EXECUTIVE SUMMARY

A. MANAGEMENT HISTORY

In September 1997, Bornion Timber Sdn Bhd (BTSB) and the State Government of Sabah signed the Sustainable Forest Management License Agreement 03/97 (SFMLA 03/97). The licenced area initially comprised an area of approximately 108,993 ha, consisting of the Ulu Sg. Milian Forest Reserve (BLOCK A – 77,733 ha) and part of the Sapulut Forest Reserve (BLOCK B – 31,260 ha). Within the administrative subdivision of the Sabah's forests, the area is also referred to as Forest Management Unit No. 11.

During the period of the First 10–Year Forest Management Plan (2002 – 2011) the whole Licenced Area had been managed by BTSB.

In the 2^{nd} Forest Management Plan (2012 – 2021), however, the Licenced Area has been reduced to a total gross area of approximately 98,985 ha, due to the excision of 10,008 ha within BLOCK A by the State Government for the purpose of development by a different management entity.

B. SCOPE OF FOREST MANAGEMENT PLAN

FMU No. 11 has been split into two separate Sub-Management Units, for the purpose of forest management certification assessment and management as separate entities under Natural Forest and Forest Plantation regime respectively. The Natural Forest Management Unit comprises a gross area of 41,878.7 ha or about 41% of the Licenced (FMU) Area, whereas the Forest Plantation Management Unit covers a gross area of 57,105.9 ha or about 59% of the FMU area.

Management Type / Function	Gross Area (ha)	Sub-Unit (%)	FMU area (%)
Natural Forest Sub- Management Unit			
Production	29,574.2	70.62	
Conservation	12,304.5	29.38	
Total Sub-Unit:	41,878.7	100.00	40.99
Forest Plantation Sub-Management			
Production	53,255.65	93.26	
Conservation	1,973.65	3.46	
Community Forestry	1,876.60	3.29	
Total Sub-Unit:	57,105.9	100.00	59.01
Total FMU area (ha):	98,984.6		100.00

A summary of the subdivision of the FMU is given in the Table below.

Due to the design of the FMU boundaries both natural and plantation forest areas are further subdivided into

- PART A in the Northern part of the Licenced Area, within Milian Forest Reserve, and
- PART B in the Southern part of the Licenced Area, within parts of Sapulut Forest Reserve

This FMP only covers the Natural Forest Management area, whereas the Forest Plantation Management Unit is regulated by a separate plan.

C. COMPANY MISSION, POLICIES AND OBJECTIVES

Mission

Bornion Timber Sdn. Bhd. will ensure that the integrity, health, viability, and productivity of its natural forest within the licenced area are maintained and enhanced without jeopardizing the biological and social environment.

Management Policies and Objectives

As a Licensee and Manager of forest resources BTSB holds the obligation to manage the Licenced Area in accordance with the terms and conditions as stipulated in the SFMLA 03/97 to provide optimal benefits and financial returns for the Company, as well as for the State Government. At the same time, BTSB also has a responsibility for other stakeholders, e.g., to address the socioeconomic values and needs of local communities, and to ensure the sustainability of the forest resources. BTSB's policy is to strike a balance between economic, environmental and social values of the forest area to ensure its overall integrity and long-term viability.

- BTSB strives to <u>maintain permanent forest resources</u> that deliver the full range of benefits, that is, sustained yield of high quality timber and other wood products that forests can provide, for reasonable returns to the stakeholders of the Company, now and in future.
- <u>Environmental safeguards</u> shall be integrated into our normal operations so that overall biological diversity is assured throughout the Licenced Area. Therefore, BTSB will apply forest management practices based on the principles of sustainable forest management.
- The <u>local communities</u> are among our key stakeholders. Therefore, BTSB is committed towards the social requirements of managing the Licenced Area, with care, safety, health, compassion and consideration of community needs forming part of the day to day operations.
- BTSB will provide means of <u>human resource development</u> through training and enhancing technical skills for its staff and the young generation. BTSB also opens its door to institutions of higher learning, enabling students and research fellows to participate in practical training or engage in research and development tasks.

BTSB's <u>overall forest management objective</u> is to enhance and ensure the perpetuity of the natural resources of the Licenced Area, which is to be managed on a sustainable basis by seeking a balance between a variety of values, products, and services, in an environmentally appropriate and socially acceptable manner.

The resulting specific management objectives are summarized in the following points:

- Protecting Biodiversity
- Maintaining and Enhancing Economic Viability
- Contribute to Socioeconomic Development
- Provide Recreation Opportunities
- Undertake Research and Development
- Maintain Forest Management Certification

D. CERTIFICATION COMMITMENT

In line with the forest certification policy of the Sabah Forestry Department (SFD) the company is committed to maintain its certified status under the Malaysian Timber Certification Scheme (MTCS) which has been endorsed by the Programme for the Endorsement of Forest Certification (PEFC International, Switzerland), the world's largest forest certification organisation. BTSB has adopted MTCS for both natural forests and plantations which is currently referred to as the Malaysian Criteria and Indicators for Sustainable Forest Management (MC&I SFM) which includes both Natural Forests and Forest Plantations as the applicable certification standards.

E. CURRENT SITUATION

1. Area description

The mean annual rainfall in the area amounts to 2,342.9 mm, with an average mean of 203.6 mm/month and a broad range of variation from 27.9 to 557.8 mm/month.

The atmospheric temperature ranges from 28°C to 35°C with temperatures at night rarely falling below 18°C. The range between the warmest and coolest month is less than 5°C.

The mean monthly relative humidity ranges from 70% to 90%, depending on location and month.

The dominant soil formations are the Crocker and Maliau Associations, which cover about 83.9% of the Licenced Area. Soil types include Orthic Acrisols of Tanjong Lipat and Kapilit families and Chromic Cambisols of the Luasong family. Their texture varies from sandy clay loam to clay loam and they have a very low reserve of plant nutrients.

The topography ranges from gentle to considerably rugged terrain that is categorized into two classes of slope: 0° to 25° and greater than 25°. Substantial portions of the southwestern parts of Ulu Sg. Milian FR (BLOCK A) and the western parts of Sapulut FR (BLOCK B) are hilly, with elevations of more than 1,000 m above sea level. The slope classification indicates that approximately 60 % of the total area are undulating hills having slopes ranging from 0° to 25°.

The Licenced Area (BLOCK A) forms part of the watershed of the Milian River, which is the tributary of the Kinabatangan River, draining to the east coast. Most of the tributaries of Milian River have their headwaters in the Licenced Area, which flow down from the western portion of the FMU. Sg. Pingas and Sg. Labau flow from Trus Madi FR through Ulu Sg. Milian FR and join Sg. Pinangah and Sg. Melikop. All these rivers drain into the Milian River to form part of the upper Kinabatangan River drainage system.

Prior to year 1997 the Licenced Area was classified into six different forest types, however, three of these forest types are of minor occurrence. These include Limestone Forest, Kerangas or Heath Forest, and Lowland Dipterocarp mixed with Heath Forest.

The three dominant forest types are Upland Mixed Dipterocarp Forests (UMDF); Upland Mixed Dipterocarp Forest mixed with Kerangas Forest (UMDF & KF) and Lowland Mixed Dipterocarp Forest (LMDF).

2. <u>Wildlife surveys</u>

Three expert surveys on wildlife populations in the Licenced Area had been carried out in years 1998, 2011, and 2014. Since year 2015, BTSB has established its own Wildlife Unit to monitor wildlife populations in the FMU.

According to the survey of year 2014 twenty-six species of mammals were recorded which are all protected species under the Wildlife Conservation Enactment 1997. The presence of some umbrella species is encouraging which provide an indication of the area being able to support such wildlife populations. Presence of endangered species confirmed that the areas designated as Conservation Areas have significant biodiversity values.

Presence of the Asian elephant (Elephas maximus) was recorded based on foot prints and dung piles seen in the Sapulut Forest Reserve and was also recorded during the survey conducted by Sabah Wildlife Department in April 1998. The occurrence other endangered species such as the Malayan Sun Bear (Helarctos malayanus) was confirmed through camera trapping.

Six species of primates were noted to be present in the area during the survey including the Orang-utan (Pongo pygmaeus), Bornean gibbon (Hylobates muelleri), Pig-tailed Macaque (Macaca nemenstrina), Long-tailed Macaque (Macaca fascicularis), Red Leaf Monkey or Maroon Langur (Presbytis rubicunda) and Hose's Langur (Presbytis hosei) were recorded during the survey.

Evidence on the presence of the highly endangered orang-utan within the surveyed area during this survey conforms with earlier findings by Ancrenaz. M et al. (2004) that the area is generally low in term of Orang-utan density in Sabah.

Vocalizations of Bornean gibbon could be heard in all the surveyed areas indicating that the species is still common within the Licenced Area.

Images of the Pig-tailed Macaque (Macaca nemenstrina) were captured on camera traps, indicating their common presence in the Licenced Area. The Long-tailed Macaque is believed to be common in the Licenced Area.

The presence of ungulates was recorded through their footprints and also through their captured images on camera traps. They are recorded throughout all the surveyed areas and appeared to be still common although there are sign of hunting activities targeting any of these species. The species include Sambar Deer (Cervus unicolor), Bornean Yellow Muntjac (Muntiacus atherodes), Common Barking Deer (Muntiacus muntjac), Lesser Mouse-deer (Tragulus javanicus), Greater Mouse-deer (Tragulus napu) and Bearded Pig (Sus barbatus).

Other species recorded during the survey and also by the Patrol and Enforcement Unit include the Yellow-throated Marten (Martes flagivula), Common Porcupine (Hystrix brachyura), Thick-spined Porcupine (Thecurus crassipinis), Malay Civet (Viverra tangalunga), Pangolin (Manis javanicus), Leopard Cat (Felis bengalensis) and Giant Squirrel (Ratufa affinis).

One important finding in the Licenced Area is the presence of Tufted Ground Squirrel (Rheithrosciurus macrotis), a bornean endemic, captured on camera trap set up by Patrol and Enforcement Unit of BTSB in compartments 83 and 119.

A total of 141 bird species were recorded in the survey area of which twenty eight species (28) are listed as protected species under the Wildlife Conservation Enactment 1997. With the exception of species such as the hornbills and Great Argus (Argusianus argus), most of species are typical of disturbed habitats.

All eight species of hornbills recorded during the survey were the Oriental pied hornbill (Anthracaceros coronatus), white crowned hornbill (aceros comatus), wrinkled hornbill (aceros corrugatus), helmeted hornbill (Rhinoplax vigil), Rhinoceros hornbill (Buceros rhinoceros), Wreathed hornbill (Rhyticeros undulatus), Bushy-crested hornbill (Anorrhinus galeritus), and Black hornbill (Anthracoceros malayanus). The Helmeted hornbill (Rhinoplax vigil) and the Rhinoceros hornbill (Buceros rhinoceros) are classified as Near Threatened on the IUCN Red List.

One notable species is the presence of a pair White-fronted Falconet (Microhierax latifrons), a Bornean endemic species listed as Near Threatened on the IUCN Red List.

Other important species that were recorded during the survey include Storm's Stork (Ciconia stormi) and Oriental Darter (Anhinga melanogaster).

Most of the other recorded species can be found in abundance in the surveyed area and also in other disturbed forest habitats almost throughout Sabah.

Twenty four reptile species were encountered during the survey. Such secretive wildlife species are difficult to detect, given the limited period undertaken to survey the area in which efforts focused on surveying mammals and birds.

The survey also recorded the presence of 18 species of amphibians in the surveyed areas.

With the exception of long-tailed macaques (Macaca fascicularis) and pig-tailed macaques (Macaca nemestrina) most mammal species occur at very low density.

All bird species recorded during the survey except for larger birds such as the hornbills were found to be fairly common throughout the surveyed areas.

Hunting pressure (poaching) from the surrounding villages and outsiders is another potential threat which has also been the main constraint of protecting the wildlife in the Licensed Area. However, this situation has been mitigated to a certain extent by erecting new forest gates that are used to monitor and control the access into the FMU.

Since the end of year 2015, Bornion Timber Sdn. Bhd. has established its own Wildlife Unit with the objective to develop a long-term wildlife monitoring system.

3. High Conservation Values

Besides their economic value, forests also include environmental and social values, such as watershed and soil protection, habitats for wildlife, as well as areas important to the livelihood of local communities. Where such values are considered to be of outstanding significance or of critical importance these are defined as High Conservation Value Forests (HCVF). The company has undertaken an assessment of High Conservation Values present in the Licenced Area, based on the WWF-Toolkit for Malaysia. The assessment revealed that the following HCV categories are present in the FMU:

HCV 1 (Species diversity), HCV 2 (Landscape-level Ecosystem and Mosaics), HCV 3 (Ecosystem and Habitats), HCV 4 (Ecosystem Services), HCV 5 (Community Needs), and HCV 6 (Cultural Values).

4. Environmental Impact Assessment (EIA)

A Special Environmental Impact Assessment (SEIA) was undertaken for all the activities to be conducted in the Licenced Area. The SEIA study started in June 2002 and following two sessions of public hearing and submissions it was approved on 6th June 2003.

An agreement or "Surat Akujanji" was signed between BTSB and EPD on 9th June, 2003 to adhere to the environmental management standards and mitigation measures recommended in the SEIA report. A supplementary amendment was issued in 2016 to include additional mitigation measures.

Regular EIA monitoring is conducted by an appointed registered EIA consultant who submits the Environmental Compliance Report (ECR) to the Environment Protection Department every four months. Any non-compliance issued has to be addressed and rectified until the next ECR Audit.

Based on the recommendation of the EIA consultant the company has developed environmental management standards and mitigation measures for maintenance of biodiversity and water quality, road safety, earthworks, slope stabilization, drainage systems, operation of machinery and trucks, waste management, forest fire management, and safety & health, of its staff and forest workers.

The company also runs its own Environmental Monitoring Programme to ensure the compliance with rules and regulations of the relevant authorities.

5. <u>Socio-economic situation</u>

A new Social Impact Assessment has been completed in 2022. Based on the assessment, collected data could be grouped into four different social impacts: 1) land, 2) environment, and 3) socioeconomic / sociocultural. For the purpose of further analysis using the RIAM (Rapid Impact Assessment Matrix) analysis method, these three impacts were further refined into eight (8) sub-categories, 1) Land Disputes, 2) Changes in Livelihood, 3) Food Security, 4) Local Culture, 5) Infrastructure development, 6) Water quality, 7) Labour Requirement, 8) Local economy.

There are 29 villages found within 2 km distance from the boundary of the Licenced Area. Only a single village (Kg. Wawasan, Cpt 59 of Ulu Sg Millian FR) is located within FMU 11.

It is estimated that there are about 9,748 people from 1,965 households living in 1,269 houses in the 21 villages and 8 sub-villages located within and adjacent to Licenced Area. The average number of persons per household is 4.96, which is about the average for Sabah (5.0).

The Dusun form the main local communities residing at the vicinity and within Ulu Sg. Milian FR while the Murut communities dominate the population adjacent to Sapulut FR. The dominant religion in both areas is Christian. Generally, the local communities can be grouped into 5 groups based on their location and ethnicity (see Table 3.6). These are Dusun Lobou, Mixed Dusun, Lundayeh and Murut, Mixed Murut and Sungai, and Murut.

In general, all villages and sub-villages are well connected with the main road. However, the road conditions from the highway to their respective villages vary from graveled to earth road.

The houses of the villagers vary in shapes and sizes. The building materials used are either from wood, a combination of wood and concrete or fully concrete depending on the household's financial strength. Wooden houses, however, are common in all villages. Water supply is not a major problem since almost all villages have installed piped-gravity water, except for Kg. Wawasan which depends on rainwater and river water.

Electricity supplied by SESB has reached 93% of the 29 villages. The rest have to rely either on generator sets or kerosene pump-lamps.

Many public utilities have been established or provided by the government, particularly in the older villages. These utilities include 18 community halls and 17 football fields, a rest-house (in Kg. Masaum only) and Public Telephone Booths. In addition, mobile telecommunication companies have erected their towers in strategic places.

Regarding health care facilities only Kg. Pandiwan has a Village Clinic (Klinik Desa). It also services other nearby villages. The rest of the communities would have to travel to the Health Centres located in Sook, Tulid, Nabawan and Sapulut. All serious and emergency cases will be referred to the District General Hospital in Keningau and Telupid or Duchess of Kent Hospital Sandakan (in the case of villagers in Kg. Masaum).

Kindergartens and or primary schools are available in some established villages with higher population density. Churches or chapels are available in 21 villages, while mosques are available in 7 villages.

Subsistence farming still remains the main economic activity of all the communities within and adjacent to the Licenced Area. Based on the SBS survey, the percentage of respondents who are farmers ranges between 60% and 80%.

The household monthly cash incomes earned by the families of the respondents varies widely among the community and by area, locality, and village. About 80% of the households earn less than RM 700 per month. The percentage of households earning higher income ranges between 10% and 20% by area and village.

Agriculture is the primary means of life in all villages surveyed. The main source of income is from rubber for those who have developed small land lots inside the Licenced Area, and from small-scale oil palm plantations around the FMU. The income derived from these crops contributes 85% of the total household cash income. This is followed by remittances from family members working outside the community (10%). Operating small sundry shops, private transportation business, or odd jobs contribute small household cash income (5%).

A number of training programs are run by various agencies to enhance the capacity and capability of local communities. Some of the villages surveyed participate in improving the technical skills of the people, particularly school leavers. The institutions and agencies implementing formal training courses and programmes include the Department of Agriculture, Fishery Department and Lembaga Industri Getah Sabah. Besides this, the Department of Agriculture runs intensive and extensive programmes involving rural communities, called Rural Extension Services.

About 20% of the respondents own titled land, whilst 80% stated that they do not own any land or they are in the process of application for Native Titles. About 75% of the respondents claimed to have NCR, also inside the Licenced Area. These communities claim that they have been cultivating the lands before the Ulu Sg. Milian FR was gazetted as a Commercial FR.

The local communities living within and adjacent to the Licenced Area use their land(s) or farmland plots exclusively for agriculture farming. The most common cash crops planted are rubber and oil palm, while padi is planted mainly for subsistence. Other crops that have been planted include various fruit tree species. Based on field observations, there is no land that remains idle.

The population is fast growing and as a consequence, new generations would have to cope with smaller pieces of inherited land or none at all. Furthermore, most of their so called 'land' now belongs to other people, or to commercial oil palm companies. So, many have to search for new land and opened up sub-villages. Others claim land inside the Licenced Area especially in BLOCK A as their NCR land, which subsequently caused conflicts and frictions between the concerned communities, BTSB, and the Sabah Forestry Department.

The villagers recognize the importance of watershed conservation as a source of clean water supply. The only watershed areas available are located within the Licenced Area. As a consequence, the communities are opposed to logging activities carried out by BTSB within identified watershed areas.

Despite the fact that an increasing number of people of the villagers adjacent to the FMU are now earning wages a substantial portion continues to be dependent on land for subsistence farming. Important functions of the FMU for local people include fishing (15% of the households), harvesting of rattan (60%), hunting (95%), harvesting of medicinal plants (10%), the use of water for consumption (100%), and collection of firewood (15%).

In some of the surveyed villages the communities claimed that the "surrounding lands", including those cultivated inside the Licenced Area, are "customarily" considered as the "common property" of the communities. They insisted that they should be allowed to continue their practices in the cultivated area. However, the SFD does not recognize their claims as NCR claims within Forest Reserves are not recognized under the Sabah Forest Enactment 1968.

Though the communities living adjacent to BLOCK A have initially expressed their dissatisfaction with BTSB and the SFD because they are not permitted to continue their activities within the Licenced Area, about 85% of the households expressed their support to the SFM project, provided they are allowed to continue their practices in the Licenced Area, that their "land rights" are recognized, and they are given priority for employment.

Therefore, the challenge for BTSB is to involve the communities into forestry activities, and also to create business opportunities for the growing population. This would restrain them from further encroaching into the Licenced Area for farming activities. Consequently, it is important for BTSB not only to designate areas for the community to continue farming activities, but also to improve the productivity on these cultivated areas, so that less area is required.

At the same time, BTSB must continue to create employment for the inhabitants of local communities to help raising the level of technical skills and household income. There is also a need to educate and provide training for the villagers, enabling them to participate in forest management activities.

6. Forest Resource Assessment

During the 2nd FMP for Natural Forests resource assessments were undertaken, including satellite image interpretation of a SPOT5 image (2.5 and 5 m resolution captured on 06/07/2007 and 20/09/2009 respectively), and a comprehensive forest inventory on the ground.

An analysis of the timber stocks according to forest types and strata was carried out.

In order to develop a statistically sound assessment of the timber resources in areas under Natural Forest Management (NFM) a systematic Forest Resource Assessment (FRA) has been completed that adequately covers the whole estimated net production area. The Sampling Unit design consists of a strip line of 240 m length and 20 width. A strip line is

subdivided into 12 sub-sampling units (SSU) each for recording trees according to three different diameter classes in a nested design. A total of about 130 Sampling Units have been systematically spread over the production area to determine the stocking conditions. All data collected have been analyzed using tailored software for data entry and analysis.

Parameter	Mean value
Total number of trees [N/ha]	883.35
Number of trees alive [N/ha]	874.47
Number of PCTs [N/ha]	169.17
Avg. DBH [cm]	12.49
Avg. CBH [m]	5.11
Avg. Total Height [m]	8.16
BA total alive [m ² /ha]	18.66
VOL total [m ³ /ha]	131.54
VOL Dipt [m ³ /ha]	54.86
VOL comm. Non-Dipt [m ³ /ha]	62.07
VOL non-comm. [m ³ /ha]	14.61

The key results are shown in the following table:

F. FUTURE FOREST MANAGEMENT

1. Infrastructure development

The NFM gross area of 41,878.7 ha has been subdivided into 89 compartments, based on a delineation that follows mainly natural features like ridges, rivers and streams, permanent roads, etc. Compartment sizes range from 228 to 835 ha, averaging 460 ha. Specific forest functions have been allocated to each compartment.

The current road network comprises a total of 238.8 km of main and secondary roads, resulting in a total density of about 5.84 m per ha. During the course of harvest planning the adequacy of the existing and abandoned road network will be reviewed and changed as necessary.

Most of the abandoned road network will be reopened and upgraded according to the planned harvesting progress. During this process a reclassification of roads by road classes will be undertaken.

The company operates a Base Camp for its NFM and ITP operations in Block A, located within Ulu Sg. Milian Forest Reserve. This Northern Base Camp at Mile 46 is located about 18 km to the west of the junction at Kg. Simpang Empat along the Sook – Tulid public road. It comprises a total area of 45.12 ha, including workshop, storage areas, nursery, water ponds, and quarters for company staff and workers. The *Pandiwan* Base Camp in Block B is located 11.5 km to the east of the public road junction, with a total size of approximately 6.5 ha. This camp supports all operations to be carried out in both NFMand ITP compartments within Block B of Sapulut Forest Reserve. The new southern camp known as Mile 63 Base Camp is also located in Block B and is situated 8km from the public road. The camp's main function is to support the ITP operations to be carried out within the area. Refer to Figure 8.2 for location of these Base Camps. The location of in-field stumping areas and temporary log landings will be determined before the commencement of NFM harvesting operations, and

these will be shown in the Comprehensive Harvesting Plan (CHP) maps for each forest compartment.

2. Forest zoning and net production area

Within the NFM area, two main forest functions have been identified at the individual compartment level: conservation and protection functions of various HCV categories, and timber production function. Some HCV categories overlap in a single forest compartment and hence, such compartments can support multiple conservation objectives. For example, riparian reserves provide a buffer against erosion and river sedimentation, and also serve as biodiversity areas and corridors for wildlife movement. Protection of steep areas protect the soil resources and also provide clean water for local communities.

The gross production area amounts to 41,878.7 ha. Compartments totalling 12,304.5 ha (29.38% of the gross area) have been reserved for the purpose of conservation and protection. The remaining net production area is 22,247.2 ha or 53.1% of the gross area.

3. Management of High Conservation Values and Protection Areas

The overall goal of conservation management is to ensure that all sites with identified High Conservation Values and other areas to be protected according to environmental rules and regulations of the responsible government authorities are effectively protected from encroachment and any other unauthorized activities. These areas have been described, mapped and marked.

The management prescriptions for conservation and protection areas serve to

- ensure the integrity of the identified areas
- enable their undisturbed development
- maintain their associated attributes and values
- enhance these areas to deliver the ecological services, where these had been affected by previous disturbance

Management standards for conservation and protection areas based on HCV categories have been developed, including indicators to be used to determine whether the standard has effectively assured the conservation objective

4. Production objectives

The management objective is to ensure that the FMU is responsibly managed in order towards providing an optimum and continuous supply of high quality timbers and other wood or non-wood products. Achievement of this objective requires to enhance the growth of commercial timber species and general health of the forest ecosystem, through active intervention management such as, silvicultural treatment and enrichment planting.

5. <u>Timber harvesting methods</u>

All timber harvesting that will be carried out shall apply Reduced Impact Logging (RIL) methods as prescribed by the Sabah Forestry Department. Tractors will be used for log extraction to the roadside landing as a standard harvesting method. In environmentally more difficult terrain, tractors will be equipped with long-distance ground winching systems and/or logfisher machinery will be employed to ensure minimum skid-trail density and environmental impacts.

6. Growth projection and yield forecast

Yield regulation requires clear specifications on the amount of overall timber volume that may be annually removed from the production area under the sustained yield principle. This volume is also referred to as the Annual Allowable Cut (AAC).

Growth simulation models are important tools assisting with quantification of harvestable volumes at sustainable levels. They also provide mechanisms to achieve a target growing stock within a defined adjustment period. The target growing stock is the stand volume level where the annual commercial growth increment is maximized.

It is emphasized that the growth projection data presented are based upon limited samples that were not evenly distributed throughout the production forest within Block A and Block B and hence, these may not provide a reliable estimate of actual stand conditions.

There is a need to conduct more intensive compartment-based inventories to determine the stocking and undertake improved stand projections at compartment level to achieve more reliable harvesting readiness indications. This can be achieved by conducting strip sampling inventories of stand and stocking parameters which will serve as input into advanced yield prediction software.

7. <u>Annual Allowable Cut</u>

The calculation of the Annual Allowable Cut (AAC) is based on repeated simulation runs. The main target of the simulation is to identify harvesting scenarios which are sustainable on the long run. Therefore, all simulations are carried out over a period of 200 years.

Out of the sustainable harvesting scenarios, those producing the highest harvested volume can then be regarded as an estimate for the annual harvestable volume per hectare within a cutting cycle and hence, the AAC.

All simulations were repeated six times to account for the random effects in the simulation program. The results from the six repetition runs were averaged afterwards.

The simulation results indicate that assuming a cutting cycle of 30 years between 3 and 5.5 trees per hectare could be harvested on a sustainable basis, resulting in an average harvested volume of 34.41 m3/ha. From an assumed net production area of 22,616.5 hectares in FMU No. 11 an average of 753.9 hectares would be harvested per annum, resulting in an Annual Allowable Cut (AAC) of

25,941.7 m³ per annum.

The net production area has been determined according to the NFM gross area minus nonproductive areas, which still requires more refinement and adjustment, i.e. the AAC will also undergo some change once these area changes have been finalized.

The AAC does not yet include deductions for damaged harvested volume caused by tree felling and log extraction, or by log defects that could affect the net sales volume. A suitable factor should be determined by the company to estimate the merchantable log volume.

8. <u>Harvesting schedule and volumes</u>

During the period of this current 3rd Forest Management Plan (2022-2031) harvest operations are scheduled to commence in year 2023. Harvesting operations, however, will be subject to attractive market conditions for the available commercial species. Should these conditions be unfavourable then timber harvesting might still have to be deferred.

Within this current plan period, a total of nineteen Compartments are planned to be harvested, covering an estimated gross area of **8,847.2 ha** with a net harvestable area of **6,783.8 ha**. The AAC entitlement for these ten years is **259,417 m³** with an estimated net volume of **186,733.74 m³**, considering estimated losses caused by tree felling and extraction to the log landing.

9. <u>Silvicultural management approach</u>

Logged-over natural forests need to be actively managed to optimize their growth potential for financially attractive returns. If no management measures are carried out in these forests natural succession may produce stocking results sub-optimum to species composition, timber quality, volume and value that forest managers require to run a profitable business. As a consequence, lack of economic profitability attracts potential investors towards nonforest land uses. As a simple basic principle, all productive forest areas should be stocked with commercial timber species. In cases where no commercial regeneration or advanced growth exists enrichment or gap planting shall be carried out to achieve full stocking. The positive effect of treatment can generally last for a period of up to 10 years and can be maintained through a subsequent treatment operation.

Silvicultural activities must focus on a forest transformation process that results in stocking conditions dominated by commercial timber species with best possible growth rates and value. This means that the portion of well performing commercial trees needs to be increased and shifted in favour of species with higher value. Potential Crop Trees (PCTs) need to be identified that match a set of specific selection criteria which are based on quality parameters and market priority ranking. Identified PCTs require silvicultural activities that enable their growth at maximum level. These measures include liberation treatment by removal of direct competitors where neccessary, as well as by climber cutting and removal of bamboo clusters, wherever these affect the growth of PCTs.

Biodiversity of treated forests will be maintained since silvicultural measures will only be carried out in the direct environment of selected PCTs, whereas other areas will be left untouched.

Detailed procedures of silvicultural management measures are described in Standard Operating Procedures (SOP) on Silvicultural Tending and Forest Rehabilitation respectively.

10. Silvicultural treatment and forest rehabilitation

The total area scheduled to be treated during the this current plan period amounts to a gross area of 11,256.9 ha with a corresponding net area of 8,439.9 ha.

If required, enrichment planting of suitable but poorly stocked areas will be carried out as identified during the silvicultural treatment works. Only indigenous timber species of commercial priority class 1 and 2 will be planted to ensure a high market value.

At the current stage the areas to be planted are expected to be minimal due to the long period passed since the last logging event which has been more than 20 years ago in most logged-over compartments.

11. Worker safety and health

The company has developed its own S&H policy which is fully endorsed by the management. A Safety & Health Committee oversees the implementation of the S&H policy. The necessary type of Personal Protective Equipment (PPE) to be used by the company staff and workers is specified by job categories and risk exposure. The S&H Officer conducts regular S&H training courses and briefings, as well as S&H monitoring in the field to ensure all staff fully understand and comply with the respective company policies.

12. Organization and manpower

Due to the company's focus on rubber plantation establishment in the ITP area of FMU 11 activities in natural forests had been limited to boundary control and monitoring of forest integrity, forest inventory works, and some silvicultural treatment. With the formulation of this Forest Management Plan for natural forests the activities in this FMU Sub-Unit will be revived.

The overall company management of BTSB is effected by a Chief Operations Officer (COO) who is directly supported by a Chief Operations Manager cum Director. He directs an Operations Manager who oversees the day to day operations of all company Divisions. The Operations Manager is assisted by a team of Senior Officers heading the following Divisions of the company:

- Finance and Administration Division, comprising 6 Units
- Production Division, comprising 1 Unit
- Forest and Plantation Management Division, comprising 5 Units
- Survey and Enforcement Division, comprising 2 Units
- Research and Development, Environment, Safety and Health Division, comprising 3 Units

The current operational manpower at the field camps comprises a total of 108 staff. Several of these employees also are given work tasks covering the Plantation Sub-FMU. A total of 162 employees or 91% of the workforce originate either from local communities in the vicinity of the FMU or from other places in Sabah, meaning that BTSB is a major employer in Central Sabah providing job opportunities and giving preference to the employment of local people.

In terms of employment by gender the majority of BTSB's staff is male (76%), which is typical for companies involved in natural resource management. However, the company employs a significant number of female staff (26 employees, 24%) working in the technical as well as in the service and support units at the Mile 46 Base Camp.

The company is aware that a well-trained human resource is to be considered as the most important company asset that enables BTSB to thrive its business and achieve higher levels of performance and efficiency. This is why investment into developing human resource capital must be made a priority: a modular training programme has been developed with a focus on high priority topics. Additional training will be identified for individual company staff following completion of staff performance assessments.

13. Plan review

The objective of the plan review is to ensure that the foundation of the planning framework remains intact and accords with changes in the production environment that might affect the viability and profitability of the timber business. In consequence, the FMP will need to be periodically adapted to avoid that this fundamental planning instrument continues to remain relevant for implementing approved management activities on the ground.

As this FMP for the NFM Sub-Management Unit has been developed for year 2022 to 2031 any changes to the assumptions and conditions of resource management need to undergo a full review by the year 2027.

14. Timber marketing and sales

The past 15 years of the tropical hardwood market are characterized by a more or less steady decline in exports of the three important suppliers: Indonesia, Malaysia, and Brazil. On the demand side, however, an increase of 25% has been reported, though tropical hardwood consumption estimates vary from source to source. In other words, the global market is facing a supply constraint. As a result of declining natural forests, erratic supply disruptions and surging end-use demand in China and India premium tropical hardwood species continue to be highly valued. This situation has caused an average annual price increase of 11% during the period 2001 to 2010, while softwood and low value hardwood prices have retreated considerably.

Price levels for Malaysian logs have been fluctuating throughout the years with three criteria as most important price determinants: species, log diameter and log quality. For Sabah producers, average log export prices range between RM 470 and RM 1,000 per m³ FOB, depending on the price factors mentioned above. These figures indicate that quality matters and hence, the company needs to ensure that reasonable efforts and investments are made to ensure bets possible product quality to capture the higher market end of the log prices.

Considering the continuous growth in global demand for wood products it can be safely assumed that price levels will continue to move upwards, despite some trends of timber substitution for non-timber products. With well-established Dipterocarp species such as, e.g., Selangan Batu, Seraya, Keruing, and Kapur delivering the raw material for classical products of the high-end solid wood consumer market producers are not expected to be affected by possible wood substitution trends.

In conclusion the company expects good business opportunities in the years to come and will endeavour to draw optimum benefits from its sustainable managed natural forests.

15. Forest fire control

During prolonged periods of drought forest fires constitute a threat to the forest area however forest plantations are more susceptible to fires compared to natural forests but may spread. The period from March to September is critical where monitoring activities need to be stepped up.

Several approaches to forest fire management are applied in and around FMU No. 11. BTSB's management approach employs an Integrated Forest Fire Management (IFFM) System whereby all aspects of prevention and suppression are dealt with in a holistic manner. Effective and efficient forest fire prevention and suppression (firefighting) can only be carried out when proper procedures, resources and facilities are in place and put into operation. A Forest Fire Management Plan prepared for year 2022 to 2033 regulates the details of forest fire control in the FMU.

16. Stakeholder Consultation

BTSB will aim to create and strengthen trust between local communities and relevant stakeholders by providing a platform to reach out and connect their views which are to be considered, informed and or be involved in. Relevant stakeholders are listed as follows:

No.	Village Name	Major Ethnicity	
1	Kg. Kilo	Dusun	
2	Kg. Pinipi	Dusun Lobou	
3	Kg. Kuit	Dusun	
4	Kg. Alab	Dusun Lobou	
5	Kg. Lanas Station	Murut	
6	Kg. Batu Lunguyan	Dusun	
7	Kg. Poring Baru Simbuan	Dusun	
8	Kg. Mantanid	Dusun	
9	Kg. Maatol	Dusun	
10	Kg. Masaum	Sungai, Murut	
11	Kg. Kipaliu Baru	Dusun	
12	Kg. Alab Dalog	Dusun Lobou	
13	Kg. Sasagahan	Dusun	
14	Kg. Dumbun	Dusun	
15	Kg. Pulutan	Dusun	
16	Kg. Wawasan	Dusun	
17	Kg. Kalindukan	Murut	
18	Kg. Fontas-Mandalong	Murut	
19	Kg. Pandiwan (A)	Murut	
20	Kg. Pandiwan (B)	Murut	
21	Kg. Tompusison	Murut	
22	Kg. Solog	Murut	
23	Kg. Kogupil	Murut	
24	Kg. Langkuku	Murut	
25	Kg. Tataluan	Murut	
26	Kg. Sg Matoi	Murut	
27	Kg. Panganitan	Murut	
28	Kg. Kagasa	Murut	
29	Kg. Matiku	Murut	

No	Organisation Name	Type of Organisation	Description
1	Sabah Forestry Department (Headquarters)	Government	Main Forestry Authority
2	Sook District forestry Office	Government	Local District Forestry Department
3	Environment Protection Department	Government	Environmental Authority
4	Sabah Wildlife Department (Headquarters)	Government	Sabah Wildlife Authority
5	Department of Occupational Safety and Health (Sabah)	Government	Sabah Authority of Safety and Health

6	Sabah Labour Department	Government	Sabah Labour's Authority
7	Sabah Lands and Surveys Department	Government	Land and Survey Authority of Sabah
8	Department of Irrigation and Drainage, Sabah	Government	Irrigation and Drainage Authority of Sabah
9	Sabah Immigration Department	Government	Sabah Immigration Authority
10	Sook District Office	Government	District Local Authority
11	Nabawan District Office	Government	District Local Authority
12	Pejabat Hal-Ehwal Anak Negeri Sabah	Government	Local Authority on Native of Sabah
13	Forest Research Centre, Sepilok	Research Agency	Sabah Forestry Research and Development Body
14	Universiti Malaysia Sabah Faculty Forestry Tropical(International Tropical Frorestry Program)	Research Agency	Local Universities
15	HUTAN-Kinabatangan Orang-utan Conservation Project	NGO	Relevant NGO on Conservation, Scientific Research, Ecosystem Protection and management, Capasity building and raising awareness
16	Partners of Community Organisations (PACOS) Trust	NGO	Local NGO of Community Based Organisation on Indigenous People's Rights
17	World Wide Fund for Nature - Malaysia (WWF - Malaysia) Sabah Office	NGO	Relevant NGO on conservation and sustainability development of forest, wildlife and rivers
18	Timber Association of Sabah (TAS)	NGO	Local NGO on Timber Industries of Sabah
19	Land Empowerment Animal People (LEAP)	NGO	Relevant NGO on conservation mainly to protect & restore remaining forest and wildlife populations in Sabah.