



ENVIRONMENTAL IMPACT STATEMENT REPORT

FOR THE

FOR EXPANSION OF THE COOKING OIL PROCESSING PLANT ON SUB C AND SUB D OF LOT 10208/M, MUMBWA ROAD, MWEMBESHI AREA IN CHILANGA DISTRICT BY PARROGATE GINNERIES LIMITED



Prepared By



May, 2022



Expansion of Cooking Oil Processing Plant
in Chilanga District
Environmental Impact Statement

Draft Report

May 2022

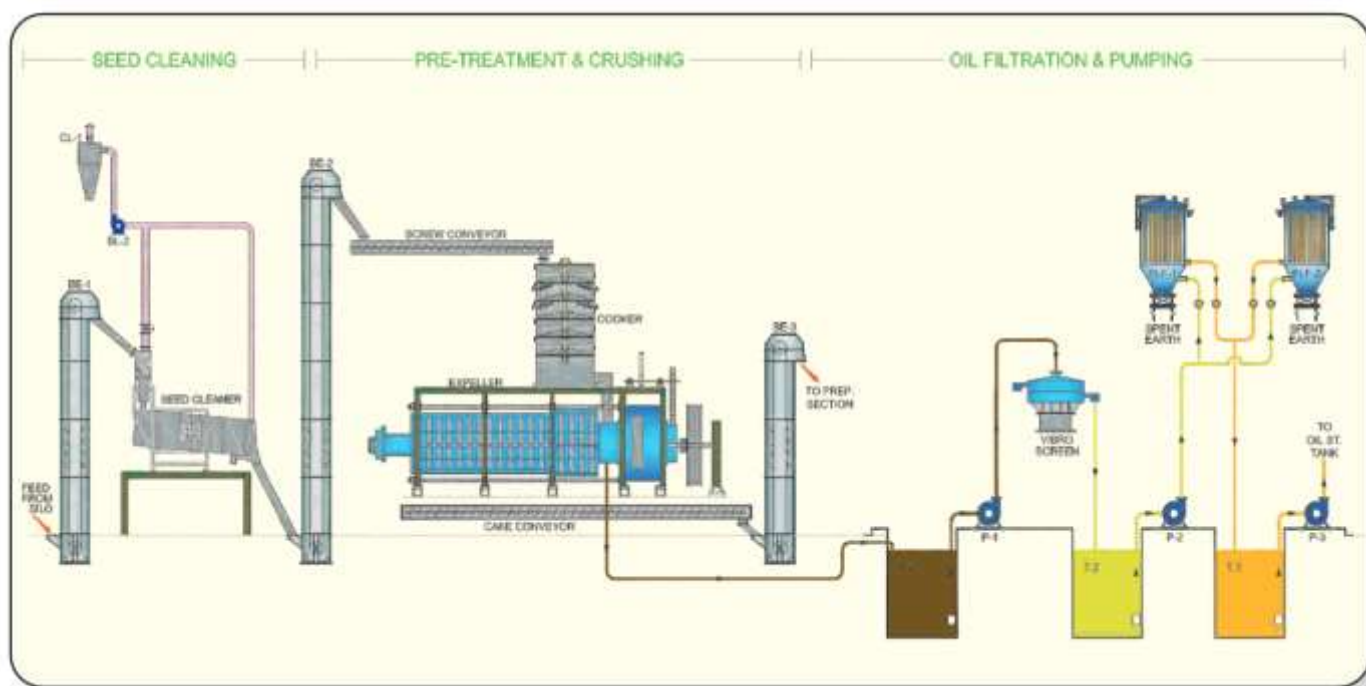


Parrogate Ginneries Ltd
Plot No 5001, off Mumbwa
Road Chinika Industrial Area,
Lusaka.

Prepared for
PARROGATE Ginneries Limited

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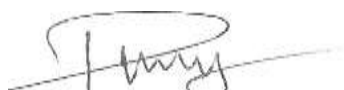
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QUALITY CONTROL PLAN

Project Title	Environmental Impact Assessment (EIA) for the Expansion of the cooking oil processing plant on Sub C and Sub D of lot 10208/M, Mumbwa road, Mwembeshi area in Chilanga district, Zambia.
Contract No.	14/2022
Client	PARROGATE Ginneries Limited (PGL), Lusaka.
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*By signing, I certify that the document/report has been prepared and reviewed as per the quality assurance measures established by Environmental Science and Engineering Consultants Limited, **Ndola.***

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Acronyms and Abbreviations

Abbreviation	Definition
CBD	Convention on Biological Diversity
CTC	Chilanga Town Council
CSR	Corporate Social Responsibility
ECZ	Environmental Council of Zambia
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
EP	Equator Principles
ESEC	Environmental Science and Engineering Consultant
FRA	Food Reserve Agency
GRZ	Government of the Republic of Zambia
GSD	Geological Survey Department
HIV/AIDS	Human Immuno Virus/Acquired Immuno Deficiency Syndrome
HSE	Health Safety and Environment
IAP	Interested and Affected Parties
LWSC	Lusaka Water Supply and Sanitation Company
masl	metres above sea level
NIPA	National Institute for Public Administration
NRDC	Natural Resources Development College
NWASCO	National Water Supply and Sanitation Council
PGL	Parrogate Ginneries Limited
SHE	Safety Health and Environment
SI	Statutory Instrument
STIs	Sexually Transmitted Infections
TLV	Threshold Limit Value
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organisation
USD	United States Dollars
WARMA	Water Resource Management Authority
ZEMA	Zambia Environmental Management Agency
ZSA	Zambia Statistics Agency

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Overview

This document forms the Environmental Impact Statement Report for PARROGATE Ginneries Limited (PGL).

PARROGATE is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district which was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

Parrogate Ginneries Limited intends to expand the plant on Sub C and Sub D of Lot 10208/M, Mumbwa road, Mwembeshi area, Lusaka west. It will ensure environmental sustainability of operations of the plant through preparation of the EIA and therein, an Environmental Management Plan (EMP) as per the Zambian legal requirements.

Scope of the EIA study

To determine the environmental and social implications of the project, an EIA must be undertaken according to the Environmental Management Act (Environmental Impact Assessment) Regulations S.I. No. 28 of 1997.

The EIA study has been carried out following the guidelines and requirements of the Zambia Environmental Management Agency (ZEMA) and the project Terms of Reference (see appendices) which were reviewed by ZEMA and approved. The document encompasses an Environmental Impact Statement (EIS) and an Environmental Management and Monitoring Plan (EMMP).

The study addresses issues surrounding the following aspects of the environment:

- Solid waste management and management of other waste during construction and operation phase;
- Soil contamination during all phases ;
- Air quality and noise ;
- Wastewater quality;
- Occupational health and safety;
- Traffic management and safety
- Flora and Fauna;
- Socio-economic issues including employment and multiplier effects, HIV/AIDS;
- Public health issues including waste management and vector control.

The Environmental Management and Monitoring Plan outlines obligations and responsibilities of the Developer (PGL), Contractor and other relevant parties to serve as a management tool in the successful implementation of recommended mitigation measures and subsequent monitoring thereof during all project phases.

Project Location

The site for the cooking oil processing plant is located on plot number 10208/M, Mumbwa road, Mwembeshi area whose geographical coordinates are 15°21'4" S and 27°57'23" E. It

is located about 30 km from the Lusaka CBD and 20 m off Mumbwa road. The site is in the vicinity of Mwembeshi maximum correctional facility in the northern direction, Mwembeshi Boarding Secondary School in the south-east direction and Round House lodge on the southern side. The plant area is surrounded by farms on the eastern side, while Mumbwa road form the western border.

Project Objectives

The objective of the project is to expand the Cooking Oil Processing Plant by Solvent Extraction from 200MT/Day to 600MT/Day. The plant is located on Lusaka-Mumbwa road in Mwembeshi area of Chilanga District in Lusaka Province.

Other objectives and benefits of the project are as follows: -

- To contribute to reduction of public demand for cooking oil in Chilanga, Lusaka and the nation as a whole.
- Contribute to national Growth Domestic Product (GDP) by enhancing infrastructural development in Zambia;
- Provide employment opportunities for skilled, semi-skilled and casual workers through direct and indirect job opportunities.
- Contribute revenue to the Government and the Local Authority through payment of corporate taxes, rates and personal levy; and
- Contribute to reduction of poverty levels in Chilanga District through people employment.

Life Span

The plant is expected to have a lifespan that will last as long as possible within the period of the lease remains relevant to the area. However, processing plants of that nature are expected to last over **35 years** as long as the market remains available for the product.

Project Investment Cost

The cost of the project is estimated at **US\$ 90,000** with its implementation expected to commence in the year 2022 or upon acquisition of necessary permits from ZEMA and other Authorizing Agencies.

Legal Framework

In accordance with the Zambian Environmental Laws, the cooking processing facility falls under the Second Schedule; regulation 7 (2) of the Environmental Impact Assessment regulations, statutory instrument No. 28 of 1997 and listed under the category of Processing and Manufacturing Industry: (g) **“Food processing plants - 400 tonnes or more output a year”**. The facility has potential adverse environmental impacts that are generally site-specific, and could be readily addressed through mitigation measures. Accordingly, the Zambia Environmental Management Agency (ZEMA) is mandated to evaluate and assess the EIA report and decide whether to approve or disapprove the facility.

Approach and Methodology

ESEC LTD was the Consultant in the Social and Environmental Assessment of the proposed expansion of the plant. The information generated during the various specialist

investigations was continuously reviewed and presented and incorporated during the write-up of the document. .

ESEC LTD used a well-established methodology in assessing the impacts and benefits associated with the project. The methodology, as discussed in the main body of the report, assists in ensuring an objective assessment and clearly indicates the criteria used during the EIA process. With the said methodology, decision making is facilitated and subjectivity prevented in order to ensure an impartial reflection and assessment of the project.

Baseline Conditions

To describe the existing environment, appropriate standard methodologies were used. These included undertaking inventory of physical and biological environments, conducting interviews with stakeholders and reviewing of relevant literature. Information on names of geographical features were checked from the maps and confirmed by interviewing the project proponents who were conversant with the area and specific details. The inventory of the existing physical and biological environment such as vegetation in the proposed project site focused on quality, quantity, density, and distribution. The mapping of the existing surrounding buildings was undertaken to map out the surroundings of the project areas in order to determine the location of the proposed development in relation to any existing critical installations and developments that would be affected by the project. In doing so, the existing environment was categorized into physical, social and biological environments.

The project site specifically is a disturbed site with few vegetation. The remnants of natural vegetation of the project area broadly fall into two categories. They include the grassy vegetation and the few trees maintained on certain part of uncleared land. Specifically though, the vegetation surrounding the proposed site is classified in three groups namely Mushitu Forests, Succulents, Shrubs and Climbers/Creepers and Grasses (*Poaceae*). The proposed plant site has no endangered flora or fauna species. None of the IUCN Red List of threatened fauna species was recorded at the project site.

The project area is not serviced by any water supply company and there are boreholes at the site. Water supply will be from the p drill boreholes and sanitation will be by proposed sewer line into septic tanks.

The climate in the area around the facility is tropical characterized by three distinct seasons in the year: During the rainy season, extending from early November to April, maximum temperatures may vary from about 24°C to 29°C. The Annual minimum temperatures range between 11°C and 15°C. The range between daily maximum and minimum temperatures is about 7°C. The temperature variations in the area of Chilanga are considerable between the cold and hot seasons the average minimum temperature is 10°C with a max of 35°C. The highest temperatures are recorded in October and the 30-year annual mean temperature is 20.7°C

The terrain features shallow valleys and mild hills, with a very gentle north-south slope dipping towards Southern side of the project site even though the site appears almost flat to the human eye.

The general atmospheric air quality and noise conditions of the project area are normal to high and typical of an agricultural area.

Alternatives Considered

Field visits undertaken during the course of study assisted the Consultant team to consider

available alternatives to the plant site.

The following alternatives were considered: -

- **Project need alternative:** The shareholders of PGL have been motivated to expand and operate Cooking Oil Plant to make profit for them by selling finished oil product locally. The increasing demand for cooking oil in Zambia and the availability of raw materials (soybeans, sunflower, palm etc) in Zambia has created a conducive business environment. The proposed project will help Zambia meet the demand for finished cooking oil product as well as help reduce importation of edible oils and subsequent reduction of local prices.
- **Site alternatives:** Two alternative site localities were evaluated using the following criteria; Land Acquisition, Resettlement and Compensation, Market and Infrastructure Accessibility during the Scoping Phase of the Environmental Impact Assessment. The alternatives as follows:

Alternative A: To Use the Existing Site in Chilanga District

The site in Chilanga District has all the land acquisition papers put in place. Chilanga District was earmarked for Industrialization especially manufacturing & agro – Processing. There are no settlers on this land and moreover, it is close to the largest market outlet (Lusaka City) and easily accessible by a good road (Mumbwa Road) located in an area with commercial farming blocks where there is easy access to Soya Beans supply. This is in line with the National Development Plan

Alternative B: Source a Land Parcel in elsewhere

This alternative requires sourcing another land parcel though discussions with local authorities. It could involve resettlement and compensation of project affected persons (PAPs). Moreover, access roads will have to be constructed.

- **Water Supply alternative**
The use of bore hole for water supply was analyzed against connecting to a local water supply utility company and buying of disposable water bottles for domestic use. The use of a borehole was preferred for the project operations and domestic use as an alternative which seemed to be cheaper and appropriate
- **Sewerage Management:** Three options for sewerage and waste water treatment have been considered.

Option 1 requires that the sewage water be discharged to the municipal sewage plant. This option will require that the plant sewer system be connected to Lusaka City Council sewage system which is nearer than Chilanga Town Council. This area has no council sewer system yet.

Option 2 is the preferred option in which a sewer package (septic tanks and effluent retention ponds) that would be installed for the office complex and change house, with the effluent being pumped out and discharged into the council sewer ponds on licensed arrangement. **This option was considered best fit.**

Option 3 would be to discharge the sewage effluent from the package plant to the nearby streams as it would contain nutrients (nitrate and phosphate) that would nourish the riverine system and hence contaminate water and cause harm to the eco-system.

- **Waste Management alternatives:** Two options of using the waste bin were analyzed against using a skip bin. The first option meant that the company needed to buy many waste bins, which have a limited holding capacity. The second option was opted as the skip bin has a huge carrying capacity.
- **Power alternatives:** The principal source of electricity during the operational phase of the project will be hydro-power energy to be sourced from a nearby ZESCO main which is found within reach of the project site. The ZESCO main was picked as a major source of power as it provides the clean and less costly power alternative which is also environmentally friendly.

In terms of power source for boilers, two alternatives will be considered either diesel or coal powered boilers.

Diesel

- Burns faster and produces huge quantities of energy
- It is cheaper than petrol

Limitation:

- It is not readily available locally
- It is very expensive as it has an increased evaporation time as compared to coal.
- Effluent production is very high and dangerous to the environment
- Transporting this commodity is very expensive
- The fumes may be very catastrophic in case of any fault

OPTION: Not Selected

Coal

- It is readily available locally
- Transportation is very cheap as it will be transported from Maamba via railway
- Can easily be offloaded from the Chikumbi Railway siding.
- Coal is cheaper than Diesel in terms of cost.
- Its effluent is easy to contain as it shall pass through a water scrubber
- Produces high energy as it contains between 69% & 86% carbon by weight

Limitation:

- Rail Transportation is tightly timed compared to road transport which is quicker.
- Chemically, coal is mostly carbon, which, when burned, reacts with oxygen in the air to produce carbon dioxide, a heat-trapping gas. When released into the atmosphere, carbon dioxide works like a blanket, warming the earth above normal limits.

● **OPTION: Selected**

- **Raw Materials alternatives:** The average bottle of cooking oil contains vegetable oil, with no additives, preservatives, or special flavorings. The oil comes from various parts of plants, in most cases from what are commonly called seeds. Some of the alternative raw materials include sunflower, palm kernel, safflower, cotton, sesame, and grapeseed oils) or nuts (including peanut, soybean, almond, and walnut oils). A few special cases involve merely squeezing the oil from the flesh of the fruit of the plant. For example, coconut oil comes from the coconut's white meat, palm oil from the

pulp of the palm fruit, and olive oil from the flesh of fresh olives. A typically, corn oil is derived from the germ (embryo) of the kernel.

Three alternatives for raw materials were evaluated using the following criteria;

- Technology to be used
- Availability of the raw material
- Prices
- Market
- Accessibility during the Scoping Phase of the Environmental Impact Assessment

The average bottle of cooking oil contains vegetable oil, with no additives, preservatives, or special flavorings. The oil comes from various parts of plants, in most cases from what are commonly called seeds. Some of the alternative raw materials include sunflower, palm kernel, safflower, cotton, sesame, and grapeseed oils) or nuts (including peanut, soybean, almond, and walnut oils). A few special cases involve merely squeezing the oil from the flesh of the fruit of the plant. For example, coconut oil comes from the coconut's white meat, palm oil from the pulp of the palm fruit, and olive oil from the flesh of fresh olives. A typically, corn oil is derived from the germ (embryo) of the kernel.

Sunflower

- It is readily available on the Zambian market and beyond borders.
- Market is readily available
- Consumption of sunflower oil is moderately high in Zambia and across borders.

Limitation: Low market as compared to soya bean oil and the material is moderately expensive

OPTION: Not selected

Cotton Seed

- It is readily available on the Zambian market and beyond borders.
- Market is readily available
- Low market as compared to sunflower and soya bean oil

Limitation: Cotton seed is very expensive; Production level of oil is very low as compared to sunflower and soya beans; The consumption of cotton seed oil is very low; and Very expensive to extract.

OPTION: Not selected

Soya beans

- It is cheaper to grow
- Readily available market and sourcing.
- The prices are not as high
- Environmentally, one of the many benefits of soya is that it is able to ingest atmospheric nitrogen that other plants need to get from the soil. Soya often ingests more atmospheric nitrogen than it uses to grow, and fixes the remainder into the soil (where it will be available for the next crop). The process of nitrogen consumption and fixation is enhanced if nodules have formed on the soya roots, and those nodules only form when the appropriate rhizobium bacteria are present in the soil.
- Public consumption levels are very high.

Limitation: Very few if not nothing

OPTION: Selected.

- **Alternative Technology:** There are various technological options that have been considered for PGL Oil Processing Plant with the following having been considered in this study:
 - ✓ **Steam Heating Process:** Super steam is passed through the soya seed to loosen the fat molecules in the cells. The heated seed is then crushed in a screw funnel. This is the old technology for oil processing.
 - ✓ **Thermo-heating using a combination of coal and fire wood to heat the water in the boiler section.** This has implications of air pollution by smoke which affects the surrounding area/community.
 - ✓ **Solvent extraction method:** The most preferred technology is the solvent extraction method which has minimal impacts on the climatic environment and does not result into deforestation in order to source wood for heating.
- **Domestic Waste Disposal Facilities:** The option of using waste bins was analysed against using a skip bin. The first option meant that the company needs to buy many waste bins, which have a limited holding capacity. The second option was opted as the skip bin has a huge carrying capacity.
- **Alternative Products:** The main alternative product is soya cake which will be used for making of animal feed. The cake is also used in the confectionary and sausage making industries. The cake is also used to make High Energy and Protein Supplement (HEPS) for under nourished people.

Potential Socio and Environmental Impacts

The main issues arising during expansion and operational phase include gaseous and dust emissions. The Developer is responsible to take appropriate measures to ensure occupational health and safety for all persons in the proposed plant as well as the safety and comfort of surrounding communities directly affected by operational activities.

Negative impacts

- Deteriorating quality of air due to gaseous and dust emissions. ;
- Solid waste generation;
- Occupational health and Safety in relation to work environment;
- Direct impact on localized soil e.g. soil contamination during operations;
- Generation of sewage;
- Oil effluent Impact on ground water;
- Noise pollution due to use of machinery during operations;

Positive impacts

- Employment opportunities for people of Chilanga and Zambia at large;
- Revenue for Government through payment of taxes;;
- Improved social interaction;

- Fulfilling the need for processed cooking oil in Zambia;
- Multiplier effects in related service and goods sectors;
- Empowerment of small scale soya beans growers.

Environmental Management and Monitoring

The study has proposed an Environmental Management and Monitoring Plan (EMP) to address the management of the identified negative impacts associated with the plant. The plan consists the following:-

- Implementing the Impacts Mitigation Plan;
- Monitoring the implementation of the EMP; and
- Institutional Framework for Monitoring, Reporting and Supervision of EMP.

Environmental monitoring and enforcement are stated along with the output from such monitoring activities. Monitoring responsibilities are specified for the responsible authorities (PGL).

Key parameters to monitor during operation of the project will include:

- Sewage/ effluent quality;
- Emissions from boilers ;
- Coal ash from boilers section;
- Hexane leaks;
- Dust from the feeders/storage section;
- Solid waste storage, collection and disposal;
- Emergency Preparedness (e.g fire preparedness and maintenance of fire equipment).
- Worker safety.

Conclusion

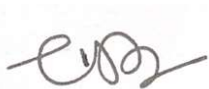
The expansion of the Cooking oil plant will undoubtedly bring economic development. This undertaking is within an already cleared and cultivated area and most of the environmental impacts during the operational phase of the project will be positive and the following are among the notable ones: -

- Provide direct employment opportunities for the skilled, semi-skilled and casual workers ;
- Empowerment to small scale soya beans growers (out grower schemes)
- Contributing to supply of affordable high quality processed cooking oil.

Declaration of Authenticity

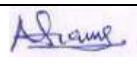
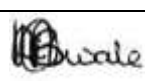
PARROGATE Gineries Limited (PGL) certifies and declares that the information presented in this Environmental Impact Statement (EIS) is both factual and accurate. This EIS conforms to the requirements of the Environmental Impact Assessment Regulations, SI 28 of 1997 with regard to the development of Environmental Management Plans.

For and on behalf of the **PARROGATE Gineries Limited, Zambia.**



.....
Mr. Rakesh Yadav
 Group Technical Head
Parrogate Gineries Limited

EIA STUDY TEAM

Proposed EIA Study Project Team					
No.	Name	Qualification	Position	Role	Signature
1	Patson Zulu	- Bachelor of Science (Chemistry), University of Zambia, 1980-85. - Postgraduate advanced certificates in Hazardous Waste Management April 16 to May 25, 1995: Advanced Hazardous Waste Management" course conducted at the Miljokonsulterna, Nykoping, in Sweden. Qualification - Postgraduate certificate in Hazardous Waste Management - March 1 to April 1, 1999: "ISO-14000 - Environmental Management Systems" in Sweden Topics covered - Environmental Auditing, Environmental Policy, Life-Cycle Analysis, Eco-Labeling, Cleaner Production, ISO 14 001 Standard, etc. Qualification - Postgraduate certificate	Team Leader	Coordination of EIA activities, plant process operation and units analysis, technology assessment and EIS report writing.	
2	Abiud Banda	- Masters of Science in Geo-Information Science and Earth Observation, University of Zambia, South Africa, 2017-2019 - Bachelor of Engineering (Environmental), Copperbelt University, 2015 - Environmental Impact Assessment Procedures, ZEMA,	Environmental Engineer – Reporting Water Resources Specialist and Air Quality Expert	Critical analysis of project components in relation to existing environmental setting; report writing Assessment of water resources and quality and Air quality assessment / air dispersion modelling	
3	Alice Muyanga	BSc (Wood Science and Technology - Forest Ecology), Copperbelt University, 2016	Ecologist	Assessment of ecological impacts.	
4	Siame Ndanji	Bachelor of Mineral Science (Geology), University of Zambia, 2017	Geology Expert	Assessment of the geology of the proposed site	
6	Ernest Mwape	- MSc (Agriculture Economics); - BA (Economics/Statistics)	Social Science Expert	- Socio-economic surveys - Social impact assessment - Environmental and Social Sustainability	
7	Bwalya Mwale	Bachelor of Engineering (Environmental), Copperbelt University, 2017	Solid waste Management	- Analysis of best options for solid waste at the proposed site - Assessment of waste water, and sewage management	

NON TECHNICAL SUMMARY

NON TECHNICAL SUMMARY

PARROGATE is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district which was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

The proposed plant expansions will be constructed in 2022 and once operational will involve procurement of the soya bean seed which will be cut, heated, and squeezed to make vegetable cooking oil.

The total cost of investment is estimated at **US\$ 90,000.00** with its implementation expected to commence upon acquisition of necessary permits from ZEMA and other authorizing agencies. The project is expected to have a lifespan that will last as long as possible. However, plant of that nature is expected to last over **35 years**.

The positive impacts of the project will include employment opportunities due to construction and operation of the plant, improved aesthetics of the area, contribute to government revenue, improve social interaction and fulfilling the need for affordable high quality processed cooking oil in Zambia

The main issues arising during construction and operations include gaseous and dust emissions, noise pollution etc The Developer shall be responsible for providing adequate sanitation for workers and ensuring proper measures for the management of solid and liquid waste products such as garbage and building rubble. Operational raw materials shall be sourced, stored, and used according to appropriate procedures. The Developer shall be responsible to take appropriate measures to ensure occupational health and safety for all persons in the proposed plant as well as the safety and comfort of surrounding communities directly affected by proposed plant activities.

The Cooking Oil Processing Plant will undoubtedly bring economic development. This undertaking will be within an already cleared area and most of the environmental impacts during the construction and operational phase of the project will be positive and the following are among the notable ones: -

- Provide direct employment opportunities for the skilled, semi-skilled and casual workers during the all phases;
- Empowerment to the small scale soya beans growers (out grower schemes)
- Contributing to supply of affordable high quality processed cooking oil.

NON TECHNICAL SUMMARY (CHI NY'ANJA)

Parrogate ndi gulu yama company yamene ipezeka muma iko aku Malawi, mu Zambia ndi Ku Zimbabwe. Munu mwathu mu ziko la Zambia ali ma plant opanga salad awili ina ili mu njira yaku mumbwa mu Lusaka ndipo inanso iliku mwembeshi mumuzinda wa chilanga yamene idapangiwa mu chaka Cha 2017. Kukulisa kwa company ili kuzalenga kupanga 200MT pa siku kufika 600MT pa siku kufunika kuikapo njira zili zinai monga (1) kuchosa mbeu ndi kusunga (2) kusuka mbeu ndi kupatula (3) kusikinya salad (4) kusunga salad muma shed.

Company ili idayamba kale kusebenza ndipo imasebenzesa mbeu ya soya beans yamene imasukidwa, ndipo kutenthedwa ndiponso naku khamidwa kupanga salad.

Kukulisa was kwa company imeneyi kuzachitidwa Chino chaka Cha 2022. Ndipo ikayamba kusebenza kuzakhala kugula kugula mbeu ya soya beans yamene izayamba kujubidwa, kutenthedwa ndipo kukhamidwa salad.

Ndalama kwanila \$90,000 yaikidwa padela kuti zonse zichitidwe ndipo ndipo chiloledwe kuchokwela ku boma kupyolela mu chigawo Cha ZEMA ndiwo chasalako Kuti company imeneyi iyamba kumangidwa. Iyi company izasebenza mopitilila zaka 35 years.

Iyi project ikayamba kuzakhala zinchito monga zomanga company, boma izapindulako ndalama za msonkho ndiponso salad yamene izapangidwa izakhala yabwino.

Koma pakupanga company imeneyi pazakhala nkawa ya chuwi, ndi chungu chifukwa Cha mamangidwe. Komabe ene ake a company imeneyi ndiwo azakhala ndi nchito yosebenzelepo Pali nkawa zimenezi kuonesesa Kuti zaudongo zili mumalo mwake munjila yabwino.

Company yopanga salad imeneyi ikatha kumangidwa izaleta;

- nchito kuli anthu amene alindi luso ndiponso amene alibe luso ku zinchito zamanja.
- alimi a soya beans azakhalako ndi msika paku gulisa soya beans yao ku company imeneyi.
- izatengako mbali pakupanga salad yabwino

1

INTRODUCTION

1. INTRODUCTION

1.1 Proposed Background

This document is the Environmental Impact Statement Report for Parrogate Ginneries Limited, a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district. Parrogate Ginneries Limited is an integrated agro value chain production unit with special interest in the production of edible oil and soyabean related products. The Company intends to expand the plant capacity from 200 MT/Day to 600 MT/Day and will include addition of four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil. PGL will ensure environmental sustainability of operations of the plant through preparation of the EIA and therein, an Environmental Management Plan (EMP) as per the Zambian legal requirements.

In accordance with the Zambian Environmental Laws, the cooking processing facility falls under the Second Schedule; regulation 7 (2) of the Environmental Impact Assessment regulations, statutory instrument No. 28 of 1997 and listed under the category of **Processing and Manufacturing Industry: (g) “Food processing plants - 400 tonnes or more output a year”**. The facility has potential adverse environmental impacts that are generally site-specific, and could be readily addressed through mitigation measures. This EIS report, has therefore been prepared in accordance with section 29 of the Environmental Management Act No. 12 of 2011 that requires the presentation of the findings of the EIA study and identifies both positive and negative impacts of the project together with recommendations to mitigate potential negative impacts and enhance the benefits.

1.2 Project Justification/Rationale

The shareholders of PGL have been motivated to expand the Cooking Oil Plant to make profit for themselves by selling finished oil product locally. The increasing demand for cooking oil in Zambia and the availability of raw materials (soybeans) in Zambia has created a conducive business environment. The proposed expansion will help Zambia meet the demand for finished cooking oil product as well as help reduce importation of edible oils and subsequent reduction of local prices.

1.3 Project Description

PGL intends to expand the plant capacity from 200 MT/Day to 600 MT/Day and will include addition of four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

There are nine (9) unit operations involved in preparation of soya beans for solvent extraction and these are itemized below;

- Receiving and storing,
- Cleaning
- Drying

- Tempering
- Cracking
- Dehulling
- Conditioning
- Flaking
- Expanding.

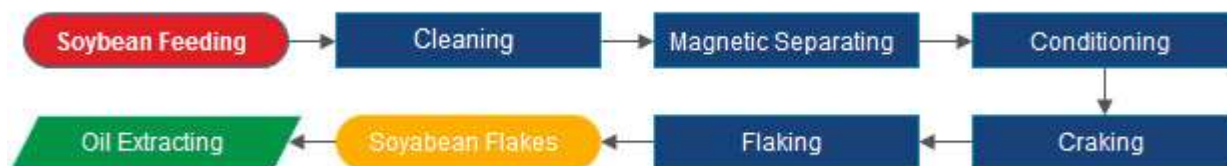


Figure 1-1: Pretreatment Process flow Diagram

PRETREATMENT SECTION

- **Receiving and storing raw soybeans:** When the raw material (soya beans) arrive at the plant using private trucks or rail, samples will be taken for moisture content, foreign matter, and damaged seeds. The seeds will then be weighed and carried to silos for storage in readiness for processing.
- **Cleaning or “scalping.”**: The seeds will then be removed from storage and cleaned. Cleaning involves removal of foreign particles by screening and loose hulls by aspiration. Large-size and small-size impurities in seeds will be removed by Vibrating Screen. The seeds will then be uniformly distributed on the surface of Vibrating Screen, then light impurities removed with function of aspiration channel. The Vibrating Screen is stable in performance, large in working capacity, and low in noise.



Figure 1-2: Oilseed Cleaning equipment

- **Gravity De-stoning:** Heavy impurities such as stone, glass, metal will be removed from the flowing seeds. It is negative pressure vessel, which will not only remove impurities, but ensure clean environment.



Figure 1-3: Gravity de-stoner machine

- **Drying:** The seeds will be dried to reduce the moisture content to 10% (percent) by weight.
- **Tempering:** After drying, the seed will be tempered for 2 to 3 days to allow the moisture to equilibrate and the hulls to loosen. Soybeans are generally cleaned again after drying using magnets, screens, and aspirators.
 - ✓ **Magnetic Separation:** for separating out metallic impurities. Complete with buffer seed feeder.



Figure 1-4: Magnetic separator

- ✓ **Dust Separation:** By Cyclone and Centrifugal Fan. In this way, light impurities are separated and the workshop is clean.
- **Cracking:** During the process of cracking, seeds are passed through a series of corrugated rolls that are generally about 10 inches in diameter and 42 inches long. The purpose of cracking is to break the seeds into pieces suitable to dehulling and flaking. Usually each bean is broken into four to six pieces. Cracking should produce a minimum of fines. The soybean is cracked (crushing machine) into 4-8 parts for downstream hull-kernel separation and flaking. Max. powder ratio: 4%. The Toothed

Cracking Roller is large in working capacity and stable in performance. Space between the tooth rollers can be adjusted easily. There is no material when the Cracking Roller is stopped.



Figure 1-5: Example of crushing machine

- Dehulling:** The purpose of dehulling is to produce high protein meal for animal feed or flour for human consumption. Soybeans are not dehulled for oil extraction. Dehulling decreases the volume that passes through the extractor, thus increasing throughput. Beans are dehulled by screening and aspiration. The removed hulls may be combined with hulls from the earlier cleaning steps and used in animal feed.
- Conditioning:** Cracked soybeans, with or without hulls, are then transported to conditioners. Conditioners are vertical stack cookers or rotary horizontal cookers where the soybeans are heated and moistened to make them pliable enough to ensure proper flaking. The conditioner has two functions: drying and softening. The Conditioner is made up of feeding, heating, drying and discharging sections and discharging funnel. Feed the conditioner at the top, subsequently soybean is distributed uniformly to reduce scouring to the heating tube. Typically, soybean-out temperature: 60, moisture content in soybean: 10%. The Conditioner should ensure the soybean flow without interruption, and the soybean is conditioned uniformly with least energy consumption. In addition, try to extend the serviceable time of Conditioner.
- Flaking:** Conditioned soybeans are fed through large, smooth-surfaced rollers and emerge as flakes ranging in thickness from 0.2 mm to 0.5 mm. The flaking machine is designed to turn the oil materials into flakes, by means of mechanical extruding force. Flaking process is essential in oil mill plant, since it can effectively improve the oil yield of oil mill machinery through increasing material superficial area.

This newly developed flaker machine is featured of compact structure, easy operation, reliable and safe working performance. Since the design is based on different oilseed properties, this flaking machine can process different oilseeds including soybeans.



Figure 1-6: Example of flaking machine

- **Expanding:** The expanders mix flaked soybeans with water and steam and press them into pellets called “collets.” Collets are denser and more porous than flakes. They allow more oil to be extracted from the soybeans and increase the throughput of the extractor. Collets also allow the solvent to drain more freely, decreasing the energy needed for desolventizing.

SOYBEAN OIL EXTRACTION SECTION

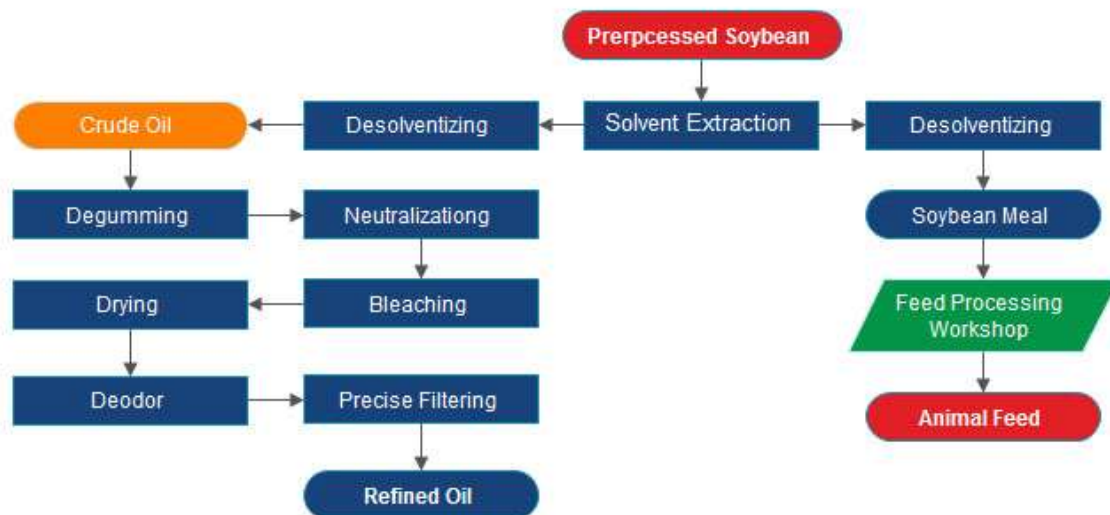


Figure 1-7: Oil Extraction and Refining Process Flow Chart

- **Oil Extraction:** The flaked soybean is conveyed to Rotary Extractor and kept for a certain level. Spray the flaked soybean with solvent (hexane). The flaked soybean moves forward with the action of driving device. In this case, the flaked soybean is sprayed and immersed, thus oil in soybean is separated out. Mixture of oil and solvent is called “Miscella”. When the Miscella has been filtered, it will flow to the Miscella cell. Pump the Miscella of high concentration into the Miscella Tank and then to the evaporation and oil stripping system. Miscella of low concentration is

sprayed again. After approx. 1 hour, the oil is extracted out. Then the cake slag (here called as “meal”) is pushed to the wet meal (there is solvent in the meal, so it is called “wet meal”) outlet of extractor. Recover solvent in wet meal by Desolventizer (DTDC). Constant material level works for sealing and stabilizing material flow. The transmission bearing is set outside to prevent against mechanical trouble caused by solvent corrosion. Meal in Miscella is removed by Liquid Cyclones.

- Wet Meal Desolventizing System:** The Desolventizer is made up of 5 layers. The 1st layer are designed for pre-heating wet meal to reduce moisture condensing and are designed for steam penetration. Mixture of steam and solvent vapor will pass through wet meal, which will not only make heat exchange but also remove some solvent in the wet meal. The 2nd and 3rd layers are for desolventizing by direct steam. Fresh steam (let in) removes solvent in wet meal completely. Toast the meal in the 4th layer, since there is steam condensate in the direct steam, which will increase moisture content in meal. Blow in cold air in the 5th layer to low meal temperature (The temperature of meal would be 8 -10 higher than ambient temperature). Hot air used in Desolventizer is supplied by Hot Air Heater. Remove the meal in the solvent vapor with Vapor Wash Cyclone, this will reduce meal entering into solvent vapor condensing system.
- Miscella Evaporation:** Miscella is temporarily stored in Miscella Tank and then pumped to the 1st-Stage Evaporator. Heat source of 1st-Stage Evaporator is the secondary steam coming from Desolventizer. So energy is significantly saved. Miscella from 1st-Stage Evaporator makes heat exchange with crude oil from Oil Stripper. Thus temperature of Miscella entering into 2nd-Stage Evaporator is increased and temperature of crude oil is lowered. The Miscella is then pumped to the 2nd-Stage Evaporator. Heat source of 2nd-Stage Evaporator is indirect steam. Subsequently the Miscella is pumped to the Oil Stripper.
- Solvent Condensing System:** Solvent condensing system is closely connected with evaporation system. All solvent vapor from Extractor, un-condensed vent gas, free gas from Combined Solvent-water Separator, free gas from Underground Solvent Tanks and free gas from Miscella Tank finally enters into the Vent Condenser, where the gas is cooled by low temperature water and thus most of the solvent gas is recovered. Vent gas is let out of the workshop by Fan. Waste water condensed from direct steam is discharged from Solvent-water Separator. If there is still some solvent in the waste water, boil the waste water to meet requirements in stipulated in National Standard.
- Boiler Operations:** The plant will be run using two coal - fired boilers. Boiler 1 will be of a capacity of 15 Tons and Boiler 2 will be 20 Tons. The coal peas will come from Maamba Collieries and Wange coal Mines who will be the major suppliers of coal for the plant. The plant usage capacity of coal is estimated at 460 Tons per month. The water product from the Boiler is Coal ash and soot. Coal will be disposed of by being used in road constructions and Making blocks. Monthly stack emissions will be conducted to ensure that the emissions are within ZEMA guidelines and returns will then be sent to ZEMA every after 6 month.
- Water Treatment Plant:** The proposed plant will get its operation water from a borehole. This water will go through the water treatment process called reverse osmosis where all the impurities will be removed before the water can be used in the

processing unit plant operations and the boilers.

1.4 Proposed Project Location

The Cooking Oil Processing Plant which covers an area of **32.4 Ha** is located on Sub C and D of Lot 10208/M, along Mumbwa road, in Mwembeshi area of Chilanga district, of Lusaka Province. The facility is located some 30 Km west from Lusaka central business district along Mumbwa road, about 20 m from Mumbwa road. The prominent neighbors are Mwembeshi maximum correctional facility in the northern direction, Mwembeshi Boarding Secondary School and Round house lodge on the southern side. The area is surrounded by farms on the eastern and southern sides and Mumbwa road on the western side. Within the project site there is one office block, soya beans processing plant that include warehouses, fuel depots, waste area, extraction, refinery and packaging plants, five bore holes, and access road.

The following are the coordinates of the plant:

Table 1-1: Proposed Plant site coordinates

PARROGATE GINNERIES LIMITED SITE COORDINATES			
Beacon No.	Description	Longitude (E)	Latitudes (S)
A	Corner Point	27° 57' 33" E	15° 21' 02" S
B	Corner Point	27° 57' 22" E	15° 21' 02" S
C	Corner Point	27° 57' 22" E	15° 21' 55" S
D	Corner Point	27° 57' 33" E	15° 21' 55" S
E	Center point	27° 57' 23" E	15° 21' 04" S



1.5 Material Requirements

The proposed plant requires the following raw materials; Oil seed (Soya beans), Water, Electricity and Diesel in operation phase. The proposed site has a borehole, and water will be pumped and go through the Reverse Osmosis system to treat it before it is used. Energy in form of power will be supplied by ZESCO Limited for the entire plant and also Generator Sets which will be on standby to be used during any emergencies. The other source of energy for the proposed plant will be coal peas which will be sourced from Maamba Collieries and Wange Coal Mines.

1.6 Estimated Cost and Start Date

The total cost of the **proposed plant** is estimated at **US\$ 90,000.00** with EMP implementation expected to commence upon acquisition of necessary permits from ZEMA and other authorizing agencies. The proposed plant is expected to have a lifespan that will last as long as possible within the period of the lease remains relevant to the area. However, processing plants of that nature are expected to last over 35 years as long as the market remains available for the product.

1.7 Project Objectives

The objective of the project is to expand the existing Cooking Oil Processing Plant from 200 MT/Day to 600 MT/Day on **Sub C and Sub D of Lot 10208/M**, located along Mumbwa road, Mwembeshi area, Lusaka west in Chilanga District.

Other objectives and benefits of the plant are as follows: -

- To upgrade a 200MTPD Soybean crushing and solvent extraction plant and a 600MTPD Refinery Plant
- To contribute to reduction of public demand for cooking oil in Chilanga and the nation as a whole.
- Contribute to national Growth Domestic Product (GDP) by enhancing infrastructural development in Chilanga, Zambia;
- Provide employment opportunities for skilled, semi-skilled and casual workers through direct and indirect job opportunities.

- Contribute revenue to the Government and the Local Authority through payment of corporate taxes, rates and personal levy; and
- Contribute to reduction of poverty levels in Chilanga District through people employment.

1.8 Legal and Administrative Framework

The document has been prepared in line with the requirements of the **Zambian Environmental Management Act, 2011** and its subsidiary legislation, the **Environmental Impact Assessment Regulations, 1997** (Statutory Instrument No.28 of 1997). It also refers to the **Factory Act, Local Government Act, of 2019, the Urban and Regional Planning Act, 2015**, the **Water Resource Management Act, 2011**, the **Public Roads Act, 2002** and other applicable legislations and regulations. The administrative framework within which the proposed project will be implemented will include **Zambia Environmental Management Agency (ZEMA)**, the **Chilanga Town Council**, **Ministry of Housing and Infrastructure Development**, **Water Resource Management Authority (WARMA)** and other regulatory and government agencies.

In accordance with the **Zambian Environmental Laws**, the proposed project falls under the **Second Schedule; regulation 7 (1) of the Environmental Impact Assessment regulations, statutory instrument No. 28 of 1997** and listed under the category of **Processing and Manufacturing Industry: (g) “Food processing plants - 400 tonnes or more output a year”**.. This EIA, has therefore been prepared in accordance with section 29 of the **Environmental Management Act No. 12 of 2011** that requires the presentation of the findings of the EIA study and identifies both positive and negative impacts of the project together with recommendations to mitigate potential negative impacts and enhance the benefits.

1.9 Need for the Environmental Impact Assessment (EIA)

The current economic development trends worldwide have recognized the need to take environmental considerations into account. This is to ensure a sustainable management of the world’s diverse but delicate and diminishing resources and is made using the processes and activities encompassed under the tool of **Environmental Impact and Assessment, (EIA)**.

The process begins with the development of **Draft Terms of References (TORs)** by the Proponent in conjunction with the appointed **EIA Consulting Team** for the proposed development. Thereafter, a **Scoping Meeting** is called by the Proponents or Developer, in order to provide the public with an opportunity to participate in the environmental assessment process.

The input from the various stakeholders and potential Interested and Affected parties (IAPs) consolidates the **Draft TORs** and **Scoping Report** which are now submitted to **ZEMA**. The approved **TORS** by **ZEMA** provide a basis for conducting the detailed **Environmental Impact Assessment (EIA)**. After the assessment, an **EIA report** is produced and submitted to **ZEMA**.

1.10 ESEC LTD and EIA Terms of Reference

ESEC LTD was recruited by the Developer (**PGL**) to provide environmental management consultancy and advisory services. The Consultants then liaised with all the stakeholders by engaging all the interested and affected parties (IAPs) and incorporating their views and concerns into the **EIA process**, to develop the **TORs**. The firm undertook and facilitated the

undertaking of specialized studies related to the assessment. This EIS is the output.

1.11 Overview on PGL

PARROGATE is a group of companies with branches in Malawi, Zambia, and Zimbabwe. The success of Parrogate lies in its commitment to investing in the best and most qualified human resources, hard work, ambition, integrity, accountability and its pragmatic approach to doing business. Parrogate has made large investments to ensure its sustained commercial footprint in Africa. Shareholding of PGL is as presented in Table 1-1-2 and 1-1-3.

Table 1-1-2: Name and Details of the Project Developer

Name and Details of the Project Developer	
Name of Project Developer	Parrogate Ginneries Limited
Address and contact details	Address: Plot No 5001, off Mumbwa RoadChinika Industrial Area , Lusaka Tel No.: +260 0971546941 E-mail: rakeshyadav@parrogate.com.zm
Ownership	CORBEL FINANCE LIMITED – 99.96%

Table 1-1-3: Shareholders of the Project

Particulars of Shareholder	Nationality & NRC/Passport No	Country of Origin	Number of Shares held	Percentage Shareholding
PRADEEP GANEDIWAL	PPN. Z4207201 INDIA	INDIA	1.00	0.02
PRADUMA NKUMAR	PPN. Z4987035 INDIA	INDIA	1.00	0.02
BUSINESS ENTITIES				
Name of Businesses	Residential & Postal Addresses		Number of Shares held	Percentage Shareholding
CORBEL FINANCE LIMITED	SACKVILLE HOUSE, AAKPELWA ST, LIVINGSTONE		4,998.00	99.96
Total			5,000.00	100 %

1.12 Approach and Methodology

An environmental and socio-economic survey was conducted to ascertain environmental and socio-economic characteristics of the baseline environment and the possible impacts of the facility. Data for both the impact assessment and the baseline survey were collected using a combination of tools aimed at drawing out both qualitative and quantitative information using multiple but complementary public opinion survey. Discussions were held within the facility with various stakeholders.

1.13 Initial Scoping with public consultation

In line with the Environmental Impact Assessment Regulations of 1997, a scheduled scoping exercise for the proposed expansion of the Cooking Oil Processing Plant by Solvent Extraction project in Mwembeshi, was conducted as an initial stage in the EIA study. **Due to Covid-19 Pandemic, a public opinion survey (Scoping) was held from 7th to 8th April 2022 using one-on-one interviews with Chilanga Town Council, Round house Lodge, nearby locals and also the website www.parrogate.com.** The stakeholders were drawn from Chilanga Town Council, Mwembeshi Secondary School and nearby settlers. Prior notices for consultations were given before scoping survey. The project description, potential environmental and socio-economic, mitigation measures, and benefits were presented to stakeholders for their feedback. The public opinion survey provided an opportunity for capturing of any other relevant issues for inclusion in the EIA document. The meeting allowed stakeholders to air their views on all possible environmental and socio economic impacts and best practical mitigation measures. Media prints, survey website, and comments raised are annexed to the report.

1.14 Desktop study

In order to gain a clear perspective on the environmental and social implications of the proposed project, detailed desktop studies were conducted on reports concentrating on the available data and documents related to the environmental studies. Literature review will include but not limited to:

- Review of the existing environmental information and legislation;
- Review of the Environmental Management Act and its subsidiary legislation and other relevant Acts and international conventions.

1.15 Baseline Studies and Data Collection

To describe the existing environment appropriate standard methodologies were used. These included undertaking inventory of physical and biological environments and reviewing of relevant literature. Information on names of geographical features were checked from the maps and confirmed. The inventory of the existing physical and biological environment such as vegetation in the vicinity of the facility focused on quality, density, and distribution. The mapping of the area was undertaken to map out the surroundings of the project areas in order to determine the location of the facility in relation to any existing installations that are affected by the facility. In doing so, the existing environment was categorized into physical and biological environment. After data collection and analysis, preliminary description of bio-physical and socioeconomic environment within and around study area was done.

The EIA involved: -

- **Desk study** and review of the available background information about the project proponent, the project area and its nature., the environmental and legislation

information, literature review concerning the project site, collected secondary data, analysed survey plans, interviews with owners who provided valuable information associated to the project;

- **Several field trips** and surveys were conducted by the study team at the site and surroundings to gather information on the existing environment including topography, geology and soils, fauna and flora, population and settlement, economic activities and existing physical infrastructure relevant to the environmental study. Collected primary data and carried out ground truthing on the information provided to the consultant and triangulated important information pointed out during literature review in order to have an in-depth understanding of the current status of the station and its surrounding environment;
- **Evaluating the objective of the project** against the current environmental status and project conceptualization; Identifying all potential social-economic, positive and negative impacts that may arise as a result of regularizing, normalizing and continuous operation of the cooking oil plant and their impacts on the biophysical environment, their magnitude and significance;
- **Prescribing the mitigation measures** to all the identified potential negative impacts; outlining a sustainable Environmental Management Plan (EMP) for the project.

2

POLICY, LEGAL, AND INSTITUTIONAL FRAMEWORK

2. LEGISLATIVE AND ADMINISTRATIVE FRAMEWORK

This section outlines the legal and administrative framework within which the project will be implemented. It outlines the relevant national legislations and international agreements.

2.1 Environmental Policy/Plans/strategies

2.1.1 National Policy on Environment (NPE), 2009

It is the principal policy that governs environmental management in Zambia to safeguard the environment and sustainable use of natural resources. The Policy expects to achieve increase economic growth that is not detrimental to environment and natural resources. The specific objectives are:

- Promote the sound protection and management of Zambia's environment and natural resources in their entirety, balancing the needs for social and economic development and environmental integrity to the maximum extent possible, while keeping adverse activities to minimum;
- Manage the environment by linking together the activities, interests and perspectives of all groups, including the people, non-governmental organizations (NGOs) and government at both the central and decentralized local levels;
- Accelerate environmentally and economically sustainable growth to improve the health, sustainable livelihoods, income and living conditions of the poor with greater equity and self-reliance;
- Ensure broadly based environmental awareness and commitment to enforce environmental laws and to the promotion of environmental accountability;
- Regulate and enforce environmental laws and build individual and institutional capacity to sustain the environment;
- Promote the development of sustainable industrial and commercial processes having full regard for environmental integrity.

Relevance/Compliance: PGL intends to expand and operate the cooking oil plant in an environmentally and socially sound manner and operate in line with the country's set regulations environmental protection, which is a focal point of NPE.

2.1.2 National Conservation Strategy (NCS), 1985

The National Conservation Strategy has been the main policy document on the Environment and Natural Resources in Zambia. The objectives of the NCS are as follows:

- To ensure the sustainable use of Zambia's renewable natural resources;
- To maintain the country's biological diversity;
- To maintain essential ecological processes and life-support systems.

The NCS had triggered the enactment of Environmental Protection and Pollution Control Act (EPPCA), a regulatory instrument that cuts across sectors and creation of Environmental Council of Zambia (ECZ) to regulate environmental matters and deal with related issues in 1991. It establishes policies and devises plans and fully integrates conservation into Zambia's social and economic development. It also aims to analyse trends and current issues to better anticipate problems and needs.

Relevance/Compliance: PGL will ensure sustainable use of resources as well as make certain that the facility is environmentally friendly. PGL will ensure that effluents discharged into the environment should comply with ZEMA standards and that they do not cause pollution in the receiving environment.

2.1.3 National Environmental Action Plan (NEAP), 1994

The National Environmental Action Plan (NEAP) is a comprehensive plan focusing on the identification of environmental issues, analysis of its causes and recommending adequate mitigation measures. The overall objective of NEAP is to integrate environmental concerns into the social & economic development planning process of the country. The three (3) founding principles of NEAP are as follows:

- The right of the citizens to a clean and healthy environment;
- Local community and private sector participation in natural resources management; and
- Obligatory Environmental Impact Assessments (EIAs) of major development projects in all sectors.

Relevance/Compliance: PGL will follow the requirements of the Plan and therefore, expand and operate the plant in a manner that will ensure to arrest ground and surface water contamination in the priority areas of the plant.

2.1.4 National HIV and AIDS Strategic Framework (NASF), 2017 – 2021

The National HIV-AIDS Strategic Framework (NASF) 2017-2021, provides an overall strategy for the planning, coordination and implementation of the multi-sectoral national response based on available evidences. The principal goal is to reposition prevention of new HIV infections as the focus of the national multi-sectoral HIV and AIDS response. A great emphasis is laid on scaling up HIV combination prevention services that enable individuals to maintain their HIV negative status as well as improve access to quality treatment and care services. NASF was developed through highly participatory and consultative process and reflects aspirations of the Zambians in their efforts to fight HIV and AIDS epidemic. The framework is designed to support decentralised implementation with meaningful involvement of communities, people living with HIV, Civil Society Organisations (CSOs) and marginalized populations, so as not to leave anyone behind in the response.

Relevance/Compliance: PGL will establish adequate mechanism for HIV/AIDS awareness in the project area through consultations amongst affected communities.

2.2 National legislative framework

2.2.1 Environmental Management Act (EMA), 2011

The Zambian Environmental Management Act (EMA), 2011 is the superior Act on matters relating to environmental protection and management. Its superiority is outlined in Section 3 of the Act. The Act sets out a framework for Environmental Impact Assessments (EIA's) as well as renaming the Environmental Council of Zambia (ECZ) as the Zambia Environmental Management Agency (ZEMA), a regulatory Agency mandated to do all such things as are necessary to ensure the sustainable management of natural resources and the protection of the environment, and the prevention and control of pollution.

The Act outlines principles governing environmental management and provides for, among

other things, Environmental Impact Assessment, and regulations relating to environmental assessments. The Act has also spelt out offences relating to failure to prepare and submit an EIA report for projects that require such reports. Projects that require preparation of EIA reports must be approved by ZEMA prior to implementation. Section 29 of the Act specifically states that “a person shall not undertake any project that may have an effect on the environment without the written approval of the Agency, and except in accordance with any conditions imposed in that approval.”

The Environmental Impact Assessment) Regulations, 1997 (Statutory Instrument No. 28 of 1997) specifies the requirements for an EIA and it also set out in its Second Schedule projects for which EIAs are applicable. It provides specific guidelines for conducting environmental impact assessments. The regulations require project developers undertaking projects that may have significant effect on the environment to conduct environmental impact assessment prior to obtaining written approval from ZEMA on implementation of the project. Regulation 3 of the Statutory Instrument specifically states that “A developer shall not implement a project for which a project brief or an environmental impact statement is required under these Regulations, unless the project brief or an environmental impact assessment has been concluded in accordance with these Regulations”.

The Environmental Management (Environmental Impact Assessment) Regulations, 1997 (Statutory Instrument No. 28 of 1997) specifies the requirements for an EIA and it also sets out in its Second Schedule projects for which EIAs are applicable. It provides specific guidelines for conducting environmental impact assessments and for evaluation of environmental impact statements. The regulations require project developers undertaking projects that may have significant effect on the environment to conduct environmental impact assessment prior to obtaining written approval from ZEMA on implementation of the project. Regulation 3 of the Instrument specifically states that “A developer shall not implement a project for which a project brief or an environmental impact statement is required under these Regulations, unless the project brief or an environmental impact assessment has been concluded in accordance with these Regulations.

Compliance: The cooking oil processing plant will be operated in accordance with the provisions of the Act and applicable environmental regulations.

A. Environmental Protection and Pollution Control (EPPCA) Act, 1990 (Environmental Impact Assessment) Regulations, SI No. 28 of 1997.

These Regulations provide the main framework under which Environmental Impact Assessments (EIA) are conducted under the supervision of ZEMA that considers and decides to approve or reject projects.

Relevance: - the expansion of the cooking oil processing plant has social-economic and environmental impacts, hence the relevance of the EIA.

Compliance: The facility will implement the approvals obtained in accordance to these regulations. The proposed cooking oil processing plant will be required to submit an EIS to the ZEMA, and approval from the ZEMA will be required to be implemented in the facility.

B. Statutory Instrument No. 112 of 2013; Part II on Air and Water pollution (Licensing) Regulations.

These Regulations provide for licensing of gaseous emissions to the environment and also provides for statutory discharge limits for respective parameters. The Regulations also provides for issuance of permits, limits, air quality guidelines and classification of effluent discharge to air or water.

Relevance: The facility may produce air pollutants including smoke from the vehicles, dust and plant odors during construction and operation activities.

Compliance: The facility will ensure that only modern equipment with none or fewer emissions are released into the atmosphere. The workers shall further be provided with PPE attire including air masks.

C. Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part II-liquid waste discharge

This regulation provides for the licensing of liquid waste discharge limits for respective parameters. Operational stage of the facility may cause contamination of storm water by hydrocarbons; therefore measures have to be put in place to comply with the provisions of this regulation.

Relevance: these regulations are relevant in that the proposed plant facilities (canteens, toilets, bathrooms) have potential to leak, spill into the environment causing pollution, especially foul smells.

Compliance: The effluents will be monitored to ensure that the foul smell from the effluents is adequately reduced. A proper sewer system is in place. The effluent will be channeled to the Company sewer system within the plant.

D. Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part IV Hazardous waste management.

The regulation provides for licensing of solid/liquid hazardous waste management from generation through to disposal and owning of hazardous waste disposal sites. The processing facility will involve the generation of hazardous waste in form of sludge and should be handled in accordance with this regulation.

Relevance: These regulations are relevant in that the operations of the facility will somehow generate hazardous waste whose transportation and disposal requires constant monitoring.

Compliance: All the hazardous waste will be contained because the area will be made of concrete. Any machine oil will be adequately stored in the drums and sold to the recycling companies.

E. The Extended Producer Responsibility (EPR) Statutory Instrument No. 65 of 2018

The SI came into force on 3rd August, 2018 extends the responsibility of the producer of a product or class of products to the post-consumer stage of the product or class of products. It places an obligation on producers of products that have potential to pollute the environment to minimize waste through treatment, reclamation, re-use, recovery or recycling. It regulates the following types of packaging material:

- i. Cartons
- ii. Non-returnable glass bottles
- iii. Non-returnable plastic bottles
- iv. Plastic carrier bags and flat bags below 30 microns
- v. Beverage cans
- vi. Waste oils
- vii. Waste lubricant containers
- viii. Used lead acid batteries
- ix. Pesticides containers/packaging
- x. Chemicals containers/packaging
- xi. Expired chemicals
- xii. Used tyres
- xiii. Near end of life or end of life electrical and electronics
- xiv. Electrical and electronic equipment.

Relevance: These regulations are relevant in that the construction and operations of the proposed facility will involve production of plastic packaging at the Plastic Packaging Plant.

Compliance: All the plastic packaging and cartons at the proposed plant shall comply with EPR Regulations.

2.3 Other Related Legal Framework

As required in the preparation of the full environmental impact assessment, in addition to consultation of the Environmental Management Act No. 12 of 2011, consideration of provisions or requirements in the other relevant pieces of legislation is vital to this project. Some of these are listed below:-

2.3.1 Standards Act No.4 of 2017

This provides for standards of quality control for certain commodities and continues the existence of the Zambia Bureau of Standards by re-defining its powers and functions; provide for standardization and quality assurance of products and services through the setting of national standards and provision of conformity assessment services for products and services; to repeal the Standards Act, 1994; and to provide for matters connected with or incidental to the foregoing.

Relevance: The proposed facility will involve installation of tanks, electrical components and other ancillary facilities that are subject for standardization.

Compliance: The developer (PGL) will install the components according to the Zambia bureau of standards Specification. Before any material and equipment are taken to the site it shall be ensured that all the inspections and authorizations are obtained from the Zambia Bureau of Standards.

2.3.2 Metrology Act No. 6 of 2017

This is an Act to continue the existence of Zambia Weights and Measures Agency, rename it as the Zambia Metrology Agency and re-define its functions; establish the Board of the

Agency and provide for its functions; provide for the designation, keeping and maintenance of national measurement standards; provide for the use of measurement units of the International System of Units and other units; provide for consumer protection, health, safety and environmental management through legal metrology measures; repeal the Weights and Measures Act, 1994; and provide for matters connected with or incidental, to the foregoing.

Relevance: The proposed facility will involve the use of measurement units of the International System of Units and other units especially during any construction on the plant.

Compliance: The developer (PGL) will install the tanks, electrical components and other ancillary facilities according to the Zambia Metrology Agency's Weights and Measures.

2.3.3 National Heritage Conservation Act, 1989

The National Heritage and Conservation Act (NHCA) established the National Heritage and Conservation Commission (NHCC) which is responsible for the conservation of ancient, cultural and natural heritage, relics and objects of aesthetic, historical, pre historical, archeological or scientific interest by preservation, restoration, rehabilitation and reconstruction. The national heritage and conservation commission is responsible for identification and conservation of sites of cultural and historical interest. The commission is also responsible for enforcement of the national heritage Act.

Relevance: The proposed facility being in an area which might have some historical background not known to us requires compliance to this Act.

Compliance: The area is void of any archeological history, in a case where a strange object having cultural significance is found, the developer will ensure that the matter is made known to the National Heritage and Conservation Commission.

2.3.4 Land Act, 1995

The Lands Department in the Ministry of Lands, Natural Resources, and Environmental Protection is the government agency that enforces the provisions of the Land Act. The Act provides for holding of land into categories that include state, local authority and traditional land.

Relevance: The land in question is under state's jurisdiction and as such is governed by the Act.

Compliance: The land in question belongs to PGL. The property is registered in the name of the owner of the land.

2.3.5 Local Government Act No.4 2019

This Act provides for an integrated local government system; give effect to the decentralization of functions, responsibilities and local services at all levels of local government; ensure democratic participation in, and control of, decision making by the people at the local level; revise the function of local authorities; provide for the review of

tariffs, charges and fees within area of the local authority; repeal and replace the Local Government Act, 1991.

Relevance: The proposed facility being in the Chilanga Town Council area, it will require local licensing e.g. fire certificates.

Compliance: All the required certificates will be furthered at the Chilanga Town Council.

2.3.6 Factories Act, No. 2 of 1966

Enacted in 1967, the Act regulates the conditions of employment in factories and other places of work as regard to the safety, health and welfare of persons employed therein. The Act also provides for the examination and inspection of certain plant and machinery in order to ensure safety.

Relevance: The proposed Soya Oil processing plant will house factory equipment and will be operational for 24hrs every day.

Compliance: The developer will ensure that the machinery being used for construction and maintenance are in good working order to avoid any accidents.

2.3.7 Public Health Act, 1995

This Act provides for prevention and suppression of public health hazards. It regulates all matters and activities that are connected to outbreak of diseases. Provisions of the Act are implemented by Councils through licensing and inspections.

Relevance: The facility's activities may affect the health of the workers at the site and the general public, hence the need to adhere to this act.

Compliance: Activities to do with good sanitation, health and safety and general cleanliness will be enhanced throughout the operations of the plant. This will be enhanced by implementing adequate mitigation measures including routine medical check-ups for all the workers on site during all the facility's operational phases.

2.3.8 Water Resources Management Act, 2011

The Act provides for establishment of the Water Resources Management Authority and defines its functions and powers; the management, development, conservation, protection and preservation of the water resource and its ecosystems; the equitable, reasonable and sustainable utilization of the water resource; issues rights to draw or take water for domestic and noncommercial purposes, and ensures that the poor and vulnerable members of the society have an adequate and sustainable source of water free from any charges; create an enabling environment for adaptation to climate change; provide for the constitution, functions and composition of catchment councils, sub-catchment councils and water users associations; provide for international and regional cooperation in an equitable and sustainable utilization of, shared water resources; provide for the domestication and implementation of the basic principles and rules of international law relating to the environment and shared water resources as specified in the treaties, conventions and agreements to which Zambia is a State Party; repeal and replace the Water Act, 1949; and provide for matters connected with, or incidental to, the foregoing.

Relevance: Water abstraction from rivers and underground requires permit from WARMA.

Surface run-off and seepage from the proposed pipeline should not contribute to pollution of water resources that may render its use by other stakeholders unsustainable. This legislation is relevant to the project to ensure that measures to prevent pollution to human health and to any water supply bodies are taken into account through provisions of tight leakage control systems.

Compliance: Several permits will be obtained from WARMA such groundwater permits.

2.3.9 Employment Code Act, No. 3 of 2019

An Act to regulate the employment of persons; prohibit discrimination at an undertaking; constitute the Skills and Labour Advisory Committees and provide for their functions; provide for the engagement of persons on contracts of employment and provide for the form and enforcement of the contracts of employment; provide for employment entitlements and other benefits; provide for the protection of wages of employees; provide for the registration of employment agencies; regulate the employment of children and young persons; provide for the welfare of employees at an undertaking; provide for employment policies, procedures and codes in an undertaking; repeal and replace the Employment Act, 1965, the Employment (Special Provisions) Act, 1966, the Employment of Young Persons and Children Act, 1933 and the Minimum Wages and Conditions of Employment Act, 1982; and provide for matters connected with, or incidental to, the foregoing.

Cited Section: Introduction and Title.

Relevance: For the proposed development, this will cover such matters as contracts of work. The proposed project will employ a number of people.

Compliance: The developer will ensure that the employees' conditions of service are humane and that all people that get employed will be employed on the basis of merit and skills and not race, gender or tribe.

2.3.10 Public Roads Act, 2002 (amended in 2006)

The Act provides for establishment of the Road Transport and Safety Agency and its functions; a system of road safety and traffic management; licensing of drivers and motor vehicles; registration of motor vehicles and trailers; compulsory third party insurance of motor vehicles; licensing and control of public service vehicles; promotion of road safety; regulation of road transport between Zambia and other countries with which Zambia has concluded cross-border road transport agreements.

Relevance: All the stages of the facility might lead to disturbance to the normal flow of traffic in Mumbwa road near the facility area. Hence the need for PGL and the Contractor to adhere to this Act.

Compliance: The proponent shall ensure that all the transportation vehicles are registered and being driven by licensed drivers who shall promote road safety.

2.3.11 National Council for Construction Act No. 10 of 2020

An Act provides, among other things, for the promotion, development, and regulation of the construction industry in Zambia, registration of contractors, affiliation to the Council of professional bodies or organizations whose members are engaged in activities related to the

construction industry. It also provides for the regulation of the construction industry; repeal the National Council for Construction Act 2003; and provide for matters connected with, or incidental to, the foregoing

Relevance: The Act will be relevant during construction activities the contractor on site shall be required to be registered with the NCC and also all the works are supposed to be done with great compliance to the best construction practices. Hence the relevance of this Act.

Compliance: The Company shall engage only licensed contractors and ensured that the NCC certificates are all valid.

2.3.12 Electricity Act No. 11 of 2019

The Act seeks to regulate the generation, transmission, distribution and supply of electricity so as to enhance the security and reliability of the supply of electricity; provide for the sale and purchase of electricity within and outside the Republic; facilitate the achievement of the efficient, effective, sustainable development and operation of electricity infrastructure; provide roles and responsibilities of various participants in the electricity sector; provide for a multi-year tariff framework; promote transparency in the identification and allocation of risks, costs and revenues within and between participants in the electricity sector; ensure the protection and safety of consumers of electricity and the public; repeal and replace the electricity Act, 1995; and provide for matters connected with, or incidental to, the foregoing. g. The act states that any person, who, without legal right, cuts, injures or interferes with any apparatus for generating, transmitting or distributing or supply electricity, or maliciously extinguishes or damages any lamp or other electric apparatus provided for the convenience of the public, shall be guilty of any offence.

Relevance/Compliance: the proposed Facility construction components and operations at the site will utilize power from ZESCO and some pass through or intersect a ZESCO power line, hence the Developer shall carry out the work in accordance with this Act.

2.3.13 Forest Act of 2015 and S.I. No 11 of 2018

The Act provides for the establishment and management of National Forests and Local Forests; the conservation and protection of forests and trees; and the licensing and sale of forest produce.

Relevance: The area has few vegetation and hence the need to comply with the Act.

Compliance: Indiscriminate cutting of trees within the proposed facility site will be discouraged. Where trees are cut, revegetation programme will be implemented to offset the losses.

2.3.14 Road Traffic Act, 2002

The Act provides for establishment of the Road Transport and Safety Agency and its functions; a system of road safety and traffic management; licensing of drivers and motor vehicles; registration of motor vehicles and trailers; compulsory third party insurance of motor vehicles; licensing and control of public service vehicles; promotion of road safety; regulation of road transport between Zambia and other countries with which Zambia has

concluded cross-border road transport agreements.

Relevance: All the stages of the proposed facility might lead to disturbance to the normal flow of traffic on Mumbwa road near the Plant area. Hence the need for PGL and the Contractor to adhere to this Act.

Compliance: The proponent shall ensure that all the transportation vehicles are registered and being driven by licensed drivers who shall promote road safety.

2.3.15 Occupational Health and Safety Act, 2010

This Act provides for the establishment of the Occupational Health and Safety Institute and for its functions. It provides for the establishment of health and safety committees at workplaces and for the health, safety and welfare of persons at work. It further provides for, among other provisions, the protection of persons, other than persons at work, against risks to health or safety arising from, or in connection with, the activities of persons at work.

Relevance: The proposed facility works will have occupational health and safety risks such as exposing workers on site to high levels of dust, lifting heavy equipment, trip and slide hazards etc.

Compliance: The Company will ensure that all the necessary safety signs are displayed around the site, within the site and safety attires are worn always by the employees. Safety awareness talks every morning by the chief safety officer will also be conducted.

2.4 International Convention and Agreements

This subsection summarizes some of the international conventions and agreements to which the Zambian Government is a party and which are applicable to the project. The agreements and protocols impose obligations on Zambia to address issues or topics included in these documents.

2.4.1 Convention on Biological Diversity (ratified in 1993)

This convention requires Parties to it to prepare national biodiversity action plans. Zambia has already in place a National Biodiversity Action Plan whose objectives include, ensuring the conservation of a full range of Zambia's natural ecosystems through a network of protected areas, development and implementation of strategies for conservation of biodiversity, sustainable use and management of biological resources.

Biological resources of significant conservation value that will be identified during Project implementation will be conserved and protected.

Relevance: the area earmarked for the facility might have had indigenous trees.

Compliance: PGL will endeavor to preserve the tree and incorporate them into the landscape of the proposed project.

2.4.2 Convention on Wetlands of International Importance (1975)

The Convention aims at promoting conservation and sustainable use of wetlands and their

resources for the benefit of the present and future generations.

Relevance/Compliance: The Project development and implementation would need to be undertaken in a way that should not comprise the ecological character of the nearby water bodies.

2.4.3 Convention Concerning the Protection of World Heritage (1972)

The Convention aims at ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage.

Relevance/Compliance: Cultural and natural heritage sites that may be identified during the construction and operations of the facility will be protected and conserved in accordance with the provisions of the Convention to which Zambia is party to.

2.4.4 Protection of the World Cultural and Heritage (1972)

This convention was ratified by Zambia in 1982. It provides for the protection of cultural and heritage sites.

Relevance: The proposed facility being in an area which might have some historical background not known to the Developer requires compliance to this Act

Compliance: if any such items are found, they will be handed over to the National Heritage and Conservation Commission.

2.4.5 Ramsar Convention: -

The general objective of the Ramsar Convention is to curtail the loss of wetlands and to promote wise use of all wetlands. The convention addresses one of the most important issues in Southern Africa, namely the conservation of water supplies and use of the natural and the human environments in an intergenerational equitable manner.

Relevance: - The proposed facility may bring about surface and underground water depletion and pollution and therefore the convention will be adhered to.

Compliance: The effluent prone areas will be made of concrete to ensure that all the spillages are contained before contaminating underground water.

2.4.6 African Convention on the Conservation of Nature and Natural Resources (Algiers, 1968), (Maputo, 2003):-

The objective of the convention is to encourage individual and joint actions for the conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind. This must be done from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.

Relevance to the Project: -Soil protection, water protection and protection of flora and fauna shall be a requirement considering environmental aspects of the project. Most of these requirements are already covered under the customizing legal structures already described. However, it is necessary to recognize that these requirements are also provided for at international level hence the relationship.

Compliance: - provisions of this convention together with the customizing regulations are critical to the project.

2.4.7 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):-

The objective of this agreement is to ensure that international trade of wild flora and fauna does not endanger their existence. The convention is customized through the Zambia Wild Life Act No. 12 of 1998 and the implementing body is the Department of National parks and Wildlife.

Relevance to the Project: -The proposed facility area has potential for existence of small animals and birds. If protection measures are not strictly enforced, there is likelihood that employees may start exploiting these resources.

Compliance: - Provisions of this Convention together with the customizing regulations are critical to the project.

2.4.8 Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and their Disposal: -

The objective is to control import and export of hazardous wastes. It also aims at ensuring that any trans-boundary movement and disposal of hazardous waste, when allowed, is strictly controlled and takes place in an environmentally sound and responsible manner.

Relevance: - hazardous wastes may be generated and disposed of.

Compliance: Maximum control measures shall be put in place to ensure that their transportation and disposal is done in accordance with provisions of this Convention.

2.4.9 Equator Principles Adopted for the Project

For the purpose of complying with international best practices in environmental management as a voluntary initiative, PGL has adopted three Equator Principles that shall be observed throughout the EIA process including the Scoping Stage. These principles shall also be sustained throughout the project lifecycle. The adopted principles are listed below.

- a) **Principle 5 (Consultation and Disclosure):-** Environmental management by effective consultation and disclosure is now being recognized as the most effective way of ensuring compliance. PGL will always consult with affected communities in a culturally and structured manner. To attain this, PGL will promote free, fair and informed participation by all stakeholders.
- b) **Principle 6 (Grievance Mechanism):-** PGL shall develop and implement a transparent and systematic grievance mechanism and major guiding principles shall be implemented during the EIA Process. This shall be done to develop a good first and sustainable impression with the community.
- c) **Principle 9 (Independent Monitoring and Reporting):-** PGL shall facilitate an effective independent monitoring and reporting of project activities that shall interact

with the environment. This principle shall be observed starting from the EIA process stage.

2.4.10 United Nations Framework Convention on Climate Change

This was signed by Zambia in 1992. The main objective is to achieve stabilization of greenhouse gas concentrations in the atmosphere. Zambia recognizes that the largest source of one of the main greenhouse gases, carbon dioxide, is from burning wood fuel and the use of coal and oil.

Relevance: - Evidence of climate change is now common knowledge. The PGL project may contribute to climate change due to increase in the emissions from the machinery and gas emissions from boilers throughout the project lifespan.

Compliance: there will be no major gas emissions at the processing plant due to the latest machines which are installed.

2.5 Institutional Framework

A number of institutions will have a regulatory and monitoring role directly or indirectly under their respective pieces of legislation. However, the following will be the key institutions whose requirements will need to be complied with:

- **Ministry of Water Development, Sanitation and Environmental Protection (MWDSEP)**

This is a newly formed department, after the abolishment of Ministry of Local Government and Housing. It is in charge of water policy, water supply and sanitation, water resources management and development in the country.

- **Ministry of Health (MoH)**

The Ministry of Health (MoH) has the supervisory responsibility for sanitation and hygiene promotion. The Environmental Health Section of MoH under the Directorate of Public Health and Research is the section most relevant to drainage which is an integral part of sanitation and hygiene promotion.

- **Chilanga Town Council (CTC)**

Chilanga Town Council (CTC) is the governing local authority for the Chilanga. The Local Authority derives its authority from several Zambian laws, but primarily, Section 61 of the Local Government Act enlisting 63 functions of local authorities. CTC's responsibilities include the following, but are not limited to:

- The establishment and maintenance of sanitation and drainage systems to facilitate the removal of refuse and effluent,
- Prohibit and control the use of land and erection of buildings in the interest of public health, safely and orderly development of the Council area, and
- Approval to formalize unplanned settlements.

In the strategic plan, core pillars for the Council include: strengthening institutional

governance, enhancing institutional capacity, infrastructure development (especially the central business district), effective management of solid waste and environmental conservation, maintenance of health standards through health programmes, enhancement of revenue base and efficient utilization of finance and enhancement of community participation in civic matter within the Chilanga Town Council.

- **Water Resources Management Authority (WARMA)**

WARMA was set up by the Zambian Government, following the water sector reforms process that led to the enactment of the Water Resources Management Act of 2011. WARMA is an authority whose main function is “to promote and adopt a dynamic, gender-sensitive, integrated, interactive, participatory and multi-sectoral approach to water resources management and development that includes human, land, environmental and socio-economic considerations, especially poverty reduction and the elimination of water borne diseases, including malaria”. It is also responsible for managing and regulating the use of Zambia’s water resources in an integrated, participatory and sustainable manner based on human, land, environmental and socio-economic considerations.

- **Zambia Environmental Management Agency (ZEMA)**

Zambia Environmental Management Agency (ZEMA) is a statutory body established in 1992, under Environmental Protection and Pollution Control Act, 1990. It was earlier known as Environmental Council of Zambia. Its mandate is to protect environment and pollution control to provide health and welfare of persons, as well as the environment. Part VI of the above- mentioned Act assigns ZEMA certain roles and responsibilities which are as follows:

- Formulating and providing standards on classification and analysis of wastes and advising on standard disposal methods and means;
- Publicizing the correct means of storage, collection and disposal of any class of wastes; and
- Maintaining statistical data on nature, quantity and volume of waste generated and on- sites where waste disposal is taking place or has taken place.

3

PROJECT DESCRIPTION

3. PROJECT DESCRIPTION

3.1 History of the Project

PARROGATE is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district which was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

3.2 Key Stakeholders

The major stakeholders identified are:

- Parrogate Ginneries Limited staff – the proposed site
- Local communities – these include neighbouring facilities and settlements such as Round house Lodge, Mwembeshi Secondary School, and other surrounding areas for public consultations and raising concerns on this project.
- Chilanga Town Council – mandated to monitor all the projects in the District.
- Zambia Environmental Management Agency – Lusaka reviewing the project and ultimate approval of this Project.
- Lusaka Water Supply and Sanitation Company

3.3 Justification of the Project

Project Motivation

The shareholders of PGL have been motivated to expand the Cooking Oil Plant to make profit for themselves by selling finished oil product locally. The increasing demand for cooking oil in Zambia and the availability of raw materials (soybeans) in Zambia has created a conducive business environment.

The proposed expansion will help Zambia meet the demand for finished cooking oil product as well as help reduce importation of edible oils and subsequent reduction of local prices.

3.4 Description of the plant area

The site for the proposed Cooking Oil Processing Plant which covers an area of **32.4 ha** is located off Mumbwa road, within Parrogate Ginneries Limited premises, situated in Mwembeshi area of Chilanga district of Lusaka province. Parrogate Ginneries Limited is located at Sub C and D of Lot 10208/M. The neighbors are farms, Round house lodge, and Mumbwa Road lies, about 20m.

The proposed plant expansion will be constructed in 2022 and once operational will involve procurement of the soya bean seed which will be cut, heated and squeezed to make vegetable cooking oil.

3.4.2 Plant Component Description/ Manufacturing Process and Flow of Material

The project site has two areas, one for office blocks, and the other for the soya/plastic plant areas. Other infrastructures at the proposed site will be: Warehouses, fuel depots, waste area, extraction, refinery and packaging plants, bore holes (water tanks) Zesco transformer , concrete slabs, and concrete roads.

The main components of the proposed facility are Preparation/crushing, Extraction, Refinery, cake shed, plastic plant and filling room.

There are nine (9) unit operations involved in preparation of soya beans for solvent extraction and these are itemized below;

- Receiving and storing,
- Cleaning
- Drying
- Tempering
- Cracking
- Dehulling
- Conditioning
- Flaking
- Expanding

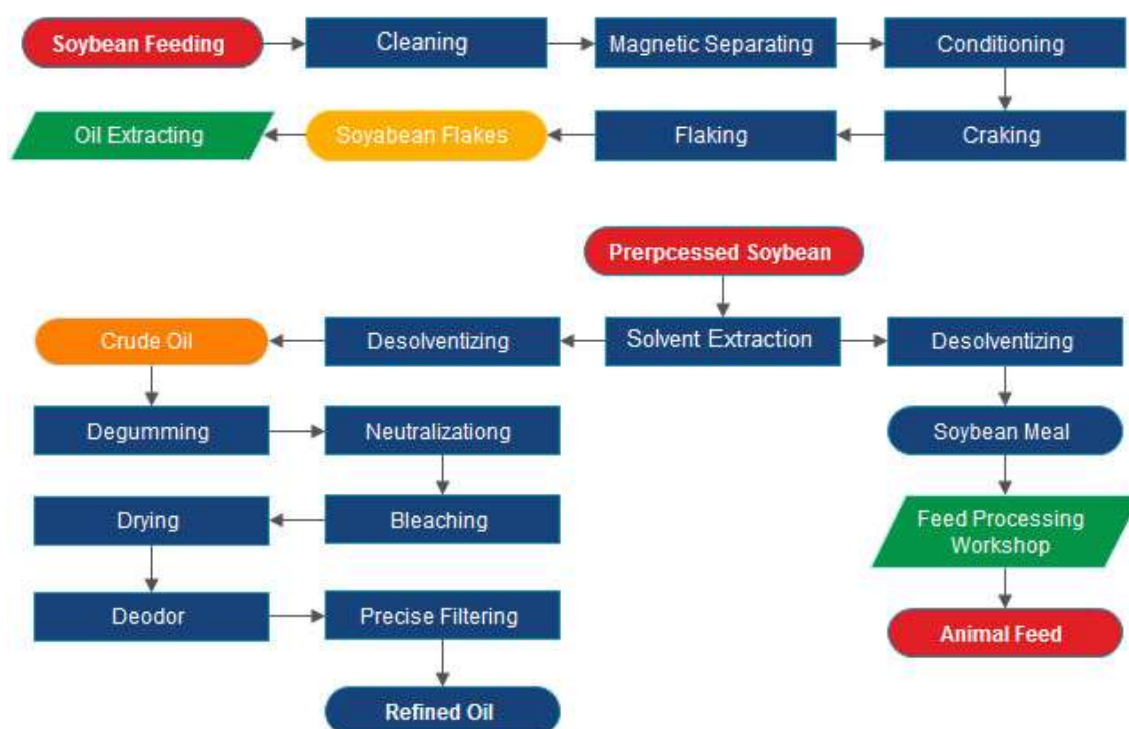


Figure 3-1: Cooking oil plant process flow

PRETREATMENT SECTION

- **Receiving and storing raw soybeans:** When the raw material (soya beans) arrive at the plant using private trucks or rail, samples will be taken for moisture content, foreign matter, and damaged seeds. The seeds will then be weighed and carried to

silos for storage in readiness for processing.

- **Cleaning or “scalping.”**: The seeds will then be removed from storage and cleaned. Cleaning involves removal of foreign particles by screening and loose hulls by aspiration. Large-size and small-size impurities in seeds will be removed by Vibrating Screen. The seeds will then be uniformly distributed on the surface of Vibrating Screen, then light impurities removed with function of aspiration channel. The Vibrating Screen is stable in performance, large in working capacity, and low in noise.



Figure 3-2: Oilseed Cleaning equipment

- **Gravity De-stoning**: Heavy impurities such as stone, glass, metal will be removed from the flowing seeds. It is negative pressure vessel, which will not only remove impurities, but ensure clean environment.



Figure 3-3: Gravity de-stoner machine

- **Drying:** The seeds will be dried to reduce the moisture content to 10% (percent) by weight.
- **Tempering:** After drying, the seed will be tempered for 2 to 3 days to allow the moisture to equilibrate and the hulls to loosen. Soybeans are generally cleaned again after drying using magnets, screens, and aspirators.
 - ✓ **Magnetic Separation:** for separating out metallic impurities. Complete with buffer seed feeder.



Figure 3-4: Magnetic separator

- ✓ **Dust Separation:** By Cyclone and Centrifugal Fan. In this way, light impurities are separated and the workshop is clean.
- **Cracking:** During the process of cracking, seeds are passed through a series of corrugated rolls that are generally about 10 inches in diameter and 42 inches long. The purpose of cracking is to break the seeds into pieces suitable to dehulling and flaking. Usually each bean is broken into four to six pieces. Cracking should produce a minimum of fines. The soybean is cracked (crushing machine) into 4-8 parts for downstream hull-kernel separation and flaking. Max. powder ratio: 4%. The Toothed Cracking Roller is large in working capacity and stable in performance. Space between the tooth rollers can be adjusted easily. There is no material when the Cracking Roller is stopped.



Figure 3-5: Example of crushing machine

- **Dehulling:** The purpose of dehulling is to produce high protein meal for animal feed or flour for human consumption. Soybeans are not dehulled for oil extraction. Dehulling decreases the volume that passes through the extractor, thus increasing throughput. Beans are dehulled by screening and aspiration. The removed hulls may be combined with hulls from the earlier cleaning steps and used in animal feed.
- **Conditioning:** Cracked soybeans, with or without hulls, are then transported to conditioners. Conditioners are vertical stack cookers or rotary horizontal cookers where the soybeans are heated and moistened to make them pliable enough to ensure proper flaking. The conditioner has two functions: drying and softening. The Conditioner is made up of feeding, heating, drying and discharging sections and discharging funnel. Feed the conditioner at the top, subsequently soybean is distributed uniformly to reduce scouring to the heating tube. Typically, soybean-out temperature: 60, moisture content in soybean: 10%. The Conditioner should ensure the soybean flow without interruption, and the soybean is conditioned uniformly with least energy consumption. In addition, try to extend the serviceable time of Conditioner.
- **Flaking:** Conditioned soybeans are fed through large, smooth-surfaced rollers and emerge as flakes ranging in thickness from 0.2 mm to 0.5 mm. The flaking machine is designed to turn the oil materials into flakes, by means of mechanical extruding force. Flaking process is essential in oil mill plant, since it can effectively improve the oil yield of oil mill machinery through increasing material superficial area.

This newly developed flaker machine is featured of compact structure, easy operation, reliable and safe working performance. Since the design is based on different oilseed properties, this flaking machine can process different oilseeds including soybeans.



Figure 3-6: Example of flaking machine

- **Expanding:** The expanders mix flaked soybeans with water and steam and press them into pellets called “collets.” Collets are denser and more porous than flakes. They allow more oil to be extracted from the soybeans and increase the throughput of the extractor. Collets also allow the solvent to drain more freely, decreasing the energy needed for desolventizing.
- **Solid Waste Management**
The proposed plant will generate an average of 5-10 tons of solid waste materials **per month**. These will include the following:
 - Plastic waste from Plastic Plant.
 - Paper waste from Offices.
 - Trash materials from the screens.

These materials will be disposed of at Chilanga dump site.

A solid waste Management company will be engaged to ensure constant removal of solids from the plant once every week.

3.5 Relevant policy, legislative and planning framework

This document has been prepared in line with the requirements of the Zambian Environmental Management Act, 2011 and its subsidiary legislation, the Environmental Impact Assessment Regulations, 1997 (Statutory Instrument No.28 of 1997). It also refers to the Local Government Act, of 2019, the Urban and Regional Planning Act, 2015, the Water Resource Management Act, 2011, the Public Roads Act, 2002 and other applicable legislations and regulations. The administrative framework within which the proposed project will be implemented will include Zambia Environmental Management Agency (ZEMA), the Chilanga Town Council, Ministry of Housing and Infrastructure Development, Water Resource Management Authority (WARMA) and other regulatory and government

agencies.

Project implementation will also conform to international conventions and internationally recognized standards such as Equator Principles (EP). The EP are based on and implemented in accordance with World Bank Group's International Finance Corporation (IFC) Performance Standards and the IFC Environmental Health and Safety (EHS) Guidelines.

This project will be implemented within the confinement of these guidelines and the following:

- The Environmental Management Act NO. 12 OF 2011
 - Statutory Instrument No. 112 of 2013; Part II on Air and Water pollution (Licensing) Regulations
 - Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 part III
 - Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part II
 - Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part IV
- The Factory Act 1966
- Urban and Regional Planning Act, 2015 PART III section 17
- The occupation health and safety act of 2010 PART IV Section 16
- Public Health Act Cap 295 of 1978 Part V Section 31
- The Local Government Act No. 2 of 2019 Introductory Part
- The Fisheries Act No. 22 of 2011
- The Water Resources Management act No. 21 of 2011 Section 6
- The National HIV/AIDS/STI/TB Act of 2002 Section 4
- The National Heritage and Conservation Act (Cap.173 of 1989) Section 8
- The Employment Code Act No. 3 2019 Introductory Part
- Workers Compensation Act No. 10 of 1999 Section 6
- The Road Traffic Act Cap 464 Section 196
- The Lands Act (Cap. 184 of 1995) Section 8
- The Forest Act No.4 of 2015 (The Forests Community Forest Management Regulations, SI No. 11 OF 2018).

3.6 Identification of associated projects

The Cooking Oil Processing Plant is near other similar Plants such Kalomo Grain Marketing Limited (Supreme Oil Zambia) in Manda Hill of proposed site, Mount Meru Millers Zambia Limited and other small scale oil processing companies dotted around Lusaka. Therefore there could be possibilities of these facilities competing for the same customers for the final product.

3.7 Project Products and by- products

The main products in the production cycle will be **soybean oil, soybean cake and soy hulls. Coal ash** as a waste product of coal i.e. a by-product will be used in the boiler. This

coal will also be expected to be supplied as an aggregate in the brick making industry as well as a harder on gravel roads. In summary, the following are the products of the crush plant.

- Soya meal
- Soya oil

Below are the by-products from the crush plant (bean sifter)

- Trash
- Sticks
- dust

By-products and Wastes

Other wastes from the production line include:

- **Non-hazardous Solid waste:** include material such as scrap timber and various off cuts and refuse such as discarded packaging (e.g. soya bags), garbage and domestic waste from workers canteen etc.
- **Hazardous waste:** hazardous waste results from operation activities; this comprise mainly used oil / lubricants.
- **Runoff:** Storm water from the site
- **Dust:** Dust generated on site due to movement of vehicles.
- **Exhaust emissions:** from operation of vehicles on site.
- **Gas Emissions:** gas emitted from the production line.

Table 3-1 Sources of solid waste and disposal during operation

Waste	Source	Disposal
Glass	Broken panes during maintenance works	Disposal – Municipal dumpsite if broken.
Ferrous	Off cuts during maintenance works	Recycled – taken to a licensed scrap dealers.
Packaging	Empty cement bags, fittings, plastics, paper and cardboard	Disposal – Municipal dumpsite Recycling companies like Flex waste.
Plant material	Maintenance works	Reused – Composted Disposal – Municipal dumpsite
Domestic waste	Cleaning	Reused – Reuse and composting Disposal – Municipal dumpsite

3.8 Resources for project implementation

Resources required for successful implementation and operation of the project include the total financial cost of construction works estimated at **US\$ 90,000.00**. Skilled and unskilled human resource shall be local and Zambia at large.

3.10 Project Location

The plant is located off Mumbwa road, within Parrogate Ginneries Limited premises, situated in Mwembeshi area of Chilanga district of Lusaka province. Parrogate Ginneries Limited is located at Sub C and D of Lot 10208/M. The facility lies at 27° 57'24.3" E and 15° 20'58.1" S, 30km from the Lusaka business District Centre and 20m from Mumbwa road.

Table 3-2 Proposed Site Coordinates

PARROGATE GINNERIES LIMITED SITE COORDINATES			
Beacon No.	Description	Longitude (E)	Latitudes(S)
A	Corner Point	27° 57' 33" E	15° 21' 02" S
B	Corner Point	27° 57'22" E	15° 21'02" S
C	Corner Point	27° 57'22" E	15° 21'55" S
D	Corner Point	27° 57'33" E	15° 21'55" S
E	Center point	27° 57'23" E	15° 21'04" S



Figure 3-7: Location Map of the proposed Cooking Oil Processing facility

3.11 Size of Project Area

The Cooking Oil Processing Plant covers an area of **32.4ha** in extent.

3.12 Nature of the Project

The expansion project will involve construction of the following components seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage and will take up a total area of approximately 7 hectares.

The proposed expansion will be constructed in 2022 and once operational will involve procurement of the soya bean seed which will be cut, heated and squeezed to make vegetable cooking oil. The proposed second phase shall involve the extraction of oil from soya bean. The proposed combined facility will focus on the Manufacture of vegetables oils and lie within the confines of value addition of extracting oil from soya bean for market and human consumption. The main products in the processing cycle will be soya bean oil, soya bean cake and soya hulls whilst by-products will be coal ash as a waste product of coal that will be used in the boiler. This coal will also be expected to be supplied as an aggregate in the brick making industry and as well as a hardener on gravel roads.

Facilities/infrastructure to be at the plant will include;

- Main solvent extraction plant (with components such as water scrubber, chimney etc.),
- Security cabin
- Toilets, soak away/septic tank
- Laboratory
- Administration office
- soya receiving shed
- preparation section
- packaging section
- boiler shed
- Silo component

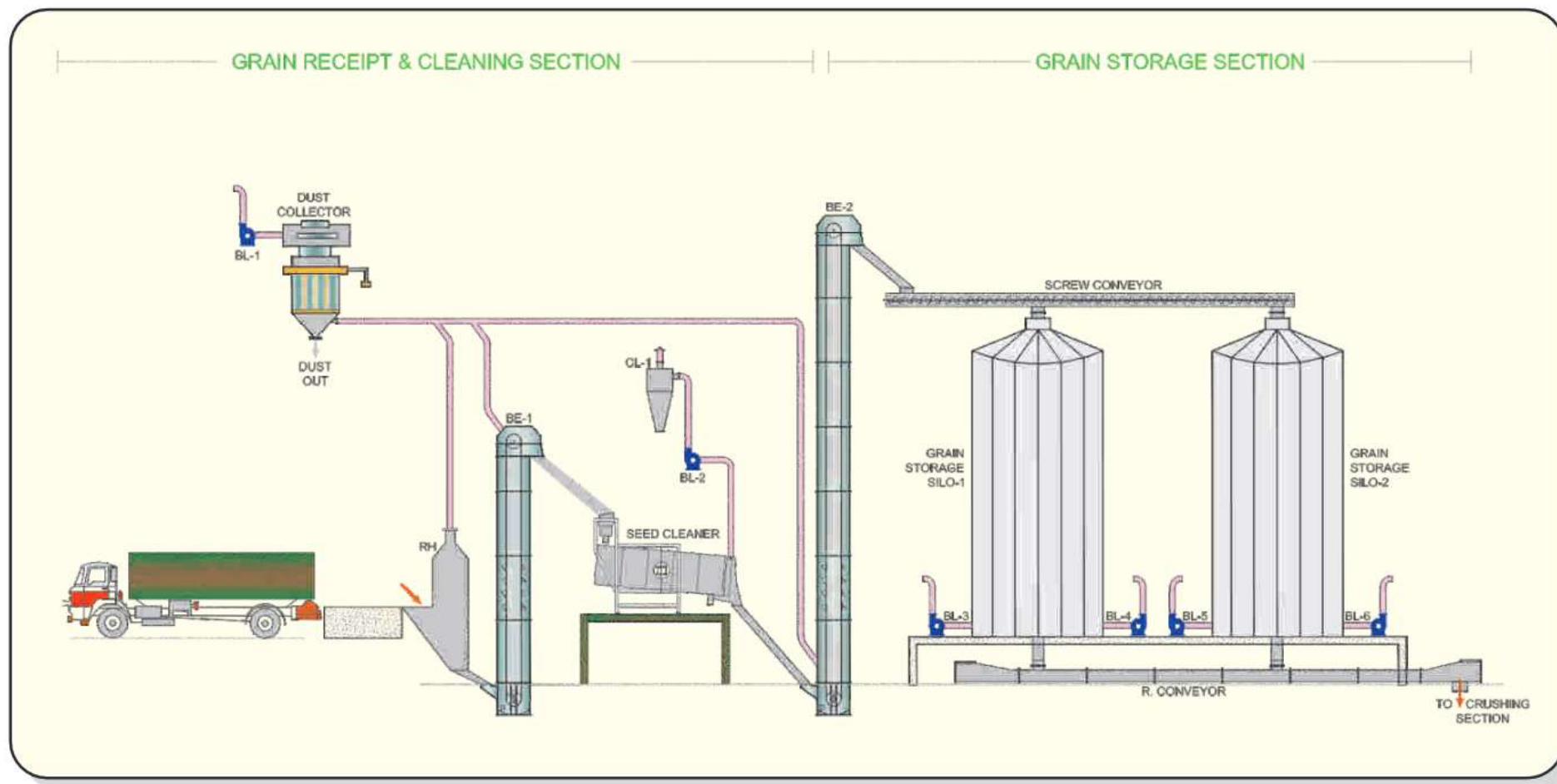


Figure 3-8: Grain receipt, cleaning and Storage Section

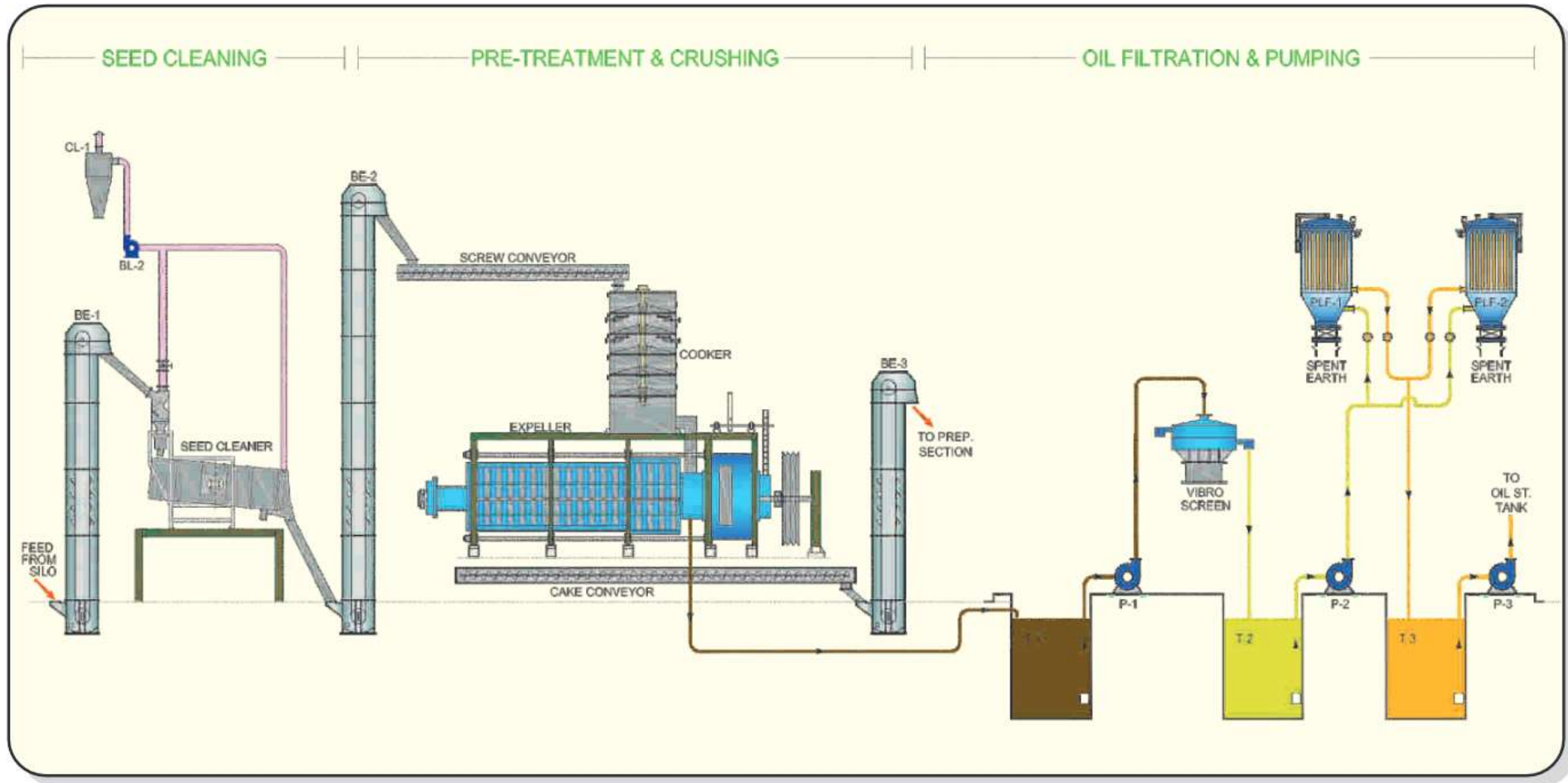


Figure 3-9: Oil Mill Section

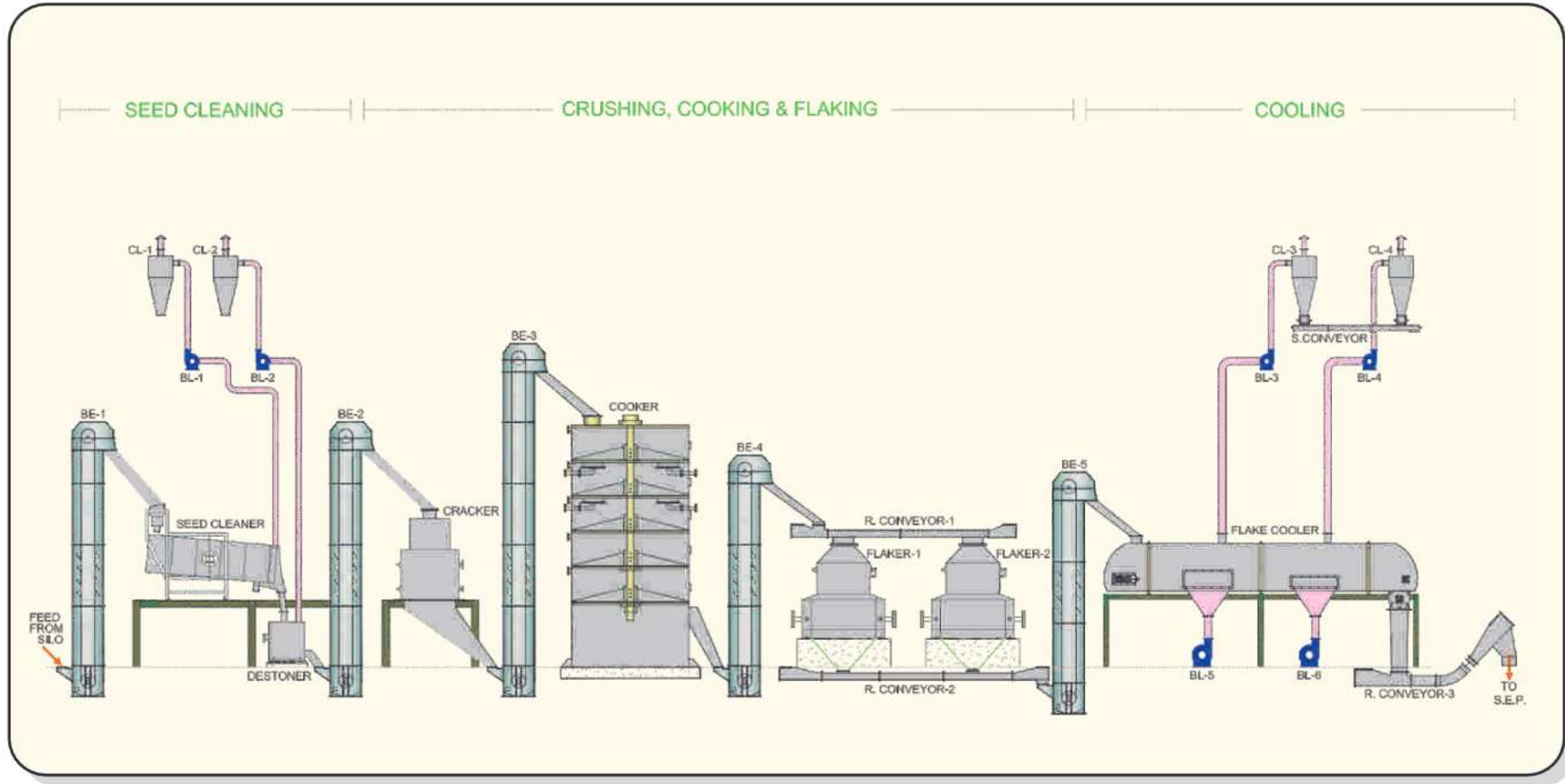


Figure 3-10: Cooking Oil Processing Plant –Preparatory Section

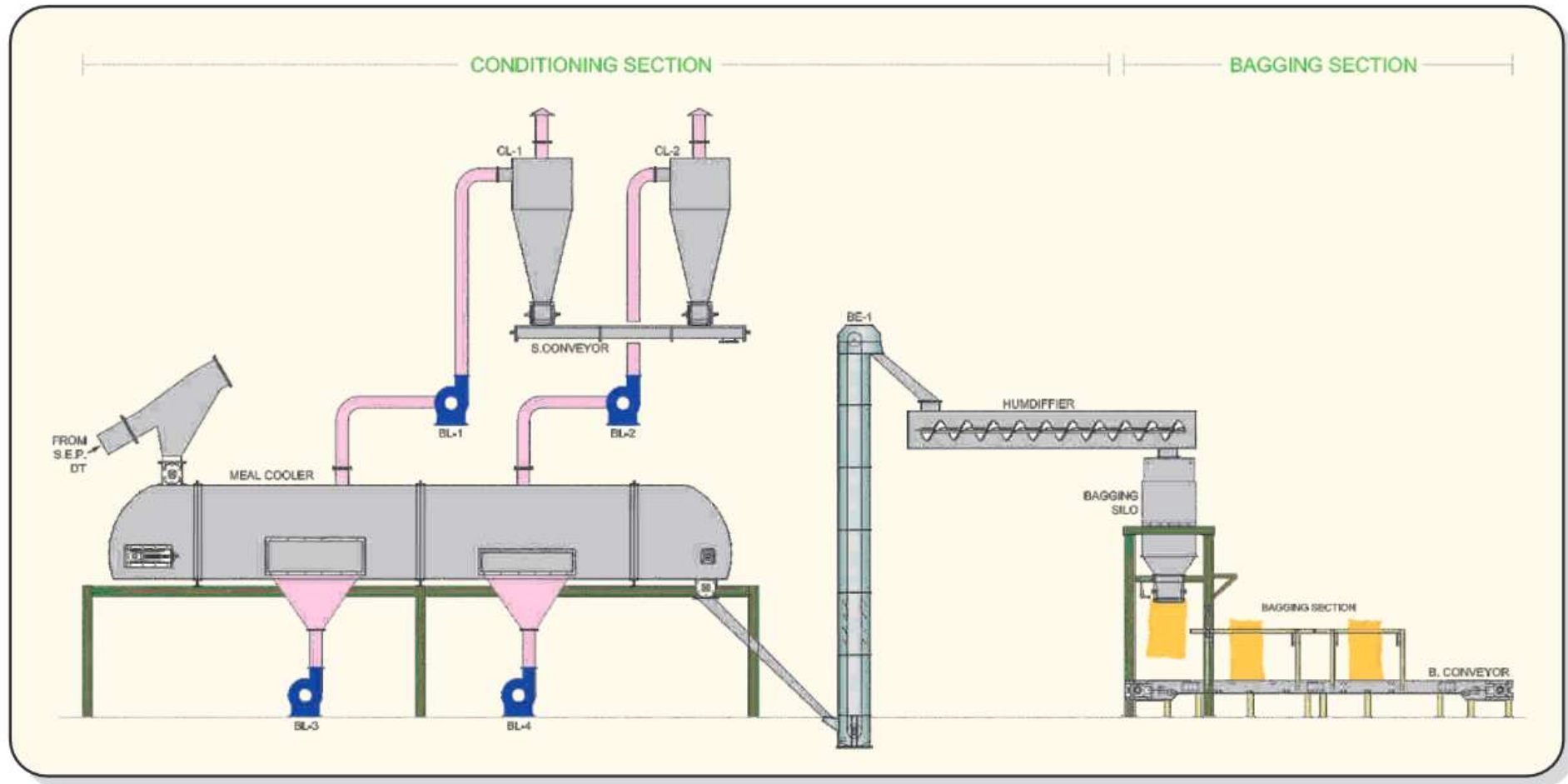


Figure 3-11: Conditioning Section

CONTINUOUS DEGUMMING SECTION

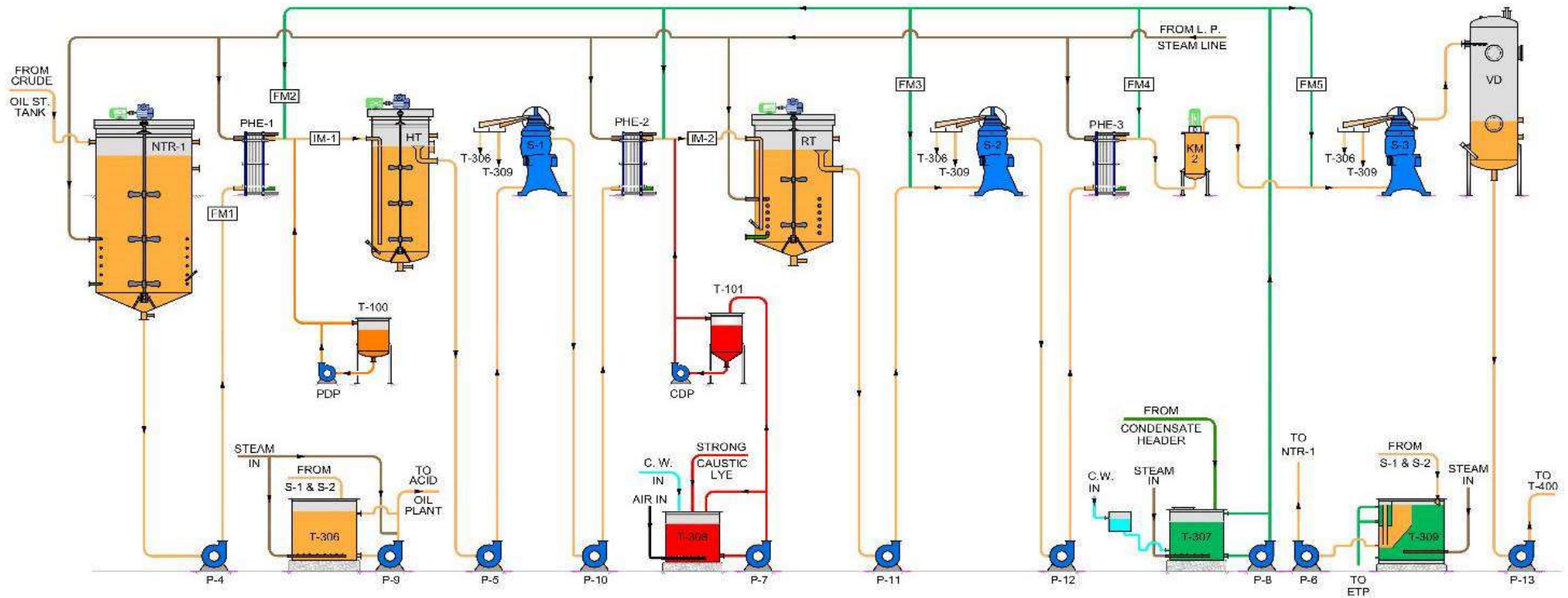


Figure 3-12: Refinery Neutralization - Degumming Section

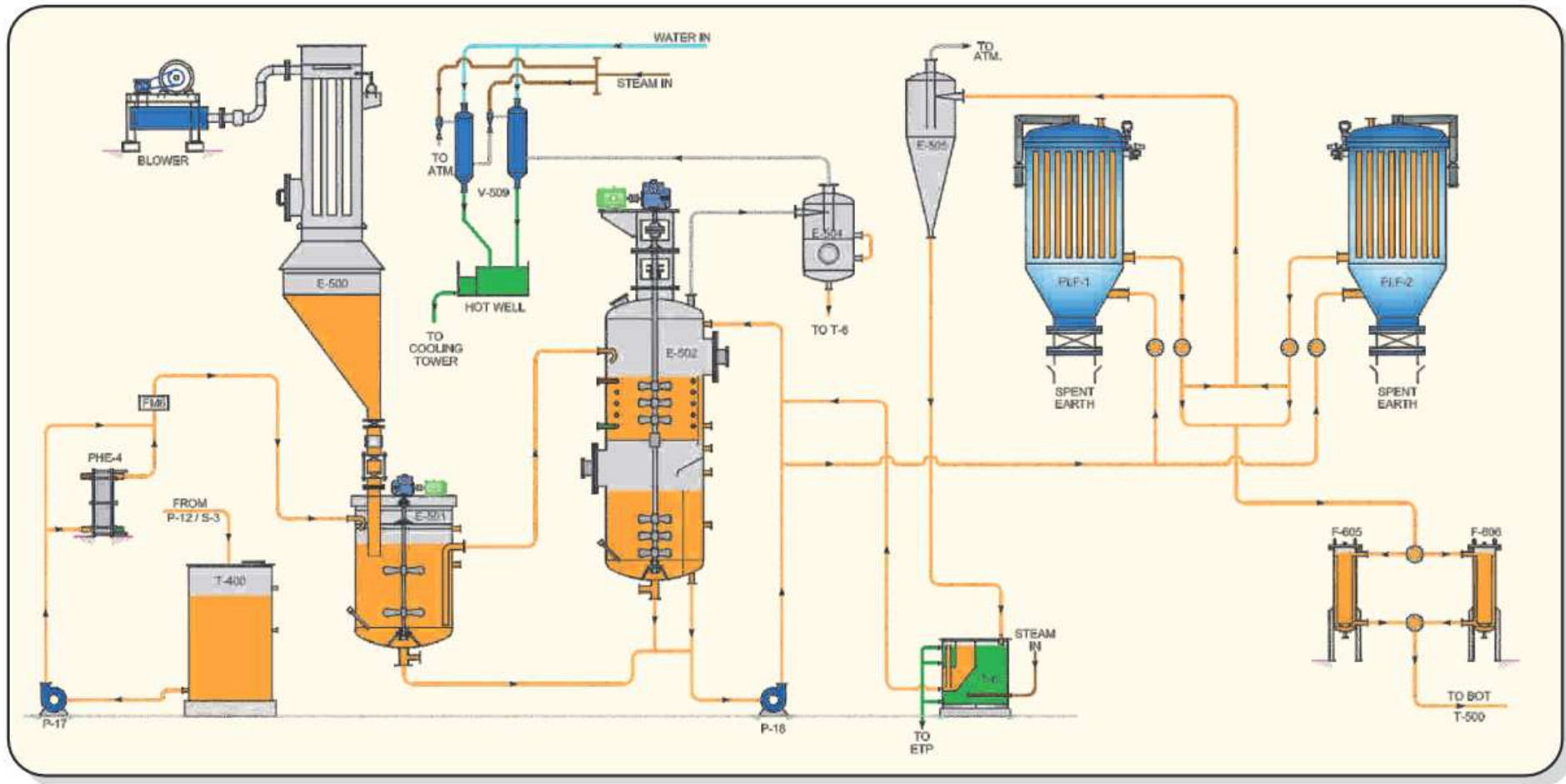


Figure 3-13: Refinery Bleaching Section

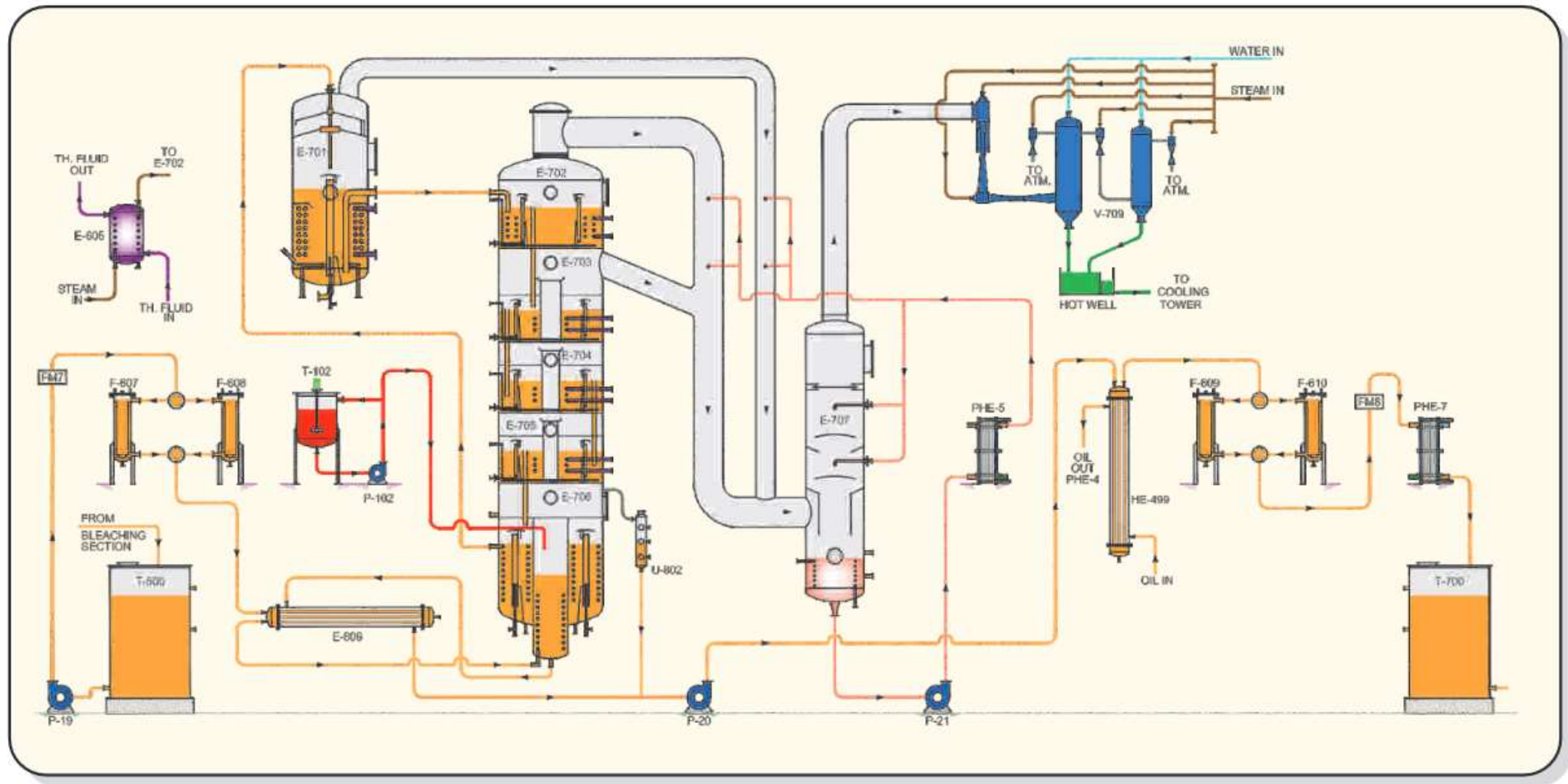


Figure 3-14: Refinery Deodorization Section

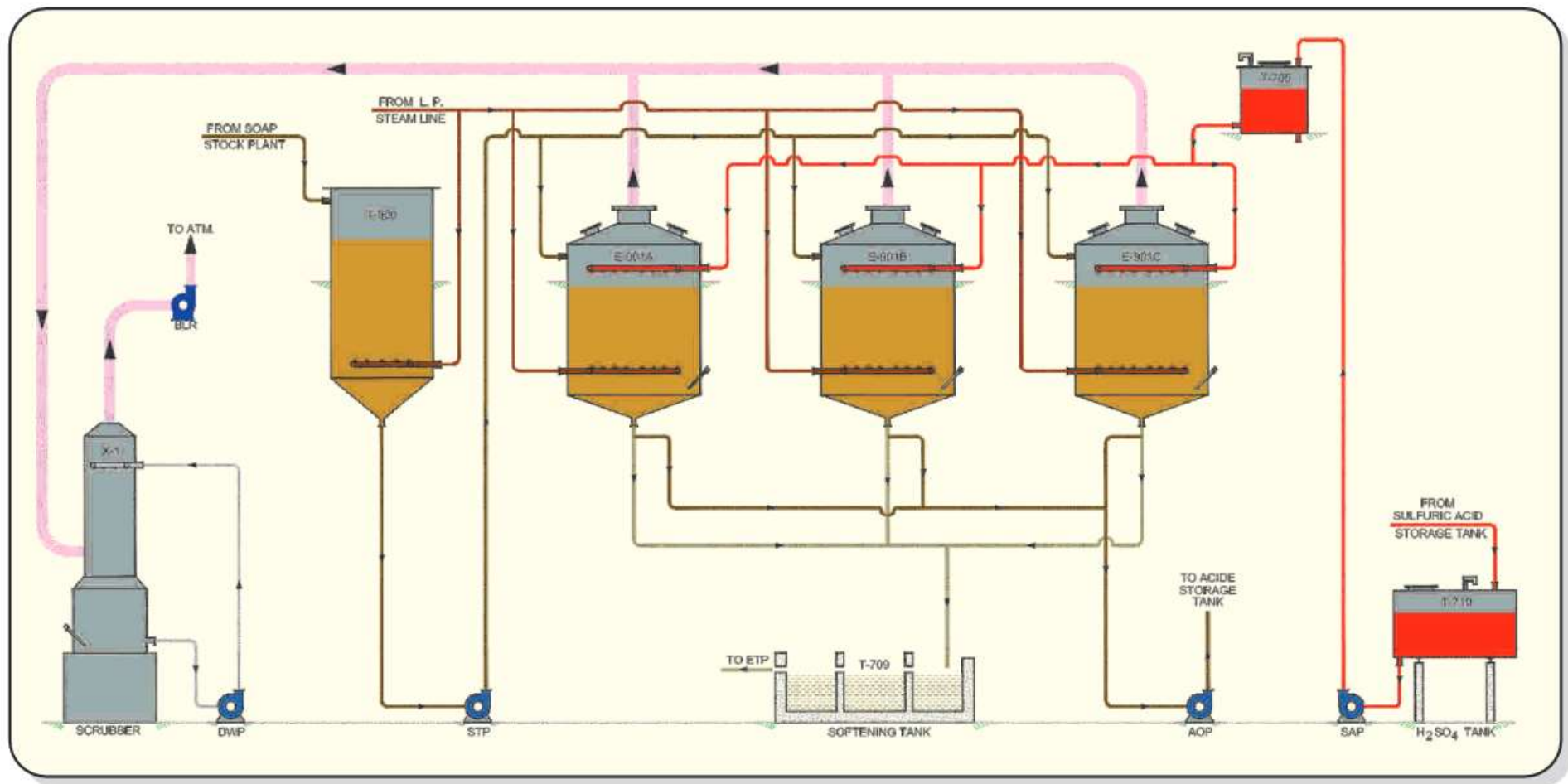


Figure 3-15: Soap Stock Splitting/ Acid Oil Plant

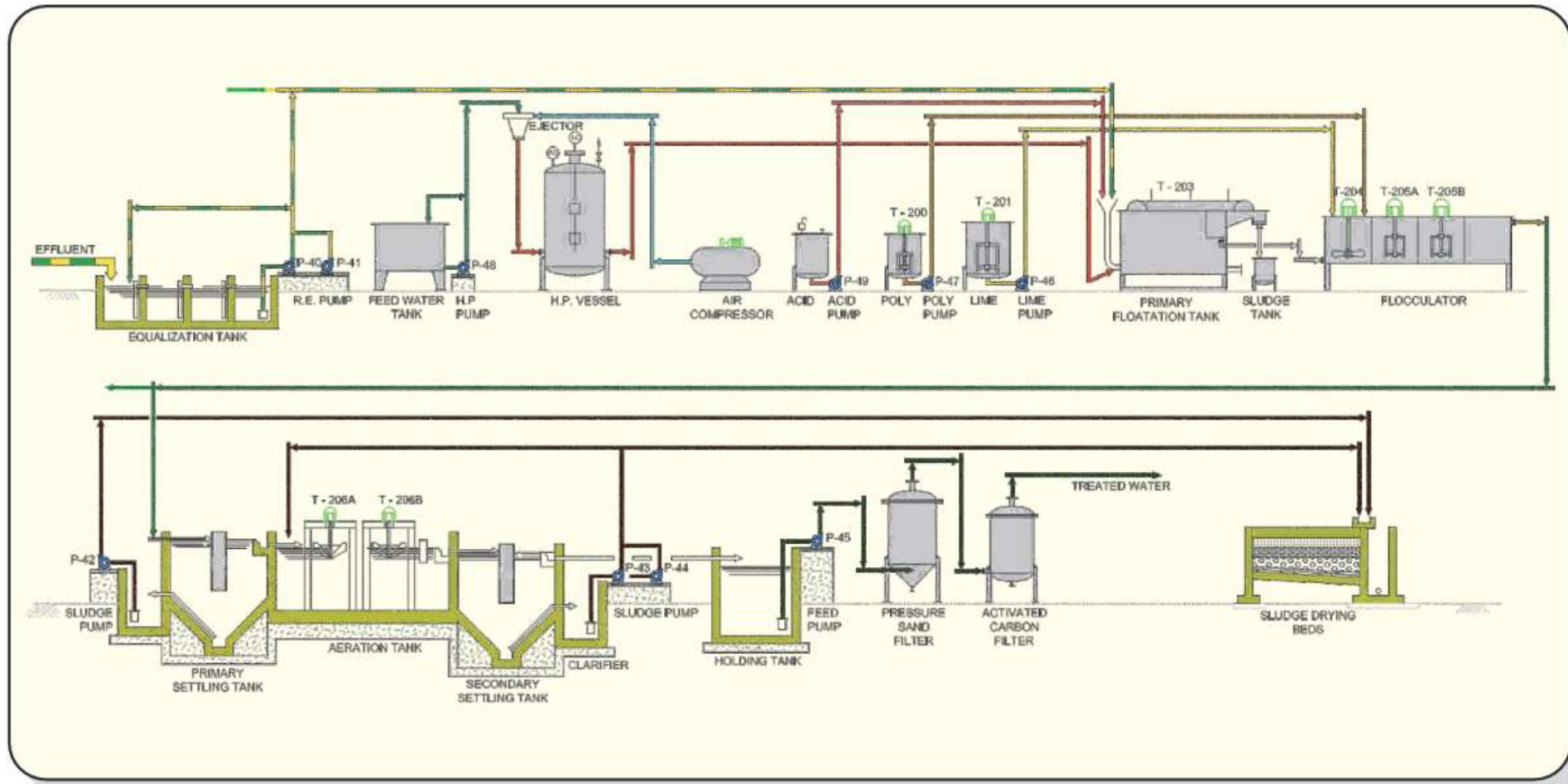


Figure 3-16: Proposed Effluent Water Treatment Plant (i.e. a combination Dissolved Air Floatation, Conventional Activated Sludge, Pressure sand filtration and activated carbon filtration)

3.12.1 Raw Materials

The proposed plant requires the following raw materials; Oil seed (Soya beans), Water, Electricity and Diesel in operation phase. The proposed Plant will have borehole, and water will be pumped and go through the Reverse Osmosis system to treat it before it is used. Energy in form of power will be supplied by ZESCO Limited for the entire plant and also two Generator Sets which will be on standby to be used during any emergencies. The other source of energy for the proposed plant will be coal peas which will be sourced from Maamba Collieries and Wange Coal Mines.

During maintenance phase, steel roofing sheet and normal concrete, cement and blocks will be used with wall finishes done using paint.

Maintenance of structures and common areas will include routine cleaning of plant, office corridors and public toilets, maintenance of physical structure (e.g. roof / walls of the plants), security lighting and fire equipment. The car park and internal roads will be cleaned routinely and monitored on a day to day basis for damage to the road surface. Any repairs necessary shall be carried out by the Proponent

The majority of the materials will be procured locally. Where local suppliers are not available or where local products are found to be of inferior quality and specification, the developer will import from neighboring countries.

3.14 Drainages

Drainage from paved areas will be designed to carry and discharge storm water into the Company storm water drains of the site. These drains will channel water into the treatment pond with a capacity of 75 KL per day .

3.15 Security

The proposed site is bounded by a wire fence. There will be a delivery entrance and the main entrance to the site. The day to day security responsibilities will be outsourced to a qualified and respected Security company and a security mandate already drawn up.

3.16 Landscaping

Various areas of landscaping will be incorporated in the design of the expansion work at the site. Boundaries, both internally and externally will be landscaped to create a visual buffer. Areas around the parking lots will also be landscaped to create a visually pleasing environment.

3.17 Project Main Activities

The project will be developed in three (3) phases - preparatory works; construction of all supporting infrastructure such as: site clearance, external and internal access roads, exterior

security fence around the site, drainage and sewage reticulation; and Operational phase.

The following are among the expected activities that will be undertaken for the proposed extension: -

3.17.1 Site Preparation phase

During this phase, the Consultant carried out the following activities. These included:

- Assemble EIA Team
- Prepare Terms of Reference (TORs) and Scoping Meeting (held at Chilanga Town Council with main stakeholders)
- Conduct field visits for specialized studies
- Prepare Specialized study reports
- Conduct Disclosure Meeting with a limited number of stakeholders due to public gathering restrictions because of COVID 19
- Prepare draft EIS Report;
- Prepare final EIS for submission to ZEMA
- Facilitate Public Hearing (If any).

This phase will mainly include clearing of vegetation for construction of the plant, offices and the associated structures. Land clearing will be done using heavy machinery. Clearing and preparation of land will employ procedures that will minimize emission of Green House Gasses. Cleared organic matter (biomass) will not be burnt but chipped and ploughed into the soil during land preparation stage or use.

Recruitment and Training of Personnel: The project will involve the recruitment of both skilled and unskilled staff. For the unskilled staff preference will be for consideration of local communities as a way of empowering them. This is also in line with Government Employment Policy.

3.17.2 Construction phase

The construction of the proposed cooking oil processing plant, offices, associated structures and other auxiliary works will be the major components of this phase. This will involve digging of foundations and ferrying of construction materials such as sand, gravel, cement and steel to the sites. This will also have storage facilities. The following other activities will be undertaken:

- Clearing, and ground levelling and compaction. At this stage a heritage expert will be expected to be on site to ascertain the absence of heritage resources at the site.
- Site Access and Parking Facilities with associated Drainage System
- Setting up Facilities indirectly linked to the Soya Processing Plant
- Factory, Office and Main Residential Foundations and Structures
- Setting up and construction of the Water Reticulation and Waste Management System
- Erecting of Plant Structures and Installation of Processing Equipment
- Installation of Power
- Installation of Fire Fighting Equipment
- Installation of Security System

3.17.3 Operation phase

This will start with commissioning of the plant (manufacturing of cooking oil), the activities under this phase will comprise of the following:

- Acquiring of the necessary raw materials (source local soya seed).
- Screening of the soya seed.
- Crushing of the soya seed.
- Conveying the soya flakes to the extraction plant.
- Selling of finished cooking oil locally and internationally.

Acquiring of the necessary raw materials (source local soya seed)

Initial phase of the project will involve purchase of Oil seed will include soya seed and will be acquired from local farmers from Chilanga, Lusaka province and other provinces such as Eastern and Southern Province including Central province. PARROGATE will encourage farmers to bring their soya seed at the plant and once the seed is accepted, it will be weighed at the weighbridge and bought.

Cleaning and grinding

- The incoming soya beans seeds will be passed over magnets to remove any trace metal before being stripped of all extraneous material.
- The stripped soya beans seed will then ground into coarse meal to provide more surface area for oil extraction. The hammer mills crush the material to the proper sizes consistently.
- The meal will be heated to facilitate extraction of oil.
- The heated meal will be rolled into flakes and processed by solvent extraction to attain maximum yield.
- The flakes are conveyed to the extraction plant through a conveyor belt.

During operation phase, the following activities shall also be carried out:

- Rehabilitation works on certain buildings and plant areas
- Repainting of old buildings
- Areas prepared for parking will be surfaced with tarmac;
- Areas surrounding buildings and parking areas will be landscaped.

Maintenance of structures and common areas will include routine cleaning of plant and office corridors and public toilets, maintenance of physical structure (e.g. roof / walls of the plants), maintenance of security lighting and fire equipment. The car park and internal roads will be cleaned routinely and monitored on a day to day basis for damage to the road surface. Any repairs necessary shall be carried out by the Proponent.

Waste Management

- All waste will be stored at the designated waste bins within the company premises awaiting a ZEMA Licensed transporter to take waste for disposal at the nearby dumpsite. Wherever possible, reuse of waste will be encouraged. All waste will be disposed (non-organic and organic) will be collected and temporarily stored at the designated site, where separation will be done and transported to the government approved dumpsite by a reputable contracted company.

Effluent Storage

- All effluent from the company operations will be pretreated at the effluent water treatment plant before discharging it in the Sewerage trunk line. The primary treatment that aims at the removal of floating and settleable materials such as suspended solids and organic matter will be employed.

Hazardous waste

- Hazardous waste will generally comprise of used oils and lubricants to be stored in drums at designated storage sites. Once sufficient waste is collected, an approved and recommended contractor by ZEMA collects the waste for disposal at a suitably licensed waste disposal site.

3.17.4 Decommissioning phase

The closure plan for the project will include; Back filling, re-vegetate and re-grass some part of the plant progressively until closure. Post-closure, the site will be fully re-vegetated and re-grassed. After lapse of this period, an application for closure certificate will be lodged.

This phase shall include the following;

- Repairing all the structures to a suitable state for alternative uses.
- Conducting re-vegetation activities where possible around the entire project area.
- General clean-up of the site.

4

ANALYSIS OF ALTERNATIVES

PROJECT ALTERNATIVES

A variety of alternatives, such as the following, exist for the design and management of the project.

The characteristics of the identified sites are briefly outlined below.

4.1 Project Need

The shareholders of PGL have been motivated to construct and operate Cooking Oil Plant to make profit for themselves by selling finished oil product locally. The increasing demand for cooking oil in Zambia and the availability of raw materials (soybeans) in Zambia has created a conducive business environment.

The proposed project will help Zambia meet the demand for finished cooking oil product as well as help reduce importation of edible oils and subsequent reduction of local prices.

4.2 Site Alternative

Two alternative site localities were evaluated using the following criteria; Land Acquisition, Resettlement and Compensation, Market and Infrastructure Accessibility during the Scoping Phase of the Environmental Impact Assessment. The alternatives as follows:

- **Alternative A: To Use the Existing Plot in Chilanga District:** The site in Chilanga District has all the land acquisition papers put in place. Chilanga District was earmarked for Industrialization especially manufacturing & agro – Processing. There are no settlers on this land and moreover, it is close to the largest market outlet (Lusaka City) and easily accessible by a good road (Mumbwa Road) located in an area with commercial farming blocks where there is easy access to Soya Beans supply. This is in line with the National Development Plan
- **Alternative B: Source a Land Parcel in elsewhere:** This alternative requires sourcing another land parcel though discussions with local authorities. It could involve resettlement and compensation of project affected persons (PAPs). Moreover, access roads will have to be constructed.

4.3 Raw materials

Three alternatives for raw materials were evaluated using the following criteria;

- Technology to be used
- Availability of the raw material
- Prices
- Market
- Accessibility during the Scoping Phase of the Environmental Impact Assessment

The average bottle of cooking oil contains vegetable oil, with no additives, preservatives, or special flavorings. The oil comes from various parts of plants, in most cases from what are commonly called seeds. Some of the alternative raw materials include sunflower, palm

kernel, safflower, cotton, sesame, and grape seed oils) or nuts (including peanut, soybean, almond, and walnut oils). A few special cases involve merely squeezing the oil from the flesh of the fruit of the plant. For example, coconut oil comes from the coconut's white meat, palm oil from the pulp of the palm fruit, and olive oil from the flesh of fresh olives. A typically, corn oil is derived from the germ (embryo) of the kernel.

Sunflower

- It is readily available on the Zambian market and beyond borders.
- Market is readily available
- Consumption of sunflower oil is moderately high in Zambia and across borders.

Limitation: Low market as compared to soya bean oil and the material is moderately expensive

OPTION: Not selected

Cotton Seed

- It is readily available on the Zambian market and beyond borders.
- Market is readily available
- Low market as compared to sunflower and soya bean oil

Limitation: Cotton seed is very expensive; Production level of oil is very low as compared to sunflower and soya beans; The consumption of cotton seed oil is very low; and Very expensive to extract.

OPTION: Not selected

Soya beans

- It is cheaper to grow
- Readily available market and sourcing.
- The prices are not as high
- Environmentally, one of the many benefits of soya is that it is able to ingest atmospheric nitrogen that other plants need to get from the soil. Soya often ingests more atmospheric nitrogen than it uses to grow, and fixes the remainder into the soil (where it will be available for the next crop). The process of nitrogen consumption and fixation is enhanced if nodules have formed on the soya roots, and those nodules only form when the appropriate rhizobium bacteria are present in the soil.
- Public consumption levels are very high.

Limitation: Very few if not nothing

OPTION: Selected.

4.4 Water Supply Alternative

The use of bore hole for water supply was analysed against connecting to a local water supply utility company and buying of disposable water bottles for domestic use. The use of a borehole was preferred for the project operations and domestic use as an alternative which seemed to be cheaper and appropriate.

4.5 Energy sources

The principal source of electricity during operational phase of the project will be hydro-power energy to be sourced from a nearby ZESCO main which is found within reach of the project site. The ZESCO main was picked as a major source of power as it provides the

clean and less costly power alternative which is also environmentally friendly. The use of a generator was also analysed against but since its costly operating Gensets, PGL will have the Gensets at the site only to be run during power outage.

In terms of power source for boilers, two alternatives will be considered either diesel or coal powered boilers.

Diesel

- Burns faster and produces huge quantities of energy
- It is cheaper than petrol

Limitation:

- It is not readily available locally
- It is very expensive as it has an increased evaporation time as compared to coal.
- Effluent production is very high and dangerous to the environment
- Transporting this commodity is very expensive
- The fumes may be very catastrophic in case of any fault

OPTION: Not Selected

Coal

- It is readily available locally
- Transportation is very cheap as it will be transported from Maamba via railway
- Can easily be offloaded from the Chikumbi Railway siding.
- Coal is cheaper than Diesel in terms of cost.
- Its effluent is easy to contain as it shall pass through a water scrubber
- Produces high energy as it contains between 69% & 86% carbon by weight

Limitation:

- Rail Transportation is tightly timed compared to road transport which is quicker.
- Chemically, coal is mostly carbon, which, when burned, reacts with oxygen in the air to produce carbon dioxide, a heat-trapping gas. When released into the atmosphere, carbon dioxide works like a blanket, warming the earth above normal limits.

OPTION: Selected.

4.6 Alternative Processing Technology/Methods

There are various technological options that have been considered for PGL Oil Processing Plant with the following having been considered in this study:

- ✓ **Steam Heating Process:** Super steam is passed through the soya seed to loosen the fat molecules in the cells. The heated seed is then crushed in a screw funnel. This is the old technology for oil processing.
- ✓ **Thermo-heating using a combination of coal and fire wood to heat the water in the boiler section.** This has implications of air pollution by smoke which affects the surrounding area/community.
- ✓ **Solvent extraction method:** The **most preferred technology** is the solvent extraction method which has minimal impacts on the climatic environment and

does not result into deforestation in order to source wood for heating.

4.7 Waste Management Alternatives

The option of using the waste bin was analysed against using a skip bin. The first option meant that the company needed to buy many waste bins, which have a limited holding capacity. The second option was opted as the skip bin has a huge carrying capacity. The proponent will engage a solid waste collector to ensure waste management at the facility is well maintained. All non-organic waste will be collected and disposed of using a reputable company and taken to the council dumpsite.

4.8 Sewerage management alternatives

Three options for sewerage and waste water treatment have been considered.

Option 1 requires that the sewage water be discharged to the municipal sewage plant. This option will require that the plant sewer system be connected to Lusaka City Council sewage system which is nearer than Chilanga Town Council. This area has no council sewer system yet.

Option 2 is the preferred option in which a sewer package (septic tanks and effluent retention ponds) that would be installed for the office complex and change house, with the effluent being pumped out and discharged into the council sewer ponds on licensed arrangement. **This option was considered best fit.**

Option 3 would be to discharge the sewage effluent from the package plant to the nearby streams as it would contain nutrients (nitrate and phosphate) that would nourish the riverine system and hence contaminate water and cause harm to the eco-system.

4.9 The “No Action” or “No Project alternative”

The no project (no-action alternative) alternative in respect to the proposed project implies that the status quo is maintained. Under the no-project alternative, the existing land use will not be used, neither shall the project be implemented. The land owner will continue not to make any good value of the land. The proposed oil processing project would not be constructed and the expectations attached to the project would not be met. The no-project construction alternative is the least preferred from the socio-economic perspective due to the following factors:

- ✓ The existing land use is not profitable to the optimum.
- ✓ The land is underdeveloped and no profits are being generated from it as opposed to the time when the plant is installed and is operational;
- ✓ No employment opportunities will be created from the proposed land parcel if the project is not implemented.
- ✓ National GDP will definitely lose out at this period of economic slump down due to low productivity in the country.

Other reasons were;

- ✓ Current demand for cooking oil and soya cake both local and international is very high and thereby increasing the prices of available supplies which has negatively affected the animal farming industry and the national economy as a whole. Without this project the industry would continue to suffer high product

prices.

From the analysis above, it becomes apparent that the “no project alternative” is not a viable alternative to the proponent.

5

DESCRIPTION OF THE BASELINE ENVIRONMENT

5. DESCRIPTION OF THE BASELINE ENVIRONMENT

This section describes briefly the environmental and social conditions of the facility's area. It gives highlights on climate, rainfall, wind, hydrology, geology, air quality, soils, land use / land tenure, flora and fauna, archaeology and cultural heritage, traffic volume, noise and socio-economics.

The bio-physical data of the proposed project area was gathered by both literature review and field visits to the site. Climatic data was collected from a Metrological department and weather website (www.weatherbase.com.) Data on air quality, flora, fauna and existing physical developments and infrastructure were collected on-site during field visits. The hydrology, geology, and topography of the area were established by both field visits and literature review.

Ecologically, the proposed cooking oil processing plant site was divided into four strata in four directions i.e. North, West, East, and South for easier management purposes. The stratum was arrived at, depending on the administrative boundaries, the size in terms of coverage, and the physical barriers. In each strata, one transect of 100m was established. Thereafter, with each 100m transect, four plots of 20m apart from the other were established.

A Garmin Quest, Global Positioning System (GPS) Navigation instrument, was used by the study team to capture and record some of the geographical data at the site. GPS coordinates were collected, recorded on the instrument, and later exported to a web-based Google earth App for analysis.

5.1 Climate

Chilanga receives good rainfall with an annual average of 527 to 1318 mm, although this varies from season to season. This is suitable for the cultivation of most crops. The temperature distribution is usually in the range of 29°C mean monthly temperatures in summer and about 20.7°C means monthly winter temperatures. The average pan evaporation is approximately 1875 mm. Evaporation exceeds precipitation for eight months of the year.

5.1.1 Temperature

The temperature variations in Chilanga are considerable between the cold and hot seasons the average minimum temperature is 10°C with a max of 35°C. The highest temperatures are recorded in October and the 30-year annual mean temperature is 20.7°C

5.1.2 Relative Humidity

Relative humidity increases in December and highest in February at 80.7% and drops to 49% in October.

5.1.3 Sunshine

At the peak of summer (i.e.; October), the sun is expected to shine for an average of 10 hours per day. This represents the average number of hours in the daytime that the sun is visible and not obscured by cloud e.g. the average number of hours the sun is actually out and shining. In winter (i.e.; June and July), the sun shines for an average of 8 hours per day. There is more sunshine during

the dry season than during the wet season. Sunshine hours decrease from December to March and then start to increase in April and May.

5.1.4 Rainfall

The typical average rainfall in the area is 850mm (min: 527mm and max 1,318mm over a 30-year period), with the majority of precipitation occurring during the months of November to March (90% of annual rainfall).

5.1.5 Wind

The study area experiences prevailing easterly winds during the dry season with fresh winds. Wind direction in the rainy season is mostly westerly's, north-east to south-west. Wind speeds are fairly low ranging between 0.90 m/s – 1.8 m/s. Wind speeds are usually calm between January and March (0.9 m/s – 1.1 m/s) and increase from August to October reaching the peak at 1.8m/s.

5.2 Geology

The geology of Zambia comprises of various rocks and layers dating from over 1,000 million years ago. These rock formations consist of igneous, sedimentary, and metamorphic rocks. The age of the Katanga Super Group ranges from late Precambrian to cambrian (100 to 500 million years old). The Katanga Super Group comprises shales, sandstone, dolomites, localized, limestone and conglomerates.

Lusaka province is underlain by the Lusaka Dolomite Formation. Dolomite and gemstone formations are subject to karst-action whereby the carbonate rocks, which are soluble in mildly acidic water such as rainwater, experience solution weathering of rectangular joint patterns. This results in enlarged fissures and hollows in the rock formation. The solution fissures and cavities that occur at various depths retain water and give carbonate formations a high degree of porosity and permeability, such that areas underlain by dolomite and gemstone are very important aquifers and reliable underground water sources

5.3 Soils

The average soil types recorded in the district could be classified in two, the alluvial soils found in the dambos and the sandy loamy in the uplands. The upland soils are more widespread in the district. Their capacity to retain nutrients is good and they have high water holding capacity. The upland soils are generally fertile because of high biomass of humus found in the Miombo woodland. The alluvial soils can also be found in most parts of the district, which consists mostly of the Munga and Riparian woodlands. Generally, the soil environment has been excessively disturbed through occurrences of unplanned digging for medicines, traditional cereal drink (munkoyo), Zambian traditional polony (chikanda) and generally farming in the area. The late and uncontrolled fires have had their negative effects on the soils and other life forms in most parts of the forest reserves. There has been an increase in soil acidity levels in most soils due to continuous use of nitrogenous fertilizers. This requires serious liming and increased organic matter. The other limitation is mainly low soil fertility due to depleted nutrients in the soils.

The geology of the area places the project site over the boundary of the carbonate sequence of the Lusaka Dolomite. The soils of the proposed project area well drained, shallow to moderately shallow, dark brown, friable, fine loamy to clayey soils with humic topsoil (Orthi-eutric Leptosols) and moderately well drained, deep to very deep, red to strong brown, friable, moderately leached, fine loamy to clayey soils having a clear clay increase with depth (chromi-haplic Lixisols)

5.4 Topography

The predominating topography of the site is situated on the flat land with elevation of about 1,217 m above mean sea level. The terrain features shallow valleys and mild hills, with a very gentle north-south slope dipping towards Southern side of the project site even though the site appears almost flat to the human eye. The valleys create natural surface drainage.

5.5 Air Quality and Noise

Air/Dust

The main sources of dust emissions that can reduce local air quality within the project area include movement of vehicles along the Mumbwa road. During construction phase, the surrounding human communities, flora, and fauna have the potential of being exposed to dust emissions. During operation phase, the boilers in the plant will also be a source of air pollution. Hexane gas to be used as a solvent can also leak and become source of pollution. Coal ash from the boiler if not taken care of could also be a source of dust.

The ambient air concentration levels of Particulate Matter (PM_{2.5} and PM₁₀) were within the emission limit set by ZEMA.

Noise

There is less noise at the project site which mostly is background noise. Once the plant is operational, the main source of noise will be boilers, crusher plant, refinery, movement of utility vehicles and heavy duty equipment such as loaders and forklifts, trucks bringing soya beans and loading cooking oil and other products and by products. The workers and local communities near the plant could be considered to be sensitive receptors.

Noise levels measured at the site during assessment indicated within (minimum of **72 dBA** at roadside boundary of proposed site) WHO limits of 80dBA 30m away from Mumbwa Road and above (maximum of 99.8 **dBA**) WHO Limits on the Mumbwa road when vehicles are passing.

5.6 Hydrogeology

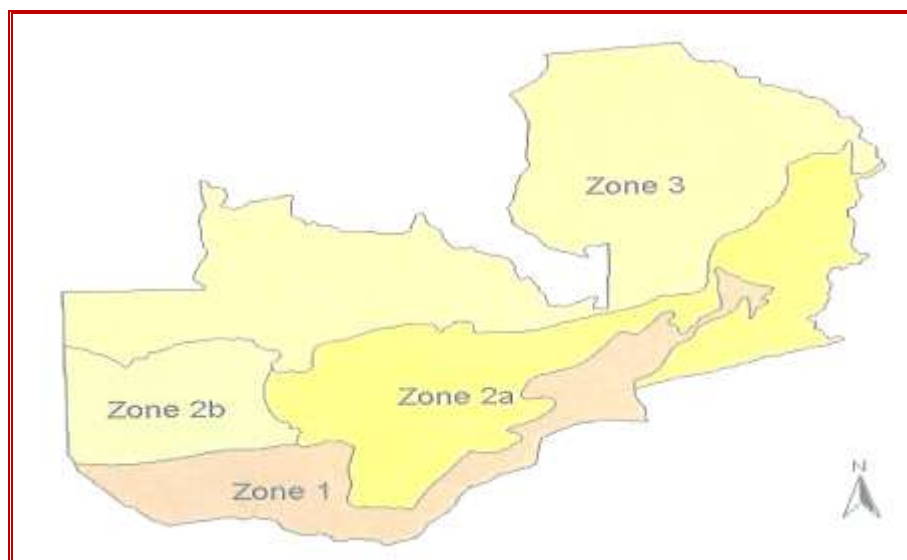
The depth to the groundwater table in the region of the proposed project is generally moderate to low. Areas of shallow groundwater are encountered to the west and south of Lusaka, below the western margin of the plateau near Mwembeshi and in the Upper Mwembeshi (Department of Water Affairs Lusaka & Federal Institute for Geosciences and Natural Resources, Hannover, 2012). Characteristic of the areas within and those surrounding Lusaka District, the underlying rock is limestone.

5.7 Hydrology

Surface Water

Chilanga district receives between 500 and 1,000 mm of rain per year. While rainfall is the primary source, it is the lithology (or rock type) and the structural characteristics of the rocks (porosity, clay content, folding, faulting, jointing and foliation) that are determinants of ground water availability. Rain fall is relatively uniform and predictable over long time periods, and therefore provide sufficient water to recharge aquifers. The amounts of ground water go down from May to November (the dry season), but rise from December to April (the rainy season).

Chilanga district falls in Zone 2a of Zambia's agro-ecological classification



Surface water sources are limited around the project with no stream within 1km radius of the project site.

Groundwater

Ground water levels occur according to rainfall and pumping. Generally, ground water levels go down between May and November and rise between December and April during the rainy season. The main water yielding level is generally found between 27 and 40 meters, a depth at which solution cavities are apparently particularly well developed. According to samples of water collected within the site, the parameters analyzed were within the ZABS Standards for Drinking Water making the water fit for human consumption (See attached laboratory certificate in the appendix).

Water and Sewage

The project area is not serviced by any Sewerage line. The Developer will utilize various water-saving devices to conserve water. The sole aim will be to minimize and contain wastewater, pretreat it before it is discharged into the environment.

5.8 Land Use / Land Tenure

The project area is used primarily for agricultural activities agriculture, quarrying and trading that serve the larger consumer market of Chilanga and Lusaka.

5.9 Flora and Fauna

5.9.1 Flora Assessment

The plant site is a brown area and located in an area officially designated as an agricultural/ industrial development zone thus there is little to no evident flora. The vegetation at the site is characterized by grass cover and few scattered indigenous trees.

The site has small shrubs which include *Diospyrus Mespiliformis* (African Ebony – locally known as mucenja) while grass or weed life include *Urochloa mosambicense*, *hyperrhenia* and *Biden pilosa*

There are no endangered or rare species of trees found in the project area.

5.9.2 Fauna assessment

No fauna species have been observed on the site, although lizards are to be expected. There was no evidence on the site or the area surrounding it of the presence of any species of flora or fauna that could be classified as endemic to the area or of special scientific value.

Aquatic fauna

According to the results of interviews with locals near the project site, the only common Aquatic fauna found during rainy season in small shallow pools, are species that indicate a disturbed aquatic ecosystem. These are;

- *Agama sp.* (common lizard)
- *Grithidea rhizophorarum* (Water Snail)
- *Rana sp.* (common frog)
- *Raftia pachyptila* (Tube Worms)

All species are neither endangered or rarely threatened species. They are common ones.

Birds and Insects

Birds at the proposed site area were sighted by taking field walks around the site and surrounding areas. Most of the birds were identified on sight and reference was made through desk study literature. The birds observed in the area included the domestic chickens (*Gallus domesticus*) and house sparrow

(Passer domesticus). The insects observed on site included honey bees (*Apis mellifera*) termites (*Microtermes goliath*) various species of grass hoppers etc. Other notable and observed species of birds on the project area include; black cheeked love bird (*Agapornis nigrigenis*), rock pratincole (*Glareola nuchalis*), spoonbill (*platelea alba*), long- crested eagle (*Lophaetus occipitalis*).

Other birds that are expected on the project area include; western banded snake eagle (*circaetus cineroscens*), African skimmer (*Rynchops flavirostris*).

Note that all the birds mentioned above are common birds no one species is characterised as threatened or endangered later alone Rare.

5.10 Archaeology and Cultural Heritage

There are no known archaeological or cultural heritage sites at the proposed plant site and the surrounding environment.

5.11 Traffic volume

Currently private vehicles, buses and minibuses uses Mumbwa road for public transport. As the proposed Plant will be expanded, there is great possibility of increase in traffic volumes on the Mumbwa road due to deliveries of material to the site. The proposed site has internal roads and parking area that will ensure less traffic along Mumbwa road.

5.12 Socio-economic conditions

5.12.1 Population of Chilanga District

Chilanga district is 5,252 Km² in size with a projected population of 127,604 people in 2018. That implies a population density of 24 people per square kilometre. By 2020, the population was expected to reach 157,290 people with 79,135 males and 78,155 females.

In the same year, according to the Demographic and Health Survey (2018 Zambia DHS, published in 2020) **infant mortality rate** for Lusaka Province was 55 deaths per 1,000 live births compared to the national average of 45 deaths per 1,000 live births. Total fertility rates was 3.7 in 2014, went down 3.5 by 2018. This rate compares favourably with the national average of 5.3 (with rural rate at 6.6).

5.12.2 Development surrounding project site

The built environment nearer and around the plant site (within 2 km) consists of sparse human settlements that include compounds for farm labourers, paramilitary residential compound, a lodge, farms (small holding and commercial farms) and villages slightly further away.

Within the plant premises are to be found two ginneries (InterContinental and Parrogate), office block and laboratory building, storage shed, boiler sheds, effluent treatment plant, solid waste disposal area, extraction, refinery and packaging plant, five boreholes, ZESCO transformer, concrete

platforms and gravel roads.

5.12.3 Economic Activities

With regard to economic activity, the south-eastern side of the district is the most urbanised, where the administrative centre of the district is located. The larger part of the district is largely agricultural settlements dominated by small and medium scale farmers that rely on the larger market of Lusaka district.

The district is host to Munda Wanga Botanical Gardens, a tourist destination not far from the very urbanised area of Lusaka district. The other notable establishments in the district are

Lafarge/Chilanga Cement plant and a lot of lodges and recreation facilities, especially along the T2 road – in particular around government administrative centre.

Though most people are subsistence farmers, a lot more people engage in various agriculture business or economic activities because of the large consumer market in nearby Lusaka district. The number of small and medium scale agriculturalists is always rising because a lot of people in formal employment decide to start farming much earlier than was the case a few decades ago. The other economic activities are private transport, traders, service providers like hoteliers, educators and healthcare people. The district has a fair share of people who earn their living as employees in private or public institutions.

5.12.4 Education

In 2015, **Literacy rate** for Lusaka province was 80.1 percent; it compares favourably with the national averages of 67.5 percent (with rural and urban rates at 54.3 and 82.8 percent respectively)

Currently the district has 35 registered primary/basic schools and secondary schools. In addition, the district has Registered Community Schools. At community level the Parents Teachers Association (PTA) work hand in hand with respective school administrators. Despite having such a number of schools, the pupil teacher ratio is still high for primary schools.

5.12.5 Health Facilities

Chilanga District has about 13 health care facilities with the closest to the site being Mwembeshi rural health center. Most townships in close proximity to the proposed project have access to the health facility. The district also houses two hospices

5.12.6 Energy

The proposed plant will get its source of energy from Zesco and proposed gensets to supplement power needs of the plant.

Chilanga District generally has seen an increase in the number of developments coming up from 2012 to date. This increase in both population and economic activities has resulted in the growth of the energy sector. The demand for power and other energy products in the district has resulted in a number of filling stations coming up and sales of charcoal has also increased. The plant has its own share in the aforementioned demand for energy.

5.12.7 Transport and communication

The project site is well serviced by the tar Mumbwa road 20 meters from the site.

The plant site is well serviced by tarred road (Mumbwa), which passes by the facility. Mumbwa road connects the plant area to Lusaka District Town Centre, the other parts of the district and the rest of the country. The site can be accessed using public transport (mini-buses/taxis).

The environs of the study area are well covered and served by the local radio, television network and local print media. The local newspapers are sold in shops within the area. The surrounding area is also well covered by both landline phone (telephone - ZAMTEL) and mobile cell networks (Airtel, MTN and Zamtel)

5.12.8 Water Supply and Sanitation

The Lusaka Water Supply and Sanitation Company (LWSC) Limited is the utility company in charge of providing water and sanitation services in Lusaka Province. The company operates under the legal framework as outlined by The Water Supply and Sanitation Act No. 28 of 1997. The company is licensed by the National Water Supply and Sanitation Council (NWASCO) as the Regulator, to provide water supply and sanitation services in the City of Lusaka.

The plant expansion works will use water from a borehole. Effluent will be treated within the plant and the waste water will be used for cooling coal ash and dust suppression expansion will use water from a bore located within the plant.

PGL will ensure that they install a borehole for supply of clean and safe water for consumption during both the construction and operational phase of the project.

Sewage

The proponent will ensure that all site sewer lines are connected to the local sanitary facilities through on-site septic tanks that shall be installed.

Surface Drainage

Most of the rainwater will mainly be absorbed into the soil during construction phase. However, there will be appropriate drainage systems on site to handle the run-off/storm water from the site during operation of the project. These will collect all the excess water from the facility into the effluent treatment system which will be constructed on the proposed expansion site.

5.12.9 Potential Resettlement and Compensation

The proposed site for the plant has no settlers and the social assessment indicates that there will be no resettlement or compensation issues associated with the operation of the proposed plant.

6

POTENTIAL ENVIRONMENTAL IMPACTS AND THEIR MITIGATION MEASURES

6. POTENTIAL ENVIRONMENTAL IMPACTS AND THEIR MITIGATION MEASURES

A number of environmental issues were identified during the scoping process and the EIA study. The purpose of this section is to predict and make an assessment of the impacts on the environment that may potentially arise as a result of the operations of the plant. Impacts that could occur are grouped and discussed below under the headings of the various environmental components or receptors that are likely to be affected by the implementation of the project.

An assessment of the general significance of these impacts based on significance and likelihood is made on the basis of information gathered during the scoping process, the environmental baseline study of the plant area which included several plant visits by respective experts, as well as a desk study of relevant existing documents and information pertaining to the study and information describing the nature and design of the proposed project. The possible environmental impacts related to the project are discussed in this section: -

The key environmental issues of concern have been referred to in this chapter and the mitigation measures are incorporated in the environmental management and monitoring section of this report.

6.1 Positive Impacts (Socio – economic impacts)

6.1.1 Employment Opportunities

The facility currently will provide between 300-450 direct employment opportunities. A permanent workforce is proposed at 250 after the expansion works. The proposed plant will have skilled personnel and crafts people as well as un-skilled labor and will offer many employment opportunities. Furthermore, indirect opportunities for employment are stimulated in the other sectors related to operations, such as manufacturers and suppliers of local raw materials and finished products and providers of services. Maintenance phases will also create indirect employment opportunities for locals especially for semi-skilled labor such as brick layers, steel fixers, carpenters, supervisors, and sub-contractors.

6.1.2 Improved Aesthetics of the area

The proposed plant will contribute to the development of the Chilanga's industrial development by providing impressive scenery and contributes to a positive aesthetic outlook of the surrounding built environment in Chilanga District.

6.1.3 Increased Public revenue

The proposed facility will pay revenue and taxes thus increase revenue and taxes for both the central and local authorities. This includes scrutiny fees for the local planning authorities (CTC) and other indirect taxes resulting from the construction project such as VAT on materials and services, PAYE as well as revenue to pension funds such as NAPSA.

6.1.4 Multiplier Effect

The developer will enhance local participation throughout the various phases of its construction and operation by focusing on local suppliers, employees, and consumers and intends to maximize the multiplier effect on the Zambian economy.

6.2 Negative Impacts (Preparation/Construction/Operation Phases)

This particular project is expected to have some negative environmental impacts and these are:

6.2.1 Direct impact on localized land and soil (construction and Operation)

Destabilized soils could result in soil erosion due to storm water runoff during periods of heavy rainfall which could have an effect in the long run.

All earthworks for maintenance will be carried out during the dry season and the permanent storm water, road and site drainage system will be in place before the onset of the following rains.

Hydrocarbon/Oil Leaks and Spills

Oil/grease spills are noted to be prevalent during construction and operations on the site; dealing with petroleum products. Such products contain detrimental elements to the environment since they contain traces of heavy metals such as; mercury, lead and sulphur among others. It is wise to control and observe the little that could occur especially during maintenance of the involved machinery.

6.2.1.1 Impacts on biological existing environment (fauna and flora)

The site is already a cleared site with an already existing operational plant. In comparison to surrounding areas, impacts on utilization of natural resources within the project area will be mitigated through good plant practices and replanting of exotic plants within the plant.

Impact on Biodiversity

Construction Phase

The site is already a cleared site with an already existing operational plant thus little to no global significance has been identified and no impact on biodiversity.

Mitigation measures

- ✓ Good practices that protect biodiversity.

Impact on Fauna

Construction activities will result to loss of fauna due movement of heavy equipment. Operation of the plant will have little to no impact on fauna

Mitigation measures

PGL commits to notify the National Park and Wildlife Department should any fauna be noticed on the proposed plant.

Introduction of Alien species

All workers are sensitized not to carry or introduce alien species (plants or otherwise) into the proposed plant area which contaminate water bodies, so as to avoid alien species invasion in the area. Inspections should also be done to ensure that no seeds or plant remnants of these invasive species are carried on equipment being transferred from other areas to the project site.

The developer will monitor the trees that are replanted on site ensuring that no alien species are

planted on site

6.2.1.2 Impacts on risk of fire

There are some operations that may pose a risk to fire occurrences at the proposed plant. These occurrences may arise during both construction especially fuel storage area and operation phases since there will be extensive use of electricity in the facility. High risk of fire is also expected due to the flammability of the products (petrol, diesel, Hexane) handled at the site. It should therefore be ensured that all operations during operational phases are in tandem with the Fire Risk Reduction Rules.

6.2.1.3 Impacts of the facility will have on the business within the vicinity of the proposed project site

Local businesses around the area will have easy access to the commodity (such as restaurants and other industrial companies) but provide competition to other industries producing the same commodity.

6.2.2 Impact on Noise (construction and Operation)

Preparation and Construction Phases

Noise from constructing machinery; however, considering that the area is navigated by busy main roads, additional noise from construction traffic around the area could be enhanced.

Operation Phase

Potential sources of noise at operation stage will include:

- **Noise from increased traffic**

The increased volume of traffic to the area will result in an increased background noise level, especially during peak times. However, given that the site is located next to existing busily trafficked Mumbwa road, it is not considered that the impact of noise from the additional traffic will be significant.

Faulty operation equipment will not be allowed to operate on the site to ensure quiet operation. Earmuffs shall be provided to personnel working in or near noise environments.

Public liaison through the management will be an integral part of PGL management in order to avoid potential conflict with surrounding developments and neighboring residential areas as regards the activities of the development. Prior notice will be given in good time of impending activities that may potentially cause disturbance to surrounding residential areas.

6.2.3 Impact on Air quality (Construction and Operation)

- **Dust releases and nuisance**

Construction activities such as clearing of the land, excavation, and movement of heavy equipment will result into increased dust levels at the proposed site. Bare surface areas with loosened topsoil combined with the operation of machinery such as trucks, folk lifts will increase dust raised from the site. Dust will be raised during the off-loading of materials (soya seeds) delivered to the site; the preparation of the

foundations will require the importation of raw materials.

Coal-fired Boilers at the proposed Plant once operational will be a source of air pollution; particulate matter, Oxides of nitrogen, Sulphur and carbon are mostly emitted. Hexane if leaked could also pose adverse effects at the plant.

- **Exhaust nuisance**

The operation of machinery will result in an increase in the levels of air pollution within the site due to exhaust fumes although the impact of this will be localized and is considered moderate to small. Given that the site is already active, the surplus impact of exhaust fumes from operational vehicles will generally be very small. Levels of such exhaust pollution will depend highly on the maintenance and condition of the equipment and vehicles at and coming to the site. The proponent shall ensure all vehicles are properly serviced to avoid unnecessary fumes during construction works.

6.2.4 Solid Waste generation (Construction and Operation)

Solid waste is expected to be generated at all stages. Waste that will be produced on the site includes building rubble, iron cuttings as well as worker's domestic garbage mainly biodegradables such as food stuff and non-biodegradables (such as plastics).

The following Solid Waste Management protocols will be followed:

- Proper housekeeping will ensure that all parts of the site are at all times clean and tidy. Bins will be provided throughout the development for the deposition of litter.
- Designated covered areas will be provided for the storage of normal solid waste arising within the project area.
- An approved waste removal company will be contracted by the developer to collect un-recyclable solid waste for disposal at an approved refuse dumping site in accordance with Section 63 of the EMA No. 12 of 2011.
- All hazardous wastes, material soiled with hazardous wastes and empty containers of hazardous materials shall not be disposed of on site. All such waste shall be stored on site in an approved manner, and be removed at regular intervals to offsite waste disposal facilities designed to handle such hazardous waste as required by law (Hazardous Waste Management Regulations SI No. 112 of 2013 Regulations 18 - 30).

6.2.5 Generation of sewage (Operation)

The main source of sewage is from offices and production units. The following measures are ensured;

- All sewage will be directed/connected to the effluent treatment system;
- Proper sanitary system will be put in place
- Effluent from the plant will be discharged directly to the effluent treatment plant.

6.2.6 Impact on ground water – abstraction related (construction and Operation)

It is not considered likely that the water requirements of the proposed plant will result in over abstraction of ground water that could result in reduced availability to other users or have detrimental effects to the aquifer.

Borehole abstraction will be monitored for the proposed facility. Only required amounts shall be drawn and storage tanks will be mounted to ensure conservation of water. The reticulation system will be automated to only draw water when reservoirs go below a preset minimum level.

6.2.7 Impact on Traffic and Road Safety (construction and Operation)

The major road around the plant is Mumbwa road. Currently private vehicles, buses and minibuses use Mumbwa road for public transport. As the Plant is already in operation, there is little possibility of increase in traffic volumes on the Mumbwa road.

6.2.8 Occupational Health and Safety (Construction and Operation)

● Safety risks

Construction and Operations phases at the proposed plant involve potentially risk levels to the occupational health and safety of workers and personnel. The nuisance of dust and the movement of vehicles around the site may impact on the health of workers. Potential risks include working at heights with scaffolding platforms, welding, cutting, and on site handling of machinery.

Other risks may include explosions, fire, hazardous situations arising from process designs etc.

Strict adherence to safety measures and procedures will minimize (or eliminate) risks of accidents occurring and ensure healthy and safe conditions for all persons working on the site. Adherence to engineering regulations and standards would eliminate structural failure.

Safety arrangements shall include:

- ✚ All Fire Fighting equipment such as fire extinguishers and hydrants will be checked and serviced regularly to ensure that they are always in full working order.
- ✚ Personnel shall be trained in fire procedures and assembly points. Fire drills will be conducted based on the Emergency Response Plan.
- ✚ Personal Protective Clothing (PPE) shall be issued and used as required by the various classes of the workforce e.g. gloves and aprons for cleaning and housekeeping, gloves, aprons and/or overalls, respirator and face shield for spraying chemicals, etc.

● Health risk

The dust raised during various plant activities and exposed worksites can pose a nuisance to workers or adjacent communities. Impacts are potentially significant if unmitigated and can lead to either chest or eye irritations.

The developer shall comply with the Zambian Construction Health and Safety Standards. These include provisions of:

- Factories Act. Cap. 441,
- Workers Compensation Act

In addition, the developer shall ensure that all employees, subcontractors, suppliers and visitors are made aware of and comply with safety rules and measures that will apply on site, and is responsible for conducting the necessary trainings of personnel. The developer shall take reconnaissance of safety regulations in order to avoid unsafe/disruptive actions on site.

6.2.9 Impacts on Archaeological/Historical/Cultural sites (Preparation)

The proposed plant site does not contain known historical, pre historical or archaeological or scientific interest.

Any such features that may be discovered that were not apparent on surface investigation will be reported by the Developer and applicable procedures will be followed.

6.3 The Evaluation of the Impacts Significance

The assessment of the issues has been conducted according to a synthesis of criteria required by the integrated environmental management procedure defined as follows:

6.3.1 Nature of the Impact

This is an appraisal of the type of effect the plant activities would have on the affected environmental component. Its description includes what is being affected and in what way. This includes both the positive and negative.

- **Direct Impact** - These are impacts that are typical, inevitable, and predictable. They are caused directly during implementation of project activities.
- **Indirect Impact** - These are reasonably foreseeable and probable impacts that are caused by facility direct and indirect effects. The impacts may occur at some future time after direct effects and will be located within the boundaries of the systems affected by the plant.

6.3.2 Duration

The lifetime of the impact is measured in the context of the life-time of the proposed development.

- **Short term** - the impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase.
- **Medium term**- the impact will last for the period of the construction phase, thereafter it will be entirely negated.
- **Long term** -the impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter.
- **Permanent** -the only class of impact which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

6.3.3 Intensity

A description of whether or not the intensity (magnitude) of the impact would be high, medium, low or negligible (no impact). An attempt will be made to quantify the impacts on components of the affected environment will be described as follows: Is the impact destructive, or benign? Does it destroy the impacted environment, alter its functioning, or slightly alter it? These are rated as follows:

- **Low** - where the impact will not have significant influence on the environment, and this will not be required to be significantly accommodated in the project design or implementation; the impact alters the affected environment in such a way that natural processes of functions are not affected in any significant way.
- **Moderate** - where it could have an adverse influence on the environment which would require modification of the project design or alternative implementation schedules; the affected environment is altered, however, function and process continue, albeit in a modified way.
- **High** - where it could have significant influence on the environment but cannot be mitigated or be accommodated by the project environment by introducing alternative mitigation measures such as realignment at a particular stretch or adoption of different design measures.

6.3.4 Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

- **Unlikely** - the probability of the impact occurring is very low, due to the circumstances, design or experience.
- **Possible** - the impact could possibly happen, and mitigation planning should be undertaken.
- **Probable** - it is most likely that the impact will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.
- **Improbable** - it is not likely that the impact will occur at some or other stage of the development.
- **Certain/Definite** - the impact will take place regardless of any prevention plans, and only mitigatory actions or contingency plans can be relied on to contain the effect.

6.3.5 Severity

This describes whether the severity (harshness / gravity) of the impact would be high, medium, low or negligible (no impact). The severity of the impact will be qualitatively determined on the components of the environment to be affected by taking into consideration the following questions. Is the impact harsh, serious, or dangerous? Does it degrade the impacted environment, alter its functioning, or slightly modify its natural state? These are rated as follows:-

- **Low** applies where the impact is very little and will not have significant influence on the environment. This will not be required to be significantly accommodated in the project design or implementation and the impact changes the affected environment in such a way that natural processes of functions are not affected in any significant way;
- **Moderate**, applies where the impact could have an adverse influence on the environment and would require some modification of the project design or

alternative implementation schedules. In this regard, the affected environment is altered while the function and process continue, albeit in a modified way; and

- **High**, applies where the impact could have significant influence on the environment but cannot be mitigated or be accommodated by the project environment by introducing alternative mitigation measures such as realignment at a particular stretch or adoption of different design measures. In this regard, the function or process of the environment is disturbed to the extent where it temporarily or permanently ceases.

6.3.6 Sensitivity

The sensitivity of the element being impacted would be regarded as being high, medium, low or negligible (no impact). An effort will be made to determine the qualitative sensitivity of the element of the environmental components being impacted upon due to the proposed development. Is the reaction of the environmental component due to the impact acceptable or not? Does it destroy the impacted environmental component, alter its functioning, or slightly alter it?

- **Low**, where the sensitivity of the element being impacted will not have significant influence on the environmental component, and this will not be required to be significantly accommodated in the project design or implementation. The impact to the affected environment will be in such a way that natural processes of functions are not affected in any significant way;
- **Moderate**, where the sensitivity of the element being impacted could have an adverse influence on the environmental component, which would require modification of the project design or alternative implementation schedules. The affected environment is altered while the function and process continue and the albeit in a modified way; and
- **High**, where the sensitivity of the element being impacted could have significant influence on the environmental component but cannot be mitigated or be accommodated by the project environment by introducing alternative mitigation measures such as realignment at a particular stretch or adoption of different design measures. The function or process of the environment is disturbed to the extent where it temporarily or permanently ceases.

6.3.7 Determination of Significance

Significance is an indication of the importance of the impact in terms of physical extent, intensity and time scale, and therefore indicates the level of mitigation required. Usually the community is involved in provision of information and determination on the characteristics of the impacts and the significance is determined based on this information.

The classes are rated as follows:-

- **Negligible**, the impact is not substantial and does not require any mitigatory action, Low, the impact is of little importance, but may require limited mitigation,
- **Moderate**, the impact is of importance and therefore considered to have mitigation. Mitigation is required to reduce the negative impacts to acceptable

levels or positive impacts maximised,

- **High**, the impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential. Positive impacts should be enhanced as a priority.

From the baseline information assembled in the previous chapter coupled with the information gained during the consultation stage, the expected environmental impacts can be categorised into positive and negative impacts.

In addition, it is important to consider the duration of the impact and at what phase of the project it occurs, i.e. impacts during site preparation phase or impacts over the life of the project (operational phase) and whether the impacts are direct (i.e. removal of vegetation) or indirect (increased sexual diseases as a result of the improved wages).

The evaluation of impacts using these criteria is presented in Table 6 on the next page:

6.3.8 Significance Ranking Matrix

Table 6-1 Significance

CONSEQUENCE (Magnitude Geographic Extent Duration of impact)															
LIKELIHOOD (Frequency of activity Frequency of impact Sensitivity)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 6-2: Positive/Negative Mitigation ratings

Significance Rating	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation

Very High	126-150		Propose mitigation measures	Improve current management
High	101-125		Propose mitigation measures	Improve current management
Medium-High	76-100		Propose mitigation measures	Improve current management
Low-Medium	51-75		Maintain current management	Propose mitigation measures
Low	26-50		Maintain current management	Propose mitigation measures
Very low	1-25		Maintain current management	Propose mitigation measures

Table 6-3: Impacts on the Bio-Physical Environment (Operational Phase)

Impacts on Air Quality	
Deterioration in air quality due to increased traffic exhaust emissions, odour from solid waste and fugitive dust	
Magnitude of impact	4
Geographic extent	3
Duration of impact	2
Frequency of activity	4
Frequency of impact	4
Sensitivity of element	2
Result	Medium-High (-88)
Comment/ Mitigation	
- All discharges to air from kitchens will be screened through kitchen hoods, filters, and extraction fans to ensure compliance with local building regulations. - Proper house cleaning and management of solid waste will ensure the risk of odour due to the accumulation of refuse is minimal. - All walkways and driveways will be paved, while other areas will be landscaped and planted with flowers or grass and hence no dust release is envisaged	
Deterioration in air quality due to increased traffic exhaust emissions, odour from solid waste and fugitive dust	
Magnitude of impact	1
Geographic extent	2
Duration of impact	1
Frequency of activity	1
Frequency of impact	2
Sensitivity of element	1
Result	Very Low (-12)

Impacts of Noise on the Environment	
Magnitude of impact	2
Geographic extent	2
Duration of impact	3
Frequency of activity	3
Frequency of impact	4

Sensitivity of element	2
Result	Low -Medium (-75)
Comment/ Mitigation	
The site is located along T2 Kabwe road from which noise levels equivalent to what may result from additional traffic to be attracted by the proposed facility are already experienced, and hence expected to have a corresponding effect	
Noise pollution from plant construction and operation and traffic movement	
Magnitude of impact	2
Geographic extent	1
Duration of impact	1
Frequency of activity	1
Frequency of impact	3
Sensitivity of element	1
Result	Low (-20)

Table 6-4: Evaluation of Impacts

Phase	Description of Impact	Type of Impact	Spatial Extent	Frequency	Duration	Intensity	Severity	Probability	Sensitivity	Determination of Significance
Improved Aesthetics of the area										
All phases	Enhanced aesthetics of the project area by improving the landscaping and general cleanness of the site.	Indirect/ Direct	Site	More than twice	Long term	Moderate	Moderate	Probable	Moderate	High
Boosting supplying sector										
All phases	Positive boost to the local and national economy through its multiplier effect	Indirect/ Direct	Site	More than twice	Long term	Moderate	Moderate	Probable	Moderate	High
Employment and enhance services										
All phases	Employ people during all the phases of the project.	Indirect/ Direct	Site	More than twice	Long term	Moderate	Moderate	Probable	Moderate	High
Improved local Economy										
All phases	Impacts on the local economy due to alternative income generating activities, increased employment levels, influx of people to the area, land use changes, increased purchasing power.	Indirect/ Direct	Site	More than twice	Long term	Moderate	Moderate	Probable	Moderate	High

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Impacts on Water Quality

All phases	Storm water and other run offs	Indirect	Local	More than twice	Long term	Moderate	Moderate	Probable	Moderate	Moderate

Impacts on Air Quality

Construction	Temporary air pollution due to dust generated by excavation, vehicle traffic and transportation of construction materials and fumes from vehicles	Direct	Local	More than twice	Short term	Moderate	Moderate	Possible	Moderate	Moderate
Operational	Localized Gaseous fumes due to operations.	Indirect	Site	More than twice	Long term	Moderate	Moderate	Possible	Moderate	Moderate

Impacts on Noise

All phases	Noise from increased traffic.	Indirect	Site	More than twice	Long term	Low	Moderate	Possible	Moderate	Moderate

Impacts of Traffic and road safety

All phases	Increased noise levels.	Indirect	Site	More than twice	Long term	Moderate	Low	Possible	Low	Low

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Impacts of occupation health and safety

All phases	Workers could be in danger of accidents from machinery such as excavators etc	Direct	Site	More than twice	Medium	High	Moderate	Possible	Moderate	Moderate

Table 6-5: Summary of Potential Impacts and their Mitigation Measures

No.	Environmental Impact	Source of Impact	Potential Impact	Proposed Mitigation Measures
1.	Impact on soil	During site Preparation and construction	- Altering the topography of the area. - Destabilized soils could result in soil erosion due to storm water runoff during periods of heavy rainfall which could have an effect in the long run.	The clearing of land shall take place. However, all earthworks for site preparation and levelling and preparation of the platform will be carried out during the dry season and the permanent storm water, road and site drainage system will be in place before the onset of the following rains
2.	Air quality deterioration due Dust	During site Preparation and construction	- Dust from site preparation and construction works phase and from vehicle movements around the site; - Dust from removal of top soil and excavation of trenches for tanks; - Dust from the cement and aggregate during construction; - Worker exposure to dust	- Watering the site at regular intervals during the site preparation and construction phases of project implementation; - Respirators shall be used to protect employees;
3.	Solid Waste generation	During all the stages of the project	Degradation of soil and general environment	☐ Institute solid waste management by having designated bins and engaging a company for collection; ☐ Having designated points for the disposal of waste; ☐ Separation of biodegradable from non-biodegradable waste. Waste will be separated into the four categories hence reducing the environmental load by minimizing actual waste being Biodegradable; Plastics; Glass and bottles; and Cans and metal. ☐ Minimizing solid waste through effective and efficient operations on site of the service station Operations during and after the construction phase of project implementation;

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				- Waste will be kept to minimum levels by efficient and effective operations on site; - A system will be put in place to ensure that there is proper storage of the waste so that even in the event of potential delay in collection, the waste is properly contained; - Vehicles carrying waste should be covered as they transport the waste to designated dumping sites; - Mixing of stones and cement will be done at one point of the site to be identified by the qualified surveyors and constructors in order to avoid contaminating the whole area.
4.	Generation of sewage.	From site offices	Contaminating surface water and underground water	- All sewage will be directed/connected to the effluent treatment system; - Proper sanitary system will be put in place - Sewage from the development will be discharged directly to the existing trunk main
5.	Safety and Risk of Workers	- Accidents during Site preparation; Construction; and - Injury / loss of life from accidents	Loss of life	- Ensure that all workers are briefed on potential hazards and necessary safety precautions; - Implementation of emergency procedure on site; - Use of clearly labelled signage during and after the project construction phase; - Proper control and directing of on and offloading traffic during construction phase;
6.	Traffic and Parking	During operation stage of the project	Increased traffic loads.	There is enough room for a good car park.
7.	Noise Pollution as a result of vehicular	Construction and Operational stages	Disturbing surrounding community	Works will be done in an enclosed or barricaded area as per construction rules;

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	movements to and from during construction and operational activities;			• Ensuring proper regulation of working hours. • Regular servicing of vehicles
8.	Health and safety of workers	• Construction phase	• Chronic illnesses leading to Loss of life	• Implement a safety and health policies designed to identify, evaluate, monitor and control health hazards and provide safety training; • Put in place a health scheme for the employees; • Ensure that employees are regularly trained and drilled to fire fighting and safety techniques; • Provide adequate ablution facilities for all employees and change rooms facilities; and • Provide hygienically prepared meals for all employees.

7

APPROACH AND METHODOLOGY

7. DESCRIPTION OF METHODS USED IN DATA COLLECTION

7.1 Introduction

This section refers to various study tools that were adopted for each element of EIA study like literature review, understanding prevalent environment of the study area, data collection and data analysis approach, transect and socio-economic study, and Geographic Information Systems (GIS) mapping using drone-imagery.

7.2 Methodology

For the preparation of detailed EIA, ESEC LTD team collected the necessary information through field assessments, government authorities, and carried out public consultations. The team developed communication links with appropriate personnel of the PGL and other relevant key entities with the objective of progress of proposed assignment in a timely manner.

The scope of the study is to describe the project and evaluate all the possible positive and negative environmental impacts in order to propose the mitigation measures necessary to reduce the effect of the identified negative impacts. Data has been collected from different sources which is then analyzed and synthesized to understand prevalent environment, identify impacts, and thereby propose adequate management plans.

7.3 Data Collection

Literature review that was partially carried out during Scoping Report preparation has been continued for the EIA study. The prime objective is to:

- Review of existing studies, environmental legislation, environmental and social surveys, and technical documents relevant to sewerage connection;
- Collect any data required to meet requisites of the approving authorities, e.g. ZEMA and World Bank.
- The team collected required information from different government departments, academic institutions (universities), public agencies, research institution, authorised websites, etc. The collected information (policy documents, published books, journals, and census data) has been reviewed by the team for better understanding of project area, environment, sensitiveness, and socio-economic structures.

The baseline data was collected in order to describe the existing environment. Data collection included an inventory of biophysical environment, conducting interviews with stakeholders and reviewing of relevant literature. Information on names of geographical features were checked from maps and confirmed by interviewing key local informants who were conversant with the area and specific details.

The inventory of the existing physical and biological environment on the facility focused on quality, quantity, density, and distribution. The mapping of the existing surrounding industries was undertaken to map out the surroundings of the plant area in order to determine the location of the proposed development in relation to any existing critical installations and developments that would be affected by the project. In doing so, the existing environment was categorized into physical, social and biological environments. Specialized studies were conducted to assess possible impacts on air, soil and water. Existing Baseline Data: Review of relevant published data, including previous EIAs and Environmental monitoring data. Sources of baseline data and all key documents, which have been used for this EIA, are listed in the appendices.

Biophysical Environment: Vegetation has been partially cleared due to human interference as the area is a designated industrial area thus rendering the area into a sterile environment. As for species identification the following were considered: Leaf composition, leaf type, leaf variation and plasticity, branch shape and stems. The Species diversity, Abundance, Population and Evenness of the trees within the area was not conducted as the plant is within an already existing industrial area which is already cleared of plants and no trees will be cut.

Fauna and avifauna at the proposed plant site area were sighted by taking field walks around the site and surrounding areas. Little or no birds were identified on sight and reference was made through desk study literature.

Baseline Surveys: Where baseline data was considered to be potentially insufficient (such as, out of date, lack of seasonality considerations, too narrow scope) for the current EIA process, new baseline surveys were conducted and additional primary data collected. Project baseline surveys included socio-economics.

7.4 Mapping

GIS maps are prepared to illustrate the climatic conditions; land use & land cover patterns, historical sites, geological formations, routes for laying pipelines, and other related parameters. The mapping is based on geographical coordinates collected during field surveys, consultations and while some are based on data available from satellite images and authorised websites.

7.5 Scoping Phase

ESEC LTD team visited the project site several times and interacted with various stakeholders such as PGL Staff, ZEMA and other regulatory authorities for conducting the preliminary investigations to define the scope and formulating Terms of Reference (ToR) for the detailed EIA study. The stakeholders had been identified through a detailed stakeholder identification and mind-mapping process in discussion with PGL and ZEMA during the inception phase and document review. The findings of the preliminary assessment had been recorded and documented as the Scoping Report along with the ToR, which was submitted to ZEMA by the Consultant for approval in April, 2022.

7.6 Preparation of EIS

PGL through the ToR has described a list of significant tasks that needs to be undertaken by the Consultant to prepare a comprehensive and detailed EIA. The tasks are as follows:

i. Legislative and Regulatory Framework

ESEC LTD studied the relevant legislation and policies at National, Regional, and Local levels from secondary data sources. The World Bank operational policies are also studied and analysed to streamline the policies that are triggered by the operations of PGL.

ii. Environmental and Socio-Economic Baseline Study

ESEC LTD team collected and assessed information on key environmental, ecological, and social parameters present within the project areas. The approach for the environmental and socio-economic baseline study is as follows:

a) Environmental Baseline Study

- Desktop Review

The study source for desktop review included environmental project brief, geographical, ecological

and socio- economic profiles for Lusaka, data obtained from the PGL, and other available maps, related reports and documents. The data collection and review had been conducted to:

- Collect documented data on all aspect of the project.
- Assess ongoing or planned initiatives related to Housing.
- Detailed review of any existing studies, environmental legislation, environmental and social quantitative and/or qualitative surveys and studies.
- Study the ZEMA environmental laws and regulations.
- Collect any additional data that is required to meet the requirements of the approving authorities.

- Data Collection and Site Surveys

Data collection and site surveys had been initiated prior to the development of Scoping Report and continued throughout the period of EIA study. It involved interacting with various stakeholder institutions and engaging with them through consultations at institution/residential/company level of Chilanga and Lusaka. The prime objective of the activity is to carry out reconnaissance survey for site inspection and understanding project area for overall environmental and social assessment.

b) Socio-Economic Baseline Study

- Primary and Secondary Data

This assessment is based on primary exercises like field investigations, consultations/meetings with relevant stakeholders and secondary socio-economic data obtained from books, reports, journals, and other sources such as the Chilanga State of the Environment Outlook Report, Central Statistics Office (CSO) Census Reports, NGOs, CBOs, Universities and other sources.

- Stakeholder Consultations and Focused Group Discussions

ESEC LTD ensured that each relevant stakeholder is involved during the study to provide a foundation for attaining and sustaining support of stakeholders, particularly the directly affected persons and local communities. Early engagement of stakeholders in any activity is critical, as community perceptions, expectations and relationships established can reduce risks and threats to the project.

The stakeholder engagement process included identification of stakeholders, in consultation with PGL and ZEMA and analysis of their objectives and interest, engagement strategies and monitoring & reporting. The project stakeholders were engaged through consultation-based methodologies, comprising of qualitative and quantitative tools to acquire the project and project areas related information and suggestions/concerns from the stakeholders by using the questionnaires designed for this project. The website was prepared in such a way that it covered each component of the project requirement such as air, water, ecological, socio-economic, land acquisitions etc. Stakeholder meetings were conducted using the open designed website.

iii. Identification of Impacts and Mitigation Measures

Based on the findings of the field investigations and consultations, ESEC LTD team identified the potential impacts of all the project specific activities related to operation and decommissioning phase and the cumulative impact assessment (CIA) in detail using qualitative or quantitative methods. Interaction matrix has been used to identify the interaction between project activities and the environmental and social sensitivities. This records the rationale for the impacts and their potential significance, mitigation measures, linked to relevant legislation and the provisions of the

EMP.

Impacts are identified from environmental and socio-economic baseline as affecting the receptors air, water, land, biodiversity, resources, and community. These were further categorized into pre-construction, construction, operational and decommissioning impacts. Impact assessments were also based on criteria developed by ZEMA requirements.

iv. Analysis of Alternatives

ESEC LTD team on the basis and in coordination with PGL and PGL assessed all the alternatives options of the proposed project and provided the recommendations/suggestions for modification in the project works to eradicate and minimize the negative impacts. A comparative analysis of the alternative options in terms of technical, financial, environmental and social has been prepared with justification for the selection in the context of the local conditions. The 'Alternatives' has been analysed for the following components:

- Project Location
- Project Design
- Technology to be used
- No project scenario

v. Environmental and Social Management and Monitoring Plans

ESEC LTD developed the EMP consisting of the plans for the proper and improved implementation of mitigation measures to reduce the adverse impacts arising out of the project activities. The proposed EMP comprises of mitigation and monitoring plan for Construction, Operation and Decommissioning Phases in accordance with the ToR.

ESEC LTD team also prepared the Monitoring and Evaluation (M&E) plan for the implementation arrangements and subsequently performance as well as outcome monitoring of the actions suggested in the EMP

8

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

8 ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management and Monitoring Plan (EMMP) provides framework for management and mitigation of the environmental and social impacts associated with the cooking oil processing plant. The EMMP is a direct consequence of the EIA for the proposed project. It also depicts how the organizational capacity and resources will be organized to implement the mitigation measures proposed in the EIA.

PGL will implement mitigation measures contained in the EMMP to ensure environmental protection. In this regard, the EMMP that is based on the Environmental Management Act No, 12 (2011), (EIA) Regulations of 1997 together with ZS specifications underscores responsibilities of the PGL in safeguarding the environment in and around the proposed plant.

8.1 The Main Aim of the Environmental Management Plan

The aim of this Environmental Management plan for the facility is to avoid, minimize, or ameliorate effects or impacts resulting from plant activities and where possible, enhance beneficial effects. To this effect, PGL is going to initiate several Environmental Action Plans in order to address the issues arising from this development.

Meanwhile the significant positive impacts from PGL activities will be follows:

- Increased formal and informal Employment Opportunities for the locals especially the youths
- Increased market for farmers supplying raw materials and the general consumer community who will purchase cooking oil and by-products products.
- Increased Government Revenue from Taxes
- Economic Multiplier Driver
- Increased Citizens' Participation in Economic Activities

The identified significant negative impacts from the implementation of the PGL proposed plant are:

- Generation of noise by plant equipment
- Possible ground water contamination resulting from chemical, oils and hexane usage.
- Air pollution due to Emission from processing activities e.g. use of boilers and hexane and dust during operation activities especially at the oil seed feeding point

Due to the foregoing Environmental Management Plans to enhance the positive impacts, and mitigate the negative impacts have been developed and cover the following aspects:

1. Assigning responsibilities for the anticipated negative impacts for mitigation and costing
2. Identifying and assigning possible areas for amplifying the positive impacts
3. Continuing with local and institutional public consultations for mitigations that ensure Sustainable development

The developed EMMPs in section 8.2 are derived from the summarized mitigation for negative impacts in section 6.0, which outlines the mains sources of the risks discussed.

The impact mitigation plan allocates the responsibilities for implementation of the proposed mitigation measures to the various stakeholders and indicates at what stage in the project they should be performed. The Plan is presented in this chapter and it addresses the negative impacts generated by the project activities throughout the cycle and presents the associated cost estimates of mitigating the adverse impacts. The key components of the proposed impact mitigation plan are:

- Surface Water Management
- Erosion Control and Sediment Retention

- Water Quantity and Quality
- Vegetation and Flora
- Wildlife and Fauna Habitats
- Processing chemicals Management
- Hazardous Waste Management
- Noise
- Occupational Health and safety
- Land and Soil
- Air Quality
- Noise
- Landscape and Aesthetics
- Land-use and Surrounding Environment
- Socio-economic issues
- HIV/AIDS Awareness
- Work Accidents

8.2 Surface Water Management

Surface water is an important component of both ecological and human use of the land. The aim of the surface water management Program is to ensure that where practical, flows into and through the project site and the nearby streams are maintained and that water quality to these systems is maintained.

8.3 Erosion Control and Sediment Retention

The nature of the soils at the project area indicates that they are prone to erosion in a disturbed state. According, and where appropriate, all surface runoff from areas of disturbance and areas with elevated runoff coefficient will be directed by correctly designed drainage system, to sediment traps with sufficient volume and retention time to maximize settlement of suspended sediment prior to release. The drains will be designed according to the characteristics of peak flows for the predetermined design storm, and the requirement to discharge flows without causing erosion.

8.4 Effluent Discharge and Treatment

There shall be effluent produced from the plant process. The effluent will be discharged into the proposed effluent treatment plant. All monitoring of the effluent will be at the treatment plant. The other effluent will be sewer materials and other domestic/official uses which will be collected in a septic tank/Soak-away.

The groundwater system will be protected by constructing soak-away system that will not contaminate the ground water system. Thus a septic tank with a water tight lining connected to a soak-away will be constructed to allow for collection of slug that will eventually be emptied once full with the liquid matter that will float out into a soak-away system which will be sighted 60 metres away from water bodies water abstraction point in line with the requirements of the Public Health Act. It is anticipated that generally after 60 metres water would have purified in the underground formation of a combination of the geological and soil material which works as filter.

8.5 Optimum Usage Processing Chemicals

Excessive usage and spillage of processing chemicals can not only result in higher operating cost but also elevated level in surface and underground water systems.

8.6 Biomass Burning

There will be no biomass burning generated during weeding and landscape maintenance will be composited.

8.7 Noise.

Noise generated from construction and operations at the project site is not expected to impact on local communities due to the distances between the operations area and areas of habitation. However, the development's technical team will investigate any noise complaints received.

8.8 Soil Erosion

Gullies can easily form due to water erosion. This is an ecological disadvantage for there will be gully erosion. The hazard assessment results should be used to plan the proposed plant and associated structures properly and put up a well paved drainage system.

8.9 Sediment Ponds

Drainage system for effective conveyance of surface runoff away from disturbed areas will minimize the extent of erosion. For plant, roadside drains may play this function and will further retain direct discharge of eroded soil particles.

8.10 Sewerage effluent Sanitation Facilities

Improper sanitation facilities may lead to disease outbreak (airborne, waterborne or vector borne). Adequate sanitation facilities include:

- Toilet facilities adequate for the plant and additional workforce with septic tanks that will be maintained regularly to ensure their effectiveness.

8.11 Occupational Safety and Health

The safety and environmental control unit will be formed and 'beefed up' in order to minimize work place accidents. The following will be done:

- Workers shall be given proper and adequate training in machinery handling and safe working procedures.
- Personnel protective apparels such as safety boots, gloves, and respirators (especially for possible pesticide application) shall be provided in terms of suitability and adequacy.

Traffic signage at strategic locations within the access roads shall be provided, particularly farm blocks undergoing harvesting where haulage traffic volume is higher than any other block.

8.12 Management of Hazardous Materials

The following measures will be implemented to minimize potential environmental pollution

arising from these materials:

- i. **Processing chemicals** – proper storage and handling used containers will be returned to suppliers or collected for proper disposal – the developer will ensure they are never reused for domestic purposes;
- ii. **Used lubricants** – will be collected for disposed of as wastes in accordance with ZEMA Regulations;
- iii. **Fuel dispensing** will be carried out at existing dispensing points within the estate and by trained and experienced personnel to prevent spillage;
- iv. **Containers for fuel** and fuel enhancers will be collected and properly disposed of in accordance with ZEMA Regulations.

8.13 Community Consultation and Interaction

PGL shall adhere to its corporate policy of working with the local authorities and the surrounding communities to ensure that the expansion project becomes very much a part of the local community by adhering to lease agreements and other deliberations. The corporate affairs office shall constantly liaise with the community to thwart land tensions wherever necessary.

8.14 Workforce Awareness

Work force awareness and culture is an important component in minimizing environmental and cultural impacts resulting from project operations. Plant personnel will be made aware of the MML Environmental Policy. An environmental awareness induction plan will be implemented to ensure that all plant workers are aware of their environmental responsibilities.

8.15 HIV/AIDS Awareness Program

PGL HIV/AIDS Workplace Policy should be implemented throughout the organization structure. The Safety, Health and Safety Department which is given the mandate to implement the policy should ensure that all employees and other casual workers are sensitized about the dangers of HIV/AIDS.

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Table 8-0-1: PGL ENVIRONMENTAL MANAGEMENT PLAN

ASPECT	IMPACT	OBJECTIVE	MITIGATION/ENHANCEMENT MEASURE	FREQUENCY OF MONITORING	TIME FRAME	PERFORMANCE INDICATOR	RESPONSIBLE PERSON	COST (US\$)
Site training	Positive Enhance people's skills	To sensitize all employees working at the plant site	Site training session on Environmental management/safety	Planning for periodical assessment.	During all stages of operation	Programme for education both employees and customers	PGL Safety Manager	1500/Yr
Erosion at site	Negative soil degradation	Avoid soil degradation	Rehabilitate exposed areas to minimize erosion. Ensure proper usage of loose soils.	Planning for Periodical assessment	During all stages of operation	Absence of gullies and erosional signs	PGL Safety Manager	330/month
Air Quality	Negative air pollution	To eliminate and reduce discomfort to workers and surrounding communities To control the movement of the heavy duty equipment	Watering the ground to suppress any minute dust rising. Maintain dust levels $\leq 10\text{mg}/\text{m}^3$; Provide protective dust masks to workers. Control gaseous emissions from the plant unit operations; Nox, Sox, etc	Regular inspections throughout the operation Phase.	During all stages of operation	Exhaust fume emissions, unpleasant odour, dust are controlled.	PGL Safety Manager	200/month
Solid waste management	Negative land pollution	To avoid unwarranted disposal of solid waste.	- Disposal of waste will be limited to approved solid waste disposal sites - Waste management protocols - Waste management protocols including designated storage areas for solid waste with segregation for recyclable materials	Regular inspections throughout the operation Phase	During all stages of operation	Absence of solid waste.	PGL Safety Manager	500/month

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Noise Pollution due to operation activities	Negative Noise Pollution	To minimize noise disturbance to resulting from the operations of the Plant	Noise levels will be monitored, if results are above the recommended 80db appropriate mitigation measures like provision of ear protective gears and appropriate clothing to the workers operating at the site; Use of well- maintained machinery.	Regular inspections throughout the operation Phase	During all stages of operation	Noise levels at the nearest sensitive receiver are minimized.	PGL Manager	Safety	200/month
Safety/Health risk of workers	Negative	To prevent accidents, injury or health risks to workers/public	Periodic training and continual safety reminders to all operating staff and require periodic drills in safety and emergency procedures; Ensure that all workers are briefed on potential hazards and necessary safety precautions; Implementation of emergency procedure on site; Use of clearly labeled signage during and after the project operational phase; Proper labeling of machinery and equipment with the necessary pictorial and written instructions; Ensuring that the employees wear protective clothing at all times during all the phases of plant activities	Periodical inspections throughout the operation Phase.	Throughout the plant cycle	Operational Manual on Safety, Health and Environment for construction workers is developed and available on site.	PGL Manager	Safety	6000/yr
Oil and fuel leaks	Negative	To prevent contamination of soils and underground aquifers	Oil shall be cleaned immediately any spill is noticed Vehicles shall be serviced in designated garage with concretized surface; All oils shall be properly kept in secure concretized room at the motor vehicle workshop to avoid direct spillages to underground water.	Planning for Periodical assessment	Throughout the plant cycle	Absence of oil leaks	PGL Manager	Safety	500/month

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Public Health and safety	Negative	To prevent public injury or health risks to workers/public	<i>Sufficient warning sign posters shall be installed in all areas under maintenance and out of use. The speed limit signs and /or humps for vehicles coming into the plant to be provided. Speed humps to help reduce the speed of trucks on the access roads will be built.</i>	Planning for Periodical assessment	Throughout the plant cycle	Evidence of a health workforce and records.	PGL Manager	Safety	500/month
Occupational Safety and Health Risk of Workers	Negative	To prevent accidents, injury or health risks to workers/public	• <i>Implementation safety and health policies designed to identify, evaluate, monitor and control health hazards and provide safety training;</i> • <i>There shall be a health scheme for the employees;</i> • <i>Employees shall be regularly trained and drilled to firefighting and safety techniques;</i> • <i>The firm shall ensure that all visitors are briefed on potential hazards and necessary safety precautions;</i> • <i>Implementation of emergency procedure on site;</i> • <i>Use of clearly labelled signage;</i> • <i>Proper labelling of machinery and equipment with the necessary pictorial and written instructions;</i> • <i>Ensuring that employees wear protective clothing at all times;</i> • <i>Proper control and directing of traffic during peak period for deliveries.</i>	Planning for Periodical assessment	Throughout the plant cycle	Operational Manual on Safety, Health and Environment for construction workers is developed and available on site.	PGL Manager	Safety	1000/month
Flora & Fauna due Site clearance.	Negative Loss of Flora & Fauna diversity	To minimize disturbance	• <i>good plant practices and replanting of exotic plants within the plant</i> • <i>Leave undisturbed areas to allow for natural vegetation to flourish for maintenance of fauna biodiversity</i>	Planning for Periodical assessment	Throughout the plant cycle	Presence of undisturbed areas within and around worksite Presence of green fields	PGL Safety Manager		1000/month

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			Implement a Landscaping plan for establishment of green fields					
Water quality	Surface and ground Water Quality	To prevent surface and groundwater pollution	- Proper design of drainage system for storm water control - Monitoring and maintenance of sewerage system - Monitoring effluent for quality and quantity, especially suspended solids, settled solids, BOD, COD etc	Planning for Periodical assessment	throughout the plant life	Effluent within allowable limits Compliant quarterly Audit and Monitoring returns Well serviced monitoring equipment	PGL Safety Manager	4000/month
TOTAL								15,730.00

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Table 8-0-2: PGL EMMP

Impact	Mitigation Measure	Objective	Actions to be taken for its implementation	Period of Implementation	Indicators	Authority Responsible	Cost of Mitigation
Impact on Land and Soil							
Soil contamination due to improper storage of chemicals, fuels and poor waste oil disposal methods.	Chemicals and Petroleum products dispensing shall be done by qualified personnel;	To regulate any chemical usage.	Regularly weekly reports on soil composition at selected sites.	From inception to operation phase	Any visible soil contamination	☐ Developer ☐ Site Engineer	Training
Exposed soil is prone to erosion by water or wind.	Limitation of earth moving to dry periods;	To avoid erosion of soil by fast flowing rainwater.	Period of construction shall be specified.	All Phases	Visible signs of soil erosion	☐ PGL	1,000USD
	Protection of susceptible soil surface with cover crops and grass;	To control the current of the fast flowing rainwater.	Mitigation measures provided for impacts on soil shall be part of the overall Implementation Cost.	All Phases	Visible signs of soil erosion	☐ PGL	1,500USD
	Protection of drainage channels by planting grass or stone pitching;	To avoid direct contact of fast flowing surface water with susceptible soils.	Stone pitching and grass planting in drainage systems shall be part of the overall Implementation Cost as means of mitigating soil erosion.	All Phases	Visible signs of soil erosion	☐ PGL	1,000 USD for stone pitching
Exposed soil is prone to erosion by water or wind.	Installation of Sedimentation basins or planting of erodible surfaces as soon as possible.	To trap soil particles from the current of the fast flowing water.	Mitigation measures for impacts on soils shall be part of the overall Contractor conditions.	All Phases	Visible signs of erosion	☐ PGL	4,000 USD
Soil compaction could result following Plant activities.	Permanent access routes to be used.	To limit the size of area prone to compaction.	Mitigation measures for impacts on soils compaction shall be part of the overall Implementation Cost.	All Phases	Soil Compaction	☐ PGL	Covered in the construction
Soil erosion near drainage channels where water velocity could increase.	Soil erosion should be prevented especially near drainage channels	To control soil erosion and check for drainage channels requiring attention.	Program for regular Plant drainage maintenance shall be developed and made available.	All Phases	Presence of Gullies	Local authorities	5,000 USD

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	Regular maintenance of drainage channels for COD, BOD, etc.	To prevent deterioration water bodies, which are prone to soil erosion.	Mitigation measures for impacts on soil erosion shall be part of the overall Implementation Cost.	Operation Phase	Presence of Gullies	☐ PGL ☐ Local authorities	
Impacts on Vegetation							
Retardation of vegetation growth due to contamination from dust particles and gas emissions.	Dust control by application of water; Gravel road will be maintained.	To suppress dust generation	Mitigation Measures for impacts on vegetation shall be part of the overall Implementation Cost.	All Phases	Vegetation Quality	☐ PGL	1,000 USD
	Spraying water using water bowers	To reduce the amount of dust generation.	Mitigation measures for impacts on vegetation shall be part of the overall Implementation Cost.	Operation Phase	Vegetation Quality	☐ PGL	
Loss of vegetation due to site clearing which will lead to loss of habitat and displacement of fauna species, especially avifauna.	Planting of trees in the plant;	To avoid mechanical clearing and reduce the extent of the area without vegetation.	Mitigation measures for impacts on vegetation shall be part of the overall Implementation Cost	All Phases	Vegetated Area	☐ PGL	400 USD
Impact on water quality							
Siltation of water courses due to soil erosion of nearby drains and heavy rains.	☐ Buffer zones of undisturbed areas ☐ Sediment traps in drainages gullies	To filter of the sediment particles in the fast flowing rain water with undisturbed trees and grass.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Implementation Cost	Operation Phase	☐ Turbidity ☐ Sediment load	☐ PGL	Covered under mitigation for Soil Erosion
Siltation of water courses due to soil erosion of nearby	Drainage systems shall have scour checks;	To reduce the current of rainwater flow.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Implementation	Operation Phase	☐ Turbidity ☐ Sediment load	☐ PGL	6,000 USD

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drains and culverts.			Cost				
	Drainage systems shall discharge into settlement basins; later re-used in the Plant	To create a water reservoir which can be used by Plant and milling	Mitigation measures provided for impacts on Water Quality shall be part of the overall Implementation Cost	Operation Phase	☐ Turbidity ☐ Sediment load	☐ PGL	Covered above in the drainage system cost
	Silt traps shall be put along drainage systems;	To protect surface water pollution through filtering finest particles in water current.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Implementation Cost	Operation Phase	☐ Turbidity ☐ Sediment load	☐ PGL	
	Spoon drains shall have scour checks. Monthly sampling and preparation of report for local authority and ZEMA	To control excessive flow and risks of erosion.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Implementation Cost	Operation Phase	☐ Turbidity ☐ Sediment load	☐ PGL	
Water shortage for the local community due to over exploitation for plant operation. This where the use boreholes will be handy	Exploitation of water sources for approval by the local authority and with consent from the local community.	To avoid conflicts and to receive support from the local community.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Implementation Cost	Operation Phase	Extent of Water Scarcity in the community	☐ PGL	2,000 USD
	Provision of proper functioning toilet facilities.	To filter pollutants from getting to the ground water.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Implementation Cost	Operation Phase	☐ Fecal count ☐ Ecoli ☐ Presence of Odor	☐ PGL	700 USD

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Ground water contamination due to construction of substandard campsite pit latrines for workers.							
	Good hygienic standards and proper maintenance of pit latrines.	To promote cleanliness and avoid epidemics in construction camps.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Tender Document	Construction Phase	☐ Fecal count ☐ Ecoli ☐ Presence of Odor	☐ PGL	700 USD
Sedimentation and increased turbidity in nearby surface water caused by erosion of bare areas and runoffs resulting from site grading works and drainage.	Steep area shall be avoided;	To make use of available soils and reduce on creating more bare areas which are prone to soil erosion.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Tender Document	Operation Phase	☐ Signs of Erosion ☐ Turbidity ☐ Sediment load	☐ PGL	700 USD
	Sides of drainage channels shall be planted with grass or stone pitched;	To filter of the sediment particles in the fast flowing rain water with grass and also to avoid erosion of soil surfaces by stone pitching.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Tender Document	Operation Phase	☐ Signs of Erosion ☐ Turbidity Sediment load	☐ PGL	
	Drainage systems shall have scour checks esp. from milling plant.	To reduce the current of rainwater flow.	Mitigation measures provided for impacts on Water Quality shall be part of the overall Tender Document	☐ Operational Phase	☐ Signs of erosion ☐ Turbidity ☐ Sediment load	☐ PGL	As above
Impacts on Air Quality							
Air pollution caused by Gaseous emissions, exhaust fumes and dust from trucks, graders will affect human,	☐ Regular sampling of boiler stack gas from chimneys ☐ Erecting tall chimney ☐ maintenance of	☐ To ensure gaseous emissions are devoid of pollutant gasses above speck. ☐ To check for	☐ Site engineer shall keep up to date records on gaseous emissions as a result of the development. ☐ Log book on vehicle & equipment maintenance shall be kept on the plant for	☐ Operation phase	PM ₁₀ , NO ₂ , CO ₂ , SO ₂ , CO, VOCs	☐ PGL	30,000USD / month for medium to

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vegetation and also disturb habitats for birds and insects.	operation vehicles and equipment in order to reduce emission of exhaust fumes; and installation of water Scrubbers	defects and servicing of the vehicles and equipment so that they are in good operation condition.	inspection and shall be part of the overall Tender Document				old
	Periodically water down on Plant in-route roads;	To suppress dust.	Log book on dust control showing watering times shall be kept on site for inspection and shall be part of the overall Tender Document	Operation Phase	PM ₁₀ , NO ₂ , CO ₂ , SO ₂ , CO, VOCs	☐ PGL	N/A
Unpleasant odours due to poorly maintained toilets and poor waste management.	Cleaning and regular maintenance of toilets to avoid unpleasant odours.	To maintain and promote a healthy environment at campsites and prevent the spread of diseases.	Public Health standards as provided under the Public Health Act Cap 295 shall be enforced shall be part of the overall Implementation Cost	Operation Phase	Odour	☐ Contractor ☐ PGL ☐ Local Authority	On-going (Administrative)
Impacts of Noise							
Noise and vibration caused by Plant trucks, construction machinery and other operations.	Working hours limited to day light only;	To avoid sleep disturbance at night.	Enforcement of EM (L) R, 2013 on Noise Abatement.	Operation Phase	Excessive noise levels, complaints from residents	☐ Contractor ☐ Developer ☐ ZEMA ☐ Local Authority	Cost is not applicable as the Programme is based on 9day working hours.
Noise and vibration caused by Plant trucks, construction machinery, and other operations.	Enforcement of the Factories Act, Cap 441.	To promote occupational health and safe working conditions among the construction workers.	Enforcement of the Factories Act, Cap 441.	Operation Phase	Excessive noise levels, complaints from residents	☐ Contractor ☐ Developer ☐ Ministry of Labour	3,000 USD

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Noise from increased traffic.	Apply all ZEMA Regulation on Noise Abatement;	To monitor and control noise generation.	Enforcement of EM (L) R, 2013 on Noise Abatement.	Operational Phase	Excessive noise levels, complaints from residents	☐ ZEMA ☐ Local Authority ☐ Local Police ☐ Traffic Unit	
	Control of noise generating activities (by local by-laws).	To monitor and control noise generation.	Enforcement of EPPC Act, Cap 204 on Noise Abatement.	Operational Phase	Excessive noise levels, complaints from residents	☐ ZEMA ☐ Local Authority ☐ Local Police ☐ Traffic Unit	
Impacts on Landscape and Aesthetics							
Visual impact of the Plant works could be substantial if designs are not compatible with the surrounding environment	Development of plant and other facilities must be environmentally safe enough and compatible with the surrounding environment.	To maintain areas of scenic beauty.	Plant design shall be Environmentally safe enough and compatible with the surrounding environment.	☐ Design Phase ☐ Construction Phase	Visual analysis	☐ Design Engineers ☐ Developer	Covered in landscaping cost
Disfigurement of the natural landscape and aesthetic view due to piles of biomass, fresh fruit bunches etc.	The solid waste and other products of the Plant shall be either re-used or burnt safely using a certified incinerator.	To maintain areas of scenic beauty	Plant designs shall be environmentally and compatible with the natural landscape of the surrounding environment.	☐ Design Phase ☐ Construction Phase	Visual View	☐ Design Engineers ☐ Developer	Covered under landscaping
Impacts on Land-use and surrounding environment							
If unskilled people are not recruited from local areas then it is likely that people who reside far away from the	☐ Local people with the necessary skills shall be employed in	To avoid Un-planned settlements which may lead to land use change and	Recruitment of local people for unskilled labour shall be the priority and as part of the overall Implementation Cost.	☐ Design Phase ☐ Construction Phase	☐ Unplanned Settlements ☐ Social Order	☐ Developer ☐ Community Representative ☐ Local Authority	Mitigated through salaries

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project area may get employed and decides to settle near the project.	the Plant project ☐ Training shall be offered;	social upheavals.					
Emission of exhaust fumes to the surrounding environment due to increased traffic.	ZEMA Regulation on Air Pollution;	To monitor and control emission of exhaust fumes to the surrounding environment.	Enforcement of EM (L) R, 2013 on air Pollution	Operational Phase	PM10, NO2, CO2, SO2, CO, VOCs	☐ ZEMA ☐ Local Authority ☐ ZEMA Monitoring Unit	
	Adherence to engine maintenance schedules and standards to reduce air pollution.	☐ To keep the Plant viable environmentally ☐ To check for defects and repair any malfunctioning engine.	☐ Enforcement of EM (L) R, 2013 on Air Pollution. ☐ Development of engine maintenance schedules and making them available for inspection on site.	☐ Operational phase	PM10, NO2, CO2, SO2, CO, VOCs	☐ Developer ☐ Contractor ☐ ZEMA	15,000 USD
Impacts on Socio-economic Environment							
Temporary marriages, casual sex relationships and more chances of transmission of sexual diseases due to interaction of project workers with local communities.	There shall be provision of education both to the local community and camp workers on STDs and HIV/AIDS using aids such as video shows, pamphlets, talks, etc.	To sensitize the construction workers and local communities about the dangers of STDs and HIV/AIDS and to protect themselves.	Mitigation measures for impacts of STDs and HIV/AIDS shall be part of the overall implementation Cost.	☐ Construction Phase ☐ Operational Phase	☐ Divorce cases ☐ STI/STD disease prevalence rates	☐ Developer ☐ Community Based Organizations ☐ Local Authority	On-going Cost
Increased vehicular traffic and accidents in black spot areas.	Provision of adequate warning road signs in black spot areas and speed retarders and/or mechanisms at village crossing sites.	To prevent fatal accidents especially that the increase in the vehicular traffic will be huge.	Mitigation Measures for impacts on socioeconomic shall be part of the overall Implementation Cost.	☐ Operational Phase	Availability of warning signs	• Developer • Local Authority	400 USD

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Impacts of Increased Road Traffic							
Excessive dust from soya see vehicles could affect the natural environment.	Through watering of dust roads.	To avoid respiratory and visibility problems and the gathering of dust on protected areas and property.	Mitigation Measures for impacts of traffic shall be part of the overall Implementation Cost.	Operation Phase	PM10	☐ Contractor ☐ Local Authority	Water bowser US\$50/hr
Impacts of Work Accidents							
Advanced planning of safety equipment requirements	Development of safety procedures and operational manual.	To ensure that Workers undertaking Plant tasks know exactly what is to be done.	Mitigation Measures for impacts of work accidents shall be in Tender Document.	Operational Phase	Availability of safety Tool kits	☐ Contractor ☐ Local Authority	2000 USD Yearly
Lack of enforcement of safety and health regulations could impact negatively on Plant workers.	Enforcement of Public health and safety regulations.	To safe guard the health and safety of workers.	Mitigation Measures for this impact shall be in the Tender Document.	Operational Phase	Potential site hazards	☐ Developer ☐ Contractor ☐ Local Authority	On-going Cost
Socio-economic impact of the project on surrounding areas							
Interaction of construction and Plant workers with the nearby communities may lead to transmission	There shall be provision of education both to the local community and workers on STDs and HIV/AIDS using aids	To prevent the transmission of sexually transmitted diseases between the local community and	Mitigation Measures for impacts of construction camps shall be part of the overall Implementation Cost.	Operational Phase	STI/STD Disease Prevalence	☐ Contractor ☐ Developer ☐ Local Authority ☐ CBO on Health	On-going Awareness Program with staff and

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of sexually transmitted diseases.	such as video shows, pamphlets, talks, etc.	Construction workers.			Rates		communities
	Local people with the necessary skills shall be employed	To ensure the local community benefit from the project.	Mitigation Measures for impacts of construction shall be part of the overall Implementation Cost.	Operational Phase	STI/STD Disease Prevalence Rates	☐ Developer ☐ Local Authority ☐ Labour Department of Ministry of Labour ☐ Community representative	2,500 USD
TOTAL							77,200.00

9

ENVIRONMENTAL MONITORING PLAN

9. ENVIRONMENTAL MONITORING PLAN

Environmental monitoring ensures that the impacts have been accurately predicted and that appropriate mitigation measures are being implemented as planned and that they have the expected effects. Identification of potential environmental impacts associated with the expansion of the Cooking Oil Processing Plant indicates a need to design and implement a specific environmental monitoring plan. The monitoring process begins with supervision of implementation. The bulk of the activities may take place during the implementation stage.

The environmental objectives of these activities are to ensure mitigation measures outlined in the contracts are being properly implemented, that environmental contractual measures are being respected, construction is going in accordance with the agreed design standards and that no unforeseen negative impacts are occurring as a result of project execution. The key components of the proposed environmental monitoring plan are presented under table of Monitoring Activities and Indicators. While it is appropriate to indicate that progressive construction will be practiced, this aspect of Environmental Management is not always possible as some areas only become available at the end of the project construction phase. As the construction phase progress, the monitoring plan will be reviewed and adjusted in accordance with project environmental management requirements outlined in this report.

9.1 Monitoring arrangements

To avoid deliberate creation of gaps between what actually gets implemented on the ground, the contracts must spell out the sanctions for noncompliance with mitigation measures.

ESEC LTD is to compile an activity Environmental report that will form the basis for assessment of environmental performance.

9.2 Operational Phase

PGL will be responsible for monitoring and management of all indirect impacts occurring in the project area.

Table 9-0-1: Monitoring and reporting

Impact	Mitigation measure	Monitoring and reporting method	Frequency	Responsibility
Erosion	Design and construction of drainage reticulation will arrest the flow of water.	Design plans and site diary	-	Engineering/Safety Manager
Erosion	Careful design of paving	Design plans	On going	Safety manager and contractors
Soil contamination	Fuel and oil containers will be stored in a bunded area. Any decanting will also take place in that area.	Site inspection	Daily	Safety/ managers
Soil contamination	Building rubble and spoil, will be collected and reused or taken to a dumpsite	Site inspections	Daily	Safety/Maintenance managers
Air pollution	A water bowser will regularly water the areas on the plant not concreted to suppress the dust	Site diary	Daily	Safety manager
Air pollution	All motorized traffic will be regularly serviced to curtail above normal fumes. Boiler emissions to be controlled	Plant and Vehicle service monitoring records	On going	Safety and Production Managers/Logistic officer
Noise pollution	Areas involving noisy machinery or activities will be fit with noise reducers and serviced for good noise performance. Equipment and plant machinery shall be well maintained and in good condition such that noise emitted is within an acceptable level	Complaints records	On going	Safety and Production Managers
Health and Safety	Traffic will be controlled to ensure public and workers' safety.	Site inspection	-	Safety manager/ Security
Health and Safety	Health and Safety standards will be maintained at all times on site.	PPE issue records Accident records	On going	Safety manager
Health and Safety	Appropriately designed entry points and signs.	Site design	-	Safety manager
Health and Safety	Personnel will be issued with and have a contractual obligation to wear appropriate Personal Protective Clothing, when required.	PPE issue records Accident records	On going	Safety manager
Health and Safety	Promotion of health awareness, particularly HIV/AIDs prevention.	Training records, publications	On going	Safety manager
Traffic	Design and construction of ingress and egress points with broader width.	Site design	-	Developer
Visual impact	The design layout of the PGL aims to minimise any negative visual impact in the area.	Site design	-	Developer

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Visual impact	Selection of materials and external colour schemes will be professionally chosen.	Site design	-	Developer
Water abstraction	Water will be abstracted into holding tanks from the borehole.	Reports and water testing records	Ongoing	Safety manager
Solid waste management	A private firm will be engaged to collect domestic waste on a regular basis.	Invoices	Ongoing	Disposal contractor
Solid waste management	PGL will supply bins to areas will be designated for rubbish separation and collection.	Site Inspections	Ongoing	Safety manager
Soil Contamination	All storage facilities for fuels to be banded and concretized.	Site Inspections	-	Safety manager
Soil Contamination	Waste disposed of in designated areas	Site inspections	Daily	Safety manager
Health and Safety	Domestic waste collected and disposed of regularly	Site Inspections, Invoices	monthly	Safety manager
Health and Safety	Contractual obligation to wear PPE encouraged	Accident records, PPE issue records	Ongoing	Safety manager
Health and Safety	Fire hydrants and hoses located in high risk areas	Fire equipment inspection records	Quarterly	Safety manager
Health and Safety	Fire hydrant placement in premises and appropriate training	Training records equipment inspection records	Quarterly	Safety manager
Health and Safety	All workers required to follow Good Practices	Audit records	Annually	Management
Security	Engaging a reputable security firm.	Security reports	-	Security firm
Noise	Restriction on noisy activities on the site	Site inspections	-	Management

Table 9-0-2: Monitoring and reporting

IFC EHS Guideline	Host Country Regulatory Limit	Element to be Monitored	Method of Monitoring	Frequency of Monitoring	Indicator	Means of Verification	Authority Responsible	Cost	Sampling area/ source
Land and Soil									
		Land and Soil	Site Engineer to make inspections of sites for storage of materials, oil and fuels and ensure they have sealed surfaces.	Periodical inspections throughout the Construction Phase	Clean storage sites free from any oil or fuel spillage maintained throughout Construction Phase.	Inspection Report is available at MML	PGL Engineering Department	US\$ 200	Entire plant
			Site Engineer to inspect the waste disposal sites.	Periodical inspections throughout the Construction Phase	Waste oil is being disposed of in designated sites and in the approved method.	Inspection Report is available at MML Engineering Department	PGL	N/A	
			Site Engineer to ensure used oil is being collected for recycling.	Periodical inspections throughout the Construction Phase	Containers for collection of used oil are available on site.	Used oil from serviced plant machinery has been collected in containers.	PGL	US\$ 600	
			Site Engineer to inspect storage tanks and ensure they have bound walls around them high enough to contain any spillage.	Once before the fuel storage tanks are put to use.	Bund wall design and construction plan has been developed approved and is available.	Bund walls around fuel storage tanks have been constructed.	PGL	N/A	

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			The Site Engineer to make inspections and ensure heavy construction equipment is confined	Daily inspections throughout the Construction Phase.	Absence of caterpillar trampling on plant area	Complaints from the local community on invasion of their lands by construction equipment are nonexistent.	PGL	N/A	
			The Site Engineer to undertake inspection of earthworks and ensure that slopes are graded to specifications.	Daily inspections throughout ALL Phase.	Absence of rills, gullies	Absence of erosion features.	PGL	N/A	
			Once earthworks are completed, the Site Engineer should monitor the restoration measures to be implemented such as re-vegetation	Each time earthworks are completed throughout Construction Phase	Presence of re-vegetation in erosion prone areas.	Restoration programmed for re-vegetation of exposed soils is available and is being implemented.	PGL	Ongoing Cost through employed Site Engineer	

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Vegetation									
		Vegetation	Site Engineer to ensure that excessive clearance of vegetation is avoided and should be confined to the	Each time clearance of vegetation is being done throughout Construction Phase	The area of vegetation cleared is minimal	Area for vegetation clearance is clearly marked and is confined to the designs.	PGL	Ongoing Cost through employed Site Engineer	Office area and open areas
Water Quality (Effluent Discharge from the plant)									
-30 mg/l -125 mg/l -50 mg/l -400b	-5.5-9 -50 mg/l -150 mg/l -100 mg/l -5000	Water Quality -pH -Biological Oxygen Demand -Chemical Oxygen Demand -Total Suspended Solid	Site Engineer to inspect and satisfy that interceptors are put in place and working well.	Periodical inspections throughout the Construction Phase.	Clean water supply maintained throughout the Construction Phase.	Absence of water pollution incidents	PGL	Ongoing Cost through employed Site Engineer	Waste water treatment plant,
			Site Engineer to inspect and satisfy that areas where hazardous liquids are stored are banded.	Periodical inspections throughout the Construction Phase.	Clean water supply maintained throughout the Construction Phase.	Absence of water pollution incidents	PGL	Ongoing Cost through employed Site Engineer	
			Site Engineer to inspect and satisfy that water from concrete	Periodical inspections throughout the	Clean water supply maintained	Absence of water pollution	PGL	Ongoing Cost through employed Site Engineer	

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MPN/100ml	MPN/100 ml	-Coliform -Color -Free Chlorine content (Cl ₂) -Total nitrogen content	batching plants is treated.	Construction Phase.	throughout the Construction Phase.	incidents			
n/a	-150								
n/a	-2 mg/l								
-10 mg/l	-40 mg/l								
			Site Engineer to inspect and satisfy that silt traps are put along drainage systems;	Periodical inspections throughout the Construction Phase.	Clean water supply maintained throughout the Construction Phase.	Absence of water pollution incidents	PGL	Ongoing Cost through employed Site Engineer	
			Site Engineer to inspect and satisfy that spoon drains have scour checks.	Periodical inspections throughout the Construction Phase.	Clean water supply maintained throughout the Construction Phase.	Absence of water pollution incidents	PGL	Ongoing Cost through employed Site Engineer	
			Site Engineer to inspect and satisfy that siting of pit latrines is	Before construction of pit latrines.	Construction is done according to design	Pit latrine siting and construction report	PGL	Ongoing Cost through employed Site Engineer	

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			done away from water logged areas;		specifications.				
		Air Quality							
1 Year – 20 mg/m ³			Site Engineer to observe the level of dust generated during operation. Watering down should be done if dust levels are unacceptable.	Regular inspections throughout the Construction Phase.	Deposition of dust on surfaces such as grasses, shrubs, trees and rooftops should decrease with watering.	Dust deposition on the immediate surroundings is controlled.	PGL	Ongoing Cost through employed Site Engineer	-Main gate
24 hour – 50 mg/m ³									-Boiler section
		Air Quality	Site Engineer to check and ensure that vehicles and equipment are maintained in order to reduce emission of exhaust fumes;	Regular inspections throughout the Construction Phase.	Exhaust fume emissions are controlled.	Maintenance Log book is available on site.	PGL	Ongoing Cost through employed Site Engineer	- Outside plant
24 hour – 20 mg/m ³	-6 mg/m ³	- Dust Particulate Matter (PM10) (Total suspended particles)							- Tank farm plant
10 minute – 500 mg/m ³		-SO ₂							-Fan room
1 year – 40 mg/m ³		-NO _x	Site Engineer to inspect and ensure that toilets are cleaned and maintained to avoid	Regular inspections throughout the Construction Phase.	Unpleasant odours are controlled.	Clean toilet environment free from unpleasant odours.	PGL	N/A	
1 hour – 200	-5 mg/m ³	-CO							

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mg/m ³	-5 mg/ m ³ -20 mg/m ³		unpleasant odours.						
			Site Engineer to inspect and ensure waste is carefully managed and disposed of in designated places to prevent unpleasant odours.	Regular inspections throughout the Construction Phase.	Controlled waste disposal method.	Waste is dumped in designated places.	PGL	Ongoing Cost through employed Site Engineer	
		Noise							
Leq (hourly), 70 dB(A)	70 dBA (6:00 – 21:00)	Ambient Noise	Sit Engineer to monitor noise and vibrations on an adhoc basis in order to establish noise levels at the project site and the nearest sensitive receptors and should not exceed 90-decibels.	Regular inspections throughout the Phase.	Noise levels at the nearest sensitive receiver are minimized.	Number of complaints of noise disturbance is controlled.	PGL	Ongoing Cost through employed Site Engineer	-Main gate -outside Boilers - Outside plant - Tank farm plant
			Site Engineer to check and ensure that working hours	Daily inspections throughout the	Sleep disturbance is minimized.	Number of complaints of sleep disturbance is	PGL	Ongoing Cost through employed Site	-Fan room

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			are limited to day light only;	Phase.		minimized.		Engineer	
		Landscape and Aesthetics							
		Landscape and Aesthetics	Site Engineer to make visual inspection of earth works to ensure that excessive excavation other than those agreed upon is not carried out, particularly at borrow pit sites, temporary and approach roads and around the contractor's camp.	Daily inspections throughout the Phase.	Landscape alterations are reduced to a minimum.	Final landscape and aesthetic view is compatible with the surrounding environment.	PGL	Ongoing Cost through employed Site Engineer	
Hazardous Wastes Waste									

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	No hazardous waste disposal site in Zambia	-Lubricant -Contaminated cloth -Light tube -Battery -Ink -Waste from lab - Contaminated bags	All hazardous waste is stored in a bunded wall locked before taken for disposal by a ZEMA licensed contractor. Burnt by external authorize agency	Weekly inspections throughout the Phase.	minimized hazardous waste at the plant	quantities of waste on the storage site	PGL	Ongoing Cost through employed Site Engineer	-Production, Utility -Factory Utility -Office - QA, -Waste water treatment Utility

The following table illustrates the different stakeholders and their monitoring responsibilities and reporting.

Table 9-0-3: Monitoring and Reporting Responsibilities

Stakeholder	Overall environmental performance of the Project	Discussions with Engineering Manager
PGL	- Monitoring the implementation of EMP - Overall environmental performance of the Project	Regular environmental progress reports to stakeholders
Safety manager-PGL	- Implementation of mitigating measures for air, water, etc. - Environmental management of worksites - Develop Waste management Plan - Rehabilitation of abandoned worksites - Performance of equipment - Accidents (trips, pollution spills, etc.) - Negative social and environmental impacts - Environmental performance of equipment - Implementation of mitigating measures - Occupational health and safety plan - Traffic and worksite accidents report - Air quality	- Regular environmental progress reports to ZEMA - Maintenance records - Accidents reports - Mitigating actions
External Consultant	Negative social and environmental impacts	Complaints to Safety manager

10. DISCUSSION CONCERNING AREAS AND ISSUES WHERE INFORMATION IS INCOMPLETE

The consultant (ESEC LTD) endeavoured to obtain as much information as possible when preparing the Environmental Impact Statement (EIS). However, there are no national standards on noise and vibration; moreover, lack of measuring equipment for these aspects also posed a challenge. Literature search conducted for the project area did not yield any valuable information to benchmark findings in the field.

11

DECOMMISSIONING AND CLOSURE PLAN

11. DECOMMISSIONING AND CLOSURE PLAN

11.1 Objectives

The main objectives of the decommissioning plan will be to:

- Ensure the safety of site and workers in the vicinity of the plant site
- Prevent potential significant adverse effects on adjacent environs
- Return the land to conditions capable of supporting the former land use, or where this is not practical, or feasible, an alternative sustainable land use
- Promote alternative economic activities in the area that are sustainable in the future

11.2 Decommissioning and rehabilitation investigations

Prior to commencing decommissioning activities, investigations and risk assessment will be undertaken as follows:

11.2.1 Preliminary investigations

- Evaluation of general conditions and background information
- State of environment prior to establishment of the cooking oil processing plant
- Documentation of all activities during operational phase
- Documentation of any environmental incidents during operations
- Preliminary evaluation of contaminants present at the site and their likely properties and behavior
- Evaluation of available planning data and architectural map
- Results of environmental monitoring studies

11.3 Decommissioning of infrastructure

11.3.1 Buildings

The buildings which will be constructed on the site are seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage area, Other infrastructure includes officers, laboratories, warehouses, lavatories, guard rooms etc. The following measures will be applied to the mentioned structures:

- Breaking and removal of walls and concrete foundation
- Removal of pillars and related concrete foundations
- Demolishing of steel and removal of its concrete foundation and pipes
- General site clean-up

Site leveling and re-profiling will be done to re-establish the natural pattern across the site, after which, the site could be utilized for other facilities or activities. All materials and equipment that cannot be reused, recycled, or sold will be disposed of at an approved non-hazardous disposal site.

DECOMMISSIONING OF PLANT INFRASTRUCTURE AND ITS IMPACTS

As indicated in the foregoing and table below, the area will be re-profiled to establish the natural drainage pattern. All reusable and recyclable materials and scrap of good value will be salvaged and sold off. Site leveling and re-profiling shall be done to re-establish the natural drainage pattern across the site, after which, the site shall be re-vegetated with indigenous grasses and trees. All materials and equipment that cannot be reused recycled or sold shall be disposed of at an approved non-hazardous disposal site. The following activities are anticipated to be carried out:

Site Drainage Systems

After cessation of operations, drainage channels and open surfaces will be re-profiled with the additional soil amendment material such as rock from elsewhere, previously stripped topsoil and organic matter and re-vegetated. The re-shaping and grading of a site is essential for rehabilitation to ensure that the final landform is hydrological compatible with surrounding areas. This entails making slopes stable and less prominent.

Re-vegetation

For the purposes of re-vegetation, the proposed project will collaborate with the Forestry Department who already has a nursery of indigenous plant tree species in Lusaka. All the preparatory works will be completed before the time when the seeds are most likely to experience the conditions they need to germinate and survive such as reliable rainfall and suitable temperatures.

Monitoring

The monitoring plan and its implementation shall be spearheaded by the different government departments. These shall particularly be the Zambia Environmental Management Agency (ZEMA) WARMA, and the Chilanga Town council. The current engagement with the Provincial department is creating a platform from which this backstopping can be achieved, once the thermal power plant cease and the site decommissioned.

11.4 General site rehabilitation budget

A sum of **\$440,000** has been estimated in the reclamation cost for the general site breaking, levelling and reprofiling.

Table 0-1: Cost estimates of Reclamation

Issue	Action	Implementing Organisation	Responsible Organisation	Duration	Estimated Cost (\$)
Process equipment	Transportation and disposing of equipment in appropriate scrap yards and waste disposal site	Scrap metal dealers to dismantle process equipment and salvage operational equipment like motors and pumps PGL management	PGL management Contractor	8 Weeks	150,000
Soil	Removal of concrete foundations and covering over with top soil.	Civil Engineering firms PGL management	PGL management Contractor	One Month	50,000
Offices and ancillary buildings like	Change of use of buildings on site to suite operational	PGL management to obtain local authority approval	PGL management Contractor	Four Week	90,000

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workers houses	changes after decommissioning of plant	Implementation through civil engineering firm			
Decommissioning program/Report	Writing a decommissioning report and submit a copy to ZEMA	PGL management	PGL management Contractor	Two weeks	15,000
TOTAL					305,000

12

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

12. EMERGENCY PREPAREDNESS PLAN (EPP)

12.1 Scope

The EPP plan is necessary to protect the health, safety, and welfare employees, customers and visitors at the plant and to provide for the protection of the facility and personnel during any emergency situation.

The EPP will include, at a minimum, the following basic components:

- How to report fires and other emergencies
- Emergency evacuation procedures and routes.
- Procedures to be followed by employees (if any) who remain to conduct some critical functions before they evacuate.
- Procedures to account for all employees after emergency evacuation.
- Rescue and medical duties for those employees (if any) who are designated to perform them.
- Names and phone numbers of persons who can be contacted for further information on the emergency plan.

Through the use of regularly scheduled safety procedures, training programs, and operational procedures, management will disseminate and train selected personnel in identifying conditions that might lead to emergency conditions. Customers and visitors will be instructed, as part of their orientation, in the steps to take to prevent and report emergency situations when these conditions are found to exist.

Listed below are specific procedures that shall be addressed by management to minimize the occurrence of and impact from a fire emergency. There are no unusual fires present in the area but attention shall be paid to sudden fires. Special emphasis at the storage areas shall be placed on housekeeping and storage practices and office areas because flammable and combustible materials may be used and stored there e.g. computers and valuable files.

Management shall be committed to preventing the occurrence of fires and situations that may promote a fire.

All fire protection equipment will be inspected and results of inspection recorded. Equipment to be inspected will include fire extinguishers and any other deemed worth. All areas will be inspected to check for the following unsafe conditions: -

- Poor housekeeping procedures
- Smoking in non-designated areas (if any)
- Flammable/combustible materials not stored properly

12.2 Procedures for Fires

Fire discovered by employee

- For localized fire, put it off before it spreads;
- For storage area, clear the area of all other personnel and visitors. Instruct all personnel to evacuate the facility.
- Confine the fire
- Activate the fire alarm (if available).

First Aid

First aid kits should be fully stocked, strategically located, and properly maintained. Never give more than immediate, temporary care.

Equipment and supplies should be chosen in accordance with the recommendations of health providers and service should be rendered only as covered by written, physician-approved standard procedures. First aid attendants should be duly qualified and certified.

Emergency Response Coordinator

Responsibilities of the Emergency Response Coordinator will include the following:

- To develop the site specific Emergency Response Plan in co-ordination with the management, on-site security personnel and the local emergency services such as the Police, Fire Brigade, Hospital etc.;
- Establishing an Emergency Control Centre at the site in coordination with the local Fire, Rescue and Police Authorities and establishing emergency communications systems;
- Selecting, appointing, organizing and training of personnel of the Emergency Response Team;
- Designating evacuation paths, assemblage areas;
- Ensuring that all employees and staff members are knowledgeable of emergency alarms, actions, and evacuation procedures.
- Assuring emergency equipment is operating and readily available (emergency medical kits, flash lights, evacuation chairs, fire equipment etc.
- Ensuring that the Emergency Response Plan is kept current.

All employees are responsible for familiarizing themselves with the procedures set forth in the Emergency Response Plan. The Emergency Response Plan will provide procedures to follow during anticipated emergency situations such as.

- Fire
- Explosion in buildings
- Extended power outages / Elevator / equipment failure
- Traffic Accident Flood
- Personnel / public violent behavior or disturbances
- Robbery

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Table 12-1: Emergency Response Plan

S/n	EMERGENCY SITUATION	CAUSE	PROPOSED RESPONSE	RESPONDENTS
1.	Fuel Spillage	• Undue stress on tank and product lines or aged facilities • Human error e.g. overfilling tanks • Faulty equipment	• Switch of power, • Stop all operations • Create sand bunding around spillage point • Scoop or sponge/soak out spilled product • Clean up site • Document incidence • Report to Zambia Police, ZEMA and ERB	Key Respondent: Emergency Respondent on Duty Other Respondents: Other Workers, Local Fire services
2	Fire Outbreak	• Neglect of safety procedures • Faulty electric connections • Carelessness e.g. smoking in non-smoking areas	• Sound alarm and direct people on site to assemble at Fire Assembly point for safety • Conduct roll Call • Fight the fire using appropriate tools (fire extinguisher, sand, water) • Inform Zambia Police and Chilanga Town Council • Isolate area with barrier tape • Clean up site • Document incidence • Report to Zambia Police, ZEMA and ERB	Key Respondent: Emergency Respondent on Duty Other Respondents: Manager, Other Staff Local Fire services, Zambia Police
3	Staff Injury	• Failure to adhere to safety procedures • Unskilled labour • Faulty equipment • Sheer accident	• For minor injuries apply appropriate First Aid • For major injuries take to hospital • Document incidence	Key Respondent: First Aid Attendant on Duty Other Respondents: Station Manager, Hospital Staff, Zambia Police
4	Wastewater spillage from sewer facilities or oil interceptor due	Setting a limit for cleaning and monitoring to ensure levels are maintained below	• Clean up of contaminated sites • Inform ZEMA, WARMA, if large area affected or potential wash down to surface or ground water resources has occurred • Contain the spill using appropriate bunding material such as soil • Check and address causative factor e.g. unblock clogged system • Document incidence	Key Respondent: Station Manager Other Respondents: Other staff

13

CONCLUSION

13. CONCLUSION

Having assessed the project activities in terms of the technology and project design (site layout) against the exiting physical, biological, and socio-economic environment through desk research, field observation and indeed stakeholder engagement, it has been established that the proposed cooking oil plant area will not be impacted negatively by the proposed facility. Thus, it will impact less negatively on the three major components of the environment.

This undertaking is within a partially cleared area and most of the environmental impacts during the construction and operational phase of the project will be positive and the following are among the notable ones: -

- Improvement of the Zambia's financial standing;
- Provide direct employment opportunities for the skilled, semi-skilled and casual workers during the three phases;
- Boost local economy;
- Contribute to enhancing the nation's economy through paying taxes

It is clear from this study that a proposed plant of this nature will have both environmental and socio-economic impacts on the surroundings, most of which are positive. Currently, with the recent increase in demand of the commodity in the country, the needs for better environmental have also increased. This project will help meet this increase in demand.

The main negative impacts that will result from a project of this nature is:

- Generation of waste potentially becoming a pollutant
- Traffic and Safety

However, following the analysis of the risks, adequate mitigation measures will be implemented and closely monitored, rendering these impacts insignificant.

It is proposed that the development as described in this report meets the requirements for approval on the basis that:

- Health and safety regulations will be implemented according to National Standards throughout the project.
- Waste generated will be disposed of safely and within the regulations set by ZEMA and the Chilanga Town Council.
- Design of the site and subsequent development activities will consider Environmental preservation as the primary objective.
- Traffic Control and other safety improvements will be done in liaison with RTSA, RDA and CTC

14.DECLARATION OF AUTHENTICITY

Rakesh Yadav

I, ...the undersigned, certifies and declares that the information presented in this Environmental Impact Statement (EIS) is both factual and accurate and represents the proposed project. This EIS conforms to the requirements of the Environmental Impact Assessment Regulations, SI 28 of 1997 with regard to the development of Environmental Management Plans.

We further declare that the concerns raised by stakeholders at the time of carrying the consultations have been taken into account in preparing this EIS Report.

We acknowledge that the proposed project will be implemented in accordance with the applicable Zambian legal and administrative framework.

For and on behalf of **Parrogate Ginneries Limited, Zambia.**



.....
Mr. Rakesh Yadav
Group Technical Head
Parrogate Ginneries Limited

15. REFERENCES

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16. APPENDICES

Appendix A: Curriculum Vitae of the EIA Study Team Members.

Appendix B: Scoping & Disclosure Meeting Advert.

Appendix C: Certificate of Incorporation

Appendix D: Certificate of Title

Appendix E: Cooking Oil Processing Plant Layout

Appendix F: Water, Noise, And Air Quality Report

APPENDIX A1: CURRICULUM VITAE**Patson Zulu**

Position Title and No.	TEAM LEADER

Surname: ZULU

First Name: PATSON

CURRICULUM VITAE (CV)

Position Title and No.	
Name of Expert:	PATSON ZULU
Date of Birth:	27/01/1960
Country of Citizenship/Residence	ZAMBIA

Education:

Name of Institution/University - City - Country	Period		Diploma Obtained	Main Topic / Major
	From	To		
ANTI-CORRUPTION COMMISSION-LUSAKA ZAMBIA	NOV,2015	NOV,2015	POSTGRADUATE CERTIFICATE	INTEGRITY COMMITTEE INDUCTION
INSTITUTE OF DIRECTORS-LUSAKA-ZAMBIA	MAR,2009	MAR,2009	POSTGRADUATE CERTIFICATE	CORPORATE GOVERNANCE
INSTITUTE OF DIRECTORS-LUSAKA-ZAMBIA	JULY,2006	JULY,2006	POSTGRADUATE CERTIFICATE	MANAGEMENT DEVELOPMENT PROGRAMME FOR SENIOR MANAGERS- MANAGERIAL SKILLS AND CAPABILITIES, PLANNING PROCESS, STRATEGY FORMULATION AND CONTROL, MANAGING CHANGE
INSTITUTE OF DIRECTORS-SIYVONGA-ZAMBIA	JULY,2005	JULY,2005	POSTGRADUATE CERTIFICATE	STRATEGIC MANAGEMENT WORKSHOP FOR MANAGERS
ZAMBIA INSTITUTE OF ADVANCED LEGAL EDUCATION (ZIALE)-LUSAKA-ZAMBIA	NOV 2003	NOV 2003	POSTGRADUATE CERTIFICATE	INVESTIGATORS AND PROSECUTORS COURSE
BONN, GERMANY	DEC 2001	DEC 2001	POSTGRADUATE CERTIFICATE	ENVIRONMENTAL MANAGEMENT TOOLS
UNIVERSITY OF THEWITWATERSRAND U-JOHANNESBURG-SOUTH AFRICA	21 FEB 2000	25FEB 2000	POSTGRADUATE CERTIFICATE	ENVIRONMENTAL ASSESSMENT
SWEDEN	Mar 1999	April 1999	POSTGRADUATE CERTIFICATE WITH HONOURS	ISO-14000 - ENVIRONMENTAL MANAGEMENT SYSTEMS

HOKKAIDO INSTITUTE OF ENVIRONMENTAL SCIENCES-SAPPORO-JAPAN	Sept 1996	Nov. 1996	POSTGRADUATE CERTIFICATE	PLANNING ON REGIONAL ENVIRONMENTAL PRESERVATION
MILJOKONSULTERNA-NYKOPING-SWEDEN	April 1995	May 1995	POSTGRADUATE CERTIFICATE	ADVANCED HAZARDOUS WASTE MANAGEMENT
DRESDEN, GERMANY	Nov 1993	Dec 1993	POSTGRADUATE CERTIFICATE	ADVANCED WASTE MANAGEMENT
THE UNIVERSITY OF ZAMBIA-LUSAKA-ZAMBIA	1980	1984	BACHELOR OF SCIENCE DEGREE	CHEMISTRY

PROFESSIONAL TRAINING

Name/Place of Training Institution- City - Country	Type of Training	Period		Certificates or Diploma Obtained
		From	From	
ZAMBIA BUREAU OF STANDARDS- LUSAKA-ZAMBIA	QUALITY MANAGEMENT SYSTEM:IMPLEMENTATION and INTERNAL AUDIT: ISO 9001 and ISO 19011:2018	9 JAN,2021	13 JAN, 2021	CERTIFICATE OF TRAINING
ZAMBIA BUREAU OF STANDARDS- LUSAKA-ZAMBIA	ENVIRONMENTAL MANAGEMENT SYSTEMS: IMPLEMENTATION : ISO 14001:2015	16 JAN,2021	17 JAN,2021	CERTIFICATE OF TRAINING
FRINGILLA LODGE-KITWE-ZAMBIA	STRATEGIC ENVIRONMENTAL ASSESSMENT	10 OCT,2010	13 OCT,2010	CERTIFICATE OF ACHIEVEMENT
THE UNIVERSITY OF ZAMBIA-LUSAKA-ZAMBIA	MINING AND THE ENVIRONMENT	9 OCT,2002	12 OCT,2002	CERTIFICATE OF ACHIEVEMENT
DET NORSKE VERITAS-LUSAKA	PROJECT MANAGEMENT	20 FEB,2001	23 FEB,2001	TRAINING CERTIFICATE
GABORONE-BOTSWANA	SADC INDUSTRIAL POLLUTION PREVENTION SEMINAR	FEB 2001	FEB 2001	ATTENDANCE CERTIFICATE
ENVIRONMENTAL COUNCIL OF ZAMBIA-CHISHIMBA-ZAMBIA	CLIMATE CHANGE TRAINING FOR GOVERNMENT PLANNING OFFICERS AND KEY STAKEHOLDERS	10 APR,2000	14 APR,2000	TRAINING CERTIFICATE
KENYA	CLEANER PRODUCTION ROUNDTABLE CONFERENCE FOR AFRICA	2000		CERTIFICATE OF ACHIEVEMENT
ENVIRONMENTAL COUNCIL OF ZAMBIA-CHISHIMBA-ZAMBIA	ENVIRONMENTAL IMPACT ASSESSMENT REVIEW	6 DEC,1999	10 DEC,1999	ATTENDANCE CERTIFICATE
KENYA	EXPERT GROUP ONWASTE MANAGEMENT FOR AFRICA	1998		ATTENDANCE CERTIFICATE
NAIROBI KENYA	GROUP EXPERT WORKSHOP ON MUNICIPAL SOLID WASTE MANAGEMENT	DEC 1997		ATTENDANCE CERTIFICATE
DAR-ES-SALAAM-TANZANIA	ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT	OCT 1997		ATTENDANCE CERTIFICATE
GABORONE, BOTSWANA	3RD SADC WASTE MANAGEMENT CONFERENCE	JUNE 1997		ATTENDANCE CERTIFICATE

LUSAKA ZAMBIA	NATIONAL WORKSHOP ON CLEANER PRODUCTION FOR CHIEF EXECUTIVES AND DECISION MAKERS FROM INDUSTRY, NGOS, ACADEMIA AND LOCAL GOVERNMENT	NOV 1997	NOV 1997	ATTENDANCE CERTIFICATE
SAPPORO-JAPAN	PLANNING ON REGIONAL ENVIRONMENT PRESERVATION	4 SEPT,1996	18 NOV, 1996	SPECIAL TRAINING CERTIFICATE
DRESDEN UNIVERSITY OF TECHNOLOGY AND UNITED NATIONS ENVIRONMENT PROGRAMME- GERMANY	ENVIRONMENTAL MANAGEMENT FOR DEVELOPING COUNTRIES- WASTE MANAGEMENT	10 NOV, 93	10 DEC,93	CERTIFICATE OF PROFICIENCY

Employment record:

Period	Employing organization and your title/position. Contact information for references	Activities Performed	Title / Positions	Country	Summary of activities performed relevant to the Assignment
May 2019 to Present	ENVIRONMENTAL SCIENCE AND ENGINEERING CONSULTANTS LTD	CONSULTANCY	• LEAD CONSULTANT • TEAM LEADER	ZAMBIA	• LEAD CONSULTANT/ TEAM LEADER FOR ; ➤ FEASIBILITY STUDY FOR IMPROVED SOLID WASTE MANAGEMENT SYSTEM IN CHOMA DISTRICT BY CHOMA MUNICIPAL COUNCIL AND GIZ ➤ ENVIRONMENTAL MANAGEMENT SYSTEM IMPLEMENTATION ➤ QUALITY MANAGEMENT SYSTEM; IMPLEMENTATION AND INTERNAL ENVIRONMENTAL AUDITS ➤ ENVIRONMENTAL IMPACT ASSESSMENT ➤ ENVIRONMENTAL PROJECT BRIEFS

July 2003 to Feb. 2018	ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY	ENVIRONMENTAL MANAGEMENT	- MANAGER, NORTHERN REGION - MANAGER FOR THE INSPECTORATE - CLEANER PRODUCTION MANAGER	ZAMBIA	- MANAGEMENT AND SUPERVISION OF INSPECTORATE WORK, COMMUNICATION, AND ACCOUNTS FOR ZEMA. - ADVISED AND EDUCATED THE PUBLIC AND REGULATED PARTIES ABOUT ENVIRONMENTAL ISSUES, REGULATIONS, POLICY, AND COMPLIANCE. - PROVIDED CLIENTS WITH GUIDANCE ON HOW TO COMPLY WITH ENVIRONMENTAL REGULATIONS - CONDUCTED ALL TESTS IN ACCORDANCE TO THE ZAMBIA ENVIRONMENTAL REGULATIONS AND THEN DETERMINED THE COMPOSITION OF THE AIR, WATER AND GASES
July 1999 to June 2003	ZAMBIA ASSOCIATION OF CHAMBERS OF COMMERCE AND INDUSTRY (ZACCI)	TRAINING OF OFFICERS IN CLEANER PRODUCTION METHODOLOGY	CLEANER PRODUCTION MANAGER	ZAMBIA	ZAMBIAN MANAGER AND COUNTERPART MANAGER FOR DET NORSKE VERITAS OF NORWAY TO TRAIN ZAMBIAN INDUSTRIES IN CLEANER TECHNOLOGY AND CLEANER PRODUCTION OF GOODS AND SERVICES. COORDINATED VARIOUS WORKS UNDER ZAMBIA ASSOCIATION OF CHAMBERS OF COMMERCE AND INDUSTRY (ZACCI).
	ENVIRONMENTAL COUNCIL	ENVIRONMENTAL	SENIOR INSPECTOR/PROJECT	ZAMBIA	INDUSTRIAL POLLUTION AND

1992-1999	OF ZAMBIA	MANAGEMENT	COORDINATOR		CLEANER TECHNOLOGY - WASTE MANAGEMENT - PROJECT JOINTLY EXECUTED BY THE ENVIRONMENTAL COUNCIL OF ZAMBIA (ECZ) AND THE LUSAKA CITY COUNCIL (LCC) TO DIAGNOSE LUSAKA MUNICIPAL SOLID WASTES (Team leader- waste characterization for Lusaka District) - DEVELOPED AND IMPLEMENTED AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) IN A ZAMBIAN INDUSTRY, TOGETHER WITH DET NORSKE VERITAS (DNV) OF NORWAY - FORMULATION OF WASTE MANAGEMENT REGULATIONS AS DELEGATED LEGISLATURE OF THE ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL ACT OF 1990
1985 to 1992	NITROGEN CHEMICALS OF ZAMBIA	PRODUVTION OF FERTILISERS	PROCESS ENGINEER/LABORATORY CHEMIST	ZAMBIA	- DEVELOPMENT OF MASS BALANCE AND ENERGY BALANCE TECHNIQUES, SIMPLE PROCESS MODIFICATIONS AND DESIGN. - ORGANISE TRAINING MATERIALS FOR PLANT TECHNICIANS - QUALITY CONTROL, RESEARCH AND DEVELOPMENT

Membership in Professional Associations and Publications:

- i. PATSON ZULU ET AL (1996) SOLID WASTE MANAGEMENT MASTER PLAN PROJECT DOCUMENT FOR THE CITY OF LUSAKA (DIAGNOSIS)
- ii. "ZAMBIA RAILWAYS ENVIRONMENTAL ASSESSMENT STUDY" - PATSON ZULU AND ZEBEDIAH PHIRI; OCTOBER 1999.
- iii. PATSON ZULU ET AL (2002) 'ENVIRONMENTAL MANAGEMENT SYSTEM FOR ZAMBIA RAILWAYS'

Language Skills (indicate only languages in which you can work): ENGLISH, NYANJA AND BEMBA

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
1. Document Reviews including existing legal frameworks relevant to the projects	1. Review of relevant documents for i. Feasibility study for improved solid waste management system in choma district by choma municipal council and GIZ ii. Waste characterization for Lusaka District (1996) iii. A proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and Engineering Consultant Limited. iv. Also lead Team Experts to a review process for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience
2. Lead the team preparing the inception Report	2. Team Leader and Environmental Expert for the team that prepare the inception report for Feasibility study for improved solid waste management system in choma district by choma municipal council and GIZ, Ramoji Resources for the proposed Copper Processing Plant and Water Pipeline Project in Salamano area of Chambishi in Kalulushi District and Waste Characterization for Lusaka District
3. Lead the team preparing the EIA terms of Reference for submission to ZEMA	3. Environmental Project Brief proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited. Environmental impact Assessment for proposed Manganese mine in Kaufuma area, Mkushi District by Status Mineral Limited ,2021 Environmental impact Assessment for an existing Ndambo dam in Chaminuka area, Chongwe district by Zambezi Ranching and cropping Limited,2020 Environmental project brief for the construction of a filling station in kalomo district by Zam fuel Petroleum, 2020 Environmental project brief for the Large scale coal prospecting and

	exploration project in Chamana area, Sinazongwe district by Zambian Weiye Limited, 2020 Environmental impact Assessment for Development of Mixed Crops farm on Kundalila road in Serenje district,2020 Environmental impact Assessment for the Existing Cooking oil processing plant in Lusaka by Parrogate Ginneries LTD,2020 Environmental project brief for the construction of campsites and use of Existing borrow pits for the water and sanitation improvement works in Mansa and Samfya by China Civil Engineering Construction Corporation (CCECC) and Ministry of water development, Sanitation and Environmental protection (MWDSEP), 2020 Feasibility study for improved solid waste management system in Choma District by Choma municipal council and GIZ, 2019. Environmental impact Assessment for the Construction of the China aided International Conference center in Lusaka by Ministry of Housing and Infrastructure Development (MHID), 2019
4. Review of the compiled Draft ToRs, Scoping Report and Specialized reports into a Draft EIS for submission to ZEMA	4. Reviewed the Compiled and drafted EIS under Environmental Science and Engineering Consultant Limited.

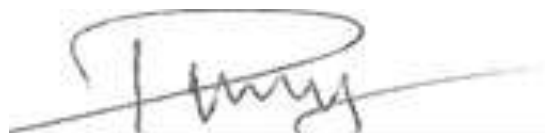
Expert's contact information: e-mail patsonzulu@gmail.com Phone: 0977 470849/0955833581/0967470849

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available, as and when necessary, to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by the Bank.

27/05/22

PATSON ZULU



Name

Signature

Abiud Banda

Position Title and No.	ENVIRONMENTAL ENGINEER (Water, Air & Noise) & GIS SPECIALIST
Name of Expert:	Abiud Banda
Country of Citizenship/Residence	Zambia

Education:

Master's Degree (Currently enrolled) in Geo-information Science (GIS) and Earth Observation, University of Zambia, Zambia.

Bachelor's Degree in Environmental Engineering, Copperbelt University (2011 – 2016), Kitwe, Zambia.

GSCE G12 Division one certificate, Chizongwe Technical School (2007 - 2009 Year), Chipata, Zambia

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
May 2019 to Present	Environmental & GIS Specialist - Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre, NDOLA	Zambia	Environmental Consultant - Environmental impact Assessment for the Construction of a filling station at Garneton turnoff in Kitwe by African Grey Limited, 2018 Environmental Consultant - Environmental impact Assessment for the Construction of a filling station at Nakadoli in Kitwe by African Grey Limited, 2018 Environmental Consultant - Environmental impact Assessment for the Construction of a filling station in Masala, Ndola by Usangu Logistics Limited, 2018 Environmental Specialist - Environmental Assessment for the decommissioning of fuel storage facility by Syngenta Zambia Limited, 2019
March 2017 to March. 2018	Waste Management Inspector, Northern Region, Zambia Environmental Management Agency	Zambia	•Advised and educated the public and regulated parties about environmental issues, regulations, policy and compliance. •Provided clients with guidance on how to comply with environmental regulations •Conducted all tests in accordance to the Zambia environmental regulations and then determined the composition of the air, water and gases.
2015	Environmental Engineer, Mulonga Water and Sewerage Company	Zambia	Evaluated architectural designs for existing pipe networks □ Supervised sewer, manhole cover designs, unblocking and water treatment plans Examined and updated sanitary inspection log entries on a regular basis

			Ensured all needed permits and clearances were obtained and all job cards worked on time Ground water pollution spatial distribution in Kamuchanga and AEL compound

Membership in Professional Associations and Publications:

1. Graduate Member- Engineering Institution of Zambia
2. Poster presentation: "Mobile Micro sensors for air monitoring, Lusaka show ground 2016 at Copperbelt University stand
3. Poster presentation: "Mobile Micro sensors for air monitoring, Pretoria, South Africa, May 2017 at SAIMM Young Professional Conference (YPC).
4. Project: "Designing and building a low cost wireless mobile micro sensor for air pollution monitoring, Environmental Lab, CBU 2015 to Department of Environmental lecturers, Kitwe
5. NSTC Presentation: "Designing and Building Mobile Micro-Sensor Prototype for Air Quality Monitoring, School of mathematics and natural sciences conference room, July 2016 to National Science and Technology Council, CBU, Kitwe
6. Industrial Seminar: "Designing and Building Mobile Micro-Sensor Prototype for Air Quality Monitoring, Lunte Lodge, September 2017 to Mopani Copper Mines, Konkola Copper Mines, PGLumbila Mines, Lumwana Mining Limited, Nkana Water & sewerage Company, National Science and Technology Council and CBU Researchers, Kitwe

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
1. Document Reviews including existing legal frameworks relevant to the projects	1. Review of relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area PGLulushi District under Environmental Science and Engineering Consultant Limited.
2. Part of the team preparing the EIA terms of Reference for submission to ZEMA	2. GIS and Environmental Expert for the proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited.
3. Part of the Scoping meeting to be held at the Proposed Project site	3. GIS and Environmental Expert for various other environmental impact assessment projects

	highlighted on the ESEC LTD Company experience.
4. Collection of satellites maps for the proposed site	4. Data captured for a proposed filling station project by ACM Products Limited at Copperhill Mall Kitwe District
5. Map Production for the Project Site	5. Produced maps for the proposed Diesel Storage tank Project at Mineral Junxion Limited in Kitwe District, 2019
6. Compilation of Draft ToRs, Scoping Report and Specialized reports into a Draft EIS for submission to ZEMA	6. Compiled and drafted the EIS for the proposed Copper Processing Plant in Salamano Area of PGLulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.
7. Incorporate comments from stakeholders and ZEMA into a final of EIS document	7. Incorporated comments from ZEMA for the proposed Copper Processing Plant in Salamano Area of PGLulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.

References

Patson Zulu (0967470849) Chairman and CEO Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Lillian C. PGLenge, Principal Inspector – Waste Management, Zambia Environmental Management Agency (ZEMA) P.O. Box 71302, Ndola. Email: lPGLenge@gmail.com/ lPGLenge@zema.org.zm Cell: +260955292799
Dr. Phenny Mwaanga, Project Supervisor - Ecotoxicology Lecturer, The Copperbelt University, School of Mines & Mineral Sciences, P.O. Box 21692, Kitwe, Zambia Email: phennym@yahoo.co.uk Cell: +260969156065	Eng. Davy Banda, Former Peri-urban Manager/Sanitation Engineer, Mulonga water and Sewerage Company, P.O. Box 11712, Chingola, Zambia. Email: bandadavy@mwsc.com.zm Cell: +260967362338/955670164

Expert's Contact Information: email abiudbanda@gmail.com Phone: 0972 590297/0953364136

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my

qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.

ABIUD BANDA

27/05/22



.....
Name of Expert

Date

Signature

PATSON ZULU

27/05/22



.....
Name of authorized Representative of the Consultant

Date

Signature

Alice Muyanga

Position Title and No.	ECOLOGY EXPERT
Name of Expert:	Alice Muyanga
Date of Birth:	28 th June, 1989
Country of Citizenship/Residence	Zambia

Education:

2011 to 2016 Copperbelt University, BSc Wood Science and Technology, ZAMBIA
 1995 to 2007 St Jones Convent Secondary School GCE Levels Certificate

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
November 2018 - present	Ecology Expert – Environmental Science and Engineering Consultants LTD	Zambia	- Reviewed previous works related to flora and fauna and relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area PGLulushi District under Environmental Science and Engineering Consultant Limited - Ecological Expert for the proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited - Assessed the flora of the area for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019
2018	Supervisor – ZAFFICO, Ndola	Zambia	Supervising casual workers in the maintenance of compartments, where small pine trees are grown
April 2017 – May 2017	Waste Management Researcher-Food and Agriculture Organisation	Zambia	Interviewed the city council, households and the waste management bodies concerning the management of waste and how much was generate.

Membership in Professional Associations and Publication:

1. Member of CBU Anti-AIDS

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
1. Document Reviews including ecological state of the proposed site and existing legal frameworks relevant to the projects	1. Reviewed previous works related to flora and fauna and relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area PGLulushi District under Environmental Science and Engineering Consultant Limited.
2. Part of the team preparing the EIA terms of Reference for submission to ZEMA	2. Ecological Expert for the proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited.
3. Part of the Scoping meeting to be held at the Proposed Project site	3. Ecological Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
4. Flora and fauna assessment of the proposed project site and compilation of the ecology report	4. Assessed the flora of the area for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019

References

Patson Zulu (0967470849) Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Prof. Jacob Mwitwa Lecturer at the Copperbelt University (Director at Kapasa Makasa University) School of Natural Resources Jambo Drive, Riverside Kitwe, Zambia. P.O. Box 21692 Tel. +260 212 230 923 Mobile: +260 977 848 462/ +260 966 848 462 EMAIL: mwitwajp@yahoo.com
Dr. Elisha Ncube Lecturer at the Copperbelt University School of Natural Resources Jambo Drive, Riverside Kitwe, Zambia. P.O. Box 21692 Tel. +260964612068/ +260977662278	Mrs Yaki Namiluko Lecturer at the Copperbelt University School of Mines and Minerals Jambo Drive, Riverside Kitwe, Zambia. P.O. Box 21692 Tel. +260977830770

Expert's Contact Information: email muyanga.alice.am@gmail.com Phone: 0968327998

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.

27/05/22



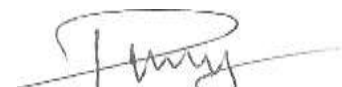
Name of Expert

Date

Signature

PATSON Zulu

27/05/22



Name of authorized Representative of the Consultant

Date

Signature

Siame Ndanji

Position Title and No.	GEOLOGIST
Name of Expert:	Siame Ndanji
Date of Birth:	
Country of Citizenship/Residence	Zambia

Education:

2011 – 2017: University of Zambia – Bachelor of Mineral Science (Geology)

2007 – 2009: Zimba High School – Grade 12 School Certificate

2005 – 2006: Kafue Boys Secondary School – Grade 9 School Certificate

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
August 2019 - present	Geology Expert – Environmental Science and Engineering Consultants LTD	Zambia	Assessed the geology and possibility of successful exploration activities of the area for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019
May to July of 2019	Survey Team Member - Geological Survey Department Geologist, Geological Survey of Zambia Ministry of Mines and Minerals Development Lusaka-10101, Zambia Tel: (+260) 0977563106, (+260) 0956723322	Zambia	- Stream and soil sediment geochemical survey of the Copperbelt and Northwestern province conducted by the geological survey department from May to July of 2019. - In this survey I took part in the planning of the survey and collection of the samples
2017 - July 2019	Geology Researcher – University of Zambia	Zambia	- Conducted two projects that helped me in understanding the practical aspects of my field. - The first was an independent mapping project, in this project I conducted geological mapping on an area of 20 km² from which I was able to generate a detailed geological map. - The second project was a soil geochemical; survey, in this project soil samples collected in an area were analysed with the objective of finding mineralization in the area from which they were collected.

Licences:

1. Blasting Licence (All mine operations)
2. Valid Silicosis
3. Valid medical certificate of fitness (KCM)

Membership in Professional Associations and Publication:

1. President – The Copperbelt Mines and Minerals Engineering Society (May 2017 – July 2018)
2. Student Counsellor – The Copperbelt University Student Counsellor (May 2017 – June 2018)
3. Committee Member – The Engineering Institute of Zambia – CBU Chapter (May 2017 – July 2018)
4. Registered Member of Engineering Institution of Zambia (EIZ)
5. Registered Member of Southern Africa Institute of Mining and Metallurgy (SAIMM)

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
5. Document Reviews including geological and hydrogeological state of the proposed site and existing legal frameworks relevant to the projects	5. Reviewed previous works related to geology and mining rights and relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area PGLulushi District under Environmental Science and Engineering Consultant Limited.
6. Geological and mineral quality assessment of the proposed project site and compilation of the mineral and soil assessment report	6. Assessed the geology and possibility of successful exploration activities for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019

References

B.N. Upreti, Ph.D. Professor and Head, Department of Geology School of Mines University of Zambia Great East Road Campus, P.O. Box 32379, Lusaka-10101, Zambia Tel: (+260) 0966716572 (Cell) Email: bnupreti@gmail.com Former Head of Department of Geology, and Dean, Institute of Science and Technology Tribhuvan University, Kathmandu, Nepal.	Dr. A. Ahmed, Ph.D Lecturer, Department of Geology School of Mines University of Zambia Great East Road Campus, P.O. Box 32379, Lusaka-10101, Zambia. Tel: (+260) 0978289796 Email: aahmed@unza.zm
Mr. C. Mwansa, B.Sc	Mr. B. Musonda, M.Sc.

Geologist, Geological Survey of Zambia Ministry of Mines and Minerals Development Corner of Nationalist and Government road, P.O Box 50135, Lusaka-10101, Zambia Tel: (+260) 0977563106, (+260) 0956723322	Lecturer, Lecturer, Department of Geology School of Mines University of Zambia Great East Road Campus, P.O. Box 32379, Lusaka- 10101, Zambia. Tel: (+260) 0978825283

Expert's Contact Information: sndanji@gmail.com

Phone: 0975750200

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.

Ndanji Same

27/05/22

Adams

Name of Expert

Date

Signature

PATSON ZULU

27/05/22

[Signature]

Name of authorized Representative of the Consultant

Date

Signature

Ernest Mwape

Position Title and No.	SOCIAL ECONOMIC EXPERT
Name of Expert:	Ernest Mwape
Date of Birth:	27 th January, 1966
Country of Citizenship/Residence	Zambia

Education:

1991 to 1994 University Of Manitoba, Msc. Agricultural Economics, CANADA
(Production Economics)

1984 to 1988 University Of Zambia, BA Economics/Statistics, ZAMBIA

1979 to 1983 Mpatamato Secondary School GCE O'levels Certificate

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
August 2014 to August 2017	Director – Policy and Planning Division, Zambia Development Agency (ZDA)	Zambia	1. Editing, finalizing and publishing eight Annual Reports that were outstanding statutory obligations to the National Assembly since the Agency was established in 2007; 2. Preparing and publishing the 2016-2020 ZDA Strategic Plan; writing the 2016-2020 Strategic Plan for Zambia Export Development Fund (ZEDEF); 3. Reviewing and redesigning the Agency's Monitoring & Evaluation system; 4. Compiling the Agency's Annual Work-Plans and Budgets; and designing the template for Operations Manual for all Divisions at the Agency. 5. coordinated and facilitated a number of capacity workshops for the Agency, in particular officers in the Policy and Planning Division
August 2007 to August 2014	Economic Governance Specialist, Governance Department at the Ministry of Justice	Zambia	1. Provided secretariat services to the Africa Peer Review Mechanism (APRM) 2. Facilitating and coordinating activities undertaken by governance oversight institutions that promote accountability, 3. Transparency, anti-corruption and those that foster increased efficiency and effectiveness in the delivery of public goods and services 4. co-authored thematic reports on Economic Governance and Management, and Political & Democratic Governance in

			Zambia's first self-assessment report for the APRM in 2010
November 2006 to July 2007	Program Officer - Private Sector Development Reform Program (PSD – RP) domiciled at the Ministry of Commerce, Trade and Industry (MCTI)	Zambia	1. responsible for coordinating activities that were undertaken through the Trade Expansion Working Group that eventually resulted in review and revision of some policies and regulations governing the business environment
October 2004 to October 2006	Macroeconomics Advisor - Japanese International Cooperation Agency (JICA) in Lusaka, Zambia	Zambia	1. prepared advisory notes on various economic development initiatives that the Zambian Government was undertaking
September 2001 up to November 2004	Policy Component Manager of the USAID-funded Community-Based Natural Resources Management and Sustainable Agriculture (CONASA) project		1. Raise public awareness about the concept and benefits of Community-Based Natural Resources Management (CBNRM). 2. reviewed and analysed policies and legislation that govern the natural resources sector in Zambia
1999 to September 2001	Chief Economist for the Zambia Association of Chambers of Commerce and Industry (ZACCI)		1. Draft position papers that reflected the interests and concerns of the business community for consideration by the Zambian Government and cooperating partners. 2. made a lot of presentations to the Parliamentary Committee on Economic Affairs and Labour, such as the recommendations and proposals that were adopted and implemented by Government through the World Bank sponsored Enterprise Development Project (EDP) that increased participation of commercial banks and made them comfortable to submit their confidential information

Membership in Professional Associations and Publications:

1. Secretariat to the African Peer Review Mechanism (APRM); Ruling Justly component of the Millennium Challenge Account (MCA); the initial Legal and Judicial Reforms Committee; the Governance Sector Advisory Group (GSAG); and the Macroeconomics Sector Advisory Group.
2. In July 2006 I was elected the Vice President of Economics Association of Zambia (EAZ). I did a lot of work for the Association, such as: preparing presentations for the Parliamentary Committee on Economic Affairs and Labour; critiques of the annual national budgets; prepared comments on various Government initiatives, policies, and legislation; drafted project proposals; organized and moderated discussions on topical economic issues; etc.
3. I served as Chairperson of the DFID-funded Revenue Institutions of Zambia Enhanced Support (RIZES)/CSO project hosted by Economics Association of Zambia (EAZ) between 2004 and 2005.
4. I was involved in negotiations between EAZ and NIZA (a Netherlands-based NGO) to help raise awareness on NEPAD program of the Organization of African Union.
5. I was Vice-Chairman of the Socio-Economic Committee of the Poverty Monitoring and

Analysis (PMA) component of the World Bank funded Zambia Social Investment Fund (ZAMSIF) project.

6. Between 1999 and 2001, I served on the Technical Committee of the Directorate of Macro-Economic Policy Analysis (DMPA) project jointly implemented by the Ministry of Finance and Economic Development (MOFED, Zambia); the Africa Capacity Building Foundation (ACBF in Harare, Zimbabwe) and the United Nations Development Program (UNDP in Zambia).
7. Between 2000 and 2001, I served on the Macro-economics and Industry Working Groups that were preparing Zambia's Poverty Reduction Strategy Paper (PRSP) under the auspices of the World Bank's Poverty Reduction Growth Facility (PRGF). From 2001 to 2004, I continued to participate in the PRSP process and maintained active links through the Environment SAG in which I represented the CONASA project and Civil Society for Poverty Reduction (CSPR).
8. Between August 2000 and August 2001 I served as the National Focal Point for Zambia for the second Africa-Asia Business Forum (AABF II). The Government of Japan through UNDP funded AABF with the objective of promoting business linkages between Asian and African companies. I recruited six companies that took part in the process and concluded with the Forum in Pretoria, South Africa.

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
1. Part of the team preparing the inception Report	1. For ten months up to 31st July 2007, I was a Program Officer in charge of the portfolio looking at economic institutions, policy and trade expansion at the Private Sector Development Reform Program (PSD – RP)
2. Input in preparing terms of Reference	2. Socio-economic Expert for the proposed Copper Processing Plant in Salamano Area of PGLulushi District conducted under Environmental Science and Engineering Consultant Limited.
3. Stakeholders and interested parties consultations 4. Socio-economic surveys; 5. Socio-Economic impact assessment Environmental and Social-economic Sustainability Assessment	3. Socio-economic Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience. 4. Under the Ministry of Agriculture & Water Development (MAWD) in February 1989 he worked as Economist/Statistician responsible for

	organizing and conducting the annual crop forecasting surveys, and production of the National Early Warning Monthly Food Security Bulletins. 5. After the restructuring of the Ministry, I was appointed as Principal Planner (Infrastructure) and served as Project Coordinator of the civil works component of the US\$10mn World-Bank funded project called Zambia Agricultural, Marketing, Processing and Infrastructure Project (ZAMPIP)
6. Reviewing of draft EIS document	6. Internal Document Quality Control - reviewed the proposed Copper Processing Plant in Salamano Area of PGLulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.

Expert's Contact Information: email: ernmade@yahoo.co.uk Phone: 0967994059/0955994059

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by ZPPA.

ERNEST MWAKE

27/05/22



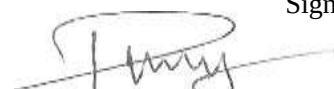
Name of Expert

Date

Signature

PATSON ZULU

27/05/22



Name of authorized Representative of the Consultant

Date

Signature

Bwalya L. Mwale

Position Title and No.	ENVIRONMENTAL ENGINEER
Name of Expert:	Bwalya L. Mwale
Date of Birth:	28th February, 1995
Country of Citizenship/Residence	Zambia

Education:

Bachelor's Degree in Environmental Engineering, Copperbelt University (2013 – 2018), Kitwe, Zambia.
 GSCE G12 Division one certificate, Mazabuka Girls Secondary School (2009 - 2011), Mazabuka, Zambia

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
2019 to Present	Environmental Specialist - Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre, NDOLA	Zambia	Environmental Consultant - Environmental impact Assessment for the Construction of the China aided International Conference center in Lusaka by Ministry of Housing and Infrastructure Development(MHID), 2019 Environmental Consultant – Feasibility study for improved solid waste management system in Choma District by Choma municipal council and GIZ,2019 Environmental Consultant - Environmental impact Assessment for the Existing Cooking oil processing plant in Lusaka by Parrogate Gineries LTD,2020
2016	Environmental Engineer (Officer), Zambia Sugar Plc	Zambia	Ensured proper solid waste, surface and ground water management Carried out microbiological, water and waste water analysis Carried out air pollution analysis using stack emission analysis and trend studies Ensured all needed permits and clearances were obtained and all job cards worked on time Ensured safety, health, environment and quality management(SHEQ) were upheld Ground water pollution spatial distribution in njomona and kawama compound

Membership in Professional Associations and Publications:

1. Graduate Member- Engineering Institution of Zambia (MEIZ)
2. Journal of Environment Protection and Sustainable Department: Seasonal variation of nitrate and phosphate levels in groundwater-a case study of Mpongwe farming block in Zambia, 2019.
<http://files.aiscience.org/journal/article/pdf/70140070.pdf>
3. Project: Seasonal variation of nitrate and phosphate levels in groundwater-a case study of Mpongwe farming block, Copperbelt University 2018 to Department of Environmental lecturers, Kitwe

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
1. Document Reviews including existing legal frameworks relevant to the projects	1. Review of relevant documents for a feasibility study for an improved solid waste management system in Choma District under Environmental Science and Engineering Consultant Limited.
2. Part of the Scoping meeting to be held at the Proposed Project site	2. Environmental Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
3. Collection of satellites maps for the existing waste collection containers	3. Data captured for current locations for stationary solid waste collections points and proposed Material recovery facility in Choma District under Environmental Science and Engineering Consultant Limited

References

Patson Zulu (0967470849) Chairman and CEO Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Shirley Ndalama, Environmental Officer - Mazabuka, Zambia Sugar Plc P.O. Box 670240, Mazabuka. Tel: +260 963 317 222
Mr. S Sichilima, Project Supervisor/Lecturer, The Copperbelt University, School of Mines & Mineral Sciences, P.O. Box 21692, Kitwe, Zambia Email: nsichilima@gmail.com Tel: +260 964 825 396	Inonge P. Mulemi, SHERQ Officer - Mazabuka, Zambia Sugar Plc P.O. Box 670240, Mazabuka. Email: Inongemulemi@gmail.com Tel: +260 962 242 752

Expert's Contact Information: email bwalyalydiamwale95@gmail.com Tel: +260 953 029495/+260 977 782858

27/05/22



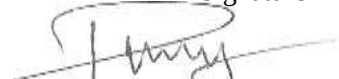
Name of Expert

Date

Signature

PATSON ZULU

27/05/22



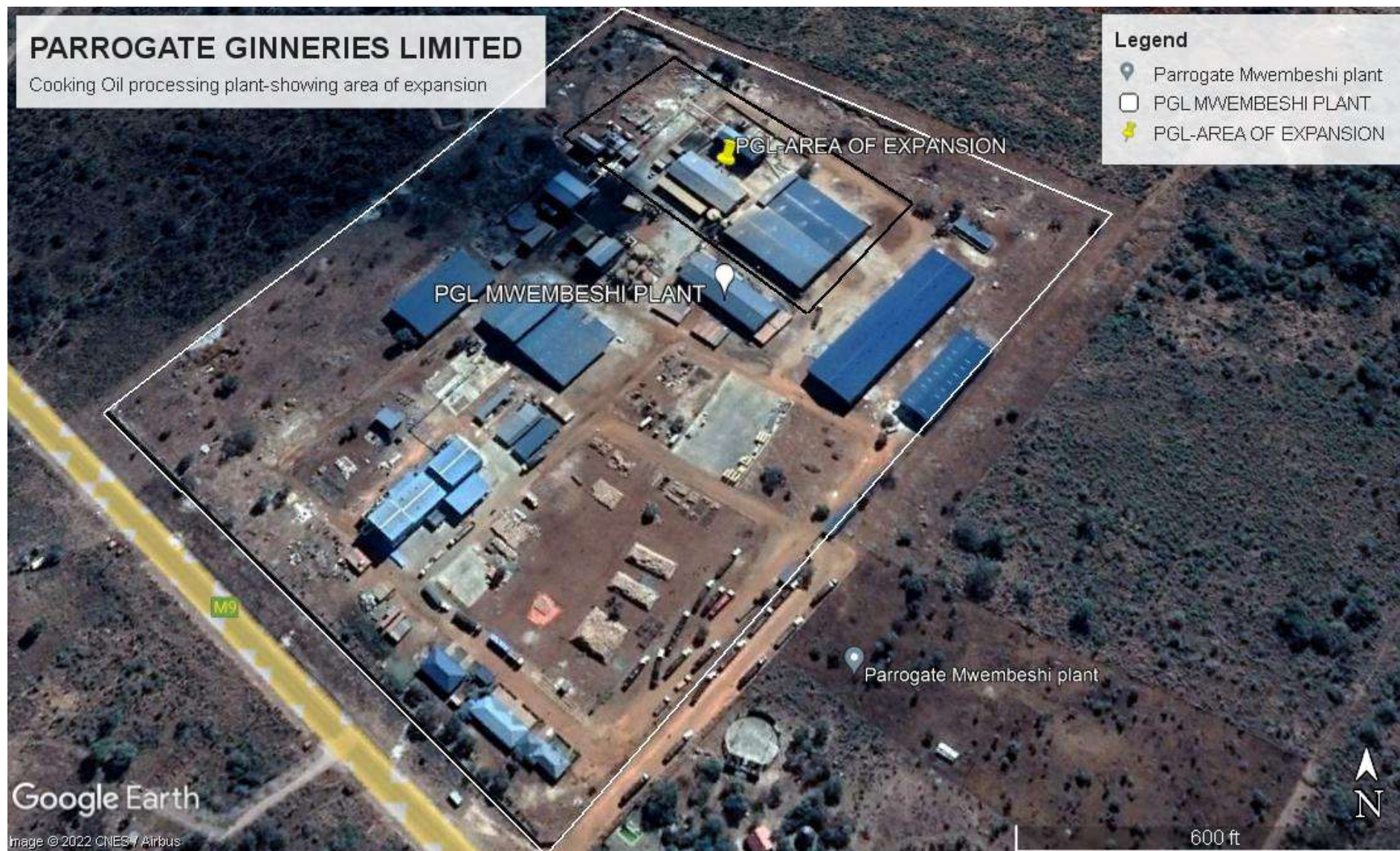
Name of authorized Representative of the Consultant

Date

Signature

APPENDIX A2: SATELLITE MAP OF THE COOKING OIL PROCESSING PLANT





APPENDIX A3: PHOTOS OF THE PROPOSED EXPANSION SITE AREA



APPENDIX B: SCOPING ADVERT & MEETING REPORT



PUBLIC NOTICE

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PUBLIC CONSULTATION SCOPING MEETING FOR THE PROPOSED EXPANSION OF THE SOLVENT EXTRACTION PLANT PHASE II IN MWEMBESHI, CHILANGA.

The Environmental Management Act of 2011 requires that all companies engaged in process operations undertake an Environmental Impact Assessment (EIA) to be approved by the Zambia Environmental Management Agency (ZEMA).

Parrogate intends to expand the existing Mwembeshi Edible Oil Processing Plant by 400 metric tons in Mwembeshi area in Chilanga.

This notice therefore serves to inform members of the general public; both interested and affected parties that an Environmental Impact Assessment for the aforementioned proposed project **has commenced**.

The Environmental Impact Assessment Regulations No.28 of 1997 requires that the sponsor of the project consult stakeholders through holding public meetings before operationalizing the project. However, given the governments guidelines in relation to COVID-19, it is not advisable to convene a general public meeting but instead a face-to-face interaction with limited stakeholders will be held. However, It is proposed that interested stakeholders can provide their comments and input in written to us through the following platforms;

- Email: rakeshyyadav@parrogate.com.zm
- Company website (www.parrogate.com)

The deadline for submission of comments is **4th April, 2022**

TT21032022

SCOPING MEETING FOR EXPANSION OF THE COOKING OIL PROCESSING PLANT IN
MWE MBESHI AREA, OFF MUMBWA ROAD, CHILANGA DISTRICT

RESPONDENT LIST

NAME	INSTITUTIONS/PLACE	POSITION	CONTACT DETAILS	SIGNATURE
Nemwinge S. Zulu	Westwood lodge	Manager	0977501130	[Signature]
COLLINS MWAMBA	PARROGATE	FHS SUPERVISOR	0979867958	[Signature]
Eliza bethsikhulu	Sika musa	Farm	0961364560	[Signature]
chansambe MBYA			0770713079	[Signature]
FUNOZUKA HUMPHREY	MWE MBESHI SEC	DEPUTY	0977605861	[Signature]
Sikaduka Michael	MWE MBESHI SEC	School	0979-614878	[Signature]
SWALE JOHN	MWE MBESHI RHC	FHT	0974925405	[Signature]
Simukoko Oboet	MWE MBESHI RHC	Clinical officer	0971752741	[Signature]
SHATA KHOZA	SHAMBIRINGO	Engineer	0977393737	[Signature]
Austin Lwato	Isha Mamba's Kressi		0978608757	[Signature]
Elisha Muzya	Mwence	Camp teacher	0760874022	[Signature]
Muridhar Thakur	PGL	Plant Manager	0976005890	[Signature]
BRIST MWALE	ESF	Vol. 6-EC	0967-994655	[Signature]
RATSON Zulu	ESF	CEO/Chair	0977470849	[Signature]
CHRISTABEL MULEBA	CHILANGA COUNCIL	COUNCIL TREASURER	0975 985 880	[Signature]
Pailande Humphrey	Chilanga Council	Env Manager	0978843311	[Signature]

RECORD OF CONSULTATIONS DURING SCOPING PHASE OF THE EIA FOR THE PROPOSED EXPANSION OF PARROGATE COOKING OIL PROCESSING PLANT, 7th and 8th April 2022

Given the Covid-19 guidelines that forbade gathering of large crowds of people, Environmental Science and Engineering Consultants (ESEC) Ltd (the company engaged by Parrogate Ginneries to undertake the EIA for the proposed expansion of the cooking oil plant) decided to conduct separate Scoping meetings for each of the identified stakeholders. The meetings took the better part of two days, Thursday 7th April and Friday 8th April of 2022.

ESEC was accompanied by Mr Collins Mwamba, the Environmental Health and Safety Supervisor at Parrogate Ginneries, Mwembeshi Plant. At the outset of each of the deliberations Mr Patson Zulu briefed the stakeholders about the need and requirements for undertaking EIAs, which includes stakeholder consultations. Mr Zulu informed the stakeholders about the various stages of the EIA process. Apart from the Scoping stage, it was indicated that there was more opportunities and time for stakeholders to provide their more informed input or concerns on the proposed project and help with recommendations to mitigate or remedy adverse impacts of the proposed projects.

1. The first stakeholder to be consulted was Mrs Namwinga Zulu, Manager of **Westwood Pub & Lodge (also known as Round House Lodge)** located less than ten metres across the gravel road on the eastern boundary of Parrogate premises. Mr Patson Zulu, CEO and Chairman of ESEC briefed Mrs Zulu about the EIA process. He informed her that the consultation was part of the Scoping phase of the EIA, and her input would help shape and inform the ToRs and Scoping report.

Mrs Zulu complained about the foul smell that is usually experienced in the evening, at least once per week. Apart from that she had no complaint or objections to the proposed expansion of the cooking oil processing plant. She proposed that Parrogate would do well to open a retail sales outlet to sell the cooking oil and soap. She wondered why the surrounding community members should commute some 70 Km to

Lusaka to buy commodities that are produced within their area. It was indicated that Mt Meru in Chibombo district and Zambeef of Chisamba district that sell some of the cooking oil they produce through retail sales outlets at filling stations around Katuba and Lusaka, and some of these communities are not within close proximity to the cooking oil processing plants. Customer come with their own containers into which oil is poured.

Apart from employees of various government institutions, there is a large community of local residents that include Mwembeshi Secondary School, two prisons, clinic and paramilitary camp that form a huge customer base that can significantly benefit from such a retail sales outlet for cooking oil and bar soap.

Mrs Zulu was informed that ESEC will provide feedback to all stakeholders regarding the outcome of the specialist studies of the EIA process that would be undertaken. ESEC will investigate all stakeholder complaints regarding current operations of the plant.

2. **Mwembeshi (Provincial STEM) Secondary School** is located less than a kilometre from the cooking oil processing plant. ESEC met with Mr. Humphrey Funduluka the deputy headmaster and Mr Michael Sikaonga the boarding master of the school.

They both complained about the lack of corporate social responsibility (CSR) on the part of the company. They expected the company to undertake a number of CSR projects at the school, in particular sponsorship of needy children from the surrounding community. The school community consists of some 550 pupils and 52 staff (of whom 20 stay within the school premises).

The company was found wanting in a number of aspects; for example the dumping of waste and by products on neighbouring premises. One neighbour went so far as to sue the company over such practices. The other complaint related to the foul noxious smell that company operations generates.

Otherwise both school officials welcomed the proposed investment as it would lessen the unemployment burden in the surrounding area. The proposed expansion entail increase in job opportunities, but the school representatives advised the company to improve the

welfare and condition for its Zambian workers. The poor conditions of service and work environment adversely impacts the plight and welfare of the local community.

3. Mrs Elizabeth Situmbeko, a caretaker of one of the neighbouring small holder farms (owned by a Mr Musa) indicated that she had no complaint or objections to the proposed expansion of the plant as it would increase job opportunities for the people in the local community.
4. Wife to Mr Fredrick Moonga (another caretaker of a smallholding farm) refused to offer any opinion on the proposed expansion of the cooking oil plant.
5. Mr Chansa Bwembya was another caretaker farmer that ESEC consulted. The owner of the farm was outside the country. Mr Chansa indicated that Simon Farm used to have a lot of livestock and grew a variety of food crops, but has been inactive since the owner left for Tanzania. He welcomed the expansion of the plant as it may accord him an opportunity to get a formal job.

Mr Chansa complained about the noise pollution at night; otherwise he had no objection to the proposed expansion.

6. ESEC talked to Mr John Siwale (Environmental Health officer - Technical) and Mr Obert Simukoko (Clinical Officer) at **Mwembeshi Rural Health Clinic** about the impact of operations of Parrogate Ginneries.

It was indicated that the company is a major employer and has indirectly contributed to the reduction in crime in the area as some youth are kept busy whilst earning a livelihood. However, the company has a bad reputation with regards to the poor conditions of services for its employees. In that respect, Parrogate has little socio-economic impact on the community it operates in.

Even though there are few work-related accidents reported at the company, the respondents were however concerned at the absence of a clinic within the company premises given the size of the operations and number of employees. In light of the proposed expansion the company should set up a clinic with permanent staff to cater for not only the workers, but their relatives too. This is especially appropriate given that there are other workers belonging to Continental Ginneries in the same premises.

They said that patients from the plant area reported complaints about the foul smell that is experienced in the evening. They suggested that ESEC investigate whether the noxious smell is dangerous to the health of workers and the surrounding local community.

Noise pollution is also experienced in the evenings/night although it is of tolerable level.

7. There is sizeable community of people that live at **Isha Mbingo Kraal** that is located along Mumbwa. ESEC talked to Mr Shaka Khoza a tenant and Mr Austin Liato (former Member of Parliament) proprietor of Isha Mbingo Kraal about the proposed expansion of Parrogate cooking oil plant and its impact on the environment and local community.

They were concerned that the company does not look after its workers well; most workers get very low wages – even degree holders get very low salaries. Parrogate as a big employer has too much leverage over its workers, and takes advantage of the dire economic situation in the country, and rural areas in particular. Grievance address or complaint handling mechanism is absent as there seem to be total disregard for the laws that regulate the employer-worker relationship.

ESEC was informed about an unfortunate incident where the company refused to pay medical expenses for some two workers who got involved in work-related accidents. They felt there is need for the company to have a clinic with permanent medical personnel to avoid such unfortunate experiences.

They also talked about the foul smell that is usually experienced at night. Mr Liato considered suing the company at some point in time. The proposed expansion of the plant operations will entail increased air pollution. It is therefore important to address the issue through implementation of more effective and efficient mitigation measures. He also asked that a thorough investigation be undertaken to ascertain how safe the smell/fumes are.

Even though there is some noise pollution, it is not dangerous to the health and welfare of the surrounding community.

The company does not seem to have a structured, formal and budgeted corporate social

responsibility (CSR) plan. The community expects a lot from Parrogate Ginneries, but it is not coming through in a number of aspects as it merely reacts to uncoordinated appeals for appeal from different groups of people. It was suggested that the company open a retail shop that would sell cooking oil and soap to the local community – there is a sizeable community in Mwembeshi that include institutions and their workers (such as clinic, prisons, boarding schools, lodges, etc) that need huge quantities of these commodities.

8. Mr Elisha Muziya a caretaker of a neighbouring property along Mumbwa road informed ESEC that he had experienced the foul smell and also noise pollution at night. Apart from the few jobs, he could not point to any other thing that the local community benefits from the presence and operations of the company.
9. At **Chilanga Town Council**, ESEC met with a Christabel Museba (Council Treasurer) as acting Council Secretary and talked to Mr Humphrey Pailande, Environmental Planner. Mr. Pailande indicated that Chilanga Town Council is not yet a planning authority, and therefore does not authorise land use changes – that was done by Lusaka Provincial Planning Department.

He informed ESEC that Covid restrictions had been relaxed, and therefore meetings involving huge number of people can be convened, but participants have to wear masks. ESEC promised to convene such a meeting during disclosure of its findings.

Otherwise the Council had no objection to the proposed expansion of the cooking oil processing plant.

Report prepared by



Ernest Mwape

Socio-Economic Specialist, ESEC

10th April 2022



APPENDIX C: DISCLOSURE ADVERT & MEETING REPORT

The logo for Parrogate, featuring the word "Parrogate" in a white, sans-serif font. The letter "o" is stylized with a blue circular graphic element inside it. The logo is set against a dark blue rectangular background.

PUBLIC NOTICE

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) DISCLOSURE MEETING FOR THE PROPOSED EXPANSION OF THE COOKING OIL PROCESSING PLANT ON SUB C AND SUB D OF LOT 10208/M, MUMBWA ROAD, MWEMBESHI AREA IN CHILANGA DISTRICT BY PARROGATE GINNERIES LIMITED.

The Environmental Management Act of 2011 requires that all companies engaged in processing operations undertake an Environmental Impact Assessment (EIA) to be approved by the Zambia Environmental Management Agency (ZEMA).

Parrogate intends to expand the capacity of its Mwembeshi Edible Oil Processing Plant by an additional 400 metric tons in Mwembeshi area in Chilanga.

This notice therefore, serves to inform members of the general public, both interested and affected parties, that an Environmental Impact Assessment for the aforementioned proposed project is **being conducted** and an opportunity is hereby being availed to the general public to review the findings and proposed measures to mitigate adverse impacts of the proposed expansion of the oil processing plant and to enhance positive ones. The Environmental Impact Assessment Regulations No.28 of 1997 require that the Developer or Owner of the project consult stakeholders through holding of a disclosure public meeting before operationalizing the project. The general public is hereby invited for the disclosure meeting to be held at the Mwembeshi Plant Site on **27th May, 2022**, at 10:00 Hrs.

It is further proposed that interested stakeholders can provide their comments and input in writing through the following platforms:

- Email: rakeshyadav@parrogate.com.zm
- Company website (www.parrogate.com)

The deadline for submission of comments is **27th May, 2022**.

27th MAY 2022

Parrogate



DISCLOSURE MEETING FOR EXPANSION OF THE COOKING OIL PROCESSING PLANT
ON SUB C AND SUB D OF LOT 10208/M, MUMBWA ROAD, MWEMBESHI AREA IN
CHILANGA DISTRICT BY PARROGATE GINNERIES LIMITED

RESPONDENT LIST

NAME	INSTITUTIONS/PLA CE	POSITION	CONTACT DETAILS	SIGNATURE
MR. JESU IDAKALA	ELIZABETH H FARMERS	FARMER	0967-091199	[Signature]
MR. NCANDU SHAMUDOMO	ZCS	OIC	0994320999	[Signature]
MR. KEVIN KAPALI	ZCS	OPERATIONS	0971551182	[Signature]
MR. LUKYI SAKALA	ZCS	SECRETARY	0979-163246	[Signature]
MS. MWAMBENYA CHUMA	ZCS	OFFICER	0978004240	[Signature]
MS. Grace Nyuwenda	Round House	waitress	0979-299862	[Signature]
MR. JARED MANSIONI	ESEC		0977-808724	[Signature]
Silvester Chigoma	PGL	Asist HSE	0974671817	[Signature]
Phram Mumbwa	PGL	LABOUR SUPERVISOR	0976161115	[Signature]
BIKORA CHRISTOPHER	PGL	A.O.P/H/S Supervisor	0777855491	[Signature]
BWALDA L. MWALE	ESEC LTD	EAV - SPECIALIST	0977782858	[Signature]
PRINCE CHENYA	ESEC LTD	Driver	0944426386	[Signature]
MR. Roderick Mbatia	Parrogate	Factory mgmt	0770880936	[Signature]
Rakesh Yadav	Parrogate	G.M. Te.	0971546941	[Signature]
MAXWELL SONGORO	Parrogate	Administrative Officer	0974066946	[Signature]
ALBERT Nkomesha			0971155641	[Signature]
BERNARD MWANSA	community member		0989155047	[Signature]
MATIMBA MATIMBULA	PGL	ENGINEER	0974998463	[Signature]
ALEX Mulebela	PGL	Office Clerk	0978495454	[Signature]
JOHN SIMALE	Ministry of Health	EHT	0974925405	[Signature]
Sudan Adom	PGL	Admin	0974323892	[Signature]
Patience Simba	PGL	Admin	0978607420	[Signature]
COLLINS MWANBWA	PGL	FHS SUPERVISOR	0979867958	[Signature]
ERNEST MWARS	ESEC	SAC-LEC sp	0967-994059	[Signature]

MINUTES OF PUBLIC DISCLOSURE MEETING ON PROPOSED EXPANSION OF PARROGATE OIL PROCESSING PLANT HELD IN MWEMBESHI PLANT, CHILANGA DISTRICT - 29th May 2022

ESEC Ltd was engaged by Parrogate Ginneries Limited (PGL) to undertake an environmental impact assessment (EIA) for the proposed expansion of the cooking oil processing plant in Mwembeshi area of Chilanga District.

The meeting was called to order at 12:15 hrs by Mr Patson Zulu, CEO and Chairman of Environmental Science and Engineering (ESEC) Limited. He requested management of PGL to introduce themselves, followed by ESEC team and then everybody else who was present in the meeting. (see attached list of attendance).

FINDINGS FROM CONSULTATIONS WITH LOCAL STAKEHOLDERS

Attached to these minutes is the presentation (of findings) that Mr Zulu made during the meeting. Some of the additional issues raised were as follows:

- Possibility of PGL funding an out-grower scheme for local farmers. PGL buys soya beans from farmers around the country. The company has a presence in the following districts: Katete, Chipata,
- There are a lot more Acts of Parliament that have an impact on the environment; those listed in the presentation were just illustrative. Some additional pieces of legislation that affect the environment include Wildlife Act, Forestry Act, Fisheries, etc.
- ZAWA Board of Directors meet once per month to consider EIS for various projects and have power to either reject or approve proposed projects. If the project is approved ZEMA Board issues a Letter of
- Despite some misgivings, all the stakeholders had no objection, and therefore welcomed the proposed expansion of the PGL edible oil processing plant in Mwembeshi area of Chilanga District.
- Some of the issues that concerned the community about PGL operations were:
 - Foul smell at night
 - Noise that is more audible at night
 - Solid waste dumped on neighbouring properties
 - Absence of strong and consistent corporate social responsibility (CSR)
 - Poor terms and conditions of service for PGL workers at Mwembeshi plant
 - Absence of clinic and ambulance, even though management indicated that there is vehicle dedicated for that purpose.

Some initial mitigation measures that management raised were as follows:

- i. Foul smell will be dealt with through oxygenisation of waste water

- ii. Noise pollution will be reduced through regular maintenance of equipment. It was indicated that new machinery that will be installed will not produce as much noise given it is based on new technology
- iii. Solid waste will be collected and properly stored in a designated area within the plant premises
- iv. PGL promised to have a structured CSR strategy and budget, including policy guidelines on the same

PLENARY DISCUSSION

- a) PGL management was asked how many subsidiary companies PGL has. In response it was indicated that the company has a presence in Lusaka, Mwembeshi, Katete, Chipata and Kalomo in Zambia. It also has had operations in Zimbabwe for over twenty years.
- b) Mr Rakesh, Country Manager for PGL covering Zambia and Zimbabwe pledged the following:
 - CSR efforts will be implemented immediately; Mwembeshi Prisons and Mwembeshi Boarding Secondary School have received PGL products at various times
 - There is already a vehicle that is designated as an ambulance
 - Foul smell will be mitigated through oxygen aeration of the waste water
 - Machines and equipment that will be installed through expansion project have new environmentally-friendly technology that generate less noise and has lower pollution of air
- c) Participants wanted to know how much ground water is abstracted by PGL. PGL management indicated that it uses 150,000 ltrs of water every two days
- d) The meeting was informed that the company used to sell seed cotton mash to the surrounding local community as livestock feed. PGL management indicated that the company stopped to buy cotton seed for processing because of low production countrywide, leading underutilisation of the installed ginning capacity.
- e) The company indicated that it will open a mini-mart at a filling station next to the plant through which it will sell some of its products and other household goods to the local community through retail outlet. PGL indicated that it already had 24-hr mini-mart in Makeni area.
- f) PGL pledged to address most of the CSR-related issues (that are not contingent on the proposed expansion of the plant, and therefore does not need ZEMA approval) within three months. It was suggested that members of the local community, especially those in attendance of the meeting check with PGL management and remind them about this pledge.
- g) The meeting was reminded that anybody can actually report any violations of the law by companies operating in Zambia. In fact, individuals can report such violation not only to ZEMA but also to local authorities and police. Environmental law requires manufacturing companies to employ environmental and safety officers to ensure continuous compliance to Zambian laws.



Ernest Mwape

Socio-Economic Specialist, ESEC

Secretary

27th May 2022



APPENDIX D: CERTIFICATE OF INCORPORATION

2791 63460



Republic of Zambia

**CERTIFICATE OF INCORPORATION
OF A PRIVATE COMPANY LIMITED BY SHARES**

(Section 10)

This is to certify that

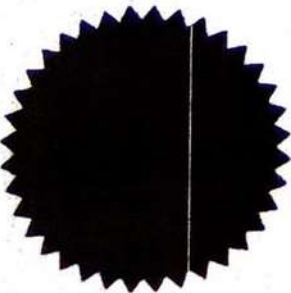
PARROGATE GINNERIES

..... Limited (full name of company)

is on and from the 30th day of August, 2006

Incorporated as a private company limited by shares.

Given under my hand and Seal at Lusaka, Zambia, this 30th day of August, 2006




B.K. Mwalongo
Assistant Registrar of Companies

(Note that this certificate is not valid unless the official Seal of the Registrar of Companies has been affixed)
Stocked by the Office of the Registrar of Companies



THE PATENTS AND COMPANIES REGISTRATION AGENCY

The Companies Act, 2017
(Act No. 10 of 2017)

The Companies (Prescribed Forms) Regulations, 2018
(Sections 270, 271 and 273)

Available at www.pacra.org.zm

ANNUAL RETURN				
PART A COMPANY DETAILS				
1.	Company Number <i>Indicate the 12 digit registration number</i>	120060063460		
2.	Company Name <i>Indicate the name as captured on the certificate of incorporation</i>	PARROGATE GINNERIES LIMITED		
3.	Principal Business Activity	1040 MANUFACTURE/PROCESSING OF VEGETABLES AND ANIMAL OILS AND FATS WHICH INCLUDES MANUFACTURING AND PROCESSING OF CRUDE VEGETABLE OIL, SOYA BEAN OIL, PALM OIL AND COTTON SEED OIL.		
4.	Other Business Activities	0163 POST HARVEST CROP ACTIVITIES WHICH INCLUDES COTTON GINNING		
5.	Physical Address <i>State the registered office of the Company</i>	Plot/House/Village Street Area Town Province	PLOT NO. 397A/D KAFUE ROAD MAKENI LUSAKA LUSAKA	
6.	Postal Address <i>State the notification address of the Company</i>	Post Box Area Town Province	50854 MAKENI LUSAKA LUSAKA	
7.	Phone Number <i>Indicate the international code e.g. +260 for Zambia</i>	Mobile Landline	+260 979 332 456 +260 211 273 793	
8.	Email Address	yg@parrogate.com.zm		
9.	Nominal Capital or Guaranteed Amount <i>Nominal Capital or Guaranteed amount must not be less than the prescribed minimum</i>	15,000		
10.	Class of Shares <i>If other indicate the specific class of shares</i>	ORDINARY	PREFERENTIAL	OTHER
11.	Number of Shares	15,000		
12.	Number of Paid Up Shares	5,000		
13.	Number of Unpaid Shares			
14.	Par Value	K1.00		
PART B ANNUAL RETURN DETAILS				
15.	Type of Company	Private Limited By Shares ☒		



16. Company Category Select category of Company by marking with "X"	Select one type of Company by marking with "X". In case of Public Limited Companies, attach annual audited Financial Statements and updated Beneficial Ownership information.	Private Limited By Guarantee	
		Unlimited Private Company	
		Public Limited Company	
		Local Bank	
		Foreign Bank	
		Insurance Company	
		Re-Insurance Company	
		Bureau De Change	
		Financial Institution	
		Other (Specify) FOOD MANUFACTURING	X
17. Date of Financial Year End		1/04/2019	

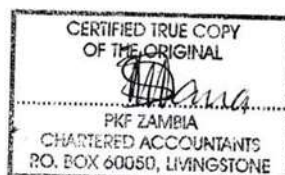
PART C DIRECTORS				
No	First Name:	Surname:	Identity Number:	Date Appointed:
1	PRADEEP	GANEDIWAL	PPN. Z4207201	
2	PRADUMAN KUMAR	GANEDIWAL	PPN. Z4987035	
3	YASHWARDHAN	GANEDIWAL	PPN. Z4910201	
4				

PART D SHAREHOLDERS						
No	First Name:	Surname:	Identity Number:	Number of Shares:	Class of Shares:	Number of Paid Up Shares:
1	PRADEEP	GANEDIWAL	PPN. Z4207201	1	ORDINARY	1
2	PRADUMAN KUMAR	GANEDIWAL	PPN. Z4987035	1	ORDINARY	1
3	CORBEL FINANCE LIMITED	N/A	REG NO.	4,998	ORDINARY	4,998
4						

PART E BENEFICIAL OWNERS				
No	First Name:	Surname:	Identity Number:	Nature of Interest
1	PRADEEP	GANEDIWAL	PPN. Z4207201	BUSINESS
2	PRADUMAN KUMAR	GANEDIWAL	PPN. Z4987035	BUSINESS
3	CORBEL FINANCE LIMITED	N/A	REG NO.	BUSINESS
4				

PART F DECLARATION	
21. First Name: UMESH	
Surname: SHARMA	
Capacity: ☐ Director ☒ Secretary ☒ Receiver/Liquidator ☐	
Signature: <i>[Signature]</i>	Date: 01/04/2019

PART G PARTICULARS OF PERSON LODGING NOTICE	
22. First Name	PRECIOUS
23. Surname	MPUNDU
24. Gender	FEMALE
25. Date of Birth	04/09/1993



26.	Nationality	ZAMBIAN	
27.	Identity Type: For Landowner: NRC For non-Landowner: NRC/ Passport/ Driver's License/ Resident Permit	NRC	
28.	Identity Number	286320/31/1	
29.	Phone Numbers Include the international code in g. +260 for Zambia	Mobile	
		Landline	+260 213 324 447
30.	Email Address	compservlivingstone@zm.pkfea.com	
31.	Physical Address (State the principal office of the Company)	Plot/ House/ Village	SACKVILLE HOUSE
		Street	SAKPELWA STREET
		Area	TOWN
		Town	LIVINGSTONE
		Province	SOUTHERN
		Country	ZAMBIA
32.	Signature:	Date:	



APPENDIX E: CERTIFICATE OF TITLE

DR 1A

No. 166187

REPUBLIC OF ZAMBIA

Registered No. 10208/M/2

THE LANDS AND DEEDS REGISTRY ACT
(Section 45)

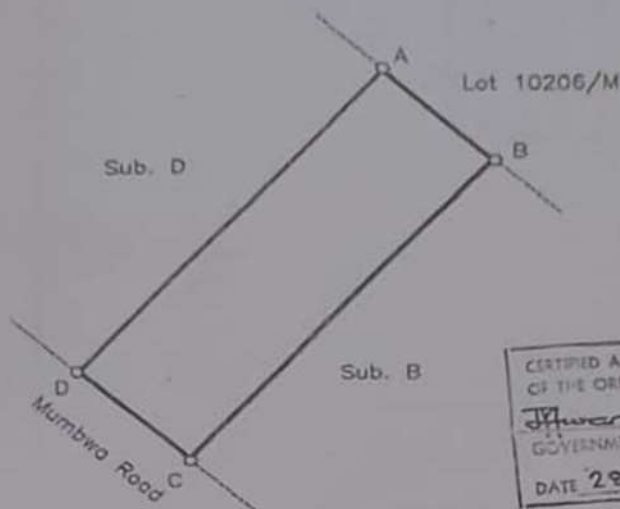
CERTIFICATE OF TITLE

THIS Certificate, dated the SEVENTH day of JUNE two thousand and TWELVE under the hand and seal of the Registrar of the Lands and Deeds Registry of Zambia WITNESSETH that PARROGATE GINGERIES LIMITED a Company incorporated in Zambia and having its registered office at Lusaka

is a tenant or lessee for the unexpired residue of a term of 99 years from the first day of June, 2002 (subject to such reservations, restrictions, incumbrances, liens, estates and interests as are notified by memorial underwritten or endorsed hereon) of and in ALL that piece of land in extent 20.2354 hectares more or less being Subdivision C of Lot No.10208/M situate in the Lusaka Province of Zambia which piece of land is more particularly delineated and described on Diagram No.412 of 2012 except and reserved all minerals oils and precious stones whatsoever upon or under the said land.....



SIDES METRES		ANGLES OF DIRECTION	SYSTEM Y	CO-ORDINATES Local METRES X	DIAGRAM NUMBER 412/2012
AB	259.33	312.09.52			APPROVED: (Sgd) T.L. Mwanalushi GOVERNMENT SURVEYOR DATE: 23/01/2012
BC	780.29	42.09.52			
CD	259.33	132.09.52			
DA	780.29	222.09.52			



SCALE 1: 10000

BEACON DESCRIPTION All are iron pegs in concrete

THE FIGURE A-B-C-D-A

REPRESENTS 20.2354 Hectares

OF LAND BEING Sub. C of Lot 10208/M

SITUATED IN THE Lusaka PROVINCE REPUBLIC OF ZAMBIA

SURVEYED IN January 2012

BY ME (Sgd) J.G. Nyangulu
LAND SURVEYOR

PARENT DIAGRAM No.:
 SURVEY RECORDS No.: D22/2011
 S G FILE No.: SD/104/13/10
 PLAN No.: SD/104/87/10
 MAP REFERENCE: 64/2012
 1527 B4 &
 1528 A3

T.L.M



Registered No. 10208/H/N/4

THE LANDS AND DEEDS REGISTRY ACT
(Section 45)

CERTIFICATE OF TITLE

THIS Certificate, dated the TWENTY-FIFTH day of APRIL two thousand and THIRTEEN under the hand and seal of the Registrar of the Lands and Deeds Registry of Zambia WITNESSETH that PARROGATE GINGERIES LIMITED a Company incorporated in Zambia and having its registered office at Lusaka

is a tenant or lessee for the unexpired residue of a term of 99 years from the first day of June 20 02 (subject to such reservations, restrictions, incumbrances, liens, estates and interests as are notified by memorial underwritten or endorsed hereon) of and in ALL that

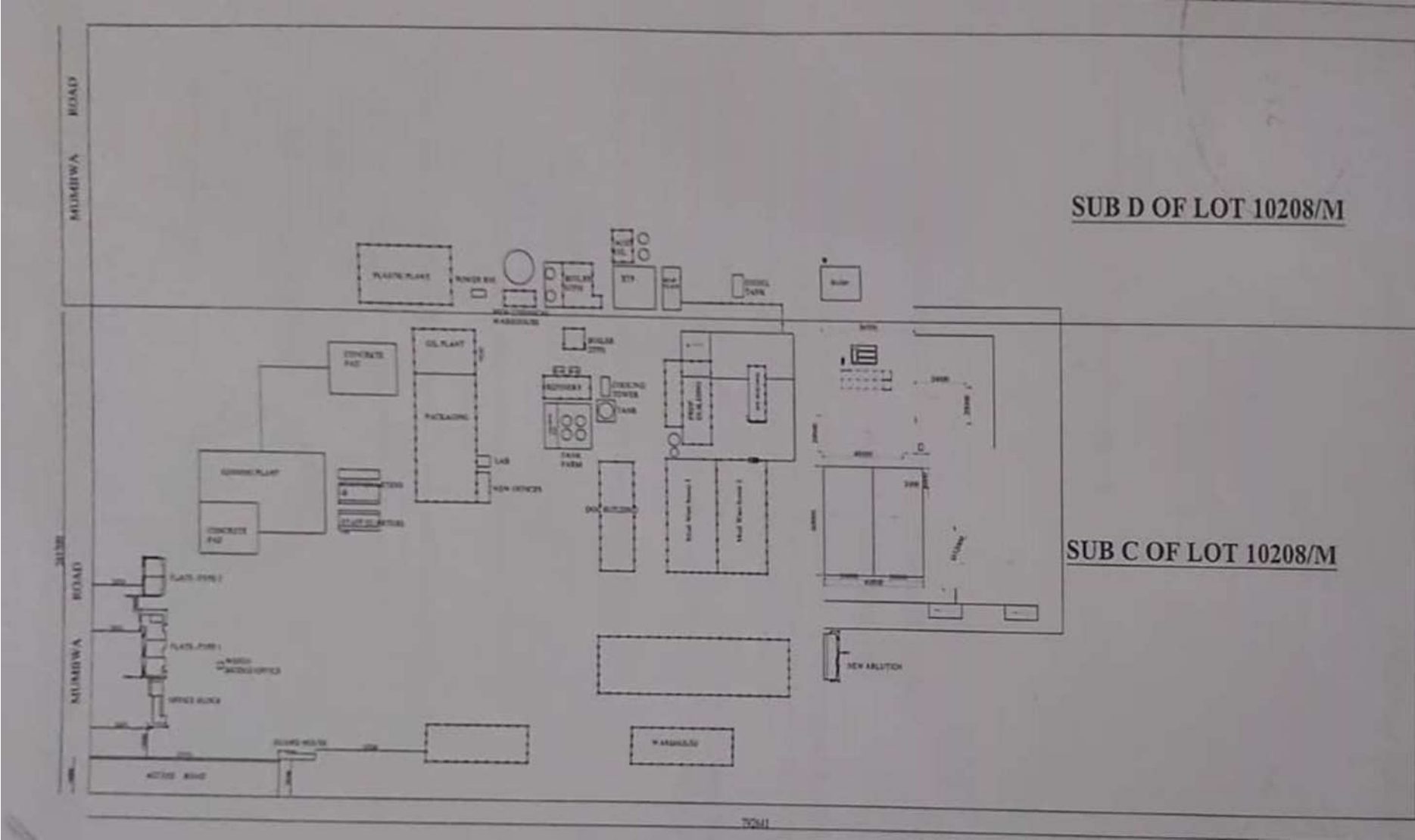
piece of land in extent 12.1514 hectares more or less being Subdivision 'D' of Lot No. 10208/H/1 in the Lusaka Province of Zambia which piece of land is more particularly delineated and described on Diagram No. 415 of 2012 except and reserved all minerals oils and precious stones whatsoever upon or under the said land.


F. M. Syanziba
Registrar



RECEIVED
OF THE REGISTRAR
231
Lands of Zambia
12/05/13

APPENDIX F: COOKING OIL PROCESSING PLANT LAYOUT



APPENDIX G: SCOPING REPORT



SCOPING REPORT



**FOR EXPANSION OF THE COOKING OIL PROCESSING PLANT ON SUB C AND
SUB D OF LOT 10208/M, MUMBWA ROAD, MWEMBESHI AREA IN
CHILANGA DISTRICT BY PARROGATE GINNERIES LIMITED**

PREPARED FOR



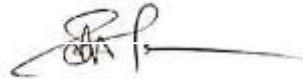
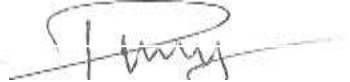
PARROGATE GENNERIES LIMITED

Prepared By



APRIL 2022

Revision Schedule					
Rev	Date	Details	Prepared by	Reviewed by	Approved by
1	Apr 2022	Scoping	Bwalya L Mwale Environmental Specialist	Patson Zulu/Ernest Mwape	Patson Zulu Team Leader

Contact:

Patson Zulu
Chairman/CEO

E-mail: patsonzulu@gmail.com
Mobile: +260 977470849/967470849



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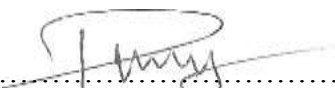
DECLARATION

This is a declaration by Environmental Science and Engineering Consultants (ESEC) Ltd who prepared these Terms of Reference (ToRs) that the information and data presented herein is authentic and has been verified by Parrogate Ginneries Limited, who are the project Developers.

This report therefore, contains Environmental Impact Assessment (EIA) Terms of Reference (ToRs) for the Cooking Oil Processing Plant by Solvent Extraction facility operated by Parrogate Ginneries Limited.

I, **PATSON ZULU** as Team Leader, hereby, certify that I supervised the team that prepared this document and provided technical and administrative oversight throughout the process.

Environmental Consultant

Signature:

Patson Zulu

Chairman and CEO

Environmental Science & Engineering Consultants Ltd

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ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
CBD	Convention on Biological Diversity
CTC	Chilanga Town Council
CSR	Corporate Social Responsibility
ECZ	Environmental Council of Zambia
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
EP	Equator Principles
ESEC	Environmental Science and Engineering Consultant
FRA	Food Reserve Agency
GRZ	Government of the Republic of Zambia
GSD	Geological Survey Department
HIV/AIDS	Human Immuno Virus/Acquired Immuno Deficiency Syndrome
HSE	Health Safety and Environment
IAP	Interested and Affected Parties
LWSC	Lusaka Water Supply and Sanitation Company
masl	metres above sea level
NIPA	National Institute for Public Administration
NRDC	Natural Resources Development College
NWASCO	National Water Supply and Sanitation Council
PGL	Parrogate Ginneries Limited
SHE	Safety Health and Environment
SI	Statutory Instrument
STIs	Sexually Transmitted Infections
TLV	Threshold Limit Value
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organisation
USD	United States Dollars
WARMA	Water Resource Management Authority
ZEMA	Zambia Environmental Management Agency
ZSA	Zambia Statistics Agency

1. INTRODUCTION

This document presents the scoping report for undertaking the Environmental Impact Assessment (EIA) study preparation of an Environmental Impact Statement (EIS) for the proposed expansion of the Cooking Oil Processing Plant by Solvent Extraction from 200MT/Day to 600MT/Day. The plant is located on Lusaka-Mumbwa road in Mwembeshi area of Chilanga District in Lusaka Province. The Scoping Report has been prepared on behalf of Parrogate Ginneries Limited, Zambia, who are the project proponent. ESEC LTD has been contracted to prepare the EIS for the project.

The purpose of this document is to set forth the scope of the EIA study and the approach that will be used to conduct the study and to prepare the EIS for the project to international standards. In addition, the document presents the legal and administrative framework within which the project will be implemented.

This report gives a description of the proposed project. The study area has been defined as being 1km radius from the boundary of the proposed site of the Cooking Oil Plant and the surrounding areas.

The document will therefore provide an opportunity for the Zambia Environmental Management Agency (ZEMA) and other stakeholders to confirm the scope of the assessments which form the EIA study approach to be adopted in the process of producing the EIS.

The document has been prepared in line with the requirements of the Environmental Protection and Pollution Control Act (Environmental Impact Assessment) Regulations, 1997 (Statutory Instrument No.28 of 1997), which stipulates issues to be covered in conducting an EIA study and the stages that must be followed. It has also been prepared in line with the requirements of international standards. Site specific conditions have also been taken into account in determining the likely significance of the issues to be covered in the study.

1.1 Proposed Project

Parrogate is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district. This plant which is the subject of these ToRs was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

Parrogate Ginneries Limited intends to expand the plant on Sub C and Sub D of Lot 10208/M, Mumbwa road, Mwembeshi area, Lusaka west. It will ensure environmental sustainability of operations of the plant through preparation of the EIA and therein, an Environmental Management Plan (EMP) as per the Zambian legal requirements.

The total cost of the investment is estimated at **US\$ 90,000.00.**

1.2 Environmental Impact Assessment

PGL proposes to expand the 200MTPD Cooking Oil Processing Plant to 600 MTPD on Sub C and Sub D of Lot 10208/M, Mumbwa road, Mwembeshi area, Lusaka west. PGL is required to conduct an environmental impact assessment in accordance with the Environmental Impact Assessment Regulations, Statutory Instrument No. 28 of 1997.

PGL has since contracted ESEC LTD to conduct the environmental impact study. In accordance with the requirements of the stated regulations, under the first Schedule, scoping of the proposed project should be carried out as part of the EIA process.

1.3 Legal and Administrative Framework

The document has been prepared in line with the requirements of the Zambian Environmental Management Act, 2011 and its subsidiary legislation, the Environmental Impact Assessment Regulations, 1997 (Statutory Instrument No.28 of 1997). It also refers to the Local Government Act, of 2019, the Urban and Regional Planning Act, 2015, the Water Resource Management Act, 201102, the Public Roads Act, 2002 and other applicable legislations and regulations. The administrative framework within which the proposed project will be implemented will include Zambia Environmental Management Agency (ZEMA), the Chilanga Town Council, Ministry of Local Government, Water Resource Management Authority (WARMA) and other regulatory and government agencies.

Management of the plant wishes to operate the facility in conformity with international conventions and internationally recognized standards such as Equator Principles (EP). The EP are based on and implemented in accordance with World Bank Group's International Finance Corporation (IFC) Performance Standards and the IFC Environmental Health and Safety (EHS) Guidelines.

1.4 Purpose of Scoping Exercise

Scoping exercise is the process of identifying the content and extent of the environmental information to be gathered by the Developer and submitted to a competent authority (Zambia Environmental Management Agency) under the EIA process. This is an early stage in the EIA process and is designed to ensure that the environmental impact assessment studies provide all the relevant information on the impacts of the project, the alternatives to the project and any other relevant information on the project. The specific objectives of the scoping exercise are to:

- Plan for stakeholder involvement during the study;
- Explain to interested and affected parties the nature of the proposed project;
- Gather interested and affected parties' input concerning key issues that need be addressed in the EIA study;
- Identify major environmental and social concerns from stakeholders and affected parties;
- Establish priorities for EIA study;
- Prepare a scoping report (this report);
- Select experts to undertake the environmental and social impact assessment studies based on identified types of environmental and social impacts to be investigated.
- Prepare Terms of Reference (ToRs) for the EIA study for the proposed project;

For the proposed Cooking Oil Processing Plant by Solvent Extraction project, a scoping exercise was conducted as an initial stage in the EIA study. Due to Covid-19 Pandemic, a

public opinion survey (Scoping) was held from 7th to 8th April 2022 using one-on-one interviews with Chilanga Town Council, Mwembeshi Secondary School, nearby locals and also the website www.parrogate.com.

This scoping report is therefore a compilation of the outcomes of the stakeholder engagement via interviews and website comments as part of the EIA process for the Cooking Oil Processing Plant. It also includes secondary information gathered through literature review of relevant environmental documentation on the project area.

1.5 Structure of the Scoping Report

This scoping report has been structured as described below:

Section 1 outlines an introduction to the report which also includes the purpose of the scoping exercise.

Section 2 gives a history of the plant, rationale, brief description of the regional setting, the proposed location of the Cooking Oil Processing Plant and land use within the area.

The objectives are presented in **Section 3** while description of existing environment and project activities are presented in **Sections 4 and 5** respectively.

The identification of the environmental impacts **are presented in Section 6** while alternatives and the legislative and administrative framework are presented in **Sections 7 and 8 respectively**.

Sections 9 and 10 respectively present information on public consultation and highlights on the Terms of Reference. The names and brief qualifications of the EIA Study Team are presented in **Section 11**.

Table 16.1: Developer Contact Information

Proponent	Parrogate Ginneries Limited
Contact person	RAKESH YADAV
Designation	Group Technical Head
Mobile number	0971546941
Email	rakeshyadav@parrogate.com.zm
Physical address	Plot No 5001, off Mumbwa RoadChinika Industrial Area , Lusaka

Table 16.2: **Particulars of Directors**

Particulars of Shareholder	Nationality & NRC/Passport No	Country of Origin	Number of Shares held	Percentage Shareholding
PRADEEP GANEDIWAL	PPN. Z4207201 INDIA	INDIA	1.00	0.02
PRADUMAN KUMAR	PPN. Z4987035 INDIA	INDIA	1.00	0.02
	BUSINESS ENTITIES			
Name of Business	Residential & Postal Addresses		Number of Shares held	Percentage Shareholding
CORBEL FINANCE LIMITED	SACKVILLE HOUSE, AAKPELWA ST, LIVINGSTONE		4,998.00	99.96
Total			5,000.00	100 %

2. PROJECT BACKGROUND

2.1 History of the Facility

PARROGATE is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district. This plant which is the subject of these ToRs was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

The proposed facility will include an adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage.

2.2 Key Stakeholders

The major stakeholders identified are:

- Parrogate Gineries Limited staff – the proposed site
- Local communities – these include neighbouring facilities and settlements such as Round house Lodge, Mwembeshi Secondary School, and other surrounding areas for public consultations and raising concerns on this project.
- Chilanga Town Council – mandated to monitor all the projects in the District.
- Zambia Environmental Management Agency – Lusaka reviewing the project and ultimate approval of this Project.
- Lusaka Water Supply and Sanitation Company

2.3 Justification

Motivation/Rationale and Justification for the EIA

The shareholders of PGL have been motivated to expand the Cooking Oil Plant to make profit for themselves by selling finished oil product locally. The increasing demand for cooking oil in Zambia and the availability of raw materials (soybeans) in Zambia has created a conducive business environment.

The proposed expansion will help Zambia meet the demand for finished cooking oil product as well as help reduce importation of edible oils and subsequent reduction of local prices.

2.4 Description of the plant area

The site for the proposed Cooking Oil Processing Plant which covers an area of **12ha** is located off Mumbwa road, within Parrogate Gineries Limited premises, situated in Mwembeshi area of Chilanga district of Lusaka province. Parrogate Gineries Limited is located at Sub C and D of Lot 10208/M. The neighbors are farms, Round house lodge, and Mumbwa Road lies, about 20m.

The following are the coordinates of the plant:

Table 16.3: Proposed Plant site coordinates

PARROGATE GINNERIES LIMITED SITE COORDINATES			
Beacon No.	Description	Longitude E	Latitudes S
A	Corner Point	27° 57' 33" E	15° 21' 02" S
B	Corner Point	27° 57' 22" E	15° 21' 02" S
C	Corner Point	27° 57' 22" E	15° 21' 55" S
D	Corner Point	27° 57' 33" E	15° 21' 55" S
E	Center point	27° 57' 23" E	15° 21' 04" S



The plant is already operational and will expand to include the additional four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage.

There are nine (9) unit operations involved in preparation of soya beans for solvent extraction and these are itemized below;

- Receiving and storing,

- Cleaning
- Drying
- Tempering
- Cracking
- Dehulling
- Conditioning
- Flaking
- Expanding.

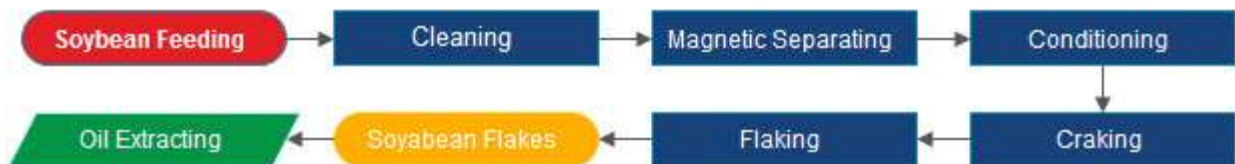


Figure 16-1: Pretreatment Process flow Diagram

PRETREATMENT SECTION

- **Receiving and storing raw soybeans:** When the raw material (palm, sunflower, soya beans, etc) arrive at the plant using private trucks or rail, samples will be taken for moisture content, foreign matter, and damaged seeds. The seeds will then be weighed and carried to silos for storage in readiness for processing.
- **Cleaning or “scalping.”:** The seeds will then be removed from storage and cleaned. Cleaning involves removal of foreign particles by screening and loose hulls by aspiration. Large-size and small-size impurities in seeds will be removed by Vibrating Screen. The seeds will then be uniformly distributed on the surface of Vibrating Screen, then light impurities removed with function of aspiration channel. The Vibrating Screen is stable in performance, large in working capacity, and low in noise.



Figure 16-2: Oilseed Cleaning equipment

- **Gravity De-stoning:** Heavy impurities such as stone, glass, metal will be removed from the flowing seeds. It is negative pressure vessel, which will not only remove impurities, but ensure clean environment.



Figure 16-3: Gravity de-stoner machine

- **Drying:** The seeds will be dried to reduce the moisture content to 10% (percent) by weight.
- **Tempering:** After drying, the seed will be tempered for 2 to 3 days to allow the moisture to equilibrate and the hulls to loosen. Soybeans are generally cleaned again after drying using magnets, screens, and aspirators.
 - ✓ **Magnetic Separation:** for separating out metallic impurities. Complete with buffer seed feeder.



Figure 16-4: Magnetic separator

- ✓ **Dust Separation:** By Cyclone and Centrifugal Fan. In this way, light impurities are separated and the workshop is clean.
- **Cracking:** During the process of cracking, seeds are passed through a series of corrugated rolls that are generally about 10 inches in diameter and 42 inches long. The purpose of cracking is to break the seeds into pieces suitable to dehulling and flaking. Usually each bean is broken into four to six pieces. Cracking should produce a minimum of fines. The soybean is cracked (crushing machine) into 4-8 parts for downstream hull-kernel separation and flaking. Max. powder ratio: 4%. The Toothed Cracking Roller is large in working capacity and stable in performance. Space between the tooth rollers can be adjusted easily. There is no material when the Cracking Roller is stopped.



Figure 16-5: Example of crushing machine

- **Dehulling:** The purpose of dehulling is to produce high protein meal for animal feed or flour for human consumption. Soybeans are not dehulled for oil extraction. Dehulling decreases the volume that passes through the extractor, thus increasing throughput. Beans are dehulled by screening and aspiration. The removed hulls may

be combined with hulls from the earlier cleaning steps and used in animal feed.

- **Conditioning:** Cracked soybeans, with or without hulls, are then transported to conditioners. Conditioners are vertical stack cookers or rotary horizontal cookers where the soybeans are heated and moistened to make them pliable enough to ensure proper flaking. The conditioner has two functions: drying and softening. The Conditioner is made up of feeding, heating, drying and discharging sections and discharging funnel. Feed the conditioner at the top, subsequently soybean is distributed uniformly to reduce scouring to the heating tube. Typically, soybean-out temperature: 60, moisture content in soybean: 10%. The Conditioner should ensure the soybean flow without interruption, and the soybean is conditioned uniformly with least energy consumption. In addition, try to extend the serviceable time of Conditioner.
- **Flaking:** Conditioned soybeans are fed through large, smooth-surfaced rollers and emerge as flakes ranging in thickness from 0.2 mm to 0.5 mm. The flaking machine is designed to turn the oil materials into flakes, by means of mechanical extruding force. Flaking process is essential in oil mill plant, since it can effectively improve the oil yield of oil mill machinery through increasing material superficial area.

This newly developed flaker machine is featured of compact structure, easy operation, reliable and safe working performance. Since the design is based on different oilseed properties, this flaking machine can process different oilseeds including soybeans.



Figure 16-6: Example of flaking machine

- **Expanding:** The expanders mix flaked soybeans with water and steam and press them into pellets called “collets.” Collets are denser and more porous than flakes. They allow more oil to be extracted from the soybeans and increase the throughput of the extractor. Collets also allow the solvent to drain more freely, decreasing the energy needed for desolventizing.

SOYBEAN OIL EXTRACTION SECTION

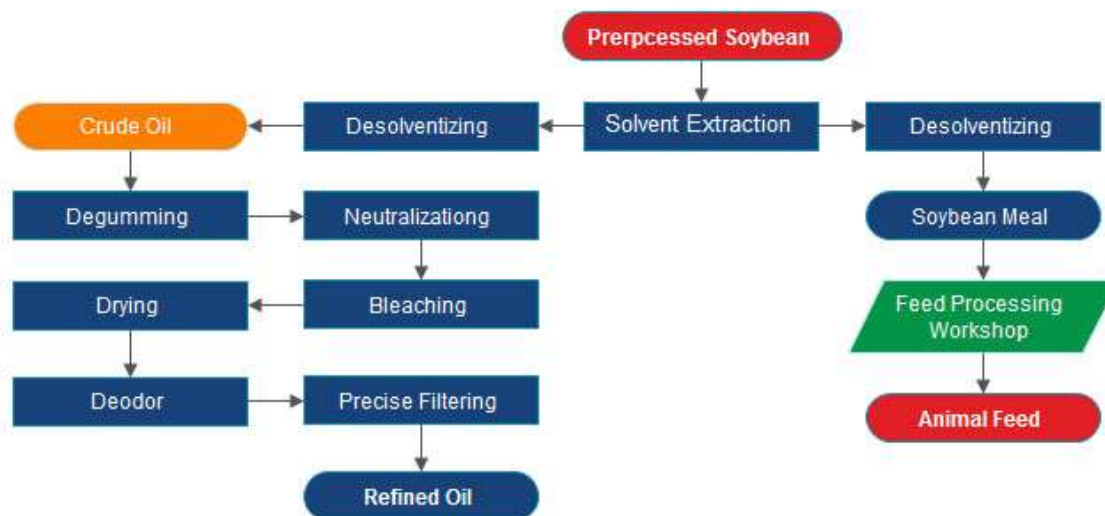


Figure 16-7: Oil Extraction and Refining Process Flow Chart

- Oil Extraction:** The flaked soybean is conveyed to Rotary Extractor and kept for a certain level. Spray the flaked soybean with solvent (hexane). The flaked soybean moves forward with the action of driving device. In this case, the flaked soybean is sprayed and immersed, thus oil in soybean is separated out. Mixture of oil and solvent is called “Miscella”. When the Miscella has been filtered, it will flow to the Miscella cell. Pump the Miscella of high concentration into the Miscella Tank and then to the evaporation and oil stripping system. Miscella of low concentration is sprayed again. After approx. 1 hour, the oil is extracted out. Then the cake slag (here called as “meal”) is pushed to the wet meal (there is solvent in the meal, so it is called “wet meal”) outlet of extractor. Recover solvent in wet meal by Desolventizer (DTDC). Constant material level works for sealing and stabilizing material flow. The transmission bearing is set outside to prevent against mechanical trouble caused by solvent corrosion. Meal in Miscella is removed by Liquid Cyclones.
- Wet Meal Desolventizing System:** The Desolventizer is made up of 5 layers. The 1st layer are designed for pre-heating wet meal to reduce moisture condensing and are designed for steam penetration. Mixture of steam and solvent vapor will pass through wet meal, which will not only make heat exchange but also remove some solvent in the wet meal. The 2nd and 3rd layers are for desolventizing by direct steam. Fresh steam (let in) removes solvent in wet meal completely. Toast the meal in the 4th layer, since there is steam condensate in the direct steam, which will increase moisture content in meal. Blow in cold air in the 5th layer to low meal temperature (The temperature of meal would be 8 -10 higher than ambient temperature). Hot air used in Desolventizer is supplied by Hot Air Heater. Remove the meal in the solvent vapor with Vapor Wash Cyclone, this will reduce meal entering into solvent vapor condensing system.
- Miscella Evaporation:** Miscella is temporarily stored in Miscella Tank and then pumped to the 1st-Stage Evaporator. Heat source of 1st-Stage Evaporator is the

secondary steam coming from Desolventizer. So energy is significantly saved. Miscella from 1st-Stage Evaporator makes heat exchange with crude oil from Oil Stripper. Thus temperature of Miscella entering into 2nd-Stage Evaporator is increased and temperature of crude oil is lowered. The Miscella is then pumped to the 2nd-Stage Evaporator. Heat source of 2nd-Stage Evaporator is indirect steam. Subsequently the Miscella is pumped to the Oil Stripper.

- **Solvent Condensing System:** Solvent condensing system is closely connected with evaporation system. All solvent vapor from Extractor, un-condensed vent gas, free gas from Combined Solvent-water Separator, free gas from Underground Solvent Tanks and free gas from Miscella Tank finally enters into the Vent Condenser, where the gas is cooled by low temperature water and thus most of the solvent gas is recovered. Vent gas is let out of the workshop by Fan. Waste water condensed from direct steam is discharged from Solvent-water Separator. If there is still some solvent in the waste water, boil the waste water to meet requirements in stipulated in National Standard.
- **Boiler Operations:** The plant will be run using two coal - fired boilers. Boiler 1 will be of a capacity of 15 Tons and Boiler 2 will be 20 Tons. The coal peas will come from Maamba Collieries and Wange coal Mines who will be the major suppliers of coal for the plant. The plant usage capacity of coal is estimated at 460 Tons per month. The water product from the Boiler is Coal ash and soot. Coal will be disposed of by being used in road constructions and Making blocks. Monthly stack emissions will be conducted to ensure that the emissions are within ZEMA guidelines and returns will then be sent to ZEMA every after 6 month.
- **Water Treatment Plant:** The proposed plant will get its operation water from a borehole. This water will go through the water treatment process called reverse osmosis where all the impurities will be removed before the water can be used in the processing unit plant operations and the boilers.

2.5 Relevant policy, legislative and planning framework

This document has been prepared in line with the requirements of the Zambian Environmental Management Act, 2011 and its subsidiary legislation, the Environmental Impact Assessment Regulations, 1997 (Statutory Instrument No.28 of 1997). It also refers to the Local Government Act, of 2019, the Urban and Regional Planning Act, 2015, the Water Resource Management Act, 2011, the Public Roads Act, 2002 and other applicable legislations and regulations. The administrative framework within which the proposed project will be implemented will include Zambia Environmental Management Agency (ZEMA), the Chilanga Town Council, Ministry of Housing and Infrastructure Development, Water Resource Management Authority (WARMA) and other regulatory and government agencies.

The plant operations will also conform to international conventions and internationally recognized standards such as Equator Principles (EP). The EP are based on and implemented in accordance with World Bank Group's International Finance Corporation (IFC) Performance Standards and the IFC Environmental Health and Safety (EHS)

Guidelines.

This facility will be operated within the provisions of the guidelines as follows:

- The Environmental Management Act No. 12 of 2011
 - Statutory Instrument No. 112 of 2013; Part II on Air and Water pollution (Licensing) Regulations
 - Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 part III
 - Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part II
 - Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part IV
- The Factory Act No. 2 of 1966
- Urban and Regional Planning Act, 2015 PART III section 17
- The occupation health and safety act of 2010 PART IV Section 16
- Public Health Act Cap 295 of 1978 Part V Section 31
- The Local Government Act No. 2 of 2019 Introductory Part
- The Fisheries Act No. 22 of 2011
- The Water Resources Management act No. 21 of 2011 Section 6
- The National HIV/AIDS/STI/TB Act of 2002 Section 4
- The National Heritage and Conservation Act (Cap.173 of 1989) Section 8
- The Employment Code Act No. 3 2019 Introductory Part
- Workers Compensation Act No. 10 of 1999 Section 6
- The Road Traffic Act Cap 464 Section 196
- The Lands Act (Cap. 184 of 1995) Section 8
- The Forest Act No.4 of 2015 (The Forests Community Forest Management Regulations, SI No. 11 OF 2018)

2.6 National legislative framework

2.6.1 Environmental Management Act (EMA), 2011

The Zambian Environmental Management Act (EMA), 2011 is the superior Act on matters relating to environmental protection and management. Its superiority is outlined in Section 3 of the Act. The Act sets out a framework for Environmental Impact Assessments (EIA's) as well as renaming the Environmental Council of Zambia (ECZ) as the Zambia Environmental Management Agency (ZEMA), a regulatory Agency mandated to do all such things as are necessary to ensure the sustainable management of natural resources and the protection of the environment, and the prevention and control of pollution.

The Act outlines principles governing environmental management and provides for, among other things, Environmental Impact Assessment and regulations relating to environmental assessments. The Act has also spelt out offences relating to failure to prepare and submit an EIA report for projects that require such reports. Projects that require preparation of EIA reports must be approved by ZEMA prior to implementation. Section 29 of the Act specifically states that “a person shall not undertake any project that may have an effect on the environment without the written approval of the Agency, and except in accordance with any conditions imposed in that approval”.

This Scoping Report was prepared in accordance with the legal framework on Environmental Management enshrined in the Environmental Management Act No. 12 of 2011 of the Laws of Zambia and its subsidiary legislation, the Environmental Impact Assessment Regulations S.I. No. 28 of 1997. Section 3 (1) of the EIA Regulations states that, “a developer shall not implement a project for which a project brief or environmental impact statement is required under these Regulations, unless the project brief or the environmental impact statement has been concluded in accordance with these regulations and the Zambia Environmental Management Agency has issued a decision letter.”

In accordance with the Zambian Environmental Laws, the dam falls under the Second Schedule; regulation 7 (1) of the Environmental Impact Assessment regulations, statutory instrument No. 28 of 1997 and listed under the category of “(1) **Urban development**. The Proposed Cooking Oil Processing Plant has potential adverse environmental impacts that are generally site-specific, and could be readily addressed through mitigation measures. Accordingly, the Zambia Environmental Management Agency (ZEMA) is mandated to evaluate and assess the EIA report and decide whether to approve or disapprove the proposed project.

The National Environmental Policy of Zambia recognizes the need for any socio-economic development to be undertaken in such a manner that avoids environmental degradation. Provides environment and natural resources management policies to address current and future threats to environment and to human livelihoods and provides policy guidelines for sustainable development.

Compliance: The expansion of the plant will be implemented in accordance with the provisions of the Act and applicable environmental regulations.

Applicable Regulations under the Environmental Management Act No. 12 of 2011 are described below.

- **Environmental Protection and Pollution Control (Environmental Impact Assessment) Regulations, SI No. 28 of 1997.** These Regulations provides the main framework under which EIAs are conducted, submitted to ZEMA and considered for either approval or rejection. These regulations are relevant as a guide to Developer as to what is supposed to be done at every stage of the EIA process. The requirements of conducting an EIA are all stipulated under these regulations and the developer shall ensure compliance at every stage. The EIA regulations give guidelines as to how much review fee will be paid to ZEMA for the purpose of reviewing the EIS for the proposed project and that development shall not be undertaken by a developer without an approval letter from ZEMA.
- **Statutory Instrument No.112 of 2013 – Environmental Management (Licensing) Regulations.** These Regulations provide standards and guidelines for mitigating air, waste water, hazardous waste, pesticides and toxic substances and ozone depleting substances. The Developer will adhere to the provisions of the regulations.

The provisions of the Environmental Management Act will be adhered to by Developers and is currently being used for the preparation of the Terms of Reference and the follow up EIA for the coal mining project.

2.6.2 National Heritage Conservation Act, 1989

The National Heritage and Conservation Commission is the administrative body for the enforcement of the National Heritage Conservation Act. The Act provides for the establishment of the National Heritage Commission responsible for the conservation, restoration, rehabilitation, reconstruction, adaptive use and good management of ancient, cultural and natural heritage of aesthetic, historical and archaeological nature. The Act aims at preserving local culture and sites, monuments and shrines that have national significance.

Relevance/Compliance: There will be no clearing of vegetation or land; nevertheless national heritage will be conserved if discovered and the commission informed.

2.6.3 The Land Act, 1995

The Lands Department in the Ministry of Lands, Natural Resources and Environmental Protection is the government agency that enforces the provisions of the Land Act. The Act provides for holding of land into categories that include state, local authority and traditional land.

The land considered for this project is vested in state ownership.

Relevance: The Act is relevant because all land in Zambia is vested in the state and the project site falls within state land.

Compliance there of: Developers will utilize the land in accordance with the intended purpose and provisions of this Act. The developer has so far complied with this act and it will strive to comply with any provisions under this act.

2.6.4 The Local Government Act No.4 2019

The Ministry of Local Government is the administrative body for the enforcement of the Local Government Act. The Act provides for the establishment of local councils and districts, and specifies the functions of local government some of which relates to environmental protection and natural resources management functions. These include preventing pollution of water supplies, among others.

Relevance: The proponent shall abide by the By-Laws established by the Local Authorities (Chilanga Town Council).

Compliance there of: Acquisition of Local Authority permits and compliance with other environmental regulations shall be as stipulated therein.

2.6.5 Forest Act, 2015 & S.I. No 11 of 2018

The Forestry Department under the Ministry of Lands, Natural Resources and Environmental Protection is the administrative body mandated to enforce the provisions of the Act. The Act provides for the establishment and management of National Forests and Local Forests and makes provision for the conservation and protection of forests and trees; and provide for the licensing and sale of forest produce.

Relevance: The area under consideration is already cleared, thus this Act is vital in ensuring

protection of the trees in the project area.

Compliance there of: The Developers will endeavor to act within the provisions of this law.

2.6.6 Public Health Act, 1995

This Act relates mainly to the control and notification of infectious diseases. Parts of the Act (Part IX) relate to sanitation and housing. It places an obligation on all individuals and on property owners not to allow nuisance situations which could lead to the spread of infectious diseases. The Act is enforced by the Ministry of Local Government.

Relevance: - The activities to be undertaken will entail public interaction through workers and other visitors to the project area. This will require adequate public health facilities and conditions.

Compliance there of: The Proponent shall comply with the provisions of the Act in order to safeguard human life.

2.6.7 The Public Health Act (Infected Areas) (Coronavirus Disease 2019) Regulations, S.I 21 of 2020

The Act provides for the prevention and suppression of the spread of the Corona virus disease, also known as Covid-19. It regulates all matters and activities that are connected to outbreak of diseases. Provisions of the Act are enforced/ implemented by authorized qualified officers through inspections.

Relevance: - The project site will be required to adhere to all set guidelines and Covid-19 regulations and therefore the Act is relevant.

Compliance: All plant workers and contractors will adhere to all the Covid-19 guidelines and regulations as set by the Government of Zambia

2.6.8 Public Health Act (Corona Virus) Infectious Diseases S.I No. 21 of 2020

The Act declares the Coronavirus Disease 2019 a notifiable infectious disease under section 9 of the Public Health Act, which mandates people to notify relevant authorities whenever a person is suffering from such a disease.

Relevance:- The project site will be required to set up and conduct preliminary tests to detect presence of coronavirus disease among workers.

Compliance: All plant workers and contractors are mandated to notify relevant authorities whenever a person is suffering from such a disease

2.6.9 Water Resources Management Act, 2011

The Act provides for the establishment of the Water Resources Management Authority and defines its functions and powers. It provides for the management, development, conservation, protection and preservation of the water resources and its ecosystems. It also

provides for equitable, reasonable and sustainable utilization of water resources, among other provisions. The Act specifies activities where permits are required. The administrative body for the enforcement of the Act is the Water Resources Management Authority.

Activities under these purposes may include but not limited to the following;

- i. **Use water for purposes specified under section sixty, other than for domestic purposes specified under section seventy of the Water Resource Management Act No. 21 of 2011;**
- ii. Construct, acquire any water works, impound, supply or distribute water from any water or borehole to any other person;
- iii. Drain any swamp, marsh, dambo, wetland, re-charge area or other land;
- iv. Construct or acquire any water works for the purpose of draining into, conserving or utilizing, in any manner whatsoever, water from a water resource;
- v. Construct water works necessary to restore the course of a water resource that has changed its course;
- vi. Harvest of any rainwater by means of a dam, weir or barrage that is on a water resource;
- vii. Conduct any operation that would interfere with the bank or course of a watercourse;
- viii. Sink, deepen or alter any borehole for any purpose in a water shortage area; or
- ix. Carry any activity in relation to a water resource as may be prescribed.

Relevance/Compliance: The relevance of this act is that it will regulate how Developers will utilize the surface water resources, protect both surface and ground water from contamination within the project site. The developer will extensively consult with the Water Resources Management Authority (WARMA) to make sure all the requirements are met for purposes of water permit and the protection of the water resource in the project area.

2.6.10 The Employment Code Act, No. 3 of 2019

An Act to regulate the employment of persons; prohibit discrimination at an undertaking; constitute the Skills and Labour Advisory Committees and provide for their functions; provide for the engagement of persons on contracts of employment and provide for the form and enforcement of the contracts of employment; provide for employment entitlements and other benefits; provide for the protection of wages of employees; provide for the registration of employment agencies; regulate the employment of children and young persons; provide for the welfare of employees at an undertaking; provide for employment policies, procedures and codes in an undertaking; repeal and replace the Employment Act, 1965, the Employment (Special Provisions) Act, 1966, the Employment of Young Persons and Children Act, 1933 and the Minimum Wages and Conditions of Employment Act, 1982; and provide for matters connected with, or incidental to, the foregoing.

Cited Section: Introduction and Title.

Relevance/Compliance: Developers will comply with this act by employing the required

age, establishing contracts, conditions of service, and settling disputes in accordance with this act. The relevance of this Act to the project will serve as guide to equal and formidable employment conditions.

2.6.11 Public Roads Act, 2002 (amended in 2006)

The Act establishes the Roads Development Agency (RDA), which is responsible for the care, maintenance and construction of public roads in Zambia. The Agency is the administrative body for the enforcement of the Act.

Relevance: The proposed expansion site involves construction near the public road (Mumbwa Road).

Compliance: Developers will comply with this act by getting approvals from RDA especially if re-designing egress and ingress.

2.6.12 The National Council for Construction Act No 10 of 2020

An Act to provide for the establishment of the National Council for Construction and to define its functions; to provide for the promotion and development of the construction industry in Zambia; to provide for the registration of contractors; to provide for the affiliation to the Council of professional bodies or organizations whose members are engaged in activities related to the construction industry; to provide for the regulation of the construction industry; to provide for the establishment of the Construction School; to provide for the training of persons engaged in construction or in activities related to construction; and to provide for matters connected with or incidental to the fore-going.

Relevance/Compliance: expansion and operation activities of the Cooking Oil Plant shall be done in compliance with this Act. Developers will engage those who are registered with national council for construction with the right grade to carry out the works. Further, Developers will establish Health and Safety Committees at various levels during the Construction phase. The committee will focus on the improvement of safety and welfare of employees.

2.6.13 Electricity Act No.11 of 2019

The Act seeks to regulate the generation, transmission, distribution and supply of electricity and to provide for matters connected with or incidental to the foregoing. The act states that any person, who, without legal right, cuts, injures or interferes with any apparatus for generating, transmitting or distributing or supply electricity, or maliciously extinguishes or damages any lamp or other electric apparatus provided for the convenience of the public, shall be guilty of any offence.

Relevance/Compliance: The Oil Processing Facility SHALL BE connected to a ZESCO power line; hence the Developer shall always carry out the work in accordance with this Act.

2.6.14 Road Traffic Act, 2002

The Act establishes the Road Transport and Safety Agency (RTSA) and defines its functions; it provides for a system of road safety and traffic management; licensing of drivers and motor vehicles; registration of motor vehicles and trailers; compulsory third party insurance of motor vehicles; licensing and control of public service vehicles; promotion of road safety; regulation of road transport between Zambia and other countries with which Zambia has concluded cross-border road transport agreements. It also provides for implementation of the SADC Protocol on Transport, Communications, and Meteorology among other provisions. RTSA is the administrative body for the enforcement of the Act.

Relevance: Developers will use different vehicles on the roads (Mumbwa Road) during the expansion, operation and demolition. Thus, the company will ensure the use of the road in accordance with these regulations.

Compliance: Developers continue to adhere to the Road Traffic Act with regard to the haulage of construction materials and equipment.

2.6.15 Occupational Health and Safety Act, 2010

This Act provides for the establishment of the Occupational Health and Safety Institute and for its functions. It provides for the establishment of health and safety committees at workplaces and for the health, safety, and welfare of persons at work. It further provides for, among other provisions, the protection of persons, other than persons at work, against risks to health or safety arising from, or in connection with, the activities of persons at work.

2.6.16 The Zambia Wildlife Act No. 14 of 2015

An Act to provide for the winding up of the affairs of the Zambia Wildlife Authority; establish the **Department of National Parks and Wildlife** in the Ministry responsible for tourism; provide for the appointment of a Director and other officers responsible for National Parks and Wildlife;

Provide for the transfer of the functions of the Authority to the Ministry responsible for tourism, Department of National Parks and Wildlife and Director of National Parks and Wildlife; establish the Wildlife Management Licensing Committee; provide for the establishment, control and management of National Parks, bird and wildlife sanctuaries and for the conservation and enhancement of wildlife eco-systems, biological diversity and objects of aesthetic, pre-historic, historical, geological, archaeological and scientific interest in National Parks; provide for the promotion of opportunities for the equitable and sustainable use of the special qualities of public wildlife estates; provide for the establishment, control and co-management of Community Partnership Parks for the conservation and restoration of ecological structures for non-consumptive forms of recreation and environmental education; provide for the sustainable use of wildlife and the effective management of the wildlife habitat in Game Management Areas; enhance the benefits of Game Management Areas to local communities and wildlife; involve local communities in the management of Game Management Areas; provide for the development and implementation of management plans; provide for the regulation of game ranching; provide for the licensing of hunting and control of the processing, sale, import and export of wild animals and trophies; provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Convention on Wetlands of International Importance especially as Waterfowl Habitat, the Convention on Biological Diversity, the Lusaka Agreement on Cooperative Enforcement Operations

Directed at Illegal Trade in Wild Fauna and Flora and other international instruments to which Zambia is party; repeal the Zambia Wildlife Act, 1998; and provide for matters connected with, or incidental to, the foregoing.

Relevance: The Proposed site does not fall in a Game Management Area. The site is within the existing private area with years of anthropogenic activities in terms of land development and farming. However, the Act is relevant in that the area may be a habitat to animal species which may or may not be endangered.

Compliance there of: Developers will follow the requirements of this Act in order to conserve the animal and bird life within the vicinity of the proposed site.

2.6.17 The Fisheries Act, No. 22 of 2011

The Act provides for the appointment of the Director of Fisheries and fisheries officers and provides for their powers and functions. It promotes sustainable development of fisheries and a precautionary approach in fisheries management, conservation, utilization and development. It establishes fisheries management areas and fisheries management committees and provides for the regulation of commercial fishing and aquaculture. It establishes the Fisheries and Aquaculture Development Fund. It has replaced the Fisheries Act of 1974.

The implementing institution for this Act is the Ministry of Fisheries and Livestock. The Act regulates all fishing activities in Zambia undertaken in any kind of aquatic ecosystem. This includes lakes, rivers and streams. It also regulates activities that may interfere with fisheries.

Relevance/Compliance: The project area has no streams. Boreholes have been drilled as the main source of the water that will be used for construction and operation activities. Management of the groundwater if not properly handled may result in contamination or depletion of it. Developers will follow the guidelines in this Act to avoid the contamination of the stream which may result in adverse impacts on aquatic species.

2.6.18 The Petroleum Act Cap 439 and the Energy Regulation Act Cap 436

The Petroleum Act provides for control of conveyance and storage of petroleum products such as kerosene, diesel and petrol. The Act provides further provides for control measures regarding production, transportation, handling, distribution, re-sale and use of energy.

The Energy Regulation Act of 1995 makes provision with respect to the production and distribution of energy in Zambia and establishment of the Energy Regulation Board (ERB) for purposes of control and licensing of energy undertakings. In accordance with this Act, ERB shall, in conjunction with other Government agencies, formulate measures to minimize the environmental impacts of transportation, storage and use of fuels and enforce such measures by attachment of appropriate conditions to licences held by such undertakings.

Relevance/Compliance: The developer will handle all petroleum related products on proposed site in accordance with the Act. The developer will also follow the requirements of this act when transporting, storing and using petroleum products during the construction and operation phases of the project.

2.7 Institutional Framework.

2.7.1 Ministry of Local Government

The Ministry of Local Government is responsible for the development of policy on environment covering issues such as solid waste management and landfill site. The ministry is also responsible for co-coordinating and monitoring the other ministries that play a role in the effective conservation and management of the environment.

Relevance: The proposed project has the potential to generate and hold solid waste (domestic)

Compliance there of: The Developer shall obtain all necessary documentation with respect to solid waste management from Chilanga Town Council.

2.7.2 Zambia Environmental Management Agency

The Zambia Environmental Management Agency (ZEMA) is a statutory body created by an act of parliament and falls under the Ministry of Green Economy and Environment (MGEE). The ZEMA is responsible for the enforcement of the Environmental management in Zambia, pollution control, natural resources management and solid waste management which includes establishment of the landfill sites.

Relevance: Due to size and nature, the proposed site, falls under a category requiring the preparation of an Environmental Impact Assessment.

Compliance there of: This Scoping report is being prepared in compliance with the above legal provisions. The Developer shall in accordance with this Act engage a solid waste management company, avoid air pollution and unnecessary cut of trees in order to protect and conserve the environment.

2.7.3 Local Authorities

Chilanga Town Council

Councils are established under the Local Government Act. The functions of a District Council include town planning and pollution control. Local Authorities are concerned with the health of local community members and the conservation of natural resources within the confines of their administrative influence. The Local authorities are also responsible for enforcement of the provisions of the Local Government Act and the public Health Act.

Relevance: The proposed Cooking Oil Processing Plant is situated in Chilanga District of Lusaka Province of Zambia. The Council already knows about the project and developers have been working closely with the council. The CTC is also relevant in that the project under review will employ people. The health of the local community, the public, and the environment are of concern.

Compliance: Developers will continue to work closely with the local authority and seek approval for any works such as buildings and others. The developer shall conserve and protect the environment. It shall avoid unnecessary noise, air and water pollution. To avoid noise and air pollution the developer shall be working during daytime and will be watering the ground to suppress dust.

Table 16.4: Summary of Institutional framework and roles

INSTITUTION	ROLE
Zambia Environmental Management Agency (ZEMA)	ZEMA is the regulatory body responsible for enforcing the National Environmental Law in the Zambia - the Environmental Management Act No. 12 of 2011. ZEMA controls the laws related to the proposed project such as environmental protection, pollution control, natural resources conservation and waste management.
Ministry of Green Economy and Environment (MGEE)	The MGEE is responsible for the protection of natural resources pollution control and administration of land in the country. Through ZEMA, It will also be a major player in approving the project. The departments under the ministry that will be directly concerned with the project activities include the Forest department (FD), Department of National Parks and Wildlife (DNPW-ZAWA) and the National Heritage Conservation.
Ministry of Water Development and Sanitation (MWDS)	The Ministry through the Water Resources Management Authority (WARMA) will regulate and control the use of water for the project activities as it has the sole responsibility of managing water resources in the country through issuance of water permits.

2.8 International Convention and Agreements

This subsection summarises some of the international conventions and agreements to which the Zambian Government is a party and which are applicable to the project. The agreements and protocols impose obligations on Zambia to address issues or topics included in these documents.

2.8.1 Convention on Biological Diversity (ratified in 1993)

This convention requires Parties to it to prepare national biodiversity action plans. Zambia has already in place a National Biodiversity Action Plan whose objectives include, ensuring the conservation of a full range of Zambia's natural ecosystems through a network of protected areas, development and implementation of strategies for conservation of

biodiversity, sustainable use and management of biological resources.

Biological resources of significant conservation value that will be identified during Project implementation will be conserved and protected.

2.8.2 Convention Concerning the Protection of World Heritage (1972)

The Convention aims at ensuring the identification, protection, conservation, presentation, and transmission to future generations of the cultural and natural heritage.

Cultural and natural heritage sites that may be identified during implementation of the proposed Project will be protected and conserved in accordance with the provisions of the Convention to which Zambia is party to.

Ramser Convention: - The general objective of the Ramser Convention is to curtail the loss of wetlands and to promote wise use of all wetlands. The convention addresses one of the most important issues in Southern Africa, namely the conservation of water supplies and use of the natural and the human environments in an intergenerational equitable manner.

African Convention on the Conservation of Nature and Natural Resources (Algiers,1968), (Maputo, 2003): - The objective of the convention is to encourage individual and joint actions for the conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind. This must be done from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.

Kyoto Protocol to the United Nations Framework Convention on Climate Change: - The aim is to further reduce greenhouse gases by enhancing the national programs of developed countries aimed at this goal and by establishing percentage reduction targets for the developed countries.

Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and their Disposal: - The objective is to control import and export of hazardous wastes. It also aims at ensuring that any trans-boundary movement and disposal of hazardous waste, when allowed, is strictly controlled and takes place in an environmentally sound and responsible manner.

The United Nations Framework Convention on Climate Change (UNFCCC):- It was signed by Zambia in 1992. The main objective is to achieve stabilization of greenhouse gas concentrations in the atmosphere. Zambia recognizes that the largest source of one of the main greenhouse gases, carbon dioxide, is from burning wood fuel and the use of coal and oil. Developers will take all precautions to make sure that the contributions to greenhouse gases from the farming and animal husbandry operations are minimal. The closure phase will involve re-forestation and site remediation.

2.9 Identification of associated neighbouring processing plants

The Cooking Oil Processing Plant is near other similar Plants such Kalomo Grain Marketing Limited (Supreme Oil Zambia) in Manda Hill of proposed site, Mount Meru Millers Zambia Limited and other small scale oil processing companies dotted around Lusaka. Therefore there could be possibilities of these facilities competing for the same customers for the final

product. This will be assessed and documented in the EIS.

2.10 Products and by- products

Materials to Be Used

Soya, Hexane and water are the major raw materials for the project. Coal will also be used during the production cycle. During construction, steel roofing sheet and normal concrete, cement and blocks will be used with wall finishes done using paint

Products

The following are the products of the oil mill plant.

- Soya meal
- Soya oil

Below are the by-products from the crush plant (bean sifter)

- Trash
- Sticks
- dust

By-products and Wastes

Other wastes from the production line include:

- **Non-hazardous Solid waste:** include material such as scrap timber and various off cuts and refuse such as discarded packaging (e.g. soya bags), garbage and domestic waste from workers canteen etc.
- **Hazardous waste:** hazardous waste results from operation activities; this comprise mainly used oil / lubricants. **Runoff:** Storm water from the site
- **Dust:** Dust generated on site due to movement of vehicles.
- **Exhaust emissions:** from operation of vehicles on site.
- **Gas Emissions:** Gas emitted from the production line.

Table 16.5: Sources of solid waste and disposal

Waste	Source	Disposal
Glass	Broken panes during maintenance works	Disposal – Municipal dumpsite if broken.
Ferrous	Off cuts during maintenance works	Recycled – taken to a licensed scrap dealers.
Concrete	Rubble	Reused – backfill during construction
Packaging	Empty cement bags, fittings, plastics, paper and cardboard	Disposal – Municipal dumpsite Recycling companies like Flex waste.

Plant material	Maintenance works	Reused – Composted Disposal – Municipal dumpsite
Domestic waste	From residents during Operation	Reused – Reuse and composting Disposal – Municipal dumpsite

2.11 Resources for project operation

The total investment cost of the proposed expansion of cooking oil plant is **US\$90,000.00**. Skilled and unskilled human resource are sourced locally and Zambia at large.

2.12 Brief history of the Project including options considered

PARROGATE is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district. This plant which is the subject of these ToRs was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

The proposed facility will include an adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage.

3. OBJECTIVES

3.1 Main Objective

The objective of the project is to expand the existing Cooking Oil Processing Plant from 200 MT/Day to 600 MT/Day on **Sub C and Sub D of Lot 10208/M**, located along Mumbwa road, Mwembeshi area, Lusaka west in Chilanga District.

3.2 Specific Objectives

The purpose and objectives of this document are;

1. To upgrade a 200MTPD Soybean crushing and solvent extraction plant and a 600MTPD Refinery Plant
2. To comply with internationally accepted best practices in environmental management.
3. To comply with legal requirement in the EIA Regulations for submitting a Scoping Report for approval before proceeding with other stages of the EIA process.
4. To provide the initial information about the Cooking Oil Processing Plant project in order for a legal opinion to be made regarding the EIA process.
5. To set out the extent (scope) and key elements of the EIA study.
6. To place limits on the information that must be collected, thereby optimizing the use of resources during the study.
7. To provide names and skills of the EIA team for regulatory approval.
8. To facilitate efficient utilization of the time, money and expert knowledge on issues of environmental significance to the project.
9. To guide the EIA report in order to avoid presenting irrelevant information that may cause the report not to be a working document.
10. To facilitate early consultation with the Zambia Environmental Management Agency (ZEMA) and other Interested and Affected Parties (IAPs).
11. To facilitate effective planning and smooth implementation of the EIA process by the consulting team.
12. To eliminate chances of disagreement in terms of the EIA process and the detail of information and consultations required to complete the process.

4. EXISTING ENVIRONMENTAL CONDITIONS

This section describes briefly the environmental and social conditions of the project area. It gives highlights on climate, rainfall, wind, hydrology, geology, air quality, soils, land use / land tenure, flora and fauna, archaeology and cultural heritage, traffic volume, noise and socio-economics.

Chilanga district is 5,252 Km² in size. According to the 2010 Population and Housing Preliminary Report, the district had a projected population of 127,604 people in 2018 - a population density of 24 people per square kilometre. By 2020, the population was expected to reach 157,290 people with 79,135 males and 78,155 females.

4.1 Location

The plant is located off Mumbwa road, within Parrogate Ginneries Limited premises, situated in Mwembeshi area of Chilanga district of Lusaka province. Chilanga District is located between Shibuyunji district (in the west), Kafue district (in the south), Lusaka district (in the east) of Lusaka Province and Central Province in its northern boundary .

Parrogate Ginneries Limited is located at Sub C and D of Lot 10208/M. The facility lies at 27° 57'24.3" E and 15° 20'58.1" S, 30km from the Lusaka business District Centre and 20m from Mumbwa road. Some of the notable structures in the area are Mwembeshi maximum correctional facility in the northern direction, Mwembeshi Boarding Secondary School and Round house lodge on the southern side. The area is surrounded by farms on the eastern and part of the southern side and Mumbwa road lies on the western side.

The following are the coordinates of the Plant site:

Table 16.6: Proposed Cooking Oil Processing Plant Site Coordinates

PARROGATE GINNERIES LIMITED SITE COORDINATES			
Beacon No.	Description	LongitudeE	Latitudes S
A	Corner Point	27° 57' 33" E	15° 21' 02" S
B	Corner Point	27° 57' 22" E	15° 21' 02" S
C	Corner Point	27° 57' 22" E	15° 21' 55" S
D	Corner Point	27° 57' 33" E	15° 21' 55" S
E	Center point	27° 57' 23" E	15° 21' 04" S



Figure 16-8: Location Map of the Proposed Cooking Oil Processing Plant

4.2 Climate

The climate in the area around the facility is tropical characterized by three distinct seasons in the year: During the rainy season, extending from early November to April, maximum temperatures may vary from about 24°C to 29°C. The Annual minimum temperatures range between 11°C and 15°C. The range between daily maximum and minimum temperatures is about 7°C.

The temperature variations in the area of Chilanga are considerable between the cold and hot seasons the average minimum temperature is 10°C with a max of 35°C. The highest temperatures are recorded in October and the 30-year annual mean temperature is 20.7°C.

The typical average rainfall in the area is 850mm (min: 527mm and max 1,318mm over a 30-year period), with the majority of precipitation occurring during the months of November to March (90% of annual rainfall).

According to the Zambian government, the district falls in agro-ecological region II whose weather is heavily influenced by the Inter-Tropical Convergence Zone (ITCZ).

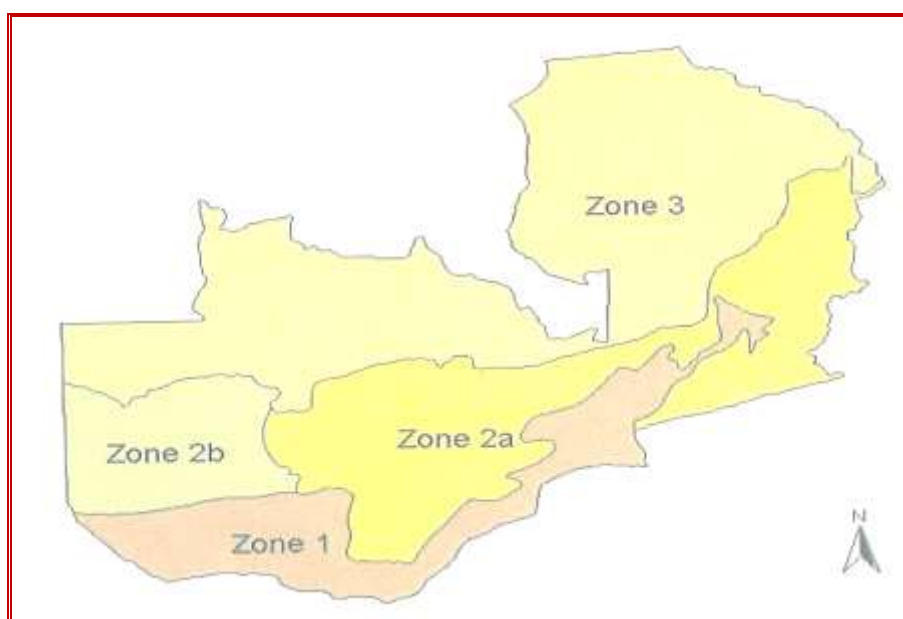


Figure 16-9: Agro-Ecological Zones of Zambia

4.3 Rainfall

The rains generally start in the middle of October and continue through up to the beginning of April. Rainfall reaches its peak around January after which it diminishes slightly up to the beginning of April when usually it ceases entirely. The typical average rainfall in the area is 850mm (min: 527mm and max 1,318mm over a 30-year period), with the majority of precipitation occurring during the months of November to March (90% of annual rainfall).

4.4 Wind

The Average wind speed is between 4 and 9 km/hr in Lusaka Province. Rainfall come with light northerly breeze while the months of July and August are associated with dry dust wind gushes of easterly winds.

4.5 Temperature

Lusaka province experiences average temperatures of 15°C during the cold season and 29°C during hot season. And it is not unusual to have temperatures outside of this range – very low temperatures of about 10°C have been recorded in July and higher than the maximum temperatures in October. The temperature variations in the area of Chilanga are considerable between the cold and hot seasons the average minimum temperature is 10°C with a max of 35°C. The highest temperatures are recorded in October and the 30-year annual mean temperature is 20.7°C

4.6 Hydrology

Surface Water

Chilanga district receives between 500 and 1,000 mm of rain per year. While rainfall is the primary source, it is the lithology (or rock type) and the structural characteristics of the rocks (porosity, clay content, folding, faulting, jointing and foliation) that are determinants of ground water availability. Rain fall is relatively uniform and predictable over long time periods, and therefore provide sufficient water to recharge aquifers. The amounts of ground water go down from May to November (the dry season), but rise from December to April (the rainy season).

Surface water sources are limited around the project with no streams or rivers in the vicinity of the site. However, the ground water sources are available especially during the rainy season when the water table rises.

The potential impact of the operations of the proposed Cooking Oil Processing Plant with regard to surface water pollution will be assessed. Hydrocarbons leachability will be assessed based on laboratory leachability tests data. The results will be compared with whatever secondary data that might be available.

Groundwater

The quality of groundwater in Chilanga and surrounding areas varies depending on factors such as landuse, location of on-site sanitation facilities and underlying geologic formation.

The project site lies in Lusaka watershed and most people in the district rely on riverine, wells and borehole water supply sources. Very few people in urbanised areas are connected to water utility company water supply and sanitation system. The plant area is located in a rural part of the district without access to most basic socio-economic utility facilities. And so, the water sources are subject to contamination, and therefore can easily be sources of easily transmissible diseases.

4.7 Air Quality

The main sources of dust emissions that can reduce local air quality within the project area include movement of vehicles along the Mumbwa road. During construction phase, the surrounding human communities, flora, and fauna have the potential of being exposed to dust emissions. The boilers in the plant will also be a source of air pollution. Hexane gas to be used as a solvent can also leak and become source of pollution. Coal ash from the boiler if not taken care of could also be a source of dust.

A review of air pollution data within the site will be undertaken as part of the environmental and social impact assessment of the proposed project. Ambient air quality monitoring will be undertaken as part of the EIA study to identify potential impacts of dust and air emissions on human health and functions of the ecosystems services within and around projects site as defined by the study area.

4.8 Soils

The Lusaka province is underlain by the Lusaka Dolomite Formation. Dolomite and gemstone formations are subject to karst-action whereby the carbonate rocks, which are

soluble in mildly acidic water such as rainwater, experience solution weathering of rectangular joint patterns. This results in enlarged fissures and hollows in the rock formation. The solution fissures and cavities that occur at various depths retain water and give carbonate formations a high degree of porosity and permeability, such that areas underlain by dolomite and gemstone are very important aquifers and reliable underground water sources.

The quality, quantity and direction of groundwater flow in the plant are elaborately defined. There are five boreholes used for plant operations and another two for domestic purposes. A review of available hydrogeological data relevant to the project area will be undertaken to understand the hydrogeological conditions of the project site. A geophysical study will be undertaken to determine the soil structure and characteristics such as texture, moisture, holding capacity, fertility and porosity.

The existing available data will be used to benchmark future rehabilitation activities during decommissioning and closure.

4.9 Land Use / Land Tenure

The larger portion of the district falls under customary land tenure system. Even though there are a lot of business establishments coming up, the rate at which land ownership is converted from customary to freehold system (mostly 99-year leasehold tenure) is too low to ensure increased security of tenure and therefore encourage higher propertied investments.

Under the state or free leasehold tenure, the Republican President is the custodian of all titled land holdings on behalf of all Zambians. According to the Zambian law individuals are allowed to convert their customary land onto leasehold tenure as long as the traditional leaders through the local government authority give consent for the same.

Most of common land use activities in Chilanga district are agriculture, quarrying and trading that serve the larger consumer market of Lusaka.

Current land use activities within the study area will be mapped during the socio- economic survey to be undertaken as part of the EIA study.

4.10 Flora and Fauna

The Vegetation has changed all over the province and district because it increases in population density over the years on account of being nearer the capital city, Lusaka (people migrate to the capital city for various socio, political and economic reasons). Low electricity connectivity of residential areas means that most people use charcoal and firewood for most domestic purposes. These sources of energy are bad for the people and environment.

Being mostly a rural district, Chilanga has relatively high levels of small-scale and medium agricultural activities, contributing to clearance of high proportion of vegetation for various economic activities. The vegetation has changed to largely grassy areas with small youngish trees and shrubs (re-growths of older trees that were cut down for various domestic uses like firewood, charcoal, housing and other infrastructure purposes).

The district used to have wildlife in years gone by. Because of widespread and increased human settlement there is significant increase in domesticated animals like cattle, goats, pigs and small livestock and birds. Large and medium scale commercial farmers keep a lot of livestock and fowls.

There are still plenty of smaller wild birds like house sparrows and crows. There are insects, and small reptiles and mammals

4.11 Archaeology and Cultural Heritage

There are no known archaeological or cultural heritage sites at the proposed plant site.

4.12 Traffic volume

Currently private vehicles, buses and minibuses uses Mumbwa road for public transport. As the proposed expansion of the Plant will be constructed, there is great possibility of increase in traffic volumes on Mumbwa road due to deliveries of material to the site.

Therefore, a detailed traffic assessment will be undertaken to gather primary data on the traffic situation on Mumbwa Road. Secondary data, if available, will be compared with the primary data.

4.13 Noise

The sources of noise are the boilers, crushers, refinery, trucks and loaders that operate within the plant area. Even with an increase in plant machinery and equipment such as these, it not expected that they will have significant additional impact on noise level than what already exists.

Noise disturbance as a result of the plant operations will be assessed. Sensitive receptors within the study area will be identified and the potential impacts assessed. Noise surveys will be undertaken to generate primary baseline data, which will be supplemented with secondary data if available.

Based on the findings from the secondary and primary data, the data will be analysed and potential impacts will be identified. Appropriate mitigation measures will be recommended.

The noise surveys will consider noise levels and exposure to all receptors.

4.14 Socio-economic conditions

Population of Chilanga District

By 2020, the population was expected to reach 157,290 people with 79,135 males and 78,155 females. In the same year, according to the Demographic and Health Survey (Zambia DHS 2018, published in 2020) **infant mortality rate** for Lusaka Province was 55 deaths per 1,000 live births compared to the national average of 45 deaths per 1,000 live births. Total fertility rates was 3.7 in 2014, went down 3.5 by 2018. This rate compares favourably with

the national average of 5.3 (with rural rate at 6.6).

Development surrounding plant site

The built environment nearer and around the plant site (within 2 km) consists of sparse human settlements that include compounds for farm labourers, paramilitary residential compound, a lodge, farms (small holding and commercial farms) and villages slightly further away.

Within the plant premises are to be found two ginneries (InterContinental and Parrogate), office block and laboratory building, storage shed, boiler sheds, effluent treatment plant, solid waste disposal area, extraction, refinery and packaging plant, five boreholes, ZESCO transformer, concrete platforms and gravel roads.

Economic Activities

With regard to economic activity, the south-eastern side of the district is the most urbanised, where the administrative centre of the district is located. The larger part of the district is largely agricultural settlements dominated by small and medium scale farmers that rely on the larger market of Lusaka district.

The district is host to Munda Wanga Botanical Gardens, a tourist destination not far from the very urbanised area of Lusaka district. The other notable establishments in the district are Lafarge/Chilanga Cement plant and a lot of lodges and recreation facilities, especially along the T2 road – in particular around government administrative centre.

Though most people are subsistence farmers, a lot more people engage in various agriculture business or economic activities because of the large consumer market in nearby Lusaka district. The number of small and medium scale agriculturalists is always rising because a lot of people in formal employment decide to start farming much earlier than was the case a few decades ago. The other economic activities are private transport, traders, service providers like hoteliers, educators and healthcare people. The district has a fair share of people who earn their living as employees in private or public institutions.

Education

In 2015, **Literacy rate** for Lusaka province was 80.1 percent; it compares favourably with the national averages of 67.5 percent (with rural and urban rates at 54.3 and 82.8 percent respectively).

Health Facilities

Chilanga District has about 13 health care facilities with the closest to the site being Mwembeshi rural health center. Most townships in close proximity to the proposed project have access to the health facility. The district also houses two hospices.

Energy

The plant expansion will get its energy from ZESCO.

Chilanga generally has seen an increase in the number of developments coming up from 2012 to date. This increase in both population and economic activities has resulted in the growth of the energy sector. The demand for power and other energy products in the district has resulted in a number filling stations coming up and sales of charcoal has also increased. The plant has its own share in the aforementioned demand for energy.

Transport and Communication

The plant site is well serviced by tarred road (Mumbwa), which passes by the facility. Mumbwa road connects the plant area to Lusaka District Town Centre, the other parts of the district and the rest of the country. The site can be accessed using public transport (mini-buses/taxis).

The environs of the study area are well covered and served by the local radio, television network and local print media. The local newspapers are sold in shops within the area. The surrounding area is also well covered by both landline phone (telephone - ZAMTEL) and mobile cell networks (Airtel, MTN and Zamtel).

Water Supply and Sanitation

Lusaka Water Supply and Sanitation Company (LWSC) Limited is the utility company in charge of providing water and sanitation services in Lusaka Province. The company operates under the legal framework as outlined by The Water Supply and Sanitation Act No. 28 of 1997. The company is licensed by the National Water Supply and Sanitation Council (NWASCO) as the Regulator, to provide water supply and sanitation services in the City of Lusaka.

The plant expansion works will use water from a borehole. Effluent will be treated within the plant and the waste water will be used for cooling coal ash and dust suppression expansion will use water from a bore located within the plant.

Potential Resettlement and Compensation

The other part of plant is already in full operation and the social assessment indicates that there will be no relocation, resettlement, or compensation issues associated with the operation of the plant.

5. PROPOSED PROJECT ACTIVITIES

The various development phases of the proposed Cooking Oil Processing Plant, includes construction, operations and decommissioning stages.

5.1 Preparation Phase

During this phase, the Consultant will carry out the following activities. These will include:

- Assemble EIA Team
- Prepare Terms of Reference (TORs) and Scoping Meeting
- Conduct field visits for specialized studies
- Prepare Specialized study reports
- Conduct Disclosure Meeting on website due to public gathering restrictions because of COVID 19
- Prepare draft EIS Report;
- Prepare final EIS for submission to ZEMA
- Facilitate Public Hearing (If any).

This phase will mainly include clearing of vegetation for construction of the plant, offices and the associated structures. Land clearing will be done using heavy machinery. Clearing and preparation of land will employ procedures that will minimize emission of Green House Gasses. Cleared organic matter (biomass) will not be burnt but chipped and ploughed into the soil during land preparation stage or use.

Recruitment and Training of Personnel: The project will involve the recruitment of both skilled and unskilled staff. For the unskilled staff preference will be for consideration of local communities as a way of empowering them. This is also in line with Government Employment Policy.

5.2 Construction phase

The construction works of the expansion of the cooking oil processing plant, associated structures and other auxiliary works will be the major components of this phase. This will involve digging of foundations and ferrying of construction materials such as sand, gravel, cement and steel to the sites. This will also have storage facilities. The following other activities will be undertaken:

- Clearing, and ground levelling and compaction. At this stage a heritage expert will be expected to be on site to ascertain the absence of heritage resources at the site.
- Site Access and Parking Facilities with associated Drainage System
- Setting up Facilities indirectly linked to the Soya Processing Plant
- Factory, Office and Main Residential Foundations and Structures
- Setting up and construction of the Water Reticulation and Waste Management System
- Erecting of Plant Structures and Installation of Processing Equipment
- Installation of Power
- Installation of Fire Fighting Equipment
- Installation of Security System

5.3 Operation phase

This will start with commissioning of the plant (manufacturing of cooking oil), the activities under this phase will comprise of the following:

- Acquiring of the necessary raw materials (soya seed).
- Screening of the soya seed.
- Crushing of the soya seed.
- Conveying the soya flakes to the extraction plant.

Acquiring of the necessary raw materials (soya seed)

Oil seed will include soya seed, sunflower etc and will be acquired from local farmers from Eastern and Southern Province including Lusaka. Most of these will be brought at the plant and once the seed is accepted, it's weighed at the weighbridge and bought.

Cleaning and grinding

- The incoming soya beans seeds will be passed over magnets to remove any trace metal before being stripped of all extraneous material.
- The stripped soya beans seed will be then ground into coarse meal to provide more surface area for oil extraction. The hammer mills crush the material to the proper sizes consistently.
- The meal will be heated to facilitate extraction of oil.
- The heated meal will be rolled into flakes and processed by solvent extraction to attain maximum yield.
- The flakes are conveyed to the extraction plant through a conveyor belt.

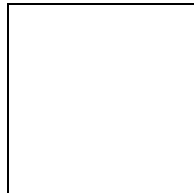


Figure 16-10: Process flow diagram for the Proposed Plant

Maintenance of structures and common areas will include routine cleaning of plant and office corridors and public toilets, maintenance of physical structure (e.g. roof / walls of the plants), maintenance of security lighting and fire equipment. The car park and internal roads will be cleaned routinely and monitored on a day to day basis for damage to the road surface. Any repairs necessary shall be carried out by the Proponent.

Waste Management

- All waste will be stored at the designated waste bins within the company premises awaiting a ZEMA Licensed transporter to take waste for disposal at the nearby dumpsite. Wherever possible, reuse of waste will be encouraged. All waste will be disposed (non-organic and organic) will be collected and temporarily stored at the designated site, where separation will be done and transported to the government approved dumpsite by a reputable contracted company.

Effluent Storage

- All effluent from the company operations will be pretreated before discharging it in the Sewerage trunk line.

Hazardous waste

- Hazardous waste will generally comprise of used oils and lubricants to be stored in drums at designated storage sites. Once sufficient waste is collected, an approved and recommended contractor by ZEMA collects the waste for disposal at a suitably licensed waste disposal site.

5.4 Decommissioning phase

The objective of the Decommissioning and Closure Plan is to clear all structures and equipment brought on site due to the project period and rehabilitate the land to its original state or an agreed upon alternative. The rationale for the Plan is to provide assurance to ZEMA that the project proponent will provide adequate resources to rehabilitate the land. It is also intended to provide guarantee that government will not have to use public resources to rehabilitate the land in the case that the project proponent fails to do so.

The closure plan for the project will include; Back filling, re-vegetate and re-grass some part of the plant progressively until closure. Post-closure, the site will be fully re-vegetated and re-grassed. After lapse of this period, an application for closure certificate will be lodged.

This phase shall include the following;

- 1) Repairing all the structures to a suitable state for alternative uses.
- 2) Conducting re-vegetation activities where possible around the entire project area.
- 3) General clean-up of the site.

6. IDENTIFICATION OF ENVIRONMENTAL IMPACTS

Environmental impacts are any changes in the physical, natural or cultural environment arising from undertaking a development project. These environmental impacts are investigated to identify and assess their significance, which is basis for informing decision-making by the regulatory authorities and other stakeholders. This subsection highlights the types of potential impacts that may arise as a result of undertaking the proposed project and the approach to be used to assess the significance of the impacts.

6.1 Impact Identification for Proposed Project

The potential impacts of the proposed Cooking Oil Processing Plant Project will be identified and assessed based on review of and critical assessment of the facility components in relation to the prevailing environmental and social baseline conditions. The assessment will include:

- Determining environmental and social conditions in sufficient detail against which the impacts can be identified and assessed;
- Predict future changes to the physical environment;
- Identifying significant impacts likely to happen if the plant continues to operate as it is or if changes were to be made.

The process of identification and assessment of potential impacts will also be based on applicable national legislations and design guidelines for the Project.

The impacts will be characterised in terms of being beneficial (positive impact on the environment) or adverse (negative impact on the environment) or neutral (no impact on the environment). They will further be characterised as direct, indirect, cumulative, reversible and irreversible based on the definitions below:

Direct These are impacts that are typical, inevitable and predictable. They are caused directly during implementation of project activities.

Indirect These are reasonably foreseeable and probable impacts that are caused by facility direct and indirect effects. The impacts may occur at some future time after direct effects and will be located within the boundaries of the systems affected by the plant.

Cumulative These are reasonably foreseeable and probable impacts that are caused by direct and indirect effects and other activities.

Reversible Impacts These are impacts that can be reversed.

Irreversible Impacts These are impacts that are not reversible.

Local Impact will affect the immediate plant site.

Regional Impact will affect areas outside the plant

National Impact on a national scale.

6.2 Impact Mitigation

For identified and predicted impacts, appropriate mitigation measures will be implemented to eliminate or minimise the significant negative effects or enhance the positive ones. These may include preventative engineering. The objectives of mitigation are basically to:

- find more environmentally and socially responsible ways of undertaking some activities;
- enhance environmental and social benefits;
- avoid, minimise or remedy negative impacts within acceptable levels;
- Ensure that residual negative impacts are within acceptable levels.

6.3 Potential impacts

Preliminary potential impacts were identified during the scoping exercise and review of secondary data. These impacts have provided an initial indication of baseline surveys and investigations that should be carried out as part of the EIA study. The following are the identified potential impacts:

Projected Significant Positive project impacts

Positive project impacts anticipated from the undertaking will include but not limited to the following;

- Increased food (cooking oil) security in the area and the country at large through availability of processed cooking oil (**Immediate direct impact**).
- Increased employment and business opportunities for the local people (**Immediate direct impact**).
- Socio-economic change through increased revenue, disposable income and availability of goods for the local people (**long indirect impact**).
- Increased revenue for the local authorities in Chilanga District as well as central government through taxes, export charges, and levies. (**Cumulative impact**).
- Availability of ready market for local crops such as soya bean as well as out grower scheme opportunities (**Immediate indirect impact**).
- Enhanced Standard of living resulting from increased socio-economic activities in the area (**Immediate indirect impact**).

Projected Negative project impacts

Negative impacts may occur during the project implementation lifecycle. These will be mitigated in accordance with applicable regulatory requirements. Anticipated impacts include;

- Possible ground water contamination resulting from chemical, oils and hexane usage (**cumulative impact**).
- Surface water contamination due to fatty acid effluent from the processing plant.

- Dust generation during the construction phase, through access roads and during operation activities especially at the oil seed feeding point. **(cumulative impact)**.
- Changes in air quality due to processing activities e.g. use of boilers and hexane. **(Cumulative impact)**.
- Generation of noise by plant equipment. **(Cumulative impact)**.
- Loss of flora and fauna due to land clearing.
- Damage to Cultural, historical and heritage sites (if any).
- Increased Crime and Increase in HIV/AIDS prevalence and Sexually Transmitted Diseases (STD's) due influx of people seeking employment in the area. **(Cumulative impact)**.
- Solid waste generation (Hazardous and non-hazardous) from plant operations.

A. Planning and Construction Phase

Since the Plant is operational, there will be no negative impact during planning phase at the project site.

During the construction phase the project impacts anticipated from the undertaking will include but not limited to the following;

- Increased trade opportunities through the supply of goods and services.
- Employment for the local people for the duration of the project
- Improved land use in the area
- General improvement in local livelihoods due to synergistic impacts of positive effects of the project such as locals benefiting from supplying, economic boom. Increase in revenue to local authorities and institutions from land rates, licenses and personal levy
- Possible ground water contamination resulting from chemical and oils usage.
- Dust generation during the construction phase, through access roads and during operation activities thus changes in air quality
- Generation of noise.
- Loss of flora and fauna due to land clearing.
- Damage to cultural, historical and heritage sites (if any).
- Solid waste generation (Hazardous and non-hazardous)

B. Operational Phase

• **Impact on Noise**

Noise resulting from the operation of machinery on the site is likely to assume some significance mainly during the loading/offloading of raw material/products as this will

involve the use heavy machinery such as folk lifts, trucks, loaders etc. This can pose a nuisance to adjacent residential areas in the long term given the proximity.

- **Noise from increased traffic**

The increased volume of traffic to the area will result in an increased background noise level, especially during peak times. However, given that the site is located next to existing busily trafficked roads, it is not considered that the impact of noise from the additional traffic will be significant.

Acutely maintained operation equipment will not be allowed to operate on the site to ensure quiet operation. Earmuffs shall be provided to personnel working in or near noise environments.

Public liaison through the management will be an integral part of PGL management in order to avoid potential conflict with surrounding developments and neighboring residential areas as regards the activities of the development. Prior notice will be given in good time of impending activities that may potentially cause disturbance to surrounding residential areas.

Impact on air quality

- **Impact on Air quality**

Dust releases and nuisance

Bare surface areas with loosened topsoil combined with the operation of machinery such as trucks, folk lifts will increase dust raised from the site. Dust will be raised during the off-loading of materials (soya seeds) delivered to the site; the preparation of the foundations will require the importation of raw materials.

During operation phase, coal-fired Boilers at the proposed Plant will be a source of air pollution; particulate matter, Oxides of nitrogen, Sulphur and carbon will be mostly emitted. Hexane if leaked could also pose adverse effects at the plant.

Air Quality

- Air pollution caused by dust and exhaust emissions generated through movement of heavy trucks along the access road and at the plant.

Surface Water and Groundwater Quality

- Potential contamination of surface water in the nearby water bodies caused by contaminated surface runoff from the plant operations.
- Potential contamination of groundwater caused by seepage into the groundwater regime of contaminative materials arising from plant effluent and laboratory operations.

Table 16.7: Potential Impacts and preventative/mitigation measures – Operation and Maintenance phase

Impact Area	Potential Impact / Source	Area of Influence	Potential preventive / mitigation measures
Resources and waste	Waste and wastewater generated by permanent installations during operation and maintenance.	Local, specific distances depend on local conditions	Waste management plan
Socio-Economic Impacts	- Economic benefits due to production of cooking oil - In case cooking oil is also supplied to other towns other than Chilanga and Lusaka availability of cooking oil in the country	Local and regional: Individuals and companies benefitting from improved power supply	
	Benefits due to improved local livelihood	Local	
Working Conditions	Risk of injuries for workforce as a result of routine project operation activities and maintenance	Local: Workforce	- Develop a HSE management system for the project in accordance with international good practice. - Good site management practice (training and qualification of staff, appropriate work standards) will be implemented to reduce health and safety risks.

6.4 Impact Assessment Methodology

A standard impact assessment methodology will be applied on identified impacts and will take into account the nature or status of the predicted impact, extent of the impact, magnitude or intensity of the impact, the duration of the impact and the probability of the impact occurring. The impacts will be given a rating using the assessment criteria as indicated in Table 6. The overall significance of the impact will be obtained based on the extent (E), duration (D), intensity (I) and probability of the impact (P) occurring.

$$\text{Significance of predicted impact (S)} = (E + D + I) \times P$$

The impact assessment terminology and ratings that will be used to describe the impacts are presented in Table 0.8.

Table 16.8: Impact Assessment Terminology and Ratings to be used in determining significance

Impact Assessment Terminology and Ratings to be used in determining significance		
Assessment Terminology		Ratings Used for determining significance
Nature of predicted impacts (N)		
Neutral	No impact on the environment	0
Negative	Adverse impact on the environment	-
Positive	Beneficial impact on the environment	+1
Duration of predicted impact (D)		
Short term	An impact that persists for 0 - 5 years	1
Medium term	An impact that persists for between 5 - 15 years.	2
Long term	An impact that will cease after the operation life of the project.	3
Permanent	No mitigation will occur (Permanent feature)	4
Extent of the impact (E)		
Site specific	Impact within the boundaries of the site	1
Local	Impact within an area of 5 km of the site	2
Regional	Impact within the Lusaka Province	3
National	Impact on national scale	4
Intensity of the impact (I)		
Low	Impact affects the environment in such a way that no natural, cultural	1

	and social functions and processes are affected.	
Medium	Where the affected environment is altered but natural, cultural and social functions and processes continue, albeit in a modified way.	2
High	Natural, cultural or social functions and processes are altered to the extent that they will temporarily cease.	3
Very high	Natural, cultural or social functions and processes are altered to the extent that they will permanently cease.	4
Probability of impact (P)		
Improbable	The possibility of the impact to materialise is very low.	2
Probable	There is a distinct possibility that the impact will occur.	4
Highly probable	It is most likely the impact will occur.	6
Definite	The impact will occur regardless of any prevention or corrective actions.	8

Table 6: Impact Assessment Terminology and Ratings to be used in determining significance		
Assessment Terminology		Ratings Used for determining significance
Significance of predicted impact (S) = (E + D + I) x P		
High	An impact that is capable of causing sufficient change in the environment and fundamentally affect the status, potential productivity or usage of the environment.	> 50
Medium	An impact that is capable of causing change in the environment but does not fundamentally affect the status, potential productivity or usage of the environment.	25 - 50

Low	An impact which is either too small to be measured or does not give rise to any material change in the environment.	< 25

7. PROJECT ALTERNATIVES

A variety of alternatives, such as the following, exist for the design and management of the project:

7.1 Plant Need

The shareholders of PGL have been motivated to expand and operate Cooking Oil Plant to make profit for them by selling finished oil product locally. The increasing demand for cooking oil in Zambia and the availability of raw materials (soybeans, sunflower, palm etc) in Zambia has created a conducive business environment.

The proposed project will help Zambia meet the demand for finished cooking oil product as well as help reduce importation of edible oils and subsequent reduction of local prices.

7.2 Site Alternative

Two alternative site localities were evaluated using the following criteria; Land Acquisition, Resettlement and Compensation, Market and Infrastructure Accessibility during the Scoping Phase of the Environmental Impact Assessment. The alternatives as follows:

- **Alternative A: To Use the Existing Site in Chilanga District**

The site in Chilanga District has all the land acquisition papers put in place. Chilanga District was earmarked for Industrialization especially manufacturing & agro – Processing. There are no settlers on this land and moreover, it is close to the largest market outlet (Lusaka City) and easily accessible by a good road (Mumbwa Road) located in an area with commercial farming blocks where there is easy access to Soya Beans supply. This is in line with the National Development Plan

- **Alternative B: Source a Land Parcel in elsewhere**

This alternative requires sourcing another land parcel through discussions with local authorities. It could involve resettlement and compensation of project affected persons (PAPs). Moreover, access roads will have to be constructed.

7.3 Processing Technology/Methods Alternatives

There are various technological options that have been considered for PGL Oil Processing Plant with the following having been considered in this study:

- ✓ **Steam Heating Process:** Super steam is passed through the soya seed to loosen the fat molecules in the cells. The heated seed is then crushed in a screw funnel. This is the old technology for oil processing.
- ✓ **Thermo-heating using a combination of coal and fire wood to heat the water in the boiler section.** This has implications of air pollution by smoke which affects the

surrounding area/community.

- ✓ **Solvent extraction method:** The most preferred technology is the solvent extraction method which has minimal impacts on the climatic environment and does not result into deforestation in order to source wood for heating.

7.4 Alternative Products

The main alternative product is soya cake which will be used for making of animal feed. The cake is also used in the confectionary and sausage making industries. The cake is also used to make High Energy and Protein Supplement (HEPS) for under nourished people.

7.5 Raw materials

Three alternatives for raw materials were evaluated using the following criteria;

- Technology to be used
- Availability of the raw material
- Prices
- Market
- Accessibility during the Scoping Phase of the Environmental Impact Assessment

The average bottle of cooking oil contains vegetable oil, with no additives, preservatives, or special flavorings. The oil comes from various parts of plants, in most cases from what are commonly called seeds. Some of the alternative raw materials include sunflower, palm kernel, safflower, cotton, sesame, and grapeseed oils) or nuts (including peanut, soybean, almond, and walnut oils). A few special cases involve merely squeezing the oil from the flesh of the fruit of the plant. For example, coconut oil comes from the coconut's white meat, palm oil from the pulp of the palm fruit, and olive oil from the flesh of fresh olives. A typically, corn oil is derived from the germ (embryo) of the kernel.

Sunflower

- It is readily available on the Zambian market and beyond borders.
- Market is readily available
- Consumption of sunflower oil is moderately high in Zambia and across borders.

Limitation: Low market as compared to soya bean oil and the material is moderately expensive

OPTION: Not selected

Cotton Seed

- It is readily available on the Zambian market and beyond borders.
- Market is readily available
- Low market as compared to sunflower and soya bean oil

Limitation: Cotton seed is very expensive; Production level of oil is very low as compared to sunflower and soya beans; The consumption of cotton seed oil is very low; and Very expensive to extract.

OPTION: Not selected

Soya beans

- It is cheaper to grow
- Readily available market and sourcing.
- The prices are not as high
- Environmentally, one of the many benefits of soya is that it is able to ingest atmospheric nitrogen that other plants need to get from the soil. Soya often ingests more atmospheric nitrogen than it uses to grow, and fixes the remainder into the soil (where it will be available for the next crop). The process of nitrogen consumption and fixation is enhanced if nodules have formed on the soya roots, and those nodules only form when the appropriate rhizobium bacteria are present in the soil.
- Public consumption levels are very high.

Limitation: Very few if not nothing

OPTION: Selected

7.6 Water Supply Alternative

The use of bore hole for water supply was analysed against connecting to a local water supply utility company and buying of disposable water bottles for domestic use. The use of a borehole was preferred for the project operations and domestic use as an alternative which seemed to be cheaper and appropriate.

7.7 Energy sources

The principal source of electricity during operational phase of the project will be hydro-power energy to be sourced from a nearby ZESCO main which is found within reach of the project site. The ZESCO main was picked as a major source of power as it provides the clean and less costly power alternative which is also environmentally friendly.

In terms of power source for boilers, two alternatives will be considered either diesel or coal powered boilers.

Diesel

- Burns faster and produces huge quantities of energy
- It is cheaper than petrol

Limitation:

- It is not readily available locally
- It is very expensive as it has an increased evaporation time as compared to coal.
- Effluent production is very high and dangerous to the environment
- Transporting this commodity is very expensive
- The fumes may be very catastrophic in case of any fault

OPTION: Not Selected

Coal

- It is readily available locally
- Transportation is very cheap as it will be transported from Maamba via railway
- Can easily be offloaded from the Chikumbi Railway siding.
- Coal is cheaper than Diesel in terms of cost.
- Its effluent is easy to contain as it shall pass through a water scrubber
- Produces high energy as it contains between 69% & 86% carbon by weight

Limitation:

- Rail Transportation is tightly timed compared to road transport which is quicker.
- Chemically, coal is mostly carbon, which, when burned, reacts with oxygen in the air to produce carbon dioxide, a heat-trapping gas. When released into the atmosphere, carbon dioxide works like a blanket, warming the earth above normal limits.

OPTION: Selected

7.8 Alternative Technology

Since the Plant is already in full operation with a good production rate, the option of continuing using the existing technology was preferred against the installation of new technology.

7.9 Domestic Waste Disposal Facilities

The option of using the waste bin was analysed against using a skip bin. The first option meant that the company needed to buy many waste bins, which have a limited holding capacity. The second option was opted as the skip bin has a huge carrying capacity.

7.10 Sewage Management

Three options for sewerage and waste water treatment have been considered.

Option 1 requires that the sewage water be discharged to the municipal sewage plant. This option will require that the plant sewer system be connected to Lusaka City Council sewage system which is nearer than Chilanga Town Council. This area has no council sewer system yet.

Option 2 is the preferred option in which a sewer package (septic tanks and effluent retention ponds) that would be installed for the office complex and change house, with the effluent being pumped out and discharged into the council sewer ponds on licensed arrangement. **This option was considered best fit.**

Option 3 would be to discharge the sewage effluent from the package plant to the nearby streams as it would contain nutrients (nitrate and phosphate) that would nourish the riverine system and hence contaminate water and cause harm to the eco-system .

7.11 The “No Action” or “No Project alternative”

The no project (no-action alternative) alternative in respect to the proposed project implies that the status quo is maintained. Under the no-project alternative, the existing land use will not be used, neither shall the project be implemented. The land owner will continue not to make any good value of the land. The proposed oil processing project would not be constructed and the expectations attached to the project would not be met. The no-project construction alternative is the least preferred from the socio-economic perspective due to the following factors:

- ✓ The existing land use is not profitable to the optimum.
- ✓ The land is underdeveloped and no profits are being generated from it as opposed to the time when the plant is installed and is operational;
- ✓ No employment opportunities will be created from the proposed land parcel if the project is not implemented.
- ✓ National GDP will definitely lose out at this period of economic slump down due to low productivity in the country.

From the analysis above, it becomes apparent that the “no project alternative” is not a viable alternative to the proponent.

8. CONSULTATION AND PUBLIC PARTICIPATION

Public consultation brings out among other important issues better information on local environmental and socio-economic issues of concerns that may arise from proposed projects. In addition, it can produce better ideas on issues and/or alternatives that may not have been previously considered by project proponents.

The *Zambian Environmental Management Act No.12 of 2011* provides for public participation in Part VII of the Act. Its subsidiary legislation, the *Environmental Impact Assessment Regulations, 1997* also provides for on-going public participation throughout the EIA process including the scoping and preparation of the Terms of Reference (ToR) for the environmental and social impact assessment study. The Fourth Schedule of the Regulations gives guidance on conducting EIA studies and it specifically provides for public participation.

In compliance with the *Zambian environmental regulations* and to conform to international best practices in conducting environmental and social impact assessments, project stakeholder targeted **meetings (scoping) were conducted as an initial stage in the EIA study. Due to Covid-19 Pandemic, a public opinion survey (Scoping) was held from 7th to 8th April 2022 using one-on-one interviews with Chilanga Town Council, Round house Lodge, nearby locals and also the website www.parrogate.com.**

Information on alternatives, anticipated impacts, proposed mitigation measures, among others, were presented in English and translated in the local language (Nyanja) well understood by the local communities. The stakeholders were drawn from Chilanga Town Council, Mwembeshi Secondary School and nearby settlers. The stakeholders helped to determine the scope of the work to be carried out when preparing the EIS by contributing and raising their concerns on the proposed project. The views of the stakeholders, where appropriate, have been taken into account in preparing the draft ToR for submission to ZEMA.

The stakeholders were informed about the meeting through different modes that included:

- Website (www.parrogate.com.) Advertisement;
- Contact calling of stakeholders (direct invitation).

Consultation and Public Participation

Scoping consultation in the framework of the Cooking Oil Processing Plant was organized in three main stages:

- Pre-Scoping phase consultation;
- Scoping phase consultation; and
- EIS phase consultation.

8.1 Pre-Scoping phase consultation

The pre-scoping phase consultation activities were undertaken as part of studying the socio-economic baseline of the project. Main purposes have been to:

- Inform the government and local authorities as well as communities about the

- Project;
- gather and record the communities' initial issues and concerns about the Project;
- Inform people about the upcoming public consultation (i.e. Scoping and EIA consultations);
- Strengthen relationships between stakeholders and the PGL; and
- Understand the best approach and methodology of engaging the communities in the area.

During this stage, no formal documents were distributed to stakeholders; only high level information was verbally provided to the communities and authorities.

The main issues raised during the pre-scoping consultation comprise the following:

- Potential employment opportunities, particularly for women;
- Opportunities for improved livelihood at individual, local and regional level; and
- Need for increased awareness amongst community members.

8.2 Scoping Phase Consultation

The purpose of the consultation process during the Scoping phase has been to:

- inform stakeholders about the EIA and details of the proposed Project;
- gather comments and concerns regarding the Project; and
- Further strengthen relationship with the stakeholders.

For the Scoping Phase, a high-level identification and selection process was undertaken to identify the relevant stakeholders for engagement purposes. The target stakeholders, divided into national and district levels have been the following:

❖ **National Level:**

- Ministry of Local Government (MLG)
- Zambia Environmental Management Agency (ZEMA);
- Water Resources Management Authority (WARMA);
- Ministry of Water Development and Sanitation;

❖ **District Level:**

- Chilanga Town Council;
- Lusaka Water Supply and Sanitation Company
- Department of National parks and wildlife
- Department of fisheries

Formal Invitation was email sent/delivered to the identified stakeholders and the respondents are presented as a list in the Appendices.

The stakeholders helped to determine the scope of the work to be carried out when preparing the EIA report by contributing and raising their concerns on the proposed project. The relevant concerns raised by the stakeholders are summarised below. These concerns have been taken into account in preparing the ToR for the EIA study.

8.3 EIS Phase Consultation

The aim of the EIS phase consultation will be to:

- inform stakeholders about the findings of the specialist reports and the results of the impact assessment;
- gather feedback on impact assessment and likely concerns on the process or the results;
- gather feedback on the proposed mitigation measures as well as the environmental management and monitoring plan; and
- Further strengthen relationships with the stakeholders.

The plan will be to engage mainly with government (national, provincial, and district). Should the project impacts be expected to significantly affect the local communities, then communities will also be engaged.

Stakeholders will be notified on the meetings by e-mail (government officials), letters, and phone calls (specifically PGL staff). E-mail communication and follow up phone calls will be made directly by the PGL team. Prior to the meetings, the draft EIS report will be available on PGL website; hard copies and other electronic copies will be made available on request to stakeholders.

Stakeholder concerns or feedback provided during the meetings will be taken into consideration and will be worked into the relevant sections of the draft EIS as necessary.

The key issues from the meeting which form the basis for detailed studies are highlighted below:

- ✚ Dust emissions arising from construction and operations;
- ✚ Criminal trespass, theft and vandalism arising from ease accessibility of the PGL to thieves;
- ✚ Criminal activities to the surrounding communities
- ✚ Contamination of surface and groundwater;

Table 16.9: summary of how issues/concerns raised by stakeholders will be addressed in the EIA study

Environmental Impact	Mitigation Measures
Impacts on Flora & Fauna	The site is uncleared site which is partially cleared on the northern side. In comparison to surrounding areas, impacts on utilization of natural resources within the project area will be mitigated through good plant practices and replanting of exotic plants within the plant.
Occupational Health	Awareness and training of its workers on safety procedures as well as providing protective clothing and equipment.
Air quality deterioration and Noise generation	✓ Equipment and plant machinery shall be well maintained and in good condition such that noise emitted is within an acceptable level. Any equipment or machinery producing abnormal noise will be fit with noise reducers and serviced for good noise performance. Workers operating in areas where noise is emitted are provided with protective equipment. ✓ All equipment/boilers emitting gases will be maintained and

	air quality monitoring conducted to ensure no air pollution is caused during operational
Impacts of the storage, management, use and disposal of plant chemicals and containers	✓ Well-designed infrastructure for storage of chemicals. Management and use of these chemicals is equally done following laid down procedures in line with regulations set out by ZEMA.
Use of water for cooking oil processing	✓ The proponent shall obtain water Permit for all boreholes to be drilled on site from WARMA. ✓ A good and effective monitoring system is put in place.
Deterioration of Water quality	✓ Stick to good practices of operation rules of ensuring regulatory conditions is followed. ✓ Ensure zero discharge of effluent to the environment. All effluent is channelled to the settling pond. ✓ Installation of sewer system (septic tanks) and ensure proper operation and regular maintenance throughout the project construction phase
Erosion/sedimentation.	Carryout proper construction activities. Limit movement of heavy machinery only to designated access routes and operational areas
Relocations /Resettlements and/or Compensation	The proposed development site has no settlers who will require a form of resettlement and/or compensation as the project site is within already existing operational plant.
Safety and Health Risk of Workers	✓ Implementation of safety and health policies designed to identify, evaluate, monitor and control health hazards and provide safety training; ✓ employees shall familiarize with safety techniques through training; ✓ Management shall ensure that safety inductions are undertaken to persons visiting or working in sensitive areas; ✓ Implementation of emergency procedure on site; ✓ Use of clearly labelled signage; ✓ Ensuring that employees wear suitable protective clothing at all times when it is needed; ✓ Proper control and directing of traffic during material delivery.
Employment	✓ Through advertising fairly ✓ Ensure gender sensitivity in terms of employment

8.4 Grievance Redress Mechanism

Grievance expression and management mechanism will utilize existing local structures and channels of communication; which starts from the institutional set up that uses the structure of authority to channel grievances to local government. Any person or PAPs with an issue regarding implementation of this expansion project, impacts of the Project from current or planned activities, asset data accuracy and team member activities will launch their grievance(s) through their

representatives who in turn will take it to the Director and the Project Committee at PGL.

Media will also be involved and encouraged to expose unresolved grievances so that national coverage is made possible to force reluctant officialdom to respond to grievances appropriately and effectively

SL No.	Process	Description	Tentative Timeframes
1.	Receipt of Grievance	Face to face, phone, letter, e-mail, recorded during public/community interaction, others	1 day
2.	Grievance assessed and recorded	Assess relevancy of the Grievance w.r.t. project related activities	3-6 days
3.	Acknowledgement of the Grievance	Acknowledgement of grievance through appropriate medium and logged into database.	6-12 days
4.	Development of Response	Grievance assigned to appropriate party for resolution	4-7 days
		Response development with input from management/ relevant stakeholders	7-14 days
5.	Response Signed off	Redress action approved at appropriate levels	3- 6 days
6.	Implementation and communication of response	Redress action implemented and update of progress on resolution communicated to complainant	15 days
7.	Complainants' Response	Confirm with complainant that grievance can be closed or determine what follow up is necessary	2-4 days
8.	Grievance Closure	Record final sign off. If grievance cannot be closed, return to step 2 or refer to ZEMA or resort to court of law.	4-7 days

9. TERMS OF REFERENCE

It is a requirement in terms of Regulations 8 of the *Zambian Environmental Impact Assessment Regulations, 1997* to prepare an EIS in accordance with the Terms of Reference (ToR). The ToR should be prepared by the Developer in consultation with the ZEMA. The regulations further require that the project developer ensures that public views are taken into account during the preparation of the terms of reference through organising a public consultation process. This public consultation process should involve Government agencies, local authorities, nongovernmental and community-based organisations and interested and affected parties who should contribute in determining the scope of work to be done in the conducting EIA study and in preparation of the EIS.

The basis of this scoping report is the scoping exercise undertaken as initial stage in the EIA process. This exercise helped to determine the scope of the EIA study. Key issues and concerns arising from scoping meetings are summarised and have been taken into account in the preparation of the ToR.

The draft ToR document was prepared in April 2022 and submitted to ZEMA in accordance with the provisions of the *Environmental Impact Assessment Regulations, Statutory instrument No. 28 of 1997*. Following review and comments by ZEMA on the draft ToR, the final ToR (the approach) for conducting the EIA study has been prepared. This scoping reporting is an appendix to the final Terms of Reference for the study.

9.1 Description of specific tasks to be undertaken for the EIA Process

The regulations provide guidance on conducting the EIA study. The specific tasks that will be carried out are briefly outlined below.

- i. **Notification for scoping meeting:** This has already been carried as part of the process. All the key stakeholders were informed of the meeting through the print and electronic media (*Daily Mail and Times of Zambia Newspaper* – 22nd March 2022).
- ii. **Holding scoping meetings with the stakeholders (7th to 8th April 2022):**
- iii. **Writing scoping report and draft ToR:** The views and concerns of the stakeholders on the proposed project were gathered and incorporated, where appropriate, in the draft Terms of Reference.
- iv. **Submitting draft ToR to ZEMA** for review and comments (12th April 2022).
- v. Receiving feedback and suggestions from ZEMA on the draft ToR.
- vi. Preparing final ToR based on feedback from ZEMA.
- vii. Submitting the final ToR to ZEMA for approval:
- viii. Preparing the Environmental Impact Statement ;
 - Reviewing of relevant environmental documentation relating to the Project in particular.
 - Establishing an environmental and socio-economic baseline for the Project

through undertaking specialist studies to supplement and update existing secondary data and information on the socio-economic and environmental conditions of the project area.

- Analysing proposed project and alternatives with regard to potential environmental and socio-economic impacts and risks during the construction, operation and closure.
- Identifying possible environmental and social mitigation strategies based on potential environmental and socio-economic impacts and risks identified.
- Predicting and assessing impacts of the project in terms of their magnitude, significance and duration (impact assessment and evaluation).
- Recommending environmental and social management and monitoring required.
- Collating gathered data and information from reviewed documents, specialist baseline studies, interviews, relevant comments received from stakeholders and recommendations into an Initial Draft Environmental Impact Statement (EIS).

- ix. **Public Disclosure Meeting:** This will include notification of key stakeholders of the public disclosure meeting through the invitations, the print and electronic media. Following notifications, the meeting will be held to inform stakeholders about the contents of the Draft EIS including mitigation measures for significant impacts. Environmental and social issues and concerns on the project will be obtained during the public disclosure meeting.
- x. **Producing the Final Draft EIS Document:** Issues and concerns will be incorporated into the initial draft EIS to produce the final draft EIS for submission to ZEMA for review and comments.
- xi. **Producing the Final EIS based on ZEMA comments** and subsequent submission to the regulatory authority, ZEMA.

9.2 Investigations to be undertaken for the EIA Study

The main baseline surveys and detailed investigations to be undertaken as part of the EIA study are presented in Table 0.10 and are briefly discussed in Terms of Reference. Other study aspects that include climate, topography, and archaeology will be undertaken through review of relevant secondary data available in environmental documentation.

Table 16.10: Aspects of Environmental and Social Issues to be investigated

Aspects of Environmental and Social Issues to be investigated	
Study aspect	Specialist
Air Quality	Air Quality Specialist
Soils and land capability	Soils Science Specialist/Geologist
Surface Water and Groundwater Quality	Water Resources Specialist
Noise and vibration	Noise and Vibration Specialist
Flora and fauna	Ecologist

Traffic	Traffic Survey Specialist
Geological survey of the proposed site	Geology Specialists
Socio-economic	Social Scientist / Economist

9.3 Public Participation Process

Public participation process during the environmental impact assessment study and preparation of the Environmental Impact Statement will be followed as per requirements set out in Regulation 8(2), Regulation 10 and Stage 5 of the Fourth Schedule of the Environmental Impact Assessment Regulations, Statutory Instrument No. 28 of 1997. The process will involve the following:

- **Notification of the meeting in writing to Government agencies**, local authorities, non-governmental and community-based organisations and interested and affected parties;
- Placing of notices of the public meetings on noticeboards and in the print and electronic media (local newspapers and radio);
- Holding one on one meetings with the identified stakeholders;
- Obtaining stakeholders' inputs (views and concerns) initially at the time of scoping the project and preparation of the Terms of Reference. Other meetings will be held during the surveys and at the public disclosure of the draft Environmental Impact Statement.

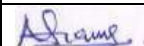
Public participation process in conducting the EIA study and preparation of the EIS for the proposed Cooking Oil Processing Plant in Chilanga District has already commenced to help determine the scope and content of environmental and social information in the Environmental Impact Statement. This scoping report is a compilation of the proceedings of the scoping meeting and information and data obtained through review of environmental documentation relevant to the project.

A public disclosure meeting will be held following preparation of the draft EIA report.

10. EIA STUDY TEAM

It is a requirement under Regulation 9(1) of the Environmental Impact Assessment Regulations, Statutory Instrument No. 28 of 1997, that the names and qualifications of the EIA Study Team members be submitted to ZEMA for approval. The names and qualifications of the study team members are presented in the Table 0.11 below. The detailed curriculum vitae are presented in Appendix B of the Final Terms of Reference Document.

Table 16.11: EIA Study Project Team

EIA Study Project Team					
No	Name	Qualification	Position	Role	Signature
1	Patson Zulu	- Bachelor of Science (Chemistry), University of Zambia, 1980-85. - Postgraduate certificate in Hazardous Waste Management April 16 to May 25, 1995: "Advanced Hazardous Waste Management" course conducted at the Miljokonsulterna, Nykoping, in Sweden. Qualification - Postgraduate certificate in Hazardous Waste Management	Team Leader	Coordination of EIA activities, plant process operation and units analysis, technology assessment and EIS report writing.	
2	Abiud Banda	- Masters of Science in Geo-Information Science and Earth Observation, University of Zambia, South Africa, 2017-2019 - Bachelor of Engineering (Environmental), Copperbelt University, 2015 - Environmental Impact Assessment Procedures, ZEMA,	Environmental Engineer – Reporting Water Resources Specialist and Air Quality Expert	Critical analysis of project components in relation to existing environmental setting; report writing Assessment of water resources and quality and Air quality assessment / air dispersion modelling	
3	Alice Muyanga	BSc (Wood Science and Technology - Forest Ecology), Copperbelt University, 2016	Ecologist	Assessment of ecological impacts.	
4	Siame Ndanji	Bachelor of Mineral Science (Geology), University of Zambia, 2017	Geology Expert	Assessment of the geology of the proposed site	

6	Ernest Mwape	• MSc (Agriculture Economics); • BA (Economics/Statistics)	Social Science Expert	• Socio-economic surveys • Social impact assessment • Environmental and Social Sustainability	
7	Bwalya Mwale	• Bachelor of Engineering (Environmental), Copperbelt University, 2017	Solid waste Management	• Analysis of best options for solid waste at the proposed site • Assessment of waste water, and sewage management	

11. POSSIBLE ANALYSIS ON INFORMATIONS GAPS

The baseline data shall be collected in order to describe the existing environment. Data collection will include an inventory of biophysical environment, conducting interviews with stakeholders and reviewing of relevant literature. Information on names of geographical features were checked from maps and confirmed by interviewing key local informants who were conversant with the area and specific details.

The inventory of the existing physical and biological environment such as vegetation in the proposed project site will focus on quality, quantity, density, and distribution. The mapping of the existing surrounding developments will be undertaken to map out the surroundings of the project areas in order to determine the location of the proposed development in relation to any existing critical installations and developments that would be affected by the project. In doing so, the existing environment will be categorized into physical, social and biological environments. Specialized studies shall be conducted to assess possible impacts on air, soil and water.

Existing Baseline Data: Review of relevant published data, including previous EIAs and Environmental monitoring data. Sources of baseline data and all key documents, which have been used for this EIA, shall be listed in the EIS Report appendices.

Biophysical Environment: Vegetation identification shall be done by examining tree shape, size and foliage color. As for species identification the following shall be considered: Leaf composition, leaf type, leaf variation and plasticity, branch shape and stems. The Species diversity, Abundance, Population and Evenness of the trees within the proposed site shall be included. Fauna and avifauna at the proposed site area will be sighted by taking field walks around the site and surrounding areas. Most of the birds will be identified on sight and reference was made through desk study literature.

Baseline Surveys: Plant being operational, only critical data that could have been missed shall be collected.

Sampling

Water, effluent and air pollutants shall be sampled for analysis. **Sample processing**

The water samples shall be analysed at onsite Plant laboratory. The water samples analysed for pH, cobalt (Co), copper (Cu), iron (Fe), Manganese (Mn), and Zinc (Zn). The Emissions collected and analysed for various pollutants to include dust, hexane, and oxides of carbon, Sulphur and nitrogen. .

12. SOCIAL ANALYSIS

Chilanga District in general has a number of small scale and a few large scale farmers growing crops (maize, soya beans, wheat, and groundnuts), fish farming and rearing of animals. The project area is predominantly a low industrial area with a lot of manufacturing and processing plants like Lafarge Cement etc. and a lot of people conducting small scale selling of commodities as a source of income. The surrounding local residents also depend on industries existing in the area for employment and small scale trading of goods and services.

Socio-Economic Environment

The economic base of the district is mainly agriculture. About 90% of the district's inhabitants depend on agriculture for their livelihood. Products such as milk, beef, water-melons, tomatoes, maize, and rose flowers are distributed both in the district and outside.

The informal sector is fairly active in the district. The informal sector trading is seen in vegetable, fruit, house ware, second hand clothes, furniture, carpenters and tailors offering the full range of basic essentials

Local Economy

It is expected that the development of the proposed project will improve the local economy, creating employment, make available affordable cooking oil, create markets for crops and enhance land use. This positive boost extends to the area of the increased food security attached to the anticipated increase in soya beans production resulting from increased demand for it from this project.

Socio-Economic Benefits

The proposed project anticipated benefits will include but not limited to;

- Employment for the local people for the duration of the project
- Availability of locally produced cooking oil within the project area
- Government revenue through taxes and levies to the local council
- Improved economy for the local through disposable income availability.
- Improved land use through cooking oil processing activities.

Social Fabric and Structure of the project site

Chilanga areas are composed of local residents of mixed ethnic and tribal backgrounds with the predominant local language being Nyanja. No specific traditional practices are conducted typical of a single tribe or culture in the project area.

Land Ownership and Zoning

The proposed project site is on title. The **32.4** Ha, allocation for the proposed expansion has been acquired for undertaking the proposed workw. All project activities will be undertaken within the project site.

Religious and cultural practices

The population in the project area is a mixture of different tribes and cultural backgrounds originating from various parts of the Zambia and a few foreign nationals that have settled in the area owing to its favorable business potential. Therefore, that area has no specific

traditional rites or ceremonies being practiced. Most of the people in the area embrace the Christian faith.

13. PROPOSED MITIGATION MEASURES

The following mitigation measures for the identified impacts of the project will be fully discussed in the final EIA;

Environmental Impact	Mitigation Measures
Impacts on Flora & Fauna	The site is uncleared site which is partially cleared on the northern side. In comparison to surrounding areas, impacts on utilization of natural resources within the project area will be mitigated through good plant practices and replanting of exotic plants within the plant.
Occupational Health	Awareness and training of its workers on safety procedures as well as providing protective clothing and equipment.
Air quality deterioration and Noise generation	✓ Equipment and plant machinery shall be well maintained and in good condition such that noise emitted is within an acceptable level. Any equipment or machinery producing abnormal noise will be fit with noise reducers and serviced for good noise performance. Workers operating in areas where noise is emitted are provided with protective equipment. ✓ All equipment/boilers emitting gases will be maintained and air quality monitoring conducted to ensure no air pollution is caused during operational
Impacts of the storage, management, use and disposal of plant chemicals and containers	✓ Well-designed infrastructure for storage of chemicals. Management and use of these chemicals is equally done following laid down procedures in line with regulations set out by ZEMA.
Use of water for cooking oil processing	✓ The proponent shall obtain water Permit for all boreholes to be drilled on site from WARMA. ✓ A good and effective monitoring system is put in place.
Deterioration of Water quality	✓ Stick to good practices of operation rules of ensuring regulatory conditions is followed. ✓ Ensure zero discharge of effluent to the environment. All effluent is channelled to the settling pond. ✓ Installation of sewer system (septic tanks) and ensure proper operation and regular maintenance throughout the project construction phase
Erosion/sedimentation.	Carryout proper construction activities. Limit movement of heavy machinery only to designated access routes and operational areas
Relocations /Resettlements and/or Compensation	The proposed development site has no settlers who will require a form of resettlement and/or compensation as the project site is within already existing operational plant.
Safety and Health Risk of Workers	✓ Implementation of safety and health policies designed to identify, evaluate, monitor and control health hazards and provide safety training; ✓ employees shall familiarize with safety techniques through training;

	✓ Management shall ensure that safety inductions are undertaken to persons visiting or working in sensitive areas; ✓ Implementation of emergency procedure on site; ✓ Use of clearly labelled signage; ✓ Ensuring that employees wear suitable protective clothing at all times when it is needed; ✓ Proper control and directing of traffic during material delivery.
Employment	✓ Through advertising fairly ✓ Ensure gender sensitivity in terms of employment

14. CONCLUSION

As outlined in Section 1, the PGL has endeavored to submit this Report in accordance with the requirements of the Zambia Environmental Management Agency (ZEMA) and to expedite the smooth and normal operation of the project in line with its strategic plans. It is the wish of PGL that this report will receive a favorable consideration due to the following:

- The project has national benefit especially amid hiked edible oil prices in the country.
- The negative impacts and concerns from stakeholders shall be fully assessed.
- The proposed plant contributes to the economic development of the Chilanga district and the nation through the economic empowerment of the employees and revenue gathered from production of high quality cooking oil.
- The plant shall respond positively to the direction of the ZEMA to ensure it complies with the stipulations provided for in the EMA No.12 of 2011

Throughout EIA Process PGL will continue to commit itself to fostering a continued process of environmental compliance with the due guidance from ZEMA, CTC and the various related stakeholders, so as to achieve sustainable national development.

15. RECOMMENDATIONS

The major environmental risks associated with the proposed cooking oil plant are air pollution specifically from boiler operation and solvent extraction. However, the levels and impact of air pollutants will be mitigated by regularly limiting the releases to ZEMA approved levels.

Other environmental risks will include ground water pollution. In order to reduce these impacts, the effluent will be pretreated before release to the environment. All requirements shall be set out in the EMP and be complied by Parrogate Ginneries Ltd.

It is PGL's hope that the Zambia Environmental Management Agency, Chilanga Town Council and other relevant Stakeholders will allow PGL to demonstrate its ability to implement the proposed measures of the project to the best of its ability and for the benefit of all Stakeholders, taking into consideration the fact that the positive impacts of the proposed project far out-weigh the negative impacts.

16. DECLARATION OF AUTHENTICITY

I, Rakesh Yadav the undersigned, declare that the contents of these Scoping report reflect the scope of work that will be undertaken in conducting the Environmental Impact Assessment (EIA) for the Cooking Oil Processing Plant by Solvent Extraction on Mumbwa Road in Mwembeshi area in accordance with the Environmental Management Act No. 12 of 2011 read together with the Environmental Impact Regulations S.I. No. 28 of 1997.

We further declare that the concerns raised by stakeholders at the time of consultations have been taken into account in preparing this Scoping report.

We acknowledge that Environmental Impact Assessment studies for the facility will be undertaken in accordance with the applicable Zambian legal and administrative framework.

For and on behalf of the **Parrogate Ginneries Limited, Zambia.**



.....
Mr. Rakesh Yadav
Group Technical Head
Parrogate Ginneries Limited

17. REFERENCES

GRZ, 2011. Environmental Management Act No. 12 of 2011. Government Printers, Lusaka, Zambia.

GRZ, 1997. The Environmental Impact Assessment Regulations, 1997. Statutory Instrument No. 28 of 1997. Government Printers, Lusaka, Zambia.

18. APPENDICES

Appendix A: Curriculum Vitae of the EIA Study Team Members.

Appendix B: Scoping Meeting Advert.

Appendix C: Certificate of Incorporation

Appendix D: Certificate of Title

APPENDIX A: CURRICULUM VITAE

Patson Zulu

Position Title and No.	TEAM LEADER:INDUSTRIAL PROCESS AND ENVIRONMENTAL MANAGEMENT EXPERT
Name of Expert:	Patson Zulu
Date of Birth:	27 th January, 1960
Country of Citizenship/Residence	Zambia

Education:

Post-Graduate Studies/Training

Name of Institution/Univer- sity - City - Country	Period		Certificate/Diploma/Degree obtained	Main Topic / Major
	From	To		
ANTI-CORRUPTION COMMISSION-LUSAKA ZAMBIA		NOV,2015	POSTGRADUATE CERTIFICATE	INTEGRITY COMMITTEE INDUCTION
INSTITUTE OF DIRECTORS-LUSAKA- ZAMBIA		MAR,2009	POSTGRADUATE CERTIFICATE	CORPORATE GOVERNANCE
INSTITUTE OF DIRECTORS-LUSAKA- ZAMBIA		JULY,2006	POSTGRADUATE CERTIFICATE	MANAGEMENT DEVELOPMENT PROGRAMME FOR SENIOR MANAGERS- MANAGERIAL SKILLS AND CAPABILITIES, PLANNING PROCESS, STRATEGY FORMULATION AND CONTROL, MANAGING CHANGE
INSTITUTE OF DIRECTORS- SIYVONGA-ZAMBIA		JULY,2005	POSTGRADUATE CERTIFICATE	STRATEGIC MANAGEMENT WORKSHOP FOR MANAGERS
ZAMBIA INSTITUTE OF ADVANCED LEGAL EDUCATION (ZIALE)- LUSAKA-ZAMBIA		NOV 2003	POSTGRADUATE CERTIFICATE	INVESTIGATORS AND PROSECUTORS COURSE
BONN, GERMANY		DEC 2001	POSTGRADUATE CERTIFICATE	ENVIRONMENTAL MANAGEMENT TOOLS
NIVERSITY OF THEWITWATERSRAND U-JOHANNESBURG- SOUTH AFRICA	21 FEB 2000	25FEB 2000	POSTGRADUATE CERTIFICATE	ENVIRONMENTAL ASSESSMENT
SWEDEN	Mar 1999	April 1999	POSTGRADUATE CERTIFICATE WITH HONOURS	ISO-14000 - ENVIRONMENTAL MANAGEMENT SYSTEMS
HOKKAIDO INSTITUTE OF ENVIRONMENTAL SCIENCES-SAPPORO- JAPAN	Sept 1996	Nov. 1996	POSTGRADUATE CERTIFICATE	PLANNING ON REGIONAL ENVIRONMENTAL PRESERVATION
MILJOKONSULTERNA-	April	May 1995	POSTGRADUATE	ADVANCED HAZARDOUS WASTE

NYKOPING-SWEDEN	1995		CERTIFICATE	MANAGEMENT
DRESDEN, GERMANY	Nov 1993	Dec 1993	POSTGRADUATE CERTIFICATE	ADVANCED WASTE MANAGEMENT
Name/Place of Training Institution- City - Country	Type of Training	Period		Certificates or Diploma Obtained
		From	From	
ZAMBIA BUREAU OF STANDARDS- LUSAKA-ZAMBIA	QUALITY MANAGEMENT SYSTEM:IMPLEMENTATION and INTERNAL AUDIT: ISO 9001 and ISO 19011:2018	9 JAN,2021	13 JAN, 2021	CERTIFICATE OF TRAINING
ZAMBIA BUREAU OF STANDARDS- LUSAKA-ZAMBIA	ENVIRONMENTAL MANAGEMENT SYSTEMS: IMPLEMENTATION : ISO 14001:2015	16 JAN,2021	17 JAN,2021	CERTIFICATE OF TRAINING
FRINGILLA LODGE- KITWE-ZAMBIA	STRATEGIC ENVIRONMENTAL ASSESSMENT	10 OCT,2010	13 OCT,2010	CERTIFICATE OF ACHIEVEMENT
THE UNIVERSITY OF ZAMBIA- LUSAKA-ZAMBIA	MINING AND THE ENVIRONMENT	9 OCT,2002	12 OCT,2002	CERTIFICATE OF ACHIEVEMENT
DET NORSKE VERITAS-LUSAKA	PROJECT MANAGEMENT	20 FEB,2001	23 FEB,2001	TRAINING CERTIFICATE
GABORONE- BOTSWANA	SADC INDUSTRIAL POLLUTION PREVENTION SEMINAR	FEB 2001	FEB 2001	ATTENDANCE CERTIFICATE
ENVIRONMENTAL COUNCIL OF ZAMBIA- CHISHIMBA- ZAMBIA	CLIMATE CHANGE TRAINING FOR GOVERNMENT PLANNING OFFICERS AND KEY STAKEHOLDERS	10 APR,2000	14 APR,2000	TRAINING CERTIFICATE
KENYA	CLEANER PRODUCTION ROUNDTABLE CONFERENCE FOR AFRICA	2000		CERTIFICATE OF ACHIEVEMENT
ENVIRONMENTAL COUNCIL OF ZAMBIA- CHISHIMBA- ZAMBIA	ENVIRONMENTAL IMPACT ASSESSMENT REVIEW	6 DEC,1999	10 DEC,1999	ATTENDANCE CERTIFICATE
KENYA	EXPERT GROUP ONWASTE MANAGEMENT FOR AFRICA	1998		ATTENDANCE CERTIFICATE
NAIROBI KENYA	GROUP EXPERT WORKSHOP ON MUNICIPAL SOLID WASTE MANAGEMENT	DEC 1997		ATTENDANCE CERTIFICATE
DAR-ES-SALAAM- TANZANIA	ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT	OCT 1997		ATTENDANCE CERTIFICATE
GABORONE, BOTSWANA	3RD SADC WASTE MANAGEMENT CONFERENCE	JUNE 1997		ATTENDANCE CERTIFICATE
LUSAKA ZAMBIA	NATIONAL WORKSHOP ON CLEANER PRODUCTION FOR CHIEF EXECUTIVES	NOV 1997	NOV 1997	ATTENDANCE CERTIFICATE

	AND DECISION MAKERS FROM INDUSTRY, NGOS, ACADEMIA AND LOCAL GOVERNMENT			
SAPPORO-JAPAN	PLANNING ON REGIONAL ENVIRONMENT PRESERVATION	4 SEPT,1996	18 NOV, 1996	SPECIAL TRAINING CERTIFICATE
DRESDEN UNIVERSITY OF TECHNOLOGY AND UNITED NATIONS ENVIRONMENT PROGRAMME-GERMANY	ENVIRONMENTAL MANAGEMENT FOR DEVELOPING COUNTRIES-WASTE MANAGEMENT	10 NOV, 93	10 DEC,93	CERTIFICATE OF PROFICIENCY

Secondary School: Kalulushi Secondary

- **Period:** 1975 - 1979
- **Qualification:** Cambridge School Certificate
- **Subjects Studied:** English, Literature in English, Geography, History, Mathematics, Pure Physics, Pure Chemistry and Pure Biology
- **Grade Obtained:** Division One

Employment Record relevant to the Assignment:

Period	Employing organization and your title/position. Contact information for references	Activities Performed	Title / Positions	Country	Summary of activities performed relevant to the Assignment
May 2019 to Present	ENVIRONMENTAL SCIENCE AND ENGINEERING CONSULTANTS LTD	CONSULTANCY	• LEAD CONSULTANT • TEAM LEADER	ZAMBIA	• LEAD CONSULTANT/ TEAM LEADER FOR ; ➤ FEASIBILITY STUDY FOR IMPROVED SOLID WASTE MANAGEMENT SYSTEM IN CHOMA DISTRICT BY CHOMA MUNICIPAL COUNCIL AND GIZ ➤ ENVIRONMENTAL MANAGEMENT SYSTEM IMPLEMENTATIO

					➤ N QUALITY MANAGEMENT SYSTEM; IMPLEMENTATION AND INTERNAL ENVIRONMENTAL AUDITS ➤ ENVIRONMENTAL IMPACT ASSESSMENT ➤ ENVIRONMENTAL PROJECT BRIEFS
July 2003 to Feb. 2018	ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY	ENVIRONMENTAL MANAGEMENT	• MANAGER, NORTHERN REGION • MANAGER FOR THE INSPECTORATE • CLEANER PRODUCTION MANAGER	ZAMBIA	• MANAGEMENT AND SUPERVISION OF INSPECTORATE WORK, COMMUNICATION, AND ACCOUNTS FOR ZEMA. • ADVISED AND EDUCATED THE PUBLIC AND REGULATED PARTIES ABOUT ENVIRONMENTAL ISSUES, REGULATIONS, POLICY, AND COMPLIANCE. • PROVIDED CLIENTS WITH GUIDANCE ON HOW TO COMPLY WITH ENVIRONMENTAL REGULATIONS • CONDUCTED ALL TESTS IN ACCORDANCE TO THE ZAMBIA ENVIRONMENTAL REGULATIONS AND THEN DETERMINED THE COMPOSITION OF THE AIR, WATER AND GASES
July 1999 to June 2003	ZAMBIA ASSOCIATION OF CHAMBERS OF COMMERCE AND INDUSTRY (ZACCI)	TRAINING OF OFFICERS IN CLEANER PRODUCTION METHODOLOGY	CLEANER PRODUCTION MANAGER	ZAMBIA	• ZAMBIAN MANAGER AND COUNTERPART MANAGER FOR DET NORSKE VERITAS OF NORWAY TO TRAIN ZAMBIAN INDUSTRIES IN CLEANER TECHNOLOGY AND CLEANER PRODUCTION OF GOODS AND

					SERVICES. COORDINATED VARIOUS WORKS UNDER ZAMBIA ASSOCIATION OF CHAMBERS OF COMMERCE AND INDUSTRY (ZACCI).
1992-1999	ENVIRONMENTAL COUNCIL OF ZAMBIA	ENVIRONMENTAL MANAGEMENT	SENIOR INSPECTOR/PROJECT COORDINATOR	ZAMBIA	- INDUSTRIAL POLLUTION AND CLEANER TECHNOLOGY - WASTE MANAGEMENT - PROJECT JOINTLY EXECUTED BY THE ENVIRONMENTAL COUNCIL OF ZAMBIA (ECZ) AND THE LUSAKA CITY COUNCIL (LCC) TO DIAGNOSE LUSAKA MUNICIPAL SOLID WASTES (Team leader- waste characterization for Lusaka District) - DEVELOPED AND IMPLEMENTED AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) IN A ZAMBIAN INDUSTRY, TOGETHER WITH DET NORSKE VERITAS (DNV) OF NORWAY - FORMULATION OF WASTE MANAGEMENT REGULATIONS AS DELEGATED LEGISLATURE OF THE ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL ACT OF 1990
1985 to 1992	NITROGEN CHEMICALS OF ZAMBIA	PRODUCTION OF FERTILISERS	PROCESS ENGINEER/LABORATORY CHEMIST	ZAMBIA	- DEVELOPMENT OF MASS BALANCE AND ENERGY BALANCE TECHNIQUES, SIMPLE PROCESS MODIFICATIONS AND DESIGN. - ORGANISE

					TRAINING MATERIALS FOR PLANT TECHNICIANS • QUALITY CONTROL, RESEARCH AND DEVELOPMENT

Membership in Professional Associations and Publications:

1. Patson Zulu et al (1996) Solid Waste Management Master Plan Project Document for the City of Lusaka (Diagnosis)
2. "Zambia Railways Environmental Assessment Study" - Patson Zulu and Zebediah Phiri; October 1999.
3. Patson Zulu et al (2002) 'Environmental Management System for Zambia Railways'

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
5. Document Reviews including existing legal frameworks relevant to the projects	5. Review of relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and Engineering Consultant Limited. Also lead Team Experts to a review process for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience
6. Lead the team preparing the inception Report	6. July 2018, Team Leader and Environmental Expert for the team that prepare the inception report for Ramoji Resources for the proposed Copper Processing Plant and Water Pipeline Project in Salamano area of Chambishi in Kalulushi District
7. Lead the team preparing the EIA terms of	7. GIS and Environmental Expert for the

Reference for submission to ZEMA	proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited.
8. Lead the team for the Scoping meeting to be held at the Proposed Project site	8. Team Leader and Environmental Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
9. Review of the compiled Draft ToRs, Scoping Report and Specialized reports into a Draft EIS for submission to ZEMA	9. Reviewed the Compiled and drafted EIS for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.
10. Review the Revised (Incorporate comments from stakeholders and ZEMA final of EIS document	10. Reviewed the revised Final EIS for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.

Expert's Contact Information: email patsonzulu@gmail.com Phone: 0977 470849/0955833581/0967470849

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.

PATSON ZULU

24/04/2022



.....
.....

Name of Expert

Date

Signature

PATSON Zulu

24/04/2022



.....
.....
Name of authorized Representative of the Consultant

Date

Signature

Abiud Banda

Position Title and No.	ENVIRONMENTAL ENGINEER (Water, Air & Noise) & GIS EXPERT
Name of Expert:	Abiud Banda
Date of Birth:	29 th August, 1989
Country of Citizenship/Residence	Zambia

Education:

Master's Degree (Currently enrolled) in Geo-information Science (GIS) and Earth Observation, University of Zambia (2017 – 2021), Zambia.

Bachelor's Degree in Environmental Engineering, Copperbelt University (2011 – 2016), Kitwe, Zambia.

GSCE G12 Division one certificate, Chizongwe Technical School (2007 - 2009 Year), Chipata, Zambia

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
May 2019 to Present	Environmental & GIS Specialist - Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre, NDOLA	Zambia	Environmental Consultant - Environmental impact Assessment for the Construction of a filling station at Garneton turnoff in Kitwe by African Grey Limited, 2018 Environmental Consultant - Environmental impact Assessment for the Construction of a filling station at Nakadoli in Kitwe by African Grey Limited, 2018 Environmental Consultant - Environmental impact Assessment for the Construction of a filling station in Masala, Ndola by Usangu Logistics Limited, 2018 Environmental Specialist - Environmental Assessment for the decommissioning of fuel storage facility by Syngenta Zambia Limited, 2019
March 2017 to March. 2018	Waste Management Inspector, Northern Region, Zambia Environmental	Zambia	•Advised and educated the public and regulated parties about environmental issues, regulations, policy and compliance. •Provided clients with guidance on how to comply with environmental regulations

	Management Agency		•Conducted all tests in accordance to the Zambia environmental regulations and then determined the composition of the air, water and gases.
2015	Environmental Engineer, Mulonga Water and Sewerage Company	Zambia	Evaluated architectural designs for existing pipe networks □ Supervised sewer, manhole cover designs, unblocking and water treatment plans Examined and updated sanitary inspection log entries on a regular basis Ensured all needed permits and clearances were obtained and all job cards worked on time Ground water pollution spatial distribution in Kamuchanga and AEL compound

Membership in Professional Associations and Publications:

4. Graduate Member- Engineering Institution of Zambia
5. Poster presentation: "Mobile Micro sensors for air monitoring, Lusaka show ground 2016 at Copperbelt University stand
6. Poster presentation: "Mobile Micro sensors for air monitoring, Pretoria, South Africa, May 2017 at SAIMM Young Professional Conference (YPC).
7. Project: "Designing and building a low cost wireless mobile micro sensor for air pollution monitoring, Environmental Lab, CBU 2015 to Department of Environmental lecturers, Kitwe
8. NSTC Presentation: "Designing and Building Mobile Micro-Sensor Prototype for Air Quality Monitoring, School of mathematics and natural sciences conference room, July 2016 to National Science and Technology Council, CBU, Kitwe
9. Industrial Seminar: "Designing and Building Mobile Micro-Sensor Prototype for Air Quality Monitoring, Lunte Lodge, September 2017 to Mopani Copper Mines, Konkola Copper Mines, Kalumbila Mines, Lumwana Mining Limited, Nkana Water & sewerage Company, National Science and Technology Council and CBU Researchers, Kitwe

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
4. Document Reviews including existing legal frameworks relevant to the projects	4. Review of relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and

	Engineering Consultant Limited.
5. Part of the team preparing the EIA terms of Reference for submission to ZEMA	5. GIS and Environmental Expert for the proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited.
6. Part of the Scoping meeting to be held at the Proposed Project site	6. GIS and Environmental Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
7. Collection of satellites maps for the proposed site	7. Data captured for a proposed filling station project by ACM Products Limited at Copperhill Mall Kitwe District
8. Map Production for the Project Site	8. Produced maps for the proposed Diesel Storage tank Project at Mineral Junxion Limited in Kitwe District, 2019
9. Compilation of Draft ToRs, Scoping Report and Specialized reports into a Draft EIS for submission to ZEMA	9. Compiled and drafted the EIS for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.
10. Incorporate comments from stakeholders and ZEMA into a final of EIS document	10. Incorporated comments from ZEMA for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.

References

Patson Zulu (0967470849) Chairman and CEO Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Lillian C. Kalenge, Principal Inspector – Waste Management, Zambia Environmental Management Agency (ZEMA) P.O. Box 71302, Ndola. Email: lkalenge@gmail.com/ lkalenge@zema.org.zm Cell: +260955292799
Dr. Phenny Mwaanga, Project Supervisor - Ecotoxicology Lecturer, The Copperbelt University, School of Mines & Mineral Sciences, P.O. Box 21692, Kitwe, Zambia Email: phennym@yahoo.co.uk Cell: +260969156065	Eng. Davy Banda, Former Peri-urban Manager/Sanitation Engineer, Mulonga water and Sewerage Company, P.O. Box 11712, Chingola, Zambia. Email: bandadavy@mwsc.com.zm Cell: +260967362338/955670164

Expert's Contact Information: email abiudbanda@gmail.com Phone: 0972 590297/0953364136

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.

ABIUD BANDA

24/04/2022



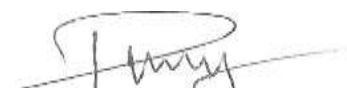
Name of Expert

Date

Signature

PATSON ZULU

24/04/2022



Name of authorized Representative of the Consultant

Date

Signature

Alice Muyanga

Position Title and No.	ECOLOGY EXPERT
Name of Expert:	Alice Muyanga
Date of Birth:	28 th June, 1989
Country of Citizenship/Residence	Zambia

Education:

2011 to 2016 Copperbelt University, BSc Wood Science and Technology,
ZAMBIA

1995 to 2007 St Jones Convent Secondary School GCE Levels Certificate

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
November 2018 - present	Ecology Expert – Environmental Science and Engineering Consultants LTD	Zambia	- Reviewed previous works related to flora and fauna and relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and Engineering Consultant Limited - Ecological Expert for the proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited - Assessed the flora of the area for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019
2018	Supervisor – ZAFFICO, Ndola	Zambia	Supervising casual workers in the maintenance of compartments, where small pine trees are grown
April 2017 – May 2017	Waste Management Researcher-Food and Agriculture Organisation	Zambia	Interviewed the city council, households and the waste management bodies concerning the management of waste and how much was generate.

Membership in Professional Associations and Publication:

2. Member of CBU Anti-AIDS

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
7. Document Reviews including ecological state of the proposed site and existing legal frameworks relevant to the projects	7. Reviewed previous works related to flora and fauna and relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and Engineering Consultant Limited.
8. Part of the team preparing the EIA terms of Reference for submission to ZEMA	8. Ecological Expert for the proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited.
9. Part of the Scoping meeting to be held at the Proposed Project site	9. Ecological Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
10. Flora and fauna assessment of the proposed project site and compilation of the ecology report	10. Assessed the flora of the area for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019

References

Patson Zulu (0967470849) Environmental Science & Engineering	Prof. Jacob Mwitwa Lecturer at the Copperbelt University (Director at

Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Kapasa Makasa University) School of Natural Resources Jambo Drive, Riverside Kitwe, Zambia. P.O. Box 21692 Tel. +260 212 230 923 Mobile: +260 977 848 462/ +260 966 848 462 EMAIL: mwitwajp@yahoo.com
Dr. Elisha Ncube Lecturer at the Copperbelt University School of Natural Resources Jambo Drive, Riverside Kitwe, Zambia. P.O. Box 21692 Tel. +260964612068/ +260977662278	Mrs Yaki Namiluko Lecturer at the Copperbelt University School of Mines and Minerals Jambo Drive, Riverside Kitwe, Zambia. P.O. Box 21692 Tel. +260977830770

Expert's Contact Information: email muyanga.alice.am@gmail.com Phone: 0968327998

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.

24/04/2022



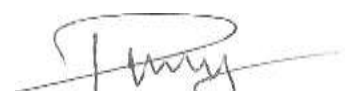
Name of Expert

Date

Signature

PATSON ZULU

24/04/2022



Name of authorized Representative of the Consultant

Date

Signature

Siame Ndanji

Position Title and No.	GEOLOGIST
Name of Expert:	Siame Ndanji
Date of Birth:	
Country of Citizenship/Residence	Zambia

Education:

2011 – 2017: University of Zambia – Bachelor of Mineral Science (Geology)

2007 – 2009: Zimba High School – Grade 12 School Certificate

2005 – 2006: Kafue Boys Secondary School – Grade 9 School Certificate

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
August 2019 - present	Geology Expert – Environmental Science and Engineering Consultants LTD	Zambia	Assessed the geology and possibility of successful exploration activities of the area for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019
May to July of 2019	Survey Team Member - Geological Survey Department Geologist, Geological Survey of Zambia Ministry of Mines and Minerals Development Lusaka-10101, Zambia Tel: (+260) 0977563106, (+260) 0956723322	Zambia	- Stream and soil sediment geochemical survey of the Copperbelt and Northwestern province conducted by the geological survey department from May to July of 2019. - In this survey I took part in the planning of the survey and collection of the samples
2017 - July 2019	Geology Researcher – University of	Zambia	Conducted two projects that helped me in understanding the practical aspects of my field.

	Zambia		- The first was an independent mapping project, in this project I conducted geological mapping on an area of 20 km² from which I was able to generate a detailed geological map. - The second project was a soil geochemical survey, in this project soil samples collected in an area were analysed with the objective of finding mineralization in the area from which they were collected.

Licences:

4. Blasting Licence (All mine operations)
5. Valid Silicosis
6. Valid medical certificate of fitness (KCM)

Membership in Professional Associations and Publication:

6. President – The Copperbelt Mines and Minerals Engineering Society (May 2017 – July 2018)
7. Student Counsellor – The Copperbelt University Student Counsellor (May 2017 – June 2018)
8. Committee Member – The Engineering Institute of Zambia – CBU Chapter (May 2017 – July 2018)
9. Registered Member of Engineering Institution of Zambia (EIZ)
10. Registered Member of Southern Africa Institute of Mining and Metallurgy (SAIMM)

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

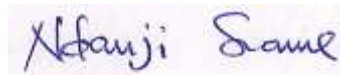
Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
11. Document Reviews including geological and hydrogeological state of the proposed site and existing legal frameworks relevant to the projects	11. Reviewed previous works related to geology and mining rights and relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and Engineering Consultant Limited.
12. Geological and mineral quality assessment of the proposed project site and compilation of the mineral and soil assessment report	12. Assessed the geology and possibility of successful exploration activities for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia

References

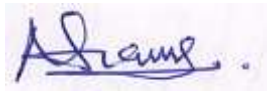
B.N. Upreti, Ph.D. Professor and Head, Department of Geology School of Mines University of Zambia Great East Road Campus, P.O. Box 32379, Lusaka-10101, Zambia Tel: (+260) 0966716572 (Cell) Email: bnupreti@gmail.com Former Head of Department of Geology, and Dean, Institute of Science and Technology Tribhuvan University, Kathmandu, Nepal.	Dr. A. Ahmed, Ph.D Lecturer, Department of Geology School of Mines University of Zambia Great East Road Campus, P.O. Box 32379, Lusaka-10101, Zambia. Tel: (+260) 0978289796 Email: aahmed@unza.zm
Mr. C. Mwansa, B.Sc Geologist, Geological Survey of Zambia Ministry of Mines and Minerals Development Corner of Nationalist and Government road, P.O Box 50135, Lusaka-10101, Zambia Tel: (+260) 0977563106, (+260) 0956723322	Mr. B. Musonda, M.Sc. Lecturer, Lecturer, Department of Geology School of Mines University of Zambia Great East Road Campus, P.O. Box 32379, Lusaka-10101, Zambia. Tel: (+260) 0978825283

Expert's Contact Information: sndanji@gmail.com**Phone:** 0975750200**Certification:**

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.



24/04/2022



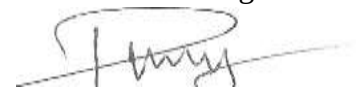
Name of Expert

Date

Signature



24/04/2022



Name of authorized Representative of the Consultant

Date

Signature

Ernest Mwape

Position Title and No.	SOCIAL ECONOMIC EXPERT
Name of Expert:	Ernest Mwape
Date of Birth:	27 th January, 1966
Country of Citizenship/Residence	Zambia

Education:

1991 to 1994 University Of Manitoba, Msc. Agricultural Economics , CANADA
(Production Economics)

1984 to 1988 University Of Zambia, BA Economics/Statistics, ZAMBIA

1979 to 1983 Mpatamato Secondary School GCE O’levels Certificate

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activitites Performed Relevant To The Assignment
August 2014 to August 2017	Director – Policy and Planning Division, Zambia Development Agency (ZDA)	Zambia	6. Editing, finalizing and publishing eight Annual Reports that were outstanding statutory obligations to the National Assembly since the Agency was established in 2007; 7. Preparing and publishing the 2016-2020 ZDA Strategic Plan; writing the 2016-2020 Strategic Plan for Zambia Export Development Fund (ZEDEF); 8. Reviewing and redesigning the Agency’s Monitoring & Evaluation system; 9. Compiling the Agency’s Annual Work-Plans and Budgets; and designing the template for Operations Manual for all Divisions at the Agency. 10. coordinated and facilitated a number of capacity workshops for the Agency, in particular officers in the Policy and Planning Division
August 2007 to August	Economic Governance	Zambia	5. Provided secretariat services to the Africa Peer Review Mechanism (APRM)

2014	Specialist, Governance Department at the Ministry of Justice		6. Facilitating and coordinating activities undertaken by governance oversight institutions that promote accountability, 7. Transparency, anti-corruption and those that foster increased efficiency and effectiveness in the delivery of public goods and services 8. co-authored thematic reports on Economic Governance and Management, and Political & Democratic Governance in Zambia's first self-assessment report for the APRM in 2010
November 2006 to July 2007	Program Officer - Private Sector Development Reform Program (PSD – RP) domiciled at the Ministry of Commerce, Trade and Industry (MCTI)	Zambia	2. responsible for coordinating activities that were undertaken through the Trade Expansion Working Group that eventually resulted in review and revision of some policies and regulations governing the business environment
October 2004 to October 2006	Macroeconomics Advisor - Japanese International Cooperation Agency (JICA) in Lusaka, Zambia	Zambia	2. prepared advisory notes on various economic development initiatives that the Zambian Government was undertaking
September 2001 up to November 2004	Policy Component Manager of the USAID-funded Community-Based Natural Resources Management and Sustainable Agriculture (CONASA) project		3. Raise public awareness about the concept and benefits of Community-Based Natural Resources Management (CBNRM). 4. reviewed and analysed policies and legislation that govern the natural resources sector in Zambia
1999 to September 2001	Chief Economist for the Zambia Association of Chambers of Commerce and Industry (ZACCI)		3. Draft position papers that reflected the interests and concerns of the business community for consideration by the Zambian Government and cooperating partners. 4. made a lot of presentations to the Parliamentary Committee on Economic Affairs and Labour, such as the recommendations and proposals that were adopted and implemented by Government through the World Bank sponsored Enterprise Development Project (EDP) that increased participation of commercial banks and made them comfortable to submit their confidential information

Membership in Professional Associations and Publications:

9. Secretariat to the African Peer Review Mechanism (APRM); Ruling Justly component of the Millennium Challenge Account (MCA); the initial Legal and Judicial Reforms Committee; the Governance Sector Advisory Group (GSAG); and the Macroeconomics Sector Advisory Group.
10. In July 2006 I was elected the Vice President of Economics Association of Zambia (EAZ). I did a lot of work for the Association, such as: preparing presentations for the Parliamentary Committee on Economic Affairs and Labour; critiques of the annual national budgets; prepared comments on various Government initiatives, policies, and legislation; drafted project proposals; organized and moderated discussions on topical economic issues; etc.
11. I served as Chairperson of the DFID-funded Revenue Institutions of Zambia Enhanced Support (RIZES)/CSO project hosted by Economics Association of Zambia (EAZ) between 2004 and 2005.
12. I was involved in negotiations between EAZ and NIZA (a Netherlands-based NGO) to help raise awareness on NEPAD program of the Organization of African Union.
13. I was Vice-Chairman of the Socio-Economic Committee of the Poverty Monitoring and Analysis (PMA) component of the World Bank funded Zambia Social Investment Fund (ZAMSIF) project.
14. Between 1999 and 2001, I served on the Technical Committee of the Directorate of Macro-Economic Policy Analysis (DMPA) project jointly implemented by the Ministry of Finance and Economic Development (MOFED, Zambia); the Africa Capacity Building Foundation (ACBF in Harare, Zimbabwe) and the United Nations Development Program (UNDP in Zambia).
15. Between 2000 and 2001, I served on the Macro-economics and Industry Working Groups that were preparing Zambia's Poverty Reduction Strategy Paper (PRSP) under the auspices of the World Bank's Poverty Reduction Growth Facility (PRGF). From 2001 to 2004, I continued to participate in the PRSP process and maintained active links through the Environment SAG in which I represented the CONASA project and Civil Society for Poverty Reduction (CSPR).
16. Between August 2000 and August 2001 I served as the National Focal Point for Zambia for the second Africa-Asia Business Forum (AABF II). The Government of Japan through UNDP funded AABF with the objective of promoting business linkages between Asian and African companies. I recruited six companies that took part in the process and concluded with the Forum in Pretoria, South Africa.

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned

	work
7. Part of the team preparing the inception Report	7. For ten months up to 31st July 2007, I was a Program Officer in charge of the portfolio looking at economic institutions, policy and trade expansion at the Private Sector Development Reform Program (PSD – RP)
8. Input in preparing terms of Reference	8. Socio-economic Expert for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted under Environmental Science and Engineering Consultant Limited.
9. Stakeholders and interested parties consultations 10. Socio-economic surveys; 11. Socio-Economic impact assessment Environmental and Social-economic Sustainability Assessment	9. Socio-economic Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience. 10. Under the Ministry of Agriculture & Water Development (MAWD) in February 1989 he worked as Economist/Statistician responsible for organizing and conducting the annual crop forecasting surveys, and production of the National Early Warning Monthly Food Security Bulletins. 11. After the restructuring of the Ministry, I was appointed as Principal Planner (Infrastructure) and served as Project Coordinator of the civil works component of the US\$10mn World-Bank funded project called Zambia Agricultural, Marketing, Processing and Infrastructure Project (ZAMPIP)

12. Reviewing of draft EIS document	12. Internal Document Quality Control - reviewed the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.

Expert's Contact Information: email: ernmade@yahoo.co.uk Phone: 0967994059/0955994059

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by ZPPA.

ERNMADE MWAKE

24/04/2022



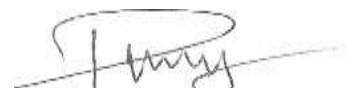
.....
.....
Name of Expert

Date

Signature

PATSON ZULU

24/04/2022



.....
.....
Name of authorized Representative of the Consultant

Date

Signature

James Bwalya

Position Title and No.	CIVIL ENGINEER
Name of Expert:	James Bwalya
Date of Birth:	8 th February, 1989
Country of Citizenship/Residence	Zambia

Education:

Bachelor's Degree in Civil Engineering, Copperbelt University (2012 – 2017), Kitwe, Zambia.

GSCE G12 Division one certificate, Katanshi School (2008 - 2010 Year), Mufulira, Zambia

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
October 2019 to Present	Civil Engineer - Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre, NDOLA	Zambia	Civil Engineer - Environmental Assessment for the Construction of China-Aided International Conference Centre by Ministry of Housing and Infrastructure Development, 2020 Environmental Specialist - Environmental Assessment for the decommissioning of fuel storage facility by Syngenta Zambia Limited, 2019
2015	Civil Engineer, Mulonga Water and Sewerage Company	Zambia	Evaluated architectural designs for existing pipe networks Supervised sewer, manhole cover designs, unblocking and water treatment plans Examined and updated sanitary inspection log entries on a regular basis Ensured all needed permits and clearances were obtained and all job cards worked on time Ground water pollution spatial distribution in Kamuchanga and AEL compound

Membership in Professional Associations and Publications:

1. Graduate Member- Engineering Institution of Zambia

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
1. Part of the Scoping meeting to be held at the Proposed Project site	1. Civil Engineer for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
2. Collection of satellites maps for the proposed site	2. Data captured for a proposed filling station project by ACM Products Limited at Copperhill Mall Kitwe District
3. Compilation of Draft ToRs, Scoping Report and Specialized reports into a Draft EIS for submission to ZEMA	3. Compiled and drafted the EIS for the proposed Expansion of Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2020 under Environmental Science and Engineering Consultant Limited.

References

Patson Zulu (0967470849) Chairman and CEO Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Eng. Davy Banda, Former Peri-urban Manager/Sanitation Engineer, Mulonga water and Sewerage Company, P.O. Box 11712, Chingola, Zambia. Email: bandadavy@mwsc.com.zm Cell: +260967362338/955670164

Expert's Contact Information: email bwalyajames.jb.jb@gmail.com Phone: 0969535371

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation

described herein may lead to my rejection by ZEMA.

24/04/2022



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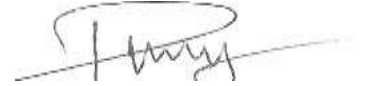
Name of Expert

Date

Signature

PATSON Zulu

24/04/2022



.....

Name of authorized Representative of the Consultant

Date

Signature

Bwalya L. Mwale

Position Title and No.	ENVIRONMENTAL ENGINEER
Name of Expert:	Bwalya L. Mwale
Date of Birth:	28 th February, 1995
Country of Citizenship/Residence	Zambia

Education:

Bachelor's Degree in Environmental Engineering, Copperbelt University (2013 – 2018), Kitwe, Zambia.

GSCE G12 Division one certificate, Mazabuka Girls Secondary School (2009 - 2011), Mazabuka, Zambia

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
2019 to Present	Environmental Specialist - Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre, NDOLA	Zambia	Environmental Consultant - Environmental impact Assessment for the Construction of the China aided International Conference center in Lusaka by Ministry of Housing and Infrastructure Development (MHID), 2019 Environmental Consultant – Feasibility study for improved solid waste management system in Choma District by Choma municipal council and GIZ, 2019 Environmental Consultant - Environmental impact Assessment for the Existing Cooking oil processing plant in Lusaka by Parrogate Ginneries LTD, 2020
2016	Environmental Engineer (Officer), Zambia Sugar Plc	Zambia	Ensured proper solid waste, surface and groundwater management Carried out microbiological, water and waste water analysis Carried out air pollution analysis using stack emission analysis and trend studies Ensured all needed permits and clearances were obtained and all job cards worked on time Ensured safety, health, environment and

			qualitymanagement(SHEQ) were upheld
			Ground water pollution spatial distribution in njomonaand kawama compound

Membership in Professional Associations and Publications:

1. Graduate Member- Engineering Institution of Zambia (MEIZ)
2. Journal of Environment Protection and Sustainable Department: Seasonal variation of nitrate and phosphate levels in groundwater-a case study of Mpongwe farming block inZambia, 2019.
<http://files.aiscience.org/journal/article/pdf/70140070.pdf>
3. Project: Seasonal variation of nitrate and phosphate levels in groundwater- a casestudy of Mpongwe farming block, Copperbelt University 2018 to Department of Environmental lecturers, Kitwe

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments thatBest Illustrates Capabilities to handle the assigned work
1. Document Reviews including existing legalframeworks relevant to the projects	1. Review of relevant documents for a feasibility study for an improved solid waste management system in Choma District under Environmental Science and Engineering Consultant Limited.
2. Part of the team preparing the EIA termsof Reference for submission to ZEMA	2. Environmental Expert for the existing cooking oil processing plant by Parrogate Ginneries Limited in Lusaka District under Environmental Science and Engineering Consultant Limited.

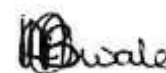
3. Part of the Scoping meeting to be held at the Proposed Project site	3. Environmental Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
4. Collection of satellite maps for the existing waste collection containers	4. Data captured for current locations for stationary solid waste collection points and proposed Material recovery facility in Choma District under Environmental Science and Engineering Consultant Limited

References

Patson Zulu (0967470849) Chairman and CEO Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Shirley Ndalama, Environmental Officer - Mazabuka, Zambia Sugar Plc P.O. Box 670240, Mazabuka. Tel: +260 963 317 222
Mr. S Sichilima, Project Supervisor/Lecturer, The Copperbelt University, School of Mines & Mineral Sciences, P.O. Box 21692, Kitwe, Zambia Email: nsichilima@gmail.com Tel: +260 964 825 396	Inonge P. Mulemi, SHERQ Officer - Mazabuka, Zambia Sugar Plc P.O. Box 670240, Mazabuka. Email: Inongemulemi@gmail.com Tel: +260 962 242 752

Expert's Contact Information: email bwalyalydiamwale95@gmail.com Tel: +260 953 029495/+260 977 782858

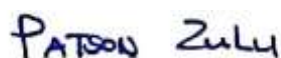
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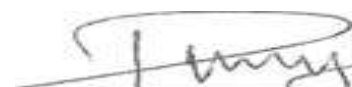
Name of Expert

Date

Signature



24/04/2022



Name of authorized Representative of the Consultant Date

Signature

APPENDIX A2: SATELLITE MAP OF THE PROPOSED COOKING OIL PROCESSING PLANT





PUBLIC NOTICE

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PUBLIC CONSULTATION SCOPING MEETING FOR THE PROPOSED EXPANSION OF THE SOLVENT EXTRACTION PLANT PHASE II IN MWEMBESHI, CHILANGA.

The Environmental Management Act of 2011 requires that all companies engaged in process operations undertake an Environmental Impact Assessment (EIA) to be approved by the Zambia Environmental Management Agency (ZEMA).

Parrogate intends to expand the existing Mwembeshi Edible Oil Processing Plant by 400 metric tons in Mwembeshi area in Chilanga.

This notice therefore serves to inform members of the general public; both interested and affected parties that an Environmental Impact Assessment for the aforementioned proposed project **has commenced**.

The Environmental Impact Assessment Regulations No.28 of 1997 requires that the sponsor of the project consult stakeholders through holding public meetings before operationalizing the project. However, given the governments guidelines in relation to COVID-19, it is not advisable to convene a general public meeting but instead a face-to-face interaction with limited stakeholders will be held. However, It is proposed that interested stakeholders can provide their comments and input in written to us through the following platforms;

- Email: rakeshyyadav@parrogate.com.zm
- Company website (www.parrogate.com)

The deadline for submission of comments is **4th April, 2022**

7721032022

APPENDIX C: CERTIFICATE OF INCORPORATION

INSTRUMENT No. 2791
Companies Registration No. 63460



Republic of Zambia

**CERTIFICATE OF INCORPORATION
OF A PRIVATE COMPANY LIMITED BY SHARES**

(Section 10)

This is to certify that

PARROGATE GINNERIES
..... Limited (full name of company)

is on and from the 30th day of August, 2006
Incorporated as a private company limited by shares.

Given under my hand and Seal at Lusaka, Zambia, this
30th day of August, 2006




B.K. Mwalongo
Assistant Registrar of Companies

(Note that this certificate is not valid unless the official Seal of the Registrar of Companies has been affixed)
Stucked by the Office of the Registrar of Companies)



THE PATENTS AND COMPANIES REGISTRATION AGENCY

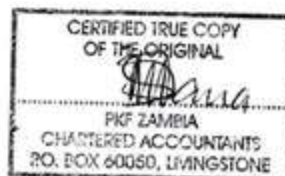
The Companies Act, 2017
 (Act No. 10 of 2017)

The Companies (Prescribed Forms) Regulations, 2018
 (Sections 270, 271 and 273)

Available at www.patents.gov.zm

ANNUAL RETURN				
PART A COMPANY DETAILS				
1.	Company Number Indicate the 7 digit registration number	12006063440		
2.	Company Name Indicate the name as captured in the certificate of incorporation	PARROGATE GINNERIES LIMITED		
3.	Principal Business Activity	1040 MANUFACTURE/PROCESSING OF VEGETABLES AND ANIMAL OILS AND FATS WHICH INCLUDES MANUFACTURING AND PROCESSING OF CRUDE VEGETABLE OIL, SOYA BEAN OIL, PALM OIL AND COTTON SEED OIL. 0163 POST HARVEST CROP ACTIVITIES WHICH INCLUDES COTTON GINNING		
4.	Other Business Activities	1013 POST HARVEST CROP ACTIVITIES WHICH INCLUDES COTTON GINNING		
5.	Physical Address State the registered office of the Company	Plot No. 397A/3 Rafue Road Mankoni Lusaka Province Zambia		
6.	Postal Address State the alternative address of the Company	Plot No. 397A/3 Rafue Road Mankoni Lusaka Province Zambia		
7.	Phone Number Indicate the international code e.g. +260 for Zambia	Mainline +260 979 332 856		
8.	Email Address	y@parrogate.com.zm		
9.	Nominal Capital or Guaranteed Amount Indicate Capital or Guaranteed amount paid for less than the prescribed minimum	15,000		
10.	Class of Shares If other indicate the specific class of shares	ORDINARY	PREFERENTIAL	OTHER
11.	Number of Shares	15,000		
12.	Number of Paid Up Shares	5,000		
13.	Number of Unpaid Shares			
14.	Par Value	K1.00		
PART B ANNUAL RETURN DETAILS				
15.	Type of Company	Private Limited By Shares ☒		

16.	Company Category Select category of Company by marking with 'X'	Private Limited By Guarantee				
		Unlimited Private Company				
17.	Date of Financial Year End	Public Limited Company				
		Local Bank				
		Foreign Bank				
		Insurance Company				
		Re-Insurance Company				
		Bureau De Change				
		Financial Institution				
	Other Specify: FOOD MANUFACTURING	X				
PART C DIRECTORS						
No	First Name	Surname	Identity Number	Date Appointed		
1	PRADEEP	GANEDIWAL	PPN. Z4207201			
2	PRADUMAN KUMAR	GANEDIWAL	PPN. Z4987035			
3	YASHWARDHAN	GANEDIWAL	PPN. Z4910201			
4						
PART D SHAREHOLDERS						
N	First Name	Surname	Identity Number	Number of Shares	Class of Shares	Number of Paid Up Shares
1	PRADEEP	GANEDIWAL	PPN. Z4207201	1	ORDINARY	1
2	PRADUMAN KUMAR	GANEDIWAL	PPN. Z4987035	1	ORDINARY	1
3	CORBEL FINANCE LIMITED	N/A	REG NO.	4,998	ORDINARY	4,998
4						
PART E BENEFICIAL OWNERS						
No	First Name	Surname	Identity Number	Nature of Interest		
1	PRADEEP	GANEDIWAL	PPN. Z4207201	BUSINESS		
2	PRADUMAN KUMAR	GANEDIWAL	PPN. Z4987035	BUSINESS		
3	CORBEL FINANCE LIMITED	N/A	REG NO.	BUSINESS		
4						
PART F DECLARATION						
21.	First Name: UMESH	Surname: SHARMA	Capacity: Director ☐ Secretary ☒ Receiver/Liquidator ☐	Signature: <i>[Signature]</i> Date: 01/04/2019		
PART G PARTICULARS OF PERSON LODGING NOTICE						
22.	First Name	PRECIOUS				
23.	Surname	MPUNDU				
24.	Gender	FEMALE				
25.	Date of Birth	04/09/1993				



APPENDIX D: CERTIFICATE OF TITLE

DR 1A

No. 166187

REPUBLIC OF ZAMBIA

Registered No. 10208/N/2

THE LANDS AND DEEDS REGISTRY ACT
(Section 45)

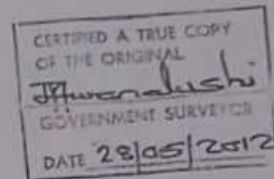
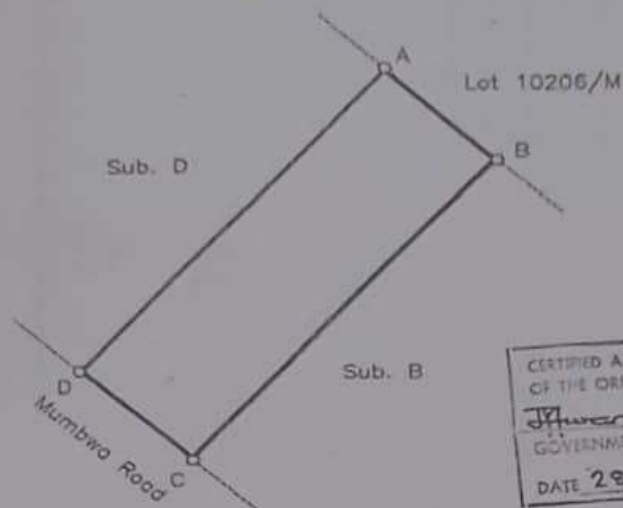
CERTIFICATE OF TITLE

THIS Certificate, dated the SEVENTH day of JUNE 1992
documented and TWELVE under the hand and seal of the Registrar of the
Lands and Deeds Registry of Zambia WYTHGUSSETHI GWA FARROGATE GINBERIES LIMITED
a Company incorporated in Zambia and having its registered office at Lusaka

is a tenant or lessee for the unexpired residue of a term of 99 years from the first
day of JUNE 20 02 (subject to such reservations, restrictions, incumbrances, liens,
estates and interests as are notified by memorial underwritten or endorsed hereon) of and in ALL that piece of
land in extent 20,2154 hectares more or less being Subdivision C of Lot No.10208/N situate
in the Lusaka Province of Zambia which piece of land is more particularly delineated and
described on Diagram No.412 of 2012 except and reserved all minerals oils and precious
stones whatsoever upon or under the said land.....



SIDES METRES		ANGLES OF DIRECTION	SYSTEM Y	CO-ORDINATES Local METRES X	DIAGRAM NUMBER 412/2012
AB	259.33	312.09.52			APPROVED: (Sgd) T.L.Mwanalushi GOVERNMENT SURVEYOR DATE: 23/01/2012
BC	760.29	42.09.52			
CD	259.33	132.09.52			
DA	760.29	222.09.52			



SCALE 1: 10000
 BEACON DESCRIPTION All are iron pegs in concrete
 THE FIGURE A-B-C-D-A
 REPRESENTS 20.2354 Hectares
 OF LAND BEING Sub. C of Lot 10206/M
 SITUATED IN THE Lusaka PROVINCE REPUBLIC OF ZAMBIA
 SURVEYED IN January 2012
 BY ME (Sgd) J.G.Nyangulu
 LAND SURVEYOR

PARENT DIAGRAM No.:
 SURVEY RECORDS No.: D22/2011
 S G FILE No.: SD/104/13/10
 PLAN No.: SD/104/07/10
 MAP REFERENCE: 64/2012
 1527 B4 &
 1528 A3

T.L.M



Registered No. 10208 PM/D/A

THE LANDS AND DEEDS REGISTRY ACT
(Section 43)

CERTIFICATE OF TITLE

THIS Certificate, dated the TWENTY-FIFTH day of APRIL two thousand and THIRTEEN under the hand and seal of the Registrar of the Lands and Deeds Registry of Zambia WITNESSETH that PARROGATE CEMETERIES LIMITED a Company Incorporated in Zambia and having its registered office at Leaksa

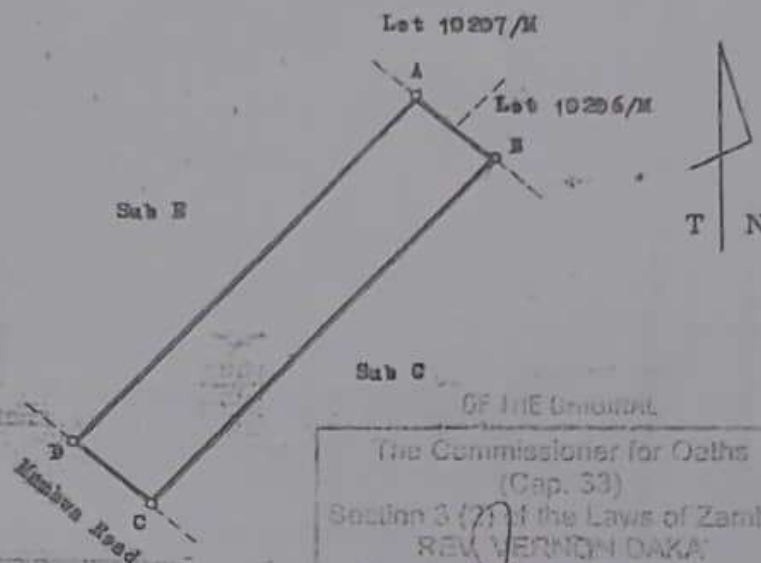
is a tenant or lessee for the unexpired residue of a term of 99 years from the first day of June 20 02 (subject to such reservations, restrictions, incumbrances, liens, estates and interests as are notified by memorial underwritten or endorsed hereon) of and in All that

piece of land in extent 12,1415 hectares more or less being Subdivision 'D' of Lot No. 10208/M estate in the Leaksa Province of Zambia which piece of land is more particularly delineated and described on Diagram No. 412 of 2012 except and reserved all minerals oils and precious stones whatsoever upon or under the said land.


Registrar



SIDES	METRES	ANGLES OF DIRECTION	CO-ORDINATES		DIAGRAM NUMBER
			SYSTEM Y	METRES X	
AB	155.60	312.09.52			413/2012
BC	780.29	42.09.52			
CD	155.60	137.09.52			
DA	780.29	228.09.52			
					APPROVED:
					<i>M. M. M. M.</i>
					GOVERNMENT SURVEYOR
					DATE: 23/01/2012



SCALE 1: 10000

REMARK DESCRIPTION: All are iron pegs in concrete

THE FIGURE 1-2-3-4

PRESENTS IN THE

CHAINED BEING 10000/1

CREATED IN THE PROVINCE REPUBLIC OF ZAMBIA

SURVEYED IN January 2012

BY ME

[Signature]
LAND SURVEYOR

PARENT DIAGRAM No. 1/1991
SURVEY RECORDS No. 1/2012
S.C. FILE No. 1/19/10
2012
MAP No. 1/19/10

J

APPENDIX E: SCOPING MEETING MINUTES/PHOTOS

RECORD OF CONSULTATIONS DURING SCOPING PHASE OF THE EIA FOR THE PROPOSED EXPANSION OF PARROGATE COOKING OIL PROCESSING PLANT, 7th and 8th April 2022

Given the Covid-19 guidelines that forbade gathering of large crowds of people, Environmental Science and Engineering Consultants (ESEC) Ltd (the company engaged by Parrogate Ginneries to undertake the EIA for the proposed expansion of the cooking oil plant) decided to conduct separate Scoping meetings for each of the identified stakeholders. The meetings took the better part of two days, Thursday 7th April and Friday 8th April of 2022.

ESEC was accompanied by Mr Collins Mwamba, the Environmental Health and Safety Supervisor at Parrogate Ginneries, Mwembeshi Plant. At the outset of each of the deliberations Mr Patson Zulu briefed the stakeholders about the need and requirements for undertaking EIAs, which includes stakeholder consultations. Mr Zulu informed the stakeholders about the various stages of the EIA process. Apart from the Scoping stage, it was indicated that there was more opportunities and time for stakeholders to provide their more informed input or concerns on the proposed project and help with recommendations to mitigate or remedy adverse impacts of the proposed projects.

10. The first stakeholder to be consulted was Mrs Namwinga Zulu, Manager of **Westwood Pub & Lodge (also known as Round House Lodge)** located less than ten metres across the gravel road on the eastern boundary of Parrogate premises. Mr Patson Zulu, CEO and Chairman of ESEC briefed Mrs Zulu about the EIA process. He informed her that the consultation was part of the Scoping phase of the EIA, and her input would help shape and inform the ToRs and Scoping report.

Mrs Zulu complained about the foul smell that is usually experienced in the evening, at

least once per week. Apart from that she had no complaint or objections to the proposed expansion of the cooking oil processing plant. She proposed that Parrogate would do well to open a retail sales outlet to sell the cooking oil and soap. She wondered why the surrounding community members should commute some 70 Km to Lusaka to buy commodities that are produced within their area. It was indicated that Mt Meru in Chibombo district and Zambeef of Chisamba district that sell some of the cooking oil they produce through retail sales outlets at filling stations around Katuba and Lusaka, and some of these communities are not within close proximity to the cooking oil processing plants. Customer come with their own containers into which oil is poured.

Apart from employees of various government institutions, there is a large community of local residents that include Mwembeshi Secondary School, two prisons, clinic and paramilitary camp that form a huge customer base that can significantly benefit from such a retail sales outlet for cooking oil and bar soap.

Mrs Zulu was informed that ESEC will provide feedback to all stakeholders regarding the outcome of the specialist studies of the EIA process that would be undertaken. ESEC will investigate all stakeholder complaints regarding current operations of the plant.

11. Mwembeshi (Provincial STEM) Secondary School is located less than a kilometre from the cooking oil processing plant. ESEC met with Mr. Humphrey Funduluka the deputy headmaster and Mr Michael Sikaonga the boarding master of the school.

They both complained about the lack of corporate social responsibility (CSR) on the part of the company. They expected the company to undertake a number of CSR projects at the school, in particular sponsorship of needy children from the surrounding community. The school community consists of some 550 pupils and 52 staff (of whom 20 stay within the school premises).

The company was found wanting in a number of aspects; for example the dumping of waste and by products on neighbouring premises. One neighbour went so far as to sue the company over such practices. The other complaint related to the foul noxious smell that company operations generates.

Otherwise both school officials welcomed the proposed investment as it would lessen the unemployment burden in the surrounding area. The proposed expansion entail increase in job opportunities, but the school representatives advised the company to improve the welfare and condition for its Zambian workers. The poor conditions of service and work environment adversely impacts the plight and welfare of the local community.

12. Mrs Elizabeth Situmbeko, a caretaker of one of the neighbouring small holder farms (owned by a Mr Musa) indicated that she had no complaint or objections to the proposed expansion of the plant as it would increase job opportunities for the people in the local community.

13. Wife to Mr Fredrick Moonga (another caretaker of a smallholding farm) refused to offer any opinion on the proposed expansion of the cooking oil plant.

14. Mr Chansa Bwembya was another caretaker farmer that ESEC consulted. The owner of the farm was outside the country. Mr Chansa indicated that Simon Farm used to have a lot of livestock and grew a variety of food crops, but has been inactive since the owner left for Tanzania. He welcomed the expansion of the plant as it may accord him an opportunity to get a formal job.

Mr Chansa complained about the noise pollution at night; otherwise he had no objection to the proposed expansion.

15. ESEC talked to Mr John Siwale (Environmental Health officer - Technical) and Mr Obert Simukoko (Clinical Officer) at **Mwembeshi Rural Health Clinic** about the impact of operations of Parrogate Ginneries.

It was indicated that the company is a major employer and has indirectly contributed to the reduction in crime in the area as some youth are kept busy whilst earning a livelihood. However, the company has a bad reputation with regards to the poor conditions of services for its employees. In that respect, Parrogate has little socio-economic impact on the community it operates in.

Even though there are few work-related accidents reported at the company, the respondents were however concerned at the absence of a clinic within the company premises given the size of the operations and number of employees. In light of the proposed expansion the company should set up a clinic with permanent staff to cater for not only the workers, but their relatives too. This is especially appropriate given that there are other workers belonging to Continental Ginneries in the same premises.

They said that patients from the plant area reported complaints about the foul smell that is experienced in the evening. They suggested that ESEC investigate whether the noxious smell is dangerous to the health of workers and the surrounding local community.

Noise pollution is also experienced in the evenings/night although it is of tolerable level.

16. There is sizeable community of people that live at **Isha Mbingo Kraal** that is located along Mumbwa. ESEC talked to Mr Shaka Khoza a tenant and Mr Austin Liato (former Member of Parliament) proprietor of Isha Mbingo Kraal about the proposed expansion of Parrogate cooking oil plant and its impact on the environment and local community.

They were concerned that the company does not look after its workers well; most workers get very low wages – even degree holders get very low salaries. Parrogate

as a big employer has too much leverage over its workers, and takes advantage of the dire economic situation in the country, and rural areas in particular. Grievance address or complaint handling mechanism is absent as there seem to be total disregard for the laws that regulate the employer-worker relationship.

ESEC was informed about an unfortunate incident where the company refused to pay medical expenses for some two workers who got involved in work-related accidents. They felt there is need for the company to have a clinic with permanent medical personnel to avoid such unfortunate experiences.

They also talked about the foul smell that is usually experienced at night. Mr Liato considered suing the company at some point in time. The proposed expansion of the plant operations will entail increased air pollution. It is therefore important to address the issue through implementation of more effective and efficient mitigation measures. He also asked that a thorough investigation be undertaken to ascertain how safe the smell/fumes are.

Even though there is some noise pollution, it is not dangerous to the health and welfare of the surrounding community.

The company does not seem to have a structured, formal and budgeted corporate social responsibility (CSR) plan. The community expects a lot from Parrogate Gineries, but it is not coming through in a number of aspects as it merely reacts to uncoordinated appeals for appeal from different groups of people. It was suggested that the company open a retail shop that would sell cooking oil and soap to the local community – there is a sizeable community in Mwembeshi that include institutions and their workers (such as clinic, prisons, boarding schools, lodges, etc) that need huge quantities of these commodities.

17. Mr Elisha Muziya a caretaker of a neighbouring property along Mumbwa road informed ESEC that he had experienced the foul smell and also noise pollution at night. Apart from the few jobs, he could not point to any other thing that the local community benefits from the presence and operations of the company.

18. At **Chilanga Town Council**, ESEC met with a Christabel Museba (Council Treasurer) as acting Council Secretary and talked to Mr Humphrey Pailande, Environmental Planner. Mr. Pailande indicated that Chilanga Town Council is not yet a planning authority, and therefore does not authorise land use changes – that was done by Lusaka Provincial Planning Department.

He informed ESEC that Covid restrictions had been relaxed, and therefore meetings involving huge number of people can be convened, but participants have to wear masks. ESEC promised to convene such a meeting during disclosure of its findings.

Otherwise the Council had no objection to the proposed expansion of the cooking oil processing plant.

Report prepared by



Ernest Mwape

Socio-Economic Specialist, ESEC

10th April 2022

SCOPING MEETING FOR EXPANSION OF THE COOKING OIL PROCESSING PLANT IN MWEMBESHI AREA, OFF MUMBWA ROAD, CHILANGA DISTRICT

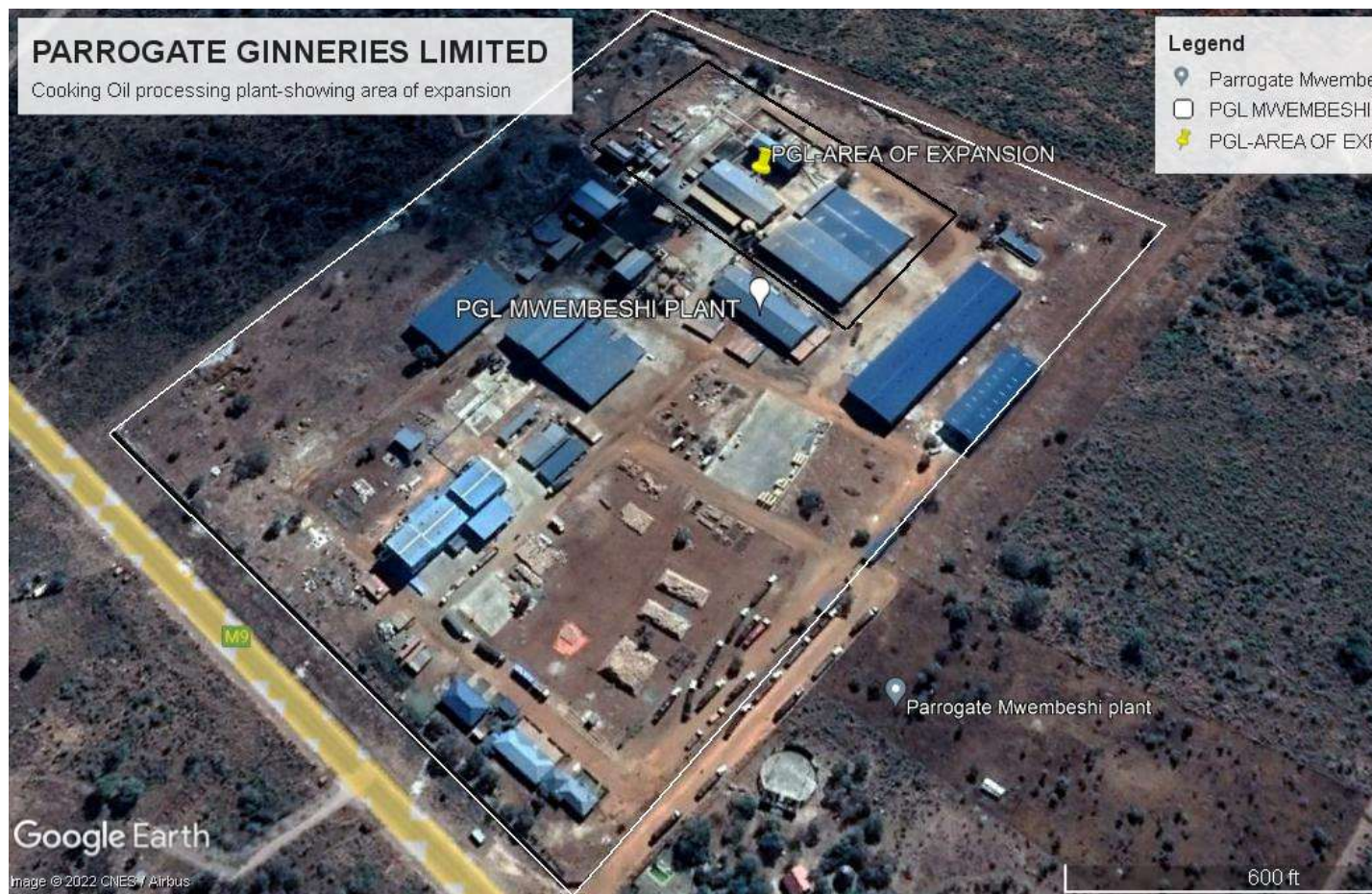
RESPONDENT LIST

NAME	INSTITUTIONS/PLACE	POSITION	CONTACT DETAILS	SIGNATURE
Nemwinge S. Zulu	Westwood lodge	Manager	0977501130	[Signature]
Collins Mwamba	Parrogate	HR SUPERVISOR	0979867958	[Signature]
Eliza beth Sibukhaka	Bika, musa	Farmer	0961364560	[Signature]
Chansambe M. BYA			0770713079	[Signature]
FUNDULUKA HUMPHREY	MWEMBESHI SEC	DEPUTY	0977605861	[Signature]
Sikadusa Michael	MWEMBESHI SEC	School	0979-614878	[Signature]
SWALE JOHN	MWEMBESHI RHC	ETT	0974925405	[Signature]
Simaboko Obert	MWEMBESHI RHC	Clinical officer	0971752241	[Signature]
SHIRAZ KHATOZA	SHAMBIRI GRO	Engineer	0977393737	[Signature]
Austin Lwato	Isha M...	's Kress	0978608757	[Signature]
Elisha Muzya	Mwence	camp talker	0760874022	[Signature]
Muridhar Thakur	PGL	Plant Manager	0976005890	[Signature]
ERNEST MWALE	ESR	Vol. 6 - ECo	0967-994655	[Signature]
PATSON ZULU	ESR	CEO/Chair	0977470849	[Signature]
ETHELSTABEL MULEBA	CHILANGA COUNCIL	COUNCIL	0975 935 880	[Signature]
Pailande Humphrey	Chilanga Counci	Treasurer	0978843311	[Signature]
		Env Manager		



APPENDIX F: PHOTOS OF THE SITE





APPENDIX G: WATER, NOISE AND AIR QUALITY REPORT

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ABBREVIATIONS, NOMENCLATURE & ACRONYMS

CO	Carbon Monoxide
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Mitigation Plan
EMA	Environmental Management Act
EMP	Environmental Management Plan
GRZ	Government of the Republic of Zambia
IFC	International Finance Corporation
PGL	PARROGATE Ginneries Limited
NO_x	Oxides of Nitrogen
ND	Not Detectable
PAC	Potential Areas of Concern
SHEQ	Safety Health Environment and Quality
SO₂	Sulphur Dioxide
ZEMA	Zambia Environmental Management Agency
ZMAC	Zambian Maximum Allowable Concentrations
ZESCO	ZESCO Limited
&	And
%	Percentage

WEIGHTS & MEASURES

km	Kilometre
mg	Milligram
Kg	Kilogram
Kv	Kilovolts
dB	Decibel
ha	Hectare
km²	Square kilometre
m	Metre
m²	Square metres
m³	Cubic metres
mg/l	Milligrams per litre
Mm³/a	Million cubic metres per year
µg/l	micrograms per litre
µm	micrometer (micron)

EXECUTIVE SUMMARY

Project Background

PARROGATE is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district which was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

Parrogate Ginneries Limited intends to expand the plant on Sub C and Sub D of Lot 10208/M, Mumbwa road, Mwembeshi area, Lusaka west. It will ensure environmental sustainability of operations of the plant through preparation of the EIA and therein, an Environmental Management Plan (EMP) as per the Zambian legal requirements.

Location

The site for the cooking oil processing plant is located on plot number 10208/M, Mumbwa road, Mwembeshi area whose geographical coordinates are 15°21'4" S and 27°57'23" E. It is located about 30 km from the Lusaka CBD and 20 m off Mumbwa road. The site is in the vicinity of Mwembeshi maximum correctional facility in the northern direction, Mwembeshi Boarding Secondary School in the south-east direction and Round House lodge on the southern side. The plant area is surrounded by farms on the eastern side, while Mumbwa road form the western border.

Sampling Criteria

The choice of sampling points was dependent on the distances and directions relative to proposed site for cooking oil project. The presence of human activity and settlement was also considered in selecting the points. The main objective of this exercise was to establish the base line noise, water and air quality data.

A Garmin Quest, Global Positioning System (GPS) Navigation instrument, was used by the study team to capture and record some of the geographical data at the Project site. GPS coordinates were collected, recorded on the instrument and later exported to a web-based Google earth App for analysis. Photographs of some boreholes, streams and Rivers were taken using One Plus camera and included in the EIS report.

Air Quality, Noise and Dust

The main sources of dust emissions that can reduce local air quality within the project area include movement of vehicles along the Mumbwa road. During construction phase, the surrounding human communities, flora and fauna have the potential of being exposed to dust emissions. During operation phase, the boilers in the plant will also be a source of air pollution. Hexane gas to be used as a solvent can also leak and become source of pollution. Coal ash from the boiler if not taken care of could also be a source of dust.

The ambient air concentration levels of Particulate Matter (PM_{2.5} and PM₁₀) were within the emission limit set by ZEMA.

Noise

There is less noise at the project site which mostly is background noise. Once the plant is operational, the main source of noise will be boilers, crushing plant, refinery, movement of utility vehicles and heavy duty equipment such as loaders and forklifts, trucks bringing soya beans and loading cooking oil and other products and by products. The workers and local communities near the plant could be considered to be sensitive receptors.

Noise levels measured at the site during assessment indicated within (minimum of **72 dBA** at roadside boundary of proposed site) WHO limits of 80dBA 30m away from Mumbwa Road and above (maximum of 99.8 **dBA**) WHO Limits on the Mumbwa road when vehicles are passing.

Water quality

Surface water sources are limited around the project with no stream . However, the ground water sources are available (at about 70m and 120m deep in the dry season but during the rainy season the water table rises (30m to 50m deep). According to the samples obtained from on site borehole and analyzed on-site, the parameters analyzed were within the ZABS Standards for Drinking Water making the water fit for human consumption (See attached laboratory certificate in the appendix).



.....

Bwalya L. Mwale

Environmental Specialist

1. INTRODUCTION

The Developer is proposing to expand the Cooking Oil Processing Plant by Solvent Extraction from 200MT/Day to 600MT/Day, in Mwembeshi area, Chilanga District.

The water, noise and air quality study is designed to assess the current water, noise and air quality in the project area before the project commencement and to assess potential future water, noise and air quality impacts during the construction and operation of the proposed cooking oil processing plant. The potential impacts are assessed against the provisions of the Environmental Management Act (Licensing) Regulations 2013, Emission Limits for Ambient Air Pollutants and ZABS Drinking Standards. The study has proposed mitigation measures for all adverse impacts.

1.1 Project Background

PARROGATE is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district. This plant which is the subject of these ToRs was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

1.1.1 Objectives of the study in relation to the overall project

The ultimate aim of this report is to provide information that will be a part of the baseline to establish an environmental benchmark against which the proposed project can be measured.

The objective of the water, Noise and air quality study is to assess the potential impacts that may arise mainly from the construction and operation of the proposed project, windblown dust that may arise from construction vehicles. The effects of exhaust gases and particulate emissions from the heavy mobile machinery and operation of oil mill are also assessed on their impacts in

the environment.

The specific objectives of the water, air quality and noise survey were:

- To obtain baseline data on the levels of groundwater, surface water and establish ambient dust within and around the proposed site prior to project implementation. The levels obtained will represent baseline information of the project area;
- To understand the baseline noise levels in decibels.

1.1.2 Location of the Project

The site for the cooking oil processing plant is located on plot number 10208/M, Mumbwa road, Mwembeshi area whose geographical coordinates are 15°21'4" S and 27°57'23" E. It is located about 30 km from the Lusaka CBD and 20 m off Mumbwa road.

Table 16-12: Proposed site coordinates

PARROGATE GINNERIES LIMITED SITE COORDINATES			
Beacon No.	Description	LongitudeE	Latitudes S
A	Corner Point	27° 57' 33" E	15° 21' 02" S
B	Corner Point	27° 57' 22" E	15° 21' 02" S
C	Corner Point	27° 57' 22" E	15° 21' 55" S
D	Corner Point	27° 57' 33" E	15° 21' 55" S
E	Center point	27° 57' 23" E	15° 21' 04" S

1.2 *Scope of the Work*

The scope of work involved:

- Desk study of available information from PGL for proposed plant technology.
- Site visits to get a clear view of site conditions and location of communities and other facilities in the area.
- Air quality sampling of existing condition in the area before project commencement.
- Water quality sampling in one location (on-site borehole)
- Determination of impact areas for proposed crushing plant area, windblown dust from the construction and operations and dust from haulage road (Mumbwa Road)
- Noise level measurements of existing condition in the area before project commencement
- Determining impacts that require mitigation and recommend mitigation measures and monitoring plans.

1.2.1 Study Area

The spatial boundaries for the study area were one Kilometer (1km) radius from the boundary of the proposed cooking oil processing plant but also areas where significant environmental and socio-economic impacts can be induced by the project. These areas will include surrounding developments which are all within the 1km radius. The study assessed all the environmental and social facets of the project throughout the entire life cycle from construction and operation to decommissioning and closure phases.

1.2.2 Study Aspect

The Water, Noise, and air quality is focused on what potential impacts will arise during construction, operation and decommissioning of the cooking oil processing plant. The main potential pollutant of study is the PM₁₀ and TSP (PM_{2.5}). The operations have potential to release

dust on the roads and fine materials in the project site could be dispersed naturally by prevailing winds in the area. Noise levels are expected to be high during operations at the site.

1.3 Sampling Methodology

1.3.1 Approach to Assessment

The Methodology and the approach to assessment is outlined below.

Ambient Air Quality

Ambient air quality monitoring is on the baseline studies included as part of the EIA study. The monitoring was conducted to establish ambient air quality baseline conditions within the project area prior to the construction and operation of the proposed cooking oil processing plant. A multi-gas analyser (JBL-B600) was used to analyse ambient air quality at predetermined sampling points (I.e. on the northern, southern, western and eastern sides of the proposed site).

The results were compared with ZEMA Ambient Air quality guidelines. A DustMate instrument for measuring PM₁₀ and PM_{2.5} particles was used to determine the baseline values in the proposed area surrounding community.

The monitoring exercise was conducted at selected sampling points for a day to be able to get representative results indicative of the baseline ambient air quality within the project area prior to commencement of the project.

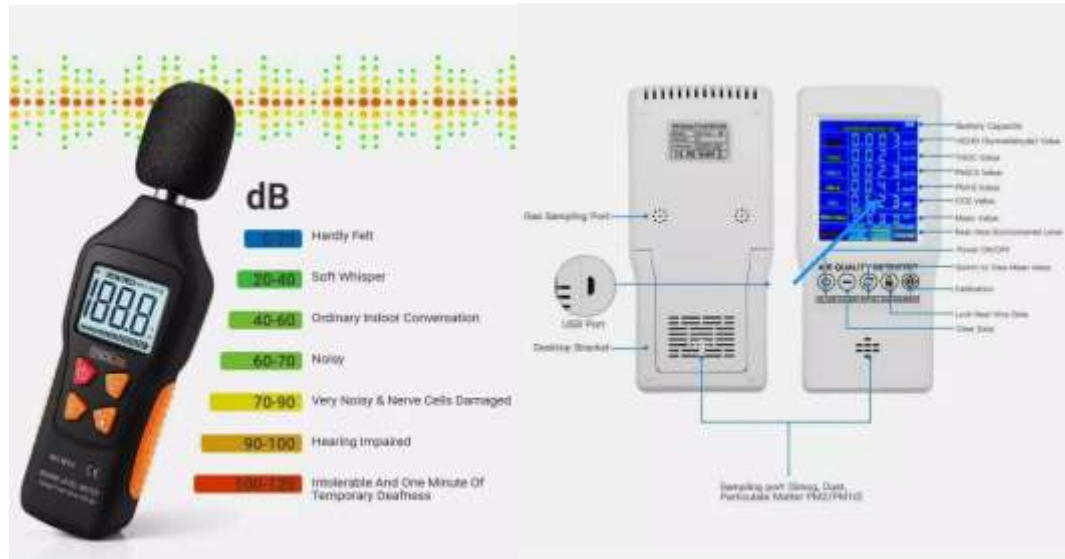
Noise levels

Noise levels within the project site were sampled using a sound level meter (MM-SMB01). This equipment is a hand-held noise logger machine and noise levels were sampled at close range to the source where 1.2m above the ground.

Noise measurements were taken in the same location as for the air quality. The following methodology was employed to determine the levels of noise at the project site;

- Identification of the stationery and mobile sources of noise
- Classification of noise level range using the sound level meter (range between 30-80dB for low;80-100 for medium and 100-130 for high level noise generation)
- Measurement of the noise level at the point of generation
- Determination of activity leading to noise generation.

- Noise level zoning of areas near the sources at predetermined distances to sensitive receptors within the project site.



This assessment was conducted to establish baseline data for the project site. Readings were obtained for each sampling point and for each point 10 to 15 minutes was used as duration for the determination of acceptable or non-acceptable noise levels. The noise guidelines limits followed were the IFC/World Bank guide lines.

Surface and Groundwater Quality

The quality, quantity, and direction of groundwater flow at the proposed site are not elaborately defined. A borehole exists at the proposed site. The monitoring of surface water was not conducted as there are no streams within the 1km radius from the proposed site. A multi-water parameter analyser was used to analyse ground water quality one location. The results were compared with ZABS Drinking Water standards statutory limits.

1.3.2 Consultation

The water, noise and air quality study were informed by the submissions of stakeholders' concerns on mainly dust, air emissions and noise from the construction and operations. The air quality sampling was conducted where the indicated experiences with some dust in the area. Experience was gotten from the excavation activities at the site.

2. LEGISLATIVE INSTITUTIONAL FRAMEWORK

THE ENVIRONMENTAL MANAGEMENT ACT, No 12 of 2011

The Environmental Management Act No. 12 of 2011 provides for amongst other matters, principles governing environmental management; the continued existence of the Environmental Council of Zambia which has been re-named as the Zambia Environmental Management Agency (ZEMA); functions of the board of the Agency; and integrated environmental management.

Further provisions are for environmental protection and pollution control as well as management of specific issues of environmental management to do with water and air pollution control, waste management, pesticides and toxic substances, noise, ionizing radiation regulation, ozone depleting substances and natural resources management. In addition to being addressed in the main provisions of the Act, these issues have been addressed in regulations specific to them, particularly under the Environmental Management (Licensing) Regulations.

Other matters provided for relate to international environmental agreements, environmental information, public participation, the creation of an environmental fund; enforcement provisions; reviews and appeals; environmental offences and general provisions; and for the making of Regulations by the responsible Minister. For purposes of administering, monitoring and enforcement of environmental protection and pollution prevention provisions, the Act provides for the establishment of an inspectorate and appointment of inspectors.

The sections of the EMA below are relevant: -

a) Environmental Impact Assessment Regulations (SI No. 28 of 1997 Part 2 and 3)

These regulations require developers of projects set out in Schedule 1 to provide an environmental project brief to the Zambia Environmental Management Agency. If the Agency finds that the project will have a significant impact on the environment, it may require the developer to submit an environmental impact statement. Development plans which require briefs or impact statements include projects involving urban development, transportation, dams, rivers, mining, waste disposal, forestry, manufacturing, and certain types of agricultural activity. This regulation prohibits the undertaking of any project that may have an effect on the environment without the written approval of the Agency, and except in accordance with any conditions imposed in that approval.

Relevance: This Statutory Instrument is relevant to the proposed project because the

Developer intends to establish a cooking oil processing plant that requires an Environmental Impact Assessment.

Compliance there of: The EIA being prepared comprise of specialized studies, this one being one of them in compliance with the above legal provisions.

ENVIRONMENTAL MANAGEMENT (LICENSING) REGULATIONS, STATUTORY INSTRUMENT No. 112 OF 2013

The Environmental Management (Licensing) Regulations were made by the Minister responsible for the environment in exercise of powers contained in Sections 43 and 134 of the Environmental Management Act of 2011 and in consultation with ZEMA. They regulate air and water pollution; waste management; hazardous waste; pesticides and toxic substances; and ozone depleting substances. They also have general provisions.

Regulations that are of particular relevance to the proposed project are outlined below.

a) The Air Pollution Control Regulations 4(1) of SI 112 (2013):

Matters pertaining to air and water pollution are set out in Part II, which also specifies licensing requirements and prescribes emission limits for air and water pollution control applicable to plant, undertakings or processes that emit air pollutants. An emission limit is “the maximum limit, level, rate, amount or concentration of a given substance permitted to be discharged into the atmosphere”.

Regulation 4(1) requires any person who intends to emit or discharge a pollutant or contaminant into the environment to make an application to ZEMA for an emission licence in the prescribed form. However, this Regulation does not apply to the discharge of pollutants into a sewer within an area that is subject to operations of a water utility or local authority, unless such utility or local authority does not approve the discharge of such pollutants into the sewer. The Regulation also does not apply to the discharge of pollutants on private property unless the owner of the sewer approves such discharges into the sewer.

In terms of Regulation 6, ZEMA has a duty to assess the quality of ambient air in accordance with prescribed guidelines and to regulate emissions of air pollutants into the atmosphere in order to protect human health, animal and plant life as well as the environment.

Relevance: There may be various sources of air pollution in the proposed project - during the pre-construction and implementation stages.

Compliance: The project developer will need to obtain a licence from ZEMA. Sustainable and environmentally sound processes will need to be adopted for the management of air pollutants in accordance with the stipulated requirements under the Environmental Management (Licensing) Regulations. The project should be managed in such a way as to minimize discharge of air pollutants in question into the atmosphere as well as contracting independent monitors (environmental consultants) to conduct regular emissions monitoring at construction and operation stage to ascertain the levels of air pollution contribution by the project activities.

b) Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part II – Effluent discharge control.

This regulation provides for the licensing of liquid waste discharge limits for respective parameters. Operational stage of this proposed project may cause contamination of storm water by hydrocarbons; therefore, measures have to be put in place to comply with the provisions of this regulation.

Relevance: these regulations are relevant in that the proposed project has potential to leak, spill or wash effluents into the environment causing pollution.

Compliance: The trucks, crushing/washing machines which will be used during the operation will be routinely serviced to avoid excessive oil leakages. Effluent from the plant will also need to be pretreated before discharged into the environment.

IFC STANDARDS ON NOISE

International Finance Corporation General Approach to the Management of EHS Issues (Noise) at the Facility or Project Level require the generation of non-disruptive noise within the area of operation. Noise prevention and mitigation measures should be applied where predicted or measured noise impacts from a project facility or operations exceed the applicable noise level guideline at the most sensitive point of reception.

The IFC General guidelines on Noise highlight the levels of noise that must be generated for industrial facilities and exposure limits for individuals.

Relevance: The regulation is relevant as the activities at the proposed facility have the potential to generate audible noise levels above the maximum allowable limits.

Compliance thereof: The developer will adhere to the internationally acceptable practice in noise level generation and implement noise abatement technology in areas of high-level generation.

3. SAMPLING

The choice of sampling points was dependent on the distances and directions relative to proposed site. The presence of human activity and settlement was also considered in selecting the points. The main objective of this exercise was to establish the base line noise, water and air quality data.

3.1 *Location of the sampling points* ***Air sampling***

The Air quality study was conducted over a period of 24 hours in which ambient air quality data was obtained by way of periodical measurements in the morning and evening of the 24-hour duration. Three sampling points were identified and the levels of PM₁₀ and PM_{2.5} were measured. Three sample results were obtained for each sampling point and analyzed (only final results were recorded for each). Potential areas of concerns were two in total located at different areas within the project area. The following are the coordinates for the three sites:

Groundwater sampling

A borehole exists at the proposed site. One sample was picked and analyzed onsite.

4. RESULTS

The choice of sampling points was dependent on the distances and directions relative to proposed manganese mine. The presence of human activity and settlement was also considered in selecting the points. The main objective of this exercise was to establish the base line water, noise and air quality data.

4.1 Results

AIR AND NOISE



AIR AND NOISE RESULTS

Sampling Date	Sampling Point GPS Cord (Garmin etrex10)	Dust Results ($\mu\text{g}/\text{m}^3$)		Noise (dBA)
		PM ₁₀	PM _{2.5}	
07/04/2022	Sample Point A (15°21'02"S, 27°57'33"E)	20.0	24.0	55.2
07/04/2022	Sample Point B (15°21'4.0"S, 27°57'13"E)	12.0	19.0	72
07/04/2022	Sample Point C (15°20'55.6"S, 27°57'23"E)	9.0	15.0	99.8
Emission Limit		50 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$	90dBA

Signature: 

Bwalya L. Mwale

Environmental Specialist

Environmental Science & Engineering
Consultants Ltd

Signature: 

Patson Zulu

Chairman and CEO

Environmental Science & Engineering
Consultants Ltd

RESULTS

Table 16-13: Proposed site air and noise results

COMMENTS: Air quality at the proposed site was good and below the ZEMA Emission Limits. Noise levels measured at the site during assessment indicated within (minimum of 72 dBA at roadside boundary of proposed site) WHO limits of 80dBA 30m away from Mumbwa Road and above (maximum of 99.8 dBA) WHO Limits on the Mumbwa road when vehicles are passing.

Table 16-14: Groundwater sample results



GROUNDWATER RESULTS

PARAMETER	RESULTS	LEGAL LIMITS
PH	7	6 – 9
CONDUCTIVITY (μS/CM)	121.3	≤4300
TSS (MG/L)	7.4	≤100
TDS (MG/L)	430	3000
TEMPERATURE (0C)	34	≤10
COLOR (HAZEN)	4.1	≤20
TURBIDITY (NTU)	4.3	≤15
OIL & GREASE (MG/L)	<0.01	≤5
TOTAL HYDROCARBON (MG/L)	<0.01	≤10

Signature: 

Bwalya L. Mwale

Environmental Specialist

**Environmental Science & Engineering
Consultants Ltd**

Signature: 

Patson Zulu

Chairman and CEO

**Environmental Science & Engineering
Consultants Ltd**

5. ANALYSIS

The project Site and the surrounding areas have no industrial activity happening within a 1km radius of the proposed site. However, the proposed site is a designated farm area partly anthropogenic disturbed by farming activities. On analysis of the area, it was concluded that the air quality is generally good owing to the lack of industrial activity likely to cause air pollution. Dust concentration levels emitted at the three sites were very minimal and were below the Zambian Maximum Acceptable Concentrations

There are no heavy or light industrial activities in close proximity to the project area. Therefore, the results of the noise assessment are typical of a rural setting except when heavy equipment and trucks passes through the Mumbwa Road or come to the plant is when abnormal noise levels are recorded.

6. POTENTIAL ENVIRONMENTAL IMPACTS

The identification of the potential environmental and Air quality impacts that may result from project development is based on a review of the project design, the process raw materials, and the process technology to be employed by the Developer. The impacts were identified through site visits during the collection of baseline data through measurements and study of the local area.

POTENTIAL IMPACTS

The anticipated impacts of the proposed project on air will be high given the nature of plant. The following might arise due to the project implementation:

Construction phase

During construction phase at the proposed cooking oil plant and related infrastructure, heavy machinery will be used for excavation and compaction. The machinery is likely to cause an increase in the levels of CO, SO₂ and NO_x on the project site coupled with dust during works.

The air quality of the sites during this phase may be compromised due to dust and vehicular emissions from machinery and motor vehicles delivering construction machinery on the sites. Noise levels are also expected to be high due to heavy construction machinery on site.

Operational Phase

During the Operation phase, the main expected source of pollutants will be diesel and petrol vehicles.

Once the plant is operational, the main source of noise will be boilers, crusher plant, refinery, movement of utility vehicles and heavy duty equipment such as loaders and forklifts, trucks bringing soya beans and loading cooking oil and other products and by products. Carbon monoxide gases might be the main pollutants in the ambient air during the operations phase. The workers and local communities near the plant could be considered to be sensitive receptors.

7. CONCLUSSIONS

The air quality and noise study on the site indicated atmospheric conditions typical of an area in a rural setup with little or no activities. All gases measured were within the acceptable concentrations. Noise levels were also within allowable limits except when the trucks and other heavy vehicles passed the near the propose site on the Great east road. The noise generation impact as a result of the proposed cooking oil plant operation will be significant however the impact will be completely abated by the developer.

Water quality were within the ZABS Drinking Water standards making them fit for human consumption. Apart from the outlined observations in certain areas with high levels of noise, the results obtained from the survey are representative of the baseline conditions in the area.

8. APPENDICES

WATER, AIR AND NOISE RESULTS CERTIFICATES



AIR AND NOISE RESULTS

Sampling Date	Sampling Point GPS Cord (Garmin etrex10)	Dust Results ($\mu\text{g}/\text{m}^3$)		Noise (dBA)
		PM _{2.5}	PM ₁₀	
07/04/2022	Sample Point A (15°21'02"S, 27°57'33"E)	20.0	24.0	55.2
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07/04/2022	Sample Point C (15°20'55.6"S, 27°57'23"E)	9.0	15.0	99.8
Emission Limit		50 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$	90dBA

Signature: 

Bwalya L. Mwale

Environmental Specialist

**Environmental Science & Engineering
Consultants Ltd**

Signature: 

Patson Zulu

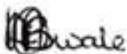
Chairman and CEO

**Environmental Science & Engineering
Consultants Ltd**



GROUNDWATER RESULTS

PARAMETER	RESULTS	LEGAL LIMITS
PH	7	6 – 9
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TDS (MG/L)	430	3000
TEMPERATURE (°C)	34	≤10
COLOR (HAZEN)	4.1	≤20
TURBIDITY (NTU)	4.3	≤15
OIL & GREASE (MG/L)	<0.01	≤5
TOTAL HYDROCARBON (MG/L)	<0.01	≤10

Signature: 

Bwalya L. Mwale

Environmental Specialist

**Environmental Science & Engineering
Consultants Ltd**

Signature: 

Patson Zulu

Chairman and CEO

**Environmental Science & Engineering
Consultants Ltd**

APPENDIX H: SCOPING REPORT

SCOPING REPORT



**FOR EXPANSION OF THE COOKING OIL PROCESSING PLANT ON SUB C AND
SUB D OF LOT 10208/M, MUMBWA ROAD, MWEMBESHI AREA IN
CHILANGA DISTRICT BY PARROGATE GINNERIES LIMITED**

PREPARED FOR



PARROGATE GINNERIES LIMITED

Prepared By



APRIL 2022

Revision Schedule					
Rev	Date	Details	Prepared by	Reviewed by	Approved by
1	Apr 2022	Scoping	Bwalya L Mwale Environmental Specialist	Patson Zulu/Ernest Mwape	Patson Zulu Team Leader





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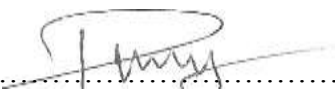
DECLARATION

This is a declaration by Environmental Science and Engineering Consultants (ESEC) Ltd who prepared these Terms of Reference (ToRs) that the information and data presented herein is authentic and has been verified by Parrogate Ginneries Limited, who are the project Developers.

This report therefore, contains Environmental Impact Assessment (EIA) Terms of Reference (ToRs) for the Cooking Oil Processing Plant by Solvent Extraction facility operated by Parrogate Ginneries Limited.

I, **PATSON ZULU** as Team Leader, hereby, certify that I supervised the team that prepared this document and provided technical and administrative oversight throughout the process.

Environmental Consultant

Signature:

Patson Zulu
Chairman and CEO
Environmental Science & Engineering Consultants Ltd

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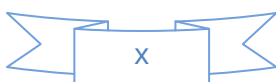
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ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
CBD	Convention on Biological Diversity
CTC	Chilanga Town Council
CSR	Corporate Social Responsibility
ECZ	Environmental Council of Zambia
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
EP	Equator Principles
ESEC	Environmental Science and Engineering Consultant
FRA	Food Reserve Agency
GRZ	Government of the Republic of Zambia
GSD	Geological Survey Department
HIV/AIDS	Human Immuno Virus/Acquired Immuno Deficiency Syndrome
HSE	Health Safety and Environment
IAP	Interested and Affected Parties
LWSC	Lusaka Water Supply and Sanitation Company
masl	metres above sea level
NIPA	National Institute for Public Administration
NRDC	Natural Resources Development College
NWASCO	National Water Supply and Sanitation Council
PGL	Parrogate Ginneries Limited
SHE	Safety Health and Environment
SI	Statutory Instrument
STIs	Sexually Transmitted Infections
TLV	Threshold Limit Value
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organisation
USD	United States Dollars
WARMA	Water Resource Management Authority
ZEMA	Zambia Environmental Management Agency
ZSA	Zambia Statistics Agency

1 INTRODUCTION

This document presents the scoping report for undertaking the Environmental Impact Assessment (EIA) study preparation of an Environmental Impact Statement (EIS) for the proposed expansion of the Cooking Oil Processing Plant by Solvent Extraction from 200MT/Day to 600MT/Day. The plant is located on Lusaka-Mumbwa road in Mwembeshi area of Chilanga District in Lusaka Province. The Scoping Report has been prepared on behalf of Parrogate Ginneries Limited, Zambia, who are the project proponent. ESEC LTD has been contracted to prepare the EIS for the project.

The purpose of this document is to set forth the scope of the EIA study and the approach that will be used to conduct the study and to prepare the EIS for the project to international standards. In addition, the document presents the legal and administrative framework within which the project will be implemented.

This report gives a description of the proposed project. The study area has been defined as being 1km radius from the boundary of the proposed site of the Cooking Oil Plant and the surrounding areas.

The document will therefore provide an opportunity for the Zambia Environmental Management Agency (ZEMA) and other stakeholders to confirm the scope of the assessments which form the EIA study approach to be adopted in the process of producing the EIS.

The document has been prepared in line with the requirements of the Environmental Protection and Pollution Control Act (Environmental Impact Assessment) Regulations, 1997 (Statutory Instrument No.28 of 1997), which stipulates issues to be covered in conducting an EIA study and the stages that must be followed. It has also been prepared in line with the requirements of international standards. Site specific conditions have also been taken into account in determining the likely significance of the issues to be covered in the study.

1.1 Proposed Project

Parrogate is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district. This plant which is the subject of these ToRs was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

Parrogate Ginneries Limited intends to expand the plant on Sub C and Sub D of Lot 10208/M, Mumbwa road, Mwembeshi area, Lusaka west. It will ensure environmental sustainability of operations of the plant through preparation of the EIA and therein, an Environmental Management Plan (EMP) as per the Zambian legal requirements.

The total cost of the investment is estimated at **US\$ 90,000.00.**

1.2 Environmental Impact Assessment

PGL proposes to expand the 200MTPD Cooking Oil Processing Plant to 600 MTPD on Sub C and Sub D of Lot 10208/M, Mumbwa road, Mwembeshi area, Lusaka west. PGL is required to conduct an environmental impact assessment in accordance with the Environmental Impact Assessment Regulations, Statutory Instrument No. 28 of 1997.

PGL has since contracted ESEC LTD to conduct the environmental impact study. In accordance with the requirements of the stated regulations, under the first Schedule, scoping of the proposed project should be carried out as part of the EIA process.

1.3 Legal and Administrative Framework

The document has been prepared in line with the requirements of the Zambian Environmental Management Act, 2011 and its subsidiary legislation, the Environmental Impact Assessment Regulations, 1997 (Statutory Instrument No.28 of 1997). It also refers to the Local Government Act, of 2019, the Urban and Regional Planning Act, 2015, the Water Resource Management Act, 201102, the Public Roads Act, 2002 and other applicable legislations and regulations. The administrative framework within which the proposed project will be implemented will include Zambia Environmental Management Agency (ZEMA), the Chilanga Town Council, Ministry of Local Government, Water Resource Management Authority (WARMA) and other regulatory and government agencies.

Management of the plant wishes to operate the facility in conformity with international conventions and internationally recognized standards such as Equator Principles (EP). The EP are based on and implemented in accordance with World Bank Group's International Finance Corporation (IFC) Performance Standards and the IFC Environmental Health and Safety (EHS) Guidelines.

1.4 Purpose of Scoping Exercise

Scoping exercise is the process of identifying the content and extent of the environmental information to be gathered by the Developer and submitted to a competent authority (Zambia Environmental Management Agency) under the EIA process. This is an early stage in the EIA process and is designed to ensure that the environmental impact assessment studies provide all the relevant information on the impacts of the project, the alternatives to the project and any other relevant information on the project. The specific objectives of the scoping exercise are to:

- Plan for stakeholder involvement during the study;
- Explain to interested and affected parties the nature of the proposed project;
- Gather interested and affected parties' input concerning key issues that need be addressed in the EIA study;
- Identify major environmental and social concerns from stakeholders and affected parties;
- Establish priorities for EIA study;
- Prepare a scoping report (this report);
- Select experts to undertake the environmental and social impact assessment studies based on identified types of environmental and social impacts to be investigated.
- Prepare Terms of Reference (ToRs) for the EIA study for the proposed project;

For the proposed Cooking Oil Processing Plant by Solvent Extraction project, a scoping exercise was conducted as an initial stage in the EIA study. Due to Covid-19 Pandemic, a

public opinion survey (Scoping) was held from 7th to 8th April 2022 using one-on-one interviews with Chilanga Town Council, Mwembeshi Secondary School, nearby locals and also the website www.parrogate.com.

This scoping report is therefore a compilation of the outcomes of the stakeholder engagement via interviews and website comments as part of the EIA process for the Cooking Oil Processing Plant. It also includes secondary information gathered through literature review of relevant environmental documentation on the project area.

1.5 Structure of the Scoping Report

This scoping report has been structured as described below:

Section 1 outlines an introduction to the report which also includes the purpose of the scoping exercise.

Section 2 gives a history of the plant, rationale, brief description of the regional setting, the proposed location of the Cooking Oil Processing Plant and land use within the area.

The objectives are presented in **Section 3** while description of existing environment and project activities are presented in **Sections 4 and 5** respectively.

The identification of the environmental impacts **are presented in Section 6** while alternatives and the legislative and administrative framework are presented in **Sections 7 and 8 respectively**.

Sections 9 and 10 respectively present information on public consultation and highlights on the Terms of Reference. The names and brief qualifications of the EIA Study Team are presented in **Section 11**.

Table 0.1: Developer Contact Information

Proponent	Parrogate Ginneries Limited
Contact person	RAKESH YADAV
Designation	Group Technical Head
Mobile number	0971546941
Email	rakeshyadav@parrogate.com.zm
Physical address	Plot No 5001, off Mumbwa Road Chinika Industrial Area , Lusaka

Table 0.2: **Particulars of Directors**

Particulars of Shareholder	Nationality & NRC/Passport No	Country of Origin	Number of Shares held	Percentage Shareholding
PRADEEP GANEDIWAL	PPN. Z4207201 INDIA	INDIA	1.00	0.02
PRADUMAN KUMAR	PPN. Z4987035 INDIA	INDIA	1.00	0.02
	BUSINESS ENTITIES			
Name of Business	Residential & Postal Addresses		Number of Shares held	Percentage Shareholding
CORBEL FINANCE LIMITED	SACKVILLE HOUSE, AAKPELWA ST, LIVINGSTONE		4,998.00	99.96
Total			5,000.00	100

2 PROJECT BACKGROUND

2.1 History of the Facility

PARROGATE is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district. This plant which is the subject of these ToRs was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

The proposed facility will include an adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage.

2.2 Key Stakeholders

The major stakeholders identified are:

- Parrogate Ginneries Limited staff – the proposed site
- Local communities – these include neighbouring facilities and settlements such as Round house Lodge, Mwembeshi Secondary School, and other surrounding areas for public consultations and raising concerns on this project.
- Chilanga Town Council – mandated to monitor all the projects in the District.
- Zambia Environmental Management Agency – Lusaka reviewing the project and ultimate approval of this Project.
- Lusaka Water Supply and Sanitation Company

2.3 Justification

Motivation/Rationale and Justification for the EIA

The shareholders of PGL have been motivated to expand the Cooking Oil Plant to make profit for themselves by selling finished oil product locally. The increasing demand for cooking oil in Zambia and the availability of raw materials (soybeans) in Zambia has created a conducive business environment.

The proposed expansion will help Zambia meet the demand for finished cooking oil product as well as help reduce importation of edible oils and subsequent reduction of local prices.

2.4 Description of the plant area

The site for the proposed Cooking Oil Processing Plant which covers an area of **12ha** is located off Mumbwa road, within Parrogate Ginneries Limited premises, situated in Mwembeshi area of Chilanga district of Lusaka province. Parrogate Ginneries Limited is located at Sub C and D of Lot 10208/M. The neighbors are farms, Round house lodge, and Mumbwa Road lies, about 20m.

The following are the coordinates of the plant:

Table 0.3: Proposed Plant site coordinates

PARROGATE GINNERIES LIMITED SITE COORDINATES			
Beacon No.	Description	Longitude E	Latitudes S
A	Corner Point	27° 57' 33" E	15° 21' 02" S
B	Corner Point	27° 57' 22" E	15° 21' 02" S
C	Corner Point	27° 57' 22" E	15° 21' 55" S
D	Corner Point	27° 57' 33" E	15° 21' 55" S
E	Center point	27° 57' 23" E	15° 21' 04" S



The plant is already operational and will expand to include the additional four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage.

There are nine (9) unit operations involved in preparation of soya beans for solvent

extraction and these are itemized below;

- Receiving and storing,
- Cleaning
- Drying
- Tempering
- Cracking
- Dehulling
- Conditioning
- Flaking
- Expanding.

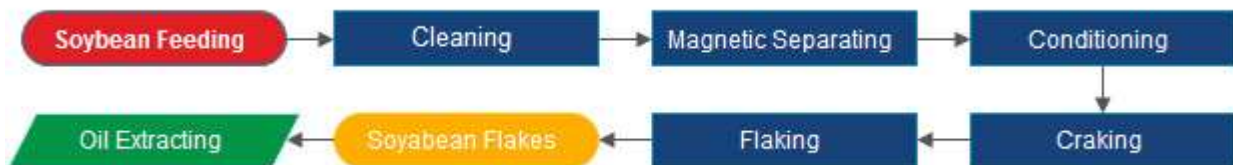


Figure 0-1: Pretreatment Process flow Diagram

PRETREATMENT SECTION

- **Receiving and storing raw soybeans:** When the raw material (palm, sunflower, soya beans, etc) arrive at the plant using private trucks or rail, samples will be taken for moisture content, foreign matter, and damaged seeds. The seeds will then be weighed and carried to silos for storage in readiness for processing.
- **Cleaning or “scalping.”:** The seeds will then be removed from storage and cleaned. Cleaning involves removal of foreign particles by screening and loose hulls by aspiration. Large-size and small-size impurities in seeds will be removed by Vibrating Screen. The seeds will then be uniformly distributed on the surface of Vibrating Screen, then light impurities removed with function of aspiration channel. The Vibrating Screen is stable in performance, large in working capacity, and low in noise.



Figure 0-2: Oilseed Cleaning equipment

- **Gravity De-stoning:** Heavy impurities such as stone, glass, metal will be removed from the flowing seeds. It is negative pressure vessel, which will not only remove impurities, but ensure clean environment.



Figure 0-3: Gravity de-stoner machine

- **Drying:** The seeds will be dried to reduce the moisture content to 10% (percent) by weight.
- **Tempering:** After drying, the seed will be tempered for 2 to 3 days to allow the moisture to equilibrate and the hulls to loosen. Soybeans are generally cleaned again after drying using magnets, screens, and aspirators.
 - ✓ **Magnetic Separation:** for separating out metallic impurities. Complete with buffer seed feeder.



Figure 0-4: Magnetic separator

- ✓ **Dust Separation:** By Cyclone and Centrifugal Fan. In this way, light impurities are separated and the workshop is clean.
- **Cracking:** During the process of cracking, seeds are passed through a series of corrugated rolls that are generally about 10 inches in diameter and 42 inches long. The purpose of cracking is to break the seeds into pieces suitable to dehulling and flaking. Usually each bean is broken into four to six pieces. Cracking should produce a minimum of fines. The soybean is cracked (crushing machine) into 4-8 parts for downstream hull-kernel separation and flaking. Max. powder ratio: 4%. The Toothed Cracking Roller is large in working capacity and stable in performance. Space between the tooth rollers can be adjusted easily. There is no material when the Cracking Roller is stopped.



Figure 0-5: Example of crushing machine

- **Dehulling:** The purpose of dehulling is to produce high protein meal for animal feed or flour for human consumption. Soybeans are not dehulled for oil extraction. Dehulling decreases the volume that passes through the extractor, thus increasing throughput. Beans are dehulled by screening and aspiration. The removed hulls may

be combined with hulls from the earlier cleaning steps and used in animal feed.

- **Conditioning:** Cracked soybeans, with or without hulls, are then transported to conditioners. Conditioners are vertical stack cookers or rotary horizontal cookers where the soybeans are heated and moistened to make them pliable enough to ensure proper flaking. The conditioner has two functions: drying and softening. The Conditioner is made up of feeding, heating, drying and discharging sections and discharging funnel. Feed the conditioner at the top, subsequently soybean is distributed uniformly to reduce scouring to the heating tube. Typically, soybean-out temperature: 60, moisture content in soybean: 10%. The Conditioner should ensure the soybean flow without interruption, and the soybean is conditioned uniformly with least energy consumption. In addition, try to extend the serviceable time of Conditioner.
- **Flaking:** Conditioned soybeans are fed through large, smooth-surfaced rollers and emerge as flakes ranging in thickness from 0.2 mm to 0.5 mm. The flaking machine is designed to turn the oil materials into flakes, by means of mechanical extruding force. Flaking process is essential in oil mill plant, since it can effectively improve the oil yield of oil mill machinery through increasing material superficial area.

This newly developed flaker machine is featured of compact structure, easy operation, reliable and safe working performance. Since the design is based on different oilseed properties, this flaking machine can process different oilseeds including soybeans.



Figure 0-6: Example of flaking machine

- **Expanding:** The expanders mix flaked soybeans with water and steam and press them into pellets called “collets.” Collets are denser and more porous than flakes. They allow more oil to be extracted from the soybeans and increase the throughput of the extractor. Collets also allow the solvent to drain more freely, decreasing the energy needed for desolventizing.

SOYBEAN OIL EXTRACTION SECTION

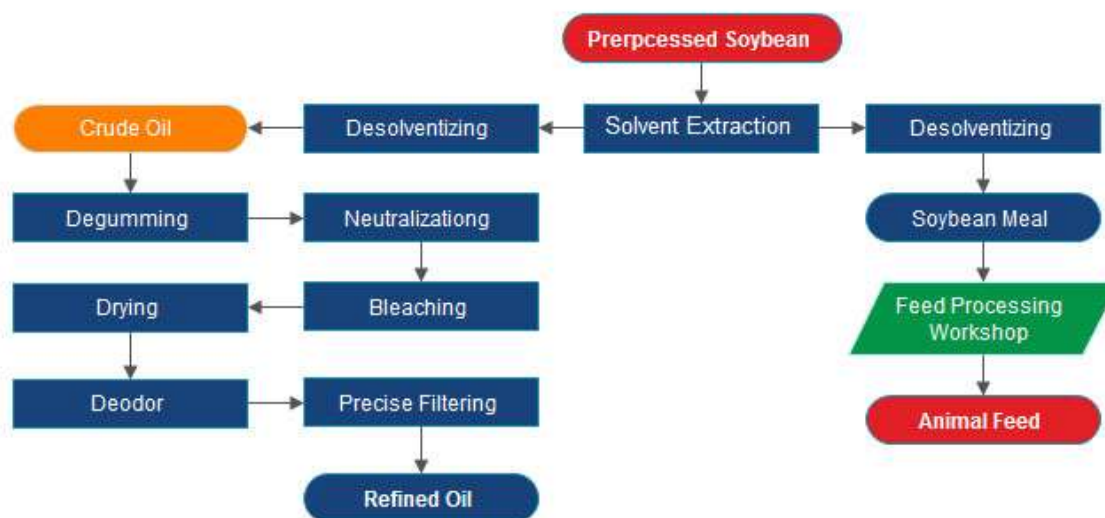


Figure 0-7: Oil Extraction and Refining Process Flow Chart

- Oil Extraction:** The flaked soybean is conveyed to Rotary Extractor and kept for a certain level. Spray the flaked soybean with solvent (hexane). The flaked soybean moves forward with the action of driving device. In this case, the flaked soybean is sprayed and immersed, thus oil in soybean is separated out. Mixture of oil and solvent is called “Miscella”. When the Miscella has been filtered, it will flow to the Miscella cell. Pump the Miscella of high concentration into the Miscella Tank and then to the evaporation and oil stripping system. Miscella of low concentration is sprayed again. After approx. 1 hour, the oil is extracted out. Then the cake slag (here called as “meal”) is pushed to the wet meal (there is solvent in the meal, so it is called “wet meal”) outlet of extractor. Recover solvent in wet meal by Desolventizer (DTDC). Constant material level works for sealing and stabilizing material flow. The transmission bearing is set outside to prevent against mechanical trouble caused by solvent corrosion. Meal in Miscella is removed by Liquid Cyclones.
- Wet Meal Desolventizing System:** The Desolventizer is made up of 5 layers. The 1st layer are designed for pre-heating wet meal to reduce moisture condensing and are designed for steam penetration. Mixture of steam and solvent vapor will pass through wet meal, which will not only make heat exchange but also remove some solvent in the wet meal. The 2nd and 3rd layers are for desolventizing by direct steam. Fresh steam (let in) removes solvent in wet meal completely. Toast the meal in the 4th layer, since there is steam condensate in the direct steam, which will increase moisture content in meal. Blow in cold air in the 5th layer to low meal temperature (The temperature of meal would be 8 -10 higher than ambient temperature). Hot air used in Desolventizer is supplied by Hot Air Heater. Remove the meal in the solvent vapor with Vapor Wash Cyclone, this will reduce meal entering into solvent vapor condensing system.
- Miscella Evaporation:** Miscella is temporarily stored in Miscella Tank and then pumped to the 1st-Stage Evaporator. Heat source of 1st-Stage Evaporator is the

secondary steam coming from Desolventizer. So energy is significantly saved. Miscella from 1st-Stage Evaporator makes heat exchange with crude oil from Oil Stripper. Thus temperature of Miscella entering into 2nd-Stage Evaporator is increased and temperature of crude oil is lowered. The Miscella is then pumped to the 2nd-Stage Evaporator. Heat source of 2nd-Stage Evaporator is indirect steam. Subsequently the Miscella is pumped to the Oil Stripper.

- **Solvent Condensing System:** Solvent condensing system is closely connected with evaporation system. All solvent vapor from Extractor, un-condensed vent gas, free gas from Combined Solvent-water Separator, free gas from Underground Solvent Tanks and free gas from Miscella Tank finally enters into the Vent Condenser, where the gas is cooled by low temperature water and thus most of the solvent gas is recovered. Vent gas is let out of the workshop by Fan. Waste water condensed from direct steam is discharged from Solvent-water Separator. If there is still some solvent in the waste water, boil the waste water to meet requirements in stipulated in National Standard.
- **Boiler Operations:** The plant will be run using two coal - fired boilers. Boiler 1 will be of a capacity of 15 Tons and Boiler 2 will be 20 Tons. The coal peas will come from Maamba Collieries and Wange coal Mines who will be the major suppliers of coal for the plant. The plant usage capacity of coal is estimated at 460 Tons per month. The water product from the Boiler is Coal ash and soot. Coal will be disposed of by being used in road constructions and Making blocks. Monthly stack emissions will be conducted to ensure that the emissions are within ZEMA guidelines and returns will then be sent to ZEMA every after 6 month.
- **Water Treatment Plant:** The proposed plant will get its operation water from a borehole. This water will go through the water treatment process called reverse osmosis where all the impurities will be removed before the water can be used in the processing unit plant operations and the boilers.

2.5 Relevant policy, legislative and planning framework

This document has been prepared in line with the requirements of the Zambian Environmental Management Act, 2011 and its subsidiary legislation, the Environmental Impact Assessment Regulations, 1997 (Statutory Instrument No.28 of 1997). It also refers to the Local Government Act, of 2019, the Urban and Regional Planning Act, 2015, the Water Resource Management Act, 2011, the Public Roads Act, 2002 and other applicable legislations and regulations. The administrative framework within which the proposed project will be implemented will include Zambia Environmental Management Agency (ZEMA), the Chilanga Town Council, Ministry of Housing and Infrastructure Development, Water Resource Management Authority (WARMA) and other regulatory and government agencies.

The plant operations will also conform to international conventions and internationally recognized standards such as Equator Principles (EP). The EP are based on and implemented in accordance with World Bank Group's International Finance Corporation (IFC) Performance Standards and the IFC Environmental Health and Safety (EHS) Guidelines.

This facility will be operated within the provisions of the guidelines as follows:

- The Environmental Management Act No. 12 of 2011
 - Statutory Instrument No. 112 of 2013; Part II on Air and Water pollution (Licensing) Regulations
 - Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 part III
 - Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part II
 - Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part IV
- The Factory Act No. 2 of 1966
- Urban and Regional Planning Act, 2015 PART III section 17
- The occupation health and safety act of 2010 PART IV Section 16
- Public Health Act Cap 295 of 1978 Part V Section 31
- The Local Government Act No. 2 of 2019 Introductory Part
- The Fisheries Act No. 22 of 2011
- The Water Resources Management act No. 21 of 2011 Section 6
- The National HIV/AIDS/STI/TB Act of 2002 Section 4
- The National Heritage and Conservation Act (Cap.173 of 1989) Section 8
- The Employment Code Act No. 3 2019 Introductory Part
- Workers Compensation Act No. 10 of 1999 Section 6
- The Road Traffic Act Cap 464 Section 196
- The Lands Act (Cap. 184 of 1995) Section 8
- The Forest Act No.4 of 2015 (The Forests Community Forest Management Regulations, SI No. 11 OF 2018)

2.7 National legislative framework

2.7.1 Environmental Management Act (EMA), 2011

The Zambian Environmental Management Act (EMA), 2011 is the superior Act on matters relating to environmental protection and management. Its superiority is outlined in Section 3 of the Act. The Act sets out a framework for Environmental Impact Assessments (EIA's) as well as renaming the Environmental Council of Zambia (ECZ) as the Zambia Environmental Management Agency (ZEMA), a regulatory Agency mandated to do all such things as are necessary to ensure the sustainable management of natural resources and the protection of the environment, and the prevention and control of pollution.

The Act outlines principles governing environmental management and provides for, among other things, Environmental Impact Assessment and regulations relating to environmental assessments. The Act has also spelt out offences relating to failure to prepare and submit an EIA report for projects that require such reports. Projects that require preparation of EIA reports must be approved by ZEMA prior to implementation. Section 29 of the Act specifically states that “a person shall not undertake any project that may have an effect on the environment without the written approval of the Agency, and except in accordance with any conditions imposed in that approval”.

This Scoping Report was prepared in accordance with the legal framework on Environmental Management enshrined in the Environmental Management Act No. 12 of

2011 of the Laws of Zambia and its subsidiary legislation, the Environmental Impact Assessment Regulations S.I. No. 28 of 1997. Section 3 (1) of the EIA Regulations states that, “a developer shall not implement a project for which a project brief or environmental impact statement is required under these Regulations, unless the project brief or the environmental impact statement has been concluded in accordance with these regulations and the Zambia Environmental Management Agency has issued a decision letter.”

In accordance with the Zambian Environmental Laws, the dam falls under the Second Schedule; regulation 7 (1) of the Environmental Impact Assessment regulations, statutory instrument No. 28 of 1997 and listed under the category of “(1) **Urban development**. The Proposed Cooking Oil Processing Plant has potential adverse environmental impacts that are generally site-specific, and could be readily addressed through mitigation measures. Accordingly, the Zambia Environmental Management Agency (ZEMA) is mandated to evaluate and assess the EIA report and decide whether to approve or disapprove the proposed project.

The National Environmental Policy of Zambia recognizes the need for any socio-economic development to be undertaken in such a manner that avoids environmental degradation. Provides environment and natural resources management policies to address current and future threats to environment and to human livelihoods and provides policy guidelines for sustainable development.

Compliance: The expansion of the plant will be implemented in accordance with the provisions of the Act and applicable environmental regulations.

Applicable Regulations under the Environmental Management Act No. 12 of 2011 are described below.

- **Environmental Protection and Pollution Control (Environmental Impact Assessment) Regulations, SI No. 28 of 1997.** These Regulations provides the main framework under which EIAs are conducted, submitted to ZEMA and considered for either approval or rejection. These regulations are relevant as a guide to Developer as to what is supposed to be done at every stage of the EIA process. The requirements of conducting an EIA are all stipulated under these regulations and the developer shall ensure compliance at every stage. The EIA regulations give guidelines as to how much review fee will be paid to ZEMA for the purpose of reviewing the EIS for the proposed project and that development shall not be undertaken by a developer without an approval letter from ZEMA.
- **Statutory Instrument No.112 of 2013 – Environmental Management (Licensing) Regulations.** These Regulations provide standards and guidelines for mitigating air, waste water, hazardous waste, pesticides and toxic substances and ozone depleting substances. The Developer will adhere to the provisions of the regulations.

The provisions of the Environmental Management Act will be adhered to by Developers and is currently being used for the preparation of the Terms of Reference and the follow up EIA for the coal mining project.

2.7.2 National Heritage Conservation Act, 1989

The National Heritage and Conservation Commission is the administrative body for the enforcement of the National Heritage Conservation Act. The Act provides for the establishment of the National Heritage Commission responsible for the conservation,

restoration, rehabilitation, reconstruction, adaptive use and good management of ancient, cultural and natural heritage of aesthetic, historical and archaeological nature. The Act aims at preserving local culture and sites, monuments and shrines that have national significance.

Relevance/Compliance: There will be no clearing of vegetation or land; nevertheless national heritage will be conserved if discovered and the commission informed.

2.7.3 The Land Act, 1995

The Lands Department in the Ministry of Lands, Natural Resources and Environmental Protection is the government agency that enforces the provisions of the Land Act. The Act provides for holding of land into categories that include state, local authority and traditional land.

The land considered for this project is vested in state ownership.

Relevance: The Act is relevant because all land in Zambia is vested in the state and the project site falls within state land.

Compliance there of: Developers will utilize the land in accordance with the intended purpose and provisions of this Act. The developer has so far complied with this act and it will strive to comply with any provisions under this act.

2.7.4 The Local Government Act No.4 2019

The Ministry of Local Government is the administrative body for the enforcement of the Local Government Act. The Act provides for the establishment of local councils and districts, and specifies the functions of local government some of which relates to environmental protection and natural resources management functions. These include preventing pollution of water supplies, among others.

Relevance: The proponent shall abide by the By-Laws established by the Local Authorities (Chilanga Town Council).

Compliance there of: Acquisition of Local Authority permits and compliance with other environmental regulations shall be as stipulated therein.

2.7.5 Forest Act, 2015 & S.I. No 11 of 2018

The Forestry Department under the Ministry of Lands, Natural Resources and Environmental Protection is the administrative body mandated to enforce the provisions of the Act. The Act provides for the establishment and management of National Forests and Local Forests and makes provision for the conservation and protection of forests and trees; and provide for the licensing and sale of forest produce.

Relevance: The area under consideration is already cleared, thus this Act is vital in ensuring protection of the trees in the project area.

Compliance there of: The Developers will endeavor to act within the provisions of this law.

2.7.6 Public Health Act, 1995

This Act relates mainly to the control and notification of infectious diseases. Parts of the Act (Part IX) relate to sanitation and housing. It places an obligation on all individuals and on property owners not to allow nuisance situations which could lead to the spread of infectious diseases. The Act is enforced by the Ministry of Local Government.

Relevance: - The activities to be undertaken will entail public interaction through workers and other visitors to the project area. This will require adequate public health facilities and conditions.

Compliance there of: The Proponent shall comply with the provisions of the Act in order to safeguard human life.

2.7.7 The Public Health Act (Infected Areas) (Coronavirus Disease 2019) Regulations, S.I 21 of 2020

The Act provides for the prevention and suppression of the spread of the Corona virus disease, also known as Covid-19. It regulates all matters and activities that are connected to outbreak of diseases. Provisions of the Act are enforced/ implemented by authorized qualified officers through inspections.

Relevance: - The project site will be required to adhere to all set guidelines and Covid-19 regulations and therefore the Act is relevant.

Compliance: All plant workers and contractors will adhere to all the Covid-19 guidelines and regulations as set by the Government of Zambia

2.7.8 Public Health Act (Corona Virus) Infectious Diseases S.I No. 21 of 2020

The Act declares the Coronavirus Disease 2019 a notifiable infectious disease under section 9 of the Public Health Act, which mandates people to notify relevant authorities whenever a person is suffering from such a disease.

Relevance:- The project site will be required to set up and conduct preliminary tests to detect presence of coronavirus disease among workers.

Compliance: All plant workers and contractors are mandated to notify relevant authorities whenever a person is suffering from such a disease

2.7.9 Water Resources Management Act, 2011

The Act provides for the establishment of the Water Resources Management Authority and defines its functions and powers. It provides for the management, development, conservation, protection and preservation of the water resources and its ecosystems. It also provides for equitable, reasonable and sustainable utilization of water resources, among other provisions. The Act specifies activities where permits are required. The administrative body for the enforcement of the Act is the Water Resources Management Authority.

Activities under these purposes may include but not limited to the following;

- x. **Use water for purposes specified under section sixty, other than for domestic purposes specified under section seventy of the Water Resource Management Act No. 21 of 2011;**

- xi. Construct, acquire any water works, impound, supply or distribute water from any water or borehole to any other person;
- xii. Drain any swamp, marsh, dambo, wetland, re-charge area or other land;
- xiii. Construct or acquire any water works for the purpose of draining into, conserving or utilizing, in any manner whatsoever, water from a water resource;
- xiv. Construct water works necessary to restore the course of a water resource that has changed its course;
- xv. Harvest of any rainwater by means of a dam, weir or barrage that is on a water resource;
- xvi. Conduct any operation that would interfere with the bank or course of a watercourse;
- xvii. Sink, deepen or alter any borehole for any purpose in a water shortage area; or
- xviii. Carry any activity in relation to a water resource as may be prescribed.

Relevance/Compliance: The relevance of this act is that it will regulate how Developers will utilize the surface water resources, protect both surface and ground water from contamination within the project site. The developer will extensively consult with the Water Resources Management Authority (WARMA) to make sure all the requirements are met for purposes of water permit and the protection of the water resource in the project area.

2.7.10 The Employment Code Act, No. 3 of 2019

An Act to regulate the employment of persons; prohibit discrimination at an undertaking; constitute the Skills and Labour Advisory Committees and provide for their functions; provide for the engagement of persons on contracts of employment and provide for the form and enforcement of the contracts of employment; provide for employment entitlements and other benefits; provide for the protection of wages of employees; provide for the registration of employment agencies; regulate the employment of children and young persons; provide for the welfare of employees at an undertaking; provide for employment policies, procedures and codes in an undertaking; repeal and replace the Employment Act, 1965, the Employment (Special Provisions) Act, 1966, the Employment of Young Persons and Children Act, 1933 and the Minimum Wages and Conditions of Employment Act, 1982; and provide for matters connected with, or incidental to, the foregoing.

Cited Section: Introduction and Title.

Relevance/Compliance: Developers will comply with this act by employing the required age, establishing contracts, conditions of service, and settling disputes in accordance with this act. The relevance of this Act to the project will serve as guide to equal and formidable employment conditions.

2.7.11 Public Roads Act, 2002 (amended in 2006)

The Act establishes the Roads Development Agency (RDA), which is responsible for the care, maintenance and construction of public roads in Zambia. The Agency is the administrative body for the enforcement of the Act.

Relevance: The proposed expansion site involves construction near the public road (Mumbwa Road).

Compliance: Developers will comply with this act by getting approvals from RDA especially if re-designing egress and ingress.

2.7.12 The National Council for Construction Act No 10 of 2020

An Act to provide for the establishment of the National Council for Construction and to define its functions; to provide for the promotion and development of the construction industry in Zambia; to provide for the registration of contractors; to provide for the affiliation to the Council of professional bodies or organizations whose members are engaged in activities related to the construction industry; to provide for the regulation of the construction industry; to provide for the establishment of the Construction School; to provide for the training of persons engaged in construction or in activities related to construction; and to provide for matters connected with or incidental to the fore-going.

Relevance/Compliance: expansion and operation activities of the Cooking Oil Plant shall be done in compliance with this Act. Developers will engage those who are registered with national council for construction with the right grade to carry out the works. Further, Developers will establish Health and Safety Committees at various levels during the Construction phase. The committee will focus on the improvement of safety and welfare of employees.

2.7.13 Electricity Act No.11 of 2019

The Act seeks to regulate the generation, transmission, distribution and supply of electricity and to provide for matters connected with or incidental to the foregoing. The act states that any person, who, without legal right, cuts, injures or interferes with any apparatus for generating, transmitting or distributing or supply electricity, or maliciously extinguishes or damages any lamp or other electric apparatus provided for the convenience of the public, shall be guilty of any offence.

Relevance/Compliance: The Oil Processing Facility SHALL BE connected to a ZESCO power line; hence the Developer shall always carry out the work in accordance with this Act.

2.7.14 Road Traffic Act, 2002

The Act establishes the Road Transport and Safety Agency (RTSA) and defines its functions; it provides for a system of road safety and traffic management; licensing of drivers and motor vehicles; registration of motor vehicles and trailers; compulsory third party insurance of motor vehicles; licensing and control of public service vehicles; promotion of road safety; regulation of road transport between Zambia and other countries with which Zambia has concluded cross-border road transport agreements. It also provides for implementation of the SADC Protocol on Transport, Communications, and Meteorology among other provisions. RTSA is the administrative body for the enforcement of the Act.

Relevance: Developers will use different vehicles on the roads (Mumbwa Road) during expansion, operation and demolition. Thus, the company will ensure the use of the road in

accordance with these regulations.

Compliance: Developers continue to adhere to the Road Traffic Act with regard to the haulage of construction materials and equipment.

2.7.15 Occupational Health and Safety Act, 2010

This Act provides for the establishment of the Occupational Health and Safety Institute and for its functions. It provides for the establishment of health and safety committees at workplaces and for the health, safety, and welfare of persons at work. It further provides for, among other provisions, the protection of persons, other than persons at work, against risks to health or safety arising from, or in connection with, the activities of persons at work.

2.7.16 The Zambia Wildlife Act No. 14 of 2015

An Act to provide for the winding up of the affairs of the Zambia Wildlife Authority; establish the **Department of National Parks and Wildlife** in the Ministry responsible for tourism; provide for the appointment of a Director and other officers responsible for National Parks and Wildlife;

Provide for the transfer of the functions of the Authority to the Ministry responsible for tourism, Department of National Parks and Wildlife and Director of National Parks and Wildlife; establish the Wildlife Management Licensing Committee; provide for the establishment, control and management of National Parks, bird and wildlife sanctuaries and for the conservation and enhancement of wildlife eco-systems, biological diversity and objects of aesthetic, pre-historic, historical, geological, archaeological and scientific interest in National Parks; provide for the promotion of opportunities for the equitable and sustainable use of the special qualities of public wildlife estates; provide for the establishment, control and co-management of Community Partnership Parks for the conservation and restoration of ecological structures for non-consumptive forms of recreation and environmental education; provide for the sustainable use of wildlife and the effective management of the wildlife habitat in Game Management Areas; enhance the benefits of Game Management Areas to local communities and wildlife; involve local communities in the management of Game Management Areas; provide for the development and implementation of management plans; provide for the regulation of game ranching; provide for the licensing of hunting and control of the processing, sale, import and export of wild animals and trophies; provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Convention on Wetlands of International Importance especially as Waterfowl Habitat, the Convention on Biological Diversity, the Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora and other international instruments to which Zambia is party; repeal the Zambia Wildlife Act, 1998; and provide for matters connected with, or incidental to, the foregoing.

Relevance: The Proposed site does not fall in a Game Management Area. The site is within the existing private area with years of anthropogenic activities in terms of land development and farming. However, the Act is relevant in that the area may be a habitat to animal species which may or may not be endangered.

Compliance there of: Developers will follow the requirements of this Act in order to conserve the animal and bird life within the vicinity of the proposed site.

2.7.17 The Fisheries Act, No. 22 of 2011

The Act provides for the appointment of the Director of Fisheries and fisheries officers and provides for their powers and functions. It promotes sustainable development of fisheries and a precautionary approach in fisheries management, conservation, utilization and development. It establishes fisheries management areas and fisheries management committees and provides for the regulation of commercial fishing and aquaculture. It establishes the Fisheries and Aquaculture Development Fund. It has replaced the Fisheries Act of 1974.

The implementing institution for this Act is the Ministry of Fisheries and Livestock. The Act regulates all fishing activities in Zambia undertaken in any kind of aquatic ecosystem. This includes lakes, rivers and streams. It also regulates activities that may interfere with fisheries.

Relevance/Compliance: The project area has no streams. Boreholes have been drilled as the main source of the water that will be used for construction and operation activities. Management of the groundwater if not properly handled may result in contamination or depletion of it. Developers will follow the guidelines in this Act to avoid the contamination of the stream which may result in adverse impacts on aquatic species.

2.7.18 The Petroleum Act Cap 439 and the Energy Regulation Act Cap 436

The Petroleum Act provides for control of conveyance and storage of petroleum products such as kerosene, diesel and petrol. The Act provides further provides for control measures regarding production, transportation, handling, distribution, re-sale and use of energy.

The Energy Regulation Act of 1995 makes provision with respect to the production and distribution of energy in Zambia and establishment of the Energy Regulation Board (ERB) for purposes of control and licensing of energy undertakings. In accordance with this Act, ERB shall, in conjunction with other Government agencies, formulate measures to minimize the environmental impacts of transportation, storage and use of fuels and enforce such measures by attachment of appropriate conditions to licences held by such undertakings.

Relevance/Compliance: The developer will handle all petroleum related products on proposed site in accordance with the Act. The developer will also follow the requirements of this act when transporting, storing and using petroleum products during the construction and operation phases of the project.

2.7 Institutional Framework.

2.7.1 Ministry of Local Government

The Ministry of Local Government is responsible for the development of policy on environment covering issues such as solid waste management and landfill site. The ministry is also responsible for co-coordinating and monitoring the other ministries that play a role in the effective conservation and management of the environment.

Relevance: The proposed project has the potential to generate and hold solid waste (domestic)

Compliance there of: The Developer shall obtain all necessary documentation with respect to solid waste management from Chilanga Town Council.

2.7.2 Zambia Environmental Management Agency

The Zambia Environmental Management Agency (ZEMA) is a statutory body created by an

act of parliament and falls under the Ministry of Green Economy and Environment (MGEE). The ZEMA is responsible for the enforcement of the Environmental management in Zambia, pollution control, natural resources management and solid waste management which includes establishment of the landfill sites.

Relevance: Due to size and nature, the proposed site, falls under a category requiring the preparation of an Environmental Impact Assessment.

Compliance there of: This Scoping report is being prepared in compliance with the above legal provisions. The Developer shall in accordance with this Act engage a solid waste management company, avoid air pollution and unnecessary cut of trees in order to protect and conserve the environment.

2.7.3 Local Authorities

Chilanga Town Council

Councils are established under the Local Government Act. The functions of a District Council include town planning and pollution control. Local Authorities are concerned with the health of local community members and the conservation of natural resources within the confines of their administrative influence. The Local authorities are also responsible for enforcement of the provisions of the Local Government Act and the public Health Act.

Relevance: The proposed Cooking Oil Processing Plant is situated in Chilanga District of Lusaka Province of Zambia. The Council already knows about the project and developers have been working closely with the council. The CTC is also relevant in that the project under review will employ people. The health of the local community, the public, and the environment are of concern.

Compliance: Developers will continue to work closely with the local authority and seek approval for any works such as buildings and others. The developer shall conserve and protect the environment. It shall avoid unnecessary noise, air and water pollution. To avoid noise and air pollution the developer shall be working during daytime and will be watering the ground to suppress dust.

Table 0.4: Summary of Institutional framework and roles

INSTITUTION	ROLE
Zambia Environmental Management Agency (ZEMA)	ZEMA is the regulatory body responsible for enforcing the National Environmental Law in the Zambia - the Environmental Management Act No. 12 of 2011. ZEMA controls the laws related to the proposed project such as environmental protection, pollution control, natural resources conservation and waste management.
Ministry of Green Economy and Environment (MGEE)	The MGEE is responsible for the protection of natural resources pollution control and administration of land in the country. Through ZEMA, It will also be a major player in approving the project. The departments under the ministry that will be directly concerned with the project activities include the Forest department (FD), Department of National Parks and Wildlife (DNPW-ZAWA) and the National Heritage Conservation.
Ministry of Water Development and Sanitation (MWDS)	The Ministry through the Water Resources Management Authority (WARMA) will regulate and control the use of water for the project activities as it has the sole responsibility of managing water resources in the country through issuance of water permits.

2.8 International Convention and Agreements

This subsection summarises some of the international conventions and agreements to which the Zambian Government is a party and which are applicable to the project. The agreements and protocols impose obligations on Zambia to address issues or topics included in these documents.

2.8.1 Convention on Biological Diversity (ratified in 1993)

This convention requires Parties to it to prepare national biodiversity action plans. Zambia has already in place a National Biodiversity Action Plan whose objectives include, ensuring the conservation of a full range of Zambia's natural ecosystems through a network of protected areas, development and implementation of strategies for conservation of

biodiversity, sustainable use and management of biological resources.

Biological resources of significant conservation value that will be identified during Project implementation will be conserved and protected.

2.8.2 Convention Concerning the Protection of World Heritage (1972)

The Convention aims at ensuring the identification, protection, conservation, presentation, and transmission to future generations of the cultural and natural heritage.

Cultural and natural heritage sites that may be identified during implementation of the proposed Project will be protected and conserved in accordance with the provisions of the Convention to which Zambia is party to.

Ramser Convention: - The general objective of the Ramser Convention is to curtail the loss of wetlands and to promote wise use of all wetlands. The convention addresses one of the most important issues in Southern Africa, namely the conservation of water supplies and use of the natural and the human environments in an intergenerational equitable manner.

African Convention on the Conservation of Nature and Natural Resources (Algiers, 1968), (Maputo, 2003): - The objective of the convention is to encourage individual and joint actions for the conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind. This must be done from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.

Kyoto Protocol to the United Nations Framework Convention on Climate Change: - The aim is to further reduce greenhouse gases by enhancing the national programs of developed countries aimed at this goal and by establishing percentage reduction targets for the developed countries.

Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and their Disposal: - The objective is to control import and export of hazardous wastes. It also aims at ensuring that any trans-boundary movement and disposal of hazardous waste, when allowed, is strictly controlled and takes place in an environmentally sound and responsible manner.

The United Nations Framework Convention on Climate Change (UNFCCC): - It was signed by Zambia in 1992. The main objective is to achieve stabilization of greenhouse gas concentrations in the atmosphere. Zambia recognizes that the largest source of one of the main greenhouse gases, carbon dioxide, is from burning wood fuel and the use of coal and oil. Developers will take all precautions to make sure that the contributions to greenhouse gases from the farming and animal husbandry operations are minimal. The closure phase will involve re-forestation and site remediation.

2.9 Identification of associated neighbouring processing plants

The Cooking Oil Processing Plant is near other similar Plants such Kalomo Grain Marketing Limited (Supreme Oil Zambia) in Manda Hill of proposed site, Mount Meru Millers Zambia Limited and other small scale oil processing companies dotted around Lusaka. Therefore there could be possibilities of these facilities competing for the same customers for the final

product. This will be assessed and documented in the EIS.

2.10 Products and by- products

Materials to Be Used

Soya, Hexane and water are the major raw materials for the project. Coal will also be used during the production cycle. During construction, steel roofing sheet and normal concrete, cement and blocks will be used with wall finishes done using paint

Products

The following are the products of the oil mill plant.

- Soya meal
- Soya oil

Below are the by-products from the crush plant (bean sifter)

- Trash
- Sticks
- dust

By-products and Wastes

Other wastes from the production line include:

- **Non-hazardous Solid waste:** include material such as scrap timber and various off cuts and refuse such as discarded packaging (e.g. soya bags), garbage and domestic waste from workers canteen etc.
- **Hazardous waste:** hazardous waste results from operation activities; this comprise mainly used oil / lubricants. **Runoff:** Storm water from the site
- **Dust:** Dust generated on site due to movement of vehicles.
- **Exhaust emissions:** from operation of vehicles on site.
- **Gas Emissions:** Gas emitted from the production line.

Table 0.5: Sources of solid waste and disposal

Waste	Source	Disposal
Glass	Broken panes during maintenance works	Disposal – Municipal dumpsite if broken.
Ferrous	Off cuts during maintenance works	Recycled – taken to a licensed scrap dealers.
Concrete	Rubble	Reused – backfill during construction
Packaging	Empty cement bags, fittings, plastics, paper and cardboard	Disposal – Municipal dumpsite Recycling companies like Flex waste.

Plant material	Maintenance works	Reused – Composted Disposal – Municipal dumpsite
Domestic waste	From residents during Operation	Reused – Reuse and composting Disposal – Municipal dumpsite

2.11 Resources for project operation

The total investment cost of the proposed expansion of cooking oil plant is **US\$90,000.00**. Skilled and unskilled human resource are sourced locally and Zambia at large.

2.12 Brief history of the Project including options considered

PARROGATE is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district. This plant which is the subject of these ToRs was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking oil.

The proposed facility will include an adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage.

3 OBJECTIVES

3.1 Main Objective

The objective of the project is to expand the existing Cooking Oil Processing Plant from 200 MT/Day to 600 MT/Day on **Sub C and Sub D of Lot 10208/M**, located along Mumbwa road, Mwembeshi area, Lusaka west in Chilanga District.

3.2 Specific Objectives

The purpose and objectives of this document are;

13. To upgrade a 200MTPD Soybean crushing and solvent extraction plant and a 600MTPD Refinery Plant
14. To comply with internationally accepted best practices in environmental management.
15. To comply with legal requirement in the EIA Regulations for submitting a Scoping Report for approval before proceeding with other stages of the EIA process.
16. To provide the initial information about the Cooking Oil Processing Plant project in order for a legal opinion to be made regarding the EIA process.
17. To set out the extent (scope) and key elements of the EIA study.
18. To place limits on the information that must be collected, thereby optimizing the use of resources during the study.
19. To provide names and skills of the EIA team for regulatory approval.
20. To facilitate efficient utilization of the time, money and expert knowledge on issues of environmental significance to the project.
21. To guide the EIA report in order to avoid presenting irrelevant information that may cause the report not to be a working document.
22. To facilitate early consultation with the Zambia Environmental Management Agency (ZEMA) and other Interested and Affected Parties (IAPs).
23. To facilitate effective planning and smooth implementation of the EIA process by the consulting team.
24. To eliminate chances of disagreement in terms of the EIA process and the detail of information and consultations required to complete the process.

4 EXISTING ENVIRONMENTAL CONDITIONS

This section describes briefly the environmental and social conditions of the project area. It gives highlights on climate, rainfall, wind, hydrology, geology, air quality, soils, land use / land tenure, flora and fauna, archaeology and cultural heritage, traffic volume, noise and socio-economics.

Chilanga district is 5,252 Km² in size. According to the 2010 Population and Housing Preliminary Report, the district had a projected population of 127,604 people in 2018 - a population density of 24 people per square kilometre. By 2020, the population was expected to reach 157,290 people with 79,135 males and 78,155 females.

4.1 Location

The plant is located off Mumbwa road, within Parrogate Ginneries Limited premises, situated in Mwembeshi area of Chilanga district of Lusaka province. Chilanga District is located between Shibuyunji district (in the west), Kafue district (in the south), Lusaka district (in the east) of Lusaka Province and Central Province in its northern boundary .

Parrogate Ginneries Limited is located at Sub C and D of Lot 10208/M. The facility lies at 27° 57'24.3" E and 15° 20'58.1" S, 30km from the Lusaka business District Centre and 20m from Mumbwa road. Some of the notable structures in the area are Mwembeshi maximum correctional facility in the northern direction, Mwembeshi Boarding Secondary School and Round house lodge on the southern side. The area is surrounded by farms on the eastern and part of the southern side and Mumbwa road lies on the western side.

The following are the coordinates of the Plant site:

Table 0.6: Proposed Cooking Oil Processing Plant Site Coordinates

PARROGATE GINNERIES LIMITED SITE COORDINATES			
Beacon No.	Description	LongitudeE	Latitudes S
A	Corner Point	27° 57' 33" E	15° 21' 02" S
B	Corner Point	27° 57' 22" E	15° 21' 02" S
C	Corner Point	27° 57' 22" E	15° 21' 55" S
D	Corner Point	27° 57' 33" E	15° 21' 55" S
E	Center point	27° 57' 23" E	15° 21' 04" S



Figure 0-8: Location Map of the Proposed Cooking Oil Processing Plant
4.2 Climate

The climate in the area around the facility is tropical characterized by three distinct seasons in the year: During the rainy season, extending from early November to April, maximum temperatures may vary from about 24°C to 29°C. The Annual minimum temperatures range between 11°C and 15°C. The range between daily maximum and minimum temperatures is about 7°C.

The temperature variations in the area of Chilanga are considerable between the cold and hot seasons the average minimum temperature is 10°C with a max of 35°C. The highest temperatures are recorded in October and the 30-year annual mean temperature is 20.7°C.

The typical average rainfall in the area is 850mm (min: 527mm and max 1,318mm over a 30-year period), with the majority of precipitation occurring during the months of November to March (90% of annual rainfall).

According to the Zambian government, the district falls in agro-ecological region II whose weather is heavily influenced by the Inter-Tropical Convergence Zone (ITCZ).

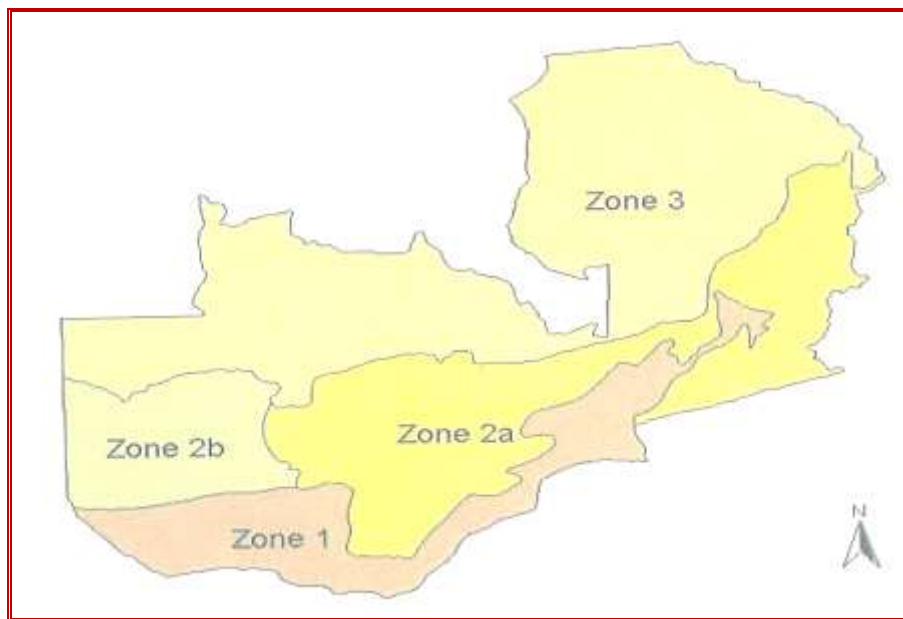


Figure 0-9: Agro-Ecological Zones of Zambia

4.3 Rainfall

The rains generally start in the middle of October and continue through up to the beginning of April. Rainfall reaches its peak around January after which it diminishes slightly up to the beginning of April when usually it ceases entirely. The typical average rainfall in the area is 850mm (min: 527mm and max 1,318mm over a 30-year period), with the majority of precipitation occurring during the months of November to March (90% of annual rainfall).

4.4 Wind

The Average wind speed is between 4 and 9 km/hr in Lusaka Province. Rainfall come with light northerly breeze while the months of July and August are associated with dry dust wind gushes of easterly winds.

4.5 Temperature

Lusaka province experiences average temperatures of 15°C during the cold season and 29°C during hot season. And it is not unusual to have temperatures outside of this range – very low temperatures of about 10°C have been recorded in July and higher than the maximum temperatures in October. The temperature variations in the area of Chilanga are considerable between the cold and hot seasons the average minimum temperature is 10°C with a max of 35°C. The highest temperatures are recorded in October and the 30-year annual mean temperature is 20.7°C

4.6 Hydrology

Surface Water

Chilanga district receives between 500 and 1,000 mm of rain per year. While rainfall is the primary source, it is the lithology (or rock type) and the structural characteristics of the rocks (porosity, clay content, folding, faulting, jointing and foliation) that are determinants of ground water availability. Rain fall is relatively uniform and predictable over long time periods, and therefore provide sufficient water to recharge aquifers. The amounts of ground water go down from May to November (the dry season), but rise from December to April (the rainy season).

Surface water sources are limited around the project with no streams or rivers in the vicinity of the site. However, the ground water sources are available especially during the rainy season when the water table rises.

The potential impact of the operations of the proposed Cooking Oil Processing Plant with regard to surface water pollution will be assessed. Hydrocarbons leachability will be assessed based on laboratory leachability tests data. The results will be compared with whatever secondary data that might be available.

Groundwater

The quality of groundwater in Chilanga and surrounding areas varies depending on factors such as landuse, location of on-site sanitation facilities and underlying geologic formation.

The project site lies in Lusaka watershed and most people in the district rely on riverine, wells and borehole water supply sources. Very few people in urbanised areas are connected to water utility company water supply and sanitation system. The plant area is located in a rural part of the district without access to most basic socio-economic utility facilities. And so, the water sources are subject to contamination, and therefore can easily be sources of easily transmissible diseases.

4.7 Air Quality

The main sources of dust emissions that can reduce local air quality within the project area include movement of vehicles along the Mumbwa road. During construction phase, the surrounding human communities, flora, and fauna have the potential of being exposed to dust emissions. The boilers in the plant will also be a source of air pollution. Hexane gas to be used as a solvent can also leak and become source of pollution. Coal ash from the boiler if not taken care of could also be a source of dust.

A review of air pollution data within the site will be undertaken as part of the environmental and social impact assessment of the proposed project. Ambient air quality monitoring will be undertaken as part of the EIA study to identify potential impacts of dust and air emissions on human health and functions of the ecosystems services within and around projects site as defined by the study area.

4.8 Soils

The Lusaka province is underlain by the Lusaka Dolomite Formation. Dolomite and gemstone formations are subject to karst-action whereby the carbonate rocks, which are soluble in mildly acidic water such as rainwater, experience solution weathering of rectangular joint patterns. This results in enlarged fissures and hollows in the rock

formation. The solution fissures and cavities that occur at various depths retain water and give carbonate formations a high degree of porosity and permeability, such that areas underlain by dolomite and gemstone are very important aquifers and reliable underground water sources.

The quality, quantity and direction of groundwater flow in the plant are elaborately defined. There are five boreholes used for plant operations and another two for domestic purposes. A review of available hydrogeological data relevant to the project area will be undertaken to understand the hydrogeological conditions of the project site. A geophysical study will be undertaken to determine the soil structure and characteristics such as texture, moisture, holding capacity, fertility and porosity.

The existing available data will be used to benchmark future rehabilitation activities during decommissioning and closure.

4.9 Land Use / Land Tenure

The larger portion of the district falls under customary land tenure system. Even though there are a lot of business establishments coming up, the rate at which land ownership is converted from customary to freehold system (mostly 99-year leasehold tenure) is too low to ensure increased security of tenure and therefore encourage higher propertied investments.

Under the state or free leasehold tenure, the Republican President is the custodian of all titled land holdings on behalf of all Zambians. According to the Zambian law individuals are allowed to convert their customary land onto leasehold tenure as long as the traditional leaders through the local government authority give consent for the same.

Most of common land use activities in Chilanga district are agriculture, quarrying and trading that serve the larger consumer market of Lusaka.

Current land use activities within the study area will be mapped during the socio- economic survey to be undertaken as part of the EIA study.

4.10 Flora and Fauna

The Vegetation has changed all over the province and district because it increases in population density over the years on account of being nearer the capital city, Lusaka (people migrate to the capital city for various socio, political and economic reasons). Low electricity connectivity of residential areas means that most people use charcoal and firewood for most domestic purposes. These sources of energy are bad for the people and environment.

Being mostly a rural district, Chilanga has relatively high levels of small-scale and medium agricultural activities, contributing to clearance of high proportion of vegetation for various economic activities. The vegetation has changed to largely grassy areas with small youngish trees and shrubs (re-growths of older trees that were cut down for various domestic uses like firewood, charcoal, housing and other infrastructure purposes).

The district used to have wildlife in years gone by. Because of widespread and increased human settlement there is significant increase in domesticated animals like cattle, goats, pigs

and small livestock and birds. Large and medium scale commercial farmers keep a lot of livestock and fowls.

There are still plenty of smaller wild birds like house sparrows and crows. There are insects, and small reptiles and mammals

4.11 Archaeology and Cultural Heritage

There are no known archaeological or cultural heritage sites at the proposed plant site.

4.12 Traffic volume

Currently private vehicles, buses and minibuses use Mumbwa road for public transport. As the proposed expansion of the Plant will be constructed, there is great possibility of increase in traffic volumes on Mumbwa road due to deliveries of material to the site.

Therefore, a detailed traffic assessment will be undertaken to gather primary data on the traffic situation on Mumbwa Road. Secondary data, if available, will be compared with the primary data.

4.13 Noise

The sources of noise are the boilers, crushers, refinery, trucks and loaders that operate within the plant area. Even with an increase in plant machinery and equipment such as these, it is not expected that they will have significant additional impact on noise level than what already exists.

Noise disturbance as a result of the plant operations will be assessed. Sensitive receptors within the study area will be identified and the potential impacts assessed. Noise surveys will be undertaken to generate primary baseline data, which will be supplemented with secondary data if available.

Based on the findings from the secondary and primary data, the data will be analysed and potential impacts will be identified. Appropriate mitigation measures will be recommended.

The noise surveys will consider noise levels and exposure to all receptors.

4.14 Socio-economic conditions

Population of Chilanga District

By 2020, the population was expected to reach 157,290 people with 79,135 males and 78,155 females. In the same year, according to the Demographic and Health Survey (Zambia DHS 2018, published in 2020) **infant mortality rate** for Lusaka Province was 55 deaths per 1,000 live births compared to the national average of 45 deaths per 1,000 live births. Total fertility rates was 3.7 in 2014, went down to 3.5 by 2018. This rate compares favourably with the national average of 5.3 (with rural rate at 6.6).

Development surrounding plant site

The built environment nearer and around the plant site (within 2 km) consists of sparse human settlements that include compounds for farm labourers, paramilitary residential compound, a lodge, farms (small holding and commercial farms) and villages slightly further away.

Within the plant premises are to be found two ginneries (InterContinental and Parrogate), office block and laboratory building, storage shed, boiler sheds, effluent treatment plant, solid waste disposal area, extraction, refinery and packaging plant, five boreholes, ZESCO transformer, concrete platforms and gravel roads.

Economic Activities

With regard to economic activity, the south-eastern side of the district is the most urbanised, where the administrative centre of the district is located. The larger part of the district is largely agricultural settlements dominated by small and medium scale farmers that rely on the larger market of Lusaka district.

The district is host to Munda Wanga Botanical Gardens, a tourist destination not far from the very urbanised area of Lusaka district. The other notable establishments in the district are Lafarge/Chilanga Cement plant and a lot of lodges and recreation facilities, especially along the T2 road – in particular around government administrative centre.

Though most people are subsistence farmers, a lot more people engage in various agriculture business or economic activities because of the large consumer market in nearby Lusaka district. The number of small and medium scale agriculturalists is always rising because a lot of people in formal employment decide to start farming much earlier than was the case a few decades ago. The other economic activities are private transport, traders, service providers like hoteliers, educators and healthcare people. The district has a fair share of people who earn their living as employees in private or public institutions.

Education

In 2015, **Literacy rate** for Lusaka province was 80.1 percent; it compares favourably with the national averages of 67.5 percent (with rural and urban rates at 54.3 and 82.8 percent respectively).

Health Facilities

Chilanga District has about 13 health care facilities with the closest to the site being Mwembeshi rural health center. Most townships in close proximity to the proposed project have access to the health facility. The district also houses two hospices.

Energy

The plant expansion will get its energy from ZESCO.

Chilanga generally has seen an increase in the number of developments coming up from 2012 to date. This increase in both population and economic activities has resulted in the

growth of the energy sector. The demand for power and other energy products in the district has resulted in a number filling stations coming up and sales of charcoal has also increased. The plant has its own share in the aforementioned demand for energy.

Transport and Communication

The plant site is well serviced by tarred road (Mumbwa), which passes by the facility. Mumbwa road connects the plant area to Lusaka District Town Centre, the other parts of the district and the rest of the country. The site can be accessed using public transport (mini-buses/taxis).

The environs of the study area are well covered and served by the local radio, television network and local print media. The local newspapers are sold in shops within the area. The surrounding area is also well covered by both landline phone (telephone - ZAMTEL) and mobile cell networks (Airtel, MTN and Zamtel).

Water Supply and Sanitation

Lusaka Water Supply and Sanitation Company (LWSC) Limited is the utility company in charge of providing water and sanitation services in Lusaka Province. The company operates under the legal framework as outlined by The Water Supply and Sanitation Act No. 28 of 1997. The company is licensed by the National Water Supply and Sanitation Council (NWASCO) as the Regulator, to provide water supply and sanitation services in the City of Lusaka.

The plant expansion works will use water from a borehole. Effluent will be treated within the plant and the waste water will be used for cooling coal ash and dust suppression expansion will use water from a bore located within the plant.

Potential Resettlement and Compensation

The other part of plant is already in full operation and the social assessment indicates that there will be no relocation, resettlement, or compensation issues associated with the operation of the plant.

5 PROPOSED PROJECT ACTIVITIES

The various development phases of the proposed Cooking Oil Processing Plant, includes construction, operations and decommissioning stages.

5.1 Preparation Phase

During this phase, the Consultant will carry out the following activities. These will include:

- Assemble EIA Team
- Prepare Terms of Reference (TORs) and Scoping Meeting
- Conduct field visits for specialized studies
- Prepare Specialized study reports
- Conduct Disclosure Meeting on website due to public gathering restrictions because of COVID 19
- Prepare draft EIS Report;
- Prepare final EIS for submission to ZEMA
- Facilitate Public Hearing (If any).

This phase will mainly include clearing of vegetation for construction of the plant, offices and the associated structures. Land clearing will be done using heavy machinery. Clearing and preparation of land will employ procedures that will minimize emission of Green House Gasses. Cleared organic matter (biomass) will not be burnt but chipped and ploughed into the soil during land preparation stage or use.

Recruitment and Training of Personnel: The project will involve the recruitment of both skilled and unskilled staff. For the unskilled staff preference will be for consideration of local communities as a way of empowering them. This is also in line with Government Employment Policy.

5.2 Construction phase

The construction works of the expansion of the cooking oil processing plant, associated structures and other auxiliary works will be the major components of this phase. This will involve digging of foundations and ferrying of construction materials such as sand, gravel, cement and steel to the sites. This will also have storage facilities. The following other activities will be undertaken:

- Clearing, and ground levelling and compaction. At this stage a heritage expert will be expected to be on site to ascertain the absence of heritage resources at the site.
- Site Access and Parking Facilities with associated Drainage System
- Setting up Facilities indirectly linked to the Soya Processing Plant
- Factory, Office and Main Residential Foundations and Structures
- Setting up and construction of the Water Reticulation and Waste Management System
- Erecting of Plant Structures and Installation of Processing Equipment
- Installation of Power
- Installation of Fire Fighting Equipment
- Installation of Security System

5.3 Operation phase

This will start with commissioning of the plant (manufacturing of cooking oil), the activities under this phase will comprise of the following:

- Acquiring of the necessary raw materials (soya seed).
- Screening of the soya seed.
- Crushing of the soya seed.
- Conveying the soya flakes to the extraction plant.

Acquiring of the necessary raw materials (soya seed)

Oil seed will include soya seed, sunflower etc and will be acquired from local farmers from Eastern and Southern Province including Lusaka. Most of these will be brought at the plant and once the seed is accepted, it's weighed at the weighbridge and bought.

Cleaning and grinding

- The incoming soya beans seeds will be passed over magnets to remove any trace metal before being stripped of all extraneous material.
- The stripped soya beans seed will be then ground into coarse meal to provide more surface area for oil extraction. The hammer mills crush the material to the proper sizes consistently.
- The meal will be heated to facilitate extraction of oil.
- The heated meal will be rolled into flakes and processed by solvent extraction to attain maximum yield.
- The flakes are conveyed to the extraction plant through a conveyor belt.

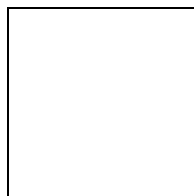


Figure 0-10: Process flow diagram for the Proposed Plant

Maintenance of structures and common areas will include routine cleaning of plant and office corridors and public toilets, maintenance of physical structure (e.g. roof / walls of the plants), maintenance of security lighting and fire equipment. The car park and internal roads will be cleaned routinely and monitored on a day to day basis for damage to the road surface. Any repairs necessary shall be carried out by the Proponent.

Waste Management

- All waste will be stored at the designated waste bins within the company premises awaiting a ZEMA Licensed transporter to take waste for disposal at the nearby dumpsite. Wherever possible, reuse of waste will be encouraged. All waste will be disposed (non-organic and organic) will be collected and temporarily stored at the designated site, where separation will be done and transported to the government approved dumpsite by a reputable contracted company.

Effluent Storage

- All effluent from the company operations will be pretreated before discharging it in

the Sewerage trunk line.

Hazardous waste

- Hazardous waste will generally comprise of used oils and lubricants to be stored in drums at designated storage sites. Once sufficient waste is collected, an approved and recommended contractor by ZEMA collects the waste for disposal at a suitably licensed waste disposal site.

5.4 Decommissioning phase

The objective of the Decommissioning and Closure Plan is to clear all structures and equipment brought on site due to the project period and rehabilitate the land to its original state or an agreed upon alternative. The rationale for the Plan is to provide assurance to ZEMA that the project proponent will provide adequate resources to rehabilitate the land. It is also intended to provide guarantee that government will not have to use public resources to rehabilitate the land in the case that the project proponent fails to do so.

The closure plan for the project will include; Back filling, re-vegetate and re-grass some part of the plant progressively until closure. Post-closure, the site will be fully re-vegetated and re-grassed. After lapse of this period, an application for closure certificate will be lodged.

This phase shall include the following;

- 4) Repairing all the structures to a suitable state for alternative uses.
- 5) Conducting re-vegetation activities where possible around the entire project area.
- 6) General clean-up of the site.

6 IDENTIFICATION OF ENVIRONMENTAL IMPACTS

Environmental impacts are any changes in the physical, natural or cultural environment arising from undertaking a development project. These environmental impacts are investigated to identify and assess their significance, which is basis for informing decision-making by the regulatory authorities and other stakeholders. This subsection highlights the types of potential impacts that may arise as a result of undertaking the proposed project and the approach to be used to assess the significance of the impacts.

6.1 Impact Identification for Proposed Project

The potential impacts of the proposed Cooking Oil Processing Plant Project will be identified and assessed based on review of and critical assessment of the facility components in relation to the prevailing environmental and social baseline conditions. The assessment will include:

- Determining environmental and social conditions in sufficient detail against which the impacts can be identified and assessed;
- Predict future changes to the physical environment;
- Identifying significant impacts likely to happen if the plant continues to operate as it is or if changes were to be made.

The process of identification and assessment of potential impacts will also be based on applicable national legislations and design guidelines for the Project.

The impacts will be characterised in terms of being beneficial (positive impact on the environment) or adverse (negative impact on the environment) or neutral (no impact on the environment). They will further be characterised as direct, indirect, cumulative, reversible and irreversible based on the definitions below:

Direct These are impacts that are typical, inevitable and predictable. They are caused directly during implementation of project activities.

Indirect These are reasonably foreseeable and probable impacts that are caused by facility direct and indirect effects. The impacts may occur at some future time after direct effects and will be located within the boundaries of the systems affected by the plant.

Cumulative These are reasonably foreseeable and probable impacts that are caused by direct and indirect effects and other activities.

Reversible Impacts These are impacts that can be reversed.

Irreversible Impacts These are impacts that are not reversible.

Local Impact will affect the immediate plant site.

Regional Impact will affect areas outside the plant

National Impact on a national scale.

6.2 Impact Mitigation

For identified and predicted impacts, appropriate mitigation measures will be implemented to eliminate or minimise the significant negative effects or enhance the positive ones. These may include preventative engineering. The objectives of mitigation are basically to:

- find more environmentally and socially responsible ways of undertaking some activities;
- enhance environmental and social benefits;
- avoid, minimise or remedy negative impacts within acceptable levels;
- Ensure that residual negative impacts are within acceptable levels.

6.3 Potential impacts

Preliminary potential impacts were identified during the scoping exercise and review of secondary data. These impacts have provided an initial indication of baseline surveys and investigations that should be carried out as part of the EIA study. The following are the identified potential impacts:

Projected Significant Positive project impacts

Positive project impacts anticipated from the undertaking will include but not limited to the following;

- Increased food (cooking oil) security in the area and the country at large through availability of processed cooking oil (**Immediate direct impact**).
- Increased employment and business opportunities for the local people (**Immediate direct impact**).
- Socio-economic change through increased revenue, disposable income and availability of goods for the local people (**long indirect impact**).
- Increased revenue for the local authorities in Chilanga District as well as central government through taxes, export charges, and levies. (**Cumulative impact**).
- Availability of ready market for local crops such as soya bean as well as out grower scheme opportunities (**Immediate indirect impact**).
- Enhanced Standard of living resulting from increased socio-economic activities in the area (**Immediate indirect impact**).

Projected Negative project impacts

Negative impacts may occur during the project implementation lifecycle. These will be mitigated in accordance with applicable regulatory requirements. Anticipated impacts include;

- Possible ground water contamination resulting from chemical, oils and hexane usage (**cumulative impact**).
- Surface water contamination due to fatty acid effluent from the processing plant.
- Dust generation during the construction phase, through access roads and during

- operation activities especially at the oil seed feeding point. **(cumulative impact)**.
- Changes in air quality due to processing activities e.g. use of boilers and hexane. **(Cumulative impact)**.
- Generation of noise by plant equipment. **(Cumulative impact)**.
- Loss of flora and fauna due to land clearing.
- Damage to Cultural, historical and heritage sites (if any).
- Increased Crime and Increase in HIV/AIDS prevalence and Sexually Transmitted Diseases (STD's) due influx of people seeking employment in the area. **(Cumulative impact)**.
- Solid waste generation (Hazardous and non-hazardous) from plant operations.

C. Planning and Construction Phase

Since the Plant is operational, there will be no negative impact during planning phase at the project site.

During the construction phase the project impacts anticipated from the undertaking will include but not limited to the following;

- Increased trade opportunities through the supply of goods and services.
- Employment for the local people for the duration of the project
- Improved land use in the area
- General improvement in local livelihoods due to synergistic impacts of positive effects of the project such as locals benefiting from supplying, economic boom. Increase in revenue to local authorities and institutions from land rates, licenses and personal levy
- Possible ground water contamination resulting from chemical and oils usage.
- Dust generation during the construction phase, through access roads and during operation activities thus changes in air quality
- Generation of noise.
- Loss of flora and fauna due to land clearing.
- Damage to cultural, historical and heritage sites (if any).
- Solid waste generation (Hazardous and non-hazardous)

D. Operational Phase

- **Impact on Noise**

Noise resulting from the operation of machinery on the site is likely to assume some significance mainly during the loading/offloading of raw material/products as this will involve the use heavy machinery such as folk lifts, trucks, loaders etc. This can pose a

nuisance to adjacent residential areas in the long term given the proximity.

- **Noise from increased traffic**

The increased volume of traffic to the area will result in an increased background noise level, especially during peak times. However, given that the site is located next to existing busily trafficked roads, it is not considered that the impact of noise from the additional traffic will be significant.

Acutely maintained operation equipment will not be allowed to operate on the site to ensure quiet operation. Earmuffs shall be provided to personnel working in or near noise environments.

Public liaison through the management will be an integral part of PGL management in order to avoid potential conflict with surrounding developments and neighboring residential areas as regards the activities of the development. Prior notice will be given in good time of impending activities that may potentially cause disturbance to surrounding residential areas.

Impact on air quality

- **Impact on Air quality**

Dust releases and nuisance

Bare surface areas with loosened topsoil combined with the operation of machinery such as trucks, folk lifts will increase dust raised from the site. Dust will be raised during the off-loading of materials (soya seeds) delivered to the site; the preparation of the foundations will require the importation of raw materials.

During operation phase, coal-fired Boilers at the proposed Plant will be a source of air pollution; particulate matter, Oxides of nitrogen, Sulphur and carbon will be mostly emitted. Hexane if leaked could also pose adverse effects at the plant.

Air Quality

- Air pollution caused by dust and exhaust emissions generated through movement of heavy trucks along the access road and at the plant.

Surface Water and Groundwater Quality

- Potential contamination of surface water in the nearby water bodies caused by contaminated surface runoff from the plant operations.
- Potential contamination of groundwater caused by seepage into the groundwater regime of contaminative materials arising from plant effluent and laboratory operations.

Table 0.7: Potential Impacts and preventative/mitigation measures – Operation and Maintenance phase

Impact Area	Potential Impact / Source	Area of Influence	Potential preventive / mitigation measures
Resources and waste	Waste and wastewater generated by permanent installations during operation and maintenance.	Local, specific distances depend on local conditions	Waste management plan
Socio-Economic Impacts	- Economic benefits due to production of cooking oil - In case cooking oil is also supplied to other towns other than Chilanga and Lusaka availability of cooking oil in the country	Local and regional: Individuals and companies benefitting from improved power supply	
	Benefits due to improved local livelihood	Local	
Working Conditions	Risk of injuries for workforce as a result of routine project operation activities and maintenance	Local: Workforce	- Develop a HSE management system for the project in accordance with international good practice. - Good site management practice (training and qualification of staff, appropriate work standards) will be implemented to reduce health and safety risks.

6.4 Impact Assessment Methodology

A standard impact assessment methodology will be applied on identified impacts and will

take into account the nature or status of the predicted impact, extent of the impact, magnitude or intensity of the impact, the duration of the impact and the probability of the impact occurring. The impacts will be given a rating using the assessment criteria as indicated in Table 6. The overall significance of the impact will be obtained based on the extent (E), duration (D), intensity (I) and probability of the impact (P) occurring.

$$\text{Significance of predicted impact (S)} = (E + D + I) \times P$$

The impact assessment terminology and ratings that will be used to describe the impacts are presented in Table 0.8.

Table 0.8: Impact Assessment Terminology and Ratings to be used in determining significance

Impact Assessment Terminology and Ratings to be used in determining significance		
Assessment Terminology		Ratings Used for determining significance
Nature of predicted impacts (N)		
Neutral	No impact on the environment	0
Negative	Adverse impact on the environment	-
Positive	Beneficial impact on the environment	+1
Duration of predicted impact (D)		
Short term	An impact that persists for 0 - 5 years	1
Medium term	An impact that persists for between 5 - 15 years.	2
Long term	An impact that will cease after the operation life of the project.	3
Permanent	No mitigation will occur (Permanent feature)	4
Extent of the impact (E)		
Site specific	Impact within the boundaries of the site	1
Local	Impact within an area of 5 km of the site	2
Regional	Impact within the Lusaka Province	3
National	Impact on national scale	4
Intensity of the impact (I)		
Low	Impact affects the environment in such a way that no natural, cultural and social functions and processes	1

	are affected.	
Medium	Where the affected environment is altered but natural, cultural and social functions and processes continue, albeit in a modified way.	2
High	Natural, cultural or social functions and processes are altered to the extent that they will temporarily cease.	3
Very high	Natural, cultural or social functions and processes are altered to the extent that they will permanently cease.	4
Probability of impact (P)		
Improbable	The possibility of the impact to materialise is very low.	2
Probable	There is a distinct possibility that the impact will occur.	4
Highly probable	It is most likely the impact will occur.	6
Definite	The impact will occur regardless of any prevention or corrective actions.	8

Table 6: Impact Assessment Terminology and Ratings to be used in determining significance		
Assessment Terminology		Ratings Used for determining significance
Significance of predicted impact (S) = (E + D + I) x P		
High	An impact that is capable of causing sufficient change in the environment and fundamentally affect the status, potential productivity or usage of the environment.	> 50
Medium	An impact that is capable of causing change in the environment but does not fundamentally affect the status, potential productivity or usage of the environment.	25 - 50

Low	An impact which is either too small to be measured or does not give rise to any material change in the environment.	< 25

7 PROJECT ALTERNATIVES

A variety of alternatives, such as the following, exist for the design and management of the project:

7.1 Plant Need

The shareholders of PGL have been motivated to expand and operate Cooking Oil Plant to make profit for them by selling finished oil product locally. The increasing demand for cooking oil in Zambia and the availability of raw materials (soybeans, sunflower, palm etc) in Zambia has created a conducive business environment.

The proposed project will help Zambia meet the demand for finished cooking oil product as well as help reduce importation of edible oils and subsequent reduction of local prices.

7.2 Site Alternative

Two alternative site localities were evaluated using the following criteria; Land Acquisition, Resettlement and Compensation, Market and Infrastructure Accessibility during the Scoping Phase of the Environmental Impact Assessment. The alternatives as follows:

- **Alternative A: To Use the Existing Site in Chilanga District**

The site in Chilanga District has all the land acquisition papers put in place. Chilanga District was earmarked for Industrialization especially manufacturing & agro – Processing. There are no settlers on this land and moreover, it is close to the largest market outlet (Lusaka City) and easily accessible by a good road (Mumbwa Road) located in an area with commercial farming blocks where there is easy access to Soya Beans supply. This is in line with the National Development Plan

- **Alternative B: Source a Land Parcel in elsewhere**

This alternative requires sourcing another land parcel though discussions with local authorities. It could involve resettlement and compensation of project affected persons (PAPs). Moreover, access roads will have to be constructed.

7.3 Processing Technology/Methods Alternatives

There are various technological options that have been considered for PGL Oil Processing Plant with the following having been considered in this study:

- ✓ **Steam Heating Process:** Super steam is passed through the soya seed to loosen the fat molecules in the cells. The heated seed is then crushed in a screw funnel. This is the old technology for oil processing.
- ✓ **Thermo-heating using a combination of coal and fire wood to heat the water in the boiler section.** This has implications of air pollution by smoke which affects the surrounding area/community.

- ✓ **Solvent extraction method:** The most preferred technology is the solvent extraction method which has minimal impacts on the climatic environment and does not result into deforestation in order to source wood for heating.

7.4 Alternative Products

The main alternative product is soya cake which will be used for making of animal feed. The cake is also used in the confectionary and sausage making industries. The cake is also used to make High Energy and Protein Supplement (HEPS) for under nourished people.

7.5 Raw materials

Three alternatives for raw materials were evaluated using the following criteria;

- Technology to be used
- Availability of the raw material
- Prices
- Market
- Accessibility during the Scoping Phase of the Environmental Impact Assessment

The average bottle of cooking oil contains vegetable oil, with no additives, preservatives, or special flavorings. The oil comes from various parts of plants, in most cases from what are commonly called seeds. Some of the alternative raw materials include sunflower, palm kernel, safflower, cotton, sesame, and grapeseed oils) or nuts (including peanut, soybean, almond, and walnut oils). A few special cases involve merely squeezing the oil from the flesh of the fruit of the plant. For example, coconut oil comes from the coconut's white meat, palm oil from the pulp of the palm fruit, and olive oil from the flesh of fresh olives. A typically, corn oil is derived from the germ (embryo) of the kernel.

Sunflower

- It is readily available on the Zambian market and beyond borders.
- Market is readily available
- Consumption of sunflower oil is moderately high in Zambia and across borders.

Limitation: Low market as compared to soya bean oil and the material is moderately expensive

OPTION: Not selected

Cotton Seed

- It is readily available on the Zambian market and beyond borders.
- Market is readily available
- Low market as compared to sunflower and soya bean oil

Limitation: Cotton seed is very expensive; Production level of oil is very low as compared to sunflower and soya beans; The consumption of cotton seed oil is very low; and Very expensive to extract.

OPTION: Not selected

Soya beans

- It is cheaper to grow
- Readily available market and sourcing.

- The prices are not as high
- Environmentally, one of the many benefits of soya is that it is able to ingest atmospheric nitrogen that other plants need to get from the soil. Soya often ingests more atmospheric nitrogen than it uses to grow, and fixes the remainder into the soil (where it will be available for the next crop). The process of nitrogen consumption and fixation is enhanced if nodules have formed on the soya roots, and those nodules only form when the appropriate rhizobium bacteria are present in the soil.
- Public consumption levels are very high.

Limitation: Very few if not nothing

OPTION: Selected

7.6 Water Supply Alternative

The use of bore hole for water supply was analysed against connecting to a local water supply utility company and buying of disposable water bottles for domestic use. The use of a borehole was preferred for the project operations and domestic use as an alternative which seemed to be cheaper and appropriate.

7.7 Energy sources

The principal source of electricity during operational phase of the project will be hydro-power energy to be sourced from a nearby ZESCO main which is found within reach of the project site. The ZESCO main was picked as a major source of power as it provides the clean and less costly power alternative which is also environmentally friendly.

In terms of power source for boilers, two alternatives will be considered either diesel or coal powered boilers.

Diesel

- Burns faster and produces huge quantities of energy
- It is cheaper than petrol

Limitation:

- It is not readily available locally
- It is very expensive as it has an increased evaporation time as compared to coal.
- Effluent production is very high and dangerous to the environment
- Transporting this commodity is very expensive
- The fumes may be very catastrophic in case of any fault

OPTION: Not Selected

Coal

- It is readily available locally
- Transportation is very cheap as it will be transported from Maamba via railway
- Can easily be offloaded from the Chikumbi Railway siding.

- Coal is cheaper than Diesel in terms of cost.
- Its effluent is easy to contain as it shall pass through a water scrubber
- Produces high energy as it contains between 69% & 86% carbon by weight

Limitation:

- Rail Transportation is tightly timed compared to road transport which is quicker.
- Chemically, coal is mostly carbon, which, when burned, reacts with oxygen in the air to produce carbon dioxide, a heat-trapping gas. When released into the atmosphere, carbon dioxide works like a blanket, warming the earth above normal limits.

OPTION: Selected

7.8 Alternative Technology

Since the Plant is already in full operation with a good production rate, the option of continuing using the existing technology was preferred against the installation of new technology.

7.9 Domestic Waste Disposal Facilities

The option of using the waste bin was analysed against using a skip bin. The first option meant that the company needed to buy many waste bins, which have a limited holding capacity. The second option was opted as the skip bin has a huge carrying capacity.

7.10 Sewage Management

Three options for sewerage and waste water treatment have been considered.

Option 1 requires that the sewage water be discharged to the municipal sewage plant. This option will require that the plant sewer system be connected to Lusaka City Council sewage system which is nearer than Chilanga Town Council. This area has no council sewer system yet.

Option 2 is the preferred option in which a sewer package (septic tanks and effluent retention ponds) that would be installed for the office complex and change house, with the effluent being pumped out and discharged into the council sewer ponds on licensed arrangement. **This option was considered best fit.**

Option 3 would be to discharge the sewage effluent from the package plant to the nearby streams as it would contain nutrients (nitrate and phosphate) that would nourish the riverine system and hence contaminate water and cause harm to the eco-system .

7.11 The “No Action” or “No Project alternative”

The no project (no-action alternative) alternative in respect to the proposed project implies that the status quo is maintained. Under the no-project alternative, the existing land use will not be used, neither shall the project be implemented. The land owner will continue not to make any good value of the land. The proposed oil

processing project would not be constructed and the expectations attached to the project would not be met. The no-project construction alternative is the least preferred from the socio-economic perspective due to the following factors:

- ✓ The existing land use is not profitable to the optimum.
- ✓ The land is underdeveloped and no profits are being generated from it as opposed to the time when the plant is installed and is operational;
- ✓ No employment opportunities will be created from the proposed land parcel if the project is not implemented.
- ✓ National GDP will definitely lose out at this period of economic slump down due to low productivity in the country.

From the analysis above, it becomes apparent that the “no project alternative” is not a viable alternative to the proponent.

8 CONSULTATION AND PUBLIC PARTICIPATION

Public consultation brings out among other important issues better information on local environmental and socio-economic issues of concerns that may arise from proposed projects. In addition, it can produce better ideas on issues and/or alternatives that may not have been previously considered by project proponents.

The *Zambian Environmental Management Act No.12 of 2011* provides for public participation in Part VII of the Act. Its subsidiary legislation, the *Environmental Impact Assessment Regulations, 1997* also provides for on-going public participation throughout the EIA process including the scoping and preparation of the Terms of Reference (ToR) for the environmental and social impact assessment study. The Fourth Schedule of the Regulations gives guidance on conducting EIA studies and it specifically provides for public participation.

In compliance with the *Zambian environmental regulations* and to conform to international best practices in conducting environmental and social impact assessments, project stakeholder targeted **meetings (scoping) were conducted as an initial stage in the EIA study. Due to Covid-19 Pandemic, a public opinion survey (Scoping) was held from 7th to 8th April 2022 using one-on-one interviews with Chilanga Town Council, Round house Lodge, nearby locals and also the website www.parrogate.com.**

Information on alternatives, anticipated impacts, proposed mitigation measures, among others, were presented in English and translated in the local language (Nyanja) well understood by the local communities. The stakeholders were drawn from Chilanga Town Council, Mwembeshi Secondary School and nearby settlers. The stakeholders helped to determine the scope of the work to be carried out when preparing the EIS by contributing and raising their concerns on the proposed project. The views of the stakeholders, where appropriate, have been taken into account in preparing the draft ToR for submission to ZEMA.

The stakeholders were informed about the meeting through different modes that included:

- Website (www.parrogate.com.) Advertisement;
- Contact calling of stakeholders (direct invitation).

Consultation and Public Participation

Scoping consultation in the framework of the Cooking Oil Processing Plant was organized in three main stages:

- Pre-Scoping phase consultation;
- Scoping phase consultation; and
- EIS phase consultation.

8.1 Pre-Scoping phase consultation

The pre-scoping phase consultation activities were undertaken as part of studying the socio-economic baseline of the project. Main purposes have been to:

- Inform the government and local authorities as well as communities about the Project;
- gather and record the communities' initial issues and concerns about the Project;

- Inform people about the upcoming public consultation (i.e. Scoping and EIA consultations);
- Strengthen relationships between stakeholders and the PGL; and
- Understand the best approach and methodology of engaging the communities in the area.

During this stage, no formal documents were distributed to stakeholders; only high level information was verbally provided to the communities and authorities.

The main issues raised during the pre-scoping consultation comprise the following:

- Potential employment opportunities, particularly for women;
- Opportunities for improved livelihood at individual, local and regional level; and
- Need for increased awareness amongst community members.

8.2 Scoping Phase Consultation

The purpose of the consultation process during the Scoping phase has been to:

- inform stakeholders about the EIA and details of the proposed Project;
- gather comments and concerns regarding the Project; and
- Further strengthen relationship with the stakeholders.

For the Scoping Phase, a high-level identification and selection process was undertaken to identify the relevant stakeholders for engagement purposes. The target stakeholders, divided into national and district levels have been the following:

❖ National Level:

- Ministry of Local Government (MLG)
- Zambia Environmental Management Agency (ZEMA);
- Water Resources Management Authority (WARMA);
- Ministry of Water Development and Sanitation;

❖ District Level:

- Chilanga Town Council;
- Lusaka Water Supply and Sanitation Company
- Department of National parks and wildlife
- Department of fisheries

Formal Invitation was email sent/delivered to the identified stakeholders and the respondents are presented as a list in the Appendices.

The stakeholders helped to determine the scope of the work to be carried out when preparing the EIA report by contributing and raising their concerns on the proposed project. The relevant concerns raised by the stakeholders are summarised below. These concerns have been taken into account in preparing the ToR for the EIA study.

8.3 EIS Phase Consultation

The aim of the EIS phase consultation will be to:

- inform stakeholders about the findings of the specialist reports and the results of the

- impact assessment;
- gather feedback on impact assessment and likely concerns on the process or the results;
- gather feedback on the proposed mitigation measures as well as the environmental management and monitoring plan; and
- Further strengthen relationships with the stakeholders.

The plan will be to engage mainly with government (national, provincial, and district). Should the project impacts be expected to significantly affect the local communities, then communities will also be engaged.

Stakeholders will be notified on the meetings by e-mail (government officials), letters, and phone calls (specifically PGL staff). E-mail communication and follow up phone calls will be made directly by the PGL team. Prior to the meetings, the draft EIS report will be available on PGL website; hard copies and other electronic copies will be made available on request to stakeholders.

Stakeholder concerns or feedback provided during the meetings will be taken into consideration and will be worked into the relevant sections of the draft EIS as necessary.

The key issues from the meeting which form the basis for detailed studies are highlighted below:

- ✚ Dust emissions arising from construction and operations;
- ✚ Criminal trespass, theft and vandalism arising from ease accessibility of the PGL to thieves;
- ✚ Criminal activities to the surrounding communities
- ✚ Contamination of surface and groundwater;

Table 0.9: summary of how issues/concerns raised by stakeholders will be addressed in the EIA study

Environmental Impact	Mitigation Measures
Impacts on Flora & Fauna	The site is uncleared site which is partially cleared on the northern side. In comparison to surrounding areas, impacts on utilization of natural resources within the project area will be mitigated through good plant practices and replanting of exotic plants within the plant.
Occupational Health	Awareness and training of its workers on safety procedures as well as providing protective clothing and equipment.
Air quality deterioration and Noise generation	✓ Equipment and plant machinery shall be well maintained and in good condition such that noise emitted is within an acceptable level. Any equipment or machinery producing abnormal noise will be fit with noise reducers and serviced for good noise performance. Workers operating in areas where noise is emitted are provided with protective equipment. ✓ All equipment/boilers emitting gases will be maintained and air quality monitoring conducted to ensure no air pollution is caused during operational

Impacts of the storage, management, use and disposal of plant chemicals and containers	✓ Well-designed infrastructure for storage of chemicals. Management and use of these chemicals is equally done following laid down procedures in line with regulations set out by ZEMA.
Use of water for cooking oil processing	✓ The proponent shall obtain water Permit for all boreholes to be drilled on site from WARMA. ✓ A good and effective monitoring system is put in place.
Deterioration of Water quality	✓ Stick to good practices of operation rules of ensuring regulatory conditions is followed. ✓ Ensure zero discharge of effluent to the environment. All effluent is channellled to the settling pond. ✓ Installation of sewer system (septic tanks) and ensure proper operation and regular maintenance throughout the project construction phase
Erosion/sedimentation.	Carryout proper construction activities. Limit movement of heavy machinery only to designated access routes and operational areas
Relocations /Resettlements and/or Compensation	The proposed development site has no settlers who will require a form of resettlement and/or compensation as the project site is within already existing operational plant.
Safety and Health Risk of Workers	✓ Implementation of safety and health policies designed to identify, evaluate, monitor and control health hazards and provide safety training; ✓ employees shall familiarize with safety techniques through training; ✓ Management shall ensure that safety inductions are undertaken to persons visiting or working in sensitive areas; ✓ Implementation of emergency procedure on site; ✓ Use of clearly labelled signage; ✓ Ensuring that employees wear suitable protective clothing at all times when it is needed; ✓ Proper control and directing of traffic during material delivery.
Employment	✓ Through advertising fairly ✓ Ensure gender sensitivity in terms of employment

8.5 Grievance Redress Mechanism

Grievance expression and management mechanism will utilize existing local structures and channels of communication; which starts from the institutional set up that uses the structure of authority to channel grievances to local government. Any person or PAPs with an issue regarding implementation of this expansion project, impacts of the Project from current or planned activities, asset data accuracy and team member activities will launch their grievance(s) through their representatives who in turn will take it to the Director and the Project Committee at PGL.

Media will also be involved and encouraged to expose unresolved grievances so that national coverage is made possible to force reluctant officialdom to respond to grievances appropriately and effectively

SL No.	Process	Description	Tentative Timeframes
1.	Receipt of Grievance	Face to face, phone, letter, e-mail, recorded during public/community interaction, others	1 day
2.	Grievance assessed and recorded	Assess relevancy of the Grievance w.r.t. project related activities	3-6 days
3.	Acknowledgement of the Grievance	Acknowledgement of grievance through appropriate medium and logged into database.	6-12 days
4.	Development of Response	Grievance assigned to appropriate party for resolution	4-7 days
		Response development with input from management/ relevant stakeholders	7-14 days
5.	Response Signed off	Redress action approved at appropriate levels	3- 6 days
6.	Implementation and communication of response	Redress action implemented and update of progress on resolution communicated to complainant	15 days
7.	Complainants' Response	Confirm with complainant that grievance can be closed or determine what follow up is necessary	2-4 days
8.	Grievance Closure	Record final sign off. If grievance cannot be closed, return to step 2 or refer to ZEMA or resort to court of law.	4-7 days

9 TERMS OF REFERENCE

It is a requirement in terms of Regulations 8 of the *Zambian Environmental Impact Assessment Regulations, 1997* to prepare an EIS in accordance with the Terms of Reference (ToR). The ToR should be prepared by the Developer in consultation with the ZEMA. The regulations further require that the project developer ensures that public views are taken into account during the preparation of the terms of reference through organising a public consultation process. This public consultation process should involve Government agencies, local authorities, nongovernmental and community-based organisations and interested and affected parties who should contribute in determining the scope of work to be done in the conducting EIA study and in preparation of the EIS.

The basis of this scoping report is the scoping exercise undertaken as initial stage in the EIA process. This exercise helped to determine the scope of the EIA study. Key issues and concerns arising from scoping meetings are summarised and have been taken into account in the preparation of the ToR.

The draft ToR document was prepared in April 2022 and submitted to ZEMA in accordance with the provisions of the *Environmental Impact Assessment Regulations, Statutory instrument No. 28 of 1997*. Following review and comments by ZEMA on the draft ToR, the final ToR (the approach) for conducting the EIA study has been prepared. This scoping reporting is an appendix to the final Terms of Reference for the study.

9.1 Description of specific tasks to be undertaken for the EIA Process

The regulations provide guidance on conducting the EIA study. The specific tasks that will be carried out are briefly outlined below.

- xii. **Notification for scoping meeting:** This has already been carried as part of the process. All the key stakeholders were informed of the meeting through the print and electronic media (*Daily Mail and Times of Zambia Newspaper* – 22nd March 2022).
- xiii. **Holding scoping meetings with the stakeholders (7th to 8th April 2022):**
- xiv. **Writing scoping report and draft ToR:** The views and concerns of the stakeholders on the proposed project were gathered and incorporated, where appropriate, in the draft Terms of Reference.
- xv. **Submitting draft ToR to ZEMA** for review and comments (12th April 2022).
- xvi. Receiving feedback and suggestions from ZEMA on the draft ToR.
- xvii. Preparing final ToR based on feedback from ZEMA.
- xviii. Submitting the final ToR to ZEMA for approval:
- xix. Preparing the Environmental Impact Statement ;
 - Reviewing of relevant environmental documentation relating to the Project in particular.
 - Establishing an environmental and socio-economic baseline for the Project through undertaking specialist studies to supplement and update existing

secondary data and information on the socio-economic and environmental conditions of the project area.

- Analysing proposed project and alternatives with regard to potential environmental and socio-economic impacts and risks during the construction, operation and closure.
- Identifying possible environmental and social mitigation strategies based on potential environmental and socio-economic impacts and risks identified.
- Predicting and assessing impacts of the project in terms of their magnitude, significance and duration (impact assessment and evaluation).
- Recommending environmental and social management and monitoring required.
- Collating gathered data and information from reviewed documents, specialist baseline studies, interviews, relevant comments received from stakeholders and recommendations into an Initial Draft Environmental Impact Statement (EIS).

xx. **Public Disclosure Meeting:** This will include notification of key stakeholders of the public disclosure meeting through the invitations, the print and electronic media. Following notifications, the meeting will be held to inform stakeholders about the contents of the Draft EIS including mitigation measures for significant impacts. Environmental and social issues and concerns on the project will be obtained during the public disclosure meeting.

xxi. **Producing the Final Draft EIS Document:** Issues and concerns will be incorporated into the initial draft EIS to produce the final draft EIS for submission to ZEMA for review and comments.

xxii. **Producing the Final EIS based on ZEMA comments** and subsequent submission to the regulatory authority, ZEMA.

9.2 Investigations to be undertaken for the EIA Study

The main baseline surveys and detailed investigations to be undertaken as part of the EIA study are presented in Table 0.10 and are briefly discussed in Terms of Reference. Other study aspects that include climate, topography, and archaeology will be undertaken through review of relevant secondary data available in environmental documentation.

Table 0.10: Aspects of Environmental and Social Issues to be investigated

Aspects of Environmental and Social Issues to be investigated	
Study aspect	Specialist
Air Quality	Air Quality Specialist
Soils and land capability	Soils Science Specialist/Geologist
Surface Water and Groundwater Quality	Water Resources Specialist
Noise and vibration	Noise and Vibration Specialist
Flora and fauna	Ecologist
Traffic	Traffic Survey Specialist

Geological survey of the proposed site	Geology Specialists
Socio-economic	Social Scientist / Economist

9.3 Public Participation Process

Public participation process during the environmental impact assessment study and preparation of the Environmental Impact Statement will be followed as per requirements set out in Regulation 8(2), Regulation 10 and Stage 5 of the Fourth Schedule of the Environmental Impact Assessment Regulations, Statutory Instrument No. 28 of 1997. The process will involve the following:

- **Notification of the meeting in writing to Government agencies**, local authorities, non-governmental and community-based organisations and interested and affected parties;
- Placing of notices of the public meetings on noticeboards and in the print and electronic media (local newspapers and radio);
- Holding one on one meetings with the identified stakeholders;
- Obtaining stakeholders' inputs (views and concerns) initially at the time of scoping the project and preparation of the Terms of Reference. Other meetings will be held during the surveys and at the public disclosure of the draft Environmental Impact Statement.

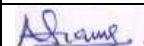
Public participation process in conducting the EIA study and preparation of the EIS for the proposed Cooking Oil Processing Plant in Chilanga District has already commenced to help determine the scope and content of environmental and social information in the Environmental Impact Statement. This scoping report is a compilation of the proceedings of the scoping meeting and information and data obtained through review of environmental documentation relevant to the project.

A public disclosure meeting will be held following preparation of the draft EIA report.

10 EIA STUDY TEAM

It is a requirement under Regulation 9(1) of the Environmental Impact Assessment Regulations, Statutory Instrument No. 28 of 1997, that the names and qualifications of the EIA Study Team members be submitted to ZEMA for approval. The names and qualifications of the study team members are presented in the Table 0.11 below. The detailed curriculum vitae are presented in Appendix B of the Final Terms of Reference Document.

Table 0.11: EIA Study Project Team

EIA Study Project Team					
No	Name	Qualification	Position	Role	Signature
1	Patson Zulu	- Bachelor of Science (Chemistry), University of Zambia, 1980-85. - Postgraduate certificate in Hazardous Waste Management April 16 to May 25, 1995: "Advanced Hazardous Waste Management" course conducted at the Miljokonsulterna, Nykoping, in Sweden. Qualification - Postgraduate certificate in Hazardous Waste Management	Team Leader	Coordination of EIA activities, plant process operation and units analysis, technology assessment and EIS report writing.	
2	Abiud Banda	- Masters of Science in Geo-Information Science and Earth Observation, University of Zambia, South Africa, 2017-2019 - Bachelor of Engineering (Environmental), Copperbelt University, 2015 - Environmental Impact Assessment Procedures, ZEMA,	Environmental Engineer – Reporting Water Resources Specialist and Air Quality Expert	Critical analysis of project components in relation to existing environmental setting; report writing Assessment of water resources and quality and Air quality assessment / air dispersion modelling	
3	Alice Muyanga	BSc (Wood Science and Technology - Forest Ecology), Copperbelt University, 2016	Ecologist	Assessment of ecological impacts.	
4	Siame Ndanji	Bachelor of Mineral Science (Geology), University of Zambia, 2017	Geology Expert	Assessment of the geology of the proposed site	

6	Ernest Mwape	• MSc (Agriculture Economics); • BA (Economics/Statistics)	Social Science Expert	• Socio-economic surveys • Social impact assessment • Environmental and Social Sustainability	
7	Bwalya Mwale	• Bachelor of Engineering (Environmental), Copperbelt University, 2017	Solid waste Management	• Analysis of best options for solid waste at the proposed site • Assessment of waste water, and sewage management	

11 POSSIBLE ANALYSIS ON INFORMATIONS GAPS

The baseline data shall be collected in order to describe the existing environment. Data collection will include an inventory of biophysical environment, conducting interviews with stakeholders and reviewing of relevant literature. Information on names of geographical features were checked from maps and confirmed by interviewing key local informants who were conversant with the area and specific details.

The inventory of the existing physical and biological environment such as vegetation in the proposed project site will focus on quality, quantity, density, and distribution. The mapping of the existing surrounding developments will be undertaken to map out the surroundings of the project areas in order to determine the location of the proposed development in relation to any existing critical installations and developments that would be affected by the project. In doing so, the existing environment will be categorized into physical, social and biological environments. Specialized studies shall be conducted to assess possible impacts on air, soil and water.

Existing Baseline Data: Review of relevant published data, including previous EIAs and Environmental monitoring data. Sources of baseline data and all key documents, which have been used for this EIA, shall be listed in the EIS Report appendices.

Biophysical Environment: Vegetation identification shall be done by examining tree shape, size and foliage color. As for species identification the following shall be considered: Leaf composition, leaf type, leaf variation and plasticity, branch shape and stems. The Species diversity, Abundance, Population and Evenness of the trees within the proposed site shall be included. Fauna and avifauna at the proposed site area will be sighted by taking field walks around the site and surrounding areas. Most of the birds will be identified on sight and reference was made through desk study literature.

Baseline Surveys: Plant being operational, only critical data that could have been missed shall be collected.

Sampling

Water, effluent and air pollutants shall be sampled for analysis. **Sample processing**

The water samples shall be analysed at onsite Plant laboratory. The water samples analysed for pH, cobalt (Co), copper (Cu), iron (Fe), Manganese (Mn), and Zinc (Zn). The Emissions collected and analysed for various pollutants to include dust, hexane, and oxides of carbon, Sulphur and nitrogen. .

12 SOCIAL ANALYSIS

Chilanga District in general has a number of small scale and a few large scale farmers growing crops (maize, soya beans, wheat, and groundnuts), fish farming and rearing of animals. The project area is predominantly a low industrial area with a lot of manufacturing and processing plants like Lafarge Cement etc. and a lot of people conducting small scale selling of commodities as a source of income. The surrounding local residents also depend on industries existing in the area for employment and small scale trading of goods and services.

Socio-Economic Environment

The economic base of the district is mainly agriculture. About 90% of the district's inhabitants depend on agriculture for their livelihood. Products such as milk, beef, water-melons, tomatoes, maize, and rose flowers are distributed both in the district and outside.

The informal sector is fairly active in the district. The informal sector trading is seen in vegetable, fruit, house ware, second hand clothes, furniture, carpenters and tailors offering the full range of basic essentials

Local Economy

It is expected that the development of the proposed project will improve the local economy, creating employment, make available affordable cooking oil, create markets for crops and enhance land use. This positive boost extends to the area of the increased food security attached to the anticipated increase in soya beans production resulting from increased demand for it from this project.

Socio-Economic Benefits

The proposed project anticipated benefits will include but not limited to;

- Employment for the local people for the duration of the project
- Availability of locally produced cooking oil within the project area
- Government revenue through taxes and levies to the local council
- Improved economy for the local through disposable income availability.
- Improved land use through cooking oil processing activities.

Social Fabric and Structure of the project site

Chilanga areas are composed of local residents of mixed ethnic and tribal backgrounds with the predominant local language being Nyanja. No specific traditional practices are conducted typical of a single tribe or culture in the project area.

Land Ownership and Zoning

The proposed project site is on title. The **32.4** Ha, allocation for the proposed expansion has been acquired for undertaking the proposed workw. All project activities will be undertaken within the project site.

Religious and cultural practices

The population in the project area is a mixture of different tribes and cultural backgrounds originating from various parts of the Zambia and a few foreign nationals that have settled in the area owing to its favorable business potential. Therefore, that area has no specific

traditional rites or ceremonies being practiced. Most of the people in the area embrace the Christian faith.

13 PROPOSED MITIGATION MEASURES

The following mitigation measures for the identified impacts of the project will be fully discussed in the final EIA;

Environmental Impact	Mitigation Measures
Impacts on Flora & Fauna	The site is uncleared site which is partially cleared on the northern side. In comparison to surrounding areas, impacts on utilization of natural resources within the project area will be mitigated through good plant practices and replanting of exotic plants within the plant.
Occupational Health	Awareness and training of its workers on safety procedures as well as providing protective clothing and equipment.
Air quality deterioration and Noise generation	✓ Equipment and plant machinery shall be well maintained and in good condition such that noise emitted is within an acceptable level. Any equipment or machinery producing abnormal noise will be fit with noise reducers and serviced for good noise performance. Workers operating in areas where noise is emitted are provided with protective equipment. ✓ All equipment/boilers emitting gases will be maintained and air quality monitoring conducted to ensure no air pollution is caused during operational
Impacts of the storage, management, use and disposal of plant chemicals and containers	✓ Well-designed infrastructure for storage of chemicals. Management and use of these chemicals is equally done following laid down procedures in line with regulations set out by ZEMA.
Use of water for cooking oil processing	✓ The proponent shall obtain water Permit for all boreholes to be drilled on site from WARMA. ✓ A good and effective monitoring system is put in place.
Deterioration of Water quality	✓ Stick to good practices of operation rules of ensuring regulatory conditions is followed. ✓ Ensure zero discharge of effluent to the environment. All effluent is channelled to the settling pond. ✓ Installation of sewer system (septic tanks) and ensure proper operation and regular maintenance throughout the project construction phase
Erosion/sedimentation.	Carryout proper construction activities. Limit movement of heavy machinery only to designated access routes and operational areas
Relocations /Resettlements and/or Compensation	The proposed development site has no settlers who will require a form of resettlement and/or compensation as the project site is within already existing operational plant.
Safety and Health Risk of Workers	✓ Implementation of safety and health policies designed to identify, evaluate, monitor and control health hazards and provide safety training; ✓ employees shall familiarize with safety techniques through training;

	✓ Management shall ensure that safety inductions are undertaken to persons visiting or working in sensitive areas; ✓ Implementation of emergency procedure on site; ✓ Use of clearly labelled signage; ✓ Ensuring that employees wear suitable protective clothing at all times when it is needed; ✓ Proper control and directing of traffic during material delivery.
Employment	✓ Through advertising fairly ✓ Ensure gender sensitivity in terms of employment

14 CONCLUSION

As outlined in Section 1, the PGL has endeavored to submit this Report in accordance with the requirements of the Zambia Environmental Management Agency (ZEMA) and to expedite the smooth and normal operation of the project in line with its strategic plans. It is the wish of PGL that this report will receive a favorable consideration due to the following:

- The project has national benefit especially amid hiked edible oil prices in the country.
- The negative impacts and concerns from stakeholders shall be fully assessed.
- The proposed plant contributes to the economic development of the Chilanga district and the nation through the economic empowerment of the employees and revenue gathered from production of high quality cooking oil.
- The plant shall respond positively to the direction of the ZEMA to ensure it complies with the stipulations provided for in the EMA No.12 of 2011

Throughout EIA Process PGL will continue to commit itself to fostering a continued process of environmental compliance with the due guidance from ZEMA, CTC and the various related stakeholders, so as to achieve sustainable national development.

15 RECOMMENDATIONS

The major environmental risks associated with the proposed cooking oil plant are air pollution specifically from boiler operation and solvent extraction. However, the levels and impact of air pollutants will be mitigated by regularly limiting the releases to ZEMA approved levels.

Other environmental risks will include ground water pollution. In order to reduce these impacts, the effluent will be pretreated before release to the environment. All requirements shall be set out in the EMP and be complied by Parrogate Ginneries Ltd.

It is PGL's hope that the Zambia Environmental Management Agency, Chilanga Town Council and other relevant Stakeholders will allow PGL to demonstrate its ability to implement the proposed measures of the project to the best of its ability and for the benefit of all Stakeholders, taking into consideration the fact that the positive impacts of the proposed project far out-weigh the negative impacts.

16 DECLARATION OF AUTHENTICITY

I, Rakesh Yadav the undersigned, declare that the contents of these Scoping report reflect the scope of work that will be undertaken in conducting the Environmental Impact Assessment (EIA) for the Cooking Oil Processing Plant by Solvent Extraction on Mumbwa Road in Mwembeshi area in accordance with the Environmental Management Act No. 12 of 2011 read together with the Environmental Impact Regulations S.I. No. 28 of 1997.

We further declare that the concerns raised by stakeholders at the time of consultations have been taken into account in preparing this Scoping report.

We acknowledge that Environmental Impact Assessment studies for the facility will be undertaken in accordance with the applicable Zambian legal and administrative framework.

For and on behalf of the **Parrogate Ginneries Limited, Zambia.**



.....
Mr. Rakesh Yadav
Group Technical Head
Parrogate Ginneries Limited

17 REFERENCES

GRZ, 2011. Environmental Management Act No. 12 of 2011. Government Printers, Lusaka, Zambia.

GRZ, 1997. The Environmental Impact Assessment Regulations, 1997. Statutory Instrument No. 28 of 1997. Government Printers, Lusaka, Zambia.

18 APPENDICES

Appendix A: Curriculum Vitae of the EIA Study Team Members.
Appendix B: Scoping Meeting Advert.
Appendix C: Certificate of Incorporation
Appendix D: Certificate of Title
Appendix E: Scoping meeting advert/report
Appendix F: Photos of the site
Appendix G: Water, noise and air report
Appendix H: Scoping report
Appendix I: ToRs

APPENDIX A: CURRICULUM VITAE

Patson Zulu

Position Title and No.	TEAM LEADER:INDUSTRIAL PROCESS AND ENVIRONMENTAL MANAGEMENT EXPERT
Name of Expert:	Patson Zulu
Date of Birth:	27 th January, 1960
Country of Citizenship/Residence	Zambia

Education:

Post-Graduate Studies/Training

Name of Institution/Univer sity - City - Country	Period		Certificate/Diploma/Degree obtained	Main Topic / Major
	From	To		
ANTI-CORRUPTION COMMISSION-LUSAKA ZAMBIA		NOV,2015	POSTGRADUATE CERTIFICATE	INTEGRITY COMMITTEE INDUCTION
INSTITUTE OF DIRECTORS-LUSAKA- ZAMBIA		MAR,2009	POSTGRADUATE CERTIFICATE	CORPORATE GOVERNANCE
INSTITUTE OF DIRECTORS-LUSAKA- ZAMBIA		JULY,2006	POSTGRADUATE CERTIFICATE	MANAGEMENT DEVELOPMENT PROGRAMME FOR SENIOR MANAGERS- MANAGERIAL SKILLS AND CAPABILITIES, PLANNING PROCESS, STRATEGY FORMULATION AND CONTROL, MANAGING CHANGE
INSTITUTE OF DIRECTORS- SIYVONGA-ZAMBIA		JULY,2005	POSTGRADUATE CERTIFICATE	STRATEGIC MANAGEMENT WORKSHOP FOR MANAGERS
ZAMBIA INSTITUTE OF ADVANCED LEGAL EDUCATION (ZIALE)- LUSAKA-ZAMBIA		NOV 2003	POSTGRADUATE CERTIFICATE	INVESTIGATORS AND PROSECUTORS COURSE
BONN, GERMANY		DEC 2001	POSTGRADUATE CERTIFICATE	ENVIRONMENTAL MANAGEMENT TOOLS
UNIVERSITY OF THEWITWATERSRAND U-JOHANNESBURG- SOUTH AFRICA	21 FEB 2000	25FEB 2000	POSTGRADUATE CERTIFICATE	ENVIRONMENTAL ASSESSMENT
SWEDEN	Mar 1999	April 1999	POSTGRADUATE CERTIFICATE WITH HONOURS	ISO-14000 - ENVIRONMENTAL MANAGEMENT SYSTEMS
HOKKAIDO INSTITUTE OF ENVIRONMENTAL SCIENCES-SAPPORO- JAPAN	Sept 1996	Nov. 1996	POSTGRADUATE CERTIFICATE	PLANNING ON REGIONAL ENVIRONMENTAL PRESERVATION
MILJOKONSULTERNA-	April	May 1995	POSTGRADUATE	ADVANCED HAZARDOUS WASTE

NYKOPING-SWEDEN	1995		CERTIFICATE	MANAGEMENT
DRESDEN, GERMANY	Nov 1993	Dec 1993	POSTGRADUATE CERTIFICATE	ADVANCED WASTE MANAGEMENT
Name/Place of Training Institution- City - Country	Type of Training	Period		Certificates or Diploma Obtained
		From	From	
ZAMBIA BUREAU OF STANDARDS- LUSAKA-ZAMBIA	QUALITY MANAGEMENT SYSTEM:IMPLEMENTATION and INTERNAL AUDIT: ISO 9001 and ISO 19011:2018	9 JAN,2021	13 JAN, 2021	CERTIFICATE OF TRAINING
ZAMBIA BUREAU OF STANDARDS- LUSAKA-ZAMBIA	ENVIRONMENTAL MANAGEMENT SYSTEMS: IMPLEMENTATION : ISO 14001:2015	16 JAN,2021	17 JAN,2021	CERTIFICATE OF TRAINING
FRINGILLA LODGE- KITWE-ZAMBIA	STRATEGIC ENVIRONMENTAL ASSESSMENT	10 OCT,2010	13 OCT,2010	CERTIFICATE OF ACHIEVEMENT
THE UNIVERSITY OF ZAMBIA- LUSAKA-ZAMBIA	MINING AND THE ENVIRONMENT	9 OCT,2002	12 OCT,2002	CERTIFICATE OF ACHIEVEMENT
DET NORSKE VERITAS-LUSAKA	PROJECT MANAGEMENT	20 FEB,2001	23 FEB,2001	TRAINING CERTIFICATE
GABORONE- BOTSWANA	SADC INDUSTRIAL POLLUTION PREVENTION SEMINAR	FEB 2001	FEB 2001	ATTENDANCE CERTIFICATE
ENVIRONMENTAL COUNCIL OF ZAMBIA- CHISHIMBA- ZAMBIA	CLIMATE CHANGE TRAINING FOR GOVERNMENT PLANNING OFFICERS AND KEY STAKEHOLDERS	10 APR,2000	14 APR,2000	TRAINING CERTIFICATE
KENYA	CLEANER PRODUCTION ROUNDTABLE CONFERENCE FOR AFRICA	2000		CERTIFICATE OF ACHIEVEMENT
ENVIRONMENTAL COUNCIL OF ZAMBIA- CHISHIMBA- ZAMBIA	ENVIRONMENTAL IMPACT ASSESSMENT REVIEW	6 DEC,1999	10 DEC,1999	ATTENDANCE CERTIFICATE
KENYA	EXPERT GROUP ONWASTE MANAGEMENT FOR AFRICA	1998		ATTENDANCE CERTIFICATE
NAIROBI KENYA	GROUP EXPERT WORKSHOP ON MUNICIPAL SOLID WASTE MANAGEMENT	DEC 1997		ATTENDANCE CERTIFICATE
DAR-ES-SALAAM- TANZANIA	ECOLOGICALLY SUSTAINABLE INDUSTRIAL DEVELOPMENT	OCT 1997		ATTENDANCE CERTIFICATE
GABORONE, BOTSWANA	3RD SADC WASTE MANAGEMENT CONFERENCE	JUNE 1997		ATTENDANCE CERTIFICATE
LUSAKA ZAMBIA	NATIONAL WORKSHOP ON CLEANER PRODUCTION FOR CHIEF EXECUTIVES	NOV 1997	NOV 1997	ATTENDANCE CERTIFICATE

	AND DECISION MAKERS FROM INDUSTRY, NGOS, ACADEMIA AND LOCAL GOVERNMENT			
SAPPORO-JAPAN	PLANNING ON REGIONAL ENVIRONMENT PRESERVATION	4 SEPT,1996	18 NOV, 1996	SPECIAL TRAINING CERTIFICATE
DRESDEN UNIVERSITY OF TECHNOLOGY AND UNITED NATIONS ENVIRONMENT PROGRAMME- GERMANY	ENVIRONMENTAL MANAGEMENT FOR DEVELOPING COUNTRIES- WASTE MANAGEMENT	10 NOV, 93	10 DEC,93	CERTIFICATE OF PROFICIENCY

Secondary School: Kalulushi Secondary

- **Period:** 1975 - 1979
- **Qualification:** Cambridge School Certificate
- **Subjects Studied:** English, Literature in English, Geography, History, Mathematics, Pure Physics, Pure Chemistry and Pure Biology
- **Grade Obtained:** Division One

Employment Record relevant to the Assignment:

Period	Employing organization and your title/position. Contact information for references	Activities Performed	Title / Positions	Country	Summary of activities performed relevant to the Assignment
May 2019 to Present	ENVIRONMENTAL SCIENCE AND ENGINEERING CONSULTANTS LTD	CONSULTANCY	• LEAD CONSULTANT • TEAM LEADER	ZAMBIA	• LEAD CONSULTANT/ TEAM LEADER FOR ; ➤ FEASIBILITY STUDY FOR IMPROVED SOLID WASTE MANAGEMENT SYSTEM IN CHOMA DISTRICT BY CHOMA MUNICIPAL COUNCIL AND GIZ ➤ ENVIRONMENTAL MANAGEMENT SYSTEM IMPLEMENTATIO

					➤ N QUALITY MANAGEMENT SYSTEM; IMPLEMENTATION AND INTERNAL ENVIRONMENTAL AUDITS ➤ ENVIRONMENTAL IMPACT ASSESSMENT ➤ ENVIRONMENTAL PROJECT BRIEFS
July 2003 to Feb. 2018	ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY	ENVIRONMENTAL MANAGEMENT	• MANAGER, NORTHERN REGION • MANAGER FOR THE INSPECTORATE • CLEANER PRODUCTION MANAGER	ZAMBIA	• MANAGEMENT AND SUPERVISION OF INSPECTORATE WORK, COMMUNICATION, AND ACCOUNTS FOR ZEMA. • ADVISED AND EDUCATED THE PUBLIC AND REGULATED PARTIES ABOUT ENVIRONMENTAL ISSUES, REGULATIONS, POLICY, AND COMPLIANCE. • PROVIDED CLIENTS WITH GUIDANCE ON HOW TO COMPLY WITH ENVIRONMENTAL REGULATIONS • CONDUCTED ALL TESTS IN ACCORDANCE TO THE ZAMBIA ENVIRONMENTAL REGULATIONS AND THEN DETERMINED THE COMPOSITION OF THE AIR, WATER AND GASES
July 1999 to June 2003	ZAMBIA ASSOCIATION OF CHAMBERS OF COMMERCE AND INDUSTRY (ZACCI)	TRAINING OF OFFICERS IN CLEANER PRODUCTION METHODOLOGY	CLEANER PRODUCTION MANAGER	ZAMBIA	• ZAMBIAN MANAGER AND COUNTERPART MANAGER FOR DET NORSKE VERITAS OF NORWAY TO TRAIN ZAMBIAN INDUSTRIES IN CLEANER TECHNOLOGY AND CLEANER PRODUCTION OF GOODS AND

					SERVICES. COORDINATED VARIOUS WORKS UNDER ZAMBIA ASSOCIATION OF CHAMBERS OF COMMERCE AND INDUSTRY (ZACCI).
1992-1999	ENVIRONMENTAL COUNCIL OF ZAMBIA	ENVIRONMENTAL MANAGEMENT	SENIOR INSPECTOR/PROJECT COORDINATOR	ZAMBIA	- INDUSTRIAL POLLUTION AND CLEANER TECHNOLOGY - WASTE MANAGEMENT - PROJECT JOINTLY EXECUTED BY THE ENVIRONMENTAL COUNCIL OF ZAMBIA (ECZ) AND THE LUSAKA CITY COUNCIL (LCC) TO DIAGNOSE LUSAKA MUNICIPAL SOLID WASTES (Team leader-waste characterization for Lusaka District) - DEVELOPED AND IMPLEMENTED AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) IN A ZAMBIAN INDUSTRY, TOGETHER WITH DET NORSKE VERITAS (DNV) OF NORWAY - FORMULATION OF WASTE MANAGEMENT REGULATIONS AS DELEGATED LEGISLATURE OF THE ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL ACT OF 1990
1985 to 1992	NITROGEN CHEMICALS OF ZAMBIA	PRODUCTION OF FERTILISERS	PROCESS ENGINEER/LABORATORY CHEMIST	ZAMBIA	- DEVELOPMENT OF MASS BALANCE AND ENERGY BALANCE TECHNIQUES, SIMPLE PROCESS MODIFICATIONS AND DESIGN. - ORGANISE

					TRAINING MATERIALS FOR PLANT TECHNICIANS • QUALITY CONTROL, RESEARCH AND DEVELOPMENT

Membership in Professional Associations and Publications:

4. Patson Zulu et al (1996) Solid Waste Management Master Plan Project Document for the City of Lusaka (Diagnosis)
5. "Zambia Railways Environmental Assessment Study" - Patson Zulu and Zebediah Phiri; October 1999.
6. Patson Zulu et al (2002) 'Environmental Management System for Zambia Railways'

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
11. Document Reviews including existing legal frameworks relevant to the projects	11. Review of relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and Engineering Consultant Limited. Also lead Team Experts to a review process for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience
12. Lead the team preparing the inception Report	12. July 2018, Team Leader and Environmental Expert for the team that prepare the inception report for Ramoji Resources for the proposed Copper Processing Plant and Water Pipeline Project in Salamano area of Chambishi in Kalulushi District
13. Lead the team preparing the EIA terms of	13. GIS and Environmental Expert for the

Reference for submission to ZEMA	proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited.
14. Lead the team for the Scoping meeting to be held at the Proposed Project site	14. Team Leader and Environmental Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
15. Review of the compiled Draft ToRs, Scoping Report and Specialized reports into a Draft EIS for submission to ZEMA	15. Reviewed the Compiled and drafted EIS for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.
16. Review the Revised (Incorporate comments from stakeholders and ZEMA final of EIS document	16. Reviewed the revised Final EIS for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.

Expert's Contact Information: email patsonzulu@gmail.com Phone: 0977 470849/0955833581/0967470849

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.

PATSON ZULU

24/04/2022



.....
.....

Name of Expert

Date

Signature

PATSON Zulu

24/04/2022



.....
.....
Name of authorized Representative of the Consultant

Date

Signature

Abiud Banda

Position Title and No.	ENVIRONMENTAL ENGINEER (Water, Air & Noise) & GIS EXPERT
Name of Expert:	Abiud Banda
Date of Birth:	29th August, 1989
Country of Citizenship/Residence	Zambia

Education:

Master's Degree (Currently enrolled) in Geo-information Science (GIS) and Earth Observation, University of Zambia (2017 – 2021), Zambia.

Bachelor's Degree in Environmental Engineering, Copperbelt University (2011 – 2016), Kitwe, Zambia.

GSCE G12 Division one certificate, Chizongwe Technical School (2007 - 2009 Year), Chipata, Zambia

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
May 2019 to Present	Environmental & GIS Specialist - Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre, NDOLA	Zambia	Environmental Consultant - Environmental impact Assessment for the Construction of a filling station at Garneton turnoff in Kitwe by African Grey Limited, 2018 Environmental Consultant - Environmental impact Assessment for the Construction of a filling station at Nakadoli in Kitwe by African Grey Limited, 2018 Environmental Consultant - Environmental impact Assessment for the Construction of a filling station in Masala, Ndola by Usangu Logistics Limited, 2018 Environmental Specialist - Environmental Assessment for the decommissioning of fuel storage facility by Syngenta Zambia Limited, 2019
March 2017 to March. 2018	Waste Management Inspector, Northern Region, Zambia Environmental	Zambia	•Advised and educated the public and regulated parties about environmental issues, regulations, policy and compliance. •Provided clients with guidance on how to comply with environmental regulations

	Management Agency		•Conducted all tests in accordance to the Zambia environmental regulations and then determined the composition of the air, water and gases.
2015	Environmental Engineer, Mulonga Water and Sewerage Company	Zambia	Evaluated architectural designs for existing pipe networks □ Supervised sewer, manhole cover designs, unblocking and water treatment plans Examined and updated sanitary inspection log entries on a regular basis Ensured all needed permits and clearances were obtained and all job cards worked on time Ground water pollution spatial distribution in Kamuchanga and AEL compound

Membership in Professional Associations and Publications:

10. Graduate Member- Engineering Institution of Zambia
11. Poster presentation: "Mobile Micro sensors for air monitoring, Lusaka show ground 2016 at Copperbelt University stand
12. Poster presentation: "Mobile Micro sensors for air monitoring, Pretoria, South Africa, May 2017 at SAIMM Young Professional Conference (YPC).
13. Project: "Designing and building a low cost wireless mobile micro sensor for air pollution monitoring, Environmental Lab, CBU 2015 to Department of Environmental lecturers, Kitwe
14. NSTC Presentation: "Designing and Building Mobile Micro-Sensor Prototype for Air Quality Monitoring, School of mathematics and natural sciences conference room, July 2016 to National Science and Technology Council, CBU, Kitwe
15. Industrial Seminar: "Designing and Building Mobile Micro-Sensor Prototype for Air Quality Monitoring, Lunte Lodge, September 2017 to Mopani Copper Mines, Konkola Copper Mines, Kalumbila Mines, Lumwana Mining Limited, Nkana Water & sewerage Company, National Science and Technology Council and CBU Researchers, Kitwe

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
11. Document Reviews including existing legal frameworks relevant to the projects	11. Review of relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and

	Engineering Consultant Limited.
12. Part of the team preparing the EIA terms of Reference for submission to ZEMA	12. GIS and Environmental Expert for the proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited.
13. Part of the Scoping meeting to be held at the Proposed Project site	13. GIS and Environmental Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
14. Collection of satellites maps for the proposed site	14. Data captured for a proposed filling station project by ACM Products Limited at Copperhill Mall Kitwe District
15. Map Production for the Project Site	15. Produced maps for the proposed Diesel Storage tank Project at Mineral Junxion Limited in Kitwe District, 2019
16. Compilation of Draft ToRs, Scoping Report and Specialized reports into a Draft EIS for submission to ZEMA	16. Compiled and drafted the EIS for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.
17. Incorporate comments from stakeholders and ZEMA into a final of EIS document	17. Incorporated comments from ZEMA for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.

References

Patson Zulu (0967470849) Chairman and CEO Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Lillian C. Kalenge, Principal Inspector – Waste Management, Zambia Environmental Management Agency (ZEMA) P.O. Box 71302, Ndola. Email: lkalenge@gmail.com/ lkalenge@zema.org.zm Cell: +260955292799
Dr. Phenny Mwaanga, Project Supervisor - Ecotoxicology Lecturer, The Copperbelt University, School of Mines & Mineral Sciences, P.O. Box 21692, Kitwe, Zambia Email: phennym@yahoo.co.uk Cell: +260969156065	Eng. Davy Banda, Former Peri-urban Manager/Sanitation Engineer, Mulonga water and Sewerage Company, P.O. Box 11712, Chingola, Zambia. Email: bandadavy@mwsc.com.zm Cell: +260967362338/955670164

Expert's Contact Information: email abiudbanda@gmail.com Phone: 0972 590297/0953364136

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.

ABIUD BANDA

24/04/2022



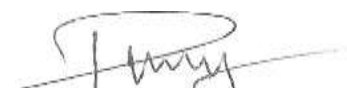
Name of Expert

Date

Signature

PATSON ZULU

24/04/2022



Name of authorized Representative of the Consultant

Date

Signature

Alice Muyanga

Position Title and No.	ECOLOGY EXPERT
Name of Expert:	Alice Muyanga
Date of Birth:	28 th June, 1989
Country of Citizenship/Residence	Zambia

Education:

2011 to 2016 Copperbelt University, BSc Wood Science and Technology,
ZAMBIA

1995 to 2007 St Jones Convent Secondary School GCE Levels Certificate

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
November 2018 - present	Ecology Expert – Environmental Science and Engineering Consultants LTD	Zambia	- Reviewed previous works related to flora and fauna and relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and Engineering Consultant Limited - Ecological Expert for the proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited - Assessed the flora of the area for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019
2018	Supervisor – ZAFFICO, Ndola	Zambia	Supervising casual workers in the maintenance of compartments, where small pine trees are grown
April 2017 – May 2017	Waste Management Researcher-Food and Agriculture Organisation	Zambia	Interviewed the city council, households and the waste management bodies concerning the management of waste and how much was generate.

Membership in Professional Associations and Publication:

3. Member of CBU Anti-AIDS

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
13. Document Reviews including ecological state of the proposed site and existing legal frameworks relevant to the projects	13. Reviewed previous works related to flora and fauna and relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and Engineering Consultant Limited.
14. Part of the team preparing the EIA terms of Reference for submission to ZEMA	14. Ecological Expert for the proposed Molasses based ethanol plant By Consolidated Farming Limited in Shibuyunji District under Environmental Science and Engineering Consultant Limited.
15. Part of the Scoping meeting to be held at the Proposed Project site	15. Ecological Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
16. Flora and fauna assessment of the proposed project site and compilation of the ecology report	16. Assessed the flora of the area for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019

References

Patson Zulu (0967470849) Environmental Science & Engineering	Prof. Jacob Mwitwa Lecturer at the Copperbelt University (Director at

Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Kapasa Makasa University) School of Natural Resources Jambo Drive, Riverside Kitwe, Zambia. P.O. Box 21692 Tel. +260 212 230 923 Mobile: +260 977 848 462/ +260 966 848 462 EMAIL: mwitwajp@yahoo.com
Dr. Elisha Ncube Lecturer at the Copperbelt University School of Natural Resources Jambo Drive, Riverside Kitwe, Zambia. P.O. Box 21692 Tel. +260964612068/ +260977662278	Mrs Yaki Namiluko Lecturer at the Copperbelt University School of Mines and Minerals Jambo Drive, Riverside Kitwe, Zambia. P.O. Box 21692 Tel. +260977830770

Expert's Contact Information: email muyanga.alice.am@gmail.com Phone: 0968327998

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.

24/04/2022



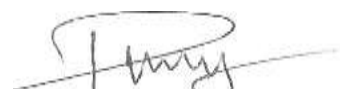
Name of Expert

Date

Signature

PATSON ZULU

24/04/2022



Name of authorized Representative of the Consultant

Date

Signature

Siame Ndanji

Position Title and No.	GEOLOGIST
Name of Expert:	Siame Ndanji
Date of Birth:	
Country of Citizenship/Residence	Zambia

Education:

2011 – 2017: University of Zambia – Bachelor of Mineral Science (Geology)

2007 – 2009: Zimba High School – Grade 12 School Certificate

2005 – 2006: Kafue Boys Secondary School – Grade 9 School Certificate

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
August 2019 - present	Geology Expert – Environmental Science and Engineering Consultants LTD	Zambia	Assessed the geology and possibility of successful exploration activities of the area for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia Weiye Limited, August 2019
May to July of 2019	Survey Team Member - Geological Survey Department Geologist, Geological Survey of Zambia Ministry of Mines and Minerals Development Lusaka-10101, Zambia Tel: (+260) 0977563106, (+260) 0956723322	Zambia	- Stream and soil sediment geochemical survey of the Copperbelt and Northwestern province conducted by the geological survey department from May to July of 2019. - In this survey I took part in the planning of the survey and collection of the samples
2017 - July 2019	Geology Researcher – University of	Zambia	Conducted two projects that helped me in understanding the practical aspects of my field.

	Zambia		- The first was an independent mapping project, in this project I conducted geological mapping on an area of 20 km² from which I was able to generate a detailed geological map. - The second project was a soil geochemical survey, in this project soil samples collected in an area were analysed with the objective of finding mineralization in the area from which they were collected.

Licences:

7. Blasting Licence (All mine operations)
8. Valid Silicosis
9. Valid medical certificate of fitness (KCM)

Membership in Professional Associations and Publication:

11. President – The Copperbelt Mines and Minerals Engineering Society (May 2017 – July 2018)
12. Student Counsellor – The Copperbelt University Student Counsellor (May 2017 – June 2018)
13. Committee Member – The Engineering Institute of Zambia – CBU Chapter (May 2017 – July 2018)
14. Registered Member of Engineering Institution of Zambia (EIZ)
15. Registered Member of Southern Africa Institute of Mining and Metallurgy (SAIMM)

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

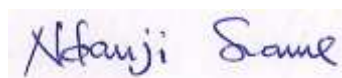
Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
17. Document Reviews including geological and hydrogeological state of the proposed site and existing legal frameworks relevant to the projects	17. Reviewed previous works related to geology and mining rights and relevant documents for a proposed Water Pipeline Project for Ramoji Resources in Salamano area Kalulushi District under Environmental Science and Engineering Consultant Limited.
18. Geological and mineral quality assessment of the proposed project site and compilation of the mineral and soil assessment report	18. Assessed the geology and possibility of successful exploration activities for the proposed mineral exploration project in Chondwe area Masaiti District by Zambia

References

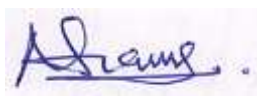
B.N. Upreti, Ph.D. Professor and Head, Department of Geology School of Mines University of Zambia Great East Road Campus, P.O. Box 32379, Lusaka-10101, Zambia Tel: (+260) 0966716572 (Cell) Email: bnupreti@gmail.com Former Head of Department of Geology, and Dean, Institute of Science and Technology Tribhuvan University, Kathmandu, Nepal.	Dr. A. Ahmed, Ph.D Lecturer, Department of Geology School of Mines University of Zambia Great East Road Campus, P.O. Box 32379, Lusaka-10101, Zambia. Tel: (+260) 0978289796 Email: aahmed@unza.zm
Mr. C. Mwansa, B.Sc Geologist, Geological Survey of Zambia Ministry of Mines and Minerals Development Corner of Nationalist and Government road, P.O Box 50135, Lusaka-10101, Zambia Tel: (+260) 0977563106, (+260) 0956723322	Mr. B. Musonda, M.Sc. Lecturer, Lecturer, Department of Geology School of Mines University of Zambia Great East Road Campus, P.O. Box 32379, Lusaka-10101, Zambia. Tel: (+260) 0978825283

Expert's Contact Information: sndanji@gmail.com**Phone:** 0975750200**Certification:**

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my rejection by ZEMA.



24/04/2022



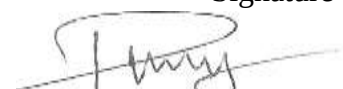
Name of Expert

Date

Signature



24/04/2022



Name of authorized Representative of the Consultant

Date

Signature

Ernest Mwape

Position Title and No.	SOCIAL ECONOMIC EXPERT
Name of Expert:	Ernest Mwape
Date of Birth:	27 th January, 1966
Country of Citizenship/Residence	Zambia

Education:

1991 to 1994 University Of Manitoba, Msc. Agricultural Economics , CANADA
(Production Economics)

1984 to 1988 University Of Zambia, BA Economics/Statistics, ZAMBIA

1979 to 1983 Mpatamato Secondary School GCE O’levels Certificate

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activitites Performed Relevant To The Assignment
August 2014 to August 2017	Director – Policy and Planning Division, Zambia Development Agency (ZDA)	Zambia	11. Editing, finalizing and publishing eight Annual Reports that were outstanding statutory obligations to the National Assembly since the Agency was established in 2007; 12. Preparing and publishing the 2016-2020 ZDA Strategic Plan; writing the 2016-2020 Strategic Plan for Zambia Export Development Fund (ZEDEF); 13. Reviewing and redesigning the Agency’s Monitoring & Evaluation system; 14. Compiling the Agency’s Annual Work-Plans and Budgets; and designing the template for Operations Manual for all Divisions at the Agency. 15. coordinated and facilitated a number of capacity workshops for the Agency, in particular officers in the Policy and Planning Division
August 2007 to August	Economic Governance	Zambia	9. Provided secretariat services to the Africa Peer Review Mechanism (APRM)

2014	Specialist, Governance Department at the Ministry of Justice		10. Facilitating and coordinating activities undertaken by governance oversight institutions that promote accountability, 11. Transparency, anti-corruption and those that foster increased efficiency and effectiveness in the delivery of public goods and services 12. co-authored thematic reports on Economic Governance and Management, and Political & Democratic Governance in Zambia's first self-assessment report for the APRM in 2010
November 2006 to July 2007	Program Officer - Private Sector Development Reform Program (PSD – RP) domiciled at the Ministry of Commerce, Trade and Industry (MCTI)	Zambia	3. responsible for coordinating activities that were undertaken through the Trade Expansion Working Group that eventually resulted in review and revision of some policies and regulations governing the business environment
October 2004 to October 2006	Macroeconomics Advisor - Japanese International Cooperation Agency (JICA) in Lusaka, Zambia	Zambia	3. prepared advisory notes on various economic development initiatives that the Zambian Government was undertaking
September 2001 up to November 2004	Policy Component Manager of the USAID-funded Community-Based Natural Resources Management and Sustainable Agriculture (CONASA) project		5. Raise public awareness about the concept and benefits of Community-Based Natural Resources Management (CBNRM). 6. reviewed and analysed policies and legislation that govern the natural resources sector in Zambia
1999 to September 2001	Chief Economist for the Zambia Association of Chambers of Commerce and Industry (ZACCI)		5. Draft position papers that reflected the interests and concerns of the business community for consideration by the Zambian Government and cooperating partners. 6. made a lot of presentations to the Parliamentary Committee on Economic Affairs and Labour, such as the recommendations and proposals that were adopted and implemented by Government through the World Bank sponsored Enterprise Development Project (EDP) that increased participation of commercial banks and made them comfortable to submit their confidential information

Membership in Professional Associations and Publications:

17. Secretariat to the African Peer Review Mechanism (APRM); Ruling Justly component of the Millennium Challenge Account (MCA); the initial Legal and Judicial Reforms Committee; the Governance Sector Advisory Group (GSAG); and the Macroeconomics Sector Advisory Group.
18. In July 2006 I was elected the Vice President of Economics Association of Zambia (EAZ). I did a lot of work for the Association, such as: preparing presentations for the Parliamentary Committee on Economic Affairs and Labour; critiques of the annual national budgets; prepared comments on various Government initiatives, policies, and legislation; drafted project proposals; organized and moderated discussions on topical economic issues; etc.
19. I served as Chairperson of the DFID-funded Revenue Institutions of Zambia Enhanced Support (RIZES)/CSO project hosted by Economics Association of Zambia (EAZ) between 2004 and 2005.
20. I was involved in negotiations between EAZ and NIZA (a Netherlands-based NGO) to help raise awareness on NEPAD program of the Organization of African Union.
21. I was Vice-Chairman of the Socio-Economic Committee of the Poverty Monitoring and Analysis (PMA) component of the World Bank funded Zambia Social Investment Fund (ZAMSIF) project.
22. Between 1999 and 2001, I served on the Technical Committee of the Directorate of Macro-Economic Policy Analysis (DMPA) project jointly implemented by the Ministry of Finance and Economic Development (MOFED, Zambia); the Africa Capacity Building Foundation (ACBF in Harare, Zimbabwe) and the United Nations Development Program (UNDP in Zambia).
23. Between 2000 and 2001, I served on the Macro-economics and Industry Working Groups that were preparing Zambia's Poverty Reduction Strategy Paper (PRSP) under the auspices of the World Bank's Poverty Reduction Growth Facility (PRGF). From 2001 to 2004, I continued to participate in the PRSP process and maintained active links through the Environment SAG in which I represented the CONASA project and Civil Society for Poverty Reduction (CSPR).
24. Between August 2000 and August 2001 I served as the National Focal Point for Zambia for the second Africa-Asia Business Forum (AABF II). The Government of Japan through UNDP funded AABF with the objective of promoting business linkages between Asian and African companies. I recruited six companies that took part in the process and concluded with the Forum in Pretoria, South Africa.

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned

	work
13. Part of the team preparing the inception Report	13. For ten months up to 31st July 2007, I was a Program Officer in charge of the portfolio looking at economic institutions, policy and trade expansion at the Private Sector Development Reform Program (PSD – RP)
14. Input in preparing terms of Reference	14. Socio-economic Expert for the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted under Environmental Science and Engineering Consultant Limited.
15. Stakeholders and interested parties consultations 16. Socio-economic surveys; 17. Socio-Economic impact assessment Environmental and Social-economic Sustainability Assessment	15. Socio-economic Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience. 16. Under the Ministry of Agriculture & Water Development (MAWD) in February 1989 he worked as Economist/Statistician responsible for organizing and conducting the annual crop forecasting surveys, and production of the National Early Warning Monthly Food Security Bulletins. 17. After the restructuring of the Ministry, I was appointed as Principal Planner (Infrastructure) and served as Project Coordinator of the civil works component of the US\$10mn World-Bank funded project called Zambia Agricultural, Marketing, Processing and Infrastructure Project (ZAMPIP)

18. Reviewing of draft EIS document	18. Internal Document Quality Control - reviewed the proposed Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2018 under Environmental Science and Engineering Consultant Limited.

Expert's Contact Information: email: ernmade@yahoo.co.uk Phone: 0967994059/0955994059

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by ZPPA.

ERNMADE MWAKE

24/04/2022



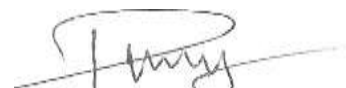
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Name of Expert

Date

Signature

PATSON ZULU

24/04/2022



.....
.....
Name of authorized Representative of the Consultant

Date

Signature

James Bwalya

Position Title and No.	CIVIL ENGINEER
Name of Expert:	James Bwalya
Date of Birth:	8 th February, 1989
Country of Citizenship/Residence	Zambia

Education:

Bachelor's Degree in Civil Engineering, Copperbelt University (2012 – 2017), Kitwe, Zambia.

GSCE G12 Division one certificate, Katanshi School (2008 - 2010 Year), Mufulira, Zambia

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
October 2019 to Present	Civil Engineer - Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre, NDOLA	Zambia	Civil Engineer - Environmental Assessment for the Construction of China-Aided International Conference Centre by Ministry of Housing and Infrastructure Development, 2020 Environmental Specialist - Environmental Assessment for the decommissioning of fuel storage facility by Syngenta Zambia Limited, 2019
2015	Civil Engineer, Mulonga Water and Sewerage Company	Zambia	Evaluated architectural designs for existing pipe networks Supervised sewer, manhole cover designs, unblocking and water treatment plans Examined and updated sanitary inspection log entries on a regular basis Ensured all needed permits and clearances were obtained and all job cards worked on time Ground water pollution spatial distribution in Kamuchanga and AEL compound

Membership in Professional Associations and Publications:

2. Graduate Member- Engineering Institution of Zambia

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capabilities to handle the assigned work
4. Part of the Scoping meeting to be held at the Proposed Project site	4. Civil Engineer for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
5. Collection of satellites maps for the proposed site	5. Data captured for a proposed filling station project by ACM Products Limited at Copperhill Mall Kitwe District
6. Compilation of Draft ToRs, Scoping Report and Specialized reports into a Draft EIS for submission to ZEMA	6. Compiled and drafted the EIS for the proposed Expansion of Copper Processing Plant in Salamano Area of Kalulushi District conducted in 2020 under Environmental Science and Engineering Consultant Limited.

References

Patson Zulu (0967470849) Chairman and CEO Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Eng. Davy Banda, Former Peri-urban Manager/Sanitation Engineer, Mulonga water and Sewerage Company, P.O. Box 11712, Chingola, Zambia. Email: bandadavy@mwsc.com.zm Cell: +260967362338/955670164

Expert's Contact Information: email bwalyajames.jb.jb@gmail.com Phone: 0969535371

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and iam available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation

described herein may lead to my rejection by ZEMA.

24/04/2022



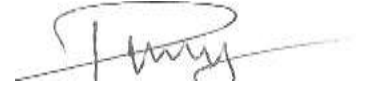
.....
Name of Expert

Date

Signature

PATSON Zulu

24/04/2022



.....
Name of authorized Representative of the Consultant

Date

Signature

Bwalya L. Mwale

Position Title and No.	ENVIRONMENTAL ENGINEER
Name of Expert:	Bwalya L. Mwale
Date of Birth:	28 th February, 1995
Country of Citizenship/Residence	Zambia

Education:

Bachelor's Degree in Environmental Engineering, Copperbelt University (2013 – 2018), Kitwe, Zambia.

GSCE G12 Division one certificate, Mazabuka Girls Secondary School (2009 - 2011), Mazabuka, Zambia

Employment Record relevant to the Assignment:

Period	Employing Organization And Position. Contact Information	Country	Summary Of Activities Performed Relevant To The Assignment
2019 to Present	Environmental Specialist - Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre, NDOLA	Zambia	Environmental Consultant - Environmental impact Assessment for the Construction of the China aided International Conference center in Lusaka by Ministry of Housing and Infrastructure Development (MHID), 2019 Environmental Consultant – Feasibility study for improved solid waste management system in Choma District by Choma municipal council and GIZ, 2019 Environmental Consultant - Environmental impact Assessment for the Existing Cooking oil processing plant in Lusaka by Parrogate Ginneries LTD, 2020
2016	Environmental Engineer (Officer), Zambia Sugar Plc	Zambia	Ensured proper solid waste, surface and groundwater management Carried out microbiological, water and waste water analysis Carried out air pollution analysis using stack emission analysis and trend studies Ensured all needed permits and clearances were obtained and all job cards worked on time Ensured safety, health, environment and

			qualitymanagement(SHEQ) were upheld
			Ground water pollution spatial distribution in njomonaand kawama compound

Membership in Professional Associations and Publications:

4. Graduate Member- Engineering Institution of Zambia (MEIZ)
5. Journal of Environment Protection and Sustainable Department: Seasonal variation of nitrate and phosphate levels in groundwater-a case study of Mpongwe farming block inZambia, 2019.
<http://files.aiscience.org/journal/article/pdf/70140070.pdf>
6. Project: Seasonal variation of nitrate and phosphate levels in groundwater- a casestudy of Mpongwe farming block, Copperbelt University 2018 to Department of Environmental lecturers, Kitwe

Language Proficiency: Fluent in English, Bemba, and Nyanja

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments thatBest Illustrates Capabilities to handle the assigned work
1. Document Reviews including existing legalframeworks relevant to the projects	1. Review of relevant documents for a feasibility study for an improved solid waste management system in Choma District under Environmental Science and Engineering Consultant Limited.
2. Part of the team preparing the EIA terms of Reference for submission to ZEMA	2. Environmental Expert for the existing cooking oil processing plant by Parrogate Ginneries Limited in Lusaka District under Environmental Science and Engineering Consultant Limited.

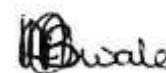
3. Part of the Scoping meeting to be held at the Proposed Project site	3. Environmental Expert for various other environmental impact assessment projects highlighted on the ESEC LTD Company experience.
4. Collection of satellite maps for the existing waste collection containers	4. Data captured for current locations for stationary solid waste collection points and proposed Material recovery facility in Choma District under Environmental Science and Engineering Consultant Limited

References

Patson Zulu (0967470849) Chairman and CEO Environmental Science & Engineering Consultants Limited 10 Jacaranda Road, Town Centre Ndola	Shirley Ndalama, Environmental Officer - Mazabuka, Zambia Sugar Plc P.O. Box 670240, Mazabuka. Tel: +260 963 317 222
Mr. S Sichilima, Project Supervisor/Lecturer, The Copperbelt University, School of Mines & Mineral Sciences, P.O. Box 21692, Kitwe, Zambia Email: nsichilima@gmail.com Tel: +260 964 825 396	Inonge P. Mulemi, SHERQ Officer - Mazabuka, Zambia Sugar Plc P.O. Box 670240, Mazabuka. Email: Inongemulemi@gmail.com Tel: +260 962 242 752

Expert's Contact Information: email bwalyalydiamwale95@gmail.com Tel: +260 953 029495/+260 977 782858

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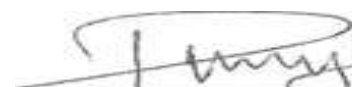
Name of Expert

Date

Signature



24/04/2022



Name of authorized Representative of the Consultant Date

Signature

APPENDIX A2: SATELLITE MAP OF THE PROPOSED COOKING OIL PROCESSING PLANT



Parrogate

PUBLIC NOTICE

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PUBLIC CONSULTATION SCOPING MEETING FOR THE PROPOSED EXPANSION OF THE SOLVENT EXTRACTION PLANT PHASE II IN MWEMBESHI, CHILANGA.

The Environmental Management Act of 2011 requires that all companies engaged in process operations undertake an Environmental Impact Assessment (EIA) to be approved by the Zambia Environmental Management Agency (ZEMA).

Parrogate intends to expand the existing Mwembeshi Edible Oil Processing Plant by 400 metric tons in Mwembeshi area in Chilanga.

This notice therefore serves to inform members of the general public; both interested and affected parties that an Environmental Impact Assessment for the aforementioned proposed project **has commenced**.

The Environmental Impact Assessment Regulations No.28 of 1997 requires that the sponsor of the project consult stakeholders through holding public meetings before operationalizing the project. However, given the governments guidelines in relation to COVID-19, it is not advisable to convene a general public meeting but instead a face-to-face interaction with limited stakeholders will be held. However, It is proposed that interested stakeholders can provide their comments and input in written to us through the following platforms;

- Email: rakeshyyadav@parrogate.com.zm
- Company website (www.parrogate.com)

The deadline for submission of comments is **4th April, 2022**

TT21032022

APPENDIX C: CERTIFICATE OF INCORPORATION

2791 63460



Republic of Zambia

**CERTIFICATE OF INCORPORATION
OF A PRIVATE COMPANY LIMITED BY SHARES**

(Section 10)

This is to certify that

PARROGATE GINNERIES

..... Limited (full name of company)

is on and from the 30th day of August, 2006

Incorporated as a private company limited by shares.

Given under my hand and Seal at Lusaka, Zambia, this

30th day of August, 2006




B.K. Mwalongo
Assistant Registrar of Companies

[Note that this certificate is not valid unless the official Seal of the Registrar of Companies has been affixed]
Stuck by the Office of the Registrar of Companies



THE PATENTS AND COMPANIES REGISTRATION AGENCY

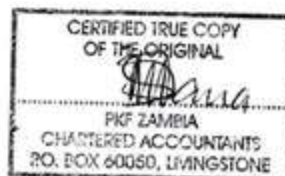
The Companies Act, 2017
 (Act No. 10 of 2017)

The Companies (Prescribed Forms) Regulations, 2018
 (Sections 270, 271 and 273)

Available at www.patents.gov.zm

ANNUAL RETURN				
PART A COMPANY DETAILS				
1.	Company Number <i>Indicate the 7 digit registration number</i>	12006063440		
2.	Company Name <i>Indicate the name as captured in the certificate of incorporation</i>	PARROGATE GINNERIES LIMITED		
3.	Principal Business Activity	1040 MANUFACTURE/PROCESSING OF VEGETABLES AND ANIMAL OILS AND FATS WHICH INCLUDES MANUFACTURING AND PROCESSING OF CRUDE VEGETABLE OIL, SOYA BEAN OIL, PALM OIL AND COTTON SEED OIL, 0163 POST HARVEST CROP ACTIVITIES WHICH INCLUDES COTTON GINNING		
4.	Other Business Activities	0163 POST HARVEST CROP ACTIVITIES WHICH INCLUDES COTTON GINNING		
5.	Physical Address <i>State the registered office of the Company</i>	Plot No. 397A/3 RAPUE ROAD MARKENI LUSAKA Province Zambia		
6.	Postal Address <i>State the alternative address of the Company</i>	Plot No. 397A/3 MARKENI LUSAKA Province Zambia		
7.	Phone Number <i>Indicate the international code (e.g. +260 for Zambia)</i>	Mainline +260 979 332 856		
8.	Email Address	y@parrogate.com.zm		
9.	Nominal Capital or Guaranteed Amount <i>Indicate Capital or Guaranteed amount stated in the prospectus/ memorandum</i>	15,000		
10.	Class of Shares <i>If other indicate the specific class of shares</i>	ORDINARY	PREFERENTIAL	OTHER
11.	Number of Shares	15,000		
12.	Number of Paid Up Shares	5,000		
13.	Number of Unpaid Shares			
14.	Par Value	K1.00		
PART B ANNUAL RETURN DETAILS				
15.	Type of Company	Private Limited By Shares ☒		

16.	Company Category Select category of Company by marking with 'X'	Private Limited By Guarantee				
		Unlimited Private Company				
17.	Date of Financial Year End	Public Limited Company				
		Local Bank				
		Foreign Bank				
		Insurance Company				
		Re-Insurance Company				
		Bureau De Change				
		Financial Institution				
	Other Specify: FOOD MANUFACTURING	X				
PART C DIRECTORS						
No	First Name	Surname	Identity Number	Date Appointed		
1	PRADEEP	GANEDIWAL	PPN. Z4207201			
2	PRADUMAN KUMAR	GANEDIWAL	PPN. Z4987035			
3	YASHWARDHAN	GANEDIWAL	PPN. Z4910201			
4						
PART D SHAREHOLDERS						
N	First Name	Surname	Identity Number	Number of Shares	Class of Shares	Number of Paid Up Shares
1	PRADEEP	GANEDIWAL	PPN. Z4207201	1	ORDINARY	1
2	PRADUMAN KUMAR	GANEDIWAL	PPN. Z4987035	1	ORDINARY	1
3	CORBEL FINANCE LIMITED	N/A	REG NO.	4,998	ORDINARY	4,998
4						
PART E BENEFICIAL OWNERS						
No	First Name	Surname	Identity Number	Nature of Interest		
1	PRADEEP	GANEDIWAL	PPN. Z4207201	BUSINESS		
2	PRADUMAN KUMAR	GANEDIWAL	PPN. Z4987035	BUSINESS		
3	CORBEL FINANCE LIMITED	N/A	REG NO.	BUSINESS		
4						
PART F DECLARATION						
21.	First Name: UMESH	Surname: SHARMA	Capacity: Director ☐ Secretary ☒ Receiver/Liquidator ☐	Signature:  Date: 01/04/2019		
PART G PARTICULARS OF PERSON LODGING NOTICE						
22.	First Name	PRECIOUS				
23.	Surname	MPUNDU				
24.	Gender	FEMALE				
25.	Date of Birth	04/09/1993				



APPENDIX D: CERTIFICATE OF TITLE

DR 1A

No. 166187

REPUBLIC OF ZAMBIA

Registered No. 10208/N/2

THE LANDS AND DEEDS REGISTRY ACT
(Section 43)

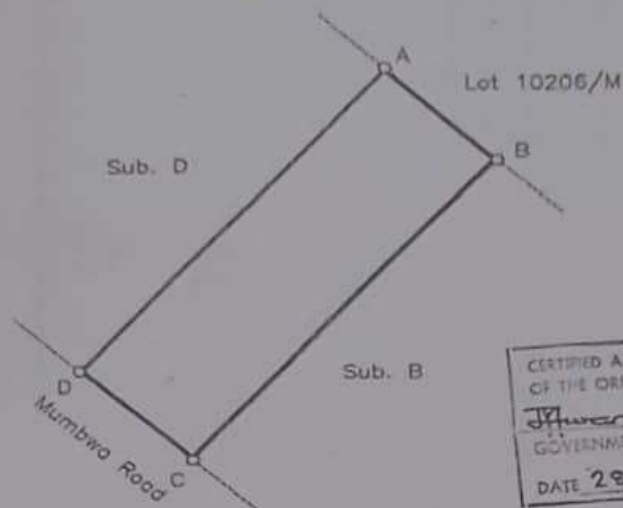
CERTIFICATE OF TITLE

THIS Certificate, dated the SEVENTH day of JUNE 1990
drawn and TWELVE under the hand and seal of the Registrar of the
Lands and Deeds Registry of Zambia WYNGUSSETHI for PARROGATH GUMBERIE LIMITED
a Company incorporated in Zambia and having its registered office at Lusaka

is a tenant or lessee for the unexpired residue of a term of 99 years from the first
day of JUNE 20 07 (subject to such reservations, restrictions, incumbrances, liens,
estates and interests as are notified by memorial underwritten or endorsed hereon) of and in ALL that
piece of
land in extent 20,2154 hectares more or less being Subdivision C of Lot No.10208/N situate
in the Lusaka Province of Zambia which piece of land is more particularly delineated and
described on Diagram No.412 of 2012 except and reserved all minerals oils and precious
stones whatsoever upon or under the said land.....



SIDES METRES		ANGLES OF DIRECTION	SYSTEM Y	CO-ORDINATES Local METRES X	DIAGRAM NUMBER 412/2012
AB	259.33	312.09.52			APPROVED: (Sgd) T.L.Mwanalushi GOVERNMENT SURVEYOR DATE: 23/01/2012
BC	760.29	42.09.52			
CD	259.33	132.09.52			
DA	760.29	222.09.52			



SCALE 1: 10000
 BEACON DESCRIPTION All are iron pegs in concrete
 THE FIGURE A-B-C-D-A
 REPRESENTS 20.2354 Hectares
 OF LAND BEING Sub. C of Lot 10206/M
 SITUATED IN THE Lusaka PROVINCE REPUBLIC OF ZAMBIA
 SURVEYED IN January 2012
 BY ME (Sgd) J.G.Nyangulu
 LAND SURVEYOR

PARENT DIAGRAM No.:
 SURVEY RECORDS No.: D22/2011
 S G FILE No.: SD/104/13/10
 PLAN No.: SD/104/07/10
 MAP REFERENCE: 64/2012
 1527 B4 &
 1528 A3

T.L.M



Registered No. 10208 PM/D/A

THE LANDS AND DEEDS REGISTRY ACT
(Section 43)

CERTIFICATE OF TITLE

THIS Certificate, dated the TWENTY-FIFTH day of APRIL two thousand and THIRTEEN under the hand and seal of the Registrar of the Lands and Deeds Registry of Zambia WITNESSETH that PARROGATE CEMETERIES LIMITED a Company Incorporated in Zambia and having its registered office at Leaksa

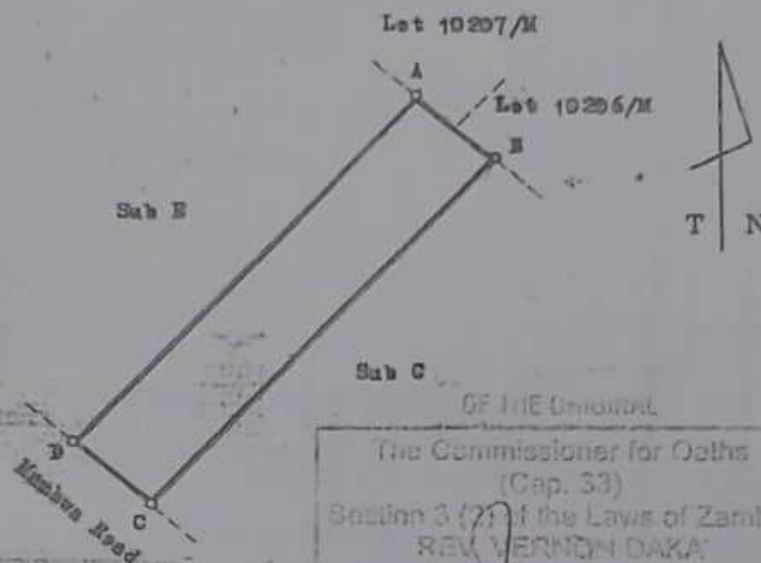
is a tenant or lessee for the unexpired residue of a term of 99 years from the first day of June 20 02 (subject to such reservations, restrictions, incumbrances, liens, estates and interests as are notified by memorial underwritten or endorsed hereon) of and in All that

piece of land in extent 12.1415 hectares more or less being Subdivision 'D' of Lot No. 10208/M estate in the Leaksa Province of Zambia which piece of land is more particularly delineated and described on Diagram No. 412 of 2012 except and reserved all minerals oils and precious stones whatsoever upon or under the said land.


Registrar



SIDES	METRES	ANGLES OF DIRECTION	CO-ORDINATES		DIAGRAM NUMBER
			SYSTEM Y	METRES X	
AB	155.60	312.09.52			413/2012
BC	780.29	42.09.52			
CD	155.60	137.09.52			
DA	780.29	228.09.52			
					APPROVED:
					<i>M. M. M. M.</i>
					GOVERNMENT SURVEYOR
					DATE: 23/01/2012



SCALE 1: 10000

REMARK DESCRIPTION: All are iron pegs in concrete

THE FIGURE 1-2-3-4

PRESENTS IN THE FIELD

CHAINED BEING 10000/10000

CREATED IN THE PROVINCE REPUBLIC OF ZAMBIA

SURVEYED IN JANUARY 2012

BY ME

[Signature]
LAND SURVEYOR

PARENT DIAGRAM No. 1/1991
SURVEY RECORDS No. 1/2012
S.C. FILE No. 1/19/10
2012
MAP No. 1/19/10

J

APPENDIX E: SCOPING MEETING MINUTES/PHOTOS

RECORD OF CONSULTATIONS DURING SCOPING PHASE OF THE EIA FOR THE PROPOSED EXPANSION OF PARROGATE COOKING OIL PROCESSING PLANT, 7th and 8th April 2022

Given the Covid-19 guidelines that forbade gathering of large crowds of people, Environmental Science and Engineering Consultants (ESEC) Ltd (the company engaged by Parrogate Ginneries to undertake the EIA for the proposed expansion of the cooking oil plant) decided to conduct separate Scoping meetings for each of the identified stakeholders. The meetings took the better part of two days, Thursday 7th April and Friday 8th April of 2022.

ESEC was accompanied by Mr Collins Mwamba, the Environmental Health and Safety Supervisor at Parrogate Ginneries, Mwembeshi Plant. At the outset of each of the deliberations Mr Patson Zulu briefed the stakeholders about the need and requirements for undertaking EIAs, which includes stakeholder consultations. Mr Zulu informed the stakeholders about the various stages of the EIA process. Apart from the Scoping stage, it was indicated that there was more opportunities and time for stakeholders to provide their more informed input or concerns on the proposed project and help with recommendations to mitigate or remedy adverse impacts of the proposed projects.

19. The first stakeholder to be consulted was Mrs Namwinga Zulu, Manager of **Westwood Pub & Lodge (also known as Round House Lodge)** located less than ten metres across the gravel road on the eastern boundary of Parrogate premises. Mr Patson Zulu, CEO and Chairman of ESEC briefed Mrs Zulu about the EIA process. He informed her that the consultation was part of the Scoping phase of the EIA, and her input would help shape and inform the ToRs and Scoping report.

Mrs Zulu complained about the foul smell that is usually experienced in the evening, at

least once per week. Apart from that she had no complaint or objections to the proposed expansion of the cooking oil processing plant. She proposed that Parrogate would do well to open a retail sales outlet to sell the cooking oil and soap. She wondered why the surrounding community members should commute some 70 Km to Lusaka to buy commodities that are produced within their area. It was indicated that Mt Meru in Chibombo district and Zambeef of Chisamba district that sell some of the cooking oil they produce through retail sales outlets at filling stations around Katuba and Lusaka, and some of these communities are not within close proximity to the cooking oil processing plants. Customer come with their own containers into which oil is poured.

Apart from employees of various government institutions, there is a large community of local residents that include Mwembeshi Secondary School, two prisons, clinic and paramilitary camp that form a huge customer base that can significantly benefit from such a retail sales outlet for cooking oil and bar soap.

Mrs Zulu was informed that ESEC will provide feedback to all stakeholders regarding the outcome of the specialist studies of the EIA process that would be undertaken. ESEC will investigate all stakeholder complaints regarding current operations of the plant.

20. Mwembeshi (Provincial STEM) Secondary School is located less than a kilometre from the cooking oil processing plant. ESEC met with Mr. Humphrey Funduluka the deputy headmaster and Mr Michael Sikaonga the boarding master of the school.

They both complained about the lack of corporate social responsibility (CSR) on the part of the company. They expected the company to undertake a number of CSR projects at the school, in particular sponsorship of needy children from the surrounding community. The school community consists of some 550 pupils and 52 staff (of whom 20 stay within the school premises).

The company was found wanting in a number of aspects; for example the dumping of waste and by products on neighbouring premises. One neighbour went so far as to sue the company over such practices. The other complaint related to the foul noxious smell that company operations generates.

Otherwise both school officials welcomed the proposed investment as it would lessen the unemployment burden in the surrounding area. The proposed expansion entail increase in job opportunities, but the school representatives advised the company to improve the welfare and condition for its Zambian workers. The poor conditions of service and work environment adversely impacts the plight and welfare of the local community.

21. Mrs Elizabeth Situmbeko, a caretaker of one of the neighbouring small holder farms (owned by a Mr Musa) indicated that she had no complaint or objections to the proposed expansion of the plant as it would increase job opportunities for the people in the local community.

22. Wife to Mr Fredrick Moonga (another caretaker of a smallholding farm) refused to offer any opinion on the proposed expansion of the cooking oil plant.

23. Mr Chansa Bwembya was another caretaker farmer that ESEC consulted. The owner of the farm was outside the country. Mr Chansa indicated that Simon Farm used to have a lot of livestock and grew a variety of food crops, but has been inactive since the owner left for Tanzania. He welcomed the expansion of the plant as it may accord him an opportunity to get a formal job.

Mr Chansa complained about the noise pollution at night; otherwise he had no objection to the proposed expansion.

24. ESEC talked to Mr John Siwale (Environmental Health officer - Technical) and Mr Obert Simukoko (Clinical Officer) at **Mwembeshi Rural Health Clinic** about the impact of operations of Parrogate Ginneries.

It was indicated that the company is a major employer and has indirectly contributed to the reduction in crime in the area as some youth are kept busy whilst earning a livelihood. However, the company has a bad reputation with regards to the poor conditions of services for its employees. In that respect, Parrogate has little socio-economic impact on the community it operates in.

Even though there are few work-related accidents reported at the company, the respondents were however concerned at the absence of a clinic within the company premises given the size of the operations and number of employees. In light of the proposed expansion the company should set up a clinic with permanent staff to cater for not only the workers, but their relatives too. This is especially appropriate given that there are other workers belonging to Continental Ginneries in the same premises.

They said that patients from the plant area reported complaints about the foul smell that is experienced in the evening. They suggested that ESEC investigate whether the noxious smell is dangerous to the health of workers and the surrounding local community.

Noise pollution is also experienced in the evenings/night although it is of tolerable level.

25. There is sizeable community of people that live at **Isha Mbingo Kraal** that is located along Mumbwa. ESEC talked to Mr Shaka Khoza a tenant and Mr Austin Liato (former Member of Parliament) proprietor of Isha Mbingo Kraal about the proposed expansion of Parrogate cooking oil plant and its impact on the environment and local community.

They were concerned that the company does not look after its workers well; most workers get very low wages – even degree holders get very low salaries. Parrogate

as a big employer has too much leverage over its workers, and takes advantage of the dire economic situation in the country, and rural areas in particular. Grievance address or complaint handling mechanism is absent as there seem to be total disregard for the laws that regulate the employer-worker relationship.

ESEC was informed about an unfortunate incident where the company refused to pay medical expenses for some two workers who got involved in work-related accidents. They felt there is need for the company to have a clinic with permanent medical personnel to avoid such unfortunate experiences.

They also talked about the foul smell that is usually experienced at night. Mr Liato considered suing the company at some point in time. The proposed expansion of the plant operations will entail increased air pollution. It is therefore important to address the issue through implementation of more effective and efficient mitigation measures. He also asked that a thorough investigation be undertaken to ascertain how safe the smell/fumes are.

Even though there is some noise pollution, it is not dangerous to the health and welfare of the surrounding community.

The company does not seem to have a structured, formal and budgeted corporate social responsibility (CSR) plan. The community expects a lot from Parrogate Gineries, but it is not coming through in a number of aspects as it merely reacts to uncoordinated appeals for appeal from different groups of people. It was suggested that the company open a retail shop that would sell cooking oil and soap to the local community – there is a sizeable community in Mwembeshi that include institutions and their workers (such as clinic, prisons, boarding schools, lodges, etc) that need huge quantities of these commodities.

26. Mr Elisha Muziya a caretaker of a neighbouring property along Mumbwa road informed ESEC that he had experienced the foul smell and also noise pollution at night. Apart from the few jobs, he could not point to any other thing that the local community benefits from the presence and operations of the company.

27. At **Chilanga Town Council**, ESEC met with a Christabel Museba (Council Treasurer) as acting Council Secretary and talked to Mr Humphrey Pailande, Environmental Planner. Mr. Pailande indicated that Chilanga Town Council is not yet a planning authority, and therefore does not authorise land use changes – that was done by Lusaka Provincial Planning Department.

He informed ESEC that Covid restrictions had been relaxed, and therefore meetings involving huge number of people can be convened, but participants have to wear masks. ESEC promised to convene such a meeting during disclosure of its findings.

Otherwise the Council had no objection to the proposed expansion of the cooking oil processing plant.

Report prepared by



Ernest Mwape

Socio-Economic Specialist, ESEC

10th April 2022

SCOPING MEETING FOR EXPANSION OF THE COOKING OIL PROCESSING PLANT IN MWEMBESHI AREA, OFF MUMBWA ROAD, CHILANGA DISTRICT

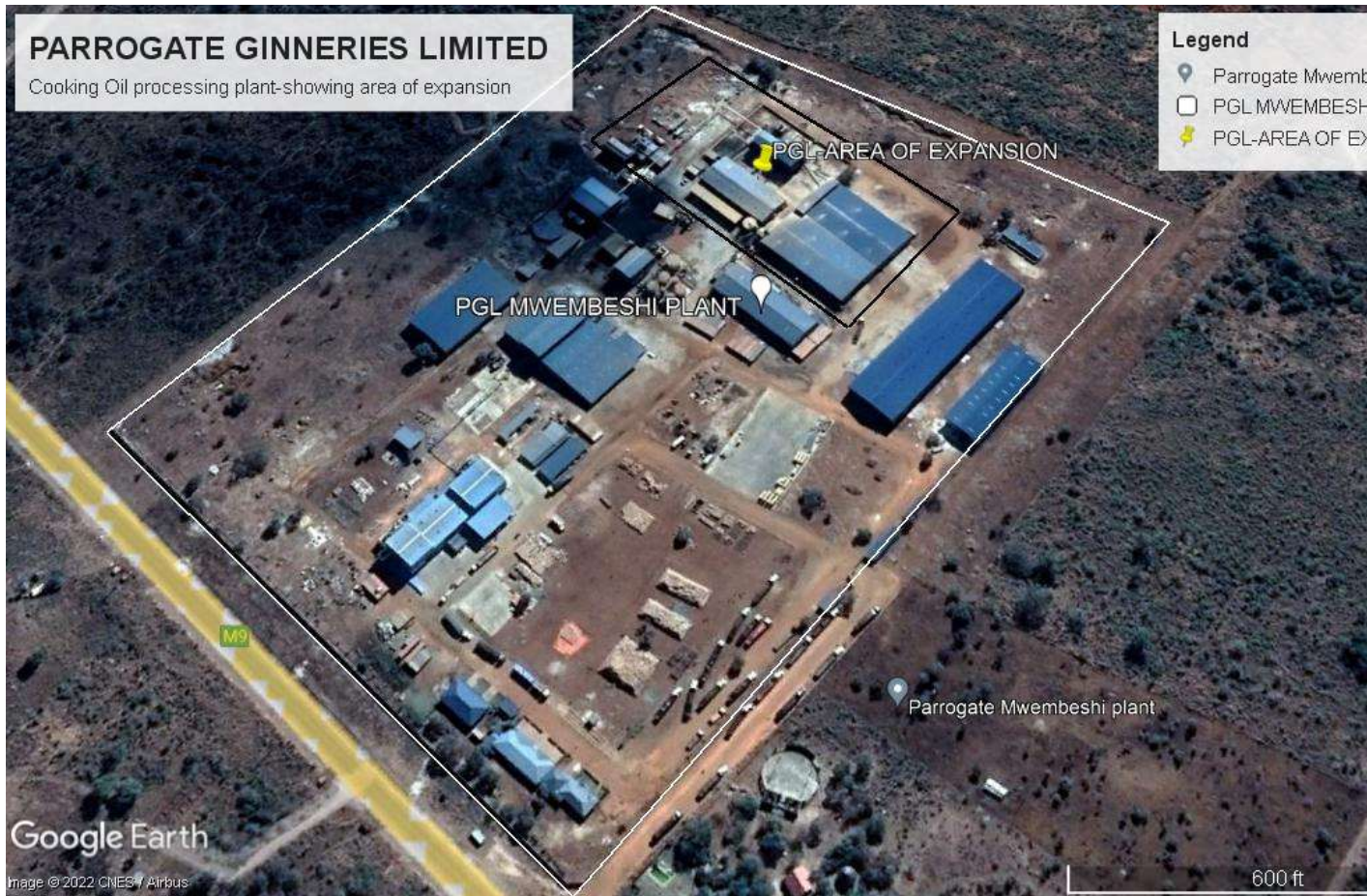
RESPONDENT LIST

NAME	INSTITUTIONS/PLACE	POSITION	CONTACT DETAILS	SIGNATURE
Nemwinge S. Zulu	Westwood lodge	Manager	0977501130	
COLLINS MWAMBA	PARROGATE	HR SUPERVISOR	0979867958	
Eliza beth Sibeko	Bika, musa	Farmer	0961364560	
chansambe M BYA			0770713079	
FUNDULUKA HUMPHREY	MWEMBESHI SEC	DEPUTY	0977605861	
Sikadusa Michael	MWEMBESHI SEC	School	0979-614878	
SWALE JOHN	MWEMBESHI RHC	FTT	0974925405	
Simaboko Obert	MWEMBESHI RHC	Clinical officer	0971752241	
SHATA KATOZA	SHAMBIRI GRO	Engineer	0977393737	
Austin Lwato	Isha Mamba's Kross		0978608757	
Elisha Muzya	Mwemba	Camp talker	0760874022	
Musidhar Thakur	PGL	Plant Manager	0976005890	
ERNEST MWALE	ESR	Vol. 6-EC	0967-994655	
PATSON ZULU	ESR	CEO/Chair	0977470849	
ETHELSTABEL MULEBA	CHILANGA COUNCIL	COUNCIL	0975 935 880	
Pailande Humphrey	Chilanga Council	Treasurer	0978843311	



APPENDIX F: PHOTOS OF THE SITE





TERMS OF REFERENCE



**FOR EXPANSION OF THE COOKING OIL PROCESSING PLANT ON
SUB C AND SUB D OF LOT 10208/M, MUMBWA ROAD, MWEMBESHI
AREA IN CHILANGA DISTRICT BY PARROGATE GINNERIES
LIMITED**

PREPARED FOR

PARROGATE GENNERIES LIMITED

Prepared By



APRIL 2022

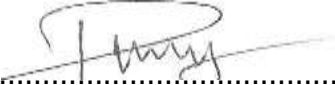
DECLARATION

This is a declaration by Environmental Science and Engineering Consultants (ESEC) Ltd who prepared these Terms of Reference (ToRs) that the information and data presented herein is authentic and has been verified by Parrogate Ginners Limited, who are the project Developers.

This report therefore, contains Environmental Impact Assessment (EIA) Terms of Reference (ToRs) for the Cooking Oil Processing Plant by Solvent Extraction facility operated by Parrogate Ginners Limited.

I, PATSON ZULU as Team Leader, hereby, certify that I supervised the team that prepared this document and provided technical and administrative oversight throughout the process.

Environmental Consultant

Signature:

Patson Zulu

Chairman and CEO

Environmental Science & Engineering Consultants Ltd

ACRONYMS

Abbreviation	Definition
CBD	Convention on Biological Diversity
CTC	Chilanga Town Council
CSR	Corporate Social Responsibility
ECZ	Environmental Council of Zambia
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
EP	Equator Principles
ESEC	Environmental Science and Engineering Consultant
FRA	Food Reserve Agency
GRZ	Government of the Republic of Zambia
GSD	Geological Survey Department
HIV/AIDS	Human Immuno Virus/Acquired Immuno Deficiency Syndrome
HSE	Health Safety and Environment
IAP	Interested and Affected Parties
LWSC	Lusaka Water Supply and Sanitation Company
masl	metres above sea level
NIPA	National Institute for Public Administration
NRDC	Natural Resources Development College
NWASCO	National Water Supply and Sanitation Council
PGL	Parrogate Ginneries Limited
SHE	Safety Health and Environment
SI	Statutory Instrument
STIs	Sexually Transmitted Infections
TLV	Threshold Limit Value
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organisation
USD	United States Dollars
WARMA	Water Resource Management Authority
ZEMA	Zambia Environmental Management Agency
ZSA	Zambia Statistics Agency

Revision Schedule					
Rev	Date	Details	Prepared by	Reviewed by	Approved by
0	Apr. 2022	ToRs	Bwalya L. Mwale	Ernest Mwape	Patson Zulu Team Leader

Contact:

Patson Zulu

E-mail: patsonzulu@gmail.com

Chairman/CEO

Mobile: +260 977470849/967470849



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DECLARATION OF AUTHENTICITY

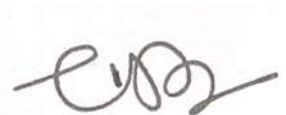
Rakesh Yadav

I, ... the undersigned, declare that the contents of these Terms of Reference reflect the scope of work that will be undertaken in conducting the Environmental Impact Assessment (EIA) for the Cooking Oil Processing Plant by Solvent Extraction on Mumbwa Road in Mwembeshi area in accordance with the Environmental Management Act No. 12 of 2011 read together with the Environmental Impact Regulations S.I. No. 28 of 1997.

We further declare that the concerns raised by stakeholders at the time of consultations have been taken into account in preparing these Terms of Reference.

We acknowledge that Environmental Impact Assessment studies for the facility will be undertaken in accordance with the applicable Zambian legal and administrative framework.

For and on behalf of **Parrogate Ginneries Limited, Zambia.**



.....
Mr. Rakesh Yadav
Group Technical Head
Parrogate Ginneries Limited

EXECUTIVE SUMMARY

Introduction

This document presents the draft Terms of Reference (ToRs) for undertaking the Environmental Impact Assessment (EIA) studies and preparation of an Environmental Impact Statement (EIS) for the proposed expansion of the Cooking Oil Processing Plant by Solvent Extraction from 200MT/Day to 600MT/Day. The plant is located on Lusaka-Mumbwa road in Mwembeshi area of Chilanga District in Lusaka Province. The ToR document has been prepared on behalf of Parrogate Ginneries Limited, Zambia who is the facility Proponent. Environment Science and Engineering Consultants (ESEC) Ltd was contracted to undertake the EIA and prepare the EIS for the project.

The ToR document sets forth the scope of the EIA studies and the approach that will be used to conduct the studies and to prepare the EIS for the facility. Potential negative and positive environmental and social impacts associated with the facility following a preliminary assessment, will be determined to provide baseline environmental conditions of the facility's area. Detailed baseline studies will be carried out for regulators to make informed decisions.

The ToR document will therefore provide an opportunity for the Zambia Environmental Management Agency (ZEMA) and other stakeholders to confirm the scope of the assessments which will form the EIA study approach to be adopted during the expansion of the cooking oil plant by solvent extraction on Sub C and Sub D of Lot 10208/M, Mumbwa road, Mwembeshi area of Chilanga District in Lusaka Province.

The document has been prepared in line with the requirements of the Zambian Environmental Impact Assessment Regulations, 1997 (Statutory Instrument No. 28 of 1997). These regulatory standards stipulate issues to be covered in conducting an EIA study and the stages that must be followed.

Project Description

Parrogate is a group of companies with branches in Malawi, Zambia and Zimbabwe. They own two cooking oil processing plants, both along Mumbwa road: one is located in Chinika industrial area of Lusaka district, the other in Mwembeshi area of Chilanga district. This plant which is the subject of these ToRs was established in 2017. The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage. The plant is currently operational and involves procurement of the soya bean seed which is cut, heated, and squeezed to make vegetable cooking



oil.

Parrogate Ginneries Limited intends to expand the plant on Sub C and Sub D of Lot 10208/M, Mumbwa road, Mwembeshi area, Lusaka west. It will ensure environmental sustainability of operations of the plant through preparation of the EIA and therein, an Environmental Management Plan (EMP) as per the Zambian legal requirements.

Objective of the Facility

The objective of the environmental impact assessment for the proposed expansion of the cooking oil plant by solvent extraction on Sub C and Sub D of Lot 10208/M, Mumbwa road, Mwembeshi area, Lusaka west is to ensure environmental sustainability of the operations at all various stages of project execution.

Proposed Project Location

The cooking oil processing plant is located on plot number 10208/M, Mumbwa road, Mwembeshi area whose geographical coordinates are 15°21'4" S and 27°57'23" E. It is located about 30 km from the Lusaka CBD and 20 m off Mumbwa road. The site is in the vicinity of Mwembeshi maximum correctional facility in the northern direction, Mwembeshi Boarding Secondary School in the south-east direction and Round House lodge on the southern side. The plant area is surrounded by farms on the eastern side, while Mumbwa road form the western border.



Figure 0-1: Location Map of Cooking Oil Processing plant

Estimated Project Cost

The estimated cost of the proposed expansion of the Parrogate Ginneries Limited facility was estimated at **US\$ 90,000**. Project implementation will commence upon acquisition of the necessary permits from ZEMA and other regulatory authorities.

Project Categorization

In accordance with the Zambian Environmental Laws, expansion of the cooking oil processing facility falls under the Second Schedule; Regulation 7 (2) of the Environmental Impact Assessment regulations, Statutory Instrument No. 28 of 1997 and listed under the category of **Processing and Manufacturing Industry: (g) "Food processing plants - 400 tons or more output a year"**. The facility has potential adverse environmental impacts that are generally site-specific, and could be readily addressed through mitigation measures. Accordingly, the Zambia Environmental Management Agency (ZEMA) is mandated to evaluate and assess the EIA report and decide whether to approve or disapprove the facility

Relevant Legislation

This ToR document has been prepared in line with the requirements of the Zambia Environmental Management Act, 2011 and its subsidiary legislation, the Environmental Impact Assessment Regulations, 1997 (Statutory Instrument No. 28 of 1997). It also refers to the Local Government Act of 2019, the Urban and Regional Planning Act of 2015, the Water Resources Management Act of 2011, the Public Roads Act of 2002 and other applicable legislation and regulations. The institutional framework within which the facility will be implemented will include Zambia Environmental Management Agency (ZEMA), the Chilanga Town Council, Ministry of Local Government and other regulatory and government agencies.

Management of the plant wish to operate the facility in conformity with the Zambian law, including international conventions and internationally recognized standards such as Equator Principles (EP). The EP are based on and implemented in accordance with World Bank Group's International Finance Corporation (IFC) Performance Standards and the IFC Environmental Health and Safety (EHS) Guidelines.

This facility will be implemented within the confines of the following specific guidelines:

- The Environmental Management Act No. 12 of 2011
 - Statutory Instrument No. 112 of 2013; Part II on Air and Water pollution(Licensing) Regulations
 - Environmental Management (Licensing) Regulations, Statutory Instrument No. 112 of 2013 part III
 - Environmental Management (Licensing) Regulations, Statutory No.

112 of 2013 Part II

- Environmental Management (Licensing) Regulations, Statutory No. 112 of 2013 Part IV

- The Urban and Regional Planning Act, 2015 Part III section 17
- The Occupation Health and Safety Act of 2010 Part IV Section 16
- The Public Health Act Cap 295 of 1978 Part V Section 31
- The Local Government Act No. 2 of 2019, Introductory Part
- The Fisheries Act No. 22 of 2011
- The Water Resources Management Act No. 21 of 2011 Section 6
- The National HIV/AIDS/STI/TB Act of 2002 Section 4
- The National Heritage and Conservation Act (Cap. 173 of 1989) Section 8
- The Employment Code Act No. 3 of 2019, Introductory Part
- The Workers Compensation Act No. 10 of 1999 Section 6
- The Road Traffic Act Cap 464 Section 196
- The Lands Act (Cap. 184 of 1995) Section 8
- The Forest Act No. 4 of 2015, The Forests Community Forest Management Regulations, SI No. 11 of 2018

Lifespan of the proposed project

The facility is expected to have a lifespan that will last for as long as possible, but within the period of the valid lease that will remain relevant to the area. However, a Plant of this nature is expected to last over 35 years.

EIS Scope of Work

The spatial boundaries for the study area will be where significant environmental and socio-economic impacts can be induced by the facility. These areas will include surrounding developments which are all within the 1km radius. The EIA will assess all the environmental and social facets of the facility throughout the entire life cycle from construction, operation to decommissioning and closure phases.

The aspects to be included in the assessment relate to air quality, soils and land use, surface water and groundwater quality, noise and ground vibration, radiation, flora and fauna, ecosystem services, traffic, carbon footprint, archaeological and cultural heritage and socio-economic situation.

EIA Methodology and Reporting

The methodology to be adopted in carrying out the environmental impact study will include the specialist studies of biophysical and socio-economic environment, public consultations, and identification and assessment of the impacts plant operation will have on these aspects of the surrounding environment. The impacts will be assessed using standard methods of environmental assessment and terminology. The EIA study report will be prepared to meet the requirements of the Zambian

Environmental Impact Assessment Regulations of 1997, read together with Statutory Instrument No. 28 of 1997. Proposed EIA Project Team

The EIA project team will include the Project Director who will also be Team Leader to provide project oversight and strategic management, Economist to assess the socio-economic impacts that may potentially arise from ~~exiting~~ the project. The Team will also include an Environmental Engineer to undertake a critical analysis of the project components in relation to existing environment and social setting. A Water Resources Expert will assess surface water and groundwater quantity and quality. Other experts that will be part of the team include the following:

- Air Quality Expert for Critical analysis of facility components in relation to existing environmental setting, assessment air quality assessment / air dispersion modeling.
- Geology Expert to assess the geological set up, undertake hydrogeological tests, determine soil texture and moisture holding capacity of the site.
- Process Engineer to ensure process control and optimization

EIA Schedule

The proposed EIA schedule of activities is included in this document. The schedule indicates the nature of activities to be undertaken, the means of getting the desired results, and when they will be undertaken. It is expected that the Final EIS for the facility will be submitted to ZEMA by end of June 2022

Conclusion

The ToR document highlights the approach that will be undertaken and the legal framework within which the facility will be implemented following approval of the ToR and approval of the completed EIS by ZEMA. The Terms of Reference have been prepared to ensure that the resultant EIA is conducted in line with all applicable national legislation, regulations and guidelines and international best practices.

Parrogate Ginneries Limited commits to continue operating the plant in an environmentally sustainable and sound manner by addressing the facility's impacts on the surrounding physical and socio-economic environment.



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1. INTRODUCTION

1.1 Background

This document presents the draft Terms of Reference (ToR) for undertaking the environmental impact assessment (EIA) study and preparation of an Environmental Impact Statement (EIS) for the proposed expansion of the cooking oil plant capacity by solvent extraction from 200 MT/Day to 600 MT/Day on **Sub C and Sub D of Lot 10208/M**, located along Mumbwa road, Mwembeshi area, Lusaka west in Chilanga District. The ToR document has been prepared on behalf of Parrogate Gineries Limited, who is the facility proponent. ESEC Ltd was engaged to prepare the EIS for the proposed expansion and operation of the existing cooking oil processing facility.

The purpose of this ToR document is to set forth the scope of the EIA study and the approach that will be used to conduct the study and to prepare the EIS for the facility that meet domestic legal requirements, including international standards and best practices. In that respect, the document also presents the legal and institutional framework in which the EIA will be conducted and proposed project implemented.

These ToRs have a project description, including spatial and temporal boundaries of the area around facility. It has also identified potential negative and positive environmental and social-economic impacts associated with the continued operation of the expanded plant following a preliminary assessment of the facility components and their interactions with the existing baseline conditions. The detailed baseline studies that will be carried out to facilitate decision-making by relevant stakeholders will involve primary data collection on the following aspects: air, soils and land use, surface water and groundwater quality, noise and ground vibration, radiation, flora and fauna, ecosystem services, traffic, carbon footprint, archaeological and cultural heritage and socio-economic factors. Secondary data on other environmental and social baseline conditions will also be gathered through review of existing documents and data relevant to the facility. Section 4 of this document presents the scope of the EIA work to be undertaken.

Primary and secondary data on the prevailing environment and social-economic conditions of the facility area and analysis of its components will form the basis for prediction and assessment of the potential environmental and social impacts of the facility and subsequent compilation of the EIS. Section 5 of this document presents impact assessment methodology and terminology to be used in executing the assignment.

The ToR document will provide Zambia Environmental Management Agency (ZEMA)

and other stakeholders the scope of work and activities that will form the EIA study, methodology and approach to be adopted in the process of producing the EIS for the cooking oil processing plant.

The document has been prepared in line with the requirements of the Environmental Management (Environmental Impact Assessment) Regulations, 1997 (Statutory Instrument No. 28 of 1997), which stipulates issues to be covered when conducting an EIA study and the stages that must be followed. It has also been prepared in line with the requirements of international standards and best practices. Site specific conditions have also been taken into account in determining the likely significance of the impacts and issues to be covered in the study.

1.2 Overview on Parrogate Ginneries Limited

Parrogate is a group of companies with branches in Malawi, Zambia, and Zimbabwe. The success of Parrogate lies in its commitment to investing in the best and most qualified human resources, hard work, ambition, integrity, accountability and its pragmatic approach to doing business. Parrogate has made large investments to ensure its sustained commercial footprint in Africa.

Table 0.1: Name and Details of the Project Developer

Name and Details of the Project Developer	
Name of Project Developer	Parrogate Ginneries Limited
Address and contact details	Address: Plot No 5001, off Mumbwa RoadChinika Industrial Area , Lusaka Tel No.: +260 0971546941 E-mail: rakeshyadav@parrogate.com.zm
Ownership	CORBEL FINANCE LIMITED – 99.96%

Table 0.2: Shareholders of the Project

Particulars of Shareholder	Nationality & NRC/Passport No	Country of Origin	Number of Shares held	Percentage Shareholding
PRADEEP GANEDIWAL	PPN. Z4207201 INDIA	INDIA	1.00	0.02
PRADUMAN KUMAR	PPN. Z4987035 INDIA	INDIA	1.00	0.02
	BUSINESS ENTITIES			
Name of Businesses	Residential & Postal Addresses		Number of Shares held	Percentage Shareholding
CORBEL FINANCE LIMITED	SACKVILLE HOUSE, AAKPELWA ST, LIVINGSTONE		4,998.00	99.96
Total			5,000.00	100 %

1.3 Project Description

Parrogate Ginneries Limited intends to expand the cooking oil plant capacity in an environmentally and socially sound manner. Parrogate contracted ESEC Ltd to conduct the environmental impact assessment (EIA) study. In accordance with the requirements of the relevant legislation and regulations, under the second Schedule, scoping of the cooking oil processing facility should be carried out as part of the EIA process.

Currently Parrogate Ginneries Limited is an operational cooking oil processing plant with sections that include seed preparation/crushing, extraction, oil refinery, cake shed, plastic plant, and filling room. The company intends to have an additional seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage sections. The project operation involves procurement of the soya bean seed which is cut, heated and squeezed to make edible cooking oil.

1.4 Objective of the Plant Expansion Project

Parrogate Ginneries Limited would like to expand operations of the plant in an environmentally sustainable manner. To do that requires preparation of the EIA and implementation of the Environmental Management Plan (EMP) as per the Zambian legal requirements. These two elements will be contained in the Environmental Impact Statements (EIS).

1.5 Environmental and Social Setting and preliminary potential impacts

The ToR outlines the environmental and social setting of the facility's area. The key potential impacts on the existing baselines conditions will be assessed and mitigation measures recommended in this EIA study. Aspects to be included in the assessment relate to air quality, soils and land use, surface water and groundwater quality, noise and ground vibration, radiation, flora and fauna, ecosystem services, traffic, carbon footprint, archaeological and cultural heritage and socio-economic situations such as increase in criminal trespass, theft, and vandalism. Preliminary assessment shows that there will be no relocation and resettlement of people.

1.6 Location

The plant is located off Mumbwa road, within Parrogate Ginneries Limited premises, situated in Mwembeshi area of Chilanga district of Lusaka province. Parrogate Ginneries Limited is located at Sub C and D of Lot 10208/M. The facility lies at 27° 57'24.3" E and 15° 20'58.1" S, 30km from the Lusaka business District Centre and 20m from Mumbwa road. Some of the notable structures in the area are Mwembeshi maximum correctional facility in the northern direction, Mwembeshi Boarding Secondary School and Round house lodge on the southern side. The area is surrounded by farms on the eastern and part of the southern side and Mumbwa road lies on the western side.

The nearest developments to the site include;

- Mwembeshi maximum correctional facility, about 2.26 km north;
- Round house lodge, about 50m south of the plant
- Mumbwa Road lies, about 20m west;

Table 0.3: Parrogate Gineries Limited Site Coordinates

	PARROGATE GINERIES LIMITED SITE COORDINATES		
Beacon No.	Description	Longitude E	Latitudes S
A	Corner Point	27° 57' 33" E	15° 21' 02" S
B	Corner Point	27° 57' 22" E	15° 21' 02" S
C	Corner Point	27° 57' 22" E	15° 21' 55" S
D	Corner Point	27° 57' 33" E	15° 21' 55" S
E	Center point	27° 57' 23" E	15° 21' 04" S



Figure 0-2: **Location Map of the Cooking Oil Processing facility**

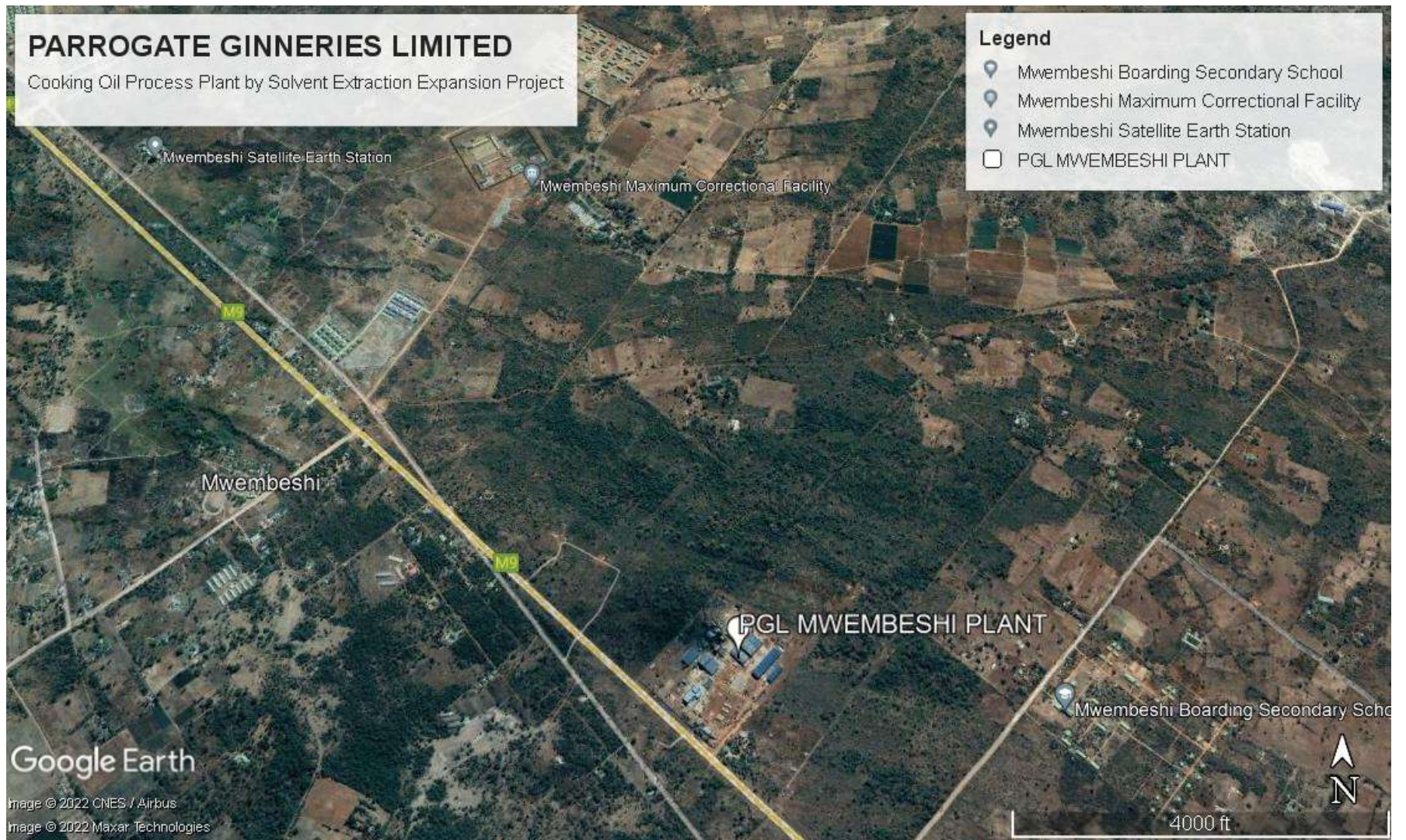


Figure 0-3: Project location with neighboring areas

1.7 Spatial Extent of the Project

Parrogate Gineries Limited site covers **32.4** ha in extent. The area has been zoned industrial/agricultural activities by Chilanga Town Council.

1.8 Estimated Project Cost and Implementation Schedule

The expansion of Parrogate Gineries Limited plant in Mwembeshi was estimated **at US\$ 90,000**. The expansion project will commence upon acquisition of the necessary permits from ZEMA and other authorizing agencies.

1.9 Purpose and Objectives of the Terms of Reference

The purpose and objectives of this document are;

- To comply with legal requirement in the EIA Regulations for preparing and submitting a Scoping Report for approval before proceeding with other stages of the EIA process.
- To comply with internationally accepted best practices in environmental management.
- To set out the extent and scope of work, and identify key elements of the EIA study.
- To place limits on the information that must be collected, thereby optimizing the use of resources during the study.
- To provide names, expertise and assigned roles of the EIA team for ZEMA approval.
- To facilitate efficient utilization of the time, money and expert knowledge on issues of environmental significance to the facility.
- To guide preparation of the EIA report, thus avoid presenting irrelevant information that may cause the report not to be a working document.
- To provide common parameters for efficient consultation with the Zambia Environmental Management Agency (ZEMA) and other interested and affected parties (IAPs).
- Approved ToRs also become Common parameters when it comes to monitoring the extent of implementation and adherence to EMP as contained in the EIS
- To facilitate effective planning and smooth implementation of the EIA process by the consulting team.
- To eliminate chances of disagreement in terms of the EIA process and the detailed information and consultations required to complete the process.

1.10 Project Categorization

According to Statutory Instrument No. 28, of the EIA Regulations of 1997, the cooking oil processing plant is a Second Schedule project. The facility has potential adverse environmental impacts that are generally site-specific, but could be readily addressed through mitigation measures. Accordingly, ZEMA is mandated to

evaluate and assess the EIA report, and approve or deny/reject the execution of the proposed project.

1.11 Lifespan and Schedule of the proposed project

The lifespan of the facility is about 40 years.

Table 0.4: Project Schedule

Activity	March 2022	April 2022	May 2022	June 2022	July 2022	August 2060
Preparation						
Site location suitability studies						
Obtaining relevant authorization (Approval)						
Procurement and transportation of the building materials and equipment						
Communication with relevant stakeholders						
Construction						
Materials Mobilization, Handling and Storage						
Movement of Construction Traffic and Heavy Machinery						
Construction Activities						
Access Roads Construction						
Decommissioning Of the Construction activities						
Commissioning						
Operation commencement of the plant						

Management of boiler ash and waste from soya beans screening.						
Decommissioning phase						
Notification of all relevant stakeholders						
Repairing all the structures						
Conducting re-vegetation activities and open pit filling						
General clean-up of the site						

2. REGULATORY FRAMEWORK AND CORPORATE REQUIREMENTS

This section outlines the legal and administrative framework within which the project will be implemented. It outlines the relevant national legislation and international agreements and best practices. The section presents social, environmental, and other regulatory requirements that shall apply to the proposed facility.

2.1 Relevant Regulations

The cooking oil processing facility will be implemented within the Zambian legal and administrative framework. It will also be in conformity with international conventions and international best practices outlined in the Equator Principles (EP), the 2012 version of the International Finance Corporation (IFC) Performance Standards and World Bank standards.

2.2 Environmental Legal and Policy Framework in Zambia

The Government of the Republic of Zambia (GRZ) adopted the National Conservation Strategy (NCS) in 1985 to balance environmental protection requirements on one hand, and facilitate economic and social development activities on the other hand. This document was upgraded to the National Environmental Action Plan (NEAP) in 1992 with the same aim of fostering environmentally sustainable economic development. The NCS and NEAP are the foundation pillars of environmental laws in Zambia. The NCS facilitated development of the Environmental Protection and Pollution Control Act (EPPCA) of 1990. This Act provided for establishment of the Environmental Council of Zambia (ECZ) in 1992. The EPPCA was repealed by the Environmental Management Act No. 12 of 2011, which is the current supreme environmental management law in Zambia. Through this Act, ECZ was changed to Zambia Environmental Management Agency (ZEMA).

2.3 The Environmental Management Act No. 12 of 2011

The Environmental Management Act repealed the Environmental Protection and Pollution Control Act No. 12 of 1990. Provisions of the Environmental Management Act require that all new infrastructure projects begin with preparation of an Environmental Impact Assessment (EIA) and thereafter, licensing, auditing and compliance inspections. Applicable Regulations to the facility under the Environmental Management Act No. 12 of 2011 are described below:

- 1) **Environmental Management Act No. 12, 2011 (Environmental Impact Assessment) Regulations, SI No. 28 of 1997.** These Regulations provide the main framework under which Environmental Impact Assessments (EIA) are conducted under the supervision of ZEMA, the agency that considers and decides to approve or reject projects.

Relevance: - the cooking oil processing plant has social-economic and environmental impacts, hence the relevance of the EIA.

Compliance: The facility will implement the approved EMP in accordance with these regulations. The proponents of the cooking oil processing plant are required to submit an EIS to the ZEMA for approval before implementing the expansion project.

- a) **Statutory Instrument No. 112 of 2013; Part II on Air and Water pollution (Licensing) Regulations.** These Regulations provide for licensing of gaseous emissions to the environment and also provide for statutory discharge limits for respective parameters. The Regulations also provide for issuance of permits, limits, air quality guidelines and classification of effluent discharge into air or water.

Relevance: The facility may produce air pollutants including smoke from the vehicles, dust and plant odors during operation activities.

Compliance: The project proponent will ensure that only modern equipment with none or fewer emissions are released into the atmosphere. The workers shall further be provided with PPE attire including air masks.

- b) **Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part IV** -These Regulations provide standards and guidelines for mitigating air, waste water, hazardous waste, pesticides and toxic substances and ozone depleting substances. The Developer will adhere to the provisions of the regulations.

Relevance: these regulations are relevant in that the operations of the facility will generate waste whose transportation and disposal requires constant monitoring.

Compliance: All waste generated during the expansion, operation and decommissioning of the cooking oil processing plant will be governed and handled with the provision of this regulation. Thus, project proponent will be ensured that all the solid waste is properly stored before disposal to the designated disposal site.

- c) **Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part II-** This regulation provides for the licensing of liquid waste discharge limits for respective parameters. Operational stage of the facility may cause contamination of storm water by hydrocarbons; therefore, measures will be put in place to comply with the provisions of this regulation.

Relevance: these regulations are relevant in that the plant facilities (canteens, toilets, bathrooms) as they have potential to leak, spill solid waste into the environment causing pollution, especially foul smells.

Compliance: The discharge of effluents will be monitored to ensure that the foul smell is adequately reduced. A proper sewer system is in place.

- d) **Environmental Management (Licensing) Regulations, Statutory No.112 of 2013 Part IV** Hazardous waste management. The regulation provides for licensing of solid/liquid hazardous waste management from generation through to disposal and owning of hazardous waste disposal sites. The processing facility will involve the generation of hazardous waste in form of sludge and should be handled in accordance with this regulation.

Relevance: These regulations are relevant in that the operations of the facility will generate hazardous waste whose transportation and disposal requires constant monitoring.

Compliance: All the hazardous waste will be contained because the area will be made of concrete. Any machine oil will be adequately stored in the drums and sold to the recycling companies.

2.4 OTHER RELATED LEGAL FRAMEWORK

As required in the preparation of the full environmental impact assessment, in addition to conforming with the Environmental Management Act No. 12 of 2011, consideration of and adherence to provisions or requirements in the other relevant pieces of legislation is vital to this project. Some of these are discussed below.

2.4.1 Urban and Regional Planning Act, 2015 PART III section 17

This Act provides regulations for development, planning and administration principles, standards and requirements for urban and regional planning processes and systems. Among many other functions, the Act establishes procedures for integrated urban and regional planning in a devolved system of governance so as to ensure multi-sector cooperation, coordination and involvement of different ministries, provincial administration, local authorities, traditional leaders and other

stakeholders in urban and regional planning; ensure sustainable urban and rural development by promoting environmental, social and economic sustainability in development initiatives and controls at all levels of urban and regional planning. It ensured uniformity of law and policy with respect to urban and regional planning by repealing the Town and Country Planning Act of 1962, and the Housing (Statutory and Improvement Areas) Act of 1975; and provide for matters connected with, or incidental to, the foregoing.

Relevance: Being industrial/agricultural activities in a peri-urban area of Chilanga District, the proposed plant expansion requires adequate planning. Therefore, the Act is relevant.

Compliance: The facility is in an area designated for industrial/agricultural activities; therefore, the proposed use of land is in accordance with this Act.

2.4.2 The Occupation Health and Safety Act of 2010 Part IV Section 16

This Act provides for the creation of health and safety committees at workplaces and for the health, safety and welfare of persons at work. It provides for the duties of manufacturers, importers and suppliers of articles, devices, items and substances for use at work; provide for the protection of persons, other than persons at work, against risks to health or safety arising from, or in connection with, the activities of persons at work; and provide for matters connected with, or incidental to, the foregoing.

Relevance: The facility might cause illnesses as well as accidents during all its phases.

Compliance: The Company will ensure that all the necessary safety signs are displayed around and within the site, and ensure that safety attire is always worn by the employees. Safety awareness talks every morning by the chief safety officer will also be conducted.

2.4.3 Public Health Act Cap 295 of 1978 Part V Section 31

This Act provides for prevention and suppression of public health hazards. It regulates all matters and activities that are connected to outbreak of diseases. Provisions of the Act are implemented by Councils through licensing and inspections.

Relevance: The facility's activities may affect the health of the workers at the site and the general public, hence the need to adhere to this Act.

Compliance: Activities to do with good sanitation, health and safety and general cleanliness will be enhanced throughout the operations of the plant. This will be enhanced by implementing adequate mitigation measures including routine medical check-ups for all the workers on site during all the facility's operational phases.

2.4.4 The Local Government Act No. 2 of 2019

This Act provides for an integrated local government system; give effect to the decentralization of functions, responsibilities and local services at all levels of local government; ensure democratic participation in, and control of, decision making by the people at the local level; revised the function of local authorities; provides for the review of tariffs, charges and fees within area of the local authority; repeal and replace the Local Government Act of 1991.

Relevance: The expanded facility area, being in the Chilanga Town Council area, will require local licensing for such things as e.g. fire certificates.

Compliance: All the required certificates will be furthered at the Chilanga Town Council.

2.4.5 The Water Resources Management Act No. 21 of 2011 Section 6

This Act provides for establishment of the Water Resources Management Authority (WARMA) and defines its functions and powers; the management, development, conservation, protection and preservation of the water resource and its ecosystems; the equitable, reasonable and sustainable utilization of the water resource; issues rights to draw or take water for domestic and noncommercial purposes, and ensures that the poor and vulnerable members of society have adequate supply and sustainable source of water free from any charges; create an enabling environment for adaptation to climate change; provide for the constitution, functions and composition of catchment councils, sub-catchment councils and water users associations; provide for international and regional cooperation in an equitable and sustainable utilization of, shared water resources; provide for the domestication and implementation of the basic principles and rules of international law relating to the environment and shared water resources as specified in the treaties, conventions and agreements to which Zambia is a State Party; repeal and replace the Water Act of 1949; and provide for matters connected with, or incidental to, the foregoing.

Relevance: Water abstraction from rivers and underground requires obtaining permission from WARMA. Surface run-off and seepage from the proposed pipeline should not contribute to pollution of water resources that may render its use by other stakeholders unhealthy or unsustainable. This legislation is relevant to the project to ensure that measures to prevent pollution to human health and to any water supply bodies are undertaken that include tight leakage control systems.

Compliance: Several permits shall be obtained from WARMA.

2.4.6 The National HIV/AIDS/STI/TB Act of 2002 Section 4

The Act provides for the establishment of the National HIV/AIDS/STI/TB Council and provides for the framework support to the development, monitoring, and evaluation of multi-sectorial and socio-economic impacts of HIV, STI, AIDS, and TB.

Relevance: Since many people will be empowered (through work or small business opportunities) it might result in increased indulgence in risky behavioral activities such as heavy drinking and casual sex which enhances the spread of the HIV/AIDS, STIs, and TB.

Compliance: Awareness programs will be arranged for all the workers as well as the distribution of condoms through various outlets such as toilets.

2.4.7 The National Construction Council Act No. 10 of 2020

The Act provides, among other things, for the promotion and development of the construction industry in Zambia, registration of contractors, affiliation to the Council of professional bodies or organizations whose members are engaged in activities related to the construction industry. It also provides for the regulation of the construction industry.

Relevance: The Act will ensure that contractors on site are registered with the NCC that ensures works are executed in compliance with the NCC regulations, standards and guidelines, and international best construction practices. Hence the relevance of this Act.

Compliance: The Company shall engage only licensed contractors and ensured that the NCC certificates are all valid.

2.4.8 The Standards Act No.4 of 2017

This Act provides for the regulation of standards and quality of commodities. It provides for the continued existence of the Zambia Bureau of Standards (ZABS), but re-defined its powers and functions; provide for standardization and quality assurance of products and services through establishing or setting national standards and provision of conformity assessment services for products and services. The Act repealed the Standards Act of 1994.

Relevance: The expansion of the cooking oil processing plant will involve installation of tanks, electrical components and other ancillary facilities that are should meet national standards as per the Standards Act.

Compliance: The developer (PGL) will procure and install components that meet the Zambia Bureau of Standards national standards specification. Before any material and equipment are taken to the site contractors will ensure that all the inspections and authorizations are obtained from the Zambia Bureau of Standards.

2.4.9 The Public Health Act No.19 of 2020

The Act provides for and regulates all matters connected with public health in the country under the authority of each district as the enforcement agency.

Relevance: The project is likely to impact public health through air emissions, noise generation, risk of injury to members of the public and pollution of surface and underground water courses.

Compliance: The project works will be done in a way that minimizes the impact on public health. The site will be watered on a regular basis to reduce air emissions; the noise activities will be done during night hours with machinery that will be regularly maintained. The developer will also employ safety personnel to ensure that safety procedures are adhered to. The developer will also follow through on all guidance that the Chilanga Town Council and ZEMA shall provide for the implementation of the proposed project.

2.4.10 The Public Health Act (Infected Areas) (Coronavirus Disease 2019) Regulations, S.I 21 of 2020

The Act provides for the prevention and suppression of the spread of the Corona virus disease, also known as Covid-19. It regulates all matters and activities that are connected to outbreak of diseases. Provisions of the Act are enforced/implemented by authorized qualified officers through inspections.

Relevance: - The project site will be required to adhere to all set guidelines and Covid-19 regulations and therefore the Act is relevant.

Compliance: All plant workers and contractors will adhere to all the Covid-19 guidelines and regulations as set by the Government of Zambia.

2.4.11 The Public Health Act (Corona Virus) Infectious Diseases S.I No. 21 of 2020

The Act declares the Coronavirus Disease 2019 a notifiable infectious disease under section 9 of the Public Health Act, which mandates people to notify relevant authorities whenever a person is suffering from such a disease.

Relevance:- The project site will be required to set up and conduct preliminary tests to detect presence of coronavirus disease among workers.

Compliance: All plant workers and contractors are mandated to notify relevant authorities whenever a person is suffering from such a disease.

2.4.12 The Metrology Act No. 6 of 2017

This Act repealed the Weights and Measures Act of 1994, continued existence of Zambia Weights and Measures Agency that was renamed as the Zambia Metrology Agency with re-defined functions; provides for the designation, keeping and maintenance of national measurement standards; provides for the use of measurement units of the International System of Units and other units; provide for consumer protection, health, safety and environmental management through legal metrology measures;; and provide for matters connected with or incidental, to the foregoing.

Relevance: The expansion of the facility will involve the use of the International System of Units and other units as required by the Metrology Act. During the expansion on the plant, new plant components will be installed and thus the need to adhere to this act .

Compliance: The developer (PGL) will install the tanks, electrical components and other ancillary facilities according to the Zambia Metrology Agency's Weights and Measures.

2.4.13 The National Heritage and Conservation Act (Cap.173 of 1989) Section 8

The National Heritage and Conservation Act (NHCA) established the National Heritage and Conservation Commission (NHCC) which is responsible for the conservation of ancient, cultural and natural heritage, relics and objects of aesthetic, historical, pre historical, archeological or scientific interest by preservation, restoration, rehabilitation and reconstruction. The NHCC is responsible for identification and conservation of sites, relics and objects of cultural, scientific, archeological and historical interest as mandated under this Act.

Relevance: The facility being in an area which might have some historical background not known to us requires compliance to this Act.

Compliance: The area is devoid of any archeological history, in case a strange object having cultural significance is found, the developer will bring such discovery to the attention of the National Heritage and Conservation Commission.

2.4.14 Workers' Compensation Act No. 10 of 1999 Section 6

This is a social security Act which provides for employee compensation in case of injury or death whilst at work. It is a requirement under this Act that all employers

register their employees with the Workers Compensation Fund and make periodic remittances of compensation contributions on behalf of their employees.

Relevance: The facility operations has potential to make employees sick, injure or even kill employees at work hence the need for PGL and the Contractor to adhere to this Act.

Compliance: The Developer will ensure that workers are sensitized on all work-related safety measures to be put in place.

2.4.15 The Road Traffic Act Cap 464 Section 196

This Act provides for establishment of the Road Transport and Safety Agency (RSTA) and its functions; a system of road safety and traffic management; licensing of drivers and motor vehicles; registration of motor vehicles and trailers; compulsory third party insurance of motor vehicles; licensing and control of public service vehicles; promotion of road safety; regulation of road transport between Zambia and other countries with which Zambia has concluded cross-border road transport agreements.

Relevance: All the stages of project execution may result in disturbance to the normal flow of traffic along Mumbwa road near the facility area. Hence the need for PGL and the Contractor(s) to adhere to this Act.

Compliance: The proponent shall ensure that all the transportation vehicles are registered and driven by licensed drivers who shall promote road safety.

2.4.16 The Lands Act (Cap. 184 of 1995) Section 8

This Act provides for matters of land tenure, land-related transactions including the conversion of land holdings under customary tenure onto leasehold tenure.

Relevance: The land in question is under leasehold tenure, therefore it is under the state's jurisdiction and as such is governed by the Act.

Compliance: The land in question belongs to PGL. The property is registered in the name of the owner of the land.

2.4.17 The Forest Act, 2015 and S.I. No 11 of 2018

The Act provides for the establishment and management of National Forests and Local Forests; the conservation and protection of forests and trees; and the

licensing and sale of forest produce.

Relevance: The area is void of vegetation and hence no need to comply with the Act.

Compliance: Nonetheless, Indiscriminate cutting of trees within the facility site will be discouraged. Where trees are cut, re-vegetation programme will be implemented to offset the losses.

2.4.18 The Factories Act, No. 2 of 1966

Enacted in 1967, the Act regulates the conditions of employment in factories and other places of work as regard to the safety, health, and welfare of persons employed therein. The Act also provides for the examination and inspection of certain plant and machinery in order to ensure safety.

Relevance: The expanded PGL Soya Oil processing plant will house factory equipment and will be operational for 24 hours every day.

Compliance: The developer will ensure that the machinery being used for construction and maintenance are in good working order to avoid any accidents.

2.5 INTERNATIONAL GUIDELINES AND STANDARDS

The project Developer decided that, in addition to national requirements, the facility will also comply with international guidelines and standards in the field of EIA, including the following:

- World Bank Safeguard Policies - The IFC performance standards;

This EIA national legislation refers to, adopted and adapted, internationally recognized standards in order to establish a transparent regulatory framework for Project execution which is in line with both national economic development requirements but also meet expectations of international stakeholders.

The **Equator Principles (EP)** are a financial industry benchmark for determining, assessing and managing social and environmental risks in project financing. They are adopted voluntarily by international financial institutions to ensure that projects financed by these institutions are developed in a manner that is socially responsible and reflect sound environmental management practices. They are based on and implemented in accordance with the World Bank Group's International Finance Corporation (IFC) Performance Standards on Social and Environmental Sustainability and the IFC Environmental Health and Safety (EHS) Guidelines. The IFC is part of the World Bank Group and its standards and guidelines define both a

robust approach to managing risks and impacts, and determine good international industry practice for significant project components.

The environmental impact assessment study for the expansion project will be carried out in accordance with the Zambian legal and policies, safeguard procedures, and guidance, which meet international best practices as defined by the World Bank Group.

The IFC Performance Standards and EHS Guidelines relevant to the Project are briefly outlined below.

i. International Finance Corporation Performance Standards

The IFC Performance Standards set out the underlying principles for sustainable project management, including impact/risk assessment, mitigation strategies, public consultation and performance monitoring.

Their relevance to the facility is briefly summarized below:

- **IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts:** Establishes requirements for social and environmental performance management throughout the life of a project through conducting initial baseline studies; identification of risks and impacts; establishing management programmes that describe mitigation and performance improvement measures and actions to address identified risks and impacts; stakeholder engagement and application of management system to monitor and improve performance of project.
- **IFC Performance Standard 2: Labour and Working Conditions:** Highlights the need for workers' rights regarding income generation, employment creation, relationship management, commitment to staff, retention and staff benefits. It identifies and outlines the need to provide workers with a safe and healthy working environment. This Performance Standard is guided by international conventions.
- **IFC Performance Standard 3: Resource Efficiency and Pollution Prevention:** Defines an approach to pollution prevention and abatement in line with current internationally disseminated technologies and good practice. It deals with ambient and cumulative considerations, resource conservation and energy efficiency, hazardous materials and waste management, pesticide use and management, and emergency preparedness and response provisions.
- **IFC Performance Standard 4: Community Health, Safety and Security:** Specifies requirements for mitigating any potential for community exposure to

risks and impacts arising from equipment accidents, structural failures and releases of hazardous materials. In addition, communities may be affected by impacts on their natural resources, exposure to diseases, and the use of security personnel.

- **IFC Performance Standard 5: Land Acquisition and Involuntary Resettlement:** Outlines a policy to avoid or minimise involuntary physical resettlement as a consequence of the project. Where it is unavoidable, it requires suitable measures to mitigate adverse impacts on affected stakeholders, including appropriate compensation for any economic displacement such as loss of subsistence or commercial livelihood.
- **IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources:** Sets out an approach to protect and conserve biodiversity, including habitats, species and communities, ecosystem diversity, and genes and genomes, all of which have potential social, economic, cultural and scientific importance.
- **IFC Performance Standard 7: Indigenous Peoples:** Recognizes that Indigenous Peoples can be marginalized and vulnerable (such as, if their lands and resources are encroached upon by or significantly degraded by a Project). Their languages, cultures, religions, spiritual beliefs, and institutions may also be under threat.
- **IFC Performance Standard 8: Cultural Heritage:** Aims to protect irreplaceable cultural heritage and to provide guidance for protecting cultural heritage throughout a Project's life cycle.

Evolving sustainability issues associated with climate change, biodiversity and 'eco- system services', human rights and gender, labour and supply chains, and stakeholder engagement with affected communities are included in the Performance Standards and in certain cases have been enhanced following review of Performance Standards.

ii. Environmental, Health and Safety Guidelines

The IFC EHS Guidelines were designed to broadly define 'good international industry practice' and set specific minimum design and operating standards (such as for emissions, discharge or exposure limits) with regard to the environment, occupational health and safety, community health and safety, and life cycle impacts including during construction, operation and decommissioning.

The detail in these standards is generally derived from globally recognised sources (such as the World Health Organisation) and are intended for application where host government's legislation is either not available or is potentially deficient with regards to good international practice. Stipulated performance levels and measures

are “generally considered to be achievable in new facilities by existing technology at reasonable costs”.

However, there is flexibility with regard to both their application to existing facilities and the fact that less stringent measures can be adopted, provided that there is a detailed justification for any proposed alternatives as part of the site-specific EIA. In the event of any unavoidable deviation from a performance measure stipulated in an EHS Guideline, the justification should be clearly explained.

The General EHS Guidelines are designed to apply to all projects and all sectors, but the detailed requirements can be superseded by sector guidelines, where factors such as facility size, technology and associated impacts merit specific attention. The specific industry sector EHS Guidelines that may be applicable to the proposed project that include the guidelines on Waste Management Facilities, Water and Sanitation.

2.6 INTERNATIONAL CONVENTIONS

Zambia is a signatory to a number of international conventions. Conventions of significant relevance to the facility are briefly described below.

- 1) Ramsar Convention:** - The general objective of the Ramsar Convention is to curtail the loss of wetlands and to promote wise use of all wetlands. The convention addresses one of the most important issues in Southern Africa, namely the conservation of water supplies and use of the natural and the human environments in an intergenerational equitable manner.

Relevance: - The expansion may bring about surface and underground water depletion and pollution and therefore the convention will be adhered to.

Compliance: The effluent prone areas will be made of concrete to ensure that all the spillages are contained before contaminating underground water.

- 2) Kyoto Protocol to the United Nations Framework Convention on Climate Change:** - The aim is to further reduce greenhouse gases by enhancing the national programs of developed countries. The Kyoto Protocol established percentage reduction targets for the developed countries to reduce their GHGs.

Relevance: - The expansion of the cooking oil processing plant may contribute to the carbon emissions due to the fumes from the machinery

around the site and through the removal of trees which act as carbon sink. Knowledge of the convention is important in order to ensure that the carbon footprint is known.

Compliance: The site has little vegetation. Unnecessary cutting of trees will be highly discouraged.

- 3) Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal:** - The objective is to control import and export of hazardous wastes. It also aims at ensuring that any trans-boundary movement and disposal of hazardous waste, when allowed, is strictly controlled and takes place in an environmentally sound and responsible manner.

Relevance: - hazardous wastes may be generated and disposed of.

Compliance: Maximum control measures shall be put in place to ensure that their transportation and disposal is done in accordance with provisions of this Convention.

- 4) Convention on Migratory Species and the African –Eurasian Water Bird Agreement:** - Like other migratory species, water birds cross several international borders during their migration, facing a wide range of threats. Without international cooperation, conservation efforts of one country can be meaningless if these birds are not protected in another country.

Relevance: - These species require protection in accordance with this Convention hence the relationship.

Compliance: Maximum measures will be put in place to ensure that workers do not kill any birds around the site.

- 5) The United Nations Framework Convention on Climate Change (UNFCCC):**- It was signed by Zambia in 1992. The main objective is to achieve stabilization of greenhouse gas concentrations in the atmosphere. Zambia recognizes that the largest source of one of the main greenhouse gases, carbon dioxide, is from burning wood fuel and the use of coal and oil.

Relevance: - Evidence of climate change is now common knowledge. The PGL project may contribute to climate change due to increase in the emissions from the machinery and gas emissions from boilers throughout the project lifespan.

Compliance: there will be no major gas emissions at the processing plant

due to the latest machines which shall be installed. ZEMA is mandated to undertake periodic monitoring of business operations that significantly impact the bio-physical and socio-economic environment to ensure their compliance to the national legislation and internationally accepted standards and best practices.

3. PROJECT DESCRIPTION

3.1 General Layout

The site for the Cooking Oil Processing Plant which covers an area of **32.4 Ha** is located on Sub C and D of Lot 10208/M, along Mumbwa road, in Mwembeshi area of Chilanga district, of Lusaka Province. The facility is located some 30 Km west from Lusaka central business district along Mumbwa road, about 20 m from Mumbwa road. The prominent neighbors are Mwembeshi maximum correctional facility in the northern direction, Mwembeshi Boarding Secondary School and Round house lodge on the southern side. The area is surrounded by farms on the eastern and southern sides and Mumbwa road on the western side.

Within the project site there is one office block,soya beans processing plant that include warehouses, fuel depots, waste area, extraction, refinery and packaging plants, five bore holes, and access roads.

3.2 Project components

The main components of the facility are preparation/crushing, extraction, refinery, cake shed, and filling room. Plant extension will involve construction of additional structures for seed offloading and storage, seed cleaning and separation, extraction and meal receiving and warehouse storage.

There are nine (9) operations involved in preparation of soya beans for solvent extraction and these are itemized below;

- Receiving and storing,
- Cleaning
- Drying
- Tempering
- Cracking
- Dehulling
- Conditioning
- Flaking
- Expanding

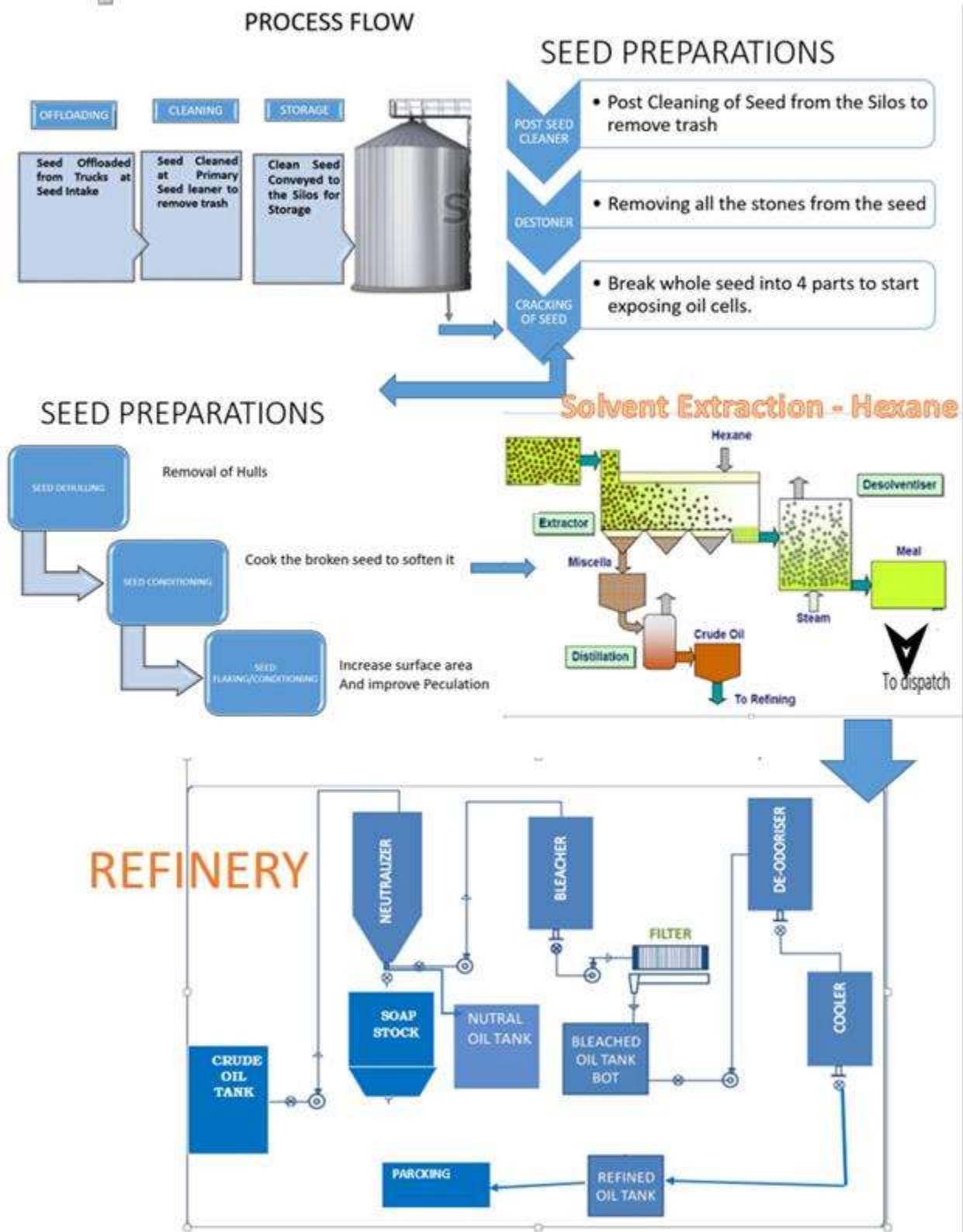


Figure 0-4: Process Flow of the processing plant

3.3 Anticipated wastes from the project cycle By-products during Operation

Since the site has another cooking oil processing plant already in operation, the following products, by-products and waste are generated:

- Solid wastes from food, empty lubricants cans, trash from the office/convenience store activities.
- Hazardous waste generally comprising of used oils, fuel and lubricants are stored in drums at designated storage sites.
- Soap stock and gum
- Coal ash

The various waste products expected to be generated during the entire cycle and their disposal or management methods are as follows:

- **Sewage waste:** Sewage from the process plant will be discharged through appropriate underground sewer lines into the septic tank and soakways.
- **Solid waste:** During the operation phase solid waste will be managed by the use of mobile bins (drums) that are placed at various locations on the site and the waste from these bins is regularly collected and disposed. All solid waste is managed by the construction of designated bin areas and the provision of bins to separate the various types of solid waste i.e. metal, glass, biological and plastic. Collection and disposal of this waste is contracted out to the approved Lusaka City Council contractor for the area and disposed of in accordance with the local authority and Zambia Environmental Management Agency (ZEMA) Regulations.
- **Hazardous waste:** hazardous waste which includes material soiled with cooking oil, fuel and used oils will continue to be stored in a hazardous waste site for collection and disposal by a ZEMA licensed hazardous waste collection company.

4. EIA SCOPE OF WORK

4.1

General scope

The scope of the EIA will cover the proposed expansion of the cooking oil processing plant and its associated infrastructure, the existing road network and the electricity transmission line that is currently in use.

The EIA report shall be prepared in compliance with the Zambian Environmental Legislation and Policies and the applicable World Bank Safeguard Policies and the World Bank Group General Environmental, Health and Safety Guidelines. The EIA study will be conducted with guidance and approval from ZEMA, the national agency that authorizes and issues environmental permits for such projects to be executed.

In general, the execution of the environmental impact assessment will follow the laid down procedure. Prior to the EIA study, a Scoping Study will be submitted to ZEMA, accompanied by the ToRs for preparing the EIA study (the present document). These will be submitted to ZEMA for consideration, comments, and eventual approval. The Scoping Study will present the project in brief, discuss alternative options and present the preferred alternative, outline potential impacts to the environment, society, and cultural heritage, and propose generic mitigation measures for alleviating the impacts. The Scoping Study will also present an overview of stakeholder engagement activities during the project implementation.

4.2

Spatial extent of the study

The spatial scope generally varies depending on the type of impact being considered. In any case it includes all areas within which significant impacts are likely to occur and takes into account the following considerations:

- The physical extent of the expansion of the plant, defined by the limits of land to be used (temporarily or permanently) by the facility.
- The nature of the baseline environment and manner in which impacts are likely to be propagated beyond the facility boundary.

For the purpose of the EIA, the area of influence for the facility has been defined as the area in which a direct or indirect impact on the physical, biological, social, or cultural heritage environment might occur. For the detailed analysis of the current baseline of the Project, the following areas of influence have been defined.

- For environmental impacts, the area of influence is defined as the area at 500 m distance from the boundary of the facility installations, i.e. Project facilities, construction camps, lay-down areas, etc. This area is considered sufficient to encompass the area physically affected by project activities and most off-site environmental impacts (e.g. noise and air quality impacts).
- For socio-economic impacts a direct area of influence within 1 km from the boundary of the facility installations was chosen. Settlements within this area are potentially affected by direct impacts that may occur from changes in land use, disruption to infrastructure and reduced environmental quality.
- For cultural heritage impacts, the area of influence is earmarked to be protected and the physical footprint of the said artifacts will be maintained.
- Specific areas of influence for certain receptors: The specific, direct area of influence for certain receptors is in some cases wider than the previously described corridors. For these cases, specific areas of influence will be defined:
 - The discharge areas of rivers directly or indirectly affected by the facility activities;
 - Mobile species that may travel across the site (on migration) or may be associated with a protected area and use other habitat in the wider area (as often occurs with bird species and estuaries) and therefore could be directly or indirectly affected by facility activities;
 - Major populated areas outside the 1 km distance that may be directly or indirectly affected by facility activities.

4.2.1 Study Area

The spatial boundaries for the study area will be within one Kilometer (1 km) radius where significant environmental and socio-economic impacts can be induced by the facility. These areas will include surrounding developments and settlements that include Mwembeshi maximum correctional facility in the northern direction, Mwembeshi Boarding Secondary School and Round house lodge on the southern side. The area is surrounded by farms on the eastern and southern sides and Mumbwa road on the west side. The EIA will assess all the environmental and social facets of the facility throughout the entire life cycle from operations to decommissioning and closure phases.

The study aspects that will be included in the assessment relate to air quality, soils and land use, surface water and groundwater quality, noise and ground vibration, radiation, flora and fauna, ecosystem services, traffic, carbon footprint, archaeological and cultural heritage and socio-economic.

4.2.2 Study Aspects

Table 4.1 presents a summary of the potential sources of environmental and socio-economic impacts relating to the facility. This is based on the review of the existing environmental documentation pertinent to the facility's site, available baseline data and issues and concerns raised during public opinion surveys and Scoping meeting that were conducted in initial stage in the EIA study. A public opinion surveys (Scoping) was held on 4th April 2022.

The issues and concerns raised by stakeholders during consultation meetings are presented as recorded checklist surveys in the Scoping report. The key issues are highlighted below:

- Dust emissions arising from the expansion of the cooking oil process plant
- Employment and business opportunities directly and indirectly related to the project;
- Traffic congestion along Mumbwa Road;
- Contamination of surface and groundwater;
- Fauna and flora physical damage and displacement as a result of the facility.

The EIA study will assess the impacts presented in Table 4.1 using standard methods of assessment and terminology outlined in Section 5.3 of this document. Potentially significant environmental and social impacts will be assessed in detail in the EIS.

Table 0.5: Potential Environmental and Social Impacts

Table 4.1: Potential Environmental and Social Impacts			
Parameter	Potential Source	Issue raised by stakeholders	How they will be assessed in EIA
Air Quality	Movement of trucks along the access road to the cooking oil processing plant and their operation generating dust and exhaust emissions.	√	Baseline data, with respect to ZEMA and World Bank Ambient Air Quality Guidelines, will be established through primary data collection. The technical report shall detail among other issues, physical properties of the potential pollutants in the ambient air - type, size, density and composition of particulate matter both PM10 and PM2.5. Other issues to be considered are: • Establish likely duration the particulate matter will remain in suspension and dispersion distance. • Establish air quality impacts on biophysical and social environment. • Recommend mitigation measures to manage air quality impacts.
Soils and land capability	Trenching on surface soils and clearing of land potentially resulting in loss of topsoil.		Loss of topsoil to be assessed based on primary surface soil. Mitigation strategies to minimize loss of topsoil, where applicable, will be included in EIS.
	Spillage and /or flow of hydrocarbon material over land from construction and operations and haulage vehicles and dump slopes respectively resulting in soil contamination.		Potential soil contamination from hydrocarbons will be assessed and included in the EIS. Mitigation measures to minimise contamination will be proposed.

	Alteration of the local landscape and visual character of the area; changes in the scenic view of the study area.		Changes in local landscape and visual character will be assessed and will be included in the EIS.
Surface Water and Groundwater Quality	Surface runoff from the site slopes contributing to contamination of surface water in nearby Stream by potentially washing down weathered material into the nearby streams.	√	The potential for weathered material to be washed down into nearby Stream and its potential to be leached when in contact with surface run-off will be assessed. Hydrocarbon leachability tests will be undertaken.

Table 4.1: Potential Environmental and Social Impacts

Parameter	Potential Source	Issue raised by stakeholders	How they will be assessed in EIA
	Seepage into the groundwater regime of contaminative materials arising from operation activities and causing contamination of groundwater.	√	The depth of the groundwater as well as the fracture zones, groundwater flow rate and flow direction will be based on review of available data relevant to the facility. Surface water quality will be assessed based on primary data. Seasonal variations in terms of quality will be assessed based on secondary data. The potential impacts will be identified and mitigation measures will be recommended.
Noise and vibration	Movement of operation vehicles and machinery causing noise disturbance and vibration on sensitive receptors in the area.	√	Baseline ambient noise levels will be measured. Noise from the facility equipment/ machinery will be established. Noise modelling will be done in order to establish receptors that are likely to be impacted upon. Impacts will be identified and mitigation measures recommended.

Flora and fauna	Loss of vegetation and habitat caused by clearing of the site as well as beyond its margins. The stocked wildlife will also be disturbed.		Flora and fauna diversity within the study area will be assessed and measures to mitigate potential impacts will be recommended. Ecosystem services of biodiversity within the study area will be identified and enhancement measures recommended. From field surveys and secondary data, species of fauna and flora that are rare, endangered or critical, and habitat that are modified, protected, etc; in the light of local, national and International outlook, will be identified.
Traffic	Increased incidences of congestion and traffic-related accidents caused by movement of vehicles on Mumbwa road during the operation phases of the facility.		Traffic assessment will be undertaken. Special emphasis will be given to the following aspects; congestion, safety, emission [dust], security, carbon footprint. Impacts will be identified and mitigation measures recommended.
Archaeological and cultural heritage	Damage to archaeological and cultural heritage sites caused by operational activities at the site.		Archaeological and cultural heritage assessment to be undertaken based on existing baseline data. Chance find procedure will be used in the event that any artefact is exhumed.

Table 4.1: Potential Environmental and Social Impacts

Parameter	Potential Source	Issue raised by stakeholders	How they will be assessed in ESIA
Socio-economic	Operations of the cooking oil processing plant will generate employment and business opportunities.		Socio-economic assessment to determine potential impacts of the cooking oil processing plant. Propose measures to enhance the beneficial impacts and to mitigate the adverse ones. The assessment will take into account under issues listed in 4.10 of this document.
	Increased employment and business opportunities may lead to increase in real estate prices, values in surrounding area		
	Physical displacement of the local communities living in the vicinity of the site.		Preliminary assessment indicates that there will be no people physically displaced. The assessment will take into account of these issues as indicated in 4.10 of this document.
Cumulative Impacts	Geochemical and geophysical processes		The potential for cumulative impacts emanating from the interaction of the economic, social and environmental aspects in a direct, indirect, insidious, even long term will be assessed.

4.1 EIA Work and Tasks

The Zambian Environmental Impact Assessment Regulations of 1997 will be complied with when carrying out the EIA. The work will include holding Scoping and other public consultative meetings, carrying out baseline surveys and preparing the EIS for the project. The general approach as to how the EIA study will be carried is presented in Section 5. Table 4.2 shows the specific tasks that will be carried out.

Table 0.6: **EIA Study Specific Tasks**

EIA Study Specific Tasks	
ENVIRONMENTAL IMPACT STATEMENT ANNOUNCEMENT	
1.1	Notification for scoping meeting.
PREPARATION OF TERMS OF REFERENCE	
2.1	Preparing Draft Terms of Reference (ToR).
2.2	Holding scoping meetings with relevant stakeholders who include local communities, local authorities in the area of the facility
2.3	Gathering stakeholders' views and concerns on the facility for inclusion in the draft ToR, where appropriate.
2.4	Finalising Draft ToR and submitting to Zambia Environmental Management Agency (ZEMA) for comments and approval
2.5	Finalising ToR based on comments from ZEMA.
ENVIRONMENTAL IMPACT STATEMENT PREPARATION	
3.1	Review of existing baseline data, relevant reports, legislation, etc.
3.1.1	Reviewing of relevant reports (current Environmental and Social Management plans, EIAs, EPBs, monitoring reports, previous environmental and social assessment reports, etc.) Relating to similar physical infrastructure.
3.1.2	Establishing an environmental and socio-economic baseline for the cooking oil processing plant
3.2	Baseline data gathering through surveys
3.2.1	Undertaking specialist studies to supplement and update existing data and information on the socio-economic and environmental conditions of the site (land use, flora and fauna, water resources (quality and use) and socio-economics)). Site visits, interviews and meetings will be conducted to obtain required baseline data.
3.3	Impact assessment and evaluation
3.3.1	Analysing existing cooking oil processing plant and alternatives with regard to potential environmental and socio-economic impacts and risks during the construction, operation and closure of the expansion works
3.3.2	Identifying possible environmental and social mitigation strategies based on potential environmental and socio-economic impacts and risks identified.
3.3.3	Predicting and assessing impacts of the project in terms of their magnitude, significance and duration.
3.3.4	Recommending environmental and social management and monitoring required.

3.3.5	Collating gathered information from reviewed documents, baseline data and surveys, interviews, relevant comments received from stakeholders and recommendations into an Initial Draft Environmental Impact Statement (EIS) document.
3.4	Public Consultations
3.4.1	Notifications for the public disclosure meeting
3.4.2	Holding disclosure meetings for targeted stakeholders on one to one basis to inform stakeholders about the contents of the Draft EIS including mitigation measures for significant impacts.
3.4.3	Obtaining concerns on the project during the disclosure meetings.
3.5	Submission of Final Draft EIS
Table 4.2: EIA Study Specific Tasks	
3.5.1	Producing the Final Draft EIS Document
3.5.2	Submitting the Final Draft EIS document to ZEMA for review and comments.
3.6	Submission of Final ESIS Document
3.6.1	Producing the Final EIS based on ZEMA comments.
3.6.2	Submitting Final EIS to ZEMA for approval

Table 0.7: EIA steps

Step	Description	Status
Screening	Screening is performed to determine if the project requires a summary EIA or a full detailed EIA.	Completed
Assessment of Alternatives	Assessment of alternatives with the aim to identify options that are technically feasible and have the least environmental and social impacts.	Complete
Scoping	Scoping identifies and consults stakeholders on key issues to be addressed in the EIA.	Current Stage
EIA	For the key issues identified during scoping, secondary data and field studies are undertaken (as necessary) to assess existing environmental and social conditions. The EIA will assess predicted environmental and social impacts and changes as a result of the project and propose mitigation measures where necessary.	Planned for the June subsequent project period

Stakeholder Engagement and Consultation	During the EIA the study team will provide relevant information and seek the views of interested parties so that these can be taken into account in the assessment and reflected in the proposed mitigation measures. Once complete, the EIS Report will be subject to public disclosure and consultation. Comments will be taken into account in revising the final EIS Report.	Scoping Consultation: completed EIA disclosure and Consultation: planned when draft EIS is complete

5. EIA METHODOLOGY

5.1 Approach to Assessment

An assessment of the environmental and social impacts associated with the facility will be undertaken as part of the EIA process. This assessment will address potential impacts from construction, operation and decommissioning phases of the cooking oil processing plant. Potential receptors of impacts will be identified from baseline data, with an assessment of the significance of potential impacts on these receptors.

Extensive baseline data will have to be gathered in order to provide current situation on which evaluation of impacts will be based. Secondary data will be used to supplement primary data. The environmental and social impacts that may potentially arise will be assessed against the baseline that will be established.

The environmental and social impact assessment will be conducted as required under the applicable Zambian legislations, notably the Environmental Impact Assessment Regulations, 1997 (Statutory Instrument No. 28 of 1997). These regulations provide guidelines on undertaking environmental impact assessment.

The general approach that will be followed in preparing the EIS for the facility will include the following:

- Gathering environmental and social baseline data;
- Analysis and assessment of the facility's potential impacts and risks during its implementation;
- Identification/preparation of environmental management and social mitigation strategy;
- Prediction and assessment of the impacts in terms of their magnitude, significance and duration;
- Recommendations for environmental management and periodic monitoring;
- Development of the decommissioning strategy;
- Estimation of the decommissioning cost; and
- Collation of the above information into the EIS.

The baseline studies included as part of the EIA study are briefly described below.

i. Ambient Air Quality

The main sources of dust emissions that can reduce local air quality within the project area include movement of utility vehicles along the gravel access road. The workers within the project area, the surrounding human communities, flora, and fauna are potentially exposed to dust emissions. The boilers in the plant are also a source of air pollution. Hexane gas being used as a solvent can also leak and become source of pollution. Coal ash from the boiler, if not taken care of, could also be a source of dust.

A review of air pollution data within the site will be undertaken as part of the

environmental and social impact assessment of the proposed project. Ambient air quality monitoring will be undertaken as part of the EIA study to identify potential impacts of dust and air emissions on human health and functions of the ecosystem services within and around projects site as defined by the study area.

ii. Water Resources

Surface water within the facility area will be monitored as part of the EIA study. Surface water from the nearby water bodies will be sampled and analyzed at an independent and reputable laboratory for parameters that will be used to assess quality of water (surface water pollution). The results will be compared with applicable water quality standards. The results will be used as baseline data. This will be supplemented with secondary data generated through routine environmental monitoring programmes.

The potential contribution of the expansion of the cooking oil processing facility to surface water pollution through leaching of the hydrocarbons and PCBs by surface run-off will be assessed by conducting hydrocarbons and PCBs leachability tests. The tests will be done at an independent and recognized laboratory.

iii. Groundwater

In terms of ground water resources, while rainfall is the primary contributor, it is the lithology (or rock type) and the structural characteristics (porosity, clay content, folding, faulting, jointing and foliation) that are relevant with respect to groundwater availability. The rainfall regime has remained reasonably uniform over a long period in the facility's area and the surrounding area, and provides sufficient recharge facility for the aquifer although seasonal ground water level fluctuations occur according to rainfall and pumping. Generally, ground water levels go down between May and November and rise between December and April during the rainy season.

The quality, quantity, and direction of groundwater flow at the facility site are not elaborately defined. A review of available hydrogeological data relevant to the facility will be undertaken to understand the hydrogeological conditions of the facility. Ageophysical study will be undertaken to identify fracture zones in the area.

iv. Soils

The soils in the Lusaka area generally belong to the lixisols soil group. Acrisols and Lixisols are amalgamated lixisol group. Lixisols are located in the drier parts of Lusaka while acrisols are found in the wetter areas. They are characterised by increasing levels of clay with increasing depth in the soil profile. Clay is washed through the profile and accumulates at depth. The soil depth and permeability are usually determined by the underlying rock formations.

Soils derived from acidic rocks of the Basement Complex and the Lower Roan schists,

are shallow and well drained. These Sandveld type soils are light yellowish brown in color and sandy, with clay content increasing with depth.

Soils derived from the Roan Dolomites, which underlie the site extend to 30m depth, are less well drained and darker in color. Both soil types have a sandy loamy upper horizon and illuviated clay in subsurface horizons. The soils are moderately leached and prone to rapid erosion if left exposed or unprotected.

Soils in the low lying dambo areas (wetlands) are clayey, poorly drained and waterlogged during the summer months.

The geochemical composition of soils is controlled by the spatial influence of mineralisation and laterite development.

The existing available data will be used to benchmark future rehabilitation activities during decommissioning and closure.

v. Noise and Vibrations

Noise is generated due to movement of utility vehicles and heavy duty equipment such as loaders and forklifts. The workers and local communities near the plant could be considered to be sensitive receptors.

Noise disturbance as a result of the plant expansion will be assessed. Sensitive receptors within the study area will be identified and the potential impacts assessed. Noise surveys will be undertaken to generate primary baseline data, which will be supplemented with secondary data, if available.

Secondary and primary data will be analyzed and potential impacts identified. Appropriate mitigation measures will be recommended.

The noise surveys will consider noise levels and exposure to all receptors.

vi. Flora and fauna

The plant site is a brown area which has no vegetation cover and no animals.

vii. Traffic

Currently public and private vehicles, that include trucks, vans, buses and minibuses use Mumbwa. With expansion of the plant, there is a possibility of increase in traffic volumes on the Mumbwa road on account of vehicles delivering raw material input.

Therefore, a traffic assessment will be undertaken to gather primary data on the traffic situation on Mumbwa Road. Secondary data, if available, will be compared

with the primary data.

viii. Socio-economic Situation of Chilanga District

a) Population of Chilanga District

Chilanga district is 5,252 Km² in size. According to the 2010 Population and Housing Preliminary Report, the district had a projected population of 127,604 people in 2018 - a population density of 24 people per square kilometre. By 2020, the population was expected to reach 157,290 people with 79,135 males and 78,155 females.

b) Development surrounding plant site

The built environment near and around the plant site (within 2 km), consists of sparse human settlements that include compounds for farm labourers, paramilitary residential compound, a lodge, farms (small holding and commercial farms) and villages that are located a little further away.

Within the plant premises are to be found two ginneries (InterContinental and Parrogate), an office block and laboratory building, storage shed, boiler sheds, effluent treatment plant, solid waste disposal area, extraction, refinery and packaging plant, five boreholes, ZESCO transformer, concrete platforms and gravel roads.

c) Economic Activities

With regard to economic activity, the south-eastern side of Chilanga district is the most urbanised area of the district, where the administrative centre of the district is located. The larger part of the district is largely agricultural settlements dominated by small and medium scale farmers that rely on the larger market of Lusaka district.

The district is host to Munda Wanga Botanical Gardens, a tourist destination not far from the very urbanised area of Lusaka district. The other notable establishments in the district are Lafarge/Chilanga Cement plant and a lot of lodges and recreation facilities, especially along the T2 road – in particular around government administrative centre.

Though most people are subsistence farmers, a lot more people engage in agriculture business economic activities because of the large consumer market in nearby Lusaka district. The number of small and medium scale agriculturalists is always rising because a lot of people in formal employment decide to start farming much earlier than was the case a few decades ago. The other economic activities are private transport, traders, service providers like hoteliers, educators and healthcare people. The district has a fair share of people who earn their living as employees in private or public institutions.

d) Education

In 2015, **Literacy rate** for Lusaka province was 80.1 percent; it compares favourably with the national averages of 67.5 percent (with rural and urban rates at 54.3 and 82.8 percent respectively).

e) Health Facilities

Chilanga District has about 13 health care facilities with the closest to the site being Mwembeshi rural health center. Most townships in close proximity to the proposed project have access to the health facility. The district also houses two hospices.

f) Energy

The plant expansion will get its source of energy from ZESCO for all its power needs on the plant.

Chilanga generally has seen an increase in the number of developments coming up from 2012 to date. This increase in both population and economic activities has resulted in the growth of the energy sector. The demand for power and other energy products in the district has resulted in a number of filling stations coming up and also the demand for charcoal has also increased. The plant has its own share in the aforementioned demand for energy.

g) Transport and communication

The project site is well serviced by tarred road (Lusaka to Mumbwa road), which passes by the project site on the west side. Mumbwa road connects the project area to Lusaka District Town Centre, the other parts of the district and the rest of the country. The project site can be accessed using private and public transport (mini-buses/taxis).

The environs of the study area are well covered by communication services and served by the local radio and television network and local print media. The local newspapers are sold in shops within the area. The surrounding area is also well covered by both land phone (telephone - ZAMTEL) and mobile cell networks (Airtel, MTN and Zamtel).

h) Water Supply and Sanitation

Lusaka Water Supply and Sanitation Company (LWSC) Limited is the utility company in charge of providing water and sanitation services in Lusaka Province. The

company operates under the legal framework as outlined by The Water Supply and Sanitation Act No. 28 of 1997. The company has been licensed by the National Water Supply and Sanitation Council (NWASCO) as the Regulator, to provide water supply and sanitation services in Lusaka Province and Chilanga district in particular.

The plant expansion works will use water from a borehole. Plant effluent will be treated within the plant and the wastewater will be used for cooling coal ash and dust suppression expansion will use water from a bore located within the plant.

i) Potential Resettlement and Compensation

The plant expansion will be done in the already secured area and the social assessment indicates that there will be no relocation, resettlement or compensation issues associated with the expansion and operation of the plant.

5.2 Public Consultations

Public consultation brings out among other important issues better information on local environmental and socio-economic issues of concern that may arise from proposed projects. In addition, it can produce better ideas on issues and/or alternatives that may not have been previously considered by project proponents.

The stakeholders will be drawn from Parrogate Ginneries Limited, Mwembeshi Correctional facility and private dwellings near the site. The stakeholders will help to determine the scope of the work to be carried out when preparing the EIS by contributing and raising their concerns on the facility.

A second consultation exercise will be Disclosure meetings on the draft EIS, immediately following baseline surveys and assessment of impacts in line with the impact identification and impact assessment methodology outlined in this document.

5.3 Impact Identification, Assessment and Mitigation Measures

The potential impacts of the facility will be identified and assessed based on review of project description and critical assessment of the facility components in relation to the prevailing environmental and social baseline conditions. The identification and assessment of potential impacts will also be based on applicable national legislations and design guidelines for the cooking oil processing plant.

A standard impact assessment methodology will be applied on identified impacts and will take into account the **nature** or status of the predicted impact, **extent of the impact, magnitude or intensity** of the impact, the **duration** of the impact and the **probability** of the impact occurring. The impacts will be given a rating using the assessment criteria as indicated in Table 5.1. The overall significance of the

impact will be obtained based on the extent (E), duration (D), intensity (I) and probability of the impact (P) occurring.

$$\text{Significance of predicted impact (S)} = (E + D + I) \times P$$

The impact assessment terminology and ratings that will be used to describe the impacts are presented in Table 5.1.

The EIS will also include a description of mitigation measures aimed at enhancing beneficial impacts and avoiding, reducing, remediating or compensating significant adverse impacts.

- ✚ **Nature of impact** – an appraisal of the type of effect an activity would have on the affected environment.
- ✚ **Extent of the impact** – indicates coverage of the impact; whether the impact will be site specific, local, regional, national, or international.
- ✚ **Magnitude or intensity of the impact** – indicates whether the impact is destructive or benign.
- ✚ **Duration of the impact** – indicates the period of time or lifetime of the impact as either short-term, medium-term and long-term.
- ✚ **Probability of the impact** – describes the likelihood of the impact actually occurring.

Table 0.8: Impact Assessment Terminology and Ratings to be used in determining significance

Impact Assessment Terminology and Ratings to be used in determining significance		
Assessment Terminology		Ratings Used for determining significance
Nature of predicted impacts (N)		
Neutral	No impact on the environment	0
Negative	Adverse impact on the environment	-1
Positive	Beneficial impact on the environment	+1
Duration of predicted impact (D)		
Short term	An impact that persists for 0 - 5 years	1
Medium term	An impact that persists for between 5 - 15 years.	2
Long term	An impact that will cease after the operation life of the facility.	3
Permanent	No mitigation will occur (Permanent feature)	4
Extent of the impact (E)		
Site specific	Impact within the boundaries of the site	1

Local	Impact within an area of 2 km of the site	2
Regional	Impact within the Lusaka Province	3
National	Impact on national scale	4
Intensity of the impact (I)		
Low	Impact affects the environment in such a way that no natural, cultural, and social functions and processes are affected.	1
Medium	Where the affected environment is altered but natural, cultural, and social functions and processes continue, albeit in a modified way.	2
High	Natural, cultural or social functions and processes are altered to the extent that they will temporarily cease.	3
Very high	Natural, cultural or social functions and processes are altered to the extent that they will permanently cease.	4
Probability of impact (P)		
Improbable	The possibility of the impact to materialize is very low.	2
Probable	There is a distinct possibility that the impact will occur.	4
Highly probable	It is most likely the impact will occur.	6
Definite	The impact will occur regardless of any prevention or corrective actions.	8
Significance of predicted impact (S) = (E + D + I) x P		
High	An impact that is capable of causing sufficient change in the environment that fundamentally affects the status, potential productivity or usage of the environment.	> 50
Medium	An impact that is capable of causing change in the environment but does not fundamentally affect the status, potential productivity or usage of the environment.	25 - 50
Low	An impact which is either too small to be measured or does not give rise to any material change in the environment.	< 25

5.4 Mitigation

A very important step of the EIA process is the identification of measures that will be taken by the project to mitigate its negative impacts. In some instances, mitigation will be inherent in the design, and in other cases mitigation measures are identified during the EIA process. Mitigation measures are technically and financially feasible and cost-effective means of mitigating significant impacts to levels that are deemed acceptable. These measures are agreed with the Project owner and integrated into the EIA and the EMP as project commitments.

The hierarchy of mitigation options is as follows.

- **Avoid at source** – remove the source of the impact.
- **Abate at source** – reduce the source of the impact.
- **Attenuate** – reduce the impact between the source and the receptor.
- **Abate at the receptor** – reduce the impact at the receptor.
- **Remedy** – repair the damage after it has occurred.
- **Compensate / Offset** – replace in kind or with a different resource of equal value.

5.5 Residual Impacts

Following agreement on technically and financially feasible and cost-effective mitigation, the EIA team, where necessary, will reassess the impacts taking into account the further mitigation commitments integrated into the design and operation of the facility. This iterative process will continue until an impact is deemed acceptable.

All residual significant impacts will be described in the EIA in terms of their overall significance. Where an impact is of more than minor significance the EIA will explain in greater detail how the mitigation hierarchy will be applied to reduce an impact to a level that is deemed to be acceptable.

5.6 Cumulative Impacts

Cumulative positive or negative impacts resulting from several or one source and affecting a specific environmental, social or cultural heritage receptor are taken into consideration during the evaluation of identified impacts. Where appropriate, their combined effect on the receptor is defined. In addition, cumulative impacts that can potentially occur from the combined effects of this project with other presently on-going or reasonably foreseeable future activities within the site are also taken into consideration and assessed.

The assessment of cumulative impacts is performed, in general terms, in a qualitative manner based on the existing information of the present or future activities taken into consideration for the judgment of the EIA team.

6.EIA SCHEDULE

The Cooking Oil Processing Plant EIA schedule of activities is presented in Table 6.1 below. The schedule indicates the activity to be undertaken and the means of getting to the desired result following performance of the activity. It also shows the responsible party and the target dates.

Table 0.9: SCHEDULE OF ACTIVITIES FOR EIA FOR COOKING OIL PROCESSING PLANT

SCHEDULE OF ACTIVITIES FOR EIA FOR COOKING OIL PROCESSING PLANT			
ACTIVITY	MEANS OF ACHIEVING ACTIVITY (Output Indicator)	RESPONSIBLE PARTY	TARGET DATE
ENVIRONMENTAL IMPACT STATEMENT ANNOUNCEMENT			
1.1 Notification for scoping meeting.	Invitation letters; record of preliminary meetings with key stakeholders; notice of scoping meeting in the print and electronic media; announcements of the meeting using public address system.	Parrogate Gineries LTD	14 th Mar 2022
PREPARATION OF TERMS OF REFERENCE			
2.1 Prepare Draft Terms of Reference (ToRs).	Draft ToRs for undertaking EIA for consideration and approval by ZEMA	ESEC Ltd	Mar –Apr 2022
2.2 Hold scoping meetings with relevant stakeholders who include local communities, local authorities in the facility area	Presentation on EIA process for the facility to all stakeholders	ESEC/ Parrogate Gineries Ltd	4 th April 2022
2.3 Gather stakeholders' views and concerns on the facility operations for inclusion in the draft ToR, where appropriate.	Record or minutes of the proceedings of consultative meetings	ESEC/ Parrogate Gineries Ltd	April 2020
2.4 Finalise Draft ToR and submit to Zambia Environmental Management Agency (ZEMA) for comments and approval	Revised draft ToR based on comments / concerns gathered from the scoping meeting.	ESEC Ltd	April 2022
2.5 Finalise ToRs based on comments from ZEMA.	Updated ToRs based on comments from ZEMA.	ESEC Ltd	April 2022
ENVIRONMENTAL IMPACT STATEMENT PREPARATION			
3.1 Review existing baseline data, relevant reports, legislation, etc.			
3.1.1 Review relevant reports (current Environmental Management plans, EIAs, EPBs, monitoring reports, previous environmental and social assessment reports, etc.) relating to facility.	Reports that study team reviewed of relevant environmental and social assessment reports	ESEC Ltd	April 2022

3.1.2 Establish an environmental and socio-economic baseline for the Cooking oil processing plan	Desktop review of relevant environmental and social assessment reports and site visits to establish baseline conditions (climate, air quality, geology, hydrology, topography, landscape, etc.).	ESEC Ltd	April 2022
3.2 Baseline data gathering through surveys			
3.2.1 Undertake specialist studies to supplement and update existing data and information on the socio-economic and environmental conditions of the facility's area (land use, flora and fauna, water resources (quality and use) and socio-economic). Site visits, interviews and meetings will be conducted to obtain required baseline data.	Report of specialist studies and socio-economic survey. List of experts (ecologist, social impact assessment specialist and environmentalist) to undertake relevant surveys (flora and fauna, socio-economic, water resources, noise and land use).	ESEC Ltd	April 2022
3.3 Impact assessment and evaluation			
3.3.1 Analyse existing processing plant and alternatives with regard to potential environmental and socio-economic impacts and risks during the construction, operation and closure.	In-depth understanding of the projects components by reviewing project design and associated activities. Assessing the potential changes that can occur on the existing baseline conditions in relation to proposed project activities.	ESEC LTD	April 2022
3.3.2 Identifying possible environmental and social mitigation strategies based on potential environmental and socio-economic impacts and risks identified.	Reviewing facility and its interaction on the existing baseline environmental and social conditions and identifying positive and negative changes.	ESEC LTD	April 2022
3.3.3 Predicting and assessing impacts of the project in terms of their magnitude, significance and duration.	Standard assessment methods and terminology will be used to assess the potential impacts of the project.	ESEC LTD	April 2022
3.3.4 Recommending environmental and social management and monitoring required.	Review of best available practices to mitigate identified potential impacts and assessing their applicability to the facility; compiling recommendations within the context of the proposed project.	ESEC LTD	April 2022
3.3.5 Collating gathered information from reviewed documents, baseline data and surveys, interviews, relevant comments received from stakeholders and recommendations into an Initial Draft Environmental Impact Statement (EIS) document.	Compiling initial draft ESIS based on an outline of the Table of Contents.	ESEC LTD	April 2022
3.4 Public Consultations			

3.4.1 Notifications for the public disclosure meeting and conduct targeted interviews of selected stakeholders	placing press statements	Parrogate Gineries LTD & ESEC LTD	April 2022
3.4.2 Creating a website for public disclosure to inform stakeholders about the contents of the Draft EIS including mitigation measures for significant impacts.	uploading a presentation on the draft EIS	ESEC LTD	April 2022
3.4.3 Obtaining concerns on the project from the public on the provided website	Record comments from the website	ESEC LTD	April 2022
3.5 Submission of Final Draft EIS			
3.5.1 Producing the Final Draft EIS Document	Updating the initial draft based on comments / issues / concerns from the public disclosure meeting	ESEC LTD	May 2022
3.5.2 Submitting the Final Draft EIS document to ZEMA for review and comments.	Preparing cover letter and submitting a hard copy and a soft copy of the Final draft EIS to ZEMA	ESEC LTD	May 2022
3.6 Submission of Final ESIS Document			
3.6.1 Producing the Final EIS.	Reviewing comments and updating the Final Draft EIS in line with comments; producing the final ESIS document.	ESEC LTD	May 2022
3.6.2 Submitting Final EIS to ZEMA for approval	Preparing cover letter and submitting 12 hardcopies and a soft copy of the Final EIS to ZEMA	ESEC LTD	May 2022

7. EIA REPORTING AND OUTPUT

The EIS shall include the information stipulated in the Environmental Management (Environmental Impact Assessment) Regulations of 1997, which include but not limited to the following:

- a description of the project, reasonable alternatives which were considered;
- a description of the proposed site and reasons for rejecting alternative sites (including the “no action” or “no project” alternative);
- a brief description of the site and the surrounding environment including specifying any information necessary to identify and assess the environmental effects of the project;
- a description of the raw material inputs into the project and their potential environmental effects;
- a description of the technology and processes that shall be used;
- a description of the products and by-products of the project;
- the environmental effects of the project, and reasonable alternatives, including the direct, indirect cumulative, short-term and long-term effects;
- the socio-economic impacts of the project; and
- an environmental (impact) management and monitoring plan (EMMP) containing a description of measures proposed for preventing, minimising or compensating for any adverse impact, and enhancing beneficial effects, and measures to monitor effluent streams or important environmental features which may be affected by the project.

The completed EIS will include:

- **Impacts** - identification of both potential and perceived impacts from a critical analysis of the operation of the facility in relation to the environmental and social setting. This will draw upon secondary data; primary data from baseline surveys commissioned for this specific facility; and on the experience of the ESEC Ltd project team. Perceived impacts, as expressed by populations, will also be considered where appropriate. The significance of effect of each impact on each receptor will be described.
- **Mitigation Measures** - programmes or processes, when implemented, that eliminate or minimise the significant negative effects or enhance the positive ones identified for each aspect studied. Mitigation measures include preventative engineering implemented during the design phase of the facility, on-going and planned programmes to eliminate or minimise impacts during development of the Project and monitoring plans to evaluate the success of the mitigation. An evaluation of the level of predicted impacts that will remain after the implementation of all proposed mitigation measures will be undertaken. The nature of the predicted impact will be described and the

significance of effects determined by referring to appropriate standards or guidelines.

- **Evaluation of Mitigated Impact** – assessment of residual effect following mitigation.
- **Environmental and Social Management** – preparation of necessary mitigation, management, monitoring and institutional measures for incorporation into the Environmental Management Plan.
- **Rehabilitation and Closure Plan** – development of a provisional plan for decommissioning and closure of the facility.
- The EIS will contain an executive summary (non-technical and in an agreed language), stating the main findings and recommendations and shall be signed by every individual person involved in its preparation.

8.SPECIALIST STUDIES

The information provided in this ToR and in the Scoping Report for the Cooking Oil Processing Plant is based on available information available (mostly from the nearby EIS projects), feedback from stakeholders provided during the Scoping meeting and expert opinion of the study team.

As the project moves into the EIA phase, a number of issues will need to be studied in more detail in order to provide a solid basis for impact assessment and prescription of mitigation measures. Such issues may need to be subjected to specialist studies or to more elaborate data gathering, if such data is available. Such issues comprise the following:

- **Biodiversity** in the facility's area. This aspect will not be studied in too much detail because it is a brown area and another cooking oil processing plant is already in operation. The area is already devoid of any biodiversity.
- **Land use** in the area housing the facility
- **Pressure on natural resources** and the social infrastructure as a result of influx of project personnel or job seekers
- **Impacts on community health and safety** as a result of the activities at the facility, influx of project personnel or job seekers
- **Impacts on employment and local economy** in particular the purchase of goods and services and the offer of jobs during the construction and operation period.

9. ENVIRONMENTAL AND SOCIAL SETTING

The preliminary overview of the environmental and social baseline conditions of the facility's area are briefly described in this section. Detailed descriptions will be presented in the EIS and will be used as the baseline against which potential environmental and social impacts will be assessed.

9.1 Topography

The site is situated on the flat land with elevation of about 1,217 m above mean sea level. The terrain features shallow valleys and mild hills, with a very gentle north-south slope dipping towards Southern side of the project site even though the site appears almost flat to the human eye. The valleys create natural surface drainage.

9.2 Climate

The climate in the area around the facility is tropical characterized by three distinct seasons in the year: During the rainy season, extending from early November to April, maximum temperatures may vary from about 24°C to 29°C. The Annual minimum temperatures range between 11°C and 15°C. The range between daily maximum and minimum temperatures is about 7°C.

The temperature variations in the area of Chilanga are considerable between the cold and hot seasons the average minimum temperature is 10°C with a max of 35°C. The highest temperatures are recorded in October and the 30-year annual mean temperature is 20.7°C.

The typical average rainfall in the area is 850mm (min: 527mm and max 1,318mm over a 30-year period), with the majority of precipitation occurring during the months of November to March (90% of annual rainfall).

Wind direction in the rainy season is mostly westerly's, north-east to south-west. Wind speeds are fairly low ranging between 0.90 m/s – 1.8 m/s. Wind speeds are usually calm between January and March (0.9 m/s – 1.1 m/s) and increase from August to October reaching the peak at 1.8m/s. Relative humidity increases in December and highest in February at 80.7% and drops to 49% in October.

At the peak of summer (i.e.; October), the sun is expected to shine for an average of 10 hours per day. This represents the average number of hours in the daytime that the sun is visible and not obscured by cloud e.g. the average number of hours the sun is actually out and shining. In winter (i.e.; June and July), the sun shines for an average of 8 hours per day. There is more sunshine during the dry season than during the wet season. Sunshine hours decrease from December to March and then start to increase in April and May.

9.3 Hydrology

Surface Water

Surface water sources are absent the facility's area with no streams or rivers in the vicinity of the site. However, the ground water sources are available especially during the rainy season when the water table rises.

The potential impact of the operations of the processing plant with regard to surface water pollution will be assessed. Crude oil leachability will be assessed based on laboratory leachability tests data. The results will be compared with whatever secondary data that might be available.

Groundwater

The quality of groundwater in Chilanga and surrounding areas varies depending on factors such as land use, location of on-site sanitation facilities and underlying geologic formation.

The project site lies in Lusaka watershed and most people in the district rely on riverine, wells and borehole water supply sources. Very few people in urbanised areas are connected to water utility company water supply and sanitation system. The plant area is located in a rural part of the district without access to most basic socio-economic utility facilities. And so, the water sources are subject to contamination, and therefore can easily be sources of easily transmissible diseases.

9.4 Air Quality

A review of air quality monitoring data around and within the site will be undertaken as part of the environmental and social impact assessment of the proposed project. Ambient air quality monitoring will be undertaken as part of the EIA study to identify potential impacts of dust and air emissions on human health and functions of the ecosystems services within and around projects site as defined by the study area.

9.5 Soils and Land Use / Land Tenure

Soils

According to FAO/UNESCO classification of soil map of the world legend, the soils at the site of the facility are classified as Luvisol-Phaeozem. However, in a broad sense, the soils at the Project site are described as an association of: well drained, shallow to moderately shallow, dark brown, friable, fine loamy to clayey soils with humic topsoil (Orthi-eutric Leptosols) and moderately well drained, deep to very deep, red to strong brown, friable, moderately leached, fine loamy to clayey soils having a clear clay increase with depth (chromi-haplic Lixisols). Soil profile pits will be excavated to further examine the nature of the soils at lower depths.

Further insight into the soil characterisation will be determined through soils

investigations to be undertaken by the Soils Expert. The investigations will take into account soil characteristics which will include soil texture, moisture holding capacity, soil fertility in terms of NPK and porosity. The baseline data will also be used to benchmark future rehabilitation activities during decommissioning and closure.

Land Use / Land Tenure

The larger portion of the district falls under customary land tenure system. Even though there are a lot of business establishments coming up, the rate at which land ownership is converted from customary to freehold system (mostly 99-year leasehold tenure) is too low to ensure increased security of tenure and therefore encourage higher propertied investments.

Under the state or free leasehold tenure, the Republican President is the custodian of all titled land holdings on behalf of all Zambians. According to the Zambian law individuals are allowed to convert their customary land onto leasehold tenure as long as the traditional leaders through the local government authority give consent for the same.

Most of common land use activities in Chilanga district are agriculture, quarrying and trading that serve the larger consumer market of Lusaka:

The road network in the area is generally good with Mumbwa road being the main trunk road servicing the area towards the Lusaka central business area.

Current land use activities within the study area will be mapped during the socio-economicsurvey to be undertaken as part of the EIA study.

9.6 Flora and Fauna

There are no notable archaeological and cultural sites in the district, not especially around the vicinity or premises of plant.

9.7 Archaeology and Cultural Heritage

There are no known archaeological or cultural heritage sites at the plant site.

9.8 Traffic volume

Currently private and public vehicles (vans, trucks, buses and minibuses) use Mumbwa road. As the Plant is already in operation, there is no possibility of significant increase in traffic volumes on the Mumbwa road.

Nonetheless, a simple traffic assessment will be undertaken to gather primary data on the traffic situation on Mumbwa Road. Secondary data, if available, will be compared with the primary data.

9.9 Noise

There is noise at the project site since the plant is in operation. The main source of

noise are boilers, crusher plant, refinery, movement of utility vehicles and heavy duty equipment such as loaders and forklifts, trucks bringing soya beans and loading crude oil and other products and by products in the existing part of the plant. The workers and local communities near the plant could be considered to be sensitive receptors of noise pollution.

Noise disturbance as a result of the plant operations will be assessed. Sensitive receptors within the study area will be identified and the potential impacts assessed. Noise surveys will be undertaken to generate primary baseline data, which will be supplemented with secondary data if available.

Based on the findings from the secondary and primary data, potential impacts will be identified. Appropriate mitigation measures will be recommended.

The noise surveys will consider noise levels and exposure to all receptors.

9.10 Socio-economic conditions in Chilanga

Population of Chilanga District

Chilanga district is 5,252 Km² in size with a projected population of 127,604 people in 2018. That implies a population density of 24 people per square kilometre. By 2020, the population was expected to reach 157,290 people with 79,135 males and 78,155 females.

In the same year, according to the Demographic and Health Survey (2018 Zambia DHS, published in 2020) **infant mortality rate** for Lusaka Province was 55 deaths per 1,000 live births compared to the national average of 45 deaths per 1,000 live births. Total fertility rates was 3.7 in 2014, went down 3.5 by 2018. This rate compares favourably with the national average of 5.3 (with rural rate at 6.6).

Development surrounding plant site

The built environment nearer and around the plant site (within 2 km) consists of sparse human settlements that include compounds for farm labourers, paramilitary residential compound, a lodge, farms (small holding and commercial farms) and villages slightly further away.

Within the plant premises are to be found two ginneries (InterContinental and Parrogate), office block and laboratory building, storage shed, boiler sheds, effluent treatment plant, solid waste disposal area, extraction, refinery and packaging plant, five boreholes, ZESCO transformer, concrete platforms and gravel roads.

Economic Activities

With regard to economic activity, the south-eastern side of the district is the most urbanised, where the administrative centre of the district is located. The larger part of

the district is largely agricultural settlements dominated by small and medium scale farmers that rely on the larger market of Lusaka district.

The district is host to Munda Wanga Botanical Gardens, a tourist destination not far from the very urbanised area of Lusaka district. The other notable establishments in the district are Lafarge/Chilanga Cement plant and a lot of lodges and recreation facilities, especially along the T2 road – in particular around government administrative centre.

Though most people are subsistence farmers, a lot more people engage in various agriculture business or economic activities because of the large consumer market in nearby Lusaka district. The number of small and medium scale agriculturalists is always rising because a lot of people in formal employment decide to start farming much earlier than was the case a few decades ago. The other economic activities are private transport, traders, service providers like hoteliers, educators and healthcare people. The district has a fair share of people who earn their living as employees in private or public institutions.

Education

In 2015, **Literacy rate** for Lusaka province was 80.1 percent; it compares favourably with the national averages of 67.5 percent (with rural and urban rates at 54.3 and 82.8 percent respectively).

Health Facilities

Chilanga District has about 13 health care facilities with the closest to the site being Mwembeshi rural health center. Most townships in close proximity to the proposed project have access to the health facility. The district also houses two hospices.

Energy

The plant expansion will get its energy from ZESCO.

Chilanga generally has seen an increase in the number of developments coming up from 2012 to date. This increase in both population and economic activities has resulted in the growth of the energy sector. The demand for power and other energy products in the district has resulted in a number filling stations coming up and sales of charcoal has also increased. The plant has its own share in the aforementioned demand for energy.

Transport and Communication

The plant site is well serviced by tarred road (Mumbwa), which passes by the facility. Mumbwa road connects the plant area to Lusaka District Town Centre, the other parts of the district and the rest of the country. The site can be accessed using public transport (mini-buses/taxis).

The environs of the study area are well covered and served by the local radio, television network and local print media. The local newspapers are sold in shops within the area. The surrounding area is also well covered by both landline phone (telephone - ZAMTEL) and mobile cell networks (Airtel, MTN and Zamtel).

Water Supply and Sanitation

Lusaka Water Supply and Sanitation Company (LWSC) Limited is the utility company in charge of providing water and sanitation services in Lusaka Province. The company operates under the legal framework as outlined by The Water Supply and Sanitation Act No. 28 of 1997. The company is licensed by the National Water Supply and Sanitation Council (NWASCO) as the Regulator, to provide water supply and sanitation services in the City of Lusaka.

The plant expansion works will use water from a borehole. Effluent will be treated within the plant and the waste water will be used for cooling coal ash and dust suppression expansion will use water from a bore located within the plant.

Potential Resettlement and Compensation

The other part of plant is already in full operation and the social assessment indicates that there will be no relocation, resettlement or compensation issues associated with the operation of the plant.

10. CONSULTATION AND PUBLIC PARTICIPATION

In compliance with the Zambian environmental regulations and to conform with international best practices (Scoping) meetings were held with targeted stakeholders in initial stage of the EIA study. A public opinion survey (Scoping) was held on 4th April 2022 and selected meetings were held in Mwembeshi area. Deliberations and issues of concern were recorded. Meetings were held to gather stakeholder concerns on key environmental and social issues that need to be addressed in the EIA study.

Project information on alternatives, anticipated impacts, proposed mitigation measures, among other things, were presented in English and translated in the local language (Nyanja) that is used by the local communities. The stakeholders were drawn from Chilanga Town Council and residents from nearby locals. The stakeholders helped to determine the scope of the work to be carried out when preparing the EIS by contributing and raising their concerns on the proposed project. The views of the stakeholders, where appropriate, have been taken into account in the draft ToR for consideration and approval by ZEMA.

- a notice was placed in mass circulation newspapers advertisement (22/03/2022 Daily Mail and Times of Zambia) inviting members of the general public to provide input on the proposed expansion of the cooking oil processing plant along Mumbwa road, Mwembeshi area of Chilanga District.

Consultation and Public Participation

Stakeholder consultation is organized in three main phases:

- Pre-Scoping phase consultation;
- Scoping phase consultation; and
- EIS phase consultation.

Pre-Scoping phase consultation

The pre-scoping phase consultation activities were undertaken as part of studying the socio-economic baseline of the project. The goal/objective of pre-scoping are :

- Inform the major stakeholders (central and local government authorities as well as communities) about the proposed Project;
- gather and record the communities' initial issues of concern about the proposed Project;

- Inform people about the upcoming public consultation (i.e. Scoping and EIA consultations);
- Strengthen relationships between stakeholders and the Developers of the project; and
- Decide on the best approach and methodology of engaging the communities in the area.

During this stage of the Project, no formal project documents were distributed to stakeholders; only high level information about the Project was verbally provided to the communities and authorities.

The following main issues were raised during the pre-scoping consultation:

- Potential employment opportunities, particularly for women and youth;
- Opportunities for improved livelihood at individual, local and regional level; and
- Need for increased awareness about the project amongst community members.

Scoping Phase Consultation

The purpose of the consultation process during the Scoping phase is to:

- inform stakeholders about the EIA and details of the proposed Project;
- gather comments and concerns regarding the Project; and
- Further strengthen relationship among the stakeholders.

For the Scoping Phase, a high-level identification and selection process was undertaken to identify the relevant stakeholders to engage for EIA purposes. The selected target stakeholders at national and district levels were as follows:

➤ National Level:

- Ministry of Local Government (MLG) -
- Zambia Environmental Management Agency (ZEMA);
- Water Resources Management Authority (WARMA);

Ministry of Water Development, Sanitation and Environmental Protection;

➤ District Level:

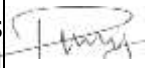
- District Commissioner;
- Chilanga Town Council;
- Lusaka Water Supply and Sanitation Company
- All government departments in the district.

The scoping exercise helped to determine the scope of the work to be carried out when preparing the EIA report by contributing and raising their concerns on the proposed project. These concerns were taken into account when preparing the ToR for the EIA study.

11. EIA PROJECT TEAM

The preparation of the EIS for the Cooking Oil Processing Plant in Lusaka City will be undertaken by the project team presented in the table below. Curriculum Vitae for each of the proposed team members are appended.

Table 0.10: EIA Study Project Team

EIA Study Project Team					
No.	Name	Qualification	Position	Role	Signature
1	Patson Zulu	- Bachelor of Science (Chemistry), University of Zambia, 1980-85. - Postgraduate certificate in Hazardous Waste Management April 16 to May 25, 1995: Advanced Hazardous Waste Management" course conducted at the Miljokonsulterna, Nykoping, in Sweden. Qualification - Postgraduate certificate in Hazardous Waste Management	Team Leader	Coordination of EIA activities, plant process operation and units analysis, technology assessment and EIS report writing.	
2	Abiud Banda	- Masters of Science in Geo-Information Science and Earth Observation, University of Zambia, South Africa, 2017-2019 - Bachelor of Engineering (Environmental), Copperbelt University, 2015 - Environmental Impact Assessment Procedures, ZEMA,	Environmental Engineer – Reporting Water Resources Specialist and Air Quality Expert	Critical analysis of project components in relation to existing environmental setting; report writing Assessment of water resources and quality and Air quality assessment / air dispersion modelling	
3	Alice Muyanga	BSc (Wood Science and Technology - Forest Ecology), Copperbelt University, 2016	Ecologist	Assessment of ecological impacts.	

4	Siame Ndanji	Bachelor of Mineral Science (Geology), University of Zambia, 2017	Geology Expert	Assessment of the geology of the proposed site	<i>Siame</i>
6	Ernest Mwape	- MSc (Agriculture Economics); - BA (Economics/Statistics)	Social Science Expert	- Socio-economic surveys - Social impact assessment - Environmental and Social Sustainability	<i>Ernest Mwape</i>
7	Bwalya Mwale	Bachelor of Engineering (Environmental), Copperbelt University, 2017	Solid waste Management	- Analysis of best options for solid waste at the proposed site - Assessment of waste water, and sewage management	<i>Bwale</i>

12. CONCLUSION

This ToR document highlights the approach that will be undertaken and the legal framework within which the expansion of the cooking oil processing plant Project will be implemented following approval of the ToR and approval of the completed EIS by ZEMA. It has been prepared to principally meet the requirements under the Zambian Environmental Management Act, 2011 read together with the Environmental Impact Assessment Regulations, 1997.

It is Parrogate Ginneries Limited commitment that a comprehensive EIS for the Cooking oil processing plant will be prepared and implemented to adequately address the potential impacts associated with the facility. This is will be carried out following approval of the document by ZEMA.

13. APPENDIX

APPENDIX A: SCOPING MEETING ADVERT (Times of Zambia/Daily Mail 22/03/2022)



PUBLIC NOTICE

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PUBLIC CONSULTATION SCOPING MEETING FOR THE PROPOSED EXPANSION OF THE SOLVENT EXTRACTION PLANT PHASE II IN MWEMBESHI, CHILANGA.

The Environmental Management Act of 2011 requires that all companies engaged in process operations undertake an Environmental Impact Assessment (EIA) to be approved by the Zambia Environmental Management Agency (ZEMA).

Parrogate intends to expand the existing Mwembeshi Edible Oil Processing Plant by 400 metric tons in Mwembeshi area in Chilanga.

This notice therefore serves to inform members of the general public; both interested and affected parties that an Environmental Impact Assessment for the aforementioned proposed project **has commenced**.

The Environmental Impact Assessment Regulations No.28 of 1997 requires that the sponsor of the project consult stakeholders through holding public meetings before operationalizing the project. However, given the governments guidelines in relation to COVID-19, it is not advisable to convene a general public meeting but instead a face-to-face interaction with limited stakeholders will be held. However, It is proposed that interested stakeholders can provide their comments and input in written to us through the following platforms;

- Email: rakeshyyadav@parrogate.com.zm
- Company website (www.parrogate.com)

The deadline for submission of comments is **4th April, 2022**

7721631032

APPENDIX B: CERTIFICATE OF TITLE

DR 1A

No. 166187

REPUBLIC OF ZAMBIA

Registered No. 10208/N/2

THE LANDS AND DEEDS REGISTRY ACT
(Section 45)

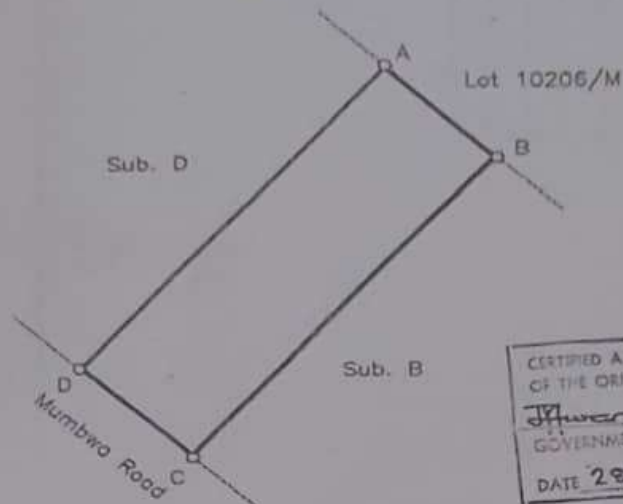
CERTIFICATE OF TITLE

THIS Certificate, dated the SEVENTH day of JUNE TWO
thousand and TWELVE under the hand and seal of the Registrar of the
Lands and Deeds Registry of Zambia WITNESSETH that FARMOCATE GIBBERINES LIMITED
a Company incorporated in Zambia and having its registered office at Lusaka

is a tenant or lessee for the unexpired residue of a term of 99 years from the first
day of JUNE 20 02 (subject to such reservations, restrictions, incumbrances, liens,
estates and interests as are notified by memorial underwritten or endorsed hereon) of and in ALL that piece of
land in extent 20,2154 hectares more or less being Subdivision C of Lot No.10208/N situate
in the Lusaka Province of Zambia which piece of land is more particularly delineated and
described on Diagram No.412 of 2012 except and reserved all minerals oils and precious
stones whatsoever upon or under the said land.....



SIDES METRES		ANGLES OF DIRECTION	SYSTEM Y	CO-ORDINATES Local METRES X	DIAGRAM NUMBER 412/2012
AB	259.33	312.09.52			APPROVED: (Sgd) T.L.Mwambushu GOVERNMENT SURVEYOR DATE: 23/01/2012
BC	780.29	42.09.52			
CD	259.33	132.09.52			
DA	780.29	222.09.52			



SCALE 1: 10000

BEACON DESCRIPTION: All are iron pegs in concrete

THE FIGURE: A-B-C-D-A

REPRESENTS: 20.2354 Hectares

OF LAND BEING: Sub. C of Lot 10206/M

SITUATED IN THE: Lusaka PROVINCE REPUBLIC OF ZAMBIA

SURVEYED IN: January 2012

BY ME: (Sgd) J.G.Nyangulu
LAND SURVEYOR

PARENT DIAGRAM No.:
SURVEY RECORDS No.: D22/2011
S G FILE No.: SD/104/13/10
PLAN No.: SD/104/07/10
64/2012
MAP REFERENCE: 1527 B4 &
1528 A3

T.L.M



Registered No. 10228/M/D/4

THE LANDS AND DEEDS REGISTRY ACT
(Section 43)

CERTIFICATE OF TITLE

THIS Certificate, dated the TWENTY-FIFTH day of APRIL THIRTEEN thousand and THIRTEEN under the hand and seal of the Registrar of the Lands and Deeds Registry of Zambia WITNESSETH that PARROGATE GIMMORREN LIMITED a Company incorporated in Zambia and having its registered office at Lusaka

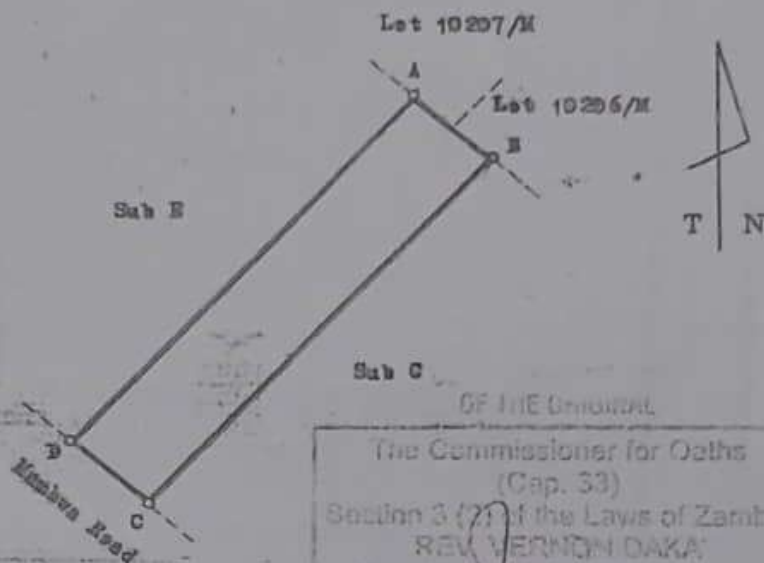
is a tenant or lessee for the unexpired residue of a term of 99 years from the first day of June 20 02 (subject to such reservations, restrictions, incumbrances, liens, estates and interests as are notified by memorial underwritten or endorsed hereon) of and in A.I. that

piece of land in extent 12.6415 hectares more or less being Subdivision 'D' of Lot No. 10228/M/D/4 in the Lusaka Province of Zambia which piece of land is more particularly delineated as described on Diagram No. 412 of 2012 except and reserved all minerals oils and precious stones whatsoever upon or under the said land.

[Signature]
Registrar



	SIDES METRES	ANGLES OF DIRECTION	CO-ORDINATES		DIAGRAM NUMBER
			SYSTEM Y	METRES X	
AB	155.60	312.09.52			413/2012 APPROVED: <i>[Signature]</i> GOVERNMENT SURVEYOR DATE: 23/01/2012
BC	780.29	42.09.52			
CD	155.60	132.09.52			
DA	780.29	222.09.52			



SCALE 1: 10000

SECTION DESCRIPTION: All are iron pegs in concrete

THE FIGURE: 1-2-3-4-1

REMARKS:

CHAINED BEING: 10000/10000

PREPARED IN THE PROVINCE REPUBLIC OF ZAMBIA

SURVEYED IN: January 2012

BY ME

[Signature]
LAND SURVEYOR

PARENT DIAGRAM No. 1/1991
SURVEY RECORDS No. 1/1991
S.C. FILE No. 1/1991
2012
MAP No. 1/1991

APPENDIX C: COMPANY PACRA DOCUMENTS

Form 33
(Prescribed Form 33)
To be typed and completed in duplicate

PACRA
THE PATENTS AND COMPANIES REGISTRATION AGENCY
The Companies Act, 2017
(Act No. 10 of 2017)
The Companies (Prescribed Forms) Regulations, 2018
(Sections 270, 271 and 273)
Available at www.pacra.org.zm

ANNUAL RETURN					
PART A COMPANY DETAILS					
1.	Company Number <i>Indicate the 7 digit registration number</i>	12006063460			
2.	Company Name <i>Indicate the name as registered in the certificate of incorporation</i>	PARROGATE GINNERIES LIMITED			
3.	Principal Business Activity	1040 MANUFACTURE/PROCESSING OF VEGETABLES AND ANIMAL OILS AND FATS WHICH INCLUDES MANUFACTURING AND PROCESSING OF CRUDE VEGETABLE OIL, SOYA BEAN OIL, PALM OIL AND COTTON SEED OIL 0163 POST HARVEST CROP ACTIVITIES WHICH INCLUDES COTTON GINNING			
4.	Other Business Activities				
5.	Physical Address <i>State the registered office of the Company</i>	Plot No. 397A/G	RAPIE ROAD MARENJI LUSAKA		
6.	Postal Address <i>State the residential address of the Company</i>	Plot No. 397A/G	RAPIE ROAD MARENJI LUSAKA		
7.	Phone Number <i>Indicate the international code e.g. +260 for Zambia</i>	+260 979 332 456			
8.	Email Address	y@parrogate.com.zm			
9.	Net Capital or Guaranteed Amount <i>Net Capital or Guaranteed Amount must not be less than the prescribed minimum</i>	15,000			
10.	Class of Shares <i>If other indicate the specific class of shares</i>	ORDINARY	PREFERENTIAL	OTHER	
11.	Number of Shares	10,000			
12.	Number of Paid Up Shares	5,000			
13.	Number of Unpaid Shares				
14.	Par Value	K1.00			
PART B ANNUAL RETURN DETAILS					
15.	Type of Company	Private Limited By Shares ☒			

**PATENTS AND COMPANIES
REGISTRATION AGENCY**
20 MAY 2019
ACCOUNTS
P.O. BOX 60519, LIVINGSTONE.

Select one type of Company by marking with 'X' in one of below listed Companies, unless stated multiple. Provide description and address. Beneficial Ownership information.		Private Limited By Guarantee		
		Uncollected Private Company		
		Public Limited Company		
16. Company Category (Select category of Company by marking with 'X')	Local Bank			
	Foreign Bank			
	Insurance Company			
	Re-Insurance Company			
	Bureau De Change			
	Financial Institution			
	Other (Specify) FOOD MANUFACTURING		X	
17. Date of Financial Year End	1/04/2019			

**PART C
DIRECTORS**

No	First Name	Surname	Identity Number	Date Appointed
1	PRADIEP	GANEDIWAL	PPN: Z4207201	
2	PRADUMAN KUMAR	GANEDIWAL	PPN: Z4987035	
3	YASHWARDHAN	GANEDIWAL	PPN: Z4910201	
4				

**PART D
SHAREHOLDERS**

N	First Name	Surname	Identity Number	Number of Shares	Class of Shares	Number of Paid Up Shares
1	PRADIEP	GANEDIWAL	PPN: Z4207201	1	ORDINARY	1
2	PRADUMAN KUMAR	GANEDIWAL	PPN: Z4987035	1	ORDINARY	1
3	CORBEL FINANCE LIMITED	N/A	REG NO.	4,998	ORDINARY	4,998
4						

**PART E
BENEFICIAL OWNERS**

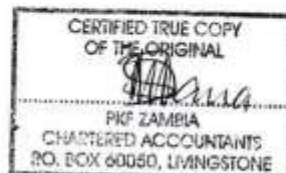
No	First Name	Surname	Identity Number	Nature of Interest
1	PRADIEP	GANEDIWAL	PPN: Z4207201	BUSINESS
2	PRADUMAN KUMAR	GANEDIWAL	PPN: Z4987035	BUSINESS
3	CORBEL FINANCE LIMITED	N/A	REG NO.	BUSINESS
4				

**PART F
DECLARATION**

21.	First Name: UMESH	
	Surname: SHARMA	
	Capacity: Director ☐ Secretary ☒ Receiver/Liquidator ☐	
	Signature: <i>[Signature]</i> Date: 01/04/2019	

**PART G
PARTICULARS OF PERSON LODGING NOTICE**

22. First Name	PRECIOUS
23. Surname	MPUNDU
24. Gender	FEMALE
25. Date of Birth	04/09/1993



26.	Nationality	ZAMBIAN	
27.	Identity Type: For Landowners, NRC, For non-Zambians: ABC/Passport/ Zambia's License/Resident Permit	NRC	
28.	Identity Number	286320/31/1	
29.	Phone Numbers Include the international code e.g. +260 for Zambia	Home:	
		Mobile:	+260 213 324 447
30.	Email Address	compservelivingstone@zm.pkfea.com	
31.	Physical Address (Give the principal office of the Company)	Plot/House Number	SACKVILLE HOUSE
		Street	RAKPELWA STREET
		Town	TOWN
		District	LIVINGSTONE
		Province	SOUTHERN
		Country	ZAMBIA
32.	Signature:	Date:	





Republic of Zambia

CERTIFICATE OF INCORPORATION OF A PRIVATE COMPANY LIMITED BY SHARES

(Section 10)

This is to certify that

PARROGATE GINNERIES

Limited (full name of company)

is on and from the 30th day of August, 2006

Incorporated as a private company limited by shares.

Given under my hand and Seal at Lusaka, Zambia, this

30th day of August, 2006



B.K. Mwalongo
B.K. Mwalongo
Assistant Registrar of Companies

[Note that this certificate is not valid unless the official Seal of the Registrar of Companies has been affixed]
Stucked by the Office of the Registrar of Companies

APPENDIX D: SCOPING REPORT

RECORD OF CONSULTATIONS URING SCOPING PHASE OF THE EIA FOR THE PROPOSED EXPANSION OF PARROGATE COOKING OIL PROCESSING PLANT, 7th and 8th April 2022

Given the Covid-19 guidelines that forbade gathering of large crowds of people, Environmental Science and Engineering Consultants (ESEC) Ltd (the company engaged by Parrogate Ginneries to undertake the EIA for the proposed expansion of the cooking oil plant) decided to conduct separate Scoping meetings for each of the identified

stakeholders. The meetings took the better part of two days, Thursday 7th April and Friday 8th April of 2022.

ESEC was accompanied by Mr Collins Mwamba, the Environmental Health and Safety Supervisor at Parrogate Ginneries, Mwembeshi Plant. At the outset of each of the deliberations Mr Patson Zulu briefed the stakeholders about the need and requirements for undertaking EIAs, which includes stakeholder consultations. Mr Zulu informed the stakeholders about the various stages of the EIA process. Apart from the Scoping stage, it was indicated that there was more opportunities and time for stakeholders to provide their more informed input or concerns on the proposed project and help with recommendations to mitigate or remedy adverse impacts of the proposed projects.

28. The first stakeholder to be consulted was Mrs Namwinga Zulu, Manager of **Westwood Pub & Lodge (also known as Round House Lodge)** located less than ten metres across the gravel road on the eastern boundary of Parrogate premises. Mr Patson Zulu, CEO and Chairman of ESEC briefed Mrs Zulu about the EIA process. He informed her that the consultation was part of the Scoping phase of the EIA, and her input would help shape and inform the ToRs and Scoping report.

Mrs Zulu complained about the foul smell that is usually experienced in the evening, at least once per week. Apart from that she had no complaint or objections to the proposed expansion of the cooking oil processing plant. She proposed that Parrogate would do well to open a retail sales outlet to sell the cooking oil and soap. She wondered why the surrounding community members should commute some 70 Km to Lusaka to buy commodities that are produced within their area. It was indicated that Mt Meru in Chibombo district and Zambeef of Chisamba district that sell some of the cooking oil they produce through retail sales outlets at filling stations around Katuba and Lusaka, and some of these communities are not within close proximity to the cooking oil processing plants. Customer come with their own containers into which oil is poured.

Apart from employees of various government institutions, there is a large community of local residents that include Mwembeshi Secondary School, two prisons, clinic and paramilitary camp that form a huge customer base that can significantly benefit from such a retail sales outlet for cooking oil and bar soap.

Mrs Zulu was informed that ESEC will provide feedback to all stakeholders regarding the outcome of the specialist studies of the EIA process that would be undertaken. ESEC will investigate all stakeholder complaints regarding current operations of the plant.

29. Mwembeshi (Provincial STEM) Secondary School is located less than a kilometre from the cooking oil processing plant. ESEC met with Mr. Humphrey Funduluka the deputy headmaster and Mr Michael Sikaonga the boarding master of the school.

They both complained about the lack of corporate social responsibility (CSR) on the part of the company. They expected the company to undertake a number of CSR projects at the school, in particular sponsorship of needy children from the surrounding community. The school community consists of some 550 pupils and 52 staff (of whom 20 stay within the school premises).

The company was found wanting in a number of aspects; for example the dumping of waste and by products on neighbouring premises. One neighbour went so far as to sue the company over such practices. The other complaint related to the foul noxious smell that company operations generates.

Otherwise both school officials welcomed the proposed investment as it would lessen the unemployment burden in the surrounding area. The proposed expansion entails increase in job opportunities, but the school representatives advised the company to improve the welfare and condition for its Zambian workers. The poor conditions of service and work environment adversely impacts the plight and welfare of the local community.

30. Mrs Elizabeth Situmbeko, a caretaker of one of the neighbouring small holder farms (owned by a Mr Musa) indicated that she had no complaint or objections to the proposed expansion of the plant as it would increase job opportunities for the people in the local community.

31. Wife to Mr Fredrick Moonga (another caretaker of a smallholding farm) refused to offer any opinion on the proposed expansion of the cooking oil plant.

32. Mr Chansa Bwembya was another caretaker farmer that ESEC consulted. The owner of the farm was outside the country. Mr Chansa indicated that Simon Farm used to have a lot of livestock and grew a variety of food crops, but has been inactive since the owner

left for Tanzania. He welcomed the expansion of the plant as it may accord him an opportunity to get a formal job.

Mr Chansa complained about the noise pollution at night; otherwise he had no objection to the proposed expansion.

33. ESEC talked to Mr John Siwale (Environmental Health officer - Technical) and Mr Obert Simukoko (Clinical Officer) at **Mwembeshi Rural Health Clinic** about the impact of operations of Parrogate Ginneries.

It was indicated that the company is a major employer and has indirectly contributed to the reduction in crime in the area as some youth are kept busy whilst earning a livelihood. However, the company has a bad reputation with regards to the poor conditions of services for its employees. In that respect, Parrogate has little socio-economic impact on the community it operates in.

Even though there are few work-related accidents reported at the company, the respondents were however concerned at the absence of a clinic within the company premises given the size of the operations and number of employees. In light of the proposed expansion the company should set up a clinic with permanent staff to cater for not only the workers, but their relatives too. This is especially appropriate given that there are other workers belonging to Continental Ginneries in the same premises.

They said that patients from the plant area reported complaints about the foul smell that is experienced in the evening. They suggested that ESEC investigate whether the noxious smell is dangerous to the health of workers and the surrounding local community.

Noise pollution is also experienced in the evenings/night although it is of tolerable level.

34. There is sizeable community of people that live at **Isha Mbingo Kraal** that is located along Mumbwa. ESEC talked to Mr Shaka Khoza a tenant and Mr Austin Liato (former Member of Parliament) proprietor of Isha Mbingo Kraal about the proposed expansion of Parrogate cooking oil plant and its impact on the environment and local community.

They were concerned that the company does not look after its workers well; most workers get very low wages – even degree holders get very low salaries. Parrogate as a big

employer has too much leverage over its workers, and takes advantage of the dire economic situation in the country, and rural areas in particular. Grievance address or complaint handling mechanism is absent as there seem to be total disregard for the laws that regulate the employer-worker relationship.

ESEC was informed about an unfortunate incident where the company refused to pay medical expenses for some two workers who got involved in work-related accidents. They felt there is need for the company to have a clinic with permanent medical personnel to avoid such unfortunate experiences.

They also talked about the foul smell that is usually experienced at night. Mr Liato considered suing the company at some point in time. The proposed expansion of the plant operations will entail increased air pollution. It is therefore important to address the issue through implementation of more effective and efficient mitigation measures. He also asked that a thorough investigation be undertaken to ascertain how safe the smell/fumes are.

Even though there is some noise pollution, it is not dangerous to the health and welfare of the surrounding community.

The company does not seem to have a structured, formal and budgeted corporate social responsibility (CSR) plan. The community expects a lot from Parrogate Ginneries, but it is not coming through in a number of aspects as it merely reacts to uncoordinated appeals for appeal from different groups of people. It was suggested that the company open a retail shop that would sell cooking oil and soap to the local community – there is a sizeable community in Mwembeshi that include institutions and their workers (such as clinic, prisons, boarding schools, lodges, etc) that need huge quantities of these commodities.

35. Mr Elisha Muziya a caretaker of a neighbouring property along Mumbwa road informed ESEC that he had experienced the foul smell and also noise pollution at night. Apart from the few jobs, he could not point to any other thing that the local community benefits from the presence and operations of the company.

36. At **Chilanga Town Council**, ESEC met with a Christabel Museba (Council Treasurer) as acting Council Secretary and talked to Mr Humphrey Pailande, Environmental Planner.

Mr. Pailande indicated that Chilanga Town Council is not yet a planning authority, and therefore does not authorise land use changes – that was done by Lusaka Provincial Planning Department.

He informed ESEC that Covid restrictions had been relaxed, and therefore meetings involving huge number of people can be convened, but participants have to wear masks. ESEC promised to convene such a meeting during disclosure of its findings.

Otherwise the Council had no objection to the proposed expansion of the cooking oil processing plant.

Report prepared by



Ernest Mwape

Socio-Economic Specialist, ESEC

10th April 2022

RESPONDENT LIST

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APPENDIX E: PHOTOS



APPENDIX F: PHOTOS OF THE PROPOSED SITE



APPENDIX J: Approval letter for Scoping report and Terms of Reference

	ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY
	Head Office Corner of Church & Suez Roads P.O Box 35131 Lusaka, Zambia Tel: +260-211-254023/254059
All Correspondence to be addressed to The Director General  info@zema.org.zm  www.zema.org.zm	

May 6, 2022

ZEMA/INS/101/08/1
In reply please quote

No:

The Group Technical Head
Parrogate Ginneries Limited
Plot No. 5001, of Mumbwa Road
Chinika, Industrial Area,
LUSAKA

Dear Sir,

REF: APPROVAL OF THE TERMS OF REFERENCE FOR THE ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR THE PROPOSED EXPANSION OF THE COOKING OIL PROCESSING PLANT ON SUB C AND SUB D OF LOT 10208/M, MUMBWA ROAD, MWEMBESHI AREA IN CHILANGA DISTRICT BY PARROGATE GINNERIES LIMITED.

The above matter refers.

Zambia Environmental Management Agency ("ZEMA") has reviewed the Terms of Reference (ToRs) and Scoping Report for the Environmental Impact Assessment of the proposed Expansion of the Cooking Oil Processing Plant on Sub C and Sub D of Lot 10208/M, Mumbwa Road, Mwembeshi Area in Chilanga District by Parrogate Ginneries Limited. We would like to inform you that the said ToRs and Scoping Report have been **approved**.

The approved ToRs and EIA Team Members are as follows:

- Project and Project Location**

The Cooking Oil Processing Plant is located on Plot Number 10208/M, Mumbwa Road, Mwembeshi area whose geographical coordinates are 15°21'4" S and 27°57'23" E. It is located about 30 km from the Lusaka CBD and 20 m off Mumbwa Road.

Proposed Project Scope

The expansion of the plant capacity from 200 MT/Day to 600 MT/Day will include adding four process operation sections, namely; Seed Offloading and Storage, Seed Cleaning and Separation, Extraction and Meal Receiving and Warehouse Storage. The project operation involves procurement of the soya bean seed which is cut, heated and squeezed to make edible cooking oil.



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