REPORT

Central Térmica de Temane Project - Waste Management Plan

Moz Power Invest, S.A. and Sasol New Energy Holdings (Pty) Ltd

Submitted to:

Ministry of Land, Environment and Rural Development (MITADER)

Submitted by:

Golder Associados Moçambique Limitada

6th Floor, Millenium Park Building, Vlademir Lenine Avenue No 174

Maputo, Moçambique

+258 21 301 292

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EXECUTIVE SUMMARY

Introduction

This report presents the Waste Management Plan (WMP) undertaken as part of the Environmental and Social Impact Assessment (ESIA) process required for a proposed gas to power facility known as the Central Térmica de Temane (CTT) Project. The Proponent for this application is Moz Power Invest, S.A. (MPI), a company to be incorporated under the laws of Mozambique under a joint development agreement with Sasol New Energy Holdings (Pty) Ltd (SNE). Shareholding for MPI is comprised of Electricidade de Mozambique E.P. (EDM) and Temane Energy Consortium (Pty) Ltd (TEC).

The scope of work for this specialist study reporting to the ESIA contains a project overview; legal framework; baseline waste environment; waste and wastewater management plans; mitigation and monitoring actions.

The overall objective of the study is to identify all waste streams associated with the project, record their inherent hazardousness, to identify the potential impacts of these waste streams and to develop measures to mitigate those impacts that cannot be eliminated or minimized to an acceptable level.

The WMP has been conducted in accordance with the following:

- Mozambique legislation;
- International conventions, World Bank performance standards and EHS guidelines; and
- Sasol's Environmental Management Plans with respect to waste and wastewater.

Baseline Waste Environment

The waste streams (solid and effluents) generated by the CTT project are expected to be mostly from equipment and vehicle maintenance at the Logistics and Worker's Camps. The production of waste and wastewater shall be dealt with in the following manner:

- Wastes destined for reuse and recycling ((as far as is practical) include:
  - General wastes: paper, wood, textiles, metal and plastic containers, tyres and domestic waste (food waste recommended to be composted); and
  - Hazardous wastes: printer cartridges (return to supplier for re-inking), waste oils (by gravity separation) and lead acid batteries
- Wastes disposed on site include:
  - Construction and demolition waste (or reuse for construction foundation); and
  - Garden waste.
- Wastes removed by a subcontractor and disposed at an appropriately licensed waste facility include:
  - General Waste: food waste, contaminated packaging waste, kitchen oil and by-products from emissions controls
  - Hazardous wastes: medical and laboratory glassware, fluorescent tubes, empty drums, used oil filters, sludge, aerosol cans, single use Personal Protective Equipment and batteries.
- Wastewater

With respect to wastewater management the following elements are relevant:

- Domestic wastewater, potentially oil contaminated (POC) water or sewage shall be transferred to Waste Water Treatment Plan (WWTP) for treatment before release to the environment. The effluent will be disposed in line with the Mozambican regulations on effluent water disposal requirements Decree 18/2004 of 2 June (amended by Decree 67/2010 of 31 December) and the World Bank EHS guidelines.

Waste Management Accountabilities

The WMP establishes accountability (producer responsibility) within specified timeframes through various waste minimization, re-use, recycling, recovery and safe treatment and disposal initiatives.

Conclusion and Recommendations

This document presents the Waste Management Plan for the CTT project. It provides a waste management baseline and details the goals, objectives and targets timeframes for implementation and roles and responsibilities to achieve a compliant standard of waste management for the CTT project.

Recommendations have been included for measures to reduce risks of performance irregularity imposed by effluent and waste demands primarily in the logistics and worker's camps where such risks could result in non-compliance events. Further recommendations have been made to ensure that the Environmental Management Plan is updated to improve alignment with the project. Ideally this plan should be reviewed every 5 years in order to keep up with advances in the waste management industry and to ensure its continued suitability, adequacy and effectiveness.

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ACRONYMS

Acronym	Description
CCGT	Combined Cycle Gas Turbine
CPF	Central Processing Facility
CTT	Central Térmica de Temane
EDM	*Electricidade de Moçambique* (Mozambique State Electricity Company)
EIA	Environmental Impact Assessment
EMS	Environmental Management Systems
EPCM	Engineering, Procurement, Construction Management
ESIA	Environmental and Social Impact Assessment
ESO	Environmental Site Office
FNDS	Fundo Nacional de Desenvolvimento
Ha	Hectares
HSSE	Health, Safety, Security and Environment
IFC	International Finance Corporation
KV	Kilovolts
MITADER	Ministry of Land, Environment and Rural Development
MSDS	Material Safety Data Sheet
MW	Megawatt
OCGE	Open Cycle Gas Engines
POC	Potentially Oily Contaminated
PPZ	Partial Protection Zone
SEPI	Sasol Exploration Production International
SNE	Sasol New Energy Holdings
SPT	Sasol Petroleum Temane Lda
TDS	Total Dissolved Solids
WTN	Waste Transfer Note
WWTP	Waste Water Treatment Plant

GLOSSARY OF TERMS

Term	Description
Bio-Medical Waste	Mozambican waste Decree 8/2003 of 18 February defines bio-medical waste as waste resulting from medical or veterinary diagnosis, treatment and research.
Contractor	The organisation that is appointed to represent the Proponent and to manage the sub-contractors' activities.
Disposal	The burial, deposit, discharge, abandoning, dumping, placing or release of waste into, or onto, any land. In accordance with National Law it is the use of any of the operations specified in Annex V of Decree 83/2014 of 31 December 2014 (see Appendix A).
Domestic Waste	Waste excluding hazardous waste, that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes.
Environmental Coordinator (EC)	A permanent employee with environmental experience, based in Mozambique, and responsible for the coordination of the environmental and social impact management of the project.
Environmental Site Officer (ESO)	This is a person with environmental training who is responsible for the day-to-day environmental management of construction activities.
Environmental Specialists	These are either personnel employed by the Proponent or external specialists called in for specific environmental aspects as defined by the environmental coordinator.
Hazardous Waste	Hazardous waste is waste that contains organic or inorganic elements or compounds with risk characteristics for being flammable, explosive, corrosive, toxic, infectious or radioactive, or for exhibiting any other characteristic that constitutes hazard for the health and safety of humans or other living creatures and for environmental quality.
Inert waste	Inert waste is waste that does not undergo any significant physical, chemical or biological transformation after disposal; does not burn, react physically or chemically biodegrade or otherwise adversely affect any other matter or environment, with which it may come into contact; and does not impact negatively on the environment, because of its pollutant content and because toxicity of its leachate is insignificant.
Non-Hazardous Wastes	Non-hazardous waste is waste that does not undergo any significant physical, chemical or biological transformation after disposal; does not burn, react physically or chemically biodegrade or otherwise adversely affect any other matter or environment, with which it may come into contact; and does not impact negatively on the environment, because of its pollutant content and because the toxicity of its leachate is insignificant. It is therefore waste with no risk characteristics according to National Law
Pollution Prevention	The reduction in volume and/or toxicity of waste prior to discharge or disposal.
Proponent	Refers to Moz Power Invest, S.A. (MPI) under a joint development agreement with Sasol New Energy Holdings (Pty) Ltd (SNE). Shareholding for MPI is comprised of Electricidade de Mozambique E.P. (EDM) and Temane Energy Consortium (Pty) Ltd (TEC).
Recovery	The controlled extraction of a material or the retrieval of energy from waste to produce a product.
Recycle	A process where waste is reclaimed for further use, which process involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material.
Re-use	To utilise articles from the waste stream again for a similar or different purpose without changing the form or properties of the articles.

Source Reduction (Minimisation)	The reduction or elimination of waste at its source. Involves the evaluation of the facility and its processes, operating practices, raw materials and waste generating processes.
Special Wastes	Based on Basel convention, special wastes are those that do not fit into the hazardous, non-hazardous, decomposable, or inert waste categories or which have special waste disposal practices. The naturally occurring radioactive materials (NORM) waste fall into this category.
SPT	Refers to Sasol Petroleum Temane Lda, which is a subsidiary of Sasol Petroleum International (Pty) Ltd. The company, Sasol Petroleum Temane Lda, is based in Mozambique, having its principle place of business at Avenida 25 de Setembro, 420, Predio JAT, 2 Andar, Sala L4, Caixa Postal 4356, Maputo, República de Moçambique.
Treatment	Any method, technique or process that is designed to change the physical, biological, or chemical character or composition of a waste in order to minimise the impact of the waste on the environment prior to further use or disposal. Treatment is divided into four categories: Thermal, Chemical, Biological, and Physical.
Waste	Waste is any unwanted substance or object which is disposed of, is intended to be disposed of, or is required to be disposed of by the provisions of National Law.
Waste disposal facility	Any site or premise used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premise.
Waste transfer facility	A facility that is used to accumulate and temporarily store waste before it is transported to a recycling, treatment or waste disposal facility.
Work sites	Areas within which the Proponent and Contractor activities take place, including the construction right of way, Transmission lines, and the like but excluding the Worker's Camp and Logistics Camp

1.0 PROJECT OVERVIEW

1.1 Introduction

The Mozambican economy is one of the fastest growing economies on the African continent with electricity demand increasing by approximately 6-8% annually. In order to address the growing electricity demand faced by Mozambique and to improve power quality, grid stability and flexibility in the system, Moz Power Invest, S.A. (MPI), a company to be incorporated under the laws of Mozambique and Sasol New Energy Holdings (Pty) Ltd (SNE) in a joint development agreement is proposing the construction and operation of a gas to power facility, known as the Central Térmica de Temane (CTT) project. MPI's shareholding will be comprised of EDM and Temane Energy Consortium (Pty) Ltd (TEC). The joint development partners of MPI and SNE will hereafter be referred to as the Proponent. The Proponent propose to develop the CTT, a 450MW natural gas fired power plant.

The proposed CTT project will draw gas from the Sasol Exploration and Production International (SEPI) gas well field via the phase 1 development of the PSA License area, covering gas deposits in the Temane and Pande well fields in the Inhassoro District and the existing Central Processing Facility (CPF). Consequently, the CTT site is in close proximity to the CPF. The preferred location for the CTT is approximately 500 m south of the CPF. The CPF, and the proposed site of the CTT project, is located in the Temane/Mangugumete area, Inhassoro District, Inhambane Province, Mozambique; and approximately 40 km northwest of the town of Vilanculos. The Govuro River lies 8 km east of the proposed CTT site. The estimated footprint of the CTT power plant is approximately 20 ha (see Figure 1).

The proposed project will draw gas from either the Sasol Exploration Production International (SEPI) gas well field via the existing Central Processing Facility (CPF) or from an alternative gas source. Consequently, the CTT site is in close proximity to the CPF. The preferred location for the CTT is approximately 500 m south of the CPF. The CPF, and the proposed site of the CTT project, is located in the Temane/Mangugumete area, Inhassoro District, Inhambane Province, Mozambique; and approximately 40 km northwest of the town of Vilanculos. The Govuro River lies 8 km east of the proposed CTT site. The estimated footprint of the CTT power plant is approximately 20 ha.

Associated infrastructure and facilities for the CTT project will include:

1) Electricity transmission line (400 kV) and servitude; from the proposed power plant to the proposed Vilanculos substation over a total length of 25 km running generally south to a future Vilanculos substation. [Note: the development of the substation falls outside the battery limits of the project scope as it is part of independent infrastructure authorised separately (although separately authorised, the transmission line will be covered by the Project ESMP, and the Vilanculos substation is covered under the Temane Transmission Project (TTP) Environmental and Social Management Plans). Environmental authorisation for this substation was obtained under the STE/CESUL project. (MICOA Ref: 75/MICOA/12 of 22nd May 2012)];

2) Piped water from one or more borehole(s) located either on site at the power plant or from a borehole located on the eastern bank of the Govuro River (this option will require a water pipeline approximately 11km in length);

3) Access road; over a total length of 3 km, which will follow the proposed water pipeline to the northeast of the CTT to connect to the existing Temane CPF access road;

4) Gas pipeline and servitude; over a total length of 2 km, which will start from the CPF high pressure compressor and run south on the western side of the CPF;

5) Additional nominal widening of the servitude for vehicle turning points at points to be identified along these linear servitudes;

6) A construction camp and contractor laydown areas will be established adjacent to the CTT power plant footprint; and

7) Transhipment and barging of equipment to a temporary beach landing site and associated logistics camp and laydown area for the purposes of safe handling and delivery of large oversized and heavy equipment and infrastructure to build the CTT. The transhipment consists of a vessel anchoring for only approximately 1-2 days with periods of up to 3-4 months between shipments over a maximum 15 month period early in the construction phase, in order to offload heavy materials to a barge for beach landing. There are 3 beach landing site options, namely SETA, Maritima and Briza Mar (Figure 7). The SETA site is considered to be the preferred beach landing site for environmental and other reasons; it therefore shall be selected unless it is found to be not feasible for any reason; and

8) Temporary bridges and access roads or upgrading and reinforcement of existing bridges and roads across sections of the Govuro River where existing bridges are not able to bear the weight of the equipment loads that need to be transported from the beach landing site to the CTT site. Some new sections of road may need to be developed where existing roads are inaccessible or inadequate to allow for the safe transport of equipment to the CTT site. The northern transport route via R241 and EN1 is considered as the preferred transport route (Figure 8) on terrestrial impacts; however, until the final anchor point is selected, and the barge route confirmed, the marine factors may still have an impact on which is deemed the overall preferable route.

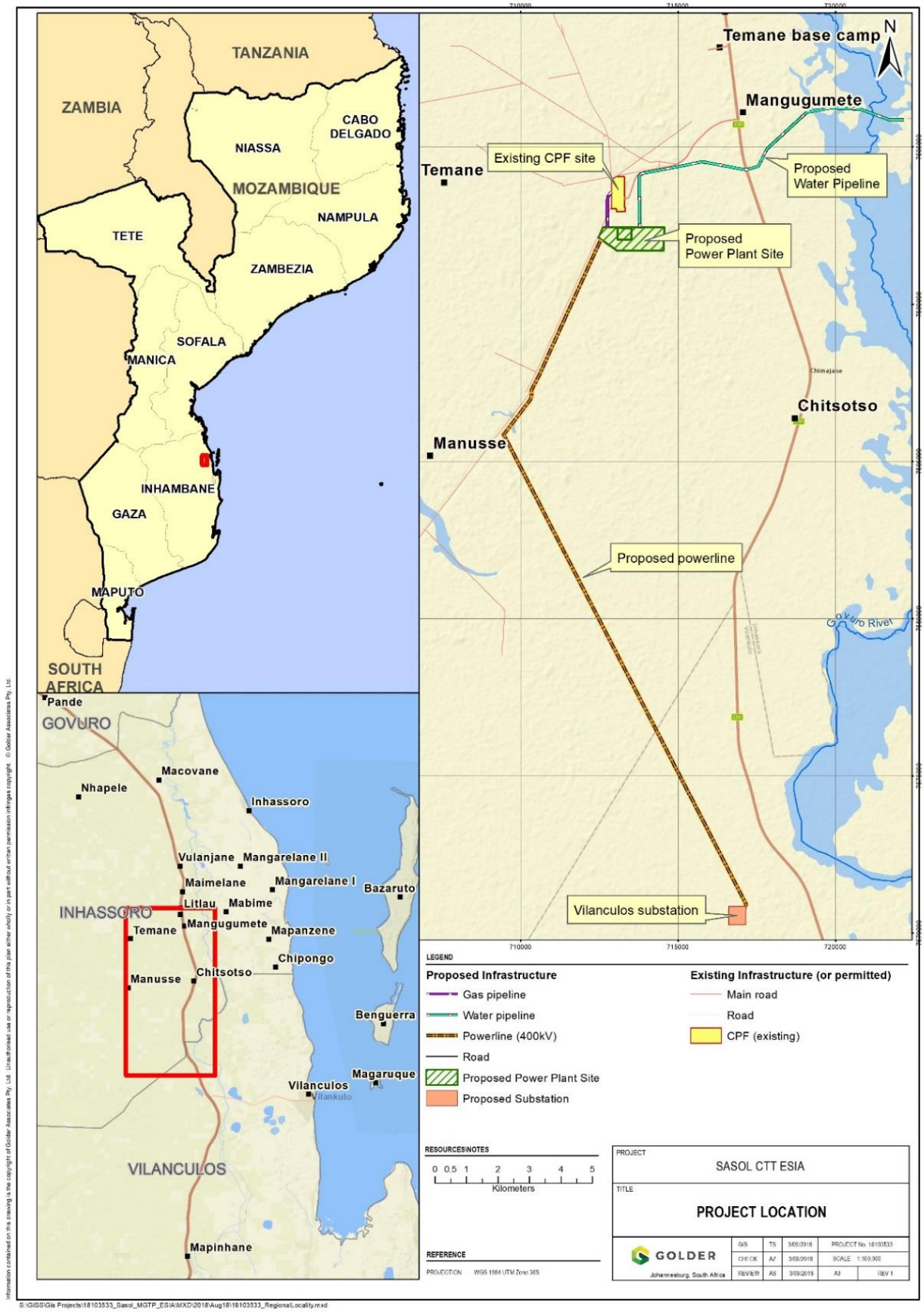

Figure 1: Project Location

1.2 Purpose and Objectives of this Document

The objective of the Waste Management Plan (WMP) is to provide a system for the identification, classification, minimization, handling, storage and treatment/disposal of all wastes generated as a result of the CTT project activities and associated infrastructures, on the surrounding environment during the project lifecycle, to ensure:

- Compliance with Mozambique waste management legislation;
- Conformation with oil and gas World Bank performance standards and World Bank EHS guidelines; and
- Implementation of industry best practice waste management procedures, in order to eliminate or mitigate potential impacts on the environment and human health.

In the long term, this will reduce waste management costs, environmental liabilities, and risks.

The WMP elaborates the requirements with respect to the definition and assessment of the potential impacts of all types of wastes expected to be produced from the project activities. The types of waste and wastewater generated during the CTT project lifecycle are described.

1.2.1 Intended Users

This document is applicable to all of the Proponent's activities undertaken during the CTT project. It is also applicable to contractors working under business agreements with the proponent for the CTT project.

2.0 LEGAL FRAMEWORK

This section summarizes the current national and international legislation, standards and guidelines that regulate environmental matters relevant to the management of waste.

2.1 Mozambican Legal Framework

2.1.1 Regulatory Authorities

- **Ministry of Land, Environment and Rural Development (MITADER)**

MITADER is responsible for directing the implementation of environmental policy, coordinating, advising and auditing. Under waste management, it is the Ministry's responsibility for the following:

a) To issue and disseminate binding rules on the procedures to be followed under waste management;
b) To carry out the environmental licensing of facilities or places of storage and / or disposal waste;
c) To monitor compliance with the provisions of the regulations and the rules on waste management;
d) To ensure public participation in the licensing process provided in paragraph (b) of this number, as well as access to relevant information on waste management.

2.1.2 Mozambican Regulations

The legal framework summarised below are the main laws, policies, directives and guidelines applicable to the CTT project activities.

Table 1: Mozambican Regulations

Name	Summary
Environment	
Constitution of the Republic of Mozambique, 16 November 2004	The constitution establishes the fundamental right to a balanced environment and the corresponding duty to defend it. The constitution further declares natural resources in the soil and the subsoil, in inland waters, in territorial waters, on the continental shelf, and in the exclusive economic zone to be State property.
Environmental Law (Decree 20/1997 of 1 October)	The Environment Law defines a number of fundamental environmental management concepts and principles, establishing the basic institutional framework for environmental protection; establishing a general norm which prohibits all activities that cause environmental damage exceeding legally defined limits (pollution in particular); stipulating special norms to protect the environment (protecting biodiversity in particular); providing for a set of environmental management instruments (the environment license, the environmental impact assessment process and the environmental audit); and describing the system inspection, offences and penalties for non-compliance.
Environmental Quality and Prevention of Pollution	
Regulations on Environmental Quality and Emission Standards (Decree 18/2004 of 2 June), as amended by Decree 67/2010 of 31 December	The Regulations are in terms of Article 10 of the Environment Law, and are concerned with environmental quality standards for air, water and soil. Regarding air, the Regulations establish standards for emission limits related to specified industrial processes and for ambient air quality. Regarding water, the Regulations specify compliance requirements for industrial liquid effluent that is discharged into the environment. Standards for different industries are set out, including domestic discharges (understood to mean discharges from sewage treatment works) and discharges from the petrochemical industry. The location of an emission from any source must be determined during the environmental licensing process so as to ensure that there is no change in the quality of the water in the receiving body, preventing the use of its water for other purposes.
Regulation for Prevention of Pollution and Protection of Marine and Coastal Environment (Decree 45/2006 of 30 November)	Approves the Regulation for the prevention of marine pollution and environmental protection of the coastal areas in order to protect the marine and fresh water ecosystems. This Regulation aims to prevent marine pollution caused by vessels, platforms, or any other polluting infrastructure which illegally perform any discharge into the waters (including inland waters), of waste waters, residues, or any polluting substance.
Waste Management	
Regulations on Urban Solid Waste Management (Decree	The Regulations establish rules on the production, emission or disposal in the soil and subsoil, in water or the air, of any toxic or polluting substance, as well as the execution of activities that accelerate deterioration of the environment, to avoid or minimize their negative impact on health and the environment.

Name	Summary
94/2014 of 31 December)	It applies to all natural and legal, public and private persons involved in the production and management of solid urban waste and the production and management of industrial and medical waste. The Decree in its Article 8 and Annex I (Waste Management Plan), mandates all the public or private entities that perform waste management activities, to develop and implement a waste management plan. The integrated management plans of municipal solid waste are valid for a period of five (5) years from the date of approval by the Municipal Assemblies or Governments.
Regulation on the Management of Biomedical Solid Waste (Decree 8/2003 of 18 February)	Establishes the rules relative to biomedical waste management, with the aim of safeguarding medical service employees' health and safety and the public in general and minimize impact of such waste on the environment. It requires all medical units, research institutes and companies covered by this regulation to develop a biomedical waste management plan, line a) of nº 2, Article 4.
Regulation on Hazardous Waste Management (Decree 83/2014 of 31 December)	This Decree approves the Regulation on Hazardous Waste Management and aims at establishing general rules related to waste disposal, including: the establishment of rules for the production and management of hazardous waste in the country and applies to all natural and legal, public and private persons involved in hazardous waste management or import, distribution and sale of expired used or new tires.
Petroleum Operations	
Environmental Regulations for Petroleum Operations, (Decree 56/2010 of 22 November).	These Regulations address EIA requirements for oil and gas related activities. Under this statute, petroleum operations are defined as "all or some of the operations related to exploration, development, production, separation and treatment, storage, transport and sale or delivery of petroleum at the agreed supply point in the country, including the operations of natural gas processing and the closure of all operations concluded". These Regulations clearly set out the EIA procedures for petroleum operations and the measures to be observed with regard to prevention, control, mitigation and rehabilitation of the environment.
Petroleum Law (Law 21/2014 of 18 August).	This law provides the framework for all aspects of petroleum related activities in Mozambique, including the rights to use and benefit from land and for Rights of Way to be designated as Partial Protection Zones and for rights holders to this land to be compensated. It also covers environmental protection and safety and requires EIAs for petroleum related activities for approval by relevant authorities; and provides for environmental controls of pollution, reporting of accidental discharges, and rehabilitation of damaged sites.

2.2 International Guidelines and Conventions

The following are international conventions and guidance related to waste management as is applicable to the CTT project:

- **World Bank Group (OP4.03) Performance Standards and World Bank Environmental, Health and Safety (EHS) Guidelines**

The WB EHS guidelines provide guidance for the following:

- Information in support of actions for avoiding, minimizing, and controlling EHS impacts during the construction, operation, and decommissioning phases of a project or development of a facility;
- The implementation of the IFC Performance Standards, particularly on those aspects related to Performance Standard 3: Pollution Prevention & Abatement and aspects of occupational and community health and safety;
- Assisting decision makers with relevant industry background and technical information;
- Management of produced water/wastewater – guidelines for reduction, reuse and disposal; and
- Treatment and disposal of general waste waters (sewage, drainage and storm water).

In the event of a host country's regulations differing from the levels and measures presented in the WB EHS Guidelines, projects will be expected to comply with whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed deviation/alternatives should be provided.

- **Performance Standard (PS) PS3:** Resource Efficiency and Pollution Prevention. This PS requires the investor to avoid or minimise **adverse** human impacts on human health and the environment by avoiding or minimising pollution from project activities.
- **Air Quality** - **Air emissions** guidelines are outlined in the World Health Organisation (WHO) Air Quality Guidelines Global Update. EHS guidelines for air quality management include the identification of possible risks and hazards associated with the project as early on as possible and understand the magnitude of the risks; the potential consequences to workers, communities, or the environment if these hazards are not adequately managed or controlled. Impacts to air quality should be prevented or minimised by ensuring that emissions to air do not result in pollutant concentrations exceeding the relevant ambient air quality guidelines or standards.

- **General WB EHS Guidelines: Environmental Waste Management**

These guidelines apply to projects that generate, store, or handle any quantity of waste across a range of industry sectors. It provides guidance in terms of general non-hazardous waste, hazardous waste and waste monitoring options. The Proponents' commitment to waste minimisation, reuse and recycle is audited against the intent of these general EHS guidelines.

Sludge and other discarded material, including solid, liquid, semi-solid, or gaseous material resulting from industrial operations needs to be evaluated on a case-by-case basis to establish whether it constitutes a hazardous or a non-hazardous waste. Facilities that generate and store wastes should practice the following:

- Establishing waste **management** priorities at the outset of activities;
- Establishing a waste management hierarchy that considers first prevention then reduction, reuse, recovery, recycling, removal and finally disposal of wastes;
- Avoiding or minimizing the generation of waste materials, as far as practicable; and
- Where waste generation cannot be avoided, minimize, recover and reuse waste

- **General WB EHS Guidelines: Power Plants**

The EHS Guidelines for Thermal Power Plants includes information relevant to the waste streams and management of waste.

Recommended measures to prevent, minimize, and control the volume of solid wastes from thermal power plants include recycling of solid wastes in uses such as cement and other concrete products, construction (roads), disposal of solid wastes in permitted landfills and dry handling of solid wastes, in particular fly ash.

- **South African National Standard (SANS) 101031 -** Mozambique has not promulgated its own noise regulations and reference is usually made to other standards and guidelines in cases where noise impacts need to be assessed. SANS 101031 is aligned with World Health Organisation (WHO) 2 guidelines.
- **Conventions**
  - The Basel Convention (1992) (on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal) to which Mozambique has acceded (1997), controls the movement, storage, transport, treatment, reuse, recycling, recovery and final disposal of hazardous waste as well as requiring producers of hazardous waste to dispose of their waste in an environmentally responsible manner close to where it is generated.
  - The Bamako Convention (1991) is supplementary to the Basel Convention and specifically covers the movement of hazardous waste into or between signatory African countries. Mozambique acceded this convention in 1999.
  - The Stockholm Convention (2004) on Persistent Organic Pollutants is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment. Mozambique acceded this convention in 2006.
  - Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (1998).
  - The European Waste Incineration Directive, Directive 2000/76/EC on the Incineration of Waste. This directive provides regulations for the incineration of household and hazardous waste in Europe. The aim of the Waste Incineration Directive is to prevent or to reduce, as far as possible, negative effects on the environment caused by the incineration and co-incineration of waste.
  - Basel Convention Technical Guidelines on Incineration on Land, 2002. These guidelines focus on the disposal of hazardous waste by thermal processes.

2.3 Sasol Environmental Management Plans

This WMP is supported by Sasol's Environmental Management Plans (EMPs) namely:

- Exploration, Appraisal and Development Activities in the Sasol License Areas EMPs (2017):
  - Construction (Infrastructure) Environmental Management Plan;
  - Framework Decommissioning and Rehabilitation Plan (f-DRP);
  - Drilling Environmental Management Plan;
  - Operational Environmental Management Plan;
  - Oil Spill Response Plan;
- Central Processing Facility's (Sasol Petroleum Temane Lda, 2013):
  - Construction Environmental Management Plan.

The EMPs take into account the following overall project processes and outputs with regard to the waste and wastewater (effluent) impacts:

- Site water management:
  - Stormwater management; and
  - Effluent management.
- Solid waste management:
  - General;
  - Waste storage and transport;
  - Waste disposal;
  - Recycling of waste; and
  - Development and operation of waste disposal sites;
- Hazardous materials management and disposal:
  - General;
  - Management of hazardous materials;
  - Storage and handling of hazardous materials;
  - Disposal of hazardous waste;
  - Disposal of medical waste;
  - Incineration of waste; and
  - Contaminated soils.

The EMPS further state (in the Environmental Management Structures) that the CTT Operations Manager shall ensure that all parties comply with all the requirements of the EIS and EMP to control waste, avoid pollution and ensure that waste is minimised.

3.0 PROJECT DESCRIPTION

The CTT project will produce electricity from natural gas in a power plant located 500m south of the CPF. The project will consist of the construction and operation of the following main components:

- Gas to Power Plant with generation capacity of 450MW;
- Gas pipeline (±2 km) that will feed the Power Plant with natural gas from the CPF;
- 400kV Electrical transmission line (± 25 km) with a servitude that will include a fire break (vegetation control) and a maintenance road to the Vilanculos substation. The transmission line will have a partial protection zone (PPZ) of 100m width. The transmission line servitude will fall inside the PPZ;
- Water supply pipeline from one or more borehole(s) located either on site or at borehole(s) located east of the Govuro River;
- Surfaced access road to the CTT site and gravel maintenance roads within the transmission line and pipeline servitudes;
- Temporary beach landing structures at Inhassoro for the purposes of delivery of equipment and infrastructure to build the power plant. This will include transhipment and barging activities to bring equipment to the beach landing site for approximately 1-2 days with up to 3-4 months between shipments over a period of approximately 8-15 months;
- Construction camp and contractor laydown areas adjacent to the CTT power plant site; and

- Temporary bridge structures across Govuro River and tributaries, as well possible new roads and/or road upgrades to allow equipment to be safely transported to site during construction.

Figure 2: Examples of gas to power plant sites (source: www.industcards.com and www.wartsila.com)

The final selection of technology that will form part of the power generation component of the CTT project has not been determined at this stage. The two power generation technology options that are currently being evaluated are:

- Combined Cycle Gas Turbine (CCGT); and
- Open Cycle Gas Engines (OCGE).

Please refer to Chapter 4 of the main ESIA document for further details on the technology option.

At this early stage in the project a provisional layout of infrastructure footprints, including the proposed linear alignments is indicated in Figure 1. A conceptual layout of the CTT plant site is shown below in Figure 3.

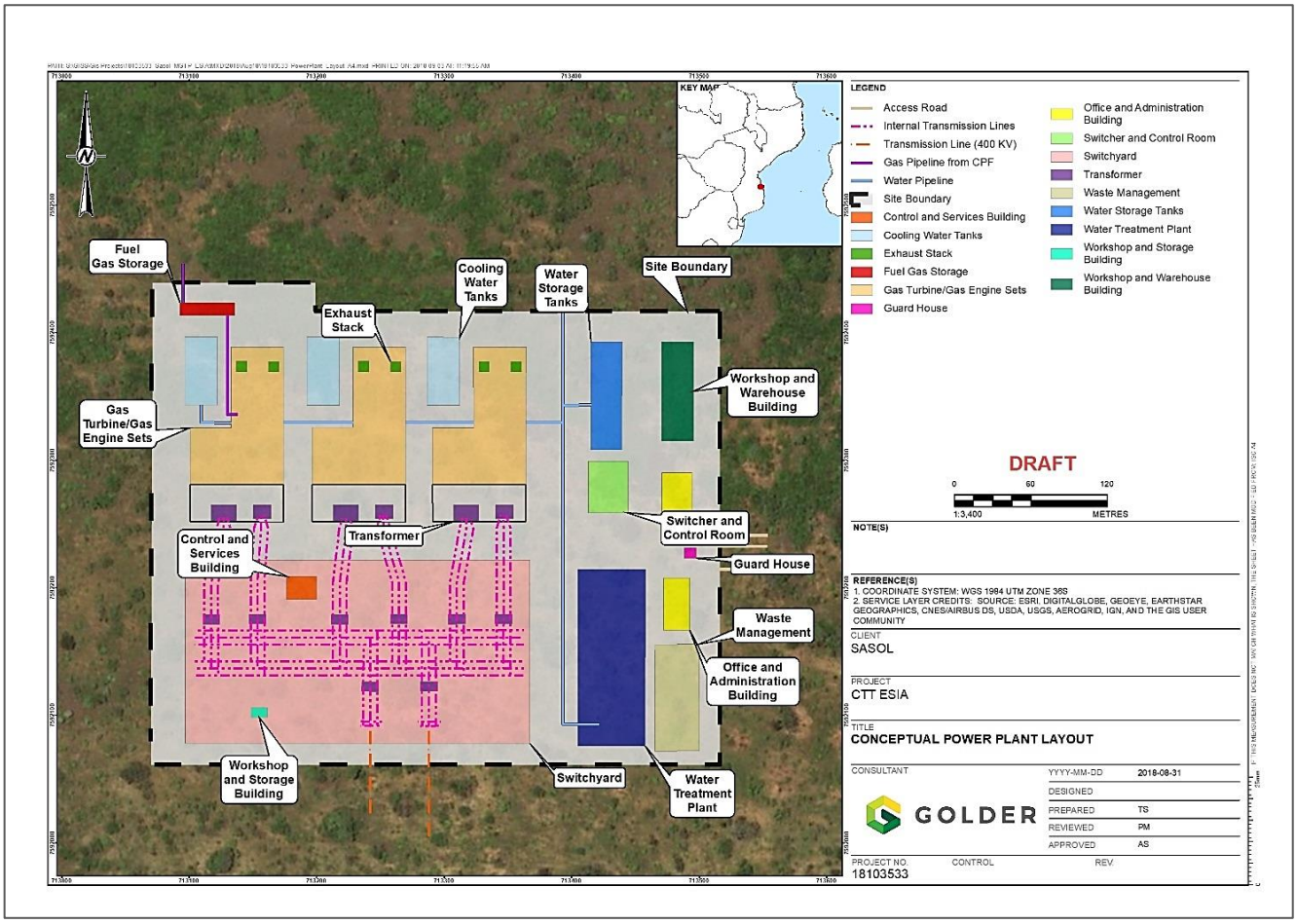

Figure 3: Conceptual layout of CTT plant site

3.1 Ancillary Infrastructure

The CTT project will also include the following infrastructure:

- Maintenance facilities, admin building and other buildings;
- Telecommunications and security;
- Waste (solid and effluent) treatment and/or handling and disposal by third party;
- Site preparation, civil works and infrastructure development for the complete plant;
- Construction camp (including housing/accommodation for construction workers); and
- Beach landing laydown area and logistics camp.

The heavy equipment and pre-fabricated components of the power plant will be brought in by ship and transferred by barge and landed on the beach near Inhassoro. The equipment and components will be brought to site by special heavy vehicles capable of handling abnormally heavy and large dimension loads. Figure 4, Figure 5 and Figure 6 show examples of the activities involved with a temporary beach landing site, offloading and transporting of large heavy equipment by road to site.

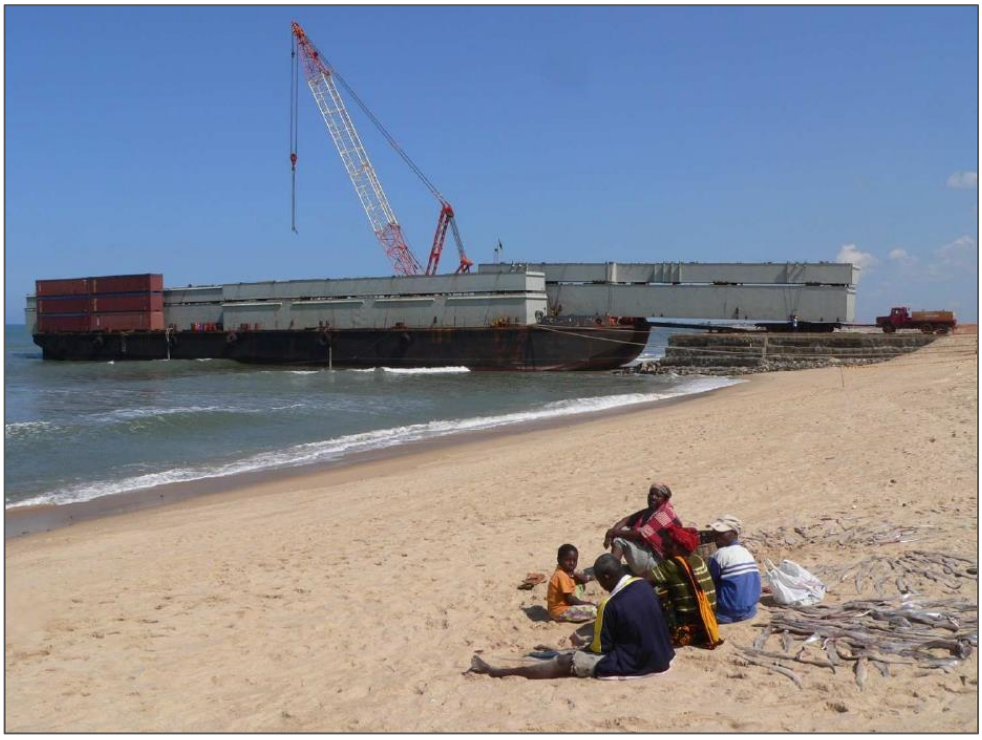

Figure 4: Typical beach landing site with barge offloading heavy equipment (source: Comarco)

Figure 5: Example of large equipment being offloaded from a barge. Note the levels of the ramp, the barge and the jetty (source: SUBTECH)

Figure 6: Heavy haulage truck with 16-axle hydraulic trailer transporting a 360 ton generator (source: ALE)

3.2 Water and electricity consumption

The type, origin and quantity of water and energy consumption are still to be determined based on the selected technology to construct and operate the CTT plant. At this stage it is known that water will be sourced from existing boreholes located on site or east of the Govuro River for either of the technology options below:

- Gas Engine: ± 12 m^3/day; or
- Gas Turbine (Dry-Cooling): ± 120 – 240 m^3/day.

3.3 Temporary Beach Landing Site and Transportation Route Alternative

As part of the CTT construction phase it was considered that large heavy equipment and materials would need to be brought in by a ship which would remain anchored at sea off the coast of Inhassoro. Equipment and materials would be transferred to a barge capable of moving on the high tide into very shallow water adjacent to the beach to discharge its cargo onto a temporary off-loading jetty (typically containers filled with sand) near the town of Inhassoro. As the tide changes, the barge rests on the beach and off-loading of the equipment commences.

Currently, the SETA beach landing site is the preferred beach landing site together with the road route option to be used in transporting equipment and materials along the R241 then the EN1 then via the existing CPF access road to the CTT site near the CPF. Figure 7 and Figure 8 indicate the beach landing site and route transportation option. The alternative beach landing sites of Maritima and Briza Mar are still being evaluated as potential options, as well as the southern transport route, which would also require road upgrades and a temporary bridge construction across the Govuro at the position of the existing pipe bridge. As part of the transportation route, the Grovuro River bridge may need to be upgraded / strengthened to accommodate the abnormal vehicle loads. Alternatively, a temporary bypass bridge will be constructed adjacent to the existing bridge.

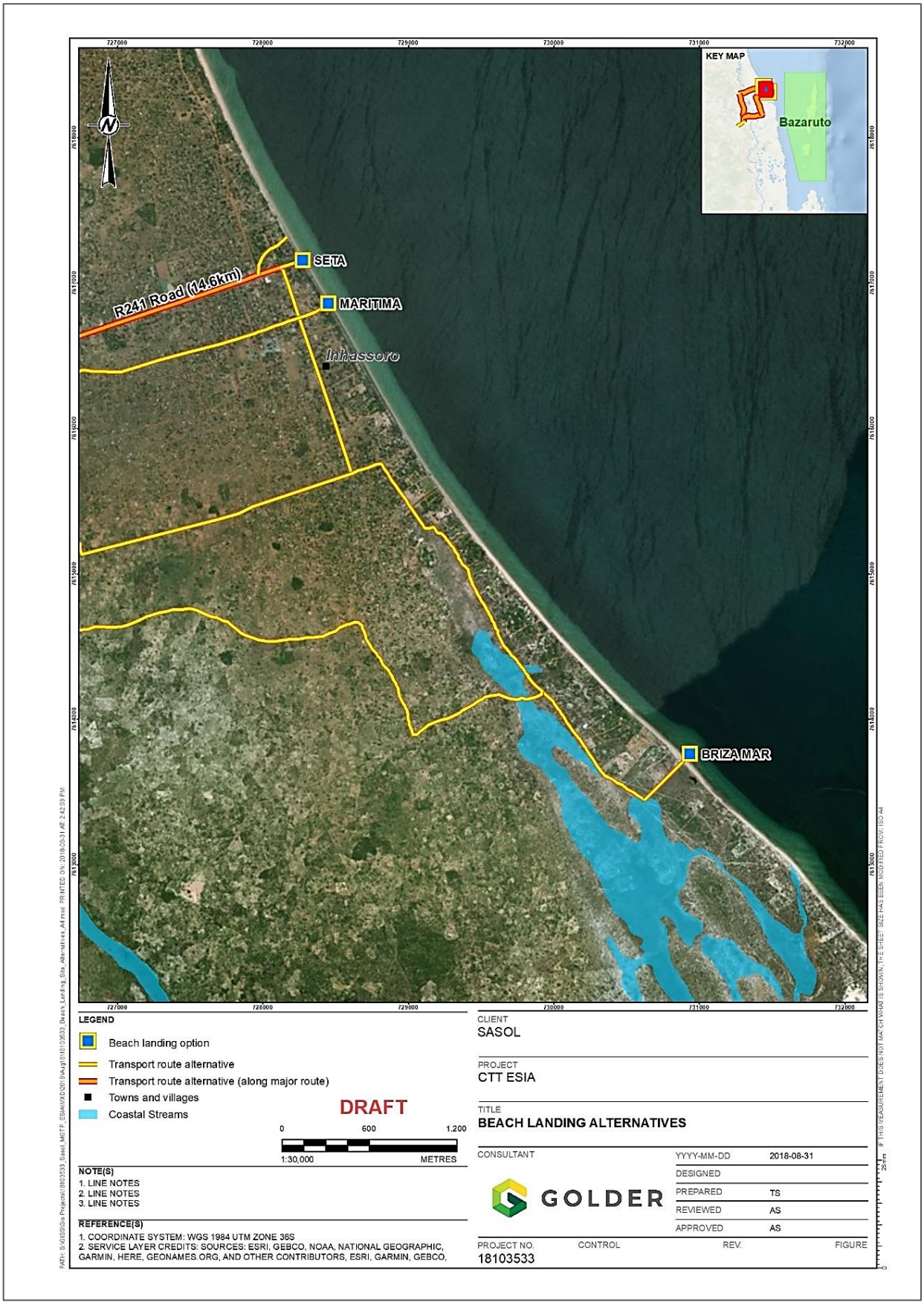

Figure 7: The three beach landing site options and route options at Inhassoro

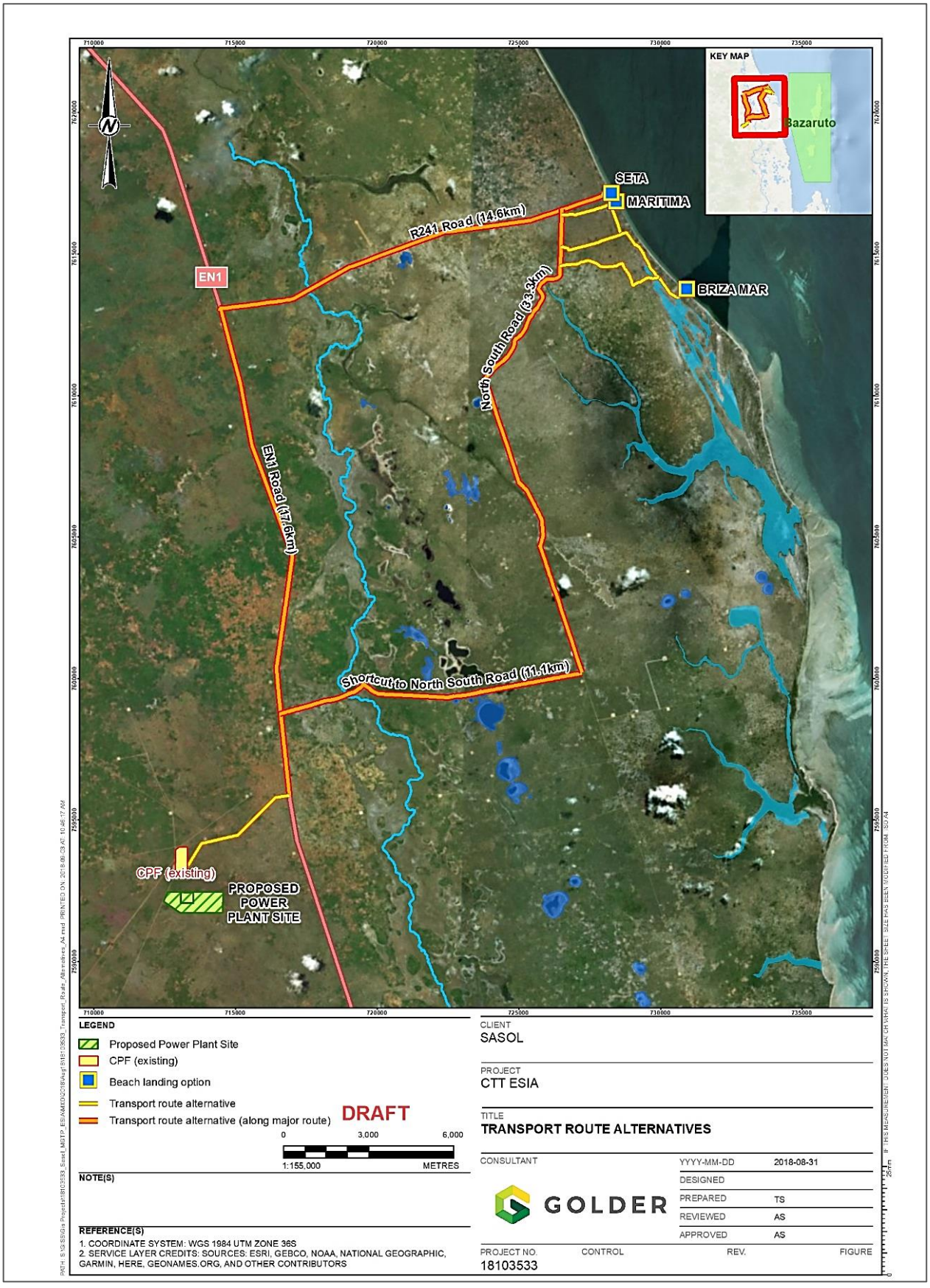

Figure 8: The two main transportation route alternatives from the beach landing sites to the CTT site

4.0 WASTE BASELINE ENVIRONMENT

4.1 Waste Identification and Classification

All waste generated by the Proponent on the CTT project will be classified in accordance with the Mozambican applicable legislation, namely the Regulations on Urban Solid Waste Management Regulations (Decree 94/2014 of 31 December) and the Regulations on Hazardous Waste Management (Decree 83/2014 of 31 December), which classifies hazardous waste based on specific characteristics.

4.2 Non-Hazardous Waste

Non-hazardous waste includes a wide range of materials that can be recycled (depending on if they have been source segregated) and does not exhibit any hazardous properties. Examples include domestic waste such as food, packaging materials, scrap metals, various metals and wood.

Article 14 of the regulations on Urban Solid Waste Management classifies non-hazardous waste according to the following categories:

a) Organic materials;

b) Paper or cardboard;

c) Rubble;

d) Plastic;

e) Glass;

f) Metal;

g) Textiles;

h) Rubber;

i) Bulky household waste;

j) Special waste.

With the exception of special wastes, which is not explicitly defined in the regulation, it is expected that all the above waste types will be generated by the CTT project to some extent, with the quantities of these wastes varying depending on the activity.

It should be noted that some products are considered non-hazardous prior to their intended use yet may become hazardous once used and may contain a range of hazardous chemicals or contaminants (e.g. oil contaminated rages and wipes).

4.3 Hazardous Waste

Hazardous waste as defined by the Mozambican law, are those listed in Annex IX of the hazardous waste regulation, which can be potentially harmful to human health or has the potential to damage the environment and demonstrates one or more of the hazard characteristics listed in Annex III of the regulation. They include wastes which have any of the following characteristics:

- Explosive;
- Flammable;
- Toxic;
- Infectious;

- Radioactive; and
- Other characteristics that constitute a danger to the life or health of humans and other living beings and to the quality of the environment.

The characteristics of hazardous wastes are further described in Annex III of the same decree (Appendix B). Despite being hazardous, several types of hazardous wastes can and should be recycled, to the extent where technically feasible or possible (e.g. waste oils and solvents).

4.4 Biomedical Waste

Bio-medical waste is regulated by Decree 8/2003, Bio-medical Waste Management Regulations and it refers to waste resulting from diagnosing, treatment (the waste that would originate from the project clinic) as well as human and veterinary science survey. The Decree indicates how bio-medical waste should be separated, identified, stored, removed, transported and disposed. Bio-medical waste will be separated into the following types:

- Infectious waste;
- “Sharps” (needles, knives etc.);
- Anatomical waste;
- Ordinary waste; and
- Pharmaceutical waste.

Only a limited amount of anatomical waste is expected to be generated from the CTT project. No surgical procedures will be done on site. For certain minor cases, minor surgical procedures may be performed in the Camp’s Clinic in an emergency. In such an event, the appropriate procedure for the storage and disposal of medical waste shall be adhered to.

4.5 Unidentified Waste

Where materials of unknown type or composition are identified, they will be treated as hazardous (precautionary approach). Raw material MSDS sheets, process knowledge, sampling and analyses, as required, will be used to classify unknown wastes for the purposes of storage, transportation, recycling/reuse, and disposal.

If the material is determined to be waste and the risks have been assessed, the integrity of the storage container, if any, will be evaluated and the waste will be transferred to an appropriate management area within the Proponent Camp’s waste storage area where it can be properly managed and / or disposed.

All unknown waste shall be managed and disposed in discussion with the Environmental Coordinator.

A list of wastes anticipated to be generated during the CTT project activities is presented in Table 2 together with the provisional classification for each waste and preferred treatment/disposal route.

Table 2: Projected Waste Streams and Classification

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
Site clearance	Wood or vegetation		**X**		**X**		Non-hazardous	Reuse and/or recycle. Wood-chipping may be used for composting.
	Surplus excavated material		**X**		**X**		Non-hazardous	Re-use if possible in the vicinity of works (bunding / landscaping).
Supply of materials	Containers (metal, plastics, etc.)	**X**			**X**	**X**	Non-hazardous	Reuse and/or recycle uncontaminated source separated plastic, ferrous and non-ferrous metals at local recycler or scrap metal merchant respectively.
	Transport Infrastructure (pipelines, access roads)	**X**			**X**		Non-hazardous	Reuse and/or recycle uncontaminated source separated plastic, and reuse of inert aggregate in construction of roads.

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
Storage and Transport of Equipment	Lubricating Oils from the equipment	**X**	**X**		**X**		Hazardous	Recycling of oil by gravity separation or centrifugation (or reuse as a fuel source e.g. as RDF in cement kilns).
Accommodation and kitchen	Food waste		**X**				Non-hazardous	Where possible used as compost or animal-feed. Otherwise, collection and disposal by third party waste contractor at approved landfill.
Packaging, general waste	Various contaminated packaging waste	**X**	**X**			**X**	Non-hazardous, combustible	Collection and disposal by third party waste contractor at approved landfill if contaminated and unsuitable for reuse or recycling.
Accommodation areas	Textiles		**X**				Non-hazardous	Reuse and/or recycle to the local market/charity.

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
Offices	Paper and cardboard		**X**			**X**	Non-hazardous	Reuse and/or recycle paper and card. Otherwise, disposal by third party waste contractor if contaminated with food waste.
Accommodation areas, offices	Plastics	**X**	**X**			**X**	Non-hazardous	Reuse and/or recycle.
Camping Facility, Accommodation areas, Maintenance works	Wastewater (Sewage)		**X**				Hazardous	Process through a wastewater treatment plant before discharging effluent to the environment. Sewage solids that are well treated with no volatiles or pathogens remaining may be used in land spreading or composting.

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
	Protective contaminated clothes	**X**	**X**			**X**	Hazardous	If PPE is reusable, follow the specified cleaning and maintenance instructions. Otherwise, dispose of contaminated single use PPE for collection by third party waste contractor.
	Pesticides		**X**			**X**	Hazardous	Follow instructions on pesticide product label, i.e. return to supplier or incineration most likely required.
	Aerosol Propellants		**X**			**X**	Hazardous	Collection and disposal by third party waste contractor for proper handling (separation, recycling). Aerosols may be degassed under a nitrogen blanket and metal component recycled.
Accommodation areas, offices, Kitchen	Glass		**X**				Non-hazardous	Reuse and/or recycle.

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
Accommodation areas, offices, Kitchen	Electronic equipment		**X**				Hazardous	Collection and recycling of e-waste by suitable approved contractors. Otherwise, appropriate treatment or disposal.
Construction	Metals	**X**	**X**			**X**	Non-hazardous	Reuse and/or recycle ferrous and nonferrous metals.
	Wires	**X**	**X**			**X**	Non-hazardous	Reuse and/or recycle uncontaminated source separated, ferrous and non-ferrous metals at local recycler or scrap metal merchant respectively.
Kitchen	Kitchen oil / grease		**X**				Non-hazardous	Collection and disposal by third party waste contractor for recycling or treatment.
Offices	Printer cartridges		**X**				Hazardous	Recycle by returning to supplier for re-inking.

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
Accommodation areas, offices, kitchen, workshops	Hazardous wastes (e.g. small batteries, Fluorescent and sodium lamps)	**X**	**X**			**X**	Hazardous	Collection and recycling of batteries (lead acid battery recycling) and recycling of e-waste by suitable approved contractors. Otherwise, appropriate treatment or disposal.
First aid / medical treatment centres	Bio-medical wastes		**X**				Bio-medical	Collection by third party waste contractor for treatment. Most bio-medical wastes may be treated until rendered non-hazardous for onward disposal, and only limited amounts of toxic chemicals/laboratory waste or sharps (needles) require incineration.
Vehicle workshops	Tyres		**X**				Non-hazardous	Recycle.

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
Vehicle workshops	Waste Oil, Oil filters, Lubricating/ Hydraulic Oil	**X**	**X**				Hazardous	Recycle waste oils. Collection and disposal or non-recyclable waste at hazardous landfill by third party waste contractor
Construction / maintenance works	Lead-acid batteries,		**X**			**X**	Hazardous	Recycle lead acid batteries. Collection and disposal or non-recyclable waste at hazardous landfill by third party waste contractor
	Waste Oil from Transformers, Lubricating/ Hydraulic Oil, Sludge	**X**	**X**	**X**		**X**	Hazardous	Recycle waste oils. Collection and disposal of non-recyclable waste at hazardous landfill by third party waste contractor

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
	Contaminated Soils	X	X		X	X	Hazardous	Collect soil samples for waste disposal profiling as necessary to fulfil appropriate soil disposal requirements or Collection and disposal by third party waste contractor at project approved landfill.
	Paints		X			X	Hazardous	Collection and disposal by third party waste contractor at project approved landfill.
Emissions controls	By-products from air pollution controls			X			Non-hazardous	Collection and disposal by third party waste contractor at project approved landfill.
Construction activities, demolition (after	Inert waste – concrete rubble and washout, grit			X	X	X	Non-hazardous	Reuse as aggregate in crusher and screener for construction (as foundation material).

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
Decommission-ing), sand blasting	Chemical waste (Sludge, Scrapings removed from the generators, tanks and pipelines)			**X**			Hazardous	Collection and disposal at hazardous landfill by third party waste contractor. Oily solids may be bio-remediated, or sludge's sent for landfilling.
	Power Electronics (Inverters, transformers and other power electronics)			**X**			Hazardous	Re-use or re-sale of transformers and Collection and disposal of non-recyclable e-waste at hazardous landfill by third party waste contractor
	Pylons and Cables					**X**	Non-hazardous	Reuse and/or recycle ferrous and nonferrous metals.

Source of Waste	Waste Stream	Beach Landing/ Logistics Camp	Worker's Construction Camp	Power Plant	Access Roads/Bridges from Beach Landing	Installation 400kV line	Classification	Reuse/Recycle/ Treatment/Disposal Route
Power Plant - Cooling Towers and Boilers	By-products (dry salt and minerals) from Brine collected in evaporation ponds / Brine mixed with cooling water			**X**			Hazardous	Treat Brine waste to remove dissolved oxygen and reuse as a cooling agent for steel heat exchangers (boilers) or desalinate and return to sea.

5.0 WASTE MANAGEMENT ACCOUNTABILITIES

The section below details roles and responsibilities for all employees, contractors and suppliers to accomplish the CTT project environmental objectives. In relation to waste management the roles and responsibilities are outlined below:

Table 3: Waste Management Responsibilities

Role	Responsibility
All employees and contractors	Ensure the effective implementation of this Waste Management Plan (WMP) with respect to their work area. Ensure any potential or actual waste management issues, including environmental incidents, are reported to the Project Manager or Supervisor. Ensure equipment (relevant to task/area of responsibility) is maintained and operated in a proper and efficient manner and as per design and operation specification.
Proponent	Proponent is to ensure that the Managing Contractor conforms to this WMP. The Managing Contractor shall be required to prepare a method statement, based on this WMP, detailing his waste management activities for approval by the Proponent.
MITADER	MITADER is the authority responsible for coordinating all environmental activities at national level and for this reason it should be the main driver of the implementation of environmental and social sustainability in all projects. This entity has the responsibility to establish acceptance standards for the various environmental indicators through legislation; and shall evaluate and jointly monitor the measures and actions proposed in the WMP in order to prepare environmental audits as soon as appropriate management deems necessary. MITADER through the National Development Fund (FNDS) established a Hazardous Waste Handling Facility at Mavoco, Beluluane district in Mozambique. The facility serves the total territory of Mozambique. It includes a weigh bridge, an unloading packaging bay, a treatment plant, land fill cells, a temporary storage facility for wastes that cannot be landfilled, offices, a laboratory and other service buildings.
Contractor	The Proponent's representative, responsible for engineering, procurement and construction management of the project. Construction management includes all social and environmental management. In some instances, the Proponent may manage the sub-contractors themselves, in which case the positions of Contractor and Site Engineer will be members of the Proponent's staff. The Contractor is specifically responsible for: ■ Appointing appropriate resources for the implementation of this Plan ■ Ensuring the effective implementation of strategies designed to reduce waste from the operations through communication with site staff and contractors ■ Ensuring any potential or actual waste issue is reported in accordance with legal requirements, licences and corporate standards ■ Providing the necessary work environment and resources to ensure that all processes are carried out under controlled conditions ■ Ensuring that operational changes consider the potential impacts of waste on the

Role	Responsibility
	surrounding environment and adjacent landowners ■ Monitoring waste management performance of employees and project contractors through regular audits and 6-monthly report review ■ Ensuring adequate resources are budgeted for in relation to waste management for their task/project ■ Conducting regular inspections and audits of the work area to monitor compliance with this plan.
Site Engineer	The Contractor's representative on site. Environmental staff (ESOs) shall report directly to the Site Engineer. Referred to as 'the Engineer' in all specifications below.
Sub-contractor (including all sub-contractors for construction and other CTT project activities)	The sub-contractor is responsible for the construction of all the works required by the project. The WMP shall form part of the Contractor's agreement with the Proponent and shall be legally binding. The Contractor shall be responsible for the actions and performance of all sub-contractors. The sub-contractors shall be responsible for ensuring compliance with relevant Mozambican legislation applicable to waste management. The Contractor shall take proactive steps to ensure that the standards in the WMP are met during all phases of construction/operations. These shall include, but not be limited to, the following: ■ Employment of competent and dedicated members of staff to oversee the implementation of the WMP. All employments and replacements of staff responsible for the waste management of the contract shall be subject to the Managing Contractor's and the Proponent's approval. ■ Active participation of such staff in the planning, construction and re-instatement of the works ■ Regular interaction with the Managing Contractor's environmental staff. ■ Ensure that the equipment required for waste management is maintained according to the equipment specifications (including inspection and maintenance records keeping). Staff must be instructed about the relevant environmental sensitivities and the specific measures that each employee will implement to meet the environmental protection and waste management standards defined by the WMP.
Environmental Site Officer (ESO)	The Environmental Site Officer (ESO) shall be appointed under the Managing Contractor's staff and shall be employed on a full-time basis for the duration of the contract in the case of all projects for which authorisation has been required by MITADER. The ESO shall: ■ Ensure the protection of the environment ■ Ensure that waste considerations are undertaken in the installation of all new infrastructures for the operation ■ Identify waste management risks and impacts to the environment and assess resources required to mitigate identified risks and impacts. Ensure that waste management controls are implemented in accordance with this Waste Management

Role	Responsibility
	Plan ■ Ensure all internal and external reporting requirements are met, including incident reporting in accordance with established Environmental Management Systems (EMS) ■ Ensure all reporting complies with internal and external monitoring standards, protocols and regulations (Annex VII of Decree 83/2014[1]) ■ Coordinate the collation and evaluation of monitoring data ■ Compile and maintain the hazardous waste inventory ■ Conduct (site) waste inspection regularly and report environmental performance to Environmental Managers ■ Liaise with the Site Engineer and EC in the case of incidents, non-conformance or any matter where the course of action is unclear ■ Prepare internal and external reports for review by the EC ■ Coordinate the implementation of any corrective actions and evaluate their effectiveness ■ Provide visible and proactive leadership in relation to waste management on the project ■ Assess new waste ■ Conduct waste audits as part of the Scheduled Internal Environmental Audits ■ Participate in the ongoing review of this Plan.
Environmental Coordinator (EC)	The EC is a senior Proponent employee with extensive environmental work experience. The EC shall liaise with any consultants or specialists, as necessary, during the course of the project. The EC shall monitor environmental performance on the project and shall review monthly non-conformance reports. The EC shall liaise with the Managing Contractor regarding any significant non-compliance by the Construction Contractor and the steps to be taken to rectify this. The EC shall provide support to the ESOs and shall review the ESO monthly reports. The EC shall update the WMP, when necessary, based on experience of the works. Any updates shall be submitted to MITADER for authorisation. The EC shall oversee the re-instatement of the site and provide final sign-off following acceptable re-instatement.
Waste Transportation Contractor	Accredited waste transportation contractor.

[1] *An annual log of the sources, quantities and types of waste produced, transported, processed, recovered, disposed of or exported, and the occurrence of accidents shall be submitted to the Ministry that oversees the Environmental Sector by the end of the first quarter of the following year, and must be kept for five years.*

6.0 WASTE MANAGEMENT

6.1 Waste Management Hierarchy

An integrated waste management plan has been prepared in this section of the report to take into account the internationally accepted waste hierarchy. The elements of the hierarchy are shown in Figure 9 below.

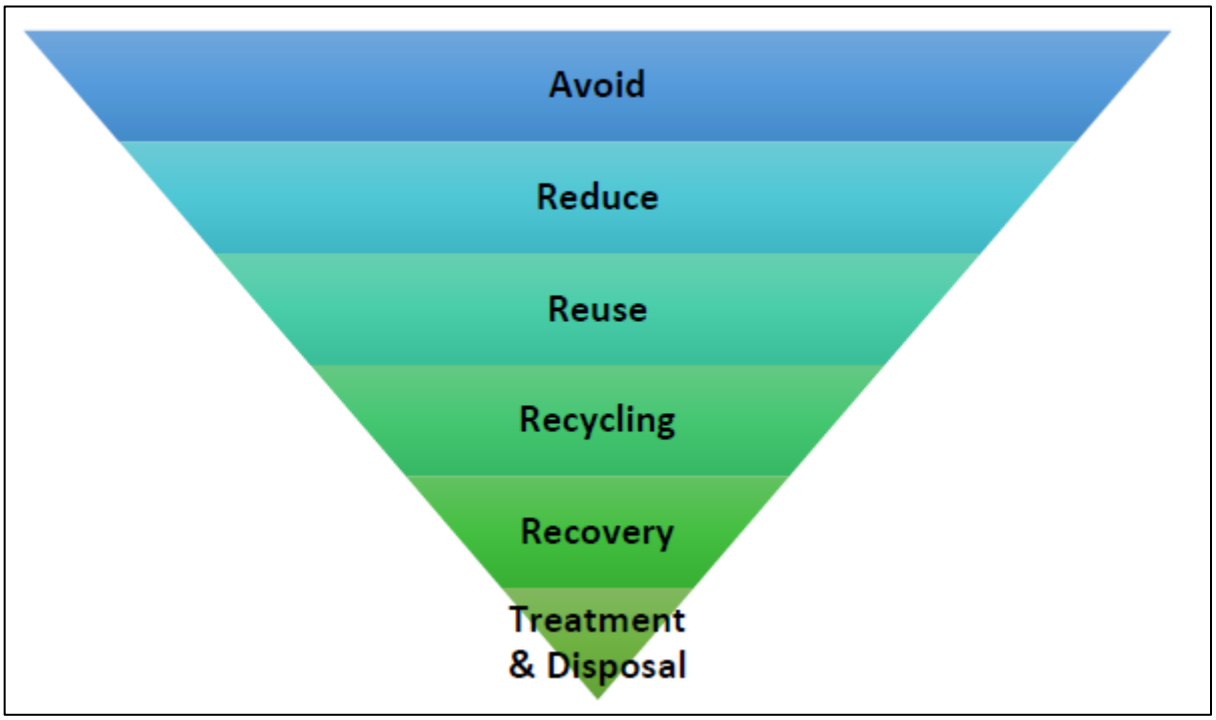

Figure 9: The waste management hierarchy

The philosophy of the waste hierarchy is that if less waste is disposed then it is less likely that there will be a potential impact on the environment. The waste hierarchy encourages measures to be put in place to reduce waste generated though more efficient processes and technologies, or at least to encourage the potential for waste that is generated to be reused or recycled. Failing this, the hierarchy requires that waste be treated where possible to reduce its volume or hazardous properties, or finally be disposed or incinerated.

Responsible waste management can be accomplished through the hierarchical application of the practices of source reduction, re-use, recycling/recovery, treatment, and responsible disposal. This is provided for in article 4 of Hazardous Waste Management Regulation, Decree 83/2014 of 31 December and Regulations on Urban Solid Waste Management, Decree 94/2014 of 31 December.

At all stages of the camp construction and operation, the first priority in terms of waste management will be to minimise the amount and toxicity of all waste streams generated. Reducing the volume and toxicity of waste generated will reduce the risks associated with the handling, storage, transport, treatment and disposal of the waste. Waste minimisation can be accomplished applying the principles below:

1) **Reduce -** source reduction or 'waste avoidance' requires that waste managers examine ways of eliminating or reducing waste at source. This is the first step in responsible waste management. In the event of choices, this is the preferred alternative.

2) **Reuse** - where waste can be reused this is a preferred option. Reuse is different from recycling insofar as it involves the reuse of a resource without changing its original form. The reuse of water would be an example of this. Wherever possible, unused or partially used materials which are surplus should be returned to the original suppliers.

3) **Recycling** - involves the collection of materials that can be re-processed for further use, such as aluminium cans and metal scrap. The separated material can be used as a product or raw material. There are local markets for some recyclable materials such as plastic, metals and tyres. Market for the recycling of paper and cardboard will be used to recycle waste paper and cardboard no longer utilised by project activities.

4) **Resource recovery** - involves the capture of energy or some other valuable benefit from the waste.

5) **Incineration** - involves the destruction of wastes, leaving a small quantity of ash to be disposed, and it is found at the most advanced level of waste disposal/treatment.

6) **Landfil**l - this is the final (least desirable) alternative which should only be used when all other reasonable alternatives have been considered.

The above principles are applicable to both hazardous and non-hazardous waste.

The Environment Site Officer (ESO) shall identify and implement waste minimisation opportunities for waste generated on site as part of the environmental audits and inspection process. Similarly, good housekeeping can minimise the amount of waste generated by ensuring that, where possible, materials are used more than once, and the use of general supplies is maximised before they are discarded, e.g. not discarding half full refuse bags.

To manage the project's camps waste streams, it will be necessary to identify disposal routes in accordance with the waste category assigned to the specific waste stream. Some waste may need to be stored temporarily while the most appropriate treatment or disposal facility is identified, and arrangements made for transfer (e.g. lead acid and dry cell batteries light bulbs and solvents).

7.0 WASTE MANAGEMENT PLAN

The guiding principle for a WMP is to adopt the waste hierarchy approach. The success of the implementation of the WMP should be monitored against the various objectives and targets that have been set in this plan.

In line with the Principle of Extended Producer Responsibility, as described in Decree 83/2014, the responsibility for implementing the waste management measures remains with the Proponent; however, where contractors are appointed to perform certain activities, the contractor shall be responsible to ensure that these measures are adhered to.

Table 4, Table 5, Table 6 and Table 7 present the procedural steps to be adopted when collection, segregating, storing, transporting and disposing of wastes as generated by CTT project activities. Responsibilities are also denoted accordingly.

7.1 Non-hazardous Waste Management

Table 4: Required Management Actions for Non-hazardous Waste

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
Waste generation and recycling	■ Develop waste inventories. These inventories will be updated throughout the project, commissioning and operations phases. ■ Stipulate the storage and disposal requirements for each waste stream. ■ Develop waste management strategies for each waste stream based on the waste management hierarchy. ■ Prepare waste management procedures for the specific scope of work and expected waste types and volumes. ■ Ensure worksites are kept free of litter and that any litter is cleaned up immediately. ■ Demonstrate efforts to reduce waste volumes, where possible, and to segregate and recycle waste where not possible.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers	■ Prior to start of project. ■ At all times during the project.	■ Record of waste reduction and recycling initiatives. ■ Recycling bins on site.	Camp sites (worker's Camp and Logistics Camp)
Waste handling and storage	■ Comply with applicable regulatory requirements and standards regarding the design and operation of all waste storage areas (Decree 83/2014 of 31	■ Contractor ■ ESO ■ Process Engineers	At all times	■ Evidence of waste storage containers. ■ Evidence of waste segregation,	■ Construction, ■ Camp sites (worker's Camp and Logistics

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
	December; Decree 94/2014, of 31 December). ■ Segregate all waste streams at source, where practicable (see section 1.1.1 below). ■ Label all hazardous waste containers in accordance with the labelling system as described in Annex IV of Decree 83/2014. This labelling system is consistent with international guidelines. ■ Store all waste in appropriately designed and clearly labelled waste bins or waste containers. ■ Cover or close waste receptacles that may present an issue for attraction of pests and other fauna. ■ Regard any unidentified wastes as hazardous waste and handle and store such waste accordingly. ■ Separate combustible wastes from ignition sources to minimise fire hazards. ■ Inspect and empty temporary waste bins/facilities regularly. ■ Securely store and contain all wastes during transport to landfill facilities.	■ Stores Managers ■ Workshop Managers ■ WWTP operators		separate bins/containers for different kinds of waste. ■ Clear labels on bins ■ Evidence of waste inspection records ■ Evidence of inspection of waste transport vehicles.	Camp).

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
	Waste transport vehicle shall be in secure skips or containers which are covered during transport.				
Waste transport and disposal	■ Comply with Mozambican waste management regulations regarding waste disposal (Decree 83/2014 of 31 December, Decree 94/2014 of 31 December). ■ Stipulate the storage and disposal requirements for each waste stream. ■ For items that are marketable, re-use or recycle waste materials. These materials shall be separated from the waste stream at their point of generation and stored separately for collection by an accredited recycling contractor. ■ In accordance to the legislation, where transport of waste off-site is required, use a transporter that is certified by Ministry that oversees the Environmental Sector (MITADER). ■ Implement a Waste Transfer Note (WTN), which is to be signed by the Site Engineer.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators operators ■ Waste transportation Contractor	At all times	■ Record of waste manifest signed by ESO ■ Certificates of safe disposal	■ Construction ■ Camp sites (worker's Camp and Logistics Camp).

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
	■ Correlate the waste manifests with the contractor's waste management method statement. ■ Retain the WTN for at least 3 years. ■ Collect waste sufficiently frequent to ensure that there is no overloading of the temporary storage at the site. ■ Have in place the means to respond appropriately to spillages of waste anywhere along the route within a time limit acceptable to the Proponent. ■ Provide certificates of safe disposal to the Site Engineer for all wastes disposed at the waste site. ■ Where possible, dispose waste in a discreet location at the waste site that permits deposition and closure independently of other waste, so that due diligence can be verified and documented.				
Specific requirements for burying of waste	Prohibit the discard or burying of waste materials (other than ash) on site.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop	At all times	As per requirement	■ Construction ■ Camp sites.

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
		■ Managers ■ WWTP operators			
Specific requirements for burning of combustible waste	Permit the burning of combustible, non-hazardous waste in a burn pit, the location of which shall be identified by the EC/ESO.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	Daily	■ Daily burning at EC-identified location ■ Absence of waste unsuitable for combustion in burn pits.	■ Construction ■ Camp sites.
Specific requirements for incineration of waste	Do not dispose of any waste by incineration unless emissions from the incinerator meet internationally accepted emissions guideline levels / limits for small, temporary installations (Basel Convention Technical Guidelines on Incineration on Land, 2002; IFC, Environmental Health and Safety Guidelines for Waste Management Facilities, 1998; The European Waste Incineration Directive, Directive 2000/76/EC on the Incineration of Waste, 200).	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	As required	As required	
Specific requirements for composting of organic wastes	Organic wastes; a composter will be used to store these at the camps.	■ Contractor ■ ESO ■ Process Engineers	At all times	As per specification	■ Construction ■ Camp sites.

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
Specific requirements for recycling of inorganic wastes	Separate inorganic waste into appropriately labelled waste bins for recycling. Provide bins for plastics, glass, waste packaging, aluminium cans and scrap ferrous metal. Uncontaminated wood shall be made available to communities for their use (or used in a wood chipper and used for composting).	■ Stores Managers ■ Workshop Managers ■ WWTP operators			

7.1.1 Segregation of Non-hazardous Waste

Regarding segregation of non-hazardous waste, the following measures shall be applied:

- Organic and inorganic waste shall be separated at the work sites. Ensure bins are clearly labelled and / or colour coded to indicate which waste types they contain.
- For organic wastes, a composter will be used to store these at the worker's camp.
- Inorganic waste shall be collected in appropriately labelled waste bins and separated for recycle. There shall be separate bins for plastics, glass, and aluminium cans and scrap metal. These shall be collected at the camps and marketed for recycling.

7.2 Hazardous Waste Management

Table 5: Required Management and Monitoring Actions for Hazardous Waste

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
Compliance with legislation	Comply with the Mozambique Regulations for the management of Hazardous Wastes (Decree 83/2014 of 31 December). The specifications below cover key requirements, but a full listing should be obtained from the regulations themselves.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers	From project initiation and at all times.	Compliance with Decree 83/2014 of 31 December	■ Construction ■ Camp sites
Hazardous waste method statement	■ Prepare a Method Statement for Management of Hazardous Waste in accordance with Article 11 of Decree 83/2014 of 31 December, including the relevant information required by Annexure II. The plan shall include but not be limited to: ▪ An inventory of all hazardous waste, together with estimated quantities, documented in accordance with the classification system in Annexures III and IX of the regulations. ▪ Measures to comply with waste hierarchy requirements for	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	Before project initiation as a basis for licensing of the activity	Authorisation by MITADER	■ Construction ■ Camp sites

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
	minimizing hazardous waste generation and recycling of waste ▪ Measures to safely contain and temporarily store hazardous waste prior to collection. ▪ Measures to label hazardous waste in accordance with Annexure IV of the regulations. ▪ Measures to transport hazardous waste in accordance with Annexures VI and VIII of the regulations. ▪ Details of the licensed disposal site.				
Waste generation and recycling	■ Develop waste inventories. These inventories must be updated throughout the project. ■ Stipulate the storage and disposal requirements for each waste stream. ■ Develop waste management strategies for each waste stream based on the waste management hierarchy. ■ Prepare waste management	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	■ Before establishment on site ■ At all times during the project	■ Record of waste reduction and recycling initiatives. ■ Recycling bins on site	■ Construction ■ Camp sites

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
	procedures for their specific scope of work and expected waste types and volumes. ■ Manage controlled waste as required by the Mozambican waste management Decree and Proponent's SHE policy. ■ Demonstrate efforts to reduce waste volumes. ■ Recycle used oils and greases, where possible, or dispose of them appropriately according to the regulation (Decree 83/2014).				
Waste storage and handling	■ Comply with applicable regulatory requirements and standards regarding the design and operation of all waste storage areas (Decree 83/2014). ■ Segregate all waste streams at source, where practicable. ■ Line hazardous waste containers or construct of materials that are compatible with the wastes to be stored. Keep containers in good condition, free from corrosion, leaks or ruptures and sealed to prevent	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers Workshop Managers, ■ Hazardous Waste Transportation Contractor	■ At all times ■ Within 7 days	■ Evidence of waste storage containers. ■ Evidence of waste segregation, separate bins/containers for different kinds of waste. ■ Clear labels on bins ■ Evidence of inspection waste storage facilities/containers	

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
	spillage. ■ Label hazardous waste in accordance with the labelling system required by Annexure IV of Decree 83/2014 of 31 December (Appendix C) ■ Keep Material Safety Data Sheets for stored hazardous waste, where available, at the following locations: - the hazardous waste storage area at the Camps - the office of the Contractor's site manager - the EC/ESO's office ■ Regard any unidentified wastes as hazardous waste and handle and store such waste. ■ Locate spill kits at hazardous liquid waste storage areas. ■ Handle waste chemicals in accordance with the appropriate Material Safety Data Sheet (MSDS). ■ Keep temporarily stored hazardous waste at the work sites on pallets underlain by a plastic liner. All waste stored in this manner shall be removed to the Base Camp within 7			■ Presence of spill kits ■ Record of MSDS for hazardous waste materials ■ Manifest of waste removal from site	

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
	days. ■ Ensure that storage at the Camps is a concrete floored, bunded, facility, covered to provide shade and prevent ingress of rain. Bunded areas shall include a trap to collect wash-down water from cleaning of the area. If this water is likely to contain hydrocarbons, then the washdown shall be treated as POC water. ■ Fully secure the storage area, with lockable gates, to prevent unauthorised access. ■ Inspect and empty hazardous waste storage facilities regularly.				
Waste transport and disposal	■ Comply with Mozambican waste management regulations regarding waste disposal, as described in Decree 94/2014 of 31 December. ■ Dispose of hazardous waste at a licensed hazardous waste disposal site. ■ Stipulate the disposal requirements for each waste stream. ■ Implement a waste manifest which	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers	At all times	■ Record of waste manifest signed by ESO ■ Certificates of safe disposal	■ Construction ■ Camp sites

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
	must be signed by the Site Engineer. ■ Correlate the waste manifest with the contractor's waste documentation. ■ Maintain the waste manifest for at least 3 years. ■ Collect waste sufficiently frequent to ensure that there is no overloading of the temporary storage at the site. ■ In accordance with the legislation, ensure that waste to be transported off site is removed by a transporter that is certified by MITADER. ■ Securely contain all wastes during transport to hazardous waste disposal sites or other means. ■ Have in place the means to respond appropriately to spillages of waste anywhere along the transport route within a time limit acceptable to the Proponent. ■ Provide certificates of safe disposal to the Site Engineer for all wastes disposed at the licensed waste site.				
Specific requirements –	Treat small quantities of soils contaminated by hydrocarbons (less than	■ Proponent ■ Contractor ESO	At all times		■ Construction ■ Camp sites.

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
bioremediation of contaminated soils	20kg) in-situ using bioremediation. Where large quantities of contaminated soils are involved (greater than 20kg) or if there is the potential to cause pollution to groundwater, surface water or community water facilities, remove to the area allocated by the EC at the Base Camp for longer-term bioremediation (over a surfaced hard standing area). Monitoring of surface and ground water in the areas with potentially impacted soils will be necessary,a monitoring programme is recommended for inclusion in the o-EMP. Contractors shall be responsible for the bioremediation of their own contaminated soil until the following standards are met: ■ There is no hydrocarbon odour. ■ The soil particles do not coagulate as a result of hydrocarbon contamination. ■ There is no visual evidence of hydrocarbons in the soil. ■ Where there is uncertainty the soil shall be sent for analysis. ■ Where soils are contaminated by	■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators			

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
	other hazardous chemicals they shall be removed and disposed of as per hazardous waste disposal requirements, indicated in the MSDSs.				
Specific requirements - disposal of unused chemical waste	Chemicals that are no longer used, or are past their shelf-life date, shall be stored in the hazardous waste storage area at the Camps for interim storage until disposal (toxic chemicals are normally sent to incineration).	■ Contractor, ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	At all times	Records of disposal	■ Construction ■ Camp sites.
Specific requirements - pesticide use for vector control	■ Should pesticides be used to control the mosquito vector in and around worker's camps and work sites, they shall be selected to minimise negative effects on non-target organisms. ■ The disposal of waste pesticide and pesticide containers shall be as per the requirements of Section 7.2.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	At all times	■ Records of pesticide use and eco-toxicity management ■ Records of selection procedure	■ Construction ■ Camp sites.
Specific requirements - cement storage,	Cement/aggregate shall be stored and mixed on compacted ground in designated areas. This ground shall be	■ Contractor ■ ESO ■ Process Engineers	Cement mixing	As per requirement	Construction

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
use and disposal	lifted and disposed of in a waste site as cover fill at the end of the construction phase.	■ Stores Managers ■ Workshop Managers			

7.3 Wastewater Management

There are four types of wastewater streams would be expected from the CTT project activities. These are:

- Potentially oily contaminated (POC) wastewater and storm water from maintenance areas and vehicle wash bays; this would be an intermittent stream;
- Domestic wastewater, which includes grey water (from kitchens and washing facilities) and sewage waste;
- Oily water effluent; and
- The brine and ultrafiltration reject from the water treatment process.

Table 6: Required Management and Monitoring Actions for Hazardous Waste

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Activities
Effluent Disposal (oily wastewater) (irrigation)	■ Dispose of effluent in line with Mozambican regulations on effluent water disposal requirements and irrigation (amended by Decree 67/2010 of 31 December.) and in line with industry specific WB EHS guidelines for effluent disposal. ■ Prepare a method statement describing effluent management at Camps that shall include, but not	■ Proponent ■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	Prior to initiation of project activities	Method statement available	■ Construction ■ Camp sites

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Activities
	be limited to: ▪ How effluent will be stored prior to treatment. ▪ How the effluent will be treated to meet the standards required under Mozambican legislation: Decree 18/2004 amended by Decree 67/2010 of 31 December, “Regulation on Environmental Quality and Effluents Emission Standards”, and under the EHS guidelines for effluent disposal. ▪ Measures to ensure that there will be no release of polluted runoff from the site. ▪ Measures to prevent erosion at any discharge point. ▪ The duration of the use of the site. ■ Proponent/Managing Contractor shall approve the Method Statement prior to submission of the effluent management method statement to MITADER as a part of wastewater licensing requirements.				

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Activities
Potentially oil-contaminated wastewater	In work areas for servicing of vehicles and equipment and other tasks where oils and fuel are handled, route spillages via appropriately sized mechanical oil separators. Undertake planned maintenance activities under roofed areas to minimise contaminated storm water.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	At all times	POC-contaminated areas contained, and drainage routed through mechanical oil traps	■ Construction ■ Camp sites
Potentially contaminated storm water	Keep potentially oil-contaminated (POC) storm water separate from other drainage. If necessary, test and treat POC storm water to remove contaminants before being released into the environment.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	At all times	Incident reports and corrective action report where contaminated water is generated	■ Construction ■ Camp sites
Compliance with Mozambique oil and grease specification for effluent	Ensure that water draining from POC areas complies with the Mozambique specification for oil and grease in effluent discharged to the environment (20 mg/l).	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	At all times	Compliance with oil and grease standard for POC-wastewater released into the environment	■ Construction ■ Camp sites
Vehicle wash bays	Regards heavy vehicle wash bay(s) as POC areas.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers	At all times	Compliance with oil and grease standard for wastewater	■ Construction ■ Camp sites

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Activities
		■ Workshop Managers ■ WWTP operators		released into the environment	
Sand washing	Should sand washing be necessary, prepare a Method Statement for approval by the Managing Contractor, which shall include details of, but not be limited to, the following: ■ Location of the washing process; ■ Estimated quantity to be washed and water volumes required; ■ Source of water for washing; ■ Any additives to be used in the washing process, including chemistry and environmental status (include MSDSs); ■ Methods for the management of effluent, including TDS and the monitoring thereof; and ■ Measures to prevent erosion as a result of the washing process.	■ Contractor, ESO, Process Engineers, Stores Managers, Workshop Managers, WWTP operators	Prior to sand washing	Approved and implemented method statement	Construction
Domestic wastewater (irrigation)	■ Discard grey water (kitchens) into French drains. ■ Drain sewage effluent from worker's Camp activities to a brick or concrete-lined sump and treat it in a package sewage plant, the	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers	At all times	Compliance with domestic wastewater specification as per Decree 18/2004 of 2 June (amended by	Camp sites

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Activities
	effluent from which shall comply with the requirements of the Mozambique regulations for domestic wastewater (Decree 18/2004 Appendix IV, amended by Decree 67/2010 of 31 December), Environmental Quality and Effluents Emission Standards Regulation and the EHS guidelines for domestic water for domestic waste water. ■ Size the sewage plant in order to cater for the maximum forecast loads over the project construction and operation periods. Undertake regular compliance monitoring of effluent quality. ■ In the event that the Contractor proposes a septic tank and soak away system, design this in accordance with a recognised standard such as ZA SANS 10400-P:2010. The septic tank shall accommodate at least three times the expected daily flow rate (approximately 90 litres per day worker) and the soak away shall	■ WWTP operators		Decree 67/2010 of 31 December)	

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Activities
	meet the requirements of the standard or other recognised standard. ■ Ensure that no septic tank and soak away system is situated closer than 150 m from a community borehole. ■ For Camps and work sites, ensure that there is a sufficient complement of compositing toilets available.				
Brine and Ultrafiltration reject	Evaporation – pond – design and management. HDPE liner. Desludging	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers ■ WWTP operators	Prior to operations and at all times	Approved and implemented method statement.	■ Construction ■ Operation

7.4 Bio-medical Waste Management

Table 7: Required Management and Monitoring Actions for Bio-medical Waste

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
Disposal of medical waste	■ Separate all medical waste from other waste. Place medical waste in labelled bags in accordance with the requirements of Decree 8/2003. ■ Separate infectious waste in yellow plastic bags or, if not possible, any other yellow impermeable plastic bags or containers labelled with the wording “Infectious Waste”. ■ Clearly identify all infectious waste container through the label “Infectious Waste” and the international Infectious Waste logo stamp. ■ Third party waste contractor to collect for treatment/incineration. Records of all medical waste collected shall be kept and submitted to the EC.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers	As required	Certificates of disposal	■ Construction ■ Camp sites
Procedure for medical waste disposal	Dispose of the waste at the in accordance with Proponent’s approved medical waste management procedures.	Thirdy party waste contractor	As required	Records of medical waste disposal.	■ Construction ■ Camp sites

Description	Requirements / specifications	Responsibility	Scheduling	Performance indicator(s)	Relevant CTT Project Activities
Off-site disposal of medical waste	The third party waste contractor shall provide the Proponent with the license of the site(s) at which the waste is to be disposed. In addition, ensure that the site(s) receiving the waste provide certificates of acceptance of the waste.	■ Contractor ■ ESO ■ Process Engineers ■ Stores Managers ■ Workshop Managers	As required	Certificates of disposal	■ Construction ■ Camp sites

7.5 Other Wastes

Those wastes which cannot be avoided, reused or recycled will be treated and/or disposed of in the most environmentally sound manner to minimize any potential human health and environmental impacts.

Waste that cannot be avoided, reused or recycled and which are not suitable for incineration or disposal at a third-party landfill site will be temporarily and properly stored while an appropriate management route is identified.

7.6 Vehicles and Waste Contractors

Only waste contractors that can demonstrate they have the necessary authorisation from MITADER for transporting the particular types of waste will be considered for the Camp's waste management facility. The following requirements shall therefore apply:

- The collection vehicle will be checked to ensure that it is designed for the type of waste and containers to be transported and that it is roadworthy.
- The contractor must be familiar with the requirements for the transportation of the type of waste (including hazardous);
- The frequency of waste collection and the interim measures for the storage of waste on site shall have to be appropriate to one another and would have to be such that the system as a whole does not pose an unacceptable risk to either the environment or human health and safety;
- The transportation contractor shall have in place the means to respond appropriately to spillages of waste anywhere along the route within a time limit acceptable to the CTT project (spill containment kits);
- Certificates of safe disposal shall have to be provided to CTT project for all wastes removed from site. Such certificates shall be issued by a recognized waste disposal operation; and
- The site at which such waste is disposed of shall have to comply with the corporate requirements of the CTT project and its shareholders. As such it shall have to be audited at intervals appropriate to the risk associated with the disposal operation.

7.6.1 Contractor Inspection

The ESO will inspect the Contractor periodically to ensure compliance with waste management requirements in relation with project activities.

7.7 Waste Records

A Waste Register and copies of WTN will be maintained by Environmental Coordinator, as required by the Mozambican waste management decree. The waste register shall contain data on the quantities of the different types of waste that are generated by the project activities and the treatment/disposal option that is used.

All waste leaving the project sites will be accompanied with a WTN containing the following information:

- Producer of the waste.
- Site name & location.
- Date.
- Description of the waste (i.e. contents and volume).
- Signature of the waste carrier.

- Name of disposal site.

8.0 TRAINING AND INDUCTIONS

Training is a critical component to raise awareness on the various impacts and associated management functions of the Plan. Contractor shall ensure that all personnel responsible who are involved in activities that could result in an environmental impact(s) and responsible for the execution of the tasks and requirements contained within this Plan receive training and are competent.

Training shall take the form of, but not be limited to: induction training, use of educational posters and daily environmental discussion topics prior to the start of each shift. During these training sessions, the following principles shall be presented / discussed:

- The Proponent's corporate environmental, health and safety policies and applicable Mozambican environmental regulations.
- Their roles and responsibilities in achieving conformity with the requirements of the Camp
- Camp Environmental Permits and their conditions; and
- The Waste Management Plan and its procedures for managing identified environmental (and social) impacts arising from Camp operations.
    - Restrictions and procedures for collection, treatment and disposal of waste and hazardous substances.
    - Need to refrain from destruction of animals and plants, indiscriminate defecation, waste disposal and/or pollution of local soil and water resources.

The contractor shall:

- Describe the training and awareness requirements necessary for the effective implementation of the Plan; and
- Document training activity associated with the Waste Management Plan by means of a training needs assessment, training matrix/plan and records of training undertaken.

9.0 INSPECTIONS, AUDITING, REPORTING, AND REVIEW

9.1 Inspections

An internal inspection schedule shall be developed and maintained for the CTT project. A record of all internal inspections results shall be recorded and maintained. Actions arising from internal inspections shall be tracked until their close out. Performance in respect of waste management shall be included in the monthly ESO reports.

9.2 Internal and External Auditing

An internal Audit Schedule shall be developed and maintained for the CTT project. A record of all internal audits and the audit outcomes will be maintained. Actions arising from internal audits will be tracked until their close-out.

Audits and/or inspections undertaken by external regulators will be facilitated via the Proponent's Environmental Manager. The findings of external regulatory audits will be recorded, and actions and/or recommendations will be addressed and tracked

9.3 Reporting to MITADER

Reporting on the CTT project shall be included in the Proponent's six-monthly environmental performance report submitted to MITADER. Additionally, an annual compliance audit report will be submitted to Government as set by Government regulation for Category A projects.

9.4 Review of this Plan

The Proponent is committed to conduct activities in an environmentally responsible manner and aims to implement best practice environmental management as part of a program of continuous improvement. This commitment to continuous improvement means that the Proponent will review this Waste Management Plan every 3 years or more often as required (e.g. in response to new information).

Reviews will address matters such as the overall design and effectiveness of the Plan, progress in waste management performance, changes in environmental risks associated with waste management, changes in business conditions, and any relevant emerging waste environmental issues appropriately covered by the Plan, or measures that are identified to improve the Plan.

The Proponent may submit an amendment or addendum to the Plan to MITADER from time to time (for approval under the EIA conditions for the CTT project).

All changes to the WMP shall be submitted to MITADER for approval. The World Bank shall be notified of any material changes to the WMP.

10.0 REFERENCES

- AECOM, Sasol Beach Landing Assessment for the Mozambique Gas to Power Project, 2014
- Basel Convention Technical Guidelines on Incineration on Land, 2002;
- Decree 83/2014 of 31 December, Hazardous Waste Management Regulation.
- Decree 8/2003 of 18 February, Bio-medical Waste Management Regulation.
- Decree 94/2014 of 31 December, Regulations on Urban Solid Waste Management.
- Decree 18/2004, amended by Decree 67/2010 of 31 December, Environmental Quality and Effluents Emission Standards Regulation
- IFC, Environmental Health and Safety Guidelines for Waste Management Facilities, 1998;
- IFC, Environmental Health and Safety Guidelines for Thermal Power Plants, 2017;
- Sasol Exploration and Production International Waste Management Plan, Revision 01, 2014.
- Sasol Petroleum Mozambique, Sasol Petroleum Temane Limitada, PSA development and LPG Project: Waste Impact Assessment, 2014
- Sasol Petroleum Mozambique, Sasol Petroleum Temane Limitada, PSA development and LPG Project: Environmental Impact Assessment, 2014.
- Sasol Exploration and Production International, Future Exploration, Appraisal and Development Activities in the Sasol License Areas, Waste Management Plan, 2017
- Sasol Exploration and Production International, Future Exploration, Appraisal and Development Activities in the Sasol License Areas & the Establishment of an Industrial Park, Inhambane Province, Mozambique, Environmental Impact Assessment, 2017.
- Sasol Exploration and Production International, Future Exploration, Appraisal and Development Activities in the Sasol License Areas, Construction (Infrastructure) Environmental Management Plan, 2017
- Sasol Exploration and Production International, Future Exploration, Appraisal and Development Activities in the Sasol License Areas, Framework Decommissioning and Rehabilitation Plan (f-DRP), 2017
- Sasol Exploration and Production International, Future Exploration, Appraisal and Development Activities in the Sasol License Areas, Operational Environmental Management Plan, 2017
- Sasol Exploration and Production International, Future Exploration, Appraisal and Development Activities in the Sasol License Areas, Drilling Environmental Management Plan, 2017
- Sasol Exploration and Production International, Future Exploration, Appraisal and Development Activities in the Sasol License Areas, Oil Spill Response Plan, 2017
- Sasol Petroleum Temane Lda, Central Processing Facility's Construction Environmental Management Plan, 2013
- The European Waste Incineration Directive, Directive 2000/76/EC on the Incineration of Waste, 2000.

Signature Page

Golder Associados Moçambique Limitada

Cândida Boavida
Environmental Consultant

Natalie Kohler
Senior Waste Consultant

CB/NK/up

NUIT 400196265
Directors: G Michau, RGM Heath

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APPENDIX A

Annex V of Decree 83/2014 of 31 December

Waste Disposal Operations

A. Operations that Do Not Lead to the Possibility of Recovery, Recycling, Regeneration, Direct Reuse or Alternative Uses of Waste **Section A encompasses all disposal operations that occur in practice**	
D1	Deposit into or onto land (e.g. landfill).
D2	Land Treatment (e.g., biodegradation of liquid or sludge waste in soils).
D3	Deep injection (e.g., injections of pumpable discards into wells, salt domes or natural fault lines).
D4	Impoundment (e.g. liquid or sludge discharge into pits, ponds or lagoons etc.)
D5	Specially engineered landfill (e.g. placement into lined discrete cells isolated from one another and the environment)
D6	Discharge into a water body, except seas/oceans.
D7	Immersion in marine environment, including burial in the seabed.
D8	Biological treatment not specified elsewhere in this annex which results in compounds or mixtures which are disposed of in accordance with one of the transactions mentioned in this section.
D9	Physio-chemical treatment not specified elsewhere in this annex which results in compounds or mixtures which are disposed of by one of the operations mentioned in this section (e.g. evaporation, drying and calcination, neutralisation, precipitation).
D10	Incineration on land.
D11	Incineration at sea.
D12	Permanent storage (e.g. emplacement of containers in a mine).
D13	Mixing prior to any of the operations referred to in this section.
D14	Reconditioning before any of the operations referred to in this section.
D15	Storage prior to any of the operations referred to in this section.

APPENDIX B

Characteristics of Waste and Hazardous Substances

Characteristics of Waste and Hazardous Substances

Class	Code	Characteristics
1	H1	**Explosive**
		Substance or explosive residue; substance or solid waste, liquid (or mixture of substances and or waste) that has the potential for chemical reaction producing gas at a temperature, pressure and velocity such that it can cause damage to surrounding areas.
2	H2	**Substances consisting of compressed liquefied gases under pressure**
		Gases that are dangerous by virtue of being compressed, liquefied, dissolved under pressure or cooled. These gases may pose additional danger and may be asphyxiating, e.g. nitrogen; flammable e.g. butane; or toxic, e.g. chlorides.
3	H3	**Flammable**
		Flammable liquids are liquids, liquid mixtures or liquids containing solids in solution or suspension (for example paints, varnishes, lacquers, etc., not including substances or waste classified differently due to their dangerous characteristics) that release flammable vapours at temperatures not exceeding 60.5°C in the case of testing in an open vessel, or not greater than 65.6°C in closed vessel tests. Since the results of tests in open and closed vessels are not strictly comparable, and bearing in mind that the results obtained by the same method often vary from each other, regulations which deviate from the above values,in order to take into account these differences, are considered compatible with the spirit of this definition.
4.1.	H4.1	**Flammable solids**
		Materials or solid waste other than those classified as explosives which during transportation conditions are readily combustible and may through friction cause or contribute to fire.
4.2	H4.2	**Spontaneously flammable substances or waste**
		Substances or waste which are capable of spontaneous heating under normal conditions of transport, or heating in contact with air and may therefore ignite.
4.3	H4.3	**Substances which, on contact with water, give off flammable gases**
		Substances or waste which react with water and are likely to become spontaneously flammable or emit flammable gases in dangerous quantities.
5.1	H5.1	**Oxidisers or Oxidising Substances**
		Substances or waste, while not independently, may generally by yielding oxygen cause or contribute to the combustion of other materials.
5.2	H5.2	**Organic peroxides**

Class	Code	Characteristics
		Substances or organic wastes containing the bivalent structure 0-0 that are thermally unstable and may undergo sub-accelerated exothermic composition.
6.1	H6.1	**(Acute) toxic substances**
		Substances or waste which, by ingestion or inhalation or skin contact, may harm human health, cause serious injury or even death.
6.2	H6.2	**Infectious substances**
		Substances or waste containing living micro-organisms or their toxins which are known to or there is good reason to believe may cause disease in humans or animals.
8	H.8	**Corrosives**
		Substances or waste which, by chemical action, cause serious damage when in contact with living tissue or, in the case of discharge, may seriously damage or destroy others or the means of transport, and may also cause other hazards.
9	H.10	**Substances which release toxic gases when in contact with air or water**
		Substances or wastes which on reaction with water or air are likely to emit toxic gases in dangerous quantities.
9	H.11	**Toxic substances (with delayed effects)**
		Substances or waste which, by inhalation, ingestion or skin contact may cause delayed or chronic effects, including cancer.
	H.12	**Ecotoxic substances**
		Substances or wastes which do or may present immediate or delayed risks for the environment, by bioaccumulation and or toxic effects on biotic systems.
9	H.13	Substances that, after disposal, may in some way give rise to other substances, such as a product of leaching, having any of the characteristics mentioned above.

APPENDIX C

Identification of Hazardous Waste

Identification of Hazardous Waste

Type of Waste	Identification Method	Label type
Hazardous Explosive Waste	Explosive hazardous waste containers should be clearly identified by a black label with orange background placed on all sides with the international symbol for explosive substances.	 ***(Explosive)***
Hazardous waste consisting of compressed or liquefied gases or under pressure	Hazardous waste containers consisting of liquefied gases or under pressure shall be clearly identified by a black or white label with a green background placed on all sides with the international symbol for substances consisting of liquefied gases or under pressure	 ***(Compressed or liquefied gases or under pressure)***
Hazardous waste consisting of flammable liquids	Hazardous waste containers consisting of flammable liquids shall be clearly identified by a black label with a red background placed on all sides with the international symbol for substances which are flammable liquids	 ***(Flammable liquids)***
Hazardous waste consisting of flammable solids	Hazardous waste containers consisting of flammable solids shall be clearly identified by a black label with a red and white striped background placed on all sides with the international symbol for substances which are flammable solids	 ***(Flammable solids)***

Type of Waste	Identification Method	Label type
Hazardous waste consisting of spontaneously combustible substances or waste	Hazardous waste containers consisting of spontaneously combustible substances or wastes shall be clearly identified by a black label with a red and white background placed on all sides with the international symbol for substances or wastes which are spontaneously combustible	 ***(Spontaneously combustible substances or waste)***
Hazardous waste consisting of substances which, on contact with water, emit flammable gases	Hazardous waste containers consisting of substances which, on contact with water, emit flammable gases shall be clearly identified by a black label with a blue background, placed on all sides with the international symbol for substances which, on contact with water, emit flammable gases	 ***(Substances which, on contact with water, give off flammable gases)***
Hazardous waste consisting of oxidisers (oxidising substances)	Hazardous waste containers consisting of oxidisers shall be clearly identified by a black label with a yellow background placed on all sides with the international symbol for oxidisers	 ***(Hazardous waste consisting of oxidisers)***
Hazardous waste consisting of organic peroxides or oxidizing agents	Hazardous waste containers consisting of organic peroxides or oxidizing agents shall be clearly identified by a black label with a yellow background placed on all sides with the international symbol for organic peroxides	 ***(Hazardous waste consisting of organic peroxides)***

Type of Waste	Identification Method	Label type
Hazardous waste containing poisonous substances (acute)	Hazardous waste containers consisting of poisonous substances shall be clearly identified by a black label with a white background placed on all sides with the international symbol for poisonous substances	 ***(Hazardous waste containing acute poisonous substances)***
Hazardous waste containing ecotoxic substances	Hazardous waste containers consisting of ecotoxic substances shall be clearly identified by a label with a white background and a black tree or white fish placed on all sides with the international symbol for ecotoxic substances	 ***(Hazardous waste consisting of ecotoxic substances)***
Hazardous waste containing infectious substances	Hazardous waste containers consisting of infectious substances (including infected objects) shall be clearly identified by a black label with a white background placed on all sides with the international symbol for infectious substances	 ***(Hazardous waste containing infectious substances)***
Hazardous radioactive waste	Hazardous radioactive waste containers shall be clearly identified by a black label with a yellow and white background placed on all sides with the international symbol for radioactive substances	 ***(Hazardous radioactive waste)***

Type of Waste	Identification Method	Label type
Hazardous waste containing corrosive substances	Hazardous waste containers consisting of corrosive substances (including acids, bases and batteries) shall be clearly identified by a label placed on all sides with the international symbol for corrosive substances	 ***(Hazardous waste consisting of corrosive substances)***
Hazardous Waste consisting of various hazardous substances and articles which cannot be categorised under other classes but may be a hazard during transport	Containers of hazardous waste, consisting of various hazardous substances and articles which cannot be categorised under other classes but may be a hazard during transport, should be clearly identified by a label placed on all sides with the international symbol for various hazardous substances and objects	 ***(Hazardous Waste consisting of various hazardous substances and articles which cannot be categorised under other classes but may be a hazard during transport)***

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