Project Summary-Updated

Name of Developer: *Khemraj Budhram*

Developer's Address: *Lot 800, Mon Repos, East Coast Demerara*

Project Name: *Rainforest Timbers Sawmill*

Contact details: *674-9262*

Project Type: *Sawmill, Lumberyard, Timber Depot and Klin Charcoal Operation*

Project Location: *Track 'KB'b In the Vicinity of Loo Creek, Eastern Side Soesdyke Linden Highway, Right Bank Demerara River.*

Sector of Operation: *Forestry*

Projected Capital Investment: *approximately GY $36 million*

Annual Turnover: *Projected GY $5 million*

Project Location and Description

The proposed sawmill will be located at *Track 'KB'b In the Vicinity of Loo Creek, Eastern Side Soesdyke Linden Highway, Right Bank Demerara River*. The proposed site has a total land area of 8.73 acres, covered in both shrubs and Dakama trees but approximately Seven (7) acres of the land will be cleared to establish the proposed sawmill. The general topography of the area is slightly undulating and the soil type is predominantly white sandy soil which is freely drained. The proposed site is surrounded by vegetation (Dakama trees) on the west, east is the Soesdyke-Linden Highway, while to the north and south is vegetation (Dakama trees). Please refer to Figure 1 below.

The proposed sawmill site is accessible by the Soesdyke-Linden Highway, a paved road capable of accommodating two-way traffic and withstanding inclement weather. From the Highway, a turnoff can be made east onto an existing sandy trail (Refer to Figure 1 below).

Figure 1: Showing the location of the proposed sawmill site and the Highway

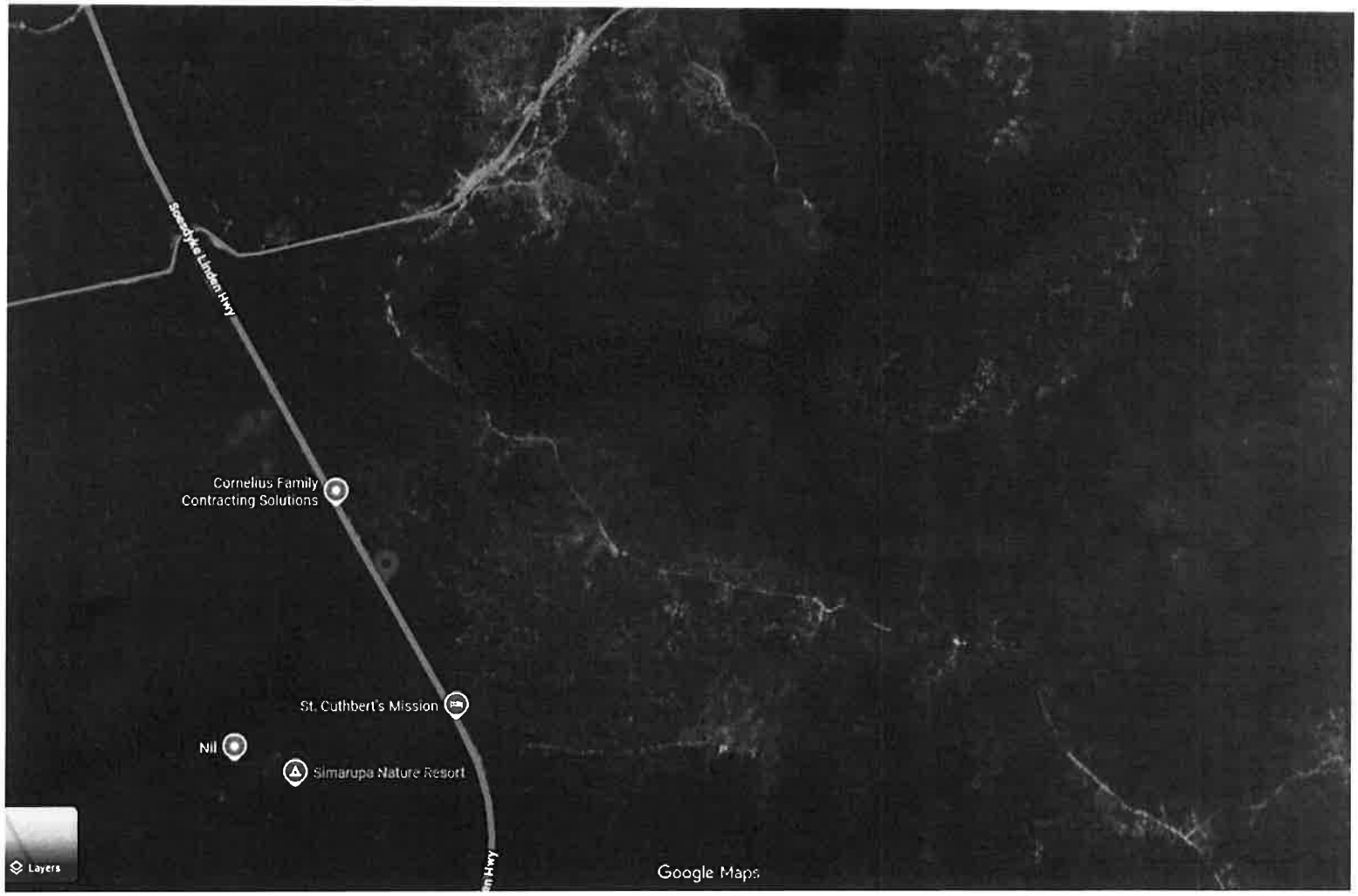

Figure 2:Th red pin is showing the location of the proposed sawmill site with the sand trail and the surrounding land uses

Pre-Construction Phase

A total area of approximately **eight (8) acres** has been cleared to facilitate the establishment of the proposed sawmill infrastructure, including the sawmill shed, living quarters, workshop, and timber depot.

Construction materials, including lumber of various dimensions, sand, aggregates, steel reinforcement rods, and cement, will be transported to the site using a hired canter truck. Materials will be delivered in a **just-in-time manner**, aligned with construction activities, to allow for immediate offloading by construction personnel. No stockpiling of materials will occur on-site, as there is currently no permanent security system in place. Only the exact quantities required for each construction phase will be mobilized, thereby reducing the risk of theft, material degradation, and unnecessary site congestion.

Construction Phase

During the construction phase, approximately **three (3) to four (4) workers** will be engaged. All workers will be responsible for providing their own personal protective equipment (PPE). A **fully stocked first aid kit** will be maintained on-site to address minor injuries. In the event of a serious injury, the affected individual(s) will be promptly transported to the **Long Creek Health Centre** for medical attention.

The construction phase is expected to last approximately **two (2) months**. The following infrastructure will be developed:

- A **single-storey wooden building** measuring **60 ft × 20 ft × 10 ft**;
- A **mill shed** measuring **60 ft × 74 ft × 20 ft**;
- An attached structure measuring **10 ft × 46 ft**, accommodating the generator room, saw shop, and control room;

- Sanitary facilities comprising **two (2) flush toilets and one (1) bath**, connected to a **separate septic tank system**; and
- A designated lunch room.

Upon completion of the mill shed, sawmill equipment and associated electrical systems will be installed and commissioned.

Solid waste generated during construction is expected to be minimal and will include items such as empty cement bags, wood off-cuts, food containers, beverage bottles, and tins. All construction-related waste will be collected in a covered garbage receptacle (plastic drum) and disposed of in a designated solid waste pit.

Noise emissions during construction are anticipated to be minimal, as activities will primarily involve **hand-held electrical tools**. Construction activities will be conducted **during daytime hours only**, between **08:00 hrs and 17:00 hrs**, Monday to Saturday. No vibration impacts are anticipated, as heavy-duty machinery such as loaders or skidders will not be utilized during this phase.

Operational Phase

The sawmill is projected to process approximately **250–350 cubic metres of logs per month**. The facility will be equipped with the following machinery:

- Two (2) portable sawmills;
- Two (2) planers;
- One (1) edger;
- One (1) moulder connected to a dust containment bin;
- One (1) rip saw;
- Three (3) chainsaws;
- One (1) **375 kVA generator**; and

- Three (3) log loaders.
- 2 Metal Klins

Both dressed and rough-sawn lumber will be produced and stored on **lumber racks and dunnage**. Timber species processed on-site will include, but are not limited to: **Tatabu, Toroniro, Shibadan, Baromalli (Farm Board), Antwood, Karatie, Silverballi, Dukalie, Purpleheart, and Greenheart**.

Logs will be sourced exclusively from licensed logging concessionaires operating within the **Ituni/Kwakwani and Mabura districts**. Logs will be transported to the site by log trucks and offloaded into a **log pond** using a Log Loader. The log pond has a storage capacity of approximately **300–500 cubic metres**. Logs will be transferred from the pond to the mills for debarking and sawing into boards. Processed boards will then pass through planers to produce finished lumber for resale.

Utilities and Support Services

Water for operational and domestic use will be sourced from the nearby **Long Creek** and transported to the site using a hired canter. Water will be stored in **two (2) 450-gallon black storage tanks**. Electricity will be supplied primarily by an **375 KVA generator**, supplemented by **solar-powered lighting systems** to reduce generator usage, particularly during nighttime hours.

Telecommunication services will be provided by the **Guyana Telephone and Telegraph Company (GTT)** and **Digicel**. Approximately **six (6) five-gallon fuel containers** will be stored on-site. All fuel containers will be securely sealed and stored in a safe and designated area to prevent spills and fire hazards.

Employment, Safety, and Fire Prevention

The sawmill will employ approximately **twelve (12) workers** on a daily basis. Operational hours will be **Monday to Friday, 08:00 hrs to 17:00 hrs**, and **Saturday, 08:00 hrs to 12:00 hrs**. All log and lumber loading and offloading activities will occur strictly during designated working hours.

Employees will be provided with appropriate **personal protective equipment (PPE)**, including gloves, high-visibility vests, safety helmets, protective goggles, and steel-toe boots. A **first aid kit** will be stationed in the office to treat minor injuries, while a company van will remain on standby for emergency transportation to the Hauraruni Health Centre.

Fire extinguishers and sand buckets will be strategically positioned throughout the facility. Additionally, **"No Smoking" signs** will be prominently displayed in fuel storage and high-risk areas to minimize fire hazards.

Environmental Effects

The potential environmental impacts that may be generated from the operation of the sawmill, Lumber Yard and Timber Depot, along with the mitigation measures, are presented in the table below:

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Sawmill and Kiln Charcoal Production Operations

Air Quality Impacts

Potential Impacts

- Emissions of particulate matter (PM), smoke, carbon monoxide (CO), volatile organic compounds (VOCs), and odours from charcoal kilns during carbonization.
- Generation of wood dust and fine particulates from sawmilling activities (cutting, sawing, edging, and handling of timber).

- Exhaust emissions from generators, loaders, and transport vehicles.
- Localized deterioration of ambient air quality and nuisance impacts on nearby receptors.

Mitigation Measures

- Utilize improved and efficient charcoal kilns (e.g. covered or retort kilns) to enhance combustion efficiency and reduce smoke emissions.
- Ensure kiln is properly seasoned to reduce incomplete combustion and excessive smoke.
- Enclose sawmill operations where practicable and install dust containment measures (e.g. collection bins, bags, tarpaulins).
- Conduct operations during daylight hours only and under favourable meteorological conditions to promote dispersion.
- Fit generators with exhaust stacks and mufflers and conduct routine servicing.
- Establish vegetative buffer zones around the facility to assist in dust and smoke attenuation.
- Train operators in best practices for kiln firing and sawmill operation.

Forest Resources and Raw Material Use

Potential Impacts

- Unsustainable harvesting of timber for lumber production and charcoal production.
- Depletion of forest resources and associated biodiversity loss if sourcing is not controlled.

Mitigation Measures

- Source all logs and wood feedstock exclusively from legally licensed and approved Loggers.

- Prioritize the use of sawmill residues (off-cuts, slabs, rejects) as charcoal to reduce waste and pressure on forests.

Soil and Water Quality Impacts

Potential Impacts

- Deposition of sawdust, charcoal fines, and ash on soil surfaces.
- Potential runoff of suspended solids into nearby drains or waterways.
- Risk of soil contamination from fuel, lubricants, and waste oil associated with machinery.

Mitigation Measures

- Store sawdust, wood shavings, charcoal fines, and ash in covered and designated containment areas.
- Maintain buffer distances between operational areas and natural watercourses.
- Construct bunded and impervious fuel storage areas with a minimum of 110% containment capacity.
- Prohibit discharge of any waste, fuel, or oils onto soil or into waterways.
- Install runoff control measures (berms, silt traps) where necessary.
- Conduct routine inspections to identify and address any signs of leakage or contamination.

Noise and Vibration

Potential Impacts

- Noise generated from sawmill machinery, generators, loading/offloading activities, and transport vehicles.
- Vibration impacts affecting workers and nearby receptors.

Mitigation Measures

- Install all machinery on properly designed concrete foundations to dampen vibration.
- House generators and high-noise equipment in enclosed structures constructed with noise-insulating materials.
- Restrict operational hours to 06:00 hrs – 18:00 hrs, in compliance with Noise Management Regulations.
- Maintain equipment according to manufacturer specifications to minimize noise emissions.
- Facilitate noise monitoring by the EPA and implement corrective actions if required.

Solid and Hazardous Waste Management

Potential Impacts

- Generation of solid waste (office waste, packaging, wood waste).
- Generation of hazardous waste (used oils, oily rags, lubricants).
- Poor waste management could result in environmental contamination and pest attraction.
- Accumulation of unburnt wood, charcoal fines, and packaging waste.

Mitigation Measures

- Implement a Waste Management Plan consistent with the Environmental Protection Act and Litter Enforcement Regulations.
- Collect general waste in covered receptacles and dispose of it through a licensed waste contractor.
- Promote reuse and recovery of wood waste (charcoal feedstock, poultry bedding, mulching, landfill cover).
- Store hazardous wastes in labelled, sealed, and bunded containers and dispose of them through approved channels.

- Prohibit open burning or incineration of waste on-site.
- Maintain cleanliness around waste storage areas to prevent vermin.

Occupational Health and Safety

Potential Impacts

- Worker exposure to wood dust, smoke, heat, noise, and moving machinery.
- Risk of injuries during cutting, loading, kiln operation, and transport activities.

Mitigation Measures

- Provide workers with appropriate Personal Protective Equipment (PPE) including helmets, gloves, safety boots, ear protection, and respiratory masks.
- Conduct routine toolbox talks and safety briefings addressing sawmill and kiln-specific hazards.
- Maintain a first aid kit in accordance with Guyana Red Cross standards.
- Ensure availability of transport and communication systems for emergency response.
- Limit worker exposure times in high-heat or smoke-prone areas.

Community and Socio-economic Impacts

Potential Impacts

- Smoke, odour, and noise affecting nearby residents.
- Increased traffic from log delivery and charcoal transportation.
- Potential conflicts over land and resource use.

Mitigation Measures

- Maintain clear communication with nearby communities regarding operational schedules.
- Implement a traffic management plan to ensure safe movement of vehicles.

- Restrict operations to approved areas and adhere to permit conditions.

Monitoring and Continuous Improvement

Mitigation Measures

Maintain records of:

- Wood sourcing and volumes processed.
- Waste generation and disposal.
- Equipment maintenance and servicing.
- Training and safety activities.
- Conduct periodic internal reviews of environmental performance.
- Submit Environmental Annual Reports to the EPA as required.
- Update mitigation measures based on inspection findings and regulatory guidance.

Charcoal Production- Metal Klins

Two metal kilns will be purchased, measuring 4ft*8ft and will be placed at the back of the sawmill, thus ensuring that smoke does not affect workers; there is no other resident in close proximity to the operation.

Site selection and assessment

Select flat, well-drained site with safe access, buffer from residences, watercourses, and protected areas.

Kiln type & design

Two 4ft*8ft metal kilns to be used producing approximately 30 to 40 bags of charcoal every 4 to 5 days.

Construction and installation

The Kiln will be made of metal.

Operation procedures

- Dry seasoned hardwoods will be used for best charcoal; softwoods produce more quick-burning charcoal or more volatiles.
- Target moisture <20% (ideally 10–15%). Wet wood reduces yield and produces more smoke.
- Cut to uniform lengths that fit kiln; split larger logs for more even pyrolysis.

Kiln preparation

- Inspect kiln for structural integrity, seals, vents and removable lids.
- Clean ashfrom previous runs, check inner coatings.
- Position kiln on non-flammable base; ensure chimney points away from flammable structures.

Loading

- Stack wood inside to maximize density but allow air channels: vertical or cross-stacking depending on kiln design.
- Kiln will not overfill; leaving clearance for lid and vents.

Ignition (start)

- A small Ignite small amount of kindling/charcoal in the designated starter port. Close lid/ports after fire catches except for controlled air inlet(s).

Pyrolysis control (primary conversion)

- Allow the wood to heat progressively; wood will begin to devolatilize and produce heavy smoke (white/gray) that later turns thin and bluish when volatiles are largely burned off.
- Control airflow with dampers/vents: too much air => full combustion (ash), too little => incomplete pyrolysis, long run times.
- Typical temperature ranges inside: 300–500°C (572–932°F) for active pyrolysis.
- Typical initial burn/pyrolysis time: larger retorts 12–48+ hours depending on size, wood type, and target char quality.

Monitoring signs

- Smoke color: heavy white/black = active volatiles; thin blue = nearing completion.
- Flame behavior in chimneys: strong flames = lots of volatiles burning; diminishing flames and smoke thinning = closer to done.
- Internal temp trending steady in 400–500°C signals active conversion.

Sealing & quenching (end of run)

- When smoke is thin/blue and flame activity declines, begin to restrict air gradually by the primary air inlet.
- Once vents are closed, you may quench by:
    - sealing and smothering: close lid and completely block vents to starve oxygen and allow cooling. This method avoids water but takes longer.

Cooling

- Allow kiln to cool fully before opening — often 12–24 hours after quench/smothering depending on size. Use temperature checks; kiln must be cool to touch or safely below ~80°C (176°F) to open.
- Opening too soon can lead to ignition and loss of product.

Unloading & handling

- Remove charcoal with care — pieces may be fragile.a metal shovels and store in dry, non-flammable containers.
- Screen/collapse oversized pieces if needed; separate ash and fines if product specs require.
- Typical yields: 20–35% by weight for many hardwoods (e.g., 1000 kg wood → ~200–350 kg charcoal) depending on species, moisture, and process control.

Quality checks & storage

- Will be store in dry, ventilated, rodent-free area; keep away from ignition sources.

Maintenance & record keeping

- Clean kiln surfaces, flues, and ash regularly; inspect seals and repair corrosion.
- A record of the amount of charcoal produce by each kiln will be kept on site

Safety reminders (final)

- Never leave kiln unattended during active burn.
- Keep spectators and vehicles upwind and at safe distance.

Environmental impacts of metal charcoal kilns (wood charcoal production)

- Deforestation and wood resource depletion: unsustainable harvesting reduces forest cover and biodiversity.
- Carbon emissions & climate impact: CO_2 from combustion and CO, CH_4, VOCs from pyrolysis contribute to greenhouse gases.
- Air pollution & local health effects: particulate matter ($PM_{2.5}$/PM_{10}), smoke, CO, NOx, SO_2, VOCs, and PAHs cause respiratory illness and nuisance.
- Black carbon: soot emissions contribute to regional warming and air quality degradation.
- Soil degradation and erosion: removal of woody biomass and site disturbance can increase erosion and reduce soil fertility.
- Water quality impacts: ash, runoff, or spills can leach nutrients/alkalis into waterways; accidental quenching runoff may be alkaline.
- Waste and residues: ash, fines, tarry condensates, and spent fuels require disposal; tar/creosote can contaminate soil.
- Biodiversity loss and habitat fragmentation: wood sourcing and site clearing degrade habitat.
- Fire risk and accidental wildfires: escapes can damage ecosystems and property.
- Social/economic impacts: respiratory disease burden, reduced livelihoods for other forest users, conflicts over resource access.

Mitigation measures (operational, technical, regulatory, and social)

Sustainable wood sourcing

- All wood for the charcoal production will be from the sawmill operation

Improve kiln efficiency & technology

- Use improved metal kiln designs to raise yield and reduce emissions.

Emission controls and monitoring

- Monitor smoke color, stack temperatures, and periodically sample for PM and CO to check performance.

Safer operational practices

- Train operators on controlled airflow, proper quenching methods, and emergency procedures to prevent over-burning and accidental fires.
- Schedule operations under favorable weather (low wind) and keep adequate firefighting equipment and containment measures on site.

Waste handling & pollution prevention

- Reuse ash where possible as soil amendment.
- Prevent quench-water runoff into streams.

Health & community safeguards

- Provide PPE, enforce break/shift rotations, and reduce direct smoke exposure for workers.
- Engage local communities on resource access, timing of operations, and benefit sharing to reduce conflicts.
- Provide health monitoring and access to medical care for workers and nearby residents if needed.

Regulatory, certification & economic incentives

- Comply with local air and waste regulations; secure permits and conduct environmental assessments if required.
- Seek access to carbon finance or sustainability premiums by documenting improved practices (e.g., ICROA-compatible methods, voluntary carbon standards) where applicable.
- Promote value-added products and markets for sustainably produced charcoal to improve economics and reduce pressure to over-harvest.