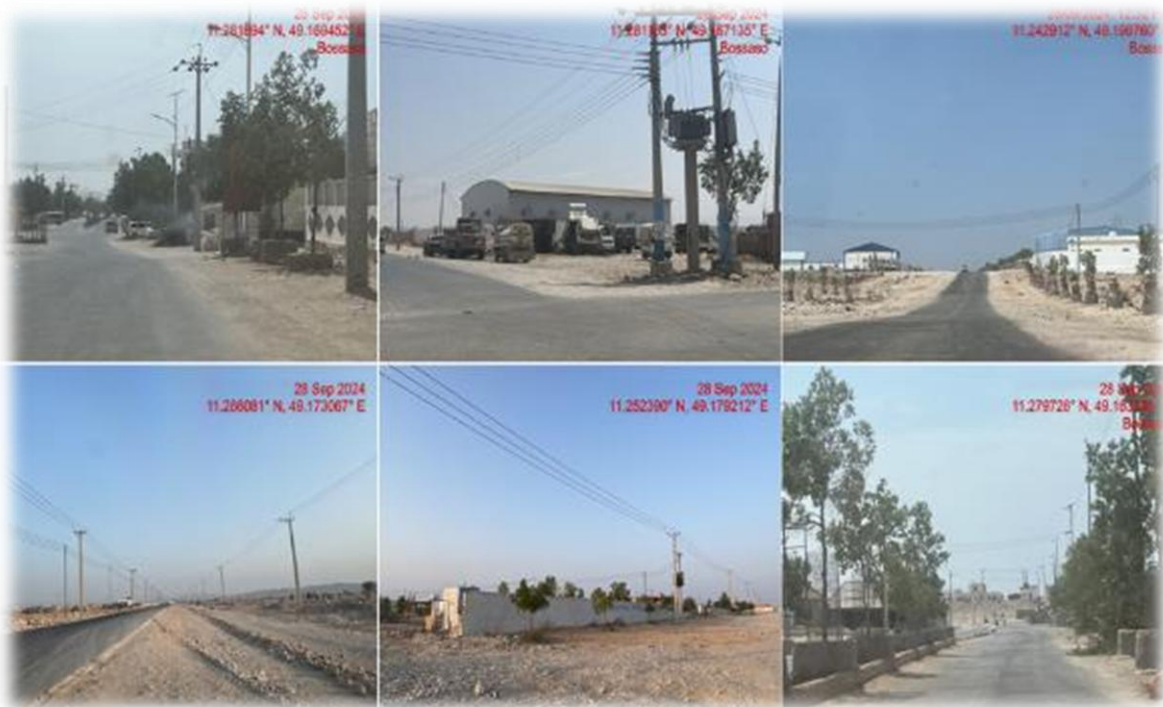




**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED  
REPAIR AND EXPANSION OF BOSASO POWER GRID, SOMALIA  
(DRAFT REPORT)**



**Prepared for** : Ministry of Energy and Water Resources, FGS

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## ACRONYMS AND ABBREVIATIONS

AC	:	Alternating Current
ACSR	:	Aluminium Conductor Steel Reinforced
ADESO	:	African Development Solutions
ADSS	:	All Dielectric Self- Supporting
AfDB	:	African Development Bank
BC	:	Bosaso College
BESS	:	Battery Energy Storage System
CBD	:	United Nations Convention on Biological Diversity
C-ESMP	:	Contractor’s Environmental and Social Management Plan
CLO	:	Community Liaison officer
CMS	:	Convention on the Conservation of Migratory Species of Wild Animals
CR	:	Critically Endangered
CSO	:	Civil Society Organization
DC	:	Direct Current
DD	:	Detail Design
E&S	:	Environmental and Social
EAU	:	East Africa University
EHS	:	Environment, Health and Safety
EN	:	Endangered
ENEE	:	Ente Nazionale Energia Elettrica
EPRP	:	Emergency Preparedness and Response P
ESA	:	Environmental and Social Assessment
ESAP	:	Environmental and Social Action Plan
ESIA	:	Environmental and Social Impact Assessment
ESMP	:	Environmental and Social Management Plan
ESP	:	Electricity Services Providers
FGM	:	Female Genital Mutilation
FGS	:	Federal Government of Somalia
FPIC	:	Free, Prior, and Informed Consent
FRS	:	Federal Republic of Somalia
GBV	:	Gender-based Violence
GHG	:	Greenhouse Gas
GIIP	:	Good International Industry Practice
GRC	:	Grievance Redress Committee
GRM	:	Grievance Redress Mechanism
GRP	:	Grievance Response Procedure
HD	:	Horizon Development
HIV/AIDS	:	Human Immuno Deficiency Syndrome
HSDG	:	High-speed Diesel Generators
IBA	:	Important Bird Areas
IDP	:	Internally Displaced Persons
ILO	:	International Labour Organization
INDC	:	Intended Nationally Determined Contributions
IPVL	:	Intimate Partner Violence
IRC	:	International Rescue Committee
IRR	:	Internal Rate of Return
ISS	:	Integrated Safeguards System
ITCZ	:	Inter-tropical Convergence Zone
IUCN	:	International Union for the Conservation of Nature
kV	:	Kilovolt
kW	:	Kilowatt
LC	:	Least Concern

LRP	:	Livelihood Restoration Plan
MoECC	:	Ministry of Environment and Climate Change
MoEWR	:	Ministry of Energy and Water Resources
MWh	:	Megawatt Hour
NAPA	:	National Adaptation Program of Action on Climate Change
NDP-9	:	Somalia’s ninth National Development Plan
NE	:	Not Evaluated
NGO	:	Non-Governmental Organization
NPV	:	Net Present Value
NRC	:	Norwegian Refugee Council
NT	:	Near-threatened
OHS	:	Occupational Health and Safety
OPGW	:	Optical Ground Wire
OS	:	Operational Safeguard
PAP	:	Project Affected Persons
PECO	:	Puntland Electric Power Company
PMP	:	Power Master Plan
PNI	:	Puntland Nursing Institute
PV	:	Photovoltaic
PWDA	:	Puntland Water Development Authority
RAP	:	Resettlement Action Plan
RE	:	Resident Engineer
RMC	:	Regional Member Countries
RoW	:	Right of Way
SDG	:	Sustainable Development Goals
SEA/SH	:	SEA/SH
SEP	:	Stakeholders Engagement Plan
SEPCO	:	Somali Electric Power Company
SG-SMT	:	Sam Greathouse School of Modern Technology
SHDA	:	Somali Health and Development Association
SOYDEN	:	Somali Youth Development Network
SPMP	:	Somalia Power Master Plan
SRCS	:	Somali Red Crescent Society
TD	:	Tender Document
DL	:	Distribution line
UNCCD	:	UN Convention to Combat Desertification
UNFCCC	:	UN Framework Convention on Climate Change
USAID	:	United States Agency for International Development
VU	:	Vulnerable
WAAD	:	Women’s Action for Advocacy and Development

# EXECUTIVE SUMMARY

## INTRODUCTION

- (i) *Background:* The Federal Government of Somalia (FGS), represented by the Federal Ministry of Finance, requested grant financing from the African Development Bank Group (AfDB, or “the Bank”) towards the cost of undertaking the “feasibility and ESIA studies for the *expansion of Bosaso Power Grid and strengthening the energy institutions.*”. Bosaso, a port city in northeastern Somalia, is a major commercial hub and trading center. Its economy is primarily driven by its port and fishing industry. Puntland Electric Power Company (PEPCO) supplies electricity, but challenges include high system losses, high tariffs, and a growing number of customers.
- (ii) *Objective of the ESIA study:* The ESIA aimed to improve a project's environmental performance by identifying potential risks and impacts, adopting measures to mitigate them, and establishing a baseline for environmental and social components. It also assessed potential environmental impacts, identified mitigation measures, and prepared an initial Environmental and Social Management Plan and Environmental and Social Monitoring Plan.
- (iii) *Scope of the ESIA study:* The ESIA reviewed policies, legislation, and institutional frameworks, described the project, and its relationship with the biophysical and socioeconomic environment. It also provided baseline information on the biophysical and socioeconomic baselines conditions of Bosaso City and the surroundings. The potential environmental and social impacts associated with the project were evaluated to ensure they do not outweigh the expected benefits, and mitigation measures recommended enhancing sustainability. Alternatives are analyzed and evaluated using various indicators. Public consultation and stakeholder engagements were conducted to gather input and identify opportunities and challenges. Environmental management and monitoring plans were recommended and a budget for ESMP implementation indicated.
- (iv) *Approach and methodology*
  - The proposed Project's ESIA methodology adhered to the established infrastructure project patterns and national and AfDB's Integrated Safeguards System requirements, including policy statement, operational safeguard, and Environmental and Social Assessment Procedures.
  - The project's environmental impact was assessed through a comprehensive review of preliminary design information, relevant documents, and the African Development Bank's Integrated Safeguards System.
  - The ESIA Team conducted site investigations in September 2024, gathering information on physical, ecological, socio-economic, health, cultural, and other values in the project area using quantitative and qualitative methods.
  - The field investigation involved extensive consultations with stakeholders, including community members and local authorities, to gather their views, background information, and identify mitigation measures for the project-affected area.
  - Information on the existing natural and socio-economic resources is of fundamental importance for the evaluation of environmental impacts. Therefore, the baseline data on the physical, biological, and social, cultural, and socio-economic setting of the project were assembled, evaluated, and presented.

- Key potentially beneficial as well as adverse impacts on the physical, biological, and socio-economic environment associated with the construction and operation phases of the project were identified and quantified where possible.
- Feasible and cost-effective mitigation and benefit enhancement measures that may avoid or reduce potentially significant adverse environmental impacts to acceptable levels were identified and recommended.
- The final step was the preparation of the ESIA report. This report has concentrated on key issues and impacts, which are of importance in terms of affecting the overall environmental performance of the project. This report also answers the essential questions needed to establish whether the project as conceived is environmentally and socially viable or should be modified during the construction phase to become acceptable.

## **LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK**

- (i) *National Laws and regulatory framework:* The review of the Federal Republic of Somalia's legal and regulatory frameworks for Environmental and Social Impact Assessment (ESIA) on power expansion highlighted the country's commitment to sustainable development through environmental protection and social inclusion. While Somalia is still developing its national environmental governance structure, key federal regulations, such as the Provisional Constitution of Somalia (2012), emphasize the importance of safeguarding the environment and ensuring sustainable natural resource use. The National Environmental Policy (2020) further underscores the need for conducting ESIA's to assess potential environmental and social impacts of development projects like power expansion. These frameworks require project developers to implement mitigation strategies, encourage public consultation, and comply with international best practices for environmental management, ensuring responsible infrastructure development in Somalia.
- (ii) *Puntland State Laws and regulatory framework:* The review of Puntland State legal and regulatory frameworks for Environmental and Social Impact Assessment (ESIA) on power expansion in Bosaso, Somalia, focuses on compliance with relevant Puntland State environmental policies, acts, and regulations. Key among these are the Puntland State Environmental Policy (2014) and the Puntland State Environmental Management Act (2016), which outline procedures for environmental protection, resource management, and sustainable development. The frameworks emphasize the need for thorough impact assessments, public participation, and mitigation measures to address potential environmental, social, and cultural impacts. These regulations also align with international standards, ensuring the proposed power expansion project in Bosaso adheres to best practices for environmental sustainability and social inclusivity.
- (iii) *Legal framework for land ownership and expropriation:* a mix of statutory, customary, and Islamic law influences the legal framework for land ownership and expropriation in Somalia. The Federal Constitution, alongside Puntland's State laws, acknowledges private property rights and guarantees protection against unlawful deprivation. However, expropriation is permitted for public interest, subject to fair compensation, as outlined in Puntland's Land Law, which emphasizes community consultation and compensation principles. Customary law (Xeer) and Islamic principles play a significant role, especially in rural areas, where clan-based land tenure often dictates land allocation and ownership. Puntland's regional government is actively working to formalize land ownership structures, yet significant challenges persist due to limited legal infrastructure, enforcement capacity, and conflicts over land rights, particularly in urban expansion and infrastructure development areas.

- (iv) *Institutional framework for management of E&S in FRS and Puntland State:* The institutional framework for Environmental and Social (E&S) management in the Federal Republic of Somalia (FRS) and Puntland State involves multiple governmental bodies responsible for enforcing E&S policies, with regional nuances. At the federal level, the Ministry of Environment and Climate Change (MoECC) oversees E&S policy formulation, regulation, and compliance across Somalia, setting baseline standards and coordinating with international partners. In Puntland State, the Ministry of Environment, Agriculture, and Climate Change (MoEACC) is the primary institution governing environmental and social issues, implementing policies tailored to regional needs, such as climate resilience, land use, and biodiversity conservation. Additionally, local authorities collaborate with MoEACC on monitoring and compliance, particularly in urban areas. Customary law also influences E&S management, especially in rural and nomadic communities, where traditional practices and local leaders often supplement formal regulatory frameworks. However, enforcement remains a challenge due to resource limitations and varying levels of institutional capacity.
- (v) *Energy sector standards related to environmental, health and safety:* At the federal level, the Ministry of Energy and Water Resources (MoEWR) has initiated policies that outline EHS guidelines for energy projects, focusing on pollution control, safe working conditions, and minimizing impacts on local communities and ecosystems. Puntland State aligns with these federal standards while adapting them to local contexts, with the Ministry of Environment, Agriculture, and Climate Change (MoEACC) playing a key role in enforcing environmental impact assessments (EIAs) and implementing safety protocols for energy projects, particularly for renewable energy and off-grid solutions. While these frameworks aim to mitigate risks, limited regulatory capacity and enforcement resources challenge full compliance, especially in remote and underserved areas.
- (vi) *Regional and International / Multilateral Agreement:* The review of regional and international multilateral environmental agreements relevant to the Federal Republic of Somalia for Environmental and Social Impact Assessment (ESIA) on power expansion projects underscored Somalia's obligations to various global frameworks aimed at promoting sustainable development and environmental protection. Somalia is a signatory to key multilateral agreements such as the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), and the United Nations Convention to Combat Desertification (UNCCD). These agreements require Somalia to integrate environmental safeguards into development projects, including the protection of biodiversity, climate change mitigation, and the prevention of land degradation. Additionally, Somalia aligns with the African Union's Agenda 2063, which promotes sustainable development across the continent. By adhering to these agreements, Somalia ensures that power expansion projects are designed and implemented with consideration for environmental sustainability, regional cooperation, and international best practices for managing environmental impacts.
- (vii) *Environmental and Social Safeguard Policies and Procedures of African Development Bank:* The review of the African Development Bank's (AfDB) Environmental and Social Safeguard Policies and Procedures, relevant to the Federal Republic of Somalia for Environmental and Social Impact Assessment (ESIA) on power expansion projects, highlights the importance of integrating environmental and social considerations into project planning and implementation. AfDB's Integrated Safeguards System (ISS 2023) that outlines ten (10) operational standards, including environmental protection, climate change mitigation, and community well-being that projects must adhere to. These safeguards require comprehensive ESIA processes, ensuring that power expansion projects in Somalia minimize negative impacts on biodiversity, water resources, and local communities. Additionally,

AfDB emphasizes the need for stakeholder engagement, transparent decision-making, and the implementation of mitigation and compensation measures for affected populations. By adhering to AfDB's safeguard policies, Somalia can ensure that its power expansion projects align with sustainable development goals, international best practices, and social inclusivity.

## PROJECT DESCRIPTION

- (i) Electricity in Bosaso is primarily supplied by Puntland Electric Power Company (PEPCO), established in 2022 through a merger of Ente Nazionale Energia Elettrica (ENEE), GOLIS, SEPCO, RAHMO, and TOWHID Energy Service Providers. Currently, the electricity supply system in Bosaso is owned and operated by four Energy Service Providers (ESPs) i.e. PEPCO, Tawfiq, Alfardaws and Somtel. PEPCO owns and operates a 15kV system (initially ENEE) and 11kV system (initially Golis) as well as Rahmo and Towhid power stations all of which are physically isolated. Power from Towhid and Rahmo power stations is generated and supplied to the surrounding areas at low voltage. Tawfiq, Alfardaws and Somtel EPs generate for their own use but supply excess to their neighbourhoods at low voltage. The Bosaso electricity supply system faces several challenges including unreliable power supply, high system losses, high electricity tariffs (arising from predominant use of high speed diesel in electricity generation), and a large number of customers, including commercial and industrial consumers in the eastern part of the city, who are not connected to the grid due to inadequate power generation and distribution system capacity constraints. Apart from generation deficit and weak power distribution system, the electricity sector in Somalia suffers from inadequate legal framework, low personnel capacity and lack of tools and materials resources to the extent that the energy sector institutions cannot effectively discharge their mandate.
- (ii) Considering the present and future electricity demand for Bosaso and surrounding areas, the “Expansion and Strengthening of Power System Network for Bosaso” is undertaken in the context of with Somalia Power Master Plan (SPM) – 2018, which amongst others prioritizes investments in distribution networks’ upgrades and expansion. It is in this regard that the Federal Government of Somalia, through the Ministry of Energy and Water Resources engaged the Joint Venture of KATCHCON Company Limited and Horizon Developments Limited to conduct a feasibility study and environmental and social impact assessment (ESIA) studies for the repair/expansion of the Bosaso Power Grid. Additionally, the assignment will involve strengthening of energy institutions, and the preparation of preliminary designs for the associated construction works.
- (iii) The challenges of the existing power system network in the city of Bosaso as established from the review of existing conditions were classified into three broad categories as follows:
  - **Power Generation** - Inadequate power generation capacity, energy mix is dominated by diesel generation, high cost of energy, high carbon footprint.
  - **Power Distribution-** Isolated distribution systems, unreliable and low-quality supply, inefficient distribution system, and sub-optimal utilization of existing power system infrastructure.
  - **Institutional Capacity** - Inadequate legal framework, low personnel capacity and lack of material tools and resources.

(iv) To resolve the challenges of power generation, the following three options were considered in the feasibility study:

- **Option 1-** Scale-Up Renewable Energy Generation, Rehabilitate, Interconnect and Expand Existing Isolated Power Systems and Strengthen Capacity of Energy Sector Institutions.
- **Option 2-** Scale-Up Diesel Generation, Rehabilitate and Expand Existing Medium Voltage System and Strengthen Capacity of Energy Sector Institutions.
- **Option 3-** Import Generation from Neighboring countries, Rehabilitate and Expand Existing Medium Voltage System and Strengthen Capacity of Energy Sector Institutions.

Based on the results of feasibility study analysis, Option 1 was found to offer the most optimal solution to the challenges faced by the Bosaso Power System Network over the next period of ten years. This option proposes the establishment of a 7.15MWp/5.5MW solar PV plant and 3MW/11MWh Battery Energy Storage System(BESS) at PEPCO's Baalade power station to boost existing generation capacity as well as supply of 1000 standalone solar home systems to customers who are beyond economical reach of the grid. Energy Yield calculations carried out using PVSyst applications show that the power plant is expected to generate 14134MWh annually (based on P50 production probability).

(v) To address the challenges of the power distribution network, the following two options were considered in the feasibility study:

- **Option 1-** Interconnect and expand existing power system networks
- **Option 2-**Expand existing mini-grids in isolation

Option 1 was found to be more favorable than Option 2 and was thus recommended for addressing the challenges of power distribution in the city of Bosaso. This option involves downgrading of the 15kV system to 11kV, interconnecting all the ESP networks and expanding the power distribution network through establishment of a new 33kV power system network, 11kV extensions and installation of new distribution transformers. The proposed scope of works of rehabilitation and expansion of the power distribution network is as follows:

- Rehabilitation of Ex-ENEE Station 1 including replacement of 3x800kVA 0.4/15kV generator transformers with 3x1250kVA 0.4/11kV transformers as well as supply and installation of new 11kV switchboard complete with auxiliaries
- Rehabilitation of Ex-ENEE Station 2 including replacement of 1x2500kVA 0.4/15kV generator transformer with 1x2500kVA 0.4/11kV transformer as well as supply and installation of new 11kV switchboard complete with auxiliaries.
- Reconductoring of 13km of existing 15kV system in 50mm<sup>2</sup> ACSR conductor with 150mm<sup>2</sup> AAAC conductor.
- Replacement of 15/0.4kV step down distribution on the existing 15kV system with 11/0.4kV transformers of a combined rated capacity of 6030kVA.
- Interconnection of the downgraded 15kV network to the existing 11kV power system network.
- Reconductor approximately 5.3km of existing 11kV overhead line in 70mm<sup>2</sup> ACSR Conductor with 150mm<sup>2</sup> AAAC conductor.
- Split the existing 11kV feeder by constructing approximately 1.92km of a new 11kV overhead line in 150mm<sup>2</sup> AAAC conductor from Ex-ENEE station 2.

- Balance network loading between the resulting 11kV feeders by shifting distribution transformers from the most loaded line to the lightly loaded feeder.
  - Extension of the existing 11kV network by about 24.7km to cover new areas and new expansion areas and to help reduce length of existing low voltage network and expand connectivity.
  - Installation of 40 new pole mounted 11/0.4kV transformers of rated capacity ranging from 100kVA to 315kVA and having a combined rated capacity of 10,545kVA in new areas to help offload existing transformers that are already overloaded and to provide connectivity of isolated stations to the interconnected grid.
  - Installation of at least 11 new Load Break switches on the 11kV network to increase flexibility of system operations.
  - Construction of a new 2x7.5MVA 33/11kV West Substation (WS) at Baalade power station.
  - Construction of a new 7.5MVA 33/11kV North Substation(NS) near the Airport
  - Construction of a new 7.5MVA 33/11kV East Substation(ES) next to TF JIDKA.
  - Construction of approximately 21.2km of 33kV Overhead line in 150mm<sup>2</sup> ACSR conductor comprising of 5.4km of 33kV Overhead line from WS to NS, 6.4km of 33kV Overhead line from NS to ES substation and 9.4km of 33kV overhead line from WS to ES. Due to congestion along the route from North Substation to East substation, approximately 2.052km will be installed underground (in congested areas).
  - Construction of approximately 4km of 33kV Overhead line from the 3.5MW Bosaso solar PV plant to WS.
  - Construction of approximately 11.4km of 33kV Single Circuit Overhead line in 150mm<sup>2</sup> ACSR conductor from the 33/11kV North Substation to the Puntland Maritime Police Force facilities, west of Bosaso airport.
  - Supply of 1000 smart meters for Commercial and Industrial consumers
- (vi) To address the challenge of institutional capacity the Consultant’s two options were:
- Option 1- Support development of the legal framework, training of personnel and provision of material tools and resources.
  - Option 2- Rely on expatriates and outsourcing of services
- Option1 was assessed to be more favorable given that it is relatively more expensive to rely on Consultants in the long-term and some of the tasks cannot be effectively discharged through an outsourcing model.
- (vii) *Key project decommissioning phase activities:* it is anticipated that the power distribution line will be continuously maintained and repaired, and will be operated for several decades. Because of its long-life cycle, the circumstances under which the line might ultimately be decommissioned and abandoned are difficult to foresee. Powerline supporting structures, transformers and switchgear may be upgraded/renewed based on cost/benefit analysis and new technologies. However, if decommissioning is undertaken, MoEWR and ESPs shall be required to prepare specific Decommissioning Management Plan at the time. Therefore, the decommissioning procedure shall include site-specific rehabilitation plans for the footprint of the project. All regulatory requirements will be complied with for the decommissioning phase.
- (viii) *Construction supervision:* Construction supervision and monitoring is likely to follow the usual practice with a suitably experienced Consultancy firm appointed under



competitive bidding procedures as defined in the construction contract and other senior supervisory staff.

- (ix) *Estimated project costs, financial and economic analysis:* The estimated cost of the project is an amount of US\$ 25.4million. Analysis carried out at the Feasibility stage show that the project is financially and economically viable. The project has a Financial Internal Rate of Return(FIRR) and Economic Internal Rate of Return (EIRR) of 28.3% and 17.3% respectively and Financial Net Present Value (FNPV) and Economic Net Present Value (ENPV) of US\$114.94million and US\$33.43million respectively.

## **ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS**

- (i) Bosaso is a major port city located in the northeastern part of the Federal Republic of Somalia, within the Puntland State. It serves as the commercial hub of Puntland and is one of the key economic centres in the country, primarily due to its strategic location along the Gulf of Aden. The city is the capital of the Bari region and has a growing population due to its importance as a trade and migration centre. The distribution lines and substations earmarked for upgrade traverse different parts of the city and are located mainly along the road networks with at least 3.6m wide Right of Way (RoW) for 11kV distribution lines, and 3-5m for 33kV distribution lines.
- (ii) *Physical Environment:* Most of northern Somalia's geomorphology is influenced by tectonic activity from the Gulf of Aden rift, resulting in unique landscapes and landforms, and strong erosions have shaped most landscapes into narrow gorges and sharp banks. Bosaso City, located along the southern shores of the Gulf of Aden, has a diverse landform and topography that significantly affects its climate, natural resources, and infrastructure development. The coastal plains are low-lying, suitable for port activities and urban expansion, while the Cal Miskaad mountain range, part of the East African Highlands, rises sharply into the region. The region's hydrology is influenced by seasonal runoff into temporary rivers, and the topography includes dry riverbeds or wadis, which channel water from mountains towards the coast during the rainy season. The region's arid climate results in localized microclimates, with higher altitudes receiving slightly more rainfall. The diverse topography creates distinct ecological zones that support various wildlife and vegetation, especially those adapted to the arid and semi-arid conditions.
- (iii) *Climate:* Bosaso City and its surrounding areas have an arid climate with low rainfall and irregular rainfall. The city is part of the rain-shadow of Ethiopian and Somali highlands, limiting moisture-bearing winds. The Gu season and Deyr season are the main rainy seasons, with the Gu season being more reliable but not delivering substantial precipitation. Bosaso relies on underground water sources and seasonal runoff for population needs, but this aridity poses challenges for agriculture, pastoralism, and water resource management, exacerbating issues like water scarcity and desertification.
- (iv) *Land Use/Land Cover:* Bosaso, a port city in Somalia, is characterized by urban development, pastoralism, and natural arid landscapes. The region's economic activities are influenced by the limited availability of natural resources and the need for sustainable management to combat land degradation and desertification. The city's land use is dominated by residential, commercial, and industrial areas, particularly around the port, which facilitates trade with the Arabian Peninsula. Agriculture is limited due to the arid climate and scarce rainfall, but small-scale, irrigated farming exists in localized areas. Pastoralism is the dominant economic activity in rural areas, with large tracts of land used as rangelands. The

natural land cover surrounding Bosaso consists mainly of sparsely vegetated desert and semi-arid scrubland, with drought-resistant vegetation and grasslands emerging during rainy seasons. The dry climate and increasing population pressure have led to land degradation, particularly in rangelands where overgrazing, soil erosion, and desertification are prominent.

- (v) The land tenure system in Bosaso combines formal and informal practices shaped by statutory, customary, and Islamic law. While statutory land ownership is recognized under Somali and Puntland law, much of the land allocation in Bosaso is still governed by customary practices and clan-based agreements, with significant influence from Islamic law principles that emphasize fair inheritance and land use. Formal land titles are more common in urban areas where the Puntland government has made efforts to formalize ownership to support economic development and attract investment. However, rapid urban expansion and migration have led to disputes over land ownership, exacerbated by limited formal documentation and conflicts between customary claims and formal title deeds. Consequently, land tenure security remains a challenge, and the local government, in cooperation with community leaders, is working to improve registration processes and land dispute resolution mechanisms to foster stability and sustainable development.
- (vi) *Geology and soils:* Bosaso City in Puntland, influenced by ancient Precambrian basement rocks, has diverse geology and soil types, with significant mineral potential. Despite its importance, the city faces water quality degradation due to population growth, climate change, and droughts.
- (vii) *Biological Environment:* a mix of coastal, desert, and shrubland ecosystems characterizes Bosaso City and its surrounding areas. The region is arid, with drought-resistant plants like acacia trees and shrubs, and is near the Gulf of Aden, influencing local biodiversity. Wildlife includes bird species, reptiles, and small mammals, but populations are limited due to habitat degradation, urban expansion, and livestock overgrazing. Rapid urbanization has led to increased land use changes, affecting natural habitats and biodiversity. Conservation efforts are needed to protect remaining ecosystems and promote sustainable land use practices. Bosaso's flora is adapted to dry, hot conditions and includes hardy trees and shrubs, perennial grasses, succulents, salt-tolerant plants, and medicinal and aromatic plants. However, habitat alterations and habitat modifications have altered the fauna species assemblages. Over 300 bird species exist in the region, but there are no Important Bird Areas or protected areas within the project area.
- (viii) *Socio-Economic Environment:* Bosaso, a commercial hub in northeastern Somalia, is a vital trading port for livestock exports, fishing, and goods exchange with the Middle East. The city's economy is bolstered by small-scale businesses, remittances from the Somali diaspora, and a growing construction sector. Despite rapid population growth, infrastructure strains, including roads, healthcare, and education services. Bosaso operates under a decentralized administrative system led by a mayor and city council, overseeing municipal functions such as urban planning, service delivery, infrastructure development, and maintaining law and order. With an estimated 700,000 residents, Bosaso is the third largest city in Somalia after Mogadishu and Hargeisa. The city is a melting pot of cultures, ethnic groups, and clans, with a significant portion under 30 years old.

## **PROJECT ALTERNATIVES**

- (i) The proposed project seeks to solve challenges in three broad categories, i.e. power generation, power distribution, capacity of energy sector institutions.

(ii) To resolve the challenges of power generation, three options were considered as follows:

- **Option 1-** Scale-Up Renewable Energy Generation, Rehabilitate, Interconnect and Expand Existing Isolated Power Systems and Strengthen Capacity of Energy Sector Institutions.
- **Option 2-** Scale-Up Diesel Generation, Rehabilitate and Expand Existing Medium Voltage System and Strengthen Capacity of Energy Sector Institutions.
- **Option 3-** Import Generation from Neighboring countries, Rehabilitate and Expand Existing Medium Voltage System and Strengthen Capacity of Energy Sector Institutions.

**Option 1** was recommended for adoption because it will lead to a reduction in the cost of generation by displacing expensive fuel predominantly used in generation, reduce the carbon footprint, and enhance generation capacity to meet growing demand for electricity in the city of Bosaso. A comparative analysis of these options is shown in the following table.

*Table 0-1 Power Generation Alternatives*

Option	Advantages	Disadvantages
1.	<ul style="list-style-type: none"> <li>– Will lead to reduction of carbon emissions arising from energy generation and is therefore a more sustainable solution.</li> <li>– Solar PV+BESS will have an impact of displacing fuel used in the generation. This reduction in operating costs will result in reduced energy costs.</li> <li>– Over-reliance on solar PV+BESS will increase predictability of energy costs and reduce vulnerability of energy costs to external shocks in the global market.</li> </ul>	<ul style="list-style-type: none"> <li>– Initial cost of investment is relatively high compared to Option 2.</li> <li>– Requires capacity building of utility personnel to effectively manage construction and operation phase of the solar PV+BESS.</li> </ul>
2.	<ul style="list-style-type: none"> <li>– Initial cost of investment is relatively low compared to Options 1&amp;3.</li> <li>– Utility personnel have adequate capacity to manage construction and operation of high-speed diesel plants.</li> </ul>	<ul style="list-style-type: none"> <li>– Adoption of this option will lead to an increase in carbon emissions arising from power generation.</li> <li>– There will be no significant reduction in the cost of energy due to the high cost of operations arising from the cost of fuel.</li> <li>– Fluctuations in the cost of fuel make the cost of energy unpredictable and vulnerable to external shocks in the global market.</li> </ul>
3.	<ul style="list-style-type: none"> <li>– Power/Energy imports: This will provide enhanced energy security</li> </ul>	<ul style="list-style-type: none"> <li>– The cost of implementing this option is high as it requires huge investment</li> </ul>

	<p>through diverse and resilient clean energy supply chains.</p>	<p>in establishing the HV national transmission grid.</p> <ul style="list-style-type: none"> <li>– This option is not financially viable in the period up to the year 2034.</li> <li>– Implementation of this option is complex and may be achieved only in the long-term.</li> </ul>
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(iii) To address the challenges of the power distribution network, the following two options were considered in the feasibility study:

- **Option 1-** Interconnect and expand existing power system networks
- **Option 2-**Expand existing mini-grids in isolation

Option 1 was recommended for adoption because it will lead to optimal utilization of power system infrastructure, enhance reliability of supply, enhance system efficiency and will lead to a reduction of lifetime costs of maintaining the distribution network. A comparative analysis of these options is shown in the following table.

*Table 0-2 Distribution Network Improvement Alternatives*

Option	Advantages	Disadvantages
1.	<ul style="list-style-type: none"> <li>• It will enhance flexibility and optimization of network resources, especially distribution transformers.</li> <li>• Relatively low cost of implementation compared to interconnecting 11kV and 15kV systems. Solution requires US\$ 313,650 less to implement compared to direct connection.</li> <li>• Solves the challenge of sourcing spare parts for the 15kV system which according to PEPCO, it's a challenge.</li> <li>• The cost of 11/0.4kV distribution transformers is low and this constitutes a lifetime cost saving on the grid. It will lead to a reduction in spare stock which is a lifetime saving.</li> </ul>	<ul style="list-style-type: none"> <li>– Downgrading requires replacement of all 15/0.4kV and 0.4/15kV transformers</li> <li>– Distribution system loss is relatively higher compared to the 15kV system.</li> </ul>
2.	<ul style="list-style-type: none"> <li>– Sub-optimal utilization of available infrastructure.</li> <li>– Requires higher spare stock levels at any given time.</li> <li>– No need to replace the 15/0.4kV and 0.4/15kV transformers.</li> <li>– Distribution system loss is relatively low compared to the 11kV system.</li> </ul>	<ul style="list-style-type: none"> <li>– Cost of interconnection is relatively higher by more than US\$313,650 and future infrastructure expansion will always be higher.</li> <li>– Challenge of sourcing for spare parts (insulators, surge arrestors and distribution transformers).</li> <li>– Increased stockholding of spare parts for the medium voltage network.</li> </ul>

- (iv) To address the challenge of institutional capacity the Consultant’s two options were:
- **Option 1-** Support the development of the legal framework, training of personnel and provision of material tools and resources.
  - **Option 2-** Rely on expatriates and outsourcing of services

Option1 was assessed to be more favorable given that it is relatively more expensive to rely on consultants in the long-term and some of the tasks cannot be effectively discharged through an outsourcing model.

## STAKEHOLDER ENGAGEMENT

- (i) Public consultations were conducted to inform stakeholders about potential impacts of proposed transmission lines and substation projects, identifying social impacts and seeking mitigation measures. This allowed the resident community, particularly the poor and vulnerable to influence the project to reduce impacts and maximize benefits. A total of three (between 28<sup>th</sup> and 30<sup>th</sup> September 2024) focus groups discussions were held with different stakeholders, comprising of youth and women groups, three key informant interviews with state ministry and municipality officials, individuals and tertiary institutions based in Bosaso City. A total of forty-six (46) individuals drawn from different entities, including Puntland State officials, Bosaso Municipality, women groups, youth groups, people living with disabilities, business operators, Universities, non-governmental organizations, civil society organizations, amongst other in Bosaso City and the surrounding areas were consulted during the stakeholder engagements.
- (ii) *Key findings on consultations with MoEMW in Puntland State and Bosaso Municipality officials:* Local officials identified potential benefits such as improved access to electricity, enhanced business activities, improved health delivery services, and increased income for residents. The project also aimed to improve the quality of life for residents in the project area, addressing challenges such as hot weather and lack of reliable power supply.
- (iii) *Key finding from consultation meetings with community members:* The community members identified potential positive impacts, including providing electricity services to non-electrified villages, easing power shortages, creating temporary employment opportunities, improving social services provisions, and contributing to future development activities. They also expressed interest in additional benefits, such as improved health institutions, telecommunication, and government services.
- (iv) *Consultation meetings with the women group:* Under the FRS Constitution (2012), women have the right to full consultation in the formulation of national development policies, the designing and execution of projects, and particularly in the case of projects affecting the interests of women. Therefore, to ensure the inclusiveness of the consultation processes, women were included in separate consultation meetings between September 25-28, 2024, with two women groups (four members each) of the community residing in and around Bosaso City.

## ANTICIPATED ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

- (i) *Positive impacts*
- National, local and regional economy
  - Benefit to local retail businesses

- Employment opportunities
- Skills transfer
- Improved access to clean and reliable electricity
- Attracting and expanding investments in Bosaso City
- Enhance application of new technologies in social facilities and infrastructures
- Expansion of small-scale business in services and commerce/trade
- Income to material/ equipment suppliers and contractors

*(ii) Negative impacts and mitigation measures*

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
Impacts on the biophysical environment	Landscape and visuals	<ul style="list-style-type: none"> <li>• Erect temporary barriers or screens around construction sites to shield views of heavy machinery, equipment, and activities from the surrounding area, minimizing visual disturbance.</li> <li>• Limit the clearing of vegetation to only what is necessary for construction, and ensure that any cleared areas are rehabilitated with native plants after construction to restore the landscape.</li> <li>• Locate material storage areas and equipment yards in less visible or already disturbed areas, and keep them tidy to reduce the visual clutter during the construction period.</li> <li>• Design temporary access roads with minimal disruption to the landscape, and ensure these roads are restored to their original condition, or better, once construction is complete.</li> <li>• Where possible, restore disturbed areas progressively as construction moves forward rather than waiting until the project is fully completed. This helps minimize prolonged visual impacts.</li> <li>• Avoid construction activities near scenic or culturally significant landscapes, and design project phases to avoid highly visible areas during periods of high public activity, such as tourist seasons.</li> <li>• Ensure that waste and debris from construction activities are promptly and properly managed and disposed of to avoid creating an unsightly and cluttered environment.</li> <li>• Minimize the use of bright lights during nighttime construction to reduce light pollution, especially in areas that are normally dark. Use directional lighting to limit the spillover of light into surrounding</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		areas.	
	Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> <li>• Avoid removing short vegetation and grass along the distribution line corridor as far as it does not hinder construction works.</li> <li>• Concrete wash water to be discharged only at designated facilities.</li> <li>• Construction of adequate and efficient drainage channels at the substation site, which will provide proper drainage for the substation during operation.</li> <li>• Discharge of untreated concrete wash water to surface waters to be strictly prohibited.</li> <li>• Ensure all hazardous materials are stored in designated areas (i.e. on flat or gently sloping ground) to prevent spillage;</li> <li>• Ensure appropriate hazardous materials containers are used with seals that are in good condition (i.e. glass containers for corrosive chemicals);</li> <li>• Ensure employees have appropriate training in safe hazardous materials handling;</li> <li>• Implementation of temporary erosion control measures (e.g. silt fence, erosion mats) especially where construction sites are near surface water.</li> <li>• Installation of portable toilets for construction workers.</li> <li>• Recycling of wash water will be done as far as practical.</li> <li>• Remove and dispose wastes from septic tanks installed for construction crew camps at appropriate interval &amp; at designated sites to avoid overflow and prevent contamination of the ground or surface drainage; and</li> <li>• Revegetation of exposed slopes immediately after construction is completed.</li> <li>• Spillage of hazardous liquids (e.g. oil) to be prevented by implementing spill prevention measures.</li> <li>• Stockpiles and temporarily removed topsoil to be stored in a location and manner to prevent soil runoff.</li> <li>• The contractor is required to collect and treat storm water runoff from open workshop servicing and repairs and other areas in bonded storage areas before discharging into receiving drainage and waterways;</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<ul style="list-style-type: none"> <li>• The contractor is required to make specific and adequate provision for the disposal of sanitary and other liquid and solid wastes in such a way as will not result in any form of pollution or hazard to human or animal health;</li> <li>• The Contractor is required to prevent entrance or accidental spillage of pollutants and wastes into flowing and/or dry water courses and groundwater resources.</li> <li>• The contractor is required to prohibit washing of project vehicles and plant in or adjacent to any water sources. All washing to be carried out at designated areas away from water sources; and</li> <li>• The contractor is responsible, at his own cost, for cleaning up any pollution caused by his activities and the payment of full compensation to those affected.</li> </ul>	
	Air quality (Dust)	<ul style="list-style-type: none"> <li>• To prevent high dust near settlements, traffic speed should be reduced to 30km/hr;</li> <li>• Reduce the duration of construction activities resulting in more dust generation;</li> <li>• Concrete mixing plants and associated machinery installed for project activities will be equipped with suitable pollution control (dust suppression equipment) arrangements.</li> <li>• The Contractor is responsible to develop an ambient air quality monitoring and management plan (C-ESMP), with particular focus on dust monitoring.</li> </ul>	Construction
	Air quality (Vehicle exhaust emissions)	<ul style="list-style-type: none"> <li>• Vehicle speed in residential areas will be limited by instructions to drivers. This will be enhanced by the installation of speed limit signals as appropriate;</li> <li>• Construction machinery should be well maintained to minimize excessive gaseous emissions;</li> <li>• Prevent the occurrence of smoke emissions or fumes from fuel oils;</li> <li>• Avoid exposing any volatile chemical to the atmosphere;</li> <li>• Do not burn material, which produce toxic gases. No burning is allowed to materials such as tires, plastic, rubber products or other materials that create heavy smoke or nuisance odour.</li> <li>• The Contractor is also responsible to</li> </ul>	Construction



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>monitor the air pollution risk at all construction sites, campsite, access roads and near settlements/villages.</p>	
	Noise & vibration	<ul style="list-style-type: none"> <li>• A proper routine and preventive maintenance procedure for project vehicles and equipment should be set for their best operating conditions and lowest noise levels possible so that extraneous noises from mechanical vibration, creaking and squeaking are reduced to a minimum;</li> <li>• Conduct job-specific training for machinery and heavy vehicle operators to cover the importance of noise control and available noise reduction measures.</li> <li>• In principle, noisy construction works to be limited to normal working hours and no operation on Fridays and public holidays.</li> <li>• Vehicles and machinery to be equipped with exhaust mufflers and well maintained.</li> <li>• Additional noise suppression measures (e.g. covering of noisy units) to be implemented if noise levels at nearest sensitive receptor consistently exceeds national noise standard or in case of consistent complaints.</li> <li>• Construction workers to be provided with appropriate PPE such as ear plugs and ear muffs for protection against excessive noise.</li> <li>• Construction machines and vehicles to be turned off when not in use.</li> <li>• Construction equipment generating high noise shall be designed to have an adequate noise control (such as mufflers, silenced exhaust acoustic);</li> <li>• Controls shall be undertaken to reduce exposures to &gt;80 dBA, including layout of equipment, selection of quieter machines, isolation of workers from noise source etc.</li> <li>• Coordinate and implement all noise and vibration control measures to ensure National and AfDB standards are met;</li> <li>• Minimize worker exposure to noise and vibration by providing appropriate PPE, hearing protection and noise control device as required.</li> </ul>	Construction
	Biodiversity (Fauna)	<ul style="list-style-type: none"> <li>• As much as possible the size of the area to be cleared and used for the project should be minimized;</li> <li>• Vehicles and trucks as much as possible should use the existing roads to minimize</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>foot and vehicle traffic through undisturbed areas and loss of habitat by wildlife;</p> <ul style="list-style-type: none"> <li>• Habitat restoration activities should be initiated after construction activities are completed; and</li> <li>• Secure the safe movement of animals displaced and an attempt to protect in their new habitat must be carried out.</li> <li>• To design an avian-safe power pole to minimize bird electrocution risk by providing sufficient separation between energized phase conductors and between phases and grounded hardware to accommodate at least the wrist-to-wrist or head-to-foot distance of a bird;</li> <li>• The use of a steel or concrete monopole structure with sufficient clearance would minimize electrocution risks to avifauna; and</li> <li>• Cross-arms, insulators and other parts of the power lines can be constructed so that there is no space for birds to perch where they can be proximate to energized wires.</li> <li>• Making power line more visible to birds (line marking). The assumption is that birds collide with overhead cables because they cannot see them. Hence, high-visibility markers should be installed to make the lines more visible to birds.</li> <li>• Habitat management at site level should be considered, such as, to avoid establishing ponds or waste disposal storage sites within development area;</li> <li>• As much as possible vegetation cover that may support small mammals, rodents, reptiles, amphibians and other birds, which attract raptors, must be removed; and</li> <li>• Retain existing low-lying vegetation ground cover along the distribution line ROW thereby minimizing vegetation clearing.</li> </ul>	
	Biodiversity (Flora)	<ul style="list-style-type: none"> <li>• Avoid unnecessary destruction of trees and other vegetation by restricting land clearing to what is absolutely necessary within the project boundary and along the access road alignment;</li> <li>• Rehabilitation of temporary construction sites and camps should be done with suitable native plants;</li> <li>• All damaged areas shall be reinstated and</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>rehabilitated upon completion of the construction;</p> <ul style="list-style-type: none"> <li>• Compensate in cash for the loss of privately-owned mature trees;</li> <li>• The contractor will be responsible for any fire accident caused by his activities within the project area;</li> <li>• The contractor is responsible for the conduct of his workforce in relation to environmental protection matters and to specifically prohibit unnecessary felling of trees;</li> <li>• There should be care to avoid introduction of invasive alien species. Early detection and eradication is recommended.</li> </ul>	
	Soil erosion	<ul style="list-style-type: none"> <li>• Along the access road corridor, replanting cleared areas on slopes vulnerable to erosion such as cut-and-fill slopes with plant species (grasses) which have the abilities to: armour the surface against erosion and abrasion by intercepting raindrops; support the slope by propping from the base; and reinforce the soil profile by increasing its shear resistance (roots); etc.,</li> <li>• Design and construct suitable permanent drainage structures including: Paved side drains for sections vulnerable to serious erosion and gully formation (mainly around tower foundation areas and within the SS); and diverting drains (where these are necessary), which avoid excessive concentration of flows.</li> <li>• Minimize side-casting of excavation materials at construction site and along the access road corridor by depositing it only on approved disposal sites;</li> <li>• Preserving topsoil from the project boundary and road cuts for re-use during site restoration on laydown and other areas used for temporary purposes.</li> <li>• The risk rating of impacts from soil erosion is classified as moderate, which is environmental impact with some consequences and likely to occur. Implementation of the above mitigation measures is expected to reduce the risk rating to Low, which is environmental impacts with no or limited consequence and less likely to occur.</li> <li>• Within the project boundary and along the</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>project access road alignment, restrict land clearing to what is absolutely necessary.</p>	
	<p>Wastes (Solid wastes)</p>	<ul style="list-style-type: none"> <li>• Construction wastes will not be allowed to accumulate on the construction site but will be promptly collected and removed regularly from the site by the Contractor;</li> <li>• Indiscriminate disposal of solid waste shall be strictly prohibited;</li> <li>• Sufficient number of labelled and colour coded garbage bins and container will be made available at all construction offices, stores, camps, canteens, etc. to ensure wastes are strictly segregated at generation sites (source). Waste bins shall be labelled in Amharic, Somali and English and according to standards;</li> <li>• Wastes will be appropriately segregated such that hazardous and non-hazardous wastes are not mixed and to allow for recycling and reuse where appropriate;</li> <li>• Waste materials will be placed and stored in suitable containers. Storage areas and containers will be maintained in a sanitary condition and shall be covered to prevent spreading of wastes by wind or animals;</li> <li>• All wastes generated shall be correctly identified and stored pending collection/transfer for reuse, recovery, recycling or disposal in an environmentally sound manner;</li> <li>• Any waste material that is inadvertently disposed in or adjacent to any watercourses will be removed immediately in a manner that minimizes adverse impacts, and the original drainage pattern will be restored;</li> <li>• All wastes, which are not designated as combustible waste to be burned on-site, will be recycled, disposed of in an approved landfill, or shipped to an approved disposal facility; and</li> <li>• Solids, sludge and other pollutants generated as a result of construction or removed during the course of treatment or control of wastewaters will be disposed of in a sanitary landfill and prevented their direct or indirect discharge to any watercourse or ground waters.</li> <li>• Hazardous wastes</li> <li>• All hazardous waste shall be disposed of in accordance with the national and</li> </ul>	<p>Construction</p>

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>international legislative requirements;</p> <ul style="list-style-type: none"> <li>• Develop and implement emergency preparedness and response plan.</li> <li>• Ensure appropriate PPE is provided and used; and</li> <li>• Establish temporary and permanent spill containment structure;</li> <li>• Know the location and proper use of clean-up material;</li> <li>• Respect, as minimum requirements national and international laws, codes and guidelines and to apply the strictest standards everywhere feasible.</li> <li>• Site operators must ensure that spilled products are immediately cleaned to prevent seepage of the same into the nearby river and groundwater.</li> </ul>	
	Wastes (Liquid wastes)	<ul style="list-style-type: none"> <li>• Proper storage of the oil is required to ensure no leakages</li> <li>• Frequent inspection and maintenance of the generator to minimize leakages.</li> <li>• No vehicles should be serviced or maintained at the project site.</li> <li>• The waste oil or used oil must be disposed-off appropriately.</li> <li>• Proper training for the handling and use of fuels for the operators of the power plant.</li> <li>• In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.</li> </ul>	Construction
Impacts on infrastructure and utilities	Water consumption	<ul style="list-style-type: none"> <li>• The Contractor will not use the existing community water points;</li> <li>• In consultation and without affecting the availability of water resources for existing users, the Contractor is responsible to make arrangements to supply the water demand for construction and other purposes;</li> <li>• The Contractor will need to develop its own water supply sources (i.e. to buy water from licensed suppliers or wells) for the construction and the campsites requirements; and</li> <li>• In the event of there being any valid dispute regarding the effect the contractor's arrangements may have on the water supply of others, the contractor shall be responsible for providing an alternative supply to those affected, which is not inferior in quantity or quality to that previously enjoyed.</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	Energy Consumption	<ul style="list-style-type: none"> <li>• Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used.</li> <li>• Proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts.</li> <li>• Complementary to these measures, they monitor energy use during construction and set targets for reduction of energy use.</li> </ul>	Construction
	Inconveniences and disruptions	<ul style="list-style-type: none"> <li>• Promptly address complains arising from persons inconvenienced or disrupted by construction activities.</li> <li>• Construction contract to obligate the contractor to create access where usual access is affected by construction works</li> </ul>	Construction
	Impacts on Vulnerable Groups	<ul style="list-style-type: none"> <li>• Establish an accessible, confidential GRM to report concerns related to safety, accessibility, and other impacts.</li> <li>• Implement additional safety protocols around work zones, including signage, barriers, and clear pedestrian pathways, especially near schools, healthcare facilities, and areas frequented by vulnerable populations.</li> <li>• Provide employment opportunities to vulnerable groups' households.</li> <li>• Coordinate with local organizations to offer support services, such as temporary relocation assistance, counselling, or financial support, to those most at risk of hardship due to project-related disruptions.</li> <li>• Regularly monitor the impact on vulnerable groups and adjust mitigation measures as needed, ensuring transparency and open communication with community representatives and local authorities.</li> <li>• Offer community workshops on health, safety, and job readiness related to the project, focusing on empowerment and resilience-building for vulnerable groups.</li> </ul>	Construction
	Accidental discovery of cultural resources	<ul style="list-style-type: none"> <li>• Chance Find Procedure disseminated among workers during induction trainings;</li> <li>• Upon identification of suspected archaeological or cultural remains, the location must not be disturbed, operations</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>will immediately cease in the affected area and activities that create ground disturbance will be minimised in and adjacent to the affected area;</p> <ul style="list-style-type: none"> <li>• The discovered site will be delineated as "no work zone";</li> <li>• Unauthorized entry will be prohibited and the site secured to prevent any damage or loss of removable objects;</li> <li>• Under no circumstances, any artefacts will be removed, destroyed or interfered with by anyone on the site; and Contractors and workers shall be informed of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts;</li> <li>• The responsible Regional authorities shall assess the significance and importance of the findings according to the various criteria relevant to cultural heritage;</li> <li>• Restoration measures will be employed to protect discoveries and flagging the area boundaries.</li> </ul>	
	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> <li>• Fencing off the facility to keep of community members, children and livestock from entering into the facility</li> <li>• Controlled access to the site only with prior approval</li> <li>• Maintain records of any person who comes to site</li> <li>• Ensure proper Right-of-Way (RoW) Management by undertaking secure clearances and maintain an adequate distance from residential areas, schools, and hospitals to minimize risks to public safety and avoid interference with daily activities.</li> <li>• Implement measures to protect vegetation, including re-vegetation where necessary.</li> <li>• Install visible and durable safety signage along the distribution routes to warn the public about electrical hazards and restrict unauthorized access.</li> <li>• Ensure that waste generated during construction, including scrap metal, cables, and insulation materials, is safely collected, disposed of, or recycled to prevent environmental contamination.</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	Worker influx – incoming workforce.	<ul style="list-style-type: none"> <li>• Maximise local hire of labour, in so far as this is compatible with the contractor’s skill requirements;</li> <li>• Train all construction workers the local culture with the objective to protect the authentic culture and heritage of the people of the project area; and</li> <li>• Assign the responsibility to liaison with local communities and local authorities to a named individual from the contractor’s organization and to require effective liaison to promote social integration, and the development of mutually satisfactory solutions to problems affecting local communities.</li> </ul>	Construction
	Security risks	<ul style="list-style-type: none"> <li>• Establish a well-structured security service to assure security of the workers and the community in the project footprint.</li> <li>• Apply due diligence during selection of security providers, devise rules of engagement and provide training to all personnel;</li> <li>• Making clear that any community member can appeal if any project security breach happened to any of the community and /or its member;</li> <li>• Carryout comprehensive community risk assessment and implement adequate provisions to minimize risks to communities, with particular attention to traffic risks on public roads and security risks assessment and responsibilities;</li> <li>• Place appropriate signage on the boundary or at the entrance to all construction sites, warning against entering the site and highlighting the health and safety risks;</li> <li>• Develop public awareness programme (including in schools along the DL corridor) to identify areas of particular risk and approaches to reduce risk.</li> <li>• Ensure that the safeguarding security to personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the nearby communities.</li> </ul>	Construction
	Occupational Health and safety Impacts	<ul style="list-style-type: none"> <li>• A construction safety management system shall be employed during project implementation;</li> <li>• Ensure that necessary protective devices and</li> </ul>	Construction



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>clothing are provided to the workers and that they are used for the safety and health of his or her workers;</p> <ul style="list-style-type: none"> <li>• Provide personal protective equipment (PPE) and clothing (gloves, fall arrester, goggles, steel-toed boots, respirators, dust masks, hard hats, etc.) materials and tools and it shall be distributed to the workers for its day-to-day use shall be monitored;</li> <li>• A safety harness is required as a fall arrester, each workman working there shall be provided with one. Every safety harness shall be provided with a suitable anchorage and fittings to prevent serious injury in the event of fall;</li> <li>• Whenever the use of a safety harness is necessary, a workman has a duty to wear the safety harness provided and keep it attached to a secure anchorage for his own or any other person’s safety;</li> <li>• To the extent possible, reduce or minimize noise at work sites and if cannot be avoided, provide workers with PPEs such as hearing protection;</li> <li>• Apply measures such as suppressing dust and other particulate matters like those from cement storage sites;</li> <li>• In the case of manual handling of loads, advise/train workers to assess the associated risks carefully and provide information about the size and distribution of loads;</li> <li>• During induction training, awareness shall be created among the workers on safe working practices and precautionary measures to be adopted;</li> <li>• Maintain adequate traffic control measures throughout the construction phase;</li> <li>• Adopt regular systematic safety recording and reporting system (incidents, near misses);</li> <li>• Place signs around the construction areas to provide safety advice and warning, facilitate traffic to provide direction to various components of the works etc. All signs shall be in Somali, Amharic and English and according to standards;</li> <li>• Ensure that safety procedures are followed at all workplaces. Supervisor are responsible to check whether appropriate safety measures are taken/implemented before any</li> </ul>	

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>construction activities commence; and</p> <ul style="list-style-type: none"> <li>• Respect working zone to protect passersby from encroaching the active working area;</li> </ul>	
	Community health and safety risks	<ul style="list-style-type: none"> <li>• Use water spray or other dust suppression techniques and ensure that equipment emissions are regularly maintained to limit air pollution.</li> <li>• Limit construction activities to daytime hours, especially near residential areas, and use noise-dampening equipment to minimize disturbance to nearby communities.</li> <li>• Develop and implement a traffic management plan to control vehicle movement near construction sites, including signage, speed limits, and designated crossing points for pedestrians.</li> <li>• Install visible barriers around construction areas and provide clear warning signs to keep the public away from hazardous zones, especially near live electrical installations.</li> <li>• Implement proper waste disposal practices to avoid any build-up of debris, hazardous waste, or pollutants that could impact community health. Secure hazardous materials to prevent unauthorized access.</li> <li>• Conduct informational sessions to inform the community about the project, potential risks, and safe practices around construction zones and electrical infrastructure.</li> <li>• Develop and communicate an emergency response plan specific to the project site, including emergency contacts, first aid stations, and protocols for handling incidents like fires or electrical hazards.</li> <li>• Regularly monitor EMF levels from the power lines to ensure they are within safe limits, as recommended by international guidelines, to protect nearby residents.</li> <li>• Set up a confidential and accessible system for community members to report health and safety concerns, ensuring timely response and resolution.</li> <li>• Maintain open lines of communication with community representatives to keep them informed about the project's progress and any temporary disruptions, fostering trust and cooperation.</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	Temporary disruption of electricity supply	<ul style="list-style-type: none"> <li>• Construction works will be planned in manner to minimize duration of power outage.</li> <li>• If power outage is unavoidable, it will be communicated to the public and facilities (e.g. hospital) in advance.</li> <li>• Outages will be planned in co-ordination with ESPs and give at least one weeks' notice for the occurrence of outages.</li> <li>• Overhead line work to be designed and carried out in a way to avoid interference with existing power lines and maintaining safe separation distances from existing distribution lines.</li> </ul>	Construction
	Impacts associated with construction traffic	<ul style="list-style-type: none"> <li>• Include a clause in the construction contracts to the effect that the contractor must make every reasonable effort to minimize road safety hazards and inconvenience to other road users, resulting from the passage of his, or his subcontractors' haulage vehicles, and should impose and enforce compliance with speed limits;</li> <li>• The Contractor to prepare a traffic management plan detailing traffic control procedures, train its personnel traffic management procedures, travel speed limits and related control measures;</li> <li>• The contractor should put speed limits for cars and appropriate traffic signs in and around construction areas;</li> <li>• Assign a well-trained &amp; adequate number of traffic marshals mainly around a place where sensitive receptors (settlements, schools, health posts, worship areas,) exist;</li> <li>• Drivers shall be given induction training at the start of the project, company policy, about road safety and due diligence to ensure safety of other road users; and</li> <li>• Create awareness for the local people on how to use roads and keep themselves away from the traffic accident.</li> </ul>	Construction
	Fire Hazards	<ul style="list-style-type: none"> <li>• Create awareness to the construction workers on potential fire hazards</li> <li>• Provision of firefighting equipment on site during construction.</li> <li>• No smoking shall be done on construction site</li> <li>• 'No smoking' signs shall be posted at the</li> </ul>	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>construction site</p> <ul style="list-style-type: none"> <li>• A fire risk assessment and evacuation plan should be prepared and must be posted in various points of the construction site including procedures to take when a fire is reported.</li> <li>• Designate an assembly point</li> </ul>	
	Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> <li>• Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders.</li> <li>• Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget.</li> <li>• In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders.</li> <li>• Prepare and implement a grievance redress mechanism to deal with grievances.</li> <li>• The grievance redress committee to include representatives from the community.</li> <li>• Sensitize stakeholders on SEP and GRM.</li> </ul>	Construction
Impacts on biophysical environment	Landscape and visual	Fence off, especially the sub-stations and power plants to off/screen the solar panels.	Operation
	Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> <li>• Conduct regular environmental monitoring of soil, groundwater, and surface water quality to detect any contamination early.</li> <li>• Implement a comprehensive waste management plan that includes safe disposal of hazardous materials, such as oils, batteries, and chemicals used in maintenance.</li> <li>• Provide training to operational staff on the proper handling and storage of hazardous materials to minimize accidental spills and leaks.</li> <li>• Perform regular maintenance and inspections of power lines, substations, and solar panels to ensure that no leaks or spills occur.</li> <li>• Opt for environmentally friendly materials and substances in maintenance and operational practices to reduce the risk of contamination.</li> </ul>	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<ul style="list-style-type: none"> <li>• Manage vegetation around power lines and substations to prevent invasive species and maintain healthy ecosystems, which can aid in filtration and runoff control.</li> <li>• Develop and implement soil remediation plans if contamination is detected, including the use of bioremediation or phytoremediation techniques</li> </ul>	
	Air quality (Dust)	<ul style="list-style-type: none"> <li>• Trees can be planted around the power plants and sub-stations provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution</li> </ul>	Operation
	Air quality (Vehicle and genset exhaust emissions)	<ul style="list-style-type: none"> <li>• Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.</li> <li>• Company vehicles should be well maintained</li> </ul>	Operation
	Noise & vibration	<ul style="list-style-type: none"> <li>• Generator room should be sound proof to ensure no noise of a nuisance level will be produced.</li> <li>• Monitor noise levels</li> </ul>	Operation
	Biodiversity (Fauna)	<ul style="list-style-type: none"> <li>• Temporary-use areas shall be restored and revegetated</li> <li>• An ecologist shall be hired to coordinate the fauna monitoring.</li> <li>• Undertake regular entomological monitoring and reporting programme</li> <li>• Bird deterrents will be installed to prevent collisions with the structures.</li> <li>• Post-construction monitoring will be undertaken to assess the impacts on local fauna and adapt mitigation strategies.</li> </ul>	Operation
	Biodiversity (Flora)	<ul style="list-style-type: none"> <li>• Undertake restoration works using indigenous plant species.</li> <li>• Undertake invasive species removal and monitoring.</li> <li>• An ecologist shall be hired to coordinate the flora monitoring.</li> </ul>	Operation
	Soil erosion	<ul style="list-style-type: none"> <li>• Construct the drainage system in a way to follow natural drain of the water</li> <li>• Concrete only the required area and leave the rest of the land with vegetation like grass</li> <li>• Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use</li> </ul>	Operation
	Wastes (Solid)	<ul style="list-style-type: none"> <li>• Provide waste handling facilities such as</li> </ul>	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>labelled waste bins</p> <ul style="list-style-type: none"> <li>• Emphasis on prudent waste generation and give priority to reduction at source</li> <li>• Solid waste management awareness to operators</li> <li>• Operator to contract a licensed waste handler to collect and dispose solid waste</li> <li>• Develop a comprehensive e-waste management plan that outlines procedures for collecting, storing, and disposing of electronic waste generated from solar panels, lithium batteries, and other maintenance components.</li> </ul>	
	Wastes (Liquid)	<ul style="list-style-type: none"> <li>• Proper storage of the oil is required to ensure no leakages</li> <li>• Frequent inspection and maintenance of the generator to minimize leakages.</li> <li>• No vehicles should be serviced or maintained at the project site.</li> <li>• The waste oil or used oil must be disposed-off appropriately.</li> <li>• Proper training for the handling and use of fuels for the operators of the power plant.</li> <li>• In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.</li> <li>• Develop a comprehensive e-waste management plan that outlines procedures for collecting, storing, and disposing of electronic waste generated from solar panels, lithium batteries, and other maintenance components.</li> </ul>	Operation
<i>Impacts on infrastructure and utilities</i>	Water consumption	<ul style="list-style-type: none"> <li>• Ensure prudent use of water.</li> <li>• Install water-conserving automatic taps.</li> <li>• Any water leaks through damaged pipes and faulty taps should be fixed promptly</li> </ul>	Operation
	Energy consumption	<ul style="list-style-type: none"> <li>• Efficient energy consumption</li> <li>• Install an energy-efficient lighting system</li> </ul>	Operation
<i>Impacts on social environment</i>	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> <li>• Fencing off the facility to keep of community members, children and livestock from entering into the facility</li> <li>• Controlled access to the site only with prior approval</li> <li>• Maintain records of any person who comes to site</li> </ul>	Operation
	Risks related to poor or inadequate stakeholder	<ul style="list-style-type: none"> <li>• Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders.</li> </ul>	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	engagement (Conflict)	<ul style="list-style-type: none"> <li>• Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget.</li> <li>• In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders.</li> <li>• Prepare and implement a grievance redress mechanism to deal with grievances.</li> <li>• The grievance redress committee to include representatives from the community.</li> <li>• Sensitize stakeholders on SEP and GRM.</li> </ul>	
	Occupational health and Safety	<ul style="list-style-type: none"> <li>• Develop and implement and emergency response plan</li> <li>• Ensure only qualified staff are employed to work in the facility</li> <li>• All workers operating the project site must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others.</li> <li>• Operators must be skilled on firefighting management</li> <li>• Annual EHS audits should be done</li> </ul>	Operation
	Community health and safety risks	<ul style="list-style-type: none"> <li>• Ensure that the right-of-way is clearly defined and maintained to minimize potential hazards associated with overhead lines, keeping adequate distance from residential buildings, schools, and public spaces.</li> <li>• Conduct public education campaigns to inform local residents about safety measures related to power lines, including potential hazards and safe practices around electricity.</li> <li>• Implement routine inspections and maintenance of distribution lines and transformers to identify and address any issues that could pose risks to community safety.</li> <li>• Erect clear and visible warning signs in and around the vicinity of power distribution lines and transformers to alert the community to electrical hazards.</li> <li>• Develop and communicate emergency response plans specific to incidents</li> </ul>	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>involving power lines and transformers, including procedures for addressing electrical outages, accidents, or fires.</p> <ul style="list-style-type: none"> <li>• Implement a vegetation management plan to ensure that trees and shrubs near power lines are regularly trimmed to prevent interference and reduce fire risks.</li> <li>• Establish an accessible GRM for community members to voice concerns regarding safety issues or disruptions related to power infrastructure, ensuring timely responses and resolutions.</li> </ul>	
	Fire hazards	<ul style="list-style-type: none"> <li>• Develop and implement an emergency preparedness and response plan with specific features on fire hazard management</li> <li>• The power plant and sub-stations must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points</li> <li>• Detection/alarm systems that can detect fire should be and installed</li> <li>• A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported.</li> <li>• Workers especially operators of the plants must be trained on fire management</li> <li>• ‘No smoking’ signs shall be posted within the power plant area</li> <li>• A fire Assembly point should be identified and marked</li> </ul>	Operation
	Security risks	<ul style="list-style-type: none"> <li>• Monitor local security developments and adjust security protocols accordingly.</li> <li>• Maintain a secure perimeter with robust fencing of the site</li> <li>• Use remote monitoring where feasible, with a centralized control room for real-time surveillance and immediate response.</li> <li>• Enforce strict access control measures, ensuring that only authorized personnel can enter the facility.</li> <li>• Deploy trained security personnel to guard the site 24/7.</li> <li>• Continue engaging local communities to foster positive relationships and minimize hostility.</li> <li>• Maintain and regularly update a comprehensive security incident response plan</li> </ul>	Operation



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<ul style="list-style-type: none"> <li>• Maintain close coordination with local law enforcement and security agencies</li> <li>• Implement a rigorous vetting process for all employees to minimize the risk of insider threats.</li> <li>• Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters.</li> </ul>	
Impacts on biophysical environment	Impacts on landscape and visual	<ul style="list-style-type: none"> <li>• Develop a comprehensive decommissioning plan that minimizes disturbance to the landscape.</li> <li>• Implement a phased decommissioning approach to minimize the visual disruption at any one time.</li> <li>• Restore the decommissioned site by regrading, replanting native vegetation, and stabilizing soil to prevent erosion.</li> <li>• Incorporate natural features, such as berms or existing vegetation, to shield decommissioning activities from public view.</li> <li>• Ensure that all materials, equipment, and waste generated during decommissioning are handled responsibly and removed from the site promptly.</li> <li>• Engage with local communities during the decommissioning process to address concerns and gather feedback on visual impacts.</li> <li>• Utilize temporary visual barriers or screens to minimize the visibility of decommissioning activities, especially in areas of high public interest or scenic value.</li> <li>• After decommissioning is complete, implement a landscaping plan that incorporates native plants and materials to enhance the area’s visual appeal.</li> </ul>	Decommissioning
	Impacts on biological environment	<ul style="list-style-type: none"> <li>• Conduct a thorough environmental impact assessment (EIA) prior to decommissioning to identify sensitive habitats, species, and ecosystems that may be affected.</li> <li>• Implement erosion control measures, such as silt fences, sediment traps, and vegetation restoration, to prevent soil erosion and sedimentation in nearby waterways, which can harm aquatic and terrestrial ecosystems.</li> <li>• Develop and implement a habitat restoration plan that includes replanting native</li> </ul>	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>vegetation and rehabilitating disturbed areas to restore natural habitats and promote biodiversity after decommissioning.</p> <ul style="list-style-type: none"> <li>• Establish measures to protect local wildlife during decommissioning, such as minimizing noise and disturbance during sensitive periods, like breeding or nesting seasons, and ensuring safe passage for animals around the site.</li> <li>• Properly manage and dispose of all waste generated during the decommissioning process to prevent contamination of the soil, water, and surrounding habitats. Implement a recycling program for materials where possible.</li> <li>• Provide training for workers on environmental protection practices and the importance of preserving the local biological environment.</li> <li>• Engage local communities and stakeholders in the decommissioning process to gather input on conservation priorities and incorporate traditional ecological knowledge into restoration efforts.</li> </ul>	
	Solid Waste Generation	<ul style="list-style-type: none"> <li>• Demolition contractor to adhere to the various manufacturer’s guidelines and requirements regarding demolition and disposal</li> <li>• Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste</li> <li>• Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements</li> <li>• Adequate collection and storage of waste on site</li> <li>• Safe transportation to the disposal sites / designated area</li> <li>• Hazardous waste must be disposed by approved waste handler</li> </ul>	Decommissioning
	Wastes (liquid)	<ul style="list-style-type: none"> <li>• Conduct a comprehensive assessment to identify and categorize all sources of liquid waste generated during decommissioning.</li> <li>• Develop a detailed liquid waste management plan outlining procedures for the collection, storage, treatment, and disposal of liquid wastes.</li> <li>• Establish temporary storage facilities for</li> </ul>	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<p>liquid wastes to prevent leaks or spills and ensure safe handling until proper disposal.</p> <ul style="list-style-type: none"> <li>• Whenever possible, use environmentally friendly materials and products that generate less hazardous liquid waste during decommissioning.</li> <li>• Ensure that all liquid wastes are disposed of in accordance with local regulations and environmental standards, using licensed waste disposal facilities.</li> <li>• Provide training for staff on liquid waste handling, storage, and emergency response procedures to minimize risks.</li> <li>• Identify opportunities for the reuse or recycling of liquid waste materials, where feasible, to minimize waste generation.</li> <li>• Engage with the local community to inform them about liquid waste management practices and promote awareness of environmental protection.</li> <li>• Maintain accurate records of liquid waste management activities, including quantities generated, treatment methods, and disposal locations.</li> <li>• Prepare for emergencies related to liquid waste, including establishing an emergency contact list and response procedures.</li> <li>• Maintain an inventory of chemicals and hazardous substances to prevent unnecessary waste generation and facilitate proper management.</li> </ul>	
	Noise and Vibration	<ul style="list-style-type: none"> <li>• Install portable barriers to shield compressors and other small stationary equipment where necessary.</li> <li>• Use quiet equipment (i.e., equipment designed with noise control elements).</li> <li>• Co-ordinate with relevant agencies in case the noise produced will require a license.</li> <li>• Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible.</li> <li>• Demolish mainly during the day when most of the neighbours are out working.</li> </ul>	Decommissioning
	Air quality (dust)	<ul style="list-style-type: none"> <li>• Use water sprays or misting systems to dampen surfaces and reduce dust generation, particularly on unpaved roads and active work areas.</li> </ul>	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<ul style="list-style-type: none"> <li>• Implement soil stabilization techniques, such as using binders or applying vegetation, to minimize dust from disturbed soil areas.</li> <li>• Enforce speed limits for vehicles operating on-site and on access roads to reduce dust emissions from vehicle traffic.</li> <li>• Use tarps or other coverings to protect stockpiles of loose materials from wind erosion and dust generation.</li> <li>• Engage with local communities to inform them about decommissioning activities and measures being taken to control dust emissions.</li> <li>• Conduct regular inspections to identify potential sources of dust emissions and ensure that mitigation measures are effectively implemented.</li> <li>• Plan for site rehabilitation after decommissioning to restore vegetation cover, which can help prevent dust generation in the long term.</li> </ul>	
	Air quality (vehicle fumes)	<ul style="list-style-type: none"> <li>• Use high-quality fuels with lower sulfur content to minimize emissions from vehicles and generators.</li> <li>• Implement a regular maintenance schedule for all vehicles and generators to ensure they operate efficiently and emit fewer fumes.</li> <li>• Optimize generator operation by running them only when necessary and using them at optimal loads to reduce emissions.</li> <li>• Implement policies to minimize idling time for vehicles and generators, encouraging operators to turn off engines when not in use.</li> <li>• Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions.</li> <li>• Establish an air quality monitoring program to track emissions from vehicles and generators and ensure compliance with local regulations.</li> <li>• Engage with local communities to inform them about emissions reduction efforts and address any concerns related to air quality.</li> <li>• Conduct scheduled checks to ensure that exhaust systems and emission control devices are functioning correctly.</li> </ul>	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<ul style="list-style-type: none"> <li>Establish a reporting system for emissions data to track progress and compliance with environmental standards.</li> </ul>	
Impacts on Infrastructure & Utilities	Water Resources	<ul style="list-style-type: none"> <li>Implement erosion and sediment control measures, such as silt fences, sediment traps, and berms, to prevent sediment runoff into water bodies during decommissioning activities.</li> <li>Properly manage and store any chemicals, fuels, or hazardous materials used during decommissioning to prevent leaks or spills that could contaminate water resources.</li> <li>Employ best practices for construction activities, such as minimizing land disturbance, avoiding work during heavy rainfall, and using bioengineering techniques to stabilize soils and prevent erosion.</li> <li>Develop and implement a temporary drainage plan to manage stormwater runoff effectively.</li> <li>Ensure proper management and treatment of wastewater generated during decommissioning activities.</li> </ul>	Decommissioning
Impacts on social environment	Impacts on Occupational health and safety	<ul style="list-style-type: none"> <li>Develop and implement a robust health and safety plan that outlines specific procedures, protocols, and emergency response strategies to protect workers during the decommissioning phase.</li> <li>Provide comprehensive training for all workers on health and safety practices, including the proper use of personal protective equipment (PPE), hazard recognition, and emergency response procedures.</li> <li>Ensure that all workers are provided with appropriate PPE, such as helmets, gloves, goggles, ear protection, and respiratory protection, and enforce its use at all times on-site.</li> <li>Conduct frequent safety audits and inspections to identify and address potential hazards. Engage workers in safety discussions to gather their input on risks and mitigation measures.</li> <li>Properly handle, store, and dispose of hazardous materials, including chemicals and fuels, in accordance with relevant regulations.</li> </ul>	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		<ul style="list-style-type: none"> <li>• Ensure that all machinery and equipment used during decommissioning are well-maintained and regularly inspected to prevent malfunctions or accidents that could endanger workers.</li> <li>• Establish clear emergency response procedures for potential incidents, such as accidents, fires, or hazardous material spills.</li> <li>• Establish effective communication channels for reporting safety concerns or incidents.</li> <li>• Implement measures to ensure that nearby communities are not adversely affected by decommissioning activities.</li> </ul>	
	Community health and safety risks	<ul style="list-style-type: none"> <li>• Fencing off the facility to keep of community members, children and livestock from entering into the facility.</li> <li>• Identify and safely manage hazardous materials</li> <li>• Implement dust suppression techniques, such as water spraying or dust inhibitors, to minimize airborne particles during demolition activities, protecting air quality.</li> <li>• Use noise-dampening equipment and restrict working hours to minimize noise pollution</li> <li>• Develop and implement a comprehensive waste management plan during decommissioning.</li> <li>• Conduct thorough environmental assessments prior to decommissioning.</li> <li>• Engage with local communities early in the decommissioning process to communicate plans, address concerns, and gather input, fostering trust and collaboration.</li> <li>• Establish an accessible GRM for community members to report concerns or incidents related to health and safety, ensuring timely responses and resolutions.</li> <li>• Develop and communicate an emergency response plan that outlines procedures for handling accidents or hazardous material spills during the decommissioning phase.</li> <li>• Develop and implement a traffic management strategies to minimize disruption caused by decommissioning vehicles.</li> </ul>	Decommissioning

**CONCLUSION AND RECOMMENDATIONS**

***Conclusion***

- (i) The ESIA study identified the potential benefits and impacts of the repair/expansion of Bosaso Power Grid, including improved power distribution, economic benefits, and reduced costs for sectors like education, health, business, and industry. The report found no significant areas of natural or semi-natural habitats, wildlife species, or archaeological and cultural heritage sites in the project area. However, inconveniences of different magnitudes to the residents and businesses are anticipated, but these will not lead to relocations, resettlements or compensations of any nature. The study recommends specific environmental protection clauses in construction contracts and monitoring of contractor works by a supervising consultant to ensure good civil/environmental engineering practices. The project is not contiguous with or near any nationally protected areas.
- (ii) It is concluded that, provided the benefit enhancement and mitigation measures as recommended in this ESIA report, there are no environmental and social grounds for not proceeding with implementation of the project in the form presently envisaged. The proposed repair and expansion of the Bosaso Power Grid could cause inconveniences and temporal disruptions to the residents and businesses, these will not lead to resettlements, relocations or compensations of any nature during construction and operation phases of the project. A robust Grievance Redress Mechanism (GRM) will be required to handle any emerging issues associated with inconveniences and disruptions in a transparent manner. For the sub-stations, no land take will occur as PEPCO has already legally acquired the lands for the substations.

### ***Recommendations***

- (i) The proposed project is technically feasible and economically attractive. If the benefit enhancement and mitigation measures recommended in this ESIA report are adopted. There are no environmental and social grounds for not proceeding with implementation of the project in the form in which it is presently envisaged. Such a worthwhile scheme, which will bring net benefits to the FRS in general and the local communities in particular should be implemented at the earliest possible date.
- (ii) Mitigation strategies should be implemented to minimize disruption to local wildlife and habitats. Modern equipment with noise-dampening features should be used during construction, and construction activities should be restricted to daylight hours. Awareness campaigns on health and safety risks should be conducted, and local workers should be prioritized for employment and economic development.
- (iii) A GBV action plan should be put in place, implementing codes of conduct, worker training, and community awareness programs. Strict adherence to OHS guidelines should be enforced, and security risks associated with the influx of workers should be managed.

### **Estimated budget for the implementation of the ESMP**

The total estimated budget for the implementation of the Environmental and Social Management Plan (ESMP) is projected at approximately USD 447,000. This budget covers a range of activities essential to ensuring compliance with environmental and social safeguards, including mitigation of adverse environmental and social risks and impacts, stakeholder engagement, grievance management and capacity building throughout the construction and operation phases of the project.

# CHAPTER ONE: INTRODUCTION

## 1.1. Background

The Federal Government of Somalia (FGS), represented by the Federal Ministry of Finance, requested grant financing from the African Development Bank Group (AfDB, or “the Bank”) towards the cost of undertaking the “feasibility and ESIA studies for the *expansion of Bosaso Power Grid and strengthening the energy institutions.*”

Bosaso is a significant port city located in the northeastern region of Somalia, specifically in the autonomous region of Puntland State of Somalia. It serves as the capital of the Bari region and is the main commercial hub in Puntland. The city has a rich history, dating back centuries as a trading center due to its strategic location on the Gulf of Aden. Its proximity to the Arabian Peninsula has made it an essential maritime gateway for trade between the Horn of Africa and the Middle East. The economy of Bosaso is primarily driven by its port, which handles a considerable amount of trade, including imports, exports, and transit goods destined for other parts of Somalia and the region. The city also benefits from its fishing industry, with a significant portion of the population engaged in fishing activities. Additionally, Bosaso serves as a hub for various humanitarian and development activities in the region.

Electricity in Bosaso is supplied mainly by Puntland Electric Power Company (PEPCO), which has been established in the year 2022 through a merger of Ente Nazionale Energia Elettrica (ENEE), and GOLIS. The power system is comprised of two isolated power system networks where supply of electricity from existing generation is not optimized. The main power system networks are the 15kV system initially operated by ENEE and the 11kV system initially operated by GOLIS. The 15kV system was initially operated by ENEE and is by far the largest power system network in the city of Bosaso. The 11 kV system was initially operated by GOLIS. PEPCO’s Towhid and Rahmo stations, as well Al-Fardaws, Tawfiq and Somtel generate and distribute power at low voltage to the neighboring regions.

Apart from isolated systems where utilization of power is not optimized, there are challenges that face electricity supply in Bosaso, including high system losses, high tariffs, and a large number of customers, including industrial consumers, to the eastern part of the city that are not connected to the grid. The growing number of potential consumers requires generation expansion as well as rehabilitation and expansion of the existing power system network.

The development of the proposed DL project will involve potential impacts on the physical, biological, and socioeconomic environment that need to be assessed. This report has been prepared following a request by the African Development Bank (AfDB). The Horizon Development (HD), working in collaboration with Katchcon Consultants, was charged with the responsibility of undertaking the environmental and social impact assessment and drafting this report.

## 1.2. Objective of the ESIA study

The main objective of this ESIA was to provide a means whereby the overall environmental performance of the project can be enhanced through identification of potentially beneficial and adverse impacts associated with project implementation and subsequent operation. It is also to adopt measures to enhance beneficial impacts and to avoid, minimize, or offset adverse impacts. Directly linked to the main objective were the specific objectives that included:

- Identifying the current environmental and social baseline of the area;
- Identifying valued environmental and social components (VECs) that may be impacted by the project;



- Assessing the potential environmental impacts, including any residual impact of the proposed project;
- Identifying mitigation measures to minimize the adverse impact;
- Preparing an initial Environmental and Social Management Plan (ESMP) and an Environmental Monitoring Plan.

### 1.3. Scope of the ESIA study

The scope of work of the ESIA study was as follows:

- Review of policies, legislation, and institutional frameworks relevant to the planned project and its location within the country;
- Describe the planned project, sub-projects, and project components, indicating the relevance of each component (the distribution line and substation), as well as ancillary facilities and their relationship with the biophysical and socioeconomic environment of the project area of influence;
- Provide baseline information on the physical and biological environment and social, cultural, demographic, and economic characteristics of the population in and around the distribution line corridor, the proposed 7.15MWp/5.5MW solar PV, and three new substations;
- Identification and evaluation of the potential environmental impacts associated with project design, implementation/construction, and subsequent operation, and to make sure these impacts do not outweigh the expected positive environmental benefits of the proposed projects.
- Identification and recommendation of various mitigation measures into the project design, construction, and operation phases to enhance the sustainability of the project,
- Identification, analysis, and evaluation of the various project alternatives with various indicators, including environmental, technical, economical, etc.
- Inclusive public consultation and stakeholder engagement to gather inputs from a wide range of stakeholders, including the local authorities and local community members' attitudes towards the project, and to identify potentials and challenges for mitigation strategies;
- Identify and recommend indicative environmental management and monitoring plans and indicate a budget for the implementation of ESMP.

### 1.4. Approach and Methodology

The approach and methodology adopted for this ESIA follow the established pattern for infrastructure projects, including the distribution line, and meet the requirements of the national and AfDB's Integrated Safeguards System, policy statement and operational safeguard, and Environmental and Social Assessment Procedures. The following section provides the details of the approach and methodology adopted for the ESIA of the proposed DL Project.

#### 1.4.1. Definition of the study area

Bosaso City – the project area (Figure 1-1), a major port city located in the northeastern region of Somalia, is the capital of the Bari region and serves as an economic and commercial hub for the Puntland State. Situated along the Gulf of Aden, Bosaso boasts a strategic location that has historically facilitated trade and maritime activities. The city has a population of approximately 700,000 residents, characterized by a mix of various Somali clans and ethnicities, contributing to a vibrant cultural landscape. Fishing, trade, and remittances primarily drive Bosaso's economy from the Somali diaspora. The port plays a crucial role in facilitating imports and exports, including livestock, charcoal, and fish. Despite facing challenges such as infrastructure deficits, limited access to basic services, and security issues, Bosaso has experienced growth and development, particularly in recent years, with improvements in transportation and telecommunications. The climate in Bosaso is arid, with hot temperatures year-round and

seasonal rainfall. The city is also known for its unique landscapes, including coastal areas, hills, and desert terrain. As Bosaso continues to develop, it faces the need for sustainable resource management and infrastructure improvements to support its growing population and economy.

Bosaso City's electricity distribution status reflects a mix of challenges and opportunities as it works to meet the growing energy demands of its population and economy. The city relies primarily on a combination of diesel generators and imported electricity from neighboring regions. The existing power infrastructure is often inadequate to supply reliable electricity, resulting in frequent outages and limited access for many residents and businesses. The current electricity distribution network is characterized by aging equipment and insufficient capacity to handle the demand, especially during peak usage periods. As a result, residents often experience power shortages, which hinder economic development and impact daily life. In response to these challenges, there have been ongoing discussions and initiatives aimed at upgrading and expanding the electricity transmission system. Recent efforts have included proposals for the repair and expansion of the existing power grid, focusing on enhancing distribution lines and substations to improve reliability and efficiency. Additionally, there is growing interest in integrating renewable energy sources, such as solar and wind, into the grid to diversify energy supply and reduce dependence on fossil fuels. This shift not only aims to enhance energy security but also aligns with broader sustainability goals.



**Figure 1-1:** Location of Bosaso City in the Puntland State

#### 1.4.2. Collection and review of available information

The available preliminary project design information, including the draft feasibility study, was reviewed with the objective of identifying potential sources of impact of the project on the environment. The HD consultants collected and reviewed published documents, regulations, and other relevant documents. Information on existing environmental conditions, necessary to provide the background for impact identification and assessment was additionally obtained from published sources. The FGS and Puntland State laws govern the legislative framework applicable to the proposed project. The national legislative and institutional framework, policies, procedures, guidelines, etc. were also reviewed. The African Development Bank Integrated

Safeguards System (ISS 2023), policy statement and operational safeguard, and Environmental and Social Assessment Procedures (ESAP 2024) were also reviewed.

### 1.4.3. Google earth and satellite imagery

Google Earth and satellite imagery were valuable tools in the environmental and social assessment of Bosaso City, providing an aerial perspective that aids in analyzing the city's geographic, environmental, and socio-economic characteristics. These resources enabled the identification of land use patterns, natural resources, urban expansion, and areas prone to environmental risks, such as coastal erosion or flood zones. This technology facilitated comprehensive environmental and social reviews. For this assessment the google earth image for the year 2024 was used:

[https://www.google.com/maps/place/Bosaso,+Somalia/@11.270461,49.1621229,5532m/data=!3m2!1e3!4b1!4m6!3m5!1s0x3d96918aac9aa7f3:0x6e8f68a7e697e656!8m2!3d11.2755407!4d49.1878994!16zL20vMDNzdDhy?entry=ttu&g\\_ep=EgoyMDI0MTEwMC4wIKXMDS0ASAFQA w%3D%3D](https://www.google.com/maps/place/Bosaso,+Somalia/@11.270461,49.1621229,5532m/data=!3m2!1e3!4b1!4m6!3m5!1s0x3d96918aac9aa7f3:0x6e8f68a7e697e656!8m2!3d11.2755407!4d49.1878994!16zL20vMDNzdDhy?entry=ttu&g_ep=EgoyMDI0MTEwMC4wIKXMDS0ASAFQA w%3D%3D) Google earth & Satellite imagery

### 1.4.4. Field investigation

Members of the ESIA Team carried out site investigations in September 2024. During the field investigation, information on physical resources, ecological resources, socio-economic aspects, health, cultural, and other values in the project area were collected. Various quantitative and qualitative data collection and information gathering techniques were used in the assessment.

### 1.4.5. Public and stakeholder consultations

The field investigation also included extensive consultations with various stakeholders, including community members along the DL Corridor, as well as different stakeholders and local authorities in the project area. The consultation was carried out to obtain the views of the project resident community on various aspects of the project, background information relevant to the impact assessment (identify any areas of specific concern that needed to be addressed in this assessment), and identification of mitigation measures.

### 1.4.6. Consultations with the design team

The ESIA objectives were integrated into project planning from the outset through regular consultations with the project design team. This involved exchange of project information, informed input in project design, technical clarifications, and incorporating E&S considerations. The communication also allowed the ESIA team to understand project components, phases, and potential impacts, thus, identifying and addressing risks. The ESIA's insights were crucial in shaping design choices, providing recommendations on resource use, waste management, and community health safeguards. Additionally, the consistent communication ensured that E&S considerations were reflected in the project design, making the ESIA study more relevant and applicable throughout the project lifecycle.

### 1.4.7. Description of the baseline environment

Information on the existing natural and socio-economic resources is of fundamental importance for the evaluation of environmental impacts. Therefore, the baseline data on the physical,

biological, and social, cultural, and socio-economic setting of the project were assembled, evaluated, and presented.

#### 1.4.8. Identification of environmental and social impacts

Key potentially beneficial as well as potential impacts on the physical, biological, and socio-economic environment associated with the construction and operation phases of the project were identified and quantified where possible. Method of impact identification and evaluation were categorized on the basis of impact significance as low, medium and high. A low significance rating was given if the impact is minor and does not notably affect the environment or community. Moderate significance was assigned to impacts that are noticeable but manageable through mitigation, while high significance applied to impacts that could cause substantial and potentially irreversible harm without robust mitigation. The magnitude of impacts was assessed in terms of the duration (short-term, medium-term, or long-term). Additionally, the reversibility of the impacts (whether it can be undone or not) were used for to characterize each impact. We evaluated the impacts as positive or negative, direct or indirect, and took into account cumulative effects when multiple impacts interacted. This comprehensive approach helped determine the overall significance of each potential impact.

#### 1.4.9. Environmental mitigation and benefit enhancement measures

Feasible and cost-effective mitigation and benefit enhancement measures that may avoid or reduce potential environmental impacts to acceptable levels were identified and recommended.

#### 1.4.10. Preparation of the ESIA report

The final step was the preparation of the ESIA report. This report has concentrated on key issues and impacts, which are of importance in terms of affecting the overall environmental performance of the project. This report also answers the essential questions needed to establish whether the project as conceived is environmentally and socially viable or should be modified during the construction phase to become acceptable.

#### 1.4.11. Report structure

The content of this ESIA report was designed to meet the requirements and guidelines of the African Development Bank Operational Safeguard (OS) and Integrated Safeguards System (ISS). The content of this ESIA report is as follows:

- Executive Summary: Concisely discusses the purpose and need of the proposed project intervention, significant findings, and recommended actions, including the stakeholders' engagement, the cost of the measures, and the institutional arrangements for implementation.
- Chapter 1: Introduction: Introduces the project and the scope of this report.
- Chapter 2: Institutional and Regulatory Framework: Provides the legislative and regulatory context for the project based on the relevant national and international requirements and guidelines.
- Chapter 3: Project Description: Describes the various elements of the proposed project, including the processing plant and associated facilities.
- Chapter 4: Environmental and Social Baseline gives an overview of the affected biophysical and socio-economic environment in the area of the project.

- Chapter 5: Analysis of Project Alternatives: Outlines the analysis of alternatives for the proposed project.
- Chapter 6: Stakeholders Engagement: Describes the process of public consultation and disclosure adopted for the project and summarizes the issues raised during such consultations. Also describes the mechanism for recording and addressing grievances raised by the public and stakeholders.
- Chapter 7: Potential Environmental and Social Impacts: Describes and rates the significance of the potential impacts identified both before and after the successful implementation of the recommended mitigation measures.
- Chapter 8: Environmental & Social Management Plan (ESMP): Provides the recommended mitigation and management measures to mitigate negative impacts and enhance positive ones for each phase of the project. Provides a plan for ongoing monitoring and management of environmental impacts, specifying timeframes, reporting requirements, and responsibility for each measure.
- Chapter 9: Summary and Conclusions: Summarizes the Key Findings of the ESIA
- Appendixes

## CHAPTER TWO: LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

### 2.1. Overview

This section gives the legal and regulatory framework relevant to the proposed project. Owing to FRS's protracted political instability over the last few decades, there has been the general lack of well-developed environmental laws and administrative frameworks. As such, environmental and natural resources management matters have over the years been managed in accordance with the existing statutes in place. However, FRS is moving towards strengthening its environmental management systems. For instance, a draft environmental and social impact assessment and audit regulations has been finalized<sup>1</sup>. Despite the recent constitutional reforms that define natural resources, common environmental goods, and ecosystem services as protectable public assets and declare the right to a clean and healthy environment, there are still significant gaps in the implementation of environmental legislation in the FRS.

In the following section relevant national policies, strategies, legal and institutional frameworks, guidelines, national and international agreements and AfDB's Integrated Safeguards System are critically reviewed and summarized to make sure that the proposed Power Distribution Project is in line with these legal instruments. Therefore, the project proponent will consult and use these legal instruments as a springboard in the course of project design, construction and operation.

### 2.1. National Laws and Regulatory Framework

#### 2.1.1. Provisional Constitution of Somalia

The Provisional Constitution of Somalia, which was ratified in 2012, emphasizes the value of safeguarding the environment and managing the country's natural resources, particularly in Articles 25, 44, and 45 (which deal with the environment, natural resources, and land, respectively). Relevant provisions include:

- Article 25 guarantees Somali citizens' rights such as a share of the nation's natural resources, protection from excessive exploitation, a healthy environment, and protection from pollution and harmful materials.
- Article 44 mandates the federal government to prioritize environmental protection, conservation, and preservation, preventing harm to natural biodiversity and the ecosystem.
- Article 45 encourages the Somali people to actively participate in the development, execution, management, conservation, and protection of natural resources and the environment.

The Constitution provides for the protection of workers' rights, non-discrimination, human rights promotion, and defence against gender discrimination and GBV in the workplace. Articles 11 ("Equality"), 14 ("Slavery, Servitude, and Forced Labour"), 15

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<sup>1</sup>Ministry of Environment and Climate Change (2024). Final draft environmental and social impact assessment and audit regulations. Ministry of Environment and Climate Change, Mogadishu, Federal Republic of Somalia.

("Liberty and Security of the Person"), 24 ("Labour Relations"), and 27 ("Economic and Social Rights") contain important clauses.

- According to Article 11, "all citizens shall have equal rights and duties before the law, regardless of sex, religion, social or economic status, political opinion, clan, disability, occupation, birth, or dialect." In addition, it says that "even if the actor did not intend this effect, discrimination is deemed to occur if the effect of an action impairs or restricts a person's rights." It further states that no one shall be subjected to discrimination by the official on the grounds of age, race, colour, tribe, ethnicity, culture, dialect, gender, birth, handicap, religion, political opinion, occupation, or wealth and that this prohibition applies to all official programs.
- "A person may not be subjected to slavery, servitude, trafficking, or forced labour for any purpose," according to Article 14.
- Every person has the right to physical integrity, security, and personal liberty, according to Article 15. "The prohibition of all forms of violence, including any form of violence against women, torture, or inhumane treatment" is one of the provisions that falls under this category.
- Article 24 states that "all workers, particularly women, have a special right of protection from sexual abuse, segregation, and discrimination in the workplace." It also enshrines everyone's right to fair labour relations. All labour laws and practices must adhere to the principle of gender equality in the workplace. It also guarantees every worker the freedom to organize and become a member of a trade union, to go on strike, and to negotiate collectively with employers, trade unions, and employees on labour-related matters.
- Every person's access to clean, drinkable water, healthcare, social security, and the realization of their constitutional rights is upheld by Article 27. Additionally, it says, "It shall be ensured that minorities who have long faced discrimination, women, the elderly, and people with disabilities get the necessary support to realize their socio-economic rights."

#### **Relevance**

*The proposed project complies with the Provisional Constitution of Somalia by proposing mitigation measures on how to deal with the social, health, safety and environmental issues for sustainable development. Additionally, the proposed project aims to enhance, upgrade and ensure reliable electricity supply and connectivity for socioeconomic development, especially in urban areas such as Bosaso City and its metropolitan.*

#### **2.1.2. Federal and state regulations on environmental, health, and safety**

Somalia is currently developing its environmental laws and policies. A National Environmental Policy created by the FGS was accepted by the Cabinet on February 13, 2020. On November 26, 2020, the Cabinet adopted the National Environmental Act after it had been drafted. To be effective, both documents must be authorized by the Parliament. Their adoption has no set schedule in place. Environmental Quality Standards, Sectoral Environmental Assessments, Environmental Impact Assessments, and Environmental Audits are among the national environmental policies, regulations, and laws that must be drafted at the federal level by the MoECC that has formed an ESIA council to help with the coordination of ESIA activities and operations in the FRS. Overall, there is concurrence at the national and state levels that the international

standards and best practices in compliance with the AfDB OS should serve as a foundation for conducting the ESIA.

**Relevance**

*The MoEWR (the proponent) including the contractors will be required to fully comply with the environmental and quality standards as per the draft national environment act. The proponent and the contractors engaged in the project will:*

- *Develop and implement a formal construction health and safety plan.*
- *Constitute health and safety committee to oversee safety and health during the construction and operation phases of the project.*
- *Ensure that the workers exposed to hazards and or accidents undergo requisite medical examinations.*
- *Ensure that equipment is serviced properly and/or use of the equipment complies with the threshold noise values provided in the AfDB guidelines*
- *Carry out, and record, a fire risk assessment identifying any possible dangers and risks, and where possible remove, the risk of fire and take precautions to deal with the remaining risks.*
- *Develop and implement an emergency preparedness and response plan (EPRP) to be applied during the construction and operation phases of the project.*
- *Implement mitigation during construction to ensure neighbouring properties are not impacted by nuisance dust.*
- *Observe any existing provisions in the FRS on management of traffic of construction vehicles as guided by the ESMP.*

**2.1.3. Somalia’s Ninth National Development Plan**

Somalia’s ninth National Development Plan (NDP-9)<sup>2</sup>, covering the period 2020-2024, identifies recurrent drought, climate change and environmental degradation as major causes of poverty and food insecurity in Somalia. The NDP-9 prioritizes environmental management, gender and social equity. It focuses on increasing energy supply, particularly from renewable sources, and energy market regulatory reform. Unregulated power production poses a major economic and environmental challenge, leading to high electricity prices and forest destruction. Access to energy is crucial for economic growth and poverty reduction, and the NDP-9 prioritizes investment in the energy sector and energy market regulation. Somalia intends to implement the Power Master Plan (PMP) with support from the World Bank, increasing the supply of renewable energy and establishing regulatory bodies to enhance market efficiency. The PMP highlights the need to diversify energy portfolios and lessen reliance on fossil fuels while identifying supply-side issues such as inadequate capacity for the production of power. Particularly for women and young people, renewable energy can speed inclusive growth and create jobs.

**Relevance**

*The proposed project supports the NDP-9 aims of increasing electricity generation capacity from renewable resources and reducing tariffs, thereby contributing to human and economic development.*

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<sup>2</sup>The NDP-9 is available here: <http://mop.gov.so/wp-content/uploads/2019/12/NDP-9-2020-2024.pdf>



#### 2.1.4. Environmental protection and land use policy and regulation

Somalia's environmental protection and natural resources are under limited federal oversight, with the National Environmental Policy and Act approved by the Cabinet but not yet passed by Parliament. A Climate Change Policy has also been developed. However, federal and state standards and regulations for environmental pollution prevention, waste management, water quality, air quality, and noise have not been formulated or approved. Land use policy and regulation oversight mechanisms are also lacking, with instruments like zoning and land use planning largely absent at federal and state levels.

##### **Relevance**

*As the Bosaso City grows, expanding the power infrastructure is essential to meet increasing energy demands, but it must be done in a way that aligns with environmental stewardship. Proper land use policies can help protect natural habitats, and reduce risks of soil degradation and deforestation. Environmental regulations also ensure that the construction and upgrading of powerlines do not disrupt local ecosystems or harm human health. Effective land use planning can further address issues related to urban sprawl, improve land tenure security, and promote equitable development, ultimately leading to a more resilient and environmentally responsible energy infrastructure for Bosaso City. The proponent will abide by the relevant provisions on environmental protection, land use policy and regulations during all phases of the project.*

#### 2.1.5. Labour and employment law

The Labour Code of Somalia (Law No. 65, adopted in 1972), governs labour and working conditions, including employment contracts, terms and conditions, remuneration, occupational health and safety, trade unions, labour authorities, and maternity leave. The code is currently being reviewed to align with the Provisional Constitution and International Labour Organization (ILO) conventions. The Federal Ministry of Labour and Social Affairs is reviewing the revised draft, which was finalized in February 2019 and awaits Parliamentary approval. The current Labour Code remains in effect until the revised code becomes law. The State laws on labour and employment are also under review to align them to the Provisional Constitution and ILO standards.

##### **Relevance**

- *The proposed project has an obligation to adhere to all the principles and tenets of the Labour Code (1972) pending any ongoing changes and amendments. The proposed project will adhere to the principles of the ILO conventions ratified by the Federal Government of Somalia (FGS), and the relevant provisions of the Provisional Constitution, when dealing with work and labour aspects during construction and operation phases of the project.*
- *The proponent and the contractors will abide by the existing labour laws, including any amendments thereof, including abiding with all stipulations on employee management and relations in all the phases of the project.*
- *The Proponent and Contractor will maintain an insurance policy cover for its employees, record of accident, carryout proper accident investigations; organize*

*for pre-employment and regular medical examinations for staff during construction and operation phases of the project.*

- *The proponent and the contractor will sensitize workers against abuse and exploitation of children, and shall not engage in any child labour during all phases of the project.*

### 2.1.6. Policy and law on gender equality and GBV

Gender Based Violence (GBV) remains one of the most serious threats to the health and safety of women and girls globally. The situation is dire in Somalia where women and girls are at more risk of rape, Intimate Partner Violence (IPV), early and forced marriage and FGM. The Somalia context is fraught with GBV and protection concerns, especially for women and girls<sup>3</sup>. For example, a recent study on GBV in Somalia<sup>4</sup> found out that 18.5% of the women and girls in the IDP camps had experienced gender-based violence in the last 12 months. Further investigation into the nature of the violence revealed that 44.0% of the violence against women and girls were physical assaults, followed by psychological abuse (24.8%), forced marriage (18.8%), attempted rape (7.2%), rape (4.0%) and denial of resources (1.6%). The study showed that about half (57.7%) of that violence were committed by intimate partners or relatives, mostly (60.6%) during the daytime. Moreover, a little over half (57.7%) of the victims were over 20 years old, and 43.7% of them experienced assault more than once.

While there are no specific data on GBV in Puntland State, considerable progress has been made by the Puntland State in addressing the GBV. For example, a ‘Report of the Independent Expert on the Situation of human rights in Somalia’, dated 6 September 2017, submitted to the United Nations Human Rights Council, stated: The Puntland Minister of Women and Human Rights Development explained that the Government had taken measures to protect women against sexual and gender-based violence, and described the progress made in their protection. In 2015, Puntland adopted the Puntland Rape Act, which facilitated the trial of rape cases in formal courts. Chapter 19 of the Rape Act, on the special duties of the prosecution authorities where the accused is charged with a sexual offence, provides that the decision to prosecute the perpetrator of a sexual offence or any other offence under that law will be made by the Attorney General, not the complainant, and that the Somali Penal Code shall not apply to rape cases. It also provides that the prosecution authorities may establish specialized units with specialized<sup>5</sup>

Somalia's National Gender Policy (2016) has been approved by the Federal Council of Ministers. The Policy aims to promote gender equality and sustainable human development by valuing women and men's contributions in economic empowerment, education, health, and political transformation. The policy outlines gender priorities in health, education, economic empowerment, and political participation. Prioritizing rural areas, the policy focuses on creating economic opportunities for both genders, including

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<sup>3</sup> file:///C:/Users/pc/Downloads/GBV%20Bulletin%20Apr%20-%20Jun%202018%20Final-1.pdf

<sup>4</sup> Hassan, A.D., Mohamed M.D. & Bashir, S.H. (2023). Prevalence, patterns, and determinants of gender-based violence among women and girls in IDP camps, Mogadishu-Somalia. *Journal of Migration and Health*, Volume 8. <https://doi.org/10.1016/j.jmh.2023.100193>.

<sup>5</sup> <https://land.igad.int/index.php/documents-1/countries/somalia/gender-4/897-women-fearing-gender-based-violence-2018/file>

vocational, entrepreneurs, and skills enhancement programs and training for women and men, including those with disabilities. The FGS has drafted the Sexual Offenses Bill (2017) with support from the UN, which has been tabled with the Parliament and is still under review. The pre-existing Penal Code (1962) includes some provisions relevant to addressing GBV, including criminalizing rape, but it does not provide an adequate legal framework for dealing with GBV cases<sup>6</sup>. In practice, most GBV cases are dealt with by the customary system.

**Relevance**

*In the absence of appropriate measures, the project can exacerbate gender inequalities and sexual and gender-based violence. In adherence to this policy, measures will be put in place to ensure gender inclusivity in decision making, employment opportunity and access to the energy generated by the project, and mitigate social risks including sexual and gender-based violence, and any form of discriminations.*

### 2.1.7. Somalia’s Power Master Plan, 2018

Developed by government of Somalia in coordination with the World Bank, the PMP seeks to create an enabling environment for independent power producers and the policy, legal and regulatory framework for the sector.

**Relevance**

*The Plan outlines key priorities for improving electricity access, increasing generation capacity, and enhancing grid stability, which directly informs the planning and implementation of projects in urban centers like Bosaso. By aligning the expansion efforts with the Power Master Plan, the city can ensure that its energy infrastructure supports long-term economic growth, reduces reliance on costly and polluting diesel generators, and meets the needs of both residents and businesses. Additionally, the Plan emphasizes renewable energy sources, offering Bosaso an opportunity to incorporate greener solutions into its energy mix, fostering environmental sustainability and resilience in the face of climate change. The proponent shall ensure that the proposed project is fully aligned with all the provisions of the masterplan.*

### 2.1.8. Energy policy and regulations

At the moment, Somalia lacks both an energy sector regulatory framework and an energy policy. However, the FGS has made the creation of an energy policy, strategy, and regulatory framework a top priority, in accordance with the NPD-9 and PMP, and a number of laws and rules are presently being developed. At the moment, the responsibility for managing the energy industry rests with the Federal Ministry of Energy and Water Resources (MoEWR). A draft Energy Policy was created by the MoEWR in 2018, and in order to give the industry a complete framework, they are currently working on an Energy Act and Regulations. Currently, the World Bank, African Development Bank (AfDB), and United States Agency for International Development (USAID) are

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<sup>6</sup> See UNDP, UN Women, and UNFPA, 2018. Somalia Gender Justice and the Law. Available at [https://www.undp.org/content/dam/somalia/docs/Project\\_Documents/Womens\\_Empowerment/Gender%20in%20Somalia%20Brief%20202.pdf](https://www.undp.org/content/dam/somalia/docs/Project_Documents/Womens_Empowerment/Gender%20in%20Somalia%20Brief%20202.pdf) for a review of the Penal Code (1962) provisions relevant to GBV.

some of the main partners supporting the implementation of the PMP and providing technical assistance to the FGS in the energy sector.

**Relevance**

*Energy policy regulation plays a critical role in the proposed upgrade and expansion of Bosaso City's electricity supply by providing a structured framework for ensuring the development of a reliable, affordable, and sustainable energy system. Clear policies and regulations help guide the planning, financing, and implementation of power infrastructure projects, addressing issues such as grid stability, generation capacity, and energy access. They also promote transparency, encourage private sector participation, and ensure that the electricity supply meets safety and environmental standards. In Bosaso, where energy demand is growing rapidly, energy policy regulation can facilitate the integration of renewable energy sources, optimize resource use, and create a favourable investment climate. Moreover, these regulations ensure that the expansion is equitable, balancing the needs of urban residents, businesses, and potential future growth, while also contributing to the broader goals of national energy security and sustainability. The proponent will ensure full adherence to all provisions of the policy.*

**2.1.9. Somalia's Intended Nationally Determined Contributions (INDCs), 2015**

The report notes that Somalia has vast untapped renewable energy resources, stating that average solar potential stands at 5-7 kWh/m<sup>2</sup>/day.

**Relevance**

*Somalia's Intended Nationally Determined Contributions (INDCs), 2015, are highly relevant to the proposed upgrade and expansion of Bosaso City's electricity supply, as they outline the country's commitments to mitigating climate change and reducing greenhouse gas emissions. These commitments emphasize the importance of transitioning to clean and renewable energy sources, which aligns with the goal of modernizing Bosaso's power infrastructure. By focusing on renewable energy, such as solar and wind power, the city can not only meet growing energy demands but also contribute to Somalia's broader climate goals. The INDCs also promote energy efficiency and environmental sustainability, ensuring that energy development in Bosaso is in line with international climate agreements. Incorporating these objectives into the electricity supply upgrade would help Bosaso reduce its carbon footprint, promote long-term environmental resilience, and align with global efforts to combat climate change, while enhancing energy access for the city's residents.*

**2.1.10. Customary legal system and sharia law**

Somalia's legal system comprises of civil law, sharia law, and customary law. The Provisional Constitution (2012) defines the country's federal structure and hierarchy of laws. The customary legal system in Somalia, known as the *xeer* system, is crucial for land rights and resource management due to weak formal regulation. This system governs property, enforces contracts, and resolves disputes. Despite variations across regions and clans, it is applicable in most of the country. The *xeer* system is compensatory, majoritarian, and uses clan insurance to protect against violations. Elders act as judges or mediators, considering precedent and custom.

The customary *Xeer* system also handles most cases of sexual violence and GBV. The FGS and some Federal Member States are making efforts to reintroduce common law courts, but the capacity of and trust in the formal justice system remains weak, and the customary system functions in parallel to state law. A number of customary practices go against basic human rights standards and serve to revictimize GBV survivors, for example, crimes of rape are commonly resolved through the marriage of the victim to the perpetrator, and revenge and honour killings are tolerated<sup>7</sup>. Numerous cultural and institutional barriers limit women’s access to justice, including fear of punishment, reprisals and harassment for reporting GBV incidents, and social stigma<sup>8</sup>.

**Relevance**

*All the power distribution projects are required to operate under the existing customary laws within the states where their projects are located. They are further expected to respect the existing customary laws in handling their relationships with all the stakeholders they engage in their areas of operation. The proponent will observe all the relevant provisions of the customary legal systems and sharia laws related to land management (as appropriate) in all phases of the project.*

#### 2.1.11. Legal framework for landownership and expropriation in FRS and Puntland State

A mix of statutory, customary, and Islamic law influences the legal framework for land ownership and expropriation in Somalia. The Federal Constitution, alongside Puntland’s State laws, acknowledges private property rights and guarantees protection against unlawful deprivation. However, expropriations are permitted for public interest, subject to fair compensation, as outlined in Puntland’s Land Law, which emphasizes community consultation and compensation principles. Customary law (*Xeer*) and Islamic principles play a significant role, especially in rural areas, where clan-based land tenure often dictates land allocation and ownership. Puntland’s regional government is actively working to formalize land ownership structures, yet significant challenges persist due to limited legal infrastructure, enforcement capacity, and conflicts over land rights, particularly in urban expansion and infrastructure development areas.

Consultations with local authorities in Bosaso regarding land ownership revealed the crucial role that Bosaso Municipality can play in facilitating land management and ensuring proper governance during the project implementation. The municipality is expected to be a key stakeholder in overseeing, addressing disputes, and guiding fair relocations when private or public structures are impacted during the project implementation. These discussions highlighted the need for clear communication, adherence to local land laws, and collaboration with community members to mitigate potential conflicts and ensure that the expansion project is executed in a manner that respects property rights and supports urban development.

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<sup>7</sup>See UNDP, UN Women, and UNFPA, 2018 for further discussion of how the customary system handles GBV cases as well as other barriers to access to justice for GBV survivors.

<sup>8</sup>UNDP, UN Women, and UNFPA, 2018.

**Relevance**

*Since land tenure in Bosaso includes a mix of statutory titles, customary claims, and clan-based ownership, the framework helps reconcile these various rights, ensuring lawful land access for the project. This legal structure is essential for minimizing disputes and fostering community acceptance by providing fair treatment and clear grievance mechanisms for those impacted by the expansion.*

### 2.1.12. Institutional framework for management of E&S in FRS and Puntland State

The institutional framework for Environmental and Social (E&S) management in the Federal Republic of Somalia (FRS) and Puntland State involves multiple governmental bodies responsible for enforcing E&S policies, with regional nuances. At the federal level, the Ministry of Environment and Climate Change (MoECC) oversees E&S policy formulation, regulation, and compliance across Somalia, setting baseline standards and coordinating with international partners. In Puntland State, the Ministry of Environment, Agriculture, and Climate Change (MoEACC) is the primary institution governing environmental and social issues, implementing policies tailored to regional needs, such as climate resilience, land use, and biodiversity conservation. Additionally, local authorities collaborate with MoEACC on monitoring and compliance, particularly in urban areas. Customary law also influences E&S management, especially in rural and nomadic communities, where traditional practices and local leaders often supplement formal regulatory frameworks. However, enforcement remains a challenge due to resource limitations and varying levels of institutional capacity.

Apart from resource constraints, the Ministry faces several challenges that are likely to hinder its ability to effectively enforce existing environmental regulations during the project. These challenges include limited technical capacity and expertise among staff, which affects the thorough assessment and monitoring of environmental impacts. Additionally, institutional weaknesses, such as unclear roles and overlapping mandates with other agencies, lead to coordination difficulties. The ministry is also likely to encounter challenges related to insufficient public awareness, which can result in community resistance or non-compliance. Furthermore, political and security instability in the region can disrupt project oversight and enforcement activities, further complicating regulatory adherence.

**Relevance**

*The established mechanisms for monitoring compliance and addressing grievances are critical for mitigating potential adverse impacts, enhancing community trust, and promoting public support for the power grid expansion, ultimately contributing to the project's long-term success and sustainability.*

## 2.2. Puntland State Laws and Regulatory Framework

### 2.2.1. Overview

Puntland State has several key environmental policies and frameworks in place. The Environmental Policy, produced in 2014 and approved by both the Cabinet and Parliament, serves as a foundational document. Additionally, the Environmental and Social Impact Assessment (ESIA) guidelines and regulations are supported by the

Puntland Environmental Impact Assessment Act, which operationalizes the "Environmental Impact Assessment Unit" within the Ministry. This unit is headed by the Director of ESIA and includes a team of qualified professionals with specialized training in Environmental Impact Assessment. Their functions include: receiving, processing, and safeguarding all ESIA-related documents submitted to the Ministry, Reviewing and making recommendations to the Director General, and advising the Ministry on whether a proposed major project should be objected to or halted due to unacceptable environmental impacts. The following are the relevant policies, laws, and regulations in Puntland State shall be applicable to the proposed project:

### 2.2.2. Puntland State Rangeland Management Policy (2016-2025)

The Puntland Rangeland Management Policy 2nd Edition (2016-2025) outlines a strategic framework to sustainably manage and rehabilitate rangelands in Puntland, Somalia. The policy emphasizes the protection of natural resources, restoration of degraded lands, and sustainable grazing practices to support pastoral livelihoods. It promotes community participation, equitable resource access, and collaboration among stakeholders, including government, local communities, and development partners. The policy also addresses climate change adaptation, drought resilience, and the importance of environmental conservation for the long-term productivity of rangelands, aiming to balance ecological integrity with socio-economic needs.

#### **Relevance**

*The Puntland State Rangeland Management Policy is crucial for the proposed project, especially in Bosaso, as it emphasizes sustainable land use and natural resource management. Aligning the project with the policy's objectives, such as minimizing land degradation and ensuring local pastoralist communities' protection, supports sustainable development goals.*

### 2.2.3. Puntland State Waste Management Policy (2006)

The Puntland Waste Management Policy (2016) provides a comprehensive framework aimed at addressing waste management challenges in Puntland State. It emphasizes the need for effective waste collection, transportation, and disposal systems, with a focus on minimizing environmental pollution and health hazards. The policy promotes waste reduction, recycling, and the safe handling of hazardous materials, while encouraging community participation and private sector involvement in waste management initiatives. It also seeks to strengthen institutional capacity, legal frameworks, and public awareness to foster sustainable waste management practices that protect both human health and the environment.

#### **Relevance**

*The policy emphasizes waste reduction, proper handling, and disposal of hazardous materials, and the importance of minimizing pollution. By adhering to these guidelines, the proposed project can manage its waste streams responsibly, prevent environmental contamination, and align with best practices for waste management. This alignment not only helps in complying with regulatory requirements but also supports broader environmental protection goals and contributes to sustainable development in the region.*

#### 2.2.4. Puntland State ESIA Act and Regulation (2016) Approved by Cabinet and Parliament

The Puntland Environmental and Social Impact Assessment (ESIA) Act and Regulation (2016), approved by the Cabinet and Parliament, establishes a legal framework for assessing the environmental and social impacts of development projects in Puntland, Somalia. The act mandates that all significant projects undergo an ESIA process to identify potential adverse effects on the environment and communities before they are approved. It sets guidelines for public participation, environmental protection, and social safeguards, ensuring that projects align with sustainable development goals. The act also strengthens the role of regulatory authorities in monitoring compliance and enforcing mitigation measures to minimize negative impacts on natural resources and local populations.

##### **Relevance**

*The Act mandates that all significant projects, such as the powerlines upgrades and expansions, undergo an ESIA to identify, evaluate, and mitigate potential environmental and social impacts before project approval. By following these regulations, the project ensures compliance with legal requirements, addresses potential environmental and social risks proactively, and promotes transparency and stakeholder engagement. This adherence helps to safeguard environmental quality and community well-being while supporting sustainable development goals in Puntland.*

#### 2.2.5. Puntland State Climate Change Strategy (2016)

The Puntland Climate Change Strategy (2016) outlines a comprehensive plan to address the impacts of climate change in Puntland, Somalia, by focusing on adaptation and mitigation measures. The strategy emphasizes strengthening the resilience of communities, particularly those dependent on pastoralism and agriculture, by promoting sustainable land and water management practices. It prioritizes climate-smart approaches, such as reforestation, renewable energy, and disaster risk reduction, while enhancing institutional capacity and policy coordination. The strategy also highlights the importance of research, data collection, and public awareness to better understand climate risks and implement effective responses, contributing to long-term environmental sustainability and socio-economic stability.

##### **Relevance**

*The strategy emphasizes the need for integrating climate resilience into development projects, promoting renewable energy, and reducing greenhouse gas emissions. By aligning the proposed project with these strategic goals, the project can enhance its climate resilience, contribute to reducing carbon footprints, and support sustainable energy solutions. This alignment not only complies with regional climate goals but also strengthens the project's overall sustainability and environmental stewardship.*



### 2.2.6. Puntland State Ministry of Environment and Climate Change Strategic Plan (2016-2020)

The Puntland Ministry of Environment and Climate Change Strategic Plan (2016-2020) sets a roadmap for safeguarding the region's environment and addressing climate change through sustainable resource management and policy implementation. The plan focuses on enhancing institutional capacity, strengthening environmental governance, and promoting climate adaptation and mitigation strategies. Key priorities include biodiversity conservation, combating land degradation, and advancing renewable energy and waste management solutions. The strategy also emphasizes community involvement, stakeholder collaboration, and raising public awareness to foster sustainable development while improving resilience to climate change and environmental challenges across Puntland.

#### **Relevance**

*The plan focuses on enhancing environmental governance, promoting sustainable resource management, and improving climate resilience, which are essential for ensuring that the power plant's development aligns with these objectives. By integrating the strategic priorities of the plan, such as effective environmental monitoring and stakeholder engagement, the project can better manage its environmental impacts, adhere to regulatory requirements, and contribute positively to regional sustainability and climate goals.*

### 2.2.7: Puntland State Environmental Policy (2014) Approved by the Cabinet and Parliament

Puntland's Environmental Policy (2014), approved by the Cabinet and Parliament, and establishes a foundational framework for the protection, conservation, and sustainable use of natural resources in Puntland State, Somalia. The policy focuses on addressing environmental degradation, promoting biodiversity conservation, and ensuring the sustainable management of land, water, and forests. It advocates for integrating environmental considerations into all development plans and projects while enhancing institutional capacities to enforce environmental regulations. The policy also encourages community participation, public awareness, and partnerships with various stakeholders to foster sustainable development and resilience to environmental challenges, such as desertification and climate change.

#### **Relevance**

*The policy emphasizes the need for balancing economic growth with environmental protection, particularly in the energy sector. It outlines guidelines for minimizing environmental impacts, promoting renewable energy, and ensuring community participation in decision-making processes.*

### 2.2.8: Puntland State Environmental Management Act (2016) Approved by Cabinet

Puntland's Environmental Management Act (2016), approved by the Cabinet, and provides a legal framework for the protection, conservation, and sustainable management of the environment in Puntland, Somalia. The Act establishes regulations for preventing environmental degradation and promoting responsible resource use

across various sectors, including land, water, and forestry. It mandates environmental assessments for development projects, reinforces institutional responsibilities for environmental monitoring, and ensures compliance with environmental standards. The Act also fosters public participation, transparency, and accountability in environmental governance, aiming to balance economic development with the preservation of natural ecosystems and biodiversity in the region.

**Relevance**

*This act mandates comprehensive environmental assessments and enforces regulations on waste management, pollution control, and the conservation of natural resources. For the hybrid power plant, it ensures that environmental impacts such as emissions, waste generation, and land use are thoroughly evaluated and mitigated. Compliance with this act is essential for obtaining the necessary permits and ensuring that the project adheres to Puntland's environmental standards.*

### **2.3. Institutional framework for implementing E&S in FRS and Puntland state**

The capacity for environmental and social (E&S) management at the project implementation agency and related institutions in the Federal Republic of Somalia (FRS) and Puntland State varies, with some notable strengths and significant gaps. In Puntland, the Ministry of Environment, Agriculture, and Climate Change (MoEACC) plays a critical role in E&S oversight, equipped with a dedicated unit responsible for reviewing environmental impact assessments (EIAs) and ensuring compliance with national E&S standards. However, the unit often faces challenges such as limited resources, insufficient staffing, and a lack of qualified E&S experts, which can hinder effective project evaluation and monitoring. Similarly, other relevant institutions, including the Ministry of Energy and Water Resources (MoEWR), lack adequately trained personnel and technical capacity to conduct thorough assessments.

In the broader context of the FRS, the institutional framework for E&S management also shows similar gaps, with regulatory bodies like the Ministry of Environment and Climate Change struggling to maintain effective oversight due to financial constraints and limited infrastructure. The regulatory body with the authority for the review and approval of Environmental and Social Impact Assessment (ESIA) documents is primarily the MoEACC in Puntland, while the federal level MoECC holds similar responsibilities for projects across the FRS. While these bodies have the authority to review ESIA, their capacity to process and evaluate documents efficiently can be compromised by insufficient staffing, lack of technical expertise, and limited public engagement mechanisms. Addressing these gaps is essential for enhancing the E&S capacity of institutions and ensuring robust environmental governance in the implementation of projects such as the power grid expansion in Bosaso.

#### **2.3.1. Energy sector standards related to environmental, health and safety in FRS and Puntland State**

At the federal level, the Ministry of Energy and Water Resources (MoEWR) has initiated policies that outline EHS guidelines for energy projects, focusing on pollution control, safe working conditions, and minimizing impacts on local communities and ecosystems.

Puntland State aligns with these federal standards while adapting them to local contexts, with the Ministry of Environment, Agriculture, and Climate Change (MoEACC) playing a key role in enforcing environmental impact assessments (EIAs) and implementing safety protocols for energy projects, particularly for renewable energy and off-grid solutions. While these frameworks aim to mitigate risks, limited regulatory capacity and enforcement resources challenge full compliance, especially in remote and underserved areas.

**Relevance**

*By aligning with national and international EHS standards, the power grid expansion can foster sustainable energy development while mitigating risks associated with construction activities, such as air and noise pollution and worker safety hazards. Compliance with these standards is essential for building community trust, securing permits, and attracting investment, ultimately facilitating a more responsible and effective approach to enhancing the energy infrastructure in Bosaso.*

### 2.3.2. E&S Capacity at the Project Implementation Agency

The Project Implementation Agency and related institutions responsible for the Bosaso Power Grid upgrade and expansion project demonstrated varying levels of Environmental and Social (E&S) capacity. The presence of dedicated E&S units, which is crucial for ensuring compliance with environmental and social safeguards throughout the project's lifecycle, was found to be lacking. Generally, the availability of qualified E&S experts was found to be limited, and this may hinder effective monitoring and management of potential impacts. Strengthening institutional capacity through training and recruitment of skilled E&S professionals is considered essential to enhance oversight, ensure adherence to relevant policies, and maintain engagement with stakeholders. Capacity-building measures would thus support the project's alignment with best practices in environmental and social performance.

**Relevance**

*Robust E&S expertise ensures that the project adheres to international and national standards for environmental protection and social responsibility. This capacity enables proactive identification, assessment, and management of potential environmental and social risks, thus minimizing adverse impacts on communities and ecosystems. Additionally, it supports comprehensive stakeholder engagement, transparent communication, and the implementation of appropriate mitigation measures. Such capabilities are essential for fostering community trust, ensuring compliance with regulatory requirements, and facilitating the project's sustainable development.*

## 2.4. Regional and International / Multilateral Agreement

### 2.4.1. Overview

In addition to the FRS and Puntland State environmental legislations, Somalia is also a party to some regional and international conventions and protocols which are of relevance to the project. The FRS is a signatory to a number of international treaties, conventions and agreements that include legally binding commitments to protect the

environment and to ensure the sustainable management of natural resources. These include:

#### 2.4.2. The United Nations Convention on biological diversity (CBD), 1992

Article 8 – In-situ conservation (d) Promoting protection of ecosystems, natural habitats and maintenance of viable populations of species in natural surroundings (j) Respecting, preserving and maintaining knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application.

##### **Relevance**

*The project will not adversely affect biological diversity since it is not a greenfield project but rather an expansion and an upgrade of the existing power supply infrastructure. Implementation of the project will help mitigate climate change a key driver of biodiversity loss.*

#### 2.4.3. The UN Framework Convention on Climate Change (UNFCCC) (ratified in 2009).

The primary objective of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." Somalia submitted its new climate action plan (Intended Nationally Determined Contribution) to the UNFCCC in 2015. Somalia has also developed the National Adaptation Program of Action on Climate Change (NAPA), which includes a climate risk assessment<sup>9</sup>.

##### **Relevance**

*The project will ensure a reliable supply of electricity mainly from solar array replacing existing diesel power generation and thereby cutting GHG emissions.*

#### 2.4.4. The UN Convention to Combat Desertification (UNCCD) (ratified in 2002).

The Convention combats desertification in those countries that experience serious droughts and/or desertification. Somalia has developed a National Action Programme for the UNCCD<sup>10</sup>.

##### **Relevance**

*The UNCCD emphasizes sustainable land management practices to prevent desertification and promote the restoration of degraded lands. By aligning the proposed solar power plant project with the principles of the UNCCD. The proposed project will be undertaken in an area that has undergone anthropogenic modifications of different strengths. As such, the proponent will be implementing one of the strategies to minimize environmental impacts, such as using previously degraded lands for the installation, incorporating land restoration measures, and*

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<sup>9</sup>The Somalia National Adaptation Programme of Action: <https://www.wiomsa.org/download/national-adaptation-programme-of-action-somalianapa/>

<sup>10</sup>The Somalia National Action Programme on UNCCD: <https://knowledge.unccd.int/sites/default/files/naps/2018-06/NAP%20Full%20Report%20-%20Final%2023%20May%20digital.pdf>

*maintaining vegetation cover. This approach not only helps to combat desertification but also enhances the project's environmental sustainability, ensuring that it contributes positively to both energy supply and land conservation efforts in vulnerable areas.*

#### 2.4.5. Convention on the Conservation of Migratory Species of Wild Animals (ratified 1985).

This Convention aims to protect those species of wild animals that migrate across or outside national boundaries from becoming endangered.

##### **Relevance**

*Power lines can pose risks to migratory birds and other wildlife through habitat disruption, collisions with infrastructure, and changes to the local environment. To adhere to the principles of the CMS, the proposed project will adopt a design layout to implement bird-friendly power line infrastructure designs, and monitoring wildlife movements. Aligning the project with the CMS will support global biodiversity conservation efforts, ensuring that the power line development is environmentally responsible and sustainable.*

#### 2.4.6. Protocol concerning Regional cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency (ratified 1988)

Combats pollution by oil and other harmful substances by enhancing measures for responding to pollution emergencies on a national and regional basis.

##### **Relevance**

*The proposed project will involve activities that carry pollution risks, such as the use of machinery, transportation of hazardous substances, and the potential for spills during maintenance or installation processes. This protocol emphasizes regional cooperation and preparedness to address pollution emergencies, ensuring that any accidental releases of harmful substances are swiftly and effectively managed. The proponent will align with the protocol by developing contingency plans and EPRP for effective emergency responses and implement best practices to minimize environmental risks. This not only helps protect against pollution but will also strengthen the project's commitment to environmental stewardship and regional cooperation.*

#### 2.4.7. Sustainable Development goals (SDGs) and agenda 2063 in Africa

Key targets of the SDG 7 – Ensure access to affordable, reliable, sustainable and modern energy for all – are by 2030, ensure universal access to affordable, reliable and modern energy services

##### **Relevance**

*Implementation of the project will contribute increased reliable electricity supply capacity in Somalia. This is one barrier to increasing affordable access to electricity. However, the project, in itself, will not automatically increase access to electricity for households as this also depends on the tariffs, distribution networks, and regulatory*

*frameworks that are beyond the scope of the project itself. It is hoped that the project will generate interest in and incentivize complementary investment and intervention in the energy sector by the government, development partners, and private sector in Puntland State to expand access to electricity in the city.*

#### 2.4.8. International Labour Organization Agreements

Somalia is also a signatory to the International Labour Organization (ILO) Conventions that include legally binding commitments relevant to labour and employment conditions and the social aspects of the project. These include commitments to equal opportunities for women in employment, ending violence and harassment in the workplace, workplace health and safety, and ending child and forced labour, among other areas. Some of the relevant provisions of the ILO that the Country has ratified include:

- Discrimination (Employment and Occupation) Convention (No. 111) (ratified in 1961).
- Forced Labour Convention (No.29) (ratified in 1960).
- Freedom of Association and Protection of the Right of Organize Convention (No. 87) and Right to Organize and Collective Bargaining Convention (No.98) (ratified in 2014).
- Abolition of Forced Labour Conventions (No. 105) (ratified in 2014).
- Worst Forms of Child Labour Convention (No. 182) (ratified in 2014).
- Violence and Harassment Convention (No 190) (ratified in 2021).
- The Tripartite Consultation (International Labour Standards) Convention (No. 144) (ratified in 2021).
- The Occupational Safety and Health Convention (No. 155) and Promotional Framework for Occupational Safety and Health Convention (No. 187) (ratified in 2021).
- Private Employment Agencies Convention (No. 181) (ratified in 2021).
- The Migration for Employment Convention (Revised) (No. 97) and Migrant Workers (Supplementary Provisions) Convention (No. 143) (ratified in 2021).

#### **Relevance**

*Project implementation will adhere to the principles of the ILO conventions ratified by Somalia. These include that:*

- *Contractors will be obliged to have policies and procedures in place to ensure equal opportunities for and treatment of employees regardless race, color, gender/sex, religion, political opinion, or social opinion.*
- *Employment practices are non-discriminatory, and to take active measures to prevent and violence, harassment and discrimination in the workplace;*
- *They will be obliged to adhere to workplace health and safety standards.*
- *Contractors and suppliers will be contractually obligated to comply with the required local and international practices, to have a human rights policy, and to have employment processes that provide the standard terms of employment for casual and temporary workers.*

## 2.5. Environmental and Social Safeguard Policies and Procedures of African Development Bank

### 2.5.1. The Integrated Safeguards Systems (ISS) of the AfDB

The African Development Bank adopted the 2013 Integrated Safeguards System (ISS) in 2013 to align Operational Safeguards with new policies, adopt Good International Industry Practice, adapt to evolving lending and investment products, harmonize safeguards with other multilateral finance institutions, and improve internal processes and resource allocation. The updated ISS (2024) focuses on mainstreaming safeguards in Bank-supported operations, providing appropriate safeguard approaches for new policies and financing mechanisms, and integrating Environmental and Social (ES) risks into operations. It improves convergence with other MFIs, aligns with key thematic issues, and broadens coverage of E&S risks. The ISS also differentiates roles and responsibilities between the Bank and its Borrowers, provides more direction on E&S requirements for projects, and supports regional member countries in achieving Sustainable Development Goals. It also assists in strengthening safeguards systems and managing E&S risks.

The updated ISS includes the African Development Bank Group's Vision for Sustainable Development, Environmental and Social Policy, ten Operating Standards (OSs), and ISS Guidance Notes. These guidelines provide technical guidance on methodological approaches, Good International Industry Practice (GIIP), and standards for meeting OSs requirements. They are supplemented by World Bank Group Environmental, Health and Safety (EHS) Guidelines, providing advisory information. The ten Environmental and Social (E&S) Operating Standards (OSs) outline requirements for Borrowers to identify and manage E&S risks, aiming to protect communities, reduce poverty, and increase prosperity. The updated AfDB OS relevant to the project are as follows:

- E&S OS 1 (OS1): Assessment and Management of Environmental and Social Risks and Impacts
- E&S OS 2 (OS2): Labour and Working Conditions
- E&S OS 3 (OS3): Resource Efficiency and Pollution Prevention and Management
- E&S OS 4 (OS4): Community Health, Safety and Security
- E&S OS 5 (OS5): Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement
- E&S OS 6 (OS6): Habitat and Biodiversity Conservation and Sustainable Management of Living Natural Resources
- E&S OS 7 (OS7): Vulnerable Groups
- E&S OS 8 (OS8): Cultural Heritage
- E&S OS 10 (OS10): Stakeholder Engagement and Information Disclosure.

### 2.5.2. The AfDB Operating Standards

#### 2.5.2.1. E&S OS 1 (OS1): Assessment and Management of Environmental and Social Risks and Impacts

This overarching safeguard governs the process of determining a project's environmental and social Category and the resulting environmental and social assessment requirements. The objective of this Operational Safeguard (OS) is to ensure that financed projects by Bank operations are environmentally and socially compatible and also ascertain that it

contributes to sustainable development including those related to climate change vulnerability. It also ensures that appropriate decisions are taken through the comprehensive analysis of various activities and their respective likely impacts. This OS will be triggered as the project likely to have potential (adverse) environmental risks and impacts on its area of influence. This section covers areas related to the general environment i.e. physical (land, water, air, climate,), socio-economic and cultural (occupational, gender, human well-being, and safety; physical cultural resources) of the community, transboundary, global impacts including pollution control (greenhouse gas (GHG) emissions), and vulnerability to climate-change effects. Environmental and Social Impact Assessment (ESIA) is conducted to identify the various hazards or risk assessment and recommended the respective mitigation measures to be included in the environmental and social management plan (ESMP). Given the nature and scope of the proposed power distribution project, this OS 1 is triggered because the project will likely have different environmental and social impacts. It is in this regard that the project has been subjected to full ESIA to meet this policy requirement, which makes the proposed project eligible for the African Development Bank (AfDB) financing. The Environment and social assessment will include the project area of influence, a comprehensive scoping of the project's components, consideration of alternatives, and assessment of impacts, including cumulative impacts, where relevant.

#### **Key requirements**

*The AfDB OS1 outlines key requirements for the assessment and management of environmental and social risks and impacts that borrowers and implementing agencies must adhere to during the preparation and implementation of the Bosaso Power Expansion Project. According to the AfDB's Integrated Safeguards System (ISS) 2023, the implementing agency is required to conduct a comprehensive Environmental and Social Impact Assessment (ESIA) to identify potential adverse effects on communities, ecosystems, and local economies. This assessment must be participatory, incorporating stakeholder engagement throughout the project lifecycle to ensure that affected communities are informed and consulted. Furthermore, the borrower must develop an Environmental and Social Management Plan (ESMP) that outlines mitigation measures, monitoring frameworks, and roles and responsibilities for implementation. Compliance with national laws and AfDB E&S standards is essential, along with the establishment of grievance mechanisms to address community concerns. For high-risk category 1 projects like the Bosaso Project, the implementing agency is required to assign in-house qualified E&S experts and provide monthly ESMP implementation and reporting to the AfDB.*

#### **2.5.2.2. E&S OS 2 (OS2): Labour and Working Conditions**

OS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions. Respect of workers' rights is one of the keystones for developing a strong and productive workforce. This OS is informed by the International Labour Organization's (ILO) Declaration on the Fundamental Principles and Rights at Work, and the United Nations Guiding Principles on Business and Human Rights. Overall, the OS2 aims to protect workers' rights, promote workplace safety and health, and ensure



fair treatment, non-discrimination, and equal opportunity for project workers. It includes vulnerable workers like women, persons with disabilities, children, and migrant workers. The OS also prevents forced labor and child labor, supports freedom of association and collective bargaining, and aligns Bank requirements with ILO, UN Conventions, and Conventions. It provides accessible means for workers to raise workplace concerns and requires timely notification of adverse impacts on labor protection and workplace health and safety. Minimum age for employment under the FRS labour code 1972 is provided as fifteen (15) years.

**Key requirements**

*According to the AfDB's Integrated Safeguards System (ISS) 2023, the borrower/implementing agency is expected to ensure fair and equitable labor practices, adhering to national labor laws and international labor standards. This includes providing safe working conditions, adequate wages, and non-discriminatory practices, as well as preventing forced labor and child labor. The borrower/implementing agency must also establish a comprehensive labor management plan that outlines procedures for worker recruitment, employment contracts, and grievance mechanisms to address worker concerns effectively. Moreover, it is a requirement to promote workers' rights to freely associate and engage in collective bargaining, fostering a respectful workplace environment.*

**2.5.2.3. E&S OS 3 (OS3): Resource Efficiency and Pollution Prevention and Management**

The Operational Safeguard (OS) acknowledges the environmental and social impacts of economic activities, such as air, water, and land pollution, on people, ecosystems, and the environment. The current and projected greenhouse gas concentrations pose a threat to current and future generations. The OS3 outlines requirements for resource efficiency and pollution prevention throughout the project life cycle, consistent with Good International Industry Practice (GIIP). The Borrower must assess and implement resource-efficiency and pollution prevention techniques, considering their technical and financial feasibility and cost-effectiveness. The Environmental and Social Assessment (ESA) evaluates the potential impacts of pollutant discharges on environmental carrying capacity, ecosystem services, land use, soils, agriculture, surrounding communities, local, regional, and transboundary impacts, proximity to sensitive areas, surface and groundwater sources, water body use, and cumulative impacts. Overall, the OS3 aims to promote sustainable resource use, minimize adverse impacts on human health and the environment, reduce pollution from project activities, and manage risks associated with pesticide use. It also aims to minimize short and long-lived climate pollutants emissions, hazardous and non-hazardous waste generation, and the generation of hazardous and non-hazardous waste.

**Key requirements**

*As per the AfDB's Integrated Safeguards System (ISS) 2023, the implementing agency must conduct a thorough assessment of potential environmental impacts associated with resource use, including energy, water, and raw materials, while adopting strategies to optimize their efficiency throughout the project lifecycle. This includes implementing measures to minimize waste generation and enhance recycling and reuse practices. The borrower is also required to develop and enforce a Pollution*

*Prevention and Management Plan that outlines protocols for managing emissions, discharges, and hazardous materials to mitigate adverse environmental effects. Furthermore, monitoring and reporting mechanisms must be established to ensure compliance with national regulations and AfDB standards on pollution control.*

#### **2.5.2.4. E&S OS 4 (OS4): Community Health, Safety and Security**

This Operational Safeguard (OS) recognizes that projects, activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to a project or activities. OS4 aims to prevent adverse impacts on health and safety of project-affected communities during the project or operation lifecycle. It promotes public health and safety by preventing the spread of communicable diseases, promoting quality and safety in infrastructure design and construction, and addressing climate change considerations. It also minimizes community exposure to project-related traffic and road safety risks, diseases, and hazardous materials. Effective emergency event measures are ensured, and personnel and property safeguarding is carried out in a manner consistent with international human rights standards. OS4 also aims to prevent sexual exploitation, abuse, and harassment (SEAH) by project workers.

##### **Key requirements**

*According to the AfDB's Integrated Safeguards System (ISS) 2023, the implementing agency is responsible for conducting a comprehensive assessment of potential health and safety risks that the project may pose to local communities, including risks related to construction activities, operational hazards, and potential security threats. The borrower must develop a Community Health and Safety Management Plan that outlines measures to mitigate identified risks, enhance emergency preparedness, and establish protocols for community engagement throughout the project lifecycle. This plan should also address the management of security personnel, ensuring their conduct aligns with human rights standards and community safety. Additionally, mechanisms for monitoring health and safety outcomes, along with clear channels for community feedback and grievance redress, must be established to promote transparency and foster trust among local stakeholders.*

#### **2.5.2.5. E&S OS 5 (OS5): Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement**

Environmental and Social Operational Safeguard (OS) 5 acknowledges that project-related land acquisition, restrictions on land access, and loss of property can have adverse impacts on communities and individuals. These impacts can lead to physical and economic displacement, resulting in severe economic, social, and environmental risks. Involuntary resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land access. If unavoidable, involuntary resettlement should be minimized, and measures to mitigate adverse impacts will be carefully planned and implemented. Bank-supported physical investment may only be carried out if the required land is free from encumbrances, occupation, or conflict. OS5 aims to avoid involuntary resettlement, minimize impacts, and ensure social assessments are used in resettlement plans. It also aims to prevent forced eviction, mitigate adverse social and economic impacts from land acquisition, and

improve living conditions for displaced persons. OS5 also establishes a mechanism for monitoring involuntary resettlement activities, conceives and executes resettlement activities as sustainable development programs, and ensures informed participation of those affected through proper disclosure of information and consultation.

**Key requirements**

*As outlined in the AfDB's Integrated Safeguards System (ISS) 2023, the implementing agency is required to conduct a thorough assessment of the potential impacts of land acquisition on affected communities, ensuring that any involuntary resettlement is minimized and carried out in a manner that respects the rights and livelihoods of those impacted. The borrower must develop a Resettlement Action Plan (RAP) that includes strategies for compensation, livelihood restoration, and community engagement throughout the resettlement process. This plan should address both physical displacement and economic displacement, ensuring fair compensation for lost assets and support for displaced individuals to re-establish their livelihoods. Additionally, effective grievance mechanisms must be in place to address community concerns and feedback regarding land acquisition processes.*

**2.5.2.6. E&S OS 6 (OS6): Habitat and Biodiversity Conservation and Sustainable Management of Living Natural Resources**

The Environmental and Social Operational Safeguard (OS) outlines requirements for Borrowers to conserve biodiversity and natural habitats, and to observe and respond to conservation and sustainable management of priority ecosystem services. The OS aligns with the Convention on Biological Diversity, Ramsar Convention on Wetlands, Convention on the Conservation of Migratory Species of Wild Animals, World Heritage Convention, United Nations Convention to Combat Desertification, and Millennium Ecosystem Assessment. It emphasizes the importance of maintaining core ecological functions of habitats and the biodiversity they support in a changing climate. The OS also addresses sustainable management of primary production and harvesting of living natural resources. It considers the livelihoods of project-affected parties, including vulnerable groups, in biodiversity conservation and sustainable management. Overall, OS6 aims to protect and conserve biodiversity and habitats, using the mitigation hierarchy and precautionary approach in project design and implementation. It aims to restore biodiversity through biodiversity offsets, achieving "no net loss but net gain" of biodiversity. OS6 promotes sustainable management of living natural resources, supports local communities' livelihoods, and supports inclusive economic development. It sustains ecosystem services availability and productivity, and integrates natural resources into sustainable development, protecting local and global environmental services and resources' values.

**Key requirements**

*The African Development Bank's (AfDB) Operational Safeguard 6 (OS6) sets forth essential requirements for habitat and biodiversity conservation, as well as the sustainable management of living natural resources during the preparation and implementation of the Bosaso Power Expansion Project. According to the AfDB's Integrated Safeguards System (ISS) 2023, the implementing agency must conduct a comprehensive biodiversity assessment to identify potential impacts on local ecosystems and species, particularly those that are rare or endangered. The borrower*

*is required to develop a Biodiversity Management Plan that outlines measures to mitigate negative impacts on habitats and ensure the sustainable use of natural resources, including strategies for habitat restoration and enhancement. Furthermore, the plan should promote the integration of biodiversity considerations into project planning and implementation, including the protection of critical habitats and ecosystems within the project area. The borrower must also engage with local communities to promote sustainable resource management practices, fostering an inclusive approach to biodiversity conservation.*

#### **2.5.2.7. E&S OS 7 (OS7): Vulnerable Groups**

The AfDB recognizes economic and social rights as integral to human rights and encourages borrowing to adhere to international norms and best practices. Vulnerable individuals and groups are at a higher risk of being unable to anticipate, cope with, resist, and recover from project-related risks and adverse impacts. Vulnerable groups include female-headed households, landless, elderly, youth, children, persons with disabilities, marginalized groups, and highly vulnerable rural minorities (HVRM). OS7 contributes to poverty reduction and sustainable development by ensuring projects enhance opportunities for these groups without threatening their unique cultural identities. The OS7 aims to identify and engage vulnerable groups early in Bank Group operations, respect their rights and interests, and preserve their culture. It adopts a gender-responsive approach to E&S impacts, considering the rights and interests of women, girls, men, and boys. The OS also aims to avoid adverse impacts on vulnerable individuals and groups, obtain Free, Prior, and Informed Consent (FPIC) for affected groups, and promote development benefits and opportunities for these groups. It also aims to improve project design and local support through ongoing consultation with affected groups.

#### **Key requirements**

*The African Development Bank's (AfDB) Operational Safeguard 7 (OS7) outlines key requirements for addressing the needs of vulnerable groups during the preparation and implementation of the Bosaso Power Expansion Project. According to the AfDB's Integrated Safeguards System (ISS) 2023, the implementing agency is required to identify and engage with vulnerable populations, including women, children, the elderly, disabled individuals, and marginalized communities, to assess their specific needs and potential project impacts. The borrower must develop a Vulnerable Groups Plan that outlines strategies to mitigate adverse effects on these populations, ensuring their meaningful participation in decision-making processes and access to project benefits. This plan should include measures to enhance their capacity for resilience, promote equitable access to resources, and provide tailored support for livelihood restoration and social development. Additionally, the borrower is expected to establish grievance mechanisms that are accessible to vulnerable groups, allowing them to voice concerns and seek redress.*

#### **2.5.2.8. E&S OS 8 (OS8): Cultural Heritage**

The Bank recognizes that cultural heritage is an inherent and essential part of self-identification, and that it provides continuity in tangible and intangible forms between the past, present, and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge, and traditions. It is defined as tangible and intangible resources inherited from the past that people identify,

independently of ownership, as being a reflection and expression of their constantly evolving values, beliefs, knowledge, and traditions. Cultural heritage is part of every culture throughout the world. In its many manifestations, it is an integral part of people's cultural identity, practice, and self-identity, and is important as a source of valuable scientific and historical information, and as an economic and social (E&S) asset for development. Cultural heritage is also deeply connected to the surrounding environmental and natural world. Operational Standard (OS) 8 sets out measures designed to protect cultural heritage throughout the project life cycle. Overall, the OS8 aims to safeguard cultural heritage from negative impacts of project activities, promote its preservation as a crucial part of sustainable development, facilitate stakeholder consultation to identify and mitigate risks, and ensure equitable sharing of benefits from cultural heritage use with affected parties.

**Key requirements**

*As stipulated in the AfDB's Integrated Safeguards System (ISS) 2023, the implementing agency is responsible for conducting a thorough assessment to identify and evaluate any cultural heritage sites, practices, and artifacts that may be affected by project activities. The borrower must develop a Cultural Heritage Management Plan that outlines strategies for the conservation and protection of identified cultural resources, ensuring that any potential impacts on cultural heritage are minimized and adequately addressed. This plan should incorporate measures for the avoidance of significant impacts, including the possibility of relocation or preservation of heritage sites, and outline protocols for the management of chance finds during construction activities. Moreover, the borrower is required to engage with local communities and stakeholders to ensure that their cultural values and knowledge are respected and integrated into project planning.*

**2.5.2.9. E&S O 10 (OS10): Stakeholder Engagement and Information Disclosure.**

The AfDB recognizes the importance of effective participation in decision-making for inclusive and just societies. It emphasizes the need for open and transparent engagement between Borrower and project stakeholders to improve environmental and social sustainability, enhance project acceptance, and contribute to successful project design and implementation. Stakeholder engagement is an inclusive process throughout the project life cycle, supporting the development of strong, constructive, and responsive relationships. It is most effective when initiated at an early stage of the project development process. The Environmental and Social Operational Safeguard (OS) must be read in conjunction with other OS to ensure compliance with requirements related to worker engagement, emergency preparedness, and cultural heritage. Overall, OS10 aims to establish a systematic approach to stakeholder engagement, enabling Borrowers to identify and maintain constructive relationships with project-affected parties. It assesses stakeholder interest and support, allowing their views to be considered in project design and E&S performance. OS10 promotes safe, effective, and inclusive engagement with project-affected parties, including women's perspectives, throughout the project life cycle. It enhances project benefits and mitigates harm to local communities. OS10 ensures timely disclosure of project information on E&S risks and impacts, provides accessible means for project-affected parties to provide input, and promotes development benefits for affected communities, considering women's needs.

**Key requirements**

*The African Development Bank's (AfDB) Operational Safeguard 10 (OS10) emphasizes the importance of stakeholder engagement and information disclosure during the preparation and implementation of the Bosaso Power Expansion Project. According to the AfDB's Integrated Safeguards System (ISS) 2023, the implementing agency is required to develop a comprehensive Stakeholder Engagement Plan (SEP) that outlines strategies for identifying and engaging relevant stakeholders, including local communities, government entities, and civil society organizations. The borrower must ensure that stakeholders are informed about the project's objectives, potential impacts, and benefits, providing accessible and timely information throughout the project lifecycle. Additionally, the SEP should incorporate mechanisms for ongoing dialogue and consultation, allowing stakeholders to express their views and concerns, which will be integrated into project decision-making processes. Furthermore, the borrower is expected to establish effective channels for grievance redress, enabling stakeholders to raise issues and seek resolution.*

*The AfDB'ISS 2023 requires that high-risk category 1 are expected to disclose following clearance from Bank and Approval by concerned environmental authority for the ESIA, and the ESIA shall be disclosed for 120 days before Board appraisal. Also, a separate and Comprehensive SEP should be prepared by the borrower and disclosed as a standalone document.*

## 2.6. The African Development Bank (AfDB) Environmental & Social Assessment Procedures (ESAP)

The key purpose of ESAP is to improve decision-making and project results by ensuring that Bank-financed operations conform to the requirements laid out in the operational standards (OS) and are thus sustainable. The Environmental and Social Assessment (ESA) process outlined in the ESAP provides a way to improve a project environmentally, socially and in relation to climate change, thereby enhancing its benefits and in order of priority – avoiding, minimizing, mitigating or compensating for adverse impacts. Effective implementation of the ESAP will help to avoid incurring costs and implementation delays as a result of unanticipated problems. It will also reduce the need for project conditionality as remedial measures can be taken in advance and incorporated into project design or project alternatives can be considered. According to the Bank's ESAP, the various environmental and social assessment processes (phase), tasks to be performed, roles and responsibilities for the Bank and its borrowers and clients to be applied and flowed during the entire project cycle and relevant to the proposed project include:-

- Country programming (project pahse1): to develop and update baseline data on regional member countries (RMCs) environmental and social components, policies, programs and capacities to better integrate environmental and social dimensions into lending priorities.
- Project identification phase (project pahse1): screening exercise focuses on the environmental and social dimensions of a project to categorize it in one out of four categories based on the potential adverse environmental and social impacts of the project.

- Project preparation (project phase 3): define the scope of the Environmental and Social Assessments (ESA) to be completed by the Borrower based on the project category. During project preparation, the scoping exercise.
- Appraisal phase (project phase 4): review and clearance of ESIA studies by the Safeguards and Compliance Division. Finally, the procedures require the public disclosure of summaries in accordance with specified deadlines. For Category 1 projects, these shall be disclosed for 120 days for public sector projects and at least for 60 days for private sector operations. All category 2 operations shall be disclosed for 30 days before Board deliberations.
- Project phase 5: loan negotiations, board presentation and loan signature
- Project implementation phase (project phase 6): the Borrowers shall ensure the implementation of Environmental and Social management Plans developed to address adverse impacts, while monitoring the project impacts and results. Operational staff shall supervise the Borrowers' work and verify compliance through supervision missions and/or environmental and social audits, whenever necessary. Audits undertaken during the completion phase and post-completion valuations shall also aim to assess the environmental and social sustainability of the results.
- Project Phase 7: Project completion (Auditing compliance at completion)
- Project Phase 8: Post Completion (Evaluating post completion)
- The Bank's ESAP include 5 operational Safeguard (OS) Objectives and those applicable to ESIA & relevant to the proposed project are briefly described below.

## 2.7. Comparison of the National legislations and the AfDB's Operational Standards

The comparison of the FRS legislations and the AfDB's Operational Standards (OSs) indicated that AfDB's OSs have equivalent national environmental and land related legislations. However, there are few gaps between the AfDB's OSs and the national requirements. In general, the AfDB's requirements appear to be more stringent than the FRS requirements. Table 2-1 summarizes the gaps and proposed recommendations to bridge the identified gaps between the AfDB's OSs and the subsequent national requirements relevant to the proposed DL project.

**Table 2-0-1: Summary of Comparison of FRS environmental-related Legislation and AfDB’s OSs and recommendations to Address Gaps**

<b>Theme</b>	<b>AfDB’s OS</b>	<b>National Legislation &amp; Regulations</b>	<b>Gaps Identified</b>	<b>Recommendation</b>
Assessment and Management of Environmental and Social Risks and Impacts	The OS1 is a safeguard that determines a project's environmental and social category, ensuring it contributes to sustainable development and climate change vulnerability. It involves comprehensive analysis of activities and impacts, including environmental and social impact assessments, to ensure appropriate decisions.	The Constitution of FRS emphasizes the importance of environmental protection, community consultation, and full ESIA for development projects, emphasizing the government's and citizens' duty to protect the environment.	Avoidance or minimization of E&S impacts are not specified in the national legislations and ESIA Guidelines National legislation & Guidelines are very much focused on the environmental aspect when compared with the social aspect	The proposed project aims to avoid, minimize and mitigate all the E&S impacts and risks identified. Hence Both the national & AfDB’s requirements shall be applied
Labour and Working Conditions	OS2 emphasizes employment creation, income generation, and inclusive economic growth. It promotes fair treatment, non-discrimination, and equal opportunity for project workers, including vulnerable ones. It aligns with ILO, UN Conventions, and Conventions.	<i>Provisional Constitution of Somalia:</i> The Constitution provides for the protection of workers' rights, non-discrimination, human rights promotion, and defence against gender discrimination and GBV in the workplace. Articles 11 ("Equality"), 14 ("Slavery, Servitude, and Forced Labour"), 15 ("Liberty and Security of the Person"), 24 ("Labour Relations"), and 27 ("Economic and Social Rights") contain important clauses. Article 24 states that "all workers, particularly women, have a special right of protection from sexual abuse, segregation, and discrimination in the workplace." It also enshrines everyone's right to fair labour relations. All labour laws and practices must adhere to the principle of	AfDB’s OS2 OHS requirements are covered in the national policies, proclamations & directives	No further action is recommended but proper implementation of existing laws need to be implemented accordingly.



Theme	AfDB's OS	National Legislation & Regulations	Gaps Identified	Recommendation
		<p>gender equality in the workplace. It also guarantees every worker the freedom to organize and become a member of a trade union, to go on strike, and to negotiate collectively with employers, trade unions, and employees on labour-related matters.</p>		
<p>Resource Efficiency and Pollution Prevention and Management</p>	<p>The OS3 requires that the client shall apply pollution prevention and control measures consistent with national legislation and standards, applicable international conventions, and internationally recognized standards and good practice - particularly the EHS Guidelines implement financially feasible and cost-effective measures for improving efficiency in the project's consumption of resources such as energy, water, raw materials, and other resources</p>	<p><i>Provisional Constitution of Somalia:</i> Article 25 guarantees Somali citizens' rights such as a share of the nation's natural resources, protection from excessive exploitation, a healthy environment, and protection from pollution and harmful materials. Federal and state regulations on environmental, health, and safety: Environmental Quality Standards, Sectoral Environmental Assessments, Environmental Impact Assessments, and Environmental Audits are among the national environmental policies, regulations, and laws that emphasize the need to minimize environmental pollution in all projects. Environmental protection and land use policy and regulation: Federal and state standards and regulations emphasise the need for environmental pollution prevention, waste management, water quality, air quality, and noise. Puntland State Waste Management Policy (2006): The Puntland Waste Management Policy (2016) provides a comprehensive framework aimed at addressing waste management challenges in Puntland State. It emphasizes the need for effective waste</p>	<p>AfDB's ESHS requirements are covered under the three national proclamations</p>	<p>No further action is recommended</p>

Theme	AfDB's OS	National Legislation & Regulations	Gaps Identified	Recommendation
		<p>collection, transportation, and disposal systems, with a focus on minimizing environmental pollution and health hazards.</p> <p>Puntland State ESIA Act and Regulation (2016): The Puntland Environmental and Social Impact Assessment (ESIA) Act and Regulation (2016), approved by the Cabinet and Parliament, establishes a legal framework for assessing the environmental and social impacts, resource use management and pollution management for all infrastructure projects in Puntland State.</p> <p>Puntland State Ministry of Environment and Climate Change Strategic Plan (2016-2020): the strategy sets a roadmap for safeguarding the region's environment and addressing climate change through sustainable resource management and policy implementation.</p> <p>Puntland State Environmental Management Act (2016): This Act provides a legal framework for the protection, conservation, and sustainable management of the environment in Puntland, Somalia. The Act establishes regulations for preventing environmental degradation and promoting responsible resource use across various sectors, including land, water, and forestry.</p> <p>Puntland State Environmental Policy (2014): Establishes a foundational framework for the protection, conservation, and sustainable use of natural resources in Puntland State, Somalia. The policy focuses</p>		

Theme	AfDB's OS	National Legislation & Regulations	Gaps Identified	Recommendation
		on addressing environmental degradation, promoting biodiversity conservation, and ensuring the sustainable management of land, water, and forests.		
Community Health, Safety and Security	The OS4 aims to prevent adverse impacts on communities during projects, promoting public health, safety, and addressing climate change, while minimizing exposure to risks and preventing sexual exploitation.	The Provisional Constitution of Somalia (2012): Article 14. Every person has the right to physical integrity, security, and personal liberty.		The proposed project aims to avoid, minimize and mitigate all the E&S impacts and risks identified. Hence Both the national & AfDB's requirements shall be applied
Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement	The OS 5 requires that Involuntary resettlement should be avoided where feasible, or minimize resettlement impacts where involuntary resettlement is unavoidable, exploring all viable project designs. Displaced people should receive significant resettlement assistance, preferably under the project, so that their standards of living, income earning capacity, production levels and overall means of	Provisional Constitution of Somalia: Articles 25, 44, and 45 (which deal with the environment, natural resources, and land, respectively). Article 45 encourages the Somali people to actively participate in the development, execution, management, conservation, and protection of natural resources and the environment. Customary legal system and sharia law: The customary legal system in Somalia, known as the Xeer system, is crucial for land rights and resource management due to weak formal regulation. This system governs property, enforces contracts, and resolves disputes. Despite variations across regions and clans, it is applicable in most of the country. The Xeer system is compensatory, majoritarian, and uses clan insurance to protect against	Avoidance or minimization Of involuntary resettlement Is not specified in the FRS legislation. Additionally, the legislations do not indicate the need to establish a mechanism to follow up and monitor proper implementation and performance of involuntary resettlement programs and check for any failure or sustainability of the resettlement plans.	AfDB's OS5 overall objectives shall be applied to avoid or minimize involuntary resettlement and to ensure livelihood improved beyond pre-project levels

Theme	AfDB's OS	National Legislation & Regulations	Gaps Identified	Recommendation
	<p>livelihood are improved beyond pre-project levels. A mechanism should be established for monitoring the performance of involuntary resettlement programs in Bank operations and remedying problems as they arise so as to safeguard against ill-prepared and poorly implemented resettlement plans</p>	<p>violations. Elders act as judges or mediators, considering precedent and custom.</p>		
<p>Habitat and Biodiversity Conservation and Sustainable Management of Living Natural Resources</p>	<p>OS6 emphasises the need to ensure that biological Diversity and ecosystem integrity are maintained for all AfDB funded projects by avoiding or, if avoidance is not possible, reducing and minimizing potentially harmful impacts on biodiversity. All AfDB funded projects should endeavour to reinstate or restore biodiversity, including, where some impacts are unavoidable,</p>	<p>National Biodiversity Policy (2015): The key objectives of the policy and strategy are to: conserve, develop and utilize the country's biodiversity resources mainstreaming biodiversity across government and society and awareness creation for public and decision makers on the value of biodiversity and ecosystem service and recommend Ecosystem based approaches of resource management as main implementation strategy required to conserve and sustainably utilize biodiversity</p>	<p>Avoidance or minimization of E&amp;S impacts are not specified in the national Biodiversity Policy</p>	<p>Since one of the aim of the proposed project is avoiding, minimizing and mitigate all the E&amp;S impacts and risks identified, both the national &amp; AfDB's requirements shall be applied</p>

Theme	AfDB's OS	National Legislation & Regulations	Gaps Identified	Recommendation
	<p>through implementing biodiversity offsets to achieve “not net loss but net gain” of biodiversity; Protect natural, modified, and critical habitats; and Sustain the availability, and Productivity of priority ecosystem services to maintain benefits to the affected communities and sustain project performance.</p>			
Vulnerable Groups	<p>OS7 aims to reduce poverty and sustainable development by involving vulnerable groups early, respecting their rights, and promoting development benefits.</p>	<p>The Provisional Constitution of Somalia (2012): Article 11: Equality - The article emphasizes equality of all citizens and prohibits discrimination on various grounds, including social origin. While it does not explicitly mention cultural heritage, it reinforces the idea that the culture of all communities in Somalia is equally respected.</p>	<p>Somalia's legal framework acknowledges vulnerable groups' rights, but gaps persist in laws and policies. Issues include limited gender-based violence provisions, inadequate social protection systems, and insufficient access to justice for marginalized communities. These gaps exacerbate social and economic marginalization.</p>	<p>The proposed project aims to avoid, minimize and mitigate all the E&amp;S impacts and risks identified. Hence Both the national &amp; AfDB's requirements shall be applied</p>
Cultural Heritage	<p>The OS8 aims to safeguard cultural heritage from negative</p>	<p>The Provisional Constitution of Somalia (2012): Article 32 on the Right to Culture specifically addresses cultural rights. Under</p>	<p>Somalia's cultural heritage legal framework is inadequate, with no</p>	<p>The proposed project aims to avoid, minimize and mitigate all the E&amp;S</p>

Theme	AfDB's OS	National Legislation & Regulations	Gaps Identified	Recommendation
	<p>impacts of project activities, promote its preservation as a crucial part of sustainable development, facilitate stakeholder consultation to identify and mitigate risks, and ensure equitable sharing of benefits from cultural heritage use with affected parties.</p>	<p>Clause 1 - every person has the right to freely participate in the cultural life of the country; Clause 2 - the state shall promote the cultural traditions and heritage of the Somali people, protect traditional knowledge, and support arts and literature.</p>	<p>comprehensive national law for protection, preservation, or management. This leaves archaeological sites vulnerable to destruction during infrastructure development. Limited institutional capacity and coordination between authorities further exacerbate these issues. Public awareness and education on cultural heritage's importance further exacerbate these issues.</p>	<p>impacts and risks identified. Hence Both the national &amp; AfDB's requirements shall be applied</p>
<p>Stakeholder Engagement and Information Disclosure.</p>	<p>OS10 promotes systematic stakeholder engagement, assessing interest, and ensuring inclusivity throughout the project life cycle, enhancing benefits, mitigating harm, and promoting development benefits for affected communities.</p>	<p>The Provisional Constitution of Somalia (2012): Article 45 encourages the Somali people to actively participate in the development, execution, management, conservation, and protection of natural resources and the environment. This involves active stakeholders' engagements in all phases of a development project.</p>	<p>Somalia's legal framework on stakeholder engagement and information disclosure is characterized by significant gaps, especially in terms of formalized processes and clear guidelines. Existing laws do not provide comprehensive requirements for public participation in environmental and social</p>	<p>The proposed project aims to avoid, minimize and mitigate all the E&amp;S impacts and risks identified. Hence Both the national &amp; AfDB's requirements shall be applied</p>

Theme	AfDB's OS	National Legislation & Regulations	Gaps Identified	Recommendation
			decision-making, leaving key stakeholders, including local communities, inadequately informed and consulted on projects that affect them. There is also a lack of robust mechanisms to ensure timely and transparent disclosure of project-related information. Moreover, limited institutional capacity and weak enforcement of existing regulations further hinder effective engagement and disclosure, leading to diminished accountability and increased risk of conflict or mistrust between project developers and affected communities.	

# CHAPTER THREE: PROJECT DESCRIPTION

## 3.1. Overview

As part of the feasibility study, the Consultant carried out a suitability assessment of the sites where the proposed infrastructure as elaborated in Section 5 of this report will be established. This includes site for the proposed solar PV plant, the 33/11kV substations as well as the transmission lines. The results of this analysis are presented in this section. Two potential sites owned by PEPCO were assessed for suitability to accommodate the proposed 7.15MWp/5.5MW solar PV plant +3MW/11MWh BESS. These sites are located by geographical coordinates as Baalade (11° 15.117'N, 49° 10.141'E), and SEPCO (11° 15.659'N, 49° 11.709'E)

*Baalade Power Plant Site:* This Site is located on the western part of the city of Bosaso and is easily accessible being situated inside an operational power plant which is located approximately 1.2km away from an existing asphalt standard road. The site measures approximately 20 acres. However, approximately 4acres have been utilized for the existing thermal generation plant and only about 16 acres are available for solar PV+BESS plant. The site has existing diesel plant and is connected to the existing 11kV PEPCO power distribution network in Bosaso. The site is located away from residential neighborhoods, making it suitable for industrial applications like the proposed power generation. The area around the existing site boundary has large tracks of unused and privately owned land offering an opportunity for Balaade plant expansion. Following consultations with PEPCO on land requirements, PEPCO has acquired additional parcel of land to provide adequate space for the proposed 7.15MWp/5.5MW.

*SEPCO Power Plant Site:* This site is located towards the eastern part of the city of Bosaso and is easily accessible on a Bitumen standard road connecting to the port and airport facilities in Bosaso. The site measures approximately 6.85acres. However, only about 4acres is available for solar PV+BESS plant. The site has HFO fired diesel plant that is currently under repair. It also has fuel storage tanks to support diesel generation. The location of this site is closer to a residential neighborhood with stringent noise restrictions especially during the night, that make it challenging for expansion of diesel generation plant, but this does not constrain potential solar BESS generation expansion. The area in the neighborhood of the site is fast growing and acquisition of additional land to support future expansion by PEPCO is likely to be more challenging. Apart from the HFO power plant facilities, the rest of the land within SEPCO boundary remains unused.

*The 33/11kV Substation Sites:* According to the investment proposal, a total of 3Nox33/11kV substations will be established. The locations of these substations are indicated on drawing no. PEP-3-01 attached as Appendix 6. The 2x7.5MVA 33/11kV West Substation will be established at the Baalade plant site which is owned by PEPCO. The Consultant has assessed this site to be suitable for the substation for the following reasons: (i) The site is easily accessible by road connecting to the port and the airport; (ii) the site will host the largest generation and therefore step up to 33kV at the site will help to reduce transmission losses by ensuring that large amounts of power generated by the station is transmitted to locations far away at a higher voltage; and (iii) the land is available, unused and already owned by PEPCO. To support the development of the North



and East Substations, PEPCO has secured a lease for the two parcels of land for a twenty-year.

*Powerline Corridors:* The proposed 11kV extensions and new 33kV powerlines will be established within road reserves of existing roads. Such lines can be fitted within a wayleave corridor not exceeding 5m from the centre of the line. Except for minor sections where encroachment of the reserves by private developers has been observed, most of the sections of the road are clear and can accommodate 33kV or 11kV overhead line without the need for relocation of existing structures. For cases where there is encroachment or congestion of the road reserve by existing power or telecommunication infrastructure, the Consultant has provided for undergrounding of the new 11kV and 33kV powerlines. The pricing includes a provision for 2.56km of 33kV and 4.93km of 11kV overhead line extensions. The routes of the lines comprising the proposed 11kV and 15kV powerlines extensions as well as proposed 33kV Overhead lines are indicated in the conceptual design.

### 3.2. Project location

The Project is located in Bosaso (11°16'32"N and 49°11'16" E) in the northeastern region (Puntland State) of the Federal Republic of Somalia (Figure 3-1). Situated along the Gulf of Aden, Bosaso serves as a major economic hub, particularly known for its thriving seaport, which facilitates trade between the Federal Republic of Somalia, the Arabian Peninsula, and other parts of the world. The city is also a center for commercial activities, including fishing, livestock trade, and a growing construction industry. With a diverse population, Bosaso has experienced rapid urbanization and development, attracting people from various regions of Somalia. Despite its economic significance, the city faces challenges related to infrastructure, security, and environmental management. Bosaso's strategic location makes it a key player in Somalia's economic recovery and regional connectivity.



**Figure 3-1:** Location of Bosaso City in the Federal Republic of Somalia

Modified from: [https://link.springer.com/referenceworkentry/10.1057/978-1-349-96056-9\\_170](https://link.springer.com/referenceworkentry/10.1057/978-1-349-96056-9_170)

### 3.3. Project Components

Broadly, the major components of the project are as follows:

- Component 1- Scale-Up of Renewable Energy Contribution
- Component 2- Distribution Network Rehabilitation and Expansion
- Component 3- Energy Sector Institutions Strengthening

#### 3.3.1. Component 1: Scale-up Renewable Energy Generation

It is proposed to scale-up renewable generation through scale up of grid connected solar as well as distribution of standalone home solar systems to households in areas where it would be uneconomical to extend the grid in the short-term.

##### 3.3.1.1. Scale-Up Grid Connected Solar

Scale-up of solar PV generation on the interconnected grid is intended to help cut down on the cost of power generation as well help reduce the carbon footprint associated with power generation through displacement of fuel. To establish most optimal plant capacity of a solar PV, the consultant considered and carried out a technical and cost analysis for different combinations of solar PV required to achieve renewable energy contributions from 20% to 70% by the year 2026. The solar PV and Battery Energy Storage required to achieve varying degrees of renewable energy contribution from 20% to 70% including the existing and planned capacity are as shown below.

Option	Criteria	Solar DC Capacity(MWp)	Solar AC Capacity(MW)	BESS Capacity (MWh)
1	20% Solar	6.47	4.97	-
2	30% Solar	9.7	7.46	-
3	40% Solar	12.93	9.95	11
4	50% Solar	16.17	12.44	31
5	60% Solar	19.4	14.92	51
6	70% Solar	22.63	17.41	72

*Source: Feasibility study report 2024.*

Carbon footprint: The Carbon footprint arising out of the adoption of Option 3(40% renewable contribution) is lower than what would be achieved if solar PV contribution as at the end of 2023 was to be maintained. The carbon emissions out of the different investment options are as shown below.

Option	Criteria	Solar PV AC Capacity(MW)	Carbon Emissions(tC02)
1	20% Solar	4.97	35,674
2	30% Solar	7.46	31,214
3	40% Solar	9.95	26,755
4	50% Solar	12.44	22,296
5	60% Solar	14.92	17,837
6	70% Solar	17.41	13,378

*Source: Feasibility study report 2024.*

The optimal plant capacity is achieved at 40% contribution of solar PV+BESS. For this reason, Option 3 was selected for generation expansion. For this option, a solar PV plant with a minimum dc capacity of 7.08MWp and AC installed capacity of 5.45MW is required to add to the existing 1MWp installed at Ex-ENEE Station 2 and the 3.5MW Bosaso Solar PV plant. For this plant, not all the energy generated from the solar PV plant can be consumed directly during the day and therefore a 3MW/11MWh Battery Energy Storage System (BESS) is required to store the energy and deliver to the grid after sunset. For the purpose of conforming to readily available equipment sizes in the market, the plant capacity is adjusted to 7.15MWp/5.5MW Solar PV and 3MW/11MWh BESS plant. This plant should be in a position to generate at least 13,146MWh of energy annually.

*Distribution of Standalone Solar Home Systems:* In order to increase access to green energy solutions, it is proposed to provide for the distribution of 1,000 Standalone Solar Home Systems to households that are temporarily established in Bosaso like the Internally Displaced Persons (IDPs) or those that are located a distance from the grid to the extent that connecting them to the grid would be uneconomical in the short-term.

### 3.3.2. Component 2: Distribution Network Rehabilitation and Expansion

The scope of distribution network rehabilitation and expansion includes, interconnection of the existing islanded medium voltage systems, extension of existing medium voltage network, construction of a new 33kV system and installation of smart meters for large power customer installations. The scope of work is outlined in the following sub-sections:

#### 3.3.2.1. Rehabilitation of Existing Medium Voltage System

The proposed scope of works includes downgrading of the 15kV system to 11kV, rehabilitation and interconnection of the existing 15kV and 11kV medium voltage systems. The scope of downgrading and rehabilitation of the 15kV system includes:

- Replacement of existing 3x800kVA 0.4/15kV step up transformers at Ex-ENEE Station 1 with 3x1250kVA 0.4/11kV transformers.
- reconductoring of existing 13km, 15kV overhead line with 150mm<sup>2</sup> AAAC Conductor.
- Replacement of the existing 2500kVA 0.4/15kV transformer at Ex-ENEE Station 2 with 2500kVA 0.4/11kV transformer.
- Replacement of 15/0.4kV step down distribution on the existing 15kV system with 11/0.4kV transformers of a combined rated capacity of 6030kVA.
- Interconnection of the downgraded network to the existing 11kV power system network.

The scope of rehabilitation of the existing 11kV power system network is intended to expand its evacuation capacity and to improve quality and reliability of supply and includes:

- Reconductor approximately 5.3km of existing 11kV overhead line in 70mm<sup>2</sup> ACSR Conductor with 150mm<sup>2</sup> AAAC conductor.

- Split the existing 11kV feeder by constructing approximately 1.92km of a new 11kV overhead line in 150mm<sup>2</sup> AAAC conductor from a section of the line near Ex-ENEE Station 2.
- Balance network loading between the resulting 11kV feeders by shifting distribution transformers from the most loaded line to the lightly loaded feeder.

#### *3.3.2.2. Medium Voltage System Extension*

To enhance efficiency of the low voltage distribution network, it is proposed to extend existing 11kV overhead lines, installation of new distribution transformers and installation of new low voltage circuits in high-capacity low voltage aerial bundled conductors. The scope of Distribution Network Extensions includes:

- Extension of the existing 11kV network by about 24.7km to cover new areas and new expansion areas and to help reduce length of existing low voltage network and expand connectivity. The details of these transformers are indicated on drawing no. PEP-3-05 attached as Appendix 5.
- Installation of 40 new pole mounted 11/0.4kV transformers of rated capacity ranging from 100kVA to 315kVA and having a combined rated capacity of 10,545kVA in new areas to help offload existing transformers that are already overloaded and to provide connectivity of isolated stations to the interconnected grid. The details of these transformers are indicated on drawing no. PEP-3-06 attached as Appendix 6.
- Installation of at least 11 new Load Break switches on the 11kV network to increase flexibility of system operations.

The scope of work will also include installation of All Dielectric Self- Supporting (ADSS) Fiber Optic cable on existing as well as new 11kV network extensions to support monitoring and control of the distribution network and energy-metering infrastructure.

#### *3.3.2.3. The 33kV Distribution System*

To enhance efficiency as well as reliability and quality of electricity supply in the city of Bosaso as the system power demand increases, a 33kV distribution system is proposed. The scope of the works involved in the establishment of this system includes:

- Construction of a new 2x7.5MVA 33/11kV West Substation (WS) at Baalade power station.
- Construction of a new 7.5MVA 33/11kV North Substation (NS) near the Airport
- Construction of a new 7.5MVA 33/11kV East Substation (ES) next to TF JIDKA.
- Construction of approximately 19.2km of 33kV Overhead line in 150mm<sup>2</sup> ACSR conductor comprising of 4.874km of 33kV Overhead line from WS to NS, 5.81km of 33kV Overhead line from NS to ES substation and 8.56km of 33kV overhead line from WS to ES.
- Construction of approximately 4km of 33kV Overhead line from the 3.5MW Bosaso solar PV plant to WS.
- Construction of approximately 10.32km of 33kV Single Circuit Overhead line in 150mm<sup>2</sup> ACSR conductor from the 33/11kV North Substation to the Puntland Maritime Police Force facilities, west of Bosaso airport.

#### 3.3.2.4. Smart Meters for Large Power Installations

As part of measures to enhance system efficiency, it is proposed to install 1,000 Three Phase smart meters for commercial & industrial customers.

#### 3.3.3. Component 3-Strengthening of Energy Sector Institutions

The Consultant has carried out a review of the Capacity Needs Assessment report prepared by Horn Population Research and Development and based on this report recommended that the following scope of capacity building be incorporated in the investment plan:

- Enhance Legal and Regulatory Framework -This includes support for the preparation and adoption of a Puntland Energy Policy and Puntland Electricity Act including alignment with legislation at the national level. The support is expected to be in the form of a consultant to assist the MOEMW of Puntland in preparation and review of the documents.
- Enhance Technical and Operational Standards: Select a consultant to assist the MOEMW and PEDA in the preparation of technical and operational standards including a clear framework for monitoring and controlling the Energy Sector at the state level. This will include the development of guidelines for compliance monitoring of assets, equipment and the power service, adapted from the one at the national level including the development of technical standards for infrastructure and equipment and definition of operational key performance indicators (KPIs): SAIDI, SAIFI, unserved energy, asset efficiency, etc., as well as the targets and trajectories for each.
- Training Interventions-Select a consultant to provide training to strengthen the capacities of personnel at the state level on the following aspects as recommended in the Capacity Needs Assessment report: Tariff setting, Legal and regulatory document drafting, Technical and operational standards and monitoring concepts, dispute resolution, Economic and Financial analysis of projects.
- Material Resources for the Ministry of Energy, Minerals and Water - Involves buying, installing and training employees to the following professional software: GIS Software for the energy department, a database Management System (DBMS) and an Enterprise Resource Planning(ERP)system.

#### 3.3.4. Plant Design Concept

In order to implement the proposed investment plan, the Consultant has developed a design concept as presented below:

- (i) *Solar Energy Resource Potential:* The solar energy resource evaluation is a key aspect in the development and operation of a PV power plant since it is the basis for the calculation of the expected electricity generation and therefore the project revenues or savings. The results given in this report refer to satellite solar irradiation data accessed through the PVSyst application. Solar Energy resource assessment for the site was carried out using satellite data accessed through PVSyst application. For this assessment, data from NASA-SSE Satellite data (1983-2005),

Meteonorm 8.1(2010-2021), sat=100% and PVGIS TMY 5.2 was accessed and showed that the site experiences GHI as follows:

- Meteonorm 8.1(2010-2021), sat=100%- 2,390.2kWh/m<sup>2</sup>
- NASA-SSE Satelite data (1983-2005)-2,475.8kWh/m<sup>2</sup>
- PVGIS TMY 5.2 -2,427kWh/m<sup>2</sup>

(ii) *Technology Assessment:* As part of the study, the Consultant has carried out a review of the PV and BESS technology including solar panels technology, mounting concepts, and inverters. In view of the site conditions and the technical capabilities of personnel in Bosaso, the following PV Technology choices are recommended with regard to the proposed hybrid plant:

- Si-Monocrystalline and monofacial solar PV modules
- Fixed Tilted PV Mounting System
- String Inverters

The monofacial modules are preferred because the albedo of the site is low and there may be no real benefit of generation from the rear end of the modules. The Fixed tilted mounting concept is preferred for ease operations and maintenance considering that the site is remote and PEPCO's technical capabilities may not be adequate at the moment to effectively handle maintenance for a tracked system. String inverters are preferred for the project for enhanced reliability, ease of maintenance as well as ease of delivery of equipment to site.

(iii) *Grid Connection Studies:* As part of the feasibility study, the Consultant developed model to simulate the 2026 PEPCO power system network by including additional generation expected from the proposed 7.15MWp/5.5MW solar PV plant, 3.5MW Bosaso Solar PV plant and new demand in the western, southern and eastern parts of the city of Bosaso. In building the model, it was assumed that the 15kV power system network would have been downgraded to 11kV and the proposed 33kV power system network ring around the city of Bosaso would have been established. Based on this model, the Consultant carried out flow simulation to establish if the voltage levels on the 11kV power system network are within  $\pm 5\%$  of the nominal when the proposed power system expansion comprising of generation as well as network expansion is implemented. In addition, the Consultant also carried out short circuit analysis of the system to specifically establish if fault levels on the power system network are beyond the breaking capabilities of existing switchgear. Load flow and short circuit simulation was carried in accordance with the method prescribed under IEC60909.

## 3.4. Construction phase activities

### 3.4.1. Construction phase activities for distribution lines

The Contractor is required to prepare and submit to the MoEWR a detailed Method Statements in order to safely undertake the construction works. However, the key construction phase activities will include the following:

- Site Clearing: Surveys and pegging will be undertaken along the RoW followed with clearance, especially within the city. However, the vegetation clearance will be

required only in the immediate area of the tower foundations. Only trees that could damage the distribution line along the RoW will be cleared. The vegetation cover along the proposed DL corridor outside the city are sparse and therefore all clearance of vegetation will preferably be done by hand and will not use heavy machinery.



Photo: 1 View of typical vegetation to be cleared from the RoW during the construction activities

- **Foundation Excavation:** Typical foundation excavation depths for lattice towers depending on the soil condition is about 3 meters. The excavation will be carried out using excavators to open the ground to prepare the foundation solution. Each excavation will be inspected and tested to confirm its suitability.
- **Construction of the concrete bases for the distribution line pylons, including stubs implementation:** The foundations are ultimately filled with concrete. The Contractor is required to safeguard excavations. This may include erecting a temporary fence or warning solution around the excavation to protect the safety of people and animals.
- **Access roads:** Site access roads will be required to provide access to channel all the traffic generated by the construction activities for the safe transport of personnel, equipment and materials. Access to the distribution lines as much as possible will be using existing access roads. However, where existing access roads are not present, new access tracks will be constructed as much as possible within the ROW. In addition to providing access to the construction activities, the access road will potentially benefit the local communities after the construction is over by making the

transport of people and goods safer, easier and quicker. Moreover, these roads will be used for inspection and maintenance purpose during the operation of the distribution line, and the proponent will discuss with the local authorities the possibility of designating the roads subject to relevant approvals.

### 3.4.2. Construction phase activities for power plants and substations

The Contractor is required to prepare and submit to the MoEWR a detailed Method Statements in order to safely construct and install the power plants and substations and control room and ancillary facilities. The key construction phase activities shall include:

- Topographical Survey; preparation of the construction site, earthwork;
- Establish the work zone and excavation for equipment and control room foundation;
- Foundation work for all buildings, tower & equipment structure and offices and stores;
- Construction of the concrete bases and lay the foundations;
- Laying the foundation and supply of external networks;
- Backfill the foundations and substation yard;
- Install major electrical components;
- Assemble the steel structures and construction of supporting metal structures;
- Assembly and installation of auxiliary systems;
- Construction of the Control Building;
- Construction of compound/internal access road;
- Property Fencing; and
- Cleaning construction waste, landscaping and site rehabilitation.
- Installation of electricity meters

### 3.4.3. Key project construction activities requirements

#### 3.4.3.1. Land required for the project

As per the feasibility study findings, no land take is anticipated during the project implementation. However, temporary spaces will be required for the construction of camps, administration offices, store and workshops, especially during construction phase. Temporary inconveniences to residents and businesses in the project footprint area are anticipated but these will not lead to relocation, resettlement or compensation of any nature. One hundred and three (103) structures encroaching on the RoW were mapped during the study will potentially be affected. A livelihood restoration plan and a robust Grievance Redress Mechanism will be adequate to address any emerging issues associated with inconveniences or disruptions, especially during construction phase.

#### 3.4.3.2. Requirements for raw materials/construction materials

The construction materials required for the proposed project shall include cement, coarse and fine aggregates, sand, reinforcement steel, rough sawn timber, bellies and steel- bar, checker-plate, anchor-bolts, and electric cables. All materials for concrete and backfill with gravel and sand etc. will come from the nearby existing aggregate production sites



where possible. The location of quarry sites, either new or existing, will be determined by the Contractor to suit his method of working but will be subject to the approval of the Engineer.

#### *3.4.3.3. Construction power requirements*

There will be no major requirement for electricity for the construction of this Project. However, power would be required to operate some construction machineries. Additionally, light may be required to light construction site offices, stores and installation sites.

#### *3.4.3.4. Water supply requirements*

Water is one of the main resource during construction and operation phases to be used for different purposes such as for concrete works and drinking and domestic consumption for construction workers. The Contractor will need to develop its own water supply sources (i.e. to buy water from licensed suppliers or wells) for the construction and the campsites requirements.

#### *3.4.3.5. Temporary construction facilities/ ancillary activities*

During the works contract, the contractor will establish temporary construction site facilities including the following:

- Temporary site offices
- Campsites
- Material storage yard
- Machinery and equipment storage yard
- Water storage tanks
- Fuel storage tanks
- Toilets and septic tanks
- Canteen facilities.
- Access road.

The storage areas are expected to be the base for a fleet of vehicles to be used for the construction process. Material destined for the distribution line will be trucked from the storage yard to site via public highways and the way leave itself. The locations of auxiliary activities have yet to be chosen. Therefore, in consultation with the Local government officials and community representatives, the Contractor will arrange the required land. If the contractor is required to designate land for those activities, Operational Safeguard (OS2) and appropriate compensation payment shall be considered. The Contractor's Environmental and Social Management Plan (C-ESMP) shall include proper mechanisms for management and monitoring of anticipated impacts due to the implementation of these ancillary activities.

#### *3.4.3.6. Camp facilities for construction workers*

The contractor will establish a principal construction camp at convenient location within the specified contract. Subsidiary camps may also need to be established, with considerably reduced facilities. Camp with all necessary facilities like sanitation, safe water supply, power supply, and a clinic as part of the camp facilities. The Contractor

may make his own arrangements to use land, probably through the local authorities. However, as much as possible the camp site shall not be within privately owned productive farmland and protected areas.

#### *3.4.3.7. Contractors' machinery and equipment*

It is expected that plant-intensive construction methods will be adopted, given the nature and scale of the works. The project contractors will mobilise and operate the following machinery and equipment for the construction of the proposed distribution lines and substation will include:

- Earth moving machines (excavators, backhoe loaders, loaders, etc.)
- Compactors and rollers.
- Lifting machines (crane, forklift)
- boring machine,
- Dump trucks, light pickup, crew truck/car hauler
- Water trucks
- Concrete mixers.
- Concrete vibrators
- Compressors.
- Cable drum and drum puller,
- Overhead line rig, static wire reel.
- Generators.
- Welding machines.
- Scaffolding.
- Electric cables and pipes.
- Various tools.

#### *3.4.3.8. Construction manpower requirements*

The construction works are usually executed by engaging both local and international contractors. The Contractors will engage skilled manpower as per their requirements to complete the work within given timeline. Therefore, the project will provide short-term employment opportunity for several local people. The construction crews will be different depending on the activity to be performed, e.g. for foundations, tower erection or cable stringing. During different phases of construction work, excavators, pile-workers, foundation and superstructure labourers, carpenters, electricians, heavy equipment operators, ironworkers, masons, plasterers, plumbers, pipefitters, sheet metal workers, steel fixers, and welders will be engaged whenever necessary. The technical staff will include civil engineers, electrical engineers, supervisors, technicians of various trades, and fulltime environmental and social safeguard expert as part of the construction contractor staff to preparing, implementing and reporting on the C-ESMP. As much as possible unskilled labor will be hired from the local community to avoid labor influx. (i.e. from the locations traversed by the distribution line, and distribution lines, and those proposed for power plants and sub-stations). These workers will receive adequate training prior to commencement of construction.

### 3.5. Operation phase activities

#### 3.5.1. Testing and commissioning

The supplier of each component shall design and construct the respective component to the standard and subject it to testing as required by the relevant standard for that specific component. If the component satisfies the provisions of the standard and related testing criteria, then the individual component shall be considered in compliance with the standard. To ensure the line performs as per specifications, a number of tests will be undertaken. Therefore, on completion of the work, physical inspection and checking will be carried out for all foundation work, tower erection and stringing to ensure strict adherence to the technical requirements. During testing, ground clearance for the line will be thoroughly checked. In addition, insulation and continuity test as well as earth resistance of each tower will be carried out before final energization.

#### 3.5.2. Operation and maintenance for distribution line

After completion of the construction, the MoEWR and ESPs will be responsible for the operation and maintenance. The main activities to be carried out during the operation life of the distribution line shall include surveillance of the condition of the distribution line routine, emergency maintenance and repairs and vegetation control. Below is the list of O&M works usually conducted for distribution lines:

- Vehicular access to the ROW will be required to effect line repairs or to correct any localized erosion or terrain instability problems that might develop. Therefore, inspect and maintain access road as required.
- Regular inspection and controlling vegetation growth on the right-of-way will be controlled to ensure safe and reliable operation of the line. Therefore, vegetation cover shall be cleared occasionally to ensure that vegetation does not interfere with the operation of the lines.
- Regular inspection and controlling future land uses within the ROW (DL Corridor) and ensuring that no new structures are constructed. In particular, buildings must be at a minimum distance from the line conductors.
- Periodical visual inspection of distribution line routes;
- Monitoring of the distribution line from the control room of associated power plants/substations;
- In case of regular schedule maintenance works, commence work following safety procedures only after notifying authorities before commencement of work;
- In case of emergency works, commence work immediately following safety procedures and notify authorities immediately upon completion of work;
- Fault detection in case of any occurrence of faults;
- Fault correction through replacement or repair works;
- Evacuation/distribution of electric power from power plants/substations to substations/load centres in controlled manner;

#### 3.5.3. Operation and maintenance for substation

The life of a substation is about 40 to 50 years. Replacement and refurbishment work may need to be done from time-to-time. Maintenance of the substation is essential for ensuring

its reliability and safety. Therefore, the main activities to be carried out during the operation life of the substation include:

- Conduct regular inspection and carry out maintenance as required. This may involve replacing some aging equipment or rebuilding certain sections of the substation;
- Regularly monitor and maintain the substation equipment like transformers with associated bay equipment, bus bar coupler, capacitor banks, battery and battery chargers, relays, and underground cables need to be after substation commissioning;
- Measurement of leakage in line current and neutral current of distribution lines;
- Regular inspection and refilling and maintenance of firefighting equipment; gardening, plantations, water supply and sanitation are also considered necessary for sound operation of substation; and
- Regularly inspect and keep the substation sites tidy at all times.

### 3.6. Decommissioning

It is anticipated that the power distribution line will be continuously maintained and repaired and will be operated for several decades. Because of its long-life cycle, the circumstances under which the line might ultimately be decommissioned and abandoned are difficult to foresee. Towers may be upgraded/renewed based on cost/benefit analysis and new technologies. However, if decommissioning is undertaken, MoEWR and ESPs shall be required to prepare specific Decommissioning Management Plan at the time. Therefore, the decommissioning procedure shall include site-specific rehabilitation plans for the footprint of the project. All regulatory requirements will be complied with for the decommissioning phase.

### 3.7. Construction arrangements

It is anticipated that the project will be tendered as contracts for different components. The construction works will be tendered under International Competitive Bidding procedures acceptable to AfDB - the funding agency and to the MoEWR, following pre-qualification of suitably qualified and experienced contractors.

### 3.8. Construction supervision

Construction supervision and monitoring is likely to follow the usual practice with a suitably experienced consultancy firm appointed under competitive bidding procedures as defined in the construction contract and other senior supervisory staff.

### 3.9. Project Cost Estimation and Financial Analysis

The recommended investment plan was subjected to financial analysis to establish its financial viability. The analysis at this stage sought to establish Internal Rate of Return (IRR), Net Present Value (NPV) and the Payback period of the investment plan which is comprised of the following components:

- Component 1- Scale-Up of Renewable Energy Generation
- Component 2- Distribution Network Rehabilitation and Expansion

- Component 3- Energy Sector Institutions Strengthening

The estimated investment cost is the amount of **US\$25,401,917** with breakdown per component as indicated in the following table.

*Table 3-0-1: Summary of Costs*

No	Description	Cost (US\$)
1	Component 1 -Solar PV+BESS	8,869,250
2	Component 2-Grid Rehabilitation and Expansion	11,037,038
3	Component 3-Strengthening of Energy Sector Institutions	2,650,000
4	Implementation of ESMP	334,000
5	Implementation of GRM	150,000
6	Project Development, Engineering and Supervision (5%)	1,152,014
7	<b>Sub-Total</b>	<b>24,192,302</b>
	<b>Contingencies (5%)</b>	<b>1,209,615</b>
	<b>Total</b>	<b>25,401,917</b>

This cost excludes:

- Cost of land required for the solar PV plant as well as proposed substations
- Cost of Right of Way (ROW) for the proposed medium voltage line extensions
- Taxes

Analysis carried out at the Feasibility stage show that the project is financially and economically viable. The project has a Financial Internal Rate of Return(FIRR) and Economic Internal Rate of Return (EIRR) of 28.3% and 17.3% respectively and Financial Net Present Value (FNPV) and Economic Net Present Value (ENPV) of US\$114.94million and US\$33.43million respectively. These results are summarized in the following table.

*Table 3-0-2: Summary of Costs*

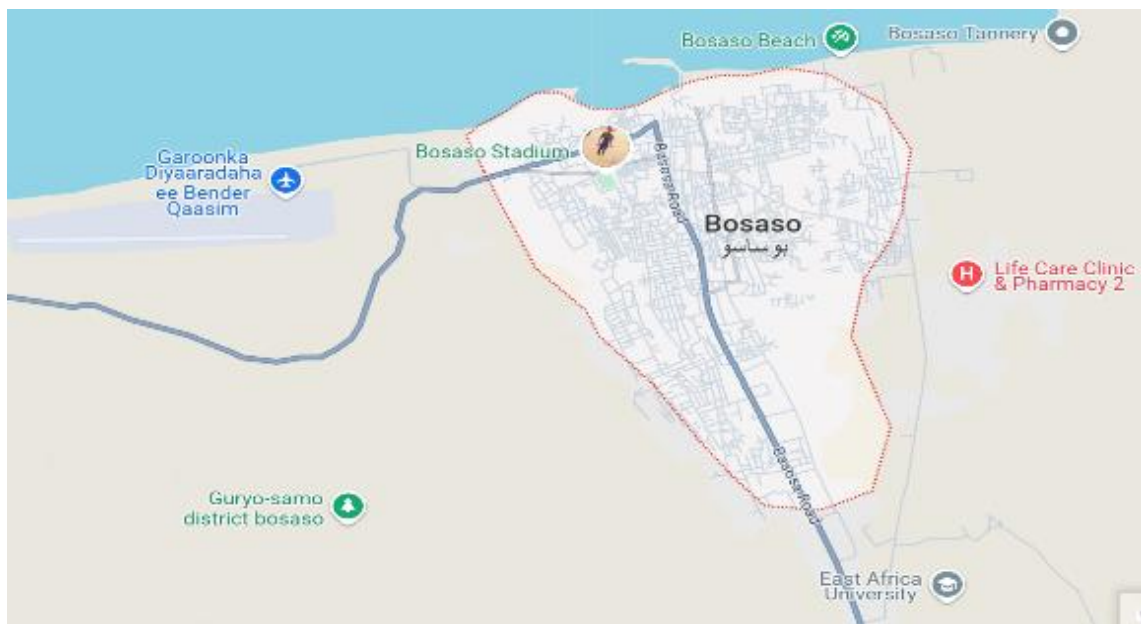
Solar PV Production Probability	EIRR	ENPV US\$	FIRR	FNPV US\$(million)
P50	17.3%	33,432,330	28.1%	114.94
P75	17.2%	32,979,623	27.96%	114.31
P90	17.0%	32,568,659	27.83%	113.74

*Source : Project Feasibility Report*

# CHAPTER FOUR: ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

## 4.1. Overview

Bosaso is a major port city located in the northeastern part of the Federal Republic of Somalia, within the Puntland State (Figure 4-1). It serves as the commercial hub of Puntland and is one of the key economic centers in the country, primarily due to its strategic location along the Gulf of Aden. The city is the capital of the Bari region and has a growing population due to its importance as a trade and migration center.



**Figure 4-1:** Location of Bosaso City and surrounding areas

Information on existing environmental and socio-economics is of fundamental importance for evaluation of environmental impacts. The contemporary and standard tools were used to investigate the physical, biological and social environment along the DL corridor, Solar PV plant (3MW required), substations (3) and other expansion area of the existing facilities. Physical observation, Key Informant Interview (KII), stakeholder consultation, transect walk, analysis of satellite image and Geographic Information System were the major tools and techniques employed for detail baseline study. The environmental parameters obtained mainly from the secondary data sources.

In this chapter, the baseline status of the physical, biological and socio-economic environment along the distribution line corridor.

## 4.2. Physical Environment

### 4.2.1. Overall landform & topography in Bosaso and surrounding areas.

Most of northern Somalia's geomorphology is influenced by tectonic activity from the Gulf of Aden rift<sup>11</sup>, resulting in unique landscapes and landforms, and strong erosions have shaped most landscapes into narrow gorges and sharp banks<sup>12</sup>. Bosaso City, located along the southern shores of the Gulf of Aden, has a diverse landform and topography that significantly impacts its climate, natural resources, and infrastructure development<sup>13</sup>. The coastal plains are low-lying, suitable for port activities and urban expansion, while the Cal Miskaad mountain range, part of the East African Highlands, rises sharply into the region. The region's hydrology is influenced by seasonal runoff into temporary rivers, and the topography (Figure 4-2) includes dry riverbeds or wadis, which channel water from mountains towards the coast during the rainy season. The region's arid climate results in localized microclimates, with higher altitudes receiving slightly more rainfall<sup>14</sup>.

The diverse topography creates distinct ecological zones that support various wildlife and vegetation, especially those adapted to the arid and semi-arid conditions. The proposed power infrastructure are strategically located in Bosaso City and the surrounding areas. The proposed power station is generally sited on stable, low-lying land near the city's outskirts (Balaade area), with safe distance from densely populated areas. The three substations are distributed across the key peri-urban zones in the north, west and east, and will serve as critical nodes that regulate voltage and ensure efficient electricity distribution. The proposed distribution lines, and the existing distribution lines extend from the proposed and existing power stations and substations, traversing diverse terrains such as coastal plains and arid plateaus.

These lines are carefully routed to avoid steep slopes and flood-prone areas, ensuring both structural stability and minimal environmental impact on Bosaso's varied topographic landscape. The topography units type and extent

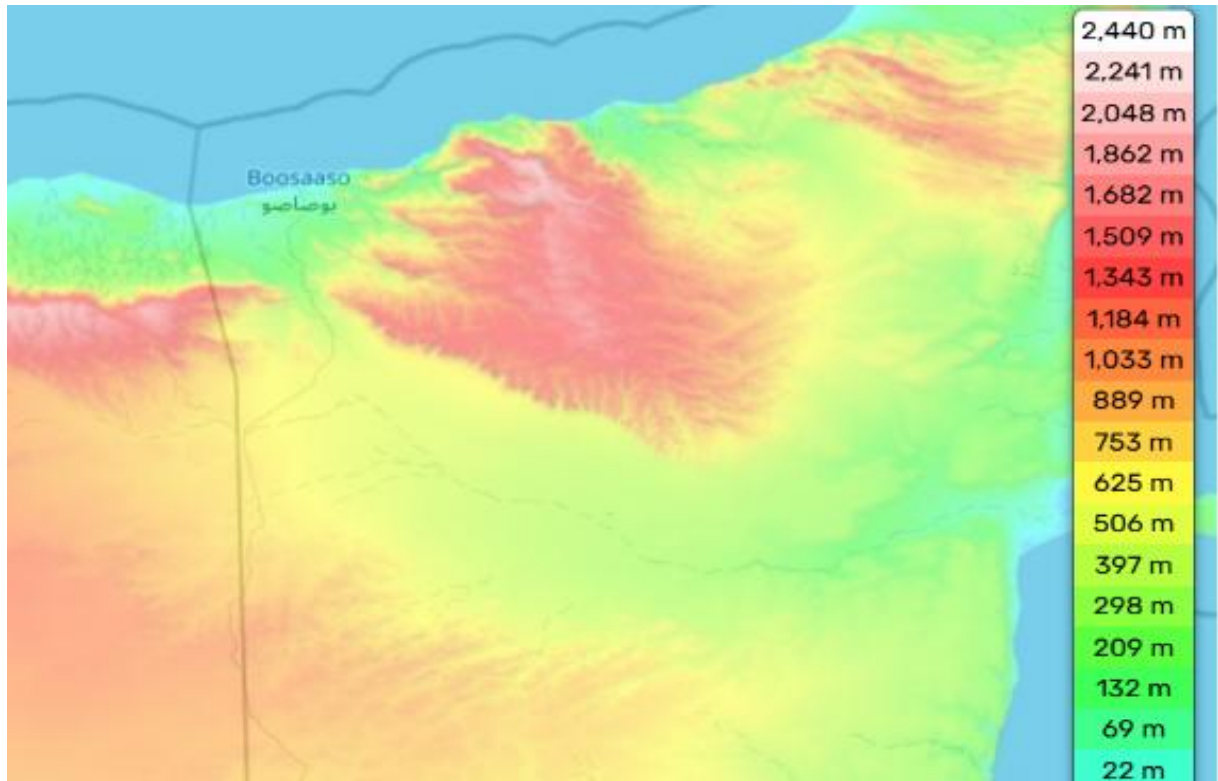
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<sup>11</sup>Ahmed, M. H., & Ibrahim, I. M. (2019). Geomorphological features and landform dynamics in the Gulf of Aden coastal region, Somalia. *African Journal of Earth Sciences*, 10(3), 103-115.

<sup>12</sup>Petrucci, Bruno. (2022). Landscape and Landforms of Northern Somalia. 10.1007/978-3-031-05487-7\_10.

<sup>13</sup>Abdirahman, A. A., Mohamed, M. A., & Mohamud, H. A. (2017). The physical geography of Puntland: A focus on the Bosaso region. *Journal of Somali Studies*, 4(2), 67-89.

<sup>14</sup>World Bank. (2020). *Climate risk profile: Somalia*. Washington, DC: World Bank Group



**Figure 4-2:** Overall topographic profile of Bosaso and the surrounding areas in northeastern Somalia

Source: <https://en-gb.topographic-map.com/map-9x7q5k/Bosaso/?center=10.631%2C48.34947&zoom=8>

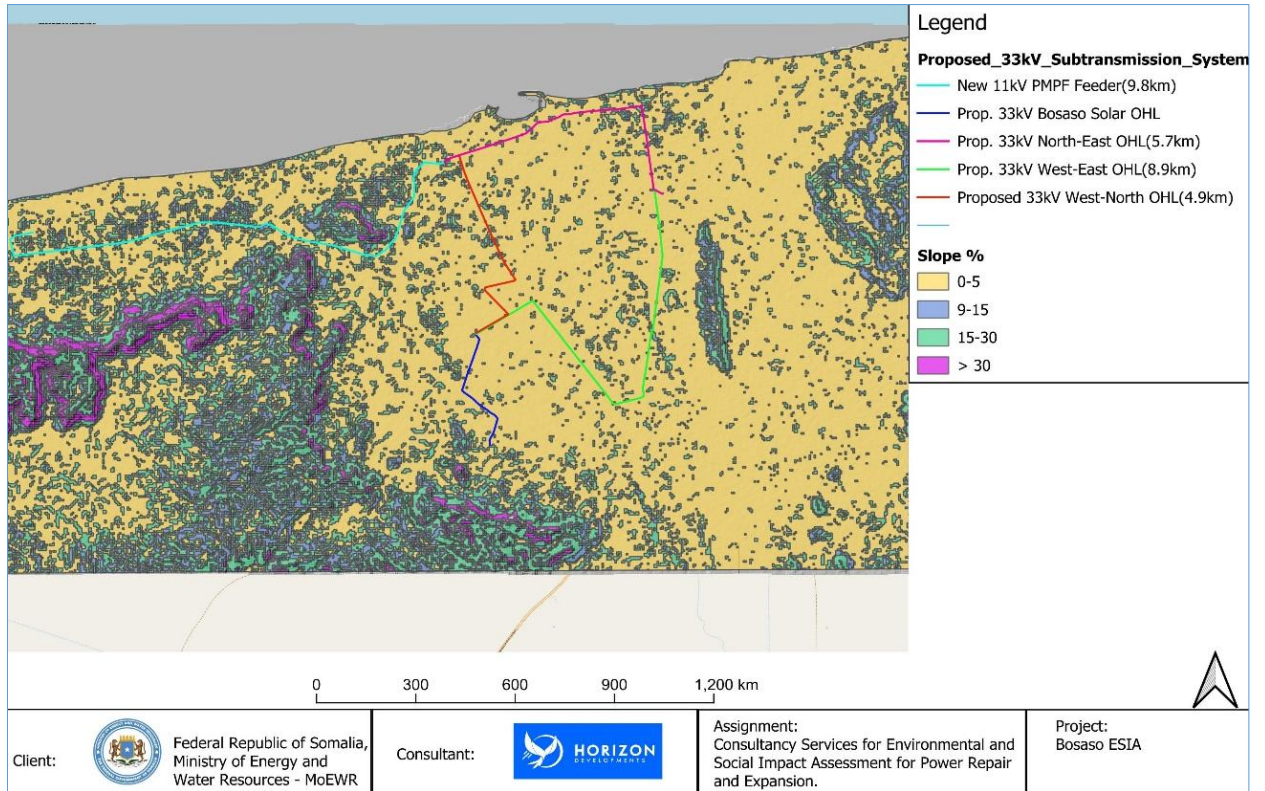




*Photo 2: Partial View of characteristic landforms and topography along the proposed DL route in and around Bosaso City*

#### 4.2.2. Topographic description and extents project footprint areas

The project footprint are falls within areas with variations of different strengths on topography (Figure 4-3). The proposed solar power plant and the sub-stations (west, east and north) fall within an area with topographic slope percentage 0-5% indicating a generally flat area. The distribution lines traverses areas with variable topographic slopes, but again most of the distribution line sections are fall within generally flat areas (0-5%).

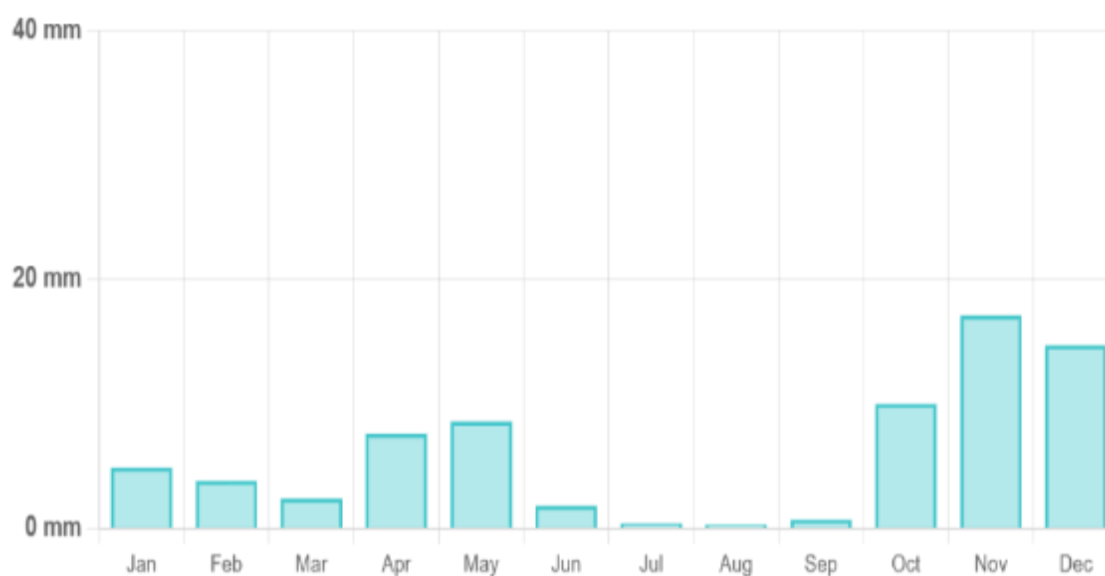


**Figure 4-3:** Specific topographic profile of the project sites

### 4.2.3. Climate

#### 4.2.3.1. Rainfall

Bosaso City and the surrounding areas has an arid climate with low and irregular rainfall (Figure 4-4). The city is part of the rain-shadow of the Ethiopian and Somali highlands, limiting moisture-bearing winds<sup>15</sup>. Bosaso has two main rainy seasons: the Gu season (April to June) and the Deyr season (October to November). The Gu season is more reliable, but neither delivers substantial precipitation due to the desert-like conditions. Droughts are common, especially during years when the ITCZ does not shift far enough north to bring rain-bearing clouds. Bosaso and the surrounding region rely on underground water sources and seasonal runoff to meet population needs<sup>16</sup>. However, the aridity poses challenges for agriculture, pastoralism, and water resource management, exacerbating issues like water scarcity and desertification<sup>17</sup>.



**Figure 4-4:** Monthly Rainfall Pattern for Bosaso City and the surrounding areas  
Source: <https://weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,Bosaso,Somalia>

#### 4.2.3.2. Temperature

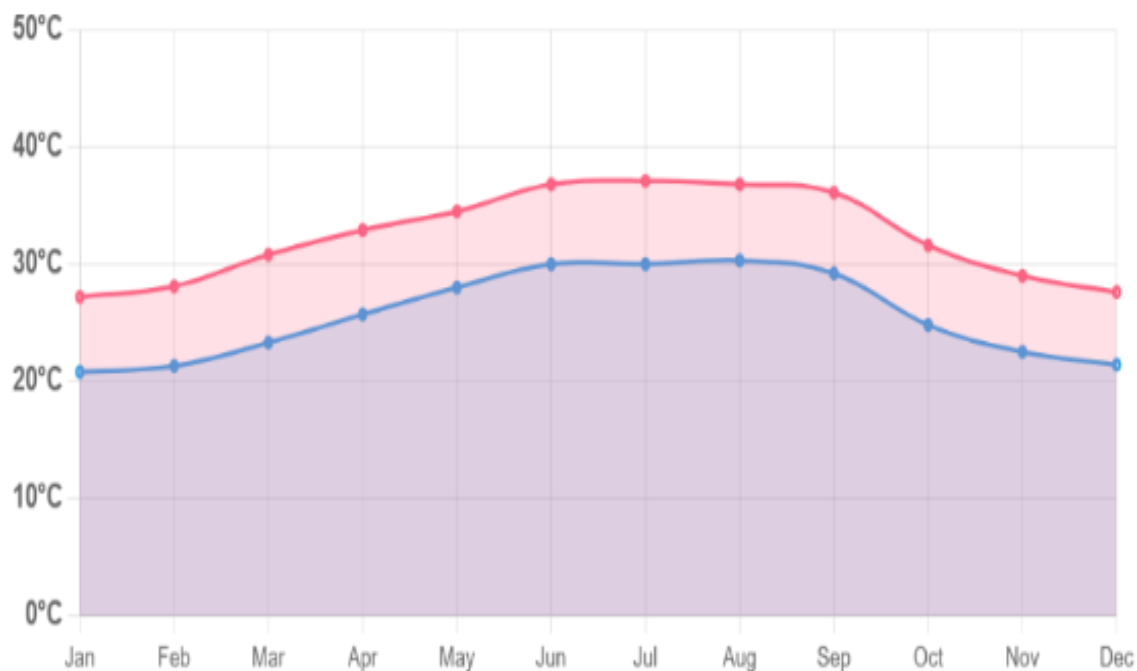
Bosaso and the surrounding areas experience a hot desert climate, typical of arid regions. The city has consistently high temperatures throughout the year, with little seasonal variation. Average daytime temperatures in Bosaso typically range from 30°C to 40°C throughout most of the year (Figure 4-5). The hottest months are from June to August, where temperatures can exceed 40°C, especially during the afternoon. In the cooler months, from November to February, temperatures are slightly more moderate, with

<sup>15</sup>Beleche, T. B., & Awale, M. M. (2018). The hydrological cycle and rainfall variability in Puntland, Somalia. *Journal of East African Natural Resource Studies*, 9(2), 105-120.

<sup>16</sup>Ali, A. Y. S., & Mohamed, K. M. (2021). Water resource management in semi-arid regions of Somalia: A case study of Bosaso city. *Somali Journal of Climate and Environmental Studies*, 6(1), 45-59.

<sup>17</sup>World Bank. (2020). *Climate risk profile: Somalia*. Washington, DC: World Bank Group

daytime highs between 28°C and 35°C (82°F to 95°F) and nighttime lows occasionally dropping to around 20°C (68°F). Despite this slight dip, Bosaso remains warm year-round. Bosaso's high temperatures are influenced by its location near the coast, which causes humidity to rise during certain periods, particularly from May to September, when the southwest monsoon winds bring hot, humid air<sup>18</sup>. However, the city's proximity to the sea can also provide brief cooling effects, especially with sea breezes. Due to the persistently high temperatures, Bosaso's climate is challenging for agricultural activities, requiring reliance on drought-resistant crops and livestock, as well as careful water resource management<sup>19,20</sup>.



**Figure 4-5: Monthly Minimum and Maximum Temperature Variation of Bosaso City**  
Source: <https://weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,Bosaso,Somalia>

#### 4.2.4. Overall Land and Use/Land Cover

Bosaso's land use and land cover reflect a combination of urban development, pastoralism, and natural arid landscapes. The region's economic activities are shaped by the limited availability of natural resources and the need for sustainable management to combat land degradation and desertification. The following are major land use and land cover types:

##### 4.2.4.1. Urban areas, built up areas and settlements

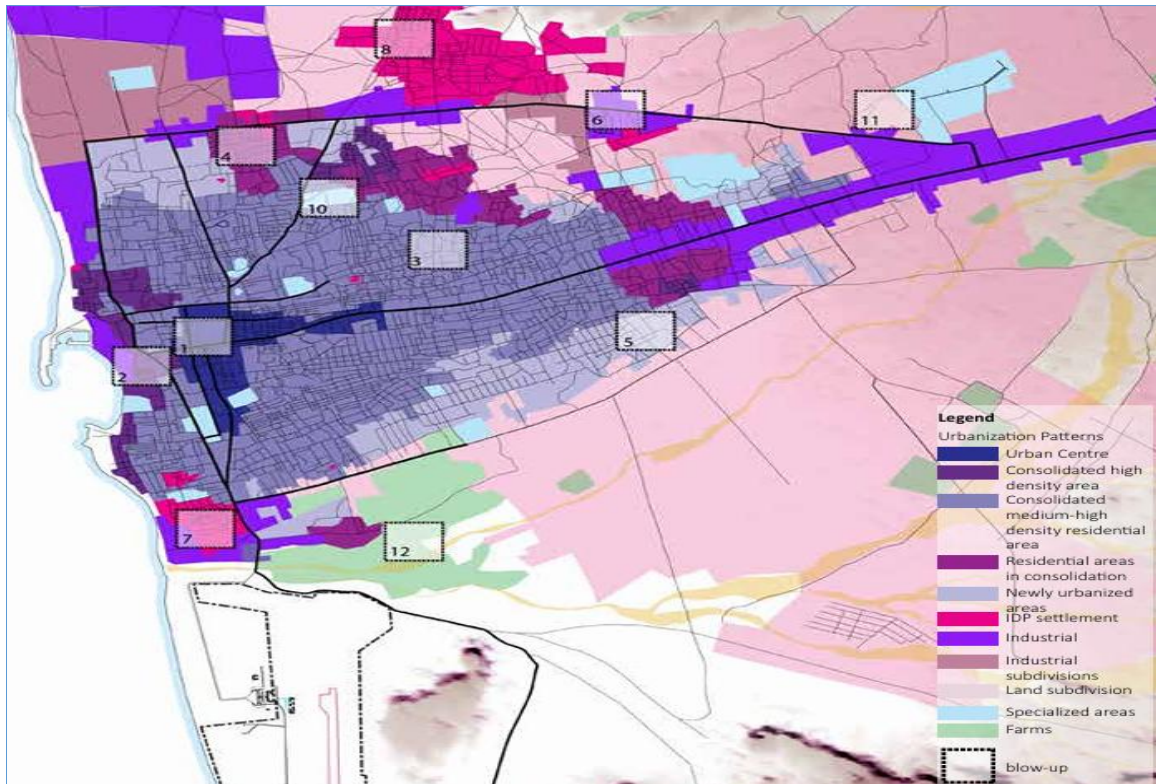
Bosaso is a rapidly growing urban center due to its strategic location as a port city along the Gulf of Aden. The city's land use is dominated by residential, commercial, and

<sup>18</sup>Beleche, T. B., & Awale, M. M. (2018). The hydrological cycle and temperature variability in Puntland, Somalia. *Journal of East African Natural Resource Studies*, 9(2), 105-120.

<sup>19</sup>World Bank. (2020). *Climate risk profile: Somalia*. Washington, DC: World Bank Group.

<sup>20</sup>Ali, A. Y. S., & Mohamed, K. M. (2021). Water resource management in semi-arid regions of Somalia: A case study of Bosaso city. *Somali Journal of Climate and Environmental Studies*, 6(1), 45-59.

industrial areas (Figure 4-6), particularly around the port, which plays a key role in Somalia's economy by facilitating trade with the Arabian Peninsula and beyond. Urban sprawl has increased as the population grows, with informal settlements emerging on the outskirts of the city. Infrastructure development is primarily concentrated along the coast and near major transportation routes.



**Figure 4-6: Settlements and urbanization patterns in Bosaso City**

Source: file:///C:/Users/HP/Downloads/Bosaso%20Strategy%20Compressed%20(1).pdf



*Photo 3. Partial View of typical built-up areas along the DL in Bosaso City and the surrounding areas*

#### 4.2.4.2. Agriculture and pastoralism

Agriculture in Bosaso and the surrounding areas is limited due to the arid climate and scarce rainfall, but small-scale, irrigated farming exists in localized areas. Agricultural land use is typically found in the form of small farms producing drought-resistant crops such as sorghum, maize, and date palms. However, the primary land use in the rural areas surrounding Bosaso is pastoralism<sup>21</sup>. Livestock herding, particularly of camels, goats, and sheep, is a dominant economic activity, with large tracts of land being used as rangelands. These rangelands are often open and sparsely vegetated due to the harsh environmental conditions.

#### 4.2.4.3. Natural vegetation, semi-arid landscapes and planted vegetation

The natural land cover surrounding Bosaso consists mainly of sparsely vegetated desert and semi-arid scrubland. Vegetation is typically drought-resistant, including species like acacia trees and shrubs adapted to the limited water availability. Grasslands also emerge during the brief rainy seasons, providing temporary grazing opportunities for livestock. However, overgrazing and desertification are ongoing concerns in the region, leading to land degradation in some areas. Shrub lands are multi-stemmed plant predominantly with height of less than 2 meter and 20-50% crown/ canopy cover. These land cover type is characterized by the occurrence of shrubs and scattered bushes and few trees – the dominant land cover types traversed. Open bushlands comprising of multi-stemmed woody plants was observed to be the second dominant land cover types along the DL route, especially in the outskirts of the City.



*Photo 4. Partial view of the characteristic vegetation along the DL in the outskirts of Bosaso City*

#### 4.2.3.4. Coastal areas

Along the coast, land use is heavily influenced by the city's port and related maritime activities. Fishing is an important livelihood for the coastal population, and fish-

<sup>21</sup>Mohamud, M. A., & Osman, F. H. (2019). Pastoralism and land degradation in the semi-arid regions of Puntland, Somalia. *Journal of East African Drylands*, 7(1), 45-62.

processing facilities are present along the shoreline. The coastline near Bosaso also has some areas of mangrove forests, although these are limited and vulnerable to both natural and human-induced pressures.



*Photo 5. Partial view of the coastal areas of Bosaso City*

#### *4.2.4.5. Degraded and barren lands*

The dry climate and increasing population pressure have led to land degradation, particularly in rangelands where overgrazing, soil erosion, and desertification are prominent<sup>22</sup>. Large areas of barren land, with exposed soil or rock, dominate the landscape outside the city. These areas are unsuitable for agriculture or pastoralism without significant rehabilitation efforts. For short periods during the rainy seasons, patches of vegetative cover could develop and grazed and browsed while for most of the years these land cover types remain to be bare lands.

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<sup>22</sup>Ali, A. Y. S., & Mohamed, K. M. (2021). Land use dynamics and environmental degradation in northern Somalia. *Somali Journal of Environmental Studies*, 5(3), 89-102.



*Photo 6. Partial view of the exposed soil and rocky surfaces along the DL in Bosaso City and the surrounding area*

#### 4.2.5. Land use and land cover project footprint sites

##### *4.2.5.1. Solar Power Plant and West Sub-station*

The land use and land cover in the vicinity of the solar power and West Power substation in Bosaso City include a diverse mix of urban and semi-urban zones. Most of the land (80%) comprises of bareland with 20% comprising of vegetation characteristic of arid environment (bushes and scrub). The area is characterized by consolidated medium to high-density residential areas (c. 30%), indicative of established neighborhoods. Additionally, newly urbanized areas are expanding (c. 25%), reflecting ongoing city growth and infrastructure development. The region also supports agricultural and livestock grazing areas (40%), which contribute to local livelihoods and food security. Meanwhile, some residential areas are undergoing consolidation (c. 25%), signifying transitional development aimed at strengthening urban infrastructure and improving living conditions. This mix of land uses highlights the dynamic interplay between residential growth, energy infrastructure, and traditional land practices.

##### *4.2.5.2. East Substation*

The East Power Substation in Bosaso City is situated in a diverse and rapidly developing landscape that encompasses various land use and land cover types. The land cover in the vicinity of the site comprise of 80% bareland and 20% bushes and scrub. This area features industrial zones (c. 40%) integral to the city's economic activities, alongside urban centers (30%) that support dense residential and commercial functions. Additionally, it is marked by IDP (Internally Displaced Persons) settlements (10%), reflecting socio-economic challenges and humanitarian responses in Bosaso city and the surrounding areas. The presence of newly urbanized areas (c. 10%) signifies recent expansions driven by population growth and urban sprawl, while consolidated high-density zones (c. 5%) showcase established neighborhoods with significant infrastructure. The area also includes specialized areas (c. 5%) dedicated to particular functions, such as



administrative, logistical, or service-oriented purposes, contributing to the complexity of land use in Bosaso.

#### *4.2.5.3. North Substation*

The land use and land cover around the North Power Substation in Bosaso City encompass a diverse mix of urban and specialized zones comprising of over 90% bareland. The region is marked by medium to high-density residential areas (c. 40%), including both permanent and informal settlements like IDP (internally displaced persons) (c. 5%) communities. Specialized zones feature critical infrastructure (c. 30%), such as the airport, military facilities, and ports, highlighting its strategic and economic significance. Additionally, the area includes newly urbanized sections (c. 5%) that are expanding as the city grows, as well as consolidated high-density neighbourhoods and residential areas (c. 20%) undergoing further development and consolidation. This mix underscores the dynamic urban landscape, with varied social and economic activities coexisting within the city's fabric.

#### *4.2.5.4. Distribution line*

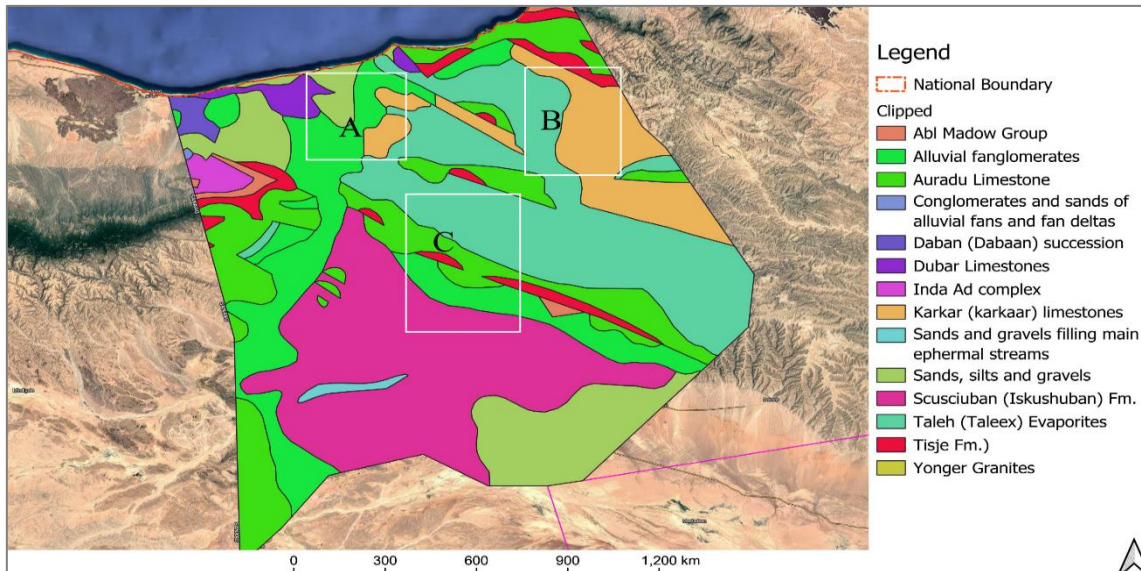
The land use and land cover along the power distribution line in Bosaso City is diverse, reflecting a blend of urban development and residential needs. The project footprint area is characterized by medium to high-density residential zones (c. 70%), including established urban centers that support commerce, public and private sector services. The distribution line also traverses areas close IDP (c. 5%) (internally displaced persons) settlements, highlighting the presence of vulnerable communities. Additionally, newly urbanized areas (c. 25%) signify recent expansions due to population growth and economic activities, while industrial zones point to manufacturing and commercial hubs vital for local employment and economic development. This mix presents unique challenges and opportunities for land management and energy infrastructure planning.

#### *4.2.6. Geology and soils*

The geology and soils of Puntland, including Bosaso City and the surrounding areas reflect a diverse landscape shaped by geological processes over millions of years with soils generally calcareous (Figure 4-7). The City's foundation consists of ancient Precambrian basement rocks, which are predominantly granitic and metamorphic in nature<sup>23</sup>. The overlying basement rocks are sedimentary layers, which are more prevalent along the coastal plains and low-lying areas. These sediments consist of sandstones, limestones, and shales deposited over millions of years. Puntland, including Bosaso is known to have significant mineral potential, including deposits of gypsum, limestone, and other industrial minerals. Along the coastline, soils are typically sandy and low in organic content. Inland areas often have reddish-brown soils, which are characteristic of the tropical weathering of underlying rocks.

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<sup>23</sup>Lenoir J.L., Kfister, D., Liogeois, J.R., Utke, A., Haider, A., & Matheis, G. (1994). Origin and regional significance of late Precambrian and early Palaeozoic granitoids in the Pan-African belt of Somalia. *Geol Rundsch* 83:624-641.



**Figure 4-7:** Geology and soils of Bosaso city and the surrounding areas, including project footprint sites

A – North Substation; B – East Sub-station; C – Power Plant and West Sub-station

The geology and soil types in Bosaso are generally influenced by the region's arid climate, low rainfall, and coastal and mountainous landscapes. The following are the main soil types found in Bosaso and its surrounding areas<sup>24,25</sup>:

- **Sandy Soils:** Light, loose-textured soils with low organic matter and nutrient content. Found predominantly along the coastal plains near the Gulf of Aden.
- **Saline Soils:** Soils with high salt concentrations due to evaporation and lack of drainage, common in arid regions. These are found mainly in the coastal areas of Bosaso where seawater intrusion and evaporation lead to salinity.
- **Lithosols (Rocky Soils):** Shallow soils with large amounts of rock fragments and minimal soil development. Found in the mountainous areas surrounding Bosaso, particularly in the Cal Miskaad range.
- **Regosols:** Loose, unconsolidated soils with little profile development, primarily composed of sandy or loamy materials. Found in both coastal and inland plains, especially in areas where sediment is deposited by wind and runoff.
- **Calcareous Soils:** Soils with a high calcium carbonate content, typically formed from limestone parent material. Common in the inland areas and foothills of the Cal Miskaad mountains.
- **Alluvial Soils:** Fertile soils deposited by rivers or wadis during seasonal flooding. Found along wadis (dry riverbeds) in the region, where seasonal runoff occurs during rains.
- **Gypsiferous Soils:** Soils with high gypsum content, common in desert environments. Found mainly in the inland arid regions, particularly in areas with sedimentary rocks.

<sup>24</sup>Mohamud, M. A., & Osman, F. H. (2019). Soil classification and land use in semi-arid regions of Puntland. *Journal of Somali Environmental Studies*, 7(2), 34-46.

<sup>25</sup>Ali, A. Y. S., & Mohamed, K. M. (2021). Land and soil resources in Bosaso: Challenges and opportunities for sustainable use. *Somali Journal of Arid Environment Studies*, 5(1), 28-42.

#### 4.2.7. Water resources and drainage networks

Coastal areas in arid and semi-arid regions highly depend on groundwater resources due to the lack of surface water. Bosaso is the major city of Puntland state, and groundwater is the main water source. Previous studies have indicated that the Bosaso aquifer has been affected by seawater intrusion due to the over groundwater extraction, and little efforts have been made to monitor the groundwater quality in the city<sup>26</sup>. The city faces degradation in water quality and water supply shortage due to the rapid population growth in recent years and effects of climate change and droughts<sup>27</sup>. Drainage networks are largely underdeveloped, with most natural drainage occurring through wadis (seasonal rivers) that flow only during the brief rainy periods, often leading to flash flooding.

#### 4.2.8. Air quality

Air quality in Bosaso City is influenced by both natural and human activities. The arid and dusty environment, combined with seasonal winds, leads to frequent dust storms that contribute to elevated particulate matter levels. In addition, the growing urbanization, increased vehicle emissions, and the use of diesel generators for electricity contribute to air pollution. Industrial activities, particularly from the port and small manufacturing businesses, also release pollutants into the atmosphere. While there are no extensive air quality monitoring systems in place, concerns about respiratory health issues, especially during dust storms, are common. Efforts to manage emissions and reduce dust exposure are limited but increasingly needed as the city expands.

#### 4.2.9. Ambient noise

Ambient noise levels in Bosaso City are shaped by a mix of urban, industrial, and transportation activities. As a bustling port city, noise from the movement of goods, trucks, and ships at the port contributes significantly to the soundscape. Additionally, the increasing traffic from cars, buses, and motorbikes, alongside the widespread use of diesel generators due to unreliable electricity, leads to elevated noise levels, particularly in commercial and residential areas. Marketplaces, busy streets, and construction activities also add to the general noise pollution. While there are no formal noise regulations or monitoring systems, the constant ambient noise has raised concerns about its impact on residents' health and well-being.

### 4.3. Biological Environment

A mix of coastal, desert, and shrubland ecosystems characterizes Bosaso City and the surrounding areas. The area features a predominantly arid landscape with sparse vegetation, including drought-resistant plants such as acacia trees, shrubs, and various grasses adapted to the harsh climate. The proximity to the Gulf of Aden influences local biodiversity, with some coastal flora extending inland. Wildlife in the area includes various bird species, reptiles, and small mammals, though populations are often limited due to habitat degradation, urban expansion, and overgrazing by livestock. The city's rapid urbanization has led to increased land use changes, affecting the natural habitats and biodiversity. Conservation efforts are needed to protect the remaining ecosystems and promote sustainable land use practices to balance development with ecological

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<sup>26</sup>Said, Abdullahi & Yurtal, Recep & Cetin, Mahmut & Gölpınar, Muhammet. (2021). Evaluation of some groundwater quality parameters using geostatistics in the urban coastal aquifer of Bosaso plain, Somalia. *Tarım Bilimleri Dergisi*. 88-97. 10.15832/ankutbd.611787.

<sup>27</sup>Said A A, Cetin M & Yurtal R (2019). Drought assessment and monitoring using some drought indicators in the semi-arid Puntland State of Somalia. *Fresenius Environmental Bulletin* 28,11A: 8765-8772

preservation. Overall, Bosaso's biological environment reflects the challenges of adapting to an arid environment while supporting the livelihoods of its growing population.

The biological environment was assessed using both secondary and primary (field) data as collected during the ESIA study.

### 4.3.1. Flora

#### *Overall flora characterization*

Bosaso lies within the semi-arid and arid climate zones, which shape its flora. The flora of the region is adapted to the dry, hot conditions and is predominantly composed of drought-tolerant species. Some of the key characteristic flora groups of Bosaso include:

- **Acacia and Commiphora species:** These hardy trees and shrubs dominate the landscape, particularly *Acacia tortilis* and *Commiphora myrrha*. These plants are well-adapted to arid conditions due to their deep roots, which allow them to access groundwater, and their small leaves, which reduce water loss through transpiration.
- **Grasses and Shrubs:** The vegetation also includes sparse grasslands dominated by perennial grasses such as *Cenchrus ciliaris* (Buffel grass) and *Chloris roxburghiana*. Shrubby plants like *Adenium obesum* (Desert Rose) and *Leptadenia pyrotechnica* thrive in open spaces, often interspersed with thorny scrub.
- **Succulents and Xerophytes:** Succulents like Euphorbia species and *Aloe somaliensis* are also found in Bosaso. These plants have adapted to store water in their leaves or stems, enabling them to survive extended dry periods. Other xerophytes, such as *Ziziphus mauritiana* (Jujube), are present and provide fruit in this harsh environment.
- **Coastal and Salt-tolerant Plants:** The coastal zones near the Gulf of Aden have halophytic (salt-tolerant) species like *Avicennia marina* (Grey Mangrove) and *Suaeda monoica*, which are common in the saline flats and near estuarine areas. These plants help stabilize the shoreline and contribute to coastal biodiversity.
- **Medicinal and Aromatic Plants:** The flora of Bosaso includes aromatic plants such as *Boswellia sacra* (Frankincense tree) and *Commiphora gileadensis* (Balm of Gilead). These species are of great economic and cultural significance for producing valuable resins used in traditional medicine, incense, and cosmetics.

#### *Flora characterization in the East Sub-station*

The East Sub-Station in Bosaso City is predominantly bareland, with sparse pockets of vegetation typical of Somalia's arid and semi-arid regions. The vegetation includes drought-resistant shrubs such as *Acacia tortilis*, *Commiphora spp.*, and *Salvadora persica*, as well as occasional grasses like *Cenchrus ciliaris* and herbs such as *Senna italica* that flourish during rainy periods. Scattered woody plants, including *Boswellia sacra* and *Prosopis juliflora*, are also present, exhibiting adaptations such as deep roots, small leaves, and spines to withstand the harsh conditions. Most of the vegetation is affected by overgrazing, climate change, and urban expansion.

#### *Flora characterization in the West Substation*

The flora of the West Sub-Station in Bosaso City is typical of Somalia's arid and semi-arid environments, with over 75% of the area consisting of bareland and scattered pockets of drought-resistant vegetation. Dominant species include xerophytic shrubs such as *Acacia tortilis*, *Commiphora spp.*, and *Salvadora persica*, alongside sparse grasses like

*Cenchrus ciliaris* and herbs such as *Senna italica* that emerge during brief rainy periods. Scattered woody plants, including *Boswellia sacra* and *Prosopis juliflora*, are also present, showcasing adaptations like deep root systems, small leaves, and spines to conserve water. This vegetation provides critical ecological functions, including soil stabilization, habitat support, and resources for local communities, but faces threats from overgrazing, urban development, and climate change.

#### *Flora characterization in the North Sub-station*

The flora of the North Sub-Station in Bosaso City is characteristic of arid and semi-arid environments, with approximately 80% of the area consisting of bareland interspersed with pockets of drought-resistant vegetation. Dominant plant species include xerophytic shrubs such as *Acacia tortilis*, *Commiphora spp.*, and *Salvadora persica*, alongside sparse patches of grasses like *Cenchrus ciliaris* and herbs such as *Senna italica*, which thrive during brief rainy periods. Scattered woody plants, including *Boswellia sacra* and *Prosopis juliflora*, provide minimal canopy cover. These species exhibit adaptations such as deep roots, small leaves, and salt tolerance to survive the harsh conditions. The vegetation plays an essential role in soil stabilization, habitat provision, and supporting local livelihoods, though it is increasingly threatened by overgrazing, urban expansion, and climate change.

#### *Flora characterization in the along the transmission lines*

A mix of planted trees, pockets of indigenous vegetation, and widespread presence of the invasive *Prosopis juliflora* characterizes the flora along the power transmission lines in Bosaso City. The planted trees, often introduced for aesthetic, shade, or soil stabilization purposes, coexist with native well-adapted to the arid environment. The dominance of *Prosopis juliflora*, a fast-growing invasive species, poses challenges by outcompeting native plants, altering soil properties, and affecting biodiversity. This vegetation mix highlights the need for effective management to balance ecological preservation with infrastructure development.

Table 4-1 shows the common plant species found in Bosaso and the surrounding areas together with their IUCN Red List categories. Overall, none of the species of plants known to occur in Bosaso and the surrounding areas is listed in the IUCN threat categories as critically endangered (CR), endangered (EN), near-threatened (NT), and vulnerable (VU).

**Table 4-0-1:** List of common vegetation species in Bosaso and surrounding areas, and their global IUCN Red List Categories

Botanical name	Local name /Somali	Presence in project footprint area				IUCN Red List Category
		DL	Poweplant/ WS	ES	NS	
<i>Acacia benaderensis</i>	Sarmaan	√	x	√	√	NE
<i>Acacia bussei</i>	Galool	√	√	x	√	LC
<i>Acacia edgeworthii</i>	Jeerin	√	√	x	√	NE
<i>Acacia hamulosa</i>	Masaarjebis	√	x	√	x	NE
<i>Acacia mellifera</i>	Bilcil	√	√	√	√	NE
<i>Acacia nubica</i>	Gumar	√	√		√	NE
<i>Acacia recifiens</i>	Qansax	√	√	√	√	NE

Botanical name	Local name /Somali	Presence in project footprint area				IUCN Red List Category
		√	x	√	x	
<i>Acacia Senegal</i>	Cadaad	√	x	√	x	LC
<i>Acacia seyal</i>	Jiikh; Fullay; Waajool	√	√	x	√	LC
<i>Acacia stuhlmanii</i>	Qaydar	√	√	√	√	NE
<i>Acacia tortilis</i>	Qudhac	√	√	√	x	LC
<i>Adenium obesum</i>	Desert Rose	√	√		x	LC
<i>Adenium obesum</i>	Oboo; Obow	√	√	√	x	NE
<i>Albizia anthelmintica</i>	Reydab	√	x	√	√	NE
<i>Aloe somaliensis</i>	Waraabe	√	√	x	√	NE
<i>Anisotes trisulcus</i>	Mirdhis	√	√	√	√	NE
<i>Avicennia marina</i>	Grey Mangrove)	√	√	√	x	LC
<i>Balanites Aegyptiaca</i>	Qulan	√	√	x	√	LC
<i>Boscia minimifolia</i>	Meygaag	√	√	√	√	NE
<i>Boswellia sacra</i>	Frankincense tree	√		√	√	LC
<i>Cenchrus ciliaris</i>	Buffel grass	√	√	√		LC
<i>Chloris roxburghiana</i>		√	√	x	√	LC
<i>Coleus barbatus</i>	Dhalool	√	x	√	√	NE
<i>Commiphora allophylla</i>	Xagarmadow	√	√	√	√	NE
<i>Commiphora gileadensis</i>	Balm of Gilead)	√	√	√	√	LC
<i>Commiphora myrrha</i>	Dhidin(geed) malmal (xabag)	√	√	√	√	NE
<i>Dichrostachys cinerea</i>	Dhiigtaar	√	x	√	x	NE
<i>Dobera glabra</i>	Garas	√	√	√	√	NE
<i>Euphorbia cuneata</i>	Dhirindhir	√	√	x	√	NE
<i>Euphorbia robecchii</i>	Dharkayn	√	√	√		NE
<i>Grewia bicolor</i>	Dhebi	√	√	x	√	NE
<i>Grewia penicillata</i>	Hohob	√	x	x	√	NE
<i>Prosopis juliflora</i>	Wangey/ Cali-garoob	√	√	√		NE
<i>Salvadora persica</i>	Caday; Rumay	√	√		√	LC
<i>Suaeda monoica</i>	-	√	x	√	√	LC
<i>Ziziphus mauritiana</i>	Jujube	√	x	x	√	LC

Note: LC: Least Concern NE: Not Evaluated

#### 4.3.2. Fauna

##### 4.3.2.1. Mammals and reptiles

Bosaso and surrounding areas is a home to various fauna species. However, due to anthropogenic-driven habitat alterations and modifications, the fauna species assemblages have been altered over the years. However, a few pockets of suitable habitats still exist, and hosts a variety of wild fauna species. The mammal species whose distribution ranges

fall within Bosaso include; Dorcas Gazelle (*Gazella dorcas*), Beira Antelope (*Dorcatragus megalotis*), Greater Kudu (*Tragelaphus strepsiceros*), Dibatag (*Ammodorcas clarkei*), Striped Hyena (*Hyaena hyaena*), Spotted Hyena (*Crocuta crocuta*), Somali Elephant Shrew (*Elephantulus revoili*). The common reptile species whose distribution ranges fall within Bosaso and surrounding areas include; Somali Tortoise (*Geochelone sulcata*), Horned Viper (*Cerastes cerastes*), Puff Adder (*Bitis arietans*), and Somali Rock Agama (*Agama somalica*).

#### 4.3.2.2. Avifauna

According to the previous assessments, more than 300 species of birds exist in the region<sup>28</sup>. However, there are no Important Bird Areas (IBA) or protected areas within the confines of the project area. Generally, the areas along the proposed distribution line have low to medium sensitivity. Furthermore, there are few species of conservation concern whose distributional ranges also cover Bosaso. Among the key species known to occur in the region, including Bosaso and surrounding areas, are the Somali Ostrich (*Struthio molybdophanes*), Somali Pigeon (*Columba oliviae*), Golden-winged Grosbeak (*Rhynchostruthus socotranus*), Lappet-faced Vulture (*Torgos tracheliotos*), Greater Hoopoe Lark (*Alaemon alaudipes*), Secretary Bird (*Sagittarius serpentarius*), Egyptian Vulture (*Neophron percnopterus*), and White-crowned Shrike (*Eurocephalus rueppelli*). Based on the literature review of avifauna, the seasonality of species assemblages indicates that the appearance or the observation frequency of bird species show a significant or at least recognizable seasonal dependency. Palaearctic migrants are thus, mainly seen in the months of November to March, while the movement of intra-Africa migrants may be influenced by shifting conditions in parts of their distribution range, and they appear in larger numbers during a particular time of the year. Other species may aggregate at certain places in times of suitable conditions or specific habitat offers. Waterbirds in general may flock at floodplains or temporary large water ponds during the two rainy seasons from April to June (*Gu* Season) and October to November (*Deyr* Season).

### 4.4. Socio-Economic Environment

#### 4.4.1. Overview

Bosaso, a key commercial hub in northeastern Somalia, thrives on its strategic location along the Gulf of Aden, serving as a vital trading port for livestock exports, fishing, and goods exchange with the Middle East. The city's economy is bolstered by small-scale businesses, remittances from the Somali diaspora, and a growing construction sector, while surrounding rural areas rely primarily on pastoralism and fishing for livelihoods. Rapid population growth, driven by migration and natural increase, has contributed to urban expansion but also strains infrastructure, including roads, healthcare, and education services. Although Bosaso enjoys relative stability compared to other regions in Somalia, challenges such as unemployment, environmental degradation, and security concerns persist, particularly in rural areas. Despite these obstacles, the city's economic potential continues to grow, with the port offering opportunities for future development and regional integration.

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<sup>28</sup><https://www.cbd.int/doc/world/so/so-nbsap-01-en.pdf>

#### 4.4.2. Administration setting

Bosaso, the commercial hub of Puntland State in north-eastern Somalia, operates under a decentralized administrative system led by a mayor and city council. The administration oversees municipal functions such as urban planning, service delivery, infrastructure development, and maintaining law and order. Bosaso is divided into districts, with local leadership managing daily administrative tasks. The administration collaborates with Puntland State ministries for policies and programs affecting the urban population. As a major port city, Bosaso has customs and port authorities that regulate trade and maritime activities. Despite challenges like rapid urbanization, limited resources, and improved public services, the administration focuses on enhancing governance and infrastructure to meet the needs of its growing population. The proposed project sites and sub-stations fall within administrative units located in the north, east and west. The city residents refer to these locations using different names. For instance, the north sub-station is variously referred to as Bosaso Girible/Bosaso Dan-Wadag, the east sub-station falls in administrative area referred to as El-Dhurrel/Habab, and the West Sub-station, which is also associated with the proposed power plant, is within Baalade/Bali-Khadar administrative area.

#### 4.4.3. Land tenure

A mix of formal laws, customary practices, and informal agreements shapes the land tenure and landholding system in Bosaso and surrounding areas. Land is primarily governed by customary law, where clan-based and family-oriented traditions influence land allocation and ownership. While there are official government frameworks for land registration and titles, these are often limited or inconsistently applied, and many residents rely on informal arrangements or recognition by local community leaders for securing land rights. Urban expansion and increasing land demand have intensified land-related challenges, often affecting vulnerable groups due to unclear tenure arrangements.

For Project-Affected Persons (PAPs) in Bosaso, household landholding sizes vary, reflecting differing social, economic, and spatial factors. While exact averages depend on specific project data, general estimates in urban areas suggest smaller plots with an average landholding size ranging between 0.1 and 0.5 hectares for most households. Minimum holding sizes tend to be under 0.1 hectares, particularly in densely populated areas, whereas larger or wealthier households might hold more than 1 hectare, though such cases are less common. The variation in landholding sizes is significant, influenced by socio-economic status, household needs, and proximity to central urban areas where land is more limited and highly valued.

#### 4.4.4. Population and demographics

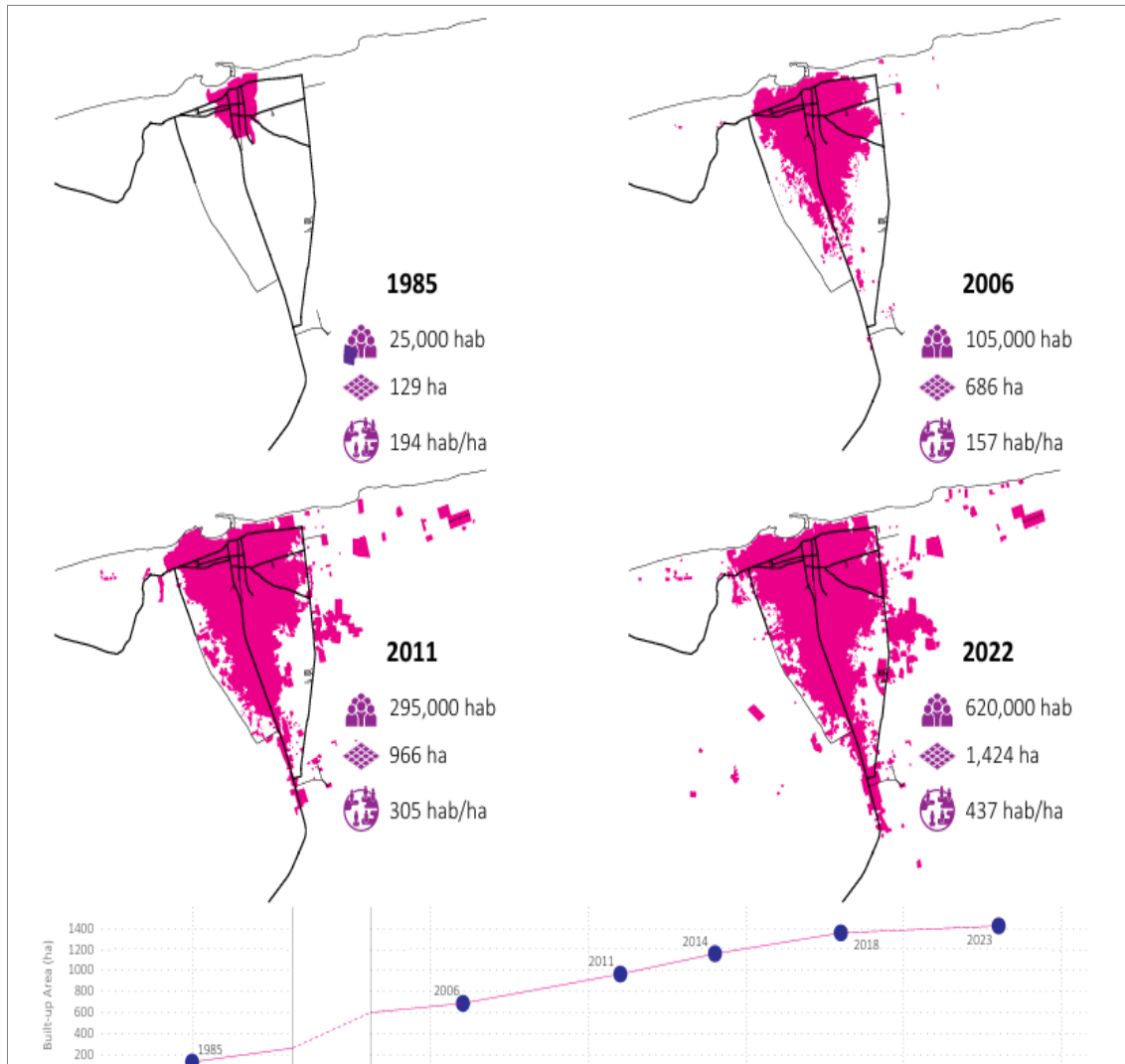
Bosaso has experienced rapid population growth in recent decades (Figure 4-8), driven by both natural population increase and internal migration from other parts of Somalia, especially from conflict-affected southern regions. The population is diverse, with a mix of urban dwellers, nomadic pastoralists, and migrant communities. The city has become a melting pot of cultures, ethnic groups, and clans. A significant portion of the population is young, with a large percentage under the age of 30. Bosaso's population is estimated at 700,000 residents<sup>29</sup>, and is projected to grow significantly by 2035 (Figure 4-9). It is the third largest city in Somalia after Mogadishu and Hargeisa. Furthermore, Bosaso is a

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<sup>29</sup><http://bosasomunicipality.com/districts>



major port for boats carrying emigrants from within the country as well as adjacent territories across the Gulf of Aden to settle (sometimes illegally) in the Persian Gulf states. While Bosaso today is a melting pot, with residents hailing from many different parts of Somalia, most of the city's population is from Warsangeli, Majeerteen, Deshiishe and other Harti groups confederation of Darod. The city is also home to many IDPs.



**Figure 4-8:** Spatial distribution of population and demographics of Bosaso (1985-2022)  
 Source: file:///C:/Users/HP/Downloads/Bosaso%20Strategy%20Compressed%20(1).pdf



**Figure 4-9: Projected trends in population growth and projections for Bosaso**  
Source: file:///C:/Users/HP/Downloads/Bosaso%20Strategy%20Compressed%20(1).pdf

#### 4.4.5. Settlement patterns

Human settlement patterns in Bosaso, Somalia, are influenced by a variety of factors, including geography, socio-economic conditions, historical context, and the impacts of conflict and displacement. Bosaso is the largest city in the Puntland State of Somalia and serves as a major commercial hub. A mix of residential, commercial, and industrial areas (Figure 4-10) characterizes the city's urban center. The downtown area is home to numerous shops, markets, and businesses, reflecting Bosaso's role as a trade center. The port area is particularly bustling, with activities related to fishing, livestock trade, and imports and exports. Residential neighborhoods vary in terms of socio-economic status. Wealthier households often live in formal housing with better infrastructure, while lower-income families may reside in informal settlements or temporary shelters with limited access to basic services.

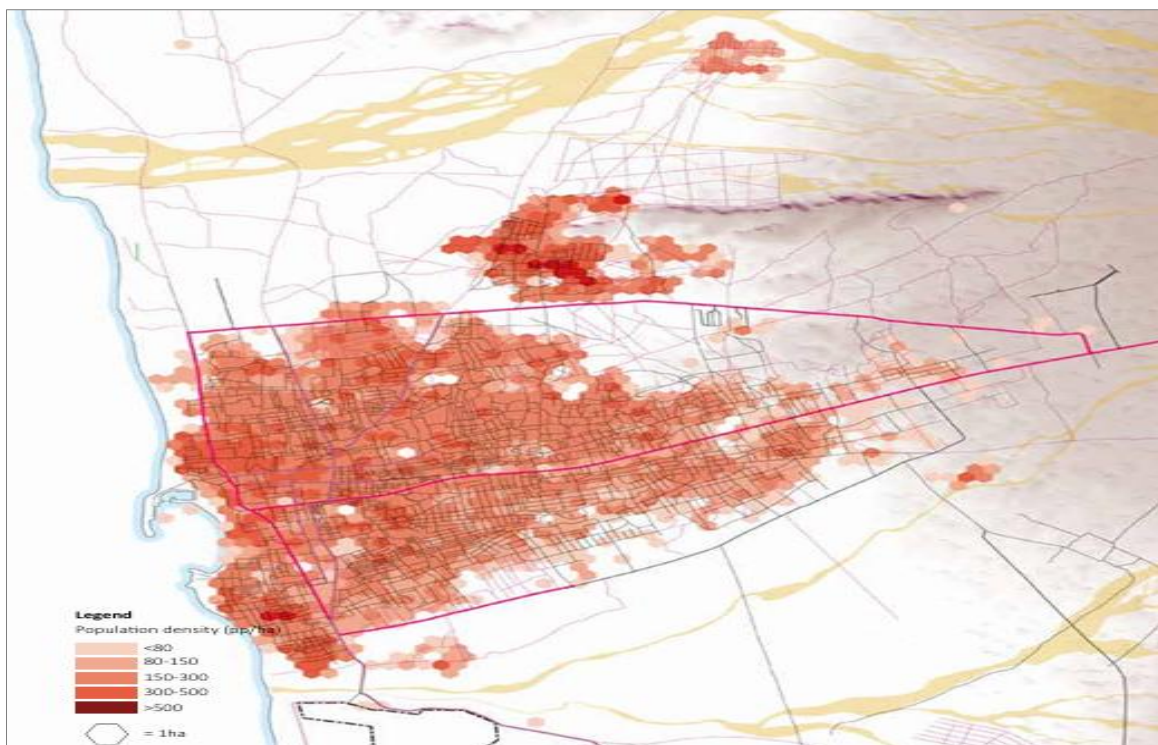
Many people in Bosaso live in informal settlements, often referred to as "IDP camps" (Internally Displaced Persons camps). These areas typically arise from:

- *Displacement:* Ongoing conflict, drought, and economic challenges have led to significant internal migration, with many families seeking refuge in Bosaso. These

informal settlements often lack basic infrastructure, including sanitation, water supply, and electricity.

- **Urbanization:** Rapid urbanization has led to the expansion of informal settlements as rural residents migrate to the city in search of better opportunities. These areas are often characterized by crowded living conditions and inadequate services.

Overall, Bosaso's settlements are influenced by socio-economic stratification, cultural practices, and community ties. Wealthier neighborhoods have better infrastructure, while poorer areas face challenges. Efforts to improve urban planning and infrastructure are ongoing, but population growth and limited resources complicate these efforts. The proposed project footprint is not expected to lead to any resettlements, relocations or compensations of any nature.



**Figure 4-10:** Settlement patterns and population densities in Bosaso

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#### 4.4.6. Ethnic, Language and socio-cultural aspects

Bosaso is a conservative Muslim society where cultural and religious practices are deeply embedded in daily life. Clan affiliations play a significant role in social organization, politics, and resource allocation. Traditional conflict resolution mechanisms based on clan elders are often employed to address disputes. The city and surrounding regions are witnessing slow but steady improvements in education, with more schools being established and increased focus on formal education, especially for young girls. However, literacy rates, particularly in rural areas, remain relatively low.

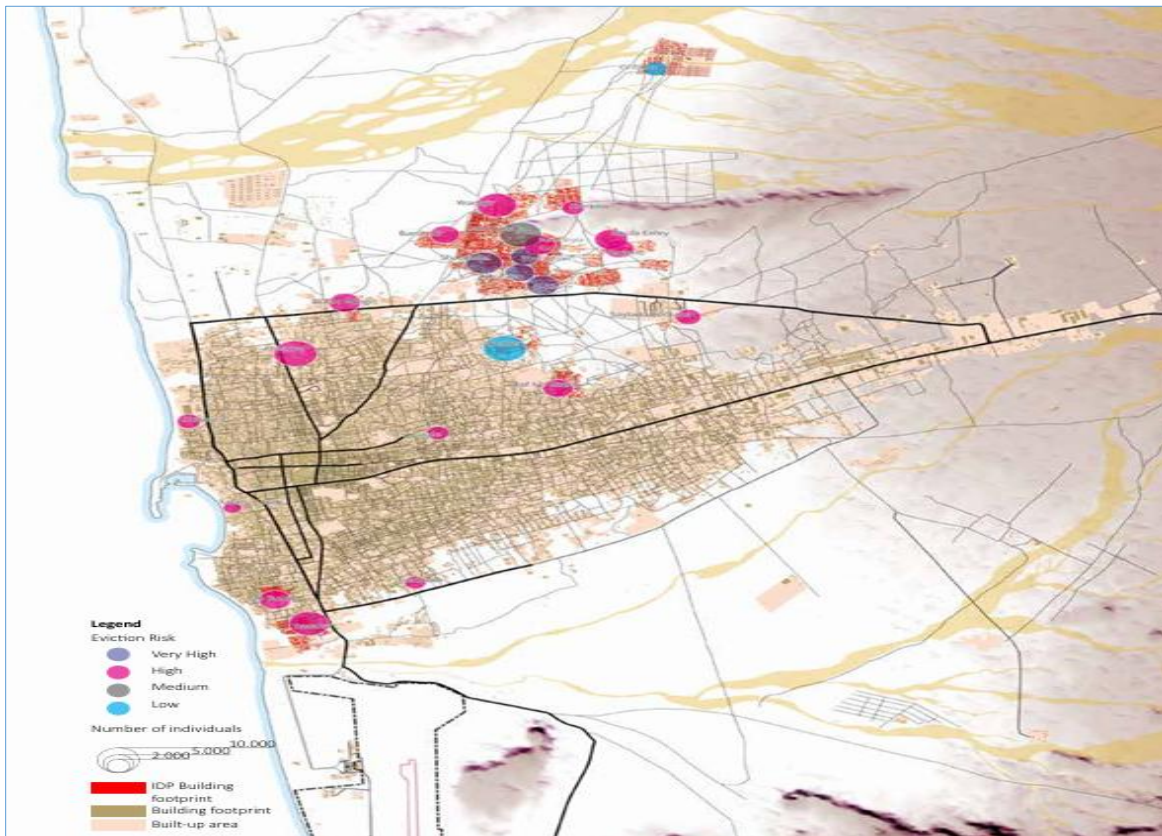
#### 4.4.7. Gender Issues in Bosaso.

Gender issues in Bosaso are deeply rooted in cultural traditions and socio-economic factors, with women facing significant challenges in education, employment, health, and political participation. While there is growing awareness of the need for gender equality and women's empowerment, systemic barriers remain, requiring continued efforts from local communities, government, and civil society organizations to address these disparities and promote gender-inclusive development.

#### 4.4.8. Vulnerable groups.

In Bosaso, several vulnerable groups face significant challenges due to socio-economic conditions, conflict, and environmental factors. These groups often experience marginalization, limited access to resources, and heightened risks to their health and well-being. However, the highly vulnerable groups as per the AfDB OS7 were not identified during the ESIA. Some of the vulnerable groups in Bosaso include:

- *Internally displaced persons (IDPs):* Bosaso hosts a large population of internally displaced persons (Figure 4-11) who have fled conflict, drought, and violence from other regions of Somalia. IDPs often live in informal settlements with inadequate shelter, limited access to clean water, sanitation, and healthcare. They face heightened vulnerabilities due to their displacement status, including economic instability and food insecurity.
- *Women and girls:* Women and girls in Bosaso face various challenges, including gender-based violence, limited access to education, and economic opportunities. Cultural norms often restrict their participation in decision-making processes and the labor market. High rates of early marriage and reproductive health issues further compound their vulnerabilities, leading to poor health outcomes.
- *Children and youth:* Children, particularly those living in IDP camps, are at risk of malnutrition, lack of access to education, and exposure to violence. Many children are unable to attend school due to displacement, economic hardship, or cultural barriers. Youth also face limited employment opportunities, leading to increased susceptibility to exploitation and engagement in harmful activities.
- *Elderly persons:* The elderly population in Bosaso may experience social isolation, health challenges, and economic dependence. Many elderly individuals lack access to healthcare services and social support, making them particularly vulnerable to poverty and neglect.



**Figure 4-11: Patterns of internally displaced persons and vulnerability in Bosaso**  
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- *Persons with disabilities:* Individuals with disabilities face significant barriers to accessing healthcare, education, and employment in Bosaso. Stigma and discrimination often hinder their inclusion in community activities and decision-making processes, further exacerbating their vulnerabilities.
- *Low-income households:* Low-income families in Bosaso, including those engaged in informal employment, often struggle to meet basic needs such as food, shelter, and healthcare. Economic instability and high unemployment rates contribute to their vulnerability, making them reliant on humanitarian assistance.
- *Pastoral and agricultural communities:* Communities dependent on pastoralism and agriculture are vulnerable to environmental challenges, including drought and climate change. These factors can lead to food insecurity and loss of livelihoods, particularly affecting women and children in these communities.

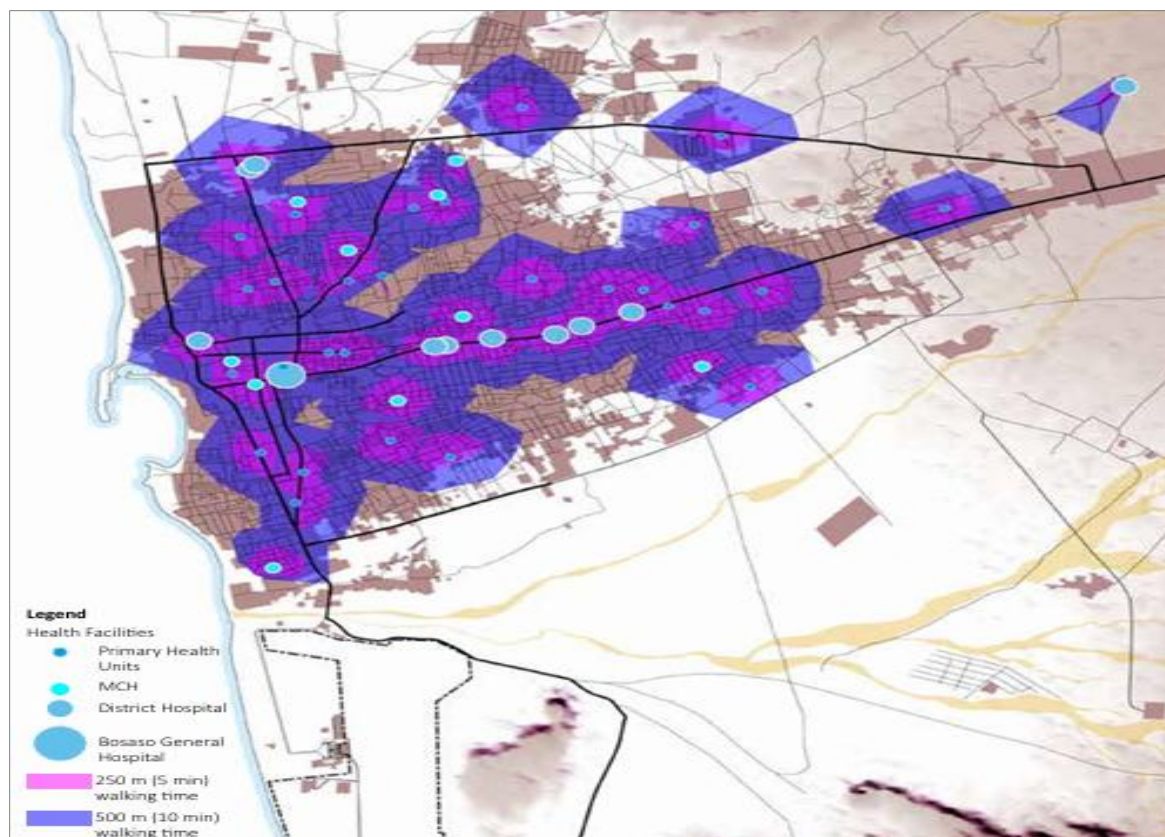
#### 4.4.9. Livelihoods and economic activities

Bosaso is a city that is experiencing rapid growth. Prior to the Somali civil war, it had a population of under 50,000 inhabitants. Since the conflict, Somalis belonging to the Harti Darod sub-clans began migrating back to their ancestral areas of Puntland. The economy of Bosaso is primarily driven by trade, fishing, and livestock. The city's strategic location on the Gulf of Aden makes it

a key trading hub, with goods flowing between the Middle East, Africa, and other parts of Somalia. Bosaso's port is vital for the export of livestock (mainly camels, sheep, and goats) to Gulf countries. The informal economy also plays a significant role, with many small-scale businesses, traders, and services supporting daily life. In addition, remittances from the Somali diaspora are a critical source of income for many families in Bosaso. These remittances help sustain households and contribute to local businesses. The construction sector has also grown, spurred by investment from both local entrepreneurs and the diaspora.

#### 4.4.10. Health services and facilities

The health services and facilities in Bosaso, Somalia, reflect the broader challenges faced by the country's healthcare system, which has been significantly affected by decades of conflict and instability. Despite these challenges, Bosaso has made some strides in improving healthcare access and quality. Bosaso is home to a range of healthcare facilities, including hospitals, clinics, and pharmacies (Figure 4-12). The main public healthcare facility in Bosaso is the Bosaso General Hospital, which offers a range of services, including emergency care, outpatient services, maternity care, and surgical procedures. However, the hospital often struggles with inadequate staffing, supplies, and infrastructure due to limited government funding and resources. There are several private hospitals and clinics that provide healthcare services, often offering better facilities and shorter wait times compared to public services. These private institutions typically charge fees, which may limit access for lower-income families. Examples include Haglaati Hospital and various private clinics offering specialized services. In addition to hospitals, there are numerous smaller health posts and community clinics scattered throughout Bosaso and surrounding areas. These facilities focus on basic health services, maternal and child health, immunizations, and preventive care. Health services available in Bosaso encompass various medical areas, including: maternal and child health, emergency and trauma care, and communicable and non-communicable diseases. Pharmacies are widely available in Bosaso, offering over-the-counter medications and prescription drugs. However, the quality and regulation of pharmaceuticals can vary, with concerns about counterfeit drugs in some areas.



**Figure 4-12:** Distribution of health facilities in Bosaso and surrounding areas  
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Despite the presence of healthcare facilities, several challenges hinder the effectiveness of health services in Bosaso including:

- **Limited resources:** Many healthcare facilities struggle with inadequate funding, equipment, and supplies, which affects the quality of care provided. Shortages of essential medications and medical supplies are common.
- **Staffing Issues:** There is often a shortage of qualified healthcare professionals, including doctors, nurses, and specialists. Low salaries, challenging working conditions, and limited opportunities for professional development contribute to this issue.
- **Infrastructure:** The physical infrastructure of many health facilities is subpar, with issues such as lack of electricity, water supply, and sanitation facilities impacting service delivery.
- **Access and affordability:** While there are various healthcare options available, access to quality care is often limited for poorer populations, particularly in rural areas surrounding Bosaso. High out-of-pocket costs for private healthcare can further restrict access.

In response to these challenges, various local and international organizations are working to improve healthcare services in Bosaso. Community health initiatives focus on maternal and child health, disease prevention, health education, and promoting the use of healthcare facilities. These initiatives aim to empower communities, enhance health literacy, and increase access to essential services.

#### 4.4.11. Educational services and facilities

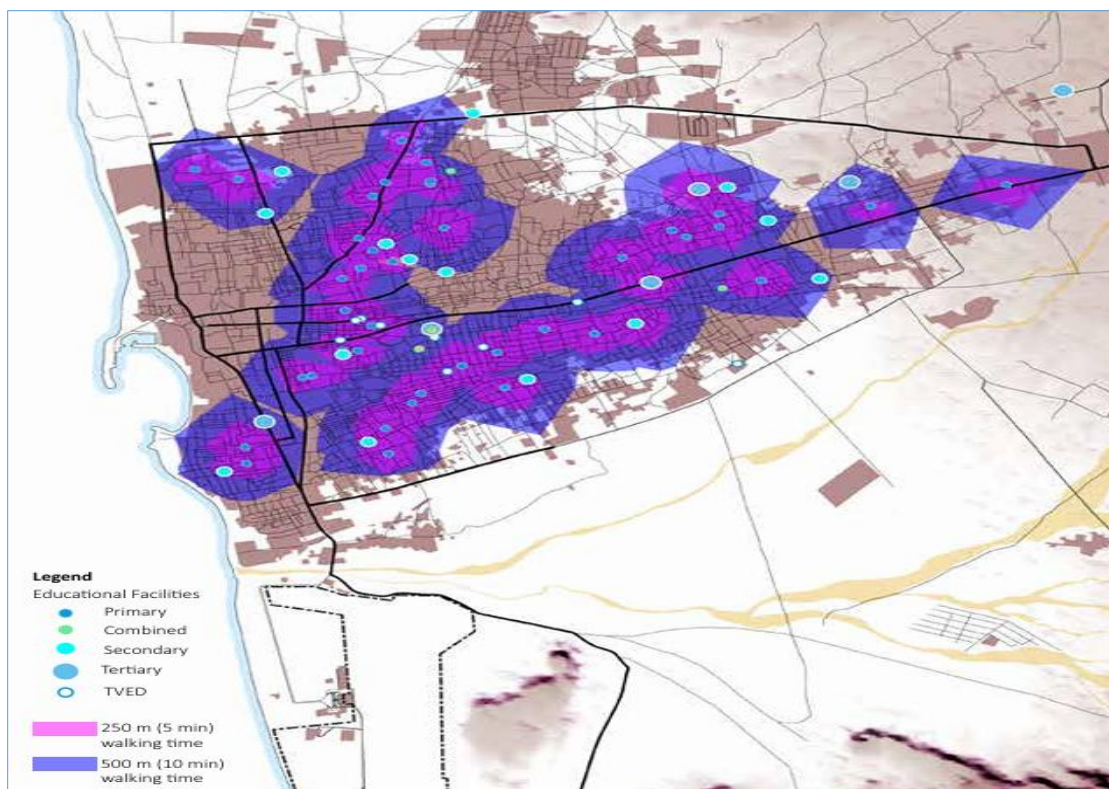
Bosaso has a number of academic institutions (Figure 4-13). According to the Puntland Ministry of Education, there are 74 primary schools in the Bosaso District. Among these are the Iftin School, Alfurqan, Umul-Qura and Garisa.[47] Secondary schools in the area include Hamdan, Shafi'i, Ugaas Yasin, Najah, Bosaso and Haji Yasin. Tertiary education is provided by Bosaso College (BC), as well as the Puntland Nursing Institute (PNI). East Africa University (EAU) also has a Bosaso branch, one of its seven campuses in Puntland. Additionally, the Sam Greathouse School of Modern Technology (SG-SMT) has been working with the local government to construct a large-scale dial-up network linking Bosaso to other northern Somali cities, including Berbera and Las Anod. A combination of factors poses challenge to the education sector. According to stakeholders contacted, despite positive efforts by government and non-governmental actors to extend access to education services, still a lot of problem exist with educational service both in terms of quality and quantity. Lifestyle and socio-culture of the people in the area, shortage of resources (classrooms, desks, and text books), lack of technologies (equipment, computers, plasma, etc.) and shortage of water and sanitation facilities (toilets) are among the major constraints identified in the education sector.

In 2022, 34,692 students attended primary schools (54 percent are boys, 46 percent girls)<sup>30</sup>, with a ratio of 34 students per teacher, above UNESCO recommended 25 students per teacher. There were 42 students per classroom, within the URF recommendation of 45. In 2022, the total students count was 10,913 (59 percent boys, 41 percent girls). While teaching staff seems to be more numerous for secondary schools (28 students per teacher) classes are more crowded and exceed the URF recommendation (50 students per classroom). Attendance declines progressively in primary schools, from grade 1 to 8. There is an increase in secondary schools, catering for people who start back education after a gap, although less women in proportion attend this level of education. Additionally, it is not possible to assess enrolment given the lack of clear data on children in school. The Ministry of education reported 4466 students attending universities in 2022 (53 percent male, 47 percent female).

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**Figure 4-13:** Spatial distribution of institutions of learning in Bosaso and surrounding areas  
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#### 4.4.12. Water supply infrastructure

Bosaso's water infrastructure is underdeveloped, with limited centralized systems and a reliance on multiple water sources. The city's primary water supply comes from boreholes, shallow wells, and, to a lesser extent, seasonal rivers. Groundwater is the main source, and water extraction is done by both public and private entities, but the infrastructure for distribution is inadequate to meet the growing demand. The Puntland Water Development Authority (PWDA) oversees the public water supply, though private water vendors and small-scale operators play a significant role in providing water to households, businesses, and industries. Due to the semi-arid climate and frequent droughts, water scarcity is a persistent issue, affecting both the quality and quantity of water available. Many residents rely on water trucking services, especially in areas not connected to the limited pipe network. Additionally, poor maintenance of existing infrastructure, including pipelines and boreholes, leads to inefficiencies and water loss. While there are ongoing efforts to improve water infrastructure, including investments in desalination plants and solar-powered water pumps, access to clean and affordable water remains a significant challenge for much of the population in Bosaso.

#### 4.4.13. Electricity and energy sources

The electricity supply infrastructure in Bosaso is characterized by a combination of public and private sector involvement, with limited centralized grid access. The city relies predominantly on decentralized power systems, where electricity is primarily generated through diesel-powered generators, reflecting the broader situation in Somalia, where national grid infrastructure is

underdeveloped. This reliance on diesel generators makes electricity expensive and environmentally unsustainable. However, there are efforts to incorporate renewable energy sources, particularly solar power, into the local energy mix. Electricity service providers in Bosaso are mainly private companies, which operate independently and provide electricity on a localized basis. These companies offer power through small-scale, community-based grids, serving households, businesses, and industries. Key players include local energy providers that use hybrid systems combining diesel and solar energy, helping to reduce costs and improve energy access. Despite these efforts, electricity supply is often inconsistent, with frequent outages due to the aging infrastructure, fuel supply issues, and limited capacity to meet growing demand. In recent years, there has been increasing interest in expanding renewable energy solutions, such as solar mini-grids, to improve access and reduce reliance on diesel generation. The major electricity services providers serving Bosaso City include: Puntland Electric Power Company (PEPCO), Kaah Electrical General Trading; and Ente Nazionale Energia Elettrica (ENEE).

Bosaso’s energy supply currently relies on a mix of solar and diesel power, though diesel generators have traditionally dominated the energy landscape due to infrastructure limitations and reliance on fossil fuels. Solar energy has been gaining ground, driven by efforts to improve renewable energy adoption and reduce diesel dependency, which is costly and contributes to greenhouse gas emissions. Several private and small-scale solar systems are now available, primarily used by households and small businesses for basic lighting and appliance needs. Despite these efforts, the energy grid remains limited, especially in informal and peri-urban settlements. Estimates suggest that approximately 30-40% of Bosaso’s population is connected to electricity, either for residential lighting or commercial purposes. This leaves a significant portion—around 60-70% of the population<sup>31</sup>—without regular access to electricity, particularly in underserved or remote areas. The lack of access to electricity has broad implications, restricting opportunities for economic development, limiting healthcare and educational facility operations, and reducing quality of life. Addressing this electricity gap requires expanding infrastructure, enhancing renewable energy integration, and developing policies that improve access for all residents, particularly low-income and vulnerable households.

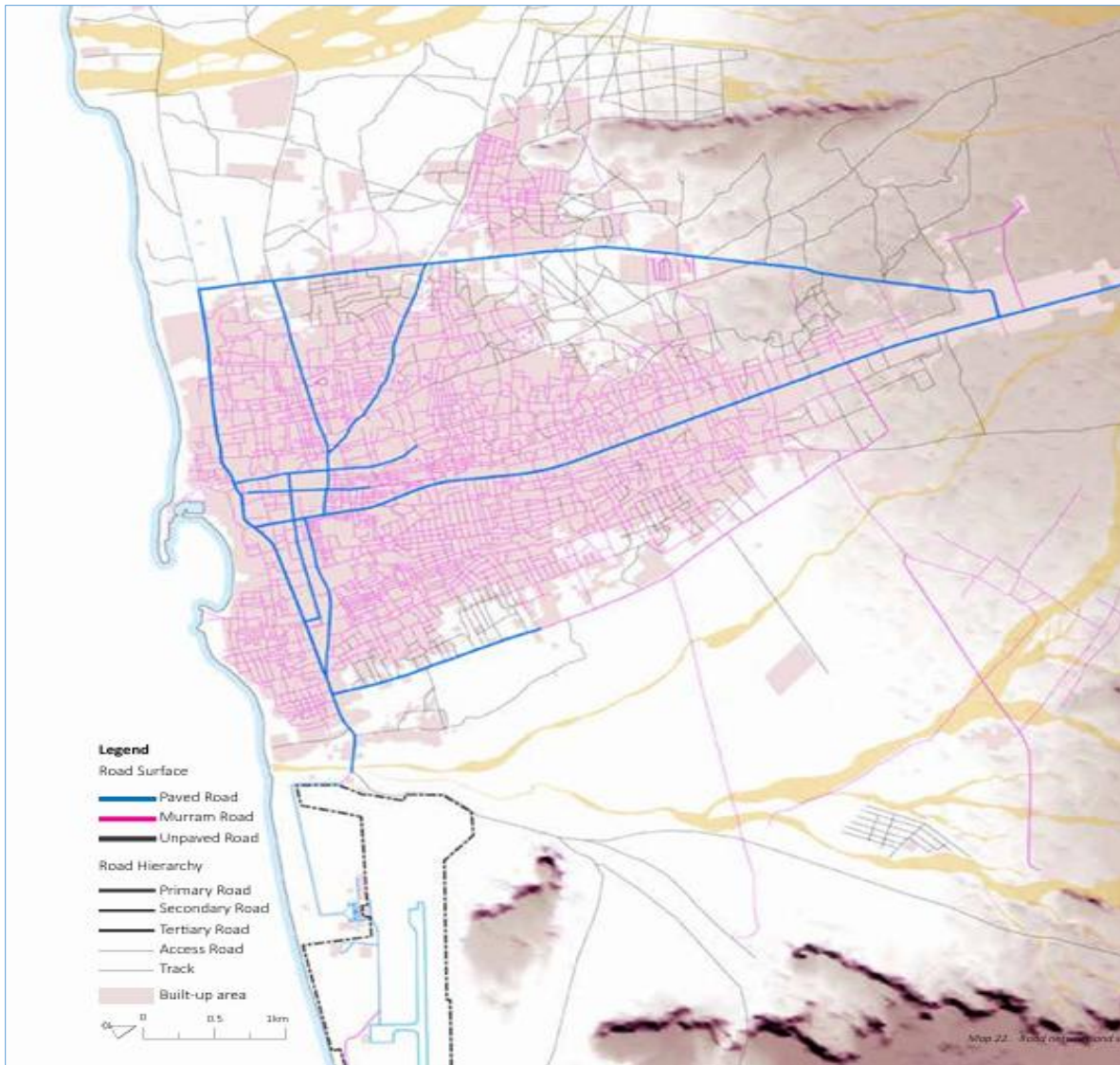
#### 4.4.14. Road networks and transportation

Bosaso is traversed by a 750-kilometre (470 mi) north–south highway<sup>32</sup> (Figure 4-14). It connects major cities in the northern part of the country, such as Galkayo and Garowe, with towns in the south. The city has a major seaport, the Port of Bosaso constructed in the mid-1980s for annual livestock shipments to the Middle East. Besides its busy seaport, Bosaso has a major airport, the Bender Qassim International Airport. In 2008, the Puntland government signed a multimillion-dollar deal with Dubai's Lootah Group, a regional industrial group operating in the Middle East and Africa. The Bosaso Airport Company is slated to develop the airport complex to meet international standards, including a new 3.4-kilometre (2.1 mi) runway, main and auxiliary buildings, taxi and apron areas, and security perimeters.

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<sup>31</sup>Source: file:///C:/Users/HP/Downloads/Bosaso%20Strategy%20Compressed%20(1).pdf

<sup>32</sup><https://lca.logcluster.org/23-somalia-road-network>



**Figure 4-14:** Road networks in Bosaso and surrounding areas

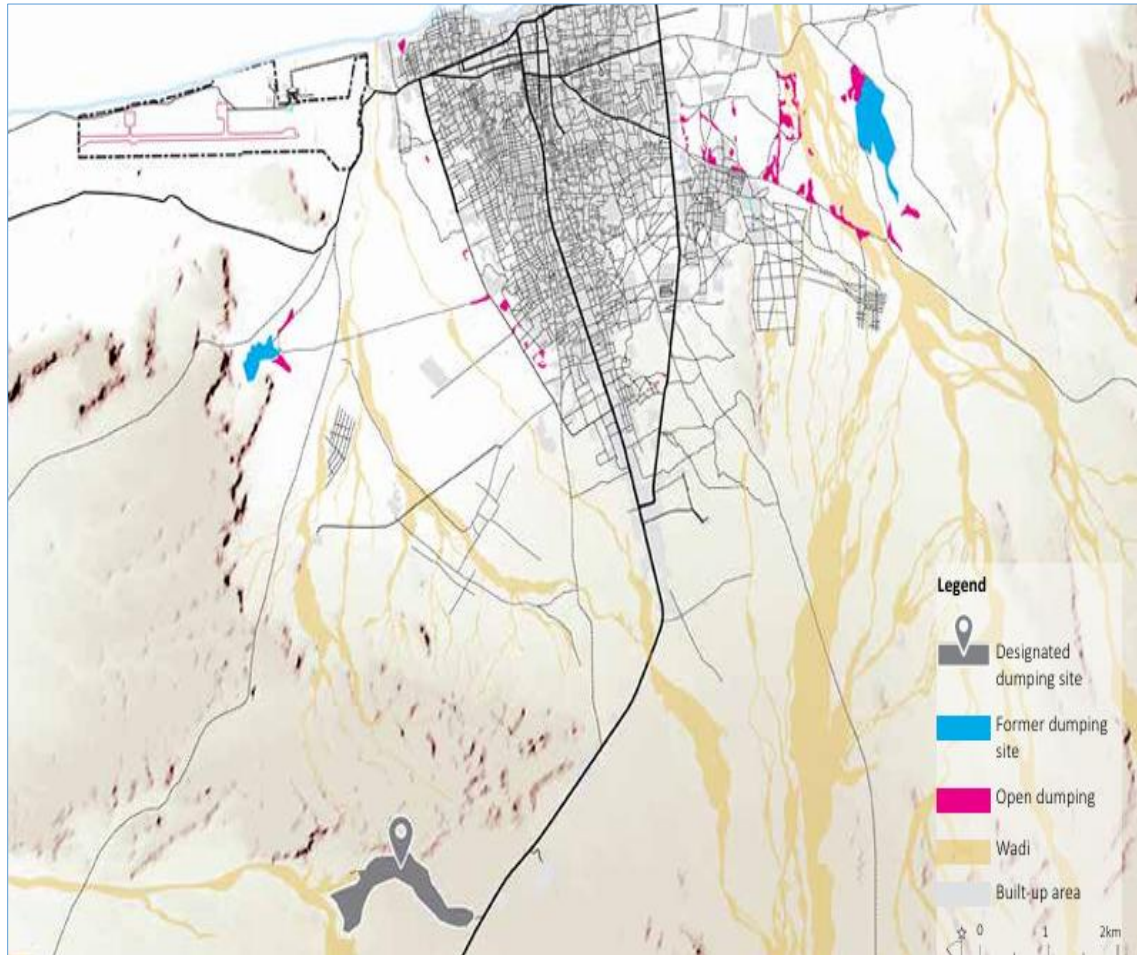
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#### 4.4.15. Waste collection and disposal

In 2015, by-laws for waste management were developed for Bosaso. These interventions were part of a larger process of regulatory framework reform for selected districts in line with the urban development strategy adopted in Puntland in 2015. However, these by-law have not been enforced. The documents distinguish between municipal solid waste and bio-medical waste. Municipal waste refers to the waste materials generated by households, commercial and retail establishments, offices, and public institutions.

The private company Alla Amin operates under a PPP contract for household waste collection for disposal in designated areas (Figure 4-15). It covers an estimated 30,000 households,<sup>4</sup> reaching a coverage of roughly 40% and charging 5 USD/month for weekly collection. Hotels and business pay based on the amount of material collected. The Local Government is supposed to manage

directly waste collection from marketplaces and public spaces including streets, and IDP settlements, although this service is limited by lack of resource. The role of the informal sector in waste collection, traditionally very important in sub-Saharan Africa in waste collection, has not been properly assessed, but doesn't seem particularly relevant according to recent survey.



**Figure 4-15:** Designated waste disposal areas for Bosaso and surrounding areas  
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#### 4.4.16. Telecommunication services

Bosaso's telecommunication infrastructure is relatively advanced compared to other regions in Somalia, driven by private sector investment. Several telecom companies provide services, including mobile networks, internet, and financial services through mobile money platforms. Major providers, such as Golis Telecom, Hormuud, and Somtel, dominate the market, offering 3G and 4G services, fiber-optic connectivity, and mobile banking solutions. The competitive market ensures affordable rates and widespread coverage, even in rural areas surrounding Bosaso, although access in remote regions can still be limited.

#### 4.4.17. Civil Societies/ Local NGOs in Bosaso and surrounding areas

The civil society landscape in Bosaso is diverse, with numerous organizations dedicated to addressing the needs of vulnerable populations and promoting development. These NGOs play a vital role in improving living conditions, providing essential services, and advocating for the rights of marginalized groups in the region. Collaborative efforts between local organizations, international NGOs, and community members are crucial for sustainable development and humanitarian response in Bosaso and surrounding areas. Some of the prominent civil society organizations and local NGOs operating in Bosaso and surrounding areas include:

- Save the Children
- Norwegian Refugee Council (NRC)
- Oxfam
- Adeso (African Development Solutions)
- Somali Red Crescent Society (SRCS)
- Women’s Action for Advocacy and Development (WAAD)
- Somali Youth Development Network (SOYDEN)
- Local Community-Based Organizations
- International Rescue Committee (IRC)
- The Somali Health and Development Association (SHDA).

## CHAPTER FIVE: PROJECT ALTERNATIVES

### 5.1. Overview

The analysis of alternatives in Environmental and Social Impact Assessment (ESIA) studies is a crucial component that compares different options for the proposed project in terms of environmental, social, technical, and economic aspects. Consequently, alternative analyses are conducted with the aim of addressing any issues regarding environmental, social, and economic factors in each place, as well as the best possible match between the necessary technical standards and site conditions. For the repair/expansion of the Bosaso Power Grid, this analysis involved identifying and evaluating different project alternatives, in order to select the option with the least environmental and social impacts.

### 5.2. Project Alternatives

The challenges of the existing power system network in the city of Bosaso as established from the review of existing conditions presented in the foregoing section were classified into three broad categories as follows:

- **Power Generation** - Inadequate power generation capacity, energy mix is dominated by diesel generation, high cost of energy, high carbon footprint.
- **Power Distribution**- Isolated distribution systems, unreliable and low-quality supply, inefficient distribution system, sub-optimal utilization of existing power system infrastructure.
- **Institutional Capacity** - Inadequate legal framework, low personnel capacity and lack of material tools and resources.

For each category, several options were identified and analyzed from a technical, environmental as well as financial and economic basis. The option with minimal environmental impact, technically plausible and economical and environmentally viable was then adopted as presented in the following sub-sections.

#### 5.2.1. Power Generation

To address the challenges of power generation, the Consultant identified and considered available options as follows:

- **Option 1**- Scale-Up Renewable Energy Generation, Rehabilitate, Interconnect and Expand Existing Isolated Power Systems and Strengthen Capacity of Energy Sector Institutions.
- **Option 2**- Scale-Up Diesel Generation, Rehabilitate and Expand Existing Medium Voltage System and Strengthen Capacity of Energy Sector Institutions.
- **Option 3**- Import Generation from Neighboring countries, Rehabilitate and Expand Existing Medium Voltage System and Strengthen Capacity of Energy Sector Institutions.

A summary of advantages and disadvantages of the different investment options required to address the challenges of the power generation in Bosaso over the period up to the year 2034 are summarized in the following table.

*Table 0-1 Comparison of Power Generation Investment Options*

Option	Advantages	Disadvantages
1.	<ul style="list-style-type: none"> <li>– Will lead to reduction of carbon emissions arising from energy generation and is therefore a more sustainable solution.</li> <li>– Solar PV+BESS will have an impact of displacing fuel used in the generation. This reduction in operating costs will result in reduced energy costs.</li> <li>– Over-reliance on solar PV+BESS will increase predictability of energy costs and reduce vulnerability of energy costs to external shocks in the global market.</li> </ul>	<ul style="list-style-type: none"> <li>– Initial cost of investment is relatively high compared to Option 2.</li> <li>– Requires capacity building of utility personnel to effectively manage construction and operation phase of the solar PV+BESS.</li> </ul>
2.	<ul style="list-style-type: none"> <li>– The initial cost of investment is relatively low compared to Options 1&amp;3.</li> <li>– Utility personnel have adequate capacity to manage construction and operation of high-speed diesel plants.</li> </ul>	<ul style="list-style-type: none"> <li>– Adoption of this option will lead to an increase in carbon emissions arising from power generation.</li> <li>– There will be no significant reduction in the cost of energy due to the high cost of operations arising from the cost of fuel.</li> <li>– Fluctuations in the cost of fuel make the cost of energy unpredictable and vulnerable to external shocks in the global market.</li> </ul>
3.	<ul style="list-style-type: none"> <li>– Power/Energy imports: This will provide enhanced energy security through diverse and resilient clean energy supply chains.</li> </ul>	<ul style="list-style-type: none"> <li>– The cost of implementing this option is high as it requires huge investment in establishing the HV national transmission grid.</li> <li>– This option is not financially viable in the period up to the year 2034.</li> <li>– Implementation of this option is complex and may be achieved only in the long-term.</li> </ul>

Because of the need to improve affordability of energy, and lower the carbon footprint, Option 1 was found to be the most favorable as compared to other options.

### 5.2.2. Power Distribution Rehabilitation and Expansion Options

To address the challenges of power distribution, the Consultant identified and considered two available options as follows:

- **Option 1-** Interconnect and expand existing power system networks
- **Option 2-** Expand existing mini-grids in isolation

A summary of advantages and disadvantages of the two options required to address the challenges of power distribution in Bosaso over the period up to the year 2034 is presented in *Table 3-2*.

*Table 0-2 Comparison of Power Distribution Investment Options*

Option	Advantages	Disadvantages
1.	<ul style="list-style-type: none"> <li>• It will enhance flexibility and optimization of network resources, especially distribution transformers.</li> <li>• Relatively low cost of implementation compared to interconnecting 11kV and 15kV systems. Solution requires US\$ 313,650 less to implement compared to direct connection.</li> <li>• Solves the challenge of sourcing spare parts for the 15kV system which according to PEPCO, it's a challenge.</li> <li>• The cost of 11/0.4kV distribution transformers is low and this constitutes a lifetime cost saving on the grid. It will lead to a reduction in spare stock which is a lifetime saving.</li> </ul>	<ul style="list-style-type: none"> <li>– Downgrading requires replacement of all 15/0.4kV and 0.4/15kV transformers</li> <li>– Distribution system loss is relatively higher compared to the 15kV system.</li> </ul>
2.	<ul style="list-style-type: none"> <li>– Sub-optimal utilization of available infrastructure.</li> <li>– Requires higher spare stock levels at any given time.</li> <li>– No need to replace the 15/0.4kV and 0.4/15kV transformers.</li> <li>– Distribution system loss is relatively low compared to the 11kV system.</li> </ul>	<ul style="list-style-type: none"> <li>– Cost of interconnection is relatively higher by more than US\$313,650 and future. infrastructure expansion will always be higher.</li> <li>– Challenge of sourcing for spare parts (insulators, surge arrestors and distribution transformers).</li> <li>– Increased stockholding of spare parts for the medium voltage network.</li> </ul>

Option 1 was found to be more favorable than Option 2 and was thus recommended for adoption. This option involves downgrading the 15kV system to 11kV, interconnecting the two systems and expanding the power distribution network through establishment of a new 33kV power system network, 11kV extensions and installation of new distribution transformers.

### 5.2.3. Strengthening of Energy Sector Institutions

To address the challenge of institutional capacity the Consultant's two options were:



- **Option 1-** Support development of the legal framework, training of personnel and provision of material tools and resources.
- **Option 2-** Rely on expatriates and outsourcing of services

Option1 was assessed to be more favorable given that it is relatively more expensive to rely on consultants in the long-term and some of the tasks cannot be effectively discharged through an outsourcing model.

#### 5.2.4. Proposed Investment Plan

Based on the results of analysis of options for addressing challenges in the three broad categories, an investment plan comprised of three main components was proposed as follows:

##### **Component 1- Scale-Up of Renewable Energy Generation**

The scope of works includes:

- Construction of 7.15MWp/5.5MW solar PV plant +3MW/11MWh Battery Energy Storage System
- Supply of 1000 standalone solar home systems

##### **Component 2- Distribution Network System Rehabilitation and Expansion**

The scope of works includes:

- Rehabilitation of Ex-ENEE Station 1 including replacement of 3x800kVA 0.4/15kV generator transformers with 3x1250kVA 0.4/11kV transformers as well as supply and installation of new 11kV switchboard complete with auxiliaries
- Rehabilitation of Ex-ENEE Station 2 including replacement of 1x2500kVA 0.4/15kV generator transformer with 1x2500kVA 0.4/11kV transformer as well as supply and installation of new 11kV switchboard complete with auxiliaries.
- Reconductoring of 13km of existing 15kV system in 50mm<sup>2</sup> ACSR conductor with 150mm<sup>2</sup> AAAC conductor.
- Replacement of 15/0.4kV step down distribution on the existing 15kV system with 11/0.4kV transformers of a combined rated capacity of 6030kVA.
- Interconnection of the downgraded 15kV network to the existing 11kV power system network.
- Reconductor approximately 5.3km of existing 11kV overhead line in 70mm<sup>2</sup> ACSR Conductor with 150mm<sup>2</sup> AAAC conductor.
- Split the existing 11kV feeder by constructing approximately 1.92km of a new 11kV overhead line in 150mm<sup>2</sup> AAAC conductor from Ex-ENEE station 2.
- Balance network loading between the resulting 11kV feeders by shifting distribution transformers from the most loaded line to the lightly loaded feeder.
- Extension of the existing 11kV network by about 24.7km to cover new areas and new expansion areas and to help reduce length of existing low voltage network and expand connectivity.

- Installation of 40 new pole mounted 11/0.4kV transformers of rated capacity ranging from 100kVA to 315kVA and having a combined rated capacity of 10,545kVA in new areas to help offload existing transformers that are already overloaded and to provide connectivity of isolated stations to the interconnected grid.
- Installation of at least 11 new Load Break switches on the 11kV network to increase flexibility of system operations.
- Construction of a new 2x7.5MVA 33/11kV West Substation (WS) at Baalade power station.
- Construction of a new 7.5MVA 33/11kV North Substation (NS) near the Airport
- Construction of a new 7.5MVA 33/11kV East Substation (ES) next to TF JIDKA.
- Construction of approximately 21.2km of 33kV Overhead line in 150mm<sup>2</sup> ACSR conductor comprising of 5.4km of 33kV Overhead line from WS to NS, 6.4km of 33kV Overhead line from NS to ES substation and 9.4km of 33kV overhead line from WS to ES. Due to congestion along the route from North Substation to East substation, approximately 2.052km will be installed underground.
- Construction of approximately 4km of 33kV Overhead line from the 3.5MW Bosaso solar PV plant to WS.
- Construction of approximately 11.4km of 33kV Single Circuit Overhead line in 150mm<sup>2</sup> ACSR conductor from the 33/11kV North Substation to the Puntland Maritime Police Force facilities, west of Bosaso airport.
- Supply of 1000 smart meters for Commercial and Industrial consumers.

### **Component 3-** Strengthening of Energy Sector Institutions

The recommended scope of work is summarized in *the following table*.

Table 0-3 Strengthening of Energy Sector Institutions -Initiatives

No	Output	Tasks	Target	Recommended Implementation Approach
1.	Enhance Legal and Regulatory Framework	Drafting of Electricity Act	All Federal Member States	To be implemented through a Consulting Firm with experience in drafting, reviewing and operationalization of similar documents.
		Drafting of Regulatory framework documents (Licensing framework, Grid Code, Tariff Rules, Market Access Rules, Environmental Sustainability Rules, Gender Equality rules).	All Federal Member States (but Grid Code to be developed at National Level)	
2.	Power sector standards, monitoring and planning	Development of guidelines for compliance monitoring of assets, equipment and the power service, adapted from the one at the national level.	All Federal Member States	To be implemented through a Consulting Firm with experience in similar works.
3.	Material resources for the MoEMW	Provide ERP	All Federal Member States	To be implemented through a Consulting Firm. Refer to <i>Note 1</i> .
		Provide DBMS	All Federal Member States	
		Provide GIS Tools	All Federal Member States	
4.	Training	Provide Short-term training in Power Sector Regulation, Power Sector Planning, Project and Contract Management, Economic and Financial Analysis of projects and Generation and T&D technologies.	Federal Government of Somalia (FGS) and All Federal Member States	To be implemented through a Consulting Firm. Refer to <i>Note 2</i> .
		Support Long-term training in Environmental and Social Impact Assessment as well as Management and Support services.	Federal Government of Somalia (FGS) and All Federal Member States.	To be implemented through partnership with a specialized training institution. Refer to <i>Note 3</i> .

### 5.3. Analysis of recommended options

The option recommended for power generation expansion involves scale up of solar PV+BESS which has minimal environmental impact as compared to scale-up of high-speed diesel generation. The results of financial analysis carried out as part of the detailed feasibility study has also shown that from this option, energy will be supplied at an LCOE of US\$0.08569/kWh which is approximately 30% of the cost of fuel used in generation. With the present demand for power in Bosaso, it is uneconomical to import power from the neighboring Ethiopia due to high cost of high voltage infrastructure required to achieve connectivity.

Regarding rehabilitation and expansion of the power distribution network, the project proposes to interconnect and expand the isolated ESP networks comprising the present day Bosaso power system. This has the advantage of :

- i) enhancing reliability and quality of supply.
- ii) Reducing system losses
- iii) Enhancing optimal utilization of plant including prioritization of green energy during the day thus cutting down on the amount of fuel consumed in power generation.
- iv) Reducing the lifetime costs of operations and maintenance costs on the medium voltage system.

Compared to the alternative, which is expanding isolated systems, this option is assessed to have minimal environmental impact, more financially and economically viable and is technical feasible.

From the field assessment conducted as part of this ESIA:

- There are no significant areas of natural or semi-natural forest all along the project corridor, and no designated or protected areas of terrestrial ecological interest that will be affected by the proposed construction activities.
- A rapid terrestrial vegetation survey, done in the course of the field investigations, confirms that no locally or regionally endangered species will be affected because of land clearing along the distribution corridor.
- The presence of wildlife within the project area is reported and confirmed by the field investigation and the local communities. However, there are no endangered or rare species entirely dependent on the project corridor.
- There are no species with restrictive habitat preferences that suffer the consequence of land clearing for the implementation of the project.
- The project corridor is neither contiguous with nor in close proximity with any of the nationally protected areas.
- There are birds in the project area. However, the project corridor is not contiguous with, nor in close proximity with, any of the nationally designated Important Bird Areas (IBA).
- Cultural Sites: Checks have been made regarding sites of archaeological, cultural, or tourism interest along the distribution line route. It has been confirmed that the proposed ROW has no archaeological, cultural, or tourism importance.

- Livelihoods of local people: considering the whole route, implementation of the scheme will not significantly affect the livelihoods of local people nor cause significant disruption. Based on the baseline survey for the Bosaso Power Expansion Project, the anticipated livelihood impacts are multifaceted. The distribution line construction may temporarily disrupt economic activities such as businesses along its route due to construction activities. On a positive note, the project components have the potential to stimulate local economic development by enhancing energy access, which can support small businesses, create jobs, and improve overall productivity. By providing more reliable and sustainable power, the project can encourage local businesses, reduce reliance on costly diesel generators, and enable new income-generating activities. Mitigation measures such as efforts to employ local labor during construction, can help offset negative impacts while maximizing the project's benefits to community livelihoods.
- There are no tribal people or ethnic minorities within the project corridor whose traditional lifestyles could become compromised through the implementation of the proposed distribution lines. Therefore, no indigenous people development plan will be required.
- Construction of the planned distribution lines and the installation of new substations is feasible, indeed attractive, from the technical, economic, and environmental viewpoints. There are no mitigation measures required, which will significantly increase project construction costs. Most measures are considered to be subject to good engineering practice by the contractor.

## 5.5. Recommendations

From the forgoing analysis, the preferred option depends on a balanced consideration of environmental sustainability, social impacts, and economic feasibility. In this case, the expansion of the power grid with integration of renewable energy would likely be the best alternative to ensure long-term energy security and sustainability for Bosaso. This alternative combines the need for improved infrastructure with environmental and social benefits, especially if care is taken to minimize impacts through careful site selection, the use of smart technologies, and incorporating renewable energy sources. The key considerations for the selected recommended alternative shall include:

- Implementing erosion control, pollution prevention, and wildlife protection measures during construction and operation.
- Engaging stakeholders, developing a grievance redress mechanism to mitigate any emerging issues and concerns during the project implementation.
- Balancing the upfront costs of expansion and smart technology integration with the long-term benefits of improved power reliability, reduced energy losses, and a sustainable energy supply.
- Ensuring that the project aligns with Puntland's Environmental Management Act and other relevant policies on energy development.

## CHAPTER SIX: STAKEHOLDER ENGAGEMENT

### 6.1. Overview

Somalia's Provisional Constitution (2012) establishes a strong framework for public participation by recognizing citizens' rights to be involved in governance, access information, and contribute to key decisions, particularly on land use, natural resources, and policy development. This framework supports transparency, accountability, and the inclusion of diverse voices in national and local decision-making processes. In particular, Article 111G - Public Participation and Decision Making is explicit on public participation and consultation, Clause 1 of the Article 111G emphasizes that the public has the right to participate in decisions that affect their governance and well-being. It establishes the principle of inclusive participation, particularly in the context of policy formulation, planning, and execution at all levels of government. Under Clause 2 of the Article 111G recognizes the right of the people to access information about public affairs, ensuring that citizens are informed about government activities and decisions.

Public consultations were carried out with the objective of informing the stakeholders on the potential impacts and seek the participation and contribution of the public and other stakeholders during implementation of the project. Identifying the potential environmental and social impacts (positive and negative), and seeking of mitigation measures for the negative impacts and measures of reinforcement for the positive impacts was the fundamental reason for conducting public consultation. Public consultation gave the opportunity to protect the interests of the resident community, especially the poor and vulnerable groups. Moreover, it provided a chance for the the resident community and local authority to influence the project to reduce adverse impacts and maximize additional benefits,

### 6.2. Objective of the Public and Stakeholders' Consultation

The primary objective of the public consultations and disclosure was to inform the resident community and their representatives about the proposed project, its potential (positive and negative) impacts and engage and maintain their active participation and support throughout the various stages of the project (planning, design, construction, operation and maintenance phases of the project). In line with the above general objectives, the public consultations were carried out with the following specific objectives:

- Sharing Information with the resident community members and key stakeholders on the scope of the proposed project and construction activities and, to solicit their views on the project and its potential or perceived impacts.
- Collect baseline social and environmental data held by the community members and local officials;
- Assess the perception, concerns, and attitude of individual households, local communities, and authorities about the proposed project;
- Learn about the views of local communities and authorities towards the acceptance of the proposed project;

- Identify the potential environmental and social impacts (i.e., beneficial and negative) of the proposed projects from the view of local residents and local authorities;
- Identify possible mitigation measures for offsetting/avoiding negative impacts and enhancing positive impacts;
- Establish and maintain a constructive relationship with relevant stakeholders; and
- Collect information on any additional requirements or issues of concern to be taken into account during the project design and construction phase in this ESIA.
- Respond to any issues or address misconceptions that the stakeholders may have regarding the proposed project.

Stakeholder engagement for the ESIA of the proposed Bosaso Power Grid Expansion Project was conducted through a series of consultations, meetings, and surveys with key stakeholders, including local communities, government agencies, business operators, and civil society organizations. These engagements were organized to ensure transparency, gather concerns, and incorporate stakeholder input into the project planning. The consultations provided the consultants with an opportunity to explain the project scope, objectives, and expected impacts, ensuring that all stakeholders had a clear understanding of the development. Public meetings were held in accessible locations, and one-on-one discussions were conducted directly with the stakeholders. Additionally, structured questionnaires were used to capture stakeholder feedback systematically.

During the engagement process, stakeholders expressed initial concerns about potential negative impacts, including land acquisition, disruptions to businesses, and environmental risks. However, it was clarified that the project footprint does not require relocation, demolition, or compensation, as no significant impacts on properties or livelihoods were anticipated. The engagement also addressed broader concerns such as noise, dust, and public safety during construction, all of which will be mitigated through the Environmental and Social Management Plan (ESMP). By ensuring continuous dialogue and grievance redress mechanisms, the engagement process fostered community trust and support for the project while reinforcing commitments to sustainable and responsible development.

### 6.3. Consultation Methodology

The public consultation and disclosure process was designed to involve all the relevant stakeholders in and around Bosaso City, especially along the proposed power distribution lines. Key agenda points included disclosure of project-related information, expectations and benefits, perception of risks, anxieties, fears, and uncertainties, and possible measures to mitigate adverse impacts. From September 25-28, 2024, consultations were held with the project stakeholders, including Ministry of Energy, minerals and water resources of Puntland and Bosaso Municipality officials. The consultations focused on disclosure of project-related information, expectations, risks, anxieties, fears, and possible measures to mitigate adverse impacts.

The study team briefed consultation participants about the proposed project's nature, components, and influence areas at the beginning of each session. Participants expressed their views and attitudes towards the project. The main findings and feedback from these events are provided in *Appendix 1* of this report.

#### 6.4. Project Information Provided by the Assessment Team

The project information provided by the Environmental and Social Impact Assessment (ESIA) study assessment team for the proposed expansion and strengthening of the Bosaso Power Grid includes detailed descriptions and key elements necessary for assessing potential environmental and social impacts. The following project details were shared by the study team during the consultation processes:

- *Scope of the project:* Explained that the project involved upgrading the existing power distribution infrastructure to enhance capacity, reliability, and efficiency. This will include the expansion of distribution lines, upgrading substations, and strengthening the overall grid.
- *Project location:* Explained that the project will be implemented in Bosaso City, the economic hub of Puntland, located along the Gulf of Aden.
- *Project phases:* Explained that the project is divided into three main phases: the design and planning phase, the construction phase (including land preparation, excavation, and installation of equipment), and the operational phase.
- *Project rationale:* Explained that the upgrade was necessary to meet Bosaso's increasing demand for reliable electricity and that population growth, economic development, and the expansion of industries and services have placed significant pressure on the existing power grid.
- *Economic and social benefits:* Explained that the enhanced power supply is expected to support local businesses, improve public services (e.g., health, education), and stimulate overall economic growth. It was also explained that the project will also help reduce reliance on inefficient and expensive diesel generators currently used by many residents and businesses.
- *Project estimated duration:* Explained that the project timeline typically covered the planning, construction, and operation phases. Depending on the scale of the upgrade, construction may take several months to over a year, with operational benefits expected soon after commissioning.
- *Physical environment:* Explained the details of the existing environmental conditions, including climate, land use, topography, soil, air quality, water resources, and biodiversity in Bosaso and surrounding areas. The stakeholders were further informed that the data formed the basis for predicting potential environmental impacts.
- *Socioeconomic conditions:* Explained that the information on the demographics, livelihoods, land ownership, public services, and economic activities of the population in Bosaso, particularly communities in proximity to the proposed project site.
- *Consideration of Alternatives:* Explained that the ESIA examined various alternatives to the proposed project, including different routes for distribution lines, alternative energy sources (e.g., renewables), and the “no project” option, where the expansion does not take place. It was further explained that the alternatives are assessed based on technical feasibility, cost, environmental impact, and social acceptability.



- To address community fears, clear the stakeholders were informed mitigation measures, including regular community engagement and transparent communication, and established grievance redress mechanism.

## 6.5. Key findings on stakeholders' consultations

The key findings from the Environmental and Social Impact Assessment (ESIA) of the Bosaso Power Grid Expansion Project highlight its significant positive impacts on local communities, businesses, and public institutions. The project is expected to enhance electricity supply reliability, reduce power outages, and support economic growth by enabling businesses to operate more efficiently. Improved access to stable electricity will also benefit essential services such as healthcare facilities, schools, and water supply systems, contributing to overall socio-economic development. Additionally, the project aligns with regional development goals by promoting energy security and supporting the transition to a more modern and resilient power infrastructure. Stakeholder engagements confirmed widespread support for the project, with community members and local officials recognizing its potential to improve living standards and foster investment opportunities.

Beyond economic and social benefits, the project is designed to minimize adverse environmental and social impacts. By utilizing the existing right of way, the expansion avoids demolitions, relocations, and resettlements, ensuring minimal disruption to livelihoods and properties. Concerns raised by stakeholders, such as construction-related disturbances, occupational safety, and temporary traffic impacts, will be effectively managed through the Environmental and Social Management Plan (ESMP). The implementation of best practices in construction and environmental management will ensure that any temporary inconveniences are mitigated while maximizing long-term benefits. Overall, the Bosaso Power Grid Expansion Project represents a transformative initiative that will enhance energy access, drive sustainable development, and improve the quality of life for residents and businesses in the region.

### 6.5.1 Key findings on consultations with Puntland State and Bosaso Municipality officials

Local authorities are another important stakeholder identified by the study team who are able to influence the implementation of the proposed projects in many ways. Therefore, a number of consultation meetings were conducted with the local authorities to learn and incorporate their views and attitudes with regard to the proposed project. The following were the key findings:



*Photo 7 View of stakeholders' consultation session with Puntland State /Bosaso Municipality Officials and other stakeholders*

### 6.5.1.1 Awareness and Understanding of the Proposed Project

In all the consultation meetings, the first topic of the discussions was to understand the awareness of the participants about the proposed projects and their components. The local authorities, both Puntland State and Bosaso Municipality Officials, had no prior information about the proposed project. Therefore, the study team provided adequate information to the participants about the nature, components, and distribution routes at the beginning of each consultation session. Once the local authorities were informed about the proposed project and the objective of this particular consultation meeting, it was not difficult to conduct fruitful consultation meetings with the local officials.

### 6.5.1.2. Expectations and benefits of the proposed project

The local officials identified the following potential benefits and participated in the consultation meetings:

- a) *Provide reliable electricity service in Bosaso City:* Owing to the nature and objective of the proposed projects, the local authorities expected the provision of reliable electricity service. According to the officials, access to electricity service is one of the major challenges of the city and the surrounding areas. Therefore, with the realization of the proposed project, this challenge will be alleviated at least to a greater degree in Bosaso City and the surrounding areas.
- b) *Increase access to electricity service and coverage:* The implementation of the proposed project will increase household access to electricity service and the overall

- electricity coverage in Bosaso and surrounding areas. Particularly, non-electrified households will get an opportunity to access electricity in the near future.
- c) *Enhance business activities in the area:* According to the officials, lack of reliable and adequate power supply in Bosaso City and surrounding areas is one of the major bottlenecks for limited business activities in the area. Therefore, with the construction of the proposed project, existing power supply will be enhanced in and around Bosaso City that requires power supply for operation, which will flourish, which in turn plays a positive role in the local Puntland State economy.
  - d) *Enhance service delivery:* According to the local officials, implementation of the proposed project, which will enhance the existing power supply in the area, will contribute positively to the delivery of some social services in the area. For example, the presence of reliable power supply will improve various health delivery services, as most of the equipment and tools used by health institutions require reliable power supply for better use.
  - e) *Employment opportunity:* The local authorities also anticipated the potential employment opportunities for the local people, especially during the construction phase. The participants believed the local people would have a new opportunity to increase their income by getting some kind of casual job opportunity during project construction.
  - f) *Improved quality of life:* Another interesting benefit identified by the officials and local authorities who participated in the consultation meetings relates to improvement of quality of life for the residents living in and around the project influence area. They explained how challenging life is for most of the residents in the project-influenced area due to the hot weather conditions and lack of reliable power supply that limited households from using different domestic electrical appliances that are required due to the climatic condition of the area. Therefore, the participants expect the quality of life of the local people to improve after project implementation. Improved access to electricity service will enable residents to use home appliances like refrigerators, ventilators, and other appliances that promote quality of life in such a hot environment.
  - g) *Reduced System Losses:* Participants, especially ESP, expect system losses to be significantly reduced with reference to the baseline levels. This is to be realized through the proposed rehabilitation and expansion of the distribution network which include medium voltage extensions, installation of additional distribution transformers as well as the establishment of a 33kV power distribution system.
  - h) *Reduced cost of energy:* Participants specifically consumers expect the project to lead to reduced cost of electricity. This should be realized from increased generation from solar PV which is known to be relatively inexpensive as compared to high-speed diesel, and improved system efficiency arising from the proposed network rehabilitation initiatives.
  - i) *Improved quality of electricity supply:* ESP expect the project to enhance quality of electricity supply. The participants, especially ESPs, believe that with interconnections of the 15kV and 11kV networks, establishment of 33kV system, extension of 11kV networks and installation of additional transformers, voltage drop, and the lengths of low voltage networks reduced, and this will lead to better quality of supply.
  - j) *Reduced environmental pollution:* The participants expect the project to lead to reduced environmental pollution.

### 6.5.1.3. Perception, Risks, Concerns, and Adverse Impacts Associated with the Project

The local officials also voiced their fears, concerns, and uncertainties associated with the implementation of the proposed distribution line and substation projects in the area. Accordingly, the following fears and concerns were raised by the local authorities during the consultation meetings:

- *Impact on land allocated for different purposes:* One of the main concerns of the local authorities is the potential negative impact of the project component on land used and allocated for various purposes, especially along the proposed powerline to be upgraded.
- *Impact on houses and housing structure:* Another concern raised by the local authorities was the potential impact of the project, especially distribution line Right of Way (RoW), on residential houses and other institutions. The participants further explained that the proposed power distribution lines will be constructed with the road reserves as is the usual practice and will not have any negative impact on health or safety.
- *Fear of not benefiting from implementation of the proposed project:* The other interesting concerns and anxieties of the local authorities include that some of the anticipated potential benefits may not be realized as promised. Based on their previous experience from similar infrastructure projects implemented in the city. Some participants were very suspicious of the proposed project in delivering the expected benefits, such as employment opportunities to the local residents, provision of electricity service, etc.

Local officials generally perceived the Bosaso Power Grid Expansion Project as a crucial infrastructure development that would enhance electricity supply reliability and support economic growth in the region. They recognized the project's potential to improve access to power for businesses, households, and public institutions, thereby fostering socio-economic development. During stakeholder engagements, officials acknowledged the project's strategic importance and expressed their support, particularly given its alignment with regional development goals. They also appreciated the project's design, which ensures that the expansion will take place within the existing right of way, minimizing disruption to communities and businesses. Despite their support, local officials raised concerns about potential risks associated with the construction phase, including temporary disturbances such as dust, noise, and traffic disruptions. They emphasized the need for effective mitigation measures to address occupational health and safety risks for workers and community members. Additionally, concerns were raised regarding potential impacts on existing infrastructure and utilities during construction activities. However, it was clarified that the project would not lead to demolitions, relocations, or resettlements along the right of way, as the alignment avoids private properties and sensitive areas. Officials were reassured that all identified risks and adverse impacts would be addressed through the implementation of the

Environmental and Social Management Plan (ESMP), ensuring responsible and sustainable project execution.

To address the concerns of Puntland State and Bosaso municipality authorities regarding potential environmental and social impacts from the proposed Bosaso power grid repair and expansion, they were informed that the project will prioritize sustainable practices and community well-being. A comprehensive Environmental and Social Impact Assessment (ESIA) has been conducted to identify and mitigate any risks, including noise, air quality, and safety impacts. To minimize disruption, the project will implement measures such as dust suppression, controlled noise levels, and secure construction zones. Additionally, a grievance redress mechanism (GRM) will be available to promptly address any emerging concerns from stakeholders, through continuous monitoring and open communication, the project will further aim to ensure that environmental integrity and community safety remain paramount throughout the construction and operational phases.

#### 6.5.1.4. Proposed benefit enhancement and mitigation measures

The participants were also given the opportunity to propose some measures to avoid or mitigate negative impacts and enhance the potential beneficial impacts. Therefore, the following measures are proposed by the local officials during the consultation meetings:

- *Provision of electricity service:* Considering the high demand for access to electricity service in Bosaso City and the surrounding areas, the local officials requested the project proponent to provide electricity service for non-electrified households in the city within the project areas. The participants also strongly pointed out that the project would not have the expected support from the local communities unless the ESP is ready to provide electricity service at least to some of the non-electrified Bosaso City residents found within the project corridor.
- *Employment opportunities for the local people:* The local officials also suggested the need to provide employment priority during construction to the local people. Employment opportunity will not only benefit the local people in terms of short-term monetary benefit but also strengthen the relationship between project proponents and the local people. This employment opportunity will enhance the acceptance of the projects by the wider community members residing in and around the project area.
- *The construction of the project must be in line with the Bosaso City master plan;* the local officials also explained the importance of considering the Bosaso City master plan, land allocation, and other future plans while designing the distribution line routes. The project implementers should also be flexible and willing to reroute and shift some of the project components if they're not in line with the Basaso City master plan. During the meetings, the participants asked clarifications on the following issues: (a) how will the project plan compensate for the affected property? Will this project alleviate the energy shortage in the area?; (b) is it possible to change some of the current project component location if it is not in line with the master plan or affect more properties?; and (c) what other direct or indirect benefits the local community can get from the construction of the proposed distribution and substation projects? The response to requests for clarifications were as follows: (a) Yes. The project will boost power generation through installation of a 7.15MWp/5.5MW solar PV plant +3MW/11MWh BESS plant. In addition, the project includes rehabilitation and

expansion of the distribution network. These measures are adequate to address the current shortfalls and constraints in electricity supply. (b) Relocation of the substations is not foreseen as these will be constructed on private land to be provided by the ESP. As for the lines, relocation is not foreseen as the powerlines will be constructed within the road reserve. The project is not in any conflict with the city masterplan (c) Reduced system losses, reduced environmental pollution, improved reliability and quality of electricity supply and reduced energy costs.

Additional information was requested about what other additional benefits the project will bring to the local people and its contribution in alleviating the energy shortage in and around Bosaso City. The study team responded that the main objective of constructing such a project is to enhance the existing power supply within the project influence area. Therefore, implementation of the proposed project will definitely reduce the existing power shortages within the project influence area. Moreover, implementation of the proposed project will create job opportunities for the local youth, improve social service provision, and play a positive role in boosting the local economy. Generally, the consultative meetings carried out with local officials were very productive. Despite such undesirable consequences, however, officials at all levels strongly and unanimously supported implementation of the proposed projects and pledged to work with the project to identify and implement measures that could mitigate adverse impacts of the project on local populations as well as the environment at large. They expressed their willingness to provide all the necessary support in their capacity for the successful implementation of the project.

#### 6.6. Key finding from consultation meetings with community members

As mentioned earlier, public consultations with community members residing within and around Bosaso City were conducted. To ensure the inclusiveness of the consultation processes, all cross-sections of communities (elders, influential community members, clan leaders, farmers, and other community members) were included in the public consultation meetings conducted with the community members in the project influence areas.

The local communities generally welcomed the Bosaso Power Grid Expansion Project, recognizing its potential to improve electricity supply, support economic activities, and enhance overall living conditions. Many community members viewed the project as a step toward modernization, reducing reliance on expensive and unreliable alternative power sources. During stakeholder engagements, they expressed optimism that the expansion would lead to better business opportunities, improved social services, and increased access to affordable electricity. The project was well received, particularly because it was clearly communicated that it would not result in demolitions, relocations, or resettlements along the right of way. Despite the positive reception, some community members raised concerns about potential risks and adverse impacts during the construction phase. Key concerns included temporary inconveniences such as dust emissions, noise pollution, traffic disruptions, and possible safety hazards near construction sites. Additionally, there were questions about how the project might affect access to roads and local businesses during implementation. However, it was clarified that all these issues would be effectively managed through the Environmental and Social Management Plan (ESMP). The community was reassured that mitigation measures,

including safety protocols, traffic management, and dust control, would be put in place to minimize any negative impacts while ensuring smooth project implementation.

#### 6.6.1. Awareness and understanding of the proposed project

Most of the community members had no prior information about the proposed distribution line and substation projects. Therefore, the study team had to introduce and brief about the proposed project's nature, components, routes/location, and activities it will involve. The information also included a presentation of the objective of these particular consultation meetings to the participants. The participants were also encouraged by the consultation facilitator to be free and actively engage in the discussion.

#### 6.6.2. Expected benefits and positive impacts

Identification of potential positive impacts of the proposed projects was one of the objectives of the public consultation meetings with the community members; therefore, the participants were given a chance to reflect on their expectations from the implementation of the proposed projects in the area. Accordingly, the participants managed to speak out what they thought would be the potential benefits of the project to their community and in the area. Some of the expected benefits and positive impacts identified by the community members are summarized below:

- *Provision of electricity services to non-electrified villages:* As electricity service is the long-time demand of many non-electrified households within and around Bosaso City, it's not surprising to hear that provision of electricity services to be what first came to the mind of the participants. According to the community members, there are a number of households within the project influence who have not yet connected to electricity. Therefore, this is the primary benefit the community expects from the project.
- *Alleviate power shortage and interruption in the area:* The community members also expect the implementation of the proposed project will improve the electricity capacity, and therefore, it will alleviate the existing power shortage and frequent power interruption in the area.
- *Creation of temporary employment opportunities:* similar to local officials consulted, the participants expect the project to provide employment opportunities, especially during the construction phase, to members of the local community. The community members also explained how such employment opportunities will benefit the local people in terms of increasing income earning and, above all, acquiring and learning new skills and knowledge related to construction activities.
- *Improve the existing poor social services provision:* According to the consultation participants, Bosaso City and the surrounding areas in particular are characterized by poor social services and infrastructure. Therefore, implementation of the proposed project in the area would help to improve some of the existing provision of social services and facilities in the area. For example, reliable and sustainable power supply will improve the provision of services given by the health institutions, as many of the devices and instruments used in the health institutions require reliable power supply for better functioning. The provision of other services like telecommunication and government and private business services such as secretary, photocopy, internet, haircut, welding, and other services that require electricity will be improved.

- *Contribute to future development activities:* the participants also pointed out the potential positive impact they expect from the implementation of the proposed project in the area, and it will increase development project activities that will take place in Bosaso City and the surrounding cities in the future. Apart from what they managed to identify in relation to the potential benefits of the project, some participants wanted to know more from the study team about additional benefits that implementation of the proposed distribution line and substation project would bring to their community.

#### 6.6.3. Perception of risks, concerns, and uncertainties associated with the project

It was noted that in all the consultation meetings carried out with the community members, it was not challenging the participants to identify the risks and uncertainties associated with the implementation of distribution line and substation projects in their communities. The anticipated risks, fears, and uncertainties associated with the proposed project are summarized as follows:

- *Injuries and accidents:* Another anticipated negative impact that the consulted community members identified in relation to the construction activities of the proposed project include injuries and accidents that can happen to humans, livestock, and properties as the movement of trucks and heavy machinery will increase at the construction phase.
- *Fear of not getting employment opportunities:* Another concern raised by the consulted community members was related to employment opportunities that the project will create during the construction phase. Some of the community members witnessed how some infrastructure projects, like road construction projects, that took place in the area gave priority to employment opportunities to people who came from other places instead of the local youth who were seeking the same opportunity. Therefore, the participants had some concerns because of similar past experiences.

To allay any fears from the local community associated with the project, they were informed that the proposed project will address environmental and social concerns by implementing responsible construction practices, prioritizing health, safety, and minimal disruption. Some of the measures shall include dust suppression, noise control, and secure work areas. Additionally, they were informed that the full ESIA has been conducted, and has identified potential risks, ensuring mitigation strategies protect air quality, water resources, and community spaces. Additionally, a grievance redress mechanism (GRM) will be available for residents to share concerns and receive support. Regular updates and open communication will keep the community informed and ensure their well-being will be safeguarded during all phases of the project.

#### 6.6.4. Mitigation measures proposed by community members

Along with identification of both positive and negative impacts of the proposed distribution line and substation projects, the community members also shared mitigation and benefit enhancement measures. Accordingly, they proposed the following measures:

- *Provision of electricity service:* In all the consultation meetings, the community members suggested the importance of providing electricity service to non-electrified households found within the direct project impact corridor. According to the participants, provision of electricity service to non-electrified households will not



only mitigate the potential negative impact of the project but also reinforce the anticipated positive impacts of the proposed project implementation.

- *Support & engage in development of other social infrastructure and social services:* The participants call up on MoEWR and the Puntland State agency responsible for electricity supply to support and take part in alleviating some of the problems the local residents are facing at the moment, which include challenges with inadequate electricity supply.
- *Priority of employment opportunity:* Community members also proposed the need to give priority in employment opportunities to be created by construction work to the local youth residing within the project influence area. Women participants also suggested the need to give equal employment opportunity to women community members who want to work in the construction activities of the project.
- *Grievance mechanism:* The consulted community members finally informed the need to conduct further consultation meetings prior to project implementation as well as suggested the importance of handling any project-related accidents and complaints through the existing local traditional grievance-solving mechanism.

The overall result from public consultation meetings is that community members' attitude towards the project is found positive and desirous of enjoying the benefits associated with electric power supply as soon as possible. The community members consulted are willing to provide assistance during the project implementation activities.

## 6.7. Consultation meetings with the women and youth groups

Under the FRS Constitution (2012), women and youth have the right to full consultation in the formulation of national development policies, the designing and execution of projects, and particularly in the case of projects affecting the interests of women and youth. Therefore, to ensure the inclusiveness of the consultation processes, women and youth were included in separate consultation meetings between September 25-28, 2024, with women groups of the community residing in and around Bosaso City.

The key findings from youth and women's groups regarding the Bosaso Power Grid Expansion Project reflect strong support for the initiative due to its anticipated socio-economic benefits. Youth groups highlighted the potential for job creation during the construction and operational phases, seeing the project as an opportunity for skills development and employment in the energy sector. They also recognized that improved electricity access would foster entrepreneurship by enabling small businesses, tech startups, and vocational training centers to operate more efficiently. Women's groups similarly acknowledged the project's positive impacts, particularly in enhancing access to reliable electricity for households, schools, and healthcare facilities, which would improve daily life and service delivery. The availability of stable power was also seen as a crucial factor in supporting women-led businesses, such as tailoring, food processing, and retail, ultimately contributing to economic empowerment.

Despite the enthusiasm, both youth and women's groups raised concerns about potential short-term disruptions during construction. Women's groups emphasized the need for safety measures near construction sites, particularly for children and vulnerable members of the community. They also highlighted concerns about dust, noise, and temporary road

access issues affecting local businesses. Youth groups, while optimistic about employment opportunities, sought assurances that local labor would be prioritized in hiring processes. It was clarified that all these concerns would be addressed through the Environmental and Social Management Plan (ESMP), with measures such as community safety protocols, traffic management, and employment opportunities for local workers. Overall, both groups expressed confidence in the project's long-term benefits and looked forward to its successful implementation, ensuring inclusive development and economic growth.



*Photo 8. View of stakeholders consultation session with women and youth groups on repair and expansion of Bosaso and surrounding areas power grid*

## 6.8. ESIA report disclosure and clearance

From the outset, it is emphasized that the proposed project shall involve a multitude of stakeholders, including the Federal and Puntland State Governments through the AfDB. Projects like this usually attract the attention of various stakeholders and hence are often prone to various scrutiny, including criticisms. This is especially true in today's highly globalized world. Therefore, it is crucially important for the project to encourage views and comments from all players and address them properly and adequately regardless of their sources, types, and motives. The MoEWR, as the project proponent, is responsible for providing all stakeholders at all levels with accurate and up-to-date information about this ESIA. Methods and modalities for public disclosure can take different forms depending on what is intended to be achieved. The bottom line, however, is the

participation of all key players at all levels—local, regional, national, as well as international ones. The following methods will be adopted for the public disclosure.

## 6.9. Disclosure plan

The project will use a variety of communication techniques to announce major project milestones and decision points, information about the project, its impact, and mitigation measures, and these are discussed as follows:

### 6.9.1. Consultative meetings upon completion of the ESIA

Upon completion of preparation of the ESIA, the MoEWR will organize a consultative workshop before the start of construction. Stakeholders identified and consulted during the initial phase of the public consultation process would be called to the next phase of consultative meetings. They will be invited to discuss the contents of the ESIA and contribute to its finalization. The purpose of the meetings will be to present the initial findings from the consultative meetings and update them with new project information. The required information on project objectives, descriptions, and potential impacts will be shared with the stakeholders to make them aware of the project impacts and the likely mitigation measures to be pursued and implemented. The participants will be encouraged to forward ideas, questions, and comments to facilitate the implementation. The results of these discussions will be incorporated in the final ESIA Report for future consideration and implementation.

### 6.9.2. Prepare Project Information Package

A dedicated Project Information Package shall be prepared by MoEWR with tools adapted to the communities. The information packages shall include a summary of ESIA findings: the purpose, nature, and scale of the project; duration of the proposed project activities; any risks to and potential impacts on communities and relevant mitigation measures; the envisaged stakeholder engagement process; and the grievance mechanism.

### 6.9.3. Project Web Site

Project documents, including the ESIA, will be uploaded on Mower's and AfDB's websites as part of the public disclosure process. This electronic medium will serve as a permanent promotion, information, and public relations forum for the project, making it easier to reach out to both national and international stakeholders and address their concerns and exchange views, experiences, and information on matters related to the project. In addition, it will equip them with accurate and up-to-date information about the project and its progress.

## 6.10. Clearance and Disclosure of the ESIA

The ESIA document will be submitted to the MoEWR for their review and approval. The ESIA report will be submitted to AfDB for review and clearance.

# CHAPTER SEVEN: ANTICIPATED ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

## 7.1. Overview

This section examines how the proposed project will interact with parts of the physical, biological, and social environments, as well as infrastructure and utilities, to produce effects on resources and receptors. The impacts are grouped according to the phases of the project life cycle in order to better understand the risks and implications connected with each one. The study area is described as Bosaso City and the surrounding areas where the indirect, combined, and cumulative effects are likely to occur. Criteria for assessing the significance of impacts stemmed from the following key elements:

- The magnitude (including nature, scale and duration) of the change to the natural or socioeconomic environment (e.g. an increase in erosion, or an increase in employment opportunities), expressed, wherever practicable, in quantitative terms. The magnitude of all impacts is viewed from the perspective of those affected by considering the likely perceived importance as understood through stakeholder engagement;
- The nature and sensitivity of the impact receptor (physical, biological, or human). Where the receptor is physical, the assessment considered the quality, sensitivity to change and importance of the receptor. For a human receptor, the sensitivity of the household, community or wider societal group was considered along with their ability to adapt to and manage the effects of the impact; and
- The likelihood (probability) that the identified impact will occur. This is estimated based upon experience or evidence that such an outcome has previously occurred.

For this assessment, significance has been defined in Table 7-1 based on five levels.

**Table 7-0-1:** Categories of significance

Category	Significance
Negligible impacts (or Insignificant impacts)	Negligible impacts (or Insignificant impacts) are where a resource or receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed ‘negligible’ or ‘imperceptible’ or is indistinguishable from natural background variations.
Minor	An impact of minor significance (‘Minor impact’) is one where an effect will be experienced, but the impact magnitude is sufficiently small (with or without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate	An impact of moderate significance (‘Moderate impact’) is one within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is ALARP (as-low-as-reasonably-possible).

	This does not necessarily mean that ‘Moderate’ impacts have to be reduced to ‘Minor’ impacts, but that moderate impacts are being managed effectively and efficiently.
Major	An impact of major significance (‘Major impact’) is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of ESIA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted.

For environmental impacts, the significance criteria used in this ESIA is as shown in Table 7-2.

**Table 7-0-2:** Overall significance criteria for environmental impacts

Receptor sensitivity	Impact Magnitude		
	Low	Medium	High
Low	Minor	Minor	Moderate
Medium	Minor	Moderate	Major
High	Moderate	Major	Major

For the social impact assessment, the perceptions of stakeholders, expressed as opinions around certain issues, can be as important as actual impacts. Consequently, the concept of perception is explicitly brought into the evaluation of significance after an impact is evaluated. When an impact is of significant stakeholder concern, this may cause a rise in the significance rating. This prompts the formulation of more rigorous, appropriate mitigation measures, which focus on the sources of the impacts, and address stakeholder perceptions. The risk of not addressing stakeholder perceptions is that reputational damage could arise, resulting in the loss of a ‘social license to operate’.

## 7.2. Impacts during construction phase

This sub-section identifies and assesses the anticipated positive and negative impacts of the project during the construction phase. For each positive impact, enhancement measures are proposed, for negative impacts, a set of mitigation and monitoring measures are identified to avoid and minimize adverse impacts.

### 7.2.1. Positive impacts

#### 7.2.1.1. National, local and regional economy

The project will boost the Puntland State and FRS economies during construction. The contractors are expected to source materials and services from local and foreign companies. This will generate local, regional, and national economic growth, increase demand for business-to-business services, and boost turnover for SMEs in Bosaso City. The impact is reversible, as it only occurs during the construction phase.

**Enhancement measures**

- Promoting local workforce development through skills training and capacity-building programs, ensuring that local businesses can benefit from the improved energy infrastructure.
- Adopting policies that encourage public-private partnerships and foreign direct investment
- Fostering trade and economic cooperation.

*7.2.1.2. Benefit to local retail businesses*

It is expected that the construction and upgrade of the substations and distribution lines will necessitate a workforce of over 50 people. The workforce, construction crews will require food, accommodation and sundries most of which will be provided by local retail shops. This will present a short-term economic benefit for local business owners.

**Enhancement measures**

- Contractors and subcontractors will encourage their workers to support businesses that conduct their businesses in line with national laws. Quality and safety of products will be advocated for amongst local businesses as this will have the overall effect of improving the standards of the local businesses.
- During the sensitization meetings with local communities, the local residents need to be informed about the Project and how their businesses can benefit from the Project.

*7.2.1.3. Employment opportunities*

The power expansion and distribution project in Bosaso City is expected to create significant employment opportunities, both during the construction and operational phases. Local job creation will encompass a range of skilled and unskilled positions, including construction workers, electricians, engineers, and project managers. Additionally, indirect jobs in supporting sectors such as transportation, supply chains, and service industries will arise, benefiting local businesses and boosting the city's economy. The project will also offer long-term employment in the operation and maintenance of the expanded power infrastructure, contributing to workforce development and enhanced livelihoods in the region.

**Enhancement measures**

- Giving priority to the locals in all employment opportunities
- Prioritize local workforce involvement and skill development.
- Establishing training and apprenticeship programs can equip local residents with the technical skills needed for both the construction and operation phases of the project, ensuring long-term job creation. Encouraging the use of local contractors and suppliers can further stimulate the local job market.
- Promoting entrepreneurship by providing support to small businesses and start-ups related to the energy sector, such as maintenance services or energy-efficient product suppliers, can create indirect employment opportunities.
- Fostering collaboration between educational institutions and the project developers can ensure a steady pipeline of skilled labor, contributing to sustained economic growth and job creation.

#### *7.2.1.4. Skills transfer*

The construction activities will require workers with various levels of skill, including skilled, semi-skilled and unskilled labour. Contractors will be required for construction of substation facilities, civil works, construction of onsite building and the distribution lines. Electrical and mechanical expertise will be required for the upgrades of distribution lines as well as re-conductoring of the 11kV and 15kV distribution lines within and around the City. While skilled labour required will be from specialised national and international contractors, semi-skilled and unskilled labour will be obtained from residents depending on the nature of work and availability of the required labour. This will be a temporary direct and reversible impact for the duration of the construction phase.

#### **Enhancement measures**

Wherever feasible, local people will be considered for job opportunities commensurate with their level of skills. Adequate occupational health and safety standards will be provided to ensure the work environment is conducive. The onus will be on the Contractor to ensure that children under the age of twelve are not employed at the site and any children above fourteen years are not given physically demanding work and work under adult supervision as per restrictions of the FGS Employment Act. The Contractors will be obligated to fight the ills of child labour, and as such, will be liable for any offences such as Child Labour amongst the contractors' workers.

#### *7.2.1.5. Improved access to clean and reliable electricity*

Under the Somalia Power Master Plan (2018), programmes to significantly increase electricity supply and coverage for the citizens of the Federal Republic of Somalia is emphasized. Projects that focus on expansion of electricity production and distribution capacity therefore supports the national socioeconomic agenda, and achieving the national development plans for the FRS. Additionally, the project will support the country in meeting its obligations under the Paris Agreement.

#### **Enhancement measures**

- Prioritizing sustainable energy solutions and expanding grid coverage to underserved communities.
- Investing in modernizing the electricity distribution infrastructure can enhance grid reliability, minimizing outages and improving service quality.
- Public awareness campaigns on energy efficiency and the benefits of clean energy can encourage responsible consumption, maximizing the impact of expanded access.
- Ensuring that affordable electricity tariffs are established will also promote equitable access, particularly for lower-income households, boosting the overall social and economic benefits of the project.

#### *7.2.1.6. Attracting and expanding investments in Bosaso City*

According to the local officials, there are potential investment areas, which require adequate and reliable power supply. It was learnt from the consultation that shortage of power supply is the main constraint to expanding the existing investments and attracting new ones in Bosaso City. Therefore, enhanced capacity provided by the proposed project would help curb the existing shortage of electricity thereby contributing to the local as well as the regional industrial and economic development.

**Enhancement measures**

- Ensure stable and sustainable electricity supply to investors to enable them reduce operational costs and enhance productivity across sectors such as manufacturing, trade, and services.
- Include provisions for energy-efficient technologies and renewable energy integration, making the city a hub for sustainable development.
- Ensure favorable tariffs for industrial users and investment in modern infrastructure.

*7.2.1.7. Enhance application of new technologies in social facilities and infrastructures*

There is a rapid expansion of social facilities and infrastructures in Bosaso City. These developments include health posts/centres, hospitals, pharmacies, rural drug stores, schools, universities, computer and electronic centres, telephone infrastructures, etc. However, the existing social facilities and infrastructures suffer either from serious shortage power supply, frequent power interruption or lack of connection at all. As a result, such social facilities and infrastructures are not in a position to provide reliable, adequate and efficient services and unable to use new technologies to deliver efficient services. The main benefit that the local people and authorities would like to get from the planned project is reliable electric power supply thereby ensuring the improved social facilities and infrastructures and application of new technologies for enhancing the quality of services being rendered to the local residents.

**Enhancement measures**

The Bosaso Municipality can facilitate the implementation of smart infrastructure, such as intelligent transportation systems and public lighting, which rely on consistent power for optimal functionality.

*7.2.1.8. Expansion of small-scale business in services and commerce/trade*

During construction new small businesses such as catering services (bars and restaurants) will be initiated along the DL construction sites. These types of businesses could earn additional income to households due to the presence of large numbers construction workers in the project area. More traffic movement could also contribute to an increase in income-generating activities in the town sections located along the project distribution line corridor and surrounding areas. In addition to improving access to domestic consumers, small local businesses including restaurants, small services, agro-processing industries and manufacturing workshops would benefit greatly from expanded distribution due to the project. Power requiring micro and small-scale enterprises are rapidly growing in Bosaso City.

**Enhancement measures**

- Contractors and subcontractors will encourage their workers to support businesses that conduct their businesses in line with national laws. Quality and safety of products will be advocated for amongst local businesses as this will have the overall effect of improving the standards of the local businesses.
- During the sensitization meetings with local communities, the local residents need to be informed about the Project and how their businesses can benefit from the Project.



#### 7.2.1.9. Gender issues

The power expansion and distribution project in Bosaso City presents both opportunities and challenges in addressing gender issues. On one hand, the project can promote gender equality by providing employment opportunities for women, particularly in administrative, technical, and managerial roles, contributing to economic empowerment. Improved access to electricity can also enhance women's daily lives by reducing the time spent on household chores, improving access to education through better lighting, and fostering women's entrepreneurship through new business opportunities.

<b>Enhancement measures</b>
<ul style="list-style-type: none"><li>• Ensure equal employment opportunities for women</li><li>• Ensure gender balance in staff establishment</li></ul>



#### 7.2.1.10. Income to material/ equipment suppliers and contractors

Construction of power plants, sub-stations and upgrading/construction of the power distribution lines in Bosaso will involve civil, electrical and mechanical works which will require sourcing of requisite materials both locally and internationally. Construction of the distribution lines will require cement and aggregates for pylon foundations, transfer cables, conductors and metallic beams. Material such as steel, timber, aggregates, reinforcement bars and cement may be available locally and this will be an opportunity for the local service suppliers to benefit financially from the project. This will be a temporary direct financial benefit for suppliers and transporters. The electrical and mechanical equipment might not be locally available and have to be imported. This presents financial benefit for local and foreign suppliers- a short-term but significant socio-economic benefit.

<b>Enhancement measures</b>
Earth materials for example, murrum, aggregate (stones and sand) are obtained from quarry operations. Conscious or unwitting purchase of these materials from unlicensed operations indirectly supports, encourages and promotes environmental degradation at illegal quarry sites and can cause medium to long-term negative impacts. It will therefore be a contractual obligation for contractors to procure construction materials from legitimate or licensed sources.

### 7.2.2. Negative impacts

#### 7.2.2.1. Impacts on biophysical environment

##### 7.2.2.1.1. Landscape and visual

Construction of the substations and distribution lines will change the landscape in the area. The project areas already have existing distribution lines which are accustomed to observers. The impact intensity will be medium because even though the change brought about by the change in landscape will be major, it is expected that even without the construction activities, the landscape would have changed considering the high rate at which land in the area has been bought by potential developers. The impact significance is rated moderate.

<b>Impact</b>	<b>Landscape and visual</b>
Type of impact	Negative
Type of Effect	Direct
Duration	Long-term: The effects will commence from the start of construction and thereafter-permanent changes in visual character will occur, including into operations.
Reversibility	Irreversible until the entire Project infrastructure is decommissioned.
Receptor Sensitivity	Low on the basis that there is no international or national tourism receptors in the area, and the land has little, if any aesthetic value.
Magnitude	Medium – the changes to the visual condition of the land will occur within the Project Site and will be noticeable across the surrounding area.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Erect temporary barriers or screens around construction sites to shield views of heavy machinery, equipment, and activities from the surrounding area, minimizing visual disturbance.</li> <li>• Limit the clearing of vegetation to only what is necessary for construction, and ensure that any cleared areas are rehabilitated with native plants after construction to restore the landscape.</li> <li>• Locate material storage areas and equipment yards in less visible or already disturbed areas, and keep them tidy to reduce the visual clutter during the construction period.</li> <li>• Design temporary access roads with minimal disruption to the landscape, and ensure these roads are restored to their original condition, or better, once construction is complete.</li> <li>• Where possible, restore disturbed areas progressively as construction moves forward rather than waiting until the project is fully completed. This helps minimize prolonged visual impacts.</li> <li>• Avoid construction activities near scenic or culturally significant landscapes, and design project phases to avoid highly visible areas during periods of high public activity, such as tourist seasons.</li> <li>• Ensure that waste and debris from construction activities are promptly and properly managed and disposed of to avoid creating an unsightly and cluttered environment.</li> <li>• Minimize the use of bright lights during nighttime construction to reduce light pollution, especially in areas that are normally dark. Use directional lighting to limit the spillover of light into surrounding areas.</li> </ul>

#### 7.2.2.1.2. Soil, groundwater and surface water contamination

Groundwater and harvested water stored in open and unprotected ponds are used for water supply purposes in Bosaso and surrounding areas for drinking, washing purposes and cattle watering. Pollution of these resources may arise at or close to the base camps or work sites as a result of inadequate provision of sanitary and waste facilities, and accidental or deliberate spillage or leakage of polluting materials. Inappropriate disposal

of refuse and some materials used in construction can also lead to public and animal health hazards. Such pollution adversely affects those who depend on local water resources, can have serious long-term effects on water quality. Additionally, removal of vegetation cover in the ROW, wayleaves and substation site whose root systems bind the soil may increase the risk of erosion by water or wind in the project area. Earthworks when constructing tower foundations near streams could increase sediment load in watercourses.

<b>Impact</b>	<b>Soil, ground water and surface water contamination</b>
Type of impact	Negative
Type of effect	Direct as it will affect soil only
Duration	Short-term changes in soil character and chemical composition may occur, but long-term consequences are unlikely unless major contamination is cleaned up.
Reversibility	Reversible as localized spills and soil compacted areas can be cleaned and restored.
Receptor Sensitivity	Low – the quality of the soil is not unique in the area and does not have significant agricultural value.
Magnitude	Low as site construction activities will be restricted to occur only in the Project Site
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Concrete wash water to be discharged only at designated facilities.</li> <li>• Construction of adequate and efficient drainage channels at the substation site, which will provide proper drainage for the substation during operation.</li> <li>• Discharge of untreated concrete wash water to surface waters to be strictly prohibited.</li> <li>• Ensure all hazardous materials are stored in designated areas (i.e. on flat or gently sloping ground) to prevent spillage;</li> <li>• Ensure appropriate hazardous materials containers are used with seals that are in good condition (i.e. glass containers for corrosive chemicals);</li> <li>• Ensure employees have appropriate training in safe hazardous materials handling;</li> <li>• Implementation of temporary erosion control measures (e.g. silt fence, erosion mats) especially where construction sites are near surface water.</li> <li>• Installation of portable toilets for construction workers.</li> <li>• Recycling of wash water will be done as far as practical.</li> <li>• Remove and dispose wastes from septic tanks installed for construction crew camps at appropriate interval &amp; at designated sites to avoid overflow and prevent contamination of the ground or surface drainage; and</li> <li>• Revegetation of exposed slopes immediately after construction is completed.</li> </ul>

- Spillage of hazardous liquids (e.g. oil) to be prevented by implementing spill prevention measures.
- Stockpiles and temporarily removed topsoil to be stored in a location and manner to prevent soil runoff.
- The contractor is required to collect and treat storm water runoff from open workshop servicing and repairs and other areas in bonded storage areas before discharging into receiving drainage and waterways;
- The contractor is required to make specific and adequate provision for the disposal of sanitary and other liquid and solid wastes in such a way as will not result in any form of pollution or hazard to human or animal health;
- The Contractor is required to prevent entrance or accidental spillage of pollutants and wastes into flowing and/or dry water courses and groundwater resources.
- The contractor is required to prohibit washing of project vehicles and plant in or adjacent to any water sources. All washing to be carried out at designated areas away from water sources; and
- The contractor is responsible, at his own cost, for cleaning up any pollution caused by his activities and the payment of full compensation to those affected.

#### 7.2.2.1.4. Air quality

The main processes of construction could lead to emission of particulate matter into the ambient air (i.e. Construction dust and debris). During construction there will be deterioration in air quality due to the generation of suspended particles/fugitive dust from concrete batching plants, construction works, construction equipment and emissions from vehicles have the potential to negatively affect air quality in the vicinity of the construction sites and access roads. However, many of these operations will take place in locations away from populated settlement areas. Therefore, the likelihood and consequences of these impacts result in a moderate risk rating. However, where the road passes through residential areas, raised dust can cause considerable nuisance, and can result in increased health issues including respiratory disease, eye, nose and throat irritation, etc. Although temporarily excessive dust will impact construction workers and community living close to the project influence area. Thus, it is important to limit dust in the work environment and to the nearby communities. At the present time, traffic emissions and other air pollution hazards are not viewed as a major problem by local populations because traffic volumes are low and tolerance levels are high.

#### *Dust*

The construction activities are likely to pose dust generation risks due to the region's arid environment, characterized by dry soils and frequent winds. Excavation, land clearing, and heavy vehicle movement during the construction phase can result in substantial dust emissions, leading to air quality deterioration. This dust can affect nearby communities, reduce visibility, and pose respiratory health risks to workers and residents.

<b>Impact</b>	<b>Air quality (Dust)</b>
Type of impact	Negative
Type of effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that air quality would revert back to baseline conditions after construction works is

	completed
Receptor sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of dust is limited to the Project Site, and the area is not prone to large-scale wind-blown erosion.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

<b>Mitigation Measures</b>	
<ul style="list-style-type: none"> <li>• To prevent high dust near settlements, traffic speed should be reduced to 30km/hr;</li> <li>• Reduce the duration of construction activities resulting in more dust generation.</li> <li>• Concrete mixing plants and associated machinery installed for project activities will be equipped with suitable pollution control (dust suppression equipment) arrangements.</li> <li>• The Contractor is responsible to develop an ambient air quality monitoring and management plan (C-ESMP), with particular focus on dust monitoring.</li> </ul>	

#### *Vehicle exhaust emissions and toxic fumes*

During the construction phase, vehicle exhaust emissions pose a risk to both air quality and public health. The use of diesel-powered construction machinery, trucks, and other vehicles results in the release of pollutants such as nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), particulate matter (PM), and volatile organic compounds (VOCs). These emissions can degrade air quality, contributing to smog formation and respiratory issues for nearby communities and workers. Additionally, prolonged exposure to these pollutants could exacerbate pre-existing health conditions, particularly for vulnerable groups such as children and the elderly. Without mitigation measures like regular maintenance of equipment and encouraging the use of cleaner fuels or technologies, the environmental impact could be considerable.

<b>Impact</b>	<b>Air quality (Vehicle exhaust emissions and toxic fumes)</b>
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that air quality would revert back to baseline conditions after construction works is completed
Receptor Sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of dust is limited to the Project Site, and the area is not prone to large-scale wind-blown erosion.
Significance of the impact without mitigation	Minor

Significance of the impact with mitigation	Negligible
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Mitigation Measures
<ul style="list-style-type: none"> <li>• Vehicle speed in residential areas will be limited by instructions to drivers. This will be enhanced by the installation of speed limit signals as appropriate;</li> <li>• Construction machinery should be well maintained to minimize excessive gaseous emissions;</li> <li>• Prevent the occurrence of smoke emissions or fumes from fuel oils;</li> <li>• Avoid exposing any volatile chemical to the atmosphere;</li> <li>• Do not burn material, which produce toxic gases. No burning is allowed to materials such as tires, plastic, rubber products or other materials that create heavy smoke or nuisance odour.</li> <li>• The Contractor is also responsible to monitor the air pollution risk at all construction sites, campsite, access roads and near settlements/villages.</li> </ul>

#### 7.2.2.1.5. Noise and vibrations

In and around the project area and along the access road corridor the noise sources include vehicular traffic and the hooting of the vehicles along the existing access road, and human activity including religious institutions. Sustained noise levels during construction are expected to be much higher than the ambient noise level in the project site and along the access road. Noise and vibration result from construction activities in general but particularly from operation of heavy machinery. Other operations generating significant noise include concrete mixing plants and if required excavation and stone crushing. The sensitive receptors include: vulnerable targets (school, clinic, worship place, local administration offices, etc.) exposed to noise and vibration from the project and construction of new or upgrading of existing access road.

Impact	Noise and vibrations
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that noise levels will rapidly revert to baseline conditions after construction works is completed
Receptor Sensitivity	Medium given that there are permanent/temporary settlements adjacent to the RoW.
Magnitude	Medium given that the generation of noise is likely to be limited to the use of construction machinery and earth movements.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Mitigation measures
<ul style="list-style-type: none"> <li>• A proper routine and preventive maintenance procedure for project vehicles and equipment should be set for their best operating conditions and lowest noise levels possible so that extraneous noises from mechanical vibration, creaking and squeaking are reduced to a minimum;</li> <li>• Conduct job-specific training for machinery and heavy vehicle operators to cover the importance of noise control and available noise reduction measures.</li> <li>• In principle, noisy construction works to be limited to normal working hours and no operation on Fridays and public holidays.</li> <li>• Vehicles and machinery to be equipped with exhaust mufflers and well maintained.</li> <li>• Additional noise suppression measures (e.g. covering of noisy units) to be implemented if noise levels at nearest sensitive receptor consistently exceeds national noise standard or in case of consistent complaints.</li> <li>• Construction workers to be provided with appropriate PPE such as ear plugs and ear muffs for protection against excessive noise.</li> <li>• Construction machines and vehicles to be turned off when not in use.</li> <li>• Construction equipment generating high noise shall be designed to have an adequate noise control (such as mufflers, silenced exhaust acoustic);</li> <li>• Controls shall be undertaken to reduce exposures to &gt;80 dBA, including layout of equipment, selection of quieter machines, isolation of workers from noise source etc.</li> <li>• Coordinate and implement all noise and vibration control measures to ensure National and AfDB standards are met;</li> <li>• Minimize worker exposure to noise and vibration by providing appropriate PPE, hearing protection and noise control device as required.</li> </ul>

#### 7.2.2.1.6. Biodiversity

##### **Fauna**

There will be no major habitat fragmentation, since the towers and associated facilities will be constructed in a habitat that is already degraded by human settlement and cultivation activities. This loss is not expected to bring about marked differences in the available habitat for the wildlife, since there is sufficient similar habitat in the area. There are no ecological sites or wildlife habitats considered to be either critical, fragile or high value within the corridor of the proposed power line and no significant impact is expected on such habitats. There will be no destruction of valuable wildlife habitats and impediments to wildlife movements during construction or operation of the Project.

The construction of Distribution line and the facility required may impact birds and bats by creating barrier effects. Birds may be restricted from the use of habitats adjacent to these developments. In addition, active construction may affect movements or can displace some birds and bats; for example, they may avoid a localized migratory route. It has been found out that slight change in flight direction, height or speed may result in fitness problem to the bird. Power distribution lines pose a number of threats to a variety of birds including migratory birds. Mortalities from collisions with power lines and electrocutions. Those bird species most vulnerable to collision are generally “poor” fliers such as the ducks and geese, while electrocution victims are usually birds of prey. The three major impacts of DL on bird species include: mortality through collision with power lines; mortality through electrocution and habitat disturbance.

Impact	Fauna
Type of impact	Negative

Type of effect	Direct and indirect as it will affect fauna/flora
Duration	Long term as impacts will persist throughout the operating period
Reversibility	Reversible: some species could be displaced from the project site during construction.
Receptor Sensitivity	No permanent presence of threatened wild fauna in the project sites and the immediate surrounding areas.
Magnitude	Medium as site construction activities will be restricted only in the project site. Fauna could move away to similar habitats in the adjacent areas.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>	
<ul style="list-style-type: none"> <li>• As much as possible the size of the area to be cleared and used for the project should be minimized;</li> <li>• Vehicles and trucks as much as possible should use the existing roads to minimize foot and vehicle traffic through undisturbed areas and loss of habitat by wildlife;</li> <li>• Habitat restoration activities should be initiated after construction activities are completed; and</li> <li>• Secure the safe movement of animals displaced and an attempt to protect in their new habitat must be carried out.</li> <li>• To design an avian-safe power pole to minimize bird electrocution risk by providing sufficient separation between energized phase conductors and between phases and grounded hardware to accommodate at least the wrist-to-wrist or head-to-foot distance of a bird;</li> <li>• The use of a steel or concrete monopole structure with sufficient clearance would minimize electrocution risks to avifauna; and</li> <li>• Cross-arms, insulators and other parts of the power lines can be constructed so that there is no space for birds to perch where they can be proximate to energized wires.</li> <li>• Making power line more visible to birds (line marking). The assumption is that birds collide with overhead cables because they cannot see them. Hence, high-visibility markers should be installed to make the lines more visible to birds.</li> <li>• Habitat management at site level should be considered, such as, to avoid establishing ponds or waste disposal storage sites within development area;</li> <li>• As much as possible vegetation cover that may support small mammals, rodents, reptiles, amphibians and other birds, which attract raptors, must be removed; and</li> <li>• Retain existing low-lying vegetation ground cover along the distribution line ROW thereby minimizing vegetation clearing.</li> </ul>	

### **Flora**

One of the major unavoidable impacts of the proposed project will be land clearing for the construction of the construction of tower foundation and Substation. Distribution line construction and maintenance can lead to the permanent removal of woody vegetation and in some cases. However, there are no significant areas of natural or semi-natural forest in and around the project area, and no designated or protected areas of terrestrial ecological interest will be affected by the proposed construction activities. While the project footprint is not well endowed with trees, approximately 250 mature trees with different diameters at breast height (dbh) stems are expected to be cleared during the construction phase of the project. There is no critical habitat that will be impacted by the project. Although the DL, the new substation projects, and the associated access road are



located in an ecologically less important area, as much as possible excessive destruction of the limited shrubs and small trees will be avoided or compensated. It is recommended to adhere to principles of environmental conservation during the construction in order to avoid excessive destruction of vegetation and disturbance of land in the construction area. Therefore, the Contractor shall implement mitigation measures to minimise the destruction of vegetation.

<b>Impact</b>	<b>Flora</b>
Type of impact	Negative
Type of effect	Direct and indirect as it will affect fauna/flora
Duration	Long term as impacts will persist throughout the operating period
Reversibility	Reversible: Vegetation restoration activities can be undertaken during the operation phase.
Receptor sensitivity	Low – no documented presence of endangered flora species
Magnitude	Low-to-medium: Vegetation clearance will be restricted only for the targeted sections of the Project site earmarked for installation of solar panels, and the accompanying infrastructure, including ancillary facilities.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

<b>Mitigation Measures</b>
<ul style="list-style-type: none"> <li>• Avoid unnecessary destruction of trees and other vegetation by restricting land clearing to what is absolutely necessary within the project boundary and along the access road alignment.</li> <li>• Rehabilitation of temporary construction sites and camps should be done with suitable native plants;</li> <li>• All damaged areas shall be reinstated and rehabilitated upon completion of the construction.</li> <li>• Compensate in cash for the loss of privately-owned mature trees;</li> <li>• The contractor will be responsible for any fire accident caused by his activities within the project area;</li> <li>• The contractor is responsible for the conduct of his workforce in relation to environmental protection matters and to specifically prohibit unnecessary felling of trees;</li> <li>• There should be care to avoid introduction of invasive alien species. Early detection and eradication is recommended.</li> </ul>

#### 7.2.2.1.7. Soil erosion

Clearance of vegetation at the proposed site will have the potential to contribute to soil erosion through the agents of wind and running water. Activities such as earthworks, construction of the proposed substation and associated facilities, spillage or uncontrolled release of potentially polluting material such as concrete wash water, fuels (oils, diesel, hydraulic fluid, or lubricants) or paint during construction could also contribute to soil degradation. Earthworks when constructing tower foundations near and/or within swamps or near streams could increase sediment load in watercourses, mainly around tower footings if within the wetland. Localised soil contamination would also arise from irresponsible waste management on site. During construction, erosion could take place as a result of change in ground cover, cut and fill, or poor erosion control practices which

increase the soil erosion potential. The sensitivity of receptor to occurrence of soil erosion during the construction phase, especially during rainy and windy periods. Impact significance: moderate.

<b>Impact</b>	<b>Soil erosion</b>
Type of impact	Negative
Type of effect	Direct and indirect as the project site is located in an area prone to soil erosion
Duration	Short term as it will likely occur only during construction phase.
Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized. Additionally, the agents of erosion tend to be seasonal and spatial.
Receptor sensitivity	Low – the project site is located in an area with low agricultural activities so eroded soil will not cause eutrophication/alter water quality of any nearby surface water resources in the Project Area.
Magnitude	Low – soil disturbance and loosening will be restricted only for the targeted sections of the Project site earmarked for installation of solar panels, and the accompanying infrastructure, including ancillary facilities.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Along the access road corridor, replanting cleared areas on slopes vulnerable to erosion such as cut-and-fill slopes with plant species (grasses) which have the abilities to: armour the surface against erosion and abrasion by intercepting raindrops; support the slope by propping from the base; and reinforce the soil profile by increasing its shear resistance (roots); etc.,</li> <li>• Design and construct suitable permanent drainage structures including: Paved side drains for sections vulnerable to serious erosion and gully formation (mainly around tower foundation areas and within the SS); and diverting drains (where these are necessary), which avoid excessive concentration of flows.</li> <li>• Minimize side-casting of excavation materials at construction site and along the access road corridor by depositing it only on approved disposal sites;</li> <li>• Preserving topsoil from the project boundary and road cuts for re-use during site restoration on laydown and other areas used for temporary purposes.</li> <li>• The risk rating of impacts from soil erosion is classified as moderate, which is environmental impact with some consequences and likely to occur. Implementation of the above mitigation measures is expected to reduce the risk rating to Low, which is environmental impacts with no or limited consequence and less likely to occur.</li> <li>• Within the project boundary and along the project access road alignment, restrict land clearing to what is absolutely necessary.</li> </ul>

#### 7.2.2.1.8. Wastes

##### **Solid waste generation**

Large scale construction work will produce considerable amount of construction waste. These wastes unless properly managed, would cause pollution of the environment and that is air, land, and surface and ground water resources. The major waste materials (and

their sources) that can be generated during construction of the Project include: waste generated by construction works, construction campsite and other facilities; containers for various construction materials and plastics; used lumber for scaffolding material, packing material; metal scraps from different construction sites; hazardous solid wastes such as discharged fuel filters, batteries, etc. of vehicles and machinery; and hazardous solid wastes such as paints and solvents and clinical or medical wastes. The Contractor shall apply the duty of care principles to waste management activities to ensure that waste is managed in accordance with the requirements of this plan and that waste does not pose a threat to human health or the environment. As a general practice at the construction site, the Contractor shall adopt the following waste minimization hierarchy that prioritises waste management solutions and these include reduce the overall amount of waste, reuse and recycling of any wastes that are unavoidably created and disposal as a last resort. Any waste material which is unable to be reused, reprocessed or recycled shall be disposed at a landfill.

As the construction site is expected to have hazardous materials like chemicals, hydrocarbons, etc., the removal and disposal of hazardous wastes in the project site should follow nationally or internationally recognized procedures. Therefore, the Contractor shall properly store (or stockpiled) the hazardous waste on site at designated location and warning signs shall be posted and handled. There are no licensed hazardous waste disposal sites around the construction area.

<b>Impact</b>	<b>Solid wastes</b>
Type of impact	Negative
Type of effect	Direct and indirect
Duration	Short term
Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized.
Receptor sensitivity	Low – Medium
Magnitude	Low
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Construction wastes will not be allowed to accumulate on the construction site but will be promptly collected and removed regularly from the site by the Contractor;</li> <li>• Indiscriminate disposal of solid waste shall be strictly prohibited;</li> <li>• Sufficient number of labelled and colour coded garbage bins and container will be made available at all construction offices, stores, camps, canteens, etc. to ensure wastes are strictly segregated at generation sites (source). Waste bins shall be labelled in Amharic, Somali and English and according to standards;</li> <li>• Wastes will be appropriately segregated such that hazardous and non-hazardous wastes are not mixed and to allow for recycling and reuse where appropriate;</li> <li>• Waste materials will be placed and stored in suitable containers. Storage areas and containers will be maintained in a sanitary condition and shall be covered to prevent spreading of wastes by wind or animals;</li> <li>• All wastes generated shall be correctly identified and stored pending collection/transfer for reuse, recovery, recycling or disposal in an environmentally sound manner;</li> </ul>

- Any waste material that is inadvertently disposed in or adjacent to any watercourses will be removed immediately in a manner that minimizes adverse impacts, and the original drainage pattern will be restored;
- All wastes, which are not designated as combustible waste to be burned on-site, will be recycled, disposed of in an approved landfill, or shipped to an approved disposal facility; and
- Solids, sludge and other pollutants generated as a result of construction or removed during the course of treatment or control of wastewaters will be disposed of in a sanitary landfill and prevented their direct or indirect discharge to any watercourse or ground waters.

#### **Hazardous wastes**

- All hazardous waste shall be disposed of in accordance with the national and international legislative requirements;
- Develop and implement emergency preparedness and response plan.
- Ensure appropriate PPE is provided and used; and
- Establish temporary and permanent spill containment structure;
- Know the location and proper use of clean-up material;
- Respect, as minimum requirements national and international laws, codes and guidelines and to apply the strictest standards everywhere feasible.
- Site operators must ensure that spilled products are immediately cleaned to prevent seepage of the same into the nearby river and groundwater.

#### **Liquid waste generation**

During the construction phase, liquid waste generation will pose environmental and health risks. Potential sources will include runoff from construction areas, spills of fuels, lubricants, and chemicals, as well as wastewater from worker camps. If not properly managed, these wastes can contaminate soil, surface, and groundwater resources, adversely affecting local ecosystems and communities. Seepage from spilled fuels and oils and leaking machinery can also negatively impact groundwater water which could lead to potential contamination. Generally, due to the localized area of impact, the overall significance of the related impacts, especially on water quality is considered to be minor, provided the necessary mitigation/ management measures are implemented.

<b>Impact</b>	<b>Liquid wastes</b>
Type of impact	Negative
Type of Effect	Direct
Duration	Short Term as it is limited to the construction phase only
Reversibility	Water abstraction is expected to be reversible. The use of waste treatment/disposal facilities is expected to be non-reversible as once space in landfill facilities is used, this will be permanently used.
Receptor Sensitivity	Low as such utilities are expected to be able to handle project requirements
Magnitude	Low as waste generated from project is considered relatively minimal
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

#### **Mitigation measures**

- Proper storage of the oil is required to ensure no leakages

- Frequent inspection and maintenance of the generator to minimize leakages.
- No vehicles should be serviced or maintained at the project site.
- The waste oil or used oil must be disposed-off appropriately.
- Proper training for the handling and use of fuels for the operators of the power plant.
- In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.

### 7.2.2.2. Impacts on infrastructure and utilities

#### 7.2.2.2.1. Water consumption

Water is one of the main resource to be used for different purposes during construction phase such as drinking and domestic consumption and for concrete and access road works, etc. Water is highly valued in pastoralist communities of the project influence areas where the inhabitants experience frequent hardship of fetching water from long distance. The main water source for Bosaso City is groundwater, and in general, water is a scarce resource in the project area. Therefore, to avoid potential competition with scarce community water and for efficient use of water the Contractor shall consider the following mitigation measures:

Impact	Water consumption
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as the water will be required during both construction and operation phases
Reversibility	Reversible as water resources in general can be considered rechargeable
Receptor sensitivity	Moderate due to importance of water supply conditions within the project area.
Magnitude	Low as water requirements are considered relatively low during the construction phase of the project
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Mitigation measures
<ul style="list-style-type: none"> <li>• The Contractor will not use the existing community water points;</li> <li>• In consultation and without affecting the availability of water resources for existing users, the Contractor is responsible to make arrangements to supply the water demand for construction and other purposes;</li> <li>• The Contractor will need to develop its own water supply sources (i.e. to buy water from licensed suppliers or wells) for the construction and the campsites requirements; and</li> <li>• In the event of there being any valid dispute regarding the effect the contractor's arrangements may have on the water supply of others, the contractor shall be responsible for providing an alternative supply to those affected, which is not inferior in quantity or quality to that previously enjoyed.</li> </ul>

#### 7.2.2.2.2. Energy consumption

During the construction phase, energy consumption risks will arise from the increased

demand for fuel and electricity needed to power construction machinery, equipment, and worker facilities. This heightened energy demand can strain local energy resources, particularly in a region where access to reliable electricity is already limited. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. Additionally, reliance on fossil fuels for construction activities may contribute to greenhouse gas emissions and environmental degradation. This impact will be negligible owing to the size of the project that will require very few trucks during the construction phase.

<b>Impact</b>	<b>Energy consumption</b>
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as energy will be required during both construction and operation phases
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low but the contractor will be required to implement energy saving measures at the project site during construction and operation phases.
Magnitude	Low as energy requirements are considered relatively low during the construction phase of the project
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used.</li> <li>• Proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts.</li> <li>• Complementary to these measures, they monitor energy use during construction and set targets for reduction of energy use.</li> </ul>

### 7.2.2.3. Impacts on social environment

#### 7.2.2.3.1. Inconveniences and disruptions

The repair and expansion of Bosaso's power grid, including constructing new medium-voltage distribution lines, a new power plant on the city's outskirts, and three additional substations, could lead to inconveniences and disruptions to the residents and businesses. The construction activities are likely to cause inconveniences and disruption of different strengths to the residents. However, such inconveniences and disruptions are expected to be temporal, and will not result into relocation or resettlements of any nature.

<b>Impact</b>	<b>Inconveniences and disruptions</b>
Type of impact	Negative
Type of effect	Direct
Duration	Long term as such impact will occur during construction and continue into the operation phase.
Reversibility	Irreversible as land area will be changed into a solar

	PV, sub-stations and distribution lines which no longer can be used for other activities.
Receptor Sensitivity	Major as the economic activities are likely to decline for some households.
Magnitude	High as the many residences are likely to be effected
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Promptly compensate economically displaced persons for loss of assets at full replacement cost.
- Provide replacement property of equal or greater value, or cash compensation at full replacement cost where appropriate, to persons with legal rights or claims to land which are recognised or recognizable under the national law.
- Provide assistance that will off-set any loss of a community’s commonly held resources. This could take the form of initiatives that enhance the productivity of the remaining resources to which the community has access, in-kind or cash compensation for loss of access or provision of access to alternative sources of the lost resource.
- Compensate economically displaced persons who are without legally recognisable claims to land for lost assets.
- Provide transitional support to economically displaced persons, as necessary, based on a reasonable estimate of the time required to restore their income-earning capacity, production levels, and standards of living.

#### 7.2.2.3.2. Economic displacement

Economic displacement is defined as the loss of assets or access to assets that leads to loss of income sources or means of livelihood because of project-related land acquisition or disruptions of economic activities.

Impact	Economic displacement
Type of impact	Negative
Type of effect	Direct
Duration	Long term as such impact will occur during construction and continue into the operation phase.
Reversibility	Irreversible as land area will be changed into a solar PV, sub-stations and transmission lines which no longer can be used for other activities.
Receptor Sensitivity	Major as the economic activities are likely to decline for some households.
Magnitude	High as the many residences are likely to be effected
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Promptly compensate economically displaced persons for loss of assets at full replacement cost.
- Provide replacement property of equal or greater value, or cash compensation at full

replacement cost where appropriate, to persons with legal rights or claims to land which are recognised or recognizable under the national law.

- Provide assistance that will off-set any loss of a community’s commonly held resources. This could take the form of initiatives that enhance the productivity of the remaining resources to which the community has access, in-kind or cash compensation for loss of access or provision of access to alternative sources of the lost resource.
- Compensate economically displaced persons who are without legally recognizable claims to land for lost assets.
- Provide transitional support to economically displaced persons, as necessary, based on a reasonable estimate of the time required to restore their income-earning capacity, production levels, and standards of living.

#### 7.2.2.3.3. Impacts on Vulnerable Groups

Security or vulnerability of households’ livelihoods vary between households depending on their relative endowment with and/ or access to a range of assets (natural, physical, human, social and financial). The more a household owns or have access to different assets, the less vulnerable it is likely to be. Ownership of or access to assets is dictated by an interplay of historical, social, economic, cultural, political and environmental processes that work favourably for some groups of households and unfavourably for others. In effect, social groups with less asset-endowments become more vulnerable to shocks (adverse impacts of the proposed project on farmland) than those with relatively generous asset-endowments. Households headed by the elderly, females, the chronically ill, persons with physical disabilities and mental illness are generally more vulnerable than others. Vulnerable households find it difficult to withstand shocks (e.g. land take by the proposed project), bounce back quickly and re-establish their livelihoods unless their livelihoods are cushioned with some sort of targeted special assistance.

<b>Impact</b>	<b>Impacts on vulnerable groups</b>
Type of impact	Negative
Type of effect	Direct
Duration	Long term as such impact will occur during construction and continue into the operation phase.
Reversibility	Irreversible as their settlements and livelihoods could be disrupted
Receptor Sensitivity	Major as their livelihoods are likely to be disrupted.
Magnitude	High as the many residences are likely to be effected
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

#### **Mitigation Measures**

- Establish an accessible, confidential GRM to report concerns related to safety, accessibility, and other impacts.
- Implement additional safety protocols around work zones, including signage, barriers, and clear pedestrian pathways, especially near schools, healthcare facilities, and areas frequented by vulnerable populations.
- Provide employment opportunities to vulnerable groups’ households.



- Coordinate with local organizations to offer support services, such as temporary relocation assistance, counselling, or financial support, to those most at risk of hardship due to project-related disruptions.
- Regularly monitor the impact on vulnerable groups and adjust mitigation measures as needed, ensuring transparency and open communication with community representatives and local authorities.
- Offer community workshops on health, safety, and job readiness related to the project, focusing on empowerment and resilience-building for vulnerable groups.

#### 7.2.2.3.4. Accidental discovery of cultural resources

The project will have no impact on known archaeological sites and artefacts as well as on cultural heritage. Nevertheless, the possibility exists for discovery of unexplored sites of cultural/historical and archaeological importance sites during excavation and site clearance. The purpose of this recommendation is to assist in the event that an unexpected deposit or remains are encountered. The construction workforce will appropriately be informed to be vigilant in the detection and reporting of, and the prevention of disturbance and damage to objects and sites of physical cultural resource. Through the orientation program the contractor will ensure that all workers are aware of the criteria for identification of possible sites.

<b>Impact</b>	<b>Accidental discovery of cultural resources</b>
Type of impact	Negative
Type of effect	Direct
Duration	Short term as it is limited to the construction phase only
Reversibility	Could be irreversible as if sites are damaged or disturbed
Receptor Sensitivity	Low as the likelihood of such discoveries is low
Magnitude	Medium given that if sites are discovered they could be of value and importance
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Chance Find Procedure disseminated among workers during induction trainings;</li> <li>• Upon identification of suspected archaeological or cultural remains, the location must not be disturbed, operations will immediately cease in the affected area and activities that create ground disturbance will be minimised in and adjacent to the affected area;</li> <li>• The discovered site will be delineated as "no work zone";</li> <li>• Unauthorized entry will be prohibited and the site secured to prevent any damage or loss of removable objects;</li> <li>• Under no circumstances, any artefacts will be removed, destroyed or interfered with by anyone on the site; and Contractors and workers shall be informed of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts;</li> <li>• The responsible Regional authorities shall assess the significance and importance of the findings according to the various criteria relevant to cultural heritage;</li> <li>• Restoration measures will be employed to protect discoveries and flagging the area boundaries.</li> </ul>

#### 7.2.2.3.5. Trespassing of unauthorized personnel

During the construction phase, trespassing by unauthorized persons could pose safety and security risks. Unrestricted access to the project site can lead to potential accidents, theft of materials, and vandalism, jeopardizing both worker safety and project integrity. Additionally, trespassing can disrupt construction activities, cause delays, and result in increased costs for security measures. Implementing robust site access controls, including fencing, signage, and regular patrols, along with community engagement to inform local residents about the project, is essential to mitigate these risks and ensure a secure working environment.

Impact	Trespassing of unauthorized personnel
Type of impact	Negative
Type of effect	Direct
Duration	Short term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential permanent health and safety impacts
Receptor Sensitivity	High on the basis that safety is the Project's highest priority.
Magnitude	Low given distance of any nearby settlements or villages
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

Mitigation measures
<ul style="list-style-type: none"> <li>• Fencing off the facility to keep of community members, children and livestock from entering into the facility</li> <li>• Controlled access to the site only with prior approval</li> <li>• Maintain records of any person who comes to site</li> <li>• Ensure proper Right-of-Way (RoW) Management by undertaking secure clearances and maintain an adequate distance from residential areas, schools, and hospitals to minimize risks to public safety and avoid interference with daily activities.</li> <li>• Implement measures to protect vegetation, including re-vegetation where necessary.</li> <li>• Install visible and durable safety signage along the distribution routes to warn the public about electrical hazards and restrict unauthorized access.</li> <li>• Ensure that waste generated during construction, including scrap metal, cables, and insulation materials, is safely collected, disposed of, or recycled to prevent environmental contamination.</li> </ul>

#### 7.2.2.3.6. Worker influx – incoming workforce

Employment opportunities, for skilled and unskilled labourers will be created during construction. Development of major conflicts between local communities and contractor's migrant workers are not to be expected in this area. However, a grievance mechanism will need to be put in place well before the start of the Project. During the community consultation sessions, participants strongly argued that the project should set priority and strictly adhere to employing local (skilled or unskilled and temporary or permanent) as long as they qualify for such jobs. Similarly, it was strongly suggested that employment priority be given to locals during operation phase.

<b>Impact</b>	<b>Worker influx</b>
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High on the basis that safety is the Project's highest priority.
Magnitude	Medium as the entire workforce of up to 200 personnel could be exposed to increased risk.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Maximise local hire of labour, in so far as this is compatible with the contractor's skill requirements;</li> <li>• Train all construction workers the local culture with the objective to protect the authentic culture and heritage of the people of the project area; and</li> <li>• Assign the responsibility to liaison with local communities and local authorities to a named individual from the contractor's organization and to require effective liaison to promote social integration, and the development of mutually satisfactory solutions to problems affecting local communities.</li> </ul>

#### 7.2.2.3.7. Security

Security risks are a concern due to the potential for local conflicts, theft, and vandalism. The presence of a large workforce and valuable equipment can attract criminal activities, posing threats to both personnel and assets. Additionally, regional instability and ongoing tensions may lead to disruptions in construction operations or even targeted attacks. To address these security challenges, it is crucial to implement a comprehensive security plan that includes risk assessments, collaboration with local law enforcement, training for workers on safety protocols, and the establishment of secure perimeters around the project site to ensure a safe working environment.

<b>Impact</b>	<b>Security</b>
Type of impact	Negative
Type of Effect	Direct
Duration	Short-term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	Medium given that could result in potential health and safety risks
Magnitude	Low given enhanced security of the city by the local administration.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Establish a well-structured security service to assure security of the workers and the community in the project footprint.</li> </ul>

- Apply due diligence during selection of security providers, devise rules of engagement and provide training to all personnel;
- Making clear that any community member can appeal if any project security breach happened to any of the community and /or its member;
- Carryout comprehensive community risk assessment and implement adequate provisions to minimize risks to communities, with particular attention to traffic risks on public roads and security risks assessment and responsibilities;
- Place appropriate signage on the boundary or at the entrance to all construction sites, warning against entering the site and highlighting the health and safety risks;
- Develop public awareness programme (including in schools along the DL corridor) to identify areas of particular risk and approaches to reduce risk.
- Ensure that the safeguarding security to personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the nearby communities.

#### 7.2.2.3.8. Occupational health and safety risks

Construction will involve occupational health and safety risks to construction workers. Approximately 200 constructions workers will be engaged during the construction phase of the project. From the nature of construction works, impacts on the health and safety to workers are anticipated through the following major causes and effects: workers on construction sites are highly exposed to injuries unless precautionary measures are taken; major causes of fatalities and noticeable injuries include electrocution effect during energizing and maintenance of the live line; major causes of fatalities include: falls, fatalities caused by machinery and/or transport, struck by falling object etc.; major causes of noticeable injuries include: falls, lifting objects, machinery, stepping on or striking against objects, transport, etc.; death and injuries have adverse economic and social implications to families in particular and the country in general; and risks from manual handling of heavy loads.

Impact	Occupational health & safety
Type of impact	Negative
Type of effect	Direct
Duration	Short Term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety s the Project's highest priority.
Magnitude	Low given that it is generally controlled throughout general best practice measurements
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Mitigation measures
<ul style="list-style-type: none"> <li>• A construction safety management system shall be employed during project implementation;</li> <li>• Ensure that necessary protective devices and clothing are provided to the workers and that they are used for the safety and health of his or her workers;</li> <li>• Provide personal protective equipment (PPE) and clothing (gloves, fall arrester, goggles, steel-toed boots, respirators, dust masks, hard hats, etc.) materials and tools and it shall be distributed to the workers for its day-to-day use shall be monitored;</li> </ul>

- A safety harness is required as a fall arrester, each workman working there shall be provided with one. Every safety harness shall be provided with a suitable anchorage and fittings to prevent serious injury in the event of fall;
- Whenever the use of a safety harness is necessary, a workman has a duty to wear the safety harness provided and keep it attached to a secure anchorage for his own or any other person's safety;
- To the extent possible, reduce or minimize noise at work sites and if cannot be avoided, provide workers with PPEs such as hearing protection;
- Apply measures such as suppressing dust and other particulate matters like those from cement storage sites;
- In the case of manual handling of loads, advise/train workers to assess the associated risks carefully and provide information about the size and distribution of loads;
- During induction training, awareness shall be created among the workers on safe working practices and precautionary measures to be adopted;
- Maintain adequate traffic control measures throughout the construction phase;
- Adopt regular systematic safety recording and reporting system (incidents, near misses);
- Place signs around the construction areas to provide safety advice and warning, facilitate traffic to provide direction to various components of the works etc. All signs shall be in Somali, Amharic and English and according to standards;
- Ensure that safety procedures are followed at all workplaces. Supervisor are responsible to check whether appropriate safety measures are taken/implemented before any construction activities commence; and
- Respect working zone to protect passersby from encroaching the active working area;
- Trenches excavated for tower pads are potential risks to humans and animals falling in the open excavation. Therefore, the Contractor is strongly advised to comply the safety requirement by providing barricades and adequate warning notices around open pad holes.
- The contractor to establish a well-equipped clinic facility to support the workforce, and even the local communities in the project footprint area.
- The Contractor is required to immediately notify EEP and AfDB within 24-48 hours in case of occurrence of fatality and serious injuries.
- Project Specific Occupational Health and Safety Management Plan shall be prepared and implemented by the Contractor.

#### 7.2.2.3.9. Community health and safety risks

Construction of the proposed substations and associated distribution line will involve moving heavy equipment and materials through residential areas. This potentially poses accident risk to the general public and construction workers. Fatal accidents could arise from unskilled operation of heavy construction machinery, unsatisfactory safety guidelines around the construction site or falling from line's lattice towers when workers neglect requisite equipment (e.g. safety latches). Minor injuries would be reversible but effects such as permanent disability or electrocution of workers during line testing resulting in fatalities are irreversible. Considering that distribution line construction workers would most likely be household heads, this impact would not only affect workers but also their immediate and extended families. The sensitivity of the human receptor, especially in the event of fatal accidents is high, although would be low for minor injuries. The potential hazards present during the installation and testing of such equipment and parts as the transformer and switchgear, include working at heights, exposure to high voltage electricity. However, the impact intensity is rated low since the system is not power loaded during any construction works.

Impact	Community health and safety risks
Type of impact	Negative
Type of effect	Direct
Duration	Short-term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	High as the number of road movements could be substantial when compared to the existing situation.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Mitigation measures
<ul style="list-style-type: none"> <li>• Use water spray or other dust suppression techniques and ensure that equipment emissions are regularly maintained to limit air pollution.</li> <li>• Limit construction activities to daytime hours, especially near residential areas, and use noise-dampening equipment to minimize disturbance to nearby communities.</li> <li>• Develop and implement a traffic management plan to control vehicle movement near construction sites, including signage, speed limits, and designated crossing points for pedestrians.</li> <li>• Install visible barriers around construction areas and provide clear warning signs to keep the public away from hazardous zones, especially near live electrical installations.</li> <li>• Implement proper waste disposal practices to avoid any build-up of debris, hazardous waste, or pollutants that could impact community health. Secure hazardous materials to prevent unauthorized access.</li> <li>• Conduct informational sessions to inform the community about the project, potential risks, and safe practices around construction zones and electrical infrastructure.</li> <li>• Develop and communicate an emergency response plan specific to the project site, including emergency contacts, first aid stations, and protocols for handling incidents like fires or electrical hazards.</li> <li>• Regularly monitor EMF levels from the power lines to ensure they are within safe limits, as recommended by international guidelines, to protect nearby residents.</li> <li>• Set up a confidential and accessible system for community members to report health and safety concerns, ensuring timely response and resolution.</li> <li>• Maintain open lines of communication with community representatives to keep them informed about the project's progress and any temporary disruptions, fostering trust and cooperation.</li> </ul>

#### 7.2.2.3.10. Temporary disruption of electricity supply

The new substations and distribution lines will have to be brought 'on-line' after the construction. A number of technical checks will be necessary during the process of connecting the substation and the associated distribution lines to the grid. This will result in disruption of electricity supply in the areas that will be connected to the new substations. The receptor sensitivity is rated medium since not all distribution lines will be worked on at the same time. The intensity of the impact is rated low since the electricity supply distribution is only expected to be interrupted towards the end of the construction period, when substation has to be brought 'online'. The impact will be short term and reversible in nature.

<b>Impact</b>	<b>Temporary disruption of electricity supply</b>
Type of impact	Negative
Type of effect	Direct
Duration	Short-term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	Low-medium
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Construction works will be planned in manner to minimize duration of power outage.</li> <li>• If power outage is unavoidable, it will be communicated to the public and facilities (e.g. hospital) in advance.</li> <li>• Outages will be planned in co-ordination with ESPs and give at least one weeks' notice for the occurrence of outages.</li> <li>• Overhead line work to be designed and carried out in a way to avoid interference with existing power lines and maintaining safe separation distances from existing distribution lines.</li> </ul>

#### 7.2.2.3.11. Impacts associated with construction traffic

In and around the project area and over the existing road, traffic levels are relatively very low. However, the proposed project during the construction phase, will involve increased traffic of earth-moving machinery and trucks hauling construction materials, goods and passengers. Construction traffic will increase total traffic flow and is likely to be greater in volume than normal flow, especially near to the main construction fronts. While laden haulage vehicles move relatively slowly, unladen vehicles tend to move relatively quickly, and there is a danger of increased hazards to pedestrians, and other road users.

<b>Impact</b>	<b>Impacts associated with construction traffic</b>
Type of impact	Negative
Type of effect	Direct
Duration	Short-term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential reversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	High as the number of road movements could be substantial when compared to the existing situation.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>
<ul style="list-style-type: none"> <li>• Include a clause in the construction contracts to the effect that the contractor must make every reasonable effort to minimize road safety hazards and inconvenience to other road users, resulting from the passage of his, or his subcontractors' haulage vehicles, and should impose and enforce compliance with speed limits;</li> </ul>

- The Contractor to prepare a traffic management plan detailing traffic control procedures, train its personnel traffic management procedures, travel speed limits and related control measures;
- The contractor should put speed limits for cars and appropriate traffic signs in and around construction areas;
- Assign a well-trained & adequate number of traffic marshals mainly around a place where sensitive receptors (settlements, schools, health posts, worship areas,) exist;
- Drivers shall be given induction training at the start of the project, company policy, about road safety and due diligence to ensure safety of other road users; and
- Create awareness for the local people on how to use roads and keep themselves away from the traffic accident.

### 7.3. Impacts during Operation Phase

#### 7.3.1. Positive impacts

##### 7.3.1.1. *Employment creation*

During the project's operation phase, employment opportunities will be created, including unskilled, semi-skilled, and skilled jobs for security personnel and mini-grid maintenance staff. These jobs will increase skill transfers, but the impact is expected to be low. To enhance job opportunities, the proponent shall prioritize local communities for the opportunities, ensure non-discriminatory employment, and provide equal opportunities for both men and women.

#### **Enhancement measures**

- Prioritize hire of locals for all unskilled labour.
- Implement a local recruitment plan that is fair and transparent (including recruitment processes that ensure inclusivity of both men and women, vulnerable individuals, minority clans, ethnic groups and VMGs.
- Adhere to labour laws, and labour management practices (timely remuneration, equitable compensation for both genders for equal work etc.)
- Create awareness to workers and the community on worker and project grievance redress mechanisms.

##### 7.3.1.2. *Reduction of pollution associated with thermal power generation*

The proposed solar power plant will provide a dependable and economical electrical supply for both residential and commercial use, minimising the need for diesel generators, kerosene, wood fuel and charcoal. This will result in lower carbon dioxide emissions, forest destruction, and greenhouse gas emissions. The plant will eventually deliver cleaner energy to many houses. This will further ensure that the proponent maintains competitive power rates to dissuade residents from using other unsustainable energy sources.

#### **Enhancement measures**

- Prioritizing sustainable energy solutions and expanding grid coverage to underserved communities.
- Investing in modernizing the electricity distribution infrastructure can enhance grid reliability, minimizing outages and improving service quality.
- Public awareness campaigns on energy efficiency and the benefits of clean energy can encourage responsible consumption, maximizing the impact of expanded access.
- Ensuring that affordable electricity tariffs are established will also promote equitable access, particularly for lower-income households, boosting the overall social and economic



benefits of the project.

### 7.3.1.3. Quality, affordable and reliable power supply

This is a maiden project with an aim of supplying power through solar because of the increasing demand for electricity in Bosaso, Puntland State and the FRS. Once operational, household and public institutions (dispensary, primary school) and shopping centre in the area will greatly benefit from the stable and affordable power supply. The impact significance is high as it will provide reliable and affordable power over a longer period. Several enhancement measures are proposed, including ensuring that they have a functional customer support team and a field response team; and ensuring that they communicate with the customers regularly, especially in instances of power outages to the consumers.

#### Enhancement measures

- Prioritizing sustainable energy solutions and expanding grid coverage to underserved communities.
- Investing in modernizing the electricity distribution infrastructure can enhance grid reliability, minimizing outages and improving service quality.
- Public awareness campaigns on energy efficiency and the benefits of clean energy can encourage responsible consumption, maximizing the impact of expanded access.
- Ensuring that affordable electricity tariffs are established will also promote equitable access, particularly for lower-income households, boosting the overall social and economic benefits of the project.

### 7.3.2. Negative impacts

#### 7.3.2.1. Impacts on biophysical environment

##### 7.3.2.1.1. Landscape and visual

The project is expected to be visible in the immediate vicinity and on the site, resulting in visual impacts. Due to low amenities, the landscape impact may be minimal and readily hidden by vegetation. The physical presence of solar panels will form a reflective surface, resulting in a direct visual alteration. However, being noticeable does not imply being obtrusive; aesthetic considerations are subjective. Some spectators may perceive PV plants as man-made constructions with visual burdens, but others regard them as a good alteration that breaks up boring views.

Impact	Landscape and visual
Type of impact	Negative
Type of effect	Direct and Indirect
Duration	Long term as it will be relevant all throughout operation phase
Reversibility	Irreversible as visual impacts will be relevant all throughout the operation phase
Receptor Sensitivity	Low given that the location of the project in an otherwise rural setup with a few settlements.
Magnitude	Medium given that project will be visible within immediate vicinity and up to some kilometers
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

**Mitigation measures**

Fence off, especially the sub-stations and power plants to off/screen the solar panels.

**7.3.2.1.2. Soil, groundwater and surface water contamination**

During the operation phase of power distribution lines, hybrid power plants, and substations in Bosaso, Somalia, soil, groundwater, and surface water contamination can pose significant environmental risks. Leaks or spills of hazardous materials, such as fuels, lubricants, and chemicals used for maintenance, can lead to the degradation of soil quality and subsequent migration of contaminants into groundwater systems. The presence of these pollutants can disrupt local ecosystems, adversely affecting plant and animal life, and impairing the health of agricultural soils that local communities rely on for food production. Additionally, sediment runoff from construction or maintenance activities may introduce pollutants into nearby water bodies, leading to further contamination of surface water and affecting aquatic habitats.

The social implications of such contamination are profound, particularly for communities that depend on these natural resources for their livelihoods. Contaminated groundwater can lead to serious health issues for residents, including gastrointestinal diseases and other waterborne illnesses, particularly among vulnerable groups like children and the elderly. Furthermore, if surface water sources, such as rivers and lakes, are polluted, it can impact fishing and recreational activities, leading to economic losses and diminished quality of life. The fear of contamination can also create distrust between local communities and project operators, potentially resulting in social tensions and conflicts over resource management and accountability. To mitigate these impacts, it is essential to implement strict monitoring protocols, ensure adherence to environmental regulations, and engage communities in dialogue about risks and safety measures, thereby fostering trust and promoting sustainable resource management.

<b>Impact</b>	<b>Soil, ground water and surface water contamination</b>
Type of impact	Negative
Type of effect	Direct
Duration	Short-term changes in soil character and chemical composition may occur, but long-term consequences are unlikely unless major contamination is cleaned up.
Reversibility	Reversible as localized spills and soil compacted areas can be cleaned and restored.
Receptor Sensitivity	Low – Medium
Magnitude	Low
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

**Mitigation measures**

- Conduct regular environmental monitoring of soil, groundwater, and surface water quality to detect any contamination early.
- Implement a comprehensive waste management plan that includes safe disposal of hazardous materials, such as oils, batteries, and chemicals used in maintenance.

Mitigation measures
<ul style="list-style-type: none"> <li>• Provide training to operational staff on the proper handling and storage of hazardous materials to minimize accidental spills and leaks.</li> <li>• Perform regular maintenance and inspections of power lines, substations, and solar panels to ensure that no leaks or spills occur.</li> <li>• Opt for environmentally friendly materials and substances in maintenance and operational practices to reduce the risk of contamination.</li> <li>• Manage vegetation around power lines and substations to prevent invasive species and maintain healthy ecosystems, which can aid in filtration and runoff control.</li> <li>• Develop and implement soil remediation plans if contamination is detected, including the use of bioremediation or phytoremediation techniques.</li> </ul>

### 7.3.2.1.3. Air quality

#### *Dust*

The project site is not expected to experience direct dust emissions due to the solar panels covering a significant area. However, the dry and arid climate of the Study Area can cause dust accumulation on solar panels, reducing efficiency and increasing maintenance demands. This can also affect air quality, potentially affecting workers and communities. Regular cleaning, dust suppression measures, and careful site design can mitigate dust generation and its adverse effects on the plant's performance and the environment. The impact is estimated to be low-to-medium magnitude.

Impact	Air quality (Dust)
Type of impact	Negative
Type of effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that air quality would revert back to baseline conditions.
Receptor sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Low-to-medium given that the generation of dust is expected to be from extent sources during the operation phase.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

Mitigation measures
Trees can be planted around the power plants and sub-stations provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution

#### *Vehicle exhaust emissions*

During the operation phase, vehicle exhaust and fumes are expected to be less frequent than during the construction phase. Maintenance vehicles, such as those cleaning solar panels and transporting personnel, are expected to be the main sources of emissions. Diesel and gasoline-powered vehicles emit pollutants like NO<sub>x</sub>, CO, and particulate matter, which can degrade local air quality. Implementing fuel-efficient or electric vehicles and minimizing unnecessary trips can help reduce the impact of exhaust fumes on air quality and the surrounding community. The impact magnitude and sensitivity of these emissions are moderate due to the few settlements within the project site.

<b>Impact</b>	<b>Air quality (Vehicle exhaust emissions)</b>
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that air quality would revert back to baseline conditions after construction works is completed
Receptor Sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of dust is limited to the Project Site, and the area is not prone to large-scale wind-blown erosion.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

#### **Mitigation measures**

- Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.
- Company vehicles should be well maintained

#### 7.3.2.1.4. Noise and vibrations

The operation phase of a plant may cause minimal noise pollution, but some sources like electrical equipment hum and maintenance activities can still affect the environment. The Project Area's quiet environment may cause low-level noise to nearby communities. To mitigate disturbances, sound-dampening measures, scheduling maintenance during daytime hours, and maintaining equipment in good condition can be implemented, ensuring minimal impact on local noise levels.

<b>Impact</b>	<b>Noise</b>
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to a few occasions associated with particular activities with the Project Site.
Reversibility	Reversible given that noise levels will be temporal and will rapidly revert to baseline conditions.
Receptor Sensitivity	Low given that there are no permanent/temporary settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of noise is likely to be limited to the use of construction machinery and earth movements.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

#### **Mitigation measures**

- Generator room should be sound proof to ensure no noise of a nuisance level will be produced.
- Monitor noise levels

### 7.3.2.1.5. Biodiversity

#### Fauna

The operation phase of the solar power plants, sub-stations and distribution in Bosaso City, Somalia, is likely to have several impacts on wild fauna. While solar installations can provide clean energy and reduce habitat destruction associated with fossil fuels, the presence of infrastructure may disrupt local wildlife movement and behaviors. Species may experience habitat fragmentation. Additionally, the risk of collision with solar panels or associated structures could pose threats to flying species. Noise and human activity around the facility may further stress wildlife, potentially leading to changes in species composition and abundance in the surrounding areas. Effective mitigation strategies, such as creating wildlife corridors and monitoring programs, will be essential to minimize these impacts.

Impact	Fauna
Type of impact	Negative
Type of effect	Direct and indirect as it will affect fauna/flora
Duration	Long term as impacts will persist throughout the operating period
Reversibility	Irreversible: some species could be displaced from the project site during construction.
Receptor Sensitivity	Low – no species listed as EN, NT and VU fauna species are found in and around the project area.
Magnitude	Low-medium as site operation activities will be restricted only in the project site. Fauna could move away to similar habitats in the adjacent areas while others become habituated.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Mitigation measures
<ul style="list-style-type: none"> <li>• Temporary-use areas shall be restored and revegetated</li> <li>• An ecologist shall be hired to coordinate the fauna monitoring.</li> <li>• Undertake regular entomological monitoring and reporting programme</li> <li>• Bird deterrents will be installed to prevent collisions with the structures.</li> <li>• Post-construction monitoring will be undertaken to assess the impacts on local fauna and adapt mitigation strategies.</li> </ul>

#### Flora

While the power plant's footprint may not expand significantly beyond the construction phase, the shading from solar panels could alter the microclimate. Some plant species may struggle to thrive under altered light and water regimes, potentially leading to shifts in local plant communities. Additionally, maintenance activities such as clearing vegetation to prevent shading on panels may limit the regeneration of native flora. Implementing strategies such as preserving native plant buffers and reducing unnecessary vegetation removal can help mitigate these impacts.

Impact	Flora
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Type of impact	Negative
Type of effect	Direct and indirect as it will affect fauna/flora
Duration	Long term as impacts will persist throughout the operating period
Reversibility	Reversible: Vegetation restoration activities can be undertaken during the operation phase, including the management of invasive plant species such as <i>Prosopis juliflora</i> , <i>Solanum incanum</i> and <i>Datura stramonium</i> that occur in the Study Area.
Receptor sensitivity	Low – no documented presence of endangered flora species
Magnitude	Low – Vegetation regeneration and restoration will ensure most open locations in the Project Site recover.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Undertake restoration works using indigenous plant species.
- Undertake invasive species removal and monitoring.
- An ecologist shall be hired to coordinate the flora monitoring.

#### 7.3.2.1.6. Soil erosion

Solar panel installation in arid environments like Bosaso can increase soil erosion risk by clearing land and removing vegetation. However, once operational, panels can protect the soil by reducing wind and water impact. To mitigate erosion, effective ground cover strategies like drought-resistant vegetation and erosion control mats are needed. Proper drainage system design can manage runoff and reduce erosion potential, ensuring soil stability and long-term stability.

Impact	Soil erosion
Type of impact	Negative
Type of effect	Direct and indirect as the project site is located in an area prone to soil erosion
Duration	Short term as it will likely occur only during construction phase.
Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized. Additionally, the agents of erosion tend to be seasonal and spatial.
Receptor sensitivity	Low – the project site is located in an area with low agricultural activities so eroded soil will not cause eutrophication/alter water quality of any nearby surface water resources in the Project Area.
Magnitude	Low – the solar panels will provide protection by reducing the impact of wind and water on the Project Site's soil surface.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Construct the drainage system in a way to follow natural drain of the water

- Concrete only the required area and leave the rest of the land with vegetation like grass
- Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use

### 7.3.2.1.7. Wastes

#### **Solid waste generation**

The operation phase, especially of the solar power plant and sub-stations project is expected to generate modest solid waste, primarily from routine maintenance activities and occasional repairs. To minimize environmental impact, a robust waste management plan including recycling and proper disposal practices will be needed. Procedures for handling and recycling materials, reducing single-use items, and regular waste audits will help minimize the impact of solid waste and promote sustainability. The nearest approved disposal facility, such as the main public landfill site, is expected to handle construction and municipal waste. The significance of solid waste during the operation phase is expected to be minor.

E-waste generated by the solar power plant, including discarded solar panels, lithium batteries, and maintenance-related materials, presents unique environmental and health challenges due to the presence of hazardous and non-biodegradable components. Solar panels contain metals like cadmium and lead, which, if not properly disposed of, can contaminate soil and water, while lithium batteries pose fire risks and can release harmful chemicals if damaged. Over time, routine maintenance of the plant also generates smaller e-wastes, including wiring, electronic parts, and packaging. Proper e-waste management practices are essential to mitigate these risks, involving recycling programs to recover valuable materials, safe storage to prevent leaks or fires, and partnerships with certified disposal facilities to ensure that waste does not harm local ecosystems or human health. Developing a robust e-waste handling protocol not only protects the environment but also reinforces the sustainability goals of the solar power initiative.

Impact	Solid wastes
Type of impact	Negative
Type of effect	Direct and indirect
Duration	Short term-Long-term
Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized.
Receptor sensitivity	Low – the project site is located in an area with no adjacent settlements.
Magnitude	Low – Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Provide waste handling facilities such as labelled waste bins
- Emphasis on prudent waste generation and give priority to reduction at source
- Solid waste management awareness to operators
- Operator to contract a licensed waste handler to collect and dispose solid waste
- Develop a comprehensive e-waste management plan that outlines procedures for collecting, storing, and disposing of electronic waste generated from solar panels, lithium

batteries, and other maintenance components.

**Liquid waste generation**

Liquid waste generation during the operation phase is expected to be minimal, but proper management is crucial. Potential sources will include runoff from solar panel cleaning processes and small amounts of wastewater from maintenance facilities or sanitary systems. Improper handling can lead to soil or water contamination. To mitigate risks, best practices for wastewater management, including using environmentally friendly cleaning agents, proper containment and treatment, and regular inspections, are essential. Sealed septic tanks will need to be installed and evacuated to a wastewater treatment plant for Bosaso City. Seepage from spilled fuels and oils can negatively impact groundwater water. The overall impact on water quality is considered minor if necessary mitigation measures are implemented.

Liquid wastes associated with e-waste from a solar power plant, mainly from lithium batteries, damaged solar panels, and routine maintenance, can pose serious environmental and health hazards if not carefully managed. This type of waste can include leaks from battery electrolyte, coolants, solvents, and cleaning agents, all of which may contain toxic chemicals. For instance, damaged lithium batteries may release lithium salts or other harmful substances that can contaminate soil and water, posing risks to local ecosystems and human health. Additionally, maintenance of solar equipment may involve using and disposing of lubricants or fluids, which require safe handling and disposal. Proper containment, storage, and disposal practices, such as using leak-proof containers and partnering with certified waste disposal facilities, are essential to mitigate these risks.

Impact	Waste water
Type of impact	Negative
Type of Effect	Direct
Duration	Short Term as it is limited to the construction phase only
Reversibility	Water abstraction is expected to be reversible. The use of waste treatment/disposal facilities is expected to be non-reversible as once space in landfill facilities is used, this will be permanently used.
Receptor Sensitivity	Low as such utilities are expected to be able to handle project requirements
Magnitude	Low as waste generated from project is considered relatively minimal
Significance of the impact without mitigation	Minor
Significance of the impact without mitigation	Minor

Mitigation measures
<ul style="list-style-type: none"> <li>• Proper storage of the oil is required to ensure no leakages</li> <li>• Frequent inspection and maintenance of the generator to minimize leakages.</li> <li>• No vehicles should be serviced or maintained at the project site.</li> <li>• The waste oil or used oil must be disposed-off appropriately.</li> <li>• Proper training for the handling and use of fuels for the operators of the power plant.</li> <li>• In the event of accidental leaks, contaminated top soil should be scooped and disposed of</li> </ul>



appropriately.

- Develop a comprehensive e-waste management plan that outlines procedures for collecting, storing, and disposing of electronic waste generated from solar panels, lithium batteries, and other maintenance components.

### 7.3.2.2. Impacts on infrastructure and utilities

#### 7.3.2.2.1. Water consumption

The operation phase of is expected to consume minimal water. However, routine maintenance like cleaning solar panels can be a concern in arid regions like Bosaso. Efficient water management practices, alternative cleaning methods, rainwater capture and reusing, and water-saving technologies can help reduce water consumption. These measures contribute to sustainable water resource management and minimize the solar power plant's water footprint, with a negligible impact.

Impact	Water consumption
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as the water will be required during both construction and operation phases
Reversibility	Reversible as water resources in general can be considered rechargeable
Receptor sensitivity	Medium due to importance of water supply conditions within the project area. Additionally, will invest in its own borehole for the project activities
Magnitude	Low as water requirements are considered relatively low during the operation phase of the project
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Ensure prudent use of water.
- Install water-conserving automatic taps.
- Any water leaks through damaged pipes and faulty taps should be fixed promptly.

#### 7.3.2.2.2. Energy consumption

Energy consumption will be relatively low compared to conventional power generation facilities. The primary energy use will involve powering ancillary systems such as inverters, control systems, and monitoring equipment, as well as maintaining the infrastructure, including lighting and security systems. However, the overall energy demand is minimal because the solar panels generate electricity from sunlight, reducing reliance on external energy sources. Effective management of energy consumption will include optimizing the efficiency of electrical components, using energy-efficient technologies, and incorporating renewable energy solutions for operational needs.

Impact	Energy consumption
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as energy will be required during both construction and operation phases

Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low but will be required to implement energy saving measures at the project site during construction and operation phases.
Magnitude	Low as energy requirements are considered relatively low during the operation phase of the project
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Efficient energy consumption
- Install an energy-efficient lighting system

### 7.3.2.3. Impacts on social environment

#### 7.3.2.3.1. Trespassing of unauthorized personnel

The Project sites may face potential risks of trespassing by unauthorized personnel, which can lead to safety hazards such as accidents, injuries, vandalism, theft, and damage to valuable components. To mitigate these risks, must implement robust security measures such as perimeter fencing, surveillance cameras, regular patrols, access control systems, and clear signage. These measures will deter unauthorized entry and ensure only authorized personnel are on site. The impact of trespassing and unauthorised access is expected to be minor to negligible, protecting the plant's assets and ensuring the safety of the workforce and the surrounding community.

Impact	Trespassing of unauthorized personnel
Type of impact	Negative
Type of Effect	Direct
Duration	Short term depending on security measures at the Project Site.
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

#### Mitigation measures

- Fencing off the facility to keep of community members, children and livestock from entering into the facility
- Controlled access to the site only with prior approval
- Maintain records of any person who comes to site

#### 7.3.2.3.2. Risks related to poor or inadequate stakeholder engagement (Conflict)

Throughout the project's operation, the proponent intends to address community concerns about inadequate stakeholder participation and information demands. A grievance redress procedure will be established and implemented, with community representatives involved. Mitigation actions will be implemented to reduce the impact of these concerns, resulting in a minor to negligible impact.

Impact	Risks related to poor or inadequate stakeholder
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<b>engagement (Conflict)</b>	
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as community/stakeholders' engagements need to be a continuous and regular exercise.
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low but will be required to implement stakeholders' engagements programmes.
Magnitude	Low-to-medium depending on implementation of mitigation measures.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>	
<ul style="list-style-type: none"> <li>• Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders.</li> <li>• Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget.</li> <li>• In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders.</li> <li>• Prepare and implement a grievance redress mechanism to deal with grievances.</li> <li>• The grievance redress committee to include representatives from the community.</li> <li>• Sensitize stakeholders on SEP and GRM.</li> </ul>	

#### 7.3.2.3.3. Occupational health and safety

During the operation phase of the proposed solar PV, workers are likely to face occupational health and safety risks such as slips and falls, working at heights, using powered and hand-held tools, trench work, working in sunny conditions and high temperatures, and exposure to electric shocks and burns.

<b>Impact</b>	<b>Occupational health and safety</b>
Type of impact	Negative
Type of Effect	Direct
Duration	Long term as it is expected during the entire operation phase
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High given that could result in potential health and safety risks to the workforce.
Magnitude	Major
Significance of the impact without mitigation	Major
Significance of the impact with mitigation	Minor

<b>Mitigation measures</b>	
<ul style="list-style-type: none"> <li>• Undertake rigorous training and capacity building on safety for all workers</li> <li>• Develop and implement and emergency response plan</li> </ul>	

- Ensure only qualified staff are employed to work in the facility
- All workers operating the project site must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others.
- Operators must be skilled on firefighting management
- Annual EHS audits should be done

#### 7.3.2.3.4. Community health and safety risks

During the operation phase, community health and safety are expected to be minimal, with primary concerns being potential accidents and occasional noise from maintenance activities and vehicle movement. A robust community health and safety protocols shall be implemented to minimize risks and promote a safe environment. Key protocols will include regular inspections and maintenance of power lines, power plant and the three sub-stations' equipment to prevent electrical hazards and ensure reliable service. Clear signage and barriers shall be installed around high-voltage areas to prevent accidental exposure, and public awareness campaigns are crucial to educate residents about electrical safety and emergency procedures. Traffic and noise management plans shall be developed and implemented to help reduce disruptions, especially near residential and sensitive areas. Additionally, an accessible Grievance Redress Mechanism (GRM) will be applied to allow the community to report concerns related to safety and receive timely responses.

Impact	Community health and safety risks
Type of impact	Negative
Type of effect	Direct
Duration	Short-term & long-term
Reversibility	Could be irreversible.
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	Low-to-medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Ensure that the right-of-way is clearly defined and maintained to minimize potential hazards associated with overhead lines, keeping adequate distance from residential buildings, schools, and public spaces.
- Conduct public education campaigns to inform local residents about safety measures related to power lines, including potential hazards and safe practices around electricity.
- Implement routine inspections and maintenance of distribution lines and transformers to identify and address any issues that could pose risks to community safety.
- Erect clear and visible warning signs in and around the vicinity of power distribution lines and transformers to alert the community to electrical hazards.
- Develop and communicate emergency response plans specific to incidents involving power lines and transformers, including procedures for addressing

electrical outages, accidents, or fires.

- Implement a vegetation management plan to ensure that trees and shrubs near power lines are regularly trimmed to prevent interference and reduce fire risks.
- Establish an accessible GRM for community members to voice concerns regarding safety issues or disruptions related to power infrastructure, ensuring timely responses and resolutions.

#### 7.3.2.3.5. Fire hazards

Fire risks are a critical concern due to the potential presence of electrical equipment and dry, arid conditions of the Project Site. The risk of fires can arise from electrical faults, overheating of components, or the accumulation of dust and debris, which may be exacerbated by the Study Area's high temperatures and low humidity. To manage these risks, shall implement stringent fire prevention and safety measures, including regular inspection and maintenance of electrical systems, installation of fire detection and suppression systems, and maintaining clear access for emergency services. Additionally, incorporating firebreaks and ensuring that vegetation around the plant is managed to minimize fuel sources can further reduce the risk of fire. By adopting these precautionary measures, the plant can effectively mitigate fire hazards and ensure a safer operational environment. With the implementation of these mitigation measures the impact significance will be minor to negligible.

Impact	Fire hazards
Type of impact	Negative
Type of effect	Direct
Duration	Short-term as it is expected that appropriate measures on fire suppression will be implemented during the operation phase
Reversibility	Could be irreversible as it could result in potential irreversible risks
Receptor sensitivity	High as safety is the Project's highest priority.
Magnitude	Low given that it is generally controlled throughout general best practice measurements
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Develop and implement an emergency preparedness and response plan with specific features on fire hazard management
- The power plant and sub-stations must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points
- Detection/alarm systems that can detect fire should be and installed
- A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported.
- Workers especially operators of the plants must be trained on fire management
- 'No smoking' signs shall be posted within the power plant area
- A fire Assembly point should be identified and marked

## 7.4. Key Impacts During the Decommissioning

In the case of the complete decommissioning of the project, decommissioning activities could include the disconnection of the various Project components (PV array, central inverter stations, substation, etc.) for Re-use, recycling and then, if these options are not available, final disposal. In addition, the internal road network will be restored, and gates and fences will be removed. Generally, the anticipated impacts throughout the decommissioning phase are similar in nature to impacts assessed during the construction phase. Therefore, the assessment of impacts for those receptors and mitigation identified during the construction phase is assumed to apply to this phase. This includes impacts related to the following: landscape and visual, biological environment, infrastructure & utilities, waste management; and occupational health and safety

### 7.4.1. Positive Impacts

#### 7.4.1.1. Employment Opportunities

Once the project has fulfilled its purpose, it will be dismantled. The facility will be demolished and removed. During demolition, job opportunities will be created for unskilled, semi-skilled, and skilled employment opportunities.

Enhancement measures
Enhancement measures
(a) Prioritize hire of locals for all unskilled labour.
(b) Implement a local recruitment plan that is fair and transparent (including recruitment processes that ensure inclusivity of both men and women, vulnerable individuals, minority clans, ethnic groups and VMGs.
(c) Adhere to labour laws, and labour management practices (timely remuneration, equitable compensation for both genders for equal work etc.)
(d) Create awareness to workers and the community on worker and project grievance redress mechanisms.

### 7.4.2. Negative impacts

#### 7.4.2.1. Impacts on biophysical environment

##### 7.4.2.1.1. Impacts on landscape and visual

Site activities will include the decommissioning of arrays and the various Project components, including distribution cables, access roads and internal road network, storage buildings, etc. From the start of decommissioning activities, visual changes will occur from the modified ground surface and the presence of construction equipment and machinery (excavators, trucks, front end loaders, compactors, and others).

Impact	Landscape and visual
Type of impact	Negative
Type of Effect	Direct
Duration	Short-term: The effects will commence from the start of decommissioning and thereafter permanent restoration in visual character will occur.
Reversibility	Irreversible
Receptor Sensitivity	Low on the basis that there is no international or national tourism receptors in the area, and the land has little, if any aesthetic value.

Magnitude	High – the restoration of visual condition of the land will occur within the Project Site and will be noticeable across the surrounding area.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

#### Mitigation measures

- Develop a comprehensive decommissioning plan that minimizes disturbance to the landscape.
- Implement a phased decommissioning approach to minimize the visual disruption at any one time.
- Restore the decommissioned site by regrading, replanting native vegetation, and stabilizing soil to prevent erosion.
- Incorporate natural features, such as berms or existing vegetation, to shield decommissioning activities from public view.
- Ensure that all materials, equipment, and waste generated during decommissioning are handled responsibly and removed from the site promptly.
- Engage with local communities during the decommissioning process to address concerns and gather feedback on visual impacts.
- Utilize temporary visual barriers or screens to minimize the visibility of decommissioning activities, especially in areas of high public interest or scenic value.
- After decommissioning is complete, implement a landscaping plan that incorporates native plants and materials to enhance the area’s visual appeal.

#### 7.4.2.1.2. Impacts on biological environment

The decommissioning phase will involve dismantling buildings, electrical infrastructure, and solar panel arrays. Similar procedures and equipment are used during construction, and the anticipated impacts are similar to those assessed during construction. These impacts include altering existing habitats, improper site management, collision risk, and roadkill. The anticipated impacts are similar to those assessed during the construction phase.

Impact	Biological environment
Type of impact	Negative
Type of Effect	Direct and indirect as it will affect Fauna /Flora
Duration	Short Term as impacts will be limited to the decommissioning period.
Reversibility	Reversible: some species could be removed from the site after decommissioning.
Receptor Sensitivity	Low
Magnitude	Medium as site decommissioning activities will be restricted only in the project site. Fauna could move away to similar habitats in the surrounding activities also.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Mitigation measures
<ul style="list-style-type: none"> <li>• Conduct a thorough environmental impact assessment (EIA) prior to decommissioning to identify sensitive habitats, species, and ecosystems that may be affected.</li> <li>• Implement erosion control measures, such as silt fences, sediment traps, and vegetation restoration, to prevent soil erosion and sedimentation in nearby waterways, which can harm aquatic and terrestrial ecosystems.</li> <li>• Develop and implement a habitat restoration plan that includes replanting native vegetation and rehabilitating disturbed areas to restore natural habitats and promote biodiversity after decommissioning.</li> <li>• Establish measures to protect local wildlife during decommissioning, such as minimizing noise and disturbance during sensitive periods, like breeding or nesting seasons, and ensuring safe passage for animals around the site.</li> <li>• Properly manage and dispose of all waste generated during the decommissioning process to prevent contamination of the soil, water, and surrounding habitats. Implement a recycling program for materials where possible.</li> <li>• Provide training for workers on environmental protection practices and the importance of preserving the local biological environment.</li> <li>• Engage local communities and stakeholders in the decommissioning process to gather input on conservation priorities and incorporate traditional ecological knowledge into restoration efforts.</li> </ul>

#### 7.4.2.1.3. Solid waste generation

The decommissioning phase will generate various solid wastes. The waste will contain the materials used in construction including concrete, metal, wood, glass, paints, adhesives, sealants and fasteners, conductors, poles solar panels and batteries. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. The impact will be of major significance due to high magnitude and medium receptor sensitivity. The batteries and panels need to be disposed in a specific way, in accordance to the manufacturer’s guidelines and relevant national and EHS regulations.

Impact	Solid wastes
Type of impact	Negative
Type of effect	Direct and indirect
Duration	Short term as it will likely occur only during decommissioning phase.
Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized.
Receptor sensitivity	Low – Medium
Magnitude	Low
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Mitigation measures
<ul style="list-style-type: none"> <li>• Demolition contractor to adhere to the various manufacturer’s guidelines and requirements regarding demolition and disposal</li> <li>• Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste</li> </ul>



Mitigation measures
<ul style="list-style-type: none"> <li>• Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements</li> <li>• Adequate collection and storage of waste on site</li> <li>• Safe transportation to the disposal sites / designated area</li> <li>• Hazardous waste must be disposed by approved waste handler</li> </ul>

#### 7.4.2.1.4. Noise and vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas. This will be as a result of the noise from demolition works. The impact significance has been assessed minor due to the fact that the impact magnitude is low and the receptor sensitivity is medium.

Impact	Noise
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to a few occasions associated with particular activities with the Project Site.
Reversibility	Reversible given that noise levels will be temporal and will rapidly revert to baseline conditions.
Receptor Sensitivity	Low given that there are no permanent/temporary settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of noise is likely to be limited to the use of construction machinery and earth movements.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

Mitigation measures
<ul style="list-style-type: none"> <li>• Install portable barriers to shield compressors and other small stationary equipment where necessary.</li> <li>• Use quiet equipment (i.e., equipment designed with noise control elements).</li> <li>• Co-ordinate with relevant agencies in case the noise produced will require a license.</li> <li>• Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible.</li> <li>• Demolish mainly during the day when most of the neighbours are out working.</li> </ul>

#### 7.4.2.2. Impacts on Infrastructure & Utilities

##### 7.4.2.2.1. Water Resources

Water requirements for the decommissioning phase are low and are limited to sanitary use by site personnel (drinking, showering, etc.) and the decommissioning activities such as cleaning of machinery and equipment, dust control, etc. The source of water for the decommissioning phase is likely to be the same as that used for the construction stage.

Impact	Water resources
Type of impact	Negative
Type of Effect	Direct

Duration	Short Term as it is limited to the decommissioning phase
Reversibility	Reversible as water resources in general can be considered rechargeable
Receptor Sensitivity	Medium due to importance of water supply conditions within the area
Magnitude	Low as water requirements are considered relatively low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

#### Mitigation measures

- Implement erosion and sediment control measures, such as silt fences, sediment traps, and berms, to prevent sediment runoff into water bodies during decommissioning activities.
- Properly manage and store any chemicals, fuels, or hazardous materials used during decommissioning to prevent leaks or spills that could contaminate water resources.
- Employ best practices for construction activities, such as minimizing land disturbance, avoiding work during heavy rainfall, and using bioengineering techniques to stabilize soils and prevent erosion.
- Develop and implement a temporary drainage plan to manage stormwater runoff effectively.
- Ensure proper management and treatment of wastewater generated during decommissioning activities.

### 7.4.2.3. Impacts on social environment

#### 7.4.2.3.1. Impacts on Occupational health and safety

During the decommissioning phase, workers face occupational health and safety risks due to onsite work. These risks include slips, falls, heights, using tools, being struck, moving machines, working in confined spaces, exposure to chemicals, hazardous materials, sunny conditions, high temperatures, and electric shocks when touching live components.

Impact	Occupational health & safety
Type of impact	Negative
Type of effect	Direct
Duration	Short Term as it is expected during the decommissioning phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	Low given that it is generally controlled throughout general best practice measurements
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Negligible

#### Mitigation measures

- Develop and implement a robust health and safety plan that outlines specific procedures, protocols, and emergency response strategies to protect workers during the decommissioning phase.

Mitigation measures
<ul style="list-style-type: none"> <li>• Provide comprehensive training for all workers on health and safety practices, including the proper use of personal protective equipment (PPE), hazard recognition, and emergency response procedures.</li> <li>• Ensure that all workers are provided with appropriate PPE, such as helmets, gloves, goggles, ear protection, and respiratory protection, and enforce its use at all times on-site.</li> <li>• Conduct frequent safety audits and inspections to identify and address potential hazards. Engage workers in safety discussions to gather their input on risks and mitigation measures.</li> <li>• Properly handle, store, and dispose of hazardous materials, including chemicals and fuels, in accordance with relevant regulations.</li> <li>• Ensure that all machinery and equipment used during decommissioning are well-maintained and regularly inspected to prevent malfunctions or accidents that could endanger workers.</li> <li>• Establish clear emergency response procedures for potential incidents, such as accidents, fires, or hazardous material spills.</li> <li>• Establish effective communication channels for reporting safety concerns or incidents.</li> <li>• Implement measures to ensure that nearby communities are not adversely affected by decommissioning activities.</li> </ul>

#### 7.4.2.3.2. Community health and safety risks

During the decommissioning phase, various environmental and social impacts on community health and safety may arise. The dismantling of infrastructure can lead to the release of hazardous materials, such as heavy metals, which, if not properly managed, could contaminate soil and groundwater, posing serious health risks to local populations. Additionally, the decommissioning activities may generate dust and noise pollution, adversely affecting air quality and disrupting the daily lives of nearby residents, particularly vulnerable groups such as children and the elderly. Socially, the community may experience increased anxiety regarding potential exposure to hazardous substances and fears of accidents during the decommissioning process, which could undermine public trust in the project and local authorities. The presence of decommissioning workers may also strain local resources and infrastructure, leading to traffic congestion and increased competition for services.

Impact	Community health and safety risks
Type of impact	Negative
Type of effect	Direct
Duration	Short-term & long-term
Reversibility	Could be irreversible.
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	Low-to-medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Mitigation measures
<ul style="list-style-type: none"> <li>• Fencing off the facility to keep of community members, children and livestock from entering into the facility.</li> <li>• Identify and safely manage hazardous materials</li> <li>• Implement dust suppression techniques, such as water spraying or dust inhibitors, to minimize airborne particles during demolition activities, protecting air quality.</li> <li>• Use noise-dampening equipment and restrict working hours to minimize noise pollution</li> </ul>

- Develop and implement a comprehensive waste management plan during decommissioning.
- Conduct thorough environmental assessments prior to decommissioning.
- Engage with local communities early in the decommissioning process to communicate plans, address concerns, and gather input, fostering trust and collaboration.
- Establish an accessible GRM for community members to report concerns or incidents related to health and safety, ensuring timely responses and resolutions.
- Develop and communicate an emergency response plan that outlines procedures for handling accidents or hazardous material spills during the decommissioning phase.
- Develop and implement a traffic management strategies to minimize disruption caused by decommissioning vehicles.

#### 7.4. Summary of the impacts

The tables 7-3, 7-4 and 7-5 provide a summary of the key impacts of the Project on the physical, biological, and social environment and infrastructure and utilities during the construction, operation and decommissioning phases. The final specific plan and monitoring requirement for the project will be annexed to the ESIA while all inputs will be completed.

##### 7.4.1. Construction phase

**Table 7-0-3:** Summary of key impacts during the Construction phase of the project

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and visual	Direct	Long term	Irreversible	Low	Medium	Minor	Minor
	Soil, ground and surface water contamination	Direct	Short term	Reversible	Low	Low	Moderate	Minor
	Air quality(Dust)	Direct	Short term	Reversible	Low	Medium	Moderate	Minor
	Air quality (vehicle exhaust emissions)	Direct	Short-term	Reversible	Low	Medium	Minor	Negligible
	Noise and vibrations	Direct	Short term	Reversible	Low	Medium	Moderate	Minor
	Biodiversity (Fauna)	Direct	Long-term	Irreversible	Low	Low/medium	Moderate	Minor
	Biodiversity (Flora)	Direct	Long-term	Reversible	Low	Low/medium	Moderate	Minor
	Soil erosion	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
	Wastes (solid wastes)	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
	Wastes (liquid wastes)	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
Impacts on infrastructure and utilities	Water consumption	Direct	Short-term	Reversible	Medium	Low	Moderate	Minor
	Energy consumption	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
Impacts on social environment	Inconveniences and disruptions	Direct	Long-term	Irreversible	Low	Low	Minor	Minor
	Impacts on vulnerable groups	Direct	Long-term	Irreversible	High	High	Moderate	Minor
	Accidental discovery of cultural resources	Direct	Short term	Irreversible	Low	Medium	Minor	Negligible
	Trespassing of	Direct	Short	Irreversible	High	Low	Minor	Negligible

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
	unauthorized personnel		term					
	Worker influx – incoming workforce	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
	Impact on shelter (housing) and settlement	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
	Security	Direct	Short term	Irreversible	Medium	Low	Minor	Negligible
	Occupational health and safety	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Community health and safety risks	Direct	Short term	Irreversible	High	High	Moderate	Minor
	Temporary disruption of electricity supply	Direct/indirect	Short-term	Reversible	Low	Low	Minor	Minor
	Construction-related traffic	Direct	Short-term	Irreversible	High	Low	Moderate	Minor

#### 7.4.2. Operation phase

**Table 7-0-4:** Summary of key impacts during the Operation phase of the project

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and Visual	Direct/indirect	Long term	Irreversible	Low	Medium	Minor	Negligible
	Soil, groundwater and surface water contamination	Direct	Short-term	Reversible	Low	Low	Moderate	Minor
	Air quality (Dust)	Direct	Short-term	Reversible	Low	Low/medium	Minor	Negligible
	Air quality (Vehicle exhaust fumes)	Direct	Short-term	Reversible	Low	Medium	Minor	Minor
	Noise and vibrations	Direct	Short-term	Reversible	Low	Medium	Minor	Negligible
	Biodiversity (Fauna)	Direct/indirect	Long-term	Irreversible	High	Low/medium	Moderate	Minor
	Biodiversity (Flora)	Direct/indirect	Long-term	Reversible	Low	Low	Minor	Minor
	Soil erosion	Direct/indirect	Short-term	Reversible	Low	Low	Minor	Minor
	Wastes (Solid wastes)	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
	Wastes (Liquid wastes)	Direct	Short-term	Reversible	Low	Low	Minor	Minor
Impacts on infrastructure and utilities	Water consumption	Direct	Short/long-term	Reversible	Medium	Low	Minor	Minor
	Energy consumption	Direct	Short/long-term	Reversible	Low	Low	Minor	Minor
Impacts on social environment	Trespassing of unauthorized personnel	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Risks related to poor stakeholder engagement	Direct/indirect	Short/long-term	Reversible	Medium	Low/medium	Moderate	Minor
	Occupational health and safety	Direct	Long-term	Irreversible	High	Low	Major	Minor
	Community health and safety risks	Direct	Short/long-term	Irreversible	High	High	Moderate	Minor
	Fire hazards	Direct	Short/long-term	Irreversible	High	Low	Moderate	Minor

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
			g-term	ble				

### 7.4.3. Decommissioning phase

**Table 7-0-5: Summary of key impacts during the decommissioning phase of the project**

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance Without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and visual	Direct	Short term	irreversible	Low	High	Minor	Minor
	Biological environment	Direct/indirect	Short term	Reversible/Irreversible	Low	Medium	Moderate	Minor
	Solid waste generation	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
	Noise and vibration	Direct	Short-term	Reversible	Low	Medium	Minor	Negligible
Impacts on infrastructure and utilities	Water utilities	Direct	Short-term	Reversible	Medium	Low	Minor	Negligible
Impacts on social environment	Occupational health and safety	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Community health and safety risks	Direct	Short-term	Irreversible	High	Low	Moderate	Minor

## 7.5. Assessment of cumulative impacts

The Environmental and Social Impact Assessment (ESIA) considered the cumulative impacts (Table 7-6) that could result from the additional impacts of other existing and/or planned developments in the area.

**Table 7-0-6:** Summary of key cumulative impacts for the repair and expansion of the Bosaso Power Grid

Attribute	Cumulative Impacts
Landscape and visual	The project may significantly alter the area’s visual environment and aesthetic appeal. The structures, especially distribution towers and substations, introduce industrial features that can disrupt the natural landscape, creating visual contrasts in otherwise open or undeveloped areas. Over time, this change in landscape may affect the character of local communities and decrease the visual appeal. Moreover, the cumulative effect of multiple new structures spread across the landscape can lead to visual "clutter," intensifying the perceived impact.
Land use	The project may significantly alter existing land patterns and accessibility. The installation of the infrastructures requires large areas for equipment and safety buffers, potentially leading to restrictions on previously accessible lands used for grazing, or local community activities. Distribution lines and substations, in particular, can fragment landscapes, limiting mobility and land usability for nearby residents, and potentially affecting local livelihoods reliant on these lands. Additionally, as more land is allocated to energy infrastructure, there is an increased likelihood of conflicts over land rights, especially in areas with limited available land resources..
Waste management	During both construction and operation phases, the project will generate a range of waste materials, including construction debris, hazardous waste from electrical equipment, and general waste from on-site activities. If not managed effectively, these materials can lead to soil and water contamination, create public health hazards, and burden local waste management systems that may already have limited capacity. Additionally, waste from ongoing maintenance, such as used oils, batteries, and electrical components, requires specialized handling and disposal to prevent long-term environmental damage. Coordinating an efficient waste management strategy that includes recycling, proper hazardous waste handling, and collaboration with local waste facilities is critical to reduce the cumulative impact of waste generated throughout the project’s lifecycle and to maintain environmental integrity in Bosaso.
Biodiversity	The cumulative impacts on biodiversity from the power grid repair and expansion project in Bosaso, involving a power station, distribution lines, and three substations, can lead to significant ecological disruption. The establishment of these infrastructures requires vegetation clearing, habitat alteration, and increased human activity, which may disturb local flora and fauna. Distribution lines, in particular, pose risks to bird populations through collision and electrocution, while the fragmentation of natural habitats may limit the movement and reproductive patterns of terrestrial species. The combined footprint of multiple facilities can exacerbate

Attribute	Cumulative Impacts
	<p>habitat loss, leading to reduced biodiversity and potential shifts in ecosystem dynamics. Mitigating these impacts requires careful planning, such as creating wildlife corridors, implementing especially bird-safe distribution designs, and conducting regular biodiversity monitoring, to help preserve Bosaso's natural ecosystems and maintain biodiversity in the face of infrastructure expansion.</p>
<p>Archaeology and cultural heritage</p>	<p>The excavation, land clearing, and construction involved in the proposed infrastructure project can inadvertently damage or destroy unmarked archaeological sites, burial grounds, and culturally significant locations that may not be immediately visible or documented. Beyond physical impacts, visible modern infrastructure may alter the cultural landscape, affecting the heritage value and aesthetic of historically important areas. To address these cumulative impacts, implementing a robust cultural heritage management plan that includes site surveys, stakeholder consultations, and "chance find" procedures can help protect Bosaso's archaeological and cultural assets throughout the project lifecycle.</p>
<p>Air quality and noise</p>	<p>Construction activities such as excavation, material transport, and equipment operation generate dust, particulate matter, and emissions that degrade air quality, posing respiratory risks to nearby residents and impacting local flora. Additionally, the continuous operation of machinery, generators, and transformers may produce elevated noise levels that contribute to community disturbances, especially in areas close to residential zones. Over time, exposure to high noise levels can lead to stress-related health issues and disrupt daily activities. Mitigation efforts such as dust control measures, emissions reduction strategies, and the use of noise barriers are essential to minimize these cumulative impacts, ensuring the project maintains a sustainable balance with the surrounding community and environment.</p>
<p>Infrastructure and utilities</p>	<p>The construction phase may increase demand for transportation networks to support the movement of materials and equipment, leading to road congestion, accelerated wear on road surfaces, and potentially affecting access to essential services. Additionally, the project may place increased demand on local water and sanitation systems, particularly if there are temporary worker accommodations that require utility connections. During the operation phase, the expanded power grid infrastructure will improve electricity access but may require consistent coordination with local utility providers to prevent overloads and ensure seamless integration. Effective planning and collaboration with local authorities to enhance road capacity, utility connections, and service provisions are essential to minimize these cumulative impacts and support infrastructure resilience in Bosaso.</p>
<p>Socio-economic conditions</p>	<p>The cumulative impacts on socio-economic conditions from the power grid repair and expansion project in Bosaso, involving a power station, distribution lines, and three substations, are likely to be mixed, bringing both positive and challenging outcomes for local communities. On the positive side, the project could create jobs, boost local businesses through demand for goods and services, and enhance electricity access, which can stimulate economic growth and improve quality of life. However, increased labor demand may attract an influx of workers from outside the</p>



Attribute	Cumulative Impacts
	<p>area, potentially raising housing and living costs and creating competition for local resources. Additionally, land acquisition for infrastructure could disrupt existing livelihoods, particularly for those reliant on business and pastoral activities. By implementing local hiring practices, engaging in community consultations, and offering compensation or alternative livelihood options for affected residents, the project can help ensure that socio-economic benefits are maximized while minimizing adverse effects on Bosaso’s communities.</p>
Occupational health and safety	<p>The cumulative impacts on occupational health and safety in the Bosaso power grid repair and expansion project, which includes a power station, distribution lines, and three substations, present heightened risks to workers over extended project phases. Construction and maintenance of these facilities involve various hazards, such as working at heights, handling electrical equipment, and exposure to heavy machinery, which increase the potential for accidents if not carefully managed. With multiple work sites, the risk of fatigue, inadequate supervision, and inconsistent safety practices may rise, compounding the likelihood of incidents. Additionally, exposure to high noise levels, dust, and potential chemical hazards can have long-term health effects if protective measures are not enforced. To mitigate these cumulative impacts, comprehensive occupational health and safety protocols, regular training, strict use of personal protective equipment (PPE), and consistent monitoring across all project phases are essential to ensure worker well-being throughout the project’s lifecycle.</p>
Community health, safety, and security	<p>The cumulative impacts on community health, safety, and security pose both direct and indirect risks to local residents. Increased traffic from construction and transport vehicles raises the likelihood of road accidents, while dust and emissions from construction activities can impair air quality, affecting respiratory health. Additionally, the influx of workers may lead to social tensions or resource competition, potentially straining local healthcare and public safety resources. Community security could also be affected by unauthorized access to construction sites, posing safety risks to residents.</p>
Infrastructure and public services	<p>During the construction phase, increased traffic and heavy machinery can exacerbate wear and tear on local roads, leading to congestion and potential damage, which may hinder access to essential services. Furthermore, the project may heighten demand for public utilities such as water, sanitation, and electricity, necessitating coordinated upgrades to these services to meet the increased load. However, the long-term benefits of enhanced power supply can bolster economic activities, improve access to modern amenities, and ultimately lead to better infrastructure development.</p>

## CHAPTER EIGHT: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

### 8.1. Overview

Environmental protection of the proposed project and its immediate surroundings is achieved through enhancement of project benefits and avoidance or mitigation of potential adverse impacts associated with the project. Unless the mitigation and benefit enhancement measures identified in this ESIA fully implemented, the prime function of the ESIA, which is to provide a basis for shaping the project so that overall environmental performance of the proposed project is enhanced, cannot be achieved.

In order for the ESMP to be effective, it must be fully integrated with the overall project management effort at all levels, which itself should be aimed at providing a high level of quality control, leading to a project that has been properly designed and constructed and functions efficiently throughout its life. On this basis, Table 8-1 sets out the management measures to be taken with regard to controlling the potential impacts, which could occur during the construction and operational phases of the project. It also indicates who is responsible for taking the management actions. Executive responsibility for project management commonly involves several organisations, each with specific responsibilities for particular aspects, and this project is no exception. Therefore, the major responsibility for environmental management will be split between several organisations, depending on their respective activities, which are being executed at various stages. The MoEWR and ESP as implementing agencies of this project will have the overall responsibility for the implementation of the recommended ESMP.

### 8.2. The Institutional arrangements for the implementation of the ESMP

The specific roles and responsibilities of proponent, implementing agency, supervision consultant and contractor are as indicated in *Table 8-2*.

**Table 8-0-1:** The ESMP implementation arrangements for the proposed repair and expansion of Bosaso power grid, Somalia

Entity	Roles and responsibilities
Proponent - MoEWR	The MoEWR will provide overall coordination and oversight of the project. MoEWR will be responsible for overall responsibility for safeguards due diligence, and compliance monitoring. The MoEWR will also provide funding for the project planning and implementation.
Project Implementation Unit	<ul style="list-style-type: none"> <li>• The MoEWR has already put in place a Project Implementation Unit (PIU) to guide implementation of the project. In the PIU Environmental and Social issues are spearheaded by an Environmental and Social Safeguards Expert whose role is to coordinate and oversee implementation of safeguards. The ToR for the E&amp;S experts needs to be shared with the Bank for review and agreement.</li> <li>• If there is shortage of ES professionals in the implementing agency, additional safeguard experts shall be hired for the project implementation period or beyond, in any case the procedure of assigning experts for the PIU shall comply to the above advise.</li> </ul>
ESPs	<p>The ESPs will be responsible for implementation and operation of the project on behalf of the MoEWR. Some of the key responsibilities include but not limited to are;</p> <ul style="list-style-type: none"> <li>• Supervise construction works through a supervision consultant and also directly</li> <li>• Monitoring the progress of the project in terms of the safeguards and technical aspects.</li> <li>• Monitoring of the ESMP implementation</li> <li>• Ensuring the project is on course in terms of timelines</li> </ul>
Puntland State Government	The Puntland State Government is a key stakeholder in this project. The roles of the Puntland State Government shall include giving relevant approvals needed, solving grievances that cannot be sorted at project level, monitoring progress of the project among others.
FRS and Puntland Ministries of Environment	Shall be responsible for approval of ESIA and EHS reports and licensing. Additionally, the ministries shall be free to check progress of implementation of ESMP.
E&S supervising consultant	<ul style="list-style-type: none"> <li>• The E&amp;S supervising consultant shall prepare quarterly supervision reports detailing environmental, health, social and safety compliance on quarterly basis amongst other technical aspects</li> <li>• Ensure the project adheres to all environmental and social impact assessment (ESIA) recommendations, national regulations, and international standards such as the World Bank ESS.</li> <li>• Oversee the implementation of mitigation measures for environmental, social, and community health and safety risks identified during the ESIA, including soil erosion, waste management, biodiversity protection, and labour influx.</li> <li>• Supervise the proper execution of the ESMP during the construction phase, ensuring contractors comply with the stipulated environmental and social safeguards.</li> <li>• Conduct regular field inspections and audits to assess the environmental and social performance of the contractors and identify non-compliance issues.</li> </ul>

Entity	Roles and responsibilities
	<ul style="list-style-type: none"> <li>• Prepare and submit periodic environmental and social monitoring reports to the MoEWR, regulatory bodies, and the AfDB.</li> <li>• Coordinate the training of train project staff and contractors on environmental and social management procedures, including waste handling, safety protocols, and community engagement.</li> <li>• Support the contractor and client is development of EPRP, and oversee emergency preparedness and response plans for potential environmental and social incidents, ensuring swift action to mitigate impacts.</li> <li>• Ensure that gender-based violence (GBV) risk mitigation measures and other labour-related guidelines are implemented on-site, particularly in managing the labour influx and worker-community relations.</li> <li>• Liaise with local and regional environmental authorities in Bosaso to ensure compliance with the Puntland State relevant laws on environment and energy production.</li> <li>• Continuously identify potential environmental and social risks throughout the construction phase and recommend adaptive management strategies as needed.</li> </ul>
Contractor	<ul style="list-style-type: none"> <li>• Prepare C-ESMP and upon approval from RE and clearance from the Bank, implementation of the contractor related aspects of the ESMP and regularly (monthly) reporting</li> <li>• The contractor on his part will have to appoint an EHS officer and a Social Specialist to coordinate and report on the ESMP implementation respectively.</li> <li>• The contractor to engage a Community Liaison Officer to act as a link between the community and the contractor and support the Social Specialist.</li> <li>• The contractor will also have the obligation of managing the E&amp;S risks related to his/her operations.</li> <li>• Maintaining the required level of stakeholder engagement and communication, including providing project schedule information to the public, accepting and resolving public grievances, advertising and hiring local workers.</li> <li>• Maintain a working grievance redress mechanism.</li> <li>• The contractor is to comply with all regulations and laws at the Puntland State and FRS levels level and other relevant regulations and laws</li> <li>• The contractor shall refer to ESIA recommendations and the ESMP when preparing the contractors- ESMP and the specific plans</li> <li>• The contractor shall provide water required for use in connection with the works including the work of subcontractors and shall provide temporary storage tanks, if required</li> <li>• The contractor shall make his own arrangements for sanitary conveniences for his workers. Any arrangements so made shall be in conformity with the public health requirements for such facilities and the contractor shall be solely liable for any infringement of the requirements.</li> <li>• The contractor shall be responsible for all the actions of any subcontractors whom s/he subcontracts.</li> <li>• The contractor shall take all possible precautions to prevent nuisance, inconvenience or injury to the neighbouring properties and to the public generally, and shall use proper precaution to ensure the safety of the community</li> </ul>

Entity	Roles and responsibilities
	<ul style="list-style-type: none"> <li>• All work operations which may generate noise, dust, vibrations, or any other discomfort to the workers and/or visitors of the client and the local community must be undertaken with care, with all necessary safety precautions taken.</li> <li>• The contractor shall take all effort to muffle the noises from his tools, equipment and workmen to not more than 70dBA</li> <li>• The contractor shall upon completion of working, remove and clear away all plant, rubbish and unused materials and shall leave the whole site in a clean and tidy state to the satisfaction of the MoEWR and the ESPs. He shall also remove from the site all the liquid and solid wastes.</li> <li>• No blasting shall be permitted without the prior approval of the MoEWR and the relevant Puntland State authorities.</li> <li>• Borrow pits will only be allowed to be opened up on receipt of permission from the approving authorities.</li> <li>• The standard of workmanship shall not be inferior to the MoEWR and AfDB Operational Standards. No materials for use in the permanent incorporation into the works shall be used for any temporary works or purpose other than that for which it is provided. Similarly, no material for temporary support may be used for permanent incorporation into the works.</li> <li>• Disposing of the waste generated during construction phase activities shall be done in accordance to the ESMP.</li> <li>• The contractor EHS officer will report on ESMP implementation during construction period. The aspect to be reported by the contractor will include safety issues i.e. hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, incidents and accidents, potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training etc.); Environmental incidents and near misses; noncompliance incidents with permits and national law; Training on E&amp;S issues (dates, number of trainees, and topics); Details of any security risks; Worker &amp; External stakeholder grievances and E&amp;S inspections by contractor, including any authorities.</li> </ul>

## 8.3. Community Grievance Redress Procedure

### 8.3.1. Grievance Management Processes

Anyone will be able to submit a grievance, comments or suggestions to the Project coordination office if they believe the construction activity is having a detrimental impact on the environment, community or on their quality of life. Any comments or concerns can be brought to the attention of the project verbally, through digital media or in writing or by filling in a grievance form (Appendix 2). The grievance form will be made available at the relevant administration agencies in Bosaso offices traversed by the project. Grievance information will be recorded in a grievance log. This information will include:

- Stakeholder name and contact details;
- Details of the nature of the grievance;
- Date received, responded to and closed out; and
- How it was submitted, acknowledged, responded to and closed out.

Where investigations are required, project staff and outside authorities as appropriate, will assist with the process. The following steps shall be performed in a timely manner to avoid delaying resolution of a grievance:

- Obtain as much information as possible from the person who received the complaint, as well as from the complainant to gain a first-hand understanding of the grievance.
- Undertake a site visit, if required, to clarify the parties and issues involved. Gather the views of other stakeholders including project employees. If necessary, identify initial options for settlement that parties have considered.
- Determine whether the grievance is eligible. Eligible grievances include all those that are directly or indirectly related to the Project.
- Ineligible Complaints may include those that are clearly not related to the Project or its contractors' activities, whose issues fall outside the scope of the GRP or where other community procedures would be more appropriate to address the grievance.
- If the grievance is deemed ineligible it can be rejected. However, a full explanation as to the reasons for this must be given to the complainant and recorded in the Grievance Database.
- If the grievance is eligible, determine its severity level. This will help to determine whether the grievance can be resolved immediately or requires further investigation and whether senior management will need to be informed of the grievance.
- If the grievance concerns physical damage, (e.g. crop, house, community asset) take a photograph of the damage and record the exact location.
- Enter the findings of the investigation in the Grievance Database.
- Once the grievance has been received/acknowledged and investigated, the complainant will be contacted with the findings and MoEWR/ESP's proposed response. Explanations will be given in writing (or where literacy is an issue orally) the manner in which the review was carried out, results of the review, any changes to activities that will be undertaken to address the grievance and how the issue is being managed to meet appropriate environmental and social management systems and requirements. As a last resort, aggrieved parties have a right to take legal action. This is a more formal rights-based approach that shall only be taken if all other approaches have failed or when there are serious conflicts about facts and data. The final decision

will be taken by the arbitrator or court based on compliance with laws, policies, standards, rules, regulations, procedures, past agreements or common practice.

### 8.3.2. Training on Grievance Management for Staff

The training plans for grievance management for staff involved in the Bosaso power grid repair and expansion project will focus on equipping team members with the skills and knowledge necessary to handle community concerns effectively and sensitively. The training will cover established procedures for receiving, documenting, and addressing grievances while ensuring that all staff members understand the importance of maintaining confidentiality for complainants. Emphasis will be placed on creating a supportive environment where community members feel safe to express their concerns without fear of retaliation or breach of privacy. Procedures will include secure documentation methods, restricted access to grievance records, and protocols for anonymizing information related to complaints. By prioritizing confidentiality and providing comprehensive training, the project aims to foster trust and transparency between project staff and the local community, facilitating effective resolution of grievances throughout the project's implementation.

### 8.3.3. Budget for implementing the GRM

Implementing a Grievance Redress Mechanism (GRM) under the Environmental and Social Management Plan (ESMP) for the power grid upgrade and expansion in Bosaso City requires a comprehensive and adequately funded budget. It is estimated that the implementation budget for GRM shall be approximately US\$150,000. This budget shall cover essential aspects, including staffing for dedicated GRM officers, training programs to build the capacity of GRM personnel, outreach and communication efforts to inform affected communities about the mechanism, and the development and maintenance of data management systems for tracking grievances. Additionally, it shall include the costs of handling and resolving grievances, which may involve community meetings, transportation, and logistical support. Ensuring sufficient funding will enable the GRM to function effectively, fostering transparency and trust among stakeholders and supporting timely and fair resolution of issues, thus contributing to the overall success and social acceptability of the project.

### 8.3.4. Grievance Redress Committee (GRCs)

Grievance management and reporting is entirely the responsibility of the MoEWR through its environmental officers and liaison officers. However, Grievance Redress Committee (GRCs) will be established at the Bosaso City level. The main function of the GRCs would be arbitration and negotiation based on a transparent and fair hearing of the cases of the parties in dispute. The GRCs shall be responsible to hear the grievances of PAPs and other stakeholders and arbitrate disputes in order to arrive at amicable solutions based on negotiation and in a transparent and fair manner. The GRCs will be independent and careful selection of the members is crucial to ensure its autonomy. Presence of female members on the GRCs is crucial in order to ensure better consideration of gender issues for grievance resolution. With the help of their leaders, project affected community members will democratically elect and nominate their representatives.

MoEWR and GRC will be responsible for the implementation of external grievance management and reporting with differentiated channels for different stakeholders. The

following are among key tasks and responsibilities of the Grievance Redress Mechanisms to be carried out by GRC:

- Regularly record all grievances received and how they have been addressed;
- Develop and keep updated a record of all consultations with stakeholders;
- Regularly prepare and file minutes of meetings;
- Ensure that the Project Contractor regularly register grievances and redressing actions;
- Document all actions agreed during meeting and follow up the implementation;
- Prepare an annual report on stakeholder consultation activities, grievance management, environmental and social performance and implementation of mitigation activities; and
- Regularly give feedback and updates to communities with adapted methods;

#### 8.3.5. Documenting, Monitoring and Reporting

A formal and documented procedure is required that may give evidence to any interested third parties, including the communities themselves, that any complaint is taken into consideration and, where founded, promptly addressed and allowing the satisfactory resolution of grievances and the response to communities' requests, the MoEWR and the lender (AfDB). Therefore, while the channels to receive complaints may be informal as adapted to the cultural context and to facilitate communities' access to the mechanism, the MoEWR shall ensure to regularly record all grievances and document how they are addressed.

During construction a number of grievances are expected to be mostly related to construction activities, MoEWR through ESPs is therefore required (i) to regularly record all grievances and how they are solved and (ii) to monitor that all grievances involving the MoEWR/ESP and its Contractor or its sub-contractors are duly recorded and followed up, and will monitor grievances routinely as part of the broader management of the Project. This entails good record keeping of complaints raised throughout the life of the construction and operation of the Project. Monthly internal reports will be compiled and distributed to the management team. These grievance reports will include:

- The number of grievances logged in the proceeding period by level and type.
- The number of grievances resolved between the Project and complainant, without accessing legal or third party mediators, by level and type
- The number of grievances unresolved after 30 days by level and type;
- MoEWR's responses to concerns raised by the various stakeholders.
- Measures taken to incorporate these responses into project design & construction.
- An appropriate grievance report should be part of MoEWR/ESP's quarterly reporting. These reports and other records will be made available for external review if required and AfDB.

#### 8.3.6. Communication of the Plan

The MoEWR's community liaison officer (CLO) shall proactively inform affected communities and the wider stakeholder group of the details of the GRP. This shall include information about where people can go and who they can talk to if they have any grievances. This information shall be widely and regularly publicized throughout the duration of the public consultation exercise, through meetings and the distribution of



fliers. The CLO shall provide the information in a format and languages that are readily understandable by the local population and/or orally in areas where literacy levels are low during routine stakeholder engagement.

### 8.3.7. Workers Grievance Management Mechanism

The objective of this Workers' Complaints Procedure (Internal Grievance Mechanism) is to establish a transparent process for workers to express concerns and file grievances, including anonymous complaints. This Procedure does not replace other channels as defined by law or collective bargaining agreements. In addition, the Contractor is required to prepare company GRM. This Workers' Complaints Procedure (Internal Grievance Mechanism) applies to all concerns that may arise from the project's workforce. Examples of complaints to which this Procedure applies are:

- Working conditions and welfare;
- Payment of wages and other benefits;
- Harassments, discrimination, intimidation;
- Health and safety risks; and
- Environmental risks.

Conversely, this Procedure does not apply to local communities' concerns, for which the Public/community Grievances Management Mechanism (GRM) applies. This procedure should also be used to collect suggestions, ideas, and improvements from employees, on the issues mentioned above. The procedure ensures that employees have every opportunity to express grievances and have them resolved in a fair, equitable and prompt manner. The procedures shall apply to all employees engaged in the project, and shall have the following guiding principles:

- **Impartiality:** All parties have the right of expressing their viewpoints. Any assumptions or actions shall be taken until all relevant information has been collected and considered. All parties have access to support or representation if they want or need it.
- **Confidentiality:** Only the worker directly involved in the grievance, or in sorting it out, can have access to information about the grievance. Information goes on an employee's personnel file only if he/she is disciplined as part of sorting out the grievance.
- **Non-retaliation:** Management takes necessary steps to make sure that workers involved in a grievance are not victimized by anyone for coming forward with the grievance or for helping to sort it out. Any retaliations shall lead to disciplinary action. However, if the grievance procedure is used by an employee to lie about someone, the employee too can be disciplined.
- **Timeliness:** All grievances shall be dealt with as quickly as possible. There are time limits for the different steps. The aim is to sort out all grievances within four weeks if at all possible.

The Project Contractor shall nominate a Grievance Officer. He/She shall have a dedicated desk/office in order to allow workers to submit complaints in person. In front of the office, a Complaints Box shall be placed to collect written complaints, both anonyms and not.

#### 8.4. Stakeholder Engagement Plan

The MoEWR shall prepare a standalone Stakeholder Engagement Plan for the project. The plan shall consider all the project's anticipated risks, impacts, and development stages, and shall be tailored to the characteristics and interests of the Affected Communities and other stakeholders. Therefore, the document shall identify ranges of stakeholders that may be interested in its actions and consider how external communications might facilitate a dialog with all stakeholders.

Given that the fundamental principle in any stakeholders identification exercise is striking the right balance between identifying relevant stakeholders on the one hand and ensuring diversity and inclusivity on the other, the process of identifying stakeholders shall be systematic and not arbitrary, which, in turn, would require adopting certain methodologies. The following are the proposed procedures for selecting relevant stakeholders:

- The level of their interest in the project, and
- The level of their influence on the project under consideration. Stakeholders' interest and influence can change with time and therefore, configurations within the stakeholders' platform could occur.

#### 8.5. Environmental and Social Monitoring Plan

Environmental monitoring is an essential tool in relation to environmental management as it provides the basis for rational management decisions regarding impact control. Monitoring should be performed during all stages of the project (namely construction, commissioning, and operation) to ensure that the impacts are no greater than predicted, and to verify the impact predictions. The monitoring program will indicate where changes to procedures or operations are required, in order to reduce impacts on the environment or local population. For the proposed project, the monitoring program will be primarily undertaken by MoEWR and the ESPs to meet the following objectives:

- to monitor the environmental conditions of the project influence area as impacted by the construction and operation of the Project;
- to check on whether mitigation and benefit enhancement measures have actually been implemented, and are proving effective in practice;
- to provide a means whereby any impacts which were subject to uncertainty at the time of preparation of this ESIA, or which were unforeseen, can be identified, and to provide a basis for formulating appropriate additional impact control measures; and
- To provide information on the actual nature and extent of key impacts and the effectiveness of mitigation and benefit enhancement measures which, through a feedback mechanism, can improve the planning and execution of future similar projects.

For this project, two basic forms of monitoring are proposed as follows:

- *Compliance monitoring*: which checks whether prescribed actions have been carried out, usually by means of inspection or enquiries; and
- *Effects monitoring*: which records the consequences of activities on one or more environmental components, and usually involves physical measurement of selected

parameters or the execution of surveys to establish the nature and extent of induced changes.

It is recommended that both sets of monitoring are undertaken. However, during construction compliance monitoring will play a primary role in checking whether recommended impact mitigation and environmental management plans have been carried out or not. This is because most impact controls take the form of measures incorporated in project designs and contract documents, and the extent to which recommendations on these matters, as set out in the ESIA, are complied with, plays a major part in determining the overall environmental performance of the project.

### 8.5.1 Monitoring During Construction Phase

Environmental monitoring during the construction phase will comprise two principal groups of activities:

- (i) review the Contractors' plans, method statements, temporary works designs, and arrangements so as to ensure that environmental protection measures specified in the contract documents are adopted and that the contractor's proposals provide an acceptable level of impact control; and
- (ii) systematic observation on a day-to-day basis of all site activities and the contractors' offsite facilities including distribution route and tower erection sites, storage areas, project offices and camp facilities, access road, quarry and spoil areas, etc. as a check that the contract requirements relating to environmental matters are in fact being complied with, and that no impacts foreseen and unforeseen are taking place.
- (iii) These activities will be fully integrated with other construction supervision and monitoring activities carried out by the construction supervision consultant. The Resident Engineer (RE) (i.e. as part of his duties connected with general site supervision) is responsible to ensure adequate level of environmental monitoring is carried out. Actual monitoring on a day-to-day basis will be carried out by Environmental Inspector from the construction supervision consultant, under the direction of the RE.
- (iv) The majority of monitoring will comprise visual observations, carried out at the same time as the engineering monitoring activities. Site inspections will take place with emphasis on early identification of any environmental problems and the initiation of suitable remedial action. Where remedial actions have been required on the part of the Contractor, further checks will need to be made to ensure that these are actually being implemented in the required form and to the agreed schedule. As experience of the principal problem areas is gained, attention will be concentrated on locations and activities, which are known to be the most troublesome, with a lower frequency of inspections at problem-free locations. Nevertheless, each construction activity site need to be formally inspected from an environmental viewpoint at least once every week.
- (v) The RE will decide on the appropriate course of action to be taken in cases where unsatisfactory reports are received from his field staff regarding environmental matters. In the case of relatively minor matters, advice to the contractor on the need for remedial action may suffice, but in all serious cases, the RE should either

recommend an appropriate course of action to the Engineer, or should issue a formal instruction to the contractor to take remedial action, depending on the extent of his delegated powers.

- (vi) In addition to visual observation, it is particularly important that monitoring should also include limited informal questioning of the local community and their elected leaders who live in the project area, since they may be aware of matters which are unsatisfactory, but which may not be readily apparent or recognized during normal site inspection visits.
- (vii) Environmental inspection checklists for site use will be developed by the RE and the Environmental Inspector to be assigned by the Supervision Consultant, prior to the commencement of construction, so as to facilitate systematic monitoring and recording. These may require modification in the light of site experience, and it is recommended that a review of their adequacy and ease of use should be carried out approximately 2 months after the commencement of works.
- (viii) The Environmental Inspector will review the effectiveness of environmental management and monitoring approximately 3 months into the construction period, and will introduce improved procedures as required in the circumstances.

## 8.6. Monitoring During Operation Phase

- (i) MoEWR/ESPs environmental unit shall also monitor and prepare periodic reports on the status of the project operation. During project operation, MoEWR/ESPs shall undertake monitoring activities, and do monthly reports that shall cover the following salient areas:
  - Results of key parameters monitored;
  - Results or status on implementation of the environmental management plan;
  - Description of any incidents which could potentially result into a non-compliance of the ESMP and actions taken to improve the situation; and
  - Proposed solutions for any outstanding/unforeseen issues and impacts detected during the monitoring.
- (ii) The recommended frequency of reporting is monthly. However, this frequency can change if demanded by the financier (i.e. AfDB). Monthly monitoring report will be submitted and financier (AfDB).

## 8.7. Monitoring report types and frequency

Monitoring environmental and social components is crucial for the successful implementation of the Bosaso power grid repair and expansion project supported by the African Development Bank (AfDB). The monitoring and reporting will ensure compliance with relevant regulations, identifies potential impacts, and helps manage risks associated with the project. The following are the various types of monitoring reports specific to environmental and social components, along with their recommended frequencies.

1. **Environmental Monitoring Reports:** These reports focus on tracking the environmental impacts of the project throughout its lifecycle, ensuring compliance with environmental standards and regulations.

#### Types of Environmental Monitoring Reports

- **Baseline Environmental Assessment Report:**
  - Purpose: Establishes the existing environmental conditions (air, water, soil, biodiversity) prior to project commencement.
  - Frequency: Conducted once at the project's outset to serve as a reference point for future assessments.
- **Environmental Compliance Reports:**
  - Purpose: Assess compliance with environmental regulations, project-specific conditions, and environmental management plans (EMPs).
  - Frequency: Quarterly during the construction phase and biannually during the operational phase.
- **Impact Monitoring Reports:**
  - Purpose: Evaluate specific environmental impacts (e.g., air quality, noise pollution, water quality) related to project activities.
  - Frequency: Monthly during construction and quarterly during operation to provide ongoing assessment of environmental conditions.
- **Biodiversity Monitoring Reports:**
  - Purpose: Track changes in local flora and fauna populations and habitat conditions due to project activities.
  - Frequency: Biannual during construction and annual during operation to assess longer-term ecological impacts.

## 2. Social Monitoring Reports

Social monitoring focuses on understanding and managing the social impacts of the project, particularly on local communities and vulnerable groups.

### 8.7.1. Types of Social Monitoring Reports

- **Social Baseline Assessment Report:**
  - Purpose: Establishes the socio-economic conditions of the affected communities prior to project implementation, including demographics, health, and livelihoods.
  - Frequency: Conducted once at the project's outset.
- **Community Engagement Reports:**
  - Purpose: Document community engagement activities, stakeholder feedback, and responses to concerns raised by local residents.
  - Frequency: Prepared after each major community engagement session and summarized quarterly.
- **Social Impact Monitoring Reports:**
  - Purpose: Evaluate social impacts such as changes in employment, health and safety, and socio-economic conditions arising from the project.
  - Frequency: Quarterly during construction and biannually during operation to track ongoing social dynamics.
- **Vulnerable Group Monitoring Reports:**

- Purpose: Assess the specific impacts on vulnerable groups (e.g., women, children, and marginalized communities) and track the effectiveness of mitigation measures.
- Frequency: Quarterly during construction and biannually during operation.

### 3. Grievance Management Reports

These reports are essential for tracking community complaints and ensuring effective resolution of grievances related to environmental and social issues.

#### 8.7.2. Types of Grievance Management Reports

- Grievance Log Reports:
  - Purpose: Document all grievances received, actions taken, and outcomes achieved, ensuring transparency and accountability.
  - Frequency: Updated monthly throughout the project lifecycle.
- Grievance Analysis Reports:
  - Purpose: Analyze trends and patterns in grievances to identify recurring issues and improve project practices.
  - Frequency: Compiled biannually to evaluate the effectiveness of grievance management processes.

### 4. Health and Safety Monitoring Reports

These reports ensure that occupational health and safety standards are upheld, protecting both workers and local communities.

#### 8.7.3. Types of Health and Safety Monitoring Reports

- Health and Safety Compliance Reports:
  - Purpose: Assess adherence to occupational health and safety regulations, protocols, and best practices.
  - Frequency: Quarterly during construction and biannually during operation.
- Incident Reporting and Analysis Reports:
  - Purpose: Document and analyze any incidents or accidents that occur, assessing root causes and implementing corrective actions.
  - Frequency: Reported immediately after incidents, with summaries compiled quarterly.

## 8.8. Capacity building

The suggested capacity-building and training program presented in a tabular format, focusing on both environmental and social (ES) management and monitoring aspects for the Bosaso power grid repair and expansion project.

<b>Training Topic</b>	<b>Key Training Areas</b>	<b>Responsible Body/Organ</b>	<b>Frequenc y</b>	<b>Estimated Number of Participant s</b>	<b>Cost Estimat e</b>
<b>Environmental Management</b>	<ul style="list-style-type: none"> <li>• Environmental laws and regulations</li> <li>• Environmental impact assessment (EIA) procedures</li> <li>• Waste management strategies</li> </ul>	Environmental Authority	Annual	20	\$3,000
<b>Social Impact Assessment</b>	<ul style="list-style-type: none"> <li>• Conducting social impact assessments</li> <li>• Stakeholder engagement techniques</li> <li>• Vulnerable group identification</li> </ul>	Social Development Ministry	Annual	15	\$2,500
<b>Health and Safety Training</b>	<ul style="list-style-type: none"> <li>• Occupational health and safety protocols</li> <li>• Emergency response procedures</li> <li>• Risk assessment methodologies</li> </ul>	Health and Safety Authority	Semi-Annual	30	\$4,000
<b>Grievance Mechanism and Management</b>	<ul style="list-style-type: none"> <li>• Grievance reporting procedures</li> <li>• Community engagement strategies</li> <li>• Monitoring and evaluation of grievance systems</li> </ul>	Project Management Office	Quarterly	50	\$3,000
<b>Monitoring and Evaluation</b>	<ul style="list-style-type: none"> <li>• Data collection methods</li> <li>• Key performance</li> </ul>	Monitoring and Evaluation Unit	Quarterly	20	\$2,000

Training Topic	Key Training Areas	Responsible Body/Organ	Frequenc y	Estimated Number of Participant s	Cost Estimat e
	indicators (KPIs) <ul style="list-style-type: none"> <li>• Reporting standards and practices</li> </ul>				
<b>Community Health and Safety</b>	<ul style="list-style-type: none"> <li>• Community health awareness</li> <li>• Safety practices for community members</li> <li>• Reporting community health issues</li> </ul>	Health Ministry	Annual	40	\$2,000
<b>Total</b>					\$16,500

Notes:

- **Cost estimates** are approximations and can vary based on local conditions, training providers, and materials required.
- The **estimated number of participants** is flexible and can be adjusted based on the specific needs and the scale of the training.
- Responsible bodies may vary depending on the stakeholders involved and local organizational structures.
- Training frequency can also be adapted based on ongoing assessments and project phases.

### 8.9. Specific Monitoring Activities

Monitoring activities during the implementation of a power grid upgrade and expansion project in Bosaso City are crucial to ensure that the project aligns with environmental, social, technical, and financial goals. The following are the specific monitoring activities anticipated during the project implementation:

#### Environmental Monitoring

- *Air quality monitoring:* Regular assessment of emissions from construction machinery and vehicles.
- *Noise level monitoring:* Continuous noise level recording using decibel meters around construction zones.
- *Waste management oversight:* Regular inspection of waste storage and disposal methods, and monitoring adherence to protocols for handling hazardous materials, ensuring they are segregated and safely disposed of.
- *Water Resource Monitoring:* Monitoring of water usage to ensure sustainable consumption. Analysis of water quality in nearby bodies to prevent contamination from construction run-off.



### **Social and Community Impact Monitoring**

- *Stakeholder engagement and communication:* Monitoring the effectiveness of community engagement initiatives, including feedback sessions and the grievance redress mechanism.
- *Resettlement and compensation:* Tracking the implementation of resettlement plans and verifying that affected individuals or communities receive fair and timely compensation. Ensuring compliance with AfDB's standards for involuntary resettlement and livelihood restoration.
- *Health and safety monitoring:* Regular audits of construction sites to ensure compliance with occupational health and safety (OHS) standards. Tracking incidents, accidents, and near-misses, and taking corrective measures. Monitoring the availability and use of personal protective equipment (PPE) by workers.
- *Gender-based violence (GBV) risk management:* Oversight of GBV awareness programs for workers and local communities, and ensuring that monitoring mechanisms are in place to track reports of harassment or violence, and that these are managed following the project's GBV action plan.

### **Technical and Quality Control Monitoring**

- *Infrastructure and equipment checks:* Routine inspection of the quality and condition of power grid components such as transformers, distribution lines, and substations. Verifying that materials meet project specifications and standards set by the AfDB and local regulations.
- *Progress tracking and reporting:* Regular progress reports on construction milestones compared to the project schedule. Use of digital tools like GIS and project management software for real-time updates on project developments.
- *Performance testing:* Conducting periodic tests to evaluate system performance as sections of the grid are upgraded or newly constructed; and ensuring that all installations meet efficiency and safety benchmarks before integration into the grid.

### **Compliance and Policy Adherence**

- *Regulatory compliance audits:* Periodic assessments to ensure the project complies with national environmental, construction, and labor laws; and documentation and reporting aligned with the AfDB's environmental and social policies.
- *Documentation and record-keeping:* Comprehensive record-keeping of permits, reports, and any corrective actions taken to maintain transparency and accountability; and submitting regular compliance reports to the relevant regulatory bodies and the AfDB.

### **Socioeconomic Monitoring**

- *Local employment and economic impact:* Tracking job creation for local communities, including roles provided and skill levels engaged; and periodic surveys to assess economic benefits to local businesses and supply chains.
- *Skills development programs:* Monitoring training sessions and capacity-building activities for local workers; and ensuring that training content aligns with the project's skills transfer objectives.

### **Security Monitoring**

- *On-site security measures:* Regular checks on the effectiveness of site security measures to protect equipment and personnel; and monitoring the implementation of protocols to address unauthorized access and potential threats.
- *Community safety and protection:* Continuous assessment of measures to safeguard surrounding communities from project-related risks; and ensuring traffic management plans are effective in reducing road hazards associated with construction.

### **Reporting and Review Processes**

- *Bi-annual review meetings:* Convening review meetings involving stakeholders, project managers, and AfDB representatives to assess progress.
- *Adaptive management:* Adjusting project plans and monitoring strategies based on feedback and observed outcomes during implementation.

#### **8.10. Pre-construction Phase**

The pre-construction phase includes the study and design phase, tendering phase and the time before the contractors' mobilisation and commencement of the works. Therefore, prior to the Contractor mobilization and the commencement of construction, environmental and social management will be concerned with the following principal groups of activities:

- *Ensuring that all National and AfDB requirements and procedures relating to ESIA are complied with;*
- *Ensuring that environmental and social considerations are explicitly contained in the contract document;*
- *Preparation of detailed designs (i.e. during tower microsighting) which incorporate specific features aimed at minimizing adverse impacts and enhancing beneficial impacts;*
- *Preparation of tender and construction contract documents which contain appropriate clauses to allow control of impacts arising from construction activities*

The MoEWR will be responsible for ensuring that its own environmental requirements are fully met. The Detail Design and Tender Document (DD and TD) Consultant to be appointed by MoEWR will have primary responsibility for the quality and content of the design and tender documents. This will include ensuring that the adverse impact minimization and benefit enhancement measures set out in the ESIA are given due consideration in the preparation of designs and tender documents.

#### **8.11. Construction Phase**

Most of the project environmental management activities will be carried out during the construction phase, since this is when most impacts can be expected to arise. Management will be concerned with controlling impacts that may result from actions of the contractor, through enforcement of the construction contract clauses related to protection of the environment. In this respect, it is important to recognize that successful mitigation of construction impacts can only be achieved if the environmental protection measures, as set out in the construction contract and in this ESIA document are properly enforced.

Construction and construction-related activities will cause impacts that will either be reflected directly or indirectly. Thus, during this phase there is a need to constantly identify the occurrence of such impacts and implement mitigation measures as indicated in this ESIA. The main responsibility for this task lies with the Contractor and the Supervision Consultant. The Supervision Consultant shall constantly monitor and ensure the ESMP is fully enforced. Further, the supervising consultant has the responsibility of identifying emergency environmental problems/risks and taking immediate actions, which are within the scope of its capabilities.

The Contractor is responsible for implementing all actions indicated in the ESMP and immediate measures proposed by the Supervision Consultant. In addition to the Contractor and the Supervision Consultant, MoEWR and relevant Puntland State agencies shall actively participate in the process and shall conduct periodic assessment of the implementation of the ESMP and of other environmental issues. An Environmental Inspector will be responsible for environmental management and monitoring at the lowest organizational level, but his role in the management chain is crucial if effective impact control is to be achieved. Other responsible bodies include the regional environmental protection organs, local administration (Bosaso Municipality and Puntland State agencies) and the community. As most socio-environmental impacts will be reflected on the local community and administration, they shall actively participate in the management plan and contribute their share of the efforts towards protecting the environment and the local community.

#### 8.12. Commissioning Phase

Major tasks to be accomplished before commissioning of the project include:

- *The contractor shall clean up the project site and its immediate environment from all construction refuse, wastes and surplus construction materials;*
- *The contractor shall properly dismantle construction plant, machinery, storage facilities, offices and other temporary structures;*
- *The contractor shall loosen all compacted earth at the temporary facilities sites and access roads. Further, such sites shall be rehabilitated to as close to their pre-construction condition as possible; and In general, all environmental requirements (to be indicated in the Contract Document) shall be satisfied.*

The contractor is responsible for conducting all the tasks listed above. However, the Supervision Consultant and the project owner have the responsibility of monitoring, evaluating and approving the actions of the Contractor, to ensure that it complies with the above requirements.

#### 8.13. Post-construction/Operation & Maintenance Phase

For the successful implementation, routine and periodic environmental and social management must be carried out in a timely manner and this would, in the meantime, ensure the (environmental, social and economic) sustainability of the project. Some of the main environmental issues of concern during project operation include:

- *Occupation, Health and safety risks; alteration to the bio-physical, social and health characteristics of the recipient environment;*

- *Alterations in the interactions between project activities and environmental sensitivities, and interactions among the various sensitivities; to ensure the effectiveness of the mitigation measures;*
- *Determination of long term and residual effects; and identification of Project specific cumulative environmental effects and recommend site-specific management plan as required.*

MoEWR, ESPs and the concerned Puntland State authorities are key actors for ensuring the implementation of management and constant updating of the ESMP.

#### 8.14. The Environmental and Social Management Plan (ESMP)

Major environmental management activities planned to be undertaken at different phases of the project are listed in *Table 8.1*.

**Table 8-0-2:** Environmental and social management plan (ESMP) for the proposed repair and expansion of Bosaso power grid, Somalia

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
<b>CONSTRUCTION PHASE</b>						
Impacts on biophysical environment	Landscape and visuals	<ul style="list-style-type: none"> <li>• [Erect temporary barriers or screens around construction sites to shield views of heavy machinery, equipment, and activities from the surrounding area, minimizing visual disturbance].</li> <li>• Limit the clearing of vegetation to only what is necessary for construction, and ensure that any cleared areas are rehabilitated with native plants after construction to restore the landscape.</li> <li>• Locate material storage areas and equipment yards in less visible or already disturbed areas, and keep them tidy to reduce the visual clutter during the construction period.</li> <li>• Design temporary access roads with minimal disruption to the landscape,</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of a perimeter fence</li> </ul>	<ul style="list-style-type: none"> <li>• One-off</li> </ul>	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>and ensure these roads are restored to their original condition, or better, once construction is complete.</p> <ul style="list-style-type: none"> <li>• Where possible, restore disturbed areas progressively as construction moves forward rather than waiting until the project is fully completed. This helps minimize prolonged visual impacts.</li> <li>• Avoid construction activities near scenic or culturally significant landscapes, and design project phases to avoid highly visible areas during periods of high public activity, such as tourist seasons.</li> <li>• Ensure that waste and debris from construction activities are promptly and properly managed and disposed of to avoid creating an unsightly and cluttered environment.</li> <li>• Minimize the use of bright</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		lights during nighttime construction to reduce light pollution, especially in areas that are normally dark. Use directional lighting to limit the spillover of light into surrounding areas.				
	Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> <li>• Avoid removing short vegetation and grass along the distribution line corridor as far as it does not hinder construction works.</li> <li>• Concrete wash water to be discharged only at designated facilities.</li> <li>• [Construction of adequate and efficient drainage channels at the substation site, which will provide proper drainage for the substation during operation].</li> <li>• Discharge of untreated concrete wash water to surface waters to be strictly prohibited.</li> <li>• Ensure all hazardous materials are stored in</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Records of any leakages from construction equipment/vehicles.</li> <li>• Oil spill containment plan.</li> <li>• Provision of fuel/oil drip and spill trays</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	6500



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>designated areas (i.e. on flat or gently sloping ground) to prevent spillage;</p> <ul style="list-style-type: none"> <li>• Ensure appropriate hazardous materials containers are used with seals that are in good condition (i.e. glass containers for corrosive chemicals);</li> <li>• [Ensure employees have appropriate training in safe hazardous materials handling];</li> <li>• Implementation of temporary erosion control measures (e.g. silt fence, erosion mats) especially where construction sites are near surface water.</li> <li>• [Installation of portable toilets for construction workers].</li> <li>• Recycling of wash water will be done as far as practical.</li> <li>• Remove and dispose wastes from septic tanks installed for construction</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>crew camps at appropriate interval &amp; at designated sites to avoid overflow and prevent contamination of the ground or surface drainage; and</p> <ul style="list-style-type: none"> <li>• [Revegetation of exposed slopes immediately after construction is completed].</li> <li>• Spillage of hazardous liquids (e.g. oil) to be prevented by implementing spill prevention measures.</li> <li>• Stockpiles and temporarily removed topsoil to be stored in a location and manner to prevent soil runoff.</li> <li>• The contractor is required to collect and treat storm water runoff from open workshop servicing and repairs and other areas in bonded storage areas before discharging into receiving drainage and waterways;</li> <li>• [The contractor is required to</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>make specific and adequate provision for the disposal of sanitary and other liquid and solid wastes in such a way as will not result in any form of pollution or hazard to human or animal health];</p> <ul style="list-style-type: none"> <li>• The Contractor is required to prevent entrance or accidental spillage of pollutants and wastes into flowing and/or dry water courses and groundwater resources.</li> <li>• The contractor is required to prohibit washing of project vehicles and plant in or adjacent to any water sources. All washing to be carried out at designated areas away from water sources; and</li> <li>• The contractor is responsible, at his own cost, for cleaning up any pollution caused by his activities and the payment of full compensation to those affected.</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Air quality (Dust)	<ul style="list-style-type: none"> <li>To prevent high dust near settlements, traffic speed should be reduced to 30km/hr;</li> <li>Reduce the duration of construction activities resulting in more dust generation;</li> <li>Concrete mixing plants and associated machinery installed for project activities will be equipped with suitable pollution control (dust suppression equipment) arrangements.</li> <li>[The Contractor is responsible to develop an ambient air quality monitoring and management plan (C-ESMP), with particular focus on dust monitoring].</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Visual Observation of dust</li> <li>Provision of PPEs especially masks</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	4500
	Air quality (Vehicle exhaust emissions)	<ul style="list-style-type: none"> <li>Vehicle speed in residential areas will be limited by instructions to drivers. This will be enhanced by the installation of speed limit signals as appropriate;</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Engine maintenance records</li> <li>Inspection of stacks</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> <li>• Construction machinery should be well maintained to minimize excessive gaseous emissions;</li> <li>• Prevent the occurrence of smoke emissions or fumes from fuel oils;</li> <li>• Avoid exposing any volatile chemical to the atmosphere;</li> <li>• Do not burn material, which produce toxic gases. No burning is allowed to materials such as tires, plastic, rubber products or other materials that create heavy smoke or nuisance odour.</li> <li>• [The Contractor is also responsible to monitor the air pollution risk at all construction sites, campsite, access roads and near settlements/villages].</li> </ul>				
	Noise & vibration	<ul style="list-style-type: none"> <li>• A proper routine and preventive maintenance procedure for project vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Noise levels- Records of noise measurements done by</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>and equipment should be set for their best operating conditions and lowest noise levels possible so that extraneous noises from mechanical vibration, creaking and squeaking are reduced to a minimum;</p> <ul style="list-style-type: none"> <li>• [Conduct job-specific training for machinery and heavy vehicle operators to cover the importance of noise control and available noise reduction measures].</li> <li>• In principal, noisy construction works to be limited to normal working hours and no operation on Fridays and public holidays.</li> <li>• Vehicles and machinery to be equipped with exhaust mufflers and well maintained.</li> <li>• Additional noise suppression measures (e.g. covering of noisy units) to be</li> </ul>		<p>contractor within the project area and at distances of 30m from the Hybrid power plant</p>		

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>implemented if noise levels at nearest sensitive receptor consistently exceeds national noise standard or in case of consistent complaints.</p> <ul style="list-style-type: none"> <li>• [Construction workers to be provided with appropriate PPE such as ear plugs and ear muffs for protection against excessive noise].</li> <li>• Construction machines and vehicles to be turned off when not in use.</li> <li>• [Construction equipment generating high noise shall be designed to have an adequate noise control (such as mufflers, silenced exhaust acoustic)];</li> <li>• Controls shall be undertaken to reduce exposures to &gt;80 dBA, including layout of equipment, selection of quieter machines, isolation of workers from</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>noise source etc.</p> <ul style="list-style-type: none"> <li>• Coordinate and implement all noise and vibration control measures to ensure National and AfDB standards are met;</li> <li>• Minimize worker exposure to noise and vibration by providing appropriate PPE, hearing protection and noise control device as required.</li> </ul>				
	Biodiversity (Fauna)	<ul style="list-style-type: none"> <li>• As much as possible the size of the area to be cleared and used for the project should be minimized;</li> <li>• Vehicles and trucks as much as possible should use the existing roads to minimize foot and vehicle traffic through undisturbed areas and loss of habitat by wildlife;</li> <li>• [Habitat restoration activities should be initiated after construction activities are completed];</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Full implementation of biodiversity management plan for the project</li> <li>• Regular biodiversity monitoring and reporting</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	4500



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> <li>• Secure the safe movement of animals displaced and an attempt to protect in their new habitat must be carried out.</li> <li>• To design an avian-safe power pole to minimize bird electrocution risk by providing sufficient separation between energized phase conductors and between phases and grounded hardware to accommodate at least the wrist-to-wrist or head-to-foot distance of a bird;</li> <li>• The use of a steel or concrete monopole structure with sufficient clearance would minimize electrocution risks to avifauna; and</li> <li>• Cross-arms, insulators and other parts of the power lines can be constructed so that there is no space for birds to perch where they can be proximate to</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>energized wires.</p> <ul style="list-style-type: none"> <li>• [Making power line more visible to birds (line marking). The assumption is that birds collide with overhead cables because they cannot see them. Hence, high-visibility markers should be installed to make the lines more visible to birds].</li> <li>• [Habitat management at site level should be considered, such as, to avoid establishing ponds or waste disposal storage sites within development area];</li> <li>• As much as possible vegetation cover that may support small mammals, rodents, reptiles, amphibians and other birds, which attract raptors, must be removed; and</li> <li>• Retain existing low-lying vegetation ground cover along the distribution</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		line ROW thereby minimizing vegetation clearing.				
	Biodiversity (Flora)	<ul style="list-style-type: none"> <li>• Avoid unnecessary destruction of trees and other vegetation by restricting land clearing to what is absolutely necessary within the project boundary and along the access road alignment;</li> <li>• [Rehabilitation of temporary construction sites and camps should be done with suitable native plants];</li> <li>• [All damaged areas shall be reinstated and rehabilitated upon completion of the construction];</li> <li>• [Compensate in cash for the loss of privately-owned mature trees];</li> <li>• The contractor will be responsible for any fire accident caused by his activities within the project area;</li> <li>• The contractor is responsible for the conduct</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Number of trees cleared</li> <li>• Planted trees</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	5500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>of his workforce in relation to environmental protection matters and to specifically prohibit unnecessary felling of trees;</p> <ul style="list-style-type: none"> <li>• There should be care to avoid introduction of invasive alien species. Early detection and eradication is recommended.</li> </ul>				
	Soil erosion	<ul style="list-style-type: none"> <li>• Along the access road corridor, replanting cleared areas on slopes vulnerable to erosion such as cut-and-fill slopes with plant species (grasses) which have the abilities to: armour the surface against erosion and abrasion by intercepting raindrops; support the slope by propping from the base; and reinforce the soil profile by increasing its shear resistance (roots); etc.,</li> <li>• [Design and construct suitable permanent drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Assess size of rills or Gulleys forming from accelerated run off from compacted areas</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	3500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>structures including: Paved side drains for sections vulnerable to serious erosion and gully formation (mainly around tower foundation areas and within the SS); and diverting drains (where these are necessary), which avoid excessive concentration of flows].</p> <ul style="list-style-type: none"> <li>• Minimize side-casting of excavation materials at construction site and along the access road corridor by depositing it only on approved disposal sites;</li> <li>• Preserving topsoil from the project boundary and road cuts for re-use during site restoration on laydown and other areas used for temporary purposes.</li> <li>• The risk rating of impacts from soil erosion is classified as moderate, which is environmental</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>impact with some consequences and likely to occur. Implementation of the above mitigation measures is expected to reduce the risk rating to Low, which is environmental impacts with no or limited consequence and less likely to occur.</p> <ul style="list-style-type: none"> <li>• Within the project boundary and along the project access road alignment, restrict land clearing to what is absolutely necessary.</li> </ul>				
	Wastes (Solid wastes)	<ul style="list-style-type: none"> <li>• Construction wastes will not be allowed to accumulate on the construction site but will be promptly collected and removed regularly from the site by the Contractor;</li> <li>• Indiscriminate disposal of solid waste shall be strictly prohibited;</li> <li>• [Sufficient number of labelled and colour coded garbage bins</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of well-maintained receptacles and centralized collection points.</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	9000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>and container will be made available at all construction offices, stores, camps, canteens, etc. to ensure wastes are strictly segregated at generation sites (source). Waste bins shall be labelled in Amharic, Somali and English and according to standards];</p> <ul style="list-style-type: none"> <li>• Wastes will be appropriately segregated such that hazardous and non-hazardous wastes are not mixed and to allow for recycling and reuse where appropriate;</li> <li>• [Waste materials will be placed and stored in suitable containers. Storage areas and containers will be maintained in a sanitary condition and shall be covered to prevent spreading of wastes by wind or animals];</li> <li>• All wastes generated shall be correctly identified and</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>stored pending collection/transfer for reuse, recovery, recycling or disposal in an environmentally sound manner;</p> <ul style="list-style-type: none"> <li>• Any waste material that is inadvertently disposed in or adjacent to any watercourses will be removed immediately in a manner that minimizes adverse impacts, and the original drainage pattern will be restored;</li> <li>• All wastes, which are not designated as combustible waste to be burned on-site, will be recycled, disposed of in an approved landfill, or shipped to an approved disposal facility; and</li> <li>• Solids, sludge and other pollutants generated as a result of construction or removed during the course of treatment or control of wastewaters will be</li> </ul>				



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>disposed of in a sanitary landfill and prevented their direct or indirect discharge to any watercourse or ground waters.</p> <ul style="list-style-type: none"> <li>• Hazardous wastes</li> <li>• All hazardous waste shall be disposed of in accordance with the national and international legislative requirements;</li> <li>• Develop and implement emergency preparedness and response plan.</li> <li>• [Ensure appropriate PPE is provided and used]</li> <li>• [Establish temporary and permanent spill containment structure];</li> <li>• Know the location and proper use of clean-up material;</li> <li>• Respect, as minimum requirements national and international laws, codes and guidelines and to apply the strictest standards everywhere</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		feasible. <ul style="list-style-type: none"> <li>[Site operators must ensure that spilled products are immediately cleaned to prevent seepage of the same into the nearby river and groundwater].</li> </ul>				
	Wastes (Liquid wastes)	<ul style="list-style-type: none"> <li>[Proper storage of the oil is required to ensure no leakages]</li> <li>Frequent inspection and maintenance of the generator to minimize leakages.</li> <li>No vehicles should be serviced or maintained at the project site.</li> <li>[The waste oil or used oil must be disposed-off appropriately].</li> <li>Proper training for the handling and use of fuels for the operators of the power plant.</li> <li>In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Engine maintenance records</li> <li>Oil spill containment plan</li> <li>Presence of separate and clean washrooms for both the gents and ladies</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	4500
	Impacts on infrastructure	Water consumption	<ul style="list-style-type: none"> <li>The Contractor will not use the existing community</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Water usage records</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
culture and utilities		<p>water points;</p> <ul style="list-style-type: none"> <li>• In consultation and without affecting the availability of water resources for existing users, the Contractor is responsible to make arrangements to supply the water demand for construction and other purposes;</li> <li>• [The Contractor will need to develop its own water supply sources (i.e. to buy water from licensed suppliers or wells) for the construction and the campsites requirements]</li> <li>• [In the event of there being any valid dispute regarding the effect the contractor's arrangements may have on the water supply of others, the contractor shall be responsible for providing an alternative supply to those affected, which is not inferior in quantity or quality to that previously</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		enjoyed].				
	Energy Consumption	<ul style="list-style-type: none"> <li>• Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used.</li> <li>• Proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts.</li> <li>• [Complementary to these measures, they monitor energy use during construction and set targets for reduction of energy use].</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Energy consumption records</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	2500
	Inconveniences and disruptions	<ul style="list-style-type: none"> <li>• [Promptly compensate economically displaced persons for loss of assets at full replacement cost].</li> <li>• [Provide replacement property of equal or greater value, or cash compensation at full replacement</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Number of PAP successfully compensated</li> <li>• Number of grievances lodged</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	17000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>cost where appropriate, to persons with legal rights or claims to land which are recognised or recognisable under the national law].</p> <ul style="list-style-type: none"> <li>• Provide assistance that will off-set any loss of a community's commonly held resources. This could take the form of initiatives that enhance the productivity of the remaining resources to which the community has access, in-kind or cash compensation for loss of access or provision of access to alternative sources of the lost resource.</li> <li>• [Compensate economically displaced persons who are without legally recognisable claims to land for lost assets].</li> <li>• [Provide transitional support to economically displaced persons, as necessary, based on a reasonable</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		estimate of the time required to restore their income-earning capacity, production levels, and standards of living].				
	Impacts on Vulnerable Groups	<ul style="list-style-type: none"> <li>• Establish an accessible, confidential GRM to report concerns related to safety, accessibility, and other impacts.</li> <li>• [Implement additional safety protocols around work zones, including signage, barriers, and clear pedestrian pathways, especially near schools, healthcare facilities, and areas frequented by vulnerable populations].</li> <li>• Provide employment opportunities to vulnerable groups' households.</li> <li>• Coordinate with local organizations to offer support services, such as temporary relocation assistance, counseling, or</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Number of PAP successfully compensated</li> <li>• Number of grievances lodged</li> <li>• Number of vulnerable people employed</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		financial support, to those most at risk of hardship due to project-related disruptions. <ul style="list-style-type: none"> <li>• Regularly monitor the impact on vulnerable groups and adjust mitigation measures as needed, ensuring transparency and open communication with community representatives and local authorities.</li> <li>• [Offer community workshops on health, safety, and job readiness related to the project, focusing on empowerment and resilience-building for vulnerable groups].</li> </ul>				
	Accidental discovery of cultural resources	<ul style="list-style-type: none"> <li>• Chance Find Procedure disseminated among workers during induction trainings;</li> <li>• Upon identification of suspected archaeological or cultural remains, the location must</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>		One-off	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>not be disturbed, operations will immediately cease in the affected area and activities that create ground disturbance will be minimised in and adjacent to the affected area;</p> <ul style="list-style-type: none"> <li>• The discovered site will be delineated as "no work zone";</li> <li>• Unauthorized entry will be prohibited and the site secured to prevent any damage or loss of removable objects;</li> <li>• Under no circumstances, any artefacts will be removed, destroyed or interfered with by anyone on the site; and Contractors and workers shall be informed of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts;</li> <li>• [The responsible Regional</li> </ul>				



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>authorities shall assess the significance and importance of the findings according to the various criteria relevant to cultural heritage];</p> <ul style="list-style-type: none"> <li>• [Restoration measures will be employed to protect discoveries and flagging the area boundaries].</li> </ul>				
	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> <li>• [Fencing off the facility to keep of community members, children and livestock from entering into the facility]</li> <li>• Controlled access to the site only with prior approval</li> <li>• Maintain records of any person who comes to site</li> <li>• Ensure proper Right-of-Way (RoW) Management by undertaking secure clearances and maintain an adequate distance from residential areas, schools, and hospitals to minimize risks to public safety and avoid interference with daily</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of a controlled access and records of every person accessing the site</li> </ul>	<ul style="list-style-type: none"> <li>• Weekly</li> </ul>	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>activities.</p> <ul style="list-style-type: none"> <li>• [Implement measures to protect vegetation, including re-vegetation where necessary].</li> <li>• [Install visible and durable safety signage along the distribution routes to warn the public about electrical hazards and restrict unauthorized access].</li> <li>• [Ensure that waste generated during construction, including scrap metal, cables, and insulation materials, is safely collected, disposed of, or recycled to prevent environmental contamination].</li> </ul>				
	Worker influx – incoming workforce .	<ul style="list-style-type: none"> <li>• Maximise local hire of labour, in so far as this is compatible with the contractor’s skill requirements;</li> <li>• [Train all construction workers the local culture with the objective to protect the authentic</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Records of employees/ updated employee register.</li> <li>• Number of local community employees and external employees/ updated employee register.</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>culture and heritage of the people of the project area]</p> <ul style="list-style-type: none"> <li>Assign the responsibility to liaison with local communities and local authorities to a named individual from the contractor's organization and to require effective liaison to promote social integration, and the development of mutually satisfactory solutions to problems affecting local communities.</li> </ul>				
	Impact on Shelter (Housing) and Settlement	<ul style="list-style-type: none"> <li>Preparation of engineering designs with due consideration to reduce the need for land and property expropriation without significantly compromising the design standards which minimise land acquisition, and in particular acquisition of land occupied by housing premises;</li> <li>[Payment of full and fair</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Number of grievances lodged</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	3500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>cash compensation, which leaves those affected by relocation at least no worse off than they were previously].</p> <ul style="list-style-type: none"> <li>• [In case of any businesses, the compensation payments should be adjusted to take into account any anticipated loss of income which may arise as a result of the need for relocation to a less suitable location away from the main centre of business activities];</li> <li>• Assessment of cash compensation for property should be carried out in a wholly transparent manner by involving representatives of PAPs in Committees resulting in payments which truly reflect current rebuilding costs;</li> <li>• All affected persons should be freely allowed to salvage building materials, trees</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>and other assets on affected land as additional compensation for displacement;</p> <ul style="list-style-type: none"> <li>No construction should commence until all land and property expropriation procedures have been completed, replacement land allocated, and cash compensation paid.</li> </ul>				
	Security risks	<ul style="list-style-type: none"> <li>Establish a well-structured security service to assure security of the workers and the community in the project footprint.</li> <li>Apply due diligence during selection of security providers, devise rules of engagement and provide training to all personnel;</li> <li>Making clear that any community member can appeal if any project security breach happened to any of the community and/or its member;</li> <li>[Carryout</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Number of security incidents and response time to security incidents.</li> <li>Compliance with security protocols.</li> <li>Incidents of unauthorized site access.</li> <li>Grievances related to security.</li> <li>Community engagement on security issues.</li> <li>Security risk assessments.</li> <li>Coordination with</li> </ul>	Quarterly	8500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>comprehensive community risk assessment and implement adequate provisions to minimize risks to communities, with particular attention to traffic risks on public roads and security risks assessment and responsibilities];</p> <ul style="list-style-type: none"> <li>• [Place appropriate signage on the boundary or at the entrance to all construction sites, warning against entering the site and highlighting the health and safety risks];</li> <li>• [Develop public awareness programme (including in schools along the DL corridor) to identify areas of particular risk and approaches to reduce risk].</li> <li>• Ensure that the safeguarding security to personnel and property is carried out in accordance with relevant human rights principles and</li> </ul>		<p>local law enforcement.</p> <ul style="list-style-type: none"> <li>• Security equipment functionality.</li> <li>• Frequency of security audits.</li> </ul>		

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>in a manner that avoids or minimizes risks to the nearby communities.</p>				
	Occupational Health and safety Impacts	<ul style="list-style-type: none"> <li>• A construction safety management system shall be employed during project implementation ;</li> <li>• Ensure that necessary protective devices and clothing are provided to the workers and that they are used for the safety and health of his or her workers;</li> <li>• [Provide personal protective equipment (PPE) and clothing (gloves, fall arrester, goggles, steel-toed boots, respirators, dust masks, hard hats, etc.) materials and tools and it shall be distributed to the workers for its day-to-day use shall be monitored];</li> <li>• A safety harness is required as a fall arrester, each workman working there shall be</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Records of any near misses, incident, and accidents.</li> <li>• Records of corrective actions implemented if there was an accident.</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	6500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>provided with one. Every safety harness shall be provided with a suitable anchorage and fittings to prevent serious injury in the event of fall;</p> <ul style="list-style-type: none"> <li>• Whenever the use of a safety harness is necessary, a workman has a duty to wear the safety harness provided and keep it attached to a secure anchorage for his own or any other person's safety;</li> <li>• To the extent possible, reduce or minimize noise at work sites and if cannot be avoided, provide workers with PPEs such as hearing protection;</li> <li>• Apply measures such as suppressing dust and other particulate matters like those from cement storage sites;</li> <li>• In the case of manual handling of loads, advise/train workers to assess the</li> </ul>				



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>associated risks carefully and provide information about the size and distribution of loads;</p> <ul style="list-style-type: none"> <li>• [During induction training, awareness shall be created among the workers on safe working practices and precautionary measures to be adopted];</li> <li>• Maintain adequate traffic control measures throughout the construction phase;</li> <li>• Adopt regular systematic safety recording and reporting system (incidents, near misses);</li> <li>• [Place signs around the construction areas to provide safety advice and warning, facilitate traffic to provide direction to various components of the works etc. All signs shall be in Somali, Amharic and English and according to standards];</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> <li>• Ensure that safety procedures are followed at all workplaces. Supervisor are responsible to check whether appropriate safety measures are taken/implemented before any construction activities commence; and</li> <li>• Respect working zone to protect passersby from encroaching the active working area;</li> </ul>				
	Community health and safety risks	<ul style="list-style-type: none"> <li>• Use water spray or other dust suppression techniques and ensure that equipment emissions are regularly maintained to limit air pollution.</li> <li>• Limit construction activities to daytime hours, especially near residential areas, and use noise-dampening equipment to minimize disturbance to nearby communities.</li> <li>• Develop and implement a traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Number of awareness creation sessions conducted.</li> <li>• Availability of and distribution of condoms</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>management plan to control vehicle movement near construction sites, including signage, speed limits, and designated crossing points for pedestrians.</p> <ul style="list-style-type: none"> <li>• [Install visible barriers around construction areas and provide clear warning signs to keep the public away from hazardous zones, especially near live electrical installations].</li> <li>• [Implement proper waste disposal practices to avoid any build-up of debris, hazardous waste, or pollutants that could impact community health. Secure hazardous materials to prevent unauthorized access].</li> <li>• Conduct informational sessions to inform the community about the project, potential risks, and safe practices around construction</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>zones and electrical infrastructure.</p> <ul style="list-style-type: none"> <li>• Develop and communicate an emergency response plan specific to the project site, including emergency contacts, first aid stations, and protocols for handling incidents like fires or electrical hazards.</li> <li>• [Regularly monitor EMF levels from the power lines to ensure they are within safe limits, as recommended by international guidelines, to protect nearby residents].</li> <li>• Set up a confidential and accessible system for community members to report health and safety concerns, ensuring timely response and resolution.</li> <li>• Maintain open lines of communication with community representatives to keep them informed about the project's progress and any temporary</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		disruptions, fostering trust and cooperation.				
	Temporary disruption of electricity supply	<ul style="list-style-type: none"> <li>Construction works will be planned in manner to minimize duration of power outage.</li> <li>If power outage is unavoidable, it will be communicated to the public and facilities (e.g. hospital) in advance.</li> <li>[Outages will be planned in co-ordination with ESPs and give at least one weeks' notice for the occurrence of outages].</li> <li>Overhead line work to be designed and carried out in a way to avoid interference with existing power lines and maintaining safe separation distances from existing distribution lines.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Records of any grievances</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	6500
	Impacts associated with construction traffic	<ul style="list-style-type: none"> <li>Include a clause in the construction contracts to the effect that the contractor must make every reasonable effort to</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Number of traffic incidents.</li> <li>Traffic management plan compliance</li> <li>Speed limit</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>minimize road safety hazards and inconvenience to other road users, resulting from the passage of his, or his subcontractors' haulage vehicles, and should impose and enforce compliance with speed limits;</p> <ul style="list-style-type: none"> <li>• [The Contractor to prepare a traffic management plan detailing traffic control procedures, train its personnel traffic management procedures, travel speed limits and related control measures];</li> <li>• The contractor should put speed limits for cars and appropriate traffic signs in and around construction areas;</li> <li>• Assign a well-trained &amp; adequate number of traffic marshals mainly around a place where sensitive receptors (settlements, schools, health</li> </ul>		<p>violations.</p> <ul style="list-style-type: none"> <li>• Traffic safety training attendance.</li> <li>• Community complaints related to traffic.</li> <li>• Emergency response time to traffic incidents.</li> <li>• Community awareness programs on traffic safety.</li> <li>• Use of alternative routes by construction vehicles.</li> </ul>		

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> <li>posts, worship areas,) exist;</li> <li>• Drivers shall be given induction training at the start of the project, company policy, about road safety and due diligence to ensure safety of other road users; and</li> <li>• [Create awareness for the local people on how to use roads and keep themselves away from the traffic accident].</li> </ul>				
	Fire Hazards	<ul style="list-style-type: none"> <li>• Create awareness to the construction workers on potential fire hazards</li> <li>• [Provision of firefighting equipment on site during construction].</li> <li>• No smoking shall be done on construction site</li> <li>• ‘No smoking’ signs shall be posted at the construction site</li> <li>• [A fire risk assessment and evacuation plan should be prepared and must be posted in various</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Records of any Fire incidences</li> <li>• Fire equipment and evacuation plan</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	6500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>points of the construction site including procedures to take when a fire is reported].</p> <ul style="list-style-type: none"> <li>Designate an assembly point</li> </ul>				
	Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> <li>[Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders].</li> <li>Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget.</li> <li>In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders.</li> <li>[Prepare and</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Availability of and implementation of the Stakeholder Engagement Plan.</li> <li>Number of stakeholder consultations held</li> <li>Record of stakeholder consultations held (minutes of meetings and list of participants).</li> <li>Information disclosed, to whom it was disclosed (Men, women, PWD, youth, vulnerable individuals and households etc., methods and languages used in the disclosure (culturally appropriate and accessible),</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	7500



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>implement a grievance redress mechanism to deal with grievances].</p> <ul style="list-style-type: none"> <li>• [The grievance redress committee to include representatives from the community].</li> <li>• [Sensitize stakeholders on SEP and GRM].</li> </ul>		<p>grievances raised and status on resolution etc.</p> <ul style="list-style-type: none"> <li>• Concerns raised and actions raised.</li> </ul>		
<b>OPERATION PHASE</b>						
Impacts on biophysical environment	Landscape and visual	Fence off, especially the sub-stations and power plants to off/screen the solar panels.	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of a perimeter fence</li> </ul>	<ul style="list-style-type: none"> <li>• One-off</li> </ul>	5500
	Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> <li>• [Conduct regular environmental monitoring of soil, groundwater, and surface water quality to detect any contamination early].</li> <li>• Implement a comprehensive waste management plan that includes safe disposal of hazardous materials, such as oils, batteries, and chemicals used in maintenance.</li> <li>• [Provide training to operational staff on the proper</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Oil spill containment plan.</li> <li>• Provision of fuel/oil drip and spill trays</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	10500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>handling and storage of hazardous materials to minimize accidental spills and leaks].</p> <ul style="list-style-type: none"> <li>• [Perform regular maintenance and inspections of power lines, substations, and solar panels to ensure that no leaks or spills occur].</li> <li>• Opt for environmentally friendly materials and substances in maintenance and operational practices to reduce the risk of contamination.</li> <li>• [Manage vegetation around power lines and substations to prevent invasive species and maintain healthy ecosystems, which can aid in filtration and runoff control].</li> <li>• [Develop and implement soil remediation plans if contamination is detected, including the use of bioremediation or</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		phytoremediation techniques]				
	Air quality (Dust)	<ul style="list-style-type: none"> <li>[Trees can be planted around the power plants and substations provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution]</li> </ul>	<ul style="list-style-type: none"> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	4500
	Air quality (Vehicle and genset exhaust emissions)	<ul style="list-style-type: none"> <li>Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.</li> <li>[Company vehicles should be well maintained]</li> </ul>	<ul style="list-style-type: none"> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Engine maintenance records</li> <li>Inspection of stacks</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	6000
	Noise & vibration	<ul style="list-style-type: none"> <li>Generator room should be sound proof to ensure no noise of a nuisance level will be produced.</li> <li>[Monitor noise levels]</li> </ul>	<ul style="list-style-type: none"> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> </ul>	4500
	Biodiversity (Fauna)	<ul style="list-style-type: none"> <li>Temporary-use areas shall be restored and revegetated</li> <li>An ecologist shall be hired to coordinate the fauna monitoring.</li> <li>[Undertake regular</li> </ul>	Proponent	Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting	Quarterly	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>entomological monitoring and reporting programme]</p> <ul style="list-style-type: none"> <li>• Bird deterrents will be installed to prevent collisions with the structures.</li> <li>• [Post-construction monitoring will be undertaken to assess the impacts on local fauna and adapt mitigation strategies].</li> </ul>				
	Biodiversity (Flora)	<ul style="list-style-type: none"> <li>• [Undertake restoration works using indigenous plant species].</li> <li>• [Undertake invasive species removal and monitoring].</li> <li>• An ecologist shall be hired to coordinate the flora monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Number of trees cleared</li> <li>• Planted trees</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	5000
	Soil erosion	<ul style="list-style-type: none"> <li>• [Construct the drainage system in a way to follow natural drain of the water]</li> <li>• Concrete only the required area and leave the rest of the land with vegetation like grass</li> <li>• [Construct rain water harvesting system on the control</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Assess size of rills or Gulleys forming from accelerated run off from compacted areas</li> <li>• Provision of a drainage system and a rain water harvesting system</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	8500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		buildings/office and harness into storage tanks for use]				
	Wastes (Solid)	<ul style="list-style-type: none"> <li>• [Provide waste handling facilities such as Provide waste handling facilities such as labelled waste bins]</li> <li>• Emphasis on prudent waste generation and give priority to reduction at source</li> <li>• [Solid waste management awareness to operators]</li> <li>• Operator to contract a licensed waste handler to collect and dispose solid waste</li> <li>• [Develop a comprehensive e-waste management plan that outlines procedures for collecting, storing, and disposing of electronic waste generated from solar panels, lithium batteries, and other maintenance components].</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of well-maintained receptacles and centralized collection points.</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	10500
	Wastes (Liquid)	<ul style="list-style-type: none"> <li>• Proper storage of the oil is required to ensure no leakages</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of separate and clean washrooms for both the</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	10000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> <li>• [Frequent inspection and maintenance of the generator to minimize leakages].</li> <li>• No vehicles should be serviced or maintained at the project site.</li> <li>• The waste oil or used oil must be disposed-off appropriately.</li> <li>• [Proper training for the handling and use of fuels for the operators of the power plant].</li> <li>• In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.</li> </ul>		<ul style="list-style-type: none"> <li>• Engine maintenance records</li> <li>• Oil spill containment plan</li> <li>• Records of all accidental spills and number of Liters</li> </ul>		
<i>Impacts on infrastructure and utilities</i>	Water consumption	<ul style="list-style-type: none"> <li>• Ensure prudent use of water.</li> <li>• [Install water-conserving automatic taps].</li> <li>• [Any water leaks through damaged pipes and faulty taps should be fixed promptly]</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Water usage records</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	12,000
	Energy consumption	<ul style="list-style-type: none"> <li>• [Install an energy-efficient lighting system]</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Diesel Generator Usage (hours/month):</li> <li>• Solar Energy Generation (kWh/month):</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	9000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				<ul style="list-style-type: none"> <li>Battery Energy Storage System (BESS) Utilization (cycles/month).</li> <li>Lighting Energy Consumption (kWh/month).</li> <li>Maintenance Records for Diesel Generators.</li> <li>Carbon Emissions (tons of CO<sub>2</sub>/month).</li> </ul>		
Impacts on social environment	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> <li>[Fencing off the facility to keep of community members, children and livestock from entering into the facility]</li> <li>Controlled access to the site only with prior approval</li> <li>Maintain records of any person who comes to site</li> </ul>	<ul style="list-style-type: none"> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Presence of a controlled access and records of every person accessing the site</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	8000
	Risks related to poor or inadequate stakeholder engagement (Conflict)	<ul style="list-style-type: none"> <li>Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders.</li> <li>Timely and prior disclosure of project all</li> </ul>	<ul style="list-style-type: none"> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Availability of and implementation of the Stakeholder Engagement Plan.</li> <li>Number of stakeholder consultations held</li> <li>Record of</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	4000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget.</p> <ul style="list-style-type: none"> <li>• In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders.</li> <li>• [Prepare and implement a grievance redress mechanism to deal with grievances].</li> <li>• [The grievance redress committee to include representatives from the community].</li> <li>• [Sensitize stakeholders on SEP and GRM].</li> </ul>		<p>stakeholder consultations held (minutes of meetings and list of participants).</p> <ul style="list-style-type: none"> <li>• Availability of grievance redress process.</li> </ul>		
	Occupational health and Safety	<ul style="list-style-type: none"> <li>• [Develop and implement and emergency response plan]</li> <li>• Ensure only</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of PPEs and WIBA cover</li> <li>• Environme</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	5000



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>qualified staff are employed to work in the facility</p> <ul style="list-style-type: none"> <li>• [All workers operating the project site must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others.]</li> <li>• Operators must be skilled on firefighting management</li> <li>• [Annual EHS audits should be done]</li> </ul>		<p>Annual audit reports</p>		
	<p>Community health and safety risks</p>	<ul style="list-style-type: none"> <li>• Ensure that the right-of-way is clearly defined and maintained to minimize potential hazards associated with overhead lines, keeping adequate distance from residential buildings, schools, and public spaces.</li> <li>• [Conduct public education campaigns to inform local residents about safety measures related to power lines, including</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Number of awareness creation sessions conducted.</li> <li>• Records of awareness sessions conducted</li> <li>• Incidences report</li> <li>• Number of awareness creation sessions conducted.</li> <li>• Availability of and distribution of condoms</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	<p>4500</p>

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>potential hazards and safe practices around electricity].</p> <ul style="list-style-type: none"> <li>• Implement routine inspections and maintenance of distribution lines and transformers to identify and address any issues that could pose risks to community safety.</li> <li>• [Erect clear and visible warning signs in and around the vicinity of power distribution lines and transformers to alert the community to electrical hazards].</li> <li>• [Develop and communicate emergency response plans specific to incidents involving power lines and transformers, including procedures for addressing electrical outages, accidents, or fires].</li> <li>• [Implement a vegetation management plan to ensure that trees and</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>shrubs near power lines are regularly trimmed to prevent interference and reduce fire risks].</p> <ul style="list-style-type: none"> <li>Establish an accessible GRM for community members to voice concerns regarding safety issues or disruptions related to power infrastructure, ensuring timely responses and resolutions.</li> </ul>				
	Fire hazards	<ul style="list-style-type: none"> <li>Develop and implement an emergency preparedness and response plan with specific features on fire hazard management</li> <li>The power plant and substations must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points</li> <li>[Detection/alar m systems that can detect fire should be and installed]</li> <li>[A fire evacuation plan</li> </ul>	<ul style="list-style-type: none"> <li>Proponent</li> </ul>	<ul style="list-style-type: none"> <li>Provision of serviced fire equipment, evacuation plan and safety signages</li> <li>Records of fire safety training</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	5500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>should be prepared and posted at strategic points and should include procedures to take when a fire is reported].</p> <ul style="list-style-type: none"> <li>• Workers especially operators of the plants must be trained on fire management</li> <li>• ‘No smoking’ signs shall be posted within the power plant area</li> <li>• A fire Assembly point should be identified and marked</li> </ul>				
	Security risks	<ul style="list-style-type: none"> <li>• Monitor local security developments and adjust security protocols accordingly.</li> <li>• [Maintain a secure perimeter with robust fencing of the site]</li> <li>• [Use remote monitoring where feasible, with a centralized control room for real-time surveillance and immediate response].</li> <li>• Enforce strict access control measures, ensuring that only authorized</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Number of security incidents reported (incidents/month):</li> <li>• Number of security audits conducted (audits/year):</li> <li>• Community engagement activities held (number/year):</li> <li>• Incidents of violence or threats against staff (number/year).</li> <li>• Collaborati</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>personnel can enter the facility.</p> <ul style="list-style-type: none"> <li>• Deploy trained security personnel to guard the site 24/7.</li> <li>• [Continue engaging local communities to foster positive relationships and minimize hostility].</li> <li>• Maintain and regularly update a comprehensive security incident response plan</li> <li>• Maintain close coordination with local law enforcement and security agencies</li> <li>• Implement a rigorous vetting process for all employees to minimize the risk of insider threats.</li> <li>• [Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters].</li> </ul>		<p>on with local law enforcement (number of meetings/year).</p> <ul style="list-style-type: none"> <li>• Number of partnerships established with security NGOs (active partnerships).</li> </ul>		
		<b>DECOMMISSIONING PHASE</b>				
Impacts on biophysical	Impacts on landscape and visual	<ul style="list-style-type: none"> <li>• Develop a comprehensive decommissioning plan that</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Photographic documentation:</li> </ul>	<ul style="list-style-type: none"> <li>• One-off</li> </ul>	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
environment		<p>minimizes disturbance to the landscape.</p> <ul style="list-style-type: none"> <li>• Implement a phased decommissioning approach to minimize the visual disruption at any one time.</li> <li>• [Restore the decommissioned site by regrading, replanting native vegetation, and stabilizing soil to prevent erosion].</li> <li>• Incorporate natural features, such as berms or existing vegetation, to shield decommissioning activities from public view.</li> <li>• Ensure that all materials, equipment, and waste generated during decommissioning are handled responsibly and removed from the site promptly.</li> <li>• Engage with local communities during the decommissioning process to address concerns and gather</li> </ul>		<ul style="list-style-type: none"> <li>• Vegetation health monitoring:</li> <li>• Number of complaints:</li> <li>• Soil erosion assessment:</li> <li>• Public awareness programs participation.</li> <li>• Community engagement metrics.</li> </ul>		

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>feedback on visual impacts.</p> <ul style="list-style-type: none"> <li>Utilize temporary visual barriers or screens to minimize the visibility of decommissioning activities, especially in areas of high public interest or scenic value.</li> <li>[After decommissioning is complete, implement a landscaping plan that incorporates native plants and materials to enhance the area's visual appeal].</li> </ul>				
	Impacts on biological environment	<ul style="list-style-type: none"> <li>[Conduct a thorough environmental impact assessment (EIA) prior to decommissioning to identify sensitive habitats, species, and ecosystems that may be affected].</li> <li>Implement erosion control measures, such as silt fences, sediment traps, and vegetation restoration, to prevent soil erosion and sedimentation in nearby waterways, which can</li> </ul>	<ul style="list-style-type: none"> <li>Proponent</li> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Biodiversity surveys.</li> <li>Community engagement records.</li> <li>Erosion and sedimentation rates.</li> <li>Flora and fauna species lists.</li> <li>Habitat quality assessments.</li> <li>Invasive species monitoring.</li> <li>Vegetation health monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	7500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>harm aquatic and terrestrial ecosystems.</p> <ul style="list-style-type: none"> <li>• [Develop and implement a habitat restoration plan that includes replanting native vegetation and rehabilitating disturbed areas to restore natural habitats and promote biodiversity after decommissioning].</li> <li>• Establish measures to protect local wildlife during decommissioning, such as minimizing noise and disturbance during sensitive periods, like breeding or nesting seasons, and ensuring safe passage for animals around the site.</li> <li>• Properly manage and dispose of all waste generated during the decommissioning process to prevent contamination of the soil, water, and surrounding habitats. Implement a</li> </ul>				



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>recycling program for materials where possible.</p> <ul style="list-style-type: none"> <li>• [Provide training for workers on environmental protection practices and the importance of preserving the local biological environment].</li> <li>• Engage local communities and stakeholders in the decommissioning process to gather input on conservation priorities and incorporate traditional ecological knowledge into restoration efforts.</li> </ul>				
	Solid Waste Generation	<ul style="list-style-type: none"> <li>• Demolition contractor to adhere to the various manufacturer’s guidelines and requirements regarding demolition and disposal</li> <li>• Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste</li> <li>• [Provision of facilities for proper</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of well-maintained receptacles and centralized collection points</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	9000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements]</p> <ul style="list-style-type: none"> <li>• Adequate collection and storage of waste on site</li> <li>• [Safe transportation to the disposal sites / designated area]</li> <li>• Hazardous waste must be disposed by approved waste handler</li> </ul>				
	Wastes (liquid)	<ul style="list-style-type: none"> <li>• [Conduct a comprehensive assessment to identify and categorize all sources of liquid waste generated during decommissioning].</li> <li>• [Develop a detailed liquid waste management plan outlining procedures for the collection, storage, treatment, and disposal of liquid wastes].</li> <li>• Establish temporary storage facilities for liquid wastes to prevent leaks</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Liquid waste generation quantities.</li> <li>• Soil contamination assessments.</li> <li>• Incidence of spills and leaks.</li> <li>• Liquid waste management plan compliance.</li> <li>• Public reporting and complaints.</li> <li>• Community engagement metrics.</li> <li>• Volume of recovered</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>or spills and ensure safe handling until proper disposal.</p> <ul style="list-style-type: none"> <li>• Whenever possible, use environmentally friendly materials and products that generate less hazardous liquid waste during decommissioning.</li> <li>• Ensure that all liquid wastes are disposed of in accordance with local regulations and environmental standards, using licensed waste disposal facilities.</li> <li>• [Provide training for staff on liquid waste handling, storage, and emergency response procedures to minimize risks].</li> <li>• Identify opportunities for the reuse or recycling of liquid waste materials, where feasible, to minimize waste generation.</li> <li>• Engage with the local community to inform them about liquid</li> </ul>		reusable liquids.		

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>waste management practices and promote awareness of environmental protection.</p> <ul style="list-style-type: none"> <li>• Maintain accurate records of liquid waste management activities, including quantities generated, treatment methods, and disposal locations.</li> <li>• Prepare for emergencies related to liquid waste, including establishing an emergency contact list and response procedures.</li> <li>• Maintain an inventory of chemicals and hazardous substances to prevent unnecessary waste generation and facilitate proper management.</li> </ul>				
	Noise and Vibration	<ul style="list-style-type: none"> <li>• [Install portable barriers to shield compressors and other small stationary equipment where necessary].</li> <li>• Use quiet</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Noise levels- Records of noise measurements done by contractor within the project area and at distances of</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	6800

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>equipment (i.e., equipment designed with noise control elements).</p> <ul style="list-style-type: none"> <li>• [Co-ordinate with relevant agencies in case the noise produced will require a license].</li> <li>• Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible.</li> <li>• Demolish mainly during the day when most of the neighbours are out working.</li> </ul>		30m from the project site		
	Air quality (dust)	<ul style="list-style-type: none"> <li>• Use water sprays or misting systems to dampen surfaces and reduce dust generation, particularly on unpaved roads and active work areas.</li> <li>• [Implement soil stabilization techniques, such as using binders or applying</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Community complaints and feedback.</li> <li>• Cumulative dust impact assessment.</li> <li>• Effectiveness of dust control measures.</li> <li>• Health impact assessments.</li> <li>• Long-term dust emission</li> </ul>	<ul style="list-style-type: none"> <li>• Weekly</li> </ul>	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>vegetation, to minimize dust from disturbed soil areas].</p> <ul style="list-style-type: none"> <li>• Enforce speed limits for vehicles operating on-site and on access roads to reduce dust emissions from vehicle traffic.</li> <li>• Use tarps or other coverings to protect stockpiles of loose materials from wind erosion and dust generation.</li> <li>• Engage with local communities to inform them about decommissioning activities and measures being taken to control dust emissions.</li> <li>• [Conduct regular inspections to identify potential sources of dust emissions and ensure that mitigation measures are effectively implemented].</li> <li>• [Plan for site rehabilitation after decommissioning to restore vegetation cover, which can help</li> </ul>		<p>trends.</p> <ul style="list-style-type: none"> <li>• Post-activity dust cleanup reports.</li> <li>• Public awareness programs participation.</li> <li>• Soil and vegetation dust monitoring.</li> <li>• Traffic patterns and impact assessment.</li> <li>• Visual assessment of dust levels.</li> </ul>		

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		prevent dust generation in the long term].				
	Air quality (vehicle fumes)	<ul style="list-style-type: none"> <li>• Use high-quality fuels with lower sulfur content to minimize emissions from vehicles and generators.</li> <li>• Implement a regular maintenance schedule for all vehicles and generators to ensure they operate efficiently and emit fewer fumes.</li> <li>• Optimize generator operation by running them only when necessary and using them at optimal loads to reduce emissions.</li> <li>• Implement policies to minimize idling time for vehicles and generators, encouraging operators to turn off engines when not in use.</li> <li>• [Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions].</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Community complaints and feedback.</li> <li>• Cumulative emission impact assessment:</li> <li>• Environmental compliance audits.</li> <li>• Health impact assessment reports.</li> <li>• Long-term emission trends.</li> <li>• Maintenance records of vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>• Weekly</li> </ul>	6000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> <li>• [Establish an air quality monitoring program to track emissions from vehicles and generators and ensure compliance with local regulations].</li> <li>• [Engage with local communities to inform them about emissions reduction efforts and address any concerns related to air quality].</li> <li>• Conduct scheduled checks to ensure that exhaust systems and emission control devices are functioning correctly.</li> <li>• Establish a reporting system for emissions data to track progress and compliance with environmental standards.</li> </ul>				
Impacts on Infrastructure & Utilities	Water Resources	<ul style="list-style-type: none"> <li>• [Implement erosion and sediment control measures, such as silt fences, sediment traps, and berms, to prevent sediment</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Community feedback</li> <li>• Compliance with water usage regulations:</li> <li>• Impact on local water resources:</li> <li>• Mitigation</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly</li> </ul>	3700



IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>runoff into water bodies during decommissioning activities].</p> <ul style="list-style-type: none"> <li>• Properly manage and store any chemicals, fuels, or hazardous materials used during decommissioning to prevent leaks or spills that could contaminate water resources.</li> <li>• Employ best practices for construction activities, such as minimizing land disturbance, avoiding work during heavy rainfall, and using bioengineering techniques to stabilize soils and prevent erosion.</li> <li>• [Develop and implement a temporary drainage plan to manage stormwater runoff effectively].</li> <li>• Ensure proper management and treatment of wastewater generated during decommissioning activities.</li> </ul>		<p>measure implementation records.</p> <ul style="list-style-type: none"> <li>• Water consumption efficiency</li> <li>• Water recycling rates:</li> <li>• Water usage quantities and supply.</li> </ul>		

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
Impacts on social environment	Impacts on Occupational health and safety	<ul style="list-style-type: none"> <li>• [Develop and implement a robust health and safety plan that outlines specific procedures, protocols, and emergency response strategies to protect workers during the decommissioning phase].</li> <li>• Provide comprehensive training for all workers on health and safety practices, including the proper use of personal protective equipment (PPE), hazard recognition, and emergency response procedures.</li> <li>• [Ensure that all workers are provided with appropriate PPE, such as helmets, gloves, goggles, ear protection, and respiratory protection, and enforce its use at all times on-site].</li> <li>• [Conduct frequent safety audits and inspections to identify and address potential</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Incident reporting and tracking.</li> <li>• Health and safety training participation.</li> <li>• Personal protective equipment (PPE) compliance.</li> <li>• Safety audits and inspections.</li> <li>• First aid response records.</li> <li>• Compliance with safety regulations.</li> <li>• Incident investigation reports.</li> </ul>	<ul style="list-style-type: none"> <li>• Weekly</li> </ul>	13,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>hazards. Engage workers in safety discussions to gather their input on risks and mitigation measures].</p> <ul style="list-style-type: none"> <li>• Properly handle, store, and dispose of hazardous materials, including chemicals and fuels, in accordance with relevant regulations.</li> <li>• Ensure that all machinery and equipment used during decommissioning are well-maintained and regularly inspected to prevent malfunctions or accidents that could endanger workers.</li> <li>• Establish clear emergency response procedures for potential incidents, such as accidents, fires, or hazardous material spills.</li> <li>• Establish effective communication channels for reporting safety concerns or incidents.</li> <li>• Implement measures to</li> </ul>				

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>ensure that nearby communities are not adversely affected by decommissioning activities.</p>				
	<p>Community health and safety risks</p>	<ul style="list-style-type: none"> <li>• Fencing off the facility to keep of community members, children and livestock from entering into the facility.</li> <li>• Identify and safely manage hazardous materials</li> <li>• [Implement dust suppression techniques, such as water spraying or dust inhibitors, to minimize airborne particles during demolition activities, protecting air quality].</li> <li>• Use noise-dampening equipment and restrict working hours to minimize noise pollution</li> <li>• [Develop and implement a comprehensive waste management plan during decommissioning].</li> <li>• [Conduct thorough environmental assessments</li> </ul>	<ul style="list-style-type: none"> <li>• Proponent</li> </ul>	<ul style="list-style-type: none"> <li>• Health incident reports.</li> <li>• Community health assessments.</li> <li>• Feedback mechanisms for community concerns.</li> <li>• Community satisfaction surveys.</li> <li>• Communication of health risks.</li> <li>• Injury rate monitoring.</li> <li>• Environmental health audits.</li> <li>• Documentation of community feedback.</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly</li> </ul>	<p>5000</p>

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p>prior to decommissioning].</p> <ul style="list-style-type: none"> <li>• Engage with local communities early in the decommissioning process to communicate plans, address concerns, and gather input, fostering trust and collaboration.</li> <li>• Establish an accessible GRM for community members to report concerns or incidents related to health and safety, ensuring timely responses and resolutions.</li> <li>• Develop and communicate an emergency response plan that outlines procedures for handling accidents or hazardous material spills during the decommissioning phase.</li> <li>• [Develop and implement a traffic management strategies to minimize disruption caused by decommissioning vehicles].</li> </ul>				
<b>Total</b>						<b>334,000</b>

Summary of the total cost of the ESMP implementation:

ITEM	DESCRIPTION	COST
Capacity Building	Cost of Capacity building	\$16,500
ESMP Implementation	ESMP Implementation	\$ 334,000
SEP Implementation and GRM	SEP Implementation and GRM	\$ 96,500
<b>TOTAL</b>		<b>\$447,000</b>

## CHAPTER NINE: CONCLUSION AND RECOMMENDATIONS

### 9.1. Conclusion

- In this report, the potential beneficial and adverse impacts of the repair/expansion of Bosaso Power Grid and preparation of preliminary designs for associated construction works are discussed. The report also identifies and recommends appropriate benefit enhancement and/or mitigation measures. Improved power distribution will boost the electricity supply capacities of the grid, making it not only accessible physically but also affordable financially. In the medium to long term, improved electricity distribution occurs by enhancing supply and curbing distribution losses. Besides, improved generation and distribution of power (enhanced capacities of the electricity grid) will improve the economy of Bosaso City and, by extension, the Puntland State economy, attract investment, and lower costs for operations in the education, health, business, and industry sectors. However, like all other infrastructure development projects, notwithstanding the far-reaching social and economic benefits, admittedly, the project would also have adverse impacts on the biophysical and socio-economic environment that need to be accounted for and avoided or mitigated when and wherever feasible. From the present ESIA study, there are no significant areas of natural or semi-natural habitats in the project area and no designated or protected areas of terrestrial ecological interest that will be affected by the proposed construction activities.
- There were no wildlife species with restrictive habitat preferences within the project influence area that will suffer the consequence of land clearing. Therefore, no special mitigation measures or biodiversity management plan will be required. The project is neither contiguous with nor in close proximity with any of the nationally protected areas. The study also shows that there are no known and observable archaeological and cultural heritage sites within the project area. Nevertheless, the possibility exists for the discovery of buried archaeological remains during excavation and site clearance. If that happens, the relevant authorities in the FRS will be alerted to commission targeted studies.
- No property belonging to religious institutions is located along the proposed distribution line route, proposed power plants, or substation locations. Therefore, no mitigation or compensation measure is recommended.
- During the ESIA field survey along the project distribution corridor, school structures belonging to different schools were identified and are likely to be affected.
- Construction phase impacts will be mitigated by specific environmental protection clauses to be included in the construction contract documents and enforcing compliance with them during construction supervision. Monitoring of the contractor's works will be carried out by the supervising consultant, who will ensure that good civil/environmental engineering practices are followed.

*It is concluded that, provided the benefit enhancement and mitigation measures as recommended in this ESIA report are adopted, there are no environmental and social grounds for not proceeding with implementation of the project in the form presently envisaged.*

## 9.2. Recommendations

The proposed project is technically feasible and economically attractive. Such a worthwhile scheme, which will bring net benefits to the FRS in general and the local communities in particular should be implemented at the earliest possible date. However, it is recommended as follows:

- It is recommended that the designs and specifications ensure incorporation of appropriate measures to minimize negative impacts and to enhance beneficial impacts.
- Maintain ongoing and transparent discussions and consultations both with members of affected communities and their administrations is in the best interest of the project. Such platforms could and should be used to disclose information about the project, to create shared understanding and trust between parties involved in the process.
- Engage vulnerable groups, including women and low-income residents, to ensure inclusivity in decision-making.
- Implement dust control measures during construction, such as regular watering of unpaved roads and controlling vehicle emissions. Ensure proper emission controls for diesel generators or thermal power sources.
- Develop a comprehensive waste management plan, including the proper segregation, storage, and disposal of both hazardous and non-hazardous waste. Encourage recycling and reusing materials where possible.
- Implement efficient water use practices to minimize consumption during construction. Develop a stormwater management plan to prevent soil erosion and contamination of water bodies and ensure that no construction activities pollute the coastal waters.
- Properly manage construction materials and spills to avoid soil contamination.
- Implement mitigation strategies to avoid or minimize disruption to local wildlife and their habitats.
- Use modern equipment with noise-dampening features during construction. Restrict construction activities to daylight hours to minimize noise disruption to nearby communities.
- Conduct awareness campaigns on the health and safety risks associated with the project, including traffic safety, construction hazards, and electricity safety.

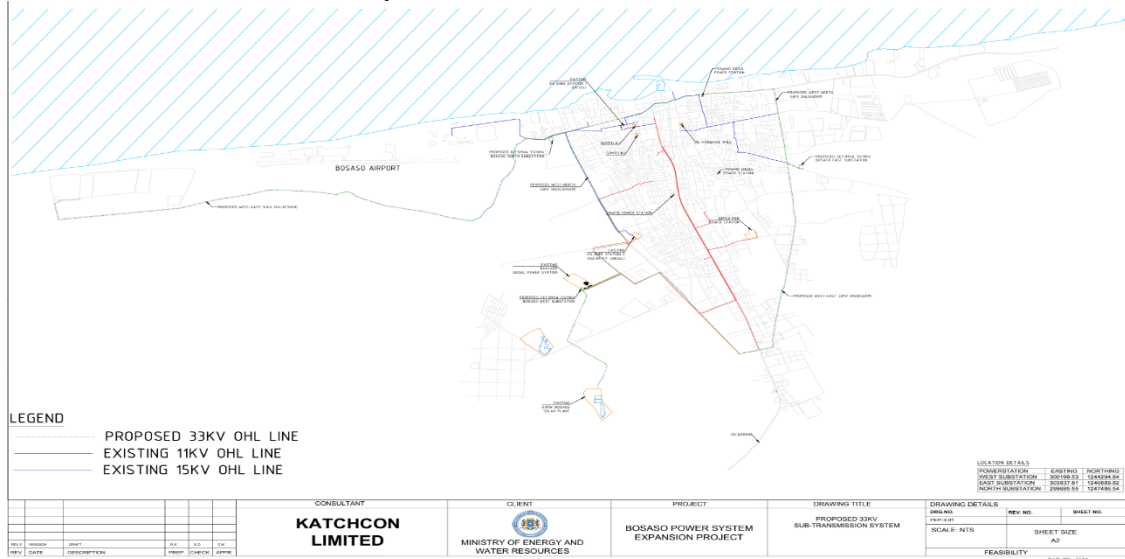


- Prioritize hiring local workers for construction and operation roles to support local employment and economic development.
- Develop a GBV action plan, including the implementation of codes of conduct, worker training, and community awareness programs to prevent and address gender-based violence during construction. Establish a confidential grievance mechanism for reporting and addressing GBV incidents.
- Enforce strict adherence to OHS guidelines, providing workers with proper safety equipment and training. Regularly monitor and audit the safety conditions on the construction site to prevent accidents and health hazards.
- Collaborate with local authorities to manage security risks associated with the influx of workers, such as theft or vandalism. Ensure security personnel are trained in human rights to prevent excessive use of force or conflicts with local communities.

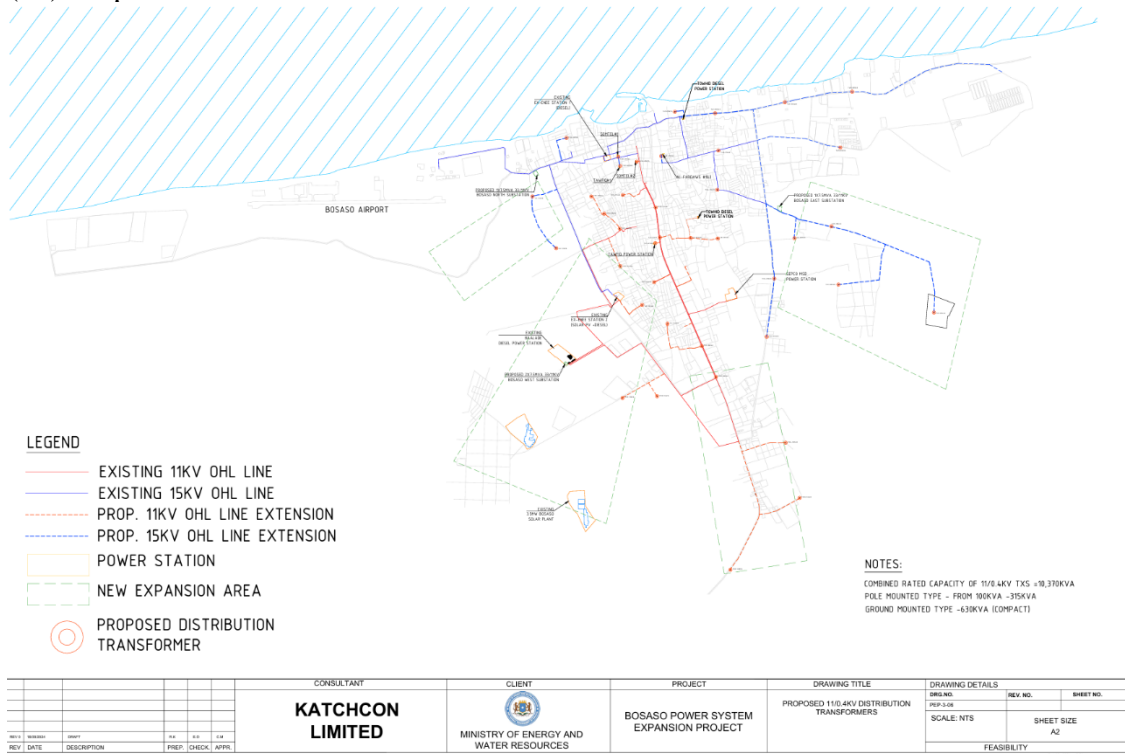
# ANNEX

## Annex 1. Project Layout

### (1a) 33kV sub-transmission system



### (1b) Proposed distribution txs stations



## Annex 2. Grievance form template

### Bosaso Power Grid Repair and Expansion Project African Development Bank (AfDB)

#### Section 1: Complainant Information

(Please provide your contact details. Your information will be kept confidential.)

- **Full Name:** \_\_\_\_\_ **Address:** \_\_\_\_\_
- **Phone Number:** \_\_\_\_\_ **Email (if available):** \_\_\_\_\_
- **Preferred Mode of Communication:**  Phone  Email  In Person  Other (specify) \_\_\_\_\_

#### Section 2: Grievance Details

- **Date of Incident:** \_\_\_\_\_
- **Location of Incident:** \_\_\_\_\_
- **Category of Grievance (please check one or more):**
  - Health & Safety
  - Environmental Impact
  - Property Damage
  - Disruption of Services
  - Land & Livelihoods
  - Employment & Labor Issues
  - Gender-Based Violence
  - Other (please specify): \_\_\_\_\_

#### Description of the Grievance:

(Please provide a detailed account of the issue, including relevant facts and supporting evidence such as photos, documents, or witness statements.)

**Have you previously reported this issue?**  Yes  No

If yes, to whom? \_\_\_\_\_

What was the response? \_\_\_\_\_

#### Section 3: Requested Resolution

- **What would you consider an acceptable resolution to your grievance?**

#### Section 4: Acknowledgment and Consent

- I confirm that the information provided in this form is accurate to the best of my knowledge.
- I understand that my grievance will be reviewed, and I may be contacted for further details.
- I consent to my grievance being shared with relevant authorities for resolution.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

#### For Official Use Only

- **Grievance Received By:** \_\_\_\_\_ **Date of Receipt:** \_\_\_\_\_
- **Grievance Reference Number:** \_\_\_\_\_ **Action Taken:** \_\_\_\_\_

- **Resolution Provided:** \_\_\_\_\_ **Date of Resolution:** \_\_\_\_\_
- **Officer Handling the Case:** \_\_\_\_\_
- **Status:**  Open  Under Investigation  Resolved  Closed

Thank you for submitting your grievance. We will review your complaint and respond within the designated time frame. For further inquiries, please contact [Project Contact Information].

### Annex 3. Grievance log template

#### **Bosaso Power Grid Repair and Expansion Project African Development Bank (AfDB)**

**Instructions:** Please fill out this form to report any grievances or concerns related to the Bosaso power grid repair and expansion project. Your feedback is important, and all reports will be treated confidentially.

#### **1. Personal Information**

- **Name:**
  - *(Optional if you prefer to remain anonymous)*
- **Address:**
  - *(Street, City, District, etc.)*
- **Phone Number:**
  - *(Optional)*
- **Email Address:**
  - *(Optional)*

#### **2. Type of Affected Person**

*(Please check one)*

- Local Resident                       Business Owner                       Community Leader  
 Employee/Worker  
 Other (please specify): \_\_\_\_\_

#### **3. Date of Report:**

*(DD/MM/YYYY)*

\_\_\_\_\_

#### **4. Description of Grievance**

*(Please describe the grievance or concern in detail, including specific locations, dates, and any other relevant information.)*

#### **5. Impact of the Grievance**

*(Please describe how this grievance affects you or your community.)*

#### **6. Preferred Resolution**

*(What action do you think should be taken to resolve this grievance?)*

#### **7. Attachments**

*(Please attach any relevant documents, photos, or other evidence to support your grievance, if applicable.)*

- Yes, I have attached documents.
- No attachments.

#### **8. Consent to Contact**

*(Do you consent to be contacted regarding your grievance?)*

- Yes
- No

**9. Signature:**

*(Optional if submitting anonymously)*

**Date:***(DD/MM/YYYY)*

**Submission Information**

Please submit this form to the designated grievance focal point or drop it in the grievance box located at the project site office. You can also send it via email to [grievance@bosasoproject.com](mailto:grievance@bosasoproject.com).

**Confidentiality Notice:** All grievances will be handled with confidentiality. Your identity will not be disclosed without your consent.

## Annex 4. Land purchase agreement – Baalade site (West sub-station)

**DAWLADDA PUNTLAND EE SOOMAALIYA**

Xafiiska Nootaayada iyo Ka Tala-bixinta  
Arrimaha Sharciga ee Saadaal

Bosaso-Soomaaliya

**SAADAAL PUBLIC NOTARY & LEGAL CONSULTANCY**

بوصاصو-الصومال

TIX NO: SPN/BP/2024/B-3435      TAARIKHDA: 06/10/2024

**UJEEDDO: HESHIIS KALA GADASHO DHUL**

Boosaaso, Maanta oo ay taariikhdu tahay **06/10/2024**, waxaa hor yimid xafiiska Nootaayo Saadaal labada dhinac ee kala ah.

**Dhinaca Kowaad/libiye: Maxamuud Salaad Maxamuud Tel:090-7735151**

**Dhinaca Labaad/ libisade: Shirkadda Korontada Pepco** waxaa wakiil u ah  
**Cabdulaahi Cilmi Muuse Tel:090-7792333 iyo Nuur Cabdi Cali Tel:090-7798922**

Dhinaca 1aad iyo dhinaca 2aad oo magacyadoodu kor ku xusan yihiin waxay caddeeyeen inay kala iibsadeen dhul iyaga oo xor ah miyirkooda qaba.

Dhulka uu Dhinaca 1aad ka iibiyey dhinaca 2aad waxa uu ku yaal magaalada **Boosaaso** Xaafadda **Baalade** gaar ahaan (Shirkadda Korontada Pepco Ex Gobaad System Solar) cabirkiisuna waa (**Koonfur 100M, Bari 155M, Galbeed 167M, Waqooyi 75M**), waxayna kala siisteen dhulka lacag dhan **\$52,500 (Konton iyo laba kun iyo shan boqol oo dollar)** wayna la kala qaaten lacagtaas dhammaanteed.

**NB.** Dhulkan wuxuu leeyahay Documentiga Tixraaciisu tahay **XND/BB/1303/2019** Lagana Qoray Nootaayo **Bulsho** Taariikhdu markay ahayd **13/03/2019**.

**Jihooyinka Dhulka(Soohdimaha Dhulka)**

<b>Bari waxaa ka xiga</b>	Axmed Guure Xasan
<b>Galbeed</b>	Maxamuud Faarax Ciise(Iskushuban)
<b>Woqooyi</b>	Jid
<b>Koonfur</b>	Jid Iyo shirkadda korontada ee Pepco Ex Gobaad System Solar

**Saxiixa Dhinaca Kowaad: Maxamuud Salaad Maxamuud Tel:090-7735151** *Maxamuud*

**Saxiixa Dhinaca Labaad: Shirkadda Korontada Pepco** waxaa wakiil u ah

- 1. Cabdulaahi Cilmi Muuse Tel:090-7792333**
- 2. Nuur Cabdi Cali Tel:090-7798922**

**Markhaantiyaal:**

- 1- Caaqil Abshir Maxamed Ciise Tel:090-7732671
- 2- Cabdulaahi Nuur Maxamed(Giriig) Tel:090-7736739

**ANSIXINTA NOOTAAYADDA**

Sidaa daraadeed markaan hubiney inay xor yihiin miyirkoodana qabaan, markaan aragnay raali ahaanshahooda, sidoo kale markaan hubiney mulkiga dhulkaas, waxaa ka sugnaaday kana diiwan galay xafiiska nootaayo SAADAAL inuu ansax yahay iibkaas sare ku xusan wuxuuna u wareegay mulkiga dhulkaas **Shirkadda Korontada Pepco**, waana ka wareegay mulkiilihii hore ee **Maxamuud Salaad Maxamuud**.

**SARKAALKA NOOTAAYADDA**  
**Garyagaan Abdulahi Saïd Osman**

**SAADAAL PUBLIC NOTARY**  
Established Under Law N.8/2014

Ref No.: 06-10-B-3435

Date: 06/10/2024

Tel: 002527921546/00252661247147

Bosaso Puntland, Somalia



**Saadaal Notary and legal Consultancy**  
Tel : +252907209929, +252906172222, +252907921546, 0667723553.  
Gmail: Saadaalnotary123@gmail.com, Facebook: saadaal Notary and Legal Consultancy  
Bossaso - Somalia





DOWLAD GOBOLEEDKA  
PUNTLAND EE SOMALIYA  
XAFIISKA NOOTAAYADA KALA WAREEJINTA HANTIDA GUURTIDA  
MAGUURTIDA EEBULSHO BOSASO

PUNTLAN STATE  
OF SOMALIA



XND/BB/1303/2019.

BOSASO.13/03/2019

**UJEEDDO:- KU WAREEJIN DHUL WEYN . MAXAMUD SALAAD MAXAMUD**

Maanta oo ay Taariikhdu Tahay Tan Sare Ku Xusan, Waxaa Yimid Xafiiska Nootaayada Bulsho, ninka magaciisa layiraahdo, **C/laahi Nuur Maxamed**, Wuxuuna isagoo masaxdiisu Caafimaad Qabto,ka iibiyey Dhul Weyn oo ku fadhiya dhul dhan ( 100 X 170 X78 ) Mitir, Kunayaal Magaalada Bosaaso Xaafadda **Baalade Aaga Shirkadda Gobaad System Solar**, Ninka Magaciisa Layiraahdo, **Maxamud Salaad Maxamud**, wuxuuna ka siiyey lacag dhan US12,000 ( Toban Iyo Laba Kun oo Doollar oo keliya ) Weyna kala qaateen lacagtaas dhamaanteed. Wuxuuna leeyahay dhulkaas Jahooyinka Kala ah;

BARI	WAXAA	KAXIGA	AXMED GUURE XASAN
GALBEED	""	""	C/LAAHI NUUR MAXAMED
WAQOYI	""	""	JID
KOONFUR	""	""	JID SHIRKADDA KORONTADA EE GOBAAD .

**NB.**

Dhulkaas wuxuu leeyahay documentiga ah, XND/BB/1707/2017 kuna taariikhaysan 17/07/2017 kana soo baxay Nootaayada Bulsho ee Bosaso.

In uu Sidaas uga iibiyey Dhulkaas Weyn Waxaa Ka Markhati ahaa:-

1. Axmed Guure Xasan 0907797169
2. C/rashiid Maxamed C/raxmaan 0907781362
3. Khaliif Maxamud Xasan 0907775300

WAREEJIYE. C/laahi Nuur Maxamed 0907736739  
LAWAREEGE. Maxamud Salaad Maxamud 0907735151

**SIDAA'DARAADEED.**

Markaan hubiney, in ay maskaxdoodu caafimaad qabto, markaan hubney mulkiga dhulkaas , waxaa ka sugnaaday, kana diwaan galay xafiiska nootaayada bulsho, in uu ansax yahay iibkaas sare ku xusan, wuxuuna u wareegay mulkiga dhulkaas **Gataha, Maxamud Salaad Maxamud**, Waana ka wareegay mulkigii hore ee sare ku xusan..

MAAMULKA XAFIISKA NOOTAAYAD BULSHO  
BOSASO MAXAMED XUSEEN



**BULSHO PUBLIC NOTARY**  
Estab. Under Law. 42/99  
Having Seen & Attested

Reg No. XND/BB/1303/019  
Date 13-03-2019  
Sing  
Tel. 0907.728142/0907.725169/ 823998 Bosa

DOWLAD GOBOLEEDKA  
PUNTLAND EE SOMALIYA



PUNTLAND STATE  
OF SOMALIA

XAFIISKA NOOYAAYADA KALA WAREEJINTA HANTIDA GUURTIDA  
MAGUURTIDA BULSHO EE BOSASO.



XND/BB/ 1707 /2017.

BOSASO. 17/07/2017

UJEEDDO:- KU WAREEJIN DHUL. C/LAAHI NUUR MAXAMED

Maantay oo ay Taariikhdu Tahay Tan sare Ku Xusan, Waxaa Yimid Xafiiska Nootaayada Bulsho Horteeda, Khaliif Maxamud Xasan, Wuxuuna Isagoo Maskaxdiisu Caafimaad Qabto, Ka iibiyey Dhul weyn oo Cabirkiisu Dhan yahay ( K/fur 200 X G/beed & bari 170 X W/qaayi 156 ) Mitir Kunayaal Magaalada Bosaso Xaafadda Baalade, Aaga Reebe, Ninka Magaciisa layiraahdo, C/laahi Nuur Maxamed, Wuxuuna Ka Siyey Lacag Dhan US\$12,000-Doolar , ( Toban Iyo Laba Kun oo Doolar oo Keliya ) Weyna Kala Qaateen Lacagtaas Dhamanteed Wuxuuna Leeyahay Dhulkaas Jahooyinka kala ah :-

BARI	WAXAA KAXIGA	ILMA GUURE
GALBEED	""	ILMA YUUSUF BARRE
WAQOQOYI	""	ILMA GUURE
KOONFUR	""	ILMA GUURE

In uu Sidaas Uga iibiyey Dhulkaas Waxa ka markhaati ahaa:

1. Axmed Guure Xasan
2. Maxamud Salaad Maxamud
3. Shahiid Xasan C/dalle

WAREEJIYE. Khaliif Maxamud Xasan  
LAWAREEGE. C/laahi Nuur Maxamed

SIDAA'DARAADEED.

Markaan Hubiney, In Ay Maskaxdoodu Caafimaad Qabto, Markaan Hubiney. Mulkiga Dhulkaas, Waxaa Ka Sugnaaday, Kana Diwaan Galay Xafiiska Nootaayada Bulsho, In uu Ansax Yahay iibkaas Sare Ku Xusan, Wuxuuna U Wareegay Mulkiga Dhulkaas , Gataha , C/laahi Nuur Maxamed, Waana ka Wareegay Mulkigii Here ee sare ku xusan

KU SIMAHA XAFIISKA NOOTAAYADA BULSHO  
C/WELI FAARAX CALI

**BULSHO PUBLIC NOTARY**  
Estab. Under Law. 42/99  
Having Seen & Attested

Reg No. XND/BB/1707/2017  
Date 17-07-2017  
Sing [Signature]  
Tel: 0907.728142/0907.725169/823998 Bosaso



## Annex 5. Baalade Site land ownership certificate

DOWLADDA HOOSE EE  
DAGAMADA BOOSAASO  
PUNTLAND, SOOMAALIYA



LOCAL MUNICIPALITY  
OF BOSASO  
PUNTLAND, SOMALIA

### SHAHAADADA MULKIYADDA DHULKA

Taariikh: 10/12/2024

Tix-Raac:1426

Mar/Mud: Puntland Electric Power Company (Pepco)

ID:907800003

### Faah Faahinta Dhulka

Tuulada/Xaafada	Laanta	Zone	Nooca
Horseed	Laanta 4	Jidka 30Ka (BAALADE)	Ganacsi

Waxaa Luguu Ogalaaday Dhulkaa soo Codsatay oo Cabirkiisu dhanyahay

Bari: Balac (m)	Waqooyi: Dherar (m)	Koonfur: Dherar (m)	Galbeed: Balac (m)
195m	400m	400m	195m

### Jihooyinka Dhulka (SOOHDIN)

Bari	Waqooyi	Koonfur	Galbeed
Jid	Khaliif Maxamuud Xasan	Jid	Ilma Ismaaciil C/raxmaan

Agaasimaha Waaxda H/Guud

Xoghayaha Dagmada Boosaaso




Duqa Dagmada Boosaaso

## Annex 6. Lease agreement for the proposed East sub-station

**DAWLADDA PUNTLAND EE SOOMAALIYA**

Xafiiska Nootaayada iyo Ka Tala-bixinta  
Arrimaha Sharciga ee Saadaal



Bosaso-Soomaaliya

**SAADAAL PUBLIC NOTARY & LEGAL CONSULTANCY**

بوصاصو-الصومال

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**BOSASO -- SOMALIA /      TIX NO: SPN/2024/B-4963      /      Date: 11/12/2024**

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**LEASE AGREEMENT FOR LAND**

This document serves as confirmation of the attendance of the following parties before **Saadaal Notary** for the purpose of entering into a lease agreement:

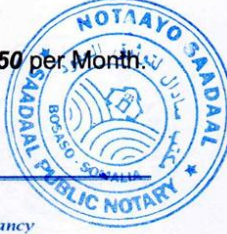
**This Lease Agreement ("Agreement")** is made and entered into on this **11th day of December 2024**, by and between:

- Lessor (Landowner):**  
**Name:** Nur Abdi Ali  
**Address:** Bosaso, Puntland, Somalia  
**Contact Number:** 0907798922
- Lessee (Tenant):**  
**Name:** Puntland Electric Power Company (PEPCO)  
**Representative:** Ayub Abdullahi Isse (Finance Director)  
**Contact Number:** 0907792997

The Lessee agrees to lease the property from the Lessor, with both parties acknowledging and agreeing to the terms, covenants, and obligations outlined in this agreement. The lease is entered into under the following terms and conditions:

- Description of Property**  
The Lessor agrees to lease to the Lessee the land described as:  
**Address/Location:** Bossaso City, Xalka Waara area. East Bossaso  
**Size/Area:** 5,544 Square Meters  
**Other Details:** 11°16'28.32"N 49°12'9.59"ECoordinates
- Term of Lease**  
The term of this lease shall commence on **11 December 2024** and continue until **11 December 2044** unless terminated earlier in accordance with this Agreement.
- Rent and Payment Terms**  
The Lessee agrees to pay the Lessor rent in the amount of USD Dollar **\$250** per Month.
  - Rent shall be paid on or before the 10<sup>th</sup> day of each month.
  - Payment Method: Bank Cheque

**Saadaal Notary and legal Consultancy**  
Tel : +252907209929, +252906172222, +252907921546, 0667723553.  
Gmail: Saadaalnotary123@gmail.com, Facebook: saadaal Notary and Legal Consultancy  
Bossaso - Somalia



#### 4. Security Deposit

The Lessee shall pay a refundable security deposit of **\$3,000** before taking possession of the land. This deposit shall be refunded at the end of the lease term, subject to any deductions for damages or unpaid rent.

#### 5. Use of Land

The Lessee agrees to use the land exclusively for the following purpose(s): **to construct the proposed a 33/11kv East Substation.**

The Lessee shall not use the land for any illegal purposes or activities.

#### 6. Maintenance and Repairs

- The Lessee shall maintain the land in good condition during the lease term.
- Any structural changes or improvements to the land require prior written consent from the Lessor.
- The Lessor shall be responsible for major repairs unless damages are caused by the Lessee's negligence.

#### 7. Utilities and Taxes

- The Lessee shall be responsible for all utilities (water, electricity) required for their use.
- The Lessor shall pay property taxes unless otherwise agreed.

#### 8. Termination

This Agreement **cannot be terminated by either party unless both the Lessor and the Lessee mutually agree** in writing to terminate the Agreement. Any termination shall be subject to terms agreed upon by both parties at the time of termination.

#### 9. Renewal After 20 Years

At the end of 20 years, this Agreement may be renewed upon **mutual agreement** of both the Lessor and the Lessee. The renewal terms and conditions shall be negotiated and agreed upon by both parties before the expiration of the initial term.

#### 10. Indemnity

The Lessee agrees to indemnify and hold harmless the Lessor from any claims, damages, or liabilities arising from the Lessee's use of the land.



### 11. Governing Law

This Agreement shall be governed by and construed in accordance with the laws of the **Federal Republic of Somalia**.


### 12. Entire Agreement

This Agreement constitutes the entire agreement between the parties. Any amendments must be made in writing and signed by both parties.

### 13. Signatures

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.



#### **Lessor (Landowner):**

Signature:   
Name: Nur Abdi Ali  
Date: December 11, 2024

#### **Lessee (Tenant):**

Signature:   
Name: Ayub Abdullahi Isse - Puntland Electric Power Company (PEPCO)  
Date: December 11, 2024

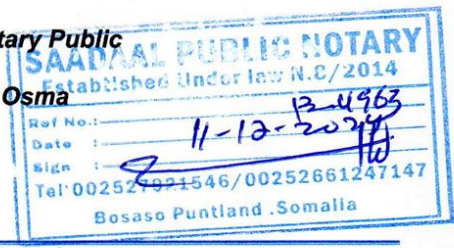

#### **Witnesses:**

1. Signature:   
Name: Hussein Yusuf Hassan
2. Signature:   
Name: Ali Warsame Hersi

### NOTARY PUBLIC

Having observed the mutual satisfaction of both parties and confirmed their sound mental health, we hereby register this agreement with **Saadaal Public Notary**

**Principal Of Saadaal Notary Public**  
**Adv. Abdulahi Said Osma**



**Saadaal Notary and legal Consultancy**  
Tel : +252907209929, +252906172222, +252907921546, 0667723553.  
Gmail: Saadaalnotary123@gmail.com, Facebook: saadaal Notary and Legal Consultancy  
Bossaso - Somalia

## Annex 7. Lease agreement for the proposed North sub-station.

**DAWLADDA PUNTLAND EE SOOMAALIYA**

Xafiiska Nootaayada iyo Ka Tala-bixinta  
Arrimaha Sharciga ee Saadaal

Bosaso-Soomaaliya

**SAADAAL PUBLIC NOTARY & LEGAL CONSULTANCY**

BOSASO -- SOMALIA / **TIX NO: SPN/2024/B-4962** / **Date: 11/12/2024**

**LEASE AGREEMENT FOR LAND**

This document serves as confirmation of the attendance of the following parties before **Saadaal Notary** for the purpose of entering into a lease agreement:

**This Lease Agreement ("Agreement") is made and entered into on this 11th day of December 2024, by and between:**

**1. Lessor (Landowner):**  
**Name:** Abdullahi Elmi Musse  
**Address:** Bosaso, Puntland, Somalia  
**Contact Number:** 0907792333

**2. Lessee (Tenant):**  
**Name:** Puntland Electric Power Company (PEPCO)  
**Representative:** Ayub Abdullahi Isse (Finance Director)  
**Contact Number:** 0907792997

The Lessee agrees to lease the property from the Lessor, with both parties acknowledging and agreeing to the terms, covenants, and obligations outlined in this agreement. The lease is entered into under the following terms and conditions:

**1. Description of Property**

The Lessor agrees to lease to the Lessee the land described as:  
**Address/Location:** Bossaso City, behind Bossaso International Airport.  
**Size/Area:** 5,363 Square Meters  
**Other Details:** 11°16'46.92"N 49° 9'54.18"E Coordinates

**2. Term of Lease**

The term of this lease shall commence on **11 December 2024** and continue until **11 December 2044** unless terminated earlier in accordance with this Agreement.

**3. Rent and Payment Terms**

The Lessee agrees to pay the Lessor rent in the amount of USD Dollar **\$200** per Month.

- Rent shall be paid on or before the 10<sup>th</sup> day of each month.
- Payment Method: Bank Cheque

**Saadaal Notary and legal Consultancy**  
Tel : +252907209929, +252906172222, +252907921546, 0667723553.  
Gmail: Saadaalnotary123@gmail.com, Facebook: saadaal Notary and Legal Consultancy  
Bossaso - Somalia



#### 4. Security Deposit

The Lessee shall pay a refundable security deposit of **\$2,400** before taking possession of the land. This deposit shall be refunded at the end of the lease term, subject to any deductions for damages or unpaid rent.

#### 5. Use of Land

The Lessee agrees to use the land exclusively for the following purpose(s): **to construct the proposed a 33/11kv North Substation-Near Bossaso International Airport.**

The Lessee shall not use the land for any illegal purposes or activities.

#### 6. Maintenance and Repairs

- The Lessee shall maintain the land in good condition during the lease term.
- Any structural changes or improvements to the land require prior written consent from the Lessor.
- The Lessor shall be responsible for major repairs unless damages are caused by the Lessee's negligence.

#### 7. Utilities and Taxes

- The Lessee shall be responsible for all utilities (water, electricity) required for their use.
- The Lessor shall pay property taxes unless otherwise agreed.

#### 8. Termination

This Agreement **cannot be terminated by either party unless both the Lessor and the Lessee mutually agree** in writing to terminate the Agreement. Any termination shall be subject to terms agreed upon by both parties at the time of termination.

#### 9. Renewal After 20 Years

At the end of 20 years, this Agreement may be renewed upon **mutual agreement** of both the Lessor and the Lessee. The renewal terms and conditions shall be negotiated and agreed upon by both parties before the expiration of the initial term.

#### 10. Indemnity

The Lessee agrees to indemnify and hold harmless the Lessor from any claims, damages, or liabilities arising from the Lessee's use of the land.





### 11. Governing Law

This Agreement shall be governed by and construed in accordance with the laws of the **Federal Republic of Somalia**.

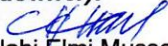
### 12. Entire Agreement

This Agreement constitutes the entire agreement between the parties. Any amendments must be made in writing and signed by both parties.

### 13. Signatures

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.



#### **Lessor (Landowner):**

Signature:   
Name: Abdullahi Elmi Musse  
Date: December 11, 2024

#### **Lessee (Tenant):**

Signature:   
Name: Ayub Abdullahi Isse Puntland Electric Power Company (PEPCO)  
Date: December 11, 2024

#### **Witnesses:**



1. Signature:   
Name: Yahye Hamid Mohamud
2. Signature:   
Name: Mohamed Ahmed Hassan

### NOTARY PUBLIC

Having observed the mutual satisfaction of both parties and confirmed their sound mental health, we hereby register this agreement with **Saadaal Public Notary**

**Principal Of Saadaal Notary Public**

**Adv. Abdulahi Said Osma**



**Saadaal Notary and legal Consultancy** Bossaso Puntland, Somalia  
Tel: +252907209929, +252906172222, +252907921546, 0667723553.  
Gmail: Saadaalnotary123@gmail.com, Facebook: saadaal Notary and Legal Consultancy  
Bossaso - Somalia

## Annex 8. PEPCO Letter to the Ministry of Energy and Water Resources on land for AfDB project.



PEPCO  
Airport Road  
Bosaso, Puntland  
Somalia

☎ 05-829111  
☎ 90-7797876  
✉ info@pepcco.so  
🌐 www.pepcco.so

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Ref: PEPCO/B/X/M/059/24

CEO OFFICE

Date: 11<sup>th</sup> December 2024

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To: **Director General**  
Ministry of Energy and Water Resources (MoEWR) FGS

CC: **Director General**  
Ministry of Energy Minerals and Water (Puntland)

Subject: **Land for AfDB project (Repair/Expansion of Bosaso Power Grid)**

Dear Director General

Puntland Electric Power Company (PEPCO) would like to confirm that it is committed to working with the ministry of Energy Minerals and Water as well as the African Development Bank (AfDB) in implementing the above mentioned AfDB project which will repair and expand the Bosaso power grid.

PEPCO has secured the necessary land required by way of long-term leasing agreement for the establishment of the proposed North & East substations around the city effective 1<sup>st</sup> June 2025.

PEPCO has also acquired additional land next to the proposed West substation.

PEPCO would also be prepared to provide any further necessary land required to execute this project which will benefit residents and businesses of Bosaso city.

We look forward to working with all necessary parties.

Yours Sincerely

A handwritten signature in blue ink, appearing to read "Bashir Abshir Muse".

Bashir Abshir Muse

