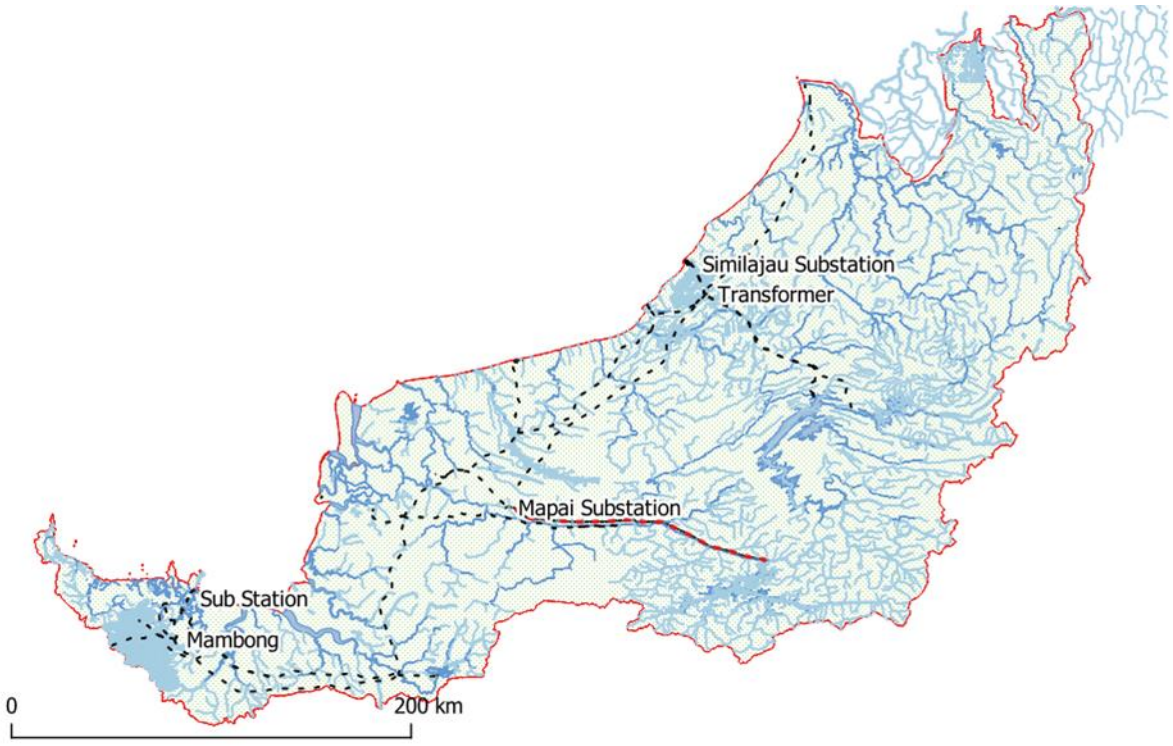
Sarawak Energy Berhad

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 177 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 lead 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. **177 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 conductor	4
Conductor size, mm2	402
Earth conductor	OPGW
Line length, km	177
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 177 km in length and 50 m wide, thereby giving a total area of about 8,850,000 m^2 (885 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	**177**	**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 177 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: – 177 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 36 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 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

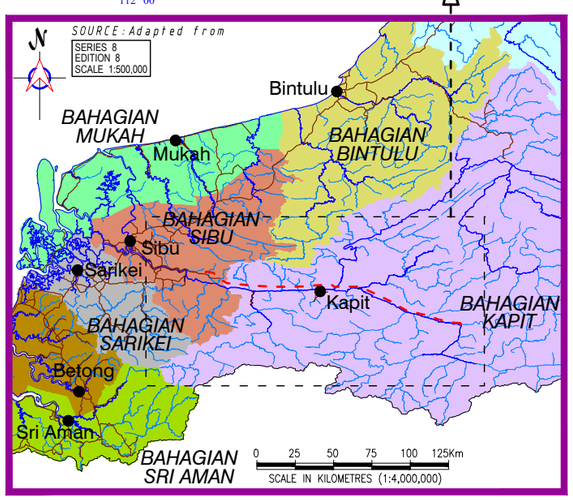
BAHAGIAN KAPIT

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. Sebatu, Sg. Setapang, Sg. Senentang, Sg. Gaat, Sg. Anan, Sg. Balang, Sg. Taang, Sg. Seginying, Sg. Putai, Sg. Kanowit, Sg. Mujok, Sg. Igan, Hulu Sg. Ngemah, Sg. Mujon, Sg. Selepong, Sg. Bekatan, Sungai Katibas, Sg. Meluan, Sg. Rerang, Sg. Bangkit, Sg. Bela Ujan, Hulu Sg. Balang, Sg. Pelak, Sg. Pulang, Sg. Sekajang, Sg. Enturnau, Sg. Nyungan, Sg. Beloh, Sg. Pacan, Sg. Santu, Sg. Ayat, Sg. Randi, Sg. Rirang, Sg. Bangkit, Sg. Itik, Sg. Gaat, Sg. Ramong, Sg. Piat, Sg. Selalang, Sg. Sebiju, Sg. Sepulau, Sg. Sekawi, Sg. Sebatu, Sg. Mengiong, Sg. Tekalit, Sg. Tangkuan, Sg. Sekawa, Sg. Nyawang, Hulu Sg. Katibas, Sg. Engakramon, Sg. Telanyai, Sg. Latang, Sg. Entuloh, Sg. Serau, Sg. Gaci, Sudok Sg. Entulu, Sg. Segentu, 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

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

PROJECT LOCATION AND TRANSMISSION LINE ROUTE

FIGURE: 1

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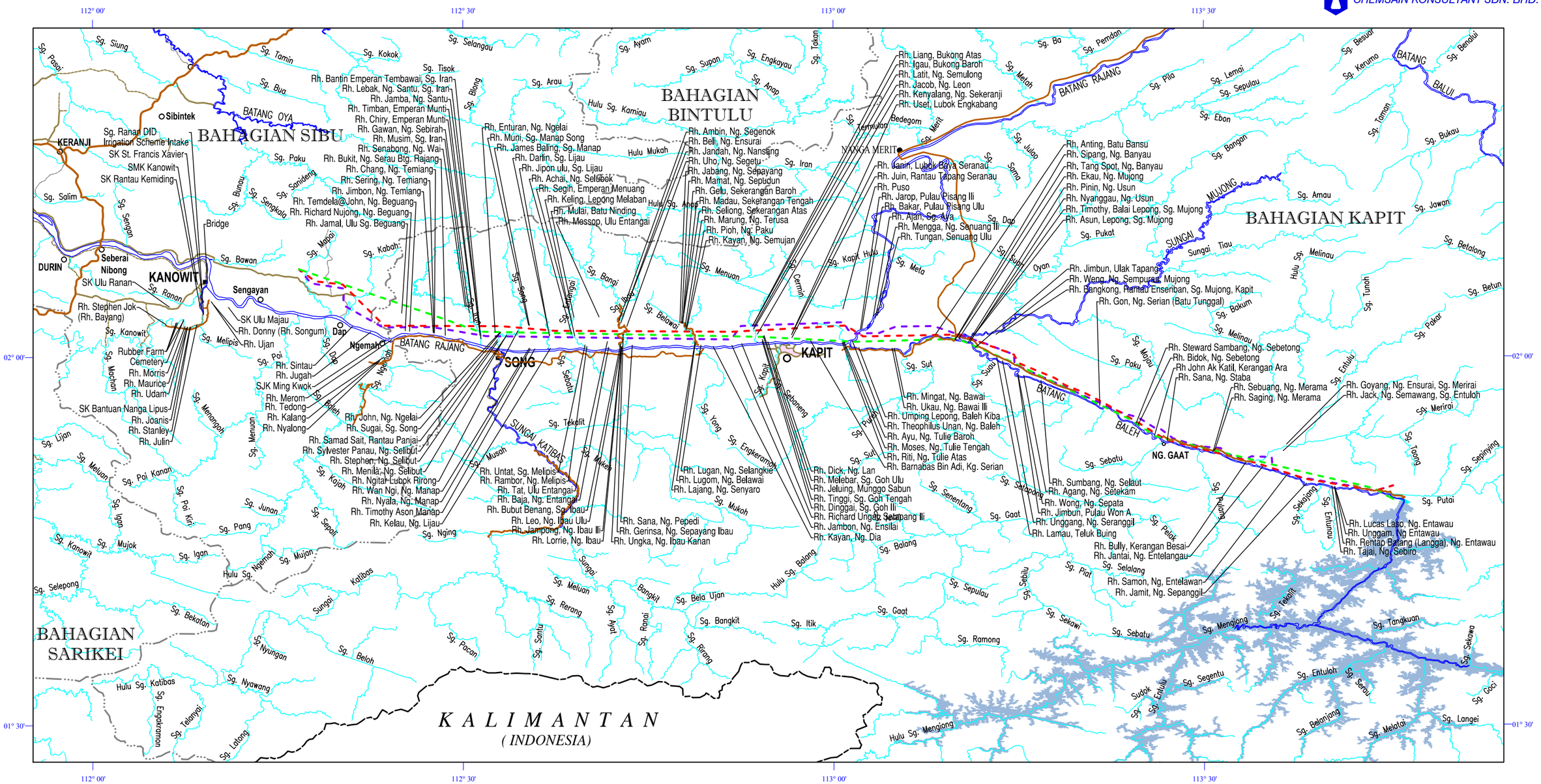


LEGEND:

- 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

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

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
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

No.	Personnel [Qualification] NREB Reg. Number [Validity]	Study Components
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].

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

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 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; Government agencies including LSD, DOA, Resident Office, BOMBA, DID, Polis Diraja Malaysia (PDRM), Forest Department Sarawak (FDS), Jabatan Bekalan Air Luar Bandar (JBALB), Jabatan Kerja Raya (JKR), Land Custody and Development Authority (LCDA), NREB, Sarawak Rivers Board (SRB), Sibu Water Board (SWB); and Plantation & 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

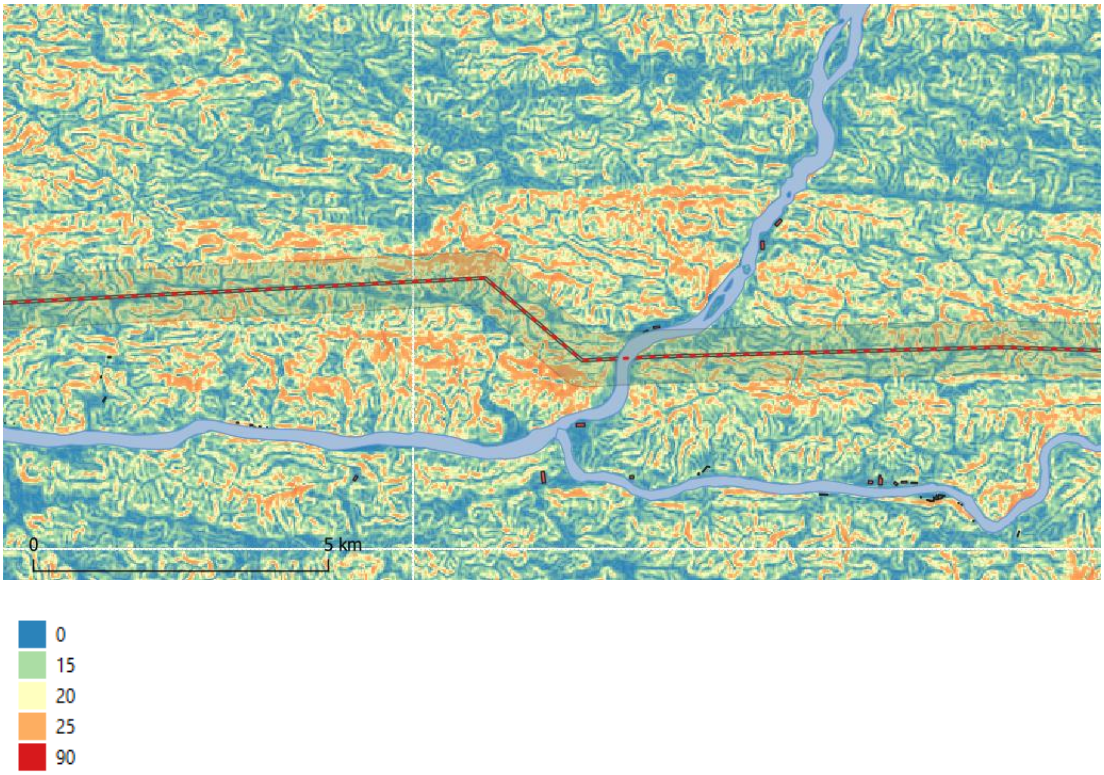
10. PRELIMINARY EXISTING ENVIRONMENT

Preliminary desktop review indicates the following:

10.1 PHYSICAL ENVIRONMENT

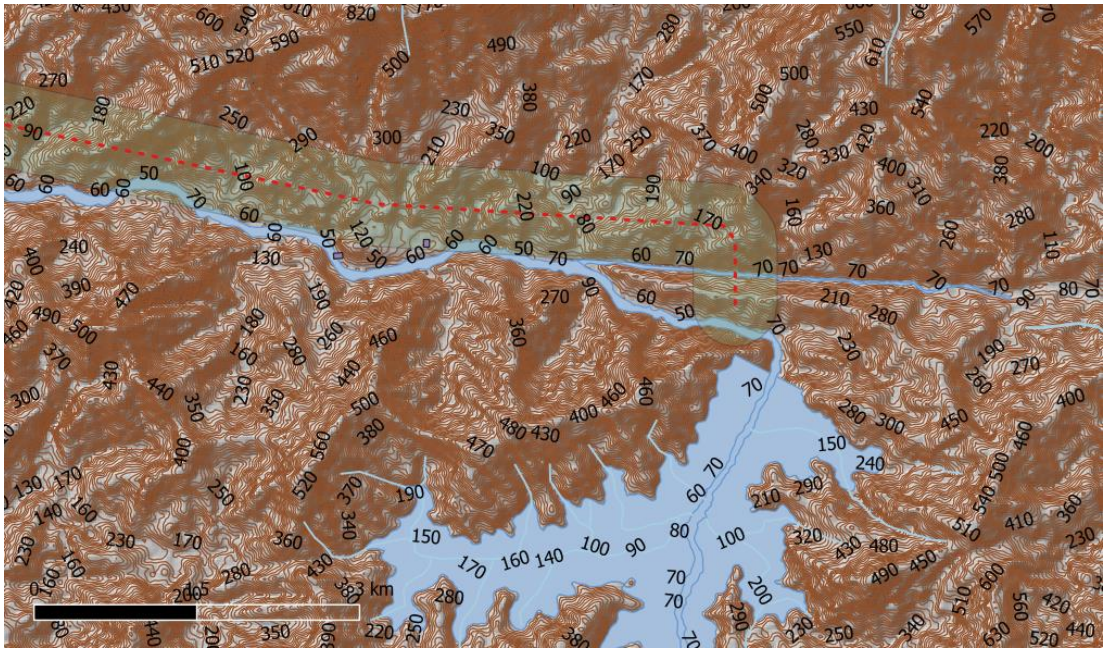
10.1.1 Topography, Geology and Soil

The terrains along the proposed TL route is 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)



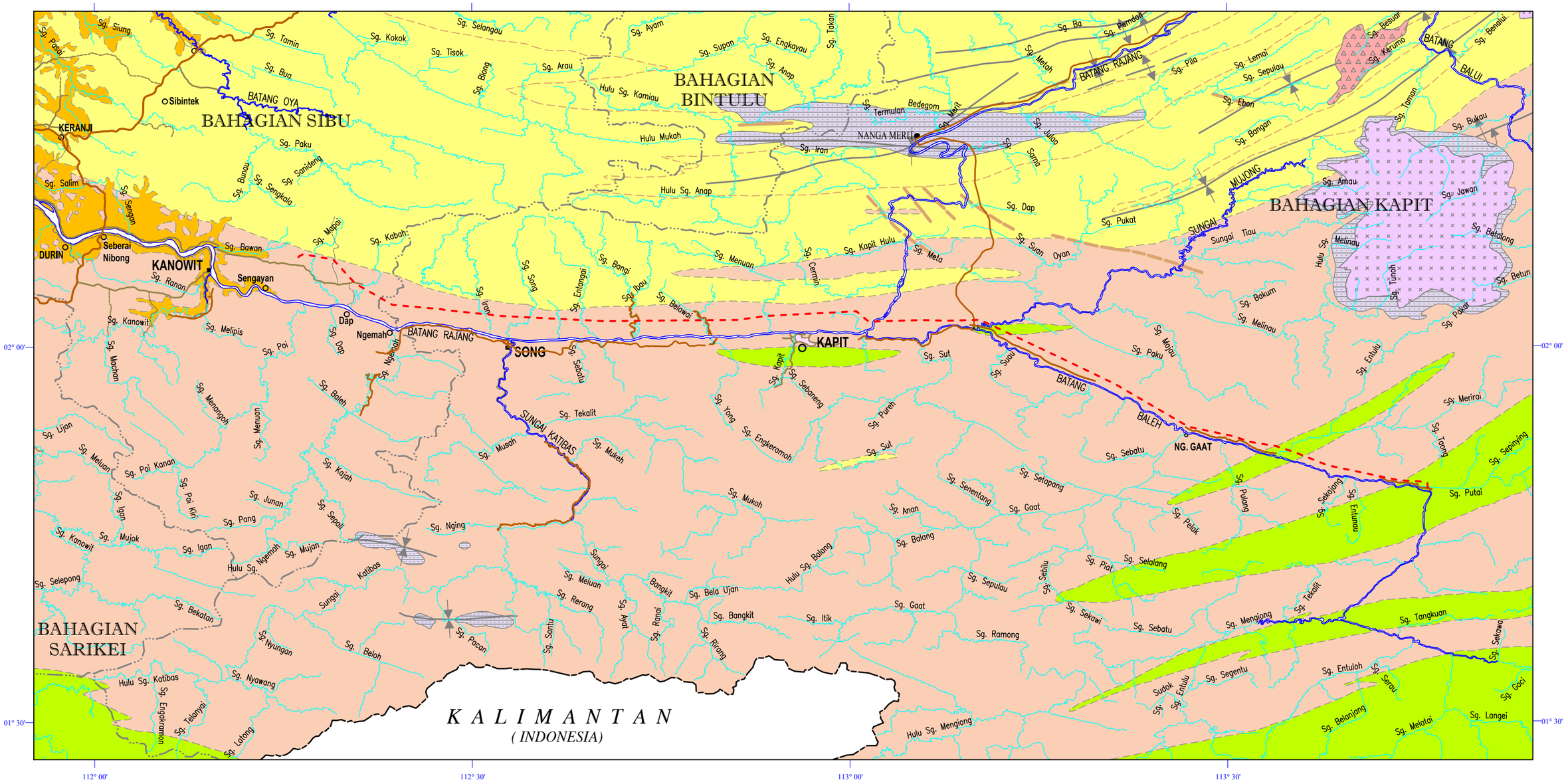
Note: Area shown from Baleh HEP extending to about 12 km downstream
Source: USGS/SRTM

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 is 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

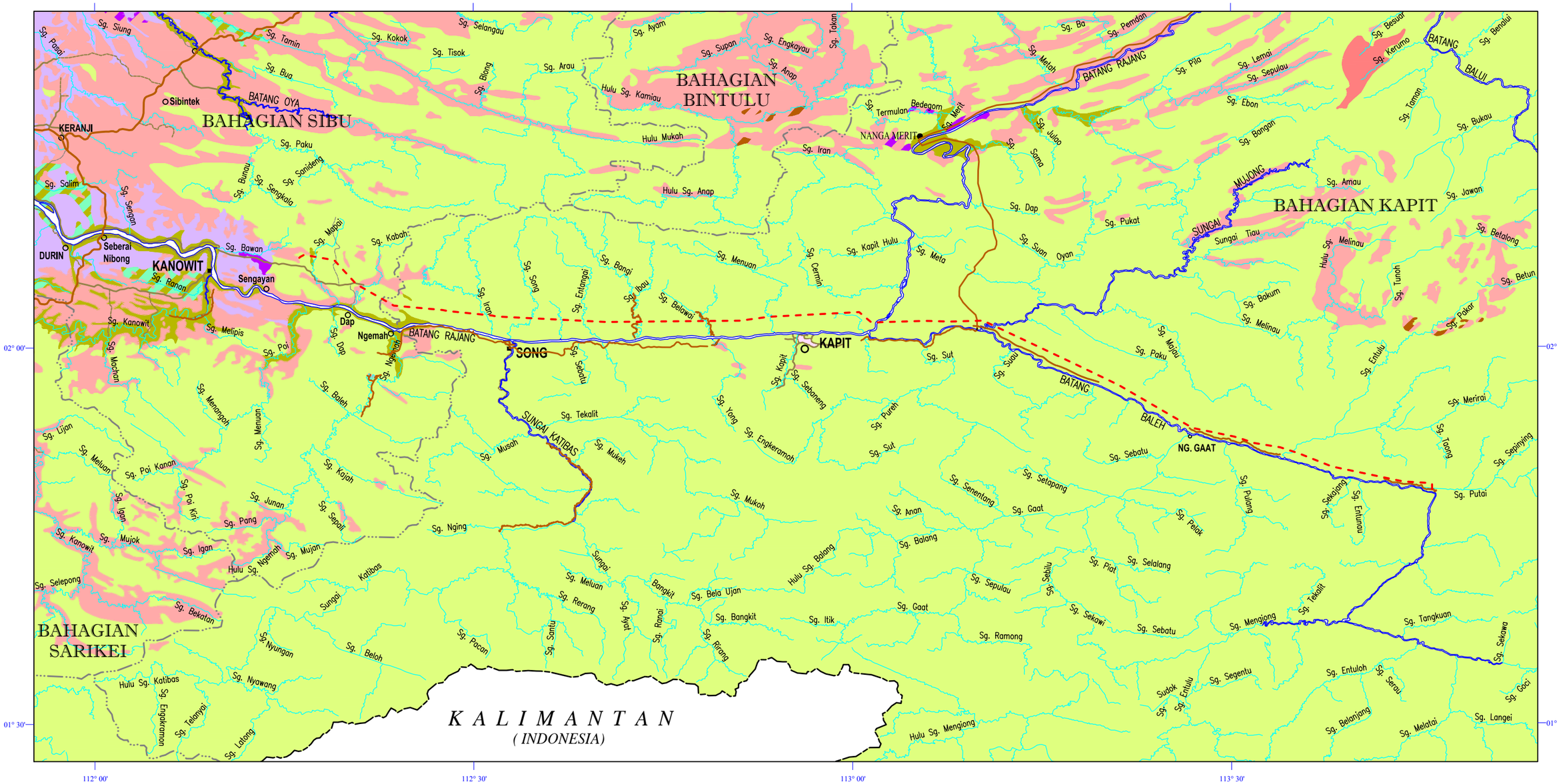
SOURCE : Adapted from

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

GEOLOGY

FIGURE: 5

D:\ACAD\DRAWINGS\EV103\792\TOR\FIG–5.DWG



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.

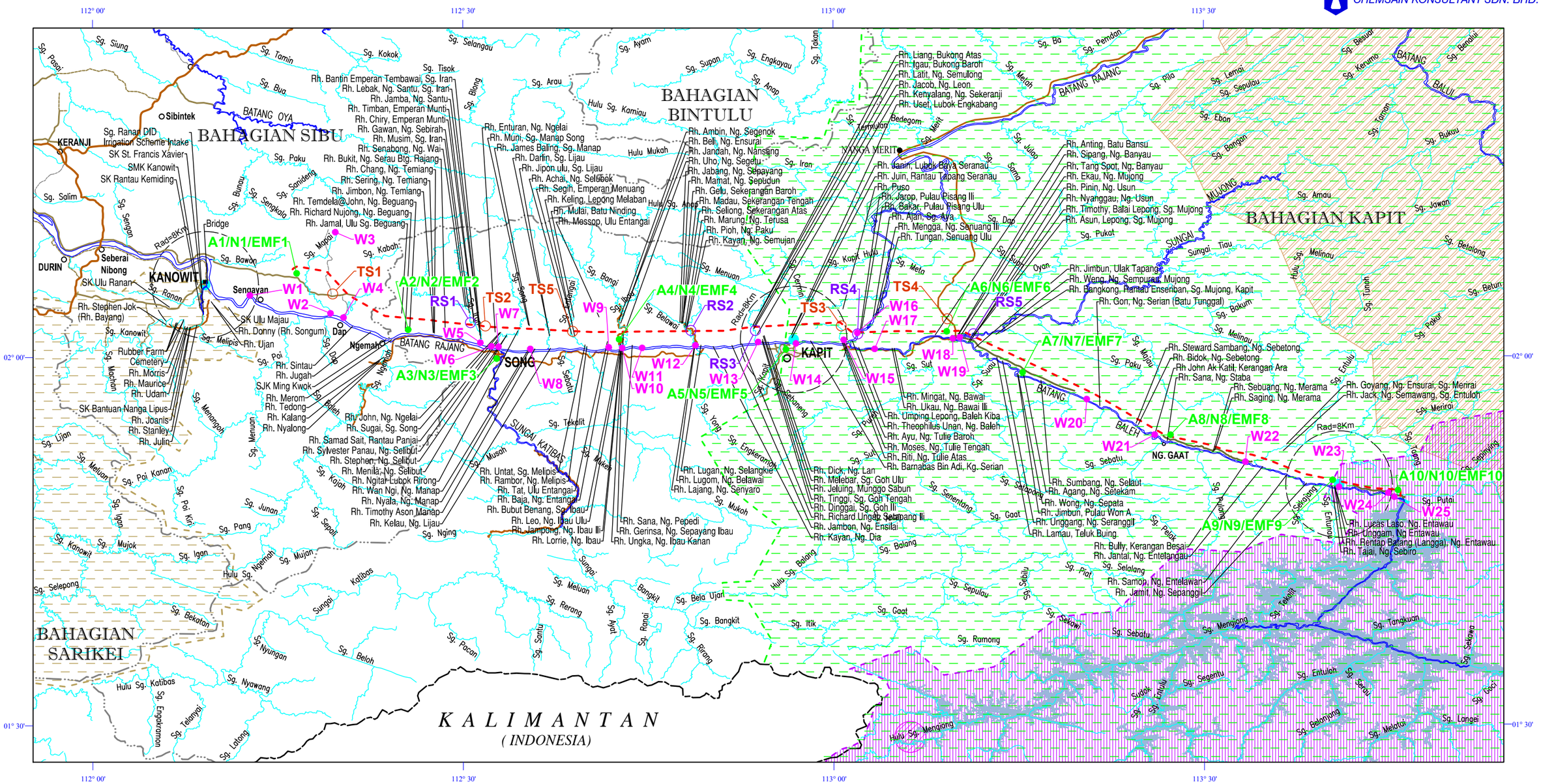
Btg. Baleh is one of several main tributaries of Btg. Rajang. Btg. Baleh catchment spans an area of 12,433 km^2 equivalent to 24.2% of the entire Btg. Rajang Basin. Downstream of the Baleh HEP, Btg. Baleh flows westward for 97 km before joining with Btg. Rajang. The major tributaries on both rivers' 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)
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

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**.

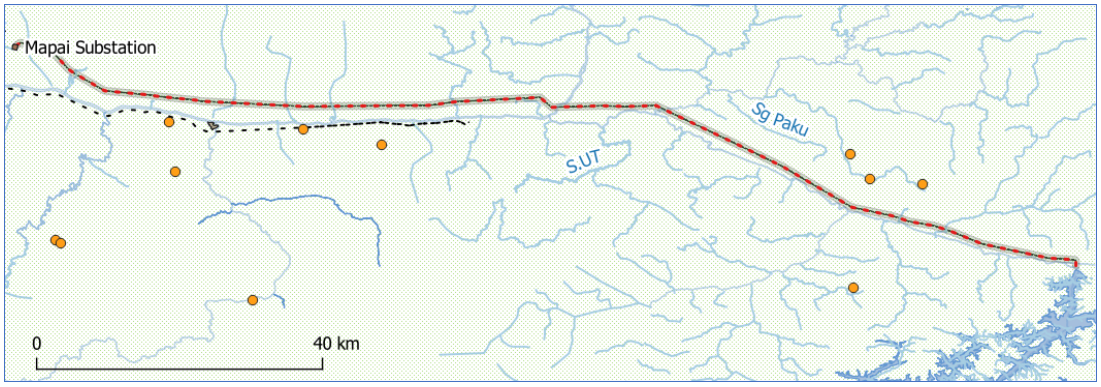
The area along the lower Btg. Baleh and Btg. Rajang is largely composed of young and old secondary forest. Shifting cultivation in this area has been practiced for many years and is still active. Most of the areas along the riverbanks are easily accessible by the local communities and the lands are fertile. 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.

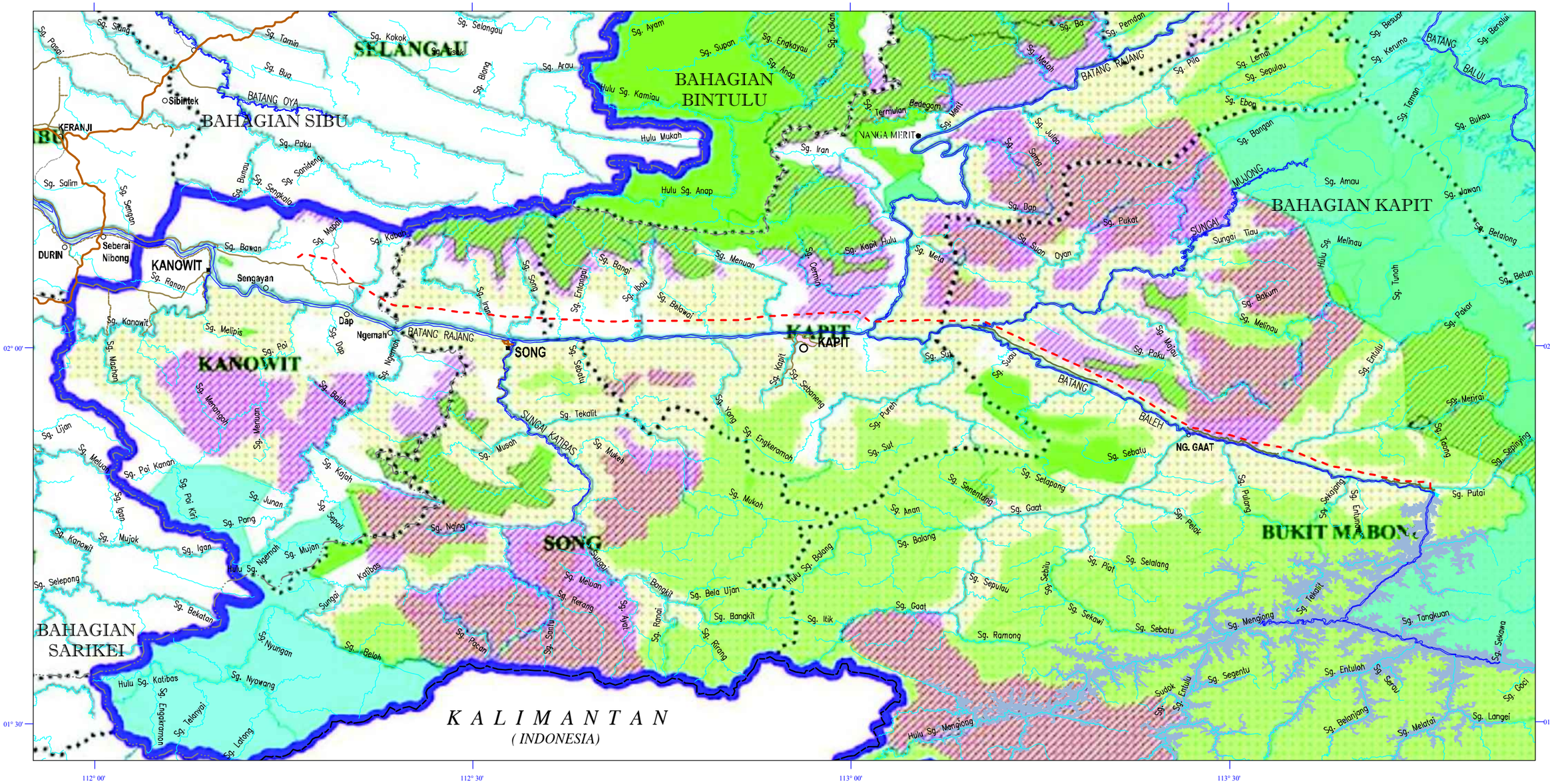


Source: Department of Agriculture (DOA) Kuching (Oct 2017)

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)
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

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

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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

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 principle 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
- 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.:
- 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.

[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.

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 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 (point 1). Accessed by local people and access road towards the proposed TL.
2.	TS2	02° 02' 30.70"N 112° 32' 0.44"E	Traffic survey on existing logging road (point 2). Intersection of existing road used by local people and access to the proposed line route alignment.
3.	TS3	02° 02' 28.96"N 113° 0' 49.65"E	Traffic survey on existing logging road (point 3). Intersection of existing road used by local people and access to the proposed line route alignment.
4.	TS4	02° 03' 03.27"N 113° 09' 25.06"E	Traffic survey on existing logging road (point 4). Intersection of existing road used by local people and access to the proposed line route alignment.
5.	TS5	02° 02' 03.84"N 112° 39' 04.46"E	Traffic survey on existing road (point 5). 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' 46.79" N 112° 30' 48.19" E	Riverine survey at Sg. Iran, river crossing by TL line route. Accessed by settlements located upstream and local people.
7.	RS2	02° 02' 07.86" N 112° 48' 38.86" E	Riverine survey at Sg. Belawai, river crossing by TL line route. Accessed by settlements located upstream and local people.
8.	RS3	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.
9.	RS4	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.
10.	RS5	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.

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 177 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.

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, 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 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