



RESEARCH PROJECT ON THE IMPACTS OF LARGE SCALE INFRASTRUCTURE DEVELOPMENTS ON COASTAL BIODIVERSITY: A CASE OF LAPSSET INFRASTRUCTURE PROJECT IN LAMU

FINAL REPORT ON STATUS OF COMPLIANCE WITH ENVIRONMENTAL AND SOCIAL SAFEGUARDS BY PROJECTS UNDER LAPSSET PROGRAMME

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December, 2021

EXECUTIVE SUMMARY

The LAPSET Programme is an infrastructure programme consisting of seven key infrastructure projects and four associated projects. It was conceived to improve access and connectivity between Kenya, Southern Sudan and Ethiopia and eventually form a land bridge across the entire Great Lakes region from Eastern Coast of Africa (Lamu) to Western Coast (Douala) Cameroon. The objective of the LAPSET Programme is to integrate the transportation system and land use pattern in order to optimally exploit the potential of the three countries to be directly served by the transport corridor. LAPSET Programme is desirous to ensure all programme related environmental and social impacts are adequately identified and managed in all its components. Various environmental and social impact assessment studies were carried out for both the Programme and projects being implemented under the programme. The studies identified potential environmental and social impacts that could arise during implementation of projects under the programme and proposed safeguard measures to be implemented to safeguard the physical, biophysical and social environment. An evaluation of the performance of these environmental and social safeguards is therefore critical to determine implementation status, effectiveness of the safeguards, gaps and challenges for timely interventions. This Environmental and Social Audit report is the first for the LAPSET Programme and covers three sampled projects being implemented under the LAPSET Corridor Programme.

LAPSET Programme activities reviewed

This environmental and social audit covered three projects being implemented under the LAPSET Corridor Programme namely; the first three berths of Lamu port and associated infrastructure, the Lamu port access road and the Garsen-Witu-Lamu road all confined within the LAPSET Corridor Programme core area in Hindi and Basuba Wards of Lamu County. The development area of the first three berths of Lamu port and associated infrastructure falls within GPS coordinates 40°52'00" to 41°00'00" in Easting and -2°13'00" to -2°16'00" in Southing, that of the port access road starts at GPS: -2°11'58.92"S, 40°49'51.46"E ending at the entrance of Lamu Port at -2° 11' 54.25" S, 40° 54'35.18"E while that of Garsen-Witu-Lamu roads starts at the Minjila B9/C112 junction in Tana River County, GPS Coordinate - 2°19'24.60"S, 40°06'41.17"E ending in Lamu Mokoe Jetty GPS coordinates -2°14'33.46"S, 40°52'11.68"E.

Documents reviewed and approval process

Four LAPSET Corridor Programme documents and three environmental and social impact assessment (ESIA) reports were reviewed. The programme document reviewed were, LAPSET Corridor and new Lamu port feasibility study and master plans report, Integrated Transport Infrastructure Master Plan for Lamu Port City, Strategic Environmental Assessment Study for the Master Plan for the LAPSET Corridor Infrastructure Development Project and Lamu Port City Agreed Investment Framework Report. Reviewed ESIA reports were ESIA for construction of the first three berths of Lamu Port and associated infrastructure, ESIA for Lamu port access road and ESIA for construction of Garsen-Witu-Lamu Road. Approval process of LAPSET Corridor Programme and projects implemented under the Programme involved the Kenya Government Authorization of Master Plans for LAPSET Corridor, Lamu Port and Lamu Metropolis administratively, legally, and financially. The approval also involved establishment of LAPSET Corridor Development Authority (LCDA), consideration of environmental conservation, electricity supply system, prioritization of corridor components, access road construction to connect LAPPSET Corridor and New Lamu Port, link road for New Lamu Port, electricity and water supply to Lamu Port and Lamu Metropolis.

Compliance level by the assessed LAPSET Programme activities

The LAPSET Corridor Programme was subjected to a Strategic Environmental Assessment (SEA) as required by international legal instruments specifically Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Trans-boundary Context and national legal instruments specifically Environmental Management and Coordination Act CAP 387 laws of Kenya, and Environmental (Impact Assessment/Audit) Regulations, 2003. However, the SEA was carried out while implementation of the LAPSET Programme was in progress. Implementation of recommendations in the SEA report (*to first address pre-existing concerns of increasing structural poverty as households continue losing assets to drought; declining land productivity on account of accelerated erosion; declining productivity of other livelihood systems; declining water resource base; and escalating loss of wildlife populations*) at Policy, Legislative, Strategic and operation levels for successful implementation of LAPSET Programme could not be executed timely. The three sampled projects implemented under LAPSET Corridor Programme were subjected to ESIA study as required by international

legal instruments specifically Espoo Convention, Principle 17 of the 1992 Rio Declaration on Environment and Development; Article fourteen of the Convention of Biological Diversity and national legal instruments specifically CAP 387 laws of Kenya, and Environmental (Impact Assessment/Audit) Regulations, 2003. However construction of the Lamu port and allied infrastructure begun prior to completion of the ESIA process meaning no approved substantive environmental and social management plan was in place with clear environmental and social safeguards to be implemented to protect and conserve the environment. This contravened the requirements of CAP 387 laws of Kenya.

Social impacts of the activities

Positive socio-economic impacts of the sampled projects being implemented under the LAPSET Corridor Programme were mainly employment opportunities, improved local business opportunities, reduced travel time, reduced motor vehicle operating costs: improved access to social services: improved road transport and communication, reduced transport cost, improved security: access to scholarship for local youths: improved infrastructure and property value. Negative socio-economic impacts that have resulted from implementation of the sampled projects include loss of livelihoods, loss of livestock grazing corridors, loss of livestock water sources, increase in human-wildlife conflicts, increase in demand for bush meat, dilution of local culture, increase in incidents of petty crimes, perceived increase in HIV/AIDS in Hindi town, broken marriages, reduced agricultural productivity of material borrow sites due to non- rehabilitation, teenage pregnancy and child marriages.

Adequacy of environmental and social management plans

Whereas environmental and social management plans (ESMP) for the three sampled projects were found to be generally adequate, the ESMP for the first three berths for Lamu Port and associated infrastructure lacked a detailed Environmental and Social Monitoring Plan (ESMP) that could guide and ensure strict monitoring of terrestrial, marine and social environments.

Recommendations for improvement of the EMPs for ongoing Programme activities

- ✓ A detailed Environmental, Social Monitoring Plan (ESMP) to be developed by LCDA in collaboration with KPA and KeNHA and strictly be implemented to ensure strict monitoring of terrestrial, marine and social environments.

- ✓ An adequate budget to be provided and availed by LCDA, KPA and KeNHA for the complete implementation of ESMP developed.
- ✓ Quarterly, bio-annual and annually progress reports on environmental and social monitoring to be developed by LCDA, KPA and KeNHA and submitted to NEMA.
- ✓ Dissemination of environmental and social monitoring findings to be carried out quarterly targeting the local community including fishing community, civil society groups, County Government of Lamu and National Government Agencies among other stakeholders.

ACRONYMS

AIA	Archaeological Impact Assessment
BMUs	Beach Management Units
CC	County Commissioner
CGL	County Government of Lamu
CITES	Convention on International Trade In Endangered Species
CSOs	Community Support Organization
DCC	Deputy County Commissioner
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EMPs	Environmental Management Plans
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management Monitoring Plan
ESMPs	Environmental and Social Management Plans
HIA	Heritage Impact Assessment
KEFRI	Kenya Forest Research Institute
KeFS	Kenya Fisheries Service
KeNHA	Kenya National Highway Authority
KFS	Kenya Forest Service
KMFRI	Kenya Marine and Fisheries Research Institute
KNATCOM	Kenya National Commission for UNESCO
KPA	Kenya Ports Authority
KV	Kilo volts
KWS	Kenya Wildlife Service
LAPSET	Lamu port-South Sudan -Ethiopia Transport corridor

LCDA	LAPSET Corridor Development Authority
NEMA	National Environment Management Authority
PAPs	Project Affected Persons
PICI	Presidential Infrastructure Championship Initiative
SEA	Strategic Environmental Assessment
SGR	Standard Gauge Railway
WIOMSA	Western Indian Ocean Marine Science Association
WWF-Kenya	World Wide Fund for Nature – Kenya

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CHAPTER 1: INTRODUCTION

1.1 Background to the LAPSET Programme

The LAPSET Corridor Programme is Eastern Africa's largest and most ambitious infrastructure project bringing together Kenya, Ethiopia and South Sudan. It is an infrastructure corridor project conceived to improve access and connectivity between Kenya, Southern Sudan and Ethiopia and eventually form a land bridge across the entire Great Lakes region from Eastern Coast of Africa (Lamu) to Western Coast (Douala) Cameroon. The objective of the LAPSET Programme therefore is to integrate the transportation system and land use pattern in order to optimally exploit the potential of the three countries to be directly served by the Corridor. The Programme is part of Kenya's Vision 2030 Strategy, a national long-term development policy that aims to transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. The LAPSET Corridor Programme has a continental institutional and leadership approval and recognition following its admission to the Presidential Infrastructure Championship Initiative (PICI) Project list in 2015. PICI aim to accelerate regional infrastructure development enabled through political championing of projects. The role of the champions is to bring visibility, unblock bottlenecks, coordinate resource mobilization, and ensure project implementation. PICI is thus a high-level platform whose aim is to put Africa on the right track towards unlocking its potential, and so to achieve the "Africa we want", as noted in Agenda 2063.

1.2 LAPSET Programme components

LAPSET Programme consists of seven key infrastructure projects and four associated projects.

1.2.1 Key infrastructure projects

- ✓ Lamu Port; a 32 berth, deep sea port at Manda Bay, Lamu County.
- ✓ Interregional Highways from Lamu to Isiolo, Isiolo to Juba (South Sudan), Isiolo to Addis Ababa (Ethiopia), and Lamu to Garsen (Kenya).
- ✓ Crude Oil Pipeline from Lamu to Isiolo, Isiolo to Juba; and a Product Oil Pipeline from Lamu to Isiolo, Isiolo to Addis Ababa.
- ✓ Oil Refinery.

- ✓ Interregional Standard Gauge Railway lines from Lamu to Isiolo, Isiolo to Juba, Isiolo to Addis Ababa, and Nairobi to Isiolo.
- ✓ 3 International Airports, one each at Lamu, Isiolo, and Lake Turkana.
- ✓ 3 Resort Cities: one each at Lamu, Isiolo and Lake Turkana.
- ✓ The multipurpose High Grand Falls Dam along the Tana River.

1.2.2 Associated projects

- Seven electric power transmission lines as follows; Rabai – Lamu 220KV transmission line, Garsen – Garissa 220KV transmission line, Kindaruma – Garissa 132KV transmission line, Masinga – Isiolo 132KV transmission line, Kamburu – Isiolo 220KV transmission, Lake Turkana – Suswa 400KV transmission line and Lamu – Garissa – Isiolo – Lokichar 220KV transmission Line.
- Land Acquisition for the LAPSSSET Corridor Program.
- Strategic Environmental Assessment (SEA) for the LAPSSSET Infrastructure Corridor to mitigate risks to the environment.
- ESIA for the Lokichar-Lamu Crude Oil Pipeline.
- Master Plan for Lamu Port City & Investment Framework.
- Integrated Transport Infrastructure Master Plan for Lamu Port City.
- LAPSSSET Outer Corridor Master Plan for Lamu Port City.
- Security Master Plan for securing the LAPSSSET corridor both at implementation and operation stage.

1.3 Objectives and expected outcomes of LAPSSSET Corridor Programme

The broad objective of LAPSSSET Corridor is to improve access and connectivity between Kenya, Southern Sudan and Ethiopia. This will eventually form a land bridge across the entire Great Lakes region from Eastern Coast of Africa (Lamu) to Western Coast (Douala) Cameroon. This will translate to improvement in socio economic development in Kenya specifically and the Eastern Africa region in general.

LAPSSSET Corridor Programme has seven key objectives which will translate to key outcomes once fully implemented as follows:-

1. Create a seamless interconnectivity within the country, region and continent through transformative regional infrastructure.
2. Raise profile of Kenya's and strengthen its regional Hub status in Eastern Africa.

3. Attract increased private sector investment in infrastructure development and management in the country.
4. Strengthen security and socio-economic base of South Sudan, Kenya, Ethiopia and other East and Central African countries.
5. Establish efficient, reliable and sustainable infrastructure in South Sudan, Kenya, Ethiopia and other East and Central Africa countries
6. Create employment opportunities in both specialized areas and manual labor thus reducing poverty levels in Eastern Africa.
7. Create capacity in infrastructure industry in East and Central Africa through Technology and Skills transfer- human, technological, financial and consumers in the country.

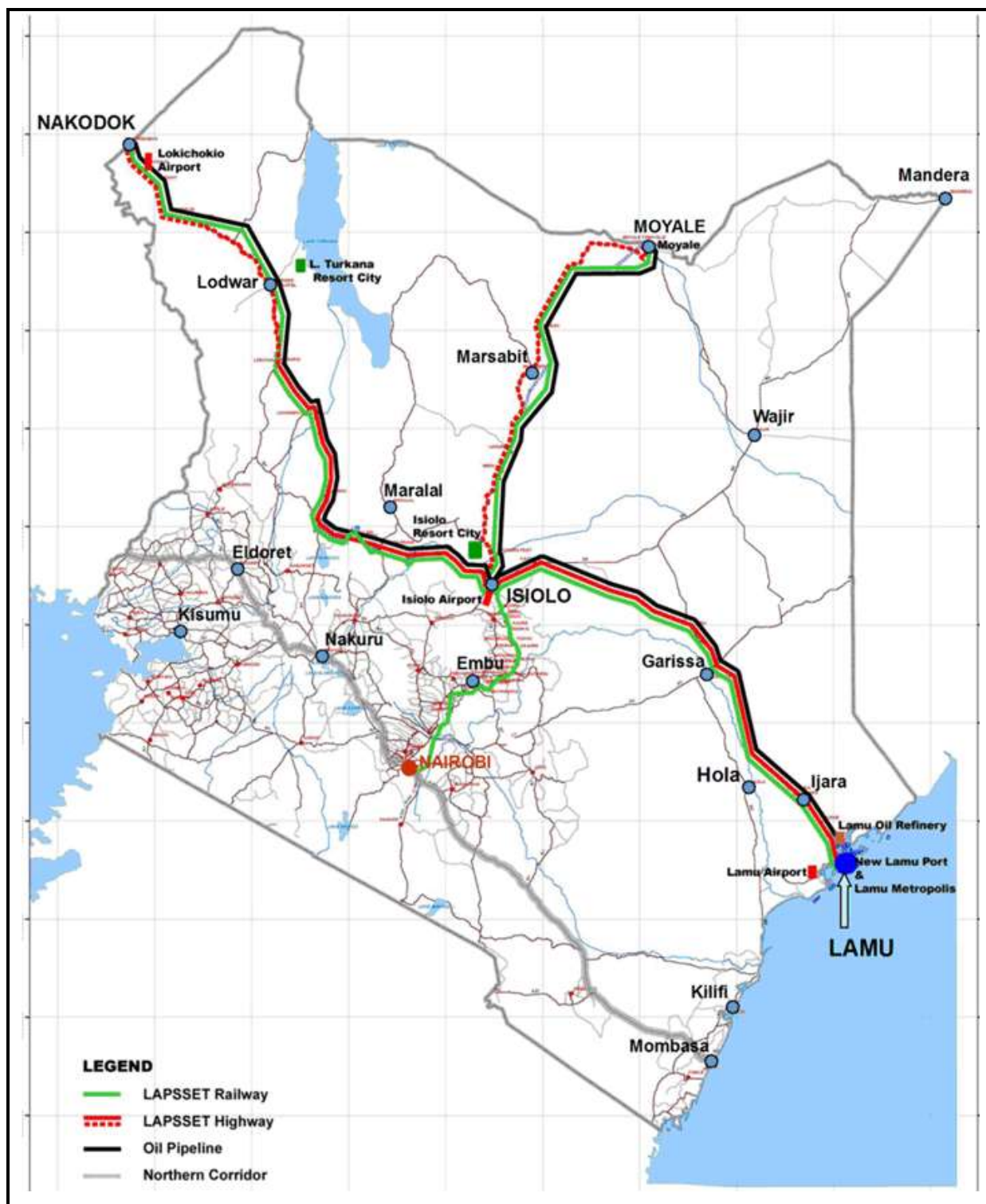
1.4 Geographical coverage of LAPSET Corridor Programme

The geographical coverage of LAPSET Corridor in Kenya is nine counties of Lamu, Garissa, Isiolo, Meru, Marsabit, Laikipia, Samburu, Baringo and Turkana (Map1). The core elements of the LAPSET Corridor are a 500 m wide Infrastructure Corridor designed to accommodate a Highway, Standard Gauge Raily (SGR), crude and product Oil Pipeline, utilities i.e. water and power transmission lines, and industrial investments in a 50 Km wide Economic Corridor spanning either sides of the infrastructure corridor. The Corridor originates from Lamu, passes through Isiolo and on to the border with Southern Sudan with a branch to Moyale from Isiolo. It is envisaged that LAPSET Corridor will connect the East and West Coasts of Africa from Lamu Port to Douala in Cameroon and then on to the Douala– Lagos–Cotonou-Abidjan Corridor. Ultimately, this Transport Corridor will open and link up Northern Kenya and the interior of Central Africa.

1.5 Implementation of LAPSET Corridor Programme

Implementation of the LAPSET Corridor Programme is being coordinated by the LAPSET Corridor Development Authority (LCDA), a Body Corporate established under the State Corporations Act Cap 446. LCDA is charged with the responsibility of Planning, Coordinating and Sequencing the implementation of the LAPSET Corridor Programme. LCDA works with Inter-ministerial Coordination Committees composed of relevant ministries including the National Treasury, Ministry of Energy and Petroleum, Ministry of Transport and Infrastructure, Ministry of Lands, Housing and Urban Development, Ministry of Water, Environment and Natural Resources, Ministry of Devolution and Planning,

Ministry of Interior and Coordination of National Government, Ministry of East Africa, Trade and Tourism, Ministry of Industrialization and Enterprises Development, Ministry of Agriculture, Livestock and Fisheries; and Ministry of Defence.



Map 1: Geographical coverage of LAPSET Corridor Programme

1.6 Rationale for Environmental and social audit for projects under LAPSSET programme

The LAPSSET Programme is desirous to ensure all programme related environmental and social impacts are adequately identified and managed in all its components. It is for this reason that a feasibility study was done in 2011 prior to commencement of implementation of projects under the programme. Whereas a Strategic Environmental Assessment (SEA) for the programme was done in 2017, the first Environmental and Social Impact Assessment (ESIA) for programme activities specifically the first three berths of Lamu port and associated infrastructure was done in 2013. Thereafter ESIAs/ Environmental Impact Assessments (EIAs) for other projects under the programme were done with ESIA for crude oil pipeline from Lokichar to Lamu being done in 2019. As part of the SEA and project specific ESIAs/EIAs, Environmental Management Plans (EMPs) have been put in place to guide environmental and social safeguard activities for specific projects under the programme. The EMPs have been the road map guiding specific projects under the programme to ensure compliance with appropriate safeguard measures to minimize negative impacts on the environment. The EMPs provide for Environmental and Social Audits to be carried out to assess compliance of each project under the programme with set procedures and safeguard measures described in project specific EMPs. It is against this background that a consultancy to assess the status of compliance with environmental and social safeguards for sampled projects under LAPSSET programme was commissioned. The consultancy is being implemented under a Western Indian Ocean Marine Science Association (WIOMSA) funded research project on impacts of large scale infrastructure developments on coastal biodiversity: a case of LAPSSET infrastructure project in Lamu. The research project is implemented by WWF Kenya in collaboration with LCDA and the National Environment Management Authority (NEMA).

1.6.1 Scope of the environmental and social audit

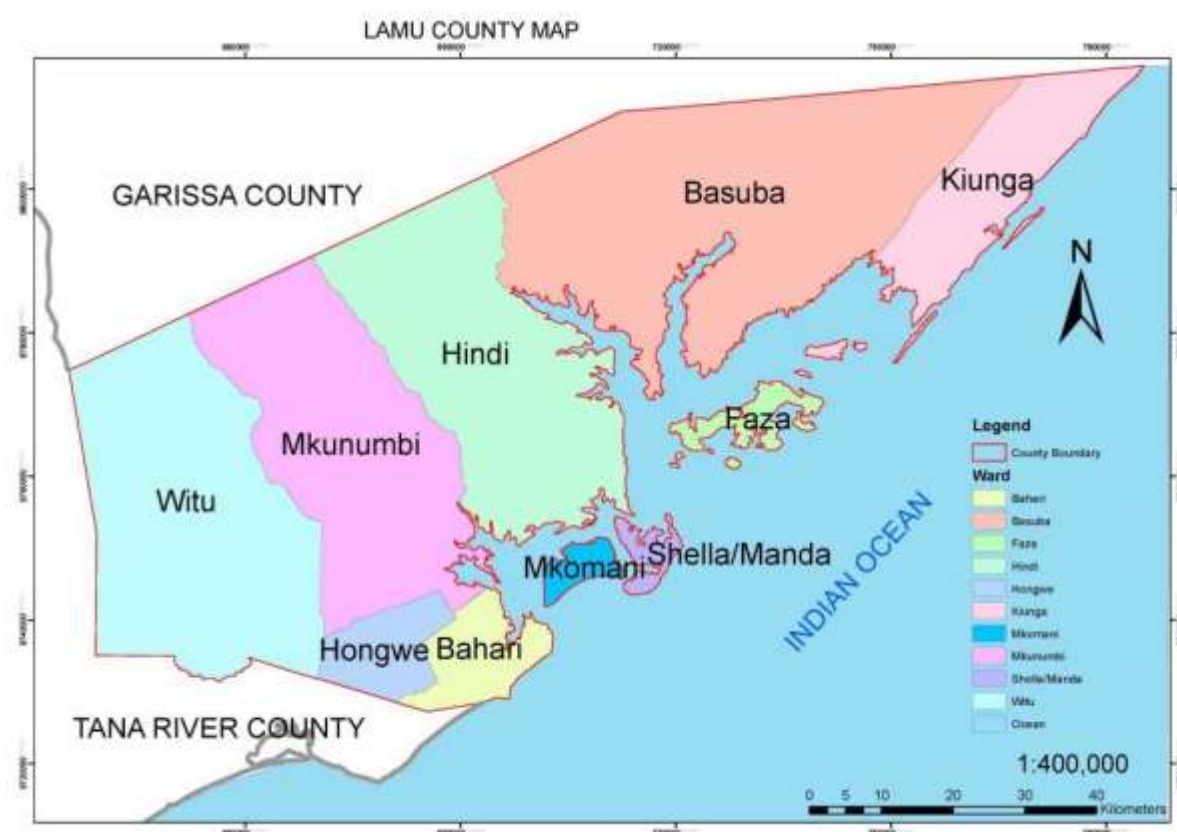
The environmental and social audit was confined within the LAPSSET Corridor Programme core area in Hindi and Basuba Wards of Lamu County (Map 2). It focused on assessing the impacts of the LAPSSET Program in the key area of Environmental Management. The environmental and social audit assessed the status of compliance with Environmental and Social safeguards for the following projects that were being implemented under the LAPSSET Corridor Programme:

1. Lamu Port Construction Project

2. Lamu-Witu-Garsen Road

3. Lamu Port Access road construction project

The above projects assessed were identified and agreed on in a meeting held between WWF, NEMA, LCDA and the Consultant.



Map 2: Research area of Hindi and Basuba Wards of Lamu County

1.6.2 Objectives of the environmental and social audit

The main objective of the environmental and social audit of the selected LAPSET Programme projects was to review and assess implementation and adherence to the safeguard measures described in the EMPs of each project being implemented under the programme as well as compliance with EMCA CAP 387 laws of Kenya while recommending areas for improvement to enhance compliance. More specifically the objectives as outline in the Terms of Reference (appendix 1) are to:

- i. Review environmental and social management performance of various projects being implemented under the LAPSET Programme
- ii. Assess the progress in implementation of EMPs (i.e. are the recommended mitigation and management measures followed?)
- iii. Assess the overall effectiveness of the EMPs in ensuring environmental and social safeguards for the projects

- iv. Document lessons learnt and recommend best practices that the activities should embrace to improve compliance with safeguard measures

1.6.3 Deliverables

The deliverables of this Environmental and Social Audit were; an Inception Report, a Draft Environmental and Social Audit Report, a presentation of the draft environmental and social audit report to stakeholders, a Final Environmental and Social Audit Report submitted to WWF-K and NEMA and Dissemination of findings of final report to stakeholders in a workshop.

1.6.3.1 Inception Report

The inception report was prepared and submitted to WWF-K for approval prior to data collection for this environmental and social audit research for the selected projects being implemented under the LAPSET Corridor Programme. The inception report specified the approach, methodology and work plan used in undertaking this environmental and social audit research.

1.6.3.2 Draft Environmental and Social Audit Report

This draft environmental and social audit report was compiled after undertaking literature review for relevant documents for LAPSET Corridor Programme, EMPs for selected projects being implemented under the LAPSET Corridor Programme and required field work activities for selected projects being implemented under the LAPSET Corridor Programme. The draft is an outcome of data analysis and synthesis from literature review of documents for selected projects being implemented under the LAPSET Corridor Programme and field work activities, it includes summary findings of:-

- i) A list of LAPSET Programme activities reviewed.
- ii) Review of EIA and EMP documents for the selected projects being implemented under LAPSET Programme and their approval process
- iii) Location of sampled projects under LAPSET Programme activities and their performance on safeguards
- iv) Compliance level by the assessed projects under LAPSET Programme and the adequacy of their EMPs
- v) Recommendations for improvement of the EMPs for ongoing Projects
- vi) Social impacts of the projects.
- vii) Overall effectiveness of LAPSET Programme EMP and safeguard practices.

1.6.3.3 Presentation of findings of the Environmental and Social Audit

The findings of the draft environmental and social audit will be presented to WWF-K, LCDA, NEMA, County Government of Lamu (CGL), County Commissioner (CC) Lamu, Deputy County Commissioner (DCC) Amu, Kenya Ports Authority (KPA), Kenya National Highway Authority (KeNHA), Kenya Forest Service (KFS), Kenya Wildlife Service (KWS), National Museums of Kenya (NMK), Kenya National Commission for UNESCO (KNATCOM), Community Support Organization (CSOs) and Project Affected Persons to obtain their comments on the draft report for incorporation in the final environmental and social audit report.

1.6.3.4 Final Environmental and Social Audit Report

The final environmental and social audit report will incorporate comments arising from presentation of the draft environmental and social audit to the various stakeholders. Five hard copies and a soft copy of the final environmental and social audit report will be submitted to WWF-K for review and approval.

1.6.3.5 Dissemination of findings of final Environmental and Social Audit report

Findings of the final Environmental and Social Audit will be disseminated in a stakeholder workshop.

CHAPTER 2: APPROACH AND METHODOLOGY

2.1 Approach

At the beginning of the assignment an inception meeting was held between the Consultant and a Team of Officers from WWF-K, NEMA and LCDA to formally introduce the Consultant to the Team. The meeting provided a forum for initial discussion on the LAPSSET Corridor Programme. The meeting also initiated discussion on the projects being implemented under the LAPSSET Corridor Programme confined within the LAPSSET project core area in Hindi and Basuba Wards of Lamu County that were to be audited. The final list of the projects being implemented under the LAPSSET Corridor Programme to be audited was agreed on after holding further consultations with WWF-K, NEMA and LCDA. During the inception meeting and further consultations with WWF-K, LCDA and NEMA thereafter, copies of relevant documents for the LAPSSET Corridor Programme and those of projects being implemented under the LAPSSET Corridor Programme were issued to the Consultant. Following the inception meeting an inception report specifying the approach, methodology, work plan and detailed fieldwork itinerary for undertaking the research and documents to be reviewed was prepared and submitted to WWF-K, LCDA and NEMA. Relevant documents for projects being implemented under the LAPSSET Corridor Programme were then reviewed prior to field work to the project sites, consultations with various project stakeholders and compilation of draft and final Environmental and Social reports.

2.2 Methodology

The methodology employed involved:-

- i) Literature review
- ii) Consultations with stakeholders
- iii) Field visits to the sampled project sites
- iv) Interviews with project affected persons
- v) Reporting

Figure 1 is an illustration of the various phases of undertaking the environmental and social audit for projects being implemented under the LAPSSET Corridor Programme confined within the LAPSSET project core area in Hindi and Basuba Wards of Lamu County.

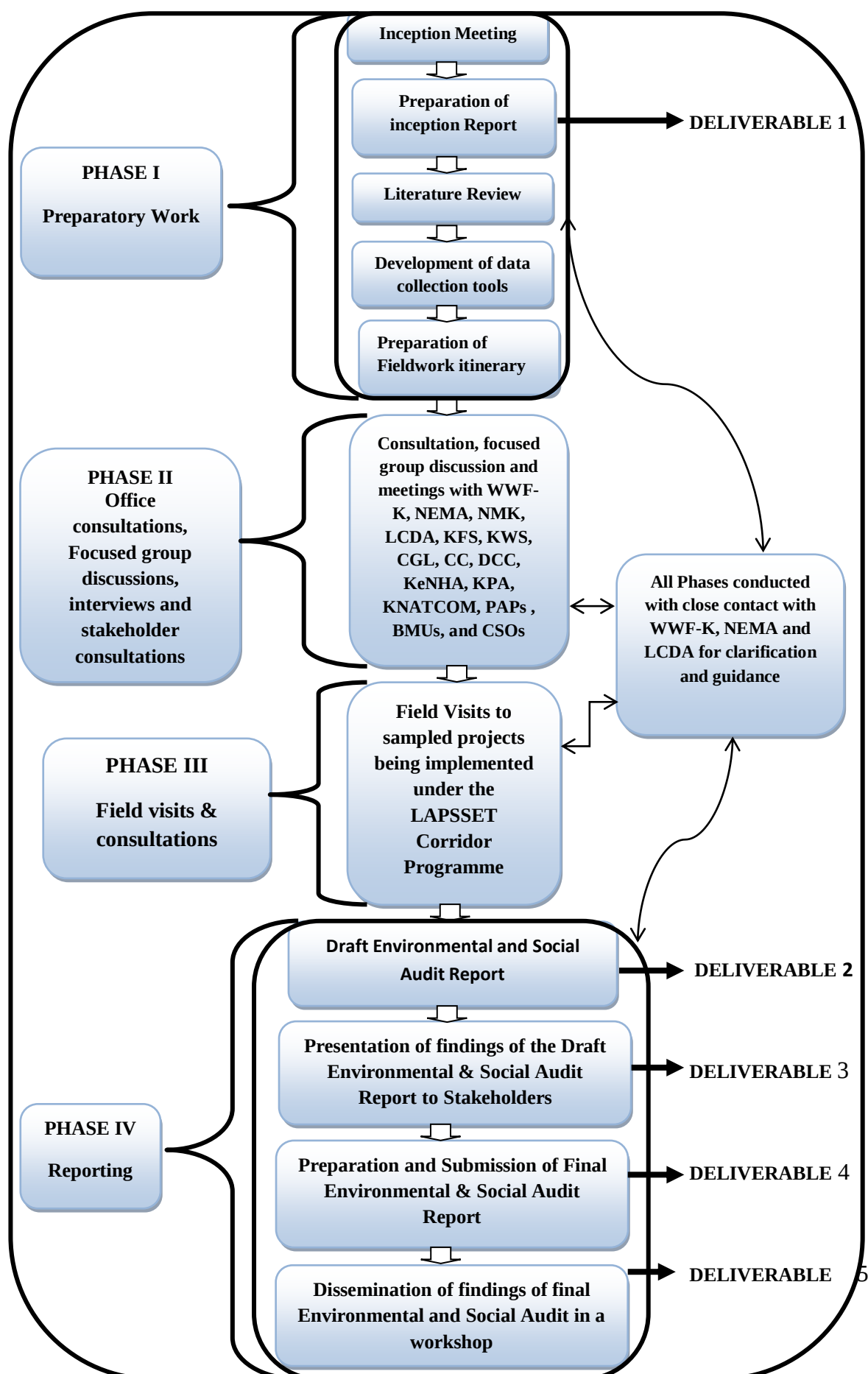


Figure 1: An illustration of the various phases of undertaking the environmental and social audit for sampled projects being implemented under the LAPSET Corridor Programme

2.2.1 Literature review

Literature review involved in-depth review of LAPSET Corridor Programme documents specifically, Feasibility Study Report, Integrated Transport Infrastructure Master Plan for Lamu Port City, Strategic Environmental Assessment Study for the Master Plan for the LAPSET Corridor Infrastructure Development Project and Lamu Port City Agreed Investment Framework Report. The review also covered relevant documents for projects being implemented under the LAPSET Corridor Programme. These were Environmental and Social Impact Assessment (ESIA) report and Environmental and Social Management Plan (ESMP) for the first three berths of Lamu Port and associated Infrastructure, ESIA Report and ESMP for Lamu Port access road and ESIA report and ESMP for Lamu-Witu-Garisen Road. The review of these documents was meant, among other things:-

- ✓ To understand the LAPSET Corridor Programme.
- ✓ To understand the ESIA and ESMP documents for sampled projects being implemented under the LAPSET Corridor Programme.
- ✓ To understand environmental and social approval process of sampled projects being implemented under the LAPSET Corridor Programme and assess whether it has been done in accordance with the procedures prescribed in the Environmental Management and Coordination Act (EMCA) CAP 377 laws of Kenya, Environmental (Impact Assessment and Audit) Regulations 2003 and other relevant sectorial laws.
- ✓ To understand ESMPs for sampled projects being implemented under the LAPSET Corridor Programme.
- ✓ To understand compliance levels of sampled projects being implemented under the LAPSET Corridor Programme and the adequacy of the ESMPs.
- ✓ To understand where improvement of ESMPs of on-going sampled projects being implemented under the LAPSET Corridor Programme is needed.
- ✓ To understand the overall effectiveness of ESMPs of sampled projects being implemented under the LAPSET Corridor Programme and safeguards practices.

2.2.2 Development of data collection tools

An interview guide and checklist relevant to each sampled project capturing the objectives of the environmental and social audit was prepared prior to fieldwork. A standardised WWF-K

form to record group members' attendance during focused group discussion was used. Appendix 2 is copy of interview guide, checklist and standardized participants attendance form during focused group discussions.

2.2.3 Focused group discussions, interviews and stakeholder consultations

Consultation were held with WWF-Kenya, NEMA, and government agencies responsible for implementation of various LAPSSET associated projects and Lead agencies responsible for management of various natural resources in the LAPSSET area. These included Kenya Ports Authority (KPA), Kenya National Highway Authority (KeNHA), Kenya Forest Service (KFS), Kenya Wildlife Service (KWS), National Museums of Kenya (NMK), Kenya National Commission for UNESCO (KNATCOM), and County Government of Lamu (CGL), County Commissioner (CC) Lamu and Deputy County Commissioner (DCC) Amu among others. The consultation also included marine conservation organizations such as CORDIO East Africa, Community Support Organization (CSOs) such as Save Lamu and Beach Management Units (BMUs). Further, consultations were held with Project Affected Persons (PAPs) who included fisher-folk, pastoralists, farmers and business community. Consultation with various stakeholders of the sampled projects was to among other things:-

- i) To gather information on the sampled projects
- ii) To gather information on the approval process of the sampled projects
- iii) To gather information on the location of the sampled projects
- iv) To gather information on performance of the sampled projects on safeguards
- v) To gather information on social impact of the projects
- vi) To seek clarification and farther guidance from WWF-Kenya and NEMA during the course of the research.

Twenty four (24) Key informant consultative meetings, nine (9) focused group discussion and one workshop of validation and dissemination of findings were held. The key informant interviews (in-person and virtue), focused group discussions and the workshop comprised of State Agencies implementing sampled projects being implemented under LAPSSET Corridor Programme or those managing natural resources with the LAPSSET Corridor , PAPs, Civil Society Groups, Contractors and Suppliers of ballast to sampled projects being implemented under the LAPSSET Corridor Programme. Appendix 3 is a

detailed schedule of key informant interviews and focused group discussions while appendix 4 is attendance list for the validation and dissemination workshop..

2.2.4 Field visits

Field visits were undertaken to all sampled project sites to among other things to:-

- i) Assess implementation of ESMPs of sampled projects being implemented under the LAPSET Corridor Programme
- ii) Undertake interviews with the project affected persons to assess social impacts of sampled projects being implemented under the LAPSET Corridor Programme
- iii) Assess compliance levels by sampled projects being implemented under the LAPSET and the adequacy of their ESMPs
- iv) Assess the overall effectiveness of ESMPs of sampled projects being implemented under the LAPSET Corridor Programme and safeguards practices.

Three field visits were carried out to Lamu Port, the Port access road and Lamu-Witu-Garsen road. Further extensive field work was carried focusing on road and port construction material sourcing sites (borrow pits) to assess rehabilitation status of the borrow pits. Field work to material sourcing sites covered 45 borrow pits within Hindi Ward operated by eight contractors/ suppliers, and borrow pits in Witu operated by H-Young & Co. (East Africa) Ltd. Rehabilitation status of the borrow pits is presented in appendix 4 while appendix 5 gives the location coordinates of material borrow sites.

CHAPTER 3: RELEVANT INTERNATIONAL CONVENTIONS AND PROTOCOLS AND NATIONAL ENVIRONMENTAL LEGISLATIONS

3.1 International Legal instruments underpinning EIA

- ✓ Espoo Convention requires that Environmental impact assessments shall, as a minimum requirement, be undertaken at the project level of the proposed activity. To the extent appropriate, the Parties shall endeavour to apply the principles of environmental impact assessment to policies, plans and programmes.
- ✓ Principle 17 of the 1992 Rio Declaration on Environment and Development (a set of principles which provide guidance on achieving sustainable development) and Agenda 21 (a global programme of action for achieving sustainable development to which countries are politically committed rather than legally obligated) both recognise the importance of EIA in contributing to sustainable development.
- ✓ Article fourteen of the Convention of Biological Diversity requires that each contracting party introduce appropriate procedures requiring EIA for its proposed projects that are likely to have significant adverse effects on biological diversity.

3.2 International Treaties, Conventions, and World Bank Policies

The following international treaties, Conventions, and WB Policies are relevant to this environmental and social audit:

Table 1: Relevant World Bank Safeguard Policies and International Conventions

Sector	Convention / Policy
EIA	World Bank Operational Policy 4.01(Environmental Assessment)
Resettlement	World Bank Operational Policy 4.12 (Involuntary Resettlement)
Ship ballast water	International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004
Disposal of dredged material and other waste	1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972
Pollution from ships	International Convention for the Prevention of Pollution From Ships, 1978. (Marpol 73/78)
Anti-fouling paints of ships	International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS), 2001
Cultural and	Convention Concerning the Protection of the World Cultural and

historical sites	Natural Heritage, Paris 1972
Wetlands	Convention on Wetland of International Importance (Ramsar, 1971)
Biodiversity	Convention on Biological Diversity (1992) WB OP 4.04: Natural Habitats
Wildlife	• Bonn Convention on the Conservation of Migratory Species of Wild Animals • Washington Convention on International Trade In Endangered Species (CITES,1973)
Hazardous waste	Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes (1989)
Oil spill	International Convention on Oil Pollution Preparedness, Response and Cooperation(1990)

3.3 International Legal instruments underpinning Strategic Environmental Assessment

The Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context states that ‘strategic environmental assessment should have an important role in the preparation and adoption of plans, programmes, and, to the extent appropriate, policies and legislation, and that the wider application of the principles of environmental impact assessment to plans, programmes, policies and legislation will further strengthen the systematic analysis of their significant environmental effects’.

3.4 Relevant Constitutional Provisions and National Environmental Legislations

Constitutional provisions and national legislations relevant to this environmental and social audit include:-

- ✓ **The Constitution of Kenya, 2010** which has explicit provisions on the environment and the right of Kenyans to a clean and healthy environment. Further, the constitution obliges the state to ensure sustainable exploitation, management and conservation of the environment and its natural resources.
- ✓ **The Environmental Management and Co-ordination Cap 387 Laws of Kenya** which gives effect to articles 69, 70 and 72 of the Constitution of Kenya 2010. Article 69 outlines obligations of the State in respect to the environment, article 70 provides for enforcement of environmental rights while article 72 provides for legislation relating to the environment. The Act thus establishes the framework for

environmental management and protection in Kenya. It confers the right of every person to a clean environment and to its judicial enforcement.

- ✓ **The Environmental (Impact Assessment and Audit) Regulations, 2003** which provides standards for conducting environmental and social impact assessments, environmental and social audits and monitoring.
- ✓ **Environmental Management and Coordination (Water Quality) Regulations, 2006** which provides standards for the protection of water quality and applies to drinking water, industrial water, effluent discharge, water used for agricultural, recreational, fisheries, wildlife and other purposes.
- ✓ **Environmental Management and Coordination (Waste Management) Regulations, 2006** which protect human health and the environment from potential effects of wastes, it classifies various types of waste and recommended appropriate disposal methods for each waste type.
- ✓ **Noise and Excessive Vibration (Pollution) (Control) Regulations, 2009** which provides standards on maximum permissible noise limits in different environment.
- ✓ **Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit sharing) Regulations 2006** which applies to conservation of biodiversity which includes conservation of threatened species, inventory and monitoring of biodiversity and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties.
- ✓ **Land Act, 2012** which provide for the sustainable administration and management of land and land based resources, and for connected purposes.
- ✓ **The Occupational Safety and Health Act, 2007** which secure the safety, health and welfare of persons at work; and protect persons other than persons at work against risks to safety and health arising.
- ✓ **The Wildlife Conservation Act, 2013** which covers matters relating to wildlife including protected areas, activities within protected areas, control of hunting, import and export of wildlife, enforcement and administrative functions.
- ✓ **The Tourism Act** which regulates tourism-related activities in Kenya and provides for the development, management, marketing and regulation of sustainable tourism and tourism-related activities
- ✓ **The National Museums and Heritage Act (CAP 216)** which protects Kenya's rich and diverse natural and cultural heritage.

- ✓ **Fisheries Act, 2012** which is a legal framework for the management, exploitation, utilization and conservation of fisheries and other connected purposes; it regulates the landing of fish and provides for the management of fish landing areas.
- ✓ **Physical Planning Act 1996** which governs land planning, it provides for the preparation and implementation of physical development plans and formulation of national, regional and local development policies, guidelines and strategies.
- ✓ **Public Health Act Cap 242** which makes provisions for securing and maintaining public health and prohibits activities that may be injurious to public health.
- ✓ **Agriculture Act Cap 318** which promotes and maintains a stable agriculture, provide for soil conservation and its fertility and to stimulate the development of agricultural land in accordance with the accepted practices of good land management and good husbandry.
- ✓ **Coast Development Authority (CDA) Act Cap 449** which provides for the planning, co-ordination and implementation of development projects in the Coast region and the exclusive economic zone.

3.5 National legal instruments Underpinning SEA

- ✓ Constitution of Kenya 2010, Article 69 (1) (f) provides that the State to ‘*establish systems of environmental impact assessment, environmental audit and monitoring of the environment*’
- ✓ Environmental (Impact Assessment/Audit) Regulations, 2003 Regulation 42 (1) provides for *strategic environmental assessment to all proposals for public policy, plans and programmes for environmental implementation to determine which ones are the most environmentally friendly and cost effective when implemented individually or in combination with others.*
- ✓ Environmental Management and Coordination Act CAP 387 Laws of Kenya section 57 (A) (1) provides for Strategic Environmental Assessment (SEA). The National Environment Management Authority SEA Guidelines states that ‘*in the SEA process, likely significant effects of a policy, plan, or program on the environment, which may include secondary, cumulative, synergistic, short, medium and long term, permanent and temporary impacts are identified, described and evaluated in the environmental report*’

3.6 National legal instruments Underpinning EIA

Environmental Impact Assessment is provided for in the Constitution of Kenya 2010 Article 69 (1) (f), Section 57 of EMCA CAP 387 laws of Kenya, Regulation 11 of legal notice 101, Environmental (Impact Assessment/Audit) Regulations, 2003, Legal Notice 31 and 32 of 2019.

CHAPTER 4: REVIEW OF LAPSET CORRIDOR PROGRAMME DOCUMENTS, ESIAS, EMPS AND APPROVAL PROCESS FOR PROJECTS IMPLEMENTED UNDER LAPSET

The following relevant project documents for LAPSET Corridor Programme were reviewed:-

- ✓ LAPSET Corridor and new Lamu port feasibility study and master plans report
- ✓ Integrated Transport Infrastructure Master Plan for Lamu Port City
- ✓ Strategic Environmental Assessment Study for the Master Plan for the LAPSET Corridor Infrastructure Development Project
- ✓ Lamu Port City Agreed Investment Framework Report

The following ESIA's for projects being implemented under LAPSET Corridor Programme were reviewed:-

- ✓ Environmental and social impact assessment study report for construction of the first three berths of the proposed Lamu Port and associated infrastructure.
- ✓ Environmental and social impact assessment project report for the proposed Lamu port access road.
- ✓ Environmental and social impact assessment study report for proposed construction of Garsen-Witu-Lamu (C112) Road

4.1 LAPSET Corridor Programme Documents

4.1.1 Feasibility Study Report

The feasibility study report has two main components namely feasibility study for the LAPSET Transport Corridor Project as a whole and a Master Plan and for the new Lamu Port Project. The LAPSET Corridor consists of three major transport infrastructure components, i.e. the railway, highway and pipeline which are designed to run parallel to one another. Environmental considerations are discussed for development of the Corridor. The Corridor does not pass any National Parks and Reserves except Marsabit National Park where the new Railway route crosses. Passage of wildlife is taken into consideration throughout the Corridor. The feasibility study report takes cognisance of important environmental and social concerns that have to be factored in and addressed during planning phases of the project components of the LAPSET Transport Corridor. Consolidated Corridor Environmental Plan recommends Environmental Impact Assessments (EIA) and Archaeological Impact Assessment (AIA) studies to be carried out for every phase of development and address issues dealing with land acquisition. Key environmental and social issues identified are:-

- ✓ In Lamu Port area impacts on marine life (Sea Turtle, Dugong, etc), fishing industry, world heritage site, and terrestrial floral and faunal species, land acquisition and impact of construction on HIV/AIDS prevalence.
- ✓ Isiolo area impacts on wildlife migration corridors due to the existence of surrounding national parks and reserves.
- ✓ Turkana and Lokichokio area should take into consideration impacts on Lake Turkana as a world heritage site and the nearby national reserves.
- ✓ Impacts on livestock and wildlife.

4.1.2 Integrated Transport Infrastructure Master Plan for Lamu Port City

The integrated transport infrastructure master plan for Lamu port city provides a baseline for long-range land-use planning, infrastructural development and infrastructure improvements based on transportation principles relating to safety, accessibility, mobility, affordability and the environment. The plan aims at minimizing negative impact on the environment and minimizing greenhouse gas emissions. It recognises that Lamu coastline is of high environmental / cultural sensitivity and hence requires serious attention. A7 Lamu – Witu – Garsen highway and A10 Lamu – Garissa – Isiolo highway are identified in the transport infrastructure master plan as the main transport axis to interconnect the various LAPSET components to each other as well as the rest of Kenya and other East African countries. The integrated transport infrastructure master plan for Lamu port city recognise that construction and operation of infrastructure projects under the LAPSET Corridor programme will give rise to adverse environmental impacts on the project area. The plan recommends that environmental impacts to be properly identified and managed by applying timely remedial measures. Identified potential impacts include:

- ✓ Direct loss of natural assets in areas cleared for the construction of project components, including the proposed new port, roads, railway, airport, resort town, oil refinery, fishing port, and new urban and industrial areas.
- ✓ Direct loss of natural assets over a larger area due to the wider development that LAPSET would attract new settlements, industries and infrastructure.
- ✓ Indirect impacts due to increased pollution and extraction of water, food, fuel and raw materials by a much larger population, however, given the scale of the LAPSET project, these impacts would be felt over large distances, including neighbouring counties and in offshore marine areas.

- ✓ Road sector development is predicted to result in high impacts during construction while construction materials borrow sites will result in moderate impacts.
- ✓ Port sector development is predicted to result in high impacts during construction, on marine water quality and marine ecology.

To ensure smooth implementation of projects implemented under the LAPSSSET Programme, the integrated master plan recommends that:

- ✓ An explanation of projects activities and their likely impacts to be done to the local population.
- ✓ An awareness campaign regarding the mitigation measures to be implemented in the project to be explained explicitly to the local population.
- ✓ Public Awareness meeting to be conducted at regular intervals during the project cycle.
- ✓ Grievances on social and environmental issues to be recorded from affected population and be sorted out with the help of the County Government.
- ✓ During construction stage, local people to register their grievances to the Project proponent in a grievance form through their County Members.
- ✓ Social and Environmental Staff of the Supervision Consultant and the Environmental Specialist of the contractor to conduct periodic visit to human settlements to collect Grievance Forms.
- ✓ Social and environmental staff in collaboration with the LCDA Environmentalist and local environmental officer of NEMA to work out solution for the grievances.

4.1.3 Strategic Environmental Assessment Study for the Master Plan for the LAPSSSET Corridor Infrastructure Development Project

A Strategic Environmental Assessment (SEA) for LAPSSSET Corridor Programme was carried out because of two main reasons notably, LAPSSSET is more of a programme hence necessitated a Programme Level SEA Study; secondly major components of LAPSSSET were under implementation, hence the need for an Integrated SEA entailing both impact prediction and mitigation. The SEA for LAPSSSET thus identified key strategic resources and linkages between environmental protection and economic growth in areas to be influenced by the programme, assessed likely significant effects of the programme to development on such resources, formulated a set of measures to address these priority concerns and recommended mechanisms for reducing environmental and social costs associated with achievement of the economic goals of LAPSSSET. The SEA noted that implementation of LAPSSSET Programme

will face challenges from pre-existing concerns whose priority resolution is necessary to create a favourable environment for implementation of the programme. Likewise, implementation of the programme will likely result in emergence of new concerns that have to be addressed and mitigated. Ten concerns (five pre-existing and five emerging) were identified that will have to be addressed and mitigated respectively for successful implementation of the programme. Identified pre-existing concerns were, increasing structural poverty as households continue losing assets to drought; declining land productivity on account of accelerated erosion; declining productivity of other livelihood systems; declining water resource base; and escalating loss of wildlife populations. Emerging concerns that implementation of LAPSET programme is likely to occasion are; realignment of the land resource base to the disadvantage of pastoral livelihoods and wildlife; continued habitat loss and threatened survival of wildlife; escalated pressure on water resources at the expense of pre-existing livelihoods and downstream ecosystems; marginalization of fishing-based livelihoods and aquatic habitats; and erosion of the cultural heritage. Successful implementation of the LAPSET Programme will require first addressing both pre-existing and emerging concerns at Policy, Legislative, Strategic and operation levels.

4.1.4 Lamu Port City Agreed Investment Framework Report

The Lamu Investment Framework focused on the Lamu node within the LAPSET Corridor. The investment framework aimed to establish a planning and investment framework for Lamu to guide implementation of the LAPSET Development Corridor. It aligned stakeholders around a shared vision for Lamu with the aim of unlocking funding and delivery in order to deliver the socio-economic and environmental benefits linked to the LAPSET Corridor project. Identified environmental concerns that need to be taken into account include; protected and gazetted habitats, fishing grounds and landing sites, marine habitats (coral reefs, mangroves, sea grass), landscape features (rivers, wetlands, beaches and sand dunes), critically environmentally sensitive areas, cultural and sacred sites, existing settlement locations and existing infrastructure such as roads, schools and airstrips. Identified environmental opportunities likely from implementation of the LAPSET Programme include; job creation and investment to the area in a planned and controlled manner will enable the protection and enhancement of the most pristine natural areas that might otherwise be threatened by those seeking land to pursue a livelihood; opportunities to improve access to valuable natural assets (in a controlled and sensitive way), enabling more people to enjoy them; opportunity to maximise the value that the heritage assets such as the World Heritage

Site and other scared sites offer, by upgrading facilities and extending the tourist offer in Lamu and implementing an eco-system services approach to development the benefits that environmental assets offer can be fully understood and utilised.

4.2 ESIA for projects implemented under LAPSET

4.2.1 ESIA for construction of the first three berths of the proposed Lamu Port and associated infrastructure

The Environmental and social impact assessment for the construction and operation of the first three berths of Lamu port and associated infrastructure established that implementation of the port development project could raise a number of environmental and social concerns that are both negative and positive to the surrounding environment and local communities. Positive impacts identified in the ESIA included increased economic activities, improved infrastructure and employment creation. The project could negatively impact on local marine water quality, mangroves, fisheries, archaeological, historical and cultural sites and impact on land ownership.

4.2.2. ESIA for Lamu Port access road and Lamu-Witu-Garsen Road

Environmental and social management plan developed during the ESIA for the proposed Lamu port access road and Lamu-Witu-Garsen Road predicted the following impacts could result from implementation of the access road:-

- ✓ Increase in soil erosion
- ✓ Soil compaction
- ✓ Loss of soil fertility
- ✓ Climate impacts
- ✓ Air Quality impacts
- ✓ Surface and groundwater Resources impacts
- ✓ Terrestrial/ Aquatic Environment: Flora and Fauna
- ✓ Land Resources
- ✓ Visual Aesthetics
- ✓ Noise and Vibrations
- ✓ Solid and Liquid Wastes
- ✓ Social Characteristics
- ✓ Impacts of material borrow sites

4.2.3 ESIA for Garsen-Witu-Lamu Road

Environmental and social management plan developed during the ESIA for the proposed Garsen-Witu-Lamu road predicted the following impacts could result from implementation of the access road:-

- ✓ **Environmental impacts:** Hydrology /drainage enhancement, soil erosion, air quality (fugitive dust and noise), reduced water quality, materials sources, flora and fauna.
- ✓ **Socio-economic impacts:** Transport cost, travel time, induced immigration and settlement, loss of land/property, spread of HIV/AIDS, trade and commerce, access to amenities, jobs creation, security and national / regional transport.
- ✓ **Occupational health and safety impacts:** Accidents and incidents at the workplace, road safety.
- ✓ **Archaeology and national heritage:** Archaeological or cultural sites (culturally important sites and shrines).

A number of mitigation measures were proposed to mitigate the potential negative impacts.

4.3 Approval process for LAPSET Corridor Programme

Approval process for LAPSET Corridor Programme involved carrying out feasibility study of the proposed programme which included all components of the programme to establish if the proposed programme was economically, environmentally and social feasible to be implemented. Recommendations to the government of Kenya were made by the Consultant based on the outcome of feasibility study. The feasibility analyzed from technical, economic, financial and other aspects for each component and confirmed that LAPSET railway; highway and oil pipeline; as well as Lamu oil refinery; Lamu resort city; and Lamu International Airports were all feasible in terms of EIRR, B/C ratio and NPV as well as FIRR and lease costs. Based on the outcome of the feasibility study, the Kenya Government approved implementation of the programme by authorising implementation of key recommendations in the feasibility study report as follows:-

1. Authorization of Master Plans for LAPSET Corridor, Lamu Port and Lamu Metropolis. Prior to commencement of construction works of the new Lamu Port, the Master Plans proposed in feasibility study report were authorized by the government of Kenya administratively, legally, and financially. This involved:
 - a) Authorization of the entire LAPSET Corridor Master Plan by the Kenyan Government, and confirmation of coordination and cooperation among the Ministries concerned.

- b) Formation of international agreements on the Plan between the government of Kenya and the governments of Southern Sudan and Ethiopia.
 - c) Authorization and confirmation of the Lamu Port Master Plan among the parties concerned, including the National and County governments and relevant authorities.
 - d) Definition and legal authorization of LAPSET Corridor, Lamu Port area, Port Limit, Free Port Area, Special Economic Zone, Bonded area.
 - e) Authorization of new Lamu City Development Plan, including interim arrangement for planning and urban management.
 - f) Land management by prescription of “Urban Area.”
 - g) Designation of Port-related Industrial Area, Special Economic Zone (SPZ), Export Processing Zone (EPZ).
 - h) Authorization of location and area for New Lamu International Airport and Resort Cities.
 - i) Authorization of other infrastructure development plans such as Electricity Supply Projects with an order of 1 GW for 1.25 million citizens and factories anticipated in the future.
- 2. Establishment of LAPSET Corridor Authority established in the government of Kenya to plan and coordinate the Projects.
 - 3. Consideration on Environmental Conservation.
 - 4. Consideration on Electricity Supply System
 - 5. Priority of the Corridor Components
 - 6. Access Road Construction to Connect LAPPSET Corridor and New Lamu Port.
 - 7. Link Road for New Lamu Port Construction.
 - 8. Electricity and Water Supply to Lamu Port and Lamu Metropolis.

4.3.1 Strategic Environmental Assessment for LAPSET Corridor Programme

- ✓ A Strategic Environmental Assessment for LAPSET Programme was carried out and a report dated January 2017 was compiled.
- ✓ The SEA for LAPSET Programme was carried while the actual implementation of LAPSET programme was on-going.
- ✓ The SEA was carried out after commencement of some of the projects being implemented under the LAPSET Programme such as the first three berths of Lamu port and associated infrastructure.

4.3.2 Impact of poor timing of SEA study for LAPSET Corridor Programme

- ✓ SEA recommendation to first address pre-existing concerns (*of increasing structural poverty as households continue losing assets to drought; declining land productivity on account of accelerated erosion; declining productivity of other livelihood systems; declining water resource base; and escalating loss of wildlife populations*) at Policy, Legislative, Strategic and operation levels for successful implementation of LAPSET Programme could not be executed timely prior to programme implementation
- ✓ SEA recommendation to first address identified emerging concerns (*realignment of land resource base to the disadvantage of pastoral livelihoods and wildlife; continued habitat loss and threatened survival of wildlife; escalated pressure on water resources at the expense of pre-existing livelihoods and downstream ecosystems; marginalization of fishing-based livelihoods and aquatic habitats; and erosion of the cultural heritage*) at Policy, Legislative, Strategic and operation levels could not be executed timely as the study was carried out while implementation of projects under the programme was underway

4.4 Approval process for sampled projects implemented under LAPSET Corridor Programme

- ✓ Environmental and social impact assessment (ESIA) was carried out for the first three berths of Lamu Port and associated infrastructure, the Port access road and Lamu-Witu- Garsen road
- ✓ ESIA for the first three berths of Lamu Port and associated infrastructure was carried out while implementation of the project was underway.
- ✓ ESIA for the Port access road and Garsen- Witu- Lamu road was carried out prior to commencement of road construction activities and EIA licences for each of the road projects issued by NEMA
- ✓ All of the material borrow site for the Garsen-Witu-Lamu road were subjected to EIA although some of the EIAs for the site were carried out after the Contractor received an improvement notice from NEMA as extraction of the materials started prior to carrying out EIA.

4.4.1 Potential effect of poor timing of ESIA study for Lamu port and associated infrastructure

- ✓ Commencement of construction of Lamu Port and associated infrastructure prior to carrying out an ESIA conclusively complete with licensing from NEMA meant that the contractor implementing the project lacked an elaborate environmental management and monitoring plan (EMMP) to guide the implementation of the project from beginning of project implementation.

- ✓ Lack of an elaborate EMMP at the beginning of project implementation meant that there were no documented action plans to ensure that potential negative impacts are monitored appropriately to minimise environmental and social impacts and ecological degradation.

CHAPTER 5: ENVIRONMENTAL AND SOCIAL PERFORMANCE OF SAMPLED PROJECTS

5.1 Location of Sampled projects

The first three berths of Lamu port and associated infrastructure are located in Lamu County, Lamu West Sub County within Hindi in Manda Bay. The development area of the project falls within 40°52'00" to 41°00'00" in Easting and -2°13'00" to -2°16'00" in Southing. The first three berths quay line coordinates are as follows A: 715070.6657 East and 975766.4983 North, B: 715316.9303 East and 9757350.2940 North, C: 715563.1949 East, 9757035.0897 North and D: 715766.3632 East, 9756775.0462 North.

The Lamu port access road starts at GPS: -2°11'58.92"S, 40°49'51.46"E (North West of Lamu Town) approximately 180m from Gulf Energy Station, off Lamu Witu Garsen (C112) Road. The access road runs in a southeasterly direction through Jipe and ends at the entrance of Lamu Port at -2° 11' 54.25" S, 40° 54'35.18"E. The approximate length of the Access Road is about 11.4km.

The Garsen-Witu-Lamu road starts at the Minjila B9/C112 junction in Tana River County, about 7 Km from Garsen town GPS Coordinate -2°19'24.60"S, 40°06'41.17"E and proceeds eastwards to Nyongoro about 16km from Witu Market. From Witu market, it takes an easterly direction up to Mkunumbi market. From Mkunumbi, the road takes a north – north easterly course to Hindi where it branches off and terminates at Mokoe Jetty in Lamu at GPS coordinates -2°14'33.46"S, 40°52'11.68"E.

Material borrow sites (borrow pits) which supplied gravel used for onshore port activities, port access road and Garsen-Witu-Lamu road were located mainly at Hindi and Witu areas. GPS coordinates for these borrow pits are in appendix 5.

5.2 Performance on safeguards

Various safeguards were proposed in the ESIA reports for the three sampled projects to protect Project Affected Persons (PAPs) from adverse negative impacts from implementation of the projects. Some of the identified PAPs were the fishing community which is organised in Beach Management Units (BMUs), the farming community who include land owners, the pastoralist community who are mainly herders and the business community. Further the safeguards were designed to protect both terrestrial and marine flora and fauna from adverse impacts of projects. The safeguards were also designed to cushion the local community from marginalization with respect to employment at the proposed port and associated facilities due

to lack of required skills. In respect to archaeological, historical and cultural sites and local tourism, the safeguards proposed aimed at preserving local culture from dilution, provide pathways for collecting and preserving artifacts encountered and preserve both tangible and intangible heritage, promote, enhance and diversify local tourism. Once fully implemented; the safeguards were envisaged to work well in cushioning PAPs while conserving and protecting physical, biophysical and social environments.

Safeguards to protect farmers and pastoralist: The resettlement action plan for the construction of the first three berths of Lamu Port and associated infrastructure worked well in ensuring displaced persons were compensated for the land they lost to the project. All affected land owners had been compensated, however women and children displaced at household level were disadvantage when the head of the household who are mainly male spent the proceeds from the compensation for other purposes besides resettling the affected family members. The compensation was silent to affected pastoralists who mainly lost access to traditional livestock grazing and watering areas.

Safeguards to protect fishing community: The fishing community was to be cushioned from adverse impacts of the construction of the first three berths of Lamu Port and associated infrastructure project by first being monetarily compensated for lost livelihoods, be enabled to explore alternative and new fishing sites in deep sea through targeted training, provision of modern fishing equipment, modernization of landing sites and construction of fishing ports among others. None of these safeguards have been executed to date; this is continuously negatively impacting on the fisher-folk economically, socially and their overall wellbeing. The fish catch has significantly reduced as the available traditional fishing area has shrunk significantly; the entire fish value chain is directly impacted negatively. Some of the fisher-folk from various BMUs have taken loans with the hope of paying the loans from compensation proceeds thus straining relationships.

Safeguards to protect local community from marginalization: Targeted training for youths from local community was to be initiated and sustained through the project cycle (construction of the first three berths of Lamu Port and associated infrastructure) to cushion locals from marginalization with respect to employment due to lack of required skills. Whereas a LAPSET Corridor has a scholarship scheme for local community youths, beneficiaries of the scheme are yet to secure employment in the new port and associated facilities.

Safeguards to protect terrestrial flora and fauna: Targeted planting of trees in public spaces to offset those lost during construction of the two roads and parts of the port. Equally establishment and gazettement of wildlife corridors was envisaged to safeguard wildlife movement. Whereas these safeguards were supposed to be implemented along with project implementation, they are yet to be implemented.

Safeguards to protect marine flora and fauna: Marine flora and fauna were to be protected from adverse impacts of port construction activities by installation of silt curtains during dredging around working area to contain/ minimize dispersal of turbidity plumes, use of intrinsic dredging techniques, selection of short dredging period in relation to tidal currents, time of the year and dredging period, dredging and offshore dumping operations were to be during dry period when no buoyant water. The account on the state of marine flora and fauna where the fishing community fish (as narrated by given BMU members from Mungini BMU, Kipungani BMU, Matondani MBU, Shela BMU and Amu BMU) indicate that these safeguards were either not implemented or if they were, then the safeguards were not effective hence their performance in protecting marine flora and fauna from adverse impacts was poor. Mangroves were to be shielded from adverse impacts by minimizing area to be cleared and conducting replacement planting of all cleared mangroves in adjacent areas. This safeguard was performing well as only 1.5 hectares of the projected 2 hectares were cleared. Further both KFS and local CSOs were actively involved in mangrove planting in adjacent creeks.

Safeguards to protect archaeological, historical and cultural sites: It was envisaged that carrying out a Heritage Impact Assessment (HIA), Archeological Impact Assessment (AIA) for all sites for projects that were to be implemented under LAPSET Corridor Programme, development and documentation of procedures and protocols for conserving artifacts encountered during project implementation could protect archeological, historical and cultural sites and heritage. Whereas HIA was carried out, recommendation that it be adopted as an annex to ESIA for the port to ensure implementation of recommendations therein was not done. The safeguard on AIA was not implemented; no AIA was carried out for any of the sites of the sampled projects or procedures developed and protocols for preserving encountered artifacts. During the opening up of the port access road some archeological remains were uncovered including building foundations, tombs and human skeletons as reported by NMK. In absence of an AIA prior to project implements and documented

procedures and protocols on handling of an encountered material of archeological importance, the encountered archaeological material could not be preserved.

Safeguards to protect Socio-cultural and Political issues: In the ESIA for construction of the first three berths of Lamu Port and associated infrastructure, it was proposed that to safeguard socio-cultural and political issues, a clear benefit sharing system with the community was to be defined, Lamu Port Steering Committee was to be included in decision-making process, a clear policy on community consultation and involvement was to be developed, natural resource related conflicts were to be addressed before initiating any project and establishment of community grievances redress mechanism and integration of community development projects. Implementation of these safeguards is largely pending hence their performance could not be evaluated.

Safeguards to protect material borrow sites: In all the three sampled projects it was envisaged that locating borrow pits away from human settlement areas, fencing off all borrow sites areas and rehabilitation of all borrow pits using stockpiled overburden material will mitigate potential impacts from such borrow areas. The acreage of borrow pits operated by each contractor/supplier is shown in figure 1, 25.49% of the borrow pits at Hindi were located at close proximity to settlement areas (homesteads) contrary to safeguard requirement of locating borrow pits away from human settlement areas figure 2 shows land use areas where the borrow pits were located. None of the borrow pits were fenced contrary to the safeguard measure of ensuring all borrow pits were fenced. Less than 10% of borrow pits in Hindi and Witu areas were fully rehabilitated, figure 3 shows rehabilitation status of the borrow pits while figure 4 is the map showing distribution of borrow pits in Hindi and Witu areas.

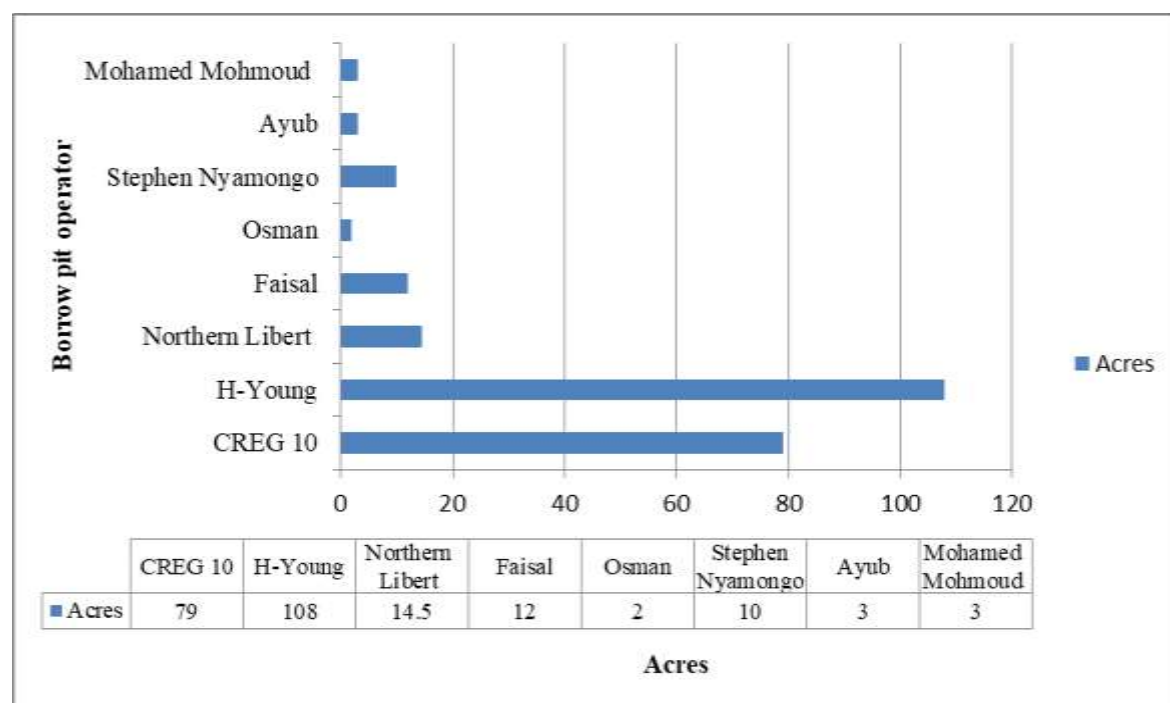


Figure 1: Acreage of borrow pit for each operator

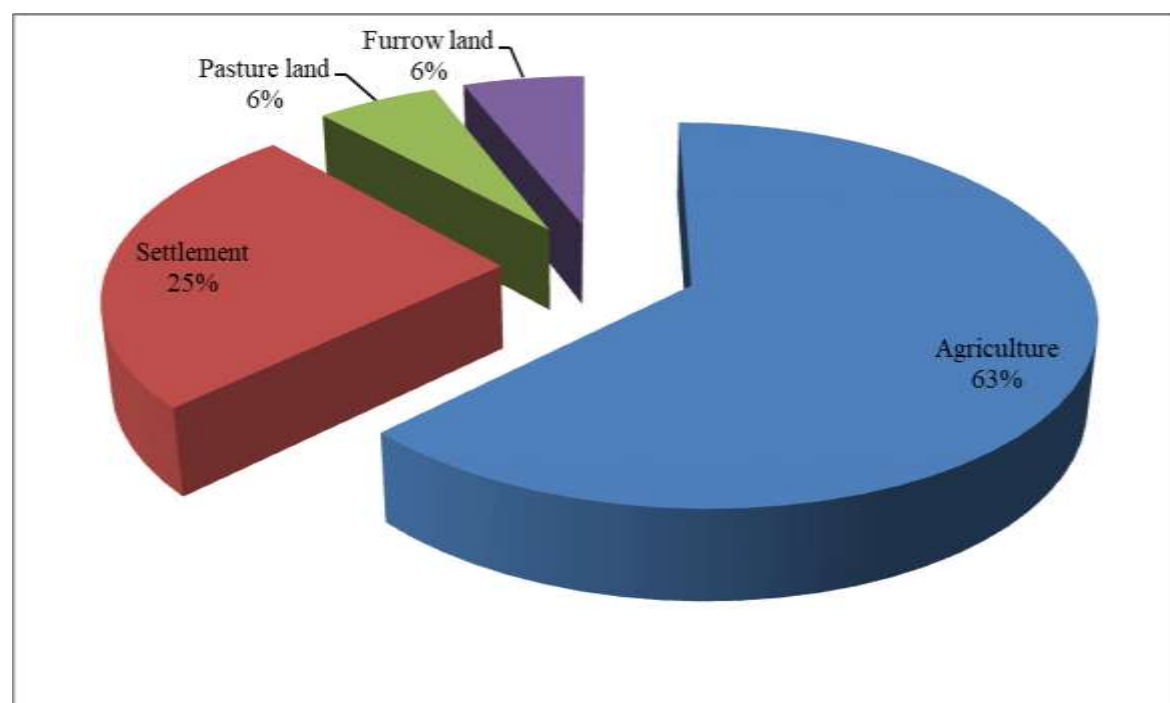


Figure 2: Land use adjacent to borrow pits

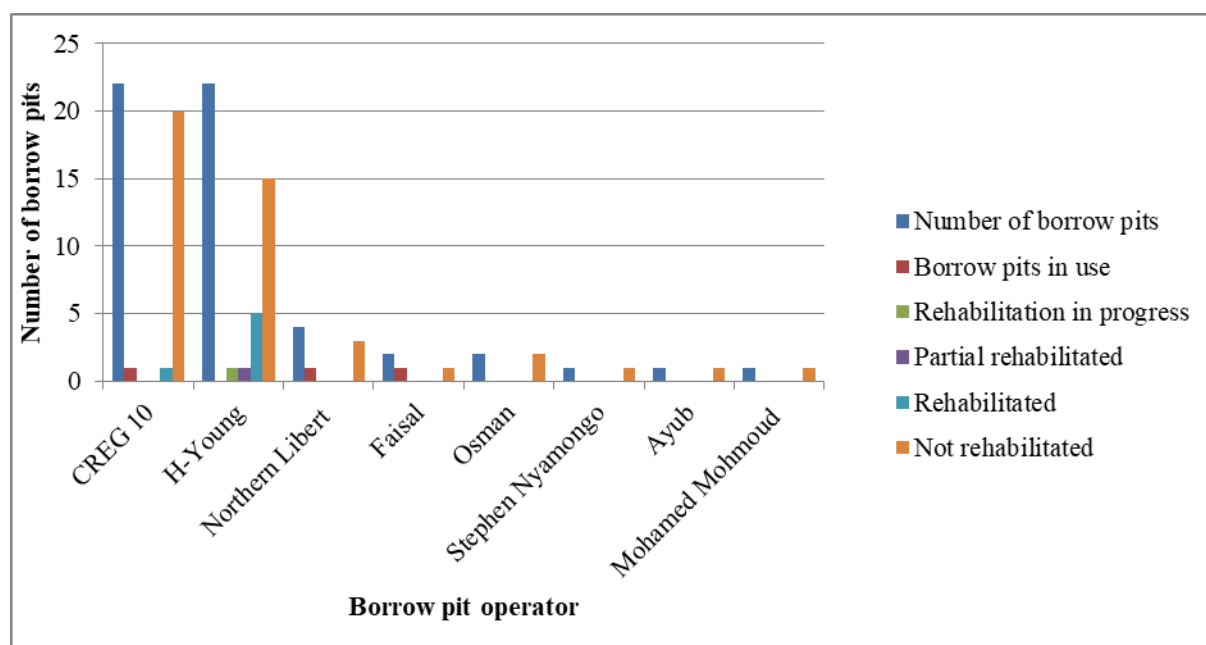


Figure 3: Rehabilitation status of borrow pits

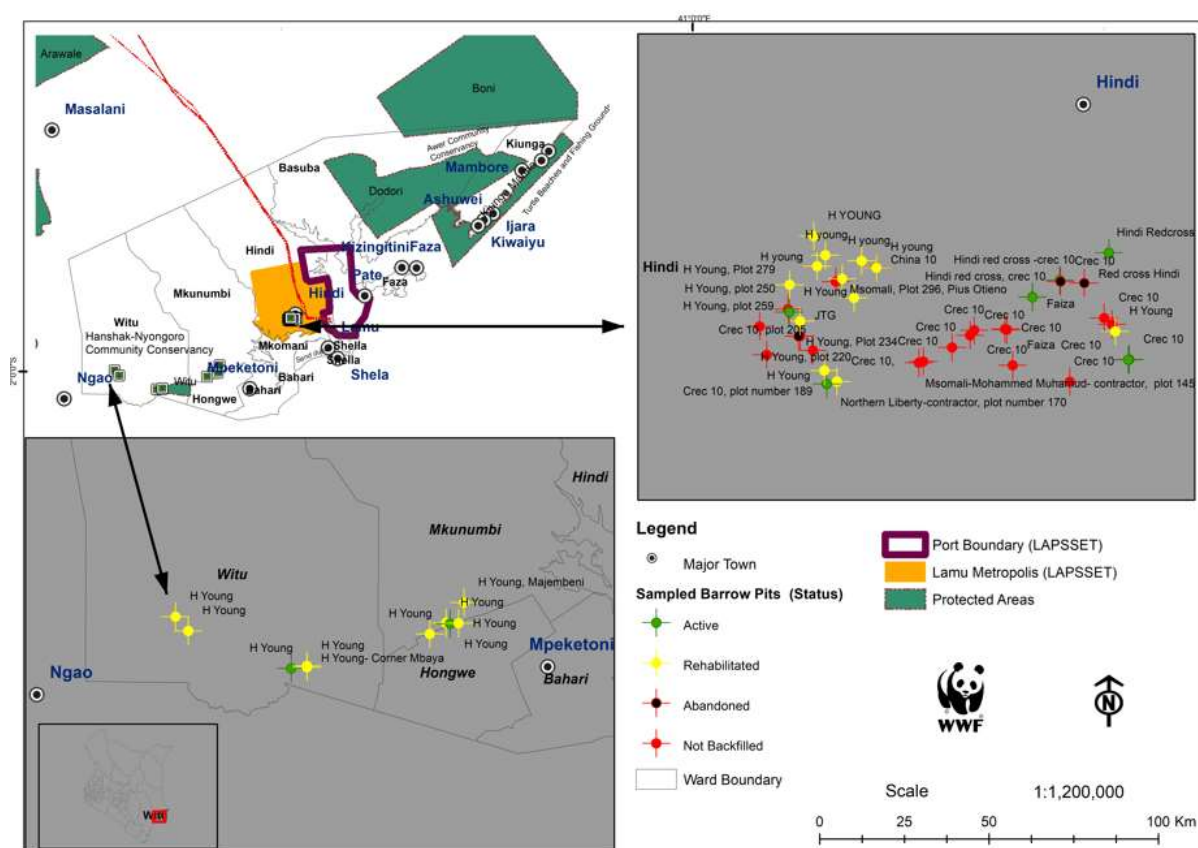


Figure 4: Distribution of borrow pits in Hindi, Mkunumbi and Witu areas and their status of rehabilitation

CHAPTER 6: PROGRESS IN IMPLEMENTATION OF EMPS FOR SAMPLED PROJECTS

6.1 EMP for first three berths of Lamu port and associated infrastructure

Environmental and social management plan developed during the ESIA for the first three berths of Lamu port and associated infrastructure predicted that construction, implementation and operation of the port will potentially have negative impacts on:

- ✓ Local socio-economic
- ✓ Fisheries
- ✓ Dredging and dredged material disposal
- ✓ Marine ecology
- ✓ Physical-chemical environment
- ✓ Coral reefs
- ✓ Terrestrial and marine environment
- ✓ Waterfront industry

Implementation status of proposed mitigation measure of each of the predicted negative impacts is tabulated in tables 2-9

Table 2: Status of implementation of mitigation measures of impacts of socio-economic impacts

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
Transport shipping & harbor	Marginalization of the local people with respect to employment at the proposed port due to lack of required skills	- MoT should initiate a middle level class training program for courses that relate to Port operations and management in Lamu.			- LAPSET has scholarship scheme targeting students from local community as part of targeted training for local community to acquire relevant skills to for local job market - Key LAPSET Personnel including Board Members, Regional Director and Community Liaison Officer are sourced from the local community - 100 Dock workers hired from the local community have been employed in the Lamu Port.
		- In the interim, MoT can enter into partnership with the Lamu Youth Polytechnic to utilize the facility to initiate the training programme. This would enable the graduates of the polytechnic qualify for employment once the port is operational			
	Loss of fishing grounds and landing sites	- Gear and vessel exchange to use other fishing grounds and methods			- Fishing community have lost their traditional livelihoods - Fishing community have not been compensated for the loss of livelihoods - Local BMUs have lost their traditional fishing ground - The fish catch has drastically reduced - Local BMUs are uncertain whether they will be able to access fishing grounds within the port area and adjacent environs once the port is operational - None of the mitigation measures proposed have been implemented
		- Investment in fish storage facilities			
		- Construction of an alternative landing site in liaison with KPA and Fisheries Department			
		- Allocation of specific sea routes for small vessels			

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
Fishing	The proposed port will encroach on fishing grounds thereby displacing the artisanal fishermen from some of their traditional fishing grounds and landing sites.	- Empower the local fishermen to move to deep waters by offering training on deep-sea fishing methods and provision of fishing gears and vessels that can enable them venture into other more distant deep water fishing grounds. - Provide modern fish landing sites with adequate infrastructure such as power, access roads and cold rooms or ice making plants.			- Fishing communities have not been empowered to be able to venture into deep sea fishing. - No training of fishing community nor provision of modern and advanced fishing gear to enable them venture into deep water fishing has been actualized. - Some BMUs lost their traditional fish landing sites - No equipping and modernization of existing fish landing sites has been done. - Kwasasi BMU was completely displaced from their Co-management area and completely lost their landing site to pave way for Lamu port construction. - During the first dredging turtles died - Two Dugongs died at Shanga area of Shanga Shakari village - Fishing ground were lost to the port area - Dredging resulted in fish mortality

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
					- Fish habitats were lost - Biodiversity within the affected area were lost - Loss of fish which was being caught in the affected area due to lack of access to the area - Iweni community managed area was lost - Access to ornamental fish within Iweni area was lost - Tourist activities such as snookering at Iweni area were lost - Loss of marine aesthetic value in the affected area - Up to the date of data collection of this report being 9th July 2021, none of the negatively affected fishers had been compensated

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
	Sea routes used by fishers, especially Mkanda will be affected by dredging as well as shipping operations since after traversing Mkanda fishers still need to cross Manda channel to access their fishing grounds. Residents of the other islands also use this route to Lamu town. Mkanda is used by fishers from Faza, Kizingitini, Matondoni, Kiunga, Mkokoni, Kiwayu, Chandani and	Prepare a timetable of shipping activities in consultation with the local community incorporating windows for fishers to use the channel to access their fishing grounds;			- Dredging deepened the channel, strong underwater currents in the channel causing small fishing vessels crossing the channel to capsize, so far two have been reported to have capsized. - Heightened security in the marine waters from Kenya Coast Guard and other security organs has resulted in increased restriction in free movement and access to traditional fishing fishing areas by members of local BMUs from Mungini MBU, Kipungani BMU, Matondani MBU, Shela BMU and Amu BMU. - The local fishing community are yet to be informed if they will be able to access their traditional fishing grounds, no fishing timetable has been prepared - No ferry services have been introduced to facilitate transport between Lamu town to other islands. - The fishing community are yet to be equipped with modern fishing equipment to enable them venture into deep waters.
		Introduce Ferry services to facilitate transport between Lamu Town and the other islands;			
		Provision of improved fishing gears, vessels and cold storage facilities such as ice plants.			
		Put in place measures to revive existing facilities at Faza and Kiunga.			
		Fast track the building of the 2 fishing ports.			

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
	Dodori. Fishers using small vessels will have difficulty travelling between their fishing grounds and landing sites through the alternate sea route via Manda-Bruno-Museum-Shela-Lamu which is rough and long. The longer travel time will result into postharvest losses.	Arrange for fishing boat coxswains to obtain training on navigation and sea safety to minimize possibility of marine accidents.			- Training of fishing boat coxswains on marine safety is yet to be done. - The proposed two fishing ports are yet to be actualized. - Reviving and modernization of existing facilities at Faza and Kiunga is yet to be done.
	Possibility of marine accidents	Demarcate passageways for small fishing vessels away from those used by ships	-		Clear demarcation of safe passageways for small fishing vessels is yet to be done. These vessels still cross the now dredged deep channel and there are reported cases of vessels capsizing and sinking due to strong water currents.

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
Mangrove harvesting	Clearing mangroves will affect the livelihood of the Ndau & Pate community who are mainly dependent on mangrove harvesting and have limited skills to join other sectors.	- Carry out ecological surveys and physic-oceanographic studies before mangrove clearing to ensure maintenance of the ecological balance			- 1.5 hectares has so far been cleared to facilitate construction of causeway within the port area. - KFS was compensated for the land and mangrove tress lost. - LCDA is yet to replace mangrove trees lost. - KFS has done a budget of replanting 10, 000 mangrove seedlings at request of the Contractor implementing the first three berths of Lamu Port and associated infrastructure. - KFS has shown the Contractor appropriate mangrove restoration site i.e. old jetty of Mokoe area, Kitangani area and pockets of dredged sites within the port area to the left when facing the port headquarters. - Continuous restoration of larger areas is yet to be actualized.
		- Re-plant mangroves in other areas to replace the areas that are cut to pave way for the project.			
		- Provide training and skills to enable local community currently dependent on mangrove harvesting join other sectors.			
		- Provision of loans to invest in other sectors of the economy			
	Restriction and/or loss of sea routes and access to mangrove resources on Shella, Magogoni and Ndununi areas during port construction	Identification and acknowledgement of local community right of access and allocation of hours of free pass during construction period		-	- Heightened security in the marine waters from Kenya Coast Guard and other security organs has resulted in increased restriction in free movement and access to traditional fishing areas by members of local BMUs from Mungini MBU, Kipungani MBU, Matondani MBU, Shela MBU and Amu MBU. - Restrictions to access to fishing areas has contributed to decline in fish catch which has negatively impacted on purchasing power of the

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
					fisher folk. - The fishing community is yet to be compensated for lost livelihoods
Farming	Port area in Kililana is agricultural land and these land owners are being displaced.	Compensate land owners based on size of land affected. Compensation to land owners to be based on customary ownership and not based on title deeds. Compensation process to be steered by DC, Chiefs and community leaders		-	- Affected land owners were compensated based on recommendations of the resettlement action plan (RAP) for LAPSET programme.
Tourism	Reduction in value of mangroves and coral reefs would affect tourism including diving and snorkeling	Use clean technology and put measures to minimize damage to mangroves and corals			- Access to ornamental fish within Iweni area was lost - Tourist activities such as snookering at Iweni area were lost - Other lost eco-tourism activities previously conducted at the area where now the port has been constructed included sport fishing, water sport activities such as wind surfing
	The new resort cities of Lamu, Kilifi and Kwale will kill the traditional tourism in Lamu	Provide training, skills and capacity to local tour guides and operators			- Lamu port and LAPSET Corridor Programme implementation as a whole have opened up Lamu to economic migrants and those accompanying them. - The nature of tourism in Lamu is slowly changing in view of the new developments.
Socio-cultural and Political	Ownership issues – fear of local residents being locked out of port	- Incorporate a clear benefit sharing system with the community			- Poor information disclosure from LCDA and other government agencies on LAPSET Corridor Programme to local community and other stakeholders created room for propaganda.

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
	related benefits				
	Mistrust due to inadequate/lack of involvement of the local leaders in the decision-making process	- Include the local leaders especially the all-inclusive Lamu Port Steering Committee in the decision-making process so that the project obtains local ownership and support to eliminate conflicts.			- Steering Committee representing community interests in Lamu Port projects which was in place and operated for about six months is yet to be reinstated since its disbandment.
		- Develop a policy on community consultation and involvement. If necessary, reconstitute the steering committee, provide it legality and incorporate it fully in the port development process			
		- Address natural resource related conflicts before initiating project			
		- Establish a fair mechanism for addressing community grievances including holding consultations on their roles to have their trust			

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
		- The port planning should integrate community development projects as part of corporate social responsibility to benefit the affected local communities			
	Loss of the world heritage site	- Protection on the world heritage site by ensuring proper mitigation measures are put in place.			- The NMK has actively engaged with LAPSET in various forums which has seen NMK incorporated into the technical committees. - The NMK team also continues to engage local communities in the greater Lamu region on different ways of preserving both the tangible and intangible cultural heritage. - No direct threats to the World Heritage site noted so far except for spill over issues specifically (i) increase in number of migrants in Lamu resulting in increased house rent in Amu as the migrants seek accommodation, (ii) culture influence from migrants, (iii) increase in migrants overtime.
		- Deliberate strategies to conserve the traditional cultures of the Lamu people should be put in place			
	Possibility of displacement, domination and loss of the cultural identity of the of	- Through Corporate Social responsibility, MoT should consider providing annual support to the two major festivals in Lamu – ‘Maulidi’ and Lamu Festivals.			- ‘Maulidi’ and Lamu Festivals receive annual support from government agencies such as Kenya National Commission to UNESCO and other well wishers

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
	indigenous Lamu people (The Swahili/Bajuni, Boni, Pokomo and Orma) following influx of outsiders	- Set up a centre to document and share cultural information in the area.			
	Majority of the businesses in Lamu are small retail and will probably be dominated in an expanded space	GoK to provide facilitation, capacity, loans and resources to enable small businesses to expand e.g. into go downs, supermarkets etc.			- New business opportunities have opened up and both local and migrants are taking advantage of the opportunities
	Lifestyle of the Boni community who are mostly hunter-gatherers has already been disrupted by the presence of settlement schemes in Hindi-Magogoni. The community is	• Study on the effects of the port development on hunter/gatherer populations and assessment of viable alternative livelihoods e.g. beekeeping, agriculture, fishing. This could be done alongside the proposed Heritage Impact Assessment.			- Increase in population from migrant workers is contributing to surge of hunters for bush meat.

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
	now getting involved in slash and burn agriculture and more recently settling. Port development in the area will further affect this community.	Capacity building for the hunter gathers groups through community groups and community projects such as demonstration projects, fish farming should be promoted.			
	Overpopulation and expected influx of outsiders to Lamu county will have major impacts on the local culture and will change the political landscape	i) Mechanisms to safeguard/secure the local culture and interests to create sense of ownership among the local people. This could be achieved through the establishment of a cultural centre. ii) Establishing integrated learning institutions where the values enshrined in Swahili culture are learned e.g. marriage counseling, dressing, handicraft (carpentry and joinery, dressmaking, men's Islamic hat weaving), traditional dances (vugo, lele mama, shangani for women). Such			- Increase in number of migrants in Lamu resulting in increased house rent in Amu as the migrants seek accommodation is being felt. - Culture influence from migrants has started to be noticed - Increase in migrants overtime is eminent.

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
		an institution will provide value addition to present activities for the unemployed community members and youth and promote tourism.			
	Possibility of proliferation of drug trafficking through multiple transport avenues-sea, rail, air	Institute proper control measures to address drug related issues such as initiating anti-drug awareness initiatives.			- Insecurity and petty crimes have started to be noticed in Hindi and Mokoe townships.
	The majority Islam population has coexisted with Christian Population. The anticipated population increase may introduce many different and unacceptable cultures including atheism, homosexuality, prostitution and drug abuse.	Deliberate strategies to conserve the indigenous culture of the Lamu people.			- 'Maulidi' and Lamu Festivals held annually are part of the wider strategy to conserve indigenous culture of Lamu People

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
	Conflicts between government and local population due to inadequate consultation or poor communication	- Institute proper measures to address local community concerns ahead of implementation. - Institute a proper communication strategy to share information about the project with local community			- Poor information disclosure from LCDA and other government agencies on LAPSET Corridor Programme to local community and other stakeholders have created room for propaganda.
Land	Conflicts arising from lack of or inadequate disclosure on the project and tension among the local communities due to lack of land title deeds despite the existence of ancestral ownership	• Recognize traditional/ancestral land ownership and ensure the Ministry of Lands accelerates land adjudication as well as the provision of title deeds to local land owners in the project area and its surrounding who still do not have official land titles.			- Affected land owners have been compensated based on the RAP report. - The LAPSET Corridor Master Plan has not been fully explained and disclosed to all stakeholders including local community and land owners adjacent to the Corridor for them to know the extent of the Corridor and planned developments along the corridor and how it will impact on their exiting land for them to make informed development decisions on their land to avoid future displacements.
		• Provide due compensation to people whose pieces of land are taken over by the project.			

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
	Displacement of people from their homes and land	- Develop a Resettlement Action Plan and a Compensation Action Plan for the project affected persons. - Affected persons to be issued with title deeds for their new locations			- All PAPs who were displaced from the land have been compensated based on the RAP
	Unresolved land issues and skewed allocations of title deeds for previous schemes at Mpeketoni-1977, Hindi-Magogoni-1983 and Witu-1988 leaving out local communities has created mistrust with government intentions	- Fairness and Equality in allocation of land ownership documents to include the local communities of Lamu - Government should address local community's concerns through positive interventions to create positive attitude	-		- Continuous engagement between Government and local community is ongoing to address unresolved and all other emerging issues
	Increased speculation and acquisitions by outsiders resulting	Fast-track land adjudication in the project area to forestall speculative tendencies			- Land speculation has been reported and has resulted in increased value of land

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
	in increased price of land (from Ksh 500,000 to approx Ksh 1.5 million per acre)				
	The Lamu port project has attracted attention from numerous community groups, activists and pressure groups and international activities including groups with vested interests. Some of these groups have submitted their petitions.	The team that carried out ESIA for first three berth of Lamu Port and associated infrastructure accessed these petitions forwarded to NEMA, Lamu County Commissioner, and the Ministry of Transport and incorporated the concerns into the EIA report. Interest groups were invited to the stakeholder consultative meetings and their concerns incorporated into this report			- CSOs such as Save Lamu, Natural Justice among others remain very active on the ground with significant advocacy activities aimed at ensuring sustainable development of Lamu as a whole in the wake of LAPSET Corridor Programme.
Livestock and Wildlife	Clearing of trees and forest for road and rail	Planting of an equivalent area of trees in locations not affected by the port development			- Implementation of road projects within LAPSET programme including the port access road and the Lamu- Witu- Garsen road has resulted in cutting of trees and other vegetation. - The road projects have also negatively affected wildlife corridors, traditional livestock water sources and grazing grounds. - Increase in human wildlife conflicts due to increase

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
					in human settlement. - Wildlife such as dick dicks, small antelopes, snakes are being hit by speeding vehicles along the newly constructed roads.
Benefit sharing	The lack of information and consultation implies the likelihood of no benefit from the port project for local community	Allocation of a percentage of port proceeds for Lamu County for direct investment into development projects including: a) Adult education and empowerment especially for women b) Higher education and scholarships for local community to enable them join formal job market c) Exchange activities and exposure of Lamu community to similar port cities e.g. in Japan, China, Singapore, Korea, Malaysia to facilitate skills development and business linkages d) Industrial development to exploit available resources such processing of mango, orange, pineapple, coconut, cashew-nut, fish, cotton, milk etc. e) Promotion of cottage industries/jua kali sector such as			- LAPSET has scholarship scheme targeting students from local community as part of targeted training for local community to acquire relevant skills to for local job market - Key LAPSET Personnel including Board Members, Regional Director and Community Liaison Officer are sourced from the local community. - Lamu port is hiring both skilled and unskilled workers from the community including recently hired 100 Dock work workers. - Despite these positive milestones, poor information disclosure from LCDA and other government agencies on LAPSET Corridor Programme to local community and other stakeholders remains a challenge that has created room for propaganda and washing away gains made by government.

Sector/activity affected	Impacts/Issues identified during ESIA	Mitigation measures suggested during ESIA	Status of implementation		Remarks
			Yes	No	
		iron smelting, jewelry, dressmaking, carpentry by local community, particularly the elderly to reduce divorce rates f) Tourism development: provide foreign language training (English, French, German) for youth to enable them conduct tourism activities g) Establishment of a community social centre including cultural library and museum where youth and elderly interact to exchange information h) Establishment of a community bank to encourage saving culture and access to loan facility tailored to local conditions			

Table 3: Status of implementation of mitigation measures of dredging and dredged material disposal

Issue/concern	Impacts identified during ESIA	Mitigation measures suggested during ESIA	Implementation status		Remarks
			Yes	No	
Impacts on the community marine conservation area-	- At the entrance of the Manda channel is	- Selection of dredging period in relation to			- Dredging and offshore dumping of dredged material was complete records

Iweni	a community managed conservation area demarcated by buoys. This area is under protection by the community and earning five BMUs a livelihood but will be lost due to dredging. - The area is a tourist attraction and currently used as a diving site by tourists. - Sea turtles are also sighted in the area.	tidal currents, time of the year and dredging period should be short. - To minimize turbidity MoT shall undertake dredging and offshore dumping operations during dry periods when no buoyant water would enhance surface transport of the turbid discharge. - Dredged material to be dumped at the proposed port area where it would be used for reclamation of the site in preparation for			on period of dredging and dredging were however not available to ascertain if this was done during the dry periods as was proposed. - There was an indication on site that some of the dragged material was used for port reclamation - Heightened security in the marine waters from Kenya Coast Guard and other security organs has resulted in increased restriction in free movement and access to traditional fishing areas by members of local BMUs from Mungini MBU, Kipungani BMU, Matondani MBU, Shela BMU and Amu BMU. - Restrictions to access to fishing areas has contributed to decline in fish catch which has negatively impacted on purchasing power of the fisher folk. - The fishing community is yet to be
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		construction of the container yards. - Negotiate with fishers to allow fishing once the dredging work is completed and compensate for lost fishing opportunity during dredging			compensated for lost livelihoods - Data and or information whether water quality monitoring was being carried out was not available. - The County Government of Lamu Fisheries Department maintains an up to date data and statistics of fisheries in the area and County as a whole.
Loss of key fishing grounds areas	- Pezali rocks are important lobster fishing grounds accessed by fishers from various BMUs diving for lobsters. - The channel is a key fishing ground for most fishers and during dredging fishers will lose a	- Hydraulic and engineering studies to be conducted prior to dredging and during dredging to identify the direction of sediment transport and depositional nodes.			

	source of livelihood.				
Loss of fish landing sites and boat anchor and repair sites	- With about 10 designated fish landings sites within the Lamu archipelago, loss of fish landing and boat repair and anchor sites during construction phase is likely to trigger growth of more fisher-established sites	- Pay careful attention to the proximity and condition of nearby shore zones and other structures to ensure that dredging operations pose no threat to their structural integrity.			
Disturbance of dolphin areas	- Dredging of the berth area may interfere with movement patterns of Dolphins that are known to occur between the Manda				

	and Kizingitini channels				
Water Column Turbidity and Sedimentation	- Deteriorating water quality will occur to a large extent since the disturbance is likely to be of high intensity in the construction and dredging phase - Changes in community structure may result proliferations of some toxic algae	- Monitoring of turbidity and sedimentation.			

Table 4: Status of implementation of mitigation measures on ecological impacts

Issue/concern	Impacts identified during ESIA	Mitigation measures suggested during ESIA	Implementation status		Remarks
			Yes	No	
Channel dredging, site	Loss of Habitats	- Support one			- KFS have planted 10, 000 mangroves

reclamation, construction of first three berths of Lamu port and associated marine structures		ecosystem rehabilitation program by at least 2 times the area to be altered or damaged by project. - Support one BMU project as part of CSR			within the project catchment area - A programme to restore degraded marine environment including sea grass beds and coral reefs is yet to be developed and implemented. - MBUs are yet to receive any form of compensation. - There is no BMU CSR project that has been supported from the LAPSET Corridor Programme
	Oil spill pollution	- Upscale use of OSMAG and related oil spill contingency plans currently in Mombasa to cover Lamu Port. - Provide a contingency fund as per NEMA's polluter pay principle.			- Port operations are barely starting one commercial ship anchored during the period of this study, KPA has moved to the Port to start port operations and will activate OSMAG and related oil spill contingency plans. - The County Government of Lamu Fisheries Department maintains an up to date data and statistics of fisheries in the area and County as a whole. - CSOs in the active in Lamu are

		- Monitoring of fish catches & fish mortality cases. - Monitor biodiversity loss and recovery patterns			monitoring biodiversity losses occasioned by implementation of the project
	Introductions of alien species	- Support ballast water surveys and management - Enforcement of shipping regulations related to control of ballast water.			- Records on ballast water surveys and management were not available - The port is yet to be fully operational for enforcement of shipping regulations related to control of ballast water to be effected
	Loss of biodiversity	- Monitor fish catches, rare species & birds			- The County Government of Lamu Fisheries Department maintains an up to date data and statistics of fisheries in the area and County as a whole.

Table 5: Status of implementation of mitigation measures on impacts on physico-chemical environment

Issue/ Concern	Impacts identified	Mitigation	Implementation	Remarks
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	during ESIA	measures suggested during ESIA	status		
			Yes	No	
Impacts on ambient noise levels	- Construction noise from activities on site from additional traffic generated during the construction phase; - Construction vibration, including those relating to piling activities; - Operational noise from the proposed port including from use of mobile plant or from static machinery and from vessels berthed at the marine facility; - Operational noise	- Construction equipment specifications to conform to source noise levels - Appropriate maintenance of equipment. - Reorientation of equipment emitting high noise so that the noise is directed away from sensitive ecosystems and human habitation - Noise attenuation			- Data on monitoring of noise levels during construction was not available - Construction workers were provided with appropriate personal protective equipment

	impacts due to changes in traffic flows on surrounding roads resulting from staff/ clients accessing or leaving the proposed port area - Noise from vessels.	should be practiced for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers - Personnel to be provided with protective gear. - Ambient noise levels to monitor at regular intervals for conformity to NEMA noise regulations.			
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Impacts on water quality	- contamination from suspended solids in site runoff and accidental discharge of pollutants and foul waste held on site - Due to dredging, a temporary increase in the volume of fine sediment is predicted in the channel during construction. - Long-term changes to drainage and flow during the operational phase could affect receiving water bodies in terms of their use and attributes (such as	- Dredging should be carried out using less intrusive dredging techniques and dredge material shall be disposed only at designated disposal area informed by appropriate research. - Environmental monitoring of marine water quality, marine sediment quality & marine ecology should	-		- Environmental monitoring data of marine water quality during dredging was not available - Environmental awareness training records were not available.
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	their ability to support aquatic life, dilute and remove pollutants and associated impacts such as erosion and flood risk). - Fuelling operations for vessels berthed at port and vehicles used within the proposed port area are a potential source of spillages entering watercourses - Breakwaters and landfills may change current patterns and cause stagnation of water behind the port structures	be initiated one week prior to commencement of dredging & will be carried out during dredging period. - Discharge of waste into sea should be prohibited & oil spill control measures adopted as per the port oil spill contingency plan. - Marine environmental monitoring as per environmental monitoring			
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	- Drill cuttings and the muddy component may be released during the construction phase especially in the processes of drainage and back filling causing turbidity and a temporary plume in the water column that may have localized impacts on plankton and pelagic fish species. - Runoff from raw material storage, spills from bulk cargo handling, and wind-blown dust are	programme will be carried out at the recommended periods with baseline levels as reference during entire monitoring programme - Ships will be required to comply with the MARPOL convention and are prohibited from discharging wastewater, bilge, oil wastes. - Ships/ carrier will be required to exchange			
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	possible sources of contamination of water - Accidental spills of toxic, harmful materials, oils or oily compounds, lubricants, fuels and other raw materials are possible sources of contamination of water - Effluent from waterfront industries may contain toxic or harmful materials, unsanitary wastes, oily wastes and other hazardous materials - Possible discharges from ships that could	ballast water in a deep sea prior to arrival in the harbour, in addition waste reception facility for bilge water and waste oil should be provided for handling cargo and oil spills. - Sewage treatment plant should be provided for treatment of wastewater from the port facilities.			
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	be sources of water pollution are bilge water, ballast water, fuels, oily wastes, sewage, garbage and other residues in a ship - Repair docks may be a possible source of toxic or harmful materials such as antifouling ants, paints, or heavy metals. - Treated and untreated wastes may be discharged into the sea during the construction and operation of the port				
Potential	- Location of the port	- Removal of			- There was no data and information to show

impacts on sediment quality	may accelerate sediment deposition in stagnant water behind structures and cause contamination of the sea bottom. - Altered sedimentation pattern may favour deposition in the port area resulting into smothering of bottom biota and physical habitat. - Eutrophication may induce high primary production rates, plankton die backs, sedimentation of dead plankton and changes in chemical	contaminated sediments, capping, as well as other measures could be effective against adverse effects on water quality. - A survey of contamination of bottom sediments should be undertaken before dredging and be used as baseline for monitoring during dredging. - Selection of disposal station, disposal methods			implementation of these mitigation measures
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	characteristics of bottom sediments, resulting in an increase of organic matter, hydrogen sulphide, and mobilization of harmful substances - Construction work and dredging may disturb bottom sediments and induce re-suspension, dispersal and settlement of such sediments, thus altering the structure bottom habitats - Dumping of dredged material in the sea directly alters bottom	and requirements for capping are key issues in undertaking disposal dredge material at sea. - In shallow water, silt curtains, as well as careful selection of the dredging method, should be ensured to minimize dispersal of re-suspended sediments.			
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	configuration and biota and may disperse toxic or harmful chemicals around the disposal site. - Dredging removes bottom habitat and may lead to a loss of fishery resources				
Potential impact on air quality	- Fugitive emissions of airborne dust, which may have the potential to deposit beyond the works boundary - Emissions of dust from bulk cargo handling and gasses from cargo handling equipment may be a	- Dust suppression measures (such as use of covers, screens, enclosures, sprinkling water and other similar methods) should be put in place at loading/unloading points, wagon	-		- There was no data and information to show implementation of these mitigation measures

	source of air pollution - Liquid cargo handling may result in the release of vapour during the cleaning of storage tanks and by the breather system - Accidental leakage of gasses may cause problems such as toxic material emission, explosions, fumes, odours and hazardous airborne emissions	tipler complex, transfer points, stockyard, rapid loading system and in internal roads. - Effective spill control measures should be adopted during construction and operation of the port			
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Table 6: Status of implementation of mitigation measures of impacts on coral reef

Activity	Potential Impacts	Impact mitigation measures	Implementation status	Remarks
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			Yes	No	
Substrate removal during dredging	• Loss of corals • Reduction in species diversity and abundance.	• Minimise coral reef habitat loss by applying careful control on boundaries during the dredging process • Translocate corals from areas that will be dredged to appropriate safe habitats	•		• Damage to coral reefs has been reported by BMUs including Mungini MBU, Kipungani BMU, Matondani MBU, Shela BMU and Amu BMU. • Recent coral survey carried out by conservation organisations such as CORDIO East Africa indicate documented severe decline in corals and that the damage to coral reefs in Manda/Pate channel and neighbouring reefs is as being extensive. • No information whether translocation of corals from areas that were dredged to appropriate safe habitats was done.
Sediment disturbance during dredging	Settlement of suspended solids on corals leading to death or reduced growth of corals	• Minimise sediment dispersion • Deploy turbidity barriers to prevent sedimentation on corals • Arrange for construction of artificial reefs to	•		• Recent coral reefs survey by Dr Obura of Cordio East Africa concluded that it is not apparent that any mitigation measures proposed were put in place. If they were they were completely ineffective. • There was no information if construction of artificial reefs to provide habitat to replace corals that were affected by the dredging as indicated during monitoring had been done.

		provide habitat to replace corals that are affected by the dredging as indicated during monitoring			
Leakage of sediments during transportation of dredge material to disposal site	Increased turbidity over sensitive coral habitats	Monitor vessel logs and records for each disposal trip			Information on vessel log monitoring records were not available.

Table 7: Status of implementation of mitigation measures of impacts from port operations and waterfront industry

Issue/concern	Potential Impact	Mitigation Options	Implementation status		Measures taken/ implementation status
			Yes	No	
Incidents arising from port operations are usually large in magnitude and impacts may spill	Dispersal of re-suspended dredged material.	- Use of silt-curtains where possible during dredging and dumping of dredged material; - Disposal of reduced			Coral reefs survey by Dr Obura of Cordio East Africa concluded that it is not apparent that any mitigation measures proposed were put in place. If they were they were completely ineffective.

Issue/concern	Potential Impact	Mitigation Options	Implementation status		Measures taken/ implementation status
			Yes	No	
over from the project site and assume a regional dimension		amounts of material to reduce agitation ○ Use of appropriate dredgers ○ Reduction of dumping frequency			
	Ecological/ Biological Loss	○ Relocation of species. ○ Re-plantating of equal or greater areas to felled mangrove trees (compensatory restoration) ○ Education and conservation efforts with local communities.			- There was no data or information on species relocation - KFS has planted 10, 000 mangrove seedlings within the catchment of the proposed project
	Dust and Other Airborne/ Fugitive	○ Dust Screens ○ Covering of stockpiles			- Measures were in place to mitigate fugitive dust at the port construction site. - Appropriate Personal protective equipment are

Issue/concern	Potential Impact	Mitigation Options	Implementation status		Measures taken/ implementation status
			Yes	No	
	Emissions	○ Spill control of bulk cargo ○ Implementation of the National Oil Spill Response Contingency Plan. ○ Water sprinkling during construction ○ Provision of Personal Protective Equipment (PPE)			given to construction workers. - The port is yet to be fully operational for implementation of the oil spill response contingency plan
	Ship Discharge Waste (Oil, Bilge)	○ Shore based facility to receive waste ○ Use of licensed waste contractor companies to collect and dispose waste.			- The port is yet to be fully operational for implementation of the mitigation measures
	Spills	○ Enforcement of response and clean up protocols			- The port is yet to be fully operational for implementation of the mitigation measures

Issue/concern	Potential Impact	Mitigation Options	Implementation status		Measures taken/ implementation status
			Yes	No	
		○ Training of response crew and provision of equipment. ○ Banding of bulk liquid storage areas. ○ Creation of a participatory oil spill response group with stakeholders such as Oil Spill Mutual Aid Group (OSMAG)			
	Effluent Discharge	○ Oil Interceptors. ○ Treatment Plants (Biodigesters).			- Sewage treatment facility are part of environmental management facilities included in the design of the port
	Noise	○ Control of times of noisy activities. ○ Noise Barriers.			- Appropriate personal protective equipment are given to construction workers.

Issue/concern	Potential Impact	Mitigation Options	Implementation status		Measures taken/ implementation status
			Yes	No	
		○ Personal Protective Equipment (PPE)			
	Vibration	○ Control of times of Vibration generating activities. ○ Personal Protective Equipment (PPE).			- Appropriate personal protective equipment are given to construction workers.
	Relocation/ Loss of Land use/ Involuntary Resettlement	○ Preparation and implementation of a Resettlement Action Plan (RAP) ○ Livelihood Restoration. ○ Compensation.			- RAP report was prepared and persons who were relocated were compensated as per the recommendation of the report
	Constraints on Fisheries	○ Construction of Fishing Port(s)			- Fishers have not been compensated for lost livelihoods

Issue/concern	Potential Impact	Mitigation Options	Implementation status		Measures taken/ implementation status
			Yes	No	
		○ Provision of modern fishing equipment. ○ Provision of Cold Storage Facilities. ○ Training on fishing techniques, aquaculture.			- None of the mitigation measures addressing impacts of constraints on fisheries have been implemented
	Socio-Cultural Impacts	○ Corporate Social Responsibility (CSR) Programs. ○ HIV-AIDS Programs for construction – VCT, Peer Counseling. ○ HIV/AIDS outreach programs during operation. ○ Establishment of a Maritime Museum.		-	- A Heritage Impact Assessment (HIA) report undertaken was in 2014, in response to the World Heritage Committee's request that the State Party carry out a full Heritage Impact Assessment focusing on potential impacts of the first three berths of the Lamu Port on the social, cultural, and religious impacts to the area. - The report was in UNESCO'S view misrepresentation of issues based largely on desktop work that did not take into account the

Issue/concern	Potential Impact	Mitigation Options	Implementation status		Measures taken/ implementation status
			Yes	No	
		o Archeological Impact Assessments prior to development			heritage concerns. - During state of conservation of Lamu World Heritage Site meeting, the UNESCO World Heritage Committee requested Kenya to revise the SEA study to factor in heritage concerns. This has not happened yet. - No Archeological Impact Assessments was done prior to development - Aproposal was submitted to LAPPSET, by the NMK in which the impact assessment would include underwater archaeology - During the opening up of the port access road some archeological remains were uncovered including building foundations, tombs and human skeletons. However, the Lamu-Witu road has been affected by acts of insecurity and it wasn't possible for NMK to

Issue/concern	Potential Impact	Mitigation Options	Implementation status		Measures taken/ implementation status
			Yes	No	
					monitor the activities or undertake any mitigation measures.

6.2 EMP for Lamu port access road

Environmental and social management plan developed during the ESIA for Lamu port access road predicted that construction of the proposed access road will potentially have negative impacts on:

- ✓ Local soils
- ✓ Local climate
- ✓ Local air quality
- ✓ Surface and Groundwater Resources
- ✓ Flora and Fauna
- ✓ Land resources
- ✓ Visual aesthetics
- ✓ Social environment
- ✓ Material borrow site

Implementation status of proposed mitigation measure of each of the predicted negative impacts is tabulated in table 8.

6.3 EMP for Garsen-Witu-Lamu road C112

Environmental and social management plan developed during the ESIA for Garsen-Witu-Lamu road (C112) predicted that construction of the proposed road will potentially have negative impacts on:

- ✓ **Environmental impacts:** Hydrology /drainage enhancement, soil erosion, air quality (fugitive dust and noise), reduced water quality, materials sources, flora and fauna.
- ✓ **Socio-economic impacts:** Transport cost, travel time, induced immigration and settlement, loss of land/property, spread of HIV/AIDS, trade and commerce, access to amenities, jobs creation, security and national / regional transport.
- ✓ **Occupational health and safety impacts:** Accidents and incidents at the workplace, road safety.
- ✓ **Archaeology and national heritage:** Archaeological or cultural sites (culturally important sites and shrines).

Implementation status of proposed mitigation measure of each of the predicted negative impacts is tabulated in table 9.

Table 8: Status of implementation of mitigation measures of impacts of Lamu port access road

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
Soils	- Increase in soil erosion - Soil compaction - Loss of soil fertility	- Confining project operations such as earthworks, excavations and bush clearing to the road corridor to avoid exposing adjacent soils to agents of soil erosion - Proper installation of drainage structures to channel storm water to the nearest natural catchments - Stabilizing road embankments and progressive re-			- Road works activities were confirmed within road corridor although there were a few incidences where equipment activity went off the corridor. - Drainage structures such as culverts, drainage channels were provided at strategic position to drain off storm water from the road - Progressive re-vegetation of destroyed vegetation had not been done

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
		vegetation of developed sections and areas incidentally cleared. - Heavy machines/truck movements that may cause soil compaction will be restricted within permitted working corridor. - Drivers /operators will be sensitized on sustainable machine operations such as keeping off vegetation within			

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
		project corridor and access roads to material sites.			
Climate	- Use of fossil energy such as diesel will increase the rate of greenhouse gas emissions into the atmosphere thus increasing global warming	- Efficient use of fossil fuels - Planting of more trees to absorb (carbon sink) greenhouses such carbon monoxide being emitted by machines/trucks			- Tree planting had not been done especially to offset those destroyed/ lost during road works activities
Air Quality	- Dust emissions as a result of construction activities and moving machines - Exhaust emissions from heavy machines	- Use of wet crushing technology at quarries, scarifying with water at borrow pits and diversions /detour spots to be			- Sprinkling of water along access roads to material sourcing site, at the borrow pits and around active road works sites was not done, this exposed local residents and affected access road users to fugitive dust emission.

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
	and hauling trucks which use fossil power used during construction phase	sprayed (damping) with water to combat dusts emissions. - Use of machines/trucks efficient in fuel consumption, no idling of machinery and vehicles with engines running.			- Vegetation along the affected section (leaves) were also covered with dust particles a clear indication of lack of mitigation measure to suppress fugitive dust
Surface and Groundwater Resources	- Increased utilization of water resources - Water use conflicts - Accident spillages	- The contractor will look for alternative means like drilling boreholes to supply water needed for construction works in consultation with Water Resources			- The contractor sourced water from Hindi Magogoni Water Association (HIMWA) catchment where there are about 10 boreholes sunk in a natural wetland which supplies water to the local community. - The contractor also sunk two boreholes at kilometre 10 along the port access

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
		Authority. - Contractor will avoid abstracting water from community fresh water resources in addition to drilling some boreholes for exclusive use by host communities. - Spillages or leakages of oil will be remediated immediately using appropriate absorbent material to prevent their entry into water resources.			road. - The contractor did not sink any boreholes for the local community. - Oil leaks and spills were appropriately remediated

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
Terrestrial/ Aquatic Environment: Flora and Fauna	- Vegetation Clearance - Habitat destruction - Disturbance of Flora and Fauna	- The contractor will avoid unnecessary bush clearing. - ii. Progressive re-vegetation of completed sections will be practiced. - iii. Compensatory tree planting will be done. - iv. Biological stabilization of road embankments will be carried out. - v. Dust, noise and other effects resulting from construction			- No progressive re-vegetation has been done to offset lost vegetation. - No compensatory tree planting has been done to offset lost vegetation.

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
		activities will be - suitably managed and appropriate guidance followed			
Land Resources	- Change in land use or land scape when land is acquired for campsites, storage of bulk construction materials, material sites and other workers facilities	- Temporary campsites, storage compounds and other facilities will be located on areas that cause minimal disturbance to existing land use(s) pattern; this will be done with collaborative consultation with land owners. - In case of ground			- The location of the campsite was appropriately selected - Most of borrow pits had not been rehabilitated

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
		contamination, ground remediation will be carried out as per the contaminants. - The borrow pits will be rehabilitated as per the borrow pit rehabilitation plan			
Visual Aesthetics	- Disruption to land scape character or value through construction activities (campsites, machines, borrow pits)	- Construction operations such as housekeeping will be carried out according to best practices and existing vegetation outside working corridor will be fully protected.			- Whereas vegetation outside the road corridor but adjacent to the corridor was largely protected, there are incidences where equipment destroyed some vegetation outside the corridor

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
Noise and Vibrations	- Movement of heavy trucks, braking, hooting and vibrating machines are likely to cause sound pollution within construction site and surrounding environment	- Machine operators /truck drivers to be sensitized on safe driving to avoid unnecessary braking or hooting. - Tress along the traverse not within carriageway will not be cut as they will act as sound absorbers. - Provision of PPEs (ear muffs) to operators working with noisy machines.			- Complains from local community on fast driving (along local access roads leading to borrow pits and connecting to C112) and hooting of truck drivers ferrying gravel from borrow pits that has been a safety concerns for members of the local community - Poor state of access road as a result of increased use by trucks collecting gravel and other materials from the borrow pits
Solid and Liquid Wastes	- Construction and decommissioning	- Waste management hierarchy;			- Waste generated at the camp site was managed and disposed appropriately.

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
	operations are likely to generate solid wastes such as spoils, packaging, garage/workshop e.g. tires and wastes from campsites. - Liquid wastes such as used oil, hydraulic fluids, coolants and wastewater from campsites are likely to be generated	prevention, reuse, recycling, recovery (if possible) and safe disposal shall be applied. - Management of wastes generated to be in line with provisions given in Waste Management Regulation, 2006.			
Social Characteristics	- Intrusion of foreign cultural settings, influx of population from foreign places is likely to cause	- The contractor will employ community liaison officer who will ensure that indigenous cultural			- Increase in migrant workers to Lamu is reported to contributing to influence on local culture - HIV/AIDS sensitization through Peer educators, provision of condoms and

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
	acculturation that will interfere with the indigenous cultures within Hindi/Magogoni, Mokowe - Increase and spread of sexually transmitted infections, Influx of people from different regions (with different prevalence rates of STDs such as HIV/AIDs) is likely to cause increase STDs infections within project	groups and values are protected and preserved. - Negative vices likely to change local people's way of lives will not be tolerated and appropriate measures will be taken. - Sub-contractor will be contracted to enforce HIV/AIDs mitigation measures.			access to VCT services was done by the contractor.

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
	locality.				
Borrow pits	- Soil erosion habitat loss /fragmentation. - Soil erosion and sediment deposition. - Change in water quality due to silt, fuel and oil pollutants - Water ponding - Dust emissions - Conflicts with host communities due to water - Ponding (hazard) noise and air pollution - Accidental falls	- Maintenance of natural drainage systems - Sites will be located in well drained areas - Stockpiling of overburden for restoration of borrow pit - Construction of ditches/cut off drains to direct storm water to nearest natural catchments. - Retaining vegetation to maintain slope stability			- No stagnant water was observed in any of the borrow pits that supplied gravel to the port access road. - The overburden excavated from every borrow pit was cut to spoil for later use in borrow pit rehabilitation works. - Most borrow pits were within settlement areas; more serious is some of them were adjacent to homesteads.

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
	causing injuries to human beings and livestock	- Maintaining vegetation buffer zone to protect water bodies - Using overburden as edge fence to control silt movements - Use of rip rap as reinforcement to edges of drainage channels - Re-vegetation to stabilize pit embankments where necessary - use of proper fuel containment, handling methods			

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
		and spillage containment to control pollution of water resources - Diverting surface water away to limit source of input water - Limiting the depth of quarrying - Fugitive dust emission will be controlled by ground damping - Borrow site activities will be carried out during official working hours			

Issue/concern	Potential impacts	Mitigation measures	Implementation Status		Remarks
			Yes	No	
		- The sites will be located away from human settlements. - Perimeter safeguard fence will be constructed in all borrow pits			

Table 9: Status of implementation of mitigation measures of impacts of Garsen- Witu-Lamu Road

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
Vegetation, ecosystems integrity and wildlife management	✓ Destruction of flora and fauna ✓ Destruction of ecosystems.	✓ Comply with all directives and rules to protect flora, fauna and habitats ✓ Develop baseline flora and fauna index			- Contractor regularly is in touch with KFS and KWS to observe requirements of local flora and fauna. - No index of local flora and fauna was developed - No record of any fauna trapped and hence for

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		✓ Release any fauna stranded by the project ✓ Replant any scarred areas with vegetation which closely resemble the type in the area unless special provisions permit otherwise ✓ Eliminate by appropriate and environmentally friendly means any invasive species ✓ Encourage the development of helpful natural			release as a result of project activities - Scarred areas have not been re-vegetated at all except for observed natural regeneration - No recorded on observed invasive species that could necessitate elimination - At the Camp of H-Yaung in Witu diesel powered generator run 24 hours no green energy sources have been installed.

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		habitats ✓ Encourage the use of cleaner fuels at camps			
Air, noise and vibrations management	✓ Noise generation ✓ Noxious and dust emissions into the atmosphere ✓ Destruction of property	✓ All construction activities to be limited to between 7am to 6pm. ✓ All equipment used to be maintained to manufacturers specifications to ensure efficient operation. ✓ Noise dampening materials to be used where excessive noise generating			- Construction limit time was observed. - Equipment maintenance specification was observed - PPEs were provided to construction staff. - Water sprinkling was done on active construction sites where fugitive dust was a concern.

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		equipment are in use. ✓ Use of personnel protective equipment (PPE) by operations staff. ✓ Use environmentally friendly fuels. ✓ Minimise the period for machinery idling. ✓ Pursue good practices in energy use during operations and sensitise staff. ✓ Dampen using water work areas materials heaps and mulch bare ground to minimise dust			

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		emissions. ✓ Minimise vibrations by appropriately mounting equipment.			
Aquatic resources and water quality	- Contamination of fresh Water streams and the Indian Ocean shores - Protection of aquatic flora and fauna	✓ Provide appropriate and adequate drainage infrastructure where required' ✓ Ensure machinery is regularly serviced to avoid leakages and / or spillages. ✓ Provide clean, neat and sanitized accommodation for labour; ✓ Dispose of all waste			- Drainage structure such as culverts was provided. - Construction equipment are regularly serviced. - Accommodation to workers is provided - Waste generated in the camp is thrown in a dug pit within the camp, paper waste is burnt, - Storage of flammables was as per MSDS. - Safety sensitization of Contractor staff in occupational safety and health is done by the Company Safety Officer.

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		and refuse following laid down rules. ✓ Oils, fuels and other materials to be stored in accordance with the manufacturers' safety data sheets (MSDS) ✓ Train staff on spill response ✓ Implement erosion and sedimentation controls. ✓ Proper handling of liquid waste.			
Waste management	✓ Contamination of the project area by wastes ✓ Increased generation	✓ All wastes shall be contained on site prior to disposal			- All solid waste generated was disposed in a dug shallow pit within the construction camp. - Paper waste is burnt

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
	of wastes ✓ Poor sanitation.	using appropriate storage containers; ✓ Consider recycling as an option in waste management hence always test alternative uses; ✓ All wastes shall be regularly cleared from the site and disposed of in approved manner; ✓ High level of housekeeping shall be maintained; ✓ Staff shall be trained / sensitised about waste management at			

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		the start of the Project and regularly as may be found appropriate.			
Land contamination, erosion and materials management	✓ Soil erosion; ✓ Siltation of water courses; ✓ Contamination of soils	✓ Develop an erosion and sediment control plan prior to commencement of works; ✓ Provide for proper storage facilities in camps, workshops and other work areas and follow proper procedures for chemical handling and dispensing; ✓ Provide for run-off			- A plan to minimise soil erosion including construction of appropriate structures is in place - MSDS requirements are followed in the camp - Traffic marshalling plan is in place including appropriate traffic diversions with clear signage.

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		and tidal overflow diversions as appropriate; ✓ Plan for motorised machinery movement with limited disturbance of soil; ✓ Implement traffic management; ✓ Maintain as much vegetation as may be practical at work sites and cover exposed areas with mulch to minimise erosion; ✓ Mark out stock pile			

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		areas and provide for appropriate measures; ✓ Commence landscaping as soon as practical; ✓ Enhance the staff appreciation through regular tool box review meetings and on site training; ✓ Closely manage materials loading, transportation and offloading; ✓ Minimise dust emissions at crush plants and related			

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		facilities.			
Socio-community, occupational health and safety and HIV/AIDS	✓ Exposure to HIV/AIDS; ✓ Exposure to poor sanitation; ✓ Risk of injury while working; ✓ Risk of respiratory infections; ✓ Change of lifestyles and production modes	✓ Disclose to the community the design and what it aspires to achieve; ✓ Liaise with the Directorate of Occupational Health and Safety Department to provide for appropriate induction training and regular updating of worker skill; ✓ Provide for traffic control and construction signs;			- HIV/AIDS sensitization is carried out - Company Safety Officer carries out safety briefings to construction staff - Appropriate traffic control signage were provided at active sites - PPEs were provided to construction workers - An emergency response plan is in place

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		✓ Provide for restrictions signs, fences around materials sites and install temporary traffic control devices; ✓ Provide appropriate personnel protective equipment (PPE) to workers and any visitors; ✓ HIV/AIDS campaigns to sensitise people about the scourge; ✓ Develop and implement a detailed			

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		site specific Emergency Response Plans.			
Archaeological and cultural resource management; and	✓ Destruction of articles of cultural importance ✓ Loss of national heritage	- Liaise with the Department of Coastal Archaeology (National Museum of Kenya) to establish site of archaeological significance; - Liaise with the local communities to establish areas of cultural and religious significances (including shrines, graves and established villages);			- Archaeological Impact Assessment (AIA) was not carried out prior to commencement of road construction activities

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		- Map out all areas of archaeological and cultural importance and realign the road off these locations; - Engage the communities and the Department Coastal Archaeology in consultations; and In the event that a find is struck, liaise with the Coastal Archaeology to establish its status.			
Fire management	✓ Destruction of property, vegetation, animals and	✓ Carry out a detailed review of area condition in relation			- Fire safety response plan is in place in the Contractor's construction camp - Appropriate fire fighting appliances are

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
	ecosystems by fire.	to wild fire incidences; ✓ Locate camps, workshops and garage facilities in areas less prone to fires; ✓ Provide fire breaks at camps, workshops and where equipment are temporarily parked; ✓ Liaise with the local communities in fire incidence management and abatement; ✓ Carry out			provided in the camp - No incidences of fire have been reported in the camp nor at construction site

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		rehabilitation to avoid long term resultant damage including erosion; ✓ Routinely remove materials that could feed fires along the Road Project; ✓ Upgrade fire preparedness and plan at fuel and chemical storage areas.			
Institutional strengthening and training	✓ Gender imbalances; ✓ Loss of livelihoods for vulnerable groups; ✓ Social injustices; ✓ Loss of property;	✓ Training courses & audio visual aids; ✓ Campaigns to sensitise communities on key			✓ Construction staff are regularly sensitised on safety and other construction topical issues, ✓ HIV/AIDS and message to construction staff and community is carried out ✓ Regular inspections and site visit are carried

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
	✓ Poor health; ✓ Increased poverty	- issues such as road safety, job announcement, routes closure and HIV/AIDS awareness; ✓ Promote equal opportunities for all groups and beneficiaries; ✓ Capacity assistance to the Project Implementation Unit through Lead Agencies; ✓ Input of long term technical assistance & training experts in			- out by relevant government agencies ✓ Tool box meetings are carried out regularly

Issue/ concern	Potential negative impacts	Proposed mitigation measures in ESMP	Implementation status		Measures taken/ implementation status
			Yes	No	
		the fields of i road management, ii road maintenance; ✓ Supervision and guidance of the Project by a joint supervision team; and Tool box training component for site labour			

CHAPTER 7: SOCIAL IMPACTS OF ACTIVITIES OF SAMPLED PROJECTS

The LAPSET Corridor Programme is important because it is now contributing to opening up of northern Kenya to spur economic and social development while linking Kenya to her landlocked northern neighbors. The programme is delivering critical infrastructure that is a prerequisite in addressing the elusive security challenge in the region. It is critical in tapping and sustainably utilizing natural resources in the region while ensuring environmental and social sustainability. The implementation of the first three berths of Lamu Port and associated infrastructure, the Lamu Port Access road and the Garsen-Witu- Lamu road projects under LAPSET Corridor Programme has so far resulted in both positive and negative social impacts.

7.1 Positive Social impacts

Employment opportunities: Construction of the first three berths of Lamu Port and associated infrastructure, the Lamu Port Access road and the Garsen-Witu- Lamu road projects has provided employment opportunities to both local and migrant workers in Lamu. The projects have been a source of employment to contractors, sub-contractors and suppliers of construction materials and other merchandise.

Improved local business opportunities: Increase in migrant workers into Lamu, improved disposable income for workers employed in the three projects has improved local purchasing power. There is increase in local demand for commodities and services which has resulted in business spinoffs to meet the demand. New businesses have sprung up to support the large number of resident and migrant workers at the project site. From conversations with traders, shopkeepers and eatery owners, there is distinct increase in the flow of money which in turn is likely to generate a suitable environment for micro and small-scale enterprises

Reduced travel time: The improvement of Garsen-Witu- Lamu road to bitumen standards has significantly reduced travel time between Lamu to Malindi and beyond. It is now possible to travel from Lamu to Mombasa and back in the same day.

Reduced motor vehicle operating costs: Costs of motor vehicle repair and maintenance for vehicles plying Garsen-Witu- Lamu road has significantly reduced. There is less damage to motor vehicle parts as was previously due to poor road condition. The frequency of spare part replacement has significantly reduced.

Improved access to social services: The now upgraded to bitumen standard Garsen-Witu-Lamu road and its branching to Mpeketoni off the main trunk at Kibaoni and loops into Mpeketoni Market through Hongwe has made accessibility of social amenities such as health facilities, schools, markets in these areas convenient. Patients including expectant mothers and children can access medical services in these areas more timely translating to saving of lives. Farmers can access markets for their produce in this area translating to improved livelihoods at household level. Learners can access schools in these area translating to improved literacy levels. There are seven (7) primary schools in Hindi division, of which six (6) are located near Hindi or in the south of Hindi. The number of health facilities are: one (1) health centre, two (2) dispensaries in the area linked to the port and on-going road works.

Improved road transport and communication: Road transport and communication between Lamu and neighboring Counties of Tana River and Kilifi has significantly improved. Livestock farmers from Tana River can transport their cattle to far markets such as Mombasa and Nairobi via road more conveniently.

Reduced transport cost: Running cost of motor vehicles including frequency of repair and maintenance for vehicles playing on the now upgraded to bitumen standard Garsen-Witu-Lamu road has significantly reduced. This translates to reduced transport cost to the passengers. Further the improved road has attracted more vehicular traffic to the area (buses, vans, saloons, motorcycles, lorries e.t.c) hence effectively ending monopoly, providing choices to make from and hence competition. Competition is healthy as it reduces costs while enhancing efficient service delivery.

Improved security: Security in the area and specifically along the upgraded to bitumen standard Garsen-Witu- Lamu road has greatly improved; some security agencies quote the improvement to be as high as ninety percent. Now vehicles can travel to and from Lamu without escort.

Access to scholarship for local youths: Local youths are benefiting from a scholarship programme administered by LAPSET. This is contributing in improving their skills to enable them become competitive in the job market more so benefit from employment opportunities available at LAPSET.

Improved infrastructure and property value: the cost of doing business has also improved due to the improved infrastructure and security. These two factors – improved transport and

security have led to increased demand for commercial and residential property in areas like Mokowe, Manda, Hindi, mpeketoni and Lamu. Building material labour and related services have also increased in the area.

7.2 Negative social impacts

Loss of livelihoods: The location where the first three berths of Lamu Port have been constructed was the main fishing areas which BMU members from Mungini BMU, Kipungani BMU, Matondani MBU, Shela BMU and Amu BMU depended on in fishing to sustain their livelihoods. Having lost access to these fishing areas coupled with lack of modern fishing equipment that can allow them venture into deep sea fishing, livelihoods of these BMU members have been lost.

Loss of livestock grazing corridors: The pastoralist community who depend largely on grazing corridors in open communal and public land for their livestock can no longer access these areas as the grazing corridors have diminished. The developed and ongoing developing of road infrastructure coupled with urbanization has reduced available grazing areas for the pastoralists.

Loss of livestock water sources: Construction of the access road to Lamu port and Garsen-Witu- Lamu road in the area affected previously existing livestock water sources. Pastoralists indicated that water ponds were destroyed at Kibokoni, Chomo and Jambiani areas.

Increase in human-wildlife conflicts: Increase in human settlement in Lamu has resulted in demand of more settlement areas that has resulted in an increase in human-wildlife conflicts. Also displacement of wildlife along the roads (Garsen-Witu-Lamu road) has contributed to increase in human wildlife conflicts.

Increase in demand for bush meat: Increase in population from migrant workers has resulted in surge of hunters for bush meat.

Dilution of local culture: Influx of migrant workers into Lamu area and their accompanying family members coupled with their interaction with indigenous Lamu people is slowly contributing to dilution of local culture.

Increase in incidents of petty crimes: As more business thrive in Hindi and Mokowe towns, cases of petty crime are also increasing.

Reduced agricultural productivity of material borrow sites: Lack of rehabilitation, poor rehabilitation or incomplete rehabilitation of material borrow site is contributing to reduced agricultural productivity of these material borrow sites that were once productive agricultural lands. This is contributing to declining local food security.

Perceived increase in HIV/AIDS in Hindi: Increase in settler population in Hindi area coupled with interactions within the population is contributing to sexual behaviors likely to contribute to increase in HIV/AIDS incidences in the area.

Broken marriages: Skewed distribution of financial proceeds from land compensation where male dominated households have the sole control of the money is said to be contributing in breaking of marriages. This is contributing to displacement of women and children at family level.

Teenage pregnancy and child marriages: From interviews and review of available public health data, there has been no significant change in the local community health status or disease incidence. However, in Hindi and part of Witu where road construction projects are on-going, there are reports of increased teenage pregnancy and child marriages blamed on road construction migrant labourers

CHAPTER 8: OVERALL EFFECTIVENESS OF EMPS AND SAFEGUARD PRACTICES

8.1 First three berths of Lamu port and associated infrastructure EMP

Mitigation measures proposed in the EMP for first three berths of Lamu port and associated infrastructure to safeguard marine flora and fauna, marine water quality, livelihoods of fishing community in the entire fish value addition chain and safeguarding against marginalisation of local community when employing have not been implemented as envisaged and hence in overall not effective. There is no detailed Environmental and Social Management and Monitoring plan with clear action plans, timelines, responsible actors and a budget to ensure effective monitoring against pollution of marine environment, destruction of marine flora and fauna, disruption of communal livelihoods and protection of Archaeological and cultural sites including underwater archaeological sites.

8.2 Lamu port access road EMP

Mitigation measures proposed in the EMP for Lamu Port access road to safeguard local soils, local climate, local air quality, surface and ground water resources were implemented and were effective. However mitigation measures meant to safeguard against adverse impacts of material borrow sites, local flora and fauna and social environment were poorly implemented and hence in overall not effective.

8.3 Garsen-Witu-Lamu road C112 EMP

Mitigation measures proposed in EMP for Garsen-Witu-Lamu road C112 to safeguard environmental impacts on local hydrology, drainage enhancement, soil erosion, air quality, water quality and protection of local fauna were and are being implemented. These safeguards measures were largely considered effective. However mitigation measures to safeguard against adverse impacts of materials sources (borrow pits) and negative effects on local flora have not been fully implemented and hence partially effective. Safeguards measures to mitigate against socio-economic impacts specifically loss of land have been implemented. However those on safeguarding on spread of HIV/ aids induced migrations are yet to be effective in mitigating perceived potential negative impacts. Safeguards measures to mitigate on occupational health and safety impacts are being implemented. Mitigation measures proposed to safeguard culturally important sites and shrines were not implemented. Potential sites of archaeological importance along the entire stretch of the road could not be

identified nor could any potential artefacts not be identified, collected and preserved for posterity.

CHAPTER 9: RECOMMENDATIONS

9.1 On-going projects

- ✓ Construction of first three berths of Lamu port and associated infrastructure and Garsen-Witu-Lamu road C112 was ongoing. To ensure effectiveness of proposed environmental and social safeguards for these two projects, strict compliance monitoring and enforcement to be carried out to by NEMA together with all other relevant Lead Agencies such as KWS, KFS, NMK to ensure implementation of EMPs of these projects .
- ✓ Provide adequate facilitation to NEMA Lamu County Office together and all other relevant Lead Agencies in Lamu for strict compliance monitoring and enforcement of safeguards measures provided in the project EMPs.
- ✓ LCDA in collaboration with KPA to develop a detailed Environmental and Social Management and Monitoring Plan (ESMMP).
- ✓ Strictly implement the ESMMP developed to ensure strict monitoring of terrestrial, marine and social environments.
- ✓ LCDA and KPA to provide adequate budget for the complete implementation of ESMP developed.
- ✓ LCDA and KPA to document quarterly, bio-annual and annually progress reports on environmental and social monitoring and submit the reports to NEMA.
- ✓ LCDA and KPA to disseminate environmental and social monitoring findings quarterly targeting the local community including fishing community, civil society groups, County Government of Lamu and National Government Agencies.

9.2 Marine flora and fauna

1. LCDA and KPA to carry out a detailed marine flora and fauna survey to establish the extent of damage to coral reefs, sea grass beds and other marine flora and fauna and propose scientifically feasible and acceptable measures to restore damages.
2. A budget to be provided by LCDA and KPA to aid in any marine flora and fauna restorations programmes that may be identified and recommended from the outcome of the detailed marine flora and fauna survey.
3. NEMA in collaboration with other relevant lead agencies to strictly monitor the implementation of recommendations from marine flora and fauna survey.

4. LCDA and KPA to ensure dissemination of findings of marine flora and fauna survey, progress of implementation of recommendation from the survey and milestones achieved from strict enforcement of implementation of the finding is done promptly to all stakeholders.

9.3 Marine water quality

1. LCDA together with KPA and in consultation with NEMA to immediately plan and begin marine water quality monitoring and sustain the monitoring throughout the remaining phase of implementation of the first three berths of Lamu port and associated infrastructure.
2. The location (monitoring points), frequency, depths and parameters to be monitored for marine water quality to be as will be documented in the ESMMP.
3. Dissemination of findings of marine water quality monitoring to be done to all interested and affected stakeholders.
4. Appropriate safeguards measures as will be recommended to be put in place to safeguard the quality of the marine waters in affected areas.

9.4 Mangrove ecosystem

1. LCDA to facilitate the replanting of mangroves that were cut as was agreed with KFS
2. Appropriate public participation meetings to address the issues of mangrove rehabilitation to be called by LCDA targeting fishing community and other stakeholder to diffuse any misunderstanding and propaganda on the ground regarding replanting of lost mangroves.
3. Local BMUs to be actively involved in mangrove restoration exercise that is to be facilitated by LCDA.
4. Continuous restoration of mangrove ecosystem in areas adjacent to the project site and other islands of the wider Lamu archipelago to be planned budgeted for and executed.
5. Mangrove mapping and mangrove health survey to be carried out in creeks adjacent to Lamu Port to establish if there are any negative effects to the mangrove ecosystem following the development off the port and associated infrastructure in the area.

9.5 Terrestrial flora

1. KeNHA to ensure that terrestrial trees lost from implementation of Lamu Port access road and Garsen- Witu-Lamu road are adequately compensated by replacement planting of trees along the said roads (avenue planting) and in public spaces including public schools, hospitals market places among others.

2. KFS in collaboration with the County Government of Lamu to promote agroforestry and farm forestry in farmlands and homesteads in the wide Lamu to increase the overall tree cover in Lamu that is a vital carbon sink.
3. KFS in collaborations with KWS to gazette un-gazetted community forests to limit farmers from accessing the forests.

9.6 Terrestrial fauna

1. KeNHA to appropriately place road signs in wildlife corridor crossing areas along Garsen-Witu-Lamu road and other affected.
2. KWS to gazette wildlife corridors to avoid farmers from accessing and converting them to farmlands.
3. KWS to provide guidance on establishment of snake parks at Estanawi area, Lake Kenyatta corridor that joins Witu Corridor and Pandanguo area to boost local ecotourism and for extraction of commercial venom.

9.7 Fishing community

1. County Government of Lamu in consultation with KPA to fast-track compensation of fishing community BMU members to end the agony of waiting currently being experienced by the affected fishing community members.
2. KPA and LCDA to ensure that fishermen and women are empowered to fish in deep sea waters by appropriately training and providing them with appropriate fishing gears and vessels for deep sea fishing.
3. KPA and LCDA to develop and modernize fish landing sites by equipping them with adequate infrastructure such as electricity, access roads and cold rooms or ice making plants.
4. A clear communication from KPA, KMA, Kenya Coast Guard and other security agencies to the fishing community on what areas of their (fishing community) formerly fishing grounds within the port area and its environs they will be able to access once the port is up and running.
5. A clear demarcation of passageways for small fishing vessels away from those used by ships to be done.
6. Fast track construction of a fishing port to address the unique needs of the fishing community.

9.8 PAPs: overall

1. LCDA to carry out a comprehensive sociological and cultural study of the LAPSET area communities to profile social, cultural and political dynamics affected and likely to affect the programme as well as community risks and responses
2. LCDA to develop comprehensive social development blue-print incorporating Ministries of Education (basic, vocational and higher education), Health, Social Services, Gender and Youth Affairs with special focus on the local communities PAPs
3. LCDA to clearly establish a local area inter-agency community engagement structure to facilitate effective communication and involvement between community and government agencies
4. LCDA to develop an integrated affirmative action- oriented gender and youth involvement strategy with clear milestones and compliance plan

9.9 Archaeological and cultural sites

1. LCDA and other relevant government agencies in consultation with the Kenya National Commission to UNESCO and NMK to incorporate the Lamu World Heritage Site as a component of the LAPSET Corridor Programme for its concerns to be effectively addressed at the discussion table.
2. LCDA in consultation with Kenya National Commission to UNESCO to spearhead a scientific process (study) to investigate the perceived/ claimed threats of LAPSET Corridor Programme to the existence of the Lamu World Heritage Site.
3. NEMA to adopt the Heritage Impact Assessment (HIA) Report conducted by UNESCO as annex of the ESIA study of the first three berths of Lamu port and associated infrastructure for full implementation.
4. Archaeological impact assessments including underwater archaeology before underwater dredging to be carried before implementing any other future projects under the LAPSET Programme.
5. NMK to develop and document clear procedures and guidelines which project contractors will use to collect, handle, preserve and hand over any encountered artefacts at any construction sites including on how and when to communicate to NMK when such artefacts are encountered.

9.10 Material borrow sites

1. KeNHA to ensure that contractors rehabilitated fully all un-rehabilitated or partially rehabilitated material borrow sites (borrow pits) and the land handed back to the owners.
2. NEMA in consultation with other relevant lead agencies to develop and document National Standards and Guidelines on how road construction material borrow sites (borrow pits) should be rehabilitated for uniformity of the rehabilitation.
3. KeNHA to ensure that contractors secure active borrow pits adjacent to homesteads from unauthorised access for safety of residents of the homesteads, general public and livestock.

9.11 Master Plans for LAPSET Corridor Programme

1. LCDA together with other relevant lead agencies to undertake a targeted comprehensive public disclosure and sensitization at all levels for the approved integrated transport infrastructure master plan for Lamu port city to address expressed fears and concerns from farmers, pastoralists and business community of potential displacement to pave way for implementation of the master plan.
2. LCDA to make public (publish) the approved integrated transport infrastructure master plan for Lamu port city for public access and consumption.

APPENDICES

APPENDIX 1: TERMS OF REFERENCE

RESEARCH PROJECT ON THE IMPACTS OF LARGE SCALE INFRASTRUCTURE DEVELOPMENTS ON COASTAL BIODIVERSITY: A CASE OF LAPSET INFRASTRUCTURE PROJECT IN LAMU

Terms of Reference

CONSULTANCY SERVICES FOR ASSESSING THE STATUS OF COMPLIANCE WITH ENVIRONMENTAL AND SOCIAL SAFEGUARDS BY PROJECTS UNDER THE LAPSET PROGRAMME

1.0. Project background

WWF Kenya in collaboration with the National Environment Management Authority (NEMA) and LAPSET Corridor Development Authority (LCDA) have received financial support from the Western Indian Ocean Marine Science Association (WIOMSA) towards implementation of a joint research project aimed at assessing the impact of large scale infrastructure developments on coastal biodiversity with specific focus on the LAPSET Infrastructure Project in Lamu. The project, which covers a period of 3 years, is in its first year of implementation. The goal of the project is to provide data and information that will contribute in safeguarding and maintaining the integrity of critical coastal ecosystems (marine and terrestrial) within the LAPSET Program area for people, economy and nature.

The research project will be confined within the LAPSET project core area in Hindi and Basuba Wards of Lamu County. The project is focused on assessing the impacts of the LAPSET Program in the following key areas:

- i) **Biodiversity:** The project seeks to establish the trend and extent of loss of the natural capital (mangroves, coral reefs, sea grass beds, terrestrial forests, grasslands, wetlands etc.) in the study area
- ii) **Community livelihoods:** A socio economic assessment by the project is important to establish the status of Project Affected Persons (PAPs) especially on their livelihoods
- iii) **Physical and Land Use Planning:** The project will assess the land use and land tenure trends since the launch (2012) of the LAPSET project High cost of LAPSET
- iv) **Environmental Management:** The project seeks to assess the status of compliance with Environmental and Social safeguards
- v) **Climate mainstreaming:** The project aims to establish the climate variability/risk and adaptation considerations necessary in the design and implementation of LAPSET programme
- vi) **Institutional frameworks:** The project aims to document the capacity needs for environmental governance institutions in the LAPSET area

2.0 Rationale for the consultancy

The LAPSET Programme is desirous to ensure all programme related environmental and social impacts are adequately identified and managed in all its components. It is for this reason that an Environmental and Social Impact Assessment (ESIA) was done in 2011 prior to the start of implementation of the programme. As part of the ESIA, an Environmental

Management Plan (EMP) was put in place to guide environmental and social safeguard activities for the programme. The EMP has been the road map guiding the project to ensure compliance with appropriate safeguard measures to minimize negative impacts on the environment. The main objective of the consultancy is to review and assess the implementation and adherence by the projects under the programme to the safeguard measures described in the EMPs of the various projects as well as compliance with the EMCA CAP 387. It will also recommend areas for improvement to enhance compliance.

3.0 Consultancy objectives

- v. Review environmental and social management performance of various projects being implemented under the LAPSSET Programme ;
- vi. Assess the progress in implementation of Environmental Management Plans (i.e. are the recommended mitigation and management measures followed?)
- vii. Assess the overall effectiveness of the EMPs in ensuring environmental and social safeguards by the projects
- viii. Document lessons learnt and recommend best practices that the activities should embrace to improve compliance with safeguard measures

4.0 Scope of the consultancy

The audit's scope will cover various projects being implemented under the LAPSSET Programme such as construction of the port; roads; jetties; offices; roads; and oil pipeline among others within the study site. The number of projects to be audited under each area will be agreed upon during negotiations with the client. The consultant will undertake the following activities in delivering the environmental and social review report:-

- i. Review the EIA and EMP document for the LAPSSET Programme;
- ii. Discuss the list of projects to be reviewed with NEMA;
- iii. Review each projects approval processes and assess whether it has been done in accordance with the procedures prescribed in EMP and Environmental (Impact Assessment and Audit) Regulations 2003;
- iv. Review the EMPs for the selected projects under implementation;
- v. Assess compliance levels by the projects and the adequacy of the EMPs;
- vi. Give recommendations for improvements where necessary on the EMPs for on-going projects;
- vii. Assess the overall effectiveness of projects' EMPs and safeguards practices

5.0 Methodology

The methodology for undertaking the work will include:

- (i) Review of relevant LAPSSET programme documents including the EIA; EMP and other relevant projects reports
- (ii) Undertake consultations with stakeholders involved in implementation of various projects under the LAPSSET Programme to gather information on the sampled projectss; approval process; their location and performance on safeguards
- (iii) Undertake field visits specifically to the identified project sites to assess implementation of the projects' Environmental Management Plans

- (iv) Undertake interviews with the project affected persons to assess social impact of the activities

Throughout the work the consultant will regularly communicate and work closely with WWF Kenya and NEMA to seek clarifications or further guidance as and when required during the course of the consultancy.

6.0 Consultancy deliverables

The main deliverables include:

- i) Inception report – describing the methodology and timelines for undertaking the review
- ii) Draft Environmental and Social Review Report;
- iii) Presentation of draft review report to stakeholders for review and input;
- iv) Submit Final Environmental and Social Review Report. The consultant will submit five hard copies and a soft copy to NEMA for review and approval
- v) Dissemination of findings of final review report to stakeholders in a workshop to be organised by the client

7.0 Consultant qualifications

A consultant with relevant experience in environmental assessment and management is being sought. The consultant should have the following qualifications:

1. A Master's Degree in any of the following fields: Environmental Sciences; Natural Resource Management; Community development, or any other relevant qualification from a recognized institution;
2. At least ten (10) years of experience in environmental assessment and management, preferably in the coastal zone;
3. Knowledge on relevant environmental legislation and project planning cycle;
4. Evidence of strong analytical and communication skills;
5. Strong understanding of the natural resources and social economic issues in the coast region;

8.0 Consultant supervision

The consultant shall report to WWF Kenya for all administrative matters while NEMA will provide overall technical supervision of the consultancy.

9.0 Consultancy duration

The total duration for delivering the task is 60 working days after signing the contract with WWF Kenya. Prior to signing of the contract the consultant will present to WWF a work plan with clear timelines for delivery of the assignment for approval.

APPENDIX 2: INTERVIEW GUIDE, CHECKLIST AND STANDARDIZED PARTICIPANTS ATTENDANCE FORM DURING FOCUSED GROUP DISCUSSIONS

Interview guide

Borrow Pits Checklist

1. Date: _____

2. Name of location: _____
3. GPS Coordinate: _____
4. Photo _____
5. Rehabilitation status (rehabilitated or not): _____
6. Borrow pit site land use:
 - i) Agricultural land
 - ii) Settlement land
 - iii) Pastoral land
 - iv) Furrow land
 - v) Others
7. Are the owners of the land able to make economic use of the borrow pits section?
(Yes/No), Explain

PARTICIPANTS' ATTENDANCE FORM



WWF *for a living planet™*

ATTENDANCE LIST

Activity Name: _____
 Project Name: _____
 Project Number (Award/Oracle): _____ Activity Start Date: _____ Activity End Date: _____
 Name of Group: _____

Name	Org.	Gender	Age bracket		ID NO.	Phone number	Signature
		M/F	<35	35>			

Prepared by: _____ Signature: _____ Date: _____
 Checked by: _____ Signature: _____ Date: _____
 Approved by: _____ Signature: _____ Date: _____

APPENDIX 3: A DETAILED SCHEDULE OF KEY INFORMANT INTERVIEWS AND FOCUSED GROUP DISCUSSIONS

KEY INFORMANT INTERVIEW				
	Name	Designation	Institution	Date
1	Abdalla Faraj	Procurement	WWF-Kenya	6//7/2021
2	Mohammed Mwenje	Curator	National Museums of Kenya, Lamu Museum	6/7/2021
3	Mathias Mwavita	Senior Warden	KWS Lamu County	6/7/2021
4	Charles Kitheka	DCC	Ministry of Interior and Coordination of National Government Lamu East Sub-County	7/7/2021
5	Evans Maneno	Ecosystem Conservator	Kenya Forest Service Lamu	7/7/2021
6	Abdulahakim Aboud	Deputy Governor & CECM Fisheries	County Government of Lamu	7/7/2021
7	James Kamula	CDE	NEMA Lamu County	7/7/2021
8	Mohammed Baishe	Director Env. & Natural Resources	County Government of Lamu	7/7/2021
9	Mohamed Abubakar	Lamu County Dpt. Public Health Env. & Natural Resources	County Government of Lamu	7/7/2021
10	Irungu Macharia	County Commissioner-Lamu	Ministry of Interior and Coordination of National Government, Lamu County	8/7/2021
11	Evans Maneno	Ecosystem Conservator	Kenya Forest Service Lamu	8/7/2021
12	Eng. Clinton Kamaria	Utility/ Infrastructure Engineer-	LCDA, Lamu Port	8/7/2021
13	Komu	County Fisheries	County Government of	9/7/2021

		Officer	Lamu	
14	Mathias Mwavita	Senior Warden	KWS Lamu County	9/7/2021
15	Eng. Francis Karemi	Consulting Engineer	KeNHA for Lamu Port dual carriage Access Road	9/7/2021
16	Mr Mwenje Mohammed	Curator	National Museums of Kenya, Lamu Museum	14/7/2021
17	Dr David Obura	Coral Reef Scientist	CORDIO East Africa	16/7/2021
18	Emily Njeru	Deputy Director Culture programme	Kenya National Commission to UNESCO	22/7/2021
19	Dr Fredrick Manthi	Director Antiquities, Sites and Monuments	National Museums of Kenya	22/7/2021
20	Eng. Howard Omutoko	Deputy Director KeNHA Coast Region	Kenya National Highway Authority (KeNHA), Coast Region	2/8/2021
21	Daniel Githinji	Principal Environment Officer	Kenya Ports Authority	6/8/2021
22	Mr Simiyu	EHS Officer	H-Young	22/8/2021
23	Eng. Francis Karemi	Consulting Engineer	KeNHA for Lamu Port dual carriage Access Road	22/8/2021
24	James Kamula	CDE	NEMA, Lamu County	22/8/2021
FOCUSED GROUP DISCUSSION				
Group Name		Description		
1	Road Contractors and other stakeholders in Lamu	Ministry of Interior and Coordination of National Government- County Commissioner Lamu, NEMA- County Director of Environment Lamu, Consultant Engineer for Lamu Port access road KeNHA		7/7/2021

		and Road Contractors for Lamu port access road, Lamu-Witu- Garsen Road and suppliers of ballast to Lamu Port	
2	Mungini BMU	MBU-PAPs	13/7/21
3	Kipungani BMU	BMU-PAPs	13/7.21
4	Matondoni BMU	MBU-PAPs	13/7/21
5	SHELA BMU	BMU- PAPs	13/7/21
6	AMU MBU	BMU- PAPs	13/7/21
7	Pastoralists, Farmers and Business Community	PAPAs	14/7/2021
8	Save Lamu	CSO	14/7/2021
9	LAPSSET Team	LAPSSET Headquarters	21/7/2021

Appendix 4: Validation and dissemination workshop attendance list

 **WWF** for a living planet™

This is a declaration that I have not received/will not receive any travel and subsistence payment from my Employer / Organization in relation to the costs to be incurred for the meeting stated below:

Attendance List

Activity Name: Lamu WIOMSA LAPSET Research Dissemination KEFRI Workshop

Project Name: WIOMSA

Project Number (Award/Oracle):

Date of Activity: 3rd-4th December 2021

Name of Group: WWF, NEMA, LCDA and partners LAPSET research findings dissemination

S/No.	Name	Organization	Position	Email	Sign 3/12/21	Sign 4/12/21
1	ZACHARY MARITIM	WWF	PLANNER	zmaritim@wwf.org		
2	ALI MUWANGI	NEMA	DDPO	ali.muwangi@nema.go.ke		
3	KOMBE CHANZERA	FWANI UNI	RESEARCH	kombechanzer@fwani.ac.ke		
4	Demas Muliwa Bulamba	Rivara Umu	Project Supervisor	bulamba@rivara.co.ke		
5	Ishag Abubakar	Save Lamu	N. Chair	ishagabubakar@gmail.com		
6	Peter Amisi	Costant	Secretary	peteramisi@gmail.com		
7	ALAN NICHOLAS	Kenya	A. RCE	alan.nicholas@gmail.com		
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9	JOHN C. NGALA	KEFRI	Research Scientist	johnchngala@gmail.com		

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Appendix 5: Rehabilitation status of 45 borrow pits within Hindi ward operated by eight contractors/ suppliers

CHINA RAILWAY NO. 10 ENGINEERING GROUP CO LTD (CREG 10) OPERATED BORROW PITS			
	PLOT NO.	SIZE (ACRES)	STATUS
1	279	0.5	Rehabilitated
2	103	7	Not rehabilitated
3	157	2	Not rehabilitated
4	156	2	Not rehabilitated
5	133	3	Not rehabilitated
6	85	2	Not rehabilitated
7	165	5	Not rehabilitated
8	208	2.5	Not rehabilitated
9	145	5	Not rehabilitated
10	173	3	Not rehabilitated
11	189	2.5	Not rehabilitated
12	205	4	Not rehabilitated
13	236	1	Not rehabilitated
14	208	3.5	Not rehabilitated
15	167	3	Not rehabilitated
16	171	3	Not rehabilitated
17	219	4	Not rehabilitated
18	217	3	Not rehabilitated
19	202	5	Not rehabilitated
20	155	10	Not rehabilitated
21			Not rehabilitated
22	178	10	In use
H-YOUNG OPERATED BORROW PITS			
1	266	3	Rehabilitated

2	279	3	Rehabilitated
3	280	4	Rehabilitated
4	267	10	Rehabilitated
5	104	10	Rehab partially
6	296	2	Rehab in progress
7	251	4	Not rehabilitated
8	252	3	Not rehabilitated
9	236	2	Not rehabilitated
10	171	3	Not rehabilitated
11	186	3	Not rehabilitated
12		10	Not rehabilitated
13	203	2	Not rehabilitated
14	202	5	Not rehabilitated
15	169	10	Not rehabilitated
16	221	1	Not rehabilitated
17	220	10	Not rehabilitated
18	234	3	Not rehabilitated
19	233	2	Not rehabilitated
20	250	6	Not rehabilitated
21	195	4.5	Not rehabilitated
22	196	5.5	Not rehabilitated
NORTHERN LIBERTY OPERATED BORROW PITS			
1	156	3	Not rehabilitated
2	172	2.5	Not rehabilitated
3	167	4	Not rehabilitated
4	179	5	In use
FAISAL OPERATED BORROW PITS			
1	157	3	Not rehabilitated

2		9	In use
OSMAN OPERATED BORROW PITS			
1	149	1	Not rehabilitated
2	133	1	Not rehabilitated
STEPHEN NYAMONGO OPERATED BORROW PITS			
1	119	10	Not rehabilitated
AYUB OPERATED BORROW PITS			
1	103	3	Not rehabilitated
MOHAMED MAHMOUD OPERATED BORROW PITS			
23	129	3	Not rehabilitated

Appendix 6: GPS Coordinates of the borrow pits

BORROW PIT OPERATOR	LOCATION: GPS COORDINATES	
	Longitude	Latitude
Crec 10	40.81828	-2.19269
Crec 10	40.81674	-2.1946
Crec 10	40.818	-2.1968
Crec 10	40.81848	-2.19721
H Young	40.81869	-2.19765
Crec 10	40.81957	-2.19942
Crec 10	40.81951	-2.19944
crec 10	40.8152	-2.19442
Crec 10	40.81525	-2.1945
crec 10	40.81348	-2.19548
Faiza	40.81349	-2.1955
Crec 10	40.81177	-2.1975
Crec 10	40.81189	-2.19755
Faiza	40.81226	-2.1998
Crec 10	40.81584	-2.20083
Crec 10	40.80983	-2.19758
Crec 10	40.80957	-2.19791
Crec 10	40.80844	-2.19868
Crec 10	40.80664	-2.19957
Mohammed Muhamud	40.80636	-2.19965
Crec 10,	40.80121	-2.20084
Northern Liberty	40.80057	-2.20099
Crec 10	40.80042	-2.20014
Crec 10	40.79971	-2.19887
JTG	40.7989	-2.19796

H Young	40.79881	-2.19798
H Young	40.79889	-2.19702
H Young	40.7968	-2.19915
H Young	40.79814	-2.19627
H Young	40.79823	-2.19646
H Young	40.79635	-2.19737
H Young	40.79823	-2.19474
H young	40.79996	-2.19356
H young	40.80047	-2.19285
H YOUNG	40.79975	-2.19165
H young	40.80275	-2.19322
Mohammed Muhamud	40.80114	-2.19453
H Young	40.80154	-2.19434
Mohammed Muhamud	40.80228	-2.19556
H young	40.80367	-2.19362
China 10	40.80368	-2.19365
H Young	40.33641	-2.33399
H Young	40.3487	-2.34788
H Young	40.44823	-2.38426
H Young	40.59774	-2.33979
H Young	40.60166	-2.34067
H Young	40.46347	-2.38307
H Young	40.46342	-2.38177
H Young	40.58211	-2.35055
H Young	40.6099	-2.3402
H Young,	40.61504	-2.32008

Appendix 7: pictorial presentation of field work observations and activities

A: First three berths of Lamu Port and associated Infrastructure



Plate 1: A section of on-going works at Lamu port at the causeway area which is adjacent to mangroves



Plate 2: A section of the dual carriage road inside the port area and the completed container yard



Plate 3: Research team at the completed and commissioned first three berths of Lamu Port

B: Stakeholder consultations



Plate 4: Office consultation with Director of Environment Lamu County and Ecosystem Conservator Lamu



Plate 5: Consultation with PAPs specifically farmers, pastoralists and business community in Lamu



Plate 6: Consultation with CSOs specifically Save Lamu



Plate 7: Consultation with BMUs specifically Mungini BMU

C: Material borrow sites



Plate 8: Research team at select material borrow sites in Hindi Magogoni area of Lamu County



Plate 9: Field work team at selected material borrow sites in Witu area of Lamu County

D: Rehabilitation status of material borrow sites



Plate 10: Maize growing in a well rehabilitated material borrow site at Hindi Magogoni area



Plate 11: MOA 1 –Tana Delta area of Witu well rehabilitated material borrow sites now colonised with secondary vegetation



Plate 12: Un-rehabilitated material borrow site at Hindi Magogoni area Lamu County



Plate 13: Un-rehabilitated borrow pits used as water pans in Witu area of Lamu County



Plate 14: Newly rehabilitated material borrow sites at Kibaoni area of Lamu County



Plate 15: One of the active material borrow sites at Hindi Magogoni area of Lamu County



Plate 16: Validation and research findings dissemination workshop