of-way. • These activities will provide opportunities to ensure that the routing of the transmission line avoids environmentally or socially sensitive sites while still being technically sound.
	Securing the ROW and land acquisition	• Survey, valuation, land acquisition and alienation by LSD for 177 km x 50 m transmission line ROW.

Phase	Activities	Descriptions
		• Access roads / access points of approximately 74.2 km.
	Access points establishment and jetties	• The existing access roads that are too narrow or unsafe to travel will be improved to ensure the safety of road users and smooth traffic flow. • Jetties will be constructed to access areas which are not easily accessible by land.
Construction	Onsite support facilities	• Site clearing of 0.8 ha. for temporary land for site offices, onsite base camps, warehouse/ store, material stock yard and machine parking. • 50 x 50 m on each tower site for temporary tower laydown and assembly area. • Provision of water supply via direct extraction, gravity feed, rainwater harvesting or piped water from JBALB if available. • Power supply – tap from SESCO and fuel powered generator sets. • Sanitary facilities – HDPE septic tanks for 245 PE. • Waste handling and disposal – biomass waste, construction wastes, domestic wastes and sewage and scheduled wastes.
	ROW clearing	• All vegetation within the footprint of the tower base and for a distance of approximately 2 m beyond the base in all directions will be cleared to ground level using hand tools such as chainsaws, parang, grass cutter, bush cleaner, etc. No chemical herbicides will be used. • Tall vegetation will be cut to ground level throughout the ROW. Roots/ stumps will be left in situ. • A clear path will be totally cleared and levelled as an access road between all towers. • Roots and stumps will be left in situ and the cut vegetation stacked or cut/chipped or mulched to increase ground contact for a speedy decomposition. • Local communities may be allowed to take the timbers for domestic use. • No open burning.
	Overburden removal	• Earthwork cut volume for tower bases (413 nos) estimated at 140,000 m^3. • Any excess will be stored at site.
	Temporary drainage and ESC	• BMPs will be implemented e.g., earth drain along the perimeter of work area at the towers, erosion control blankets, check dams, cover crops.
	Foundation preparation and installation	• Involve excavations of earth or auguring of holes for footing and concreting of the tower base. • Concrete mixing will be carried out onsite, near the tower base using mobile concrete mixers.
	Rising the towers	• Erection of towers is done by assembling prefabricated components of the lattice structure in sections using crane or gin poles.

Phase	Activities	Descriptions
	Stringing, tensioning and clamping works	● Stringing or conductoring of the transmission line commences only upon completion of a minimum length of continuous stretch, which would make fullest possible use of maximum conductor lengths and minimum number of conductor joints.
	Site stabilization and restoration of disturbed areas	● This will involve removal of spoil material and wastes, compaction of loose fill materials, damage repair and rehabilitation of finished working areas.
	Decommissioning of temporary facilities	● This involves clean-up/ removal and rehabilitation of sites that have a direct and indirect impact on air, water and soil, cultural or economic use of the area. ● Facilities to be taken over by the Proponent will not be dismantled. ● Temporary facilities or structures such as workers quarters, site offices, warehouse, store and so on will be removed. ● All the machinery and equipment or parts thereof shall be demobilized too.
	Testing and commissioning of the transmission line	● Physical inspection and checking of all foundation work, tower erection and stringing is carried out to ensure strict adherence to the technical requirements/specifications.
Operation and Maintenance	Transmission line maintenance	● Visual inspection of insulator, conductor, missing towers number, measurement of earth footing resistance, checking of tower foundation, anti-climbing device, phase plate, number plate, circuit plate, danger plate, checking of corrosion, tower earthing, conductor clearance and rectification of faults.
	ROW, access roads and slope maintenance	● Maintenance work include clearance of vegetation within ROW, access road and slope stability.
	Surveillance	● Regular surveillance ensures that insulators, earthing systems, and structural components are in order. Surveillance is undertaken by personnel via the access roads to the tower sites, or, in less accessible area, by drones on an annual basis.

3. PROJECT OPTIONS

Based on comparative analysis of the proposed route options against HSAP criteria for siting and design option, Route Option 2 emerges as the most optimum in terms of land use conflict, avoidance of settlements, avoidance of cultural resources (gravesites), avoidance of steep slopes, distance from RECODA road and non-objection from the stakeholders.

4. STAKEHOLDER ENGAGEMENT

Engagement and consultations on environmental issues with community members, institutional stakeholders and potentially affected communities in the form of stakeholder meetings, focused group discussions, social and health surveys, public display of TOR (online and physical), etc. were carried out since October 2020. The engagements process involved both formal and non-formal discussion. The feedback generated through these meetings has been incorporated as far as possible in the design of the project.

Dialogue with Community Leaders of Kapit (top) and Bukit Mabong (bottom)

5. EXISTING PHYSICAL ENVIRONMENT

The existing physical environment of the site and surrounding area is summarized below. The baseline sampling locations for surface water, ambient air and noise are shown in **Figure ES-2**.

<table>
<tr><th>Element</th><th>Description</th></tr>
<tr><td>Climate</td><td>Kapit region is subjected to an equatorial type of climate consistent with the rest of the State, characterised by hot and humid weather all year round. The two distinct monsoon regimes are:
1. Northeast monsoon (November to March) – wet season
2. Southwest monsoon (May to September) – dry season
24-hr mean temperatures fluctuate in a small range between 26.4°C to 27.4°C with long term mean of 26.9°C.
As elsewhere in the world, climate change has its effects in Malaysia with raising temperatures. In addition to the generally rising temperatures and rainfall, extreme events such as heat waves and storms are also increasing in frequency.
The mean surface wind speed observed for the last 13 years was consistent at 0.9 m/s or 3.24 km/hr, which is interpreted as light wind.</td></tr>
<tr><td>Topography</td><td>Generally, the topography of the Kapit region consist of hilly, mountainous, ridges, valleys and plateaus. The elevation is at its highest at Baleh area (60 m to 780 m) and slowly reduced as the proposed transmission line travels westwards towards Kapit area (40 m to 280 m). For Song area, the elevation ranges from 20 m to 220 m. At Kanowit area, approaching the Mapai substation area, the elevation ranges from 20 m to 180 m. Majority of this stretch is flat land with some small hills. The slope classification within the ROW is as shown below:
<table>
<tr><th>Class</th><th>Slope Gradient</th><th>Percentage</th></tr>
<tr><td>Class I</td><td>< 15°</td><td>58.71</td></tr>
<tr><td>Class II</td><td>≥ 15° – < 25°</td><td>27.50</td></tr>
<tr><td>Class III</td><td>≥ 25° – < 35°</td><td>11.49</td></tr>
<tr><td>Class IV</td><td>≥ 35°</td><td>2.30</td></tr>
</table></td></tr>
<tr><td>Geology and Seismicity</td><td>The proposed transmission line alignment is located above areas underlain by both Kapit Member and Layar Member of the Belaga Formation, a very thick sedimentary rock sequence formed from the late Cretaceous to late Eocene (60 to 30 million years ago).
As the majority of the seismic activity is on the edge of the Sunda Shelf plate, there are few recorded earthquakes inland and offshore Sarawak. The distant earthquakes are far enough away to produce very low hazard in Sarawak.</td></tr>
<tr><td>Soil and Agriculture Capability</td><td>99.72% of the transmission line right-of-way is located above areas underlain by the mixture of Skeletal Soils (Kapit series) and Red-yellow Podzolic Soils (Merit series) except for a small portion of gley soils near Mapai.
Merit soils are associated with moderately to very steeply dissected hills while Kapit soils and Merit/Kapit soil associations can be found on very steep hills and mountain (with slopes more than 33 degree). These soils are highly erodible if disturbed, and left bared.
Within the ROW, more than 80% of the soils have two or three serious to severe limitations (Classes 5td, 5td-4te), mainly due to steep terrains/topography (t), shallow depth and severe erosion hazard. Hence, the lands with such soils are unfeasible for agricultural activities.</td></tr>
</table>

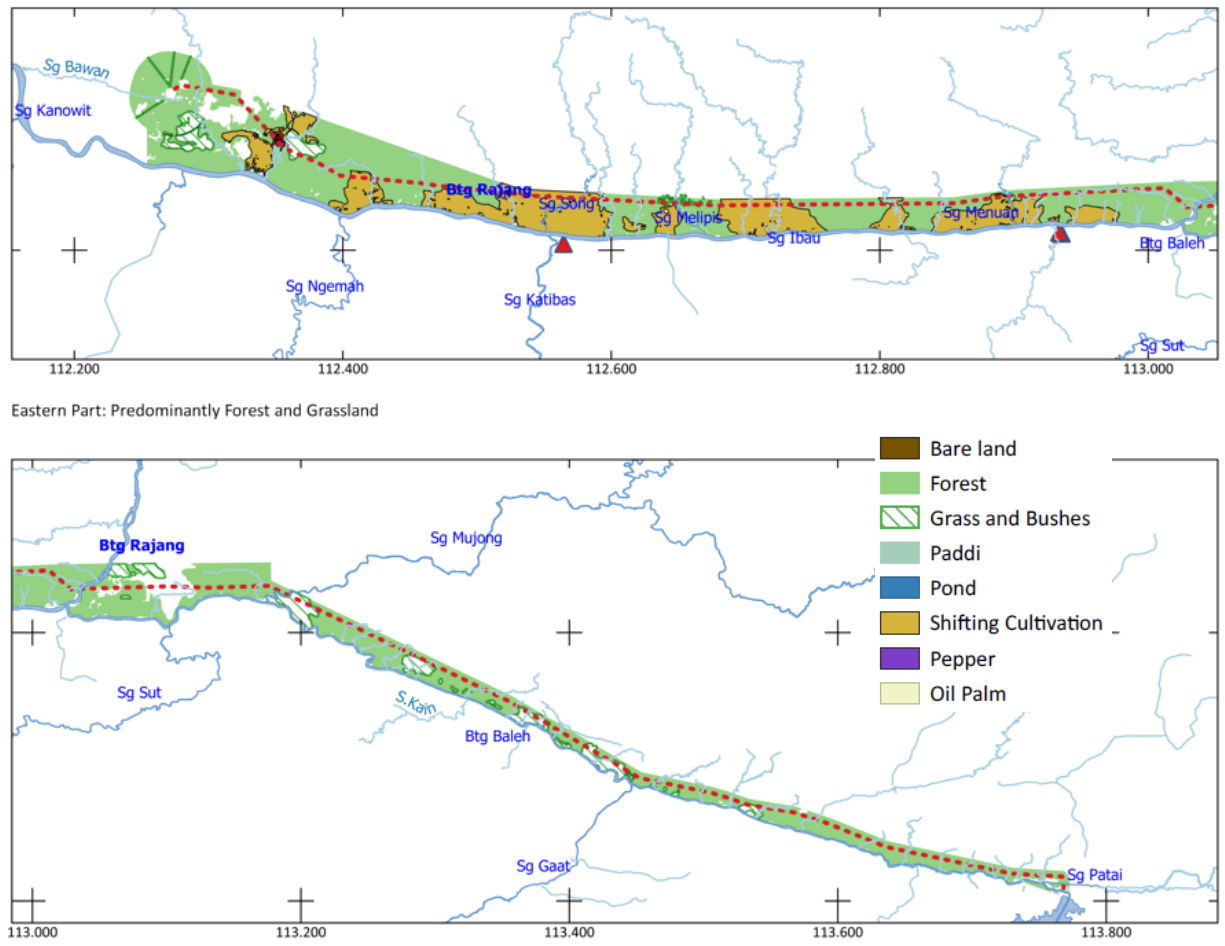
Element	Description
Hydrology	The major tributaries located on the northern banks of Btg. Rajang and Btg. Baleh, crossed by the proposed transmission line are as follows: 1. Btg. Rajang (8 nos) – Sg. Menuan, Sg. Belawai, Sg. Ibau, Sg. Entangai, Sg. Song, Sg. Iran, Sg. Kabah and Sg. Mapai. 2. Btg. Baleh (3 nos) – Sg. Putai, Sg. Merirai and Sg. Mujong. Rivers still plays important roles among the rural community in this region as: • Main transportation medium connecting remote areas to main urban centres such as Sibu, Kanowit, Song and Kapit. • Source of food (fish) as well as a source of income. • Water supply – water catchment, intakes and gravity feed catchments.
Water Quality	The most common pollutants of Btg. Rajang, Btg. Baleh and their tributaries are suspended solids from timber and plantation activities, coal mining, sand dredging activities, road constructions, ongoing construction of the Baleh HEP and sewage and grey water discharges from settlements. 25 water samples were collected and analysed: • 15 from the tributaries of Btg. Rajang and Btg. Baleh. • 10 from main Btg. Rajang and Btg. Baleh. *7 samples collected from GFS and near RWI were tested for heavy metal* The Water Quality Index (WQI) shows that all the water samples collected falls under the category of "Clean" except for W14 which is slightly polluted most likely due to anthropogenic activities from the nearby Kapit town and settlements upstream. Comparison of baseline results with relevant water quality data available from monitoring points by JBALB and NREB showed that parameters such as turbidity, COD, TSS, TCC, FCC are mostly in similar range except for Cu and Fe. Status of Btg. Baleh prior to the Baleh HEP construction was categorized as clean. However, during the Baleh HEP construction, monitoring reports from various EMPs and EIAs showed that the Btg. Baleh is slightly polluted especially for water samples collected closer to the proposed Baleh HEP. Going downstream, the water quality would improve and mostly reported to be clean before the confluence with Btg. Rajang. Similar WQI was also reported in the baseline water quality for the transmission line Project.
Air Quality	With its dense forest cover, low population density and little industry, the air quality is relatively very good. All PM_{10} and $PM_{2.5}$ levels of the 10 air samples were significantly lower than the MAAQS and WHO standards.
Noise Level	Measured day time noise levels (same locations as air sampling) were generally in the range of 45 – 53 dB(A), with a higher level of 61.7 dB(A) recorded at one location (N8-Rh. Sana). Measured night time noise levels, were generally in the range of 42 – 49 dB(A), with a higher level of 65.2 dB(A) recorded at N2 (Rh. Richard Nujong), 62.9 dB(A) recorded at N8 (Rh. Sana). Noise was due to active life in the settlements and sounds from generator sets, animals and insects which are more pronounced during night time.
EMF	The measured values were well below the International Commission on Non-Ionizing Radiation Protection's (ICNIRP) Guidelines.
Traffic	Presently, the only local road network to the northern bank of Btg. Rajang is available up to Nanga Tada, near Mapai 500 kV Substation site. Beyond this, there is no direct road linkage except by river transport and some plantation and logging tracks, up to Ng. Banyau. From Ng.Banyau, access to Putai/Baleh HPE dam site is via partially completed RECODA road on the northern bank of Btg. Baleh. In general, heavy vehicles (trucks and buses) made up about 2% to 25% of the total traffic at surveyed locations except at TS4. TS4 recorded high percentage of heavy

Element	Description
	vehicles ranging from 36% to 97% as the road is used by coal mining activities upstream. Riverine traffic mostly consists of passenger "long boat". Speed boats and express boats are also common. Roadway capacity analysis found that all the roads are operating with minimal volume-to-capacity ratio up to Year 2024.
Waste Management	The form of municipal solid waste disposal for the communities around the Project site is commonly burial, dumping into the river or burning. Municipal operated dumpsites are available in Kapit and Song but waste collection coverage is relatively low due to access difficulty. DOE licensed offsite scheduled wastes storage facilities and recycling facilities (scrap metals and plastics) are only available in Sibu. The common toilet facility used by the communities is either flush toilet or a pour-flush latrine, depending on the reliability of the household sources of domestic water. The nearest septic sludge treatment plant is the Sibu Septic Sludge Treatment Plant, which is located next to the Kemuyang Sanitary Landfill. However, the current practice in Kapit is to dispose the sludge collected from septic tanks in dumpsites.

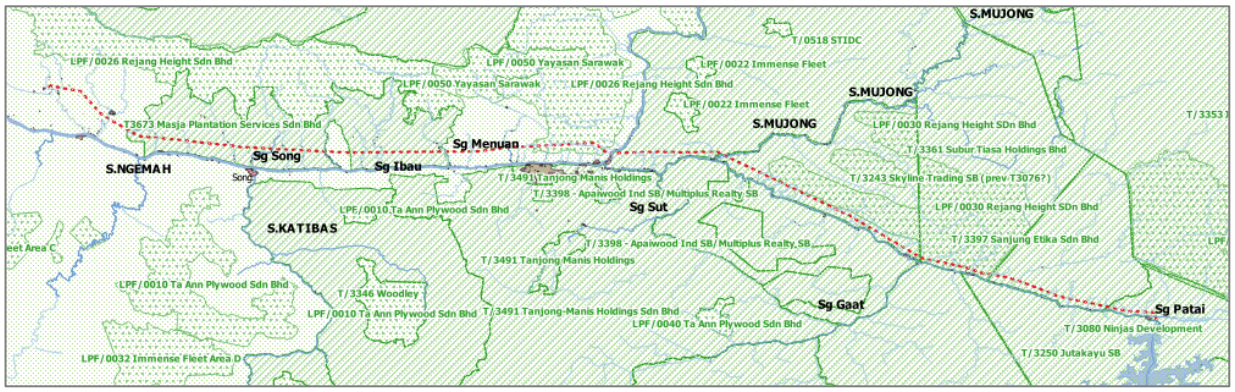
6. BIOLOGICAL ENVIRONMENT

Local community that lived along Btg. Rajang and Btg. Baleh had been farming the land near the river for more than a century. Commercial logging which started in 1960s opened up land beyond the river. As a result of these activities, the wildlife habitat comprises many types of forest. Primary forest patches occur where the terrain is too steep and difficult for logging and shifting agriculture. Secondary forest at different stages of regeneration from farming and logging activity, and farms and agroforest comprising a mix of planted trees and natural vegetation are closer to human settlements.

Element	Description
Terrestrial Flora	Landcover distribution along the transmission line clearly falls into two areas: The area along Btg. Baleh is dominated by remnant/ secondary forest occasionally mixed with patches of grass and bushes whereas the area along Btg. Rajang primarily is a mix of the same depleted forest and shifting cultivation at all stages. About 76% of the transmission line ROW are forested area and 11% shifting cultivation area. The remaining areas consist of grass and bushes (6.5%), oil palm plantation (5.4%), bare land (0.5%) and paddy fields (0.4%).



Forestry and planted forest	The entire project area is covered by or bordering to various forestry licence areas, mostly areas approved for conversion to planted forest but also some timber licences, i.e., natural forest management. The forest management companies have in several cases overlapping timber and plantation concessions in their areas.



Protected Areas	There are no gazetted, legally protected areas, i.e., national parks, wildlife sanctuaries, nature reserves, within 50 km of the proposed transmission line apart from catchment and water intake protection. The multinational Heart of Borneo Initiative is about 25 km south of the transmission line at its nearest point. The transmission line does not traverse neither gazetted nor proposed areas of the PFE.

<table>
<tr><td></td><td>The Project does not traverse any “Key Biodiversity Areas” as defined on Integrated Biodiversity Assessment Tool (IBAT)-Alliance. Neither is any area within the site classified under the IUCN management categories.</td></tr>
<tr><td>Terrestrial Fauna</td><td>Detected species were based on survey conducted at 11 sites at the proposed transmission line project in Dec 2020.
<table>
<tr><th></th><th>Potentially present</th><th>Observed at TLP</th></tr>
<tr><td colspan="3"><u>BIRDS</u></td></tr>
<tr><td>Total</td><td>217</td><td>84</td></tr>
<tr><td>Threatened</td><td>13</td><td>0</td></tr>
<tr><td>Protected (Totally Protected)</td><td>51 (11)</td><td>15(1)</td></tr>
<tr><td colspan="3"><u>MAMMALS</u></td></tr>
<tr><td>Total</td><td>85</td><td>18</td></tr>
<tr><td>Threatened</td><td>13</td><td>4</td></tr>
<tr><td>Protected (Totally Protected)</td><td>62 (6)</td><td>12 (3)</td></tr>
<tr><td colspan="3"><u>REPTILES</u></td></tr>
<tr><td>Total</td><td>53</td><td>9</td></tr>
<tr><td>Threatened</td><td>1</td><td>0</td></tr>
<tr><td>Protected (Totally Protected)</td><td>6 (1)</td><td>2</td></tr>
<tr><td colspan="3"><u>AMPHIBIANS</u></td></tr>
<tr><td>Total</td><td>72</td><td>5</td></tr>
<tr><td>Threatened</td><td>7</td><td>0</td></tr>
<tr><td>Protected</td><td>0</td><td>0</td></tr>
</table></td></tr>
<tr><td>Wildlife Utilization</td><td>Locals’ livelihood revolves around the environment surrounding them, ranging from collection of jungle produce to hunting of wildlife. Most of the jungle produce and wildlife are for self-consumption but some especially wild pigs, deer and civets found their way to Kapit market for sale.</td></tr>
<tr><td>Aquatic Flora and Fauna</td><td>There are no significant macro vegetation or particularly rare or protected species in the rivers. Locals catch Empurau, Semah, Tengadak, Baong, Tapa and Labang. Apart from Empurau, these are the same species as are the target for the Tagang schemes in the area. Empurau is frequently caught in both Bakun and Murum reservoirs, i.e., it exists in the associated tributaries. Aquaculture is rare in the area.</td></tr>
</table>

7. EXISTING HUMAN ENVIRONMENT AND LAND USE

The following summarises the baseline characteristics of socio-economic conditions of the population within the area of influence of the proposed transmission line.

Element	Description
Settlements and population	There are approximately 159 Iban settlements with total population of about 25,000 (3,413 households) scattered along the northern bank of Btg. Rajang and Btg. Baleh, between Baleh HEP up to Mapai Substation. Out of this: • 16 settlements are within the transmission line 500 m AOI • 2 settlements within 100 m from access roads • 117 settlements are within the river corridor AOI, to the south of transmission line • 24 settlements are outside the AOI

Demographic characteristics of 68 surveyed longhouses and 185 surveyed household	**Size of longhouses**: 7 to 56 doors, with population from 44 to 576 persons. **Household size**: Between 1 to 39 members (average, 7.3); 58% single-family households. **Residency**: 61% residing outside the area compared to the 39% residents. **Male to female ratio**: 1.15, i.e., more males than females **Age groups**: 69% active working age groups (15 to 64 years old); 25 schooling age and toddlers; 6% elderlies.
Socio-economic - cash income, occupations	**Monthly cash incomes**: from RM300 to RM10400 (average, RM1290). More than 80% reported to earn monthly cash incomes below RM2131 (i.e., Poverty Line Income (PLI) of Sarawak in 2019. Low cash incomes indicate high level of dependency of the local households on non-cash incomes from agricultural activities, fishing and collection/ utilization NFTPs. Reported sources of cash incomes include farming activities, wage/ salaries, remittance, self-employments, and sell of forest and river products.
Social capital	Project-affected communities indicate the existence of strong social capitals. Social norms are formed and regulated by local customary laws (*adat*), which promotes community cohesion, and increases resiliency of the community against shocks, as demonstrated in *gotong-royong* spirit in communal affairs. Local leadership which link the communities to outsiders and an enforcer of the *adat, also* plays crucial roles in the continuity and enhancement of social capital.
Vulnerable groups	Vulnerable groups identified include the elderly, sick and disable persons; single-headed households; dependent children and low-income households.
Infrastructure, facilities	**Water supply**: Gravity-fed water supply is most common, except for most settlements in Mapai/ Kabah/ Ng. Tada; Ng. Beguang and Ng. Entawau who enjoyed treated water from JBALB. **Power supplies**: Private/communal generator sets as well as SESCO. **Sewage disposal**: Pull-flushed or pour-flushed toilets. **Wastes disposal**: At designated locations near the settlements, or thrown into the rivers. **Schools and medical facilities**: Available to all settlements. **Telecommunication**: Poor or non-existence of telephone and internet coverage. **Road access**: Limited to settlements at Mapai/ Kabah/ Ng Tada (Kanowit District), and along RECODA road in Baleh. Other settlements mostly depend on water transport (longboats).
Land tenure, Land use	The transmission line traverses untitled/ undocumented lands (74.3%) and title lands (25.7%). Based on the satellite imagery and land use investigations, large areas along the transmission line are covered by forests. Other uses include oil plantations, mixed tree crops, paddy fields and fishponds. Lands within and in the vicinity of the project site are mostly under provisional leases belong to various timber concessioners and oil palm plantations. Pockets of NCR lands also coexist within these provisional leases, especially near local settlements. Social survey indicated that most of the households (95%) own lands, which are mostly NCR lands. Major land uses include mixed fruit orchards (durian, dabai, mango, jackfruit), wet and hill-rice fields, *temuda*, rubber agroforests, pepper, oil palms and short-term crops (banana, vegetables etc.).
Project support, perceptions	**66%** of the respondents indicated **supports for the project** despite a low level of awareness among community members. Community interviews also indicated **good community supports** for the project (82% supported, 4% opposed; 13% did not responded). **Main worries** indicated include water pollution; land acquisition and crop loss; loss of forest/ river resources; hampered access to orchard/ garden forest and rivers; and disruption of fishing activities phase.

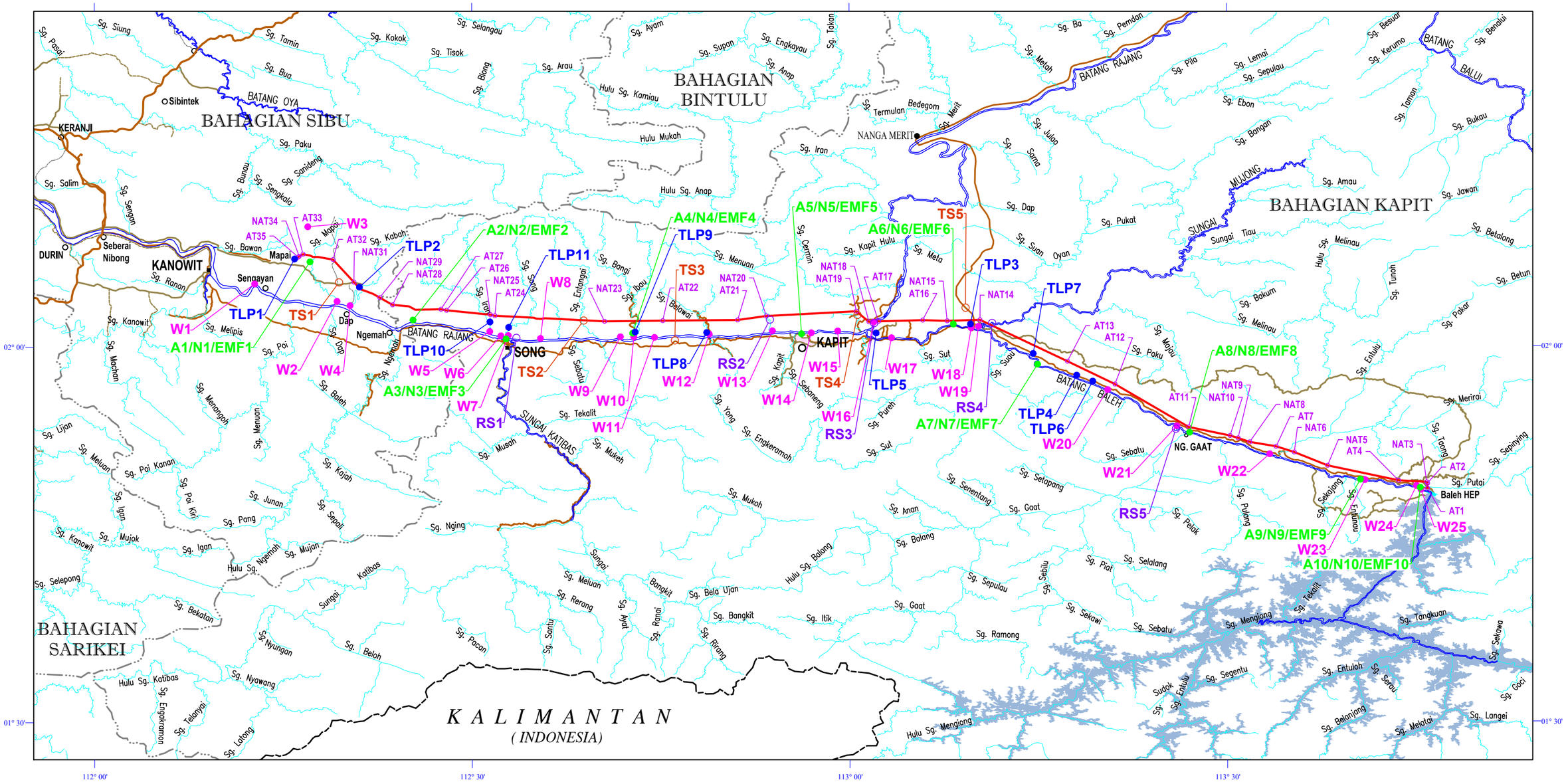
	EMF exposure and general health effects are two main concerns at the post construction phase. About 15% of women groups thought the project would have impacts on their safety, livelihood (loss of land/ crop) and health (EMF). Other were mostly uncertain (58%) or thought it would not affect them (32%). Most of the respondents in household survey believed local people would be interested in potential jobs associated with the proposed project.

8. ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

A summary of the results of the impact assessment is provided in **Table ES-1** below. The table illustrates the potential impact along with what the impact significance and proposed mitigation measures which will be implemented.

The ESMPs has been developed (Chapter 9) to specify the standards and controls required to manage and monitor the environmental and social impacts of the proposed BMTLP. To achieve this, the ESMP framework identifies potential adverse impacts from the planned activities and outlines mitigation measures required to reduce the likely negative impacts on the biophysical and social environment. The ESMP proposed in this ESIA are commitments which will be implemented by the different parties involved, i.e., SEB and its Contractors (including sub-contractors) during the construction and operation of the BMTLP.

CHEMSAIN KONSULTANT SDN. BHD.



LEGEND:

- PROPOSED TRANSMISSION LINE ROUTE
- PROPOSED ANGLE TOWER (AT1 - AT35)
- INTERNATIONAL BOUNDARY
- DIVISIONAL BOUNDARY
- BALEH DAM
- BALEH DAM RESERVOIR
- RIVERS / STREAMS
- ROADS / MOTORABLE TRACK
- ROAD TRAFFIC SURVEY - (TS1-TS5)
- RIVER TRAFFIC SURVEY - (RS1-RS5)
- BASELINE WATER SAMPLING LOCATIONS - (W1-W25)
- BASELINE AIR SAMPLING LOCATIONS - (A1-A10)
- BASELINE NOISE MONITORING LOCATIONS - (N1-N10)
- ELECTRO MAGNETIC FIELD MONITORING LOCATIONS - (EMF1-EMF10)
- FAUNA SURVEY SAMPLING LOCATIONS - (TLP1-TLP11)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR THE PROPOSED BALEH-MAPAI 500 KV TRANSMISSION LINE PROJECT

N

0 10 20 30 40Km

SCALE IN KILOMETRES (1:600,000) – A3 MEDIUM

GRID
–The outer ticks indicate the Latitude and Longitude

SOURCE : Adapted from
SERIES 8
EDITION 8
SCALE 1:500,000

ENVIRONMENTAL BASELINE SAMPLING LOCATIONS

FIGURE: ES-2

D:\ACAD\DRAWINGS\EV103\792\FIG-ES-2.DWG

Table ES- 1: Summary of Results of Impact Assessment and Proposed Mitigation Measures

	Aspects	Phase	Activities and Potential Impacts	Impact Significance	Impact Duration	Mitigation Measures (MM)
1.	Land Use Conversion	Pre-construction	Loss of land and crops for tower bases and transmission line right-of-way	Minor	Permanent	● Refer to MM under item No. 10: Loss of customary land, crops and livelihood
2.	Soil Erosion	Construction	Increase soil loss, sedimentation and turbidity of waterways near construction work site – access points, onsite support facilities, right-of-way and cut and fill activities	Minor	Short-term	● Implement ESCP BMPs including staged site clearing and earthworks during dry weather; provision of temporary drainage; erosion control blanket; check dams; stabilisation of work areas; and stockpile management.
		Operation and Maintenance	Soil disturbance from access road and slope maintenance	Insignificant	-	-
3.	Water Quality	Construction	Deterioration of water quality due to soil runoff, oil and grease spillage and other wastes	Minor	Short-term	● MM for soil erosion (No. 2) and waste management (No. 6) applicable here. ● Stringent measures to avoid spillage of construction material, leakage of oil and fuel during transportation and refuelling; keep waterways cleared of debris. ● Do not disturb streams, rivers or weirs for GFS. Damage to pipelines or structure shall be repaired promptly. ● Monitor water quality at sensitive areas.
			Deterioration of water quality due to wastewater discharge	Moderate	Short-term	● Provision of adequate washing and toilet facilities. Toilet should be at least 100 m from water bodies. ● No discharge of untreated sewage into waterways. ● Design and sizing of septic tanks in accordance with the "Sarawak Urban Sewerage System Guidelines No. 1: The Design and Construction of Septic Tanks". ● Regular desludging.
		Operation and Maintenance	Deterioration of water quality	Insignificant	-	-
4.	Air Quality	Construction	Fugitive dust and PM_{10} pollution due to traffic and transportation activities along unpaved access road surface Vehicles exhaust emission	Minor	Short-term	● Notify affected community on work commencement and activities. ● Manage site to minimise dust (cover loads, speed limits, wetting of road surface, dust suppression, no burning of biomass at the construction site).

	Aspects	Phase	Activities and Potential Impacts	Impact Significance	Impact Duration	Mitigation Measures (MM)
						● Monitor air quality within the construction site. ● Provide a public liaison person to response to complaints.
		Operation and Maintenance	Vehicles exhaust emission	Insignificant	-	-
5.	Noise	Construction	Noise from transportation activities along access roads and construction at tower sites	Minor	Short-term	● Notify affected community on work commencement and activities. ● Manage site activities to control noise level (reduce noisy activities, confine working hours between 7:00 am to 7:00 pm, control workers exposure to high noise level, PPE usage, observe traffic rules). ● Monitor noise level to ensure compliance. ● Provide a public liaison person to response to complaints.
		Operation and Maintenance	Operation of transmission line and maintenance work	Insignificant	-	-
6.	Wastes	Construction	Improper management and disposal of biomass wastes, solid waste, domestic wastes, and scheduled wastes (hazardous and non-hazardous wastes)	Moderate	Short-term	● Biomass wastes: Confine clearing to the ROW only; no dumping of into waterways or drainage and no open burning. Allow local community to access the biomass for their own use. ● Non-hazardous wastes: Recommended measures include siting storage yards and workshops away from environmental sensitive areas; provide training on waste disposal and management; implement construction material inventory; encourage 3Rs concept among workers; wastes segregation; provision of sufficient refuse bins; good housekeeping of base camps and construction site. ● Scheduled wastes: To comply with EQ (Scheduled Wastes) Regulations, 2005 requirements for proper management and disposal by DOE approved licence contractors.
		Operation and Maintenance	Solid waste generation, storage and disposal	Moderate	Temporary	● MM during construction above is applicable.

	Aspects	Phase	Activities and Potential Impacts	Impact Significance	Impact Duration	Mitigation Measures (MM)
7.	Greenhouse Gasses	Construction and Operation	Climatic condition due to GHG emissions	Minor	Long-term	● MM for Air Quality (No. 4) are applicable. ● Develop and implement preventive maintenance plan for generators, machines and engines to ensure combustion efficiency. ● Avoid use of sulphur hexafluoride (SF6). ● Quantify GHG emissions annually in accordance with internationally recognized methodologies and good practice.
8.	Traffic and Transportation	Construction	Community safety due to transportation and construction activities	Minor	Temporary	● Recommended measures include ensuring vehicles are road worthy; compliance with safety procedure and regulations; observe speed limit; ensure adequate access to affected land owners; install appropriate warning and traffic guidance signages and barricades; install speed regulation devices at sensitive locations; avoid obstruction to existing traffic movements; engage flagman to direct traffic; immediate repair to any damage to roads, properties or facilities. ● Provide a public liaison person to response to complaints.
			Riverine traffic	Minor	Temporary	● Strict compliance to SRB's requirements including ensuring activities do not cause obstruction; provision of adequate lights, signs or warnings; no activities between 6:00 pm to 6:00 am and vessel have valid River Transport Permit.
		Operation and Maintenance	Land and riverine traffic movement	Insignificant	Short-term	-
9.	Biological Resources	Construction and Operation	Increased decline in threatened flora species	Minor	Long-term	● Implement the MM proposed in relation to land acquisition, water quality, air quality and noise as mentioned earlier. ● Identify and protect threatened species. ● Confined clearing to ROW. ● Avoid felling tall trees into neighbouring areas. ● Only manual clearing – chainsaws, brush cleaners, parangs, etc. ● Roots and stumps will be left in situ and the cut vegetation stacked or cut/chipped or mulched to increase ground contact for a speedy decomposition.
			Loss and fragmentation of habitat	Minor	Long-term	
			Risk of fire	Minor	Temporary	

	Aspects	Phase	Activities and Potential Impacts	Impact Significance	Impact Duration	Mitigation Measures (MM)
			Loss of threatened fauna	Minor	Long-term	● No open burning. ● Rescue injured and stranded fauna. ● Inspect area for active nest sites or burrow areas and provide protection against them. ● Small native trees and shrub which bear fruits for birds and mammals to eat should be permitted to grow to the maximum height permitted by the operational safety guidelines. ● Prohibit hunting, poisoning and killing of wildlife by site workers. ● Notify SFC of nay discovery of protected flora or fauna.
			Noise impact on fauna behaviour	Minor	Short-term	
10.	Social Resources	Construction Operation and Maintenance	Loss of customary land, crops and livelihood	Major	Permanent	● Implement Land Acquisition and Livelihood Restoration Plan (LALRP). ● Consultation with affected communities and resolve issues (minor change to tower locations; access roads; construction timing; payment to temporarily suspended farming activities; damaged to crops; fragmentation of land, etc.) before start work. ● Provide assistance to severely affected land owners and vulnerable households when necessary. ● Settle all land issue and crop compensation before start work.
			Community utilised forest products	Minor	Permanent	● Implement Land Acquisition and Livelihood Restoration Plan (LALRP). ● Estimate the actual areas of communal forest that may be lost on a community-by-community basis, identify actual household users, and estimate the yields/ returns they obtain from these forests. ● Local communities should be allowed to collect useful forest resources such as timber and NTFR such as fruits, medicinal herbs, rattan etc. from the affected community forests within the ROW.

	Aspects	Phase	Activities and Potential Impacts	Impact Significance	Impact Duration	Mitigation Measures (MM)
			Employment opportunities and capacity building	Positive	Temporary	● Implement Labour and Local Content Management Plan and recruitment policy that prioritise employment of qualified and interested locals. ● Provide relevant trainings and on the job training to equip local workers with required skills. ● Develop database of local companies as potential service providers. ● Procurement policy to maximise local content. ● Disseminate information on job and business opportunities through headmen or their committee.
			Influx and interaction with construction workforce (non-local)	Moderate	Temporary	● Prioritise and maximise hiring of qualified locals from Kapit Division. ● Communicate and enforce Sarawak Energy's contracts and procurement criteria and processes, procedures and guidelines to all Contractors including details of Labour Engagement and Work Permit requirements. ● SEB and Contractors shall ensure compliance to work processes that screen workers, regular onsite audits to verify the validity of work passes. ● Brief workers on rules and regulations of the country including code of conduct and OSH.
			Public risk of injury and fatalities at construction site	Minor	Temporary	● Fence tower sites, put up signs around construction sites to avoid trespass. ● Engage the affected communities to inform or educate them the risks of trespassing onto construction sites.
			Public traffic safety	Minor	Temporary	● Implement MM as recommended in No. 8. ● Provide a public liaison person to response to complaints. ● Notify all land owners, community, farmers, affected by any access restrictions during construction. ● Install appropriate warning and traffic guidance signages and barricades along the access roads and rivers to facilitate traffic movements, provide directions and warn public approaching the construction site.

	Aspects	Phase	Activities and Potential Impacts	Impact Significance	Impact Duration	Mitigation Measures (MM)
						● Barge/vessel shall move at a safe speed; reduce speed when passing other vessels, especially smaller watercrafts (longboats).
			Camp followers and anti-social behaviour	Minor	Temporary	● Implement and ensure that the worker's Code of Conduct is followed. ● Ensure that all workers are housed in accommodation camps rather than in the local settlements in order to minimize interaction with local communities. ● Worker camps shall be sited away from local settlements.
			Access to infrastructure and services	Insignificant	Temporary	● Implement the MM proposed in relation to land acquisition, water quality, traffic and transportation and community health, safety and security as mentioned in previous sections. ● Any damaged to farm, or residential access roads shall be repaired.
			Visual impact	Minor	Long-term	● Towers and structures should be painted with non-reflective paints. ● Revegetate all cleared areas no longer used for project activities to minimize visual impacts. ● Maintenance clearing along the ROW will be kept to minimum. ● At locations close to local settlements, locals should be allowed to grow fruit or timber trees (i.e., outside ROW and does not pose risk to transmission line) to reduce visual impacts.
11.	Cultural Heritage	Pre-construction Construction Operation and Maintenance	No registered cultural heritage assets within the ROW Avoidance of gravesites	Insignificant	-	● Implement Chance Find Procedure. ● Avoid gravesites relocation. If unavoidable, consult and respect and upheld community's decision. ● Uphold Indigenous people's right in matters pertaining to their cultural beliefs, practices and sites deemed sacred or legendary.

	Aspects	Phase	Activities and Potential Impacts	Impact Significance	Impact Duration	Mitigation Measures (MM)
12.	Public Health, Safety and Security	Construction	Electrocution	Minor	Permanent	● 50 m ROW provide adequate protection for the public against exposure to electric and EMF field. ● Inform nearby community of safety risk related to high voltage electricity; place sign board on towers and notification signage along transmission line to warn about electrocution risk. ● No entry or activities allowed within the ROW under construction or maintenance work. ● Restrict development along the ROW by land use planning.
			Communicable disease (Covid-19)	Major	Temporary	● Ensure works do not provide habitats for breeding of diseases carrying mosquitoes and other vectors – e.g., water ponding, water logged areas, water storage tanks. ● Provide protective netting at workers quarters. ● Compulsory pre-employment medical examination for infectious diseases, followed by periodical medical surveillance at least annually. ● All project workers must be fully vaccinated. ● In the event of any outbreak of illness of an epidemic / pandemic nature, the Proponent should comply with and carry out such regulations, orders, instructions, rules and SOPs as may be made by the State Government, State Disaster Management Committee (SDMC), Ministry of Health, State Health Department, local medical and health authorities.
			Attack by wildlife	Insignificant	-	-
		Operation	EMF exposure and related chronic diseases – adult leukaemia and brain tumours	Insignificant	Long-term	● Train workers in the identification of occupational EMF levels and hazards. ● Address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by ICNIRP. Personal exposure monitoring equipment should be set to warn of exposure levels that are below occupational exposure reference levels. ● Limit exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.

	Aspects	Phase	Activities and Potential Impacts	Impact Significance	Impact Duration	Mitigation Measures (MM)
13.	Occupational Safety and Health	Construction	Heat stress	Medium risk	Temporary	● Provide shaded rest area and drinking water for employees. ● Establish work schedules, rest breaks and rotations for workers exposed to heat sources. ● Wear light coloured clothing while at work. ● Perform heavy tasks during cooler time of the day in morning and evening. ● Acclimatize new workers to their new surroundings.
			Traffic accidents	Medium risk	Temporary	● Implement MM as recommended in No. 8. ● Conduct regular vehicle inspections and preventive maintenance; drivers have valid driving license; not under the influence of drug or alcohol; comply with the speed limits, traffic signs and any other traffic rules that have been set ● Ensure all drivers and passengers follow vehicle safety rules including the wearing of seatbelts, no cell phone use while driving, no distraction of the driver, vehicle safety checks prior to long journeys, no night driving etc.
			Machinery, equipment and vehicles accident	Medium risk	Temporary	● Establish a safe operating procedure for all activities involving the use of heavy machinery and power tools. ● Ensure all machinery are registered and has a valid certificate of fitness issued by the DOSH. ● Operator has a valid certificate of competency and are recognized by the DOSH. ● Operators are not to be under the influence of any pharmaceuticals (prescribed or otherwise), alcohol, or any other stimulant when operating any machinery or equipment ● Regular inspection and preventive maintenance on all machinery and equipment. ● All machinery and equipment are to have appropriate safety protection measures and devices fitted, such as shielding of moving parts, cut off systems in case of emergency, reversing siren and lights.

	Aspects	Phase	Activities and Potential Impacts	Impact Significance	Impact Duration	Mitigation Measures (MM)
			Falling from height	Medium risk	Temporary	● Stringent supervision of work and practice (conduct risk assessment; safe work procedure for working at height; install physical barrier to secure open edges; design work platform according to the approved standard, adequate training and supervision for workers; use of PPE).
			Musculoskeletal Injury	Medium risk	Temporary	● Train workers on proper techniques in manual handling including lifting, carrying, pushing and pulling. ● Identify ergonomic risk factor and implement control measure to reduce the risk.
			Electrocution / electric shock	Medium risk	Temporary	● Ensure safe working practices (deactivate and ground transmission line prior to work; warning signs; regular training for workers; proper use of PPEs; use genuine appliances or machines certified by the Energy Commission and SIRIM; use Earth Leakage Circuit Breaker (ELCB) for any temporary electrical installation at the construction site.
			Occupational noise	Medium risk	Temporary	● Conduct noise risk assessment by competent person registered with Director General of DOSH. ● Noisy area shall be marked with the words “HEARING PROTECTION ZONE”. ● Provide and ensure use of PPEs. ● Implement a comprehensive hearing conservation program (HCP) to prevent ONRHD
			Animal bites and stings	Medium risk	Temporary	● Workers should be aware of their surroundings while performing works at site. ● Do not try to catch or confront any wild animals. ● Do not pet, handle, or feed unfamiliar animals (domestic or wild) particularly in areas where rabies is enzootic. ● Seek immediate medical attention at the nearest clinic or hospital any time a sting or envenomation occurs.

CHAPTER ONE

Introduction

CHAPTER 1: INTRODUCTION

1.1 REPORT PURPOSE

The title of this study is **Environmental and Social Impact Assessment (ESIA) Study for the Proposed Baleh – Mapai 500 kV Transmission Line Project** (**BMTLP**). Hereinafter, it will be referred to as the "**Project**" or "**BMTLP**".

This **ESIA** study presents an assessment of the potential environmental, social and community health impacts associated with the proposed construction, operation and maintenance of the **BMTLP**. This is to ensure that environmental and social aspects are diligently considered and managed during the Project lifecycle.

The report has been prepared for **Sarawak Energy Berhad (SEB)**, and presents the objectives, methodology and outcomes of the impact assessment. SEB plans to design, construct and commission the BMTLP for transferring and transforming energy from the Baleh Hydroelectric Project (Baleh HEP) to Mapai Substation, about 177 km downstream of the Baleh HEP.

1.2 PROJECT OVERVIEW

In view of the development plan to meet the requirement of energy-intensive industries at Sarawak Corridor of Renewable Energy (SCORE), it is necessary to maximize the system generation capacity currently available in SEB. The 1285 MW Baleh HEP has been identified as one of the most commercially viable projects in Sarawak after Bakun and Murum HEPs.

The Baleh HEP project comprises of 12 individual packages and BMTLP falls under **Work Package 7 (BLP7)**:

1. BLP1 – Jetty, Road & Bridge
2. BLP2 – Explosive Magazine
3. BLP3 – Operator Village
4. BLP4 – Diversion Tunnel
5. BLP5 – Main Civil (Excl. PS Civil)

6. BLP6 – Main Electrical and Mechanical Works
7. **BLP7 – 500 kV Baleh – Mapai TLP**
8. BLP8 – Biomass Removal
9. BLP9 – Hydrometric & Seismic Station
10. BLP10 – Alternative Access Road
11. BLP11 – Kapit – Baleh 33 kV Line (RES)
12. BLP12 – 500 kV Mapai Substation Extension

The main component of the BLP7 is a **177 km**, 2 x Quad conductor Drake 500 kV transmission line that will connect Baleh 500 kV Substation to Mapai 500 kV Substation. There shall be **35** angle towers (AT) erected along the BMTLP.

From the Baleh HEP, the BMTLP runs parallel along the northern banks of Batang (Btg.) Baleh and Btg. Rajang on a southeast-northwest-west direction, cutting across mostly secondary forests, logged over mixed dipterocarp forest, tree plantations, agriculture land including shifting cultivation areas and various rivers and streams.

The main activities of the Project consist of the following:

1. Securing the Right-Of-Way[1] (ROW) and the State authority approval for the acquisition of 50 m easement (25 m on either side).
2. Engineering Survey to establish the line route (including subdivision survey).
3. Clearing the ROW of vegetation (approximately 885 hectares (Ha.)).
4. Clearing of access roads ROW of vegetation.
5. Construction of transmission line towers, their foundations, access roads and stringing of the transmission line.

[1] Also known as a “wayleave” or “easement” in some countries. In this ESIA, ROW, and easement will be used interchangeably.

6. Operation and maintenance of the transmission line - focus on transmission line maintenance, ROW, access roads and slope maintenance as well as surveillance.

Assessments, impacts and management recommendations of this ESIA study will be limited to BLP7, i.e., the 500 kV BMTLP.

1.3 STATEMENT OF NEED AND STRATEGIC FIT

2021 marks the 100th year of SEB powering Sarawak. The company has long encouraged the production and supply of reliable, affordable, renewable and sustainable energy for the State of Sarawak and beyond. According to SEB (2020), Sarawak's focus on hydropower has improved energy security and reliability. The State's ambition is to attain developed status by 2030 through hydro-industrialisation while increasing the share of renewable energy in the existing generation, aligned with the United Nations Sustainable Development Goal (UN SDG) #7 to detach from carbon intensive generation.

As an early adopter of the International Hydropower Association (IHA)'s Hydropower Sustainability Assessment Protocol (HSAP), the State's leading energy developer and power utility company has been a strong advocate of sustainable hydropower development. The HSAP is currently a principal element of SEB's hydropower development program and is also a framework to evaluate sustainability at all phases of hydropower project implementation. Its mission is to advance sustainable hydropower by building and sharing knowledge on its role in renewable energy systems, responsible freshwater management and climate change solutions (SEB 2019).

The primary objective of the Project is to contribute to the State of Sarawak's agenda of sustainable development. The State aims to eliminate the use of diesel-powered electricity supply and allow the affected areas of the proposed Project to benefit from the hydropower development in Sarawak. SEB now has a total of three major HEP, namely:

1. Batang Ai HEP (108 MW)
2. Bakun HEP (2400 MW)
3. Murum HEP (944 MW)

This will grow to four (4) with the completion of the 1,285 MW Baleh HEP by 2025. Together, they will help to ensure that the State has the potential to generate 4,737 MW of hydropower by 2025 (RECODA 2020). This is aligned with the expansion of system generation capacity arising from extensive demand of the energy-intensive industries at SCORE as described below:

1. To **allow evacuation of power** from the Baleh HEP to the Sarawak Grid system to meet the growing energy demand from SCORE development on timely basis. The committed demand for energy from Sarawak Energy's domestic, commercial and industrial customers has grown from just about 1,000 MW in 2009 to almost 3,500 MW in 2017. This is largely SCORE driven, with more than 2,700 MW of committed demand from SCORE agreements with local and international customers. Projections indicate that by 2026, Sarawak's energy demand will increase to 5,600 MW by 2025 (SEB 2019). Total electricity demand is expected to rise to 6,000 MW by 2030, with approximately 1.6 million new jobs created when SCORE is fully operational.

2. The use of clean and renewable energy transmitted by the Project will contribute to the decarbonation of Sarawak Main Electricity Grid by increasing the share of renewable energy in the generation mix which lead to further reduction of Sarawak Main Electricity Grid emission (tCO_2/MWh). In 2018, hydroelectricity represented about 78% of Sarawak's power generation, which came from three HEPs (Batang Ai, Bakun and Murum) mentioned above (SEB 2018). SEB expects to maintain hydropower as the predominant part of its generation mix in the future.

   SEB's carbon emission intensity for electricity supply has also decreased by 76.57% since 2009, contributing towards the Malaysian Government's national goal to reduce emission by 35-40% by 2030 (SEB 2019).

3. Encouraging opportunities and development to local economy through job creation, direct and indirect outlays and improving the local energy transmission infrastructure (improvement grid stability and improve grid reliability).

   Under SCORE, SEB was entrusted by the State Government to harness Sarawak's abundant hydroelectric potential and indigenous natural resources to power socio-economic development. The ongoing construction packages from Baleh HEP in addition to the business opportunities, was projected to create about 3,500 jobs. SEB is working with the Kapit community to ensure

that the benefits from the expected boom accrue to the local population and is also sponsoring young people from Kapit for technical training at local institutions to prepare them for the job openings.

4. The electricity evacuation is aligned with the State and Malaysian Government's fuel diversification policy which promotes greater use of renewable energy for power generation.

1.4 OBJECTIVES OF THE ESIA

The implementation of the BMTLP may have potential impacts on the physical-chemical, biological, socio-economic and community health of the region. The ESIA study is to ensure that all impacts, direct and indirect, especially environmental and social impacts, associated with the Project are identified, predicted, evaluated and that environmental management considerations are taken into account during the Project lifecycle.

The main objectives of this ESIA study are:

- To gather baseline data and describe the existing environment and define baseline conditions based on Project information, field study and other published reports.
- To identify all potentially significant adverse and positive environmental and social impacts of the Project.
- To assess and evaluate adverse environmental and social impacts associated with the Project.
- To present the mitigation and enhancement measures which will be implemented by the Project to manage the identified impacts.
- To fulfil environmental and social commitments in line with local and international requirements and proven best practices.

1.5 IMPACT ASSESSMENT SCOPE

The scope of potential impacts of the Project have been identified based on the findings of public consultation/stakeholder engagement, the existing baseline conditions and professional knowledge and experience during a scoping process.

Impacts were first identified as either adverse or beneficial. The cross-sectoral issues and aspects were: soil erosion; water quality; wastes; biodiversity (flora and fauna); social aspects; cultural heritage; community health; occupational health and safety; air and noise pollution; and cumulative impact.

1.6 REPORT OUTLINE

Consistent with the objectives of the ESIA, the report will be a self-contained and comprehensive document structured as follows:

Chapter 1:	Introduction
Chapter 2:	Project Description
Chapter 3:	Project Options
Chapter 4:	Stakeholder Analysis and Engagement
Chapter 5:	Existing Physical Environment
Chapter 6:	Existing Biological Environment
Chapter 7:	Existing Human Environment and Land Use
Chapter 8:	Environmental Impacts and Mitigation Measures
Chapter 9:	Environmental and Social Management Plan and Monitoring Programs
Chapter 10:	Grievance Redress Mechanism
Chapter 11:	Conclusions
	References
	Appendices

1.7 PROJECT PROPONENT

The Project Proponent, **Sarawak Energy Berhad (SEB)** will also be known hereafter as the **Sarawak Energy**, **SEB** or the **Proponent**. SEB's contact details and contact person are listed below:

Project Proponent	:	**Sarawak Energy Berhad**
Address	:	Level 4, Menara Sarawak Energy, No. 1, The Isthmus, 93050 Kuching, Sarawak
Contact Person (Designation)	:	**Mr. Julaidi Rasidi** **(Manager – EIA Division, HSSE)**
Telephone	:	+60 (0) 82-388388 (ext 8427)
Fax	:	+60 (0) 82-330708
Email	:	Julaidi.Rasidi@sarawakenergy.com

1.8 ESIA STUDY TEAM

The ESIA is carried out by Chemsain Konsultant Sdn Bhd (CKSB), a registered environmental consultancy firm with Natural Resources and Environment Board (NREB) Sarawak. Any enquiries and correspondence with regards to the ESIA report can be directed to:

Environmental Consultant	:	**Chemsain Konsultant Sdn Bhd**
Address	:	172, Rock Road 93200 Kuching Sarawak
Contact Person (Designation)	:	**Ir. Brian Chong Sin Hian** **(Senior Director)**
Telephone	:	+60 (0) 82-548366
Fax	:	+60 (0) 82-548399
Email	:	bc@chemsain.com
NREB Firm Registration No.	:	NREB/F/00092
NREB Registration Validity	:	27 February 2022

The ESIA team members with their respective responsibilities and signatures are listed in **Table 1.8.1**.

Table 1.8.1: ESIA Study Team Members

No.	Personnel [Qualification]	NREB Reg. No. [Validity]	Task/Study Components	Signature
1.	Ir. Brian S.H. Chong [M. Sc. Env. Eng.]	NREB/I/00336 [08 Mar 2022]	Team Leader Environmental Engineering and Management	
2.	Eivind Oluf Kofod [M. Sc. Forestry]	NREB/I/00666 [06 Aug 2022]	Advisor Terrestrial Flora Greenhouse Gas Biodiversity Management Plan	
3.	Tan Shwu Mei [M. Env. Mgmt.]	NREB/I/00341 [08 Mar 2022]	Study Coordinator Liaison with SEB Social Science and Cultural	
4.	Benji Jihen [M. Soc. Sc. (Dev. Studies)]	NREB/I/00685 [14 Oct 2021]	Stakeholder Engagement Socio-Economic Stakeholder Engagement Plan Grievance Redress Mechanism	
5.	Dr. Elena Gregoria Chai Chin Fern [BA & MA. Social Sciences (Cultural Anthropology), Ph. D (Humanities) Area and Culture Studies]	NREB/I/00883 [25 June 2022]	Cultural Heritage Indigenous People Cultural Heritage Management Plan	

No.	Personnel [Qualification]	NREB Reg. No. [Validity]	Task/Study Components	Signature
6.	Lee Kuok Chiang [B. Eng. (Civil-Environmental)]	NREB/I/00702 [24 May 2022]	Erosion and Sedimentation Slope Stability Erosion and Sediment Management Plan	
7.	Prof. Dr. Jamal Hisham Hashim [BA (Biology & Env. Studies), M. Sc. (Public Health), Ph. D (Env. Health Science)]	NREB/1/00952 [26 May 2022]	Public Health Health Risk Electromagnetic Field Public Health Management Plan	
8.	Khairil Abel Bin Abdullah [B. Eng. (Civil)]	NREB/I/00961 [07 Jan 2022]	Occupational Safety and Health OSH/Labour Management Plan Emergency Response Plan	
9.	Foong Poh Hing [B. Eng. (Mechanical)]	NREB/I/00836 [02 Dec 2021]	Waste Management Waste Management Plan	
10.	Dr. Andrew Alek Tuen [Ph. D. Ruminant Nutrition]	NREB/1/00286 [18 Sept 2021]	Terrestrial Fauna Biodiversity Management Plan	
11.	Anthony Rentap Enchana [M. Sc. EIA]	NREB/I/00456 [08 Mar 2022]	Water Quality Conservation Management Plan	

No.	Personnel [Qualification]	NREB Reg. No. [Validity]	Task/Study Components	Signature
12.	Adrian Richard Sageng [M.Sc. (Environment)]	NREB/I/00718 [04 Apr 2022]	Land Use	
13.	Ir. Bernard Chong Yin Shik [B.Eng. (Hons)]	NREB/I/00803 [08 Mar 2022]	Civil Engineering Infrastructure and Utilities GIS and Mapping	
14.	Lina Chan [B. Sc. (Hons) Microbiology]	NREB/I/01144 [12 Sept 2021]	Air and Noise Air and Noise Management	
15.	Ir. Pooh Yih Fang [M. Sc. in Civil Eng [Trans.]	NREB/I/00472 [10 Apr 2022]	Traffic Study Traffic Management	

1.9 REGULATORY FRAMEWORK

This Section presents an overview of the environmental and social regulations, guidelines and standards (State, National and International levels) of relevance and applicable to the proposed BMTLP. These include:

- Prescribed activities
- Relevant Legislation (State, National and International)
- Guidelines
- International Standards and Guidelines
- International Treaties and Conventions

1.9.1 Prescribed Activities

The proposed BMTLP requires the clearing of ROW of 50 m in width for a total length of 177 km, giving it an approximate area of at least 885 hectares (Ha.). Disturbance by Project activities within this area is anticipated to have an adverse impact on the quality of the environment or natural resources of the State.

As such, the development of BMTLP is a prescribed activity which comes under item 7 of the **Natural Resources and Environment (Prescribed Activities) Order, 1994[2] (NREO)**. Item 7 of the First Schedule of the NREO stated the following:

> ***7. Any Other Activities Which May Damage or Have an Adverse Impact on Quality of Environment or Natural Resources of the State***

The Order requires an EIA/ESIA report to be prepared and submitted to NREB for approval before the Project can proceed for development.

Prior to proceeding with the ESIA study, the Terms of Reference (TOR) was submitted to the NREB for review and approval. The TOR are appended in **Appendix 1.9.1**. The TOR was approved on 9 Dec 2020 (see **Appendix 1.9.2**).

[2] Incorporating all amendments up to 4 November, 2004

1.9.2 Relevant Legislation

A list of applicable environmental and social legislations and their relevance for the BMTLP are given in the following **Table 1.9.1**.

Table 1.9.1: Applicable State and National Legislations

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
Environmental Management			
Natural Resources and Environment (Prescribed Activities) Order 1994 (NREO)	Sections 11A (1) and 18 of the Ordinance empower the NREB to make rules and orders pertaining to the submission of reports having impacts on environment and natural resources. Consequently, the NREO 1994 was made and came into force on 1 September 1994. The Order requires that EIA reports on prescribed activities having impacts on the environment must be submitted to the NREB for approval prior to project implementation. Refer to **Section 1.9.1** above.	The BMPTLP requires to submit an ESIA/EIA report to NREB for review and approval before project construction.	NREB
The Natural Resources and Environment (Audit) Rules, 2008	These Rules outline the legal requirement for an Independent Environmental Audit enforced by NREB.	The ESIA will outline monitoring and audit requirements under ESMP. If and when required, the project will submit an independent environmental audit to NREB.	NREB
Environmental Pollution			
Environmental Quality (Scheduled Wastes) Regulations 2005	There are 77 types of scheduled wastes listed under the First Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005. The Regulations govern the management and control of Scheduled Wastes, from their collection, storage, handling, transportation, and treatment to their disposal.	This requirement is applicable under waste generation and assessment and included in the ESMP. Management of scheduled wastes and sewage during and after construction forms an essential part of the project activities. These wastes need to be carefully disposed of for safety and health concerns, aesthetics and pollution prevention.	Department of Environment (DOE)
Environmental Quality (Sewage) Regulations, 2009	The Regulations outline the control of sewage and effluents generated from various human and industrial activities. It is pertinent to this Project to regulate the wastewater and sewage discharges from all permanent and temporary residential		DOE

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
	facilities and offices with sanitary facilities at the Project area.		
Environmental Quality (Control of Emission from Diesel Engines) Regulations 1996	The Regulations exert the control of diesel engine on motor vehicles as well as the smoke emission control of motor vehicles and set the requirements of smoke test.	This requirement is considered under air quality assessment and included in the ESMP. All diesel-power engines, machineries and vehicles in the Project area are subject to this regulation. Carbon emissions generated from the operation of diesel-powered vehicle or machinery must be reduced as low as reasonably practicable to prevent air pollution, or concerns associated with the environment or the health of workers and public.	DOE
Environmental Quality (Clean Air) Regulations 2014	The Regulations contain provisions for industrial facilities adjacent to residential areas, burning of wastes, dark smoke, and air impurities.	This requirement is considered under air quality assessment and included in the ESMP. Any activity of the Project which contributes to the accumulation of dust or impurities or release of toxic chemicals into the air during construction or commissioning phases of the Project, are subjected to these Regulations. These activities require proper management and treatment to ensure it does not affect the environment or the health of the workers and public.	DOE
Environmental Quality (Motor Vehicle Noise) Regulations 1987	The Regulations set the maximum sound level permitted for motor vehicles having two or more wheels.	This requirement is considered under baseline noise level, noise assessment and included in the ESMP. Noise emitted from motor vehicles used by staff and workers for commute between site office or living quarters to project site, or from one end of the site to another, shall adhere to the permitted	DOE

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
		noise level specified in this Regulation to prevent noise disturbance to workers and public.	
Local Authority (Cleanliness) By-Laws 1999	The By-Laws set requirements for disposal and treatment of waste accumulated from public places, or on any public and private property, and the management and maintenance of disposal and sanitary facilities, to ensure the cleanliness of these facilities and the areas specified in this By-Laws stated in: i. Part III: Collection and Removal of Refuse and Waste 9. (2) The owner or occupier of every premises shall use the service provided under the system for the collection, removal, and disposal of any refuse or waste generated from the premises, and to pay such fees, rates or other charges as the local authority may determine, with the approval of the Minister, for the provision of such services. 13. (1) The owner or occupier of any private land shall not use or permit the use of his land for the depositing or dumping of any refuse or waste of any kind. 15. (1) No person shall commence building works or related activities on any construction site unless he has provided for the use of all workers, visitors or invitees to such site, latrines or other sanitary convenience of the type and specifications approved by the local authority.	This requirement is considered under waste generation and management and included in the ESMP. Proper waste management and disposal system shall be implemented for all wastes accumulated (i.e., biomass, domestic, and construction wastes) from the Project activities. These wastes will be collected by relevant authorities at a timely manner and disposed of at the designated local dumpsite to prevent air and land pollution, or potential negative impact on human health. The Proponent shall ensure proper dumping or discharge of wastes accumulated throughout the Project life cycle, and comply with the By-Laws	Kapit District Council (MDK) Kanowit District Council (KDC)

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
Biodiversity			
Sarawak Biodiversity Regulations 2015	The Regulations govern the prohibition of collection, removal, exportation, or marketing of biological resources from State land, State land forest, permanent forests, national parks, nature reserves or wildlife sanctuaries, as well as propagation, breeding or cultivation of any protected resources.	This requirement is considered under flora and fauna baseline, assessment and included in the ESMP. Illegal collection, removal, exportation, or marketing of biological resources (i.e., trees, plants, wildlife, etc.) that are in close proximity to the Project site (i.e., along the transmission line ROW) by any member of the staff or workers associated with the Project is strongly prohibited.	Sarawak Biodiversity Centre (SBC)
Forest Ordinance 2015	The Ordinance defines the framework for protection and management of forests and regulates the taking of forest produce in Sarawak. The objective of this ordinance is to ensure sustainable management of the forest reserves for the benefit of present and future inhabitants, as well as to preserve the value of the forest reserves for social, economic and environment benefits. i. **Section 26(d): Acts prohibited in forest reserve** *No person shall in a forest reserve or protected forest cause any damage by negligence in felling any tree or cutting or dragging any timber* ii. **Section 28: Protection of forest reserve and protected forest** *No person shall do or cause to be done any act which is likely to damage or endanger the tress within a forest reserve or protected forest.*	This requirement is applicable under flora and fauna baseline, assessment and included in the ESMP. The construction activities in the proposed Project shall ensure strict compliance to the laws stipulated in the ordinance. Proper management and protection measures must be implemented on forest reserves that are within close vicinity to the Project site to prevent unauthorised activities (e.g., cutting, felling, or causing endangerment to any protected species of *flora* and *fauna)* on forests that are not marked for clearance for the purpose of the Project.	Forestry Department Sarawak (FDS)
Forest Rules 1973	The Forest Rules are enforced to prevent unlawful collection or removal of forest produce, and to prevent illegal exportation of timber produce. All matters including (but not limited to), the attempt to	This requirement is applicable under site clearing, flora and fauna baseline, assessment and included in the ESMP.	FDS

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
	remove and market trees specified in the Second Schedule of the Forest Rules 1973, and the unlicensed removal of tress within the State land reserves are subjected to penalties imposed in these Rules.	The unlicensed removal of forests produce along the transmission line route that are not subjected for removal or clearance for the purpose of the proposed Project must be prevented as illegal attempts may be made to remove and market these produce.	
National Parks and Nature Reserves Ordinance 1998	An Ordinance for the constitution and management of National Parks and Nature Reserves. All matters inclusive of (but not limited to) the protection and development of schemes and policies with regards to the protection of wildlife and their habitat within the national parks and nature reserves, the administration and establishment of the national parks and nature reserves, and the management of existing or proposed infrastructures and amenities within the national parks and nature reserves are subjected to the Ordinance.	Not applicable to this Project. There is no existing national parks and nature reserves that are located within or near the Project site. Should there be any, this Regulation serves as legal protection of the wildlife and their habitat within the national parks and nature reserves from any environmental risks which the Project may impose, this includes any harm done by personnel associated with the Project onto the wildlife.	Sarawak Biodiversity Centre (SBC)
National Parks and Nature Reserves Regulations 1998	The Regulations contain provisions for the permitted entry into national parks and nature reserves, and the management of environmentally concerned areas including aquatic areas, turtle beach zone, caves, and historical sites. All matters including any unlawful act within the national parks and nature reserves or at any special areas specified in this Regulation are subjected to the Regulation.	Not applicable to this Project. There is no existing national parks and nature reserves that are located within or near the Project site.	Sarawak Forestry Corporation (SFC)
Wild Life Protection Ordinance (WLPO) 1998	The Ordinance initiates provisions for the protection of wildlife, and the establishment and management of Wild Life Sanctuaries. All matters that include illegal importation or exportation of protected plants and animals, or the illegal possession of wild animals; and the failure to comply with rules against prohibited	This requirement is applicable under flora and fauna baseline, assessment and included in the ESMP. All form of wild life (i.e., *flora* and *fauna*) prescribed in this Ordinance, may it be within any wild life sanctuary located near the Project site or species found around Project site that are subjected to the	SFC

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
	acts in within the Wild Life Sanctuary are subjected to the Ordinance	protection of said sanctuary, shall be protected against the unlawful and illegal act of importation, exportation, and possession by members of staff and workers of the proposed Project.	
Wild Life Protection Rules 1998	The Rules specifies the prohibition of unlawful possession of equipment used to trap or catch animals within the Wild Life Sanctuary, and regulates the protection of all animals prescribed under protected animals against act of captivity, and illegal importation or exportation.	This requirement is applicable under flora and fauna baseline, assessment and included in the ESMP. Illegal possession or use of traps for the purpose of holding animals (which are found animals found within the nearby Wild Life Sanctuary or found in the surrounding area of the Project site) in captivity must be banned.	SFC
Traffic Safety (Land and Water)			
Road Transport Act 1987	An Act to make provision for the regulation of motor vehicles and of traffic on roads and other matters with respect to roads and vehicles thereon; to make provision for the protection of third parties against risks arising out of the use of motor vehicles; to make provision for the co-ordination and control of means of and facilities for transport; to make provision for the coordination and control of means of and facilities for construction and adaptation of motor vehicles; and to make provision for connected purposes.	This requirement is applicable under traffic baseline, assessment, OSH, public safety and included in the ESMP. Vehicles that are mobilized throughout the duration of the Project shall comply to road safety rules specified in the Act. Road safety measures shall be implemented by each member of the Project throughout the Project period. This applies to all staff and workers commuting to and from Project site, and for the transportation of any materials via land.	Road Transport Department (RTD)
Sarawak River Ordinance 1993	The Ordinance provides for the control and regulation of traffic by water in ports and harbours or on rivers wholly within Sarawak and in the foreshores, well as the protection of water quality of rivers. All matters regarding the security and conservation of bank erosions and shores, as well as the establishment of mode and manner for river cleanliness through	This requirement is applicable under traffic baseline, assessment, OSH, public safety and included in the ESMP. Water traffic control measure and regulations shall be implemented during the transportation of heavy	Sarawak Rivers Board (SRB)

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
	efficient mitigation measures for the act of river pollution caused by illegal dumping of solid and chemical wastes or debris are subjected to the Law.	equipment, machinery, and materials via Btg. Rajang, Btg. Baleh and their tributaries. Management of cleanliness of affected rivers and streams that will be used in the Project throughout the construction phase is essential to prevent potential water pollution. Illegal dumping of solid wastes or improper discharge of oil, grease, and toxic chemicals are prohibited throughout the Project period.	
Labour			
Sarawak Labour Ordinance (Act A1237) – Chapter 76, 1952	This Ordinance regulates employment and legislate the basic terms and conditions of service of employees in Sarawak. All matters inclusive of, but not limited to, the employment of children, the act of forced labour, unlawful act towards women workers, untimely pay of employment wages, and unlawful distributions of working hours, are subjected to the Ordinance.	This requirement is applicable under OSH and included in the ESMP. An appropriate and fair employment terms and conditions must be implemented for potential Project workers in accordance with the regulations specified in the Ordinance. Any form of discrimination against race and gender must be taken seriously, and the employment of children or the act of forced labour is not prohibited. This is to protect the welfare of all employees associated with the Project. All staff and workers shall be granted reasonable working hours as specified in the State's legislation. Any requests for carrying out work beyond the required working hours are subjected to the nature of work and the well-being of workers. Overwork may increase the risk of stress-related illnesses for workers. All workers must be well-compensated and employment wages must be paid in a timely	Department of Labour Sarawak

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
		manner to sustain the financial or personal needs of the workers.	
Immigration Act 1959/1963 (Act 155)	The Immigration Act 1959/1963 governs the admission into and departure from Malaysia, entry permits, procedures on arrival in Malaysia, removal from Malaysia, offenses and special provisions for East Malaysia. For this Project, any foreign national who wishes to work in Sarawak or Malaysia is required to have already undergone Immigration Security Clearance (ISC) verification. ISC verification document is mandatory to be attached with the visa application.	This requirement is applicable under OSH and included in the ESMP. Foreign nationals who wish to participate in the development of this Project are required to undergo proper procedures which includes proper arrival process in Sarawak or Malaysia, and complete mandatory ISC. This is to prevent unsolicited or illegal recruitment of labour in the Project.	Malaysian Immigration Department
Health and Safety			
Occupational Safety and Health Act 1994 (Act 514) and Regulations	The Act cover activities prescribed in the First Schedule. These includes Item 3: Construction where it is applicable in the commissioning phase and Item 5(a): Electricity which can be applied during the operational phase, of the proposed Project. The purpose of this Act is to secure the safety, health, and welfare of persons at work. The Act also intends to promote an occupational environment for persons at work which is adapted to their physiological and psychological needs.	This requirement is applicable under OSH and included in the ESMP. Occupational health and safety require the minimisation of the causes of hazards in a manner consistent with good international industry practice, including the HSAP. Requirement included in the ESIA.	Department of Occupational Safety and Health (DOSH)
Occupational Safety and Health (Employers' Safety and Health General Policy Statements) (Exception) Regulations 1995	The Regulations are aimed at promoting safety for both workers and the general public and put the onus of responsibility for safety and health to the employer or the operator of any facility or operation. The aim is to ensure the workers' welfare are given due consideration.	This requirement is applicable under OSH and included in the ESMP. All workers and staff who does not adhere to the safety requirements of the Project, which includes the use of Personal Protective Equipment (PPE), are not permitted to enter Project site. This is to prevent unwanted danger and injuries on said staff or worker.	DOSH

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
		Activities of the Project that are beyond a worker's qualifications or skills shall not be carried out by said worker. The lack of knowledge and understanding of the activity may not only result in a possible delay of the Project but also increase the risk of harm and injuries towards the worker. The welfare of all staff and workers must be protected throughout the Project period.	
Occupational Safety and Health (Noise Exposure) Regulation 2019	The Regulations outline the identification of excessive noise and the risks exerted, as well as the control measures that should be taken in the case of exposure to noise that exceeds the acceptable hearing limit.	This requirement is applicable under OSH, noise assessment and included in the ESMP. Workers must not be exposed to noise that are higher than the recommended limit and the total hours of exposure shall not exceed the acceptable limit specified in this Regulation. Proponent shall carry out on-site assessment of the noise surrounding the Project area and include a detailed evaluation comparing with the limits provided in DOE's Guidelines for Environmental Noise Limits and Control in this ESIA study, as well as incorporate necessary safety procedures throughout the construction and commissioning phase of the Project.	DOSH
Factories and Machinery 1967 (Act 129) and Regulations	An Act to provide for the control of factories with respect to matters relating to the safety, health, and welfare of person therein, the registration and inspection of machinery and for matters connected therewith.	This requirement is applicable under OSH, noise assessment and included in the ESMP. Heavy equipment and machineries must be handled and operated during the construction of the transmission line must be in compliance with the items specified in this Act.	DOSH

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
Water			
Sarawak Water Ordinance 1994	The Water Ordinance regulates the protection and development of water resources, inter-alia, water catchment areas, alienated land in water catchment areas, and prohibited activities in water catchment areas; the conservation and management of water resources of the State; and the supply and distribution of water in compliance with the Natural Resources and Environment Ordinance.	This requirement is applicable under water baseline, water quality assessment and included in the ESMP. Existing water resources surrounding the Project area shall be protected by prohibiting an unauthorised activity in nearby water catchment areas.	Sarawak Rural Water Supply Department / Jabatan Bekalan Air Luar Bandar (JBALB)
Sarawak Land Code Chapter 81 (1958 Edition)	The Sarawak Land Code (1958) is the principal Law governing land in Sarawak. The Land Code makes legal provision relating to land, which includes (but is not limited to) the protection of native customary rights, appropriate land development methods, and any actions or activities on state or alienated land. As the Land and Survey Department is the enforcer of the Land Code, the Department is mandated to implement the sections of the Land Code as mentioned above.	This requirement is applicable under land requirement and acquisition, cultural heritage and included in the ESMP. The area that is to be used by the proposed BMTLP and its installations will have to be acquired. Section 46 (c) of the Land Code empowers the Government to make compulsory acquisition of the lands for the purpose of the proposed Project. The line route, as proposed by the Proponent, shall "avoid titled lands including possible environmental and culturally significant areas". This complies with Part III, Section 15 of the Code under Protection of Native Customary Rights. Where native customary rights (NCR) are to be extinguished by the government, compensation will be paid to the affected natives. No State land which is encumbered by native customary rights may be alienated without payment of compensation. Proper acquisition of land shall be implemented for the use of the Project. Proposed transmission line route shall be assessed and identified prior to commencement of	Land and Survey Department Sarawak (LSD)

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
		work to avoid environmentally and culturally significant areas, where possible and practicable Affected natives for acquired land that are subjected to native customary rights (NCR) must be fairly compensated.	
Cultural Heritage			
Sarawak Cultural Heritage Ordinance 1993	The Sarawak Cultural Heritage Ordinance 1993 makes provisions for the preservation of antiquities, monuments and sites of cultural, archaeological, architectural, artistic, religious, or traditional interest or value for the benefit of the State and as a heritage of the people and for matters connected therewith or incidental thereto.	This requirement is applicable under cultural heritage and included in the ESMP. The preservation of cultural sites that are within or that are found surrounding the proposed Project site is important. This is to protect all traditional, cultural, religious, and architectural sites, monuments or antiquities that may be affected by the Project	Sarawak Museum Department
Sarawak Heritage Ordinance 2019	The Ordinance makes provisions for the preservation and conservation of antiquities, monuments and sites of cultural, archaeological, architectural, artistic, religious or traditional, historical, tangible and intangible interest or value and bio-anthropological, geographical and natural history items, for the benefit of the State and as a heritage of the people and for matters connected therewith or incidental thereto.		
Energy			
The Electricity Ordinance – Chapter 50 (Revised 2003) Electricity Rules 1999 The Electricity (State Grid Code) Rules, 2003	SEB through its subsidiary company, Syarikat SESCO Berhad is mandated to implement the Electricity Ordinance and the Electricity Rules, 1999 and 2003. The Ordinance deals with the protection and maintenance of power line and its installations as well as public safety. The Rules enhances the requirements for skill and competent persons and	This requirement is applicable in operation and maintenance of the transmission line, OSH and public safety (EMF) and included in the ESMP. Maintenance of transmission line during operation shall be conducted regularly.	SEB/Syarikat SESCO Berhad

Legal Framework	Objective / Description	Applicability to BMTLP	Agency Responsible
	registration and licensing of contractors and installations. Section 36 of the Ordinance provides the mandate for the State Cabinet Committee (*Majlis Mesyuarat Kerajaan Negeri*) to make rules cited as Electricity Rules, 1999. Installation of aerial lines operating at high or extra high voltage is governed by Rule 43. In this rule there are 13 sub-rules ((a) to (m)) regulating the protection and maintenance of power line and its installations as well as public safety.	Potential problems that may arise during operation of transmission line must be identified and repair works must be carried out effective immediately. The Client shall ensure all construction and installation works are carried out with the safety interest of the workers and public in mind. The transmission line shall be operated in the safest and reliable manner.	

1.9.3 Guidelines

The most relevant guidelines and standards essential for the Project to achieve compliance with the regulations above are listed below:

No.	Impacts	Guideline / Guidance Document
1.	EIA/ESIA	• Handbook of Policy and Basic Procedure of Environmental Impact Assessment in Sarawak published by the NREB, Sarawak. • Handbook of Environmental Impact Assessment Guidelines" and "Environmental Impact Assessment Guidelines for Thermal Power Generation and / or Transmission Projects issued by the DOE, Malaysia.
2.	Environmental Audit	• Guidelines for Natural Resources and Environment (Audit) Rules, 2008 3rd Edition, 2018.
3.	Air Quality	• Malaysia Ambient Air Quality Standard (MAAQS).
4.	Surface Water Quality	• DOE's National Water Quality Standards for Malaysia (NWQSM). • DOE's National Standard for Drinking Water Quality (Raw Water Quality Criteria). • DOE's Water Quality Index (WQI). • WHO's Guidelines for Drinking-water Quality.
5.	Greenhouse gas	• Intergovernmental Panel on Climate Change (IPCC) Guidelines.
6.	Noise	• DOE's Guidelines for Environmental Noise Limits and Control (Third Edition 2019).
7.	Soil erosion and sediment runoff	• Department of Irrigation and Drainage Malaysia (DID)'s Urban Stormwater Management Manual for Malaysia, MSMA 2nd Edition, 2012. • DID's Guideline for Erosion and Sediment Control in Malaysia, 2010. • DOE's Guidance Document for Addressing Soil Erosion and Sediment Control Aspects in the Environmental Impact Assessment (EIA) Report. • DOE's Guidelines on Land Disturbance Pollution Prevention and Mitigation Measures.
8.	Public Health	• DOE's Guidance Document on Health Impact Assessment (HIA) In Environmental Impact Assessment (EIA), 2009. • DOSH's Guidelines for Public Safety and Health of Construction Sites.

No.	Impacts	Guideline / Guidance Document
9.	Electro Magnetic Field (EMF)	• International Commission on Non-Ionizing Radiation Protection's (ICNIRP) Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz).
10.	Wastes	• Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia. • Guideline for the Design and Construction of Septic Tanks in Sarawak. • CIDB Malaysia Guidelines on Construction Waste Management.
11.	Hazard	• EIA Risk Assessment Guidelines, 2004.

1.9.4 International Standards and Guidelines

In order that the Project could be implemented to international standards, international environmental policies and guidelines are taken into account for the preparation of this ESIA. The relevant international standards/ practices that have been used as a guidance in preparing this ESIA are:

1.9.4.1 IHA Hydropower Sustainability Guideline and Tools

In January 2011, SEB was among the first of ten (10) hydropower companies from around the world to become a "Sustainability Partner" with the IHA. As such, in addition to NREB's requirements above (refer to **Section 1.9.1** above), SEB intends to comply to their own sustainability requirements. Therefore, this ESIA is conducted in accordance with the requirements of the IHA's Hydropower Sustainability Guidelines on Good International Industry Practice (HGIIP) and its two complementary assessment tools, namely:

- Hydropower Sustainability Assessment Protocol (HSAP).
- Hydropower Sustainability Environmental, Social, Governance Gap Analysis Tool (HESG).

The HSAP is a hydropower-specific assessment tool to measure and guide performance of hydropower projects against globally applicable criteria for environmental, social, financial and technical sustainability (HGIIP, 2020). The protocol includes assessment of four different stages of project development -

Early Stage, Preparation, Implementation and Operation –designed to be stand-alone assessments applied at particular stages of the project life cycle (HSAP, 2020). The evaluation framework is built around four main topics: environmental perspective, social perspective, technical perspective, and economic/financial perspective.

The criteria for assessment are that level 3 reflects basic good practice, level 5 describes proven best practice, while levels 1, 2, and 4 reflect intermediary stages (IHA, 2010).

This ESIA falls within the "Preparation" stage. There are 24 topics under Preparation assessment tools. Waste, Noise and Air Quality falls under "Implementation" tools, under topic I-18.

The HSAP are designed towards providing guidance on how to identify risks and assessment of impacts (basic good practice), and are designed to help avoid, mitigate and, manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the Proponent in relation to project-level activities. The HSAP topics and each of their applicability to the proposed Project and this ESIA, are outlined in **Table 1.9.2** below:

Table 1.9.2: HSAP Topics (Preparation)

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
P-1	**Communications and Consultation** This topic addresses the identification and engagement with project stakeholders, both within the company as well as between the company and external stakeholders (e.g., affected communities, governments, key institutions, partners, contractors, catchment residents, etc). The intent is that stakeholders are identified and engaged in the issues of interest to them, and communication and consultation processes establish a foundation for good stakeholder relations throughout the project life.	Chapter 4: Stakeholder Analysis and Engagement Chapter 7: Existing Human Environment and Land Use	**Assessment:** • Undertake stakeholder mapping to identify relevant stakeholders and those **directly**[3] and **indirectly**[4] affected. • Demographic description of the population residing in a corridor between the Btg. Rajang and 500 m north and south of the proposed transmission line. • Evaluate relative influence of the project on different stakeholders, as well as their influence on the project. • Evaluate related risks and level of risk, identifying issues of interest. • Review existing SEB grievance mechanism against HSAP and performance standards for gaps. **Stakeholder Engagement:** • Engagement with directly and indirectly affected stakeholders. • Two-way communication on topic of interest and relevance to them; issues and feedback. • Engagement/ communication/ consultation methods may include personal interview, focus group discussion, public meeting, online meetings, socio-economic survey, etc. All response and feedback shall be recorded, minuted or documented. • Engagement and consultation events will be scheduled to enable people to attend, including people of all livelihood groups, women as well as men etc.

[3] Directly affected stakeholders are those stakeholders with substantial rights, risks and responsibilities in relation to the project or issues it affects. These stakeholders may be inside the project affected area (e.g., project affected communities) or outside the project affected area (e.g., government regulators, finance institution representatives, investment partners, NGOs). They may live downstream and be at risk of effects that will not emerge for a number of years (HGIIP, 2020).

[4] Indirectly affected stakeholders usually include those with second order impacts, such as those affected by changes in the activities of a local project supplier or tourists passing through the region (HGIIP, 2020).

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
			• Gathering of additional necessary social information or assessment required to develop Stakeholder Engagement Plan and grievance mechanism procedure. • To assist on Public Notification arrangement and submission with NREB. • Feedback and comments from the stakeholders after Public Notification will be recorded and incorporated in the ESIA.
		Chapter 9: Residual Impacts and Monitoring Programs Chapter 10: Grievance Redress Mechanism	**Management:** • Plans for engagement during the ESIA will be set out in the Scoping Report. • The existing SEP for the project will be reviewed with recommendations on additions or amendments to include transmission line affected stakeholders. • Stakeholder Engagement Plan (SEP) will be developed as part of the Environmental & Social Management Plan (ESMP).
P-2	**Governance**	Not covered in this ESIA	Not within the scope of this ESIA
P-3	**Demonstrated Need and Strategic Fit** This topic addresses the contribution of the project in meeting demonstrated needs for water and energy services, as identified through broadly agreed local, national and regional development objectives and in national and regional policies and plans. The intent is that the project can demonstrate its strategic fit with development objectives and relevant policies and plans can be demonstrated, and that the project is a priority option to meet identified needs for water and energy services.	Chapter 1: Introduction	Description of project background and statement of need and strategic fit, tying up to the Baleh HEP. • Study will make reference to the main Baleh SEIA report and summarise the assessment of strategic fit and alternatives sections of the Baleh SEIA for the use of this ESIA. • This shall be supported by updated information to be provided by SEB. • Applicable legislative requirement, guidelines and standards including HSAP, and if necessary, information from Sarawak Government planners and other stakeholder groups shall be included.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
P-4	**Siting and Design** This topic addresses the evaluation and determination of project siting and design options, including the dam, power house, reservoir and associated infrastructure. The intent is that siting and design are optimised as a result of an iterative and consultative process that has taken into account technical, economic, financial, environmental and social considerations.	Chapter 3: Project Options	**Assessment:** • Description based on information gathered from Proponent and analysis of options and justification on why route (Option 2) is chosen. • Assessment to prioritize technically and economically feasible projects with relatively lower social and environmental impacts. • Description of relevant technology and methodology for the transmission line construction. This will be based on information provided by SEB. • Stakeholders' views and concerns is addressed and considered in the final siting and design. **Stakeholder Engagement:** • Refer to topic P-1 of this summary table. • Engagement with directly affected stakeholders on the options. • Two-way communication on the impacts of the alternative options during scoping and presentation of impacts, with thorough/timely feedback on issues raised.
P-5	**Environmental and Social Impact Assessment & Management** This topic addresses the assessment and planning processes for environmental and social impacts associated with project implementation and operation throughout the area of impact of the project. The intent is that environmental and social impacts are identified and assessed, and avoidance, minimisation, mitigation, compensation and enhancement measures designed and implemented.	Chapter 1: Introduction	Preparation of the ESIA shall be guided and reviewed by a HSAP Accredited Assessor. The ESIA including ESMP(s) will be publicly-disclosed and displayed at the District Offices (DOs), Kapit District Council (KDC), published in local newspapers and display in SEB's Online Portal. The purpose is to get feedback from the community and general public. The ESIA shall contain the following: • Description of the proposed project. • Project rationale and alternatives (refer to topic P-1, P-3, P-4). • Relevant legal and policy requirements.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
		Chapter 4: Stakeholder Analysis and Engagement	• Stakeholder engagement at scoping stage. • A summary of stakeholder consultation undertaken during the impact assessment and issues raised (refer to topic P-1).
		Chapter 5: Existing Physical Environment Chapter 6: Existing Biological Environment Chapter 7: Existing Human Environment and Land Use	• Description of the existing physical, biological and human environment sufficient to establish the pre-project baseline. • A documented baseline on terrestrial and aquatic biodiversity, waste, noise, air quality, water quality, EMF, erosion and sedimentation, project affected communities (including a focus on resettlement and on Indigenous Peoples (IP) if relevant), climate change, cultural heritage, public health, and labour and working conditions. • Refer to topic P-13, P-15, P-P-16, P-17, P-18, P-19, P-20, P-21, I-18 of this summary table for details on the above.
		Chapter 8: Environmental Impacts and Mitigation Measures	• Evaluation of impacts of the above areas for the pre-construction, construction and operation stages of the project. This shall include identification and assessment of potential positive and negative project impacts, including ratings of their likelihood, magnitude, severity of consequences and reversibility. • Address all key environmental issues including aquatic and terrestrial biodiversity, threatened species, critical habitats, ecosystem integrity and connectivity issues, water quality, erosion and sedimentation (refer to topic P-19, P-20, P-21, I-18). • Key social issues include project-affected communities, IP, ethnic minorities, cultural heritage (both physical and non-physical), and public health; and are analysed with respect to socio-economic indicators (including living standards, livelihoods, and health statistics) as well as gender (refer to topic P-8, P-10, P-13, P-15, P-16, P-17, P-18). • Address environmental impacts of the project that extend beyond the jurisdictional boundaries in which the project is located. • The topic also requires specific mention of: construction-related

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
			waste, noise and air quality, land disturbance and rehabilitation (refer to topic I-18). • Identify and assess potential cumulative impacts; the nature of impacts; evaluation of the role and capacities of relevant third parties (e.g., contractors, and suppliers) and primary suppliers (such as quarry and factory) which may incur potential environmental and social impacts. • Adopt the mitigation hierarchy to avoid, or where avoidance is not possible, minimize, and where avoidance/minimisation is not possible, mitigate, and, where residual impacts remain, compensate/offset. • Proposed mitigation measures and management plans linked to each identified impact, with each measure clearly stating the objective and indicators of effectiveness.
		Chapter 9: Residual Impacts and Monitoring Programs	• Identification of residual impacts. • Management plan implementation arrangements, including responsibilities, timing, resources and budget. • A monitoring programme that addresses all potential impacts and will demonstrate if mitigation measures are effective or not.
P-6	**Integrated Project Management** This topic addresses the developer's capacity to coordinate and manage all project components, taking into account project construction and future operation activities at all project-affected areas. The intent is that the project meets milestones across all components, delays in any component can be managed, and one component does not progress at the expense of another.	Not covered in this ESIA	Not within the scope of this ESIA, however the ESMP section of the ESIA will identify responsibilities clearly so that E&S measures can be integrated into subsequent construction contracts.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
P-7	**Hydrological Resource** This topic addresses the level of understanding of the hydrological resource availability and reliability to the project, and the planning for generation operations based on these available water inflows. The intent is that the project's planned power generation takes into account a good understanding of the hydrological resource availability and reliability in the short- and long-term, taking into account other needs, issues or requirements for the inflows and outflows as well as likely future trends that could affect the project.	Not covered in this ESIA	This ESIA addresses the transmission line only.
P-8	**Infrastructure Safety** This topic addresses planning for dam and other infrastructure safety during project preparation, implementation and operation. The intent is that life, property and community are protected from the consequences of dam failure and other infrastructure safety risks.	Chapter 8: Environmental Impacts and Mitigation Measures Chapter 9: Residual Impacts and Monitoring Programs	**Assessment:** • To assess safety risk associated with the transmission line construction and operation. • Topic P-16 (Labour and Working Conditions) and P-18 (Public Health) address who would be at risk and the type of risk exposure during construction and operation, e.g., electric shock, EMF, traffic accidents (road and river), accidents arising from community interactions with project activities, etc. **Management:** • ERP for the transmission line to be developed to include objectives, plans to avoid, minimise and mitigate safety risks and indicators of effectiveness. • Preparation of this ERP will make reference to SEB existing ERP.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
P-9	**Financial Viability** This topic addresses both access to finance, and the ability of a project to generate the required financial returns to meet project funding requirements, including funding of measures aimed at ensuring project sustainability. The intent is that projects proceed with a sound financial basis that covers all project funding requirements including social and environmental measures, financing for resettlement and livelihood enhancement, delivery of project benefits, and commitments to shareholders/investors.	Not covered in this ESIA	Not within the scope of this ESIA
P-10	**Project Benefits** This topic addresses the additional benefits that can arise from a hydropower project, and the sharing of benefits beyond one-time compensation payments or resettlement support for project affected communities. The intent is that opportunities for additional benefits and benefit sharing are evaluated and implemented, in dialogue with affected communities, so that benefits are delivered to communities affected by the project.	Chapter 4: Stakeholder Analysis and Engagement Chapter 7: Existing Human Environment and Land Use Chapter 8: Environmental Impacts and Mitigation Measures	**Assessment:** • This assessment may to some degree go beyond the mere establishment of the transmission line. It may thus be seen in a wider context of the HEP per se. • The Project Proponent does have policies for CSR activities (SEB's Project Benefit Plan) but in this context, it should be assessed if the HEP facilities one way or another can be extended to represent possible additional benefits to the local populations. • Opportunities such as the following may be assessed: ○ Employment ○ Subcontracting ○ Goods and services deliveries ○ Improved access ○ Utilities ○ Etc.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
P-11	**Economic Viability** This topic addresses the net economic viability of the project. The intent is that there is a net benefit from the project once all economic, social and environmental costs and benefits are factored in.	Not covered in this ESIA	Not within the scope of this ESIA.
P-12	**Procurement** This topic addresses all project-related procurement including works, goods and services. The intent is that procurement processes are equitable, transparent and accountable; support achievement of project timeline, quality and budgetary milestones; support developer and contractor environmental, social and ethical performance; and promote opportunities for local industries.	Not covered in this ESIA	Not within the scope of this ESIA. However, the ESMP section of Chapter 8 will identify which contractors will be responsible for each E&S measure.
P-13	**Project-Affected Communities and Livelihoods** This topic addresses impacts of the project on project affected communities, including economic displacement, impacts on livelihoods and living standards, and impacts to rights, risks and opportunities of those affected by the project. The intent is that livelihoods and living standards impacted by the project are improved relative to pre-project conditions for project affected communities with the aim of self-sufficiency in the long-term, and that	Chapter 7: Existing Human Environment and Land Use Chapter 8: Environmental Impacts and Mitigation Measures	**Assessment:** • Demographic description of the population residing in a corridor between the Btg. Rajang and 500 m north and south of the proposed transmission line including areas affected by access roads, influx of workers, etc. • This shall include: ○ Identification of directly and indirectly affected communities. ○ Population and settlements (number of houses/doors, gender and age distribution). ○ Cultural characteristics (ethnic composition/ IP, religion, languages spoken, way of life, values, etc.). ○ Economic activities (employment and incomes) and livelihood. ○ Education (literacy rates).

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
	commitments to project affected communities are fully delivered over an appropriate period of time. Topics P-14 'Resettlement' and P-15 'Indigenous Peoples' that follow specifically address two subsets of project affected communities.		○ Use of natural resources including aquatic, terrestrial biological resources and forest and agriculture resources. ○ Housing and sanitation. ○ Vulnerable groups – elderly, gender, etc. ○ Community organizations. ○ Land Use. ○ Infrastructure and utilities. ○ Public health (refer to topic P-18).
		Chapter 4: Stakeholder Analysis and Engagement	**Stakeholder Engagement and Support:** • Refer to topic P-1: Communications and Consultation. • Social surveys and stakeholder engagement events will be undertaken to gauge community perception and achieve support of affected community for the Project. • Consultation process will ensure local knowledge is integrated into the impact assessment. • Timing of engagement during scoping and impact assessment, and consultation events shall be timed to enable people to attend.
		Chapter 9: Residual Impacts and Monitoring Programs Chapter 10: Grievance Redress Mechanism	**Management:** • Environmental and Social Management Plan (ESMP) to be developed. • ESMP should identify the requirement for land acquisition and livelihood restoration to ensure that any economic displacement is fairly compensated with sustainable livelihood restoration. • Formal agreements with affected households will be proposed.
P-14	**Resettlement** This topic addresses physical displacement arising from the hydropower project development. The intent is that the dignity and human rights of those	The project does not involve physical displacement or resettlement of people.	• The project does not involve physical displacement or resettlement of people. • Chapter 7 will provide credible evidence to show that there is no requirement for resettlement arising from the project activities.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
	physically displaced are respected; that these matters are dealt with in a fair and equitable manner; and that livelihoods and standards of living for resettles and host communities are improved.	Chapter 7: Existing Human Environment and Land Use	• Refer to topic P-4 Siting and Design.
P-15	**Indigenous Peoples (IP)** This topic addresses the rights at risk and opportunities of IP with respect to the project, recognising that as social groups with identities distinct from dominant groups in national societies, they are often the most marginalized and vulnerable segments of the population. The intent is that the project respects the dignity, human rights, aspirations, culture, lands, knowledge, practices and natural resource-based livelihoods of IP in an ongoing manner throughout the project life.	Chapter 4: Stakeholder Analysis and Engagement Chapter 7: Existing Human Environment and Land Use Chapter 8: Environmental Impacts and Mitigation Measures	**Assessment:** • Identify / confirm whether affected people are IP according to the HSAP and State Government's definitions. • Description of the IP residing in a corridor between the Btg. Rajang, Btg. Baleh and 500 m north of the proposed transmission line including areas affected by access routes and roads and jetties. • Identification of important social and cultural practices distinct to the indigenous communities (e.g., resource harvesting activities), a description of other social and economic circumstances relevant to the indigenous community using local knowledge and expertise, and assessment of impacts on IP's dignity, human rights, aspirations, culture, lands, knowledge, practices and natural resource-based livelihoods. • Assess these IP's rights in international, national law and State's law and the risks arising from the project. • Include IP local knowledge in the assessment.
		Chapter 4: Stakeholder Analysis and Engagement Chapter 7: Existing Human Environment and Land Use	**Stakeholder Engagement and Support:** • Consultation with IPs according to a process that meets their approval, culminating in demonstration of FPIC (NB. Achievement of FPIC is SEB responsibility, and ESIA consultants cannot alone achieve this. ESIA will contribute to achievement of FPIC). • Public disclosure of commitments proposed in the ESIA. • The field surveys/verification will be linked to information gathered from local communities during the demographic/ social survey (refer to topic P-1 and P-5) and direct enquiry with the local authorities (Kapit DO, Song DO, Bukit Mabong DO and Kanowit DO),

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
			upper tier community leaders (Temenggung, Pemanca, Penghulu) and village community leaders (Tuai Rumah). • Social surveys and engagement events will be conducted to identify potential adverse impacts, opportunities, and gauge indigenous community issues and perceptions with regard to the Project (refer to topic P-1, P-13).
		Chapter 9: Residual Impacts and Monitoring Programs Chapter 10: Grievance Redress Mechanism	**Management:** • Measures to address issues and needs for IP shall be incorporated into various relevant plans e.g., overall ESMP, Cultural Heritage Management Plan, Biodiversity Management Plan, wider Baleh IPP if one exists, etc, depending on the issues that are important or of concern to the IP.
P-16	**Labour and Working Conditions** This topic addresses labour and working conditions, including employee and contractor opportunity, equity, diversity, health and safety. The intent is that workers are treated fairly and protected.	Chapter 8: Environmental Impacts and Mitigation Measures	**Assessment:** • Identify key safety risks and hazards for workers during construction (refer to topic P-8). • Identify key HR risks for workers during construction. • Reference to be made to existing labour policy and procedure compliant to National act and regulation. • Reference to be made to SEB OSH policy and procedure compliant to National act and regulation.
			Stakeholder Engagement: • SEP will propose processes for engagement with employees including those of contractors.
		Chapter 9: Residual Impacts and Monitoring Programs Chapter 10: Grievance Redress Mechanism	**Management:** • Occupational Safety & Health (OSH) Plan and Labour Management Plan (referring to SEB HR policies and procurement policies) to be developed. • Propose approach to OHS risk assessment during construction and operation.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
			• Propose monitoring of the labour force and working conditions during implementation phase. • Labour and work conditions issues will be centred on operation and maintenance of assets.

P-17	**Cultural Heritage**
	This topic addresses cultural heritage, with specific reference to physical cultural resources, at risk of damage or loss by the hydropower project and associated infrastructure impacts (e.g., new roads, transmission lines). The intent is that physical cultural resources are identified, their importance is understood, and measures are in place to address those identified to be of high importance.
		Chapter 4: Stakeholder Analysis and Engagement
		
		Chapter 7: Existing Human Environment and Land Use
		
		Chapter 8: Environmental Impacts and Mitigation Measures
			Assessment:
			• Identification of culturally sensitive area based on data from authorities in charge (Sarawak Museum, Council for Customs and Traditions), literature reviews, field visits and in-depth interviews with local authorities, upper tier community leaders, village community leaders and the locals.
			• Identification surveys will be conducted to locate and record the cultural resources within the transmission line's area of potential impact. This shall include but not limited to potential sensitive areas such as:
			  ○ Historic and cultural sites.
			  ○ Archaeological sites and artefacts.
			  ○ Burial sites/ gravesites.
			  ○ Artefacts, features, structures with cultural heritage values.
			• Assessment and evaluation of the relative levels of importance, and identification of any risks arising from the project on the culturally sensitive area or features will be based on the perception and feedback from affected community.
			• This topic will not be relevant if credible evidence provided shows that there are no physical cultural resources identified in the project affected area.

		Chapter 4: Stakeholder Analysis and Engagement	**Stakeholder Engagement and Support** • The field surveys/verification will be linked to information gathered from local communities during the demographic/social survey. • All work will be done in compliance with the State laws and local customs i.e., Sarawak Cultural Heritage Ordinance, 1993.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
			• Consult with appropriate regulatory stakeholders such as the Sarawak Museum Department, Council for Customs and Traditions (Majlis Adat Istiadat Sarawak) as well as relevant NGOs if any, including formal agreements if necessary.
		Chapter 9: Residual Impacts and Monitoring Programs	**Management:** • Proposals for avoidance, minimisation, mitigation or compensation will be established for all significant Impacts related to cultural heritage topic. • If relevant, a Cultural Heritage Management Plan to be developed. • Chance Finds Procedure to be included in ESMP.
P-18	**Public Health** This topic addresses public health issues associated with the hydropower project. The intent is that the project does not create or exacerbate any public health issues, and that improvements in public health can be achieved through the project in project-affected areas where there are significant pre-existing public health issues.	Chapter 7: Existing Human Environment and Land Use Chapter 8: Environmental Impacts and Mitigation Measures	**Assessment** • Description of community health status will be based on health information available at local clinics and village health workers as well as information gathered from social survey and stakeholder engagement that include the following information: o Presence/availability of health services and capacities. o General public health status as well as selected morbidity patterns within the community, through questionnaire survey to be conducted together with the social survey. o Incidence of COVID-19 in the local communities. o Health of different groups, e.g., women, ethnicities. o The prevalence of Gender-based Violence and Harassment (GBVH) and Sexual Exploitation and Abuse (SEA) in the area and arising from the presence of workers in existing industries (e.g., logging). o EMF exposure level. • Address impacts of project on public health: o Exposure to project related activities. o Interactions with project personnel.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
			○ Migration into the Project area. ○ EMF exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz) and the International Finance Corporation's (IFC) Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution. • Assessment of Project Proponent's policies for protection of public health in similar situations. • Assessment of possible cumulative (incremental) impacts. • Clarification of impacts and risks.
		Chapter 4: Stakeholder Analysis and Engagement	**Stakeholder Engagement** • Contacts of local authorities including local clinics for health statistics. • Social surveys will include questions concerning health issues. • Health surveys will take gender issues into account as. male and females may have different health concerns.
		Chapter 9: Residual Impacts and Monitoring Programs	**Management** • Public Health Management Plan to be developed to include objectives, plans to avoid, minimise and mitigate health risks and indicators of effectiveness.
P-19	**Biodiversity and Invasive Species** This topic addresses ecosystem values, habitat and specific issues such as threatened species and fish passage in the catchment, reservoir and downstream areas, as well as potential impacts arising from pest and invasive species associated with the planned project. The intent is that	Chapter 6: Existing Biological Environment Chapter 8: Environmental Impacts and Mitigation Measures	**Assessment:** • The focal study area will be a corridor stretching 500 m on either side of the transmission line. • Land cover/ habitat mapping will be made based on satellite imageries and LIDAR survey supported by ground truthing. At a larger scale, activities that may contribute to cumulative impacts will be included in mapping and overall assessment.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
	there are healthy, functional and viable aquatic and terrestrial ecosystems in the project-affected area that are sustainable over the long-term, and that biodiversity impacts arising from project activities are managed responsibly.	Chapter 9: Residual Impacts and Monitoring Programs	• It is not deemed necessary to conduct systematic, statistical field surveys for neither flora nor fauna unless particular issues show up during the social surveys or literature studies as disturbance during construction will only be temporary and localised at work sites. The reason for this is that the study area has been subjected to several periods of shifting cultivation or recent logging or is now covered by tree plantations (rubber or forest plantations). • Before the field survey, a literature review will be undertaken on the vegetation cover of the area under assessment, and together with analyses of satellite images, this information will be used as a basis for the fieldwork and ground-truthing. • Focus will be on habitat and vegetation types, pointing out if there are any conservation issues or if there is a likelihood, the habitat contains protected species or species important for local or commercial livelihoods. • At species level, focus will be on the presence of species listed in national/state legislation, IUCN red List or claimed of significance by local populations. • Identification of their status: i. IUCN status ii. National red-list category, iii. Endemic iv. Migratory • The aquatic flora and fauna will primarily be based upon literature studies (Baleh SEIA Report and reports by others e.g., UNIMAS and other researchers) and interviews with government agencies and the local communities. • No systematic aquatic sampling is deemed necessary for this project as the project does not directly alter flow or quality of the rivers. However, if it is indicated, that there may be rare or otherwise

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
			conservation worthy aquatic habitats or species, field verification will be launched. • Identification of the risk of introducing invasive species. • Identification and risk assessment will be made for all foreseeable impacts caused by the project activities including incremental impact on issues already existing in the area. Risk will be classified based on i.e., likelihood, spatial impact, severity and reversibility. **Stakeholder Engagement:** • Appropriate regulatory stakeholders such as Sarawak Biodiversity Centre (SBC), Forest Department Sarawak (FDS), Sarawak Forestry Corporation (SFC) as well as relevant NGOs will be consulted in order to obtain information on conservation interests, migration routes and optional mitigation measures. • The social surveys will include obtaining local information concerning local utilisation of biodiversity as well as the possible existence of focal species, feeding and resting sites. **Management**: • Proposals for avoidance, minimisation, mitigation or compensation will be established for all significant Impacts identified during construction and operation stages of the project. • Assessment of SEB environmental policies and organisational arrangements including plans to extend these to contractors. • Biodiversity Management Plan to be developed to include objectives, plans to avoid, minimise and mitigate impacts and indicators of effectiveness.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
P-20	**Erosion and Sedimentation** This topic addresses the management of erosion and sedimentation issues associated with the project. The intent is that erosion and sedimentation caused by the project is managed responsibly and does not present problems with respect to other social, environmental and economic objectives, and that external erosion or sedimentation occurrences which may have impacts on the project are recognised and managed.	Chapter 5: Existing Physical Environment Chapter 8: Environmental Impacts and Mitigation Measures	**Assessment:** • Description will be based on existing government geology and soils maps combined with slope analysis based on 30x30 m digital terrain models obtained from USGS as well as Lidar/Digital Elevation/ Terrain Model (DEM/ DTM) from Proponent. • Major geological features and soil classes will be described concerning slope stability and erodibility. Focus would be on access road construction and improvements, establishment of temporary onsite support facilities and tower bases where earthworks (cut and fill, overburden removal) activities would take place. • Erosion and sediment related risks during construction. The Modified Universal Soil Loss Equation (MUSLE) will be used to calculate the sediment yield. • Best Management Practices (BMPs) and standard requirement for construction phase to address erosion and sediment control during the construction and operation of the transmission line project.
		Chapter 9: Residual Impacts and Monitoring Programs	**Management:** • A comprehensive Erosion and Sedimentation Control Plan (ESCP) will be formulated based on the guidelines issued by the Department of Irrigation and Drainage (DID). • Practical best management practice to mitigate the potential erosion risks caused by the construction activities. • Appropriate monitoring will be recommended for the construction and operation stages.

<table>
<tr>
<td>P-21</td>
<td>Water Quality
This topic addresses the management of water quality issues associated with the project. The intent is that water quality in the vicinity of the project is not adversely impacted by project activities.</td>
<td>Chapter 5: Existing Physical Environment

Chapter 8: Environmental Impacts and Mitigation Measures</td>
<td>Assessment:

Identification and description of water catchment (including gravity feed catchment), water intake points, flood level and flood prone areas based on existing government maps and information.
Acquisition of secondary water quality data from government agencies NREB, JBALB and DOE will be made to see if there have been changes in water quality in the last few years.
For primary data, surface water sampling at selected rivers/streams will be carried out:

Sampling Method: Grab sampling and in-situ testing.
Sampling Equipment: pH and DO meter, water bottles.
Numbers of Sampling Point: 25.
Locations: Btg. Rajang, Btg. Baleh and their tributaries.
Heavy metal parameters at 7 points near water intakes and gravity feed catchment will be analysed.
Relevant Parameters and analysis method:

<table>
<tr><th>PARAMETER</th><th>METHODOLOGY</th></tr>
<tr><td>pH value</td><td>APHA 2550 B, 2017</td></tr>
<tr><td>Temperature, °C</td><td>APHA 4500-H^+ B, 2017</td></tr>
<tr><td>Dissolved Oxygen, mg/L</td><td>APHA 4500-O G, 2017</td></tr>
<tr><td>Biochemical Oxygen Demand in 5 days @20°C, mg/L</td><td>APHA 5210 B & 4500-O G, 2017</td></tr>
<tr><td>Chemical Oxygen Demand, mg/L</td><td>APHA 5220 C, 2017</td></tr>
<tr><td>Total Suspended Solids, mg/L</td><td>APHA 2540 D, 2017</td></tr>
<tr><td>Ammoniacal Nitrogen (as N), mg/L</td><td>APHA 4500-NH_3 B & F, 2017</td></tr>
<tr><td>Turbidity</td><td>APHA 2130, 2017</td></tr>
<tr><td>Total Dissolved Solids, mg/L</td><td>APHA 2540 D, 2017</td></tr>
<tr><td>Oil & Grease, mg/L</td><td>APHA 5520 B, 2017</td></tr>
<tr><td>Total Coliform Count</td><td>APHA 9221 B, 2017</td></tr>
<tr><td>Faecal Coliform Count</td><td>APHA 9221 E, 2005</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr><th colspan="2">HSAP TOPIC COVERAGE</th><th>WHERE IT IS ADDRESSED IN THE ESIA</th><th>SCOPE & METHODOLOGY</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>Al, mg/l</td><td>APHA 3030 F & 3111 D, 2017</td></tr>
<tr><td>As, mg/l</td><td>APHA 3114 B & C, 2017</td></tr>
<tr><td>Ba, mg/l</td><td>APHA 3030 F & 3111 D, 2017</td></tr>
<tr><td>Cd, mg/l</td><td>APHA 3030 F & 3111 B, 2017</td></tr>
<tr><td>Chromium, Hexavalent (as Cr6+), mg/l</td><td>APHA 3500 Cr B, 2017</td></tr>
<tr><td>Chromium, Trivalent (as Cr3+), mg/l</td><td>In House Method 0508 based on APHA 3500 Cr B, 1998</td></tr>
<tr><td>Cu, mg/l</td><td>APHA 3030 F & 3111 B, 2017</td></tr>
<tr><td>Fe, mg/l</td><td>APHA 3030 F & 3111 B, 2017</td></tr>
<tr><td>Pb, mg/l</td><td>APHA 3030 F & 3111 B, 2017</td></tr>
<tr><td>Mn, mg/l</td><td>APHA 3030 F & 3111 B, 2017</td></tr>
<tr><td>Hg, mg/l</td><td>In House Method 0535 based on APHA 3112 B, 2017</td></tr>
<tr><td>Ni, mg/l</td><td>APHA 3030 F & 3111 B, 2017</td></tr>
<tr><td>Se, mg/l</td><td>APHA 3114 C, 2017</td></tr>
<tr><td>Ag, mg/l</td><td>APHA 3030 F & 3111 B, 2017</td></tr>
<tr><td>Sn, mg/l</td><td>In House Method 0502 based on APHA 3111 D, 2017</td></tr>
<tr><td>Zn, mg/l</td><td>APHA 3030 F & 3111 B, 2017</td></tr>
</table>

Results will be compared against National Water Quality Standards for Malaysia (NWQSM), Raw Water Quality Criteria by Ministry of Health, Malaysia (MOH), existing monitoring data from DOE and NREB.
Focus would be assessment of project impact on water quality especially during construction stage.

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HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
		Chapter 9: Residual Impacts and Monitoring Programs	**Management:** • ESMP will include measures for minimisation and mitigation of water quality impacts. • Conservation Management Plan will be developed to include objectives, plans to avoid, minimise and mitigate impacts and indicators of effectiveness. • Water quality monitoring to be included in the Environmental and Social Management Plan (ESMP).
P-22	**Reservoir Planning**	Not covered in this ESIA	This ESIA addresses the transmission line only.
P-23	**Downstream Flow Regimes**	Not covered in this ESIA	This ESIA addresses the transmission line only.

P-24	**Climate Change Mitigation and Resilience**
	This topic addresses the estimation and management of the project's greenhouse gas (GHG) emissions, analysis and management of the risks of climate change for the project, and the project's role in climate change adaptation. The intent is that the project's GHG emissions are consistent with low carbon power generation, the project is resilient to the effects of climate change, and the project contributes to wider adaptation to climate change.
		Chapter 5: Existing Physical Environment
		
		Chapter 8: Environmental Impacts and Mitigation Measures
			Assessment:
			• CO_{2eqv} emissions will be calculated and provided to the Client for inclusion into the estimate for the emissions of the overall HEP.
			• CO_{2eqv} emissions caused by clearance and maintenance of a 50 m ROW and access roads will be based on:
			  ○ Calculations will cover emissions from cleared biomass as well as from construction and transportation machinery and equipment.
			  ○ Biomass estimations will be based on land cover map derived from satellite imagery and standard above ground biomass levels as listed in IPCC documentation.
			  ○ Calculation methodology will be as advocated by IPCC, assuming minimum utilisation, no burning but priority on natural decomposition.
			  ○ Emissions from machinery and equipment will be based on machinery mobilisation details provided by the Client.
			Assessment of any built-in design for resilience to climate change, e.g., increased frequency of extreme weather patterns, increased rainfall, rising in ambient temperatures and increase in lightning activities.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
		Chapter 9: Residual Impacts and Monitoring Programs	**Management** • Alignment with the Project Proponent's climate policies and goals including reference to other project activities. • Plans to ensure no burning policies are adhered to by contractors. Documentation of transmission line design to ensure it is resilient to plausible climate change scenarios.
		Chapter 4: Stakeholder Analysis and Engagement	**Stakeholder engagement** Engagement of external stakeholders shall be through the Project Proponent's general obligations at project level, of which the present is only a smaller activity.
I-18	**Waste, Noise and Air Quality** This topic addresses the management of waste, noise and air quality issues associated with the project. The intent is that noise and air quality in the vicinity of the project are of a high quality and not adversely impacted by project activities, and that project wastes are responsibly managed.	Chapter 5: Existing Physical Environment Chapter 8: Environmental Impacts and Mitigation Measures	**Assessment:** • Focus would be assessment of project impact on air, noise, EMF, traffic and waste condition during construction and operational stages. • Establish existing air quality, noise, EMF, traffic condition and waste management services available base on the following:
		Chapter 9: Residual Impacts and Monitoring Programs	**<u>Ambient Air Quality:</u>** • Sampling Method: In-situ. • Sampling Equipment: AEROQUAL 500 Portable Outdoor Air Quality Monitor. • Numbers of Sampling Point: 10. • Locations: Settlements within the impact zone (transmission line and access roads corridor and river corridor). • Parameters: PM10 (24 hours) & PM2.5 (24 hours). • Analysis Method: Compared against Malaysian Ambient Air Quality Standards (MAAQS), 2013.

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
			Ambient Noise Quality: • Sampling Method: In-situ testing. • Sampling Equipment: Noise meter. • Numbers of Sampling Point: 10. • Locations: Settlements within the impact zone (transmission line and access roads corridor and river corridor). • Parameters: Described in terms of tenth and ninetieth percentiles (L10 & L90), equivalent continuous sound pressure level (Leq) and minimum and maximum instantaneous levels (Lmin & Lmax). • Analysis Method: ISO 1996 "Description and Measurement of Environmental Noise", the DOE and the Department of Occupational Safety and Health (DOSH) standards.
			Electromagnetic Field (EMF): • Sampling Method: In-situ. • Sampling Equipment: RS Multi Field EMF Meter. • Numbers of Sampling Point: 10. • Locations: Settlements within the impact zone (transmission line and access roads corridor and river corridor). Where possible, sampling will be taken within 50 of the proposed transmission line ROW. • Parameters: Gauss (mG) or Tesla(uT). • Analysis Method: Malaysian Standard and guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines.
			Traffic: Riverine and Land • Sampling Method: Traffic count. • Sampling Equipment: Manual counting. • Numbers of Sampling Point: 10 (5 land and 5 riverine).

HSAP TOPIC COVERAGE		WHERE IT IS ADDRESSED IN THE ESIA	SCOPE & METHODOLOGY
			• Locations: Btg. Rajang, Sg. Mujong, Sg. Menuan, Sg. Belawai, Sg. Iran and existing roads and logging roads. • Parameters: Weekday and weekend road traffic and riverine traffic at representative locations.

			<u>Waste</u>
			• Identify all relevant waste legal requirements.
			• Scope of waste management and disposal assessment will include the following waste types:
			  ○ Biomass.
			  ○ Solid wastes (including construction wastes).
			  ○ Domestic wastes.
			  ○ Scheduled wastes.
			  ○ Sewage.
			• Estimation of wastes quantities for proper waste disposal planning.
			• Impacts associated with inappropriate disposal and management of wastes will be assessed.
			• Waste Management Plan will be developed to include objectives, plans to avoid, minimise and mitigate impacts and indicators of effectiveness.
			• Monitoring program will be included within the management plan.

1.9.4.2 International Finance Corporation (IFC) Policy and Performance Standards on Social and Environmental Sustainability

The IFC is a subsidiary of the World Bank Group, headquartered in Washington. D.C., and is the largest development institution worldwide. The IFC focuses on advancing economic development and improving the quality of life by encouraging the growth of the private sector in developing countries (IFC 2012). The IFC's Environment and Social Development Department is tasked with evaluating, appraising, and monitoring the environmental and social impacts of proposed and existing IFC Projects. Compliance with IFC's social and environmental framework is a requirement for Project sponsors.

The International Finance Corporation (IFC) Sustainability Policy identifies its roles and responsibilities in ensuring Project performance in partnership with Project sponsors. The Performance Standards are an international tool used to identify and manage environmental and social impact risks, as well as to clarify what is expected of project sponsors, and detail requirements that project sponsors will be required to fulfil in order to receive and retain IFC support. IFC Performance Standards have become the most widely recognised international environmental and social standards in international lending, recognised by almost all development finance institutions and a large range of private sector financers. The IFC Performance Standards (PS) are:

- **PS 1**: Assessment and Management of Environmental and Social Risks and Impacts
- **PS 2**: Labour and Working Conditions
- **PS 3**: Resource Efficiency and Pollution Prevention
- **PS 4:** Community Health, Safety, and Security
- **PS 5**: Land Acquisition and Involuntary Resettlement
- **PS 6**: Biodiversity Conversation and Sustainable Management of Living Natural Resources
- **PS 7**: Indigenous Peoples
- **PS 8**: Cultural Heritage

1.9.4.3 IFC's Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution, 2007

The Guidelines include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial and industrial areas. Where applicable, the Guidelines shall serve as guidance to address the environmental, health and safety issues, as well as the performance and monitoring for power transmission between the Project and its substations, and power distribution from the substations to the end-users.

1.9.4.4 World Bank's Environmental and Social Framework

The World Bank includes two development institutions owned by 184 member countries – the International Bank for Reconstruction and Development and the International Development Association and their operations are guided by a comprehensive set of environmental and social policies and procedures.

Launched on October 1, 2018, its Environmental and Social Framework (ESF) enables the World Bank and Borrowers to better manage environmental and social risks of projects and to improve development outcomes. It was launched on October 1, 2018.

The ESF offers broad and systematic coverage of environmental and social risks. It makes important advances in areas such as transparency, non-discrimination, public participation, and accountability—including expanded roles for grievance mechanisms. It brings the World Bank's environmental and social protections into closer harmony with those of other development institutions. The ESF consists of:

- The World Bank's Vision for Sustainable Development.
- The World Bank's Environmental and Social Policy for Investment Project Financing (IPF), which sets out the requirements that apply to the Bank.
- The **10 Environmental and Social Standards (ESS),** which set out the requirements that apply to Borrowers.
- Bank Directive: Environmental and Social Directive for Investment Project Financing.
- Bank Directive on Addressing Risks and Impacts on Disadvantaged or Vulnerable Individuals or Groups.

The 10 ESS which set out the requirements that apply to Borrowers are:

ESS1	Assessment and Management of Environmental and Social Risks and Impacts
ESS2	Labour and Working Conditions
ESS3	Resource Efficiency and Pollution Prevention and Management
ESS4	Community Health and Safety
ESS5	Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
ESS6	Biodiversity Conservation and Sustainable Management of Living Natural Resources
ESS7	Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities
ESS8	Cultural Heritage
ESS9	Financial Intermediaries
ESS10	Stakeholder Engagement and Information Disclosure

1.9.5 International Treaties and Conventions

The International Conventions and Treaties which are relevant to the proposed BMTLP are summarised in **Table 1.9.3** below.

Table 1.9.3: List of Applicable International Treaties and Conventions

Factors	International Convention and Laws	Applicability to Project
Environmental	United Nations Convention on Biological Diversity, 1992	• Identification of biological diversity conservation in the ESIA study. • Develop strategies for the conservation and sustainable use of biological diversity. • Implementation of risk assessment to ensure the Project will not affect human health.
Biodiversity	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	• Ensures international trade in specimens of wild animals and plants does not threaten their survival. • Protects endangered species threatened by excessive exploitation via import/export permits. • The project may open up access for illegal gathering of wildlife/plants for trade. Workers may capture wildlife and gather plants that are CITES-listed in order to trade them.
Hazardous Substances	Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal, 1989	• Encourages minimum generation of hazardous wastes. • Ensure proper and environmentally acceptable management of wastes. • Monitor and reduce international movements of hazardous wastes.
	Rotterdam Convention, 1998	Promote the responsibilities in relation to the importation of hazardous chemicals.
Waste	London Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, 1972	Prevention of sea pollution cause by improper disposal of waste.
	Aarhus Protocol on Persistent Organic Pollutants, 1998	Control, reduce, or eliminate discharge, emissions, and losses of persistent organic pollutants.
Indigenous Peoples	United Nations Declaration on the Rights of Indigenous Peoples	A non-legally binding resolution passed by the United Nations in 2007. It delineates and defines the individual and collective rights of Indigenous peoples, including their ownership rights to cultural and ceremonial expression, identity, language, employment, health, education, and other issues. It "emphasizes the rights of Indigenous peoples to maintain and strengthen their own institutions, cultures and

Factors	International Convention and Laws	Applicability to Project
		traditions, and to pursue their development in keeping with their own needs and aspirations. It "prohibits discrimination against indigenous peoples," and it "promotes their full and effective participation in all matters that concern them and their right to remain distinct and to pursue their own visions of economic and social development.
Heritage	Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972	• Compliance with the cultural and natural heritage of the Affected Communities of this proposed Project. • Implement methods of protection and conservation of the cultural and natural heritage of the Affected Communities of this proposed Project. • Development of scientific, legal, and technical studies to identify the potential threats this Project may cause.
	Convention for the Safeguarding of the Intangible Cultural Heritage, 2003	• Ensures respect for the intangible cultural heritage of the Affected Communities of this proposed Project. • Promote awareness of the importance of preserving cultural heritage
Labour	International Labour Organization (ILO) Conventions, 1958	Malaysia has ratified 6 out of 8 of the fundamental ILO Conventions, of which 5 are still in force. These include: • C029 - Forced Labour Convention, 1930 (No. 29) • C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98) • C100 - Equal Remuneration Convention, 1951 (No. 100) • C138 - Minimum Age Convention, 1973 (No. 138) • C182 - Worst Forms of Child Labour Convention, 1999 (No. 182)
Human Rights	International Convention on the Elimination of All Forms of Racial Discrimination (ICERD), 1965	Encourages the elimination of racial discrimination in all its forms, including eradicating racial hatred and incitement to hatred. combatting prejudices which lead to racial discrimination.
	Convention on the Rights of the Child (CRC), 1989	Ensures the rights of a child is respected, which includes the prohibition of the use of child labour.

Factors	International Convention and Laws	Applicability to Project
Climate Change	United Nations Framework Conservation on Climate Change (Kyoto Protocol)	Ensures stabilization of greenhouse gas in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
	Vienna Convention (Montreal Protocol) relative to the substances threatening the ozone layer	Reduces substances causing destruction of the ozone layer, regulating the amount of atmospheric contamination by gases that react with ozone in the upper atmosphere.
Energy	Energy Charter Protocol, 1994	Promotes energy security through the operation of more open and competitive energy markets, while respecting the principles of sustainable development and sovereignty over energy resources.

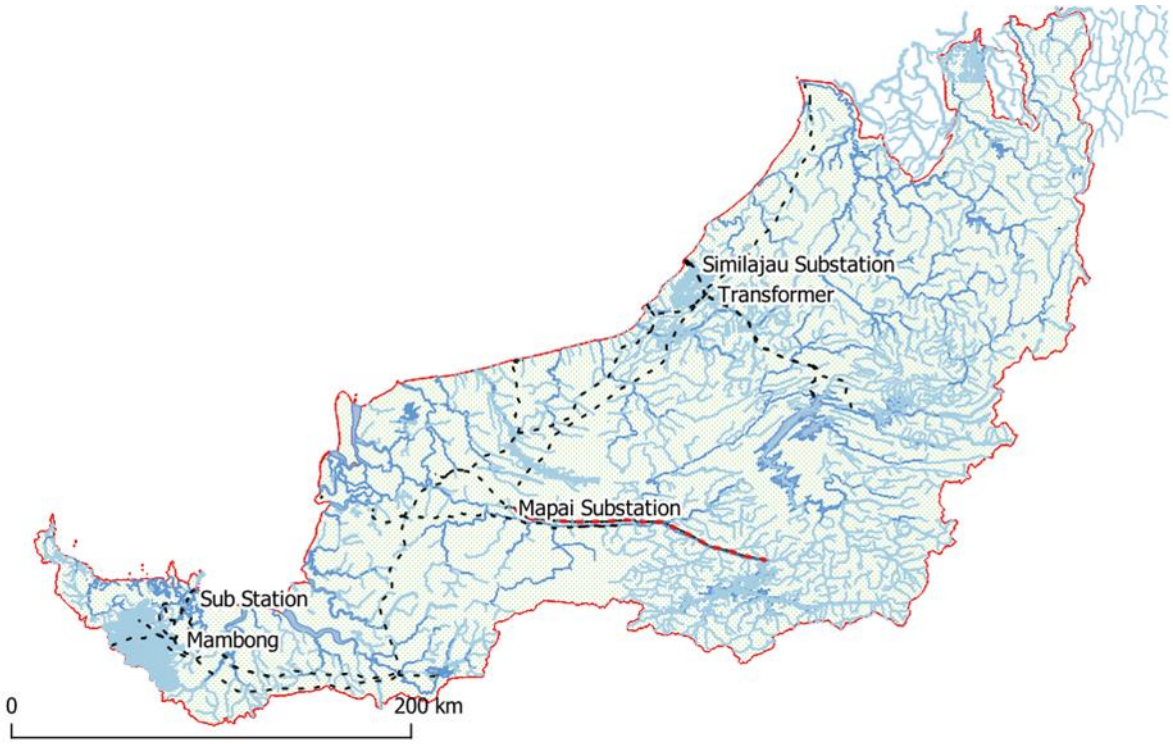
Appendix 1.9.1

Terms of Reference (TOR)

Sarawak Energy Berhad

Terms of Reference (TOR)

Environmental and Social Impact Assessment (ESIA) Study for The Proposed Baleh – Mapai 500 kV Transmission Line Project



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Abbreviation and Glossary

amsl	above mean sea level
ALARP	As low as reasonably practicable
Ambient	Refers to the surrounding environment and/or conditions
Baseline	Existing baseline conditions are the current conditions of an area to be affected by the proposed Project.
Bird strike mortality	Fatal collision between a bird and man-made structure, including transmission lines
Btg.	Batang
Buffer	Area of land separating two distinct land uses that acts to soften or mitigate the effects of one land use on the other
CD	Compact Disc
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CKSB	Chemsain Konsultant Sdn Bhd
Corridor	The corridor (or route corridor) is the swathe of land within which the transmission line will lie
Cultural resources	A broad term covering any physical, natural and spiritual properties and features that are adapted, used and created by humans, in the past and the present. Cultural resources include traditional systems of cultural practice, belief or social interaction
Cumulative (impact)	Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts
DID	Department of Irrigation and Drainage
Directly affected stakeholder	Primary: Those who are directly affected, either positively or negatively, by an organization's actions or project This category includes those who may lose land they currently use or other assets, including houses, buildings, trees, crops or other valuable property as well as access to common resources
Direct impacts (primary impact or first order impact)	Impacts that are caused directly by an activity and generally occur at the same time and at the place of the activity. These impacts are generally associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable
DOA	Department of Agriculture
DOE	Department of Environment
EBS	Environmental Baseline Sampling
Ecology	The study of interrelationships of organisms to their environment or surroundings. Ecology considers individual organisms, populations and communities, as well as large units of landscape such as forests, estuaries and river basins

Ecosystem	Organisms together with their abiotic environment, forming an interacting system, inhabiting an identifiable space.
EMF	Electromagnetic field
Endangered species	Organism threatened with extinction
Endemic species	Species of those plants and animals which are found in just one particular region and nowhere else in the world
Engagement	Term used to describe system and processes by which proponent/operator of a facility interacts on a regular basis with its stakeholders
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
Fauna	The animal life of a region
Flora	The plant life of a region
FPIC	Free, Prior and Informed Consent
GBVH	Gender-based Violence and Harassment
Habitat	The area or environment where an organism or ecological community normally lives or occurs. The natural home of species of plants or animals
Habitat fragmentation	The breaking up of an area of habitat into increasingly smaller blocks as a result of direct loss and/or disturbance
HEP	Hydroelectric Project
HSAP	Hydropower Sustainability Assessment Protocol
HSG	Hydropower Sustainability Guidelines
ICNRP	International Commission on Non-Ionizing Radiation Protection
IFC	International Finance Corporation
IHA	International Hydropower Association
Indirectly affected stakeholder	Secondary: Those who are indirectly affected by the project. This include people who live along the transmission line route who may be disturbed by project traffic, noise, dust, or other construction impacts, and who may also benefit from employment opportunities
Indirect impacts	Indirect or induced changes that may occur as a result of the proposed activity (e.g., the reduction of water in a stream that supplies water to a reservoir that supplies water to community). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity
Invasive flora or fauna	Plant or animal species which may spread into, and takes over, an ecosystem to the detriment of other species; often the result of a disturbance
IP	Indigenous People
IUCN	International Union for Conservation of Nature

JBALB	Jabatan Bekalan Air Luar Bandar
JKR	Jabatan Kerja Raya
LCDA	Land Custody and Development Authority
MAAQS	Malaysian Ambient Air Quality Standards
MOH	Ministry of Health, Malaysia
Mitigation	Actions taken during the planning, design, construction and operation of works to reduce or avoid potential adverse effects
Ng.	Nanga
NGOs	non-governmental organisations
NTFPs	Non-timber products
NREB	Natural Resources and Environment Board
NWQSM	National Water Quality Standards for Malaysia
PDRM	Polis Diraja Malaysia
PS	Performance Standard
RECODA	Regional Corridor Development Authority
ROW	Right-of-way Strip of land controlled and maintained for a transmission line, road or other linear feature
SCORE	Sarawak Corridor of Renewable Energy
Sediment	Material, including soil and organic material, that is deposited on the bottom of a water body
SEA	Sexual Exploitation and Abuse
Sg.	Sungai
SWB	Sibu Water Board
SPA	State Planning Authority
SRB	Sarawak River Board
SRTM	Shuttle Radar Topography Mission
Stakeholder	Person, organisation or other legal entity concerned with or affected by an activity and its consequences. These include authorities, local communities, investors, workforce, consumers, environmental interest groups and the general public. They may have the ability to influence its location, design and the approval process
Stakeholder Engagement and Consultation	Stakeholder engagement is the process by which an organization involves people or communities who may be affected by the decisions it makes or can influence the implementation of its decisions. They may support or oppose the decisions, be influential in the organization or within the community in which it operates, hold relevant official positions or be affected in the long term.
Traditional Knowledge	Refers to the wisdom that primarily native/indigenous peoples have accumulated during their lives, by learning from Elders and others, and from personal experience acquired while interacting with the environment
TL	Transmission Line

Transmission Line	Linear arrangement of towers and conductors which carries electricity from generating stations and transmission stations to meet electrical needs
Topography	Referring to natural features on the surface of the earth
TOR	Terms of Reference
Towers	Transmission line structures which provide support for conductors and ensure clearance from the ground
USGS	United States Geological Survey
Vegetation	General term for all plants or plant life of an area or region; it refers to the ground cover provided by plants

1. INTRODUCTION

These Terms of Reference (TOR) shall cover the preparation of a project-specific Environmental and Social Impact Assessment (ESIA), for the Proposed Baleh-Mapai 500 kV Transmission Line (TL) Project.

This ESIA shall be prepared in a manner consistent with laws and regulations of the Sarawak Government and guided by the requirements of the Hydropower Sustainability Assessment Protocol (HSAP) and IFC (International Finance Corporation) Environmental and Social Performance Standards.

2. BRIEF PROJECT BACKGROUND

2.1 PROJECT LOCATION AND ACCESS

The 1285 MW Baleh Hydroelectric Project (HEP) is located on Batang (Btg.) Baleh approximately 105 km upstream of Kapit Town at pala Bayong, and about 3 km upstream of its confluence with the Sungai (Sg.) Putai. Administratively, it is located within the Kapit Division (see **Figure 1**).

The proposed 176 km TL starts from Baleh 500 kV Substation at Baleh HEP to Mapai 500kV Substation between 2° 07' 8.66"N and 1° 48' 34.59"N and longitudes 112° 16' 24.65"E and 113° 46' 5.66"E.

The TL will be constructed along the northern banks of Btg. Baleh and Btg. Rajang, traversing mostly hilly to mountainous terrains. Along the way, the transmission route crosses mostly secondary forest, agriculture land, settlements and river crossings at Btg. Baleh, Sg. Merirai, Sg. Mujong, Btg. Rajang, Sg. Menuan, Sg. Belawai, Sg. Ibau, Sg. Entangai, Sg. Song, Sg. Iran, Sg. Kabah and Sg. Mapai.

At present, the only local road network to the northern bank of Btg. Rajang is available up to Nanga (Ng.) Tada, near Mapai 500kV Substation site. Beyond this, there is no direct road linkage except by river transport i.e., express boat services and local longboats.

On the southern bank of Btg. Rajang, a 120km road linking Kapit and Song is nearing completion. This new road will reduce travelling time to Kapit from three and half hours by express boat to two and half hours by road. From Kapit town, access is available to a point opposite Ng. Mujung across Btg. Baleh Bridge. From here, construction of the 73km access road to Baleh HEP is still ongoing.

For the commencement of development, and probably for the whole construction period, the primary means of transporting construction material, machinery and other major items, will be via land as well as the Btg. Rajang and Btg. Baleh.

Major towns and bazaars in the region are Kanowit, Ngemah, Song, Kapit and Ng. Gaat, all of them located at the southern banks of Btg. Rajang and Btg. Baleh.

2.2 STATEMENT OF NEEDS

The primary objective of the Project is to contribute to the State of Sarawak's agenda of sustainable development. This is aligned with the expansion of system generation capacity arising from extensive demand of the energy-intensive industries at Sarawak Corridor of Renewable Energy (SCORE) as described below:

1. To allow evacuation of power from the Baleh HEP to the Sarawak Grid system to meet the growing energy demand from SCORE development on timely basis.
2. The use of clean and renewable energy transmitted by the Project will contribute to the decarbonation of Sarawak Main Electricity Grid by increasing the share of renewable energy in the generation mix which led to further reduction of Sarawak Main Electricity Grid emission (tCO2/MWh).
3. Encouraging opportunities and development to local economy through job creation, direct and indirect outlays and improving the local energy transmission infrastructure (improvement grid stability and improve grid reliability).
4. The electricity evacuation is aligned with the State and Malaysian Government's fuel diversification policy which promotes greater use of renewable energy for power generation.

2.3 PROJECT COMPONENTS AND ACTIVITIES

2.3.1 Components

The Baleh HEP project comprises of 12 individual packages and this TL is Work Package 7 (BLP7):

1. BLP1 – Jetty, Road & Bridge
2. BLP2 – Explosive Magazine
3. BLP3 – Operator Village
4. BLP4 – Diversion Tunnel
5. BLP5 – Main Civil (Excl. PS Civil)
6. BLP6 – Main Electrical and Mechanical Works
7. **BLP7 – 500 kV Baleh – Mapai TLP**
8. BLP8 – Biomass Removal
9. BLP9 – Hydrometric & Seismic Station

10. BLP10 – Alternative Access Road
11. BLP11 – Kapit – Baleh 33 kV Line (RES)
12. BLP12 – 500 kV Mapai Substation Extension

Assessments, impacts and management recommendations of this ESIA study will be limited to **BLP7**, i.e., the 500 kV Baleh-Mapai TL. The main component of BLP7 consists of the following:

1. **176 km**, 2 x Quad conductor Drake 500 kV TL from Mapai 500 kV Substation to Baleh 500 kV Substation.

2.3.2 Design Basis

The basic design parameters for the proposed TL are shown below:

Table 2.1: Basic Design Parameters

Basic Transmission Ling Design Parameters	Description
Number of circuits	2
Tower type	Steel Lattice
Conductor type	ACSR
Conductor name	Quad Drake
Number of conductors	4
Conductor size, mm2	402
Earth conductor	OPGW
Line length, km	176
Line thermal rating, MVA	2200
Line voltage rating, kV	500

Source: Project Execution Plan Document (SEB, 2020)

2.3.3 Project Activities

The main activities of the Project consist of the following:

1. **Securing the right of way** (ROW) and the State authority approval for the acquisition of **50 m easement** (25 m on either side).
2. **Engineering Survey** to establish the line route (including subdivision survey).
3. **Clearing** of TL ROW of vegetation (approximately 885 hectares (Ha.)).

4. **Clearing** of access roads ROW of vegetation.
5. **Construction** of TL towers, their foundations, access roads and stringing of the TL.
6. **Operation** of the TL.

2.4 SITE OPTIONS – LINE ROUTES

Brief site option is presented below. A more comprehensive project options description shall be discussed in the ESIA.

Three options of line routes were considered and studied by Sarawak Energy as tabulated in **Table 2.2** and **Figure 2**. All three route options are located on the northern bank of Btg. Rajang and Btg. Baleh.

The TL ROW to be acquired is 176 km in length and 50 m wide, thereby giving a total area of about 8,800,000 m^2 (880 Ha.). There will be 35 major angle towers traversing mostly hilly to mountainous terrains with 4 river crossings.

Table 2.2: Comparison of Proposed Line Route Options

Option	Length (Km)	Land Use	Terrain & Elevation	No. of Angle Tower	No. of River Crossings	Remarks
1	175	Agriculture	Hilly, 50m to 300m	9	8	
2	**176**	**Agriculture**	**Within 250m**	**35**	**4**	**Only for major river crossing**
3	177	Agriculture	Within 100m	64	4	Only for or river crossing

Option 2 has been selected as it minimizes risks by:

- Avoiding titled lands including possible environmental and cultural significant areas.
- Minimizes line passing through dwelling / built-up areas such as longhouses, titled lots, cemeteries and water catchment.
- Avoiding terrain of more than 250 m in elevation and avoid steep slopes wherever possible.
- Maintaining a distance from the Regional Corridor Development Authority (RECODA) road (stretch from Nanga Mujung to Baleh HEP) to avoid potential damage to tower bases due to road slope cutting.

- Reduce number of major navigable river crossings.
- For areas without any existing/proposed roads, the route shall be kept close to river which can serve as alternative transport means during construction with river buffer zone maintained of at least 100 m to minimize damage to foundations due to erosion and to protect the existing riverbank.

The Project has received approval for the siting application by the **State Planning Authority (SPA)** on 24th January 2020 as in **Appendix A**. This approval is valid for 36 months thereafter with the submission of detailed alignment plan and fund allocation in facilitating works related to the Land and Survey Department to ensue within the timeframe.

2.5 IMPACT ZONE /AREA OF INFLUENCE

The TL is approximately 176 km in length with a required 50 m easement or ROW to be established. In addition, access roads are required to facilitate the construction and maintenance of the TL.

Project site is defined as the area required for the ROW and access roads, as shown on **Figure 1**. For the purposes of this ESIA, the study area is defined as follows:

Impact Zone	Area of Influence
TL Corridor including access roads	• Project footprint: – 176 km TL with 50 m easement (25 m on either side) – ROW (including road reserves) of access routes and roads • 500 m buffer impact zone on both sides of the TL (inclusive of 50 m easement).
River Corridor	• Btg. Rajang and Btg. Baleh south of the TL • Access routes along the southern bank to be used by construction traffic (100 m zone of influence i.e. 50 m on either side) • Jetties to be used or constructed, also with 100 m zone of influence • Towns that may be affected by the presence of the construction workforce or employment opportunities (Kanowit, Song, Kapit)

The focal study area shall be as described above.

For the physical environment, the primary areas of impact are areas to be cleared for tower bases, access routes and roads and possible lay-down and camp areas. Most of these will be within the TL Corridor including access roads.

Similarly, for terrestrial flora, the primary areas of impact are the access roads, the easement area and possible lay-down and camp areas.

For terrestrial fauna, the area of impact will be slightly different depending on the landcover. In the case of a TL, disturbance during construction will only be temporary and localised at shifting work sites. The major issue may be related to larger avifauna, and the obstacle presented by the cleared easement to the movement of terrestrial fauna during operation stage. Hunting and poaching by workers during construction and operation, and increased access leading to increased hunting and poaching can be potential issue and shall be addressed in the ESIA.

For the socio-economic and cultural environment, the primary area of impact may cover areas beyond the TL Corridor and river corridor, where communities outside the impact zone would be indirectly impacted by the Project.

2.6 PROJECT IMPLEMENTATION SCHEDULE

Implementation of the Project is anticipated to take approximately 35 months from securing the right of ways, design and engineering works, and construction to operation/commissioning of the TL, demobilisation of construction team to handover by October 2024. The Project is divided into two packages:

- Package A: Baleh – Kapit 500 kV TLP (81 km)
- Package B: Kapit – Mapai 500 kV TLP (95 km)

Both of the packages will commence concurrently as shown below:

Packages	Line Length	Commencement Date	Completion Date	Contract Duration
A	81 km	1 Nov 2021	30 Sept 2024	35 months
B	95 km	1 Dec 2021	30 Sept 2024	34 months

The completion of the Baleh-Mapai transmission line by October 2024 forms part of SEB's contractual obligation to Baleh Mechanical and Electrical Package (BLP6) to enable achievement of their contractual milestone as follows:

1. Start of Testing and Commissioning Works of transmission line protection and communication systems by October 2024
2. Baleh HEP's First Generator Unit Wet Testing (Rotation, performance and reliability run) by July 2025
3. First Power evacuation from Baleh HEP by October 2025

CHEMSAIN KONSULTANT SDN. BHD.

112° 00' 112° 30' 113° 00' 113° 30'

02° 00'

01° 30'

BAHAGIAN SIBU

BAHAGIAN BINTULU

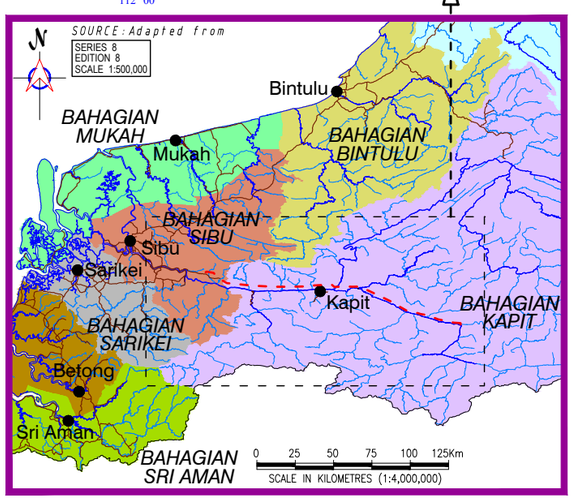
BAHAGIAN KAPIT

BAHAGIAN SARIKEI

KALIMANTAN
(INDONESIA)

Sibintek
KERANJI
DURIN
Seberai Nibong
KANOWIT
Sengayan
Dap
Ngemah
SONG
KAPIT
NANGA MERIT
BATANG OYA
BATANG RAJANG
BATANG BALUI
BATANG BALEH
SUNGAI KATIBAS
MUJONG
SUNGAI
NG. GAAT

Sg. Siung, Sg. Tamin, Sg. Kokok, Sg. Selangau, Sg. Ayam, Sg. Supan, Sg. Engkoyau, Sg. Tokan, Sg. Ba, Sg. Pemdan, Sg. Besuar, Sg. Kerumo, Sg. Bendalui, Sg. Pasai, Sg. Bua, Sg. Tisok, Sg. Blong, Sg. Arau, Sg. Anap, Sg. Metah, Sg. Pila, Sg. Lemai, Sg. Sepulau, Sg. Ebon, Sg. Bangan, Sg. Taman, Sg. Bukau, Sg. Paku, Sg. Saniding, Sg. Bunau, Sg. Sengkaia, Sg. Salim, Sg. Sengan, Hulu Sg. Kamiau, Hulu Mukah, Hulu Sg. Anap, Sg. Termulan Bedegom, Sg. Merit, Sg. Iran, Sg. Julau, Sg. Soma, Sg. Dap, Sg. Amau, Sg. Jawan, Sg. Pukat, Sg. Suan Oyan, Sungai Tiau, Hulu Sg. Melinau, Sg. Betalong, Sg. Bawan, Sg. Mapai, Sg. Kabah, Sg. Menuan, Sg. Kapit Hulu, Sg. Meta, Sg. Cermin, Sg. Song, Sg. Entangai, Sg. Bangi, Sg. Ibau, Sg. Belawai, Sg. Iran, Sg. Ranan, Sg. Kanowit, Sg. Melipis, Sg. Poi, Sg. Dap, Sg. Ngemah, Sg. Sebatu, Sg. Kapit, Sg. Sebaneng, Sg. Sut, Sg. Suai, Sg. Bakum, Sg. Melinau, Sg. Tunoh, Sg. Betun, Sg. Pakar, Sg. Majau, Sg. Paku, Sg. Entulu, Sg. Merirai, Sg. Machan, Sg. Menanggoh, Sg. Menuan, Sg. Baleh, Sg. Tekalit, Sg. Yong, Sg. Engkeramoh, Sg. Pureh, Sg. Sut, Sg. Lijan, Sg. Meluan, Sg. Poi Kanan, Sg. Poi Kiri, Sg. Musah, Sg. Mukeh, Sg. Kojah, Sg. Junan, Sg. Pang, Sg. Sepoli, Sg. Nging, Sg. Mukoh, Sg. Setapang, Sg. Senentang, Sg. Gaat, Sg. Anan, Sg. Balang, Sg. Pelak, Sg. Pulang, Sg. Taang, Sg. Sepinying, Sg. Putai, Sg. Sebatu, Sg. Kanowit, Sg. Mujok, Sg. Igan, Hulu Sg. Ngemah, Sg. Mujon, Sg. Selepong, Sg. Bekatan, Sungai Katibas, Sg. Meluan, Sg. Rerang, Bangkit, Sg. Bela Ujan, Hulu Sg. Balang, Sg. Sepulau, Sg. Sebilu, Sg. Piat, Sg. Selalang, Sg. Nyungan, Sg. Beloh, Sg. Pacan, Sg. Santu, Sg. Ayat, Sg. Randi, Sg. Bangkit, Sg. Ritrang, Sg. Gaat, Sg. Itik, Sg. Ramong, Sg. Sekawi, Sg. Sebatu, Sg. Mengiong, Sg. Tekalit, Sg. Tangkuan, Sg. Sekawa, Hulu Sg. Katibas, Sg. Engakraman, Sg. Telanyai, Sg. Latang, Sg. Nyawang, Sudok, Sg. Entulu, Sg. Segentu, Sg. Entuloh, Sg. Serau, Sg. Goci, Sg. Belanjang, Sg. Melatai, Sg. Langei, Hulu Sg. Mengiong



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR THE PROPOSED BALEH MAPAI 500 KV TRANSMISSION LINE PROJECT

LEGEND:

- TRANSMISSION LINE ROUTE
- INTERNATIONAL BOUNDARY
- DIVISIONAL BOUNDARY
- BALEH HEP DAM
- BALEH DAM RESERVOIR
- RIVERS / STREAMS
- ROADS / MOTORABLE TRACKS

0 10 20 30 40Km

SCALE IN KILOMETRES (1:600,000) – A3 MEDIUM

GRID
–The outer ticks indicate the Latitude and Longitude

SOURCE : Adapted from
SERIES 8
EDITION 8
SCALE 1:500,000

PROJECT LOCATION AND TRANSMISSION LINE ROUTE

FIGURE: 1

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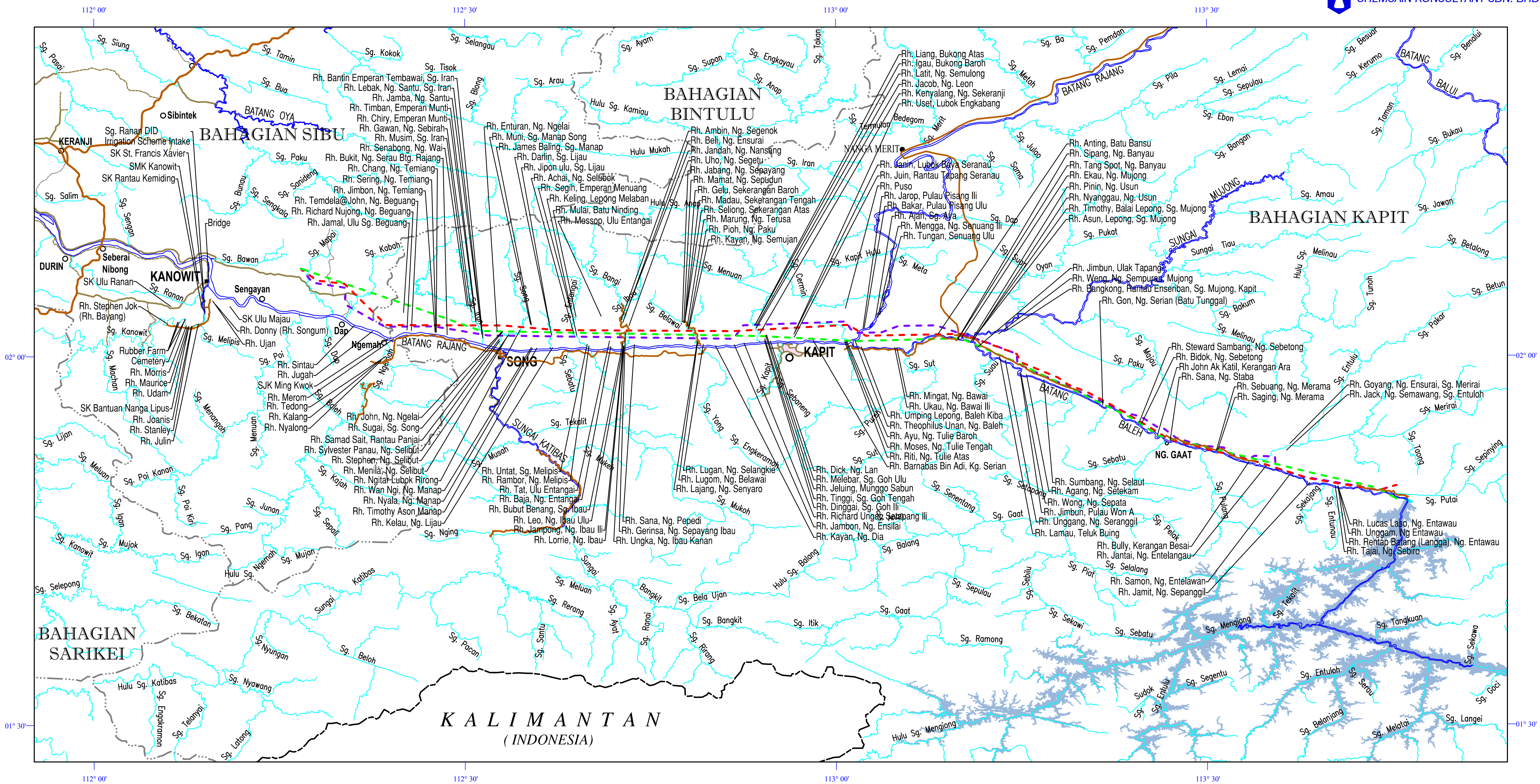
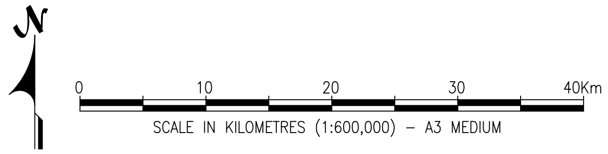


ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR THE PROPOSED BALEH MAPAI 500 KV TRANSMISSION LINE PROJECT

LEGEND:

- TRANSMISSION LINE ROUTE (OPTION 1)
- TRANSMISSION LINE ROUTE (OPTION 2)
- TRANSMISSION LINE ROUTE (OPTION 3)
- INTERNATIONAL BOUNDARY
- DIVISIONAL BOUNDARY
- BALEH HEP DAM
- BALEH DAM RESERVOIR
- RIVERS / STREAMS
- ROADS / MOTORABLE TRACKS



SCALE IN KILOMETRES (1:600,000) – A3 MEDIUM

GRID
–The outer ticks indicate the Latitude and Longitude

SOURCE : Adapted from
SERIES 8
EDITION 8
SCALE 1:500,000

LINE OPTIONS

FIGURE: 2

D:\ACAD\DRAWINGS\EV103\792\TOR\FIG–2.DWG

3. PROJECT PROPONENT

The Project Proponent, **Sarawak Energy Berhad** will also be known hereafter as the **Sarawak Energy**, **Project Proponent** or simply the **Proponent**. Their contact details and contact person are listed below:

Project Proponent	:	**Sarawak Energy Berhad**
Address	:	Level 4, Menara Sarawak Energy, No. 1, The Isthmus, 93050 Kuching, Sarawak
Contact Person (Designation)	:	**Julaidi Rasidi** **(Manager – EIA Division, HSSE)**
Telephone	:	+6 082-388388 (ext 8427)
Fax	:	+6 082-330708
Email	:	Julaidi.Rasidi@sarawakenergy.com

4. ENVIRONMENTAL CONSULTANT

The ESIA will be carried out by Chemsain Konsultant Sdn Bhd (CKSB), a registered environmental consultant with Natural Resources and Environment Board (NREB) Sarawak. Any enquiries and correspondence with regards to the ESIA report can be directed to:

Environmental Consultant	:	**Chemsain Konsultant Sdn Bhd**
Address	:	172, Rock Road 93200 Kuching Sarawak
Contact Person (Designation)	:	**Ir. Brian Chong Sin Hian** **(Senior Director)**
Telephone	:	+6 082-548366
Fax	:	+6 082-548399
Email	:	bc@chemsain.com

5. ESIA STUDY TEAM

The ESIA study will be headed by Ir. Brian Chong, a registered EIA Consultant with NREB and Department of Environment (DOE) and will be ably assisted by staff of Chemsain Konsultant Sdn Bhd and other registered ESIA Consultants.

An international specialist on HSAP / IFC Performance Standards is directly assigned to the team to review work processes, scope and methodologies to ensure, all aspects of relevant international standards are covered in the ESIA report.

The ESIA team members with their respective responsibilities are shown in **Table 5.1**.

Table 5.1: ESIA Study Team Members

No.	Personnel [Qualification] NREB Reg. Number [Validity]	Study Components
1.	Ir. Brian S.H. Chong [M. Sc. Env. Eng.] NREB/I/00336 [08 Mar 2021]	Team Leader Environmental Engineering and Management
2.	Eivind Oluf Kofod [M. Sc. Forestry] NREB/I/00666 [06 Aug 2021]	Advisor Terrestrial Flora Greenhouse Gas Biodiversity Management Plan
3.	Tan Shwu Mei [M. Env. Mgmt.] NREB/I/00341 [08 Mar 2021]	Study Coordinator Liaison with SEB Social Science and Cultural
4.	Benji Jihen [M. Soc. Sc. (Dev. Studies)] NREB/I/00685 [14 Oct 2021]	Stakeholder Engagement Socio-Economic Stakeholder Engagement Plan Grievance Redress Mechanism
5.	Dr. Elena Gregoria Chai Chin Fern [BA & MA. Social Sciences (Cultural Anthropology), PhD (Humanities) Area and Culture Studies] NREB/I/00883 [25 June 2021]	Cultural Heritage Indigenous People (IP) Cultural Heritage Management Plan
6.	Lee Kuok Chiang [B. Eng. (Civil-Environmental)] NREB/I/00702 [24 May 2021]	Erosion and Sedimentation Slope Stability Erosion and Sediment Management Plan

No.	Personnel [Qualification] NREB Reg. Number [Validity]	Study Components
7.	Prof. Dr. Jamal Hisham Hashim [BA (Biologies & Environment Studies), MSc (Public Health), PhD (Environment Health Science)] NREB/1/00952 [26 May 2021]	Public Health Health Risk Electromagnetic Field Public Health Management Plan
8.	Khairil Abel Bin Abdullah [B. Eng. (Civil)] NREB/I/00961 [07 Jan 2021]	Occupational Safety and Health OSH/Labour Management Plan Emergency Response Plan
9.	Foong Poh Hing [B. Eng. (Mechanical)] NREB/I/00836 [02 Dec 2020]	Waste Management Waste Management Plan
10.	Dr. Andrew Alek Tuen [Ph. D. Ruminant Nutrition] NREB/1/00286 [18 Sept 2021]	Terrestrial Fauna Biodiversity Management Plan
11.	Anthony Rentap Enchana [M. Sc. EIA] NREB/I/00456 [08 Mar 2021]	Water Quality Conservation Management Plan
12.	Adrian Richard Sageng [M.Sc. (Environment)] NREB/I/00718 [04 Apr 2021]	Land Use
13.	Ir. Bernard Chong Yin Shik [B.Eng. (Hons)] NREB/I/00803 [08 Mar 2021]	Civil Engineering Infrastructure and Utilities GIS and Mapping
14.	Lina Chan [B. Sc. (Hons) Microbiology] NREB/I/01144 [12 Sept 2021]	Air and Noise Air and Noise Management
15.	Ir. Pooh Yih Fang [M. Sc. in Civil Eng [Trans.] NREB/I/00472 [10 Apr 2021]	Traffic Study Traffic Management

6. STATUTORY (LEGAL AND ADMINISTRATIVE) FRAMEWORK

6.1 PRESCRIBED ACTIVITY

The proposed TL project is a prescribed activity under item 7 of the First Schedule of the Natural Resources and Environment (Prescribed Activities) Order, 1994[1].

7. Any Other Activities Which May Damage or Have an Adverse Impact on Quality of Environment or Natural Resources of the State

The Order requires an EIA/ESIA report to be prepared and submitted to NREB for approval before the Project can proceed for development.

6.2 ESIA STUDY GUIDELINES

The ESIA will be undertaken in accordance with the guidelines contained in:

- "Handbook of Policy and Basic Procedure of Environmental Impact Assessment in Sarawak" published by the NREB, Sarawak
- "Handbook of Environmental Impact Assessment Guidelines" and "Environmental Impact Assessment Guidelines for Thermal Power Generation and / or Transmission Projects" issued by the Department of Environment (DOE), Malaysia

6.3 OTHER GUIDELINES

In January 2011, SEB was among the first of ten hydropower companies from around the world to become a "Sustainability Partner" with the International Hydropower Association (IHA). As such, in addition to NREB's requirements, SEB would like to comply to their own sustainability requirements.

Therefore, the ESIA shall be conducted in accordance to the requirements of the IHA Hydropower Sustainability Assessment Protocol (HSAP) as the transmission line is associated facility of the main Baleh HEP.

7. STAKEHOLDER ENGAGEMENT AND CONSULTATION

Stakeholder engagement is the process by which an organization involves people or communities who may be affected by the decisions it makes or can influence the implementation of its decisions. The purpose of stakeholder engagement and

[1] Incorporating all amendments up to 4 November, 2004

consultation is to disclose the Project and its activities and gather views and concerns from the stakeholders deemed to be directly or indirectly affected by the Project.

The SEB attaches particular importance to public consultation in its activities. Stakeholder engagement will include information disclosure and meaningful engagement with affected groups and interested parties throughout the ESIA process and the Project lifecycle.

At least 10 meetings with the local government and local communities have been organized up to this day by SEB since Oct 2019. Most recent ones were carried out in the month of October 2020 with the District Offices of Kapit, Bukit Mabong, Song, Kanowit; local community leaders of these districts; Land and Survey; Resident Office; and Polis Diraja Malaysia (PDRM). Notification letters on the commencement of the LiDAR survey, ground survey works and soil investigation works had been issued to government agencies and Plantation and Logging companies.

The purpose of this meetings and dialog sessions were to brief and inform the stakeholders on SEB's intention to construct the Baleh-Mapai 500 kV TL as well as the upcoming activities in the area.

8. OBJECTIVE OF THE ESIA STUDY

The implementation of the project may have potential impacts on the physico-chemical, biological, socio-economic and community health of the region. The ESIA study is to ensure that the environmental feasibility of the project is evaluated and environmental management considerations are taken into account during the Project lifecycle. The ESIA study objectives are:

- To describe the existing environment and define baseline conditions based on project information, field study and other published reports.
- To assess and manage negative environmental and social impacts associated with the TL project.
- To design, implement and monitor appropriate avoidance, minimisation, mitigation, compensation and enhancement measures.
- To fulfil environmental and social commitments in line with local requirements and proven best practices.

9. REPORT OUTLINE

The ESIA Report will be structured as follows:

- Chapter 1: Introduction
- Chapter 2: Project Description
- Chapter 3: Project Options
- Chapter 4: Stakeholder Analysis and Engagement
- Chapter 5: Existing Physical Environment
- Chapter 6: Existing Biological Environment
- Chapter 7: Existing Human Environment and Land Use
- Chapter 8: Environmental Impacts and Mitigation Measures
- Chapter 9: Residual Impacts and Monitoring Programs
- Chapter 10: Grievance Redress Mechanism
- Chapter 11: Conclusions
- References
- Appendices

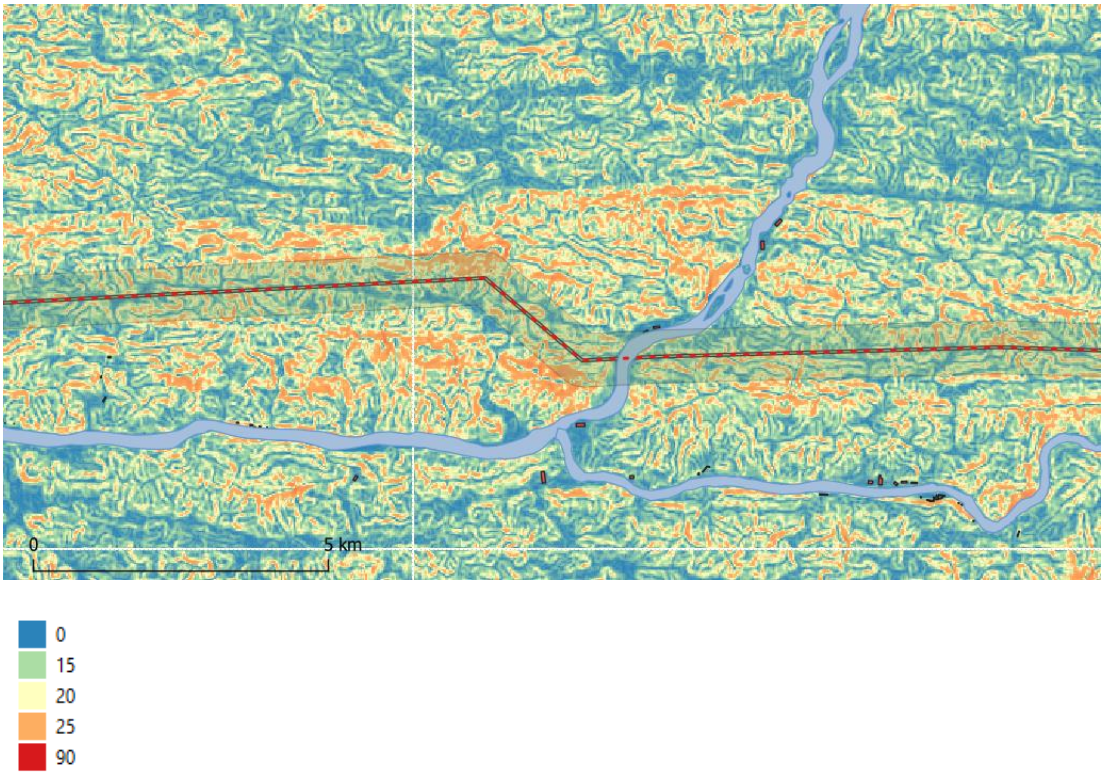
10. PRELIMINARY EXISTING ENVIRONMENT

Preliminary desktop review indicates the following:

10.1 PHYSICAL ENVIRONMENT

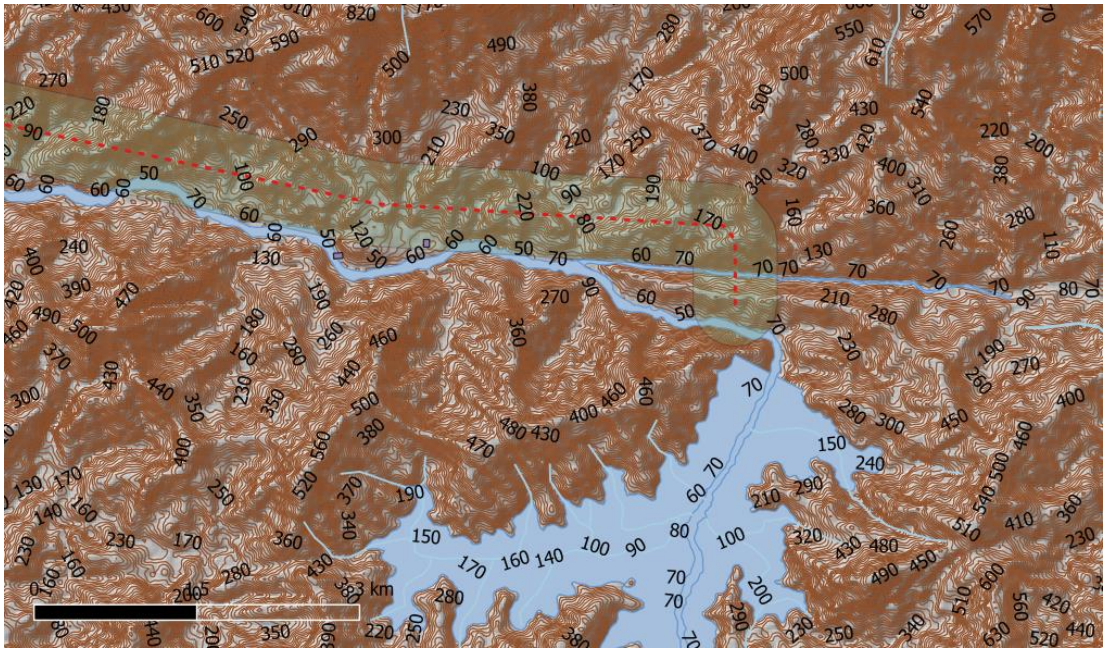
10.1.1 Topography, Geology and Soil

The terrains along the proposed TL route are generally undulating, hilly to mountainous. The existing ground level ranges (approximately) from 10 m to 275 m above mean sea level (amsl). Cut and fill and slope stabilisation works are expected for construction of the tower bases. Hence, the potential soil erosion hazards versus soil conservation measures will be one of the issues that will be studied and assessed.



Source: USGS (United States Geological Survey)/Shuttle Radar Topography Mission (SRTM)

Figure 3: Slope (degrees)



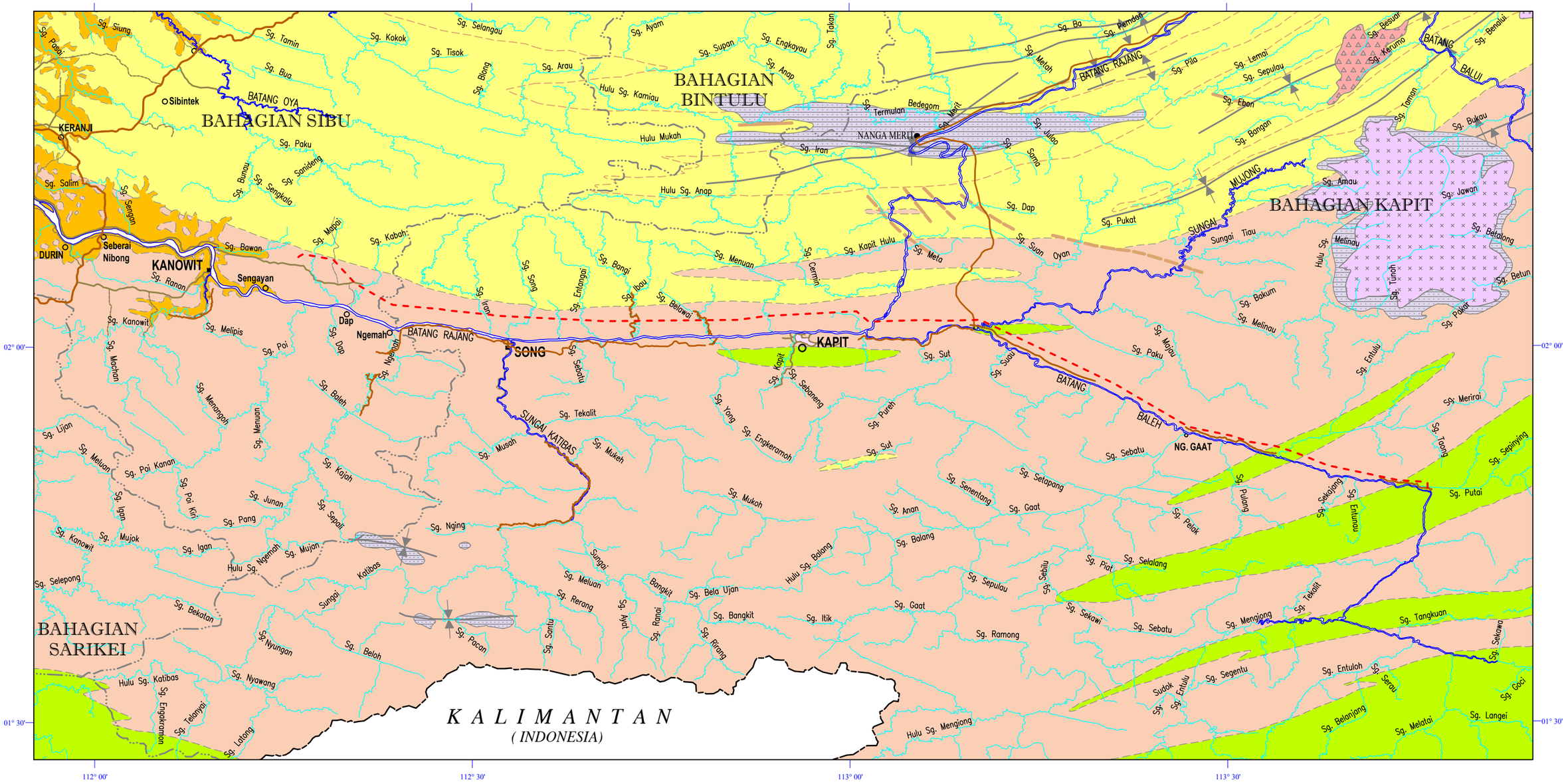
Note: Area shown from Baleh HEP extending to about 12 km downstream
Source: USGS/SRTM

Figure 4: 10-m Contour Lines

The proposed TL is aligned to generally parallel to Btg. Rajang and Btg. Baleh, approximately 1 to 2 km inland from the riverbanks. The distance is such as the route is determined after avoiding all possible environmentally, socially and culturally significant areas such as settlements, steep slopes, RECODA road and river crossings.

Btg. Baleh and Btg. Rajang flows through Belaga Formation, a very thick sedimentary rock sequence formed from the late Cretaceous to late Eocene (60 to 30 million years ago).

The banks along the Project area are covered in skeletal and red-yellow podzolic soils comprised of very shallow to moderately deep loamy sands to clays on sedimentary, acid igneous and metamorphic rocks. Kapit, Merit and Bekenu association form the skeletal and red-yellow podzolic soils of the region.



LEGEND:

- TRANSMISSION LINE ROUTE
- INTERNATIONAL BOUNDARY
- DIVISIONAL BOUNDARY
- RIVERS / STREAMS
- ROADS / MOTORABLE TRACKS

IGNEOUS PLEISTOCENE–HOLOCENE
Dacite and basalt lavas in Upper Rajang at Linau–Balui Plateau, Pila and Plieran; andesite at Sematan

IGNEOUS PLIOCENE–PLEISTOCENE
Upper Rajang andesite and basalt lavas at Hose Mountains, Usun Apau Plateau, Nieuwenhuis Mountain; microtonalite at Bt. Kalulong, Tinjar Valley; microgranodiorite, microtonalite, andesite and basalt dikes at Linau–Balui and Nieuwenhuis Mountain.

SEDIMENTARY PLEISTOCENE–HOLOCENE
Coastal and riverine alluvium, and terraces of clay, silt, sand, and gravel with layers of peat.

SEDIMENTARY LATE CRETACEOUS
Rhythmically–interbedded shale, mudstone, slate, phyllite, metagraywacke with some conglomerate lenses, Strong regional metamorphism.

SEDIMENTARY PALAEOCENE–EOCENE
Shale, slate, phyllite, sandstone with marlstone, calcareous sandstone, conglomerate and limestone lenses. Weak regional metamorphism. Chaotic assemblage of sandstone, mudstone, siltstone, chert, gabbro, basalt, spilite, limestone blocks in pervasively sheared pelitic matrix.

SEDIMENTARY EOCENE
Hard massive sandstone interbedded with sandstone, shale, and siltstone. Weak regional metamorphism.

SEDIMENTARY OLIGOCENE–MIOCENE
Sandstone, shale, mudstone, limestone, lignite with some marlstone, siltstone and calcareous sandstone.

SYMBOLS IGNEOUS ROCKS–INTRUSIVES
Intermediate to basic intrusives, mainly gabbro, diorite and their fine–grained equivalents.

SYMBOLS SEDIMENTARY ROCKS
Mixed facies; marine and continental

GEOLOGIC SYMBOLS

- Chronologic
- Formational
- Intrusive and extrusive
- Fault
- Synclinal axis with plunge
- Anticlinal axis with plunge
- Overturned anticline

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
STUDY FOR THE PROPOSED BALEH MAPAI 500 KV
TRANSMISSION LINE PROJECT

N

0 10 20 30 40Km

SCALE IN KILOMETRES (1:600,000) – A3 MEDIUM

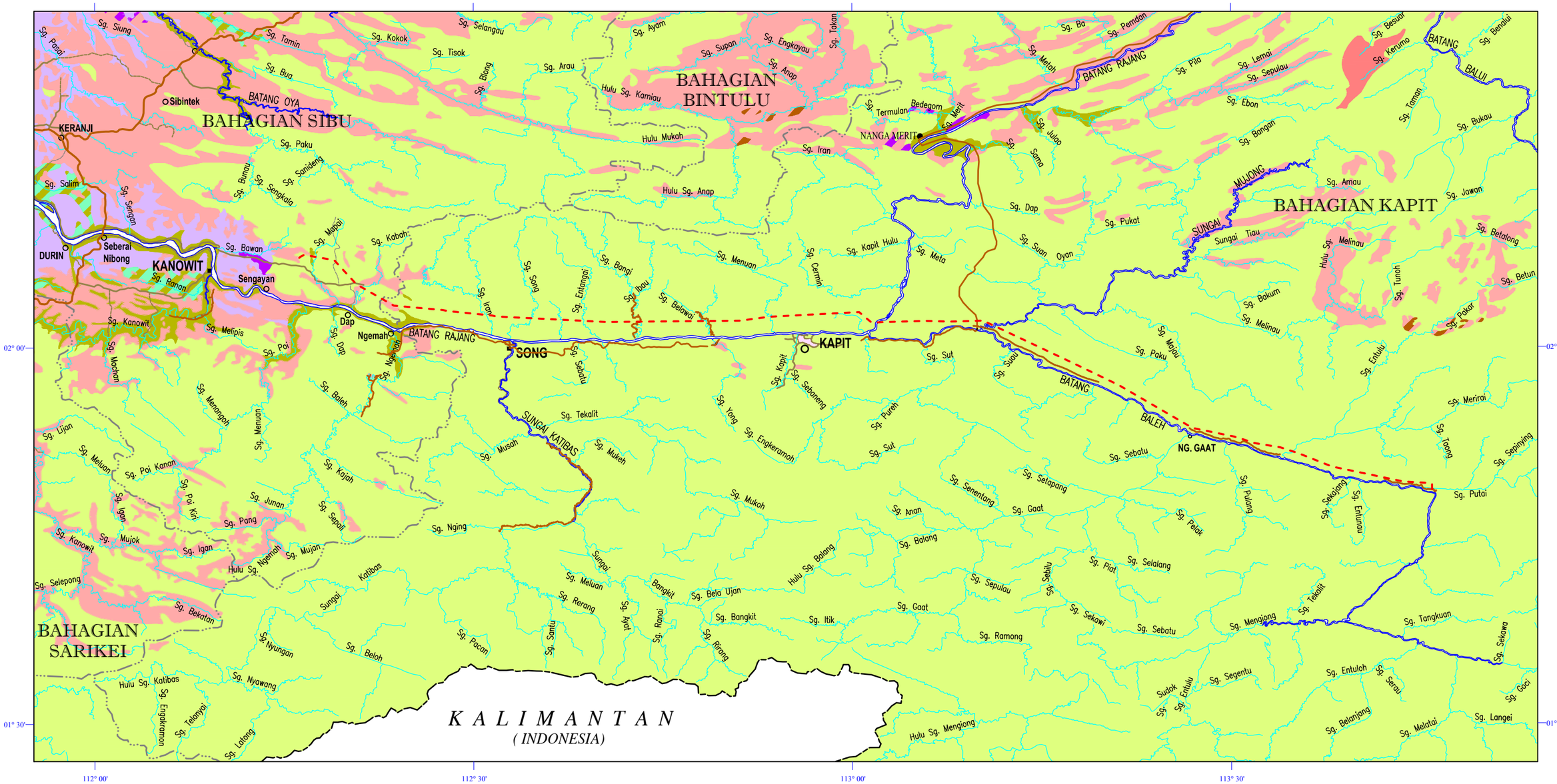
GRID
–The outer ticks indicate the Latitude and Longitude

SOURCE : Adapted from

SERIES 8 EDITION 8 SCALE 1:500,000	GEOLOGICAL MAP OF SARAWAK SECOND EDITION, 1992 SCALE 1:500,000

GEOLOGY

FIGURE: 5



LEGEND:

- TRANSMISSION LINE ROUTE
- INTERNATIONAL BOUNDARY
- DIVISIONAL BOUNDARY
- RIVERS / STREAMS
- ROADS / MOTORABLE TRACKS

- Mainly SKELETAL SOILS and LATERITIC SOILS: shallow to moderately deep, yellow to red clays; on basic to intermediate igneous rocks; steep and moderately steep land. (Equiv: Lithsols, Acrisols, Oxisols)
- Mainly SKELETAL SOILS and RED-YELLOW PODZOLIC SOILS: very shallow to moderately deep loamy sands to clays; on sedimentary, acid igneous and metamorphic rocks; steep and mountainous land. (Equiv: Acrisols, Ferralsols)
- Mainly RED-YELLOW PODZOLICSOILS: shallow to deep, yellow red loamy sands to clays; on sedimentary acid igneous and metamorphic rocks; gently sloping to steep land. (Equiv: Acrisols, Ferralsols)
- Mainly GREY-WHITE PODZOLIC SOILS: moderately deep to deep, white, grey or pale yellow loamy sands to clays; on sedimentary rocks or old alluvium; flat to moderately steep land. (Equiv: Acrisols, Ferralsols, Planosols)
- Mainly PODZOLS: shallow to deep, pale-coloured sands wih prominent sub-surface accumulation of humus or, locally, iron; on old or subrecent alluvium or coarse-textured sedimentary rocks; flat to gently sloping land. (Equiv: Podzils)
- Mainly GLEY SOILS: poorly-drained sands to clay; on recent alluvium in floodplain areas; on old alluvium on low-level terraces; on sedimentary rocks on gently undulating land and some dip slopes (Equiv: Gleysols)
- Mainly shallow PEAT SOILS (overlying mineral material at less than 1 metre depth); mainly in present floo-plains; locally at high altitude in mountainous land. (Equiv: Histosols)
- Mainly deep PEAT SOILS (overlying mineral material at more than 1 metre depth, commonly more than 3 metres); in present floodplains. (Equiv: Histosols)

Soil groups (in capitals above) are locally defined. See A Classification of Sarawak Soils, Department of Agriculture, Sarawak, 1966 and subsequent amendments.

Equivalent groups (in brackets above) are those employed for the First Draft Soil Map of the World. See world Soil Resources Report No.33, F.A.O., 1968. The correlation of Sarawak groups in this system is tentative, and particularly doubtful in the case of Grey-White Podzolic Soils.

The components of compound mapping units indicate important groups within the unit and need not indicate the full range of groups present. Considerable generalization has been necessary as this mapping scale, particularly in lowland and floodplain areas.

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
STUDY FOR THE PROPOSED BALEH MAPAI 500 KV
TRANSMISSION LINE PROJECT

N

0 10 20 30 40Km

SCALE IN KILOMETRES (1:600,000) – A3 MEDIUM

GRID
–The outer ticks indicate the Latitude and Longitude

SOURCE : Adapted from

SERIES 8 EDITION 8 SCALE 1:500,000	SOIL MAP OF SARAWAK MALAYSIA TIMOR 1968 DEPARTMENT OF AGRICULTURE, KUCHING, SARAWAK, MALAYSIA SCALE 1:500,000

SOIL

FIGURE: 6

D:\ACAD\DRAWINGS\EV103\792\TOR\FIG-6.DWG

10.1.2 Hydrology and River Systems

From hydrological aspect, the TL lies within the Btg. Rajang basin, the largest river basin in Sarawak. Btg. Rajang is also the longest river in Malaysia originating in the Iran Mountains and flowing approximately 760 km westward to the South China Sea.

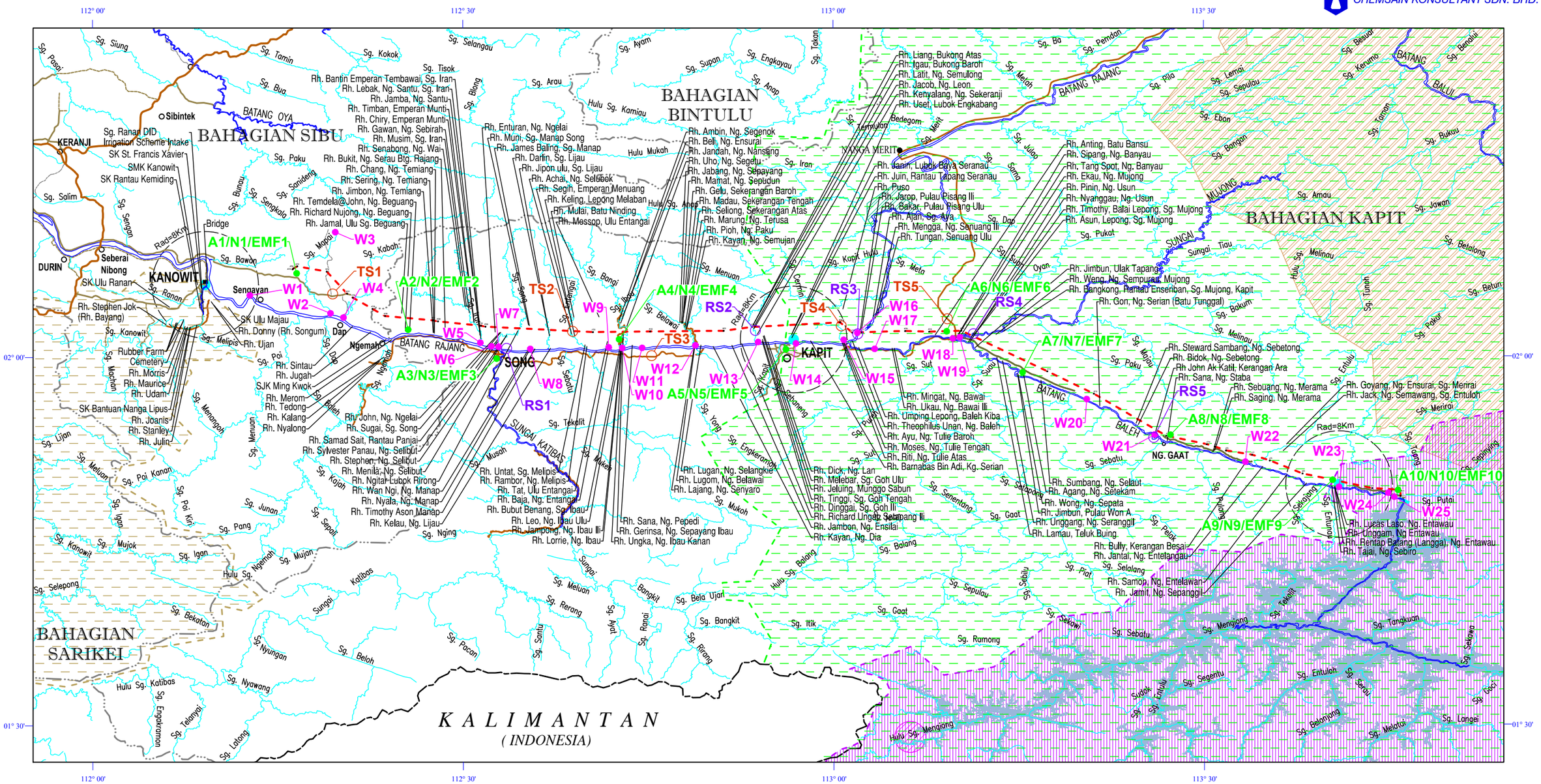
Btg. Baleh is one of several main tributaries of Btg. Rajang. Btg. Baleh catchment spans an area of 12,433 km^2 equivalent to 24.2% of the entire Btg. Rajang Basin. Downstream of the Baleh HEP, Btg. Baleh flows westward for 97 km before joining with Btg. Rajang. The major tributaries on both rivers' northern banks that are crossed by the TL are listed below:

River	Tributaries
Btg. Rajang	1. Sg. Menuan 2. Sg. Belawai 3. Sg. Ibau 4. Sg. Entangai 5. Sg. Song 6. Sg. Iran 7. Sg. Kabah 8. Sg. Mapai.
Btg. Baleh	1. Sg. Putai (about 3 km downstream of the Baleh HEP) 2. Sg. Merirai 3. Sg. Mujong.

As there are very few roads accessing the region, the Btg. Rajang and its major tributaries including Btg. Baleh act as the main transit between settlements, infrastructures and towns along the rivers. In this case, it connects Sibu, Kanowit, Song and Kapit towns. Therefore, it is common to see longboats and express boats travelling up and down the river.

There are three (3) water intake points located along Btg. Rajang and Btg. Baleh i.e., Ng. Entawau, Kapit and Kanowit intakes (see **Figure 7**).

Some of the rivers and their tributaries maybe sources of gravity-fed domestic water supplies of the local communities. This will be considered in the ESIA study and their existence investigated during the study.



LEGEND:

- TRANSMISSION LINE ROUTE
- INTERNATIONAL BOUNDARY
- DIVISIONAL BOUNDARY
- BALEH HEP DAM
- BALEH DAM RESERVOIR
- RIVERS / STREAMS
- ROADS / MOTORABLE TRACKS
- PROPOSED HOSE LAGA PARK
- GAZETTED PELAGUS NATIONAL PARK
- NANGA ENTAWAU WATER CATCHMENT
- KAPIT WATER CATCHMENT
- KANOWIT WATER CATCHMENT
- RAW WATER INTAKE POINT
- TRAFFIC SURVEY LOCATIONS - (TS1-TS5)
- RIVERINE SURVEY LOCATIONS - (RS1-RS5)
- PROPOSED BASELINE WATER SAMPLING LOCATIONS - (W1-W25)
- PROPOSED BASELINE AIR SAMPLING LOCATIONS - (A1-A10)
- PROPOSED BASELINE NOISE SAMPLING LOCATIONS - (N1-N10)
- PROPOSED BASELINE ELECTROMAGNETIC FIELD SAMPLING LOCATIONS - (EMF1-EMF10)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
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TRANSMISSION LINE PROJECT

N

0 10 20 30 40Km

SCALE IN KILOMETRES (1:600,000) – A3 MEDIUM

GRID
–The outer ticks indicate the Latitude and Longitude

SOURCE : Adapted from

SERIES 8
EDITION 8
SCALE 1:500,000

SETTLEMENTS, WATER CATCHMENTS, WATER INTAKE POINTS AND PROPOSED ENVIRONMENTAL BASELINE SAMPLING POINTS

FIGURE: 7

D:\ACAD\DRAWINGS\EV103\792\TOR\FIG-7.DWG

	
Plate 10.1: An example of long boat used by villagers to navigate the river	**Plate 10.2:** Boats are also used to pull log rafts when the water level is too low for barges or tug boats to navigate
	
Plate 10.3: Speedboat is considered the fastest mode of river transport in Btg. Baleh and Btg. Rajang as it can fit in bigger outboard engine.	**Plate 10.4:** For long distance travel such as going all the way to Sibu, express is still the preferred mode of transport.
	
Plate 10.5: Barge transporting logs (Btg. Rajang)	**Plate 10.6:** Passenger express boat plying Btg. Rajang

	
Plate 10.7: Longboats – the main river transportation in the Btg. Rajang and Btg. Baleh river basin	**Plate 10.8:** Longboat has to be pulled and pushed due very shallow water

10.2 BIOLOGICAL ENVIRONMENT

The majority of the land area of Kapit Division is dominated by forested areas (forest reserves, planted forests). Some of these forested areas are currently being logged, and/or replanted with commercial timber species (commercial forest plantations) – see **Figure 9**.

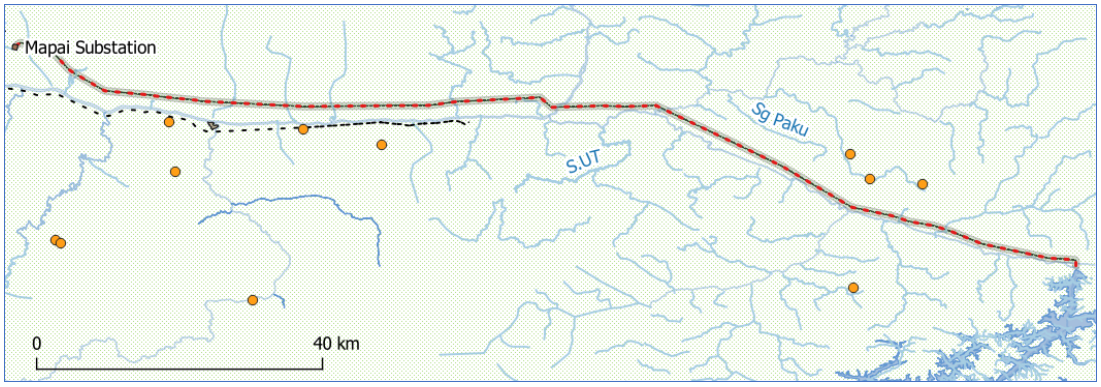
The area along the lower Btg. Baleh and Btg. Rajang is largely composed of young and old secondary forest. Shifting cultivation in this area has been practiced for many years and is still active. Most of the areas along the riverbanks are easily accessible by the local communities and the lands are fertile. Areas that had been abandoned for more than 30 years after cultivation are considered as old secondary forests (Chai 2000).

The agricultural land is found principally along the flat riverbanks, but also extends into the undulating upland and hill landscapes.

	
Plate 10.9: Old secondary forest and natural vegetation along the riverbank	**Plate 10.10:**Solitary Ensurai tree (*Dipterocarpus oblongifolius*) (left), Sg. Ibau

	
Plate 10.11: Ensurai trees (Dipterocarpus oblongifolius) forming narrow strip along the riverbanks of Btg. Baleh	**Plate 10.12:**Vegetation along logging track (in interior areas of Kapit Division)
	
Plate 10.13: Small scale market gardening - Rh Leo & Rh Lorie, Sg. Ibau	**Plate 10.14:**Farming around the longhouse compound is common
	
Plate 10.15: Pepper garden at the foothill	**Plate 10.16:** Shorea timber (grown) by the locals

There are some Tagang areas identified in the Rajang and Baleh areas as shown on **Figure 8**. Most of them are located on tributaries on the southern bank while along Btg. Baleh, they are 5 km directly north of the TL. Further clarification shall be obtained from DOA on the status of Tagang in these areas.

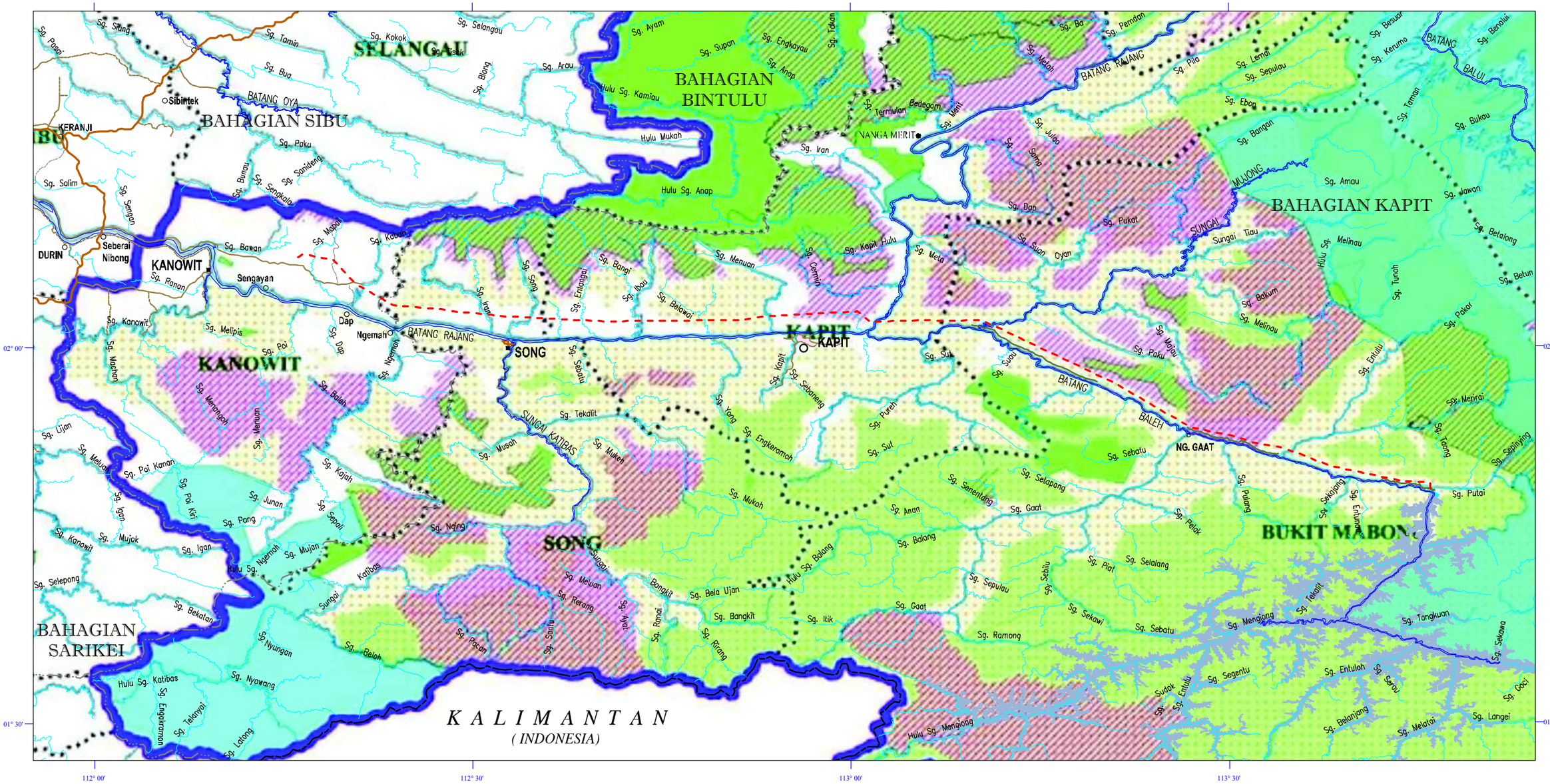


Source: Department of Agriculture (DOA) Kuching (Oct 2017)

Figure 8: Tagang Areas in Btg. Rajang and Btg. Baleh

Tagang system is defined as a smart partnership project (programme) among local community and DOA of Sarawak as the lead agency, in collaboration with other Government agencies and NGO in matters related to protection, rehabilitation, and management of fisheries resources and surrounding river system. The main objective of Tagang System is to promote and facilitate the local community related to protection, rehabilitation, and management of fisheries resources and developing market oriented eco-tourism industry through Tagang System.

CHEMSAIN KONSULTANT SDN. BHD.



LEGEND:

- TRANSMISSION LINE ROUTE
- INTERNATIONAL BOUNDARY
- DIVISIONAL BOUNDARY
- BALEH HEP DAM
- BALEH DAM RESERVOIR
- RIVERS / STREAMS
- ROADS / MOTORABLE TRACKS
- TOTAL PROTECTED AREA (TPA)
- LICENCED PLANTED FOREST (LPF)
- FOREST TIMBER LICENCED (FTL)
- PERMANENT FOREST ESTATE (PFE)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
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TRANSMISSION LINE PROJECT

N

0 10 20 30 40Km

SCALE IN KILOMETRES (1:600,000) – A3 MEDIUM

DATUM
-The outer ticks indicate the Latitude and Longitude

SOURCE: Adapted from RECODA

SERIES 8
EDITION 8
SCALE 1:500,000

LAND COVERAGE

FIGURE: 9

D:\ACAD\DRAWINGS\EV103\792\TOR\FIG-9.DWG

10.3 HUMAN ENVIRONMENT AND LAND USE

The Project is located in a rural and sparsely populated region of Kapit. Settlements, which are predominantly **Iban longhouses**, are scattered along the banks of Btg. Rajang, Btg. Baleh and their tributaries as depicted in **Figure 7**. A list of the longhouses found along the TL is provided in **Appendix B**.

A majority of the longhouses in the area still rely very much on river transportation in their daily lives. Only the longhouses located at the periphery of Kapit Town, which are those settlements along Jalan Selirik towards Ng. Mujong transit point and along Jalan Antaroh in Sungai Sut area, have direct road access to town but a majority of these longhouse residents still rely on river transport to go to their farmland, orchards, hunting grounds, fishing and neighbouring longhouses.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Plate 10.17: Rh. Jandah, Ng. Ibau</td><td>Plate 10.18: Rh. Jabang, Ng. Belawai</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Plate 10.19: The “Ruai” within a longhouse. Ruai is usually use for communal and public gatherings, sometimes, as makeshift place of worship</td><td>Plate 10.20: View of a longhouse from the river</td></tr>
</table>

	
Plate 10.21: Mixed plantations of rubber and fruiting trees	**Plate 10.22:** Hill paddy spread out to dry outside the longhouse

Major economic activities found in Kapit Division are forestry/logging, coal mining, hydropower, trading and tourism. Rural communities are mostly involved in subsistence agricultural and agroforestry activities and gathering of non-timber products (NTFPs). Hill paddy, fruit trees and vegetables are some important subsistence crops while rubber and pepper are important cash crops. Fruit trees are usually grown within rubber gardens or at the periphery pepper gardens as well as at old farm or settlement sites. Within the village territories, other than those cultivated, local lands are mostly fallowed and covered with secondary forests of various successional stages. Backyard chicken and swine keeping are also common among the local rural households.

Beside agriculture, riverine fishing and hunting are another important activity performed by local populace. Although mainly for own consumption, extra meat/fish caught is sold at the longhouses, or nearby towns to supplement household cash income. Important high value freshwater fishes caught are *semah, tengadak, labang, tapah* and *baung*, usually using gill-nets. Wild boars, deer and barking deer are few popular game animals.

10.3.1 Indigenous Peoples of the Study Areas

In Malaysia, two terms are generally used to define “Indigenous peoples” – the Orang Asli and Bumiputera. Both terms when translated literally mean “people of the origin” or “sons of the soil”. The Bumiputera population in Malaysia accounts for 67.4% of the entire population making them the majority group. Both Orang Asli and Bumiputera are ethno labels that imply indigeneity. Malays are classified as Bumiputera but not as Orang Asli. Orang Asli are however classified as Bumiputera.

The Orang Asli are made up of three main groups (Negrito, Senoi and Proto Malay). They are however not homogenous and can be sub divided into 18 groups. For example, the Negrito also known as Semang consists of Kintak, Lanoh, Batek, Mendriq, Kensiu and Jahai. The sub-groups under the Senoi are Temiar, Semai, Mah

Meri, Semak Beri, Temoq, Jah Hut and Che Wong. The Proto Malay consists of the Jakun, Orang Laut, Temuan, Semelai, Selatar. In general, the term Orang Asli refers to the indigenous peoples of Peninsular Malaysia (West Malaysia) who are not Malay Muslims.

The Bumiputera term when applied to East Malaysia states of Sarawak and Sabah imply a more heterogenous connotations. The populations of Sarawak and Sabah are made up of no fewer than 70 ethnic groups of which at least 50 are considered indigenous (Harun, 2006). In Sarawak, its 2.7 million population comprises of six (6) main ethnic groups and 25 sub-ethnic groups. The six (6) main ethnic groups are Iban, Malay, Chinese, Bidayuh, Orang Ulu and Melanau. The 25 sub-ethnic groups, as listed in the Population Census Report 2010 are Sarawak Bisayah, Bukitan, Sarawak Kadayan, Kajang, Kanowit, Kayan, Kejaman, Kelabit, Kenyah, Lahanan, Lisum, Lugat, Lun Bawang/Sarawak Murut, Penan, Punan, Sabup, Sekapan, Sian, Sipeng, Tabun, Tagal, Tanjong, Ukit and other Bumiputera. The total Bumiputera population in Sarawak is 74.7% and the two ethnic groups not considered as indigenous to the State are the Chinese (24.5%) and Indians (0.31%).

In the area of the proposed Baleh – Mapai TL project, the indigenous people are mainly the **Iban**. Under the HSAP guidelines (pg.102) for “Indigenous peoples”, the Iban qualifies as a distinct social cultural group possessing the characteristics of:

1. Ethnic self-identification as members of a distinct indigenous social cultural group which is also recognized by other ethnic groups.
2. Collective attachment to geographically distinct area divided by riverine network in the project area and to the natural resources in these riverine territories.
3. Customary cultural, economic, social or political institutions that are different from the other Bumiputera groups such as the Malay, Melanau, Bidayuh, Kayan, Kenyah, etc.
4. Speak a language considered as lingua franca to the population of Sarawak but different from the official language of the country Indigenous peoples refers to a distinct social.

Other smaller indigenous groups such as the Kanowit, Tanjong and Melanau Rajang also reside along the stretch of Btg. Rajang where the TL is proposed. The Kanowit and Tanjong are believed to be the early inhabitants of lower Rajang stretch and have migrated sparsely to upper Rajang area. According to the observation made by Edwards and Stevens in 1971, the two minority groups are largely absorbed by the more numerous Iban and some live in small numbers on the banks of Btg. Rajang between Kapit and Nanga Baleh (1971:91).

10.4 INFRASTRUCTURE AND UTILITIES

At present, the only local road network to the northern bank of Btg. Rajang is available up to Nanga (Ng.) Tada, near Mapai 500 kV Substation site. Beyond this, there is no direct road linkage except by river transport i.e., express boat services and local longboats. The most common form of riverine transport is the longboat.

In terms of **telecommunication**, there is no land line serving most of the rural longhouses. Nonetheless, limited mobile phone services are available at certain areas.

Most of the longhouses are not connected to the State grid. Most households depend on private generator sets for **power supply**.

Rivers and streams are important sources of **water** to the villagers to meet their domestic needs. Most settlements are served by separate communal gravity-fed water supplies for daily needs such as for drinking, cooking and washing.

Medical facilities are available at Kanowit, Song and Kapit. Smaller clinics are available at selected longhouses.

Open burning, river disposal and open dumping within the jungles are the common method of **waste disposal** within most of the settlements. These methods are commonly found among villages that are located away from the municipal council's jurisdiction.

Most of the longhouses are either equipped with flush or pour flush toilets, depending on the reliability of the household sources of domestic water. With reliable water supplies, pull-flushed toilets are preferred while pour-flushed is adopted whenever water source is unreliable.

11. ESIA STUDY APPROACH AND METHODOLOGY

11.1 INFORMATION AND DATA GATHERING

All relevant information on the Project will be requested from the Project Proponent. Others will be obtained as secondary and primary field data. From the Proponent, the Consultant will request relevant data concerning:

- State Planning Authority (SPA) Approval and other approvals from the relevant authorities
- Statement of need
- Accurate location of the planned TL route, towers, access routes and roads, and loading / unloading jetties
- Project description including technical drawings, TL design parameters, construction method, earthwork plan, slope and river protection, labour requirements during construction, access routes, etc.
- Site investigation reports including alternative routes, construction stage set-down areas, workshop locations, temporary as well as permanent land requirements, etc.
- Management structure and organisation
- Project implementation schedule

From Government agencies, information to be collected include:

- Conservation / protection status of project affected areas
- Demographic statistics
- Development plans
- Earlier studies (Social, ecological)
- Geology, soils
- Forest and plantation concession boundaries

When relevant, gathered data and information will be verified in the field.

Data collected in the field or from satellite / lidar images will capture but not be limited to the following:

- Sociological data including community perceptions concerning the Project. This will be done through site surveys and stakeholder dialogues with project affected

communities and groups within them, landowners and formal and informal users of land along the easement

- Terrestrial Flora - Mostly remote sensing with field verification. Focus at habitat level, unless secondary data and consultation show that threatened species are found in the area
- Terrestrial Fauna - Field survey and verification of literature findings and interviews
- Ambient Air Quality, Noise Levels and Water Quality
- Background electromagnetic field (EMF) level
- Land and river traffic data

Fieldwork and environmental baseline sampling work (EBS) will be carried out with the following field equipment:

- AEROQUAL 500 Portable Outdoor Air Quality Monitor (ambient air):
- Noise meters
- In situ water quality sampling probes
- EMF meters
- Drones, GPS, clinometers, compasses
- Laboratory Testing / Field Monitoring

All samples will be tested and analyse in CHEMSAIN's in-house MS ISO/IEC 17025 accredited chemical and microbiological laboratories in Kuching.

11.2 CONSULTATION WITH REGULATORY AGENCIES AND OTHER STAKEHOLDERS

For the ESIA study, discussions and meetings will be held with relevant government agencies, authorities and stakeholders, particularly with authorities involved in the approval of the ESIA report, such as (but not limited to) the following:

- NREB on environmental matters
- Land and Survey Department on land matters
- Forest Department Sarawak (FDS) and Sarawak Forestry Corporation (SFC) on forestry matters
- Sarawak Biodiversity Centre on biodiversity matters
- Sarawak Museum on cultural heritage and archaeology matters

- Majlis Adat Istiadat Sarawak on customary laws matters
- Sarawak Rivers Board (SRB) on river usage and safety
- Jabatan Kerja Raya (JKR) on roads and other infrastructure
- Jabatan Bekalan Air Luar Bandar (JBALB) – for existing use of the river, water supply and catchments
- Department of Agriculture (DOA) on soils and all aspects of agricultural land use
- Department of Irrigation and Drainage (DID) (Water Resources and Management Division) – for hydrological data (if additional information is required)
- District Office on population and other relevant socio-economic data available
- Sarawak State Health Department on water supply to longhouses and communicable diseases and vector control
- Minerals and Geoscience Department on relevant geological information (if additional information is required)
- Meteorological Department on climatic data
- Fire and Police Department on emergency response and safety requirements
- NGOs
- Other interested parties (political, media, forest and plantation industries)

The main aim of the consultation / meetings would be to determine the concerns of these departments / agencies / parties so that these can be addressed adequately in the ESIA.

11.3 LEGISLATIVE REVIEW

A review of related national and international environmental regulations on transmission line construction will be made. This review will include the various standards for water discharge, air emissions and noise, etc.:

- Natural Resources and Environment (Prescribed Activities) Order, 1994
- Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015
- Environmental Quality (Scheduled Wastes) Regulations 2005
- Environmental Quality (Sewage) Regulations, 2009
- Environmental Quality (Clean Air) Regulations, 2014
- Environmental Quality (Motor Vehicle Noise) Regulations 1987

- Occupational Safety and Health Act 1994 (Act 514) and Regulations
- Factories and Machinery 1967 (Act 129) and Regulations
- Sarawak Labour Ordinance (Act A1237) - Chapter 76, 1952
- Immigration Act 1959/1963 (Act 155)
- Road Transport Act 1987
- Sarawak River Ordinance, 1993
- Water Ordinance, 1994
- National Water Quality Standards for Malaysia (NWQSM)
- DOE's Guidelines for Environmental Noise Limits and Control (Third Edition 2019)
- Malaysia Ambient Air Quality Standard (MAAQS)

We will identify SEB's policies and commitments, and identify how the process and content of the ESIA has conformed to these.

We will also identify the key pertinent requirements of international agreements and standards, for example those on Indigenous Peoples (IP). We will identify the relevant requirements of HSAP and IFC Performance Standards.

We will pay particular attention to Indigenous People's rights in international, national law and State's law.

11.4 INTRODUCTION

The ESIA is to provide an introduction of the proposed Project. This is to include:

Project Title:	The title of the project
Project Background:	Brief introduction to the project background and details
Statement of Need and Strategic Fit:	Description of project background and provide a justification for the proposed project (need), identifying the sectoral targets and plans to which the Baleh project will contribute, and why it is the preferred option to meet these needs. It will also highlight sustainability considerations for siting and design, i.e. synchronisation with prevailing local activities, particularly land use and village expansion, and minimisation of environmental impacts.
Objectives of the ESIA:	Provide the main objectives of the ESIA study

Legislative Requirement:	Define the legal framework under which the ESIA is being completed Applicable environmental standards and requirements set forth at the international, national and local levels
Project Proponent:	Name and contact information for responsible parties within the organization
ESIA Consultants:	List of multidisciplinary ESIA team members that prepare the ESIA, their areas of expertise, qualification, NREB registration number and validity and signatures

11.5 PROJECT DESCRIPTION

11.5.1 Project Location

This section shall describe the location of the TL alignment in terms of:

- Administrative location (Division, district) with accompanying location map
- Access to site either by road, river, logging track, during construction and operation
- Latitude and longitude and of the TL and towers
- Total length of TL
- Maps, diagrams and photographs of project location and area
- Location i.e., a plan of all ancillary facilities such as set-down areas and worker camps
- Indication of project area and the direct and indirect areas of influence or zone of impact for the physical, biological and social-economic-cultural impacts
- Land requirement and acquisition for ROW and access roads

11.5.2 Project Concept and Components

The project description shall include an overall description of the main project thus explaining how the TL fits into the large concept. Project specific technical details shall, however, be limited to the TL and associated facilities.

11.5.2.1 Design Concept

The following project details shall be provided:

- Transmission line

- ► Line voltage
- ► Length of the TL
- ► Width of Right-of-Way (ROW)
- ► Transmission towers and details (number and types)
- ► Height of towers
- ► Foundations
- ► Lighting protection

- Access roads (including existing and new, temporary or permanent)
  - ► Location
  - ► Length and width
  - ► Stream crossings
  - ► Sedimentation and erosion prevention and control structures
- Project Schedule:
  - ► Work Programme (Gantt Chart) – phases/stages
  - ► Land Acquisition Status
  - ► Current Status of the Project
  - ► Organisation Chart (Construction and Operation Stage)

11.5.2.2 Onsite Support Facilities

Onsite support facilities, during construction and operation, shall be described and shown on map to include the following:

- Offices and onsite base camps
- Water supply (sources)
- Power supply (source)
- Sanitary Facilities
- Laydown area and storage
- Workshop
- Fuel stations
- Waste handling and disposal facilities
- Access roads (existing and new)
- Unloading jetties

11.5.3 Project Activities

This section shall outline the Project activities that are to be carried out by the Proponent. Description would be given for activities during:

- Preparation Stage:
  - ► Site investigation activities
  - ► Land acquisition, user rights, wayleave, crop restrictions, safety distances
  - ► Recruitment of labour (number of on-site employees and source)
  - ► Mobilization of machineries and equipment (type, number and route)
  - ► Access road construction and improvements to existing roads
  - ► Establishment of temporary onsite support facilities
- Construction Stage:
  - ► Employment of labour (number of employees, by contractor, source)
  - ► Land/vegetation clearing and removal and disposal of biomass
  - ► Overburden removal
  - ► Cut and fill activities (estimated amount of cut and fill)
  - ► Temporary drainage system
  - ► Erosion and sediment control
  - ► Concrete work
  - ► Platform preparation and raising of the towers
  - ► Stringing of the line
  - ► Stabilization and restoration of disturbed areas
  - ► Materials consumption (volumes of cement, aggregate, steel, cabling, fuels, oils, hazardous materials etc. expected)
  - ► Extraction of water for construction (extraction points to be identified), and discharges of wastewater (discharge points to be identified)
  - ► Waste management (biomass, sewage, greywater, scheduled wastes and solid wastes)
  - ► Volumes (number of journeys) of project traffic
  - ► Decommissioning of temporary facilities
  - ► Testing and commissioning of the TL
- Operation and Maintenance

- Maintenance activities for TL, access roads and slopes
- Maintenance i.e., regular clearance of the easement of vegetation

11.6 PROJECT OPTIONS

This section will be described based on information gathered from the Proponent. Three (3) transmission route options were considered. The principal features of each alignment considered will be given consideration and the technology, economic and environmental advantages and disadvantages of each discussed and evaluated. The ESIA will provide an independent assessment of the preferred option, based on the baseline environment identified for the ESIA and the findings of stakeholder consultation.

It will also describe the alternative technology and construction methodology options TL construction. This will be based on information provided by SEB.

The section will summarise stakeholders' views and concerns on project options, based on engagement with directly affected stakeholders on the options, two-way communication on the impacts of the alternative options and presentation of their impacts, and thorough/timely feedback on issues raised.

Finally, the basis of selecting Option 2 shall be comprehensively discussed.

11.7 STAKEHOLDER ENGAGEMENT, PUBLIC PARTICIPATION AND CONSULTATION IN ESIA

The ESIA will include full information on stakeholder engagement and consultation undertaken about the project consistent with the requirements of the IHA; the Hydropower Sustainability Assessment Protocol (HSAP), IFC Performance Standard 1, and NREB EIA requirement.

For this Project, CKSB will liaise with SEB on the consultation process and assist with the consultation as appropriate. Social surveys and other forms of information gathering for this ESIA will be coordinated with SEB's consultation program, as far as practicable. CKSB will ensure that all liaison with stakeholders and local communities will be with prior approval from the Project's SEB consultation manager.

The following will be undertaken within this scope:

- Undertake stakeholder mapping to identify relevant stakeholders and those directly[2] and indirectly affected[3], as well as vulnerable groups and those who may require a focused approach to ensure their inclusion
- Evaluate relative influence of the project on different stakeholders, as well as their influence on the project
- Evaluate related risks and level of risk, identifying issues of interest
- Identify the legal requirements for public consultation
- Identify stakeholder engagement requirements during Movement Control Order (MCO) due to Covid-19 pandemic
- Review existing SEB grievance mechanism against HSAP and performance standards for gaps
- Gathering of additional necessary social information or assessment required to develop a Stakeholder Engagement Plan and grievance mechanism procedure
- A Stakeholder Engagement Plan (SEP) for the ESIA study will be developed
- Engagement with directly-affected and indirectly-affected stakeholders
- Two-way communication on topic of interest and relevance to them; issues and feedback
- Consultation will ensure local knowledge, including IP local knowledge, is integrated into the impact assessment
- Engagement and consultation events will be scheduled to enable people to attend, including people of all livelihood groups, women as well as men etc
- Public disclosure of commitments proposed in the ESIA
- The process of consultation will seek to achieve the support of TL-affected communities for the TL
- Engagement or communication methods may include personal interview, focus group discussion, public meeting, socio-economic survey, etc.:

[2] Those who are directly affected, either positively or negatively, by an organization's actions or project. This category includes those who may lose land they currently use or other assets, including houses, buildings, trees, crops or other valuable property as well as access to common resources.

[3] This include people who live along the transmission line route who may be disturbed by project traffic, noise, dust, or other construction impacts, and who may also benefit from employment opportunities.

- Assist on Public Notification arrangement and submission with NREB including to record the proceedings and incorporate feedback and comments from the stakeholders after Public Notification in the ESIA.

11.7.1 Consent of Indigenous Peoples

International standards require consultation with IPs according to a process that meets their approval, culminating in demonstration of Free, Prior and Informed Consent (FPIC). Achievement of FPIC is SEB responsibility, and ESIA consultants cannot alone achieve this. Stakeholder engagement for this ESIA will be complementary to SEB's engagement to achieve FPIC.

11.7.2 Benefits and Perceptions

In conjunction with the social surveys, dialogue sessions and discussions as well as stakeholder engagements, one of the main areas of focus is concerned with the views and perceptions of the communities about the proposed Project and its implications to their welfare and interests. These sessions also help to gauge the awareness of the local people about the Project as well as to clarify any misunderstanding about it. The dialogue, discussions and stakeholder engagements aim to establish good relationships between the communities and the Project Proponent.

SEB's benefit-sharing plans of the Baleh HPP will be reviewed, and we will assess if they are being or can be extended to communities affected by the TL. Benefits may include: a benefit-sharing mechanism e.g., on community investment; initiatives to train affected people and enable them to take up employment or deliver goods and services.

11.8 DESCRIPTION OF THE EXISTING PHYSICAL ENVIRONMENT

11.8.1 Topography, Geology and Soil

Topographical, geological and soil of the site and its surrounding will be described. The description will be based on existing government geology and soils maps combined with slope analysis based on LiDAR data as well as 30x30 m digital terrain models obtained from USGS/SRTM. Major geological features and soil classes will be described concerning slope stability and erodibility.

A brief assessment of seismic conditions will be based on officially available maps and records.

11.8.2 Climate, Ambient Air Quality and Noise Level

The Climate will be described in terms of rainfall, prevailing winds and temperature based on publicly available government records. These parameters will not directly

be affected by the Project but may contribute to the magnitude of issues related soil and slope conditions.

Baseline ambient air quality and noise levels will be sampled at ten (10) locations, tentatively shown in **Figure 7** and described in **Table 11.1**. The proposed sampling locations are primarily chosen close to human settlements within the impact zone (TL and access roads corridor and river corridor) as mentioned in **Section 2.5** and major river crossings, where physical activities are expected to be more pronounced.

Table 11.1: Proposed Air Quality, Noise Level and EMF Sampling Points

No	Sampling ID	Coordinates	Description
1.	A1/N1/EMF1	02° 06'46.12"N 112°17'20.52"E	SK Nanga Balingiau (school) located approximately 900 m south of proposed TL.
2.	A2/N2/EMF2	02° 02'7.46"N 112°25'31.45"E	Rh. Richard Nujong, Ng. Beguang, nearby settlement located approximately 1.7 km south of proposed TL.
3.	A3/N3/EMF3	02° 0'36.37"N 112°32'55.04"E	Song town located approximately 3.3 km south of proposed TL.
4.	A4/N4/EMF4	02° 01'3.22"N 112°42'58.28"E	Rh. Bubut Benang, Sg. Ibau, nearby settlement located approximately 1.8 km south of proposed TL.
5.	A5/N5/EMF5	02° 0'59.40"N 112°56'23.23"E	Kapit town located approximately 2.8 km south of proposed TL.
6.	A6/N6/EMF6	02° 01'45.09"N 113° 8'26.93"E	Rh. Anting, Batu Bansu, nearby settlement located approximately 480 m south of proposed TL.
7.	A7/N7/EMF7	01°58'26.33"N 113°15'36.26"E	Rh. Agang, Ng. Setekam, nearby settlement located approximately 2 km south of proposed TL.
8.	A8/N8/EMF8	01°53'5.12"N 113°27'12.44"E	Rh. Sana, Ng. Staba nearby settlement located approximately 700 m south of proposed TL.
9.	A9/N9/EMF9	01°49'18.43"N 113°40'46.22"E	Rh. Lucas Laso, Ng. Entawau, nearby settlement located approximately 950 m south of proposed TL.
10	A10/N10/EMF10	01°48'22.76"N 113°46'4.11"E	Baleh Hydroelectric Project dam located approximately 400 m south of proposed TL.

The air quality parameters to be monitored are:

1. Particulate matters <10 microns (PM10)

2. Particulate matters < 2.5 microns (PM2.5)

Air quality will be sampled over 24 hours. The reference standard will be the Malaysian Ambient Air Quality Standards (MAAQS), 2013. Analysis of the samples will be performed by CHEMSAIN's accredited laboratories in Kuching.

Noise will be measured for a duration of one (1) hour each during the day and at night. The noise levels (L_{Aeq}) measured shall be assessed against level stated in First Schedule: Recommended Permissible Sound Level (L_{Aeq}) by Receiving Land Use for New Development; Guidelines for Environmental Noise Limits and Control (Third Edition 2019).

Baseline air quality and noise will be presented alongside international standards (WHO standards) set out in the IFC (World Bank Group) EHS Guidelines.

11.8.3 Electromagnetic Field (EMF)

A handheld EMF meter will be used to measure background EMF level. The normal practice is to take the measurement at a height of 1 m from ground level under the TL. At least three (3) equally spaced measurements shall be performed on either side of the TL. Each measurement will be done in increasing distance of 10 m from the TL. As the TL is yet to be constructed, measurement will be taken at the same locations as the air and noise sampling locations (**Table 11.1**). Where possible, sampling will be taken within 50 of the TL ROW.

The EMF baseline will be established in accordance with the Malaysian Standard and International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines. We will also refer to guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

11.8.4 Hydrology and River Water Quality

The TL will cross numerous smaller or larger tributaries, which will be carefully mapped together with their drainage areas. If any flood prone areas are found, these will be mapped too. Mapping of catchments (drainage areas) will be based on 30x30 m digital elevation models originating from remote sensing (USGS/NASA).

Baseline river water quality will be sampled at 15 locations (**Figure 7**) at selected tributaries of Btg. Rajang and Btg. Baleh and 10 locations at Btg. Rajang and Btg. Baleh itself (see **Table 11.2**). Sample from Btg. Rajang and Btg. Baleh will serve as reference points.

Table 11.2: Proposed Water Sampling Points

No	Sampling ID	Coordinates	Description
1.	W1	02° 5'0.83"N 112°12'56.66"E	Midstream of Btg. Rajang, before Kanowit town and within 8 km radius of Kanowit water intake. Approximately 7.5 km downstream of proposed TL.
2.	W2	02° 3'33.17"N 112°19'28.40"E	Downstream of Sg. Mapai, approximately 3.8 km downstream of proposed TL.
3.	W3	02° 9'18.90"N 112°17'0.35"E	Upstream of Sg. Mapai, approximately 3.5 km upstream of proposed TL.
4.	W4	02° 3'12.55"N 112°20'31.49"E	Downstream of Sg. Kabah, approximately 3.3 km downstream of proposed TL.
5.	W5	02° 1'8.95"N 112°31'36.31"E	Downstream of Sg. Iran, approximately 2.5 km downstream of proposed TL.
6.	W6	02° 0'51.29"N 112°32'30.29"E	Midstream of Btg. Rajang, after Song town and approximately 2.9 km downstream from proposed TL.
7.	W7	02° 0'49.31"N 112°33'4.33"E	Downstream of Sg. Song, approximately 2.8 km downstream of proposed TL.
8.	W8	02° 0'38.39"N 112°35'38.93"E	Gravity feed water supply, intake located upstream of Sg. Manap. Water samples from Rh. Nyala Ak Pang longhouse with GFS (located approximately 3 km downstream of proposed TL) to represent gravity feed catchment in the area.
9.	W9	02° 0'45.88"N 112°41'59.87"E	Gravity feed water supply, intake located upstream of Sg. Entangai. Water samples from Rh. Tat, Nanga Entagai longhouse with GFS (located approximately 2.3 km downstream of proposed TL) to represent gravity feed catchment in the area.
10.	W10	02° 0'42.86"N 112°43'5.55"E	Downstream of Sg. Ibau, approximately 2.4 km downstream of proposed TL.
11.	W11	02° 00' 42.83"N 112° 44' 42.38"E	Midstream of Btg. Rajang, before Song town and approximately 2.4 km downstream of proposed TL.
12.	W12	02° 0'55.40"N 112°49'1.14"E	Downstream of Sg. Belawai, approximately 2.1 km downstream of proposed TL.
13.	W13	02° 1'11.11"N 112°54'5.79"E	Downstream of Sg. Menuan, approximately 2.3 km downstream of proposed TL.

No	Sampling ID	Coordinates	Description
14.	W14	02° 1'4.04"N 112°57'9.86"E	Midstream of Btg. Rajang, near Kapit Water Intake point. Approximately 2.8 km downstream of proposed TL.
15.	W15	02° 1'5.03"N 112°59'28.89"E	Downstream of an unnamed river, approximately 2.8 km downstream of proposed TL.
16.	W16	02° 1'55.25"N 113° 2'7.94"E	Upstream of Btg. Rajang, before Btg. Baleh and approximately 50 m downstream of proposed TL.
17.	W17	02° 0'36.84"N 113° 3'32.24"E	Downstream of Btg. Baleh before flowing into Btg. Rajang and approximately 2.5 km downstream of proposed TL.
18.	W18	02° 1'26.99"N 113° 9'51.88"E	Midstream of Btg. Baleh, approximately 1.3 km downstream of proposed TL.
19.	W19	02° 1'33.42"N 113°10'25.35"E	Downstream of Sg. Mujong, approximately 1.0 km downstream of proposed TL.
20.	W20	01°56'30.07"N 113°20'41.89"E	Upstream of Btg. Baleh, before Sg. Mujong and approximately 1.1 km downstream of proposed TL.
21.	W21	01°53'36.10"N 113°26'12.02"E	Gravity feed water supply from Rh. John Ak Katil longhouse (located approximately 700 m downstream of proposed TL) to represent gravity feed catchment in the area.
22.	W22	01°51'22.87"N 113°33'32.18"E	Gravity feed water supply, intake located upstream of Sg. Entulu. Water sample from Rh. Bully Ak Janggu longhouse with GFS (located approximately 1.2 km downstream of proposed TL) to represent gravity feed catchment in the area.
23.	W23	01°49'19.71"N 113°41'6.95"E	Midstream of Btg. Baleh, near Entawau Water Intake point. Approximately 800 m downstream of proposed TL.
24.	W24	01°48'50.36"N 113°45'6.88"E	Downstream of Sg. Putai, approximately 530 m downstream of proposed TL.
25.	W25	01°48'30.70"N 113°45'34.92"E	Upstream of Btg. Baleh, approximately 1.1 km downstream of proposed TL and Baleh Dam.

Main rivers of Btg. Rajang and Btg. Baleh (10 points)

Analysis results will be compared against National Water Quality Standards for Malaysia (NWQSM), existing monitoring data from DOE and NREB, and international standards. The proposed parameters are as follows:

Parameters	**Parameters**
• Temperature	• Biochemical Oxygen Demand (BOD)
• pH	• Chemical Oxygen Demand (COD)
• Dissolved Oxygen (DO)	• Ammoniacal Nitrogen
• Turbidity	• Oil and Grease
• Total Dissolved Solids (TDS)	• Total Coliform Count
• Total Suspended Solids (TSS)	• Faecal Coliform Count

In addition to the above parameters, heavy metal parameters will be evaluated for 7 water samples to be taken within 8 km radius of the water intake points and gravity feed water catchment areas.

The heavy metal parameters to be analysed are as follows:

- Aluminium (Al)
- Arsenic (As)
- Barium (Ba)
- Cadmium (Cd)
- Chromium, Hexavalent (as Cr6+),
- Chromium, Trivalent (as Cr3+),
- Copper (Cu)
- Iron (Fe)
- Lead (Pb)
- Manganese (Mn)
- Mercury (Hg)
- Nickel (Ni)
- Selenium (Se)
- Silver (Ag)
- Tin (Sn)
- Zinc (Zn)

Acquisition and comparison will be made against secondary water quality data from government agencies (NREB, DOE and JBALB) which have monitoring stations along Btg. Rajang and Btg. Baleh to see the pattern in water quality over the last few years. Results of water quality analysis will be compared against National Water Quality Standards for Malaysia (NWQSM), Raw Water Quality Criteria by Ministry of Health, Malaysia (MOH) and international standards (WHO standards) set out in the IFC (World Bank Group) EHS Guidelines.

Important water uses such as for domestic, industrial, recreational, agriculture, fisheries, etc. will be included. This shall be established through survey questionnaire incorporated in the socio-economic survey of the Project.

11.8.4.1 Water Catchments and Other Protected Areas

Water catchment areas (gazetted or proposed to be gazetted), water supply intake points in the vicinity of the transmission line zone of impact will be highlighted in the description of the existing environment.

In addition to these Government operated intakes and treatment facilities, it may be expected, a number of communities operate either gravity-fed water supplies or have intakes in the rivers or streams from where they pump water. All such intakes will be mapped including their catchment areas, and their location in relation to construction stage extraction and discharge points.

11.8.5 Traffic Survey (Land and Riverine)

As there are no major roads in the study area, traffic survey will be conducted along major local or logging roads and at Btg. Rajang and Btg. Baleh where the TL crosses these rivers. Five (5) road (TS) and five (5) riverine survey (RS) stations are proposed as shown in **Figure 7** and Table 11.3. Traffic survey will be carried out to represent weekday and weekend.

Table 11.3: Proposed Traffic (Land and Riverine) Sampling Points

No	Sampling ID	Coordinates	Description
1.	TS1	02° 05' 07.67"N 112° 19' 38.74"E	Traffic survey on existing road intersection. Accessed by local people and access road towards the proposed TL.
2.	TS2	02° 02' 03.84"N 112° 39' 04.46"E	Traffic survey on existing road. Intersection of existing road used by local people and access to the proposed line route alignment.
3.	TS3	02° 0' 32.58"N 112° 45' 35.53"E	Traffic survey on new road from Song to Kapit. This is a newly completed road and is the main trunk road linking to Kapit.
4.	TS4	02° 02' 28.96"N 113° 0' 49.65"E	Traffic survey on existing logging road. Intersection of existing road used by local people and access to the proposed line route alignment.
5.	TS5	02° 03' 03.27"N 113° 09' 25.06"E	Traffic survey on existing logging road. Intersection of existing road used by local people and access to the proposed line route alignment.

No	Sampling ID	Coordinates	Description
6.	RS1	02° 02' 40.93" N 112° 33' 43.71" E	Riverine survey at Btg. Rajang, after Song. Btg. Rajang will be used for transportation of construction material and workers.
7.	RS2	02° 02' 07.33" N 112° 53' 52.70" E	Riverine survey at Sg. Menuan, river crossing by TL line route. Accessed by settlements located upstream and local people.
8.	RS3	02° 01' 49.85" N 113° 02' 09.35" E	Riverine survey at Btg. Rajang, main river crossing by TL line route. Main transportation route for river transport along Btg. Rajang.
9.	RS4	02° 01' 49.83" N 113° 11' 31.43" E	Riverine survey at Sg. Mujong, river crossing by TL line route. Accessed by settlements located upstream and local people.
10.	RS5	01° 53' 22.00" N 113° 26’ 7.13" E	Riverine survey at Btg. Baleh, near Ng. Gaat. Btg. Baleh will be used for transportation of construction material and workers.

For each road traffic survey point, the following methodology will be employed:

- To carry out 2-hour traffic survey for morning, noon and evening periods on one (1) weekday and one (1) weekend at the five (5) locations namely Survey Points TS1 to TS5. The proposed time periods for the survey are as follows:
  - ► 6.30am to 8.30am (morning)
  - ► 11.30am to 1.30pm (noon)
  - ► 4.30pm to 6.30pm (evening)
- To record the vehicles at 15-minute interval within the 2-hour peak (eg. 6.30am to 6.45am, 6.45am to 7.00am for morning peak etc.) under the six different vehicle categories namely:
  - ► Car / 4-wheel drive
  - ► Motorcycle
  - ► Van
  - ► Light truck
  - ► Heavy truck
  - ► Bus

For riverine traffic, the following methodology will be employed:

- To carry out 12-hour riverine traffic survey on one (1) weekday and one (1) weekend from 06:00 to 18:00 at the point where the transmission line crosses the rivers (namely RS1 to RS5).
- To record the following:
  - ► Time of passage for the riverine traffic plying (upstream, downstream, across) the rivers.
  - ► The types of boats (cargo, barge, tug boat, express, speed boat, long boat, long boat (engine), fishing boat and sampan).
  - ► The purpose of travelling (e.g. construction purpose / passengers / cargos etc.).
- To record the origin and destination of the riverine traffic (east to west / west to east).

11.9 DESCRIPTION OF EXISTING BIOLOGICAL ENVIRONMENT

The ESIA shall provide detailed information on the location and condition of ecosystems in and around the project area in the form of narrative, maps and tables, including the following:

11.9.1 Terrestrial Flora and Fauna

The focal study area will be a corridor stretching 500 m on either side of the TL. It should be noted that the study area has been subjected to several periods of shifting cultivation or recent logging or is now covered by tree plantations (rubber or forest plantations), grassland and secondary forest. It is not deemed necessary to survey the entire 176 km long for flora unless particular issues show up during consultation, social surveys or literature studies as much of the corridor is modified habitat. Before the field survey, a literature review will be undertaken on the vegetation cover of the area under assessment, experts in Sarawak's threatened flora and fauna will be consulted, local people will be asked whether they know if specific threatened flora and fauna are present, and together with analyses of satellite images, this information will be used as a basis for identifying specific species and habitats that will be surveyed through fieldwork and ground-truthing.

For fauna survey, sampling points will be located along the proposed transmission route. Actual points will depend on accessibility and forest type. At each sampling points, the GPS location and condition of wildlife habitat will be recorded. Duration of visual observation at each point will be about 30 minutes. All bird, mammal, reptile and amphibian species detected at the sampling point will be recorded. Camera traps

will be deployed at strategic sampling points upon consultation, survey and data collection with local people.

Bird survey will be done by observation based on sighting (with the aid of binocular) and vocalisation at selected sampling points. Mammal survey will be done by observation of animal present as well as record of their signs, such as foot and hoof prints, faeces, scratch marks and wallows. Reptile and amphibian survey will be done by visual encounter survey (record all reptile and amphibians encountered) at the same point as bird and mammal survey. Mist net may be used at few sites and the local people that we met on site will be asked if they had recently seen any particular mammals or bird.

Land cover/ vegetative/ habitat mapping will be made based on satellite imageries and LIDAR survey supported by ground truthing. At a larger scale, activities that may contribute to cumulative impacts will be included in mapping and overall assessment.

Focus will be on habitat and vegetation types, pointing out if there are any conservation issues or if there is a likelihood, the habitat contains protected species or species important for local or commercial livelihoods.

At species level, focus will be on the presence of species listed in national/state legislation, IUCN Red Listed in categories CR, EN, VU or NT, endemic or range-restricted species, migratory species, or species of significance to local populations.

The ESIA will include an inventory and mapping of both terrestrial and aquatic species found in the area, identifying:

- IUCN status
- National red-list category,
- Endemic
- Migratory
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Breeding areas

Appropriate regulatory stakeholders such as Sarawak Biodiversity Centre (SBC), Forest Department Sarawak (FDS), Sarawak Forestry Corporation (SFC) as well as relevant non-governmental organisations (NGOs) will be consulted in order to obtain information on conservation interests, migration routes and optional mitigation measures.

The social surveys will include obtaining local information concerning local utilisation of biodiversity as well as the possible existence of focal species, feeding and resting sites.

11.9.2 Aquatic Flora and Fauna

The aquatic flora and fauna will primarily be based upon literature studies and interviews with government agencies and the local communities.

No systematic aquatic sampling is deemed necessary for this project as the project does not directly alter flow or quality of the rivers. However, if it is indicated, that there may be rare or otherwise conservation worthy aquatic habitats or species, field verification will be launched. Aquatic flora and fauna data will be sourced from the Baleh SEIA report, as well as reports by UNIMAS and other researchers.

11.9.3 Protected Areas

Protected areas, if any will be identified and mapped showing the specific locations and boundaries. These may include national parks, sanctuaries, reserves, etc., Tagang areas, as well as any areas proposed for protection.

11.9.4 Critical and Natural Habitat Analysis

To meet IFC Performance Standard 5 on Biodiversity and Sustainable Management of Living Natural Resources, an analysis of whether the habitats in the project area are natural or critical habitat will be necessary. Areas of habitat may be determined to be critical habitat if they support abundances of critically-endangered or endangered species, endemic species, or migratory species above certain thresholds, or they are unique ecosystems. To undertake this analysis, it will be necessary to delineate these areas, and to estimate the abundance of such species supported by the area.

11.10 DESCRIPTION OF SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT

11.10.1 Demography and Socio-Economic Conditions

The scope includes identifying human settlements within or near the TL corridor (between Btg. Rajang and about 500m north of the TL) or ancillary facilities, including the following information for each settlement:

- Population (size, gender and age distribution)
- Cultural characteristics (ethnic composition/ IP, religion, languages spoken, way of live, values, etc.)
- Identify / confirm whether affected people are IP according to the international and State Government’s definitions

- Economic activities (employment and incomes) and livelihood
- Education (including literacy rates)
- Use of natural resources, identifying the extent of areas for farming (including fallow areas used in shifting cultivation) and forest use, for each community
- Sites of cultural importance (physical features such as trees, groves, rocks etc that may have cultural or historical significance
- Housing and sanitation
- Vulnerable groups – elderly, gender, etc.
- Community organizations
- Infrastructure and utilities (water and power supply, tele-communication, waste management, sanitary, education, health care, recreation, sport facilities, police/emergency services)
- Access, transportation, and navigation

Sources of information for this section would be from local communities during field surveys, stakeholder engagement, as well as published data from the District Office and Department of Statistics.

11.10.2 Land Use

Detailed land use and land cover based on primary and secondary data shall be derived. Desktop literature review will be undertaken together with analyses of satellite images, the information gathered will be used as a basis for the field survey and ground-truthing.

A series of maps will be produced covering a 500-meter stretch of land on the northern side of the proposed TL to Btg. Rajang on the south side. Photos and GPS coordinates of land use will be recorded.

The maps will show:

- Population centres, including:
  - ► Schools
  - ► Cemeteries
  - ► Churches, mosques, temples
  - ► Public buildings
  - ► Housing and commercial areas
  - ► Industrial area

- Agriculture lands
- Forested lands (natural forest and planted forest, timber concessions, secondary forest)
- Protected areas (national parks, sanctuaries, reserves)
- Grassland
- Tourism and recreation areas
- Culturally sensitive areas
- Other land uses as appropriate

11.10.3 Indigenous Peoples

We will Identify important social and cultural practices distinct to the indigenous communities (e.g., resource harvesting activities), a description of other social and economic circumstances relevant to the indigenous community using local knowledge and expertise, and assessment of impacts on IP's dignity, human rights, aspirations, culture, lands, knowledge, practices and natural resource-based livelihoods.

11.10.4 Cultural Heritage, Archaeological, Ceremonial and Historic Resources

Identification surveys will be conducted to locate the cultural resources within the TL's area of potential impact. All work will be done in compliance with the State laws and local customs. The work shall be carried out based on background research resources and field surveys/verification. The field surveys/verification will be linked to information gathered from local communities during the demographic/social survey.

The identification report will contain the following information plus appropriate pictures, maps and drawings, where available:

- Historic and cultural site
- Archaeological sites and artefacts, features, structures, ceremonies with religious and cultural heritage values
- Burial sites
- Artefacts,
- Information on IP or other traditional cultures, if any.

All work will be done in compliance with the State laws and local customs i.e., Sarawak Cultural Heritage Ordinance, 1993. We will consult with appropriate regulatory stakeholders such as the Sarawak Museum Department, Council for Customs and Traditions (Majlis Adat Istiadat Sarawak) as well as relevant NGOs if any, including formal agreements if necessary.

11.10.5 Public Health

Description of community health status will be based on health information available at local clinics and village health workers as well as information gathered from social survey and stakeholder engagement that include the following information:

- Presence/availability of health services and capacities
- General public health status as well as selected morbidity patterns within the community, through questionnaire survey to be conducted together with the social survey
- Incidence of COVID-19 in the local communities
- Health of different groups, e.g., women, ethnicities
- The prevalence of Gender-based Violence and Harassment (GBVH) and Sexual Exploitation and Abuse (SEA) in the area and arising from the presence of workers in existing industries (e.g., logging)
- EMF exposure level (see **Section 11.8.3**)

11.10.6 Human Resource and Labour Management Requirements

Human resources and labour management requirements, which shall be valid for the Project Proponent and his contractors will be identified taking into consideration potential labour risks, and environmental and occupational health hazards that may emanate from the construction and operation of the proposed TL for workers.

Existing legislative requirements for occupational safety and health management during construction and operation of the Project and international standards (such as those of the ILO) will be reviewed.

11.10.7 Socio-Economic Survey Methodology

The socio-economic survey will focus on communities within the identified impact zone (see **Section 2.5:Impact Zone /Area of Influence**). Information collection employ both the qualitative and quantitative approaches. In the qualitative approach, respondents' personal views and observations are obtained. In the quantitative approach, information is collected by assigning numerical values to concepts under study and analyse it objectively.

Collection of primary data will be carried out by means of surveys using questionnaires. Surveys of villages will be carried out at two levels namely:

1. Village-level survey; and
2. Household-level survey.

The purpose of the village-level survey is to gather general information about the socio-economic profile of a village. The information to be elicited from a village will cover demography, local institutions, vulnerable groups, current situation of the village in terms of accessibility, mode of transport, occupation, available facilities and infrastructure, views and perceptions about the proposed Project and others.

The approach to gathering information on the village profile is by focus group interviews. The participants who form the key informants in the group interview in a village are the village heads, other community leaders, especially members of Village Security and Development Committee (JKKK), heads of households, and others who have knowledge of the village and its community.

The household profile surveys will be randomly selected and interviewed. The aims are to collect information such as household size, household resources (lands, workforce), gender ratio, migration, education, land use, economic activities, health conditions, awareness as well as personal views/perceptions about the proposed Project.

11.11 ENVIRONMENTAL IMPACT ASSESSMENT

11.11.1 Screening and Scoping

Potential impacts of the Project have been identified through a process whereby the Project activities associated with the pre-construction, construction and operation of the TL have been considered with respect to their potential impact on resources/receptors at the site.

The potential impacts are classified in one of three categories:

- **No interaction**: where the Project is unlikely to interact with the resource/receptor;
- **Interaction likely**, but not likely to be significant: where there is likely to be an interaction, but the resultant impact is unlikely to change baseline conditions in an appreciable/detectable way; and
- **Significant interaction**: where there is likely to be an interaction, and the resultant impact has a reasonable potential to cause a significant effect on the resource/receptor.

The scoping results is illustrated in the following interaction matrix (**Table 11.4**):

- Project activities are listed vertically (rows)
- Environmental resources listed horizontally across the columns

Each resulting cell on the Interactions Matrix represents a potential interaction between a Project feature/activity and a resource/ receptor. The colours represent the following:

	Interactions are scoped out of the ESIA assessment process
	Interactions that have been scoped out and the justification for scoping out these interactions shall be provided in the ESIA
	Interactions will be considered in the impact assessment of the ESIA study

Table 11.4: Interaction Matrix

Resources/Receptors	PHYSICAL ENVIRONMENT					BIOLOGICAL ENVIRONMENT			SOCIO-ECONOMIC/HUMAN ENVIRONMENT						
Project Activities Stages	Soil Erosion	Water Quality	Air Quality & Climate	Noise & Vibration	Wastes	Flora & Fauna (Terrestrial & Aquatic)	Avian / Birds	Invasive Species	Land & Livelihood	Employment & Economy	Demographic pattern	Cultural Heritage & IP	Community Health (including EMF)	Occupational Health & Safety	Cumulative impacts
Pre-Construction															
Land Acquisition															
Construction															
ROW clearance															
Access road construction and improvements & establishment of temporary onsite support facilities															
Earthworks (cut & fill, overburden removal)															
Platform preparation, raising of towers and stringing															
Waste management															
Traffic															
Operation															
Maintenance – TL, access roads and slopes, vegetation															

11.11.2 Impact Assessment

The impact assessment process shall follow these four steps namely:

1. **Identification and prediction** of potential key environmental and social impacts as a consequence of project activities.
2. **Evaluation** of the importance and significance of the impact using a matrix.
3. Development of **mitigation measures** that will eliminate or limit negative significant impacts where practicable and enhance positive impacts.
4. Evaluation of the significance of the **residual impact**.

Each of the predicted potential impacts will be described in terms of its various **characteristics**. The terminology and designations used to describe impact characteristics are shown in **Table 11.5**.

Table 11.5: Impact Characteristic Terminology

Characteristic	Definition	Designations
Type	A descriptor indicating the relationship of the potential impact to the Project (in terms of cause and effect).	Direct Indirect Induced
Extent	The "reach" of the potential impact (e.g., confined to a small area around the Project footprint, projected for several kilometres, etc.)	Local Regional International
Duration	The time period over which a resource / receptor is potentially affected.	Temporary Short-term Long-term
Scale	The size of the potential impact (e.g., the size of the area with the potential to be damaged or impacted, the fraction of a resource that could potentially be lost or affected, etc.)	No fixed designations; intended to be numerical value or a qualitative description of "intensity"
Frequency	A measure of the constancy or periodicity of the potential impact.	No fixed designations; intended to be numerical value or a qualitative description

Once impact characteristics are defined, the next step in the impact assessment phase is to assign each potential impact a '**magnitude'**. Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the potential impact. The magnitude designations are:

- Positive
- Negligible
- Small
- Medium
- Large

The **sensitivity/vulnerability/importance** designations to be used for all resources/receptors are:

- Low
- Medium
- High

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterised, the **significance** can be assigned for each impact. Impact significance is designated using the matrix shown in **Table 11.6**.

Table 11.6: Impact Significance

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	**Medium**	**High**
Magnitude of Impact	**Negligible**	Insignificant	Insignificant	Insignificant
	Small	Insignificant	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

The matrix categorizes the impacts on four levels:

1. **Insignificant** – where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations. Insignificant impacts will not be considered further in the ESIA report (i.e. screened out).
2. **Minor** – where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small and/or the resource/receptor is of low sensitivity/vulnerability/importance. In either case, the magnitude should be well within applicable standards.

3. **Moderate** – has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its' effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.
4. **Major** – where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of EIA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e., ALARP has been applied). It is then the function of regulators and stakeholder to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.

11.11.3 Key Environmental Issues

Impacts during pre-construction, construction, and operation and maintenance will be separately identified and assessed.

We will refer to HSAP and the IFC EHS Guidelines on Electric Power Transmission and Distribution to assist in the identification of impacts. The primary areas to be assessed include the following:

Area	**Type of Impacts**
Physical Impacts	• Soil erosion (tower sites, access roads, set down areas etc etc) and sediment related risks during construction. The Modified Universal Soil Loss Equation (MUSLE) will be used to calculate the sediment yield • Sedimentation and siltation in the downstream watercourses, streams, etc • Slope alteration and stability • Effect on water quality • Potential for hazardous materials and oil spills associated with heavy equipment operation and fueling activities

Area	Type of Impacts
	• Effect on air quality (fugitive dust and emissions from vehicle traffic, land clearing activities, and materials stockpiles) and noise levels (from heavy equipment and traffic) • Effect on Electric and Magnetic Fields • Waste generation and disposal including solid and construction wastes, vegetative wastes, domestic wastes, scheduled wastes and sewage • Greenhouse Gas Emissions (Calculation methodology advocated by IPCC, and scope 1 and 2 emissions) • Resilience to climate change (Documentation of TL design to ensure it is resilient to plausible climate change scenarios)
Ecological / Biological Impacts	• Loss of habitat and habitat fragmentation due to vegetative removal • Disturbance to fauna, including nesting and migrating fauna • Effect on threatened species and critical habitat • Ecosystem resilience, sensitivity, biodiversity • Sustainability of local species populations • Electrocution of large birds, bats and other animals if deemed significant • Reduced survival of biota due to air, noise and water pollution • Poaching of threatened species by workers or camp followers • Increased pressure on fishing resources and forest (fuel wood) resources from workers or camp management • Introduction of invasive species and their spread through the easement corridor • Risks of use of herbicides (and storage, transport) in management of the easement corridor • Risk of forest fires • Induced loss of habitat and hunting through encroachment along access roads and the easement corridor

Area	Type of Impacts
Occupational health and safety	Safety hazards for workers, specific to electric power transmission: • Live power lines • Working at height • Electric and magnetic fields • Exposure to chemicals
Socio-Economic Impacts	Community health and safety: • Safety risks for community members passing through or around construction sites • Safety risks for community members from project traffic • Risk of electrocution around transmission towers and lines • EMF health hazard • Potential contamination of gravity feed water catchment • Potential loss of recreational areas • Increased traffic and associated pollution • Conflict between workers and local community members • Influx of camp followers with anti-social behaviour and environmental impacts • Bites or injury from wildlife moving out of the easement corridor during clearance Gender and vulnerable groups: • GBVH and SEA during construction • Impacts on vulnerable groups Physical and economic displacement: • Physical and economic displacement of households from the land used by the project • If no physical displacement, credible evidence will be sought to show this • Temporary use of land for temporary facilities and access roads – temporary economic displacement

Area	Type of Impacts
	• Potential loss of farmland and forest areas used for gathering and hunting • Potential loss of income due to land acquisition and loss of cash crops • Potential loss of species with current or potential commercial value • Potential impact on commercial forestry Indigenous Peoples: • Loss of ancestral lands and natural resources and belonging • Induced change in cultural practices and traditions • Demographic effects such as displacement Cultural Heritage: • Loss of damage to sites of cultural importance • Visual impacts • Benefits of project

11.11.4 Mitigation Measures

This section of the ESIA will include measures designed to avoid, minimise, mitigate and compensate potential adverse impacts to physical, biological and socio-economic-cultural resources from construction, operation and closure of the proposed TL. For each measure, the objective, responsibilities for implementation, costs, and indicators of effectiveness will be identified.

11.12 MANAGEMENT PLANS AND MONITORING PROGRAMS

The ESIA shall identify residual impacts from the impact assessment and proposed mitigation measures and management plans that linked to each identified impact, with each measure clearly stating the objective and indicators of effectiveness.

Management plans will include implementation arrangements, including responsibilities, timing, resources, and in some cases (where applicable and feasible) an estimated budget.

The plans will also include a monitoring programme that addresses all potential impacts to demonstrate if mitigation measures are effective or not.

The purpose of the ESIA is to identify the measures that are necessary and thereby propose an appropriate combination of Management Plans. However, the range of plans probably would include, but not necessarily be limited to, the following:

Pre-construction and Construction Stage, for Contractor implementation:

- Environmental and Social Management Plan (ESMP) including Environmental Monitoring Programmes
- Occupational Safety & Health (OSH)/ Labour Management Plan (referring to SEB HR policies and procurement policies)
- Stakeholder Engagement Plan with reference to existing SEB's policy
- Cultural Heritage Management Plan including chance finds procedure
- Public Health Management Plan
- Contractor's Biodiversity Management Plan
- Conservation Management Plan
- Waste Management Plan
- Vegetation/ Biomass Removal Plan including greenhouse gas emission estimation
- Site Rehabilitation Plans
- Erosion and Sediment Control Plan
- Emergency Response Plan (ERP)

Operation and Maintenance Stage, for SEB implementation:

- Environmental and Social Management Plan (ESMP) including Environmental Monitoring Programmes
- Occupational Safety & Health (OSH)/ Labour Management Plan (referring to SEB HR policies and procurement policies) including approach to OHS risk assessment and monitoring
- Emergency Response Plan (ERP), with reference to existing SEB ERP.
- Measures to address issues and needs for IP shall be incorporated into various relevant plans e.g., overall ESMP, Cultural Heritage Management Plan,

Biodiversity Management Plan, depending on the issues that are important or of concern to the IP.

All stages for SEB implementation:

- Land Acquisition and Livelihood Restoration Plan
- Biodiversity Management Plan

These plans shall not only reflect standard operational procedures addressing avoidance, minimisation and mitigation for all identified types of potential negative impacts. The plans shall also estimate the degree to which success may be expected provided all plan directions are respected. This will lead to the issue of unavoidable residual impact, i.e., the negative impacts that cannot be expected to be avoided even after all precautionary measures have been taken.

The overall recommendation shall depend on the magnitude and probability of these residual impacts.

11.13 GRIEVANCE MECHANISM

Reference will be made to Proponent's established Grievance system as a basis for the establishment of a grievance system for this TL.

Grievance mechanisms refer to the processes by which stakeholders are able to raise concerns, grievances and legitimate complaints; the project procedures to track and respond to any grievances; how issues will be escalated if they cannot be easily resolved; commitments to inform stakeholders of status or outcomes; and legal recourse avenues.

The existing grievance mechanism will be reviewed against the HSAP and the IFC performance standards for eventual gaps.

12. DELIVERABLES

Twenty-two (22) hard copies and a CD copy of the final EIA report, including maps, figures, tables and photographs will be prepared for submission to NREB, Sarawak

13. WORK PROGRAMME AND SCHEDULE

The ESIA study is projected to take 24 weeks. The work programme and schedule are as follows (subject to availability of important information / data for the study):

Activity	**Month**																							
	Oct				**Nov**				**Dec**				**Jan**				**Feb**				**Mac**			
Preparation of Summary Paper																								
Desktop Study & Data Compilation																								
Submission of TOR to the NREB																								
TOR Scoping with NREB																								
Field survey and baseline data collection																								
Laboratory analysis, data analyses and interpretation																								
ESIA Report drafting																								
Submission of 1st Draft Report to Client																								
Review of draft report by Client																								
Submission of Final draft report to Client																								
Review of draft report by Client																								
Submission of Final Report to NREB																								

This schedule may alter depending on the outcome of the scoping with NREB and availability of information from Project Proponent.

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APPENDICES

APPENDIX A: Siting Approval 24th January 2020

IBU PEJABAT TANAH DAN SURVEI
Menara Pelita, Jalan Tun Abdul Rahman Ya'akub, Petra Jaya,
93050 Kuching, Sarawak, Malaysia.
Telefon: 082-444111 Faks: 082-446611
Laman Web: www.landsurvey.sarawak.gov.my E-mel: landsurvey@sarawaknet.gov.my

Ruj. Kami: 3/SP/3D-26/19 Tarikh: 24.01.2020
Ruj. Tuan: Tarikh:

Vice President
Sarawak Energy Berhad,
Menara Sarawak Energy
No. 1, The Isthmus
93050 Kuching

Tuan,

Proposed Baleh - Mapai 500kV Overhead Transmission Line Project Sibu/Kapit

Dengan hormatnya, permohonan pihak tuan berhubung perkara di atas dirujuk.

2. Sukacita dimaklumkan bahawa projek di atas telahpun **diluluskan** oleh Majlis Perancangan Negeri dalam mesyuaratnya pada **17.01.2020** seperti yang ditunjukkan dalam **Pelan No. 3/SP/3D-26/19.** Sempadan sebenar juga adalah tertakluk kepada kerja-kerja ukur di lapangan.

3. **Kelulusan ini hanya sah untuk tempoh 36 bulan mulai dari tarikh kelulusan.** Dalam tempoh ini, pihak tuan dikehendaki :

i) Mengemukakan pelan jajaran terperinci (*detailed alignment plan*) untuk tindakan jabatan ini ; dan

ii) Menyalurkan peruntukkan untuk kos pengambilan balik/kos survei atau kos-kos lain yang berkaitan kepada jabatan ini (jika ada). Sekiranya tiada peruntukkan diterima oleh jabatan ini dalam tempoh tersebut, maka kelulusan ini akan luput dengan sendirinya. Pihak tuan akan dikehendaki untuk mengemukakan permohonan pertapakan yang baru jika ingin meneruskan projek ini.

4. Pihak tuan akan dimaklumkan tentang kos berkaitan dengan pengambilan balik, kos survei dan kos lain yang berkaitan (jika ada). Bersama ini dilampirkan sesalinan **Pelan No. 3/SP/3D-26/19** untuk makluman dan tindakan pihak tuan.

'BERSATU BERUSAHA BERBAKTI'
"AN HONOUR TO SERVE"

(PEGGY RONIN ANAK EDIN)
b.p. Pengarah Tanah dan Survei
SARAWAK
dan Setiausaha, Majlis Perancangan Negeri

An Agency to Facilitate Development

APPENDIX B: List of the longhouses found along the TL

Division:	**KAPIT**		
District:	**DAERAH BUKIT MABONG**		
Sub-Disrict:	-		
Parliment:	**P.216 HULU RAJANG**		
DUN:	**N.64 BALEH**		

No.	Longhouses	Coordinate	
1	Rh. Lucas Laso, Ng. Entawau, Balleh, Kapit	1°49'18.51"N	113°40'46.22"E
2	Rh. Unggam, Ng Entawau, Balleh, Kapit	1°49'19.41"N	113°40'47.45"E
3	Rh. Rentap Batang **(Langga)**, Ng. Entawau, Baleh	1°49'21.67"N	113°40'45.02"E
4	Rh. Tajai, Ng. Sebiro, Balleh, Kapit	1°49'23.96"N	113°40'31.98"E
5	Rh. Goyang. Ng. Ensurai, Sg. Merirai, Balleh, Kapit	1°52'48.54"N	113°36'52.27"E
6	Rh. Jantai, Ng. Entelangau, Balleh, Kapit	1°50'59.42"N	113°34'56.43"E
7	Rh. Sana, Ng. Staba, Balleh, Kapit.	1°53'05.14"N	113°27'12.45"E
8	Rh John Ak Katil Kerangan Ara	1°53'35.42"N	113°26'12.12"E
9	Rh. Steward Sambang, Ng. Sebetong, Balleh, Kapit	1°54'32.02"N	113°24'41.55"E
10	Rh. Gon, Ng. Serian (Batu Tunggal), Balleh, Kapit	1°55'57.51"N	113°21'45.48"E
11	Rh. Sumbang, Ng. Selaut, Balleh, Kapit.	1°58'2.49"N	113°16'59.57"E
12	Rh. Agang, Ng. Setekam, Balleh, Kapit	1°58'26.49"N	113°15'36.36"E
13	Rh. Jimbun,Pulau Won A, Balleh, Kapit	1°58'32.92"N	113°15'6.67"E
14	Rh. Wong, Ng. Sepata, Balleh, Kapit	1°58'32.35"N	113°15'8.20"E
15	Rh. Unggang, Ng. Seranggil, Balleh, Kapit	1°59'37.86"N	113°13'53.18"E
16	Rh. Lamau, Teluk Buing, Balleh, Kapit	1°59'55.12"N	113°13'25.81"E
17	Rh. Jimbun, Ulak Tapang, Balleh	2° 0'42.12"N	113°11'39.64"E
18	Rh. Nyanggau, Ng. Usun, Balleh, Kapit	2°01'11.23"N	113°11'15.76"E
19	Rh. Pinin, Ng. Usun, Balleh, Kapit.	2°01'10.75"N	113°11'08.22"E
20	Rh. Timothy Balai, Lepong, Sg. Mujong, Kapit	2°01'46.82"N	113°11'36.69"E
21	Rh.Ekau, Ng. Mujong, Balleh, Kapit	2°01'31.47"N	113°10'24.16"E
22	Rh. Anting, Batu Bansu, Balleh, Kapit	2° 1'45.13"N	113° 8'26.82"E
23	Rh. Asun, Lepong, Sg. Mujong, Balleh, Kapit	2°01'46.04"N	113°11'37.38"E
24	Rh. Bangkong, Rantau Enseriban, Sg. Mujong, Kapit	2°02'01.29"N	113°13'57.81"E
25	Rh. Bidok, Ng. Sebetong, Balleh, Kapit	1°54'25.18"N	113°24'52.26"E
26	Rh. Bully, Kerangan Besai, Balleh, Kapit	1°51'19.88"N	113°33'33.77"E
27	Rh. Jack, Ng. Semawang, Sg. Entuloh, Balleh, Kapit	1°52'16.59"N	113°36'36.22"E
28	Rh. Jamit, Ng Sepanggil, Balleh, Kapit	1°49'37.52"N	113°38'29.00"E
29	Rh. Jantai, Ng. Entelangau, Balleh, Kapit	1°50'59.42"N	113°34'56.43"E
30	Rh. Saging, Ng. Merama, Balleh, Kapit.	1°52'17.92"N	113°31'2.94"E
31	Rh. Samon, Ng, Entelawan, Balleh, Kapit.	1°50'19.00"N	113°36'53.19"E
32	Rh. Sebuang, Ng. Merama, Balleh, Kapit	1°52'12.37"N	113°30'55.27"E
33	Rh. Sipang, Ng. Banyau, Balleh, Kapit	2°01'25.96"N	113°10'06.15"E
34	Rh. Tang Spot, Ng. Banyau, Balleh, Kapit.	2°01'31.48"N	113°10'10.8"E
35	Rh. Weng, Ng. Sempurau, Mujong, Kapit	2°01'46.86"N	113°13'21.65"E

Division:	**KAPIT**		
District:	**DAERAH KAPIT**		
Sub-Disrict:	**-**		
Parliment:	**P.215 KAPIT**		
DUN:	**N.63 BUKIT GORAM**		

No.	Longhouses	Coordinate	
1	Rh Mingat Ng Bawai	2° 0'39.68"N	113° 5'7.06"E
2	Rh Ukau Ng Bawai Ili	2° 0'39.98"N	113° 4'57.17"E
3	Rh Umping Lepong Baleh Kiba	2° 0'44.10"N	113° 2'14.65"E
4	Rh Theophilus Unan Ng Baleh	2° 1'15.57"N	113° 1'43.89"E
5	Rh Jarop Pulau Pisang Ili	2° 2'13.13"N	113° 2'23.36"E
6	Rh Mengga Ng Senuang Ili	2° 3'6.23"N	113° 3'34.72"E
7	Rh Tungan Senuang Ulu	2° 3'20.29"N	113° 3'44.94"E
8	Rh Ajan Sg Aya	2° 3'16.51"N	113° 3'26.33"E
9	Rh Bakar Pulau Pisang Ulu	2° 2'16.09"N	113° 2'29.33"E
10	Rh Ayu Ng Tulie Baroh	2° 1'10.19"N	113° 1'3.82"E
11	Rh Moses Ng Tulie Tengah	2° 1'8.99"N	113° 0'59.50"E
12	Rh Riti Ng Tulie Atas	2° 1'7.74"N	113° 0'54.65"E
13	Rh Puso	2° 3'52.20"N	113° 0'57.90"E
14	Rh Barnabas Bin Adi Kpg Serian	2° 1'15.97"N	112°58'20.65"E
15	Rh Uset Lubok Engkabang	2° 1'57.67"N	112°56'53.09"E
16	Rh Janin Lubok Baya Seranau	2° 1'46.30"N	112°56'48.35"E
17	Rh Juin Rantau Tapang Seranau	2° 1'32.02"N	112°56'50.12"E
18	Rh Dick Ng Lan	2° 1'11.69"N	112°54'53.27"E
19	Rh Melebar Sg Goh Ulu	2° 1'42.24"N	112°54'35.15"E
20	Rh Jeluing Munggo Sabun	2° 1'39.59"N	112°54'31.10"E
21	Rh Tinggi Sg Goh Tengah	2° 1'23.85"N	112°54'26.87"E
22	Rh Dinggai Sg Goh Ili	2° 1'14.53"N	112°54'25.69"E
23	Rh Jacob Ng Leon	2° 2'15.40"N	112°53'45.12"E
24	Rh Latit Ng Semulong	2° 2'28.76"N	112°53'47.39"E
25	Rh Igau Bukong Baroh	2° 2'31.66"N	112°53'40.69"E
26	Rh Liang Bukong Atas	2° 2'33.50"N	112°53'41.19"E
27	Rh Kenyalang Ng Sekeranji	2° 1'49.91"N	112°54'2.94"E
28	Rh Richard Ungat Setapang Ili	2° 1'3.52"N	112°52'45.79"E
29	Rh Jambon Ng Ensilai	2° 0'54.63"N	112°51'58.73"E
30	Rh Kayan Ng Dia	2° 0'49.48"N	112°50'27.23"E
31	Rh Lugan Ng Selangkie	2° 0'55.93"N	112°49'28.04"E
32	Rh Lugom Ng Belawai	2° 1'5.00"N	112°49'0.15"E
33	Rh Lajang Ng Senyaro	2° 1'9.32"N	112°48'59.10"E
34	Rh Pioh Ng Paku	2° 2'13.11"N	112°48'15.82"E
35	Rh Kayan Ng Semujan	2° 2'27.58"N	112°48'21.50"E
36	Rh Marung Ng Terusa	2° 2'27.55"N	112°48'11.26"E
37	Rh Seliong Sekerangan Atas	2° 2'43.33"N	112°47'58.31"E
38	Rh Madau Sekerangan Tengah	2° 2'44.90"N	112°47'58.98"E
39	Rh Gelu Sekerangan Baroh	2° 2'46.10"N	112°47'59.20"E
40	Rh Mamat Ng Sepudun	2° 2'44.58"N	112°47'54.07"E
41	Rh Jabang Ng Sepayang	2° 2'47.80"N	112°47'46.12"E
42	Rh Mamat Ng Buan	2° 0'49.59"N	112°44'35.63"E
43	Rh Sana Ng Pepedi	2° 0'56.19"N	112°43'54.42"E
44	Rh Jampong Ng Ibau Ili	2° 0'40.77"N	112°42'59.71"E
45	Rh Lorrie Ng Ibau	2° 0'45.03"N	112°43'2.19"E
46	Rh Leo Ng Ibau Ulu	2° 0'47.80"N	112°43'0.24"E
47	Rh Ungka Ng Ibau Kanan	2° 0'49.44"N	112°43'3.69"E
48	Rh Bubut Benang Sg Ibau	2° 1'3.22"N	112°42'58.28"E
49	Rh Gerinsa Ng Sepayang Ibau	2° 1'47.75"N	112°43'10.63"E
50	Rh Uho Ng Segetu	2° 2'28.24"N	112°43'28.16"E
51	Rh Beli Ng Ensurai	2° 2'43.46"N	112°42'58.27"E
52	Rh Ambin Ng Segenok	2° 2'58.45"N	112°42'50.53"E
53	Rh Jandah Ng Nansang	2° 3'15.58"N	112°43'8.62"E
54	Rh Baja Ng Entangai	2° 0'46.23"N	112°41'59.78"E
55	Rh Messop Ulu Entangai	2° 3'14.35"N	112°41'13.16"E
56	Rh Rambor Ng Melipis	2° 0'50.32"N	112°40'14.25"E
57	Rh Untat Sg Melipis	2° 0'57.97"N	112°40'5.00"E
58	Rh Keling Lepong Melaban	2° 1'40.11"N	112°39'15.00"E
59	Rh Achai Ng Selubok	2° 1'51.32"N	112°38'59.87"E
60	Rh Segih Emperan Menuang	2° 2'46.32"N	112°39'1.35"E
61	Rh Mulai Batu Ninding	2° 3'12.67"N	112°39'10.81"E
62	Rumah Tat Ulu Entangai	2° 1'13.84"N	112°41'53.68"E

Division:	**KAPIT**		
District:	**DAERAH SONG**		
Sub-Disrict:	**-**		
Parliment:	**P.215 KAPIT**		
DUN:	**N.62 KATIBAS**		

No.	Longhouses	Coordinate	
1	Rh Kelau Ng Lijau	2° 0'41.33"N	112°37'17.07"E
2	Rh Darlin Sg Lijau	2° 1'41.89"N	112°37'12.60"E
3	Rh Jipon ulu Sg Lijau	2° 2'29.72"N	112°37'3.23"E
4	Rh Timothy Ason Manap	2° 0'38.85"N	112°36'1.44"E
5	Rh Nyala Ng Manap	2° 0'38.50"N	112°35'38.78"E
6	Rh Wan Ngi Ng Manap	2° 0'41.90"N	112°35'34.12"E
8	Rh James Baling Sg Manap	2° 2'32.11"N	112°35'34.62"E
9	Rh Muni Sg Manap Song	2° 2'35.17"N	112°35'30.55"E
10	Rh Ngitar Lubok Rirong	2° 2'6.79"N	112°34'38.89"E
11	Rh Menila Ng Selibut	2° 1'45.34"N	112°33'43.93"E
12	Rh Stephen Ng Selibut	2° 1'42.58"N	112°33'43.12"E
13	Rh Sugai Sg Song	2° 1'59.18"N	112°33'15.39"E
14	Rh John Ng Ngelai	2° 1'57.78"N	112°33'10.47"E
15	Rh Enturan Ng Ngelai	2° 2'1.06"N	112°32'48.10"E
16	Rh Samad Sait Rantau Panjai	2° 1'23.11"N	112°32'59.73"E
17	Rh Sylvester Panau Ng Selibut	2° 1'13.86"N	112°33'0.34"E
18	Rh Bantin Emperan Tembawai Sg Iran	2° 1'28.89"N	112°31'38.84"E
19	Rh Lebak Ng Santu Sg Iran	2° 1'45.76"N	112°31'35.19"E
20	Rh Jamba Ng Santu	2° 1'46.91"N	112°31'35.04"E
21	Rh Timban Emperan Munti	2° 2'49.05"N	112°31'6.42"E
22	Rh Chiry Emperan Munti	2° 2'49.05"N	112°31'5.33"E
23	Rh Gawan Ng Sebirah	2° 3'35.16"N	112°30'42.81"E
24	Rh Musim Sg Iran	2° 4'6.07"N	112°30'29.09"E
25	Rh Senabong Ng Wai	2° 4'4.88"N	112°30'22.55"E
26	Rh Bukit Ng Serau Btg Rjg	2° 1'44.79"N	112°28'46.19"E
27	Rh Chang Ng Temiang	2° 1'55.72"N	112°27'53.21"E
28	Rh Sering Ng Temiang	2° 1'59.13"N	112°27'51.07"E
29	Rh Jimbon Ng Temiang	2° 1'57.90"N	112°27'47.31"E
30	Rh Temdela@John Ng Beguang	2° 2'5.21"N	112°25'52.87"E
31	Rh Richard Nujong Ng Beguang	2° 2'7.46"N	112°25'31.45"E
32	Rh Jamal Ulu Sg Beguang	2° 3'33.49"N	112°25'14.81"E

Appendix 1.9.2

TOR Approval

&

Minutes of Scoping Meeting

0576

NATURAL RESOURCES AND ENVIRONMENT BOARD (NREB), SARAWAK

18th - 20th Floor, Menara Pelita, Jalan Tun Abdul Rahman Yakub
Petra Jaya, 93050 Kuching, Sarawak, Malaysia.
Locked Bag No. 2103, Kuching, Sarawak, Malaysia.
Tel: 082-319500/447488 Fax: 082-312800

Kuching Office
Shoplot No. 29, Lot 9005, Block 11, Muara Tebas Land District, Jalan Setia Raja, 93350 Kuching
Tel : 082-365972
Fax : 082-365934

Betong Office
Aras UG, Block Menara, Kompleks Pejabat Kerajaan Negeri, Kawasan Bandar Baru Betong, Jalan Spine, 95700 Betong
Tel : 083-471901
Fax : 083-471900

Sibu Office
Tingkat 8, Wisma Sanyan, No. 1, Jalan Sanyan 96000 Sibu
Tel : 084-337428
Fax : 084-327488

Mukah Office
6th Floor, Menara Pehin Setia Raja, 96400 Mukah
Tel : 084-873485
Fax : 084-873488

Bintulu Office
2nd Floor, Wisma Bintulu, Jalan Tanjung Kidurong, 97000 Bintulu
Tel : 086-334448
Fax : 086-335340

Miri Office
9th Floor, Wisma Pelita Tunku, Jalan Puchong, 98000 Miri
Tel : 085-437488
Fax : 085-410254

Limbang Office
3rd Floor, Limbang Plaza, Jalan Buang Siol, 98700 Limbang
Tel : 085-216488
Fax : 085-216486

Ref. : (6) NREB / 6 – 4 / 1 / 196

9 December 2020

The Manager
EIA Division, HSSE Department,
SARAWAK ENERGY BERHAD
Level 4, South Wing, Menara Sarawak Energy,
No. 1, The Isthmus, 93050 Kuching
(Attn.: Mr. Julaidi bin Rasidi) ***Fax: 082 – 330 708***

Dear Sir,

TERMS OF REFERENCE OF THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED BALEH-MAPAI 500 KV TRANSMISSION LINE PROJECT"
- MINUTES OF SCOPING MEETING

May I refer to the above matter.

2. I wish to inform you that the TOR submitted by your Environmental Consultant for the above project is accepted and they may now proceed with the ESIA report study. Please take note that the issues discussed during the Scoping Exercise held on 26th November 2020 shall be incorporated in the said EIA report.

3. Please find attached the Minutes of Scoping Meeting for your reference. Should you need further information, please do not hesitate to contact this Office.

Thank you.

"A CLEAN, GREEN AND HEALTHY SARAWAK"
"AN HONOUR TO SERVE"

[RAHMAH BIAK]
for Controller of Environmental Quality
Sarawak

c.c 1. **The Director,**
CHEMSAIN KONSULTANT SDN BHD
172, Rock Road, 93200 Kuching, Sarawak
{Attn.: Ir. Brian S.H Chong)
Fax: 082 - 548 399

2. Head of NREB Sibu

The Documents was faxed on
Date: 10/12/20 Initial: Ae.

MINUTES OF SCOPING MEETING ON THE TERMS OF REFERENCE (TOR) OF THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR "THE PROPOSED BALEH-MAPAI 500 KV TRANSMISSION LINE PROJECT"

Date : 26th November 2020 (Thursday)

Time : 2.30 p.m.

Venue : Video Conferencing

PRESENT:

Natural Resources and Environment Board (NREB) :

1. Mr. Nurharith Afnizan bin Zainorin (Chairperson)
2. Ms. Diana Jonathan
3. Ms. Kartina binti Kasoma (Minutes Recorder)

Project Proponent : Sarawak Energy Berhad

1. Mr. Julaidi Rasidi
2. Ms. Florence

EIA Consultant: Chemsain Konsultant Sdn Bhd

1. Mr. Brian Chong
2. Ms. Tan Shwu Mei

Item No.	Subject Matter	Action By
1.0	**Chairperson Address** The Chairperson welcomed the representative of the Project Proponent and his Consultant to the scoping meeting on the Terms of Reference (TOR) of the Environmental and Social Impact Assessment (ESIA) for **"THE PROPOSED BALEH-MAPAI 500 KV TRANSMISSION LINE PROJECT".** He informed that the purpose of the meeting was to determine the scope and coverage of the ESIA. Subsequently, the Chairperson invited the Environmental Consultant to brief the meeting on the TOR.	For Information
2.0	**Presentation** Ms. Tan Shwu Mei of Chemsain Konsultant Sdn Bhd briefed the meeting on the background of the proposed project. She further described on the existing environment of the project area. The key environmental impacts associated with the proposed project were also highlighted during the meeting. The 1285 MW Baleh Hydroelectric Project (HEP) is located on Batang Baleh approximately 105 km upstream of Kapit Town at pala Bayong and about 3 km upstream of its confluence with the Sungai Putai. The proposed 177 km TL starts from Baleh 500 KV Substation at Baleh HEP to Mapai 500 kV substation. The TL will be constructed along the northern banks of Btg. Baleh and Btg Rajang, traversing mostly hilly to mountainous terrains. Implementation of the project is anticipated to take approximately 36 months from securing the right of ways, design and engineering works, and construction team to handover by October 2024. The completion of the Baleh-Mapai transmission line by October 2024 forms parts of SEB's contractual obligation to Baleh Mechanical and Electrical Package (BLP6) to enable achievement of their contractual milestone as follows: - 1. Start of testing and commissioning works of transmission line protection and communication systems by October 2024; 2. Baleh HEP's First Generator Unit Wet testing (Rotation, performance and reliability run) by July 2025; 3. First Power evacuation from Saleh HEP by October 2025.	For Information

Item No.	Subject Matter	Action By
3.0	**Discussion** Besides the scope as presented in the TOR, the following matters were discussed and shall be incorporated during the preparation of the ESIA Report:- a) Detail of project components and concept; b) Project implementation schedule (Gantt Chart) and the breakdown schedule; c) To include date of commencement of project, date of completion of project; Management of earthwork, cut and fill activities and potential soil loss (eg. volume required and excess soil); d) Management of biomass waste generated (including volume and method of disposal); To demarcate the location of the stockpile, site office, workshop and workers' camp (if any) in the map and to prepare environmental management of the site; e) To identify any affected sensitive receptor(s)by the project development such as religious building, cemetery, etc. (if any) within 3 km radius of the project; f) To indicate the water intake point and water catchment area (if any) within 8 km radius from project site; g) To tabulate the air, noise (A/N) and water sampling (WS) points with the justification, weather condition, GPS coordinates for latitude and longitude, time and date; h) To address requirement of SOP on work at construction site by the KKM and other relevant authorities; i) To provide land use map (3km radius) with coordinate and legend in A3 size; j) To include socio-economic aspects; k) To incorporate the relevant drawing design, maps and diagram with clear, proper scale and legend; l) To obtain necessary approval from the relevant agencies with regard to the project and to attach all the related documents in the report; and m) To report any other pertinent environmental issues found during the EIA study. The Consultant was reminded to submit the ESIA during the 2nd week of February 2021 as per the proposed study schedule of 24 weeks.	EIA Consultant/ Project Proponent
4.0	**Decision** The meeting decided that the TOR is acceptable and the consultant may proceed with the preparation of the EIA and all issues in item 3.0 shall be incorporated in the ESIA.	EIA Consultant / Project Proponent

<table>
<tr><th>Item No.</th><th>Subject Matter</th><th>Action By</th></tr>
<tr><td>5.0</td><td><u>Submission of EIA</u>

The Consultant is required:
i. To submit a soft copy of the ESIA in CD, together with twenty-two (22) copies to the NREB,
ii. General specification of GIS:
• All data submitted shall be readable by the ESRI ArcGIS;
• Preferred to be submitted in digital copy; and
• Hardcopy map must be printed in A3 size and show coordinates.
iii. Technical specification of GIS:

<table><tr><td>1) Projection</td><td>Borneo Rectified Skew Orthomorphic (BRSO)</td></tr><tr><td>2) Datum</td><td>Timbalai 1948</td></tr><tr><td>3) Parameter</td><td></td></tr><tr><td>False Easting</td><td>2,000,000</td></tr><tr><td>False Northing</td><td>5,000,000</td></tr><tr><td>4) Unit</td><td>Meter</td></tr><tr><td>5) Map scale</td><td>1:25,000</td></tr><tr><td>6) Format (Vector)</td><td></td></tr><tr><td>ESRI Arc</td><td>.shp (shapefile)</td></tr><tr><td>7) Format (Raster)</td><td></td></tr><tr><td>Image</td><td>.jpeg, .tiff</td></tr><tr><td>Resolution</td><td>300 dpi desired, (200 dpi minimum)</td></tr></table>
iv. To pay the processing fees of RM2000.00 upon submission of the ESIA Report.</td><td>EIA Consultant / Project Proponent</td></tr>
<tr><td>5.0</td><td><u>Adjournment</u>

There being no other business, the meeting was adjourned at 3.30 p.m. with a vote of thanks from the Chairperson.</td><td>-</td></tr>
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[**NURHARITH AFNIZAN BIN ZAINORIN**]
Chairperson

Date : 8 DECEMBER 2020