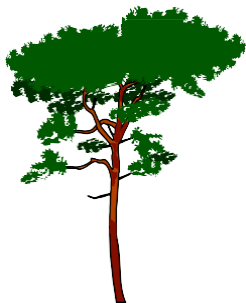




**PROPOSED BIOMASS PELLET PLANT FOR
EMERALD RENEWABLES (PTY) LTD AT MONTIGNY
USUTU MILL, BHUNYA**

**INITIAL ENVIRONMENT EVALUATION (IEE)
&
COMPREHENSIVE MITIGATION PLAN (CMP)**

Submitted by:



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NOVEMBER 2025

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TERMS & ACRONYMS

Acronym	Description
CCA	Copper Chromium Arsenic
CMP	Comprehensive Mitigation Plan
CSO	Central Statistics Office
EA	Environmental Audit
EAARR	Environmental Audit, Assessment & Review Regulations
EBS	Eswatini Building Society
ECC	Environmental Compliance Certificate
ECO	Environmental Compliance Officer
EEA	Eswatini Environment Authority
EEC	Eswatini Electricity Company
EIA	Environmental Impact Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
ENFES	Eswatini National Fire Emergency and Services
SNL	Swati Nation Land
ENPDP	Eswatini National Physical Development Plan
ENTC	Eswatini National Trust Commission
EPTC	Eswatini Posts and Telecommunications Corporation
EWABCHA	Eswatini Business Coalition on Health & Aids
EWB	Employee Well-Being
EWSC	Eswatini Water Services Corporation
FAO	Food Agricultural Organisation
FNB	First National Bank
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
GoS	Government of Eswatini
HIV	Human Immuno Deficiency Virus
HR	Human Resources
I&AP	Interested and Affected Party
IaP's	Interested and Affected Parties
IEE	Initial Environmental Evaluation
ISO	International Standards Organisation
MHUD	Ministry of Housing and Urban Development
MNRE	Ministry of Natural Resources and Energy
MoAC	Ministry of Agriculture and Cooperatives
MoPWT	Ministry of Public Works and Transport
MoPWT	Ministry of Public Works and Transport
MTN	Mobile Telephone Network
MW	Mega Watts
NERCHA	National Emergency Response Council on HIV/AIDS
NGO	Non-Governmental Organization
NRB	Natural Resources Board
OHSA	Occupational Health and Safety Act

TERMS & ACRONYMS

Acronym	Description
OVC	Orphaned Vulnerable Children
PPE	Personal Protective Equipment
QMS	Quality Management System
RE	Resident Engineer
EEA	Eswatini Environment Authority
EEC	Eswatini Electricity Company
SME	Small Medium Enterprise
EPTC	Eswatini Post and Telecommunications
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infections
EWSC	Eswatini Water Service Corporation
TB	Tuberculosis
TDL	Title Deed Land
UNDP	United Nation Development Programme
WAB	Water Apportionment Board
WHO	World Health Organisation





EMERALDS RENEWABLES

PROPOSED BIOMASS PELLET PLANT MONTIGNY USUTU MILL, BHUNYA

INITIAL ENVIRONMENTAL EVALUATION (IEE) & COMPREHENSIVE MITIGATION PLAN (CMP)

1. INTRODUCTION

1.1 Background

Emerald Renewables, a company registered in the Kingdom of Eswatini is proposing to construct a Biomass wood pellet plant at the Montigny Usutu Mill in the Manzini Region of the Kingdom of Eswatini, see Appendix 1.

The plant will be constructed adjacent to the Montigny Usutu Mill car pack at a forest section at a distance of approximately hundred and fifty (150) metres from the car park see Figure 1, 1.

Montigny is an Eswatini timber company owning plantations extending from Nhlangano in southern Eswatini, to the Usutu region in the North, with about 80,000 hectares which are under active timber management. Montigny owns sawmills at Bhunya and Nhlangano: one essential-oil plant, one chipping plant, one chipboard plant and a pole-treating plant near Bhunya. As such Montigny has secured an option to acquire an interest in the shareholding of the proposed undertaking.

Part of the Montigny company ethos is to use each part of the tree to its fullest potential and presently the waste-biomass from the sawmills is not fully utilized. The production of wood pellets using Montigny's waste biomass will bring Montigny closer to this goal.

Consultations with the Eswatini Environment Authority (EEA) in this regard led to the project to be categorized as II, Initial Environmental Evaluation (IEE), see Appendix 2. To this end, the Emerald Renewables has appointed a firm of locally-based environmental specialists, **Nkangala Envirowaste Socio & Safety Solutions (Pty)**, to carry out the IEE work.

This document is the IEE report for the Biomass Pellet Plant project, prepared in accordance with the local environmental legislation, i.e., the Environmental Management Act 2002, read together with the Eswatini Environment Authority (EEA)'s Environmental Assessment Regulations of 2022.



1.2 Purpose of the Biomass Pellet Plant

The proposed Emerald biomass pellet plant at the Montigny Usutu Mill has the following objectives, namely:

- ✚ Provide economic benefit by adding value to the waste products generated by the Montigny sawmills, thereby maximizing the value of the timber resource grown by Montigny within the Montigny plantations and Usutu Mill surrounding areas.
- ✚ Provide quality wood pellets to the renewable energy industry to power generation plants, the bulk of which will be exported
- ✚ Provide social benefit by creating jobs and restoring the Bhunya area industrial hub.
- ✚ Provide economic benefit by adding value to the available timber resources within the plantation and surrounding areas, and bringing in vital foreign exchange.
- ✚ Provide social benefit by creating jobs at Bhunya and surrounding community areas.

1.3 Project Description and Activities

The waste biomass (saw fines and wood chips) from Montigny's Usutu Sawmill situated in Bhunya will be used as raw material for a proposed 120 000 tonnes per annum wood-pellet plant. This biomass will constitute 100% of the raw material for the wood pellets. Emerald Renewables has the option to source up to 15% of the required feedstock from other timber operations in the area, see appendix two, project brief.

Emerald Renewables, the owners of the wood-pellet plant has secured a 15-year agreement for the supply of 220 000 tons of biomass (saw fines and wood chips) as well as 40 000 tons of boiler fuel (plantation residues) with Montigny. The pellet plant will be built besides the existing mill on a site over which Montigny already has jurisdiction and management control.

Electricity, which is supplied by the Eswatini Electricity Company (EEC), will be drawn from an existing, spare sub-station situated on the Usutu Mill site and supplied to the pellet-plant. Water for the pellet-plant will be drawn from the existing water system of the Usutu Mill and the necessary water rights application for the additional abstraction will be done as required.

The Pellet Plant process is inherently non-toxic and the total waste from the plant is expected to be close to zero except for a small quantity of wood ash from the furnaces. All solid, liquid, gaseous process waste; as well as all waste generated by the personnel on the plant will have properly engineered equipment to ensure conformance to the applicable Eswatini environmental laws / regulations.

The project will uplift the local economy through job-creation, increased local investment, as well as adding value to the waste biomass to a greater extent, compared with the current practice of selling some this waste to sugar mills in Eswatini

as boiler fuel. The business will earn foreign currency for Eswatini as 100% of the product will be exported.

1.3.1 Biomass Feedstock

The feedstock to the plant will be waste-biomass residues sourced from the Usutu Mill. The mill-residues consist of saw fines and the off-cut portions of the timber which are chipped. Some of the current plantation residues generated during the harvesting of the trees will be used as fuel for the furnace to dry the biomass. The moisture content of the residues is in the range of 50-55% by mass (on wet basis) and a particle size range of 0-100 mm. The residues will either be directly fed into the Pellet Plant via a feed-conveyor or will be temporarily stored in an open-air storage area, and fed onto the feed-conveyor by means of front-end loaders, see figure 1.2.

1.3.2 Wet Grinding

The raw, wet biomass (wood) will pass through an initial multi-deck screen. The oversize material will be sent back to the Usutu Mill for re-chipping, and the remaining material will be fed into the Wet Grinding process. From the screen, the wet biomass material will be passed over a Magnetic Drum to remove any metal particles and then through the Pan Grinder Mill which will reduce the biomass particle-size to a range of 0-10mm. see figure 1.3.

1.3.3 Drying

Drying of the biomass will be performed on a horizontal Belt Dryer through which warm air will be passed. The air will be moved by means of several large radial fans and the air will be heated in Hot-Water Heat Exchangers. The hot water will be heated in a small biomass furnace. The moisture content of the dried biomass will be 10% max, by mass (wet basis).

1.3.4 Dry Grinding

In this section, the dried biomass will be passed through a Hammer Mill, which will reduce the particle size to a range of 0-3,15 mm.

1.3.5 Pelleting and Cooling

Very small quantities of water and steam will be added to the fine, dried biomass, and then conditioned for pelletization in an agitator drum and screw auger mixer. The fine, conditioned biomass is fed to the Pellet Presses in which pellets with diameter of 8 mm and max length of 50mm will be produced. Cooling of the pellet product will be done in a Counter-current Cooler, fitted with a Cyclone to remove fine wood dust particles, for recycling back to the process.

1.3.6 Pellets Storage and Loading

The cool wood-pellet product will be stored in large silos prior to loading and dispatch. The pellets will be loaded into large 3m³ bulk-bags or 12m-long containers. The silos will also be fitted with dust-extraction and fire-suppression systems.



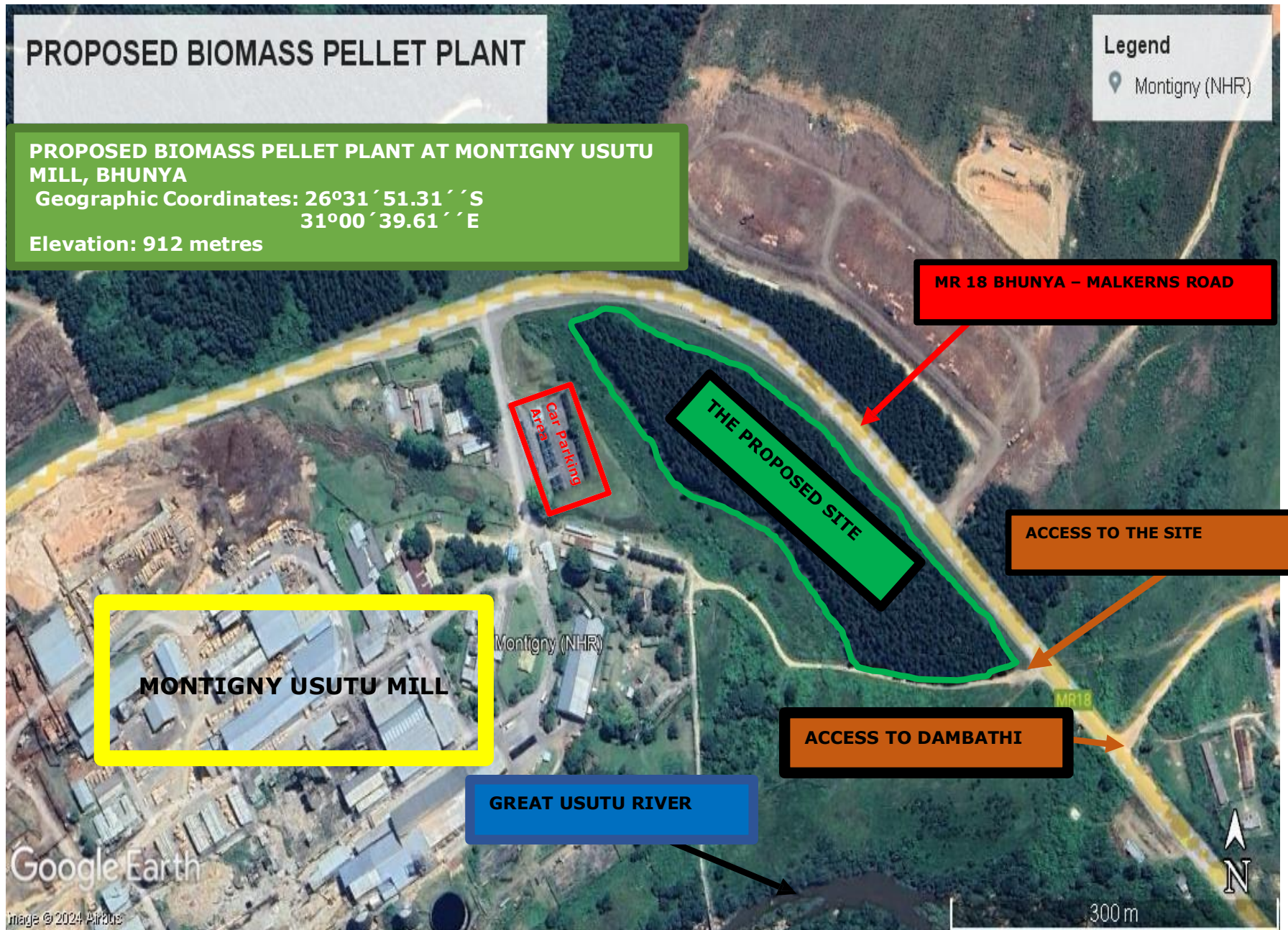


Figure 1.1: The Project Site Aerial Map



a) Raw Timber Stored at the Usutu Mill



b) Wood Chips Stockpiled at Mill Wood Yard Area



c) Wood Yard Loading Area at the Usutu Mill



Source: Internet

d) Proposed Conveyor belt System



Source: Internet

e) Wood Pellets on Conveyor Belt System



Source: Internet

f) Produced Wood Pellets

Figure 1.2: An Illustration of Wood Pellet Production



1.4 Proposed Project Alternatives

Due to market demands and current practices, there were no alternatives considered in terms of other ways of adding value to the timber or the type of process used for treating the timber.

Putting up a biomass wood pellet biomass pellet plant in this area will create opportunities for not only adding value to the timber available in the plantations but in the surrounding areas as well. With respect to the process itself, Pellet plant are operated in all part of the world with Canada, USA ,Australia and Russia being big players in the international wood pellet industry and management of its environmental impacts is well understood and documented, see appendix 3.

1.5 Purpose of the Initial Environmental Evaluation

The Initial Environmental Evaluation is aimed at identifying and estimating the magnitude of significant impacts in qualitative/quantitative terms, and formulating a Comprehensive Mitigation Plan (CMP) whereby adverse effects will be mitigated while positive ones are enhanced.

This document is the IEE report for the proposed Biomass Pellet Plant carried out as a Category II project (in Appendix 1) and its Comprehensive Mitigation Plan (CMP), as is the requirement of the Environmental Assessment Regulations of 2022 is presented separately as a stand-alone document.

Details actions to be taken to reduce negative impacts of the project are highlighted, while enhancing the positive ones. The greatest direct environmental impacts will probably be during construction, the CMP accompanying this IEE will detail measures to be incorporated in the tender documents in order to cater for these requirements. It is important that these measures be in line with the requirements of the Government of Eswatini (GoE).

Besides the legal obligation of the Emerald Renewables to secure an Environmental Compliance Certificate (ECC) for the project, the IEE is intended to provide a basis for environmentally sound decision-making in the planning process by the project implementers.

1.6 Location, Study Area and Methodology

1.6.1 Location

The proposed construction of the biomass pellet plant will be undertaken at a site adjacent to the Montigny Usutu Mill in the Manzini Region of Eswatini.

The site is located at approximately hundred and fifty (150) metres from the Montigny Usutu Mill car packing area at the following geographic locations:

📍 Geographic Coordinates: **26°31'51.31''S**
31°00'39.61''E

📍 Elevation: **912 metres**

1.6.2 The Study Area

The proposed study area extends 4, 000m² (4 hectares) of pine plantation in footprint. The site lies adjacent to the Montigny Usutu Mill, see figure 1.4. Prior to commencement of works the pine plantation will be harvested to give way for construction. The site is accessed off the MR 18 Malkerns to Bhunya on the left hand side 400m metres from the Dambhathi dirt road to the west and 800 metres to the Montigny Usutu Mill to the west.

A stream transverses the site on the northwestern boundary of the site and daylight into the Great Usutu River (GUR). Riverine vegetation encompasses the stream as it passes the site southwesterly into the GUR. In this plantation, pine (*Pinus species*) dominate. Patches of Alien vegetation abounds on the periphery of the site, see figure1.4.

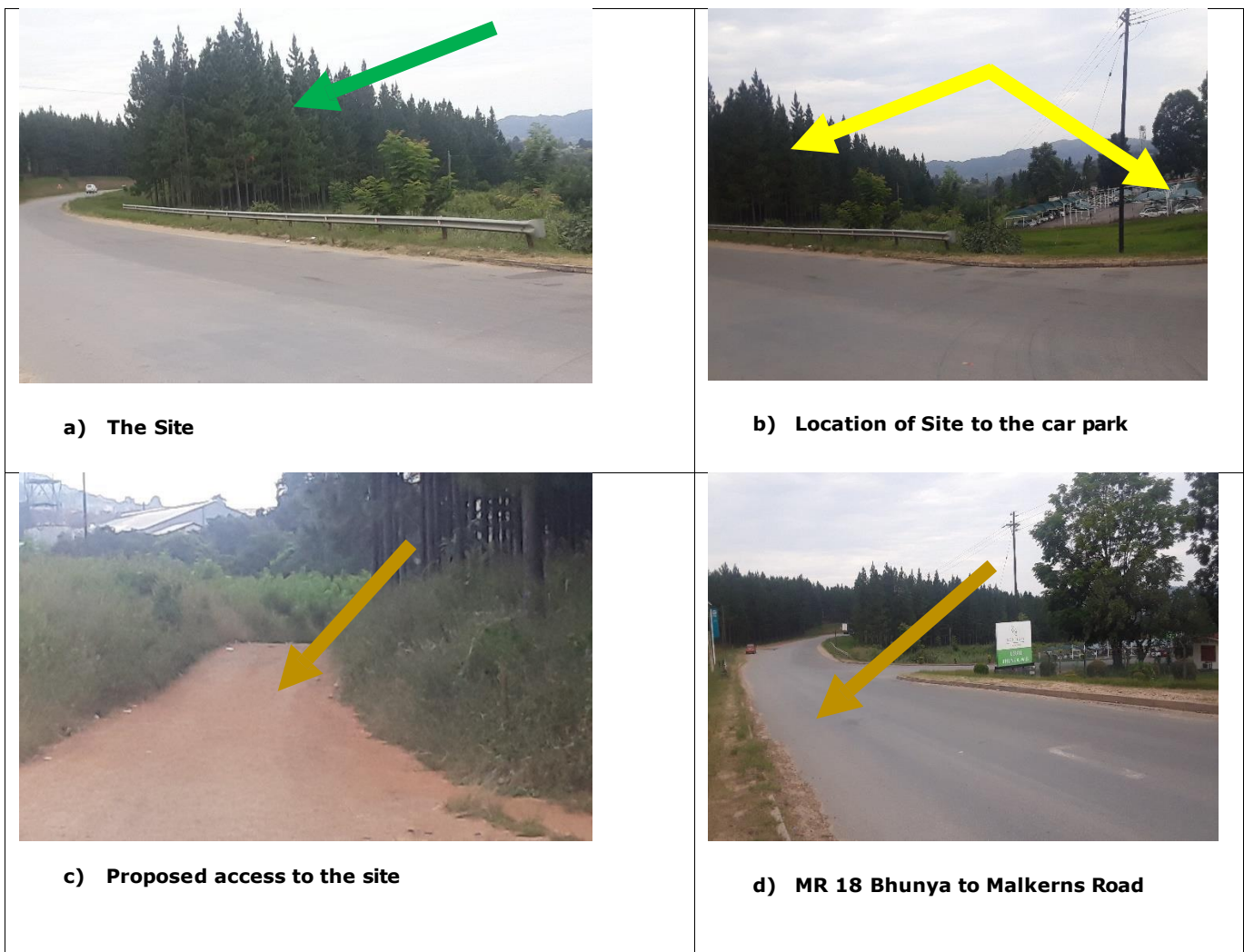


Figure 1.4: The Study Area

1.7 Costs and Phasing

The project construction is estimated to cost approximately three hundred and seventy million emalangeneni (370 million) and will be to be funded by Emerald Renewables (Pty) Ltd. Construction will take a duration of fifteen (15) months.

1.8 Scope of IEE and Methodology

1.8.1 Scope of IEE

As a category II project, the Environmental Assessment Regulations of 2022, requires an initial environment evaluation because the impacts associated with the road do not require in-depth investigations, and their mitigation measures are relatively well-known.

1.8.2 Biophysical Assessment Methodology

A biophysical assessment was carried out on the basis of professional judgment by the IEE Team. Through the use of maps and by fieldwork, details of the biophysical environment were noted. Details such as location of vegetation types, hydrology erosion, cultural/archeological sites, conservation worthy areas, and land use provided a description of the project site.

As well, photographs of important features e.g. visual resource components, vegetation, etc, were taken while in the field. Details of the physiography, geology, soils, and vegetation were obtained from relevant documentation.

1.8.3 Socio-economic Assessment Methodology

Most of the aspects of the socio-economic assessment (land tenure, land use, economic activities, service provision) are described with respect to investigations carried on the ground with the help of surveys and interviews with the locals.

In addition, certain socio-economic environment aspects of the study area were collected primarily from secondary sources such as government statistical releases.



2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 Legislation Relevant to the Biomass Pellet Plant Project

The Government of Eswatini (GoE) has, in line with international practice, recognized the need to develop, implement and enforce environmental policies, laws and regulations to protect natural resources, public health and social/individual well-being. This section is thus included here to ensure that this IEE for the construction of Biomass Pellet plant and its recommendations, especially the legally-enforced mitigations, are in line with current relevant legislation, regulations and policies.

Table 2.1 Summary of Legislation Relevant to the Biomass Pellet Plant Project

Legislation	Regulating Authority	Relevant Section	Relevance to Project
1. The Constitution of Eswatini, 2005	GoE	Every person shall promote the protection of the environment for the present and future generations. Urbanisation or industrialisation shall be undertaken with due respect for the environment. The Government shall ensure a holistic and comprehensive approach to environmental preservation and shall put in place an appropriate environmental regulatory framework.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
1.The Environmental Management Act, 2002	EEA	Controls waste disposal, air and water pollution, as well as promote integrated environmental management.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
2.The Natural Resources Act, 1974	MNRE	A Natural Resources Board (NRB) was established by this Act. The duties of the NRB include exercising supervision over natural resources, such as the protection of source, course or feeders of a public stream, and the mitigation or prevention of soil erosion.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
3.The Factories, Machinery and Construction Works Act, 1972	MoLSS	The Act is concerned with protecting the health of workers from the adverse effects of dust, fumes, other impurities and noise. This Act seeks to enforce the contractor to comply and ensure that safety and health measures are undertaken to protect construction workers.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
4.The Plant Protection Act, 1958	MoAC	Prevention of trafficking in plants listed in schedules for rare, endangered, threatened, endemic plants.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
5.The Noxious Weed Act, 19 of 1926	MoAC	This Act grants an occupier of land the duty to clear or report any noxious weed on land of which he is responsible. Noxious weed means plants mentioned in Schedule, e.g. Bug weed, Cocklebur, Dagga, Dodder, Jointed cactus, Spear Thistle, Malta-Thistle, Purple Star Thistle, Yellow-Thistle, Mexican Poppy, Khaki weed, <i>Lantana camara</i>	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.

Table 2.1 Summary of Legislation Relevant to the Biomass Pellet Plant Project...cont'd

Legislation	Regulating Authority	Relevant Section	Relevance to Project
6. The Game Act, 1953 (as Amended in 1993)	King's Office	This Act was enacted for the preservation of game and other types of wildlife in Eswatini. It prohibits any unlawful hunting and poaching of wildlife and common game. Any person found hunting or is found in possession of protected game, without a valid permit, will be guilty of contravening this Act, and can face a jail term without an option of fine.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
7. The Flora Protection Act, 2001	MoAC	The Act ensures the conservation and sustainable management of a wide range of Eswatini indigenous flora and seeks to address the depletion and extinction of some flora resources in Eswatini.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
8. The Public Health Act, 1978	MoH	Requires local authorities to deal with nuisance and specially to prevent pollution of any supply, which the public in their district has a right to use, and does use for drinking and domestic purposes, and to purify such polluted supply.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
9. The Urban Government Act # 8 of 1969	MHUD	The Act compels city councils and town boards to remove and dispose of rubbish and refuse. They may charge for these services. The Act also empowers them to construct and improve public streets, and subject to certain conditions, to recover the costs of doing so from the owners of land fronting onto such streets.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
10. The Town Planning Act, 1965	MHUD/MCC	Town Planning Boards (TPBs) are established by this Act. The duties of a TPB are to ensure that all provisions for the preparations and carrying out of town planning schemes are in accordance with the Act. The Act itself empowers the Surveyor General to approve any general layout or diagrams of subdivisions of land thereof to conform to the general plan of an approved scheme.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
11. The Building Act, 1969	MHUD/MCC	This Act restricts the construction of illegal structures, and it highlights the need for the provision of means for the removal and disposal of all waste material within and in the vicinity of a building. The Act also endorses the need for removal of debris, refuse and any rubbish from a site on completion of the constructed structure.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
12. The Wild Bird Protection Act, 1914	MNRE	Preservation of wild birds unless plumage is for scientific or educational purposes.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.

Table 2.1 Summary of Legislation Relevant to the Biomass Pellet Plant Project...cont'd

Legislation	Regulating Authority	Relevant Section	Relevance to Project
13. The Mining Act, 1960	MNRE	The Act provides guidelines for minimum distances of dwellings to active blast sites, storage of explosives, etc.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.
14. The Roads and Outspans Act, 1931	MoPWT	Establishes public roads and their lawful outspans.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited legislation.

Key: EEA-Eswatini Environment Authority; MNRE- Ministry of Natural Resources and Energy; MOAC-Ministry of Agriculture and Co-operatives; MoH- Ministry of Health; MoPWT – Ministry of Public Works and Transport; MoLSS – Ministry of Labour and Social Security

2.2 Regulations and Policies Relevant to the Biomass Pellet Plant Project

Promulgated under these pieces of legislation are various environmental regulations and policies applicable to the project as indicated in Table 2.2.

Table 2.2 Summary of Regulations and Policies Relevant to the Biomass Pellet Plant Project

Regulation	Regulating Authority	Relevant Section	Relevance to Project
1. Environmental Assessment Regulations, 2022	EEA	The regulations guide the entire and the entire environmental assessment process in Eswatini.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.
2. The Waste Regulations, 2000	EEA	These regulations guide the management of solid waste and liquid waste disposal on land. General provisions of these regulations stipulate that no person may collect, transport, recover, retreat, store, dispose of, or otherwise manage waste disposal in a manner that is likely to result in an adverse effect. In addition, no person shall dispose of commercial, household or industrial waste produced in urban areas, except special waste, which must be disposed of at an approved waste disposal facility.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.
3. The Litter Regulations, 2011	EEA	The Litter Regulations prohibit littering by way of dumping, depositing, dropping, throwing, and discarding upon any public place, private property, river stream, or any body of water in Eswatini.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.

Table 2.2 Summary of Regulations and Policies Relevant to to the Biomass Pellet Plant Project

Regulation	Regulating Authority	Relevant Section	Relevance to Project
4. Soil Erosion Prevention and Rehabilitation Policy	All Ministries	Adopted from MoAC, it is now official government policy to have projects restore land to acceptable conditions after disturbance by construction.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited policy.
5. The Public Stream Bank Regulations	MNRE	These regulations prohibit the injury or destruction of any natural vegetation within 100 feet (33 meters) of either bank or on the verge of a public stream.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.
6. The Physical Land Policy:	MHUD	This policy is under the Ministry of Housing and Urban development. It outlines the relevant planning principles to guiding planning practices in urban and rural areas.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.
7. The National Environmental Policy:	EEA	This policy falls under the Ministry of Tourism, Environment and Communications. It is based on the responsibility for environmental conservation, environmental rights of individuals, sustainable development and how people interact with environment principles.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.
8. National Biodiversity Strategy and Action Plan 2001:	EEA	This strategy was initiated to make an awareness that indiscriminate woodcutting and bush clearing is a serious threat to the natural habitats and increases the loss of indigenous trees which causes loss of shelter for birds and other animals.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.
9. International Convention to Combat Desertification Initiatives of 1998:	EEA	This Convention provides for mechanisms and opportunities for addressing problems of land degradation and desertification within the concept of development.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.
10. The Vienna Convention for the Protection of the Ozone Layer 1985:	EEA	This Convention provides for general obligations within member States to take appropriate action to protect the ozone layer from harmful pollutants resulting from human activities which are likely to modify the ozone layer.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.

Table 2.2 Summary of Regulations and Policies Relevant to the Biomass Pellet Plant Project

Regulation	Regulating Authority	Relevant Section	Relevance to Project
11. The RAMSAR Convention on the Protection of Wetlands	EEA	All member states under this convention are to protect wetlands at all costs. Wetlands are fragile and complex ecosystems. According to this convention, wetlands are defined as areas of marsh, fen or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh or brackish (<i>ematete/emacaphoti</i>).	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.
12. Air Pollution Control Regulations, 2010	EEA	Regulates the emission of gases from facilities into the atmosphere and sets out the maximum permissible levels of these gases.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.
13. The Public Stream Banks Regulations	MNRE	Prohibits the injury or destruction of any natural vegetation within 100 feet (33 meters) of either bank or of the verge of a public stream.	Construction projects of this nature are regulated, guided and monitored for compliance in line with the cited regulations.

Key: EEA-Eswatini Environment Authority; MoAC-Ministry of Agriculture and Cooperatives; MHUD-Ministry of Housing and Urban Development; MNRE- Ministry of Natural Resources and Energy

2.4 Administrative Framework

2.4.1 Overall Responsibility

Emerald Renewables (ER) will pay particular attention to all environmental aspects as outlined in the mitigation plan especially relevant legislation to the development's operations in meeting its obligation of operating in an environmentally sustainable manner and to comply with all environmental laws of Eswatini.

2.4.2 Compliance and Monitoring

The EEA, with powers to safeguard the environment against damage by the construction projects, will have a regulatory role to play, especially in the protection of the natural environment through periodic review of monitoring compliance reports to be prepared and submitted by the proponent to the EEA.



3. A DESCRIPTION OF THE EXISTING ENVIRONMENT

3.1 Location and Physiography

3.1.1 Location

The proposed construction of the biomass pellet plant will be undertaken adjacent to the Montigny Usutu Mill, in the Manzini Region of Eswatini.

The plant is located at approximately hundred and fifty (150) metres from the Usutu Mill car parking area at the following geographic locations:

Geographic Coordinates: **26°31'51.31''S**
31°00'39.61''E

3.1.2 Physiography

Eswatini is divided into four physiographic regions: the Highveld, Middleveld, the Lowveld and the Lubombo (Remmelzwaal: 1993). Eswatini highveld is in fact the upper part of the overall escarpment, consisting of a complex of steep slopes between low and high levels, dissected plateau, plateau remnants and associated hills, valleys and basins (Remmelzwaal:1993).

The project site lies in the Highveld of the Kingdom of Eswatini. The elevation of the site is 907 metres above sea level (a.s.l).

3.2 Climate

The proposed project area is located in within Highveld region which is characterised by wet summers and dry winters, and annual rainfall averaging 900 to 1500 millimetres. Temperatures vary between a maximum of about 33 °C in mid-summer and 0 °C at night in mid-winter. Temperatures vary from between 17.6°C and 16.3°C (UNFCCC: 2004).

At Bhunya where project site exist has an annual maximum and minimum temperatures are 25.2°C and 8.9°C respectively with an annual rainfall of 1285.7mm. Table 3.1 below indicates the average annual rainfall and temperature recordings of the project area recorded over a period of five (5) years from Year 2015 to Year 2020.

Table 3.1 Bhunya Rainfall and Temperature Data Averages from 2015 to 2020

WEATHER DATA												
Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Rainfall	223.2	249.2	157.1	82.5	31.6	4.2	6.6	24.2	53.5	77.4	166.7	209.4
Max Temp	24.8	25.2	22.7	24.1	20.6	21.8	20.6	23.1	24.8	24.1	25.0	25.0
Min Temp	16.3	16.3	15.5	13.9	12.0	10.0	8.9	10.5	13.5	12.2	13.8	16.4

Source: Meteorology Department (2020)

3.3 Hydrology

3.3.1 Natural Surface and Water Supply

The country has three main surface water bodies, which are the Komati near Piggs Peak, the Mbuluzi near Mbabane and the Lusutfu near Manzini. All the rivers, with the exception of the Komati, Usutu and Lomati basins originate within Eswatini (UNPCCC: 2004).

The project site falls under the Usutu basin, with the GUR flowing approximately two hundred (200) metres from the project area.

At the site a perennial stream transverses the site on the northeastern boundary. Water supply will be sourced from the Usutu Mill, see figure 3.1.



a) The Perennial Stream

Figure 3.1: Water Resource Located Close to the Project Site

3.3.2 Sanitation

Wastewater from human uses will be sewerred into the already existing sewer system used by the Montigny Usutu Mill.

3.4 Geology and Soils

3.4.1 Geology

At the project site, the site is underlain by the Usushwana complex igneous and metamorphic rocks such gabbro, granophyre, pyroxenite and coarse-grained granite (Hunter: 1966). Where they are exposed, these granites, gneisses and quartzites form the characteristic rock outcrops. There are no single persistent strata that form ridges, however, large and small outcrops of dolerite, with some basaltic, felsites, phyllites and andesitic rocks persist (Hunter: 1966).

3.4.2 Soils

Soil of the site are are characterized by intense weathering and leaching with very deep soil formation (Ferrisols and Ferralitic Soils). They have a low CEC clay and a low base saturation of the exchange complex. The are mail classified as Ferralsols, Acrisols (Rommelzwaal & Masuku: 1994).

3.5 Biodiversity

3.5.1 Flora

The Highveld physiographic zone lying in the west of the country is dominated by short grassland on rocky outcrops dissected by narrow gorges and river valleys. Small pockets of species-rich afromontane forest can be found along the mountain ranges, many of which lie above the mist belt line. These forests vary in condition with a visible increase in disturbance noted over the last six years (Loffler, P. & Loffler L. 2005).

Increased exploitation, greater grazing pressure, pathways, livestock trampling, veld fires, honey gathering, and slash-and-burn bush clearing threaten the natural vegetation. Expansive stands of exotic *Acacia* sp. (Wattle) smother many of the river and stream banks, and infestations of the weeds *Solanum mauritianum* and *Lantana camara* are common in disturbed areas, including industrial timber plantations (Loffler, P. & Loffler L. 2005).

The project site is mainly covered by pine tree (*Pinus Pinus sp*) plantation, which will harvest to give way for the four (4) hectare project footprint. Within the forest plantation *Solanum mauritianum* is persistent on boundaries of the project site. Riverine vegetation is evident next to the perennial stream. Table 3.2 shows the flora identified at the project site and peripheral areas.

Table 3.2 Flora Recorded on and around the Project Site

Siswati Name	Scientific Name	Type	Uses
Bukhwebeletane+	<i>Lantana camara</i>	Shrub	Edible fruit
Umpayini	<i>Pinus Pinus Sp</i>	Tree	Timber
Umsutane	<i>Lippia javanica</i>	Shrub	Cultural use
Impepho	<i>Helichrysum odoratissimum</i>	Shrub	Medicinal
Chuchuza+	<i>Bidens pilosa</i>	Shrub	Edible leaves
Umsobo	<i>Solanum mauritianum</i>	Shrub	Edible leaves /Weed
Umsingitane	<i>Sporobolus africanus</i>	Grass	Erosion control
Ngwengane	<i>Cynodon dactylon</i>	Grass	Indigenous grass /erosion control
Lubabe	<i>Panicum maximum</i>	Grass	Cattle Fodder
Intala	<i>Unknown</i>	Grass	Unknown
Iheji	<i>Dodonaeaviscosa</i>	Shrubs	Fencing
Green grass+	<i>Pennisetum sp.</i>	Grass	Landscaping tool

* Represents species protected under the Flora Protection Act
 + Represents Alien/Exotic Species
 R Represents riverine vegetation

In total, thirteen (13) plant species occur on site and surrounding areas, including three (3) exotic/alien species, and five (5) grasses. No species protected under the Flora Protection Act was identified.

3.5.1 Herpetofauna on Site

There is no evidence of fauna at the project site as it is an already disturbed site from daily activity at the Usutu Mill. Very few surveys of the status of amphibians of Eswatini have been undertaken and as currently conceived, the herpetofauna is composed of 154 forms of amphibians and reptiles, see table 3.3.

Table 3.3 Herpetofauna Recorded in and around on Site.

Type	Common Name	Scientific Name
Lizard	Monitor lizard	<i>Varanus niloticus</i>
Lizard	Leopard tortoise*	<i>Geochelone pardalis</i>
Lizard	Stripped skink	<i>Mabuya striata</i>
Lizard	Cape dwarf gecko	<i>Lygodactylus capensis</i>
Lizard	Variegated skink	<i>Mabuya varia</i>
Lizard	Tree agama	<i>Agama atricollis</i>
Frog	Bushveld frog	<i>Laptopelis mossambicus</i>
Frog	Common plantana	<i>Breviceps adspersus</i>
Frog	Guttural frog	<i>Bufo gutturalis</i>
Snake	Black mamba*	<i>Dendroaspis polyepsis</i>
Snake	Mozambique spitting cobra*	<i>Naja mossambica</i>
Snake	Puff adder*	<i>Bitis arietans</i>
Snake	Egyptian cobra*	<i>Naja haje</i>
Lizard	Dwarf chameleon	<i>Bradypodion spp</i>
Frog	Common river frog	<i>Rana angolensis</i>
Frog	Bushveld rain frog	<i>Breviceps adspersus</i>
Snake	Bibron's blind snake*	<i>Typhlops bibronii</i>
Snake	Brown house snake	<i>Lamprophis fuliginosus</i>

*Protected Under the Game Act

The total number of herpetofauna species known to occur in the area is 18. Of these, 6 enjoy legal protection. This represents less than 1% of the total number of protected herpetofauna in Eswatini.

3.5.2 Birds

Birds known to occur in this area include *Scopus umbretta*, *Sagittarius serpentarius*, *Ploceus ocalis*, *Pycnonotus barbatus*, *Cisticola fulvicapilla*, *Nectarinia amethystina*, etc., which are the common transients. Table 3.4 is a checklist of birds recorded or known to occur on site.

Table 3.4 Birds Species Known to Occur on Site

Siswati Names	Common Names	Scientific Names
Lilanda	Cattle egret	<i>Bubulcus ibis</i>
Lituba	Cape turtle dove	<i>Streptopelia capicola</i>
Intsendzele	Crested francolin	<i>Francolinus sephaena</i>
Sahhukulu	Scops owl	<i>Otus senegalensis</i>
Indlati	Speckled mouse bird	<i>Colius striatus</i>
Lingangane	Haded ibis	<i>Bostrychia hagedash</i>
Umguphane	Cape sparrow	<i>Passer melanurus</i>
Sangoli	Woodland kingfisher*	<i>Halcyon senegalensis</i>
Lusoti	Bateleur eagle*	<i>Terathopius ecaudatus</i>
Tsekwane	Harmer kop	<i>Scopus umbretta</i>
Incwincwi	Black sunbird	<i>Nectarinia amethystine</i>
Lintjiyane	Blue waxbill	<i>Uraeginthus angolensis</i>
Sijolobela	Long tailed shrike	<i>Corvinella melanaleuca</i>
Dvoye	Secretary bird	<i>Dicrurus adsimilis</i>
Umshoshaphansi	Grass veld pipit	<i>Anthus cinnamomeus</i>
Intsengu	Southern black flycatcher	<i>Meleanornis pammelaina</i>
Lohheya	Lizard buzzard*	<i>Kaupifalco monogrammicus</i>
Lighbhola	Black eyed bulbul	<i>Pycnonothus barbatus</i>
Ncedze	Neddicky	<i>Cisticola fulvicapilla</i>
Mbalane	Small billed form	<i>Maleorus pectoralis</i>
Lihlokohlolo	Redbishop	<i>Euplectes orix</i>
Sigwaca	Common quail	<i>Coturnix delegorguei</i>
Lusoti	Brown snake eagle*	<i>Circaetus cineris</i>
Unknown	Little spotted wood pecker	<i>Campether acaillautii</i>
Unknown	Little bee-eater	<i>Merops pusillus</i>
Unknown	Rufousbellied heron	<i>Ardeola rufiventris</i>
Unknown	Brubru	<i>Nilaus afer</i>
Unknown	Fantailed cisticola	<i>Cisticola juncidis</i>
Unknown	Southern black tit	<i>Parus niger</i>

*Red Data Listed

Of the twenty-nine (29) bird species known to occur in the area, 4 are red-data listed, although by Swazi law all bird species are protected. The site does not harbor nesting sites, and none of the rare or threatened species of birds, including the blue swallow, *Hirundo cuculatta*, were identified on site.

3.5.3 Mammals on Site

Since most of Eswatini's larger mammal species have been hunted extensively, the only sizeable population of wild mammals are found in the country's parks and reserves. However, a wide variety of mammals are also found in this area, see Table 3.5.

Table 3.5 Mammals Recorded on Site

English Name	Scientific Name
Bush squirrel*	<i>Epexerus ebii</i>
Wild dog*	<i>Lycaon pictus</i>
Common duiker*	<i>Sylvicapra grimmia</i>
Chacma baboon*	<i>Papio ursinus</i>
African wild cat*	<i>Felis lybica</i>
Vervet monkey*	<i>Pygerythrus cercopithecus</i>
Dwarf galago	<i>Galagoides demidovi</i>
House rat	<i>Rattus rattus</i>



Table 3.5 Mammals Recorded on Site...cont'd

English Name	Scientific Name
Multimamate rat	<i>Mastomys natalensis</i>
Common molerat	<i>Cryptomys hottentotus</i>
Red veld rat	<i>Aethomys chrysohilus</i>
Wahlberg's epauletted fruit bat	<i>Epomophorus wahlbergii</i>
Skunk*	<i>Mephitis spp</i>
Grey duiker*	<i>Sylvicapra grimmia</i>
Slender mongoose*	<i>Galerella sanguinea</i>
Thick-tailed bushbaby*	<i>Otolemur crassicaudatus</i>
Cattle*	<i>Bos taurus</i>

*Protected under the Game Act

Out of the 17 species types of mammals known to occur at the project site, 10 are protected species under the Game Act. This is because of extensive hunting pressures in and the around the Usutu Forest Plantations which has resulted in only the small mammals inhabiting the site as urban survivors. As well, the degree of habitat alternation is generally such that it is likely that none but the most adaptable of mammals have survived. In summary, among the known urban survivors, only the smaller mammals were identified on site.

3.5.4 Fish

Although studies of fish populations in Eswatini are at their infancy, such could be beneficial to the fish industry which is expected to grow with the recent construction of big dams in the country. There is a need to investigate any potential threat to local and downstream fish populations as transportation of silt into the rivers during construction may reduce fish populations as it may have a smothering effect on the aquatic life.

This must be avoided in accordance with the Protection of Freshwater Fish Act. Species of fish likely to be affected by the river crossing project include tilapia and other river species. Table 3.6 is a list of fish species known to occur in the Great Usutu River.

Table 3.6 Fish Species that occur in the Great Usutu River Catchment Area

Scientific Name	Common Name
<i>Anguilla mossambica</i>	Longfin eel
<i>Barbus argenteus</i>	Rosefin barb
<i>B. marequensis</i>	Largescale yellowfish
<i>B. timaticulatus</i>	Threespot barb
<i>B. toppini</i>	Eastcoast barb
<i>B. unitacniatus</i>	Longbeard barb
<i>Barillius zambezensis</i>	Barred minnow
<i>Chiloglanis anoterus</i>	Pennant tail catlet
<i>C. paratusb</i>	Sawfin rock catlet
<i>C. sweirstrae</i>	Lowveld rock catlet
<i>Clarias gariepinus</i>	Sharptooth catfish
<i>Cyprinus carpio</i>	Carp
<i>Egraulicypris brevianalis</i>	River sardine
<i>Labeo cylindricus</i>	Red eye labeo
<i>L. molybdinus</i>	Leaden labeo
<i>L. rosae</i>	Rednoise labeo



Table 3.6 Fish Species that occur in the Great Usutu River Catchment Area

Scientific Name	Common Name
<i>L. rubropunctatus</i>	Redspotted labeo
<i>Labeobarbus marequensis</i>	Lowveld Large scale yellow fish
<i>Micralestes acutidens</i>	Silver robber
<i>Microterus salmoides</i>	Largemouth bass
<i>Oreochromis mossambicus</i>	Mozambique tilapia
<i>Tilapia telapia rendalli</i>	Redbreast tilapia
<i>Glossogobius giuris</i>	Tank goby

None of these species is threatened. Most species provide essential protein to downstream communities and a source of income for others who sell the bigger species, e.g., tilapia, to the public.

3.6 Socio-Economic Environment

3.6.1 Land Tenure and Ownership

Land tenure arrangements play an important role in management of land and natural resources. In Eswatini, land tenure issues are deeply associated with customs, forms of authority, and identity.

There is basically a dual system of land tenure, with a rather strong distinction between areas of the country where communal tenure or government ownership prevails – Swati Nation Land (SNL) – and parts where private property rights are granted – Title Deed Land (TDL).

The site will be under the auspices of Emerald Renewables is owned by Montigny Investments. There is no dispute about land ownership as the land belongs to the proponent and is held under TDL.

3.6.2 Current Land Uses

No development exists at the project site except for pine plantation which will be harvested to give way for the biomass pellet plant.

3.6.3 Surrounding Land Uses

The site is surrounded forest plantation to the north and the Montigny Usutu Mill to the west the Bhunya Township to the south and the Dambathi community are to the east. A summary of surrounding land users are shown in Table 3.7.

Table 3.7 Summary of Surrounding Land Uses

Land Use Type	Description
Schools, Institutions	Bhunya Primary Zondwako Primary Bhunya Secondary High Bhunya High
Communities	Bhunya, kaLuhleko, Zondwako, Mhlangeni, kaLamgabhi
Law Enforcement	Bhunya Police Station /Montigny Usutu Mill Rangers



Table 3.7 Summary of Surrounding Land Uses....cont;d

Land Use Type	Description
Churches	Bhunya Free Evangelical Assembly Bhunya Assembly of God Bhunya Alliance Bhunya Roman Catholic Church of Zion Red Gown
Sports and Recreational Centers	Bhunya Sports Ground Bhunya Country Club
Transport	Transport Enroute Bhunya Bus Ranks
Health	Bhunya Montigny and Zondwako Clinics
Commercial Business/Node	Bhunya Commercial Node
Servitude	EWSC, EEC, EPTC
Communication	EPTC, MTN and Swazi Mobile
Emergency Services	Bhunya Usutu Mill Fire Services, EMS 977

3.6.4 Demographics

Eswatini is a small country in terms of total population; in the 2017 census the population stands at 1,093,238 comprising of 531,111 males and 562,127 females (based on preliminary results) (United Nations Populations Fund, 2017). An increase of 74,789 persons was registered during 2007-2017. Out of this total addition, 49,683 were male and 25,106 were females.

The maximum growth of 1.3% was recorded in the Hhohho region. The national capital is in the Hhohho region and migration plus better infrastructural facilities accompanied by more employment and economic opportunities could be the reasons for faster growth of Hhohho region.

Manzini Region, where the development will take place is closely followed Hhohho registering a growth of 1.1%. Manzini is both a commercial and industrial hub of the country and therefore, high growth of population was also expected in Manzini. Both Hhohho and Manzini recorded growth rates more than the national average of 0.7%. Lubombo recorded growth rate of 0.2% during the past decade while Lubombo registered a negative growth rate of -0.2 percent. Out of the total increase of 74,789 between 2007 and 2017 the contribution of Hhohho was of 37, 917 persons followed by Manzini (36, 415) and Lubombo (4,800). Lubombo showed a decline in population of 4,4343.

Lubombo Region, has the lowest population at 204,111 people (18.7% of the total population). The remaining population within Lubombo is focused within the central and Southern areas of the region, particularly around the towns Nhlengano, Mahamba and Maseyisini and in the KaZombodze area.

The lowest area of population is located in the North and East of the Region, with 9 out of Lubombo 14 Inkhundla having a population under 15,000. The percentage of population in Lubombo stood at 19.4 and 18.7 in Lubombo, see table 3.8.

Table 3.8: De-Jure Population of Eswatini/Regions: 2007-2017

DE-JURE POPULATION OF ESWATINI/REGIONS: 2007-2017					
ESWATINI REGIONS	POPULATION 2007	POPULATION 2017	PERCENTAGE TO TOTAL POPULATION 2017	ABSOLUTE CHANGE IN POPULATION 2007 - 2017	ANNUAL GROWTH RATE 2007 - 2017
Eswatini	1018449	1093238	100	74789	0.7
Hhohho	282734	320651	29.3	37917	1.3
Manzini	319530	355945	32.6	36415	1.1
Lubombo	208454	204111	18.7	-4343	-0.2
Lubombo	207731	212531	19.4	4800	0.2

Source: UN Population Fund, 2017

3.6.5 Water and Water Infrastructure

The project site is on self-supply with clean potable water from the Montigny Usutu Mill water treatment facility located at a distance of 400 metres from the project site. A perennial stream transverses the site on the north western boundary whilst the GUR flows southerly to the site and is located at a distance of 100 metres from the site.

3.6.6 Power and Communications

There is a comprehensive electricity supply to community areas spanning across the project area by the Eswatini Electricity Company (EEC). There are also Eswatini Posts and Telecommunication (EPTC) lines on site. MTN and Eswatini Mobile reception is very good, as evidenced by nearby receptor stations.

3.7 Archaeological, Cultural and Historical Resources

3.7.1 Cultural Resources

No graves have been identified at the project site.

3.7.2 Archaeological, Historical Resources

The site does not contain any archaeological artifacts, apart from the Bhunya Usutu Mill that was constructed in the 1950s and standing adjacent to the site.;

3.7.3 Protection-Worthy Areas

The site is not protected under Eswatini National Trust Commission schedules, nor is there any site nearby earmarked for nature conservation/tourism purposes.

4. METHODOLOGY OF ENVIRONMENTAL IMPACTS

4.1 Methodology of Assessment

This section outlines the methodology used to assess the significance of the potential environmental impacts. For each impact, the **EXTENT** (spatial scale), **MAGNITUDE** (size or degree scale) and **DURATION** (time scale) are described. These criteria are used to ascertain the **SIGNIFICANCE** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The tables on the following pages show the scale used to assess these variables, and defines each of the rating categories.

Table 4.1 Assessment criteria for the evaluation of impacts

Criteria	Category	Description
Extent or Spatial Influence of Impact	Regional	Beyond a 20 km radius of the site
	Local	Within a 20 km radius of the site
	Site specific	On site or within 100 m of the site
Magnitude of Impact	High	Natural and/ or social functions and/ or processes are <i>severely</i> altered
	Medium	Natural and/ or social functions and/ or processes are <i>notably</i> altered
	Low	Natural and/ or social functions and/ or processes are <i>slightly</i> altered
	Zero	Natural and/ or social functions and/ or processes remain <i>unaltered</i>
Duration of impact	Construction period	Up to 7 years
	Medium	Up to 10 years after construction
	Long Term	More than 10 years after construction

The **SIGNIFICANCE** of an impact is derived by taking into account the temporal and spatial scales and magnitude. The means of arriving at the different significance ratings is explained in Table 4.2.

Table 4.2 Impact Significance

Rating	Level of Criteria Required
High	High magnitude with either a regional extent and medium term duration or a local extent and long term duration

Medium	Medium magnitude with any combination of extent and duration except site specific and construction period or regional and long term
Low	Low magnitude with a site specific extent and construction period duration

Once the significance of an impact has been determined, the **PROBABILITY** of this impact occurring would be determined using the rating systems outlined in Tables 4.3. It is important to note that the significance of an impact should always be considered in concert with the probability of that impact occurring.

Table 4.3 Definition of probability ratings

Probability Ratings Criteria	Description
Definite	Estimated greater than 95 % chance of the impact occurring.
Probable	Estimated 5 to 95 % chance of the impact occurring.
Unlikely	Estimated less than 5 % chance of the impact occurring.

5. PREDICTION AND EVALUATION OF ENVIRONMENTAL IMPACTS

5.1 Overview

This section discusses the biophysical and socio-economic impacts that were identified in this study. This section outlines the biophysical and socio-economic impacts that were identified on site and impacts that will arise during future development on the undeveloped area. The Comprehensive Mitigation Plan (CMP) in Section 6, presented as a stand-alone document as is the requirement according to EEA's Environmental Assessment Regulations of 2022, outlines the measures that are recommended to either reduce or eliminate the negative impacts, or enhance the positive ones.

Briefly, activities for the proposed development include the following elements:

Pre/Construction Phase

The pre/construction phase will involve:

-  Site clearances excavation for infrastructure removal.
-  Employ semi-skilled labour, skilled artisans, tradesman and bricklayers to accomplish the tasks for the development.
-  Construction of concrete bunded surface for the plant.
-  Erection of steelworks, infrastructure, site boundaries, site offices and, laying of foundations site construction structure.

Decommissioning Phase

-  Rehabilitation of excavated sites and decommissioning of all temporary structures used during construction.

Operational Phase

-  Full Operations of the Biomass Pellet Plant.

5.2 Prediction and Evaluation of Planning Phase Impacts

PI - 01 Impact on Land Use

No development exists at the project site except for pine plantation which will be harvested to give way for the biomass pellet plant.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Planning Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

PI - 02 Impact on Surrounding Land Uses



The site is surrounded forest plantation to the north and the Montigny Usutu Mill to the west the Bhunya Township to the south and the Dambathi community are to the east.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Planning Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

PI-04 Impact on Services

Construction of the Biomass pellet plant will impact negatively on the water and irrigation infrastructure that is found along the project area, without which there will be no water for the community, commercial, and educational facilities.

As well, since EEC lines are found close to the Biomass pellet plant alignments, any disruption will lead to power cuts. Similarly disruptions to EPTC lines will result in communication breakdowns from the EPTC Exchange Station found along the road leading to the site.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Planning Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

PI-05 Impact on Biodiversity

The project as planned will lead to the loss of vegetation, because the entire site will be cleared in preparation for the Biomass pellet plant.

Wetlands are protected by the Ramsar Convention, and wildlife is protected by the Game Act of 1993. Moreover, the site harbours alien/exotic plant species currently used as landscape plants (*Pennisetum*) and alien domesticated species such as *Lantana camara*.

The project site is mainly covered by pine tree (*Pinus Pinus sp*) plantation, which will harvest to give way for the 2,8 ha project footprint. Within the forest plantation *Solanum mauritianum* is persistent on boundaries of the project site. Pockets of *Helichrysum odoratissimum* are found within the forest plantation often tempting the local community to harvest the medicinal plant illegally without permission.

The Noxious Weed Act forbids the propagation of such species as they obliterate the indigenous population such as *eucalyptus spp*. Builders rubble will likely exacerbate this.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Planning Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.



PI – 06 Impact on Soil

The clearance of vegetation in the site will result in the site being bare and prone to erosion during the summer months which start late November to early March.

Erosion will scar the landscape and increase sediments in the stream, ultimately affecting breeding and predator/prey relations in the aquatic system, and/or change the stream course permanently.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Planning Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

PI – 07 Impact on Water Pollution

Water pollution will result from cement and silt from an exposed area in the site. Cement will alter the pH of the nearby perennial stream and impact on the aquatic wildlife siltation, on the other hand will render the water and affect predator/prey relationship on the aquatic wildlife.

Since the stream has the site as its catchment, the construction activities will impact on its water quality. The area which the site is situated has the Eswatini Water Services Cooperation (EWSC) to provide fresh, clean, drinkable water.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Planning Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

PI - 08 Traffic and Access Impacts

During construction, the MR – 18 Bhunya – Malkerns road intersecting to the site will be affected by the activities which are to be carried out by the construction.

The traffic disruptions will have negative impacts on the forest operations at the Bhunya Usutu Mill.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Planning Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

5.3 Prediction and Evaluation of Construction Impacts

CI-01 Impact on Access to Bhunya Usutu Mill

Biomass pellet plant construction will take place under traffic and will affect accesses leading to the Bhunya Usutu Mill and the Dambathi community area.



It is inevitable that at some stage or another soils, debris, dust, and mud, will be deposited on the access roads affecting traffic around the fire station.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-02 Impact on Services

Construction will impact on infrastructure such as EWSC water supply pipelines, EWSC Water Supply Works, and as well as EEC and EPTC lines. Biomass pellet plant construction may disrupt water supply pipes leaving the Bhunya Usutu Mill without water.

Similarly, disruption to EPTC lines, EPTC Telephone Exchange and EEC lines may result in communication breakdowns and power cuts.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-03 Impact on Off-Site Areas

The proximity of the banks of the GUR may tempt the contractor to source sand from here. Sourcing sand from the local stream banks would impact negatively on the riverine habitats. Any destabilization of the stream bank would result in ecological damage, and besides, the Stream Bank Regulations prohibit any activity within 30-m of the Usutu stream bank.

As well, the impact of use of land to borrow material is that borrowing results in deep holes in the ground, rendering the land unfit for anything else.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-04 Soil Erosion

Soil erosion at the project site will be a problem during construction because the soils are highly erodible owing to their sandy nature and the terrain as evidenced by the current scouring of the river banks by run-off.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.



CI-05 Soil Pollution

Construction vehicles will require that a service yard be established, and both new and used oils will be stored there. These will pollute the soils if spilled.

The yard will be part of the contractor's site office for the project. For this project, the site office will store and generate used oil. Spills may thus be of a considerable volume, and once this contaminates soil, it cannot be reversed unless remedial actions are undertaken. Pollution of soil is critical because polluted soil cannot be re-used, and remediation is very expensive.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-06 Impact on Water Supply: Construction Water

Prior to construction of the Biomass pellet plant, several activities will take place in preparation for construction. One of these is the general planning, including seeking approvals to abstract water for construction.

The obvious choice of water supply for construction would seem to be the GUR; however, abstraction from the stream needs a permission from Montigny Usutu.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-07 Impact of Water Pollution

It is in the nature of their purpose that contractor's sites are a main cause of concern in so far as water pollution is concerned. Engineers and contractors will spend a good part of their day when executing the project. Adequate sanitary facilities and ablutions must be provided to avoid the use of open spaces and bushes to relieve themselves.

Construction crews will be working on the Biomass pellet plant road at different sections and at any given time. If no ablution facilities are provided, workers will use the nearby bushes to relieve themselves. Any run-off containing faecal matter will, ultimately pollute the GUR where this run-off eventually ends up with disease-causing pathogens such as *E.coli*.

Pollution of water due to run-off from excavated areas will also be a problem during construction. As well, cement particles are potential pollution threats to the GUR, as are construction vehicles that contractors normally wash near the river.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	High	Definite	Local

Mitigation measures are detailed in the CMP.

CI-08 Impact of Downstream Siltation

Pollution of water due to siltation from the excavated areas will be a problem during construction of the Biomass pellet plant. All exposed areas will increase sediments carried to the GUR where run-off from the exposed excavated areas will ultimately end up at.

Sediment loads change the benthic characteristics of aquatic systems. Sediments also change watercourses unpredictably and as it is currently, Eswatini rivers carry large sediments loads.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-9 Impact on Fauna

Since the Biomass pellet plant site has not yet been pegged, during construction, the contractor and he/her work crews may cause further loss of animal species by straying onto adjacent uncleared areas, in particular the riverine bushes associated with the GUR, either intentionally, or unintentionally. Workers will come across snakes and be tempted to kill them.

Lack of sensitization of work crew may also result in killing of wild animals and this could be a result of:

- Poaching – the site may still have a few species of free roaming animals in suitable habitats. Poaching is a serious crime in Eswatini under the Game Act of 1993.
- Animal kill – there is a strong likelihood of killing reptiles by construction crews especially those generally not liked in Eswatini, including snakes and frogs. The killing of legally-protected animals under the Game Act is a serious crime in Eswatini.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	High	Definite	Local

Mitigation measures are detailed in the CMP.

CI-10 Impact of Alien Vegetation

There is likelihood that construction activities may introduce alien/invasive species during construction and also during rehabilitation. The Noxious Weeds Act outlines the species that are not allowed in Eswatini. As eradication of these species is problematic and costly, the project must not exacerbate this.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-11 Impacts of Emissions

During construction, vehicles will emit gases as they move on and off the project area as they haul, load and dump construction materials. Construction vehicles will be diesel powered hence pollution emitted would be CO_x, NO_x, SO_x and hydrocarbons.

Quantities are not expected to contribute significantly to global warming, ozone depletion or phytochemical smog. Only occupational health hazards would be a problem.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-12 Impacts of Environmental Dust

Construction vehicles moving on and off the construction site will lead to excessive dust, which will be a nuisance to the Montigny Usutu Mill and nearby workers compound community. Dust will stain laundry, as well as paper and equipment at Montigny Usutu Mill and Administration Block. Also, the presence of particulate matter in the atmosphere can have an adverse effect on health and amenity. Particles lodged in the lungs can affect the respiratory system.

The dust standard in the Factories, Machinery and Construction Works Act, 1972 is a limit of 150µg/m² above which it becomes an occupational hazard that may lead to respiratory health problems, as well as social problems (staining of laundry, dust on furniture, etc.). However, with a short construction period, and well-known dust suppression measures in the construction industry, this impact is expected to be kept at minimum.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	High	Definite	Local

Mitigation measures are detailed in the CMP.

CI-13 Noise

Increased vehicular traffic is likely to increase ambient noise levels. The noise standard adopted in the Factories , Machinery and Constructions Works Act 1972 is a limit of 65dBA nearby Montigny Usutu Mill.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-14 Visual

In addition to excavation at the project site piling up of unwanted materials at spoil sites are likely to be a visual eyesore in the project.

Excavations at the project site have a propensity to spoil the aesthetic environment, not only in deep cuts involved but also in the general upkeep of contractor's camps and other off-sites areas.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-15 Construction Waste

Construction will generate construction waste in the form of metal, plastic, cement bags, rubble, etc. Waste will be generated monthly. Construction waste is not only an aesthetic problem, but it also causes health problems due to the vermin it attracts, and will clog drains.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-16 Safety Issues

At construction sites, accidents are the most common cause of death through operation of machinery. At the Biomass pellet plant construction site, workers and the public will be exposed to injury risks from construction equipment. It is important that safety of the workers and the public be entrenched in the CMP.

Also, the increased speed and frequency of construction vehicles on the MR 18 and site access road traffic will be an elevated danger to the public; hence there is a great need for public education to familiarize the public on the potential dangers of construction and the implementation of safety precautions on the road.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-17 Impact on Public and Workers' Safety

Construction sites have inherent safety risks and hazards. This includes worker's safety, especially due to construction vehicles moving on and off the construction site, and also due to the close proximity of earth moving machines and other potential hazardous equipments to workers and the public.

Further, unrestricted access to the site may expose the public to site accidents such as tools or bolts falling during construction. Injury risks are fairly uncommon in a well-managed site with staff trained in risk reduction and emergency preparedness.

An added risk is that of workers handling construction machinery from which fatalities are not uncommon. Moreover, the use of power for notably welding of steel superstructures, electrical cables will criss-cross the site and pose a danger of electrocution to workers. The impact has a low certainty; however it is high in magnitude because of the fatalities that may be involved.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-18 Impacts on Public and Worker's Health

Construction will take place at the proposed site, which has no Public toilet facilities. Workers will be tempted to cross the stream and relieve themselves in the bushes and cause sanitation problems.

This can compromise public sanitation and hygiene especially for the fire station who might use the GUR for domestic purposes.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-19 Criminal Element

Not all job seekers will be employed, making some to resort to petty thieving in the site office, because the presence of valuable material and machinery may make the place prone to criminal activity. Theft of project property by workers or even outsiders such as diesel, batteries, etc. is possible. Theft of material and machinery may delay the project and further increase the cost of the project.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-20 HIV/AIDS

Employment opportunities will lead to migration of people from far into the construction site. This is likely to bring about adverse social impacts such as social disturbance due to construction workers mingling with women (possibly unemployed) from the Bhunya, Zondwako and other peripheral areas, where drunkenness and promiscuity might result in possible health risks associated with promiscuity such as STD's and HIV/AIDS. These are nation-wide concerns. The impact is high negative, with long-term implications.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	National

Mitigation measures are detailed in the CMP.

CI-21 Impact of COVID -19

COVID-19 is a highly contagious disease that can have severe effects on people, especially those who are vulnerable. The virus is likely to pass from person to person in communal areas and where it is not possible to maintain safe distances between persons. If a person is infected while working it can be passed on through families and other contacts. You can spread the virus even if you don't have symptoms.

Employment opportunities will lead to migration of people from far into the construction site. This is likely to bring about the spread of COVID -19 in and around the construction site. This is a nation and world-wide pandemic. If a person is infected while working it can be passed on through families and other contacts. You can spread the virus even if you don't have symptoms, see Appendix 4.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	National

Mitigation measures are detailed in the CMP.

CI-22 Creation of Employment (POSITIVE)

The impact on employment is definite, with 50 positions for skilled and semi-skilled workers anticipated in the construction team. This positive impact should be enhanced.

In addition, it is likely that informal stalls selling food stuffs will blossom during the construction period. However, these aspects must be weighed against the fact that such employment or economic endeavour will be terminated at the end of the implementation of the project.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-23 Entrepreneurship Opportunities (POSITIVE)

During construction, certain aspects will be subcontracted formally to smaller businesses providing a specific service such as sale of crushed stone, sand, , paving, drainage, grass cutting, etc. The local community may benefit through the sale of food to construction workers.

The impact of entrepreneurial opportunities is a high probable positive. Potentially, 380 million emalangen (SZL) worth of work can be subcontracted during the fifteen (15) month construction period. Also, opportunities for harnessing of off cut material for fire wood and out of spec material for fencing for community materials through approval of Montigny Usutu management.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

CI-24 Training (POSITIVE)

To benefit from the on-going road infrastructure development program in Eswatini, it will be beneficial to train locals for some of the jobs such as traffic management during construction.

The impact of training opportunities is a high positive. It empowers trainees by providing the necessary expertise and experience for future projects in the construction industry.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Construction Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

5.4 Prediction and Evaluation of Operational Phase Impacts

OP-01 Soil Erosion

Developments of this nature often leave cleared areas unrehabilitated, and the soil prone to erosion. Unless mitigation measures are undertaken, soil erosion at exposed areas left by construction activities will continue on a permanent basis.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

OP-02 Land Use (Maintenance)

Poor maintenance of the Biomass pellet plant will, in the long term, negate the anticipated improvement on access.



Secondary maintenance by service providers such as EWSC will also lead to problems; as such activities often lead to destruction of the Biomass pellet plant walkways, and ultimately expensive Biomass pellet plant closures. This should not happen on this project.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

OP-03 Particulates

All construction areas left unrehabilitated will result in the generation of dust. Temporary borrow pits and spoil sites, etc., will all cause dust if left unrehabilitated. Environmental dust will be a problem to the Montigny Usutu Mill and Administration Block.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

OP-04 Visual

Unrehabilitated borrow pits and excavated construction sites are likely to be an immediate blight to the landscape. Construction activities have a tendency of leaving excavated sites unrehabilitated and prone to erosion. Excavated sites also scar the landscape.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.

OP-05 Improved Infrastructure (POSITIVE)

The operational phase of the project will bring about positive changes in so far as the infrastructure is concerned. This includes improved access, lowered maintenance costs, etc.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	Medium	Definite	Local

Mitigation measures are detailed in the CMP.



OP-06 Water Issues

There will be an increase run off water due to paved surfaces, which include roads, and water collecting from corrugated gladding roofs, which if not channeled to designated drainage system, will lead to soil erosion and contamination of receiving water sources.

Project Activities

Paving (Biomass Pellet Plant Concrete Bunded Surface)

It is proposed that concrete storm water pipes will be constructed to collect all storm water running on the surface of the project area. Surface run-off will be directed via un-lined and lined (where necessary) open channels into the natural watercourses. All details regarding the construction of these drainage flows will be totally in accordance with the Engineer's Department at ER.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	High	Definite	Local

A set of actions designed to enhance the impact are outlined in the CMP.

OP – 07 Management of the Biomass Pellet Plant

A management strategy to coordinate the overall functioning of the proposed development needs to be put in place for a functional and sustainable Biomass Pellet Plant Facility. The management strategy should also assign responsibilities and duties for the provision of basic services solid waste management, maintenance of open spaces, water supply, electricity supply, e.t.c.

Project Activities

-  Waste Management
-  Maintenance of water supply, electricity supply, e.t.c open spaces, drainages e.t.c.

Workers and company visitors may litter on site and on surrounding areas. Also, solid waste may spill from bins that are too full, attracting and rodents.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	High	Definite	Local

A set of actions designed to enhance the impact are outlined in the CMP.

OP - 8 Risk of Spills: Oil and Waste Oil

In case of accidental spillages of oil on areas of concrete hard standing in process and timber drying areas may be contaminated with persistent organic chemicals. Considerations should be given to the possibility of contamination if such areas are to be broken out, crushed and reused during any reclamation work. In this setup, there is always an environmental risk associated with oil and waste oil discharge, including the likelihood of it spilling, see Appendix 4 Material Safety Data Sheets for Waste Oil.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	High	Definite	Local

This risk is high considering the health impact it will have on the downstream communities. Mitigations to minimize the risk of spillages are detailed in the CMP.

OP – 9 HIV/AIDS

HIV and AIDS remains a grave concern given the fact that most people will migrate for employment.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	High	Definite	Local

HIV and AIDS infections during operations are probable, medium negative with long-term consequences.

OP – 10 COVID - 19

It is obligation of each employee to adhere to the following basic preventative measures, both at work and at home, to mitigate the spread of the COVID-19 virus to fellow employees and the greater community. In the interest of safeguarding your health and safety and that of others, whilst on this site.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	High	Definite	Local

COVID – 19 infections during operations are probable, medium negative with long-term consequences.

OP - 11 Fire and Emergency

Fire must be regarded as a constant threat; however, the majority of fires are unlikely to constitute a disaster, unless they accompany a major event such as an explosion. Fires in storage areas or other parts of the site may be a further potential cause of contamination, through spillage of preservatives, the dispersion of contaminants aerially and from the runoff of fire-fighting water,

Even though emergencies are not thought of until they occur, they are a negative impact in any development where risks of injury to both people and property are high. In short, the risk is difficult to quantify, however the catch phrase in mitigation is “preparedness”.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	High	Definite	Local

The impact on properties safety is a probable medium negative.

OP – 12 Air Quality (Emissions)

At operation, emissions from the biomass boiler and fugitive dust released during transfer of wood waste into the fuel storage unit have the potential to affect air quality. These effects, however, are expected to be minimal because the proposed biomass systems will burn cleanly, and have virtually no visible emissions or perceivable odour, see Appendix 4.

The proposed biomass boilers can burn biomass fuel in a controlled fashion that reduces, but not eliminate, emissions.

Assessment of Impact

Timeframe	Direction	Magnitude	Certainty	Spatiality
Operational Phase	Negative	High	Definite	Local

The impact on properties safety is a probable medium negative.

6. COMPREHENSIVE MITIGATION PLAN

6.1 Introduction

This section is the comprehensive mitigation plan (CMP) formulated after an Initial Environmental Evaluation (IEE) study was carried out for the proposed biomass pellet plant construction at Montigny Usutu Mill, at Bhunya, in the Manzini Region of the Kingdom of Eswatini.

Although it is a part of the IEE report for the project, it is being presented here as a stand-alone document in compliance with Eswatini Environment Authority (EEA) regulations. EEA stand-alone documents are prepared in such a way that they could be used without reference to any other document. As a result, this CMP does not refer to the corresponding IEE report.

This CMP is a legal document, and the contractor and proponent are obligated by law to implement it. The document ensures that appropriate monitoring is carried out, and that mitigation measures are actually implemented. Consultants from **Nkangala Envirowaste Socio & Safety Solutions (Pty) Ltd** will officially monitor the implementation of this plan, and will prepare and submit compliance reports to the Eswatini Environment Authority at the times stipulated in the EEA Environmental Compliance Certificate for the project. The environmental consultants will be responsible for resolving any environmental disputes that may arise from the interpretation of the CMP, and the consultant's decision in such cases shall be final.

The Comprehensive Mitigation Plan (CMP), prescribes and directs the management of all environmental aspects, physical, or social, identified during the environmental audit. The purpose of this CMP is to ensure that the impacts identified are kept to a minimum. This includes ensuring that the mitigation measures described in the CMP are implemented, to ensure continued monitoring of the project in all phases. The main objectives of the CMP are to:

- ✚ Outline guidelines for sound management of environmental issues associated with the operations of the development.
- ✚ Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment.
- ✚ Reduce negative environmental impacts through the proactive employment of sound and effective working practices.

6.2 Legal Status of This Document

This CMP is a legal document, and the proponent **Emerald Renewables (ER)** is obligated by law to implement it. This CMP is a legal document, and **ER** is obligated by law to implement it. It is the laws promulgated in the Environment Management Act, 2002, read together with Legal Notice 31 of 2000, *i.e.*, the Environmental Assessment Regulations of 2022 that primarily apply to this CMP. Other legislations relevant to the implementation of this CMP are embodied in: The Eswatini National Trust Commission Act, 9/1972, The Natural Resources Act, 71/1951, The Water Act, 2003, The Flora Protection Act No. 10, 2001, The Protection of Fresh Water Fish Act, 1937, The Noxious Weeds Act, 19 of 1926, The Game Act, 1953 (as Amended in 1993), The Wild Bird Protection Act, 1914, The Occupational Health and Safety Act (OHSA), 2000, and The Factories, Machinery and Construction Works Act, 1972. Relevant regulations are The Waste Regulations, 2000, The Litter Regulations of 2011 and The Water Pollution Control Regulations of 2010.

It shall be deemed a binding commitment by the parties to act within the intent and spirit of sound environmental management and to cooperate and enforce the specifications contained therein, as and where necessary. This document also ensures that work shall at all times be approached with due concern for the natural and social environment.

The CMP recognizes and enables the force of law attached to environmental aspects of the project, as contained in the Eswatini Environment Management Act, 2002, read together with the Environmental Assessment Regulations of 2022, which are applicable in this project. This document shall be read in conjunction with all the documents that comprise the contract documents for this contract. This CMP shall be expanded, customized and added to as may be necessary to meet any specific condition that may be encountered on the site during implementation and monitoring.

6.3 Precis of Mitigation

The key personnel responsible for the implementing the CMP are:

6.3.1 The Environmental Compliance Officer

The ECO, being knowledgeable about EEA requirements for monitoring CMP's will act as the EEA representative in the project, in the sense that all matters requiring EEA approval or consideration will be reported to the EEA through the ECO. The ECO must therefore be aware of all environmental obligations of the Contractor and of all areas of environmental concern at all times.

6.3.2 The Proponent, Emerald Renewables (ER)

ER must be aware of importance of the environment and ensure that the contractor, who is carrying out the project on his behalf, acts in an environmental acceptable manner. ER will also be tasked with ensuring that all governmental/non-governmental agencies are aware of their specific roles and responsibilities as per the recommendations of the CMP, to ensure effectiveness and compliance. Such organizations or agencies involve, the essential services providers Eswatini Water Services Corporation (EWSC), Eswatini Posts and Telecommunications (EPTC), Eswatini Electricity Company (EEC), Fire and Emergency Services), the various government ministries, e.t.c,

6.3.3 The Project Engineer (PE)

The Project Engineer (PE) is the one who will be responsible for supervising all construction works and monitoring activities of the contractor. The PE's role will include:

- Produce a **Photographic Record / Inventory** prior to commencement of construction.
- Run a **Site Diary** to record events and daily activities in CMP implementation

- **Issue Site Instructions** to the Contractor, as and when required (requested by the ECO), where the CMP has been contravened or with regards to more specific issues arising which are not addressed in the CMP
- **Forward copies of all records**, site diary, site instructions and other data collected, in terms of the CMP, to the ECO on a fortnightly basis (i.e. every two weeks)
- Keep an up-to-date **Site Visitors Register**
- Keep a **Complaints & Claims Register**, including a record of follow up action.

6.3.4 The Contractor (CO)

Is on the forefront of environmental damage by nature of his activities. The CMP is to guide his actions so as to cause minimal damage to the environment. It is unlikely therefore that the contractor can monitor his own activities, rather the ECO will be required to monitor all contractor's activities. In order to ensure that the contractor is committed to this, and generally ensure that the nation, through the EEA, does not find itself left with an unrehabilitated site due to bad faith, the EEA will not issue the certificate for the project until there is proof of commitment by the contractor as evidenced by inclusion of the CMP in the Tender Documents.

6.3.5 The Worker (WO)/Safety

It is crucial that all workers on site are aware of their environmental responsibilities and understand the environmental impacts of their actions. Site induction must include an environmental code of conduct that must be adhered to at all times, e.g., no killing of animal (even snakes), no hunting of birds – an illegal activity in Eswatini. Because the actions of workers tend to mirror that of the contractor who supervises them, the contractor will act in an environmentally responsible manner, and will actively encourage the workers to do the same.

6.3.6 The Eswatini Environment Authority (EEA)

The Eswatini Environment Authority (EEA) is responsible for enforcing the CMP, through periodic monitoring of environmental issues during the execution of the project. The main purpose of monitoring is to ensure that the prescribed mitigation measures / actions are carried out and to track the progress in implementation of the CMP in achieving the stated objectives. This will be done by means of submitting the findings of the monitoring exercise in the form of a Project Compliance Report (PCR).

6.4 Impacts and Mitigation Measures

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
1.Planning Phase Planning activities in preparation for construction.	<i>PL– 01 Impact on Lnd Use</i> No development exists at the project site except for a pine plantation which will be harvested to give way for the biomass pellet plant.	❖ Emerald Renewables (ER) will confirm the legal outspans of the Biomass pellet plant in consultation with the community. ❖ The project will have to ensure that the site does not encroach on the other areas that might be affected like the adjacent Montigny Usutu Mill and administration blocks and users of the GUR. ❖ There is a need for continued consultation with the community throughout the project life cycle as unforeseen circumstances that could affect the community must be promptly attended to.	ER	ECO
	<i>PL = 02 Impact on Surrounding Land Uses</i> The site surrounded forest plantation to the north and west. This includes Montigny Usutu Mill and administration offices.	❖ ER will have to ensure that the construction of the Biomass pellet plant does not encroach on surrounding land uses. ❖ ER will have to ensure that the access road leading the project site will be designed such that the trucks coming to the site can be safe and supervised, with the appropriate internationally accepted road engineering structures in place. ❖ ER will ensure that the construction of the Biomass pellet plant is planned in consultation with the community and the traditional authorities of Bhunya, Zondwako and surrounding communities. ❖ ER will document all proceedings of such meetings, including resolutions made and corrective actions undertaken by ER to the satisfaction/dissatisfaction of the community and traditional authorities.	ER	ECO
	<i>PL = 03 Impact on Services</i> The Biomass pellet plant will impact on infrastructure such as the EWSC water supply as well as EEC and EPTC lines.	<u>Water Supply and Sewer Pipelines</u> ❖ EWSC will be notified of the ER intention to construct a Biomass pellet plant in the vicinity of their water supply, water Supply tank and the need to relocate these pipelines for purposes of construction. ❖ A relocation plan will be drawn up by EWSC and ER as to how the infrastructure is to be relocated with minimal disruption, and to determine how much the relocation exercise will cost ER. Planning will be cognizant of this fact. ❖ ER will ensure that for ease of future identification, EWSC markers are used to identify the new pipeline routes. <u>EEC Powerlines</u> ❖ ER will notify EEC of the need to relocate power lines that are in close proximity with the project site. ❖ A relocation plan will be drawn up by EEC and ER as to how the infrastructure is to be relocated with minimal disruption, and to determine how much the relocation exercise will cost ER. ❖ Should the relocation involve underground cables, EEC markers need to be put in place along the new line route for future identification. <u>EPTC Lines</u> ❖ ER will notify EPTC of the need to relocate the lines from the EPTC Exchange Stations that are close to the project site. ❖ A relocation plan will be drawn up by EPTC and ER as to how the infrastructure is to be relocated with minimal disruption, and to determine how much the relocation exercise will cost the proponent. ❖ Should the relocation involve underground cables, EPTC markers need to be put in place along the new line route for future identification.	ER	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
1.Planning Phase Planning activities in preparation for construction.	<i>PL – 04 Impact on Biodiversity</i> The project as planned will lead to the loss of vegetation.	❖ Prior to construction, all protected plant species, will be marked with construction tape and will not be removed unless absolutely necessary. ❖ Where plants are in the way of construction, they will be relocated to the nearby riverine area associated with the GUR.	ER	ECO
2. Construction Phase Construction of Usutu Biomass pellet plant	<i>CI-01 Impact on Road Access</i> Biomass pellet plant construction will take place under traffic and will affect accesses leading to the Montigny Usutu Mill and Dambathi.	❖ The Contractor will ensure that no access to the fire station and other forest sections suffers any closure, temporary or otherwise, as a result of construction of the Biomass pellet plant. ❖ Where it will be inevitable that temporary disruption to accesses is necessary, the contractor will notify the all road access users community areas at least 14 days in advance of this inevitability, and immediately remove the disturbing force upon completion of works. ❖ The Contractor will regularly meet with ER management close to the proposed development, at least weekly during the construction phase of the development. ❖ The Contractor will document all proceedings of such meetings, including resolutions made and corrective actions undertaken to the satisfaction/dissatisfaction of the ER management.	Contractor	ECO
		❖ Where it is inevitable that temporary disruption to access is necessary, the contractor will notify the ER management at least 14 days in advance and immediately remove the disturbing force upon completion of works. ❖ The contractor will comply with the provision of the Factories Machinery and Construction Act, 1972 in so far as it will apply to working hours. ❖ Construction will not take place in the morning hours before 08:00hrs, and will not take place after 17:00 hrs, without the express permission of the Resident Engineer ❖ Construction activities will not be undertaken on weekends and between 1700hrs-0700hrs as per the Factories, Machinery and Construction Act of 1972. and will not take place after 17:00 hrs, without the express permission of the Resident Engineer	ER / Contractor	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
2. Construction Phase Construction of Usutu Biomass pellet plant	<i>CI-02 Impact on Services</i> Construction will impact on infrastructure such as EWSC water supply pipelines, EWSC Water Supply Works, and as well as EEC and EPTC lines.	<u>Water Supply</u> - The Contractor will take all necessary precautions to prevent the disruption of water supply to the community and nearby schools. - Where disruption will be inevitable, the contractor will formally notify the project-affected 14 days in advance, and provide water tankers for use by those affected by the disruption. - The contractor will pay for all damages to water supply pipes caused by his activities. <u>EEC Power lines</u> - The Contractor will take all necessary precautions to prevent the disruption of power supply close to the project site. - Where disruption will be inevitable, the contractor will formally notify project-affected 14 days in advance. - The contractor will pay for all damages to power supplies caused by his activities. <u>EPTC Lines</u> - The Contractor will take all necessary precautions to prevent the disruption of EPTC lines to the community and nearby schools. - Where disruption will be inevitable, the contractor will formally notify project-affected 14 days in advance. - The contractor will pay for all damages to EPTC lines caused by his activities.	Contractor	ECO
	<i>CI-03 Impact on Off-Site Areas</i> The proximity of the GUR may tempt the contractor to source sand from here.	❖ The tender document will stipulate that the contractor will refrain from sourcing sand and other natural resources from the banks of the GUR, as the contractor will not carry out any excavations for any purpose any nearer than 33m of the GUR as per the Public Stream Bank Regulations. ❖ The tender document will stipulate that although sourcing of sand from commercial sources is the contractor's prerogative, the requisite permits and EEA approvals are needed for non-commercial sources. Such requests will be availed by the successful tenderer to ER as an EMP for onward transmission to EEA for their sanction. ❖ The Contractor will comply with the Ministry of Natural Resources Act, where the suppliers of sand will ensure that they obtain the requisite License to Deal with Minerals from the Department of Geological Surveys and Mines, and a Permit from Swazi Sands.	Contractor	ECO
	<i>CI-04 Soil Pollution</i> Construction vehicles will require that a service yard be established, and both new and used oils will be stored there.	❖ The Contractor will ensure that all oils are kept in a concrete-bunded spill containment facility with an opening for periodic emptying. ❖ The Contractor will ensure that when servicing vehicles, drip trays are always used to prevent oil spills from being in direct contact with the soil. All oil rugs and related oily waste will be collected by oil suppliers for appropriate disposal.	Contractor	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
2. Construction Phase Construction of Usutu Biomass pellet plant	CI-05 Soil Erosion Soil erosion at the site will be a problem during construction	❖ The contractor will ensure that the construction period is minimized to within 6 months of the dry season to prevent long-term exposure to the elements. ❖ All reasonable precautions will be taken to prevent damage to land adjacent to the project site from storm action. In addition to construction of diversion trenches, interference with surrounding vegetation should be minimized and only vegetation that is directly in the way of construction should be removed. ❖ Rock gabions will be used to stabilize sloppy areas and prevent erosion. All disturbances will be rehabilitated immediately according to the following criteria: Stockpiling • Top soil (up to the root depth), will be stripped and stored with as little compaction as possible and only on non-wet days. • Stock piles will not exceed 2m in height • Stockpiles which are three (3) months older will be re-seeded. Rehabilitation of disturbed land and vegetation with topsoil - Manual spreading of top soil without compaction at least 50cm in depth during re-vegetation of disturbed land - Chemical analysis of topsoil to determine the type and quantity of fertilizer to be for vigorous growth of grass - Manual planting of grass runners like <i>Cynodon dactylon</i> or any other indigenous seed mix in 10cm deep contoured rows, approximately 20cm apart - Daily watering of the planted areas until growth is fully established ❖ The Contractor will ensure that all areas disturbed during construction are rehabilitated without delay. Progressive rehabilitation, i.e., the grassing of exposed areas immediately after works is finished rather than leaving this process till the end of the project will be essential. ❖ The Contractor will ensure that all dumps and stockpiles are arranged in such a way as not be exposed to the wind, and that all stockpiles are sprayed frequently with water. ❖ EEA approved borrow pits will be managed in an environmentally acceptable manner as instructed by the EMP of the borrow pit as approved by EEA.	Contractor	ECO
	CI-06 Impact on Water Supply: Construction Water Prior to construction of the Biomass pellet plant, several activities will take place in preparation for construction.	❖ There shall be no abstraction of water from any nearby rivers or streams without approvals from the Ministry of Natural Resources (River Basin Authority). ❖ Water required for dust control and other operations by the contractor will be taken out of streams and rivers only after consulting with authorities at the Natural Resources and Energy Ministry. ❖ When planning for water supply, consideration will be made with regards to the standards for the water supply and sanitation works, i.e., the statutory storage capacity of 30 days.		

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
2. Construction Phase Construction of Biomass pellet plant	<i>CI-07 Impact of Water Pollution</i> It is in the nature of their purpose that contractor's sites are a main cause of concern in so far as water pollution is concerned.	❖ Although the location of site offices for the project site will be a prerogative of the contractor, still certain condition must be met to avoid sanitation problems, the most important of which is to locate it no nearer than 33m from the GUR as per the Public Stream Banks Regulations. ❖ The contractor will ensure that as engineers, security and service personnel will occupy the site for the entire 6 months duration of construction, sanitation facilities are carefully planned for in terms of adequacy, gender sensitivity, and availability of a constant supply of water. ❖ The contractor will ensure that the proper type of sanitation facility at the site office is provided in the form of concrete septic tanks with French drains as opposed to pit latrines. ❖ Pollution during construction must be prevented at all cost. No cement mixing shall take place along the drainage lines. Mobile concrete mixers shall be used for this purpose. ❖ The contractor will ensure that workers do not relieve themselves in surrounding bushes, but use toilet facilities that will be provided. ❖ The contractor will provide enough chemical toilets for workers to be strategically located along the road corridor. The Contractor will ensure that stand pipes for washing hands and toilet papers are provided. ❖ There shall be no campsite to prevent the unsanitary and unhygienic conditions usually associated with labor camps, which are usually male-dominated.	Contractor	ECO
	<i>CI-08 Impact of Downstream Siltation</i> Pollution of water due to siltation from the excavated areas will be a problem during construction of the Biomass pellet plant.	❖ Only preventive measures are effective in keeping silt off watercourses. A short construction period is desirable, and if possible, construction can preferably be programmed to take place in the winter months. ❖ Working in small sections at a time that can be rehabilitated before proceeding to the next can reduce siltation considerably.	Contractor	ECO
	<i>CI-9 Impact on Fauna</i> Construction activities may cause further loss of animal species by straying onto adjacent uncleared areas.	❖ The contractor will educate his work force on the Game Act, and workers will refrain from killing animals, which will be given a chance to migrate to nearby habitats associated with the Montigny Usutu Mill riverine areas.	Contractor	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
2. Construction Phase Construction of Usutu Biomass pellet plant	CI-10 Impact of Alien Vegetation There is likelihood that construction activities may introduce alien/invasive species.	❖ To avoid importing alien plant seed, the Contractor will ensure that all plant is thoroughly washed free of soil before being imported to site, and thoroughly washed free of soil when being removed from site. ❖ The contractor as per Noxious Weed Act will actively destroy all alien species that might be introduced during construction and rehabilitation. Effective measures of destroying alien plants are: - Isolated plants must be rooted with a small hand pick - Rooted plants must be burnt or preferably left to rot - Chemical treatment of cut stems	Contractor	ECO
	CI-11 Impacts of Emissions During construction, vehicles will emit gases as they move on and off the project area as they haul, load and dump construction materials.	❖ The Contractor will speed up the construction program so as to minimize emission to the environment. ❖ The use of vehicles with clean engines will reduce the impact of emissions. This will require proper servicing of construction vehicles. As well, vehicle engines must be switched off when a vehicle is not in use.	Contractor	ECO
	CI-12 Impacts of Environmental Dust Construction vehicles moving on and off the construction site will lead to excessive dust	❖ The Contractor will speed up the construction program so as to minimize environmental dust on the surrounding communities. ❖ The contractor will strictly adhere to a dust limit of 150µg/m³. In the absence of equipment to measure dust, dust limits normal visibility. Personal protective equipment (nose mask) shall be used by all workers. ❖ The use of water carts for sprinkling water will go a long way in reducing dust levels along close to the project site. ❖ Water carts will be used to reduce levels of dust by sprinkling at least twice daily, or more frequently on dry windy days. ❖ Materials stockpiles will be frequently sprayed with water and workers must be provided with nose masks at places where earth-works will be carried out. ❖ Construction activities will not be undertaken on weekends or at night between 1700hrs and 0700hrs on weekdays as per the Factories, Machinery and Construction Works Act of 1972.	Contractor	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
2. Construction Phase Construction of Usutu Biomass pellet plant	CI-13 Noise Increased vehicular traffic is likely to increase ambient noise levels.	- Noise will be minimized by fitting noise suppression devices on all construction vehicles. Personal protective equipment (ear plugs) shall be used by all workers exposed to noise. - Construction activities will not be undertaken on weekends or at night between 1700hrs-0700hrs as per the Factories, Machinery and Works Act of 1972. - The Occupational Health and Safety Act (OHSA), 2001, and Safety Health and Environment (SHE) plans of construction companies dictate that at all times, workers operating equipment with a health hazard are provided with Personal Protective Equipment (PPE), to include ear plugs.	Contractor	ECO
	CI-14 Visual The excavation of borrow pits and pilling up of unwanted materials at spoil sites are likely to be a visual eyesore in the project.	- The visual impact of temporary structures such as those found in the contractor's site can be avoided by shielding or sitting these in hidden areas, and where this is not possible, physical shields such as corrugated sheets shall be used. - All machinery and equipment will be parked at the site office when not in use to minimize the visual impact of such equipments lying scattered around the site. - At all areas of activity, such as the spoil areas, borrow pits, progressive rehabilitation will be carried out immediately the disturbing force is removed, and not left till the end of the construction period.	Contractor	ECO
	CI-15 Construction Waste Construction will generate construction waste in the form of metal, plastic, cement bags, rubble, etc.	- Solid wastes generated by construction activities must be properly managed in compliance with the environmental legislation. Such waste will need to be properly disposed so as not to contravene the Waste Regulations of 2000, or the Litter Regulations of 2011. - A Waste Management Programme at construction will involve: - Collecting all waste to a temporary location but to be monitored so that it does not overspill - Sorting waste into recyclables (bottles, plastics, paper) and non-recyclables - Allowing recycling companies such as Pick It Up Waste Solutions to collect their raw materials, e.g. Ngwenya Glass, the Buy Back Center for others. - Transport the non-recyclable waste by bakkie/tractor/truck once a week to the Bhunya Landfill facility. - No waste arising from the site will be buried or burnt.	Contractor	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
2. Construction Phase Construction of Usutu Biomass pellet plant	CI-16 Safety Issues At construction sites, accidents are the most common cause of death through operation of machinery.	❖ The contractor will comply with the Occupational Health and Safety Act (OSHA) 2001 in as far as providing protective clothing to workers is concerned. ❖ Good workplace safety and health practices, including reporting, inspection and standards, are essential in reducing the number of accidents and injuries, as well as improving productivity. ❖ As the construction site will be a host to over 30 employees, the OHSA dictates that Safety, Health and Environment (SHE) representatives are elected to ensure that the Contractor's SHE policies are enforced. ❖ The OHSA dictates that the Contractor's SHE policy is displayed at the contractor's office, and is signed by the CEO of the contracting company. ❖ To assure that injuries and accidents at construction phase are kept at a minimal level, the contractor will ensure that vehicles and other equipments used are in good working condition. Precautionary measures will be undertaken at all sites where equipment will be mingling with traffic. ❖ Emergency procedures that need to be set up by the contractor during construction involve: • Preparedness to manage efficiently all types of emergencies through: - Training of at least one worker as an emergency officer. Currently WHO and MoHSW are involved in Emergency Preparedness and Response training. - Regular emergency drills • Setting up communication linkages with the nearest health facility and the Eswatini National Fire and Emergency Station to respond to such situations. • Availing reliable telephone and transport 24 hours a day to make these responses possible. • Maintaining of all fire extinguishers, blankets, etc, on regular basis, at all sites. ❖ The contractor will ensure that flagmen, to control traffic along the MR 18 Bhunya to Malkerns road and pedestrian crossings; are made highly visible through approved work kits. ❖ The contractor will provide appropriate safety equipment to workers and first aid training to the site foreman. ❖ The contractor must, following award of the tender, take out insurance cover for all construction related accidents to include property and public compensation.	Contractor	ECO
	CI-17 Impact on Public and Workers' Safety Construction sites have inherent safety risks and hazards.	❖ The contractor will make sure that adequate sanitary facilities and ablutions are provided for construction worker's usage to avoid the use of open spaces and bushes to relieve themselves. The contractor will engage local sanitation providers of chemical toilets to enhance the positive benefits of the project. ❖ The contractor will ensure that the toilets are enough for the workers and that high sanitary standards are practiced at all times. Also the contractor will make sure that his workforce is actively dissuaded from using the nearby river and bushes to defecate themselves.	Contractor	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
2. Construction Phase Construction of Usutu Biomass pellet plant	<i>CI-18 Criminal Element</i> Not all job seekers will be employed, making some to resort to petty thieving in the site office.	❖ The Contractor will engage the services of a reputable security firm to ensure that there is no petty thievery of construction materials and diesel from the site offices, and to patrol the road corridor at night. ❖ The Contractor will ensure that there are clear communication channels with the Bhunya Police Station. Every possible security measure must be implemented to decrease the chances of thugs robbing workers or contractors of their income.	Contractor	ECO
	<i>CI-21 HIV/AIDS</i> Employment opportunities will lead to migration of people from far into the construction site.	❖ The contractor will provide workers at the site office with basic HIV/AIDS education through information leaflets to be distributed within the site, and also through Toolbox Talks. ❖ The contractor will provide facilities such as free condoms, to be strategically distributed, especially in the toilets. ❖ The contractor will ensure that the site is not turned into a social or recreational facility, and employees will be warned in their employment contracts that unbecoming behavior may result in dismissal from the site. ❖ The contractor will ensure that the employment contracts and inductions stipulates clearly that workers are not to engage in any unbecoming activity whatsoever on the site with women from Bhunya, Zondwako, Luhleko, Mhlangeni, Lamgabhi and surrounding communities.	Contractor	ECO
	<i>CI-22 Impact of COVID -19</i> COVID-19 is a highly contagious disease that can have severe effects on people, especially those who are vulnerable.	❖ The contractor will provide workers at the site office with basic COVID-19 education through information leaflets to be distributed within the site, and also through Toolbox Talks. ❖ The contractor will allow plenty of space (two metres) between people waiting to enter site. ❖ Disinfectant will be dispersed to everyone before entering the premises at the entrance gate. ❖ The contractor will supply dust masks to all employees, this needs to be washed daily. ❖ Full long sleeve overall shall always be worn. ❖ The contractor will encourage employees to wear masks and gloves in vehicles ❖ Drivers should remain in their vehicles if the load will allow it, and must wash or clean their hands before unloading goods and materials ❖ Maintain Social distancing of 2 meters.		
	<i>CI-23 Creation of Employment (POSITIVE)</i> The impact on employment is definite, with 20 positions for skilled and semi-skilled workers anticipated in the construction team.	❖ The contractor will publicize the number of people required for construction activities and type of positions available to minimize false hopes. Available jobs will include general artisan assistants, cement mixers, truck drivers, construction technicians, and repetitive non-physical works such as grassing and gabion mat filling for women. ❖ The contractor will give first preference to qualified local Swati nationals from Bhunya, Zondwako, Luhleko, Mhlangeni, Lamgabhi and surrounding communities, and surrounding communities.	Contractor	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
2. Construction Phase Construction of Usutu Biomass pellet plant	CI-24 Entrepreneurship Opportunities (POSITIVE) During construction, certain aspects will be subcontracted formally to smaller businesses.	❖ In order for EmaSwati to see the development as beneficial to themselves and their communities, the contractor will ensure that qualified local and aspiring businesspersons are given first preference throughout out-sourcing of certain works so that the development does not seem exclusive to foreign engineers and companies. ❖ In the interest of fairness, the contractor will publicize works to be out sourced. This could be sale and transport of construction materials, sign writing, drainage and kerbing, rehabilitation works, security. ❖ The contractor is encouraged to subcontract a reasonable percentage of heavy haulage trucks to be used to transport earthwork materials to local Swazi-owned companies which employ women and physically-disturbed citizens, e.g., gabion fence making, gabion filling. ❖ The contractor will encourage members from the local community to sell food items to the workforce at tea and lunch time. However, high sanitary standards shall be enforced.	Contractor	ECO
	CI-25 Training (POSITIVE) The impact of training opportunities is a high positive.	❖ The contractor will, as much as possible, include in his workforce, a certain percentage of trainees from the local institutions with the aim of on-the-job training. ❖ The contractor will ensure that the training is properly supervised to equip the workers with the skills that they will need for future construction projects.	Contractor	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
3. Operational Phase Removal of all temporal construction materials, rehabilitation of excavated sites, commissioning of the Biomass pellet plant Project.	<i>OP-01 Soil Erosion</i> Developments of this nature often leave cleared areas unrehabilitated, and the soil prone to erosion.	❖ The Contractor will ensure that all the areas disturbed during construction are rehabilitated without delay, and that all access roads are rehabilitated as early as practically as possible. ❖ Long-term erosion will be controlled by proper landscaping and rehabilitation using Rehabilitation Plan to be prepared by the Contractor as part of his EMP when he sets up the site office.	ER	ECO
	<i>OP-02 Land Use (Maintenance)</i> Poor maintenance of the Biomass pellet plant will, in the long term, negate the anticipated improvement on access.	❖ ER will ensure proper maintenance of the Biomass pellet plant on a long-term basis. Maintenance involves, but is not restricted to: <u>Biomass pellet plant</u> – the need for ER to maintain this infrastructure to reduce vehicle maintenance costs and protect the investment. <u>Solid Waste</u> - the need for the ER to keep the Biomass pellet plant area is free from litter. <u>Drainage</u> – the need for ER to ensure that the drainage lines are clear at all times, and that debris does not obstruct the Biomass pellet plant side drains.	ER	ECO
	<i>OP-03 Particulates</i> All construction areas left unrehabilitated will result in the generation of dust.	❖ The contractor will ensure that all the exposed road surfaces are sealed with bitumen or an acceptable alternative at the earliest convenience. ❖ All construction areas, including borrow pits, spoil sites, contractors sites, etc., must be rehabilitated to a condition better or as close as possible to their original state. ❖ All temporary lanes will be ripped, diced, and rehabilitated to prevent dust generation.	ER	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
3. Operational Phase Removal of all temporal construction materials, rehabilitation of excavated sites, commissioning of the Biomass pellet plant Project.	<i>OP-04 Visual</i> Unrehabilitated borrow pits and excavated construction sites are likely to be an immediate blight to the landscape.	❖ At decommissioning, the Biomass pellet plant will be fully rehabilitated. A professional landscape planner will be commissioned by the contractor for this task. ❖ Borrow pits, stockpiles and the contractor's site office must be rehabilitated after construction has been completed, and a landscape planner must be engaged to improve the aesthetic value of all disturbed areas. ❖ The Contractor will remove all construction materials from the site office upon decommissioning, and will restore the site to its pre-construction condition. ❖ ER will ensure that erosion is controlled by proper landscaping and rehabilitation. In regard to soil erosion, maintenance will include the grassing of eroded areas in the annual maintenance budget for the Biomass pellet plant. ❖ ER will fix damaged road furniture such as guardrails, drains, signage and resealing of potholes, etc., at all times during the project lifetime.	ER	ECO
	<i>OP-05 Traffic Hazards</i> At operation, the workers will be exposed to traffic accidents.	❖ The proponent will ensure that road signs are placed in such a manner that they are easily seen by motorists. ❖ Mandatory stop signs at all the Biomass pellet plant, and speed limits will be stipulated.	ER	ECO
	<i>OP-06 Improved Infrastructure (POSITIVE)</i> The operational phase of the project will bring about positive changes in so far as the infrastructure is concerned.	❖ The Contractor will speed up construction and thereafter the ER will ensure that the Biomass pellet plant is properly maintained throughout its life cycle.	ER	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
3. Operational Phase Removal of all temporal construction materials, rehabilitation of excavated sites, commissioning of the Biomass pellet plant Project.	<i>OP-07 Hydrological Impacts</i> Storm Water Run-Off: During operational stages, it is anticipated that there will be an increase of storm water run-off, especially from the access roads and any other paved areas.	❖ ER will ensure that concrete storm water pipes are constructed to collect all storm water running on the surface of the project area and will ensure that these structures are well maintained to maximize their efficiency and are free of sand/pebbles or litter. ❖ ER will ensure that all surface water run-off exit the project area in a non- erosive manner. All drainage channels will be will be designed to carry the expected qualities. The surface roughness of the roadside drains should be increased to reduce the velocities near the outfall end of drains. ❖ ER will ensure that all surface drains have sand traps and are well maintained and serviced regularly e.g. removal of litter.	ER	ECO
	<i>OP – 08 Waste Management Impacts</i> During operational phases, the challenge to the project is to implement the best practical environmentally acceptable waste management practices for management of waste.	❖ ER will ensure that compliance with the Waste Regulations of 2000. ❖ ER will ensure that waste receptacles to be provided for disposal of waste. ❖ ER will ensure that waste is sorted out at source, i.e., different marked containers for glass, paper, metal cans separately and stored in separate bins for collection by recycling companies (no littering of used parts around the area) ❖ ER will routinely inspect waste storage areas for possible adverse impacts on the environment ❖ ER will ensure that all types of waste generated are disposed of at the Bhunya Landfill Facility. ❖ ER will ensure “Don’t litter” signs to be put in premises in both siSwati and English.	ER	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
3. Operational Phase Removal of all temporal construction materials, rehabilitation of excavated sites, commissioning of the Biomass pellet plant Project.	OP – 9 Risks and Hazards The safety and health of all employees is a primary concern for all industries especially where human beings interact with machinery, there is always a risk of fire and any emergencies.	<i>HIV/AIDS</i> - ER will publicly display his/her workplace HIV/AIDS policy which will include the undertaking that HIV testing will remain voluntary; and no employee will be discriminated because of his or her HIV status. - ER shall put in place an HIV/AIDS policy to protect the community from the ravishing effects of HIV and AIDS. - In order to reduce the infection rate in the workplace, each respective company within the site will develop programs that are in line with HIV and AIDS National strategic plans objectives which state that: - Increase the proportion of sexually active employees who use condoms consistently - Reduce the proportion of sexually active employees which have sex with more than one sexual partner - Reduce proportion of employees who have experienced workplace based sexual abuse - These objectives could be achieved by developing programs for peer educators, condom distribution, referral systems, HIV and AIDS policy to address the issues of stigma and discrimination. NERCHA as coordinating entity will support the new Biomass Pellet Plant to link up with AIDS servicing organization and other coordinating bodies.	ER	ECO
	OP – 10 Fire and Emergency Fire must be regarded as a constant threat. However, the risk is difficult to quantify, but the catch phrase in mitigation is “preparedness”.	<i>Fire and Emergency</i> - Intrinsic firefighting requirements that the ENFES Chief Fire Officer considers the minimum for the Biomass Pellet Plant will be provided. These are stipulated in the Water Supply and Fire Hydrant (Amendment) Regulations of 1982 as follows: - A supply capacity to the hydrant system of 11, 00 l/m for 6 hours (a total of 3960 cu.m @ 183 l/sec). - A fixed volume elevated storage of 276m is regarded by the SNFES as the minimum storage necessary to be retained at all times for initial fire fighting purposes. - A distance between hydrants of 120m. - A minimum hydrant discharge rate of 1500 l/min (25 l/sec) with a residual head of 15m. - ER will ensure that clear communication channels with the Montigny Usutu fire brigade and the nearest Eswatini Fire Emergency stations such as the Mankayane and Manzini Fire Station are established. As well, fire hydrants and extinguishers should be easily locatable within the buildings and they should be inspected three times a year. - ER will display at a prominent area within the premises evacuation procedures, and conduct fire drills regularly.	ER	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
3. Operational Phase Removal of all temporal construction materials, rehabilitation of excavated sites, commissioning of the Biomass pellet plant Project.	<i>OP – 11</i> <i>Accidental Spills</i> <i>Operational Phase</i> The safety and health of all employees is a primary concern for the Biomass Pellet Plant especially where human beings interact with machinery, there is always a risk of accidental Chemical and oil spills, fire and any emergencies.	<i>Spills</i> <u>Accidental Oil Spill Reporting</u> - ER and the employees of the entity will immediately report all incidents of accidental, sudden or non-routine discharge to the EEA, giving details of the incident including the quantity, quality and reason for the spillage (if any) have been taken to mitigate any adverse environmental impacts of the spillage. - ER will immediately notify the Ministry of Health and any other bodies in the locality which may be able to assist in preventing or mitigating harm to human or animal health or to the environment, unless the incident has not and will not create a risk to human or animal health. - ER will take all reasonable measures to warn potentially affected persons of the danger arising from the discharge, including television and radio broadcast if appropriate. <u>Remedial Action</u> - ER will immediately take all reasonable measures to avoid and mitigate any damage which may be caused to the environment or to human health as a result of the spillage. - ER attention is drawn to the fact that the EEA may require that they take measures to mitigate or repair any damage to the environment caused as a result of the discharge or to prevent a recurrence of any incident which caused the damage. - ER attention is drawn to the fact that failure to comply with such a notice may result in the EEA carrying out the required measures to be taken, and may order property owners to reimburse the EEA for costs of taking such measures.	ER	ECO

Activity	Impact Description	Mitigation Measures	Implementing Authority	Monitoring Authority
3. Operational Phase Removal of all temporal construction materials, rehabilitation of excavated sites, commissioning of the Biomass pellet plant Project.	<i>OP – 12 Air Quality (Emissions)</i> <i>Operational Phase</i> Emissions from the biomass boiler and fugitive dust released during transfer of wood waste into the fuel storage unit have the potential to affect air quality. and have virtually no visible emissions or perceivable odour.	<i>Emissions</i> • The proposed facility will be designed and operated in strict adherence to the Air Pollution Regulations of 2010 (In Appendix 4) that help manage the major sources of business and industrial emissions and restrict these contaminants. • The fuel storage area will be kept secured at all times to prevent introduction of waste from external sources being introduced into the system. • Wood waste from external sources will not be used as fuel for the proposed biomass boiler. • The fuel storage area will be kept secured at all times to prevent introduction of waste from external sources being introduced into the system. • The fuel storage and transfer areas will be enclosed to minimize dispersion of fugitive dust during fuel transfer.	ER	ECO

7. REHABILITATION PLAN

7.1 General Rehabilitation

ER will use the following General Rehabilitation Plan derived from MoAC's Criteria for Rehabilitation of Land Disturbed by Construction Activities and the Hydrological Criteria for the Control of Erosion during construction that will take place at Usutu Biomass pellet plant site.

7.2 Hydrological Criteria for the Control of Erosion

Hydrological Criteria for the Control of Erosion are summarized below. A qualified specialist will prepare specifications for the detailed design in accordance with this criteria.

Structures	Hydrological criteria for the control of erosion
Catch water drains above cuts	Catch water drains will be constructed above cuts to prevent run-off from flowing across the cuts as follows: - The drains will be lined with stone pitching or concrete (depending on the availability of stone for this purpose). - Where the natural gradients where the slopes on which the drains are constructed is 1:3 or more gentle than 1:3, catch-water banks will be constructed immediately downstream of the catch-water drains (using the materials excavated from the drains). - Where the natural gradients of the slopes on which the drains are constructed exceed 1:3, stone-masonry walls will be constructed immediately downstream of the drains (the walls will enable development of drains with the required capacity and will be more resistant to erosion than the catch-water banks). - Catch-water banks and slopes above the crest of the cuts will be vegetated to bind the soil and limit the potential for erosion, grass runners and mulch will be used on the steep slopes and hand sowing will be used on more gentle slopes. - The catch-water drains will be designed for the 1:20 year rainfall event. - The catch-water drains will be constructed before the developments of the cuts to limit the erosion of the cuts.
Slope gradients of cuts	- Cuts will be steep to limit run-off across and, consequence, erosion of the face. - The slope gradients will be determined by geotechnical stability criteria – the gradient will range from 1:0.5 (for fine decomposed granite, with prevention of erosion being the key criterion) to 1:1.5 for mixed material (soil, stone and boulders, with prevention of boulders falling being the key criterion).
	- In general, the faces of cuts will be too steep to enable vegetation to be established on these faces – vegetation generally cannot be established on slopes with steeper gradients than 1:1.5. - Vegetation of steeps cuts is also not deemed desirable because the planting of the vegetation will disturb the surface of the cuts and create conditions conducive to the erosion of the surface of the cuts. - If there are any cut faces with more gentle gradients than 1:1.5, these cut faces will be rehabilitated using grass runners mulch.

Structures	Hydrological criteria for the control of erosion
Catch water drains above cuts	• Debris traps up to 3m wide will be constructed at the toe of cuts with slope gradients steeper than 1:1.5 to capture any material falling from the face and prevent these materials from blocking the cut drains. • The traps will be reinforced through the addition of cement to the soil layer (5% cement) to produce a soilcrete layer. This will facilitate clearing of debris from the debris trap without scouring and, consequently, creating a channel adjacent to the drainage channel.
Cut toe drains and mitre chutes	• Cut drains will be lined to prevent scouring stone-pitching or concrete (depending on the availability of stone for this purpose). • The drains will discharge water from the ends of cuts via mitre chutes. • Mitre cuts will be lined to prevent scouring with grass sod, stone-pitching, concrete or gabion mattresses depending on the velocity of flow. • Where protection of fill is required, a mitre bank will be constructed. • Depending on the topography and the natural drainage patterns at the point of natural drainage lines directly or indirectly via toe drains. • The cut toe drains and mitre chutes will be designed for the 1:5 year rainfall event.
Fill slope gradients	• Fill slope gradients will not be steeper than 1: 1.5 and will be more gently than 1:1.5, preferably at least 1:3, where possible to facilitate the establishment of vegetation on the slopes.
Fill toe drains	• Drains will be constructed along the toe of fills to direct flow into natural drainage lines. These drains will collect water from mitre chutes (from cut drains) and pipe chutes (from road berms). • The drains will be lined with stone-pitching, concrete or gabion mattresses depending on the velocity of flow. • Depending on the topography and natural drainage patterns at the point of discharge, the toe drains will discharge into natural drainage lines directly or indirectly via cross drains through fill. • The drains will be designed for the 1:5 year rainfall event.
Stockpiles and soil dumps	• Stockpiles of construction materials and spoil dumps will not be placed in a natural drainage lines. • At borrow-pit sites, stockpiles will be placed within the confines of the surface-water management infrastructure (canal and bunds) at these sites. • Within the borrow pit areas, stockpiles and dumps will be placed in areas where there are barriers to flow from the catchment. These barriers could include catch-water drains or fills. Where there are no barriers, bunded canals designed for the 1:5 year rainfall event will be constructed upstream of the stockpiles. Where the size of stockpiles and dumps exceed 500m³, bunded canals must be constructed downstream to capture run-off from the 1:5 year rainfall event.

7.3 Criteria for Rehabilitation Of Land Disturbed By Construction Activities

Rehabilitation measures	Study Area	Criteria
Topsoil stripping	All areas disturbed by construction activities	- Topsoil is defined as the top layer of soil that can be mechanically removed to depth of 500mm without blasting. - Topsoil will be stripped from all areas to be disturbed by construction activities and stockpiled for use in the rehabilitation of disturbed land. - Careful attention will be paid to topsoil stripping and storage practices as follows: - Topsoil will be stripped and stored with as little compaction as possible and not in wet weather (the clay content will lead to cementation if too much moisture is present); - Topsoil stockpiles will not exceed 2m in height to prevent compaction and limit dispersion of dust from the stockpiles. - Stockpiles which are likely to remain undisturbed for 1 months or more will be vegetated; - Topsoil will be respread with as little compaction as possible; - Land to which topsoil has been applied will be vegetated.
Landscaping	Roads	- Geotechnical stability will be the key criterion influencing the slope gradients. - Where geotechnical stability criteria allow, slope gradients should be at least 1:3 to facilitate the establishment of vegetation. - Where slope gradients are 1:1.5 or greater than 1:1.5 and are not protected by structural scour-protection measures, the slopes will be established by vegetation.
	Other disturbed land	The disturbed land will be landscaped such that slope gradients are reduced to at least 1:3 and preferably 1:5.
Use of topsoil in the rehabilitation of land	Roads	- Topsoil is wasted on slope with gradients less than 1:2 as it will quickly be washed away by erosion or caused to slip off by gravity. - On slopes with a gradient of 1:2 or greater than 1:2, the layer of topsoil spread over the landscaped surface will be at least 200 mm and preferably 500 mm. - Topsoil will have to be spread manually on slopes with a gradient of less than 1:4. - Topsoil will be spread with as little compaction as possible.
	Other disturbed land	- For rehabilitation of cultivated land, the layer of topsoil spread over the landscaped surface will be at least 500 mm. - For rehabilitation of grazing land and wilderness, the layer of topsoil spread over the landscaped surface will be at least 200 mm and preferably 500 mm. - Topsoil will have to be spread manually on slopes with gradient of less than 1:4. - Topsoil will be spread with as little compaction as possible.
Fertilizers to be applied	All areas disturbed by construction activities.	Samples of different types of soil will be tested to determine the quantity and type of fertilizer required for vigorous growth of grass (most fertilizer companies offer this as a service).

Rehabilitation measures	Study Area	Criteria
Preparation of the bed for planting	All areas disturbed by construction activities	- Topsoil will be ripped to 100 mm. - Manual preparation of the bed is deemed desirable as it will create employment opportunities for the local communities. - The method of preparation of the bed depends on the method of planting. - Mechanical preparation of the seed bed will be constrained by steep slope gradients (less than 1:4).
Method of planting	All disturbed areas	Grass runners and mulch – preferred manual option for steep slopes (gradients of less than 1:3) - Runners of grass with a stoloniferous and rhizomatous growth form will be hand planted in to drills on the slopes to facilitate rapid stabilization of the slopes. - Trenches or the runners will be cut approximately 10 cm deep along the contour at a spacing of approximately 300 mm. - A mulch of grass cut from the surrounding veld, when the grass is in seed, will also be used – the mulch application rate should be 2 tons/ha. - The mulch may need to be secured on slopes with a gradient of less than 1:2, particularly during the rainy season (October to March), with pegged netting (temporary plastic bird netting or permanent biodegradable geonetting). - Seeds can be added to the mulch if deemed necessary by the rehabilitation specialist. - The success of this method is strongly dependant on the techniques used and the supervision of planting – detailed guidelines will be prepared by the rehabilitation specialist. Hydroseeding – alternative mechanical option for steep slopes (gradients of less than 1:3) - The grass and fertilizer slurry will include a mulch of grass cut from the surrounding veld, when the grass is in seed, will also be used – the mulch application rate should be 2 tons/ha. - An adhesive will be included in the moisture to prevent the seed and fertilizer from blowing, washing or slipping. Hand sowing – preferred manual option for more gentle slopes (gradients of more than 1:3) - Trenches of the seeds will be cut approximately 10 cm deep along the contour at a spacing of approximately 300 mm. - The seeds and fertilizer will be broadcast into the trenches by hand and , then, the soil should be gently compacted using a garden rake or similar implement. - A mulch of grass cut from the surrounding veld, when the grass is in seed, will also be used – the mulch application rate should be 1 ton/ha. Mechanical sowing – alternative mechanical option for more gentle slopes (gradients of more than 1:3) - Fertilizer will be spread over the surface and then ploughed or disced in. - The surface will then be harrowed until fine seed bed has been prepared. - The seed will be broadcast and then rolled with an agricultural roller. - A mulch of grass cut from the surrounding veld, when the grass is in seed, will also be used – the mulch application rate should be 1 ton/ha.

Rehabilitation measures	Study Area	Criteria
Species to be planted	All disturbed areas	- Runners of <i>Cynodon dactylon</i> (kweek/star grass) should be used in grassland areas (areas which have not been disturbed by cultivation). - Runners of <i>Pennisetum clandestinum</i> (kikuyu) can be used in areas surrounded by cultivated land, they will not be used in grassland areas, particularly the Maguga valley and in relatively undisturbed areas. - The seed mix should contain a rapidly germinating annual commercial species which will act as a “nurse crop” – this will stabilise the soil rapidly and will then die out allowing for colonization of the vegetated area by indigenous species. <i>Eragrotis teff</i> (teff) is ideal for his purpose and should be applied at a rate of 0.5 kg/ha. - The seed mix should also contain perennial commercial species with a high seed viability. These species should not be invasive. The following species are recommended, each at an application rate of 1 kg/ha: <i>Cynodon dactylon</i> (star grass); <i>Chloris gayana</i> (Rhodes grass); <i>Cenchrus ciliaris</i> (Cenchrus); and <i>Digitaria eriantha</i> (smuts grass).
Irrigation	All planted areas	- Microspray irrigation should be used and the irrigation system could be linked to a water cart. - After planting (sowing of seeds and/or planting of runners), the planted areas will be irrigated on a daily basis until the seedling and/or runners have established. - Irrigation of established vegetation will only be required if rainfall is poor (less than 300 m/yr) and/or there is dieback of vegetation.
Maintenance	All planted areas	- Monitoring of plant development in revegetated area. The frequency of monitoring required varies according to the phase of plant establishment. . monitoring will be conducted on a weekly basis during the initial phase and can be done on a monthly basis and then a seasonal basis as the plants become established. - Vegetation will be re-established in areas where the vegetation cover has died back.

8. ENVIRONMENTAL MANAGEMENT SYSTEM

Policy

There is a need to formulate a strategy for environmental management at UFPC. The strategy will include formulating a policy to ensure commitment, and an environmental management system to guide the company in implementing this strategy.

ER must make a commitment to carry out its projects in ways that will protect and preserve the environment through a “ER Environmental Management Policy.”

ER Environmental Policy’s central theme will be “carrying out all operations in compliance with applicable environmental laws and regulations”.

This policy will be publicly displaced at the reception area, and all major areas of ER operation and at its construction sites.



Environmental Management System (EMS)

ER will translate ER Environmental Management Policy into action by establishing an Environmental Management System, which will be a framework for its implementation.

With the assistance of a consultant, ER will produce an EMS document, which will contain written operational procedures for all environmental aspects of the company.

The EMS will be compliant with applicable environmental laws and regulations at national, regional, and international levels.

The EMS will utilize data collected from the company's operations to implement continuous improvement programs to minimize the environmental impact of its operations and identify potential cost savings.

The EMS will strive to eliminate the use of, generation of, and where necessary manage hazardous materials in an environmental acceptable manner. Employee training, code of practice for dangerous goods transportation, containment procedures, storage of flammable liquids, material safety data sheets, etc, will form part of the EMS.

The EMS will ensure that all operational areas conduct their activities in a manner that minimizes global climate change (fuels), minimize water pollution, and minimize waste.

The EMS will make it a strict requirement that ER conduct internal Environmental Audits and safety audits every three years, and establish procedures to regularly confirm compliance with SEA's EAARR 2000 in so far as environmental assessments for new developments are concerned.

The EMS will make provisions for co-operation with public, private, governmental and non-governmental organizations and encourage stakeholder dialogue and feedback and ideas for continuous improvement in ER Environmental Performance.

Monitoring

In terms of the Environmental Assessment Regulation of 2022, promulgated under the Eswatini Environmental Management Act (Act No. 5 of 2002), there is a requirement for the monitoring of environmental issues during the execution of the project. The main purpose of monitoring is to ensure that the prescribed mitigation measures / actions are carried out and to track the progress in implementation of the CMP in achieving the stated objectives.

As part of the monitoring of compliance of the project to environmental management guidelines, periodic Project Compliance Reports (PCRs) will need to be compiled by the ECO. The frequency of submission of PCRs to the relevant environmental authority (i.e. the SEA) will be stipulated in the Environmental Compliance Certificate issued by them. The structure and format of the **Project Compliance Report** should be as follows:



- Introduction
- Purposes of PC Report
- Progress/Status of Project
- Compliance/Non Compliance to proposed mitigation measures & Recommendations
- Conclusions
- Next Compliance Inspection

9. NON - COMPLIANCE

The Contractor shall comply with the environmental specifications and requirements on an on- going basis and any failure on his part to do so will entitle the RE to impose a penalty. In the event of on-compliance the following recommended process shall be followed:

- The Resident Engineer (RE) shall issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.
- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice. The Contractor shall provide the RE with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO. In the case of the Contractor failing to remedy the situation within the predetermined time frame, the RE shall impose a monetary penalty based on the conditions of contract.

In the case of non-compliance giving rise to physical environmental damage or destruction, the RE shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so. In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the CMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be referred to specialists for determination. The RE shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

10. CONCLUSION

All the prepared mitigation measures have been presented in a manner to ensure that all the activities to be undertaken are conducted in an environmentally and socially acceptable manner. Regular monitoring and commitment by the various identified parties responsible for specific activities will ensure that all identified and non-identified issues are adequately addressed before environmental damage is done.

11. THE INITIAL ENVIRONMENTAL IMPACT ASSESSMENT TEAM



- ✚ **Team Leader/Environmental:** Mr. Similo B. Nkonyane, who is conversant with SEA requirements for EIA, and has vast experience in the field, and also carried out research on the biophysical environment, socio-economic environment and carried out all necessary environmental researches.
- ✚ **Environmental Health Specialist:** Mr. Sidumo Nkonyane suggested mitigation measures to offset or enhance the negative and positive of Risk, Safety, Health issues respectively.
- ✚ **Ecologist** Mr. Nkosingiphile Mahlalela suggested mitigation measures to offset or enhance the negative and positive of Biodiversity.
- ✚ **Environmental Technician:** Mr. Wandile Sacolo, primarily collected data, maps from different stakeholders, mapped out project areas, conducted photography and surveys, and involved in production of the document.

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13. List of Consulted Individuals & Organisations

Name of Participant	Organization	Address/Contact
1. Ms. Patience Mamba	Usutu Forest Product Company	2452 5600
2. Mr. Justice Mahlalela	Usutu Forest Product Company	2452 5600
3. Mr. Christo Snyman	Emerald Renewables	2452 5600
4. Mr. Matsebula	Eswatini Environment Authority	2404 6960



APPENDICES



Appendix 1

Site Layout Map



Appendix 2

Categorization Letter



Appendix 3

Project Brief



Appendix 4

Air Pollution Control Regulations of 2010

