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## **Summary Master Plan**

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***Implementation for the Investment Project of Teak Tree  
Plantation of Grandis Timber Ltd. on 7,896.11 ha in Phnom  
Srouch and Aural Districts in Kampong Speu Province***

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## 1. Overview

The following is a revision of the original Master Plan (that was developed and approved during November 2009) for the development of a timber plantation on the Concession Area defined herein. The primary crop will be *Tectona grandis*, otherwise referred as Teak (English) and other complimentary agro-industrial crops to insure full utilisation of the area. The development will continue to be completed in accordance with best international practices and principles of environmental sustainability and social responsibility. The operation achieved Forest Stewardship Council (FSC) certification in 2013 and has maintained this certification since through constant improvement.

### 1.1. Company Structure

Grandis Timber Ltd. is a registered Cambodian limited company wholly owned subsidiary of Monsoon Timber K/S, a Danish Limited Partnership. Monsoon Timber K/S is a Danish Limited Partnership and the sole shareholder of Grandis Timber Ltd. The company's registered address is: c/o Bruun & Hjejle, Nørregade 21 1165 Copenhagen K Denmark. The company's offices are located at: 38D, Street 494 Phsar Doeum Thkov, Chamkamorn Phnom Penh, Cambodia

### 1.2. Geographical and ELC Boundary

The Grandis Timber Ltd. ELC straddles Racksmei Sameakki Commune in Aoral District and Krang Dei Vay Commune in Phnum Sruoch District in Kampong Speu Province, Cambodia. The administration site is approximately 120 kilometres from Phnom Penh travelling along National Road 4 (Map 1: ELC Location).

### 1.3. Legal Aspects of the Concession Area

The concession has been awarded to Grandis Timber Ltd. in accordance with Chapter 5 of 2002 Land Law and Sub Decree 146 Economic Land Concessions, under a contract with the Ministry of Agriculture, Forestry and Fisheries (MAFF) in coordination with the other relevant ministries, agencies, provincial, district, and commune and village officials. The process of converting the title from State Public to State Private land has been completed. This process has followed on Sub-decree no. 175, dated 17 August 2016. Seventeen land titles have been issued, with a total area of 7,896.11 hectares. The following are the key legal documents associated with the Concession Area:

1. Letter No. 398 ប.ស/០៩ dated May 27<sup>th</sup>, 2009 from the Cabinet of the Prime Minister to the Minister of Agriculture, Forestry and Fisheries regarding this Investment. (It is a letter from PM cabinet to MAFF in regard to review and raise proposal to Prime Minister for approval in accordance with a proposal of GT asking for 17302 ha of ELC)
2. Mission Letter No. 3464 គ.ស.គ dated June 29<sup>th</sup>, 2009 of Minister of MAFF to delegate inter-ministerial committee for inspection and evaluation the Leased Property of 17302 hectares located Phnom Sruoch and Aoral district, Kampong Speu province
3. Letter No. 4975/492 KSK.NP.PK dated August 28, 2009 of Ministry of Agriculture Forestry and Fisheries (Proposal of ELC in regard to area can be granted only 9820ha resulted from field assessment (mission No. 3464)
4. Letter No. 1192 គ.ស.គ dated September 1<sup>st</sup>, 2009 of an approval of principle on the provision of a concession rights over the Leased Property to Grandis Timber Ltd. issued by the Office of Council of Ministers.
5. Letter No. 5239/525 Kor Sor Kor.Nor Por.Por Kor dated 10 September 2009 of MAFF on the proposal of asking delegation of full power to the contract with Grandis Timber Ltd on the concession land of 9820 hectares located in Phnomsrouch and Oral district of Kampong Spue province for the plantation of teak
6. Letter No. 102 គ.ស.គ dated September 16<sup>th</sup>, 2009 issued by Royal Government of Cambodia granting a power of attorney from the Prime Minister in favour of the Minister of the Ministry of Agriculture Forestry and Fisheries to sign ELC agreement with Grandis Timber Ltd.

7. Contract on the investment of teak tree plantation between Royal Government of Cambodia represented by Minister of the Ministry of Agriculture Forestry and Fisheries
8. Letter No. 3259/336 ក.ស.ក ន.ជ.ជ.ក dated June 2nd, 2010 of Ministry of Agriculture Forestry and Fisheries of Approval Master Plan
9. 01 BB order of Royal Government of Cambodia dated May 7, 2012 guiding for implementation the tiger skin policy
10. Sub-decree No. 296 ANKr. BK dated May 31, 2013 of Royal Government of Cambodia (Cut out of 216.75 ha)
11. Sub-decree No. 294 ANKr. BK dated May 31, 2013 of Royal Government of Cambodia (Cut out of 262.48 ha)
12. Sub-decree No. 293 ANKr. BK dated May 31, 2013 of Royal Government of Cambodia (Cut out 899.50 ha)
13. Letter No. 172 ស.ជ.ណ dated March 17th, 2014 of Ministry of Environment of the approval Initial Environmental and Social Impact Assessment (ESIA) on the Leased Property of 9820 hectares
14. Letter No. 1084 ស.ជ.ណ dated October 21st, 2015 of Office of Council of Minister of permit Grandis Timber Ltd. continue legal procedures of resolution impact with community, revise contract term from 70 to 50 year and sign contact again
15. Letter No. 7231/571 កសក. ន.ជ.ជ.ក dated November 3rd, 2015 of Ministry of Agriculture Forestry and Fisheries on amendment the total area and contract term from 70 to 50 years
16. Sub-decree No. 175 អនក្រ.បក dated August 17th, 2016 of Economic Land Concession reclassification from public to private state land of 7896.11 hectares
17. Adjusted contract on the investment of Teak Tree Plantation dated December 1st, 2017 between Ministry of Agriculture Forestry and Fisheries and Grandis Timber Ltd.,

#### **1.4. History of the Concession Area**

The Concession Area was heavily logged during the late 1980's early 1990's. Since then, local residents have harvested small diameter logs off the site for firewood and charcoal production. This area was previously under an economic concession, which has been terminated due to failure of the concessionaire to make the necessary progress in developing the concession.

In 2009 Grandis Timber Ltd. applied for an area with initial size of 17,302 ha (letter No. 27/09 dated 27 May 2019). This area was reduced after assessment of the area to determine the levels of forest degradation. The boundary was set at 13,728ha.

In 2009 Grandis Timber Ltd. signed a 70-year ELC contract with MAFF for 9820 ha concession for management. Grandis Timber Ltd. received the land titles to 17 parcels in 2015 with adjusted leasing period to 50 years and 7,896.11 ha. Referring to section 1.3 it is evident from the legal documentation how the area reduced to the final registered Economic Land Concession area at present of 7,896.11 hectares.

## **2. Mission, Goals, and Objectives**

### **2.1. Mission**

The mission of Grandis Timber Ltd. is the commercial reforestation to develop sustainable high-value timber and other agricultural assets in Cambodia, which are appealing to international institutional investors.

### **2.2. Goals**

To accomplish the above mission, the goals of Grandis Timber Ltd. are:

- Creation of long-term value for our shareholders

- Establish industry leadership within the regional emerging markets in the following areas:
  - Profitability / Return on Investment
  - Tropical Hardwoods Plantation Technical Expertise
  - Operating Procedures and Efficiencies
  - Environmental Sustainability
  - Social Responsibility

### **2.3. Objectives**

To achieve the above goals, the following objectives must be met over the next 5 years:

- Primarily establishment of teak, mahogany, eucalyptus, acacia, rosewood and cashew plantations
- Establishment of complementary agriculture to fully and most economically utilize the entire land concession including shorter rotation cash crops and cattle grazing
- Continuous Improvement of:
  - Operating Procedures / Methods
  - Plant Materials
  - Tracking, Reporting, and Management of Plantation Data
- Provide training and development for local staff in the following areas
  - Technical: Forestry, Silviculture, Agriculture
  - Business: Management, Finance, Data Management, Human Resources, Ethical Conduct
  - Health and Safety
- Work in harmony with natural areas and neighbouring communities
- Achievement of International Certifications
  - Forest Stewardship Council (FSC) Certification

### **2.4. Purpose**

The purpose of Grandis Timber Ltd. is to carry out operations as follows:

- Mainly Teak Timber production
- Secondary planting seasonal and secondary crops for soil coverage and protection
- Secondary test planting of other kinds of trees on a reasonable small size
- Tertiary construction of a processing plant to process and support secondary production

## **3. Household Information**

### **3.1. Registered Permanent Residents inside the Concession Area Boundaries**

These residents are farming or residing on land within the Concession Area boundaries. Families and their land are registered with commune and village officials. Based on a survey conducted by Grandis Timber Ltd. in cooperation with the village authorities in 2017, of Kaheach, Prey Te Teoung, and Dong villages there are 809 people belonging to 188 families permanently residing and farming within the final boundaries of the Concession Area. These families are occupying a total of 607.21 hectares of land (according to government statistical data of 01 BB order and land registration). Meanwhile, the occupied area located in Aoral and Phnom Sruoch district is 47.79 hectares and 566.42 hectares, respectively. The distribution of registered permanent residents between the two districts of the Concession Area as of November 2017, is as follows:

- Aoral District, Families: 60 families, Hectares Occupied: 40.79 hectares
- Phnom Sruoch District, Families: 128 families, Hectares Occupied: 566.42 hectares

### 3.2. Unregistered Permanent Residents inside the Concession Area Boundaries

Every effort has been made to ensure there are only registered permanent residents, registered through the implementation of 01 BB order (leopard skin policy implementation) and state land registration. All of the villagers who are permanently residing and farming inside the concession are registered. They are registered with commune and village of Aoral and Phnom Sruoch district, Kampong Speu province.

These residents were re-identified and a reconciliation done with the commune and village registration records. This was measured against house and farm inventory completed by Grandis Timber Ltd. across the Concession Area in 2017 which could be compared with results from July and August of 2009.

### 3.3. Communes and Villages outside Concession

According to the communal statistic updated in 2017 and the integrated community development plan, the communes, and villages located near enough to the Concession Area to experience immediate impact are Krang Dei Vay commune, in Phnom Sruoch district (Table 1) and Reaksmei Sameakki commune, in Aoral district (Table 2). There are 1,161 and 1,072 families in Krang Dei Vay and Reaksmei Sameakki communes respectively. The total population in Krang Dei Vay commune, Phnom Sruoch district is 5,184 people of whom 2,620 are females with a similar number of people in Reaksmei Sameakki commune, Aoral district being 5,065 people of whom 2597 females (communal statistic. 2017).

**TABLE 1: PHNOM SRUOCH (DATA UPDATED 2017\_COMMUNE INTEGRATED DEVELOPMENT PLANNING)**

No.	Name of Village	Number of Family	Number of People	Number of Female
1	Banteay Roka	233	995	500
2	Krasaing Khpous	123	556	278
3	Prey Kacheach	166	672	359
4	Daung	144	751	386
5	Prey Totoeng	245	983	480
6	Dok Pur	250	1227	617
<b>Total</b>		<b>1161</b>	<b>5184</b>	<b>2620</b>

**TABLE 2: STATISTICS OF RELEVANT PEOPLE IN REAKSMEI SAMEAKKI COMMUNE**

No.	Name of Village	Number of Family	Number of People	Number of Female
1	Reaksmei	106	462	210
2	Sameakki	120	506	252
3	Ou Pdoa	150	596	301
4	Peam Ros	120	582	306
5	Pos Veak	141	822	410
6	Prey Thom	435	2097	1118
<b>Total</b>		<b>1072</b>	<b>5065</b>	<b>2597</b>

\*Note: The Company's land is about 1-1.3 kilometres southwest of the six villages.

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According to the 2009 ESIA, a major source of income for the occupants within the Concession Area and the neighbouring villages is the cutting of firewood and production of charcoal. The logging has done significant environmental damage making it nearly impossible for the forest to re-establish itself without direct planting on an industrial scale. The continued logging has left the site with few mature trees and has resulted in few parent trees as seed sources. It is reported that a family earns US\$50 to US\$175 per month from firewood and charcoal harvesting. Grandis Timber Ltd. will update these estimates as part of the 2018 ESIA. Whereas this is now Private-state land, all logging on this site is illegal. Customary user rights under the Forestry Law are allowed but controlled through regular patrols and the issuance of permits.

## **4. Management Systems**

### **4.1. Management Concepts**

The implementation of the Principles described above into the day to day operations is achieved through the management systems that Grandis Timber Ltd. has implemented. Core to the systems are the following elements:

- Company Policies
- Standard Operating Procedures (SOP)
- Social and Environmental Management System
- Open Issues Matrix (OIM)

### **4.2. Company Policies**

Company policies are developed by the management team of Grandis Timber Ltd. and submitted for review by the CEO and approved by the Board of Directors of the Company. Copies of the policies are provided to all members of the senior management team.

### **4.3. Standard Operating Procedures**

Standard operating procedures (SOPs) are procedures and tasks completed regularly in the operations. SOPs are focused on operational tasks, rather than information gathering or documentation. SOPs are the primary management tool and guidance for the operations teams under the operations manager. SOPs form the foundation of the training program by defining tasks, the order of operations, personnel involved equipment requirements, and performance standards. Personnel engaged in a given operation are trained in the SOP and tested against the performance standards to demonstrate capability.

These processes include but are not limited to:

- Documentation of conditions on the Concession Area prior to the development
- Documentation of boundaries of land occupied by local residents within the Concession Area
- Procedures for gathering data and information from local residents for the planned social and economic impact assessment;
- Compartment development management plan
- Herbicide application
- Planting clones
- Tree pruning
- Firefighting procedures

## 5. Social and Environmental Monitoring System

The social and environmental areas have a combined management plan taking into account the requirements of the area and inhabitants. The planned development consisted of the following steps:

- a. Documentation of the current status of the areas;
- b. Establishment of a benchmark area where representative samples of existing ecosystems within the landscape exist in their natural state;
- c. Establishment of specific goals and objectives for the areas;
- d. Development of a rehabilitation plan (all of the areas are at some level of degradation);
- e. Establishment of a monitoring and tracking plan (SMART);
- f. Review and adjustment of the plans based upon actual results produced

Based on the information obtained from the tracking and feedback, the impacts are measured and consultation is used to ensure adjustments have the desired effects.

The Environmental and Social monitoring program consists of an approach with four main components:

### 5.1. SMART reporting

The SMART system is a recognized system in Cambodia for environmental monitoring. This system is utilized by our concession and conservation patrollers to gather data in regards to:

- Community movement
- Non-Timber Forest Product (NTFP) collection
- Fauna sightings
- Flora sightings
- Invasive sightings
- Erosion sightings
- Pollution

Data gathered through this system is utilized to enhance other systems and to take corrective action on current management programs.

### 5.2. Permit system

The permit system was developed to measure the volume of NTFP's collected and to reduce the impact in vulnerable areas and vulnerable products. Permits are given to all who wish to collect NTFP's for cultural use. During the application, all information is gathered from the individual and the mode of transport is also recorded and marked if it is an Iron Buffalo. This enables Grandis Timber Ltd. To track the movement of Iron Buffalo's on the concession. Also, get an idea from where they came. This valuable tool assists the sustainability team:

- to engage with community members and build relationships
- to educate community members on sustainable utilization of forest products and NTFP's
- to protect vulnerable areas by steering collectors away from those areas
- to gauge the volume of NTFP's harvested on the ELC.
- to control unwanted movement and clamping down on illegal logging and illegal trapping.
- Gives Grandis Timber Ltd. a good indication on how far people are traveling to make use of the NTFP's

### 5.3. Access Control

The concession area does not have any through roads to the west bordering onto the Aural Mountains and also to the North there are no through roads. The access control is done through security at 5 access points. The access points are to control the vehicle movement into the concession area as preventative measures to:

- Prevent illegal logging
- Prevent illegal hunting or poaching
- Prevent cattle theft
- Prevent theft from Grandis Timber Ltd.
- Protection of local communities living inside the concession boundaries.
- Control the permit system
- Number Iron Buffalo's
- Educate communities with regard to fire danger, sustainability, and rules of the road and the ELC

#### **5.4. Health**

Grandis Timber Ltd. developed an infirmary with a permanently employed nurse and a visiting doctor. This infirmary is to assist local communities with their day to day health care needs. This facility is used for health education for the local communities and as a referral facility for more serious illnesses. High priority is given to woman's health due to the number of female employees as well as the number of females residing in the concession area.

#### **5.5. Daycare**

Grandis Timber Ltd. developed a daycare system for employees and local communities to leave their children in order to make it possible for parents to work. Children attending the daycare center receive the benefits of the infirmary, receive basic hygiene, are fed and receives a basic education up to 6 years of age.

#### **5.6. Collaboration / Cooperation**

In an effort to ensure the necessary technical expertise and stakeholder participate and/or buy-in Grandis Timber Ltd. sort cooperation/collaboration with the following to support the development of rehabilitation plans:

- International Conservation NGO's
- Local Conservation NGO's
- Forestry Technical Consultants
- International Universities
- Cambodian Government Forestry Administration
- International Social NGO's
- Local Government Officials

#### **5.7. Open Issues Matrix**

The Open Issues Matrix serves as a mechanism through which the management team can track monitor, and ultimately resolve issues that cannot be immediately dealt with. The management team reviews the OIM with the CEO every two weeks until the issue is resolved. Close issues are archived for future reference. Issues entered into the OIM are not limited to those found by a QCR, and can be an issue which requires medium to long-term tracking through to resolution.

The elements of the OIM include the following:

- Issue number
- Priority
- Date opened
- Target closure date
- Responsible party
- Description of the issue
- Current status



## 6. Land utilization plan and schedule

### 6.1. Zone division

A total area within the concession boundary is 7,896.11 hectares registered as State-Private land in the name of Grandis Timber Ltd. This whole area was divided into different subzones for planning and management purposes and is reflected in Table 5.

From 2010 to 2019, the company had been clearing and planting the tree species on the area of 4 623 hectares (planted tree 3 671 hectares, building infrastructures 131 hectares and preservation area 821 hectares) and remaining of 3273.11 hectares will be used for the development in this new Master Plan. The proposed are mentioned in the initial Master plan for Grandis Timber Ltd. has been significantly reduced due to the final registered concession area.

**TABLE3: LAND UTILIZATION PLAN**

Year	Sub-zone	Total Area (ha)	Productive Area (ha)	Infrastructure Area (ha)	Preservative Area (ha)
2010 - 2019	I-XXIII	4623	3671	131	821
2020	I, XIX,XX, XII, XIV	662	554	24	84
2021	II, XXII, III, VII	797	575	14	208
2022	IV, XV, XIII	670	529	4	137
2023	XI	622	561	7	54
2024	XIV, XVI, XVIII, III	522	522	0	0
<b>Total</b>		<b>7896</b>	<b>6412</b>	<b>180</b>	<b>1304</b>

**Note:**

1. The total production business area or area registered for ELC purposes is 7, 896 hectares
2. Total planted area = total production business area – area for the infrastructure of 180 hectares = 7716 hectares
3. The total plant-able area of 7716 hectares in which are;
  - 3.1 The area has been utilized (2010-2019) = 4623 hectares in which are
    - The area has been planted tree = 3671 hectares
    - The area has been developed infrastructure = 131
    - Preservation area = 821 hectares
  - 3.2 The production business area in this new Master Plan 3273 hectares in which are
    - Future plan area 2741 hectares
    - Future infrastructure development 49 hectares
    - Preservation area 48 hectares
4. In this new Master Plan, the ELC is divided into 23 sub-zones because of the different operations and financial input:

### **Sub-zone I**

This subzone marked ABCDEF (Map 4) is at the most southwestern corner of the concession, is a separate land title of 27 ha to be planted to 25ha and the remaining 2ha is riparian zone to be left open for catchment management. Less than 0.02ha will be dedicated to roads.

### **Sub-Zone II**

Is a separate land parcel to the northeast of sub-zone I, marked GHIJKLMNOPQRS (Map 4). This sub-zone consists of 208 ha of soils not suitable for teak production. 190 ha will be planted with the remainder will be protected as wetlands (1 ha), riparian zone (14 ha) and 3ha of rocky outcrops or mountains. The subzone has 1.16 ha of infrastructure in the form of roads.

### **Sub-Zone III**

This zone is marked STUVWXYZA<sub>1</sub>B<sub>1</sub>C<sub>1</sub>E<sub>1</sub>F<sub>1</sub>G<sub>1</sub>OPQR (Map 4). It is a separate title area west and northwest of sub-zone II. The area of sub-zone III is 373 ha, of which 73 ha have been planted to teak and another 5 ha planted to Acacia. This area is not ideal for Teak and the remaining 156 ha will be planted with alternatives. The remainder of the area is dedicated to conservation in the form of the riparian zone(44ha), mountainous areas(42ha), and 15 ha rocky areas with limited rooting depth. This zone shares a boundary with sub-zone II on the southeastern side.

### **Sub-zone IV**

Sub-zone IV is indicated as D<sub>1</sub>E<sub>1</sub>F<sub>1</sub>G<sub>1</sub>H<sub>1</sub>I<sub>1</sub>J<sub>1</sub>K<sub>1</sub>L<sub>1</sub>M<sub>1</sub>N<sub>1</sub>O<sub>1</sub> (Map 4). This area is to the Northeast of sub-zone III and shares a boundary on the southwest. The area covered by this zone is 128 ha which is not suitable soils for teak. Currently, the area is planted to 1ha of teak and the remaining 90 ha will be planted to alternatives. Areas not to be planted are mainly due to 33ha of the riparian zone, 2ha of the mountainous area and 1ha of infrastructure in the form of roads.

### **Sub-zone V**

The Zone depicted by P<sub>1</sub>Q<sub>1</sub>R<sub>1</sub>S<sub>1</sub>T<sub>1</sub>U<sub>1</sub> (Map 4). This is a separate title deed to the east of sub-zone IV surrounded by private land. It is planted to 1 ha of Teak, 18ha Acacia and 7.28 ha of Eucalyptus. The riparian area excluded from planting is 2 ha and 1ha is dedicated to road infrastructure.

### **Sub-zone VI**

Situated northwest of sub-zone V, and surrounded by private land, this sub-zone is indicated by V<sub>1</sub>W<sub>1</sub>X<sub>1</sub>Y<sub>1</sub>Z<sub>1</sub>(Map 4). The total area of this separate title is only 6.56 ha with less than 1 ha planted to teak and 5.5 planted other species. The remaining portion is a wetland with shallow clay that could not be planted.

### **Sub-zone VII**

The sub-zone of 8ha is situated west of sub-zone VI between sub-zone IV and sub-zone IX and is indicated by A<sub>2</sub>B<sub>2</sub>C<sub>2</sub>D<sub>2</sub>E<sub>2</sub>F<sub>2</sub>G<sub>2</sub>H<sub>2</sub>I<sub>2</sub> (Map 4). Only 4 ha is planted and the remaining 4ha is a riparian zone.

### **Sub-zone VIII**

J<sub>2</sub>K<sub>2</sub>L<sub>2</sub>M<sub>2</sub>N<sub>2</sub> (Map 4) represents the polygon for a separate title area between sub-zone 10 in the north and sub-zone 4 in the south. This area is surrounded by village land and is only 7ha in extent. The area is planted to 4 ha and the remaining 3 ha is riparian area.

### **Sub-zone IX**

Sub-zone IX lies to the north of sub-zone VI and is a polygon represented by O<sub>2</sub>P<sub>2</sub>Q<sub>2</sub>R<sub>2</sub>S<sub>2</sub>T<sub>2</sub>U<sub>2</sub>V<sub>2</sub>W<sub>2</sub> (Map 4). This separate title area is surrounded by village land and government excised riparian zone. The total area of this polygon is 25 ha of which is planted to 13ha teak, 1ha Eucalyptus, and 5 ha Mahogany. The remainder of the area is the riparian zone (3ha), and road infrastructure of 1 ha.

### **Sub-zone X**

Sub-zone X is surrounded by village land but to the north is the government riparian area. This sub-zone is lying south of sub-zone XI and north of sub-zone VIII and is a separate title area represented as X<sub>2</sub>Y<sub>2</sub>Z<sub>2</sub>A<sub>3</sub>B<sub>3</sub>C<sub>3</sub> (Map 4). The total area covered by this polygon is 18 ha of which only 14ha is planted to Eucalyptus, two ha will be planted and the remaining area consists of two ha of Riparian zone.

#### **Sub-zone XI**

Situated to the east and the north of sub-zones V, VI, IX, and X this polygon is represented by D<sub>3</sub>E<sub>3</sub>F<sub>3</sub>G<sub>3</sub>H<sub>3</sub>I<sub>3</sub>J<sub>3</sub>K<sub>3</sub>L<sub>3</sub>M<sub>3</sub>N<sub>3</sub> (Map 4). The total area of this sub-zone is 842 ha planted to Teak (58ha), Acacia (25ha), Eucalyptus (29ha), Mahogany (2ha), and Trials (1ha). 589 ha of the remainder will be planted with riparian zones (87ha) linked to some smaller wetland areas of 21ha. This subzone also consists of 12ha roads and a 2 ha gravel pit.

#### **Sub-zone XII**

This smaller sub-zone directly north of sub-zone III represented by O<sub>3</sub>P<sub>3</sub>Q<sub>3</sub>R<sub>3</sub>S<sub>3</sub>T<sub>3</sub>U<sub>3</sub>V<sub>3</sub>W<sub>3</sub>X<sub>3</sub> (Map 4) is the area in which the office and nursery are situated covering 19ha. Apart from this infrastructure it also consists of another 2ha of roads. The areas planted to date consists of Teak(77ha), Eucalyptus(1ha), Mahogany(2ha), and 1ha of other species. The future plan is for another 59 ha planting. The remaining open areas consist of 14ha riparian zone, 2ha mountain, 1 ha rocky areas 1ha wetland and 11 ha preferential drainage areas.

#### **Sub-zone XIII**

Y<sub>3</sub>Z<sub>3</sub>A<sub>4</sub>B<sub>4</sub>C<sub>4</sub>D<sub>4</sub>F<sub>3</sub>E<sub>3</sub> (Map 4) represents this sub-zone (614ha) situated directly north of sub-zone XII and west of sub-zone XI. The area is mainly planted to Teak (348ha), followed by Eucalyptus (16ha), acacia (4ha) and Mahogany (1ha). The plan is to plant a further 132 ha with remaining areas consisting of riparian zones (39ha), 9ha mountainous area and 5 ha wetland and 41 ha preferential drainage areas. This subzone also consists of 7ha roads and a gravel pit of 1ha.

#### **Sub-zone XIV**

The extent of this sub-zone is 443ha represented by E<sub>4</sub>F<sub>4</sub>G<sub>4</sub>H<sub>4</sub>I<sub>4</sub>J<sub>4</sub>K<sub>4</sub>L<sub>4</sub>M<sub>4</sub>N<sub>4</sub> and O<sub>4</sub>P<sub>4</sub>Q<sub>4</sub>R<sub>4</sub>S<sub>4</sub>T<sub>4</sub>U<sub>4</sub> and V<sub>4</sub>W<sub>4</sub>X<sub>4</sub>Y<sub>4</sub>Z<sub>4</sub> and is three parcels of land north of sub-zone XVIII (Map 4). The area is planted to Teak(253ha), Acacia(28ha), Mahogany(3ha), and other species2ha. The future plan is for a further 43 ha to be planted with the remaining areas consisting of riparian zones(45ha), mountainous area of 19 ha, 17ha wetland and 26ha of preferential drainage area. The spirit place is only 1ha. Besides the open areas, there is still 5ha roads infrastructure.

#### **Sub-zone XV**

The 368 ha of this subzone is indicated by E<sub>4</sub>F<sub>4</sub>A<sub>5</sub>B<sub>5</sub>C<sub>5</sub>D<sub>5</sub>E<sub>5</sub> (Map 4). The sub-zone lies east of Sub-zone XIV and North of sub-zone XI. This sub-zone is currently not yet cultivated or planted but 264 ha is expected to be planted with the remainder of the subzone mainly riparian zones(33ha) and wetlands(68Ha) due to clay pans. The infrastructure in this sub-zone consists of 2.87ha of roads.

#### **Sub-zone XVI**

Situated northeast of sub-zone XV and north of sub-zone XI is indicated by F<sub>5</sub>G<sub>5</sub>H<sub>5</sub>I<sub>5</sub> (Map 4). This area has partially been cultivated and planted to Teak(38ha). 348 ha still needs to be cultivated planted with the remainder of the area consisting of 9ha road infrastructure, 3ha gravel pit and 25ha cattle paddock.

#### **Sub-zone XVII**

This sub-zone indicated by H<sub>5</sub>I<sub>5</sub>J<sub>5</sub>K<sub>5</sub>L<sub>5</sub>M<sub>5</sub>N<sub>5</sub> (Map 4) share a southern boundary with Sub-zone XVI and to the north with sub-zone XVIII. This area of 695ha is mainly planted in Teak(531ha) with small areas planted to Acacia (33ha and Mahogany(4ha). The remaining areas are preservation areas consisting of the riparian zone(98ha), wetland(1ha) and drainage (17ha). The road infrastructure covers 12ha.

#### **Sub-zone XVIII**

The area north of sub-zone XVII and shares a southern boundary. It is indicated by J<sub>5</sub>K<sub>5</sub>L<sub>5</sub>M<sub>5</sub>N<sub>5</sub>O<sub>5</sub>P<sub>5</sub>Q<sub>5</sub>R<sub>5</sub> on Map 4. Approximately half of this area of 589 ha has been cultivated and planted to Teak (396.58) and Eucalyptus(4ha). 132 ha will be cultivated and planted with the remainder of the area will be preservation area of the riparian zone, wetlands, and preferential drainage systems.

#### **Sub-zone XIX**

This area directly west of sub-zone XVIII is indicated by S<sub>5</sub>T<sub>5</sub>U<sub>5</sub>V<sub>5</sub>W<sub>5</sub>X<sub>5</sub> (Map 4) This is a separate 124ha title area cultivated to be planted to Teak(62ha), and Eucalyptus(49ha). The remainder of the area is a riparian zone of 13ha.

#### **Sub-zone XX**

This area of 459ha is represented by a polygon P<sub>5</sub>Y<sub>5</sub>Z<sub>5</sub>A<sub>6</sub>B<sub>6</sub>C<sub>6</sub>D<sub>6</sub>E<sub>6</sub>F<sub>6</sub> (Map 4) situated northwest of sub-zone XVIII, south of sub-zone XXII, and west of sub-zone XXI sharing boundaries with all sub-zones mentioned. It has been planted to date with Teak (28ha), and Eucalyptus (49ha). 317 ha will be planted with the remaining portion consisting of 5ha road infrastructure, riparian zones (58ha), mountain (2ha), and wetland (19ha).

#### **Sub-zone XXI**

This is the biggest sub-zone(1085.39ha), represented by N<sub>5</sub>O<sub>5</sub>P<sub>5</sub>F<sub>6</sub>G<sub>6</sub>H<sub>6</sub>I<sub>6</sub>J<sub>6</sub>(Map 4) situated north of sub-zone XVIII sharing a boundary. The whole sub-zone has been cultivated and planted to Teak(728ha), Acacia(169ha), Eucalyptus(45ha), Mahogany(9ha), and a trial area(10ha) where mixed species were planted. The remainder of the area is the riparian zone(97ha), wetland and preferential drainage(7ha). The road infrastructure covers 19ha.

#### **Sub-zone XXII**

Represented by B<sub>6</sub>C<sub>6</sub>D<sub>6</sub>E<sub>6</sub>F<sub>6</sub>K<sub>6</sub>L<sub>6</sub>M<sub>6</sub>N<sub>6</sub>O<sub>6</sub>P<sub>6</sub>Q<sub>6</sub> (Map 4), this area of 588ha lies directly north of sub-zone XX sharing a boundary and also sharing boundaries to the north with Sub-zone XXIII. This area has been partially cultivated and planted to Teak(84ha), Acacia(95ha), Eucalyptus(5ha), and Mahogany(24ha). There is another 135ha which will be planted. The remaining area is the riparian zone and mountainous and rocky areas. This sub-zone is a gravel pit of 5ha and roads(11ha)

#### **Sub-zone XXIII**

Represented by polygon F<sub>6</sub>G<sub>6</sub>R<sub>6</sub>S<sub>6</sub>T<sub>6</sub>U<sub>6</sub>V<sub>6</sub>W<sub>6</sub>X<sub>6</sub>Y<sub>6</sub>Z<sub>6</sub>M<sub>6</sub>L<sub>6</sub>K<sub>6</sub> (Map 4) is situated in the far northwest of the concession and covers an area of 563ha. This area has been cultivated and is planted to Teak (362ha), Acacia (23ha), Eucalyptus (2ha), Mahogany (5ha) and a trial area of mixed planting. There is still a small area (52 ha) to be planted with the remainder riparian zones (43ha), preferential drainage (45ha), mountainous area (7ha), wetland (9ha) and a spirit place (1ha). The road infrastructure (7ha) and the gravel pit (5ha) cover the remaining area.

### **6.2. Production Land**

The initial area planted on the concession is 4,822ha. There was an approximate area of 1,151 ha of development that has failed and will be redeveloped. Another 1,590 is anticipated to be planted in the next 4 years. Grandis Timber Ltd. nursery propagates mainly clonal plant material to ensure higher productivity and survival. The only seedlings cultivated are the indigenous trees cultivated in the nursery for the restoration of conservation areas.

The remaining production of land and redevelopment land will be treated as follows:

#### **6.2.1. Tree plantation preparation**

The development plan changed radically from what was initially envisaged due to poorer soils in the south. Grandis Timber Ltd. had to widen its scope to incorporate the planting of Eucalyptus, Acacia and other species and crops on poorer soils. Grandis Timber Ltd. opted to plant Mahogany next to natural watercourses to prevent the spread of seed. Planting of alternative species and crops is to prevent encroachment and to utilize all land given to Grandis Timber Ltd.

##### **a. Nutrient Management Plan**

The Grandis Timber Ltd. concession soils are of a relatively low level of fertility due to the disruption of the plant to soil nutrient cycle due to the removal of the indigenous trees over the last decades and the yearly native burning practices. Ideal soils for Teak are in fact also the soils prone to leaching. Soil type, texture, and structure must be considered in the context of topography, drainage, rainfall patterns, and water table levels during various stages of the annual weather patterns. Additionally, analysis needs to be kept in the context of the constraints placed on-site selection resulting from the social and environmental objectives. These objectives (specifically FSC Principle 10, Criteria 9, Prohibition of Conversion of Natural Forests to Plantations) effectively ensure that the project must be a reforestation/afforestation project, with the likely associated soil conditions. As such, a soil/plant nutrient cycle management system specifically designed for a given site, sector and compartment is required.

#### **b. Land Preparation**

The methods, process, and techniques used to prepare the land for planting are key to the management and retention of soil nutrients. Grandis Timber Ltd. has implemented a clearance regime that is designed to retain maximum natural site nutrition and improve soil structure as below:

- Minimization of Burning

During land preparation, Grandis Timber Ltd. aims to minimize burning and rather incorporate the maximum amount of organic matter (in the form of plant biomass) back into the soil. Burning of existing vegetation releases a portion of the key nutrient nitrogen into the atmosphere. The nitrogen remaining in the soil is in a highly soluble state and is easily leached from the sandy soils found on this site. As most plant nutrients are found in the leaves and bark of the scrub type vegetation on our site it is most important to burn as little as possible of this material. A significant curing period between clearing and cultivation allows small material such as twigs and leaves to desiccate, fall and be incorporated back into the soil. Larger woody material can be collected by locals for charcoal production leaving only a small component requiring burning in isolated heaps. Soil tillage speeds up the decomposition of organic matter, exposing the soil to oxygen, and increases the surface temperature. In turn, these processes release nutrients and lead to a reduction in soil organic matter. A soil with less organic matter dries out faster, has less water holding capacity and a poorer structure.

- Clearing

As previously identified the soils on the Grandis Timber Ltd. concession have very limited organic matter and are thus very susceptible to over-cultivation. The site preparation techniques at Grandis Timber Ltd. are designed to minimize repeated tillage while at the same time doing enough to achieve a high level of weed control and adequate soil cultivation to achieve strong early growth in the teak plantations and secondary crops. Clearing

- Disc Cultivation

Except for small diameter wood for charcoal production, there are very few remaining large trees in the areas to be planted. A specially designed bulldozer will remove small-diameter wood and brush in each planting compartment. Efforts will be made to leave all large high-value trees in place to influence the biodiversity of the site. Heaps of material cleared will left to begin decomposition and allow the collection of small wood for local charcoal production. After a few months, the piles will be bulldozer raked to spread fine decomposing material and leaves. This material will be ploughed into the soil while any remaining coarse roots and branches will be burnt.

- Root Picking

Initial cultivation will take place with a three-disc, followed by 7 discs and then a 24 disc. If not clear or level enough a follow-up operation will be done. Large discs are used to incorporate organic matter into the soil and begin cultivation. Areas to be first established in agricultural crops will require a more intensive full cultivation. This includes additional disking and multiple passes of root picking to ensure a clean cultivated area. Root picking. This process is to remove all wood waste from the area to make the planting and weeding process possible. Most of the root picking is done by local communities through a permit system.

- Ripping

Cleared cultivated areas are ripped up to 80cm deep in rows 3m apart for planting teak. This is done to break up compacted and cemented soil layers to increase the effective rooting depth when the trees are established.

#### **c. Secondary crop utilization**

The primary objective of Grandis Timber Ltd. is the establishment of a teak plantation and the production of high-value timber. Agricultural crops (including cashew, sugarcane, soya, poormans lucern and others) and grazing will in some cases be used to support the primary objective and achieve maximum productive land utilization. Agricultural crops will enhance the project benefits by;

- a. Improving the area of utilizable land and reducing weeds,
- b. Funding of the initial high cultivation costs,
- c. Allow the development of poor soils by the addition of organic matter to improve the soil structure
- d. Allow for the staggering of the planting of Teak to get a fully regulated stand in rotation.

#### **6.2.2. Tree Planting**

Tree planting is conducted between June and September.

##### **a. Teak Planting**

Experience to date indicates the ideal period to establish forestry crops on this site is with the first significant and reliable monsoon rains. On this site, this is generally somewhere in May or June. Planting conditions can usually persist until around September. Our focus is to maximize establishment in the early part of the wet season. This is to ensure root development and enough time in the rainy period to apply fertilizer and do proper weeding and restocking. Clones will be planted on a 3.2 m by 3m spacing to maximize the utilization of the space available. This results in an initial planting density of 1040 clones per hectare.

##### **b. Other tree plantings**

Other crops like Mahogany, Acacia, Eucalyptus, cashews, and others will be planted according to the best industry practice.

#### **6.3. Plantation Maintenance and Protection**

Post planting management of the areas will be done as follows:

##### **6.3.1. Restocking**

Each compartment will be monitored for clone mortality after planting. Clone mortality is primarily an issue in the first year after planting. After the clones are established, a mortality count will be done to establish the survival rate. Restocking will take place within the first 3 months after planting.

##### **6.3.2. Weed control measures**

Weeds will be kept under control with a combination of different measures:

##### **a. Mechanical measures**

Removal of weeds in the inter-row is achieved with the use of mechanical means such as slashing, rotating or ploughing. Ploughing is not a good method between mature trees, but can still be done between new plantings.

**b. Manual measures**

Removal of weeds through hand pull manual slashing or manual hoeing of weeds on the row or inter-row to compliment the mechanical operations.

**c. Chemical measures**

These operations are followed by chemical weeding although it is a minor component of the Grandis Timber Ltd. program and is only done in cases where other manual and mechanical weed control methods have proven too time-consuming and costly. We have found using non-residual chemicals on a very limited basis, has greatly enhanced our ability to control tough grass weeds. FSC compliant herbicides will continue to be applied with consideration of environmental safety.

**d. Biological measures**

Livestock is used in many forestry projects to reduce fire risk and control weeds. The use of livestock to control particularly grass weeds has many benefits. On a site with low inherent nutrition such as the Grandis Timber Ltd. concession, livestock can play a positive role in eating grass and legumes and recycling nutrients into the soil. The grazing of cattle is common surrounding and on the Southern portion of the concession.

**6.3.3. Fertilizing**

Fertilizing is an expensive operation and is done once a year for the first two to three years according to the need of the specific compartment. Fertilizer is applied at planting, in the first year and in the second year at a rate of 40g (NPK chemical fertilizer 15:15:15) per tree. This is done in two places 5-15cm from the stem on the rip line and closed with soil. Fertilizer is only applied during the rainy season.

**6.3.4. Pest Control**

The trees must be monitored for signs of pest infestation. The most common pests in Cambodia are defoliant, skeletonizers, and occasionally stem bores. All field staff has fundamental training in the identification of pest infestation so that they are able to bring it to the attention of the QC and Training Department.

**6.3.5. Disease monitoring**

While Teak is very strong and not very susceptible to disease, still, the trees must be monitored for signs of disease. The most common diseases are fungal and if identified early can be controlled. All field staff will have fundamental training in the identification of signs of disease so that they are able to bring it to the attention of the QC and Training Department.

**6.3.6. Pruning**

The reason for pruning teak is to yield high-value clear lumber without knots. Typically, teak does not branch until its third year. Double stems, premature branching, and leaves on the stem need to be pruned to give good stem form. The branches will be pruned up to a target height of 6.2m. Pruning will be done in multiple variable lifts defined by the growth rates in each compartment. As general guide trees are pruned in 2m increments with three main operations to achieve a 6.2m pruned stem. The timing of pruning is done to always leave the tree with 30% of its green crown thus maintaining growth rates and not stunting growth. Pruning is generally done as soon as a 2m increment can be achieved to restrict the diameter of the “knotty core” of the tree. Once the trees achieve canopy closure, the shading works to suppress branches and the need to continue pruning diminishes. These general guidelines will be used to set a series of site-specific pruning regimes where trees are pruned up to a set diameter in each operation.

**6.3.7. Thinning**

The thinning strategy employed is designed to maximize total growth increment and at the same time manage individual log diameter. Teak log prices are strongly correlated with the diameter and increase significantly with diameters over 30cm. Thinning is managed with a general prescription and then varied depending on-site quality and resulting growth rates. In general, stands will be managed on a compartment basis and thinned using the following prescription.

- T1 Thin to Waste to 850 stems per hectare at age 5
- T2 Thin for production to 650 stems per hectare at age 10
- T3 Thin for production to 400 stems per hectare at age 16

The strategy requires regular monitoring of diameter and height growth rates, in correlation to site quality. If volume growth begins to slow due to overstocking in some compartments, thinning timing will be bought forward or thinning intensity increased.

### 6.3.8. Harvesting

Final clear-fell harvesting will occur on or around age 25 depending on growth rates. The optimal harvest age will be decided mid-rotation using growth rates and current log market prices at that time.

### 6.3.9. Environmental Management Plan

Grandis Timber Ltd. has been developing this concession since 2009. Most of the Sub-zones have been developed to a certain extent. The development is done to date focused on the protection of sensitive unplantable areas. All the roads and infrastructure were developed in such a way that the impact on the area is minimalized.

The remainder of the area will be developed in less sensitive areas and impacts were addressed to avoid detrimental impacts.

In a recent in-depth study, Grandis Timber found the impact to be minimal to non-existent but we did, however, identify areas which we will be concentrating on as areas to be monitored. Below is a table of such areas to be monitored as part of the Environmental management plan (EMP).

The main purpose of this management plan is to comply with legislation, regulations and FSC principles but above all prevent any environmental damage.

### Environmental Management Program

Environmental Resource	To be-Monitored Locations	Reference Methods and Parameters to Be Monitored	Monitoring Cycles	Responsible Institutions	Monitoring Institutions
<b>Operation Phase</b>					
<b>1. 1 Physical Resource</b>					
<b>Topography / Erosion</b>	1.along the ridges 2. road in the project area 3. protected forests along the creek	- Topography monitoring between plant ridges - Check the road conditions in the project area - Check the situation of protected forest	Once every 6 months	.Project owner	1.MoE 2.DoE
<b>Soil Quality</b>	1. using fertilizer and pesticides 2. Storage of solid-liquid waste and use of machinery	- Check the use of agricultural land and pesticides - Check the location of storage solid-liquid waste and machinery	Once every 6 months	.Project owner	1.MoE 2.DoE 3.MAFF
<b>Hydrological system and water quality</b>	1. creek system conditions situation in the project area 2. Creek water quality and drinking water quality of staff-workers	- Check creek system conditions in the project area on creek water quality and drinking water of staff-workers (Ministry of Environment parameters).	Once every 6 months	.Project owner	1.MoE 2.DoE 3. DoWRM



Environmental Resource	To be-Monitored Locations	Reference Methods and Parameters to Be Monitored	Monitoring Cycles	Responsible Institutions	Monitoring Institutions
<b>Air Quality</b>	1. Location of generator machine 2. Solid-liquid waste management	- Monitoring parameters of CO; NO <sub>2</sub> ; TSP; SO <sub>2</sub> ; PM <sub>10</sub> - Check Solid-liquid waste management	Once every 6 months	.Project owner	1. MoE 2. DoE 3. Local authorities
<b>1.2 Biological Resource</b>					
<b>Forest and wildlife resources</b>	1. The protected forest along the creek, mountains area, Shrine, and wetlands  2. Tower protected forest fire and young trees, especially dry season	- Check encroachment, illegal of taking land along the creek and mountain for their own property - Check of forest crime and wildlife - Check the forest fire protection	Once every 6 months	.Project owner	1. MoE 2. DoE 3. DoAFF 4. Local authorities
<b>1.3 Socio-economic Resources</b>					
<b>Land Use</b>	1. Land boundaries registered by MLMUPC and DLMUPC	- Monitor the border of the project area, which was registered by the Provincial Department of Land Management, Urban Planning, Construction, and Cadastral whether or not the area of 7,896.11ha, has lost or not. - Checking the clearing of land is there an encroachment of a riparian forest or not?	Once every 6 months	.Project owner 2. Contractor	1. MoE 2. DoAFF 3.DoP 4. Provincial authorities 5. Local authorities
<b>Water use</b>	1.Water use of local people	- Check the condition of people 's water use	Once every 6 months	.Project owner	1.MoE 2.DoH 3.local authorities
<b>Cooking Energy use</b>	1.cooking energy use of people	- Check the energy use	Once every 6 months	.Project owner	1.MoE 2.local authorities
<b>Health and public safety</b>	1.Location of the company's administrative office 2.Location of Staff-workers' accommodation 3.Along with all the ways in/out project area 4.Location of road maintenance 5.Parking lots of vehicles and machinery	- Monitoring of heat and no air inlet - Monitoring of management and process of all safety system (equipment for the fire safety, extinguishers, safe media system, etc.) - Monitoring of the provision of clean water and sanitation - Monitoring Medical checkups for primary rescue and reduce venom.	Once every 6 months	.Project owner	1. MoE 2. DoE 3.DoLVT 5. DoH 6. Local authorities
<b>Traffic</b>	1.The main road of the project area 2.Road signs along the access road in the project area	- Check of road transport, speed, and jam. - Check on Collapsed of the tree or branches tree on the road. - Check traffic signs along the streets	Once every 6 months	.Project owner	1. DPWT 2. local authorities (Local Traffic officer)
<b>Road</b>	1.All road conditions of the project 2.The location of all roads access to the project area	- Check the damage and repair of roads in the project area. - Check the road condition - Check the maintenance and repair of roads in the project area.	1 time per year	.Project owner	1. DPWT 2.DRD 3.Local authorities

Environmental Resource	To be-Monitored Locations	Reference Methods and Parameters to Be Monitored	Monitoring Cycles	Responsible Institutions	Monitoring Institutions
<b>Risk</b>	<ul style="list-style-type: none"> <li>1. Location of the company's administrative office</li> <li>2. Location of Staff-workers</li> <li>3. Accommodation</li> <li>4. Parking lots of vehicles and machinery</li> <li>5. The work site all 10 sub-zones</li> <li>6. Protecting towers from fire forest and trees, especially in the dry season</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring of fuel and oil storage and fuel waste</li> <li>- Monitoring and operation of all safety devices (Safety Box, Electric Fire extinguisher, Fire extinguisher, Safety system, Bell alert, etc.).</li> </ul>	Once every 6 months	.Project owner	<ul style="list-style-type: none"> <li>1. MoE</li> <li>2. DoE</li> <li>3. Local authorities</li> </ul>
<b>Project Closure Phase</b>					
<b>2.1 Physical Resource</b>					
<b>Surface Water Quality</b>	<ul style="list-style-type: none"> <li>- location of storage solid-liquid waste</li> <li>- Parking lots of vehicles and machinery, workshop and storage</li> <li>- Location of the company's administrative office</li> <li>- Location of Staff-workers' accommodation</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring of solid waste and wastewater</li> <li>- Monitoring water quality of Da creek, Domrei creek, Kseav creek and Ontong Sor creek (shown in table 5-16) on parameters such as pH, to C, CND, Turbidity, Mn, Fe, TSS, BOD5, COD, DO, TN, TP, Oil and Grease, Total Coliform.</li> </ul>	Once after the project Closure	.Project owner	<ul style="list-style-type: none"> <li>1. MoE</li> <li>2. DoE</li> <li>3. DoWRM</li> <li>4. Local authorities</li> </ul>
<b>2.2 Biological Resource</b>					
<b>Fish Resources</b>	<ul style="list-style-type: none"> <li>- Using illegal fishing tools from opportunists at Da creek, Domrei creek, Kseav creek, and Ontong Sor creek</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring illegal fishing tools from opportunists at Da creek, Domrei creek, Kseav creek and Ontong Sor Creek with cooperation from relevant authorities.</li> </ul>	Once after the project Closure	.Project owner	<ul style="list-style-type: none"> <li>1. MoE</li> <li>2. DoE</li> <li>3. DoWRM</li> <li>4. DoAFF</li> <li>5. Local authorities</li> </ul>
<b>Forest Resources</b>	<ul style="list-style-type: none"> <li>- In the whole project area (7896,11 ha)</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring the condition of non-cutting forest or non-selling forest (forest conditions as at the operation project)</li> </ul>	Once after the project Closure	.Project owner	<ul style="list-style-type: none"> <li>1. MoE</li> <li>2. PDoE</li> <li>3. PDoAFF</li> <li>4. Local authorities</li> </ul>
<b>2.3 Socio-economic Resources</b>					
<b>Road</b>	<ul style="list-style-type: none"> <li>- The main road of the Project</li> <li>- Location of all access roads to the Project area</li> </ul>	<ul style="list-style-type: none"> <li>- Check road and bridge which are damaged by the project</li> </ul>	Once after the project Closure	.Project owner	<ul style="list-style-type: none"> <li>1. DPWT</li> <li>2. DRD</li> <li>3. Local authorities</li> </ul>

## 7. Risk Analysis

Grandis Timber Ltd received an Economic Land Concession in 2009 with a lease period of 70 years. After five years the contract period was reduced by legislation to a 50-year concession. This had an impact on the long term planning of the concession reducing the possible number of rotations. A further reduction in area and/or lease period could have a negative impact on the financial viability of the ELC.

The soil quality of the ELC is reasonably poor in the south. Due to potential impact on final yield, Grandis Timber Ltd embarked on a process to increase soil fertility and also site species matching with different timber crops to better utilize the soils. Part of the process is to employ cover crops and cattle herding to enrich the soils with nutrient-rich

cow dung. The cover crops and cow dung will not only increase the nutrient levels in the soil but will also increase the nutrient holding ability of the soils whilst binding the free carbon to the soils.

This will in effect have a positive influence on the timber crop ensuring increased increment per hectare.