ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA

PROPONENT	STUDY CONDUCTED BY
OCTAVIA CARBON P.O. BOX 241-00520 GIRIRAJ BUSINESS PARK, EASTERN BYPASS, NAIROBI	Edwin Nyaga–Lead Expert Reg. No. 1974
	ASSISTED BY
	Raymond Mwakirani- Consulting Geologist Beatrice Nyairo Ass. Expert No. 9385 Geoffrey Nyambega Ass. Expert No. 10219 Sharon Chebet–Community Relations Expert Fiona Mugambi–Project Engineer Hillary Mwawasi—Reservoir Engineer

DECEMBER, 2024

AUTHENTICATION

I certify that this project report has been prepared in total adherence to NEMA requirements as provided for in the Environmental Management and Coordination Act (Cap 387) and the Environmental (Impact Assessment and Audit) Regulations (2003). The proponent has contracted a registered EIA/ EA Lead Expert for this purpose.

REPORT TITLE: **ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA.**

PROPONENT: **OCTAVIA CARBON**
P.O. BOX 241-00520
GIRIRAJ BUSINESS PARK,
EASTERN BYPASS, NAIROBI

Signature & Stamp: Martin Freimüller

OCTAVIA CARBON CO.
P.O. Box 241-00520,Nairobi
Giriraj Business Park,Unit 8
PIN: P052123006E

Date Dec 11, 2024

LEAD EXPERT: **Edwin Nyaga (Lead Expert No. 1974)**

Signature .....

Date 02/12/2024

EXECUTIVE SUMMARY

This report evaluates the proposed Direct Air Capture (DAC) project in Elementaita, Nakuru County, Kenya. The project, proposed by Octavia Carbon, aims to integrate cutting-edge DAC technology with geothermal energy to capture atmospheric CO_2 for permanent sequestration by partner company Cella Mineral Storage. The location in the Elementaita region offers ideal conditions because of its abundant geothermal resources and basalt formations suitable for CO_2 storage through mineralization.

Project Scope and Objectives

The primary aim of this project is to reduce atmospheric CO_2 levels, contributing to climate change mitigation efforts both locally and globally. Specifically, the complete DAC plant will capture 1,000 tons of CO_2 annually through 100 DAC modules, which will operate using renewable geothermal energy from existing infrastructure in Elementaita. Cella Mineral Storage will then inject the CO_2 into basalt formations underground, where it will mineralize and be permanently stored.

The project also aims to stimulate economic growth through job creation, advance Kenya's renewable energy sector, and support the country's Vision 2030 by promoting sustainable development.

Legal and Policy Framework

International and national policies, laws, and legislation relevant to the proposed project were reviewed. Policies that were reviewed included: Kenya Vision 2030, Sessional Paper on Environment and Development Paper No.6 of 1999, Green Economy Strategy and Implementation Plan (GESIP) 2016–2030, National Environmental Policy (NEP), 2013, Kenya National Climate Change Action Plan (NCCAP) 2018–2022, Environmental Management and Coordination Act, 1999 (Cap. 387), Occupational Safety and Health Act, 2007, Work Injury Benefits Act, 2007, Environmental (Impact Assessment and Audit) Regulations of 2003, Environmental Management and Co-ordination (Waste Management) Regulations 2006, Environmental Management and Co-ordination (Water Quality) Regulation, 2006, Environmental Management and Co-ordination (Noise and Excessive Vibrations Pollution Control) Regulations, 2009, Environmental Management and Co-ordination (Air Quality) Regulation, 2014, Public Health Act (Cap 242), National Gender and Equality Act, 2011, Sexual Offences Act, 2006 and its amendment 2012, County Governments Act, 2012, Climate Change Act, 2016, Employment Act, 2007, Physical and Land use Planning Act, 2019, Factories and Other Places of Work (Fire Risk Reduction) Rules, 2007, Factories and Other Places of Work (Hazardous Substances) Rules, 2007, Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005–Legal Notice No.25, Geothermal Resources Act No. 12 of 1982, Traffic Act, 2016, Energy Act,

2019, Water Act, 2016, Water Resources Management Rules, 2007, Legislative Supplement No.52, the Paris Agreement, 2015, United Nations Framework Convention on Climate Change (1992 UNFCCC) and Kyoto Protocol, Convention on Biological Diversity, IFC Environmental and Social Performance Standards (PS) and World Bank Group's Environmental and Health and Safety Guidelines.

Potential Environmental and Social Impacts

The ESIA identifies several potential impacts of the DAC project, both positive and negative:

Positive impacts: Significant reduction in atmospheric CO_2, job creation, enhanced local expertise in renewable energy technologies, and contributions to Kenya's leadership in climate change mitigation.

Negative impacts: Potential air and noise pollution during construction, risk of water contamination and soil erosion, disruption to local biodiversity, and aesthetic changes to the landscape. Mitigation strategies, such as dust suppression, water recycling, noise control, and biodiversity conservation, have been proposed to minimize these impacts.

The ESIA recommends ongoing environmental monitoring and stakeholder engagement to ensure the project operates sustainably and with minimal disruption to the local environment and communities.

In conclusion, this project represents a pioneering step toward addressing climate change while offering economic and social benefits to Kenya. By adhering to local regulations and international standards, it shows a commitment to sustainable development and environmental stewardship.

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ACRONYMS

DAC:	Direct Air Capture
CO_2:	Carbon dioxide
ROAD:	Rotterdam Capture and Storage Demonstration project
ESIA:	Environmental and Social Impact Assessment
PLC:	Programmable Logic Controllers
MVC:	Mechanical vapor compression
GoK:	Government of Kenya
NGOs:	Non-governmental organizations
GESIP:	Green Economy Strategy and Implementation Plan
NEP:	National Environmental Policy
NCCAP:	Kenya National Climate Change Action Plan
EMCA:	Environmental Management and Coordination Act
EAs:	Environmental Audits
NEMA:	National Environmental Management Authority
OSHA:	Occupational Safety and Health Act
WIBA:	Work Injury Benefit Act
NGEC:	National Gender Equality Commission
PPE:	Personal protective equipment
UNFCCC:	United Nations Framework Convention on Climate Change
NDCs:	Nationally Determined Contributions
CBD:	Convention on Biological Diversity
PS:	Performance Standards
SO_2:	Sulfur dioxide
Nox:	Nitrogen oxides
BEDAC:	Bioenergy with Direct Air Capture
STI:	Sexually transmitted infection
ESMMP:	Environmental and Social Management Plan
dB:	decibel
EHS:	Environmental, Health, and Safety

CHAPTER 1: INTRODUCTION

1.0 Overview of the project

The project represents a significant and transformative initiative aimed at advancing Kenya's energy sector by integrating Direct Air Capture (DAC) technologies. This ambitious project seeks to address both the country's growing energy demands and its environmental goals by deploying state-of-the-art DAC systems to capture carbon dioxide (CO_2) emissions from the atmosphere. Its overarching objective is to reduce greenhouse gas emissions, contribute to sustainable energy development, and enhance Kenya's position as a leader in climate change mitigation in Africa.

1.1 Historical Context of DAC Technology

1.1.1 Global Perspective

DAC technology has developed significantly since its inception. The concept emerged in the late 20th century as a response to increasing concerns about climate change and the need to reduce atmospheric CO_2 levels. The technology involves capturing CO_2 emissions from industrial sources or power plants and transporting the captured CO_2 for secure storage underground in geological formations.

Globally, DAC has been implemented in various forms, with several countries pioneering its development and deployment. The United States and Canada have been at the forefront of DAC technology, with notable projects such as the Boundary Dam Carbon Capture Project in Canada and the Petra Nova project in the United States. Europe has also seen substantial progress, with countries like Norway and the Netherlands investing heavily in DAC infrastructure. Norway’s Sleipner project and the Netherlands’ ROAD project are exemplary in demonstrating the feasibility and effectiveness of large-scale DAC operations.

1.1.2 African Perspective

In Africa, the adoption of DAC technology has been slower but is gaining momentum as nations seek to balance economic growth with environmental sustainability. South Africa has been a notable pioneer on the continent, with the CO_2 storage project at the Durban University of Technology showcasing the potential of DAC in mitigating emissions. The South African government has also included DAC in its climate action plans, recognizing its role in reducing the carbon footprint of the country's energy and industrial sectors.

1.1.3 DAC in Kenya

Kenya's Vision 2030 plan emphasizes the need for sustainable development and clean energy solutions. In recognizing its contribution to climate change mitigation, the country has committed itself to undertake steps to minimize the emissions. Among the measures being undertaken is the planting of 15 billion trees by 2032. However, the levels of CO_2 emissions are much higher than the current efforts to properly mitigate its effects. This has led to an increase in research and funding opportunities for new technologies to curb global warming. The country's journey with DAC technology is relatively nascent compared to its global and regional counterparts. However, the country has shown significant interest in adopting advanced technologies to meet its climate and energy goals. Therefore, DAC is an attractive option for reducing the environmental impact of its growing industrial sector.

In accordance with the EMCA, 1999, and subsequent amendments (2015 & 2019), all new projects with potential impact on the environment must undergo an environmental impact assessment study to comply with the EIA Regulation, 200,3 and subsequent amendments (2016 & 2019). The DAC concept in Elementaita seeks to capture atmospheric CO_2 for underground permanent storage by Cella Mineral Storage as part of the global response to climate change mitigation. This proposed project is expected to have an overall positive impact on the environment. However, the construction phase and other aspects during the operations stage are anticipated to have environmental impacts that would require to be mitigated.

1.2 Objectives of the ESIA

The objective of the study was to carry out a detailed Environmental and Social Impact Assessment (ESIA) Study Report for the DAC project at Elementaita. The general objective of the ESIA was to identify significant environmental and social impacts associated with the proposed development project on the physical, biological, social, cultural, and economic environment. Additionally, the study aims to comply with Section 58 of the Environmental Management Act (EMCA) of 1999 and subsequent amendments (2015 & 2019) which requires that a project proponent carries out a Comprehensive ESIA Study before being issued with a license to undertake a project of this nature. The study team further generated an Environmental and Social Management Plan that described in detail the mitigation measures to be carried out in case of adverse negative impacts to the environment and people's health while at the same time enhancing the positive impacts, costing, scheduling and responsibility of such measures, a detailed monitoring process and schedule. This will ensure that the project is environmentally friendly, socially acceptable and sustainable.

1.2.1 Specific Objectives

The specific objectives of the assessment are to:

i. Document the ecological and socio-economic baseline conditions of the study area.
ii. Inform and obtain input from stakeholders, (e.g., governmental authorities, the public, and vulnerable groups) and capture their relevant issues and concerns.
iii. Assess in detail the environmental, social, and health impacts that would result from the project.
iv. Identify mitigation measures to address the impacts identified.
v. Develop the ESMPs, based on the mitigation measures.
vi. Meet the requirements or recommendations of applicable national and international regulations and standards.

1.3 Study approach and methodology

The approach to the assessment process was structured to cover the requirements under the EMCA,19,99 and subsequent amendments (2015 & 2019) as well as the Environmental Impact Assessment and Audit regulations amended (2016). The study team's overall approach to the assignment was guided by the requirements of the law. This process was carried out in accordance with both national and International best practices/standards within the overall framework, the study team approaches were:

- Use of a multi-disciplinary team,
- Observations in the project area,
- Stakeholder participation and consultations,

To achieve the objectives, the ESIA report undertook desktop study, field surveys, public participation and consultation forums, administering questionnaires, photography, and Noise and CO_2 levels monitoring. The main steps followed in the ESIA exercise were as indicated below:

i. Initial examination of environmental issues including preliminary literature review.
ii. Description of the legal and administrative framework as well as a detailed literature review of available publications and reports.
iii. Preliminary and detailed field surveys, investigations and data collection of physical, biological, social, economic and cultural environment.
iv. Public meetings and consultation
v. Identification of potential environmental and social Impacts
vi. Identification of mitigation measures

vii. Preparation of both the ESMP and EMP

viii. Preparation of required report

1.4 The ESIA Team

Environmental scoping and subsequent preparation of the ESIA project report was accomplished through the involvement of several experts with varied inputs. The assignment team composition is indicated in the table below:

Table 1: The ESIA Team

Name	**Qualifications**	**NEMA Reg. No.**
Edwin Nyaga	Lead Expert	1974
Raymond Mwakirani	Consulting Geologist	1113
Fiona Mugambi	Project Engineer	N/A
Sharon Chebet	Community Relations Specialist	N/A
Beatrice Nyairo	Environmental Scientist	9385
Geoffrey Nyambega	Environmental Scientist	10219
Hillary Mlawasi	Reservoir Engineer	N/A

CHAPTER 2: PROJECT DESCRIPTION

2.0 Overview

The project, implemented by Octavia Carbon in partnership with Cella Mineral Storage, is a pioneering initiative that aims to deploy DAC technology integrated with geothermal energy to permanently remove CO_2 from the atmosphere. This project leverages Elementaita's abundant geothermal resources, skilled workforce, and unique geological formations to efficiently capture and store CO_2 through mineralization. The project marks a significant step toward combating climate change by capturing carbon dioxide from the air and storing it underground in a stable, permanent form.

2.1 Project Design

2.1.1 The Plant

As a precursor to the full-scale DAC project, a mini plant will be constructed. The purpose of this scaled-down version is to validate the design of the full plant before committing to larger-scale operations. The full plant will consist of 100 DAC modules, each capable of capturing 10 tonnes of CO_2 per year.

Key Components of the Plant

1. **Direct Air Capture (DAC) Modules**
    - The full plant will feature 100 DAC modules, designed to capture a total of 1000 tonnes of CO_2 annually. These modules are laid out in a grid pattern with a 2-meter spacing to optimize airflow across the system.
2. **Wet Section**
    - The wet section provides critical heating and cooling fluids required for the plant's operation. It includes components such as a hard water tank, soft water tank, reverse osmosis plant, electric boiler, water pumps, and a refrigeration system. In this project, the wet section will be upgraded with geothermal heating, replacing the electric boiler with a brine heat exchanger. This system will utilize geothermal brine from nearby geothermal wells to heat water more efficiently via plate heat exchangers.

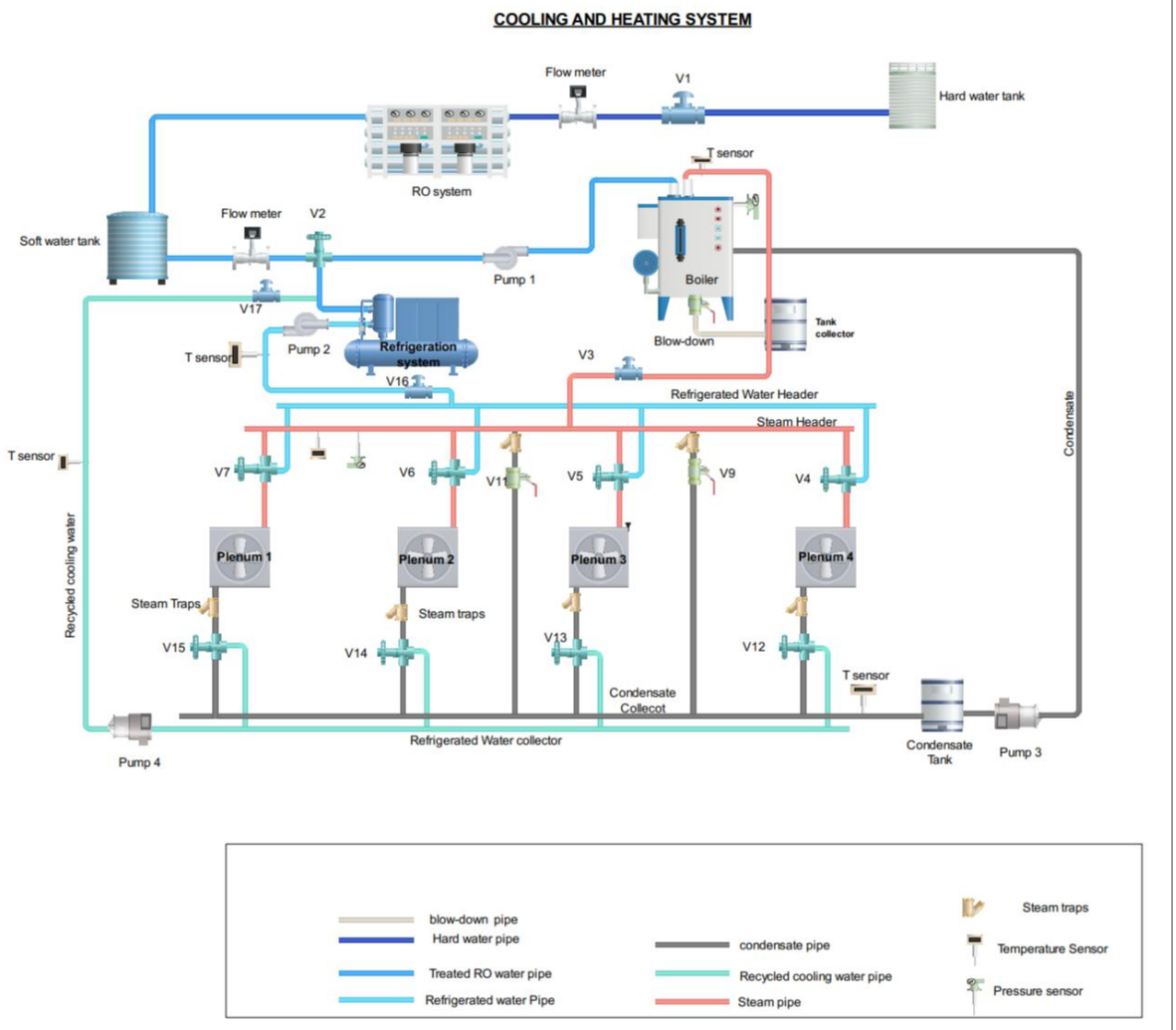

Figure 1: Model Mini-plant heating and cooling cycles

3. **Electrical and Controls Substation**
    - This area will contain the plant's electrical components, including circuit breakers, power supplies, and Programmable Logic Controllers (PLCs). The substation will manage the automated control of all plant functions, providing a crucial link between human operators and machine interfaces.
4. **Gas Transport Section**
    - The gas transport section will be responsible for moving captured CO_2 through the system. It will include a vacuum pump, gas balloon, CO_2 booster, high-pressure air receiver, and an air compressor for pneumatic functions. In the full-scale project, additional components such as a membrane separation plant, mechanical vapor

compression (MVC) system, and liquefaction plant will be introduced to further improve process efficiency by recovering and reusing the heat generated during desorption.

2.1.2 Technology

At the core of the DAC system is a patented solid sorbent made from PEI and silica, known for its high CO_2 absorption capacity. The DAC process is cyclic, with two phases: adsorption, where the air is blown through the sorbent, which selectively captures CO_2; and desorption, where non-condensable gases (NCGs), such as Nitrogen and Oxygen are purged out and the captured CO_2 is heated for purification and prepared for storage. The process produces high-purity CO_2 (98.4%) suitable for permanent geological storage. Geothermal energy will power the mini plant, ensuring an eco-friendly and cost-efficient operation.

2.1.3 Geological Storage

Cella Mineral Storage will inject the captured CO_2 into basalt formations in the Kenyan Rift Valley. Once injected, the CO_2 will undergo mineralization, transforming into stable carbonates that lock the gas away permanently for thousands of years.

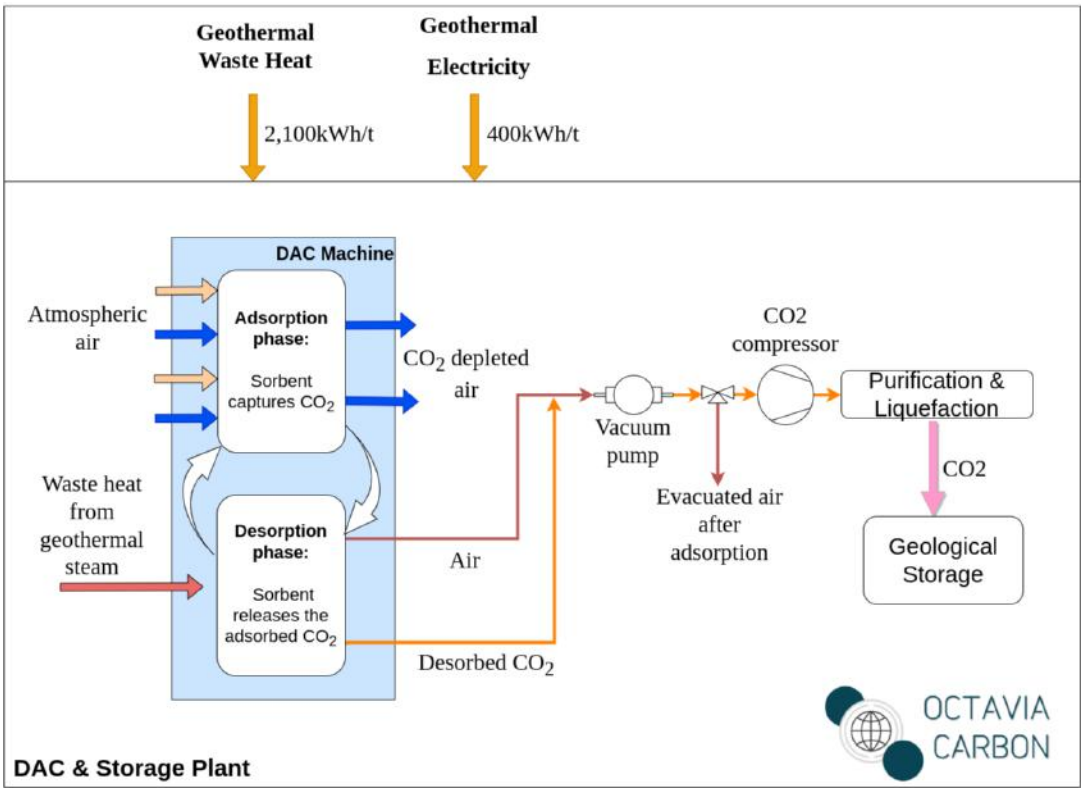

Figure 2: Simplified representation of the entire process.

2.2 Project Location

The project is located at coordinates 0°29'12.3"S 36°15'39.3"E on UTM Zone 37°S. It is about 10 km North of Eburru volcano and about 5 km from Kikopey center as shown in the map below:

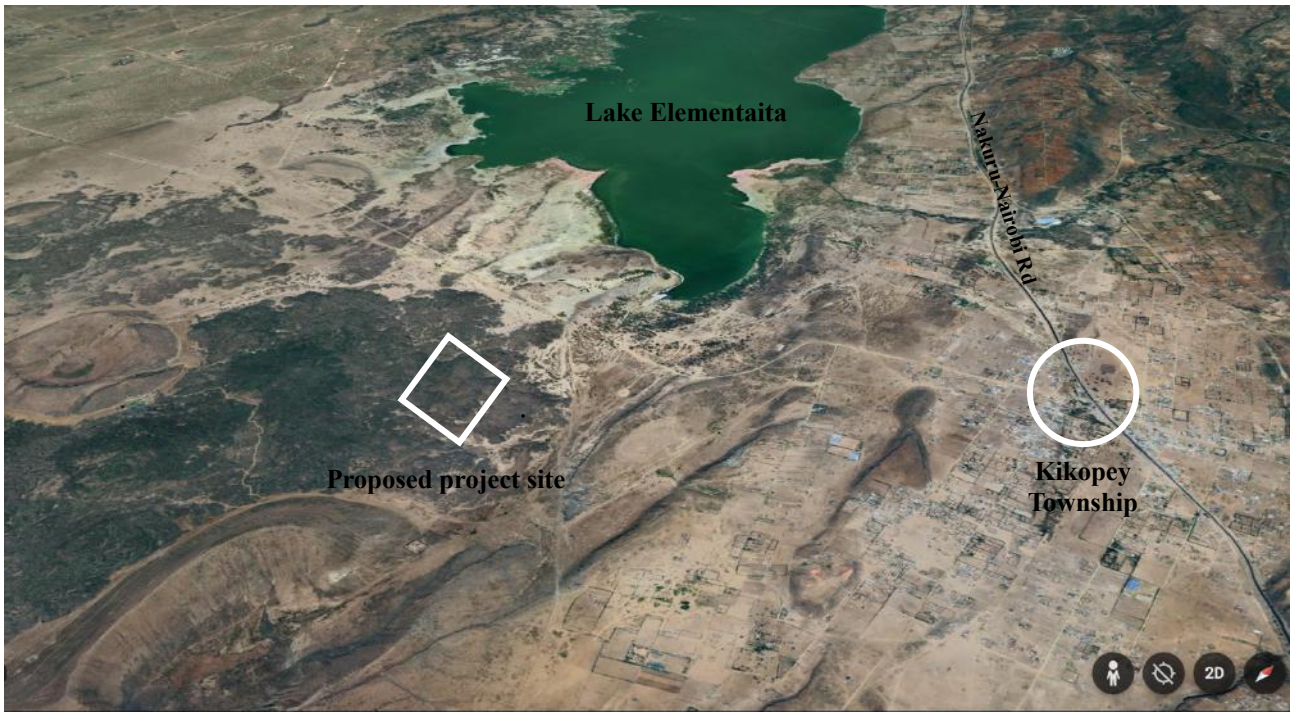

Figure 3: Map representation of the project area. Source: Google Earth

2.3 Project Objectives

It is designed to achieve several key objectives:

i. Reduction of CO_2 emissions: by integrating DAC technology, the project aims to capture a substantial percentage of CO_2 emissions from selected industrial processes, significantly reducing the carbon footprint of these activities.

ii. Advancement of clean energy: the project supports Kenya's transition to cleaner energy sources by demonstrating the feasibility and benefits of DAC technology, thereby encouraging further investment in sustainable energy solutions.

iii. Economic and social benefits: implementing DAC technology is expected to create job opportunities, stimulate local economies, and enhance Kenya's position as a leader in climate change mitigation in Africa.

2.4 Project Activities

The project involves a series of activities, from construction to decommissioning. These activities are outlined below based on the project phases.

2.4.1 Construction Phase

- *Excavation and foundation laying*

Minor excavation and site-leveling activities will take place to enable access to the required depths for the installation of the DAC machines and other infrastructure.

- *Pipeline installation*

Pipes will be laid out along designated corridors as shown in the plant model in Fig.1.

- *Installation of DAC units and compressors*

Once the foundations are prepared, DAC units, compressors, and associated equipment will be installed. The equipment will be integrated with the existing geothermal power supply on-site, which will provide the energy needed to power the capture process.

- *Construction of access roads*

Access roads will be constructed for transporting the captured CO_2 from the capture site to the injection site via trucks.

2.4.2 Operation Phase

- *CO_2 capture and collection*

The Direct Air Capture units will operate to capture CO_2 from ambient air using renewable geothermal energy.

- *CO_2 compression and transport*

The captured CO_2 will be compressed into a dense fluid form and transported via trucks to the injection wells. The project will rely on a closed system to ensure efficient handling and transport of CO_2.

- *Monitoring*

Continuous monitoring will be undertaken to ensure the integrity of the CO_2 evacuation sites. This will include, pressure measurements, and air quality data collection to ensure that the CO_2 is securely contained without any leakages.

- *Maintenance of equipment*

Routine maintenance and inspection of DAC units, compressors, trucks, and pipelines will be conducted to ensure operational efficiency and safety.

2.4.3 Decommissioning Phase

- *Decommissioning of DAC units and infrastructure*

At the end of the project's operational life, DAC units, compressors, and associated infrastructure will be decommissioned. This will involve the safe dismantling and removal of equipment from the site.

- *Site rehabilitation*

The project site will be rehabilitated and this will involve the restoration of the land to its original state, including re-vegetation as necessary.

2.5 Project Scope and Implementation

The implementation of the project will involve several key phases:

i. Site selection and feasibility studies - initial efforts have already been conducted to identify suitable sites for the DAC infrastructure and assess the geological suitability for CO_2 storage.

ii. Technology deployment - the project will deploy advanced DAC technologies, including capture systems and transportation infrastructure. This phase will involve collaboration with other technology providers such as Cella Mineral Storage and experts to ensure the use of cutting-edge solutions.

iii. Monitoring and evaluation – a comprehensive monitoring and evaluation framework will be established to track the performance of the DAC system, ensure safety, and measure the reduction in CO_2 emissions. This will include regular reporting and transparency to stakeholders.

iv. Community engagement and capacity building - engaging with local communities and building capacity will be integral to the project. This involves informing the public about the benefits of DAC, addressing any concerns, and providing training opportunities to enhance local expertise in DAC technology.

CHAPTER 3: POLICY AND LEGAL FRAMEWORK

3.0 General Overview

Sustainability is achieved through a well-managed environment. This is achieved by the Kenya Government's (GoK) environmental policy. The policy highlights and gives a clear sustainable environmental development that seeks to achieve sound environmental management without compromising future resources. There is a growing concern in Kenya and at a global level that many forms of development activities cause damage to the environment and the community. This chapter highlights the legal legislation and policy regulations relevant to the proposed DAC project in Elementaita.

3.1 Policy Framework

3.1.1 The Kenya Vision 2030

Kenya Vision 2030 places a strong emphasis on climate change mitigation as a critical component of its development strategy. The vision underscores the importance of reducing greenhouse gas emissions through the promotion of renewable energy sources, energy efficiency, and sustainable land management practices. It advocates for integrating climate mitigation measures into economic planning and infrastructure development while supporting research and technological innovation to drive low-carbon growth. By adopting these measures, Kenya aims to curb the impacts of climate change, foster sustainable development, and position itself as a leader in green technology and climate resilience.

3.1.2 Sessional Paper on Environment and Development

The overall goal of the Sessional Paper No.6 of 1999, Draft Environmental Policy, rev. is to ensure that environmental concerns are integrated into the national planning and management processes and provide guidelines for environmentally sustainable development. The objectives are to conserve and manage the natural resources of Kenya including air, land, flora, and fauna and promote environmental conservation with regard to soil fertility, soil conservation, biodiversity, and foster afforestation activities; and to protect water catchment areas. More importantly, the policy emphasizes the enhancement of public awareness and appreciation of the essential linkages between development and environment, involving NGOs, the private sector, and local communities in the management of natural resources and their living environment and ensures that an environmental impact assessment report is undertaken for all public and private projects and programs. The DAC project must be seen

in the same light that it promotes this integrated approach to environmental management and development without compromising the livelihoods of the local indigenous people.

3.1.3 The Green Economy Strategy and Implementation Plan (GESIP) 2016–2030

This framework is designed to guide the country's transition towards a green economy. It aims to achieve sustainable development by promoting economic growth while minimizing environmental impact and reducing carbon emissions. GESIP promotes low-carbon development pathways and supports Direct Air Capture as part of efforts to transition to a green economy, focusing on reducing emissions and promoting sustainable industrial practices. The plan emphasizes the importance of public and private sector collaboration, investment in sustainable infrastructure, and policy reforms to support the transition to a low-carbon, resource-efficient economy.

3.1.4 The National Environmental Policy (NEP), 2013

The policy provides guidelines for managing the environment and addressing climate change. It encourages the adoption of technologies and practices that reduce carbon emissions, supporting the integration of DAC in Kenya's climate response. The NEP outlines strategies for implementing environmental regulations, fostering partnerships, and ensuring compliance with national and international environmental commitments.

3.1.5 The Kenya National Climate Change Action Plan (NCCAP) 2018–2022

It outlines the country's strategic approach to addressing climate change through both mitigation and adaptation measures. It sets out key actions and initiatives aimed at reducing greenhouse gas emissions and enhancing resilience to climate impacts. NCCAP focuses on sector-specific interventions in areas such as agriculture, water, energy, and forestry, and promotes the integration of climate considerations into national and county planning. It also emphasizes the need for stakeholder engagement, capacity building, and financial mechanisms to support climate action. The plan is aligned with Kenya's broader climate goals and international commitments under the Paris Agreement.

3.2 Legal Framework

3.2.1 The Constitution of Kenya, 2010

The Constitution of Kenya, 2010 provides a detailed framework for dealing with environmental issues. Article 42 of the Constitution states that every person has the right to a clean and healthy

environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures.

The Constitution of Kenya applies to this proposed project as every person living within Elementaita is entitled to a clean and healthy environment and the principle of public participation is a bill of rights.

3.2.2 Environmental Management & Coordination Act, 1999 (Amended 20l5)

The principal national law in this case is the Environmental Management and Coordination Act (EMCA), 1999 (Amended 2015) provides for the establishment of an appropriate legal and institutional framework for the management of the environment. EMCA was established as a framework law and this is because so far this is the only single piece of legislation that contains the most comprehensive system of environmental management in the country.

3.2.2.1 Environmental Management and Coordination (Environmental Impact Assessment and Audit) Regulations, 2003 (amended 2019)

These regulations outline the procedures for assessing and auditing the environmental impacts of proposed projects. They require developers to conduct Environmental Impact Assessments (EIAs) before project initiation to evaluate potential environmental effects and propose mitigation measures. They also mandate Environmental Audits (EAs) to monitor and assess the environmental performance of ongoing projects. The regulations aim to ensure that environmental considerations are integrated into development planning and project execution, enhancing accountability, sustainability, and compliance with environmental standards. It also states that a project report, drawn by a qualified expert(s) should then be filed to the National Environmental Management Authority (NEMA).

3.2.2.2 Environmental Management and Coordination (Water Quality) Regulations, 2006

These regulations establish standards and procedures for safeguarding water quality to protect public health and the environment. These regulations set limits on pollutants and contaminants in water bodies, requiring industries and other water users to treat and manage their effluents to meet prescribed quality standards before discharge. They also mandate regular monitoring and reporting of water quality, enforce penalties for non-compliance, and promote the implementation of best practices in water management. The goal is to ensure safe, clean water resources and to prevent degradation of water ecosystems.

3.2.2.3 Environmental Management and Coordination (Waste Management) Regulations, 2006

Regulations establish comprehensive guidelines for managing waste to protect human health and the environment. The regulations mandate waste generators, including households, businesses, and industries, to manage waste responsibly by ensuring proper segregation, storage, and disposal. They emphasize the hierarchy of waste management, prioritizing reduction, reuse, and recycling over disposal. The regulations also require the licensing and monitoring of waste management facilities and services, and they set standards for handling hazardous waste, aiming to minimize environmental pollution and promote sustainable waste practices.

3.2.2.4 Environmental Management and Co-ordination (Air Quality) Regulations (2014)

These regulations set out standards and procedures for managing and improving air quality. These regulations define permissible limits for various air pollutants and require industries and other sources of emissions to implement control measures to reduce pollution. They mandate regular monitoring of air quality, reporting of emission data, and compliance with air quality standards. The regulations also aim to protect public health and the environment by promoting cleaner technologies and practices, and by ensuring that any new developments or industrial activities assess and mitigate their potential air quality impacts.

3.2.2.5 Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009

These regulations establish guidelines for controlling noise and vibration pollution. These regulations set permissible noise and vibration levels to protect public health and the environment from harmful disturbances. They require businesses and construction activities to adopt measures to minimize noise and vibration, including using soundproofing techniques and scheduling noisy operations to reduce impact. The regulations also mandate regular monitoring, reporting, and compliance checks to ensure that noise and vibration levels remain within legal limits, aiming to create a quieter, more comfortable living environment for all citizens.

Table 2: Second Schedule - Maximum Permissible Noise Levels

Facility		Maximum Noise Level Permitted (Leq) in dB(A)	
		Day	**Night**
i.	Health facilities, educational institutions, homes for disabled, etc.	60	35
ii.	Residential	60	35
iii.	Areas other than those prescribed in (i) and (ii)	75	65
Time Frame : Day: 6.00 am - 8.00 pm and Night: 8.00 pm – 6.00 am			

3.2.3 The Public Health Act (Cap. 242) Revised 2012

Section 115 of the Act states that no person/institution shall cause a nuisance or condition liable to be injurious or dangerous to human health. The law requires that all lawful, necessary, and reasonably practicable measures be taken to maintain areas under jurisdiction clean and sanitary to prevent the occurrence of nuisance or conditions liable for injurious or dangerous to human health.

Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permit or facilitate the breeding or multiplication of pests shall be deemed nuisances and dealt with in the manner provided by this Act.

3.2.4 Occupational Safety and Health Act (OSHA 2007)

The Occupational Safety and Health Act seeks to ensure safe and healthy working conditions for employees. It establishes standards and responsibilities for employers and employees to prevent workplace accidents and health hazards. The Act mandates the creation of safety policies, the provision of appropriate protective equipment, and regular health and safety training. It also requires employers to conduct risk assessments, report accidents and occupational diseases, and establish safety committees. The goal of OSHA 2007 is to foster a safe working environment, reduce work-related injuries and illnesses, and promote overall worker well-being.

3.2.5 Work Injury Benefit Act (WIBA) 2007

This is an Act of Parliament stipulating that employees who suffer injuries or contract diseases arising out of and in the course of their employment are entitled to compensation. It mandates employers to provide medical treatment and compensation for temporary or permanent disabilities, as well as

compensation for dependents in the case of death resulting from a workplace injury or illness. The Act also requires employers to report workplace injuries, maintain insurance for employee compensation, and provide a framework for resolving disputes through the Director of Occupational Safety and Health Services.

3.2.6 National Gender and Equality Act, 2011

National Gender Equality Commission is a constitutional Commission established by an Act of Parliament in August 2011, as a successor commission to the Kenya National Human Rights and Equality Commission under Article 59 of the Constitution. NGEC derives its mandate from Articles 27, 43, and Chapter Fifteen of the Constitution; and section 8 of NGEC Act (Cap. 15) of 2011, with the objectives of promoting gender equality and freedom from discrimination. It addresses the protection and promotion of the rights of marginalized groups, including women, children, persons with disabilities, and minority communities.

3.2.7 The Sexual Offences Act, 2006 and its amendment 2012.

Observing a standard work ethic is recommended to ensure persons from both genders are not subjected to sexual offenses. An ample working environment should prevail in all workplaces in the envisioned development by the proponent to be enhanced through the implementation of a Sexual Misconduct Policy.

3.2.8 The County Governments Act, 2012

The Constitution of Kenya, 2010 grants county governments the powers to grant or renew business licenses or refuse the same. The county government is empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety, and well-being of the inhabitants of the area. This includes the construction and maintenance of water supply, sewage, and solid waste management systems.

The Act also emphasizes the need for a consultative and participatory approach where the principles of planning and development facilitation in a county serve as a basis for engagement between the county government and the citizens and other stakeholders.

3.2.9 Climate Change Act, 2016

This Act provides a legal framework for the country to enhance climate change resilience and promote low-carbon development. It mandates the development of national and sectoral adaptation plans, promotes public and private sector participation in climate change mitigation, and encourages the use

of renewable energy and sustainable practices. It also establishes mechanisms for reporting on greenhouse gas emissions and tracking progress toward international climate commitments.

3.2.10 Employment Act, 2007

The purpose of the Act is to promote sound labor relations through freedom of association, the encouragement of effective collective bargaining and the promotion of orderly and expeditious dispute for the protection and promotion of settlements conducive to social justice and economic development for connected purposes. This Act is important since it provides for an employer-employee relationship that is important for the execution of the DAC project.

3.2.11 The National Land Commission Act, 2012 No. 5 of 2012 (Revised 2016)

This Act makes further provision to the functions and powers of the National Land Commission and to give effect to the objects and principles of devolved government in land management and administration, and for connected purposes. Section 5(1) under Article 67(2) of the Constitution, the functions of the Commission shall be the shall be:

(a) to manage public land on behalf of the national and county governments;

(b) to recommend a national land policy to the national government.

Additionally, in accordance with Article 67(3) of the Constitution, the commission shall

(a) on behalf of, and with the consent of the national and county governments, alienate public land;

(b) monitor the registration of all rights and interests in land; and

(c) ensure that public land under the management of the designated state agencies is sustainably managed for the intended purposes.

3.2.12 Physical and Land Use Planning Act, 2019

This Act makes provision for the planning, use, regulation, and development of land and connected purposes. Article 5 of the Act under Principles and Norms of physical and Land Use Planning notes that every person engaged in physical and land use planning development activities shall be in a manner that integrates the economic, social and environmental needs of present and future generations. Article 4 notes that major developments should be subjected to environmental and social impact assessment.

3.2.13 The Geothermal Resources Act, 1982

This Act governs the exploration, development, and utilization of geothermal energy in Kenya. While the Act primarily focuses on regulating geothermal resource management, it indirectly supports environmental sustainability by encouraging efficient energy use. Though not explicitly addressing Direct Air Capture, the Act's promotion of geothermal energy, a low-carbon alternative to fossil fuels, aligns with broader goals of reducing carbon emissions. The supplementary legislation enhances regulatory oversight and ensures that geothermal projects comply with environmental standards, indirectly contributing to efforts that mitigate carbon emissions, including future considerations for air capture technologies.

3.2.14 The Traffic Act, 2016

This Act specifies that motor vehicles use proper fuel. The Traffic regulations promulgated under the Act specify that every vehicle is required to be so constructed, maintained, and used so as not to emit any smoke or visible vapor. This Act will apply to the project during the construction phase.

3.2.15 The Energy Act, 2019

This Act promotes sustainable energy development and outlines the regulatory framework for energy projects, creating a framework that supports carbon capture as part of Kenya's broader strategy to reduce greenhouse gas emissions in the energy sector. It emphasizes environmental conservation and mandates energy producers to comply with emission standards, encouraging the integration of DAC technology in power generation and industrial processes to capture CO_2.

3.2.16 The Water Act, 2016

The Act establishes a comprehensive legal and regulatory framework for the management, use, and conservation of water resources. It emphasizes sustainable water resource use, protection of catchment areas, and efficient delivery of water and sewerage services. The Act also integrates environmental protection, ensuring water projects comply with environmental standards which is relevant to the proposed project as it has water use implications.

3.2.17 The Factories and Other Places of Work (Fire Risk Reduction) Rules, 2007

Sets out regulations to minimize fire risks in workplaces. The rules require employers to implement fire prevention measures, including identifying potential fire hazards and ensuring safe storage of flammable materials. They mandate the installation and maintenance of fire-fighting equipment, such as fire extinguishers and alarms, and the provision of adequate emergency exits. Employers must train

employees on fire safety procedures, conduct regular fire drills, and ensure clear evacuation plans are in place. The rules also stipulate that workplaces must be designed and maintained to prevent fires and protect the health and safety of workers in the event of a fire.

3.2.18 The Factories and Other Places of Work (Hazardous Substances) Rules, 2007

The regulations stipulate for the safe handling, use, and disposal of hazardous substances in workplaces. The rules require employers to assess and control the risks associated with hazardous substances to protect workers' health and safety. This includes labeling and storing hazardous substances properly, providing personal protective equipment (PPE), and ensuring ventilation in areas where hazardous substances are used. The rules also emphasize the importance of emergency response measures, including first aid and the safe disposal of hazardous waste, to minimize occupational hazards associated with chemical exposure.

3.2.19 The Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005 – Legal Notice No. 25

It sets regulations to protect workers from the harmful effects of excessive noise in the workplace. The rules mandate employers to assess and monitor noise levels, particularly in environments where noise exceeds 85 dB. Employers must implement noise control measures, such as engineering controls to reduce noise at the source or providing hearing protection like earplugs or earmuffs to workers exposed to high noise levels.

3.2.20 The Water Resources Management Rules, 2007 (Legislative Supplement No. 52)

Provides detailed regulations for managing and protecting the country's water resources. Established under the Water Act, these rules aim to ensure sustainable water use and conservation. They require individuals and organizations to obtain permits for activities such as water abstraction, discharge of wastewater, and changes to watercourses. The rules set standards for water quality, including measures to prevent and control pollution and promote the protection of water catchments and riparian zones.

3.3 International Regulations

3.3.1 The United Nations Framework Convention on Climate Change and Kyoto Protocol

The United Nations Framework Convention on Climate Change (UNFCCC), 1992, is of a framework nature and imposes a general requirement upon contracting parties' governments, to adopt policies and make various commitments towards the stabilization and eventual reduction of greenhouse gas

concentrations. The Kyoto Protocol was agreed in 1997 and provides signatory Parties with actual legally binding obligations and targets for the reduction of their greenhouse gas emissions.

3.3.2 The Paris Agreement, 2015

This is an international treaty under the United Nations Framework Convention on Climate Change (UNFCCC) aimed at combating climate change by limiting global warming to well below 2°C above pre-industrial levels, with efforts to limit it to 1.5°C. Kenya's Nationally Determined Contributions (NDCs) under the Paris Agreement highlight the country's commitment to reducing greenhouse gas emissions, and DAC can be a potential tool to meet these international climate targets. It marks a collective shift toward sustainable, low-carbon development.

3.3.3 The Convention on Biological Diversity (CBD)

It aims at conserving the diversity of life on Earth, promoting sustainable use of biological resources, and ensuring the equitable sharing of benefits derived from genetic resources. It provides a framework for countries to develop national strategies and action plans to address biodiversity loss, protect ecosystems, and support sustainable development.

3.3.4 The IFC Environmental and Social Performance Standards (PS) and the World Bank Group's Environmental, Health, and Safety (EHS) Guidelines

They provide comprehensive frameworks for managing environmental and social impacts associated with development projects. The IFC Performance Standards outline requirements for assessing and managing risks and impacts related to environmental and social aspects, including labor conditions, community health, and resource efficiency. They emphasize the need for stakeholder engagement, risk management, and the promotion of sustainable practices. Similarly, the World Bank Group's EHS Guidelines offer sector-specific recommendations and best practices for mitigating environmental and health impacts, ensuring safety and minimizing risks in various industries. Both frameworks aim to promote responsible project development, safeguard communities, and support sustainable development by providing guidelines for assessing, managing, and mitigating environmental and social risks.

CHAPTER 4: BASELINE INFORMATION

4.0 Climate and Weather

The climate of the project area is warm and temperate. This climate is considered to be Csb according to the Köppen-Geiger climate classification. The main factor controlling the climate in the area is the Inter-Tropical Convergence Zone (ITCZ) which defines the seasonal climatic changes. The local topography also causes variations in the climate.

The area experiences two main rainy seasons: one in the long rains from March to May, and another shorter rainy period from October to December. During these seasons, the rainfall can vary between 800 mm and 1,200 mm annually, bringing much-needed water to the region.

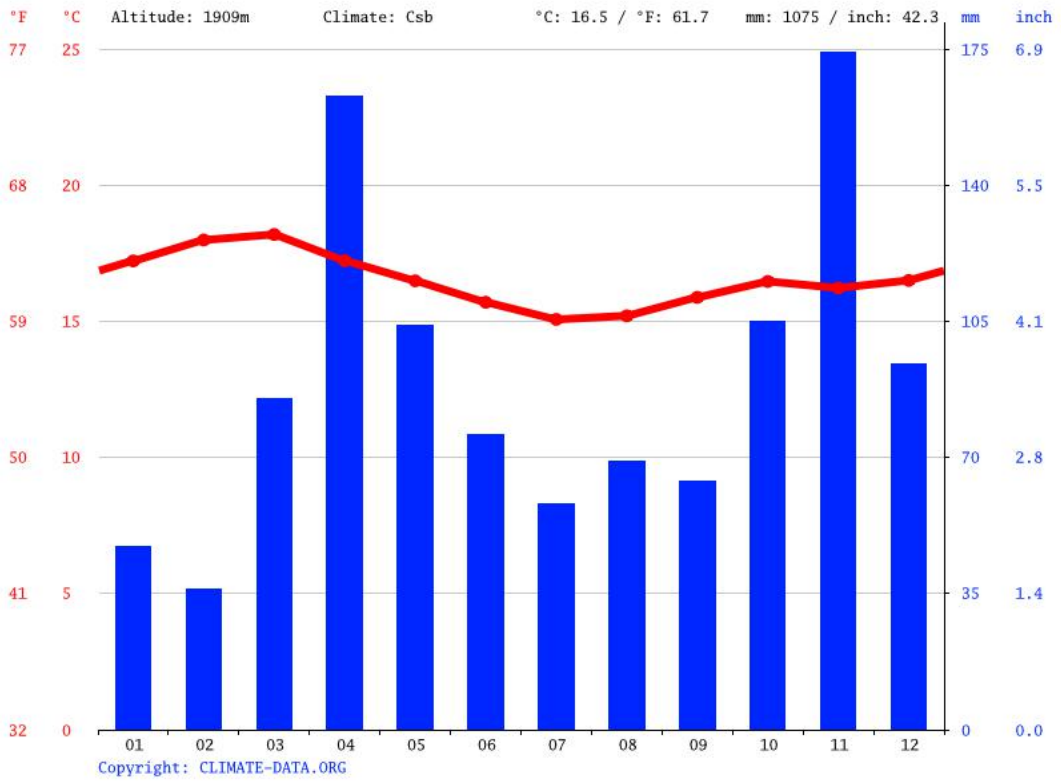

Figure 4: A climograph of Elementaita Area (rainfall variation). Source: https://en.climate-data.org/africa/kenya/nakuru/elmenteita-104579/

Precipitation is lowest in February, with an average of 36 mm/1.4 inch. The maximum quantity of rainfall is observed during the month of November, exhibiting an average value of 174 mm | 6.9 inch

Temperatures typically range between 15°C and 25°C, with the days being warm and the nights cooler. It feels quite comfortable throughout the year, but you'll notice the nights can get a little chilly.

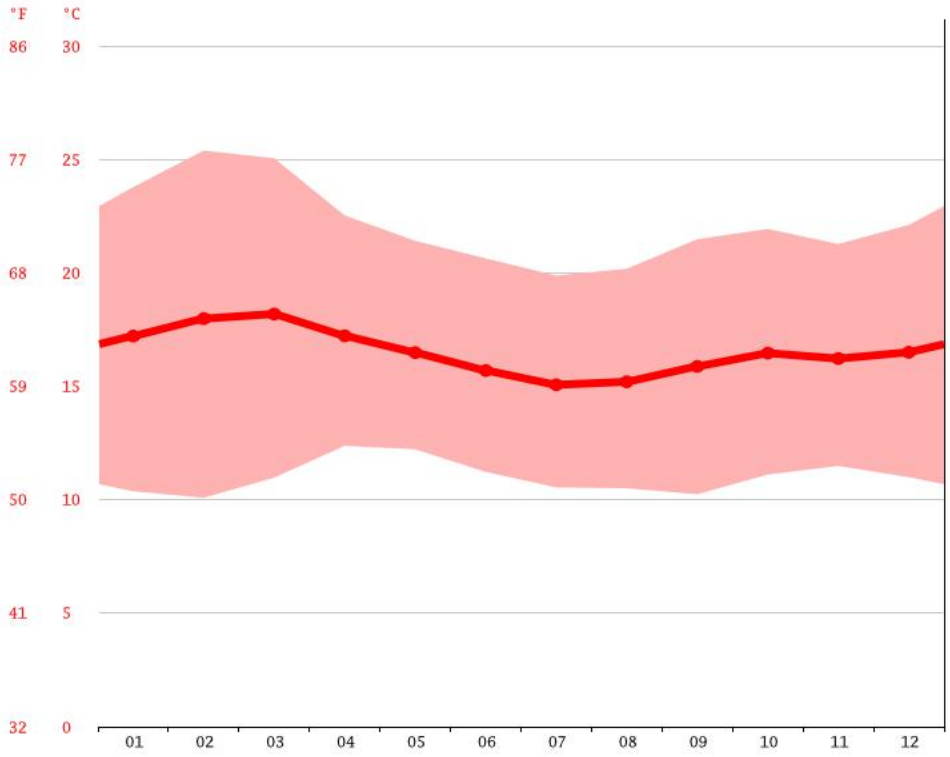

Figure 5: A climograph of Elementaita Area (Temperature variation). Source Ibid.

The average temperature is 19.3 °C with March being the hottest month of the year. During the month of July, there is a notable drop in temperature, with an average low of approximately 15.9 °C.

Winds here are usually gentle, blowing in from the southeast, and range from 5 to 15 km/h. On most days, it's a light breeze, but stronger gusts can come during storms. The humidity is fairly moderate, sitting between 50% and 80%, so it doesn't feel too dry, but it's not overly humid either. The air pressure remains stable, which helps maintain a steady weather pattern, though it can fluctuate with changing weather systems. Overall, the climate is quite pleasant, making the region suitable for both agriculture and tourism.

The area falls within the Lower Midland (LM5) agro-ecological zone, which is classified as a livestock-millet zone. Agroforestry and bee-keeping are also practiced on a small scale to supplement livelihoods. Soil fertility is moderate but requires careful management to sustain productivity, given the area's vulnerability to erosion and land degradation.

4.1 Water Resources

There are limited surface water resources in and around the project area. The main surface water resource in the vicinity of the project area is Lake Elementaita, which is alkaline in nature and

unsuitable for domestic use. Rainwater harvesting through roof catchment was witnessed in the locality. Rainfall in the area follows bimodal patterns, with short rains typically occurring from October to December and long rains from March to May. However, climate variability has led to more unpredictable rain patterns, with extended dry periods and shorter wet seasons. The project area has limited surface water resources and often has challenges of siltation, evaporation, and pollution, especially in the water pans. Access to water infrastructure is uneven. In some areas, water is sourced from distant wells or delivered by tankers, increasing costs and affecting reliability, especially in drier seasons. Underground aquifers that replenish the wells face recharge challenges due to variable rainfall and over-extraction risks.

4.2 Soil and Geology

The soil types and distribution in the project area have been influenced by the topography. Generally, the prospect area has well drained clay-loams red subsoil derived from the volcanic and basement complex rocks with volcanic ash as a major occurrence. In the transitional areas towards the plains southwards, the soils are well-drained clay-sandy. In other areas there is clay, silt and dry sandy soils. Geologically, the region is part of the East African Rift System, featuring volcanic rocks like basalt. The landscape includes lava flows and ash deposits. The soils are generally stable but can vary based on area-specific geology and volcanic features.

4.3 Ecology and Wildlife

Around Lake Elementaita, you'll find specialized flora such as salt-tolerant grasses and shrubs, including acacia trees and thorny bushes that can thrive in semi-arid conditions. The dorminant species of vegetation found within the project area include: *Dodonaea viscosa*, *Rumex usambarenis*, and *Cussonia spicata.* For avifauna, the lake itself is famous for attracting large flocks of lesser flamingos, which feed on the algae that flourish in the saline water. Besides flamingos, other bird species such as pelicans and herons are common, making the lake a key habitat for migratory and resident birds.

In terms of faunal species, the area is endowed with different of the species. Four animal species namely the Burchell's zebra *(Equus burchelli),* African buffalo (*Syncerus caffer*), gazelles (*Gazella thomsoni*), (*Gazella grantii*), giraffes (*Giraffa camelopardalis Rothschild).* There are also impalla (*Aecopyceros melampus*), spotted hyena (*Crocuta crocuta*), dik dik (*Rhynochotrogus kirkii),* bush-back, reedbuck, duiker, olive baboons *(Papio anubis),* ververt and sky monkeys, jackal, bat eared fox,

warthogs *(Phacochoerus aethiopicus),* ardvark *(Orycteropus afer),* eland and African spring hare*(Lepus sp.).*

4.4 Air Quality

The air quality in the Elementaita region is generally good, thanks to its rural setting and the absence of major industrial activities. The area is mostly agricultural, so the air is usually clean, especially when compared to urban centers. However, there are occasional sources of pollution. Dust from unpaved roads and farming activities can be an issue, particularly during the dry season, when winds can stir up more particles. Vehicle emissions from local traffic, especially around Naivasha town, can also contribute to air pollution, though it's typically not severe.

In terms of pollutants, there are relatively low levels of carbon dioxide (CO_2), sulfur dioxide (SO_2), and nitrogen oxide (NO_3). Concentration levels of these gases were zero (0.00 ppm) in all places where measurements were taken. Overall, air quality is still considered healthy, but it's important to monitor it as industrial activities or large projects could introduce new sources of emissions.

4.5 Land use and human activities

The land around Elementaita is used in a variety of ways. Agriculture is a major activity, with vegetable farming and livestock keeping being common. There are also tourism activities, especially around Lake Elementaita, which are popular for bird watching and safari trips. Some parts of the region are used for residential purposes, while others are reserved for conservation areas. The local economy relies heavily on both agriculture and tourism, which means any industrial activity, like a DAC project, would need to carefully balance these uses to avoid negative impacts. There is, however, less human activity on the land where the proposed project will sit.

4.6 Health and Safety

In terms of community health, respiratory diseases have been a concern, partly due to dust from unpaved roads and emissions from industries and vehicles. Waterborne diseases can also be an issue, especially during the rainy seasons when water sources might get contaminated. Access to healthcare is moderate, with local clinics and hospitals serving the population. Emergency services exist, but response times can vary, especially in more rural or remote areas.

4.7 Noise

The noise levels in this region are typically low to moderate, especially in rural areas near Elementaita. Common noise sources include moving vehicles, farming machinery, and animals.

Vibration from everyday activities is minimal, though construction projects and vehicle movement can cause temporal increases. Overall, it's a fairly quiet region outside Kikopey urban center.

Table 3: Noise data around the project site

Site	Minimum (dB)	Maximum (dB)	LAEq (dB)	Threshold (dB)
Kikopey Chief's Office area	39.2	62.3	51.9	60
Octavia Carbon Office Area	50.3	66.6	56.0	60
Point 1	38.9	58.3	46.1	60
Point 2- Weitemere	34.9	55.6	42.4	60
Gilgil Chief's Office area	40.1	61.5	53.4	60
Sleeping Warrior	36.4	55.9	46.6	60
Gilgil Slaughterhouse Area	30.2	59.5	39.8	60

4.8 Energy and Emissions

Energy in the area is primarily supplied through the national grid, with geothermal energy from the Olkaria plant playing a significant role. Solar power is also gaining traction for homes and businesses. The main source of energy for cooking is firewood and charcoal. Emissions in the area are mostly related to agricultural activities and vehicle traffic. There are occasional air quality concerns related to dust and smoke, but nothing too severe.

4.9 Socio-economic/cultural factors

The proposed project will be in Elementaita Ward. It is one of the five wards which make up Gilgil sub-county. According to the 2019 population census, the population size of the larger Gilgil su-county is 185,209. Of these, 92,955 are male, 92,247 are female while 7 are intersex. The population density is approximately 172 persons per km^2. Kikopey Location, in which the proposed project will be sited, has approximately 30,000 people. The population is a mix of different ethnic groups, with the Kikuyu, Maasai, and Kalenjin being the most prominent. Land ownership in the region is a mix of private land holdings and community lands. Small-scale farmers own individual plots, while some larger estates are involved in commercial farming and wildlife conservation. The land tenure system

has seen changes over time, with efforts to formalize land ownership are ongoing, but some challenges remain, particularly regarding disputes over communal land and land rights.

Culturally, Elementaita is rich in heritage, with notable sites like the Kariandusi prehistoric site, which provides insight into early human life and activities in the area. The local communities still maintain some traditional practices, especially in terms of ceremonies, pastoralism, and land use, but these are increasingly blending with modern lifestyles.

CHAPTER 5: STAKEHOLDER ENGAGEMENT AND PUBLIC PARTICIPATION

5.1 Overview

Direct Air Capture concept is a new technology in Kenya, even though it has been successfully implemented in other countries, it remains a grey area in Kenya. Therefore, it is necessary for the local community and other stakeholders to understand it and its impacts to participate in enhancing its positive impacts and mitigating the negative ones. In view of this, it is important to have local communities participation. The ESIA team for this proposed project adopted a participatory approach during the study as is required by the constitution and other legal instruments, as well as other national and international regulations.

5.2 Objectives of Public Participation

Public participation is a continuous engagement throughout the project cycle that requires regular consultations. The objectives for this public engagement were:

i. Disseminate and inform the project stakeholders about the proposed project, its key components and activities, location and expected impacts with particular attention to potentially affected or benefiting persons.
ii. Create awareness among the public and stakeholders on the need for the ESIA for the Direct Air Capture project and its due process.
iii. To obtain information about the needs, concerns, comments, suggestions and priorities of affected persons and their general reactions to proposed project activities.
iv. To provide an opportunity for stakeholders to ensure that their concerns are known to the decision-making bodies, project planning team and the developer at an early phase of project planning and implementation.
v. Create a sense of ownership, build capacity, and ensure transparency in all activities related to the project, including, but not limited to, planning, implementing, environmental management, operation, monitoring, and evaluation of the project by all key stakeholders.

5.3 Methodology and Consultation Process

The ESIA team recognizes that for the feedback to be useful to the intended users, all the stakeholders should be actively involved in the planning, implementation, and operation of the project. To accomplish this, the team adopted a participatory approach in identification of the environmental and social impacts related to the project. Several methods were used to engage the stakeholders in the

process of capturing their views on the proposed project and data collection. The data collection methods used include:

5.3.1 Questionnaires

The ESIA team administered a structured questionnaire aimed at soliciting the community's views on the various aspects of the proposed project in the area.

5.3.2 Public baraza

Three public barazas were conducted on 16th, 18th, 30th October in communities around the project area. The local community was notified via the Area Chiefs' offices and attendance sheets and minutes of the public barazas are attached in Appendix I-IV. The barazas were chaired by the respective area chiefs and the ESIA team together with representatives from the proponent presented the proposed project to those in attendance. *(See Figure 6)*

Figure 6: Community participation at Kikopey Chief's Office Grounds on 16/10/2024

Figure 7: Public participation meeting at Gema Community College Hall on 18/10/2024

5.4 Results of the Public Consultation

5.4.1 Positive feedback

5.4.1.1 Employment opportunities

The local community expressed hope that the project will open new job opportunities for their members.

5.4.1.2 Improvement of Infrastructure

Community members expressed optimism that the project, and others that are welcome in the area will help improve the infrastructure of the area, such as improvement of the road system, water sources and other social amenities.

5.4.1.3 Economic Growth

With the creation of the Special Economic Zone (SEZ) near the project site, the community members expressed that there have been improvements in business job opportunities and that this project will create more opportunities for them.

5.4.1.4 Climate Change Mitigation

The community members expressed positive hope that this project will improve the weather conditions which would in turn support their farming activities.

5.4.2 Community Concerns

5.4.2.1 Occupational Safety and Health

The community expressed concern over the possibility of emissions and other pollution elements from the capture machines that could pose health risks to people surrounding the project area and beyond. Even though the technology is safe, mitigation measures shall be presented within the ESMP to minimize and address any health impacts.

5.4.2.2 Impact on Vegetation

The residents were fearful that the CO2 captured could leak and cause acidity hence burning their crops. They also were curious if the storage would occupy space that would affect their farming activities. The proponent shall conduct constant monitoring to ensure there are no leaks and should there be accidental leakages, corrective measures shall be undertaken to contain them.

5.4.2.3 Water pollution

They also expressed concern if underground injection would acidify the water sources around them. The depth of storage of the CO2 Octavia's partner, Cella Mineral Storage, is way beyond the groundwater table. In addition, the stored CO2 will react with basalt and mineralize and form stable carbonates, and the process is irreversible; hence, it cannot cause harm to water resources. However, should this occur, Cella shall put in place measures in their ESMP for carbon storage to ensure safe storage, and should there be impacts, operations shall halt to pave the way for more research and/or employ corrective measures.

5.4.2.4 Waste Generation

During the construction and operation phases, waste will be generated including but not limited to rejected materials, surplus materials and used sorbent. Some of the materials will be unusable and hence will need to be disposed of. The proponent intends to engage the services of a NEMA-licensed waste handler to transport and properly dispose of this waste.

5.4.2.5 Grievance redress mechanism

Community members were concerned that their voices would not be heard and addressed should the project have any negative impact on them. The proponent intends to develop clear and accessible communication channels through which the members will channel their issues. The village elders and the local administration will also act as a link between the company and the community members.

5.5 Recommendations to the Proponent

The community members were positive about the proposed project. They proposed the following recommendations to the proponent:

i. Carry out more engagements with the community in every stage of the project's development
ii. Educate them more on the Direct Air Capture technology
iii. Consider the rightful locals, especially those in attendance of the public consultation forums in employment opportunities from the onset.
iv. Re-use the captured CO_2 instead of storing it underground
v. Develop a comprehensive and inclusive community engagement plan and a grievance redress mechanism for effective engagement and receiving of feedback from the local community.
vi. Open channels of communication with the local community and other relevant stakeholders.

CHAPTER 6: PROJECT ALTERNATIVE ANALYSIS

6.0 Overview

In evaluating this project, it's crucial to explore and compare alternative options that could be more beneficial from an environmental, technical, or economic perspective. This analysis examines various project alternatives, including the "No Project" scenario, alternative sites, alternative absorbents, alternative technologies, and alternative uses. The aim is to identify the most sustainable and effective option for reducing atmospheric CO_2 and maximizing positive environmental and socio-economic impacts.

6.1 "No Project" Alternative

The "No Project" alternative means halting the development of this DAC initiative entirely. On the surface, this option would avoid potential environmental impacts associated with the construction and operation of the DAC system. There would be no disruption to land use, ecosystems, or the local community from the project's infrastructure, and there would be no risks related to the transport of captured CO_2.

However, the broader consequences of not proceeding with the project are significant. Without the project, there would be no reduction in atmospheric CO_2 via DAC technology, one of the few scalable solutions that can capture CO_2 directly from the air. The absence of this project would mean a missed opportunity to contribute to global carbon reduction targets and mitigate climate change impacts, which are already affecting ecosystems and communities worldwide. Kenya, in particular, is vulnerable to climate-related issues such as droughts, floods, and changing weather patterns, making projects like this vital for long-term environmental sustainability.

Additionally, the economic and technological benefits that the project could bring to Kenya would be lost. The project has the potential to create jobs, stimulate the local economy, and position Kenya as a leader in climate technology. It would also encourage further investment in renewable energy infrastructure, particularly in the underutilized geothermal sector. Without the project, these social and economic opportunities would be foregone.

Conclusion: The "No Project" alternative would avoid some immediate environmental impacts but would result in significant long-term negative consequences, particularly in terms of climate change mitigation, lost economic opportunities, and missed advances in environmental technology. This makes it a non-viable option.

6.2 Alternative Locations

Choosing an alternative location for the DAC project is another option. The decision to implement the project in Kenya offers a unique set of advantages that are difficult to replicate elsewhere. Kenya is particularly well-suited for this project because of its abundance of renewable geothermal energy. The country's energy grid is already over 93% powered by renewables, with geothermal energy contributing almost half of that. This makes Kenya an ideal site for a DAC project because geothermal energy can be used to power the highly energy-intensive processes involved in DAC, such as CO_2 desorption, vacuum creation, and cooling. In addition, the intended location is already on an existing productive geothermal project, which among other advantages, will reduce the disturbance that will result from ground-up development, and also acts as a ready renewable energy source. Without this renewable energy source, the project would be far less sustainable, and its overall carbon footprint could increase significantly.

Moreover, Kenya's geological features, particularly the basalt formations around the Elementaita region, are perfectly suited for long-term CO_2 storage through mineralization. Basalt can naturally convert injected CO_2 into stable carbonates over time, ensuring that the captured carbon is permanently sequestered. Alternative locations having such geological formations would require fresh exploration, or extensive access road networks for transporting the CO_2 from the capture sites to injection sites, which will eventually have extensive economic and environmental implications. The choice of this location for the proposed project is strategic for several reasons:

6.2.1 Geothermal Energy Integration

The region's geothermal fields provide a reliable and sustainable source of energy. This is essential for powering the energy-intensive DAC processes which together account for nearly 80% of the plant's energy needs. By locating the DAC project in Elementaita, the project can tap directly into the geothermal power generated nearby, significantly reducing the overall carbon footprint and operational costs of the DAC system.

6.2.2 Proximity to basalt formations for CO_2 storage

The region possesses the ideal geological conditions for permanent CO_2 storage. The basalt formations found here are highly effective for CO_2 mineralization. After injection, CO_2 will gradually react with basalt to form stable carbonates, securely sequestering the gas for thousands of years. This geological advantage makes this an optimal location for storing captured CO_2 without the need to transport it to distant sites.

6.2.3 Existing infrastructure and skilled workforce

The existing geothermal projects have already fostered a skilled workforce knowledgeable in renewable energy technologies. By aligning the project with the existing geothermal development, the DAC project can benefit from this expertise, reducing training costs and improving operational efficiency. Additionally, the region has infrastructure in place, such as roads and energy grids, to support large-scale industrial projects like DAC.

6.2.4 Synergy with local development goals

Locating the project in Elementaita aligns with Kenya's broader development goals, which include expanding the use of renewable energy and fostering local industrial growth. The project would not only utilize existing resources but also help expand the geothermal sector by creating new demand for energy, driving further investment, and reducing electricity costs for local consumers.

Conclusion: The intended location stands out as the ideal place for the project due to its abundant geothermal resources. and suitable geological formations. Moving the project to a different location without these advantages would increase operational costs, reduce efficiency, and potentially compromise the project's environmental benefits. Therefore, Elementaita remains the most suitable site for the DAC project's success.

6.3 Alternative Technologies

Several alternative technologies could be considered instead of Direct Air Capture (DAC) with DAC, each with its strengths and limitations. These include:

A. **Point-source Air Capture**: This method focuses on capturing CO_2 directly from industrial emissions, such as those from power plants and factories. While point-source capture can be highly effective in reducing emissions from specific industries, it does not address CO_2 already present in the atmosphere. DAC, on the other hand, captures CO_2 from ambient air, making it more versatile and applicable across sectors. Point-source technologies are limited to industrial emitters, whereas DAC offers a broader solution that targets global atmospheric CO_2 levels.

B. **Nature-based solutions**: Options like afforestation (planting trees) or soil carbon sequestration are also important tools in the fight against climate change. Trees naturally absorb CO_2, and improving soil health can store carbon underground. However, these methods require vast amounts of land, and their effectiveness is slow compared to DAC. Furthermore, they are vulnerable to disruptions such as wildfires, deforestation, and land-use changes,

which can release stored carbon back into the atmosphere. These methods also lack the permanence of DAC, where CO_2 is mineralized and stored for thousands of years.

C. **Bioenergy with Direct Air Capture (BEDAC)**: BEDAC combines bioenergy production with Direct Air Capture, potentially offering both energy production and carbon sequestration. While promising, BEDAC also faces challenges such as land-use competition with food production and the need for significant water and energy inputs.

Ultimately, DAC technology offers unique advantages in terms of scalability, permanence, and flexibility. Unlike point-source capture, DAC can remove CO_2 from any location, and unlike nature-based solutions, it provides a secure and long-term solution. When combined with geothermal energy, DAC becomes an even more sustainable option.

6.4 Alternative Absorbents

The choice of CO_2 absorbents is critical not only for the technical efficiency of capturing carbon but also for minimizing environmental and social impacts. Below is a comparison of various absorbents that could be used in place of polyethyleneimine (PEI), which the proponent intends to use.

1. Amine-Based Sorbents

Amine-based compounds, such as monoethanolamine (MEA), are well-known for their CO_2 capture capability. These are widely used in industrial gas treatment systems. Just like PEI, they degrade over time, but unlike PEI which loses its toxicity with use, they create harmful byproducts that can pollute the environment if not properly managed. From an environmental perspective, using amine-based sorbents requires careful handling and disposal to avoid introducing toxic substances into the environment.

2. Metal-Organic Frameworks (MOFs)

MOFs are an exciting area of research because of their high surface area and tunable properties. While MOFs can capture CO_2 efficiently, their impact on the environment depends largely on the specific materials used to create them. For now, their large-scale environmental safety is not fully known, and they are still relatively expensive. This makes them a less favourable option for projects where sustainability and cost-effectiveness are key considerations.

3. Zeolites

Zeolites are a naturally occurring and environmentally friendly alternative. They work by physically trapping CO_2 within their porous structure. Zeolites are non-toxic and inert, making them safe for

both the environment and human health. However, they are more effective at capturing CO_2 from concentrated sources, such as industrial flue gases, rather than from ambient air. Their performance can also be compromised in humid conditions, which might affect their reliability in some environments.

4. Activated Carbon

Activated carbon is another absorbent option that is safe and widely available. It is derived from natural materials like coconut shells and is considered benign for the environment. However, it is not as effective at capturing CO_2 from the air as chemical sorbents like PEI. Activated carbon is more suited for applications where high concentrations of CO_2 are present, but it might need to be regenerated frequently to maintain its efficiency.

5. Sodium Hydroxide (NaOH)

Sodium hydroxide is highly effective in CO_2 capture through a chemical reaction that converts CO_2 to sodium carbonate. However, it is extremely caustic and poses significant environmental risks if not carefully managed. Its use requires strict control measures to avoid contamination of soil and water, which makes it less ideal for large-scale or long-term projects without dedicated safety protocols.

Conclusion: While PEI remains a highly efficient and well-suited option for CO_2 capture, other materials can be considered. Alternatives like zeolites and activated carbon are safer for the environment even though they may not offer the same level of performance in low-concentration CO_2 capture. Amine-based sorbents and MOFs provide high efficiency but come with environmental and economic challenges that must be carefully weighed. These alternatives may not be as efficient as PEI, but they provide grounds for more research to make the direct air capture project sustainable and environmentally safe.

6.5 Alternative Uses

The primary plan for this DAC project is to inject the captured CO_2 into underground storage. There are, however, several other potential uses for the CO_2 that could be of economic value to Octavia and reduce reliance on geological storage. Exploring these alternatives can contribute to both environmental sustainability and economic growth.

1. Enhanced Oil Recovery (EOR)

EOR is a well-known application of collected CO_2, in which CO2 is injected into oil reservoirs to boost the amount of oil that can be recovered. For many years, this technique has been used to partially

cover the expenses of CO_2 capture. This might be a lucrative market segment once oil extraction activities start in Kenya, which has discovered oil reservoirs. This solution, however, could not be in line with more general climate goals because it encourages the continued extraction of fossil fuels. It's a good economic application, but it might not be preferred in projects that aim for decarbonization or net-zero emissions.

2. Carbonation of Building Materials

The carbon that has been trapped can be used to make carbonated building products like cement. We can create long-lasting building materials and lessen our carbon footprint by adding CO_2 to produce these materials. With this prospective substitute, CO_2 is locked into a solid state and cannot be released back into the atmosphere. Furthermore, the market for sustainable building materials is expanding, which presents possible opportunities. In addition to promoting climate goals, this choice improves the sustainability of the building sector.

3. Synthetic Fuels

CO_2 can be converted into synthetic fuels such as methane or methanol through chemical processes like hydrogenation. These fuels could be used as alternatives to conventional fossil fuels in industries that are hard to electrify, such as aviation. Although synthetic fuels still release CO_2 when burned, the overall cycle can be carbon-neutral if renewable energy is used in the conversion process. This approach offers a way to replace fossil fuels, but the process is currently energy-intensive and costly, limiting its immediate scalability.

4. Food and Beverage Industry

The food and beverage industry uses CO_2 extensively, particularly for carbonating beverages like soft drinks and beer, as well as in packaging and refrigeration. The proponent aims to capture CO2 that is 99% pure, which is suitable to meet this demand. However, the quantities required in this industry are relatively small compared to the estimated capture amounts, making it a limited market. Nevertheless, this could provide a small but valuable stream of revenue for the captured carbon, particularly if other markets are not immediately viable.

5. Chemical Manufacturing

Captured CO_2 can be used as a raw material in various chemical manufacturing processes. For instance, it can be converted into chemicals like urea (used in fertilizers) or polycarbonates (used in plastics). This not only reduces reliance on traditional carbon feedstocks but also offers a way to store

CO_2 in long-lasting products. The development of CO_2-based chemicals is growing, though it still requires significant research and investment to scale these processes to industrial levels.

6. Algae Cultivation

Another innovative use for CO_2 is in algae cultivation, where CO_2 is fed to algae in bioreactors or ponds to promote growth. Algae can be harvested for biofuels, animal feed, or pharmaceuticals. This is a renewable and sustainable way to use captured CO_2, as algae act as natural carbon sinks while producing valuable biomass. However, this process is still in its early stages of commercialization and requires optimal conditions for algae growth.

7. CO_2 as Refrigerant

CO_2 can also be used as a refrigerant in cooling systems, offering an environmentally friendly alternative to synthetic refrigerants, which have high global warming potential. CO_2-based refrigerants are already being used in commercial applications like supermarkets and air conditioning systems. This alternative offers a closed-loop system where CO_2 is reused rather than released, supporting sustainability in cooling technologies.

Conclusion: Injecting CO_2 underground is currently the most mature and scalable method for long-term storage. However, exploring alternatives analysed here could create value-added products and reduce the need for permanent storage. Algae cultivation and chemical manufacturing also offer promising ways to transform CO_2 into valuable goods, though these options may require further development to become commercially viable on a large scale. By considering these alternatives, the project could create new revenue streams while diversifying its environmental strategy, potentially turning captured CO2 into a resource rather than a waste product.

6.4 Conclusion

After a thorough analysis, the current approach for the project, using DAC technology integrated with geothermal energy in Kenya, remains the most effective and sustainable option. The "No Project" alternative would lead to significant environmental and socio-economic losses. Alternative locations would fail to provide the necessary renewable energy and geological formations for efficient CO_2 capture and storage, while alternative technologies would not offer the same level of scalability or permanence in CO_2 removal. Alternative uses and alternative sorbents, on the other hand, provide ground for more research on other filters that can be used and how the captured CO2 can be safely re-used for revenue generation.

By leveraging Kenya's renewable energy resources and geological potential, the proposed project not only provides a powerful solution for reducing atmospheric CO_2 but also fosters economic development and technological innovation in the region. As such, the proposed project represents the most advantageous path forward for both local and global sustainability efforts.

CHAPTER 7: POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION

7.0 Overview

This chapter presents the assessment of the issues likely to arise as a result of the implementation of the proposed project. For each issue, the analysis is based on its nature, the predicted impact, extent, duration, intensity and probability, and the stakeholders and/or values affected. The analysis incorporates concerns about the social and environmental sustainability of the proposed project per best practices. Allocation of responsibilities, time frame, and estimated costs for implementation of these measures are presented in the Environmental and Social Management and Monitoring Plan.

7.1 Definition and classification of environmental impacts

An environmental impact is defined as any change to the environment, whether adverse or beneficial, resulting from human activities. Impacts may be:

- Positive (beneficial) or negative (adverse)
- Direct or indirect, long-term or short-term in duration, and wide-spread or local in the extent of their effect
- Cumulative when they add incrementally to existing impacts.

In the case of this project, potential environmental impacts would arise during the construction and operation phases of the project and at both stages positive and negative impacts would occur.

7.2 Impact Significance

The purpose of this ESIA Report is to identify the significant impacts related to the proposed project and then to determine the appropriate means to mitigate the negative ones. Significant impacts are defined as those which:

- Result in loss of property and livelihood
- Relate to protected areas or historically and culturally important areas
- Are of public concern and importance
- Trigger subsequent secondary impacts
- Elevate the risk to life-threatening circumstances
- Affects sensitive environmental factors and parameters.

7.3 Impact Scoring and rating criteria

The table below will guide the impact scoring criteria in the impact scoring section. The precautionary principle was used to establish the significance of impacts and their management and mitigation.

Table 4: Environmental Impact Scoring and Rating Criteria

Severity of Impact	**Rating**	**Scoring**
Insignificant/non-harmful/less beneficial	-1/+1	Very Low
Small/Potentially harmful/Potential beneficial	-2/+2	Low
Significant/slightly/harmful/significantly beneficial	-3/+3	Medium
Great/harmful/beneficial	-4/+4	High
Spatial Scope of the Impact	**Rating**	**Scoring**
Activity specific	-1/+1	Very Low
Right of way specific	-2/+2	Low
Within the Project area 5km radius	-3/+3	Medium
Regional/County	-4/+4	High
Duration of Impact	**Rating**	**Scoring**
One day to one month	-1/+1	Very Low
One month to one year	-2/+2	Low
Within the project construction period	-3/+3	Medium
Within the project life	-4/+4	High

7.4 Positive Impacts

7.4.1 Employment opportunities

The local people are likely to benefit from the short-term and long-term job opportunities arising from the construction and operation phase of the project, especially for duties that do not require special professional knowledge. Although this will be short-term, it would be helpful as the unemployment rate is high in rural areas.

7.4.2 Infrastructural development

The local community will benefit from improved infrastructure as a result of the project being operational which will also open up the local area to more business opportunities.

7.4.3 Climate Change Mitigation

Reduction of the CO_2 from the atmosphere will contribute to global climate change mitigation measures, which will in turn improve weather conditions in the area and beyond and hence enhance agricultural activity.

Impact Rating

Table 5: Positive impact rating

Impact	Severity of Impact	Spatial Scope of the Impact	Duration of Impact	Overall Score	Impact Rating
Employment opportunities	+4	+3	+4	+4	High
Infrastructural development	+2	+2	+4	+3	Medium
Climate change mitigation	+4	+4	+4	+4	High

7.5 Negative Impacts

7.5.1 Air Pollution

Local air quality can be affected during construction activities through the production and suspension of dust, having implications for local receptors. Fuel usage by machinery and equipment during the construction and operation will also cause emissions to the local environment. Capture plant operation may produce a variety of air emissions depending on the technology used. Sorbents may also be released into the receiving environment. Additionally, emissions of CO_2 may be experienced from inadequate seals and fittings along the DAC chain. The proponent has set in place an uninterrupted power supply (UPS) and is also committed to installing a solar plant as a backup in case of power outages. This is aimed at curbing emissions as much as possible and ensuring that the plant does not indirectly contribute to the very greenhouse gas emissions it seeks to mitigate.

Mitigation measures

- ***Dust control***- implement dust suppression measures, such as regularly watering construction areas and access roads, especially during dry periods.
- ***Air quality monitoring***- monitor air quality during the operation phase to ensure that there are no CO2 leaks. In case of leaks, ensure immediate corrective measures are undertaken.

- ***Vehicle emissions control***- ensure that all construction equipment and vehicles are well-maintained to minimize exhaust emissions. Use fuel-efficient machinery where possible.
- ***Provide workers with PPEs-*** ensure all crew involved in construction are provided with sufficient protective gear like dust masks.
- Reduction/regulating speed for vehicles within the project site
- Continuous monitoring and inspections

7.5.2 Noise Pollution and Vibration

Construction works during installation and associated activities will generate noise. This will mostly affect the construction workers and any fauna within close proximity to the proposed project area. In the operation phase, operations involving pressurized CO_2 tanks or compressors for loading and unloading may generate localized noise.

Mitigation measures

- N**oise barriers**- erect noise barriers around construction areas where possible to reduce noise levels. Provide high noise level warning signages to alert people when entering high noise areas.
- **Time restrictions**- restrict high-noise activities, such as heavy equipment movement to daylight hours to minimize disturbances to both wildlife and residents at night.
- Workers must be provided with earmuffs or earplugs.
- Notify nearby communities of transport schedules to reduce potential disturbances.

7.5.3 Surface Water

Surface water quality could be affected during the pre-operation/construction phase through discharges from pipeline testing, earthworks, and accidental leaks. During the operation phase, surface water could be affected by wastewater discharges from capture plant activities and cooling. The receiving environment could be polluted during the operation phase by suspended solids from site runoff and through disturbance to contaminated land and accidental spillage and leaks of substances used in the capture process onsite. The DAC process may use substantial amounts of water for cooling and other operations. To reduce strain on local water sources, the proponent:

- Intends to source water from water vendors within Kikopey.
- Intends to sink a borehole within the project site, once the plant is fully operational, to meet the demand.
- Has designed and will deploy an efficient technology for closed-loop water utilization, which ensures minimal water loss during operations and with a high capacity for water recycling.

Mitigation measures

- ***Efficient water usage***- implement water-saving technologies and recycle water where possible to reduce the demand on local water sources.
- ***Wastewater management plan***- develop and enforce a wastewater management plan to prevent contamination of local water bodies. This includes the proper disposal of wastewater and ensuring proper treatment before discharge.

7.5.4 Soil Erosion

During construction, the soil is likely to be affected as a result of vegetation clearance, minor excavations, and from contamination of the construction materials.

Mitigation measures

- ***Erosion control***- implement soil erosion control measures, such as installing silt fences, terracing, and re-vegetating exposed areas immediately after construction.
- ***Rehabilitation of disturbed areas***- stabilize soils in areas disturbed by construction through replanting and applying erosion control measures where necessary.

7.5.5 Waste Generation

General waste will be generated through the construction and operation phases of the project. There may in some cases be additional capture waste generation from degradation products of sorbent usage. Waste would not only impact the aesthetics of the area but has the potential to pollute soil and water resources.

Mitigation measures

- Contractor to ensure proper disposal of waste generated.
- Properly maintain all machines and vehicles used on site to minimize leakages
- Provide waste collection bins on-site
- Segregate toxic and non-toxic wastes using appropriate color-coded waste bins

7.5.6 Risk of Chemical Spillage

The use of PEI as an absorbent introduces the potential for chemical handling risks. Any accidental spills, leaks, or improper disposal could contaminate soil and water.

Mitigation measures

- The waste handler shall observe strict handling protocols during disposal of the used chemical.

7.5.7 Energy Use and Efficiency

Trucks require significant amounts of fossil fuel for long-distance CO_2 transportation, resulting in energy inefficiencies compared to pipelines, which are typically powered by renewable or grid energy.

Mitigation measures

- Maximize truckload capacity to reduce the number of trips required and overall fuel consumption.
- Use energy-efficient truck models and ensure regular maintenance to maintain optimal fuel efficiency.

7.6 Sociological/Cultural Impacts

7.6.1 Aesthetic impacts on the landscape

Project activities will likely change the appearance of some parts of the project area, especially the capture machines installation area, along the transportation routes, pump and compressor station, and reservoir tanks areas.

Mitigation measures

- ***Minimize land clearance***- limit the area of land clearance to the footprint necessary for infrastructure.
- ***Habitat restoration***- after construction, rehabilitate disturbed areas by replanting native vegetation as much as possible.

7.6.2 Spread of STIs

Sexual relationships are likely to emerge between the workers and the villagers during project implementation. This will likely have potential health impacts on the community.

Mitigation measure

- Promotion of STI awareness campaigns

7.6.3 Risk of accidents

Occupational hazards are likely to occur during the construction, operation and decommissioning phases if safety precautions are not followed. Avoidance of such hazards can be aided by regular risk assessment exercises conducted by the contractor and/or proponent. Additionally, higher truck volumes increase risk of accidents, potentially leading to CO_2 leaks or tank ruptures, which could pose safety risks to nearby communities and ecosystems.

Mitigation measures

- ***Health and safety training***- provide health and safety training to all workers and enforce strict health and safety protocols on-site to minimize the risk of accidents.
- ***Traffic management plan***- develop and implement a traffic management plan to reduce the risk of accidents within the site. This includes using designated routes, speed limits, and scheduling vehicle movements to avoid peak traffic times.

- ***Emergency response plan***- develop and test emergency response protocols, including coordination with local emergency services for CO_2 spills or accidents..
- Undertake regular risk assessment at the site
- Maintain at the construction site, a standard first aid kit
- Use of appropriate cautionary signage
- Train drivers in defensive driving techniques and safe handling of pressurized CO2 tanks to prevent accidents.
- Equip trucks with safety features such as real-time pressure and temperature monitoring systems for CO_2 tanks.

7.7 Biological/Ecological Impacts

7.7.1 Loss of biodiversity

Vegetation cover is an important component of any ecosystem and determines its composition. Clearances of vegetation at the proposed site will inevitably lead to a loss of plant diversity. Although vegetation removal is expected to occur during the construction phase on-site, there is still a need to keep vegetation clearance to the minimum possible.

Mitigation measures

- ***Minimize vegetation clearance***- limit the area of land clearance to the footprint necessary for infrastructure.
- ***Habitat restoration***- after construction, rehabilitate disturbed areas by replanting with the native pre-existing vegetation.

7.8 Cumulative Impacts

- **Combined environmental burden**: when added to the impacts of CO2 injection activities, truck-based transportation increases the cumulative environmental footprint of the project in the long-run.
- **Pressure on road infrastructure**: continuous use of access roads by heavy trucks could lead to faster degradation, necessitating repairs and associated environmental and financial costs.

Mitigation measures

- **Collaborative planning**: work with other project developers using the same roads to reduce cumulative traffic and environmental impacts.
- **Integrated monitoring**: monitor combined impacts on air quality, noise, and traffic, and adjust operations to minimize overlapping effects.

- **Infrastructure investments**: contribute to local road and transport infrastructure improvements to mitigate the long-term cumulative impact of truck operations.

7.8 Anticipated mitigation measures

This section provides a summary of the impacts, the recommended mitigation measures for the negative impacts and enhancement measures for the positive impacts. The construction contractors will be required to implement these measures in totality to ensure that the environment is protected. Most impacts under the economic and operational components are positive. The mitigation measures recommended for the various impacts in each of the four components are given in the tables below.

Table 6: Summary of the Negative Impacts and their mitigation measures

Impact	Mitigation Measure
Air Pollution	• Visually monitor dust generation from work zones to reduce the impact on the neighboring receptors. • Sprinkle work areas with grey water to suppress the dust • Use low-emission technology in transportation and processing. • Regular monitoring of air quality to ensure compliance with environmental regulations. • Implement a strict maintenance schedule to ensure all trucks operate efficiently and meet emission standards. • Optimize transport routes to reduce fuel consumption and emissions.
Noise Pollution	• All vehicles and equipment must be maintained and kept in good working condition. • Workers must be provided with earmuffs and/or any other necessary PPEs • Constant noise monitoring should be undertaken and corrective measures employed in case noise levels exceed the permissible range. • Restrict truck movements to daytime hours to minimize community disturbances. • Notify nearby communities of transport schedules to reduce potential disturbances.

Soil erosion	• Restore and rehabilitate disturbed areas after construction • Preserve top soils for rehabilitation of degraded sites • Restrict clearing of vegetation to areas where the DAC machines are installed and the access roads to the demarcated areas only
Energy Use and Efficiency	• Maximize truckload capacity to reduce the number of trips required and overall fuel consumption. • Use energy-efficient truck models and ensure regular maintenance to maintain optimal fuel efficiency.
Waste generation	• Waste collection bins are to be provided at designated points on-site • Contractor to liaise with licensed waste handlers to ensure proper disposal of waste generated. • Segregate toxic and non-toxic waste
Water usage/pollution	• Treat wastewater to remove suspended solids, and other contaminants before discharge. • Implement water recycling and conservation practices. • Employ monitoring of groundwater and surface water quality.
Risk of chemical spillage	• Proper handling and disposal of used PEI by the waste handler
Loss of biodiversity	• Vegetation removal should be limited to the site of operation only. • Perform environmental impact assessments to identify and protect sensitive habitats. • Revegetation of the affected areas
Loss of aesthetic appearance	• Restore and rehabilitate disturbed areas after construction • Minimize clearance of vegetation
Risk of accidents	• Contractor to undertake regular risk assessment exercises • Provide health and safety training to all workers • Develop and implement a traffic management plan • Develop an Emergency Response Plan to address any accidents • Maintain a standard first aid kit on site. • Train drivers in defensive driving techniques and safe handling

	of pressurized CO2 tanks to prevent accidents
Spread of STIs	• Promotion of STI awareness campaigns

Impact Rating

Table 7: Impact rating for the negative impacts

Impact	Severity of Impact	Spatial Scope of the Impact	Duration of Impact	Overall Score	Impact Rating
Air pollution	-2	-2	-2	-2	Low
Noise pollution	-2	-2	-1	-2	Low
Soil erosion	-2	-2	-1	-2	Low
Water pollution	-2	-2	-3	-2	Low
Waste generation	-3	-2	-3	-3	Medium
Loss of biodiversity	-3	-3	-2	-3	Medium
Loss of aesthetic appearance	-2	-2	-1	-2	Low
Risk of accidents	-3	-2	-2	-3	Medium
Spread of STIs	-2	-2	-1	-2	Low

CHAPTER 8: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

8.0 Introduction

This Environmental and Social Monitoring Plan for the proposed project provides a comprehensive framework to ensure the project operates sustainably and in full compliance with environmental regulations. Direct Air Capture, as a critical climate change mitigation strategy, requires careful oversight to ensure that any potential environmental impacts are identified early and effectively managed. This plan outlines key parameters to be monitored, including air quality, biodiversity, and waste management, ensuring that the project minimizes its environmental footprint while safeguarding public health.

8.1 Purpose and Objectives of the ESMMP

The objectives of this ESMMP are to:

i. Serve as a commitment and reference for the project proponent to implement the ESMMP including conditions of approval from NEMA.
ii. Serve as a guiding document for the environmental and social monitoring activities for the supervising Environmental and Social Experts, contractor and the project proponent including requisite progress reports.
iii. Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environmental and social aspects.
iv. Document environmental and social concerns and appropriate protection measures while ensuring that corrective actions are completed promptly.

8.2 Audit of the ESMMP

The project proponent shall conduct regular audits of the ESMMP to ensure that the system for implementation of the ESMMP is operating effectively. The audit shall check that a procedure is in place to ensure that:

i. The ESMMP being used is the up-to-date version;
ii. Variations to the ESMMP and non-compliance and corrective action are documented, and appropriate environmental and social training of personnel is undertaken.
iii. Emergency procedures are in place and effectively communicated to personnel.
iv. A register of major incidents (leaks, injuries, complaints) is in place, and other documentation related to the ESMMP, and;

v. Ensure that appropriate corrective and preventive measures are taken by the contractor once instructions have been issued.

8.3 Management Responsibility of the ESMMP

To ensure sound development and effective implementation of the ESMMP, it will be necessary to identify and define the responsibilities and authority of the various persons and organizations that will be involved in the proposed project. The following entities should be involved in the implementation of this ESMMP:

i. National Environment Management Authority (NEMA)
ii. Project proponent and/or Contractor
iii. Environmental and Social Experts/Consultants

8.3.1 National Environment Management Authority (NEMA)

The responsibility of NEMA is to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of the Government of Kenya in the implementation of all policies relating to the environment.

8.3.2 The Project Proponent/Contractor

The Project Proponent or person/firms contracted to install and equip the proposed DAC modules and pipeline system will be required to comply with the requirements of the ESMMP within this report. To ensure strict compliance, the environmental specifications of this ESMMP should form part of the contract documents.

8.3.3 The Environmental and Social Expert/Consultant

The sourced consultant will have to ensure that the proposed ESMMP is up-to-date and is being used by the project proponent/contractor. Periodic audits of the ESMMP will have to be done to ensure that its performance is as expected.

8.4 Emergency procedure during the construction and operations phase of the project

An emergency situation means unforeseen happening resulting in serious or fatal injury to employed persons or the neighboring communities. In the event of an emergency during construction and operation, the worker(s) shall:

- Alert other persons exposed to danger
- Inform the Environmental and Safety personnel
- Do a quick assessment of the nature of the emergency

- Call for immediate medical help.

The proponent shall put measures to respond to emergencies such as alarms and must have trained occupational safety personnel to assist in emergency cases.

8.5 Environmental and Social Management and Monitoring Plan (ESMMP)

Impact	Location	Monitoring Technique	Frequency	Project Phase	Threshold/Standard Acceptable Results	Monitoring Responsibility	Recommended Mitigation Measures	Costs (KShs)
Air Pollution	• Capture facility • Transportation routes	• CO_2 sensors • Gas analyzers • Observation	• Continuous at the capture facility • Twice a week at transportation routes	Construction and operation	Levels between 400-450 ppm	Contractor Octavia Carbon	• Sprinkle the construction site with water. • Provide dust masks at the project site. • Reduce speed for vehicles visiting the site. • Discontinue operations and take corrective measures in case of CO_2 leaks	200,000
Noise Pollution	• Construction site	• Sound level meters	Daily during construction	• Construction and operation	• Noise levels below 55 dB (daytime) and	Contractor Octavia	• Provide workers with earmuffs	100,000

	• Near operational facilities • Along transport routes	• Truck maintananc e logs insspection	and peak operations		45 dB (nighttime) near sensitive receptors e.g. schools, residential areas, and hospitals. • 70 dB (daytime) and 60 dB (nighttime) in industrial areas.	Carbon	• Provide signage on high noise levels and adequate notice to any party affected • All equipment and vehicles must be well-maintained • Limit working hours to 8 am to 5 pm to avoid disturbance during night hours	
Soil erosion	• Constructio n site	Observation	Bi-annually	• Construction and operation	• Re-vegetate affected areas to the original state	Octavia Carbon	• Restore and rehabilitate disturbed areas after construction • Restrict clearing of vegetation for the well pad and the access roads to the demarcated areas only	No additional cost

Waste generation	• Construction site • Capture facility • Transportation routes • Maintenance areas	• Waste audits • Waste tracking records • Segregation and categorization of waste streams (e.g., hazardous vs. non-hazardous) • Site inspections	• Weekly inspections • Daily tracking of generated waste at each site. • Quarterly audits and reporting.	Construction and operation	Full compliance with the Environmental Management and Coordination (Waste Management) Regulations, 2006 Minimal hazardous waste generation. Recycle and reuse non-hazardous waste.	Contractor Octavia Carbon	• Enhance recycling efforts • Collaborate with certified waste handlers for proper treatment and disposal. • Implement waste minimization strategies.	200,000
Water use/pollution	• Buffer zones. • Upstream and downstream	• Water sampling, analysis of pH, CO_2 concentration,	Quarterly	• Operation	• pH between 6.5 and 8.5 • TDS below 1,200 mg/L • No detectable	Octavia Carbon	• Containment and cleanup strategies if contamination occurs. • Re-use and recycle	No additional cost

	of nearby lakes, rivers, or streams close to the project site.	temperature, and dissolved oxygen.			increase in CO_2		used water	
Loss of biodiversity	Ecosystems near the project area.	Biodiversity surveys Measure of area of land cleared.	Annually	Construction and operation	No significant reduction in species richness or abundance; Habitats remain stable.	Octavia Carbon	• Enhance conservation efforts • Restore affected areas to their original state	100,000
Energy use and efficiency	Transport	Fuel logs checks Eergy audits	Weekly checks of fuel logs	Construction and operation	CO_2 emissions must not exceed **450 g/km** per truck	Octavia Carbon Contractor	• Maximize truckload capacity to reduce the number of trips required and overall fuel consumption. • Use energy-efficient truck models and ensure regular maintenance to maintain optimal fuel efficiency.	Part of project cost

Risk of accidents	Construction and operation sites	Safety inspections Inspection accident and incident register.	Quarterly	Construction Operation		Octavia Carbon Contractor	• Report accidents • Provide Emergency Response Plan (ERP) on site	100,000
Community Health and Safety monitoring	Nearby communities within a 5-10 km radius of the project	• Health surveys, • Public feedback forums	Annually, with continuous community engagement.	Pre-construction, construction, and operation	No significant increase in respiratory illnesses or adverse health impacts related to CO_2 exposure.	Octavia Carbon	• Ensure emergency response systems are operational. • Implement public health interventions. • Improve air quality management	Part of the project cost
Regulatory compliance and reporting	Project-wide	• Internal and external audits • Compliance inspections	Annually Weekly	Capture and transportation	Full compliance with environmental permits and county/national regulations.	Octavia Carbon	• Address non-compliance issues promptly. • Apply corrective action plans.	400,000
Total								**1,100,000**

CHAPTER 9: CONCLUSION AND RECOMMENDATIONS

9.0 Conclusion

This ESIA report highlights the significant environmental and socio-economic potential of this pioneering initiative. It integrates DAC technology with the region's geothermal energy resources to capture CO_2 for permanent storage, contributing to global climate change mitigation efforts. By utilizing the geothermal resources and favorable geological conditions, the project demonstrates its environmental sustainability, economic viability, and alignment with Kenya's Vision 2030 and international climate goals.

The project's design considers both the local environmental context and the global climate change agenda, offering numerous benefits such as reduced CO_2 emissions, job creation, and technological advancements in renewable energy. However, the potential environmental impacts during the construction and operation phases, including air and noise pollution, soil erosion, and loss of biodiversity, have been identified. The assessment provides a detailed plan for mitigating these risks through stringent monitoring and management practices.

9.1 Recommendations

1. ***Enhanced community engagement and capacity building***

Implement continuous engagement with local communities to foster awareness of the project benefits and address any emerging concerns. Local training programs should be developed to enhance the community's capacity to take part in project-related activities, thus fostering local ownership and ensuring long-term benefits.

2. ***Rigorous environmental monitoring***

Establish a comprehensive environmental monitoring program to track key parameters such as air quality, water quality, and soil conditions. This program should be designed to ensure timely detection of any adverse impacts, ensuring corrective measures can be taken promptly. Regular audits should be conducted to ensure adherence to environmental standards.

3. ***Minimizing biodiversity loss***

While the project site in Elementaita makes it suitable for the DAC technology, careful measures must be taken to protect the ecosystems, especially during vegetation clearing and construction. Vegetation removal should be minimized, and rehabilitation programs should be launched to restore disturbed areas post-construction.

4. Adoption of low-emission technologies

The use of low-emission construction machinery and transportation options is critical. Adopting electric or hybrid vehicles and equipment where possible, in line with Kenya's green economy goals, will reduce emissions and ensure the project's environmental sustainability and reduce the carbon footprints it aims to reduce.

5. Water conservation measures

Since the DAC process will require significant amounts of water, it is essential to implement water recycling, reuse, and conservation measures. Additionally, strict monitoring of surface water close to the proposed site should be maintained to prevent contamination and ensure water resources are safeguarded.

6. Noise pollution control

To minimize the impact of noise pollution on local communities, it is important to implement noise barriers and schedule high-noise activities at appropriate times.

7. Employment opportunities and community development

Prioritize the employment of local workers in all phases of the project, especially in roles that require semi-skilled to non-skilled personnel. In addition, community development initiatives such as infrastructure improvement and educational programs related to clean energy and climate change should be supported.

8. Compliance with regulatory frameworks

Ensure strict adherence to Kenya's environmental laws and international protocols such as the Paris Agreement. The ESMMP should be fully implemented to ensure compliance with the NEMA and other relevant bodies' regulations.

9. Re-use the captured CO_2

Carry out relevant research on how the liquefied CO_2 can be re-used instead of injecting all of it underground. This can open opportunities for more revenue and also mitigate any potential impacts as a result of injecting large quantities underground.

10. SEP and CMP

The proponent to develop a comprehensive Stakeholders Engagement Plan (SEP) and Community Management Plan (CMP). Implementing these plans will enhance community

ownership and amicable resolution of any conflicts arising from social and environmental concerns.

11. License

The proponent be licensed based on the environmental and social management measures contained in this ESIA Report.

CHAPTER 10: REFERENCES

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Appendix I: Approved ToRs

TOR 795

TERMS OF REFERENCE

FOR

ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED DIRECT AIR CAPTURE PROJECT AT ELEMENTAITA, KENYA

To be conducted by: Edwin Nyaga -Lead EIA Expert (License No. 1974)

Raymond Mwakirani -Consultant

Approved
J. Meeken
NEMA

For:

Octavia Carbon
P.O. Box 241-00520
Giriraj Business Park
Eastern Bypass, Nairobi

SEPTEMBER 2024

AUTHENTICATION

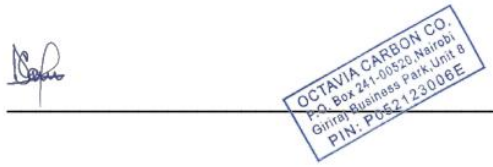
I certify that **Octavia Carbon** has contracted a licensed EIA Lead Expert with NEMA accreditation, to conduct an Environmental and Social Impact Assessment (ESIA) for the Direct Air Capture (DAC) project located in Elementaita, Kenya in accordance with legal requirements stipulated in the Environmental Management and Coordination Act (EMCA Cap 387).

PROPONENT : **OCTAVIA CARBON**

ADDRESS : **GIRIRAJ BUSINESS PARK, ALONG EASTERN BYPASS**
RUAI, NAIROBI
P.O. BOX 241-00520

Name : Duncan Kariuki

Position : Co-founder & CPO

Signature and Stamp: 

Date : Sep 25, 2024

LEAD EXPERT : **EDWIN NYAGA**

Signature:  **Date: 25.09.2024**

LEAD EXPERT REG No. 1974

CONSULTANT : **RAYMOND MWAKIRANI**

Signature:  **Date: 25.09.2024**

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List of Abbreviations

EIA:	Environmental Impact Assessment
EMCA:	Environmental Management and Coordination Act
ESIA:	Environmental and Social Impact Assessment
ESMP:	Environmental and Social Management Plan
GIS:	Geographic Information System
CO_2:	Carbon dioxide
NEMA:	National Environment Management Authority
TOR:	Terms of Reference
DAC:	Direct Air Capture
NEP:	National Environment Policy
GESIP:	Green Economy Strategy and Implementation Plan
NCCAP:	Kenya National Climate Change Action Plan
UNFCC:	United Nations Framework Convention on Climate Change
IFC:	International Finance Corporation

1.0 Introduction and Background

This Terms of Reference (ToR) outlines the approach and scope of work for conducting an Environmental Impact Assessment (EIA) for the proposed Direct Air Capture (DAC) project by Octavia Carbon, in partnership with Cella Mineral Storage. This project aims to contribute to global efforts in mitigating climate change by capturing carbon dioxide (CO_2) directly from the atmosphere and securely storing it underground in basalt rock formations. The proposed site is situated in Kenya, where innovative carbon capture technologies will be integrated with existing geological storage solutions.

Direct Air Capture technology is a cutting-edge method in carbon removal. It involves the use of advanced processes to extract CO_2 from ambient air, significantly reducing the greenhouse gas concentration. Once captured, the CO_2 will be stored in mineral form, leveraging the expertise of Cella Mineral Storage. This partnership ensures both safe and long-term storage solutions are in place, aligned with the project's vision for sustainability.

Implementing the DAC project will consider Kenya's regulatory framework, especially the Environmental Management and Coordination Act (EMCA), 1999. The ESIA process will help identify potential environmental and social impacts, both positive and negative, and recommend suitable mitigation measures. Public consultation and stakeholder engagement will also form a crucial part of the study to ensure that local communities are involved and their concerns addressed.

This ToR has been developed based on scoping outcomes, preliminary consultations, and background information on the project. It will serve as the guiding document for the EIA, helping ensure that the project complies with environmental regulations, safeguards biodiversity, and promotes socio-economic benefits in the region.

1.1 Description of the Proposed Project

The full-scale project will comprise of 100 DAC modules that will capture a total of 1000 tons of CO2 per year. The system works by pulling in ambient air and filtering out CO_2 using specialized chemical processes. Once captured, the CO_2 is compressed and transported via pipelines for secure storage in underground geological formations, facilitated by Cella Mineral Storage's advanced mineralization technology. This partnership is key to ensuring the long-term, safe storage of carbon, aligning with Kenya's ambitious climate action plans under its Nationally Determined Contributions (NDCs).

The project will be implemented in distinct phases, each involving specific activities to ensure the project's success while minimizing environmental and social impacts. The first phase, pre-construction, focuses on planning, site selection, and detailed design. During this phase, geological surveys will be conducted to identify suitable underground storage sites, and environmental and social assessments will be finalized. Stakeholder engagement will also occur to address any concerns from local communities and regulatory bodies as well as getting the necessary permits and approvals from NEMA and Nakuru County Government. The construction phase will involve the installation of DAC infrastructure, including the capture systems, transportation pipelines, and storage facilities. This will require civil works such as excavation, foundation laying, and the installation of necessary technology to capture and compress carbon dioxide. In this phase, there will also be the construction of transportation systems such as pipelines to convey the captured CO_2 to the storage sites.

Once the infrastructure is established, the operation phase begins, during which the DAC systems will be fully functional. Activities during this phase include the continuous capture of carbon dioxide from the atmosphere, its transportation, and injection into the underground storage. Regular monitoring and maintenance of the system will be critical to ensure that operations remain within safe environmental parameters, as well as to detect any potential leaks or risks associated with long-term storage. The final phase is the decommissioning phase which will occur at the end of the project's life cycle. This phase includes the dismantling of equipment, site rehabilitation, and long-term monitoring of the storage sites to ensure that the stored carbon remains safely

contained. Environmental restoration activities will be conducted to return the site to its natural state.

1.2 Scope of the Environmental and Social Impact Assessment (ESIA) Study

The scope of the assignment will be to carry out Environmental and Social Impact Assessment (ESIA) study for the proposed DAC project at Elementaita, Kenya. The ESIA study will endeavor to identify potential environmental, social and economic aspects and predict the positive and negative impacts associated with the proposed project. The ESIA study will also help to develop the best possible mitigation measures in the form of Environmental and Social Management Plan (ESMP) as well as monitoring plans that will be used to evaluate the effectiveness of the mitigation measures. The ESIA study will be structured to meet the requirements of existing legal frameworks.

The ESIA study report will provide the below information in line with the provisions of Environmental (Impact Assessment and Audit) Regulations, 2003 (amendment) 2016:

- the proposed location of the project;
- a concise description of the national environmental legislative and regulatory framework; baseline information, and any other relevant information related to the project;
- the objectives of the project;
- the technology, procedures and processes to be used in the implementation of the project;
- the materials to be used in the construction and implementation of the project;
- the products, by-products and waste generated by the project;
- a description of the potentially affected environment;
- the environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated;
- alternative technologies and processes available and reasons for preferring the chosen technology and processes;
- analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies;

- an environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment; including the cost, time frame and responsibility to implement the measures;
- provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities within the project
- the measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies.

1.3 Responsibilities of the ESIA Team

The ESIA team, under the leadership of a registered and licensed Lead EIA/Audit Expert, shall carry out the ESIA study in accordance with the general Environmental Impact Assessment guidelines and administrative procedures issued by NEMA. To achieve this objective, the ESIA team will execute the following tasks:

Task 1: Description of the Proposed Project

The ESIA team will be expected to provide a comprehensive description of the proposed project including the following:

i. Type and nature of the project
ii. Direct Air Capture details;
iii. Project design
iv. Activities to be undertaken during construction and operation phase of the project
v. Alternative technologies to be considered.

Task 2: Description of the Project Environment/Baseline Data Collection

Baseline data on the project's area of influence will be established through field survey and review of relevant literature. The following shall form part of the baseline data:

Information on the Physical Environment: The ESIA team will provide a description of the following:

i. The topography, soil characteristics and the hydrogeology of the proposed project site.
ii. Surface and sub-surface water characteristics
iii. Existing ambient air quality including parameters such as particulate matter, gaseous pollutants, and information on existing meteorological conditions such as temperature, humidity, rainfall and wind characteristics.
iv. Existing ambient noise levels and the potential sources of noise pollution

Information on Flora and Fauna of the Project's Area of Influence: The ESIA team will collect baseline information on the existing biodiversity and determine how it will be affected by construction activities. The team will as well evaluate the project alternative sites by considering

areas which have unique habitat, endemic or threatened species, or species of high economic and cultural value to society or ecosystem.

Information on Socio-economic/Cultural Aspects: Socio-economic/cultural aspects to be considered will include the following:

i. Land uses;
ii. Land ownership;
iii. Demographic profile;
iv. Economic activities around the project site;
v. Existing public infrastructure and social services
vi. Prevalent diseases;
vii. List of cultural and heritage site falling within the proposed site.

Task 3: Carry out Public Participation and Consultations

The ESIA team will ensure adequate public participation and/or consultations throughout the ESIA study for the proposed project. This will ensure that all relevant concerns and opinions regarding the proposed project are integrated into the project decision making process and are adequately addressed in the ESIA study report. The non-technical summary of the ESIA study report will be presented to the relevant stakeholders with an aim of soliciting comments from them with regards to the proposed project. Both public meetings/barazas and a key stakeholders' workshop will be conducted to fulfil this requirement.

Upon submission of the ESIA study report to NEMA, the report will be disclosed to the public for a period of 30 days to facilitate submission of comments. Notices to invite comments will be done through announcement in the local newspapers, the Kenya Gazette and radio.

Task 4: Determination of Potential Impacts of the Proposed Project

The ESIA team will identify possible positive and negative impacts arising from all aspects related to the proposed project during construction and operation phase. All the negative impacts shall be described in detail. The assessment shall include short term and long-term impacts of the proposed project as well as cumulative impacts.

The potential environmental and social impacts associated with the proposed Direct Air Capture project include:

a) Positive Impacts

The main positive impacts during construction phase will be:

i. Creation of business opportunities for local suppliers
ii. Employment opportunities for local community
iii. Reduce effects of global warming in the climatic pattern

b) Negative Impacts

The negative impacts envisaged include:

i. Vegetation clearance and disturbance;
ii. Landscape and visual impacts;
iii. Noise and vibration impacts
iv. Air pollution from elevated dust during construction;
v. Generation of wastes
vi. Occupational Safety & Health Risks
vii. Community Safety and Health

Task 5: Legislative and Regulatory Framework.

A description will be given of the pertinent regulations, standards and institutional framework governing environmental management, health and safety. Consideration will be given to the national and international legislations. Among those to be considered include the following.

1. The Constitution of Kenya, 2010
2. The Kenya Vision 2030
3. Sessional Paper on Environment and Development Paper No.6 of 1999
4. The Green Economy Strategy and Implementation Plan (GESIP) 2016–2030
5. The National Environmental Policy (NEP), 2013
6. The Kenya National Climate Change Action Plan (NCCAP) 2018–2022
7. Environmental Management and Coordination Act, 1999 (Cap. 387)

8. Occupational Safety and Health Act, 2007
9. The Work Injury Benefits Act, 2007
10. Environmental (Impact Assessment and Audit) Regulations of 2003
11. The Environmental Management and Co-ordination (Waste Management) Regulations 2006
12. The Environmental Management and Co-ordination (Water Quality) Regulation, 2006
13. The Environmental Management and Co-ordination (Noise and Excessive Vibrations Pollution Control) Regulations, 2009
14. The Environmental Management and Co-ordination (Air Quality) Regulation, 2014
15. Public Health Act (Cap 242)
16. National Gender and Equality Act, 2011
17. The Sexual Offences Act, 2006 and its amendment 2012
18. The County Governments Act, 2012
19. Climate Change Act, 2016
20. Employment Act, 2007
21. Physical and Land use Planning Act, 2019
22. The Factories and Other Places of Work (Fire Risk Reduction) Rules, 2007
23. The Factories and Other Places of Work (Hazardous Substances) Rules, 2007
24. The Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005 – Legal Notice No.25
25. Geothermal Resources Act No. 12 of 1982
26. The Traffic Act, 2016
27. The Mining Act, 2016
28. The Energy Act, 2019
29. The Water Act, 2016
30. Water Resources Management Rules, 2007, Legislative Supplement No.52.
31. The Paris Agreement, 2015
32. The United Nations Framework Convention on Climate Change (1992 UNFCCC) and Kyoto Protocol
33. The Convention on Biological Diversity

34. IFC Environmental and Social Performance Standards (PS) and World Bank Group's Environmental and Health and Safety Guidleines

Task 6: Mitigation and Management of Negative Impacts

Recommendations will be made for feasible and cost-effective measures to enhance the environmental and social benefits of the proposed project; avoid, minimize or remediate the adverse impacts; and to ensure that the residual adverse impacts are kept within acceptable levels. These measures will culminate into the Environmental and Social Management Plan (ESMP) covering all phases of the proposed project, right from construction to decommissioning. The ESMP will outline mitigation measures that will be undertaken to ensure compliance with environmental laws and regulations and to establish systems and procedures for this purpose.

A monitoring plan will also be developed taking into consideration the following:

i. The activity to be monitored and the parameters chosen to effectively carry out the exercise;
ii. The methodology to be employed and the frequency of monitoring and
iii. The locations to be monitored.

Task 7: Preparation of ESIA Study Report

The ESIA team will be required to prepare the ESIA study report which will focus on key findings, conclusions and recommended actions, supported by summaries of the data collected and citations for any references used in interpreting those data.

1.4 Methodology

Standard ESIA techniques will be used to collect the requisite information pertaining to the proposed project. These will include site reconnaissance, desktop review, mapping of the site using Geographic Information System (GIS), measurement of noise, particulate matter and CO_2 levels, expert judgement, case studies of similar projects, and public meetings/barazas.

1.5 Proposed ESIA Study Team

A multidisciplinary team, whose details are indicated in the table below, has been appointed to conduct the ESIA study for the proposed Direct Air Capture project.

Name	**Qualifications**	**NEMA Reg. No.**
Edwin Nyaga	Lead Expert	1974
Raymond Mwakirani	Consultant	1113
Fiona Mugambi	Project Engineer	N/A
Sharon Chebet	Community Relations Specialist	N/A
Beatrice Nyairo	Environmental Scientist	9385
Geoffrey Nyambega	Environmental Scientist	10219
Hillary Mlawasi	Safety Engineer	N/A

1.6 Expected Outputs

Five (5) hard copies and an electronic copy of the ESIA study report will be prepared and submitted to NEMA for review and approval. The report will include an appendix of relevant documents. The soft copy of the report will be submitted electronically via NEMA website.

1.7 Proposed work plan for the ESIA Study

The proposed work plan will be as indicated below:

Item Description	**Duration (No. of days)**
Preparation, submission and approval of Terms of Reference by NEMA	10
Baseline data collection	15
Public participation	15
Desk top ESIA study & report preparation	20
Presentation of draft ESIA report to Management of Octavia Carbon	1
Preparation of the final ESIA study report, printing, binding, endorsement and submission to NEMA	3
Public participation and consultations including: i. Preparation of public notice by NEMA ii. Submission of public notice to government printers for incorporation in Kenya Gazette iii. Submission of public notice to print media for incorporation in the newspaper with wider local circulation iv. Advertising in local newspaper, radio and Kenya Gazette for two (2) successive weeks v. Receipt of comments from the public and key stakeholders vi. Response to the public and/or stakeholders' comments by the ESIA team in form of a report and submission of the report to NEMA as an addendum to the ESIA study report where necessary.	40
Review of the ESIA study report & decision making by NEMA (Issuance of ESIA license)	50
Total No. of days to complete ESIA study Report & receive approval from NEMA	**150**

NB: Some activities will run concurrently.

1.8 Summary of impacts and their mitigation measures

Impact	Mitigation Measure
Air Pollution	• Visually monitor dust generation from work zones to reduce the impact to the neighboring receptors. • Sprinkle work areas with grey water to suppress the dust • Use low-emission technology in transportation and processing. • Regular monitoring of air quality to ensure compliance with environmental regulations.
Noise Pollution	• All vehicles and equipment must be maintained and kept in good working condition. • Workers must be provided with earmuffs and/or any other necessary PPEs • Constant noise monitoring should be undertaken and corrective measures employed incase noise levels exceed permissible range.
Soil quality	• Deploy a management/safety plan that sets out monitoring, inspection and operational requirements as well as emergency response procedures. • Pipeline monitoring options including internal inspection, external corrosion checks and leak detection (where possible) and regular patrols.
Waste generation	• The site personnel are encouraged to adhere to environmental health and safety policies in place to minimize littering and generation of other forms of waste • Contractor to liase with licensed waste handlers to ensure proper disposal of waste generated.
Water pollution	• Treat wastewater to remove suspended solids, and other contaminants before discharge. • Implement water recycling and conservation practices. • Design storage sites with robust containment measures to

	prevent leakage. • Employ rigorous monitoring of groundwater and surface water quality.
Loss of biodiversity	• Vegetation removal should be limited to site of operation only. • Perform environmental impact assessments to identify and protect sensitive habitats. • Revegetative the affected areas
Loss of aesthetic appearance	• Restore and rehabilitate disturbed areas after construction
Risk of accidents	• Contractor to undertake regular risk assessment exercises
Spread of STIs	• Promotion of STI awareness campaigns
Employment Opportunities	• Manpower should be sourced locally as much as is possible especially for the semiskilled and unskilled categories • Invest in community development projects and infrastructure improvements.
Environmental protection	• Ensure that the EMP is fully complied with

1.9 Credentials of Lead Experts

Appendix II: Budget Estimates

1.1 TOTAL COST ESTIMATES

	Quantity	Total Cost (KShs)
Mini Plant	4 DAC Units	64,399,513.43
Civil and Structural Works	1 Structure	9,357,826.73
Total		**73,757,340.16**

1.2 BREAK DOWN

SK-001	Budgeted Cost ($)	
Equipment	$	4,796.85
Structural members	$	2,078.14
Fittings	$	777.88
Manual Valves	$	259.18
Electrical	$	8,216.85
Piping	$	149.78
Instrumentation	$	3,174.02
Total	**$**	**19,452.69**

Pipe Rack+ Lenanas	Budgeted Cost ($)	
Equipment	$	170,000.00
Structural members	$	2,078.14
Fittings	$	4,914.52
Manual Valves	$	2,533.18
Electrical	$	3,965.85
Piping	$	1,236.85
Instrumentation	$	20,207.07
Total	**$**	**204,935.61**

SK-002	Budgeted Cost ($)	
Equipment	$	945.18
Structural members	$	379.86
Fittings	$	2,382.29
Manual Valves	$	1,085.73
Electrical	$	4,775.08
Piping	$	122.66
Instrumentation	$	4,642.83
Total	**$**	**14,333.63**

Reservior	Budgeted Cost ($)		
Equipment	$	2,193.22	
Fittings	$	388.94	pending
Valves	$	23.43	
Piping	$	27.18	
Instrumentation	$	20.19	
Total	**$**	**2,652.97**	

SK-003	Budgeted Cost ($)	
Equipment	$	15,748.18
Structural members	$	654.54
Fittings	$	2,788.57
Manual Valves	$	895.58
Electrical	$	3,965.85
Piping	$	336.92
Instrumentation	$	5,483.85
Total	**$**	**29,873.48**

SK-004	Budget Cost ($)	
Liquefaction Skid	$	144,425.00
Liquefaction Housing	$	3,482.97
Total	**$**	**147,907.97**

CIP	Budget Cost($)	
Pumps	$	918.00
Tank Heating System	$	26.01
Valves	$	234.00
Piping & Fittings	$	1,139.22
Instrumentation	$	2,121.00
Skid Frame	$	1,256.45
Miscellaneous	$	250.00
Total	**$**	**5,944.68**

Main Power supply	Budget Cost ($)	
Power Distribution	$	10,225.40
Main Sub-Board	$	5,411.98
DPU Sub-Board	$	2,402.84
Total	**$**	**18,040.23**

Others	Budget Cost($)		Used?	
Civil Works	$	30,000.00	$	32,000.00
Washroom	$	6,153.84	$	11,718.75
Compressor Cage	$	-	$	199.60
Sorbent parking house	$	1,165.05	$	1,165.05
Site Expenses (miscellaneous petty cash loaded onto the	$	-	$	2,019.42
Canopy Tarp	$	-	$	4,994.17
Total	**$**	**37,318.89**	**$**	**52,096.99**

Miscellenneous	Budget Cost($)	
Budget	**$**	**25,000.00**
Used	$	16,333.41
Remaining Budget	$	8,666.59

Admin Costs	Budget Cost($)	
Budget	**$**	**500.00**
Used	$	290.69
Remaining Budget	$	209.31

Total Budget	$	497,293.54
Expensed	$	503,405.06

OCTAVIA CARBON

PROPOSED DIRECT AIR CAPTURE TEST SITE

MAIN SUMMARY

BILL OF QUANTITIES

ITEM NO.	DESCRIPTION	AMOUNT [KSHS]	AMOUNT [KSHS]
A1.1	PRELIMINARIES & GENERAL ITEMS		574,200.00
A1.2	RAFT FOUNDATION		2,936,979.50
A1.3	EXTERNAL WORKS		913,901.05
A1.4	ROOF CANOPY STRUCTURE		3,642,011.46
A1.5	Consultancy fees provision- Site visit, design and BOQ preparation -Discounted if DIL proceeds with constructio	**280,734.80**	
	Subtotal		8,067,092.01
	Add 16% VAT		1,290,734.72
	TOTAL AMOUNT FOR THE DAC TEST SITE-VAT INCLUSIVE		**9,357,826.73**

Appendix III: Public Participation Minutes

MINUTES FOR THE PUBLIC CONSULTATION MEETING FOR THE DIRECT AIR CAPTURE PROJECT IN ELEMENTAITA HELD ON WEDNESDAY 16th OCTOBER, 2024, AT KIKOPEY CHIEF'S OFFICE GROUNDS AT 10 AM

	Name	Designation	Role
1	Boniface Mbae	Area Chief	Chairperson
2	Raymond Mwakirani	Lead Consultant	Member
3	Melissa Nyangarisa	Partnerships- Cella Mineral Storage	Member
4	Ian Nthiga	Partnerships – Octavia Carbon	Member
5	Geoffrey Nyambega	EIA Expert	Taking Minutes
6	John Kirika	Nyumba Kumi Elder	Member
7	Community members		41

AGENDA:

1. Introduction
2. Presentations
3. Plenary
4. AOB

Min. No.	Item	Person(s)
Preamble Min 1/16/10/2024	The area chief Mr. Boniface Mbage called the meeting to order at 10.25 am. A word of prayer was offered by Pst. David Kioko. The chair also introduced the parties present.	Chief Boniface Mbage
Min 2/16/10/2024	**Presentations:** Explained the concept of Direct Air Capture and its rationale why it is needful i.e to reduce levels of CO_2 in the atmosphere to curb global warming.	Octavia Carbon

	Octavia Carbon intends to install 4 DAC machines by end of 2024. The machines will capture, purify and liquefy CO_2 for underground storage by Cella Mineral Storage. The machines are designed to filter only CO_2 from the captured air and releases other gases back to atmosphere. The proposed location is ideal since it has affordable geothermal energy and basaltic rock formations suitable for CO_2 storage.	Cella Mineral Storage EIA Consultant
Min 3/16/10/2024	**Plenary**:	
Name	**Question/Concern/Comment**	**Response**
John Kirika	a. How do you capture the CO_2 to come to the machine? b. Do the machines capture the CO_2 from the whole world or is it just in Elementaita? c. Can't the stored CO_2 come out with time? d. Is there a connection between the carboxide in Kimende the CO_2 that will be captured? e. Will there be employment for the local communities?	a. Air is passed from the bottom of the DAC machines which have layers of PEI absorbent that has high affinity for CO_2. The chemical filters out only CO_2 and lets other gases escape through the tops of the machines. b. CO_2 released in one location diffuses and causes impact worldwide. Capturing it from Elementaita reduce its global amounts, not just locally. The general impact is wide enough. c. Before it is injected underground, the CO_2 is first liquefied. After injection, the liquefied CO_2 naturally reacts with basalt rocks to form carbonates which are stable rocks, making it impossible for it to escape. d. CO_2 from the air naturally reacts with rocks to form carboxide

		which can easily be mined. The technology used in this case stores the gas deep underground where it cannot be released. e. Yes, there will be employments. Already the company has started absorbing youths from the area and training them about their technology and will be absorbed. Other opportunities will be available when the project commences.
George Kariuki	a. How far will the project be impactful?	CO_2 has high diffusion rate. Regardless of where it is released, its effect is far reaching, therefore, local solutions will have a global effect.
Alice Kariuki	a. Will the stored CO_2 be re-used? b. Which are the repercussions (negative impacts) of the project? c. Will the machines be harmful? Will they have any emissions? d. Will there be another public participation or this is the one and only one?	a. CO_2 is used in many ways, e.g in carbonated drinks, jet fuel etc. The aim as at now is to test the efficacy of the machines. Re-using will come later after enough research has been conducted. b. From projects where similar technology has been deployed before e.g. Climeworks, there has not been reported any significant negative impacts. c. The technology has been proven to be safe. Octavia as a climate technology company, its contribution to emission is small. The company carries out life cycle assessment to calculate their

		process emissions. They then account for their emissions to ensure a positive balance. d. This is just the beginning of engagement with the local community, many other forums will be arranged even during the operation phase of the project. It is a continuous engagement process.
Sylvester Wafula	a. How sure is it that the technology will only capture CO_2 and not other gases found in the atmosphere? b. Won't the stored CO_2 have a burning effect on plants?	a. Polyethyleneimine (**PEI**), the absorbent used in the DAC machines, has high affinity only for CO_2 without affecting other gases. It has no capacity to capture the other gases. b. The captured CO_2 will be stored 800m below the ground, which is way beyond the planting depth. There will also be continuous monitoring during injection, in case of any negative impact, necessary corrective measures will be taken.
James Nderitu	a. Will this a permanent solution to finish CO_2 or is it just a temporal solution to reduce it? b. There is already large quantities of CO_2 being released, how will the release be curbed?	a. There are many ways of reducing CO_2 levels in the atmosphere. Countries have agreed to reduce their CO_2 emissions, reductions of fossil fuel usage, afforestation, maintaining healthy wetlands etc. Octavia Carbon focuses on removing excess CO_2 from the atmosphere.

		b. Evolving technologies and rising industrialization are still emitting CO_2. It's difficult to totally stop CO_2 emissions.
Geoffrey Ndirangu	a. What is CO_2? b. Will there be any smell during operations? c. Developments such as this are welcomed in the community. Consider employing rightful locals during the implementation.	a. It is a gas like any other gases in the atmosphere. It is usable by plants to make their food. It is beneficial at acceptable levels. When it exceeds, it becomes harmful; hence, there is a need to reduce it. b. No smell is expected during the capture of the CO_2. In case of any, corrective measures will be undertaken.
Lucy Nyakioba	If the project fails to work (backfires), can it have harmful health effects to communities around?	Measures are undertaken before a project is given the green light by NEMA. As part of the licensing process, an environmental management plan is developed to mitigate any negative impact at any stage of development.
David Kioko	a. What measures will be taken to avoid any health effects brought by such projects? Will this project have health effects like the diatomite factory in Kariandusi? b. If all the CO_2 is removed, what will plants use?	a. The only potential harmful item in Octavia's technology is the absorbent chemical (PEI), however, it has been approved for use and the company will have a NEMA licensed waste handler to safely dispose it after use. b. There is already too much CO_2 levels in the atmosphere and still large amounts are being emitted

		daily, it is not possible to finish it all.
Janet Njoroge	a. How does the company benefit? b. How will the company avoid pollution issues and waste generation	a. Through carbon credits once the CO2 has been successfully stored underground. Through the sale of the DAC machines once the project has been well developed. b. It is impossible to avoid waste generation in any process. The company will contract a licensed waste handler to safely dispose of waste generated from operations. Corrective measures will be taken as per the environmental management plan that will be developed.
Grace Njeri	a. There is fear that something will happen that will be of concern later b. During storage, the CO_2 will take up space, what will happen to the materials that originally occupied that space? Can't the injection fill up the ground and affect land for farming? c. This forum is not enough to sensitize all the Kikopey community.	a. The company will set up grievance redress mechanisms and feedback forums to receive and address any emerging concerns during the project cycle. b. The injected liquid CO_2 will readily react with basalt rocks to form other compounds, in essence, it won't be occupying any additional space. The injection process will be slow and in small quantities with continuous monitoring. In case the injected CO_2 does not solidify as it should, the project will be discontinued to pave way for more research.

		c. This is not the only public engagement forum, others will be planned for.	
Margaret Mugure	Will there not be gas explosions after storage since CO_2 is a gas?	The CO_2 will be liquefied before injection underground. It will then react with the rocks and will form stable rocks making it impossible to escape or explode.	
Teresa Gathoni	How will the companies/countries emitting CO_2 be handled and what percentage of CO_2 is considered excess?	We've already surpassed pre-industrial levels of CO_2. Currently, we're well above 400 ppm, and this number continues to rise. It's important to note that the impacts of climate change are already being felt globally, including rising sea levels, more frequent and intense heatwaves, and more severe weather events. And the example here, are the extreme weather patterns i.e., droughts and floods in the region Different countries have a maximum CO_2 limit. Kenya is required to reduce its emissions by 32%. If a country exceeds its maximum limit, it must purchase carbon credits to take responsibility. Emitters will lose their carbon credits if they exceed their maximum levels.	
Min 4/16/10/2024	**Resolutions:** The members were positive about the project and expressed that it will bring development and create employment opportunities for locals. They desired to be educated more about the technology		Community members in attendance

		research. c. This is not the only public engagement forum, others will be planned for.	
Margaret Mugure	Will there not be gas explosions after storage since CO2 is a gas?	The CO2 will be liquefied before injection underground. It will then react with the rocks and will form stable rocks making it impossible to escape or explode.	
Teresa Gathoni	How will the companies/countries emitting CO2 be handled and what percentage of CO2 is considered excess?	There is a maximum CO2 limit for different countries. Kenya is required to reduce its emissions by 32%. If a country exceeds its maximum limit, it must purchase carbon credits o take responsibility. Emitters will lose their carbon credits if they exceed their maximum levels.	
Min 4/16/10/2024	**Resolutions:** The members were positive about the project and expressed that it will bring development and create employment opportunities for locals. They desired to be educated more about the technology		Community members in attendance
Min 5/16/10/2024	**Adjournment:** There being no other business, the meeting was adjourned at 12.30 pm with a word of prayer.		

Signed:

Geoffrey Nyambega - EIA Expert (Taking Minutes) Signature: _____ Date: **20/10/2024**

Raymond Mwakirani – Lead Consultant Signature: _____ Date: 20.10.24

Representative – Octavia Carbon Signature: _____ Date: 26.10.24

ASS. CHIEF
KIKOPEY SUB-LOCATION
P.O. BOX 1, GILGIL
DATE 26/11/2024
SIGN

Boniface Mbae – Area Chief (Chairperson) Signature: Date: 26/11/2024

OCTAVIA CARBON

PUBLIC PARTICIPATION ATTENDANCE SHEET FOR THE ESIA STUDY FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA

OCTOBER 16, 2024 at KIKOPEY CHIEF'S OFFICE GROUNDS

S/N	NAME	ID/CONTACT	AREA/ OCCUPATION	SIGNATURE
1.	KENNEDY MAITHA	26351648		
2.	ALICE KARUKI	0724150145 9127524	BUSINESS	
3.	JOHN KIRIKA	10204440	C. Afl.	
4.	SARAH WANERU	24555865	BUSINESS	
5.	JEDIDAH WANGUI	34284852	Bussiness	
6.	James maina	6102420	Bussiness	
7.	GEORGE kariuki	25272823	Bussines	
8.	John muigai	4870611	Bussines	
9.	MARY muiruri	31047586	Bussiness	
10.	monicah wanjiku	38484196	Bussiness	MW
11.	LUCY Nyakioba	42781231	Bussiness	
12.	MARGARET MAITHIRA	21041331	Bussiness	
13.	MARY WANJIKU	22688553	BUSSINES	M.W
14.	Geoffrey Ndirangu	8149808	Bussiness	
15.	JOHNSON NJOGU	25843752.	Bussiness	
16.	Jane Kimani	35888447	Business	Kimani
17.	JAMES MBIRIU	13844493	BUSINESS	
18.	ELIZABETH WANGIKU	95576368	—	
19.	JANET NYORGE	22804498	BUSINESS	
20.	RACHEL WAMBUI	68[illegible]356	BUSINESS	
21.	JOHN KIMOTHO	0098015	BISINESS	
22.	MARY MUCHAI	23479729	BUSINESS	
23.	Maureen Pacho	22007073	COMMUNITY	
24.	Leah Wanjiru	11717675	Business	
25.	Anne Njeri Wawery	8719850	Community	
26.	Grace Njeri	0759688598	Business	

OCTAVIA CARBON

PUBLIC PARTICIPATION ATTENDANCE SHEET FOR THE ESIA STUDY FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA

OCTOBER 16, 2024 at KIKOPEY CHIEF'S OFFICE GROUNDS

S/N	NAME	ID/CONTACT	AREA/ OCCUPATION	SIGNATURE
27.	DAVID KANGETHE	6854888		[signature]
28.	MARGERT NJUGURE	0742820		Musiore
29.	Eleezah Wangari	0711259497		[signature]
30.	SILVESTER WAFULA	0720842548	VOLUNTEER	[signature]
31.	Omhale Shadrackah	0726627589	p/t	[signature]
32.	SUSAN WANJIKU	27229638		[signature]
33.	Teresa Gathoni	0729917826 13778108	volunteer	[signature]
34.	Alice wambui	16062079		[signature]
35.	DAVID NJOGU	7117858		[signature]
36.	BETH MAINA	0715143592		[signature]
37.	Grace Njeri Kihara	0701117457	35 Pst	[signature]
38.	Jane Kilusu	0712301383		[signature]
39.	Alice Lemeloi	0702374589		[signature]
40.	John Olemuke	0726881963		[signature]
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OCTAVIA CARBON

PUBLIC PARTICIPATION ATTENDANCE SHEET FOR THE ESIA STUDY FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA

OCTOBER 16, 2024 at KIKOPEY CHIEF'S OFFICE GROUNDS

S/N	NAME	ID/CONTACT	AREA/ OCCUPATION	SIGNATURE
53.	Ian Nthiga.	37120957	Partnerships	I.M.N.
54.			Octavia Carbon	
55.	Melissa Nyangarisa	32432806	Partnerships	[signature]
56.			Cella	
57.	Raymond Nwakiani	23896612	Remmy Africa	[signature]
58.	BONIFACE MBAGE	10377350	INTERIOR KIKOPEY	[signature]
59.	Geoffrey Nyambega	29374666	Remmy Africa	[signature]
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MINUTES FOR THE PUBLIC CONSULTATION MEETING FOR THE DIRECT AIR CAPTURE PROJECT IN ELEMENTAITA HELD ON FRIDAY 18th OCTOBER, 2024, AT GEMA COMMUNITY COLLEGE GROUNDS AT 10 AM

	Name	Designation	Role
1	Stephen Mwangi	Area Chief's Representative	Chairperson
2	Raymond Mwakirani	Consultant	Member
3	Fiona Mugambi	Octavia Carbon Representative	Member
4	Gideon Kariuki	Nyumba Kumi	Member
5	Geoffrey Nyambega	EIA Expert	Taking Minutes
6	Fred Wasike	Nyumba Kumi	Member
7	Community members		48

AGENDA:

1. Introduction
2. Presentations
3. Plenary
4. AOB

Min. No.	Item	Person(s)
Preamble Min 1/18/10/2024	The chief's representative Mr. Stephen Mwangi called the meeting to order at 10.30 am. An opening prayer was offered by one of the members. The chair also introduced the parties present.	Stephen Mwangi
Min 2/18/10/2024	**Presentations:** The members were introduced to the concept of Direct Air Capture, how it operates and it's benefits to both the local community and the environment. Octavia Carbon is proposing a project of setting up aa DAC plant at Sleeping Warrior to capture, purify and liquefy CO2	Octavia Carbon EIA Consultant

	for underground storage by its partner company, Cella Mineral Storage. CO2 has accumulated in the atmosphere forming a 'blanket' that prevents heat from escaping from earth's surface, this has led to increased temperatures (global warming) which indeed has caused unpredictable shifts in global climate and weather patterns. The locals identified some impacts of climate change that have affected them including prolonged drought, health problems, unpredictable rainfall patterns. Octavia intends to use the new technology to help reduce the levels of CO2 in the atmosphere as one of the climate change mitigation efforts.	

Min 3/18/10/2024	**Plenary**:	
Name	**Question/Concern/Comment**	**Response**
Grace Kahwai	How does the technology work?	There are two phases in the process, the adsorption phase and the desorption phase. In the adsorption phase, the machine opens and air is passed through the filter (chemical absorbent). Once the absorbent is saturated with the air. In the adsorption phase, the machine closes to create a vacuum. The filter is then heated using geothermal heat consequently filtering out CO2 into holding containers. The rest of the gases are released and the machine opens for another cycle. The CO2 then passes through purification and liquefaction processes and transported via pipelines to injection site.

	What impacts will it have?	The technology has less negative impacts on both the environment and biodiversity. Since it's inception and use in other countries, the technology has seen improvements to address negative impacts that have been experienced in the past in the countries where it has been implemented. If there will be any negative impacts, the company will consult with the local community on the best way to mitigate them.
	How will the community be incorporated into the project to provide feedback?	Community leaders stand in as intermediaries between the company and the community. Part of the recommendations in the study will be the formation of a proper grievance redress mechanism to provide opportunity for locals to raise their concerns/grievance for action by the company.
Mboche Waweru	What effect will this technology have?	CO2 has high diffusion rate. Regardless of where it is released, its effect is far reaching, therefore, local solutions will have a global effect.
Dorcas Kihara	What is the radius of the effect area where the carbon will be captured?	CO2 diffuses very fast globally regardless of where it is released. Absorbing it from Elementaita or any place in the world helps reduce its global levels.
	The absorption of CO2 and removal of the blanket, will it not affect the	No. It will not affect the clouds because the blanket is way above the clouds. The success of this

	clouds and cause frost that will affect our plants?	technology will lead to increased water cycle patterns.
	How will the project benefit the locals?	It will create employment opportunities and also improve weather patterns that will favor agricultural activities.
	How will the injection be done to avoid pollution of ground water? If possible, bring along bronchures and/visual presentations for ease of understanding.	The captured CO2 will be liquefied before injection by Cella. During and after injection, the CO2 will react with basalt rocks and will mineralize with time to form stable carbonates. It will be impossible for the carbon to escape to cause any pollution to ground water. The depth of storage is 800-1,000 meters below the grounds, which is way beyond the water surface. Demonstrations will be considered to help the community understand the projects better.
James Kuria	What percentage of the local community will be employed?	The different stages of the project's development will have different labor requirements. The number of the community members to be employed will depend on those requirements for every stage.
James Gisemba	DAC is said to be causing more emissions than what it captures. The chemical absorbents used are also said to be very toxic. Also, the storage of CO2 is said to be super risky.	Emissions in DAC capture come as a result of using fossil fuels to run the machines. In Octavia's case, the machines will be run by green energy which has no such emissions. The more the PEI powder is used in the filtering process, the more it loses its power/toxicity. After 2 years, it

		will either be recycled or handed over to NEMA licensed waste handler for proper disposal. The storage is only risky where there is no basaltic rock formations. In addition, the injection will be done slowly and small quantities, incase any impacts or risks occur, the process will be stopped and more research conducted to enable efficient storage.
Fredrick Kiarie	If possible, in the next public participation meetings, involve skilled members of the community who can understand such projects easily. Use the local youths for mobilization.	Public participation is meant for everybody, both the skilled and unskilled. It is good that all community members know about the project, that's when they can own it
Sharon Naliaka	What criteria was used to select the locals that the company has already employed?	Selection of local is based on specific community needs e.g. if no TVET locally, the company will look for potential talents and will train them on the technology before employing them. For those with qualifications already, they will apply and be interview for skilled workers section etc.
	Why go for DAC when there are several ways of capturing CO2?	Climate change cannot be solved by one method. Different players are taking up different methods in concerted efforts, but the aim is one: to reduce CO2 in the atmosphere. Octavia Carbon specializes in DAC technology.

	Why store the carbon underground when it can be re-used?	Carbon utilization will come later after the technology has reached it's full scale and sufficient research conducted.
James Sururu	Is the project associated to the railway project in any way?	No. This project has no association with the railway project. The proponents are different and the land for this project has already been acquired by Mumbi Limited.
Min 4/18/10/2024	**Resolutions:** The members welcomed the project and expressed hope that it will create employment opportunities for their youth, improve climate and also bring developments to the area.	Community members in attendance
Min 5/18/10/2024	**AOB:** The chair thanked the members for turning up for the public participation. He invited the Nyumba Kumi elders in attendance who updates the locals on the security issues in the area and who also gave vote of thanks.	
Min 6/18/10/2024	**Adjournment:** The meeting was adjourned at 12.50 pm with a word of prayer.	

Signed:

Geoffrey Nyambega - EIA Expert (Taking Minutes) Signature: _____ Date: 26/11/2024

Raymond Mwakirani – Lead Consultant Signature: _____ Date: 26.11.24

Representative – Octavia Carbon Signature: _____ Date: 26.11.24

Area Chief _____ Signature: _____ Date: 26/11/2024

ANN N. JORO CE
CHIEF EBURRU
LOCATION

OCTAVIA CARBON

PUBLIC PARTICIPATION FOR THE ESIA STUDY FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA ON OCTOBER 18, 2024

Attendance Sheet

S/N	NAME	ID/CONTACT	AREA	SIGNATURE
29.	LEWIS ODUOR	0795207365	Gema	[signature]
30.	Fred Wasiko	0724376433	Gema	[signature]
31.	Usengimana Samuel	0707931864	GEMA	[signature]
32.	JOSEPH MWAURA	0796457099	Gema	[signature]
33.	Stanley Mwangi Kariuki	0721986610	Gema	[signature]
34.	James Ngari or Kariuki	0727668727	Gema	[signature]
35.	Fredrick Kiarie	0723 606 398	Gema	[signature]
36.	Stanley Kariuki	0722931996	Gema	[signature]
37.	James Sururu	0714260866	Gema	[signature]
38.	MBOCHE WANJERU	0727635884	Gema	[signature]
39.	Martha Wakabari	0721465269	Gema	[signature]
40.	Grace Kahutei	0795673190	Gema	[signature]
41.	Ruth Murihia	0702388558	Gema	[signature]
42.	Serah Kariuki	0714466072	Gema	[signature]
43.	Dorcas Kihora	0720378320	Gema	[signature]
44.	Teresia Waithera		Gema	
45.	Elizabeth Njoki		Gema	
46.	Nancy Wanjiru		Gema	
47.	Gladys Wanjiku		Gema	
48.	Wangui Njihia		Gema	
49.	Eunice Njambi		Gema	[signature]
50.	Stanley Gitau		Gema	
51.	JAMES KURIA			
52.	JAMES GISEMBA		GEMA	
53.	SAMUEL KURIA	0724216212	GEMA	[signature]
54.	Mary Wangui	0720094274	Gema	[signature]
55.	FLORA NYAMBURA	0720202480	Gema	[signature]
56.	SAMUEL MBUGUA	0724913805	Gema	[signature]

OCTAVIA CARBON

PUBLIC PARTICIPATION FOR THE ESIA STUDY FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA ON OCTOBER 18, 2024

Attendance Sheet

S/N	NAME	ID/CONTACT	AREA	SIGNATURE
57.	Phyllis Wawero	26340380	Gema	Phwero
58.	MARGARET SHIUNDU	10003109	GEMA	
59.	Mary Wangenjo	07033204	134 Gema	
60.	MARGARET KAMAU	0722640753	Gema	
61.	Lucy kinothia	0722932431	Gema	
62.	Esther abenyo	0712937422	Gema	
63.	Lesho wambol	—	Gem	
64.	wambol Kalalie	—	Gema	
65.	Robert Chege	0791277206	Gema	
66.	Beatrice Wainaina	0719278239	Gema	
67.	KEVIN TOYA MONDA	0726220909	Gema	
68.	Catherine Ngatia.	6439372.	Gema.	
69.	PETER KAGWA	0713 837855		
70.	Michael Gichini	0757127092	Gema	
71.	James Gichuki	0723917918	Gema	
72.	Kagai	0727011348	gema	
73.	HADA MWAI	0715308883	Gema	
74.	MARGARET WANG	0728260487	Gema	
75.	Shaxon Nairra	0704741597	gema	
76.	MARY WANJIKU	0706762782	Gema	
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OCTAVIA CARBON

PUBLIC PARTICIPATION FOR THE ESIA STUDY FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA ON OCTOBER 18, 2024

Attendance Sheet

S/N	NAME	ID/CONTACT	AREA	SIGNATURE
1.	Stephen Murangi	0721635297 0723021	Gema	[signature]
2.	Geoffrey Nyambega	0728548807	EIA Expert	[signature]
3.	Raymond Mwakirani	0720613797	EIA expert	[signature]
4.	GEDION KARWE	6669080	GEMA	[signature]
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MINUTES FOR THE PUBLIC CONSULTATION MEETING FOR THE DIRECT AIR CAPTURE PROJECT IN ELEMENTAITA HELD ON WEDNESDAY 30th OCTOBER, 2024, AT WEITEMERE – LIVING MINISTRIES CHURCH HALL AT 10 AM

	Name	Designation	Role
1	Ann Njoroge	Area Chief	Chairperson
2	Augustine Kamunde	Administration	Member
3	Fredrick Kiarie	Nyumba Kumi	Member
4	Raymond Mwakirani	Consultant	Member
5	Ian Nthiga	Octavia Carbon	Member
6	Melissa Nyangarisa	Cella Mineral Storage	Member
7	Geoffrey Nyambega	EIA Expert	Taking Minutes
8	Community members		32

AGENDA:

1. Introduction
2. Presentations
3. Plenary
4. AOB

Min. No.	Item	Person(s)
Preamble Min 1/30/10/2024	The chair called the meeting to order at 10.57 am. An opening prayer was offered by one of the members. The chair also introduced the parties present.	Fredrick Kiarie Ann Njoroge
Min 2/30/10/2024	**Presentations:** The ESIA team together with Octavia and Cella made presentations about the project: The changing climate patterns have affected everyone. These adverse climate patterns are as a result of increased global warming resulting from increased CO2 in the atmosphere. CO2, just like any other atmospheric gases has its benefits, but when become too much in the atmosphere, it forms a blanket that prevents the earth's surface from cooling, hence bringing about global warming. Sources of the excess CO2 include	Octavia Carbon ESIA Consultant Cella Mineral Storage

	greenhouse gas emissions, increased use of fossil fuels, increased industrialization, deforestation among others. The available methods to avert the emissions have not been sufficient to address it fully. Octavia Carbon has come up with this DAC technology to reduce already existing CO2 in the atmosphere by directly capturing it for underground storage by our partner Cella. The capture process takes place in two phases: the adsorption phase and the desorption phase. In the adsorption phase, the machine opens and air is sucked in as a result of pressure difference brought about by the rotating fan at the top of the machine. The air passes through a chemical filter which is CO2-philic till it is saturated with the gas. In the adsorption phase, once the filter is saturated, the machine closes, creating a vacuum in the machine. The machine is then heated using geothermal heat to 60 degrees to release the CO2 which is evacuated to a holding tank. The gas is then liquefied in readiness for injection. The liquefied CO2 is then injected into basaltic rock formations underground where it reacts with the basal rocks and mineralizes to form stable carbonate rocks and stored permanently. The meeting, therefore, was meant to sensitize the local community about the project, its technology, the impacts it is likely to have on the environment and the local community; and get feedback from the community and any concerns, as part of NEMA's licensing process.	

Min 3/30/10/2024	**Plenary**:	
Name	**Question/Concern/Comment**	**Response**
Samuel Waweru	Apart from benefiting the environment, are there any other projects that will benefit the community?	Yes, the company is partnering with local TVET institutions to train the youth for opportunities during project implementation. The company has also sponsored a football tournament in Gilgil sub-county. In addition, when the company shall need workers, it will source locally through the chief.

Evans Nyagaka	Will the effect be locally on where the machines are installed?	No. CO2 has high diffusion rate. Regardless of where it is released, its effect is far reaching, therefore, local solutions will have a global effect.
	Why this technology and not forests?	Climate change mitigation is a concerted effort. Different players are employing different technologies but the aim is one: to reduce CO2 levels in the atmosphere. DAC is a complementary method to those already in use. Additionally, Octavia has partnered with the Kenya Forest Service in tree planting initiatives.
	Is the technology coming because of the SEZ?	The DAC technology deals with CO_2 that is already in the atmosphere and not one that will be released courtesy of the companies that will be set up at the SEZ.
	Won't the injected CO2 come out?	No. From the surveys conducted, where the basalt rocks are, there are impermeable rocks on top of them, so the CO_2 cannot escape by seeping through to the top. The basalts also do not occur continuously. After injection, the CO_2 reacts and turns to stable solid rocks and the process is irreversible.
	Is there a chemical reaction to make the CO2 to mineralize?	Yes. The basalt rocks contain minerals like sodium, magnesium etc. The liquefied CO_2 chemically reacts with these minerals to form stable compounds such as Sodium Carbonate, Magnesium Carbonate etc.
	Have the community programs by Octavia started? When will	The company conducted pilot programs to determine needs of each

	Weitemere be also considered being that there is also an existing local team?	local community around the project area. One youth has already been taken in for training, as part of Octavia's apprenticeship program. The company has also opened engagement with Munanda TVET and Kikopey Technical Training Institute on technical training on the technology. The youths can register with the area chiefs to participate in the TVET programs. The company has also sponsored local football tournament at Jaika. Weitemere youths can also participate in the tournament.
James Kiarie	What method will the absorbent use to suck the CO_2 while in the machine?	The chemical has a high affinity for CO_2, once the air is sucked into the machine, it passes through the filter and is absorbed by the chemical, while other gases escape.
Grace Kahwai	Help us understand the CO_2 and why it is a concern now.	CO_2 is part of the atmospheric gases. It is used by plants to make food. It is a concern now since it's levels have risen exponentially. It's accumulation in the atmosphere has brought about global warming which has negatively the earth, the results of its effects are felt all over.
	Will the CO_2 affect people?	For the captured CO_2, tt will not affect people since it will be stored deep underground. Also, pure CO_2 is safe since it's used in beverages. For atmospheric CO_2, it is already affecting everyone, the company is only trying to find solutions to reduce

		it from the atmosphere and hence reduce its effects.
	How far underground will the CO_2 be injected to avoid it negatively impacting people?	The depth of storage is 800-1,000 meters below the ground, which is way beyond the depth where human activities take place, such as farming and borehole drilling.
	Won't the CO_2 mix with undergound water during injection?	The liquid CO_2 will react with basalt rocks and will mineralize with time to form stable carbonates where it is permanently trapped. It will be impossible for the carbon to escape to cause any pollution to ground water.
	What is the balance between extraction and injection of the CO_2?	Each machine is meant to capture 10 tons of CO_2 per year. From geological studies conducted in the area, the amount of basalt rocks present are capable of storing millions of tons of CO_2. It is not possible to exhaust the storage space.
Samuel Ndung'u	There are not many factories in Gilgil, why install the machines here?	CO_2 diffuses globally in a span of few days, regardless of where it is released. So even if there are no industries in Gilgil, CO_2 is present. Gilgil is also preferrable because of: ● The creation of the SEZ as it will be favorable for business, ● The readily available geothermal energy to run the machines, ● The abundance of the basalt rocks ● Easier collaboration with other companies within the zone.

Charles Macharia	Does the company generate any income from this technology?	Once the plant is operational, income will be generated from carbon trading.
	Machines usually vibrate and cause destruction to buildings, will these DAC machines also have that effect?	The more the noise a machine generates, the more will be the vibrations. The noise generated from DAC machines is very small since noise only comes from the rotating fans. So the vibrations, if any, will be very minimal. Additionally, silencers are used to muffle the noise from the machines.
Michael Nditu	One company captures and another one stores, what is the process like? Is the handed over CO_2 liquid or solid?	Octavia captures the CO_2 in gaseous form from the atmosphere. It liquefies it the hands it over to Cella in liquid form for injection. After injection, the CO_2 reacts with the basalt rocks to form stable solid carbonates.
Sarah Njambi	Why drill 1 kilometer underground to store the carbon while the rocks are readily found on the surface?	The surface rocks have been affected by weather changes. The one underground is pure and best suited to store the CO_2.
Daniel Waweru	Can Octavia help the community with afforestation programs?	This community participation is the start of engagement with the local community, other projects will be considered in consultation with local community and local administration as the project progresses. The CBOs can organize such projects and present them to the area chief. At the invitation of the area chief, the company will come in to see what projects are possible to implement.

		invitation of the area chief, the company will come in to see what projects are possible to implement.
Min 4/30/10/2024	**Resolutions:** The members were positive about the project. They hoped it will help mitigate climate change that has adversely affected their farming activities.	Community members in attendance
Min 5/30/10/2024	**AOB:** The chair thanked the members for turning up for the public participation appreciated the team for honoring the community's request to hold the public participation at Weitemere. The local elders present also took time to give updates on the security in the area and the community projects the members were undertaking. The youths were encouraged to take up the opportunities offered by Octavia The chief also encouraged the local members to maintain the peace they've had this year.	
Min 6/30/10/2024	**Adjournment:** The meeting was adjourned at 12.38 pm with a word of prayer from Pst. Samuel Ndung'u	

Signed:

Geoffrey Nyambega - EIA Expert (Taking Minutes) Signature: _____ Date: 20/11/2024

Representative – Cella Mineral Storage Signature: _____ Date: 20.11.24

Representative – Octavia Carbon Signature: _____ Date: 26.11.24

Area Chief – Ann Njoroge Signature: _____ Date: 26th/11/2024

ANN N. NJOROGE
CHIEF EBURRU
LOCATION

OCTAVIA CARBON

PUBLIC PARTICIPATION ATTENDANCE SHEET FOR THE ESIA STUDY FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA

S/N	NAME	ID/CONTACT	AREA/ ~~OCCUPATION~~	SIGNATURE
105.	Geoffrey Nyamboga	0728548807	EIA Expert	[signature]
106.	Melissa Nyangarisa	0720055325	Cella	[signature]
107.	Augustine Kamonde	0720464051	Admin	[signature]
108.	Ian Nthiga.	0108081244	Octavia	IMN
109.	Raymond Mwakirani	0720613747	ESIA	[signature]
110.	ANN NJOROGE	0712984454	Chief	[signature]
111.	SAMWEL NDUNGU	0725598214	KIAMANJE	[signature]
112.	JOHN KAMAU	0721978835	"	[signature]
113.	SAMWEL NDUNGU	071316751[illegible]	"	[signature]
114.	SARA NJAMBI	0716262518	KIAMANJE	[signature]
115.	ANN MBITHE	0716262518	KIAMANJE	[signature]
116.	ANN WANGUI	0115992615		Wangui
117.	James Sululu			
118.	Charles Macharia	0726154336	Kiamanje	[signature]
119.	Daniel Sururu	0792984984	Kiamanje	[signature]
120.	BENSON SURURU	0707947884	Kiamanje	[signature]
121.	Tabitha Muthoni	0715544032	Kiamaji	[signature]
122.	Beth Wanjiku	0723167815	Kiamaji	Bet
123.	[illegible]			
124.	Michael Nduta	0705952584		
125.	EVANS NJAGAKA	0798507708	Kiamachi	[signature]
126.	GEOFFREY GACHOKA	0758424370	Kiamaje	[signature]
127.	DANIEL WAWERU	0792669455	Kiamaji	[signature]
128.	James Kiarie C.	0717040059	Kiamanje	[signature]
129.	SAMWEL WAWERU	0727635884	Kiamaji	[signature]
130.	James Ngatia Kariuki	0727668937	Kiamaji	[signature]
131	David Mwele	0721204288	Kiamaji	[signature]
132	Fredrick Kiarie	0723606398	—	[signature]

OCTAVIA CARBON

PUBLIC PARTICIPATION ATTENDANCE SHEET FOR THE ESIA STUDY FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT IN ELEMENTAITA, KENYA

S/N	NAME	ID/CONTACT	AREA/ OCCUPATION	SIGNATURE
79.	Serah Wanjiku	0714466072		[signature]
80.	Denis Njuguna	0113118846		[signature]
81.	Mike Sururu	0741142 5211		[signature]
82.	Peter Migichi	0791162683	Kimanje	[signature]
83.	Ruth nyambura	0726122041		[signature]
84.	Michael Kimani	~~070244064~~1		[signature]
85.		0702440641		
86.	Michael Nderitu	0705952874	Kiamanje	[signature]
87.	Kijooru Sururu	0743607566		[signature]
88.	Natakato Sururu	0743607566		[signature]
89.	Monica wanjiru	0790582304		[signature]
90.	Daniel Sururu	0792989984		[signature]
91.				
92.				
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103.				
104.				

Appendix IV: Questionnaires

OCTAVIA CARBON

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT AT ELEMENTAITA KENYA

Stakeholder Consultation Guide

Local Communities

We are conducting a consultation for the Elementaita Direct Air Capture (DAC) project **proposed by Octavia Carbon** and value your input. This questionnaire is designed to gather your insights, concerns, and feedback to ensure the project aligns with community interests and environmental sustainability as per the Environmental Management and Coordination Act (EMCA) regulations.

Please take a few moments to answer the questions below. Your responses will help shape the project's development and ensure it reflects the priorities of all stakeholders as well as help in impact analysis and development of mitigation measures.

Part 1: General information

Name	ALICE KARIUKI	
Contacts	**Mobile:** 0724150145	**Email:**
Occupation	BUSINESS	
Residence	KWOPEY	
Signature: AK	**Date:** 16/10/2024	

Part 2: General awareness and perception

1. How familiar are you with the concept of Direct Air Capture (DAC)?

☒ Not familiar ☒ Somewhat familiar ☐ Very familiar

2. What is your understanding of the proposed Direct Air Capture project in Elementaita?

Reducing Carbon from the atmosphere

3. What do you think are the potential benefits of the project? Improved business opportunities and economic growth.

4. Are you aware of any concerns or risks associated with the DAC technology? If yes, please describe them: The technology is said to cause more emissions and is also risky

5. How do you think the DAC project might impact the day-to-day lives of the people in your community? Increase in business

6. Are there any traditional practices, cultural sites, or local customs that you feel should be protected or taken into account during the project? No

7. Do you have any specific concerns about land use or access to resources (e.g., water, grazing land) during the project? No

8. How would you prefer to raise concerns or provide feedback during the project's implementation?

Part 3: Community engagement and expectations

9. What role would you like to see the local community or your organization play in the project? Source materials from local businesses

10. Are there any specific community needs or development priorities that should be addressed by the project? Water projects.

Part 4: Open feedback

11. Do you have any suggestions for improving the planning and implementation of the DAC project? Consider employing people who are locals to work for the company in this project.

12. Are there any other comments or concerns you would like to share regarding the project? The chemicals used should be handled carefully so that they don't affect us

OCTAVIA CARBON

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Please take a few moments to answer the questions below. Your responses will help shape the project's development and ensure it reflects the priorities of all stakeholders as well as help in impact analysis and development of mitigation measures.

Part 1: General information

Name	Fredrick Kiarie	
Contacts	**Mobile:** 0723 606 378	**Email:** —
Occupation	Mwamba Kuu – Kiamanke	
Residence	Kiamanke	
Signature:		**Date:** 30/10/2024

Part 2: General awareness and perception

1. How familiar are you with the concept of Direct Air Capture (DAC)?

☐ Not familiar ☑ Somewhat familiar ☐ Very familiar

2. What is your understanding of the proposed Direct Air Capture project in Elementaita?

The project is meant to capture CO_2 from the atmosphere for storage underground.

3. What do you think are the potential benefits of the project?

It will create employment
It will reduce global warming
It will bring employment opportunities for our people

4. Are you aware of any concerns or risks associated with the DAC technology? If yes, please describe them:

/

5. How do you think the DAC project might impact the day-to-day lives of the people in your community?

- If global warming is reduced, farming will be better.
- Security in our area will also improve since our youth will be working.

6. Are there any traditional practices, cultural sites, or local customs that you feel should be protected or taken into account during the project?

No

7. Do you have any specific concerns about land use or access to resources (e.g., water, grazing land) during the project?

NO

8. How would you prefer to raise concerns or provide feedback during the project's implementation?

- Suggestion boxes for feedback
- Direct channels of communication with the developer

Part 3: Community engagement and expectations

9. What role would you like to see the local community or your organization play in the project? Our people working at the project

10. Are there any specific community needs or development priorities that should be addressed by the project? Invest in community projects to improve lives of people

Part 4: Open feedback

11. Do you have any suggestions for improving the planning and implementation of the DAC project? Involve more learned people from the community who can understand the science in the project.

12. Are there any other comments or concerns you would like to share regarding the project? It is a good project, we hope it will be of benefit to the community and farmers.

OCTAVIA CARBON

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT AT ELEMENTAITA KENYA

Stakeholder Consultation Guide

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Please take a few moments to answer the questions below. Your responses will help shape the project's development and ensure it reflects the priorities of all stakeholders as well as help in impact analysis and development of mitigation measures.

Part 1: General information

Name	Grace Kithwa	
Contacts	**Mobile:** 0795673490	**Email:**
Occupation	Farmer	
Residence	Gema	
Signature: GK	**Date:** 18/10/2024	

Part 2: General awareness and perception

1. How familiar are you with the concept of Direct Air Capture (DAC)?

☐ Not familiar ☑ Somewhat familiar ☐ Very familiar

2. What is your understanding of the proposed Direct Air Capture project in Elementaita?

Trap CO_2 and store it in underground

3. What do you think are the potential benefits of the project? Improvement of weather for farming

4. Are you aware of any concerns or risks associated with the DAC technology? If yes, please describe them: The CO2 can leak and burn our crops
The storage space can reduce our land for farming

5. How do you think the DAC project might impact the day-to-day lives of the people in your community? more job opportunities

6. Are there any traditional practices, cultural sites, or local customs that you feel should be protected or taken into account during the project? —

7. Do you have any specific concerns about land use or access to resources (e.g., water, grazing land) during the project? —

8. How would you prefer to raise concerns or provide feedback during the project's implementation? —

Part 3: Community engagement and expectations

9. What role would you like to see the local community or your organization play in the project? Employment

10. Are there any specific community needs or development priorities that should be addressed by the project? ~~Water for the~~ Water project for the community

Part 4: Open feedback

11. Do you have any suggestions for improving the planning and implementation of the DAC project? Do more sensitization about the ~~pro~~ technology for people to understand ~~the~~ it more

12. Are there any other comments or concerns you would like to share regarding the project? We want a clear channel of communication to raise our issues if the project brings negative effects in future.

OCTAVIA CARBON

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT AT ELEMENTAITA KENYA

Stakeholder Consultation Guide

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Please take a few moments to answer the questions below. Your responses will help shape the project's development and ensure it reflects the priorities of all stakeholders as well as help in impact analysis and development of mitigation measures.

Part 1: General information

Name	JANET NJOROGE	
Contacts	**Mobile:**	**Email:**
Occupation	BUSINESS	
Residence	KIKOPEY	
Signature:		**Date:** 16/10/2024

Part 2: General awareness and perception

1. How familiar are you with the concept of Direct Air Capture (DAC)?

☑ Not familiar ☐ Somewhat familiar ☐ Very familiar

2. What is your understanding of the proposed Direct Air Capture project in Elementaita?

_____

_____

3. What do you think are the potential benefits of the project? Our businesses will grow.

4. Are you aware of any concerns or risks associated with the DAC technology? If yes, please describe them: The CO_2 will affect water source if not well stored/handled.

5. How do you think the DAC project might impact the day-to-day lives of the people in your community?

6. Are there any traditional practices, cultural sites, or local customs that you feel should be protected or taken into account during the project?

7. Do you have any specific concerns about land use or access to resources (e.g., water, grazing land) during the project?

8. How would you .prefer to raise concerns or provide feedback during the project's implementation? Contact with employer Through the chief.

Part 3: Community engagement and expectations

9. What role would you like to see the local community or your organization play in the project?

10. Are there any specific community needs or development priorities that should be addressed by the project?

Part 4: Open feedback

11. Do you have any suggestions for improving the planning and implementation of the DAC project? consider local people first when employing

12. Are there any other comments or concerns you would like to share regarding the project? minimize pollution and waste generation

OCTAVIA CARBON

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT AT ELEMENTAITA KENYA

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Please take a few moments to answer the questions below. Your responses will help shape the project's development and ensure it reflects the priorities of all stakeholders as well as help in impact analysis and development of mitigation measures.

Part 1: General information

Name	SAMUEL MBUGUA	
Contacts	**Mobile:** 0724913825	**Email:**
Occupation	FARMER	
Residence	GEMA	
Signature:		**Date:** 18/10/2024

Part 2: General awareness and perception

1. How familiar are you with the concept of Direct Air Capture (DAC)?

☐ Not familiar ☑ Somewhat familiar ☐ Very familiar

2. What is your understanding of the proposed Direct Air Capture project in Elementaita?

To capture carbon from the air and store it in rocks

3. What do you think are the potential benefits of the project?

Employment

4. Are you aware of any concerns or risks associated with the DAC technology? If yes, please describe them:

No

5. How do you think the DAC project might impact the day-to-day lives of the people in your community?

Removing the carbon may finish it from the atmosphere. Our crops will not grow because they need the carbon to produce food

6. Are there any traditional practices, cultural sites, or local customs that you feel should be protected or taken into account during the project?

No

7. Do you have any specific concerns about land use or access to resources (e.g., water, grazing land) during the project?

No

8. How would you prefer to raise concerns or provide feedback during the project's implementation?

Community leaders

The owners of the project shall have more meetings with mwananchi

Part 3: Community engagement and expectations

9. What role would you like to see the local community or your organization play in the project? ~~We~~ should provide labor e.g casual, security ~~at~~ the site

10. Are there any specific community needs or development priorities that should be addressed by the project? No

Part 4: Open feedback

11. Do you have any suggestions for improving the planning and implementation of the DAC project? No

12. Are there any other comments or concerns you would like to share regarding the project? —

OCTAVIA CARBON

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT AT ELEMENTAITA KENYA

Stakeholder Consultation Guide

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Please take a few moments to answer the questions below. Your responses will help shape the project's development and ensure it reflects the priorities of all stakeholders as well as help in impact analysis and development of mitigation measures.

Part 1: General information

Name	JOHN KIRIKA	
Contacts	**Mobile:**	**Email:**
Occupation	C. ✗H	
Residence	KIROPEY	
Signature:		**Date:** 16/10/2024

Part 2: General awareness and perception

1. How familiar are you with the concept of Direct Air Capture (DAC)?

☐ Not familiar ☑ Somewhat familiar ☐ Very familiar

2. What is your understanding of the proposed Direct Air Capture project in Elementaita?

Capturing CO_2 from the air for storage. The project seeks to reduce the gas from the atmosphere

3. What do you think are the potential benefits of the project?

more business opportunities
Improved infrastructure
Employment opportunities

4. Are you aware of any concerns or risks associated with the DAC technology? If yes, please describe them:

1. Will the machines capture CO_2 only in Elementaita or from the whole world?
2. Will not the CO_2 come out with time

5. How do you think the DAC project might impact the day-to-day lives of the people in your community? Growth of businesses for traders in Kikopey

6. Are there any traditional practices, cultural sites, or local customs that you feel should be protected or taken into account during the project?

—

7. Do you have any specific concerns about land use or access to resources (e.g., water, grazing land) during the project?

—

8. How would you prefer to raise concerns or provide feedback during the project's implementation?

/

Part 3: Community engagement and expectations

9. What role would you like to see the local community or your organization play in the project? Ok

10. Are there any specific community needs or development priorities that should be addressed by the project?

Part 4: Open feedback

11. Do you have any suggestions for improving the planning and implementation of the DAC project? Educate the people more about the Project.

12. Are there any other comments or concerns you would like to share regarding the project? Give employment to deserving people in the community
Do more public participations

OCTAVIA CARBON

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED DIRECT AIR CAPTURE (DAC) PROJECT AT ELEMENTAITA KENYA

Stakeholder Consultation Guide

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Please take a few moments to answer the questions below. Your responses will help shape the project's development and ensure it reflects the priorities of all stakeholders as well as help in impact analysis and development of mitigation measures.

Part 1: General information

Name	SARA NJAMBI	
Contacts	**Mobile:** 0716262518	**Email:**
Occupation	BUSINESS	
Residence	KIAMANJE	
Signature:		**Date:** 30/12/2024

Part 2: General awareness and perception

1. How familiar are you with the concept of Direct Air Capture (DAC)?

☐ Not familiar ☑ Somewhat familiar ☐ Very familiar

2. What is your understanding of the proposed Direct Air Capture project in Elementaita?

It will capture carbon dioxide from the air

3. What do you think are the potential benefits of the project? Development

4. Are you aware of any concerns or risks associated with the DAC technology? If yes, please describe them: The carbon can cause health problems ~~like~~ atm to people if it escapes

5. How do you think the DAC project might impact the day-to-day lives of the people in your community?

6. Are there any traditional practices, cultural sites, or local customs that you feel should be protected or taken into account during the project?

7. Do you have any specific concerns about land use or access to resources (e.g., water, grazing land) during the project?

8. How would you prefer to raise concerns or provide feedback during the project's implementation? Open a line where we can report our concers and give feedback.

Part 3: Community engagement and expectations

9. What role would you like to see the local community or your organization play in the project?

10. Are there any specific community needs or development priorities that should be addressed by the project?

Employment for our youth

Part 4: Open feedback

11. Do you have any suggestions for improving the planning and implementation of the DAC project?

The company can consider re-using the carbon instead of storing it.

12. Are there any other comments or concerns you would like to share regarding the project?

OCTAVIA CARBON

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Please take a few moments to answer the questions below. Your responses will help shape the project's development and ensure it reflects the priorities of all stakeholders as well as help in impact analysis and development of mitigation measures.

Part 1: General information

Name	EVANS NYAGAKA	
Contacts	**Mobile:** 0798507708	**Email:** —
Occupation	FARMER	
Residence	KIAMACHI	
Signature:	Evans	**Date:** 30/10/2024

Part 2: General awareness and perception

1. How familiar are you with the concept of Direct Air Capture (DAC)?

☐ Not familiar ☑ Somewhat familiar ☐ Very familiar

2. What is your understanding of the proposed Direct Air Capture project in Elementaita?

It will reduce CO_2 from the atmosphere

3. What do you think are the potential benefits of the project?

Employment
Growth of businesses
Development

4. Are you aware of any concerns or risks associated with the DAC technology? If yes, please describe them:

What if the CO_2 comes out after filling the underground rocks?

5. How do you think the DAC project might impact the day-to-day lives of the people in your community?

6. Are there any traditional practices, cultural sites, or local customs that you feel should be protected or taken into account during the project?

NO

7. Do you have any specific concerns about land use or access to resources (e.g., water, grazing land) during the project?

8. How would you prefer to raise concerns or provide feedback during the project's implementation?

meetings with the Owner (company)

Part 3: Community engagement and expectations

9. What role would you like to see the local community or your organization play in the project? Our youths should get employed

10. Are there any specific community needs or development priorities that should be addressed by the project? - Tree planting programs in our community
- Support to our local community football team.

Part 4: Open feedback

11. Do you have any suggestions for improving the planning and implementation of the DAC project? Educate us more about the project

12. Are there any other comments or concerns you would like to share regarding the project?

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Part 1: General information

Name	Lesho Wambui	
Contacts	**Mobile:** —	**Email:** —
Occupation	farmer	
Residence	Gema	
Signature:		**Date:** 18/10/2024

Part 2: General awareness and perception

1. How familiar are you with the concept of Direct Air Capture (DAC)?

☑ Not familiar ☐ Somewhat familiar ☐ Very familiar

2. What is your understanding of the proposed Direct Air Capture project in Elementaita?

—

3. What do you think are the potential benefits of the project? Job opportunities

4. Are you aware of any concerns or risks associated with the DAC technology? If yes, please describe them: The chemicals used are dangerous. They will affect us

5. How do you think the DAC project might impact the day-to-day lives of the people in your community?

6. Are there any traditional practices, cultural sites, or local customs that you feel should be protected or taken into account during the project?

7. Do you have any specific concerns about land use or access to resources (e.g., water, grazing land) during the project?

8. How would you prefer to raise concerns or provide feedback during the project's implementation? Community leaders

Part 3: Community engagement and expectations

9. What role would you like to see the local community or your organization play in the project?_____

_____

10. Are there any specific community needs or development priorities that should be addressed by the project?_____

_____

_____

Part 4: Open feedback

11. Do you have any suggestions for improving the planning and implementation of the DAC project?_____

_____

_____

12. Are there any other comments or concerns you would like to share regarding the project?

_____

_____

_____

_____

Appendix V: Octavia Carbon and Mumbi Limited MoU (Land Lease Agreement)

Memorandum of Understanding

Between

Mumbi Ltd

and

Octavia Carbon Co

This Agreement ("The term sheet") serves as a memorandum of understanding of Terms between Octavia Carbon Co ("Octavia") and Mumbi Ltd ("Mumbi") for the deployment of Octavia's pilot plant on Mumbi's land. Collectively, they shall be referred to as "the parties". The term sheet is effective as of 26th June 2024.

The term sheet is divided into two parts. "Part A – Non-Binding Provisions" has terms that are not legally binding and will be negotiated by both parties into legally binding definitive terms as more information becomes available during the course of the project. In the meantime, this MoU for a tenure of 1 year will operate as an agreement for land access for the pilot project by Octavia. A full and comprehensive agreement will be negotiated after this period depending on the success of the Cella Appraisal Well that is ongoing.

"Part B – Binding Provisions" has terms previously agreed upon by both parties and are intended to be legally binding provisions.

Part A – Non-Binding Provisions

1. **Parties:**

Octavia is a Direct Air Capture ("DAC") technology and project developer.
Mumbi is a private geothermal power developer and the landowner where this project will be situated.

2. **Background & Project Description**

The two parties intend to collaborate on the deployment of Octavia's First-of-a-Kind pilot plant in Kenya. The plant will apply Octavia's DAC technology to remove and permanently store CO2 underground.

3. **Obligations of Parties:**

Mumbi shall be responsible for the following items all at cost to be agreed between the parties:

- Provision of land for the project
- Provision of utilities like water, heat, electricity, and maintenance of the road leading to the pilot plant
- Provision of security to Octavia's plant
- Supporting Octavia in engaging local communities

Octavia shall be responsible for:

- Designing, Constructing, and commissioning the DAC plant

- Operating and maintaining the DAC plant
- Permitting the DAC plant

Both parties will provide sufficient scientific, engineering, informational, and commercial support to each other to maximize the chances of success of the project.

4. **Geothermal Heat Access:**

Both parties agree to negotiate in good faith a favorable tariff for access to geothermal heat. The parties will explore mutually beneficial ways to develop the geothermal heat infrastructure including but not limited to cost-sharing on sinking a geothermal heat well for higher temperatures; Mumbi developing and owning all heat infrastructure and selling heat to Octavia at a fixed rate; Mumbi leasing a heat well to Octavia. As more data on the temperature gradient and geochemical analysis becomes available, the parties will enter a definitive agreement that will define the partnership model for the heat infrastructure as well as a favorable price for that heat.

5. **Electricity Access:**

The parties agree to share the upfront cost of electricity transmission from where it currently exists to the point of use for this project. Furthermore, the parties agree to negotiate a Power Purchase Agreement from Mumbi's future power plant in good faith.

6. **Water**

Octavia will buy fresh water for use in Octavia's DAC plant from Mumbi when it becomes available.

7. **Community Engagement:**

The parties agree to collaborate on community engagement. Octavia will give Mumbi advance notice in a reasonable timeframe when Octavia plans to hold any community engagement session. Mumbi will support Octavia in engaging the right people within the communities around the project. All community engagement sessions associated with Octavia's activities will be held at Octavia's expense. Octavia will refrain from mentioning the storage project in their community engagement until all infrastructure is fully developed and initial storage tests done.

Part B – Binding Provisions

1. **Mutual Confidentiality**

Any information disclosed by either Party to the other Party, whether directly or indirectly, in writing, orally, or by inspection of tangible objects in connection with the negotiation or performance of the Definitive Agreements or this Term Sheet will be considered the disclosing Party's Confidential Information, and the provisions set forth in Octavia & Mumbi's mNDA, dated April 11, 2024, will control the Parties' rights and responsibilities with respect to such Confidential Information.

2. **Land Lease Agreement**

Mumbi will reserve a 1-acre plot of land bordering Cella's pilot. In the year June 2024 to June 2025, Mumbi will allow Octavia access to the land at no cost to Octavia to allow Octavia to prove out their technology. By the end of June 2025, both parties agree to negotiate a land lease

agreement in good faith at which point, Octavia shall lease land from Mumbi at a rate of $400/acre/yr. For purposes of planning the site, Mumbi will set a minimum land holding for off-take

3. **Heat Investment**

Octavia will make a heat investment of $10,000 upon the signing of this agreement towards the further development of one of Mumbi's heat wells (TG7). The actual cost will be determined by the design and depth that Octavia will desire with Mumbi providing the drilling services at the price which will be negotiated by mutual agreement. Mumbi has no objection to Octavia having exclusive rights to the heat in the identified geothermal heat well if it is developed at Octavia's cost and is situated closest to the CO2 storage well.

The money is payable to:

MUMBI LIMITED
BANK: PRIME BANK
BRANCH: RIVERSIDE DRIVE
SWIFT: PRIEKENX
USD ACCOUNT: 3001210027

Mumbi Ltd

Signature:

Name: ANTHONY GICHU

Title: DIRECTOR

Date: 27TH JUNE 2024

MUMBI LIMITED
P.O. BOX 49670-00100, NAIROBI

Octavia Carbon Co

Signature:

Name: Martin Freimüller

Title: Founder & CEO

Date: 26th June 2024

Appendix VI: Octavia Carbon and Cella Mineral Storage MoU (Carbon Storage)

Carbon Dioxide Removal and Storage Summary of Terms

This Carbon Dioxide Removal and Storage Summary of Terms, dated August 18, 2023 (this "**Term Sheet**"), serves as a statement of intent only and is not binding, except with respect to the provisions set forth in "Part B - Binding Provisions" of this Term Sheet which are intended to be, and are, legally binding agreements among the parties hereto (the "**Binding Provisions**"). The Term Sheet outlines the terms of a proposed carbon capture and sequestration demonstration project and associated sale of carbon credits (the "**Demonstration Project**") between Cella Mineral Storage, Inc., a Delaware corporation ("**Cella**"), and Octavia Carbon Co., a Delaware Corporation ("**Octavia**") (collectively, the "**Parties**").

Other than the Binding Provisions, no course of dealing shall create any binding obligation among the parties, unless and until the parties execute a definitive agreement with respect to the terms and provisions described in this Term Sheet, and then the parties shall be bound only in accordance with the terms of such agreement. Nothing in this Term Sheet shall be construed as forming any joint venture, partnership or other relationships between the parties with respect to the items described herein, and the parties shall not be under any legal obligation of any kind whatsoever with respect to any transaction by virtue of this Term Sheet or any other written or oral expression with respect to such transaction described in this Term Sheet, unless and until a definitive agreement, subsequently entered into between the parties, if any, with respect to such transaction has been executed and delivered by each such party (the "**Definitive Agreements**").

PART A – Non-Binding Provisions	
1. Parties:	**Cella provides permanent carbon dioxide storage services by means of mineralization.** **Octavia is developing a technology to capture carbon dioxide ("CO2") through direct air capture.** **Cella partners with carbon capture companies, and Octavia partners with carbon storage companies, in each case to provide a system to remove carbon from the atmosphere and store it underground, generating negative emissions sold as carbon removal credits.**
2. Background and Project Description:	**The Parties intend to cooperate on the Demonstration Project. The Demonstration Project is expected to be located at XX coordinates in Kenya. The Demonstration Project will include CO2 removal services using direct air capture ("DAC") based on Octavia's technology and geologic sequestration based on Cella's technology. The DAC machine and CO2 storage facility will be collocated, and the project will also have collocated renewable energy generation which will be used to operate the Demonstration Project. The Demonstration Project is expected to operate with a removal rate of [1,000] tCO2/year and will generate monetizable carbon offsets.**
3. Demonstration Project Timeline;	**The Demonstration Project is expected to be developed on the following milestones:** ● Finalization of Definitive Agreements: August 31, 2023

Commercial Operation	● Construction Start Date: February 1, 2024 ● Field testing of DAC machine: June 30, 2024 ● Commercial Operation Date: October 30, 2024
4. Obligations of the Parties:	**Octavia shall be responsible for:** ● Design, procurement and installation of the direct air capture machine using Octavia's technology (the "**DAC Machine**") located near the first storage well of Cella's CO2 storage facility. ● Permitting of the DAC Machine. ● Sourcing energy for the operation of the DAC machine. ● Operation and maintenance of the DAC Machine. ● Delivery of a CO2 stream meeting the certain agreed-upon specifications to Cella, namely >95% purity compressed to liquid state. ● Payment to Cella of a fixed fee per tCO2 sequestered by Cella (the "**Storage Fee**"). ● Decommissioning of the DAC Machine at the end of the Term. **Cella shall be responsible for:** ● Design, procurement, installation, operation and maintenance of a CO2 storage facility using Cella's mineralization technology (the "**Storage Facility**"). ● Permitting of the Storage Facility. ● Operation and maintenance of the Storage Facility. ● Monitoring, reporting and verification of the CO2 removed by the Demonstration Project. ● Decommissioning of the Storage Facility at the end of the Term. **Each Party will provide sufficient scientific, engineering, and commercial support to each other, and to any development partner that the Parties may mutually agree to develop the project with, to ensure that the Demonstration Project is successfully delivered, installed, and operating.** **The Parties will provide the forgoing services for a period of at least [10] years from the commercial operation of the Demonstration Project (the "Term").**
5. Carbon Credits	Octavia will be entitled to all carbon credits generated by the Demonstration Project through its operational period. Octavia shall have the right to monetize, transfer or retire such offsets in its discretion. Under the certain pre-sale agreement with Klarna and the WRLD Foundation, Octavia has pre-sold 352 tons of CO2 to be sequestered by the Demonstration Project at a price of $850/tCO2, $40/tCO2 of which such amount shall be paid to Cella on payment by the relevant clients.
6. Renewable Energy	The Demonstration Project will include an energy generation facility (the "**Facility**")", estimated to be 140MW nameplate capacity of geothermal energy production, which will provide the energy requirements of the DAC

Generation Facility	machine and storage facility. Responsibility for the cost, development, operation and maintenance of the Facility will be the owner of the Facility. Energy purchases from the Facility will be determined prior to execution of the Definitive Agreements.
7. Environmental Impact; Community Impacts	The Parties agree to work together to include standard provisions in the Definitive Agreements related to management of and liability for environmental impacts and hazardous materials. The Parties also agree to discuss terms related to local community impacts associated with the Demonstration Project.
8. Third Party Agreements	The Parties agree to work together in good faith to identify all third parties that will be engaged in the development and operation of the Demonstration Project and to work together on a mutually agreeable basis to evaluate opportunities to work with third parties and allocation of responsibilities to such third parties.
9. Intellectual Property	The Parties agree that no intellectual property ("IP") belonging to either Party shall be shared with or licensed to the other Party, except to the extent reasonably necessary to ensure technical compatibility between the DAC Machine and the Storage Facility. Each Party shall maintain exclusive ownership of the IP relating to its core technology.
10. Financing	The Parties will discuss in good faith the preferred method of financing construction of the Demonstration Project. Parties to discuss customary financing provisions and rights of financing parties to be included in the Definitive Agreements.
PART B – BINDING PROVISIONS	
11. Definitive Agreements:	**The Parties shall negotiate in good faith to enter into the Definitive Agreements.**
12. Confidentiality:	**Any information disclosed by either Party to the other Party, directly or indirectly, in writing, orally, or by inspection of tangible objects in connection with the negotiation or performance of the Definitive Agreements or this Term Sheet will be considered the disclosing Party's Confidential Information, and the provisions set forth in that certain [Mutual Non-Disclosure Agreement by and between Octavia and Cella, dated as of [April 13, 2023] will control the Parties' rights and responsibilities with respect to such Confidential Information.**
13. No Exclusivity	**This Agreement does not obligate either party to conduct business exclusively with the other party.**
14. Publicity:	**No Party shall use the name of the other including, without limitation, in any written format, without the prior written consent of the other Party. For the avoidance of doubt, a Party may advise its tax, legal or other professional advisors and existing or prospective investors or buyers of the participation of the Parties in the Demonstration Project, and may make any other disclosure of the such fact as required by law**

	or legal process, provided that the Company provides the other Party reasonable advance notice of such disclosure.
15. Fees and Expenses:	**Each Party will bear its own costs and expenses in connection with the development and negotiation of this Term Sheet and the drafting and negotiation of the Definitive Agreements and any other definitive documents necessary to effectuate the transaction contemplated by this Term Sheet.**
16. Miscellaneous:	**This Term Sheet may be executed in counterparts which, taken together, shall constitute an original. The Binding Sections of this Term Sheet shall be governed by the laws of the State of New York and any action pertaining thereto shall be brought exclusively in the state or federal courts in the County of New York.**

EXECUTED and agreed as of the date first set forth above:

Cella Mineral Storage Inc.

By: _____
Name: Corey Pattison
Title: CEO

Octavia Carbon Co.

By: Martin Freimüller
Name: Martin Freimuller
Title: CEO

Signature: Martin Freimüller (Aug 18, 2023 18:34 GMT+3)

Email: martin@octaviacarbon.com

Appendix VII: CREDENTIALS

CURRICULUM VITAE
NYAGA EDWIN MURITHI

PHONE NUMBER	:	0720436139
ADRESS	:	14802-00100, NAIROBI, KENYA
EMAIL	:	ediemurithi@gmail.com
DATE OF BIRTH	:	6TH MARCH 1984
NATIONALITY	:	KENYAN
ID NO.	:	23650140
RELIGION	:	CHRISTIAN
LANGUAGES (WRITTEN&SPOKEN)	:	ENGLISH & KISWAHILI

CAREER OBJECTIVES

To gain more professional environmental and safety experience and to enable the organization I work for continue achieving success within its sub-sector and to contribute positively to the working experience.

To have invaluable experience in Health and Safety and to develop proven ability and experience to prevent accidents/incidents, eliminating hazards and protecting the environment at workplaces.

To establish and maintain a generative environmental, Health & Safety Culture through the promotion, management and maintenance of the environment, Health & Safety Policy, System and Guidelines; compliance and adherence to all the applicable local laws ; providing expert advice on all related environment, health & safety issues.

ACADEMIC QUALIFICATIONS

University of Nairobi (2016-2022)
Masters of Art in Environmental Planning and Management

Jomo Kenyatta University of Agriculture &Technology (2019-2021)

Post Graduate Diploma in Occupational Health and Safety.

Maseno University (2004-2008)

Bachelor of Science in Environmental Studies second class Honours.

Nguviu Boys High School (1999-2002)
Kenya Certificate of Secondary Education Mean grade B.

Nyangwa Primary School (1989-1998)
Kenya certificate of primary education

Professional Qualifications

1. A registered Environmental Impact Assessment/Environmental Auditing Lead Expert with National Environmental Management Authority (**NEMA**). REG. No. 1**974.**
2. A certified occupational health and safety adviser by Directorate of occupational health and safety(**DOHS**)REG.NO. **OSH/ADV 190.**
3. A certified fire safety auditor by Directorate of occupational health and safety(**DOHS**)REG.NO. **OSH/FSA 210.**
4. A certified Air quality Monitor by Directorate of occupational health and safety(**DOHS**)REG.NO. **OSH/AQM 039.**
5. A training course in internal quality auditing Lead auditor **ISO 9001:2015.** By the Kenya Bureau of Statistics**. (KEBS).**
6. Training in **Team mate**- software for job risk identification and minimization.
7. Training in **Share point-** web platform for sharing information and meetings within an organization.
8. Training course on implementation of **ISO 17025:2005** standards by **Iceland Geo Survey.**
9. Training course on Trainer of Trainees of **ISO 9001:2015** by the Kenya Bureau of Standards.(**KEBS)**
10. A training course in disaster management and mitigation by the Kenya Red Cross **(KRC)**
11. A training course in fire and first aid by the Directorate of Occupational Safety and Health **(DOSH)**
12. A training course in conflict management, professional ethics and motivation by the Kenya School of Government (**KSG**)
13. Introduction to computer, windows 95/98/2000, MS-word, excel, MS-access, power point, MS-dos.

Working Experience

March 2014 - To date.
Geothermal Development Company.
Position: Quality Assurance, Safety& Environment Adviser.
Duties and responsibilities

- Establish standard operation procedures and systems for effective quality controls, cost control and compliance to quality policy.
- Develop and maintain a specifications database tracking all quality records and any other regulatory/technical record to support reliability and integrity efforts
- Undertake quality audits of in-service equipment/process to verify conformance with quality requirements
- Develop an inventory of all key monitoring and measuring devices and establish and implement a calibration mechanism for all identified measuring devices initiatives
- Promote quality awareness and continual improvement
- Review Material Safety Data Sheets (MSDSs) to identify potential hazards for existing and new chemicals. Develop a web platform to promote availability of MSDS to end users.
- Study processes to identify potential health hazards.
- Conduct air quality and noise monitoring of critical GDC workplaces. Develop an air quality and noise data collation system to enable timely and accurate data analysis.
- Execute Occupational Health and Safety Audits of GDC workplaces to report on the level of legal compliance.
- Conduct continuous monitoring of occupational exposures
- Implementing selected sampling methods using prescribed equipment.
- Setting up and operating sampling equipment – Automation of noise and air quality monitoring in Baringo-Silale Geothermal Project.
- Providing specifications for safety equipment being purchased

- Conducting programs and required training to educate employees on important procedures such as: Visible felt leadership, Respiratory protection programmed program, LOTO/TO, Confined Space, Permit for work, Hearing conservation program, Hazard communication program, Training on proper disposal of hazardous waste, Ergonomic training, Personal hygiene and good housekeeping
- Develops and conducts Safety training/awareness programs.
- Monitors proposed legislation and regulations and provides advice on implications for operations and company objectives
- Co-ordinates safety data capture and reporting, including incident notification.
- Provides occupational safety guidance to employees to ensure effectiveness of HSE Management System
- Conducts facility HSE inspections and reviews.
- Provides working knowledge and experience of observations, investigations, Quality Reviews (QRs), and Verification & Validations (V&Vs).
- Provides guidance on Occupational Health Programs.
- Provides accident/incident reporting and investigation support to prevent recurrence – Computerization of the ARS to enable remote reporting of accidents/incidents and efficiency in report review lifecycle
- Provides safety and environment guidance to all GDC operations concerning compliance with Occupational Safety legislation, environmental management and coordination act, codes, regulations, standards and Company Policies.
- Provides air quality and noise data of facilities to ensure compliance with operating permits.
- Prepares safety and environmental reports and documents (i.e. OHS Audit reports, and Incident/Accident reports,environmental audit).
- Participates on corporate safety compliance review teams – safety committee.

- Provides working knowledge of Safety considerations on procurement and installation of safety equipment and systems changes.

January 2013-February 2014
Naturecom Group Ltd
Position**: Environmental Expert/Safety adviser.**
Duties and responsibilities
Assigned to their client site **COMMARCO CONSTRUCTION COMPANY** as a consultant HSE officer where I oversaw a number of projects including KPA jetty construction works and contractor OHS management.

- Develop, plan and conduct training and safety inductions for company employees and contractor staff on EHS programs and procedures.
- Assist with HSE inspection and audits and follow up for closure of action points.
- Provide support in conducting emergency drills and responses.
- Ensure both employees and contractors are in compliance with regulatory and company acts, policies, HSE standards and procedures
- Preparation of EHS reports, risk assessment and work permits.
- Attend to queries from regulatory authorities on EHS related matters
- Visible EHS supervision on projects on site.
- Accident and incidence reporting
- Coming up with an Occupational Health and safety plan for all ongoing projects and risk management.
- Managing tool box meetings and PPE inspections
- First Aid box inspection
- Machinery and equipment inspection for compliance with safety standards
- Conduct training of environmental management issues and other environmental topics as required
- Conducting sensitization activities and environmental feasibility studies.
- Undertaking Environmental and Social impact assessment studies and audits

- Drawing up Environmental Management systems
- Monitoring and Evaluation of Projects
- Advising on occupational Health and safety to various companies.
- Perform any of the duties under operational and technical portfolio of the company

Sep 2009 to Dec 2012
National Environmental Management Authority (NEMA)
Compliance and Enforcement department
Duties & responsibilities

- Receiving and resolving complains from the public concerning matters relating to environmental pollution, degradation, solid waste and general environmental matters.
- Participating in setting up of various environmental regulations and guidelines such as E-waste and waste tyre management guidelines.
- Licensing of all forms of waste handling facilities such as waste transportation, recycling, dumping sites, composting, transferring stations, export & import permits and incineration.
- Updating the environmental waste management register& database.
- Carrying out of environmental inspections and monitoring in environmental degrading firms and giving the necessary improvement orders.
- Participating in the review and updating of the State of Environment (SOE) Reports.
- Reviewing of Environmental Impact Assessment (EIA) and Environmental Audit (EA) reports.
- Participating in environmental public awareness activities e.g. World Environmental Day and World Desertification Day and other NEMA supported environmental cleanup programs.
- Attending Environmental meetings, seminars and conferences.
- Updating Green track on an environmental system database.

MAY 2008 TO AUGUST 2009.
Interreligious Council of Kenya (IRCK)
Program Assistant.
Duties & responsibilities

- Developing an understanding and appreciation of faith communities in Kenya, their key doctrines, their structures and organs, key leaders and inter-faith collaboration
- Organizing and mobilizing meetings/ workshops, taking minutes while maintaining a calendar of events.
- Preparing travel arrangements for the project personnel.
- Producing accurate and timely input of project information in the computerized systems and issue status report for monitoring and evaluation purposes.
- Preparing program/project status report required for management board, donors, budget review, program analysis and annual reports.
- Monitoring and evaluation of projects/program activities by reviewing project inputs, control plans, progress reports, financial/ budgetary expenditure and commitments ensuring and identifying inconsistencies and consequently reporting to project officer for action.
- Undertaking regular field visits to monitor programs as well as conduct periodic reviews with beneficiaries/ other community based groups for the purpose of identifying evidenced based training needs and objectives for program sustainability as well as promotion and advocacy for workshops

Feb to April 2008.
Nairobi City Water &Sewerage Company (NCWSC)
Attachment-Environment Department
Duties & responsibilities

- Carrying out of environmental impact assessment for the company's water reservoirs.
- Carrying out environmental auditing and monitoring for the kariobangi waste water treatment plant.
- Carrying out industrial pollution monitoring and control for the Nairobi

sewerage system.

- Waterqualitytesting(COD,BOD,PV,Nitrates,Nitrates,Chlorides,Temperature, PH,TS.DS,SS.)
- Monitoring of the Waste water treatment (screening, grit removal, sedimentation, and filtration & sludge treatment).

APRIL 2006
Involved in agro-forestry research study in Embu district by Mt Kenya Environmental Program (**MKEP**)

SEP 2005
Involved in malaria research study at Maseno University by Walter Reed Project (**WRP**) and Kenya Medical Research Institute (**KEMRI**).

EIA/EA/Environment &Safety Projects Supervised so far.

- Geothermal Development Company-Baringo-Silali Drilling Site-HSE Adviser.
- Kenya Port Authority- Dockyard Jetty Rehabilitation-HSE Adviser
- Danka Africa Ltd– Petroleum product Recycling & Petrol Station
- Abyssinia iron & steel Ltd-Light gauge iron and steel fabrication-HSE Consultant
- Prime Steel Mills- Light gauge iron and steel fabrication
- Kenya Port Authority-Removal of old asbestos roof covering at KPA, Mombasa-EIA.
- Kenya Port Authority- Rehabilitation of dockyard slipway No1
- JIANGXI Water and Hydropower Construction Co Ltd-North Mathioya Small Hydroelectric Power Project-HSE Consultant.
- Block Apartments and Go-downs.
- Kenya Institute for the blind hostel construction-HSE Consultant.

Professional membership

2 Member of Environmental Institute of Kenya(**EIK**) Reg. No. **EIK/1/1604**

3 Member of Workplace Safety Professional Association(**WSPAK**)Reg.No **0252**

4 Member of National Quality Institute (NQI) with **KEBS.**

5 Member of Geothermal Association of Kenya (**GAK**)

6 Member of Kenya Red Cross society(**KRC**)

Hobbies and interest

1 Traveling and socializing

2 Watching and listening to environmental and safety documentaries

3 Doing physical body exercises

Referees

1) Mr.Francis Opiyo
Senior HSE officer
Geothermal Development Company,
P.O Box 100746-0010,
NAIROBI.
Tel No: 0722941284

2) Mr. John Kareko,
Director,
Naturecom Group Ltd,
P.O. BOX 14802-00100,
Nairobi.
Tel No: 0726834039.

3) Mr Zephania Ouma,
Director, Compliance &Enforcement,
National Environmental Management Authority,
P.o Box 67839-00200,
NAIROBI.
Tel No: 0721592567.

EAE 23061118

FORM 7 (r.15(2))

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/21528

Application Reference No: NEMA/EIA/EL/28652

M/S **Edwin Murithi Nyaga**
(individual or firm) of address
P.O. Box 14802 - 00100 Nairobi

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**

General

registration number **1974**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **4/23/2024** Expiry Date: **12/31/2024**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001 : 2015 Certified

Position Title	Senior Geophysicist
Name of expert	Raymond Mwakirani
Date of birth	30.03.1985
Country of citizenship/Residence	Kenya

Education:

MSc in Geothermal Energy Technology, Dedan Kimathi Institute of Technology, Nairobi- Kenya, 2020- to date.

Diploma in Exploration Geophysics United Nations University, Iceland, 2011.

BSc in Geology 2004-2008. University Of Nairobi, Nairobi-Kenya

Employment record relevant to the assignment:

Period	**Employing organization and your title/position. Contact info for references**	**Country**	**Summary of activities performed relevant to the assignment**
February 2010 to present	Geothermal Development Company – Senior Geophysicist	Kenya	Geothermal exploration and resource assessment.
2008- 2009	Kenya Marine and Fisheries Research Institute	Kenya	Researching on Marine geologic processes

Membership in Professional Associations:

Geological Society of Kenya (GSK)

Geothermal Association of Kenya (GAK)

International Geothermal Association (IGA)

Rotary Club of Nakuru (Member)

Publications:

"Resistivity Imaging Of Geothermal Resources Using 1D and 3D MT Inversion A Case Study Of Menengai Geothermal Field In Kenya." – WGC 2020, Iceland

"Integrated geophysical model for Suswa geothermal prospect using resistivity, seismics and gravity survey data in Kenya." – WGC 2015, Australia

´´Correlation of resistivity and gravity survey data from Suswa geothermal prospect in Kenya.´´ **GRC Conference-** in Las Vegas-Nevada- 2013

´´Application of TEM in static shift correction of MT data, Case study Paka Geothermal Prospect in Kenya.´´ **GRC Conference-** in Reno-Nevada- 2012

´´**Exploration for geothermal resources using magnetotellurics, Case study Menengai Geothermal Prospect in Kenya**.´´ at **ARgeo Conference-3** in Djibouti- 2010

"Resistivity structure of Paka volcano in Kenya." *United Nations University, Reykjavik Iceland,*

"Magnetotellurics data processing." *United Nations University short course training in Naivasha-Kenya 2012*

Language Skills: English, Swahili, Taita

Main Projects

Project	Country	Services	Position and Main Duties	Period
Geophysical Infill Survey at Paka	Kenya	Geophysical survey using Audio Magnetotelluric (AMT) and Transient Electromagnetic (TEM) and data interpretation.	*Lead Geophysicist:* Surface geophysical exploration of Gisenyi geothermal Prospect – Survey design, Data collection, analysis, processing and interpretation	2024
Hydrogeological survey at Suswa	Kenya	Geophysical survey using Audio Magnetotelluric (AMT) and Transient Electromagnetic (TEM) and data interpretation.	*Lead Geophysicist:* Groundwater survey in preparation for Geothermal exploratory drilling.	2024
Geophysical Survey at Magadi	Kenya	Geophysical survey using Magnetotelluric (MT) and Transient Electromagnetic (TEM) and data interpretation.	*Lead Geophysicist*: Interpreting geophysical data for Hydrocarbon occurrence.	2023
Shallow resistivity survey in Elementaita	Kenya	Geophysical survey using Audio Magnetotelluric (AMT) and Transient Electromagnetic (TEM) and data interpretation.	*Lead Geophysicist*: Interpreting geophysical data for Carbon Sequestration project.	2023
Methane Gas Prospecting in Solai	Kenya	TEM geophysical data interpretation.	*Lead Geophysicist:* Interpreting geophysical data for Methane Gas occurrence.	2021/2022
Geothermal prospecting in Elementaita	Kenya	Geophysical survey using Magneto Telluric (MT) and Transient Electromagnetic (TEM) and data interpretation.	*Lead Geophysicist:* Surface geophysical exploration of Elementaita geothermal Prospect – Survey design, Data collection, analysis, processing and interpretation	2019/2020
Geophysical Infill surveys (Menengai, Paka, Korosi and	Kenya	Geophysical survey using Magneto Telluric (MT) and Transient Electromagnetic (TEM) and data	*Lead Geophysicist:* Surface geophysical exploration of Gisenyi geothermal	2018-2021

Silali)		interpretation.	Prospect – Survey design, Data collection, analysis, processing and interpretation	
Hydrogeological survey in Kabarbesi	Kenya	Geophysical survey for groundwater analysis	*Lead Geophysicist:* Survey design and groundwater targeting.	2017
Geothermal prospecting in Gisenyi	Rwanda	Geophysical survey using Magneto Telluric (MT) and Transient Electromagnetic (TEM) and data interpretation.	*Lead Geophysicist:* Surface geophysical exploration of Gisenyi geothermal Prospect – Survey design, Data collection, analysis, processing and interpretation	2016
Geothermal prospecting in Buranga	Uganda	Geophysical survey using Magneto Telluric (MT) and Transient Electromagnetic (TEM) and data interpretation.	*Lead Geophysicist:* Surface geophysical exploration of Buranga geothermal Prospect – Survey design, Data collection, analysis, processing and interpretation	2015
Geophysical training	Kenya	Geophysical data interpretation (Joint interpretation of MT and TEM)	*Geophysics Training consultant:* Training Geophysics interns from Uganda and Tanzania on data collection, analysis, processing and interpretation	2014
Ground Electrode survey for high voltage converter stations in Kenya and Ethiopia	Kenya Ethiopia	MT and TEM geophysical data interpretation	*Project coordinator:* Interpreting geophysical data for ground electrode survey	2014
CO_2 Gas Prospecting in Tanzania	Tanzania	TEM geophysical data interpretation.	*Lead Geophysicist:* Interpreting geophysical data for CO_2 Gas prospecting	2013
Suswa Geothermal Project	Kenya	Geophysical survey using Magneto Telluric (MT) and Transient Electromagnetic (TEM)	*Lead Geophysicist*: Surface geoscientific exploration of Silali geothermal Prospect - Data collection, analysis, processing and interpretation	2012
Silali Geothermal Project	Kenya	Geophysical survey using Magneto Telluric (MT) and Transient Electromagnetic (TEM)	*Assisting Geophysicist*: Surface geoscientific exploration of Silali geothermal Prospect - Data collection, analysis, processing and interpretation	2010-2011
Lake Baringo -Korosi and Paka prospects	Kenya	Geophysical survey using Magneto Telluric (MT) and Transient	*Assisting Geophysicist*: Comprehensive geophysical	2011

		Electromagnetic (TEM)	infill work for the Baringo-Korosi-Paka block - Data collection, analysis, processing and interpretation	
Mwananyamala Geothermal Project	Kenya	Geophysical survey using Magneto Telluric (MT) and Transient Electromagnetic (TEM)	*Assisting Geophysicist:* Feasibility Studies of Mwananyamala geothermal Prospect- Data collection, analysis, processing and interpretation	2010
Menengai Geothermal Project.	Kenya	Geophysical survey using Magneto Telluric (MT) and Transient Electromagnetic (TEM)	*Assisting Geophysicist: C*oordination of infill surface geophysical studies in Menengai geothermal prospect- Data collection, analysis, processing and interpretation	2010-2011

Contact information: (email: rmwakirani@gmail.com, phone: +254 720613747)

Referees

Martin Mwaisakenyi Heya
Commissioner of Petroleum Energy
P.O Box 30582
Nairobi Kenya
Cell: 0716-363907
E-Mail: heyamartin@yahoo.com

Dr Isaac Kanda,
Principal Scientist,
Geothermal Development Company,
P.O BOX 101746- 00100,
NAIROBI- KENYA.
Cell: 0720-010620
E-Mail: ikanda@gdc.co.ke

Certification:

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

Name of Expert	**Signature**	**Date**
Raymond Mwalugha Mwakirani		11 June 2024

Name: Sharon Kaptuya Chebet

Position: Community Relations Specialist		
Personnel information	**Contacts :** +254722341681	**Date of birth:** 6th July 1980
	Address: P.O. Box 100746-00101, Nairobi.	**E-mail**: schebet@gdc.co.ke
	Professional qualifications: ▪ Associate Member Kenya institute of Management ▪ Member of Geothermal Association of Kenya ▪ Trained on Environmental Impact Assessment	
	Academic qualifications: ▪ Master of strategic management Nairobi University, Kenya - 2015 ▪ Bachelor of Arts in Community Development (Major), Business Administration(Minor) Daystar University, Kenya - 2005	
	Language proficiency: *[language and levels of speaking, reading and writing skills]* ▪ English, Swahili proficient	
details	**Address of employer:** P.O. Box 100746-00101, Nairobi.	
	Telephone: +254 719 037000	
	Job title: Community Relations specialist/Officer, GDC	**Years with present employer: 14**

Summarize of professional experience in reverse chronological order.

Organization	**Role**	**Duration of involvement**	**Relevant experience**
1. WWF- world wide fund for nature(L. Bogoria project)	Natural resource& community Relations officer	Aug 2005 – Dec 2007	▪ Stakeholders management and reporting ▪ Community engagement ▪ Project risk management ▪ Project costing/budgeting ▪ Meeting Donor Funding requirement ▪ Concept and funding proposals development, ▪ Community Development project's implementation ▪ Iso coordination and Audits ▪ Conservation of natural resources
2. Safaricom Company	Customer care	Feb 2008 – Feb 2009	
	Foundation Officer	Mar 2009 – Feb 2010	
3. Geothermal Development Company, Kenya	Community Relations Specialist	Mar 2010 - present	

Declaration

I, the undersigned Shammah Kiptanui, certify that to the best of my knowledge and belief, the information contained herein correctly describes my qualifications, my experience and myself.

Signature:

Appendix VIII: Notice of Public Consultation Baraza

Invitation to Public Participation

Date: 1/10/2024

Section 58(1) of EMCA highlights public participation as part of the Environmental Impact Assessment (EIA) process. It mandates that proponents of projects requiring an EIA must submit an EIA study report, including evidence of public participation during the assessment process. Additionally, **Section 3(5)** of EMCA underscores the principle of public participation in environmental management and decision-making, indicating that every person has a duty to cooperate with relevant institutions to ensure the proper management of the environment.

Pursuant to the above regulations, Octavia Carbon and the ESIA team wish to invite all Gilgil Sub-county community members i.e. youth, women, chiefs, persons living with disability and other stakeholders to attend public fora that will be held on dates and venues indicated below:

1) 16th October 2024 at Kikopey Location
   Venue: Kikopey Chief's Office grounds
   Time: 10:00 am - 2:00 pm
2) 18th October 2024 at Gilgil Location
   Venue: Gema Community College Hall
   Time: 10:00 am - 2:00 pm

The members of the public are invited to give their views in person during the barazas or submissions through their respective Nyumba Kumi elders or the chiefs.

Appendix IX: Company Registration Certificate

THE REPUBLIC OF KENYA

BUSINESS REGISTRATION SERVICE
P. O. BOX 30031
NAIROBI
27 APR 2022

To
The Director(s)
OCTAVIA CARBON CO
P.O. Box 39699
00623 - PARKLANDS

THE COMPANIES ACT, 2015

Records relating to the below company held by the Companies Registry as at **27 Apr 2022**

COMPANY	OCTAVIA CARBON CO
COMPANY NUMBER	FC-AMTE5B
NOMINAL SHARE CAPITAL	0.00
NUMBER AND TYPE OF SHARES (VALUE PER SHARE)	
DATE OF REGISTRATION	27 APR 2022
REGISTERED OFFICE	P.O BOX 39699, PARKLANDS TELEPHONE: +254759674441, EMAIL: MARTIN@OCTAVIACARBON.COM COUNTY: NAIROBI, DISTRICT: WESTLANDS DISTRICT , LOCALITY: WESTLANDS STREET: MKUNGU CLOSE, BUILDING: SKYNEST RESIDENCES BY CITYBLUE
POSTAL ADDRESS	P.O BOX 39699 PARKLANDS
ENCUMBRANCES	

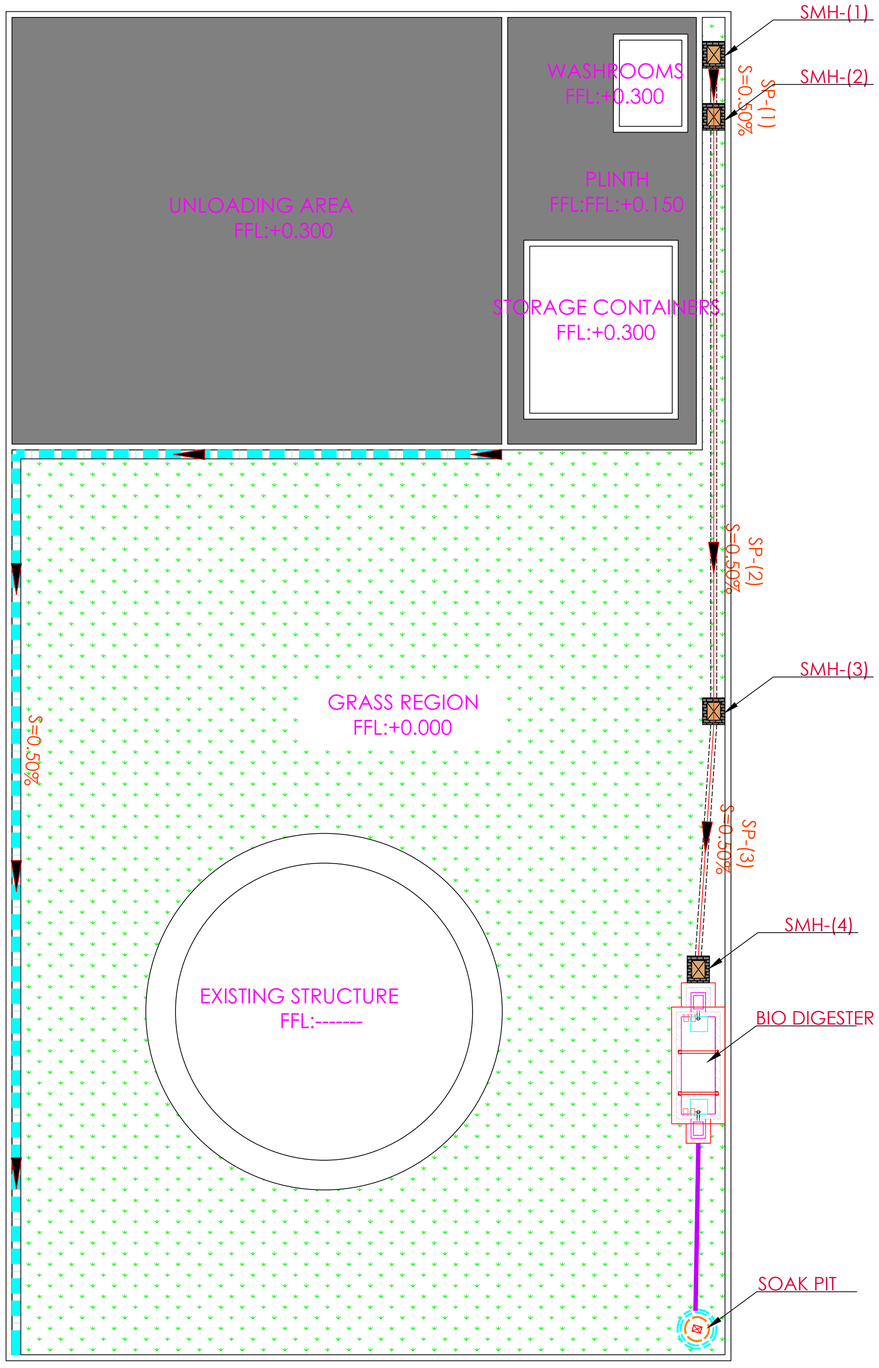
Name of Directors and Shareholders of the above company with their particular are as follows

NAME	DESCRIPTION	ADDRESS	NATIONALITY	SHARES
MARTIN GERHARD FREIMULLER	DIRECTOR	P.O BOX 39699-00623 NAIROBI	AUSTRIA	
FABIAN CHRISTOPHER TRZEBIATOWSKI	LOCAL REPRESENTATIVE	P.O BOX 39699 PARKLANDS	GERMANY	
			TOTAL	0

Yours Faithfully,
REGISTRAR OF COMPANIES

REF NO: FC-AMTE5B

DISCLAIMER: THIS IS A SYSTEM GENERATED CERTIFICATE AND DOES NOT REQUIRE A SIGNATURE



SITE–PLAN
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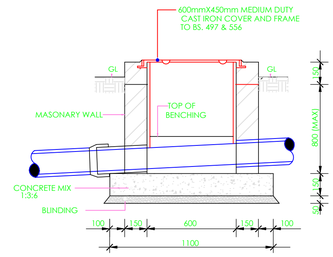
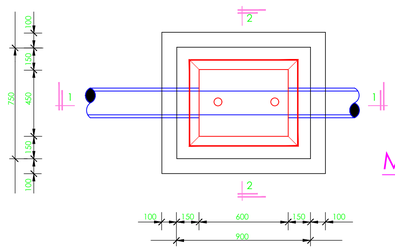


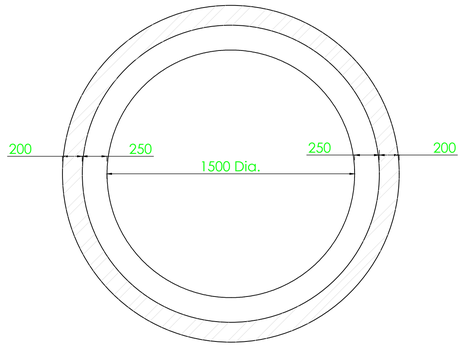
SECTION 1-1
SCALE 1:20

SECTION 2-2
SCALE 1:20

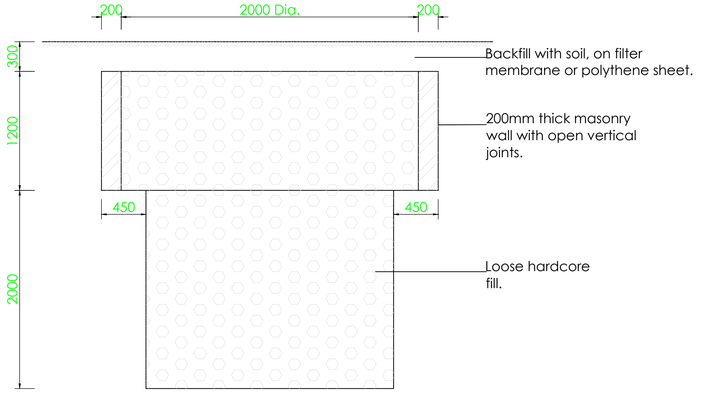


PLAN
SCALE 1:20

MANHOLE DETAILS=4 No
SCALE 1:20

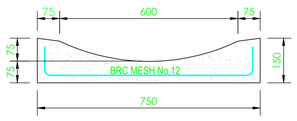


Soak Pit Plan
1:25

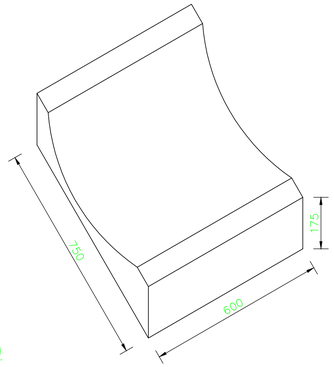


Section Thr' Soak Pit
1:25

Note: Detail for areas with sandy or red soils, for caly or black-cotton soils appropriate solutions to be determined on site.



SHALLOW INVERT BLOCK DRAIN (TYPE C)
SCALE 1:10



ISOMETRIC VIEW
SCALE 1:10

PLAN LEGEND

- GRADED AREAS
- CONCRETE PLINTHS
- LANDSCAPING
- SEWER RECTANGULAR MASONRY MANHOLE(SMH)
- BIO DIGESTER
- CATCH PIT
- SHALLOW IBD DRAIN
- SEWER PIPE(SP) (ø200mm HDPE)

NOTES:

1. THE COORDINATE PROJECTION IS THE UTM WGS 84 37S COORDINATE SYSTEM
2. THE LEVELS ARE NOT TIED TO THE NATIONAL GRID
3. THIS DRAWINGS TO BE STRICTLY FOLLOWED IN CONJUCTION WITH THE RELEVANT ARC. DRAWINGS AND DETAILS
4. ALL DIMENSIONS IN m AND mm UNLESS OTHERWISE SHOWN

A	Issued For Internal Review	K.K	T.K	TK	18.07.24
		By			

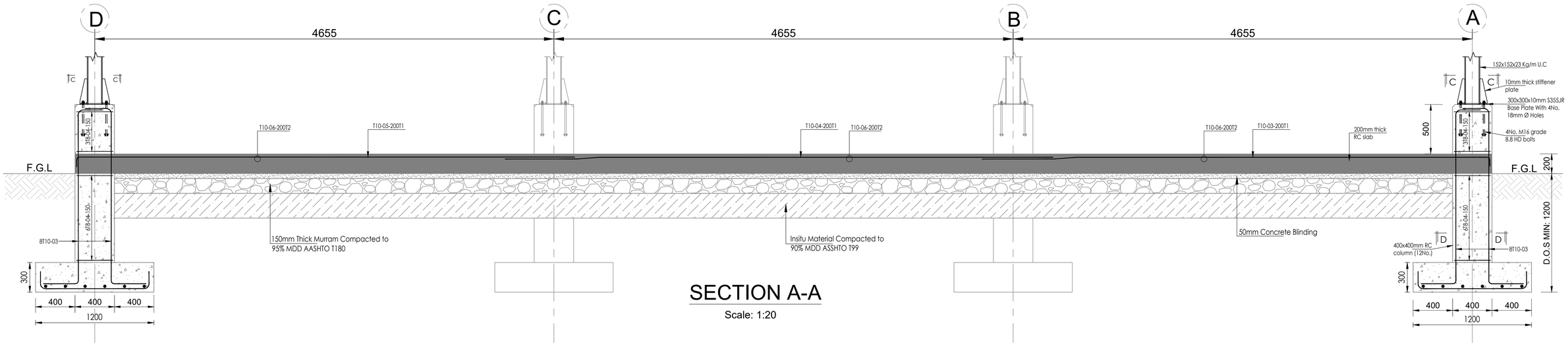
Client:
OCTAVIA CARBON

Consultant:
SYNERGETIC CONSULTING GROUP
P.O. BOX 14236-00100
NAIROBI, KENYA.

Project Title:
PROPOSED CO_2 PLANT NAIVASHA

Drawing Title:
STORM & SEWER LAYOUT

Scale @ A1:	Sheet Size:	Sheet No:	Date:
AS SHOWN	A1	1 of 4	18.07.24
Designed By:	**Drawn By:**	**Checked By:**	**Approved By:**
K.K.K	K.K.K	T.K	T.K
Project No:	**Drawing No:**		**Revision:**
000.000.2024	000.000.2024-C-95001		A



SECTION A-A

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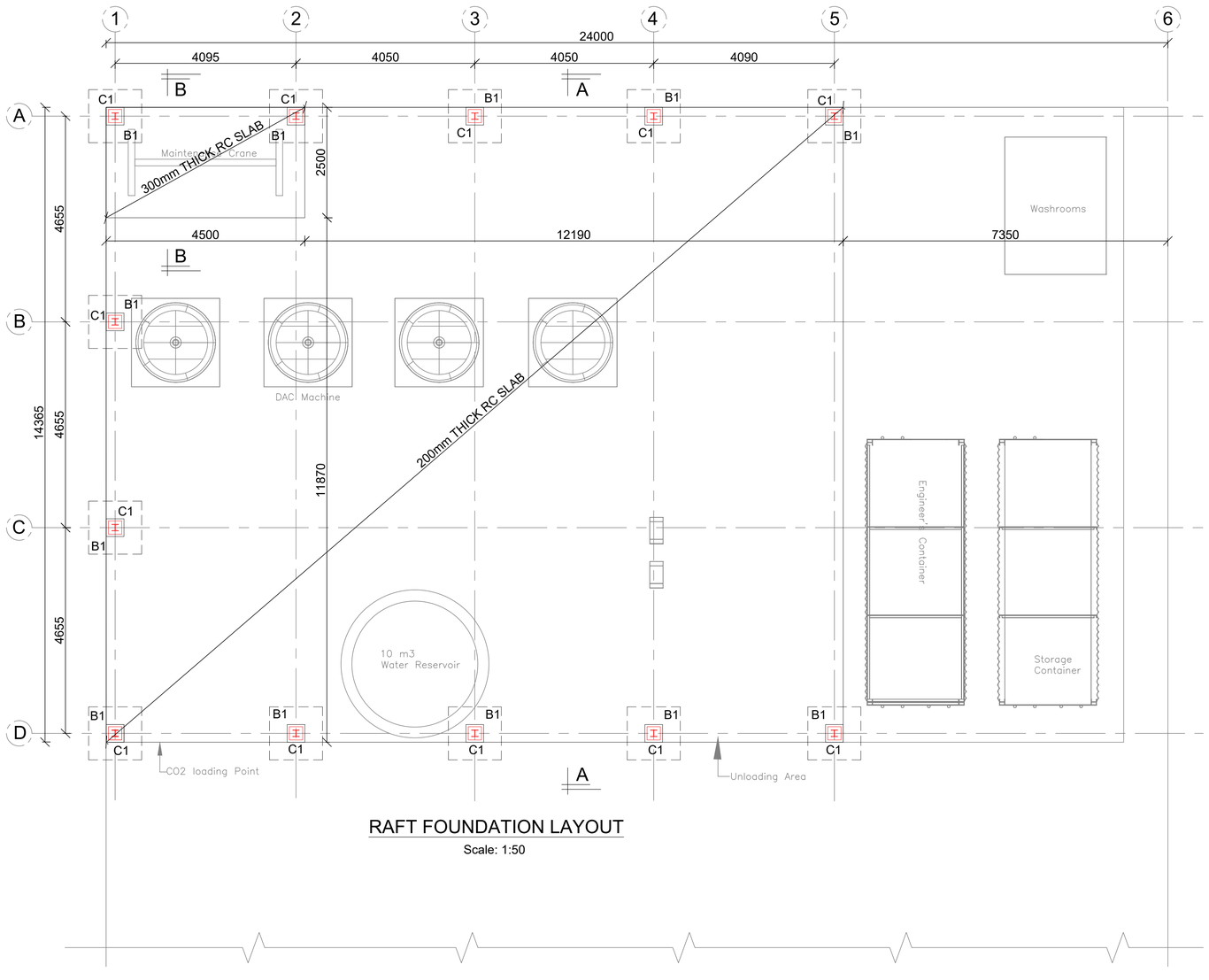

RAFT FOUNDATION LAYOUT

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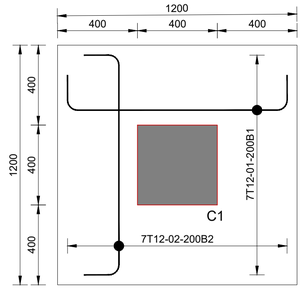
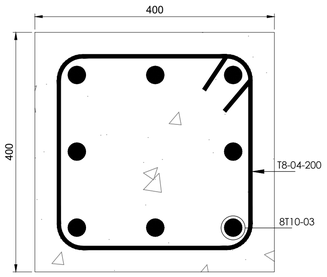


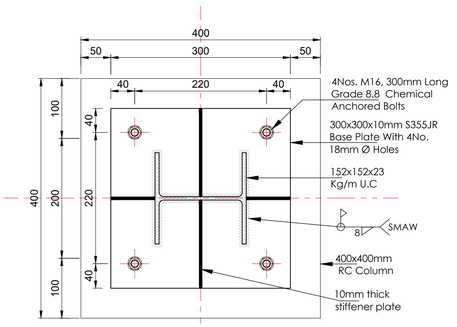
1200x1200x300mm BASE B1, 12No.

SCALE 1:15



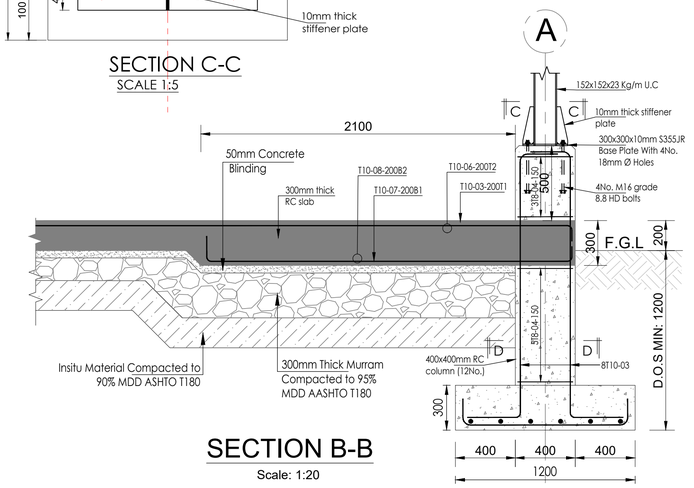
SECTION D-D

SCALE 1:5



SECTION C-C

SCALE 1:5



SECTION B-B

Scale: 1:20

1. All dimensions are in millimetres unless otherwise stated.
2. All drawings to be read in conjuction with Architectual drawings where necessary and any inconstancies to be reported to the Engineer.
3. All foundations shall be founded on approved ground.
4. The concrete used shall be of C25 in accordance with the specifications.
5. Blinding to be C15 Concrete.
6. All reinforced concrete works shall be quality controlled and mechanically vibrated to the structural Engineer's satisfaction.
7. Typical cover to main reinforcement shall be as follows:-
   Foundations - 50mm
   Columns - 40mm
   Slab - 20mm.
8. Steel Reinforcement for structural concrete shall be HT Ribbed bars and shall conform to the latest BS relevant Standards.
9. Contractor to verify all Structural Finished Levels.
10. Contractor to verify `Structural Finished Level' SFL and Finished Floor Level FFL before fabrication of Structural Steel.
11. Structural Steel sections shall be to BS 5950
12. All Structural Steel Members and Connections including Welding and Bolting (including Rawl Bolts) shall conform to the relevant and latest British Standards. Gusset plates shall be minimum 5mm thick.
13. Shop drawings must be submitted in good time for approval by the Engineer before assembly of units commence.
14. Setting out dimensions shall be cross checked on site and with the Mechanical drawings. Any inconsistencies shall immediately be notified to the Engineer.
15. D.O.S - Determined On Site
16. Expansion Joint to be provided every 20m or at a joint between the existing and a new boundary wall
17. Fabricator to prepare gate shop drawings and share with the engineer for Approval

A	Issued For Internal Review	K.K	T.K	TK	18.07.24
		By			

Client:
OCTAVIA CARBON

Consultant:
SYNERGETIC CONSULTING GROUP
P.O. BOX 14236-00100
NAIROBI, KENYA.

Project Title:
PROPOSED CO_2 PLANT NAIVASHA

Drawing Title:
RAFT FOUNDATION LAYOUT & RC DETAILS

Scale @ A1:	Sheet Size:	Sheet No:	Date:
AS SHOWN	A1	1 of 1	18.07.24
Designed By:	Drawn By:	Checked By:	Approved By:
D.B	H.B.O	T.K	T.K
Project No:	Drawing No:		Revision:
000.000.2024	000.000.2024-C-95001		A

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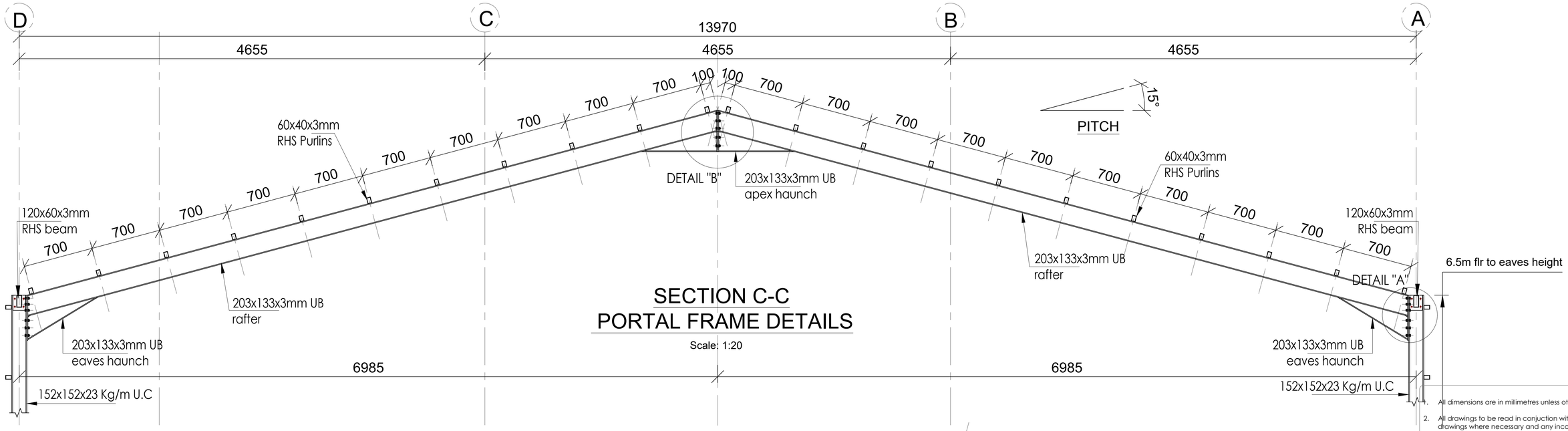

SECTION C-C
PORTAL FRAME DETAILS

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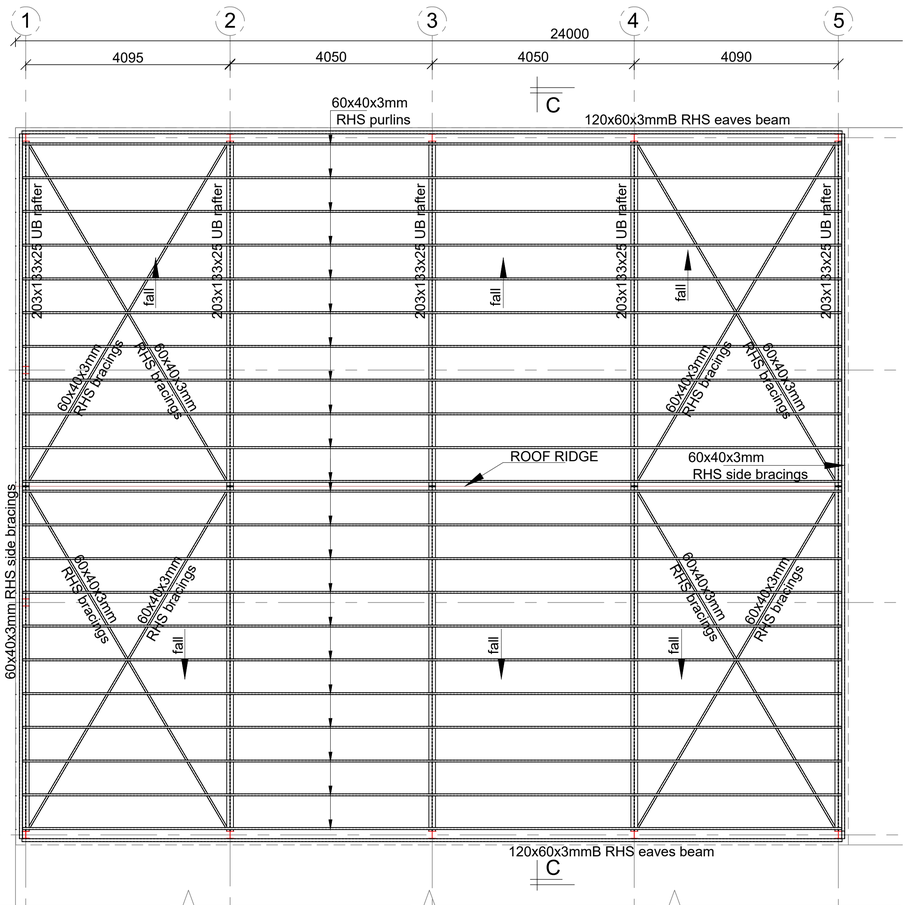

ROOF LAYOUT

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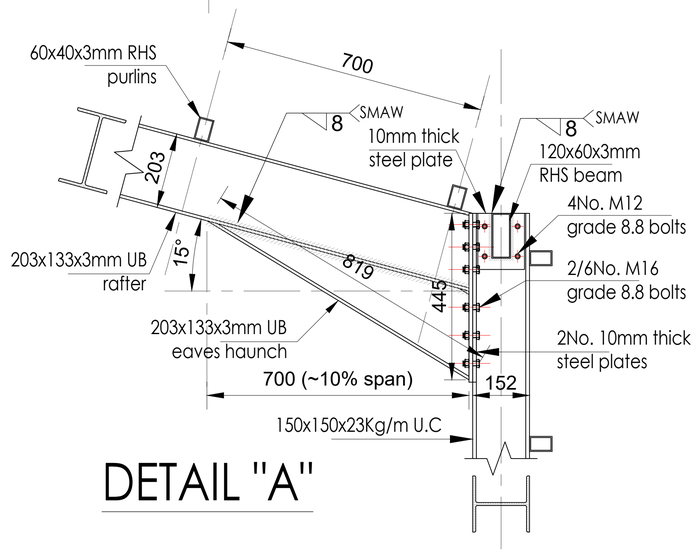

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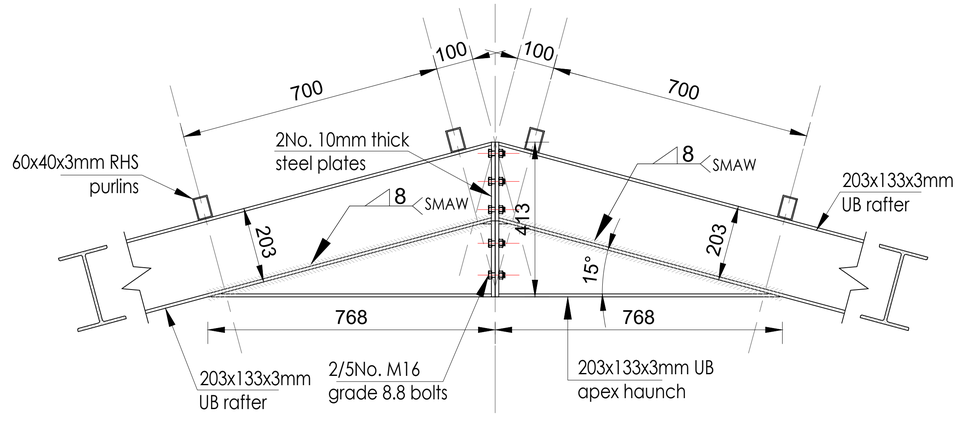

DETAIL "B"

1. All dimensions are in millimetres unless otherwise stated.
2. All drawings to be read in conjuction with Architectual drawings where necessary and any inconstancies to be reported to the Engineer.
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		By			

Client:
OCTAVIA CARBON

Consultant:
SYNERGETIC CONSULTING GROUP
P.O. BOX 14236-00100
NAIROBI, KENYA.

Project Title:
PROPOSED CO_2 PLANT NAIVASHA

Drawing Title:
SHED ROOF LAYOUT & SECTION DETAILS

Scale @ A1:	Sheet Size:	Sheet No:	Date:
AS SHOWN	A1	1 of 1	18.07.24
Designed By:	Drawn By:	Checked By:	Approved By:
D.B	H.B.O	T.K	T.K
Project No:	Drawing No:		Revision:
000.000.2024	000.000.2024-C-95002		A

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