ENVIRONMENTAL IMPACT ASSESSMENT STUDY
FOR
PORT AND MAIN ROAD OF MOMBASA SPECIAL ECONOMIC ZONE

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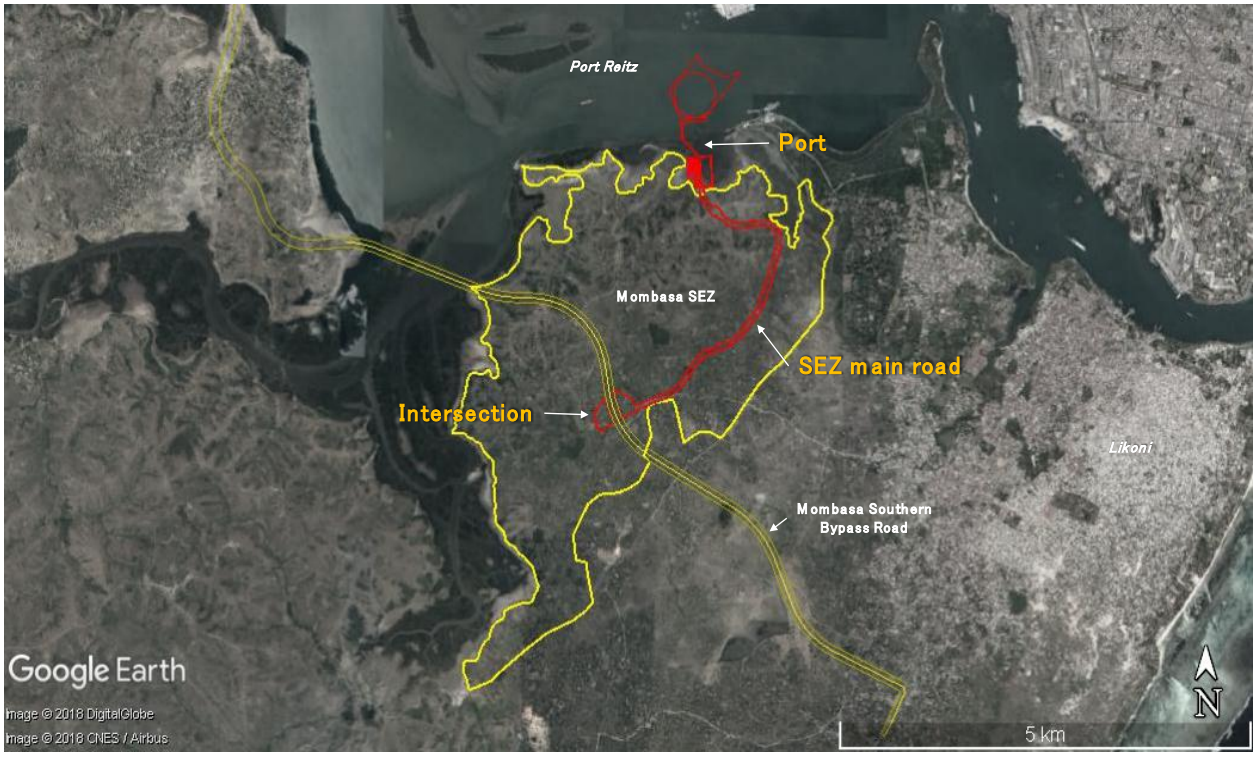

FINAL REPORT

April 2019

PROPONENT

KENYA PORTS AUTHORITY
P.O. BOX 95009 – 80107
MOMBASA

CONSULTANT

HEZTECH ENGINEERING SERVICES
P.O. BOX 42269 - 80100
MOMBASA

CERTIFICATION PAGE

Certification by Firm of Experts:

We hereby certify that this Environmental and Social Impact Assessment Study report has been prepared in accordance with the Environmental (Impact Assessment and Audit) Regulations, 2003 and the methodology and content reporting conform to the requirements of the Environmental Management and Coordination Act, 1999.

Signature_____ Date _____

Name_____**HEZEKIAH O. ADALA**_____

Address____**P.O. BOX 42269 – 80100 MOMBASA**_____

For and on behalf of: **HEZTECH ENGINEERING SERVICES**

Certificate of Registration No_____**5194**_____

Certification by the Proponent

We, KENYA PORTS AUTHORITY hereby confirm that the contents of this report are a true reflection at the site of the proposed works. We shall endeavour to implement mitigation measures proposed in the report to ensure the project complies with applicable environmental regulations.

Name_____

Signature and Stamp _____ Date _____

For and on behalf of KENYA PORTS AUTHORITY

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
BOD	Biological Oxygen Demand
BMU	Beach Management Unit
CDA	Coast Development Authority
COD	Chemical Oxygen Demand
CEPF	Critical Ecosystem Partnership Fund
CITES	Convention on International Trade in Endangered Species
CFCU	Coastal Forests Conservation Unit
CWMP	Construction Waste Management Plan
CO	Carbon Monoxide
DO	Dissolved Oxygen
DOSHS	Directorate of Occupational Safety and Health Services
EA	Environmental Audit
EACC	East African Coastal Current
EMCA	Environmental Management and Coordination Act
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMoP	Environmental and Social Monitoring Plan
ERC	Energy Regulatory Commission
GC-MS	Gas Chromatography – Mass Spec
GOK	Government of Kenya
µg/m3	Micro gram per cubic meter
JDT	JICA Design Team
JICA	Japan International Cooperation Agency
KeNHA	Kenya National Highways Authority
KPA	Kenya Ports Authority
KeFS	Kenya Fisheries Service
KFS	Kenya Forest Service

KMA	Kenya Maritime Authority
KM	Kilometres
KMFRI	Kenya Marine and Fisheries Research Institute
LRP	Livelihood Restoration Plan
MPA	Marine Protected Area
NACC	National Aids Control Council
NEMA	National Environment Management Authority
NMK	National Museums of Kenya
NOx	Oxides of Nitrogen
PM10	Particulate matter (<10 microns)
SOx	Oxides of Sulphur
WHO	World Health Organization
WWF	World Wide Fund for Nature
RoW	Right of Way
IUCN	International Union for Conservation of Nature
PAP	Project Affected Persons
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
SEM	South East Monsoon
SEZ	Special Economic Zone
TSHD	Trailing Suction Hopper Dredger
TSS	Total Suspended Solids
TN	Total Nitrogen
TP	Total Phosphate
TPH	Total Petroleum Hydrocarbons
WB	World Bank
WMP	Waste Management Plan

EXECUTIVE SUMMARY

The Kenyan government with the support of Japan International Cooperation Agency (JICA) intend to develop the Port and Road infrastructures of the Mombasa Special Economic Zone (SEZ). The proposed project is located in Dongo Kundu, Likoni Sub-county of Mombasa County and its main components are as follows:

- Development of one berth (approx. 300 m width) and associated cargo handling yard through land reclamation;
- Development of turning basin of 500 m diameter and -13 m depth in front the new berth through dredging;
- Development of access road from the proposed port to Mombasa Southern Bypass Road (approx. 4.6 km long).

The port facility will be developed and managed by Kenya Ports Authority (KPA) while the new road (hereinafter termed as "SEZ Main Road") will be developed and maintained by the Kenya National Highways Authority (KeNHA).

Ports and major road projects are classified as a "High Risk Project" under Kenya's Environmental Management and Coordination Act 1999 (Revised 2015), hence an Environmental and Social Impact Assessment (ESIA) report is required for obtaining Environmental Impact Assessment license. The ESIA Study has been undertaken in accordance to Kenya's EIA regulations and JICA's Guidelines for Environment and Social Consideration (2010).

Project Description

The berth will be constructed through dredging around the berth basin, installation of steel pipe piles, placement of armor stone for foot protection, formwork and casting of the berth superstructure. The Turning Basin would be constructed through dredging by use of Grab Dredger and Trailing Suction Hopper Dredger (TSHD). Grab dredger will be used mainly for dredging of shallow areas and TSHD for deeper areas. Dredged material would be disposed in offshore waters previously used for other dredging projects of Mombasa port. It is located approximately 6 km offshore from the Mombasa coastline at around 200 m depth.

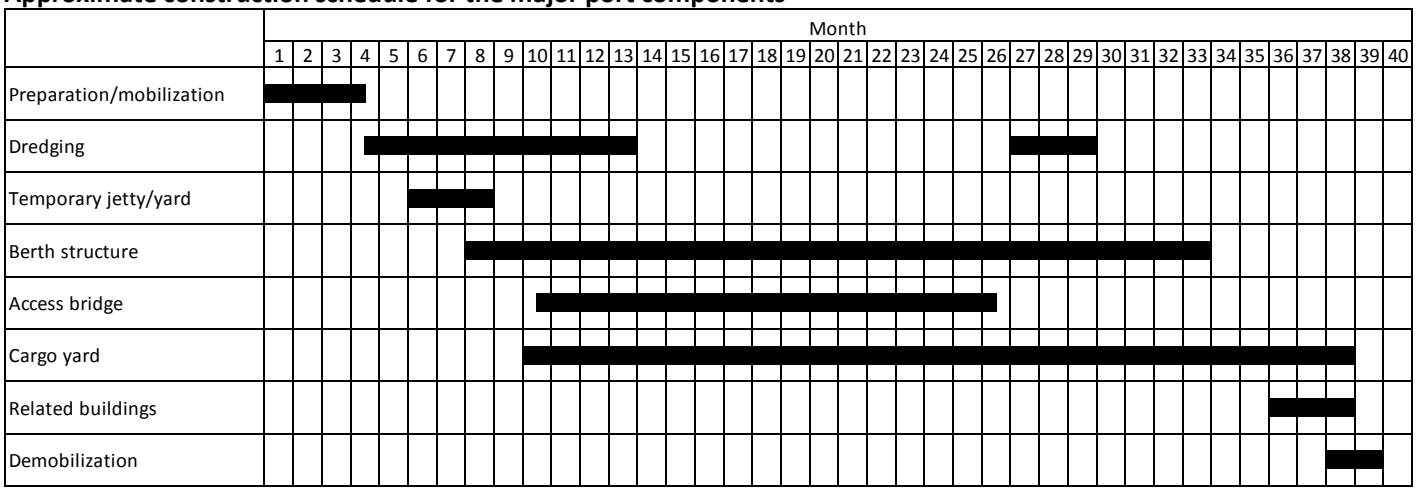
The SEZ Main Road will be constructed through cut and fill followed by compaction. In general, the cutting works will precede and the generated soil will be utilized for filling works. Main construction materials required will be reinforcement steel, concrete materials (aggregates, cement, stones etc.) and asphalt materials. All materials are planned to be procured from local suppliers.

Some of the major construction equipment planned to be employed are:

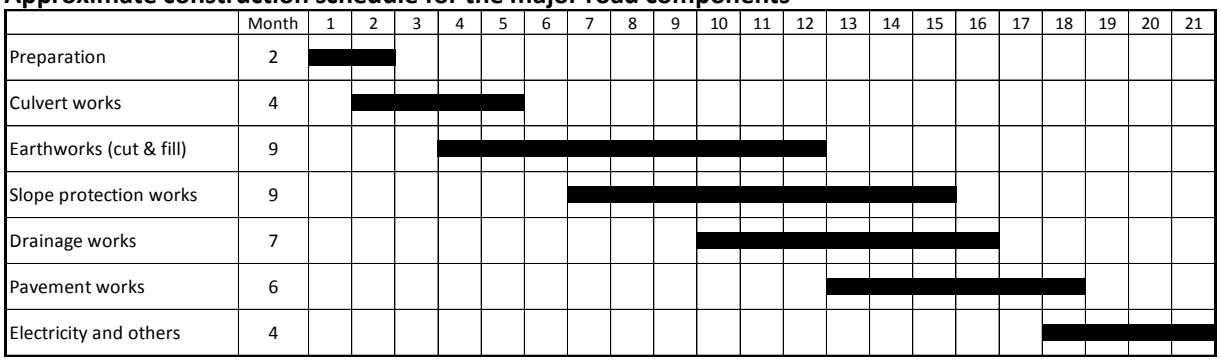
- Grab dredger incorporating hopper barge;
- Trailing Suction Hopper Dredger (TSHD);
- Hydraulic and/or vibro pile drivers;
- Concrete plant vessel;
- Dump trucks;
- Excavator, bull dozer, wheel roller, road roller, motor grader, asphalt finisher etc for access road.

The proposed port and road construction are expected to take approximately three and half years and 2 years respectively as outlined in the tables below:

Approximate construction schedule for the major port components



Approximate construction schedule for the major road components



Alternative analysis

Prior to the choice of the proposed project, an alternative analysis consideration was done, taking into account the No Project Option and the Project Option. The No Project Option was ruled out since the Mombasa port at the moment is already congested hence a new outlet would be needed to move cargo to and out from the SEZ. The Project Option therefore became inevitable and alternative analysis was also conducted by considering factors such as environmental and social impacts, cost and technical issues as follows:

- Port location and layout
- Procurement of reclamation material
- Disposal site of dredged material
- Route of access road

Legal, Policy and Institutional Framework

Legislative provisions applicable to the proposed project were identified as follows:

Legislation	Provisions relevant to the proposed project

Constitution of Kenya, 2010	Article 10 on national values and principles of governance on democracy and participation of people; Article 22 on the protection of the environment and natural resources for durable and sustainable system of development and Bill of Rights Article 42 which states that every person has the right to a clean and healthy environment.
Environmental Management and Coordination Act, 1999 (Revised 2015)	Section 58: (2) Proponents of projects specified in the Second Schedule shall undertake a full environmental impact assessment study and submit the report to the NEMA prior to being issued with any licence by the Authority: Section 2(a): Co-ordination of environmental management activities and promotion and integration of environmental considerations into development projects. Section 2(d): Examination of land use patterns to determine their impact on the quality and quantity of natural resources.
Land Act 2012	The Act specifies that there shall be equal recognition and enforcement of land rights arising under all tenure systems and non-discrimination in ownership of, and access to land under all tenure systems. The proposed project would cause involuntary resettlement hence the need to comply with provisions of this Act.
Fisheries Management and Development Act 2016	This Act provides for the conservation of fisheries resources to enhance the livelihood of communities dependent on fishing. The proposed project would have adverse effects on fisheries resources hence the need to develop livelihood restoration measures for the affected fishers.
Forest Conservation and Management Act, 2016	This Act established the Kenya Forest Service (KFS) for management and conservation of forests. KFS would take keen interest in this project because the land is rich in biodiversity the mangroves therein supports fisheries industry, a major source of livelihood for the local community.
The Water Act, 2002	The project would cause significant impact on the ocean, a key water body
The Merchant Shipping Act No. 4 of 2009	This is an Act of Parliament to make provision for the control, regulation and orderly development of merchant shipping and related services; and to consolidate the law relating to shipping and for connected purposes. The Kenya Maritime Authority (KMA) created under this Act regulates operations activities targeted by the proposed project
The Energy Act, No. 12 2006	The project consume significant amount of electrical energy and would involve construction of a power line
Wildlife Conservation and Management Act, Cap 376	This Act provides for the protection, conservation and management of wildlife in Kenya
National Museum and Heritage Act No. 6 of 2006	Act of Parliament to ensure protection of Kenya's rich and diverse natural and cultural heritage aimed at establishing a legal framework for heritage management. The project is likely to impact on a Kaya forest covered by this Act

The following policies and regulations, among others were identified as applicable to the proposed project:

- Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003
- Environment Impact Assessment Guidelines and Administrative Procedures, 2002
- Kenya Vision 2030
- National Environment Policy and Guideline 2013
- National Energy Policy 2004
- National Tourism Strategy 2013-2018
- Environmental Management and Coordination (Water Quality) Regulations, 2006
- Environmental Management and Coordination (Noise and Excessive Vibration (Pollution Control)) Regulations, 2008 (Legal Notice No 61)
- Environmental Management and Coordination (Waste Management) Regulations, 2006 (Legal Notice No 121)
- Environmental Management and Coordination (Air Quality) Regulations, 2009
- Fisheries (Beach Management Unit) Regulations, 2007
- Environmental (Prevention of Pollution in Coastal Zone and other Segments of the Environment) Regulations 2003

World Bank safeguard policies and international conventions applicable to proposed project were also reviewed and relevant provisions have been cited in this EIA study report.

Baseline Studies

Baseline studies included an assessment of the following:

Chemical Environment:

Field surveys were conducted for water quality, sediment quality, noise and air quality.

Water quality survey included elements such as salinity (pH), water clarity measured by turbidity and suspended solids, eutrophication-related factors measured by Dissolved Oxygen (DO), Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), total nitrogen, total phosphorus and contamination related parameters such as Total Petroleum Hydrocarbon (TPH) and bacterial contamination. Sediments quality survey encompassed grain size, organic matter, water content; and quality related issues i.e. contamination of bottom sediments by toxic or harmful substances such as As, Cd, Cr, Cu, Hg, Pb, Ni, Ag, Zn, PAH TPH, and PCBs. The existing condition was analysed in comparison with permissible levels of pollutants. Air quality survey consisted of particulate matter (PM_{10}), sulphur oxides (SO_x) and nitrogen oxides (NO_x). Noise level were measured at the 5 sites of air quality measurement for a 24-hour following ISO 1996/0,2,3 standards.

Whereas chemical contamination levels were observed to be below threshold levels bacterial contamination was reported in the sampling stations with coliforms levels of 33->1800 and 130->1800 MPN/100 ml reported for bottom and surface water respectively. This is an indication of faecal contamination resulting from sewage discharge. Considering that Kenya currently does not have legally adopted sediment guidelines for marine sediment quality, the results of the sediment analysis was compared with the Australian and Canadian sediment quality guidelines and it was established that concentration of all trace metals are below level one for metals, PCBs and TPH in marine sediments

thus the sediment could be classified as uncontaminated. The priority air pollutants levels (PM_{10}, NO_X and SO_X) in all the monitoring stations were below the EMCA and WHO standards, and the average values of noise were also found to be at acceptable levels.

Ecological Survey

Field sampling was conducted for the 2 priority habitat types namely port mangrove habitats, and submerged benthic habitats The target samples were flora and fauna with flora targeted on shallow benthic habitats and mangrove areas, whereas fauna was focusing on benthic macro-fauna inhabiting the 3 priority habitats.

The survey of the 20 mangrove sites within the proposed development site indicate that five (5) species of mangroves occur here and these will be affected to give way for construction activities. These are:

Scientific name	**Local name**	**Main use (NMMP, 2017 -2010)**
Rhizophora mucronata	Mkoko	Building poles, fencing poles, firewood, dye
Sonneratia alba,	Mlilana	Boat making (boat ribs), building poles, fencing poles, firewood
Avicennia marina,	Mchu	Boat making (boat ribs), building poles,
Ceriops tagal,	Mkanda	Building poles, fencing poles, firewood,
Lumnitzera racemosa.	Kikandaa	Fencing poles, firewood, dye

The 5 species of different mangrove trees were at different physiognomic and developmental stages. Majority of trees were very thin (less than 10cm DBH). Majority of trees were generally very short and the tree densities were scarce, except for isolated incidences where species sampled exceeded 5m in height and exceeded 20 individuals per 10m2. Mangrove seedlings (juveniles) growing under canopy of most stands had a high preponderance of *Rhizophora mucronata* and *Ceriops tagal*, and very few of *Avicennia marina* and *Sonneratia alba*.

During benthic survey total of 104 individuals represented in about 11 Classes were encountered. The major groups were Annelida, Crustaceans and Nematoda accounting for about 72 % total population

Terrestrial baseline study was also conducted to assess, document and analyse presence and characteristics of terrestrial flora and fauna on the access road, and to cross-reference listed species to East African conservation database and IUCN classification database, thereby identifying flora and fauna of conservation concern e.g. threatened and endemics.

Within the project area large swathes of land consist of highly disturbed vegetation, small-holder settlement areas, and community service points. Most settlement areas are also actively converting adjacent lands into agricultural use. However, isolated few sites are still intact and bear the relics of the Coastal forests ecosystem. A total of about 150 different plant species are reported as associated with areas earmarked for the New Port at Dongo-Kundu SEZ and the corridor for the access road. In a study conducted by Critical Ecosystem Partnership Fund (CEPF) (2005), 105 globally threatened species were traceable within the Kenya coastal forest zone hotspot and were listed in the IUCN Red List (2012). In this study we have confirmed one IUCN threatened species at two patches along the corridor.

Fisheries Survey

Desktop analysis was conducted using the fisheries statistics and Beach Management Units (BMUs) registers from the County government of Mombasa and Kwale and recent catch assessment surveys from some landing sites in the creek. Field surveys were also conducted to map out the resources mainly targeted at selected landing sites. The assessment further reviewed previous baseline and assessment reports and the impacts highlighted thereof.

This study has established that fishing within the project site is generally based on simple non-mechanized technologies with few mechanized boats that operate in and out of the creek. Fishers in the creek are resident and only a few migrate to the open sea during the North East Monsoon season. Fishing activity itself is divided into vessel based marine capture activities and more subsistence oriented collection activities in the intertidal zone, normally on foot without a vessel. Port Reitz creek lies south-west of Mombasa Island and is a major fishing ground shared by fishers from both Mombasa and Kwale Counties. There are 13 main landing stations used by fishers from Likoni and Changamwe sub-counties in Mombasa County and two (2) landing station in Tsunza, Kwale County. The landing site likely to be impacted directly is at Mukunguni under Mtongwe BMU.

The annual average fish production of artisanal fish catches is estimated at 270.4 metric tons (MT) with 325 MT landed in the creek landing sites. The annual production has however fluctuated from 1340 MT in 2013 to 325.0 MT in 2017 which is partly attributed to the cumulative impacts of marine infrastructure projects on fisheries resources. Most of the fish catch is landed in Mtongwe (147.1 mt), Mwangala (100.7mt) and Mkupe (75 mt). The catches from Ngare landing site in Port Reitz was 1.7mt. Fish landed in Likoni is either caught within the Mweza creek or in the open sea hence these catches may not necessary contribute to the creek fishery.

Socioeconomic Survey

The project site has complex socioeconomic characteristics particularly with regard to the ownership of land which has a very unique history. The study has shown that 72 percent of the households on the access road are Muslims and 28 percent are Christians. Both mosques and churches are available in project site. Since, Islam is the dominant religion, any interventions that will affect the livelihoods and other ways of life of the local communities must take cognizance of the values that are enshrined in the Islamic faith.

There were a total of 66 housing structures in the project area. Out of the this total, about 56% were semi-permanent buildings made of mud walls and iron sheet roofs, while 41% of the houses were temporary structures made of mud walls and "*makuti*" thatch roofs. Only 3% of the houses can be classified as permanent structures with stone walls and iron sheet roofs, but even these houses have no running water or electricity.

This study has shown that about 50 percent of the residents depend on small-scale agriculture as the main source of their livelihood. The small scale farming activities include both crop farming and livestock keeping. The main crops that are grown include food crops such as maize and cassava and cash crops such as mango, banana and coconut. The livestock that are kept in the area include cattle, goats and poultry.

There are three *Kaya* forests namely *Kaya* Mtongwe, *Kaya* Mihongani and *Kaya* Mikadini close to the project area. The *Kaya* refers to unique indigenous forest that is found along the coast. The *Kaya* forests are highly biodiverse and have high cultural significance to the Mijikenda communities, who consider them as sacred and have used them for traditional religious and spiritual ceremonies for centuries (Blackett, 1994; Government of Kenya, 2009).

Potential Impacts and Mitigation Measures

The identification of the impacts of the proposed project considered pre-construction, construction and operation stages. The identified impacts and mitigation measure are as follows:

Potential Impacts and Mitigation Measures for Port Construction

Potential Impact	Mitigation Measures
Preconstruction	
Cutting of mangrove trees (approx. 7.5 ha) to create room for port construction	• Replanting of mangroves in degraded mangrove forest area as per the National Mangrove Ecosystem Management Plan (2017-2027) and Mombasa Participatory Forest Management Plan (2015-2019). • Detailed mangrove plantation plan will be prepared through consultation with KFS and local community.
Construction	
Fugitive dust and exhaust emissions from construction vehicles and equipment	• Implement regular maintenance and ensure vehicles emitting visible pollutants (e.g. black soot) are removed from operation until repaired as per Environmental Management and Co-ordination (Air Quality) Regulations 2014. • Construction vehicles without inspection certificate will not be allowed to operate. • Avoid to the extent possible passing through sensitive areas (e.g. residential area, schools). • Slow driving on dusty roads within the community area. • Cover truck loading bed when transporting loose materials (e.g. soil). • Ensure regular watering of access roads to prevent generation of fugitive dust
Water pollution as a result of sediment dispersion through dredging and offshore dumping of dredged material	**[Grab dredger]** • Installation of silt curtain where dredging works are conducted. • Ensure there are no leakage from equipment such as barge hopper seal. **[TSHD]** • Ensure there are no leakage from equipment such as hopper seal. • Use TSHD with keel-level overflow. • Maximize under-keel clearance to minimize propeller wash effect on seabed. **[Common]** • Prohibition of overflow during transportation of dredged material • Tracking of dredger movement during offshore dumping to ensure dumping is conducted at the designated site. • Implement water quality and coral monitoring and reconsider dredging and dumping methods in case turbidity levels exceeds set threshold level or coral health degradation is observed (see monitoring plan for more details). In case dredging works overlap with other port dredging projects, coordinate with those projects and revise and strengthen the ESMP and ESMoP as necessary.
Soil pollution due to oil leak/spill from construction vehicles/equipment and fueling area	• Regular inspection of vehicles and equipment for oil and fuel leaks. Leaking vehicles and equipment to be immediately moved to a designated workshop and not used until repaired. • Maintenance/repair activities to be conducted only at designated workshop with appropriate pollution control facility (e.g. oil/water separator).

	• Spill response kit (e.g. absorbents) to be readily available at the construction site. Spills to be removed with absorbents and contained and disposed as hazardous waste. Fuel tank to be installed on an impermeable base with bunds. Install oil/water separator at fueling area.
Generation of hazardous waste (e.g. waste oil)	▪ Hazardous wastes to be stored in designated areas and with containers specialized for each waste type. ▪ Storage area to be have an impermeable base with bunds. ▪ Hazardous wastes to be collected and disposed only by NEMA-authorized firms.
Noise from construction vehicles/machine and pile driving works:	• Equip vehicles and construction equipment with exhaust mufflers and carry out regular maintenance/inspection. • Prohibit using vehicles that exceed 85 dBA when accelerating as per Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. • Avoid to the extent possible using roads that pass through sensitive areas. If unavoidable, implement speed control measures (e.g. installation of speed bumps) near sensitive areas and avoid raving of engines and unnecessary idling. • Use to the extent possible low-noise pile driver. Conduct pile-driving works in a manner so that noise levels do not exceed the construction site noise standard set under Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. • Obtain permit from NEMA in case there are works involving excessive noise/vibration as per Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. ▪ Install warning signs and use PPE (e.g. earmuff) where excessive noisy works are conducted.
Odor from: • Asphalt plant • Decomposing domestic waste in construction camps • Toilets	• Asphalt plant to be located as far as possible from sensitive areas. • Operate asphalt plant at minimum temperature. • Cover truck loading bed when transporting asphalt. • Food waste from construction camp to be segregated from other wastes and stored in manner to prevent odor. • Toilets to be cleaned daily and sludge to be removed regularly.
Sediment dispersion through offshore dumping of dredged material would impact negatively on Marine Protected Areas	• Prohibition of overflow during transportation of dredged material from the dredging site and dumping site. • Tracking of dredger/barge movement during offshore dumping to ensure dumping is conducted at the designated site. • Implement water quality and coral monitoring and reconsider dredging and dumping methods in case turbidity levels exceeds set threshold level or coral health degradation is observed (see monitoring plan for more details). In case dredging works overlap with other Mombasa port dredging projects, coordinate with those projects and revise and strengthen the ESMP and ESMoP as necessary.
Sediment dispersion through dredging and offshore dumping of dredged material impacting negatively on ecosystem	• Implement measures stated under "Water Pollution".
Marine construction works would impact negatively on fishing activities and hence livelihood of fishermen including restriction in use of Mkunguni fish landing site	• Provision of compensation and assistance to affected fishermen/fish traders. • If requested, preferentially employ affected fishermen for casual labor. • Establish alternative landing site as a replacement for Mkunguni

Impact on Kaya Mikadi Cultural Heritage site	• Prohibit entrance of construction workers inside kaya. • Demarcation of kaya boundary and erection of sign post, to ensure that workers do not enter the kaya.
Proliferation of infectious diseases such as HIV / Aids due to influx of construction workers	• Contractor to prepare and implement HIV/AIDS Prevention/Awareness Plan in accordance to HIV and AIDS Prevention and Control Act 2006. The plan shall among others include the following: - Awareness programs for construction workers - Code of Conduct to be complied by the construction workers - Other measures (e.g. counselling and testing) - Contractor to subcontract implementation of the HIV/AIDS Prevention/Awareness Plan to qualified organizations in this field
Risk of occupational accidents	• Contractor to prepare Occupational Health and Safety Plan in accordance to Occupational Safety and Health Act 2007. The plan shall among others include the following: - Risk assessment and planned safety measures - Training plan for construction workers - Organizational structure - Emergency response plan
Operation Phase	
Water pollution from rainwater runoff from port facilities	• Minimize oil leak/spill through regular maintenance of cargo handling machines Installation of oil/water separator (during construction) along the drainage and regularly collect residual oil.
Water pollution arising from wastewater discharge from ships	Regulate ship wastewater as per Environmental (Prevention of Pollution in Coastal Zone and other Segments of the Environment) Regulations 2003 and Marpol regulations.
Generation of operation waste	• Wastes to be handled and disposed only by NEMA-authorized firms. • Waste disposal containers to be provided onsite for each waste category. Preparation of Waste Management Plan (WMP) that identifies the different wastes that will be generated and their proposed disposal procedure
Sediment dispersion through dredging and offshore dumping of dredged material	Implement measures similar to those under sediment dispersion at construction phase
Rainwater runoff from port facilities	Implement measures similar to those under 'surface water run-off' at construction phase
Wastewater discharge from ships	Implement measures similar to those under 'waste water discherge' at construction phase
Generation of operation waste	Implement measures similar to those under waste at construction phase

Potential Impacts and Mitigation Measures for SEZ Main Road

Potential Impact	**Mitigation Measure**
Pre-Construction	
Cutting of threatened tree species (one *Vitellariopsis kirkii*) listed on IUCN red list	Transplantation of *Vitellariopsis kirkii*. Detailed transplantation plan to be prepared through consultation with KFS.
Involuntary land acquisition	• Carry out fair and adequate compensation as per RAP and provide livelihood restoration assistance to ensure livelihoods are restored to pre-project levels or better. • Implement internal and external monitoring to ensure the RAP is implemented appropriately. • A grievance redress mechanism (e.g. establishment of PAP Committee) will be put in place to address all emerging complaints and grievances from the PAPs and project area community.
Impacts on vulnerable persons	Vulnerable households to be provided with extra assistance as per RAP.

due to land acquisition	
Loss of income due to land acquisition	Provision of compensation and assistance as per
Construction Phase	
Fugitive dust and exhaust emissions from construction vehicles, construction activities and from concrete/asphalt plant	▪ Implement regular maintenance and vehicles emitting visible pollutants (e.g. black soot) to be removed from operation until repaired as per Environmental Management and Co-ordination (Air Quality) Regulations 2014. ▪ Avoid to the extent possible passing through sensitive areas (e.g. residential area, schools). ▪ Slow driving on dusty roads within the community area. ▪ Cover loaded trucks when transporting loose materials (e.g. soil). ▪ Regular water spraying of exposed surfaces. ▪ Covering of stockpiles. ▪ Asphalt plant to acquire emission license from NEMA and comply with emission standard set under Environmental Management and Co-ordination (Air Quality) Regulations 2014. ▪ Concrete/asphalt plant to be located as far as possible from sensitive areas.
Water pollution from sediment-laden rainwater runoff from construction site and uncontrolled discharge of concrete wash water	▪ Exposed cut and fill slopes to be protected (e.g. by shotcrete) as soon as cut and fill works are completed. ▪ Install temporary erosion control measures (e.g. sheet cover, sedimentation pond) as necessary. ▪ Stockpiles (e.g. topsoil) to be covered by sheet. ▪ Temporary construction yard to be located as far as possible from surface water bodies. ▪ Discharge of untreated concrete wash water to the environment to be strictly prohibited. ▪ Concrete wash water to be treated at designated facilities (e.g. facilities with wash water treatment system). ▪ Treated wash water to be reused as far as possible. ▪ Acquire effluent discharge license from NEMA in case discharge to environment is expected. ▪ Effluent quality (e.g. pH) to comply with discharge standard set under Environmental Management and Coordination, (Water Quality) Regulations 2006.
Oil leak/spill from construction vehicles/equipment and fueling area	▪ Regular inspection of vehicles and equipment for oil and fuel leaks. Leaking vehicles and equipment to be immediately moved to a designated workshop and not used until repaired. ▪ Maintenance/repair activities to be conducted only at designated workshop with appropriate pollution control facility (e.g. oil/water separator). ▪ Spill response kit (e.g. absorbents) to be readily available at the construction site. Spills to be removed with absorbents and contained and disposed as hazardous waste. ▪ Fuel tank to be installed on an impermeable base with bunds. Install oil/water separator at fueling area.
Generation of construction waste (e.g. domestic waste, packaging material, metal scrap, medical waste)	▪ Minimize waste generation through reuse and recycling. ▪ Wastes to be stored in designated areas and with containers specialized for each waste type. ▪ Wastes to be collected and disposed only by NEMA-authorized firms. ▪ Medical waste to be segregated from other wastes and disposed at NEMA-authorized facilities. ▪ Construction contractor to prepare a Construction Waste Management Plan (CWMP) through consultation with the county government, which

	identifies the different wastes that will be generated and their proposed storage and disposal procedures. ▪ Tracking and keeping records of waste movement and disposal.
Generation of hazardous waste (e.g. waste oil)	▪ Hazardous wastes to be stored in designated areas and with containers specialized for each waste type. ▪ Storage area to be have an impermeable base with bunds. ▪ Hazardous wastes to be collected and disposed only by NEMA-authorized firms.
Noise from construction vehicles/machine and sites	▪ Equip vehicles and equipment with exhaust mufflers and carry out regular maintenance/inspection. ▪ Prohibit using vehicles that exceed 84 dBA when accelerating as per Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. ▪ Avoid to the extent possible using roads that pass through sensitive areas. If unavoidable, implement speed control measures (e.g. installation of speed bumps) near sensitive areas and avoid raving of engines and unnecessary idling. ▪ Obtain permit from NEMA in case there are works involving excessive noise/vibration as per Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. ▪ Install warning signs and use PPE (e.g. earmuff) where excessive noisy works are conducted.
Odor from asphalt plant, toilets and decomposing domestic waste from construction camps	▪ Asphalt plant to be located as far as possible from sensitive areas. ▪ Operate asphalt plant at minimum temperature. ▪ Cover truck loading bed when transporting asphalt. ▪ Food waste from construction camp to be segregated from other wastes and stored in manner to prevent odor. ▪ Toilets to be cleaned daily and sludge to be removed regularly.
Procurement of construction raw materials (e.g. aggregates)	▪ Raw materials to be procured only from NEMA authorized quarries. ▪ Contractor to obtain EIA license in case the Contractor will develop new quarries. The quarry to be rehabilitated once it is decommissioned. ▪ Quarry to be operated in accordance to Integrated National Land use Guidelines 2011.
New main road will cut through existing community road	Construct diversion (detour) road in case construction works will hinder the use of existing community road.
Proliferation of infectious diseases such as HIV/Aids due to influx of construction workers	• Contractor to prepare and implement HIV/AIDS Prevention/Awareness Plan in accordance to HIV and AIDS Prevention and Control Act 2006. The plan shall among others include the following: - Awareness programs for construction workers - Code of Conduct to be complied by the construction workers - Other measures (e.g. counselling and testing) • Contractor to subcontract implementation of the HIV/AIDS Prevention/Awareness Plan to qualified organizations in this field.
Risk of occupational accidents	• Contractor to prepare Occupational Health and Safety Plan in accordance to Occupational Safety and Health Act 2007. The plan shall among others include the following: - Risk assessment and planned safety measures - Training plan for construction workers - Organizational structure - Emergency response plan
Risk of traffic accidents	• Strict compliance to speed limits. • Avoid to the extent possible using roads with high risk of accidents. If

	unavoidable, implement measures to minimize risks such as installing speed bumps, warning signs and placing traffic control officers at high risk areas. • Vehicle motion alarm to be installed on all construction vehicles.
Operation	
Generation of maintenance waste	• Wastes to be handled and disposed only by NEMA-authorized firms. • Waste disposal containers to be provided onsite for each waste category to facilitate segregation • Preparation of Waste Management Plan (WMP) that identifies the different wastes that will be generated and their proposed disposal procedure
Noise from vehicles using main road upon commissioning	• Establishment of green belt along sensitive areas. • Regular maintenance of green belt and road.

Environmental and Social Management Plans and Environmental and Social Monitoring Plans have been developed as part of this ESIA study to ensure these mitigation measures are undertaken and desired results achieved. In addition a Resettlement Action Plan (RAP) has been prepared to cushion Project Affected Persons (PAPs) against adverse effects of involuntary land acquisition, and a fisheries Livelihood Restoration Plan (LRP) has is also being prepared to ensure fishermen are not adversely affected by project impacts on fisheries resources. The LRP will be finalized after conclusion of consultation with stakeholders.

1. PROJECT DESCRIPTION

1.1 Project background and location

According to the Government of Kenya long-term development plan Vision 2030, Kenya aims to be a middle-income country by 2030 and the development of the Mombasa Special Economic Zone (Mombasa SEZ) is a priority project to achieve this goal. The Master plan of the Mombasa SEZ was prepared in 2015 by the Kenyan government through the assistance of Japan International Cooperation Agency (JICA) under the project titled "Project on Master Plan for Development of Mombasa Special Economic Zone".

The Mombasa SEZ is planned to be developed in the Dongo Kundu Likoni Sub-county of Mombasa County (approximate coordinates 4' 00' S, 39" 40' E) and will cover an area of approximately 1,200 ha. On completion the SEZ will consist of a free trade zone, industrial park, residential zone, tourism zone among others and are planned to be developed in three phases. Development of new infrastructure such as port, road, electricity, and water supply facilities will be required to serve the Mombasa SEZ. The port facility will be developed and managed by Kenya Ports Authority (KPA). In addition, construction of a new road (hereinafter termed "SEZ main road") will be required to connect the port and other SEZ facilities to the Southern Bypass Road. The SEZ Main Road will be developed and maintained by Kenya National Highways Authority (KeNHA). The new port and road were planned and designed under the JICA project "Preparatory Survey for Mombasa Special Economic Zone Development Project".

Figure 1.1.1 shows the layout of the port and SEZ main road.

Figure 1.1.1 Layout of port and main road within Mombasa SEZ (yellow line indicates the boundary of Mombasa SEZ)

Since port and major roads are classified as a "High Risk Project" under Kenya's Environmental Management and Coordination Act 1999 (Revised 2015), an Environmental and Social Impact Assessment (ESIA) report is required for obtaining Environmental Impact Assessment license. This ESIA study report has been prepared as per Kenya's environmental laws and regulations, as well as by taking into consideration the requirements of JICA's Guidelines for Environment and Social Consideration (2010).

1.2 Description of Project Components

The main components of the Project are as follows:

- Development of a 300 m berth and associated cargo yard;
- Development of navigation channel and turning basin of 500 m diameter and -13 m depth in front the new berth through dredging.
- Development of SEZ main road from the port to Southern Bypass Road (approx. 4,600 m)

1.2.1 Port Component

The port will consist of an offshore berth, cargo yard and an access bridge to connect the berth and cargo yard. In addition, a 13 m deep turning basin will be developed in front of the berth. The port will mainly handle containers for Mombasa SEZ and other general cargos as per demand. Figure 1.2.1 shows the layout of the main structures of the port component. More detailed descriptions of the port are provided in the ensuing Sections.

Figure 1.2.1 Main structures of the port component of Mombasa SEZ

The Berth

The berth will be of a pier structure supported with steel-pipe piles and a concrete deck. It will be constructed over a shallow water area of around 2-3 m depth. Figure 1.2.2 shows cross-section design of the berth. Two mobile cranes will be used for loading/unloading of cargos from ships.

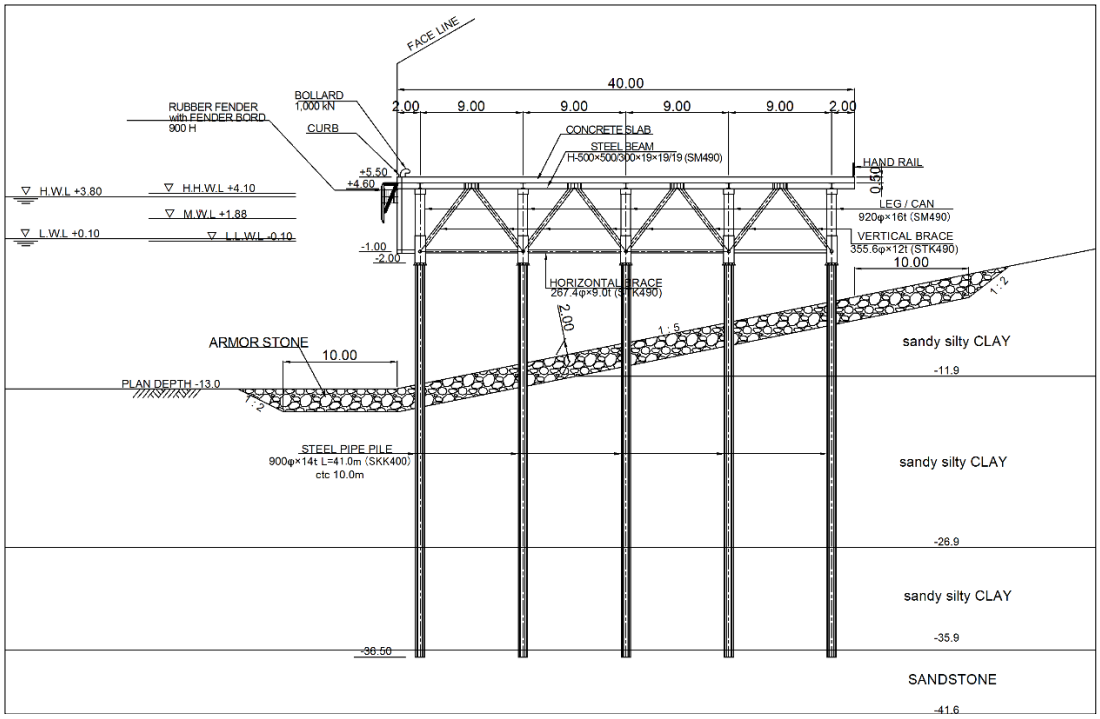


Figure 1.2.2 Cross-section design of the berth

The Cargo Yard

The cargo yard will be constructed over a mangrove/mud flat area through land reclamation (Fig. 1.2.3). A revetment will be constructed along the perimeter of the cargo yard, made from rubble stones and armor concrete blocks. The cargo yard will consist of a cargo handling area, administration area, maintenance/repair area and so on. The surface will be paved by either concrete or asphalt depending on the needs. Reach stackers will be used for handling and stacking containers inside the yard.

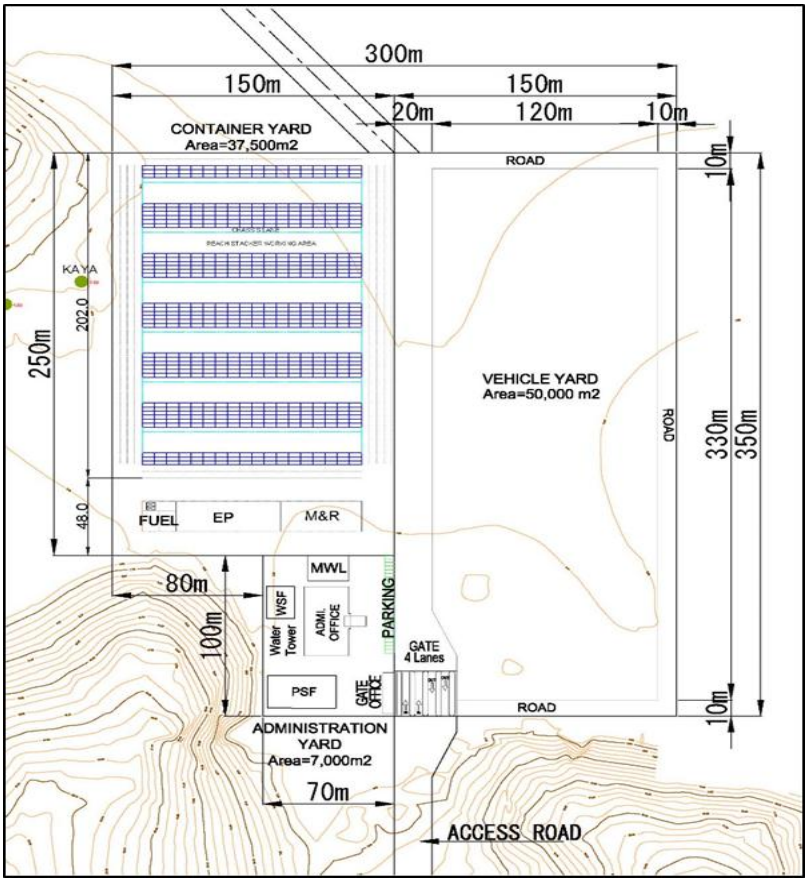


Fig. 1.2.3: Cargo and Administrative Yards

The Access Bridge

The access bridge will be constructed to connect the berth and cargo yard. It will be a pier structure supported by steel pipe piles with asphalt pavement. Trucks will be the main means of transportation of cargo between the berth and cargo yard. Figure 1.2.4 shows cross-section design of the access bridge.

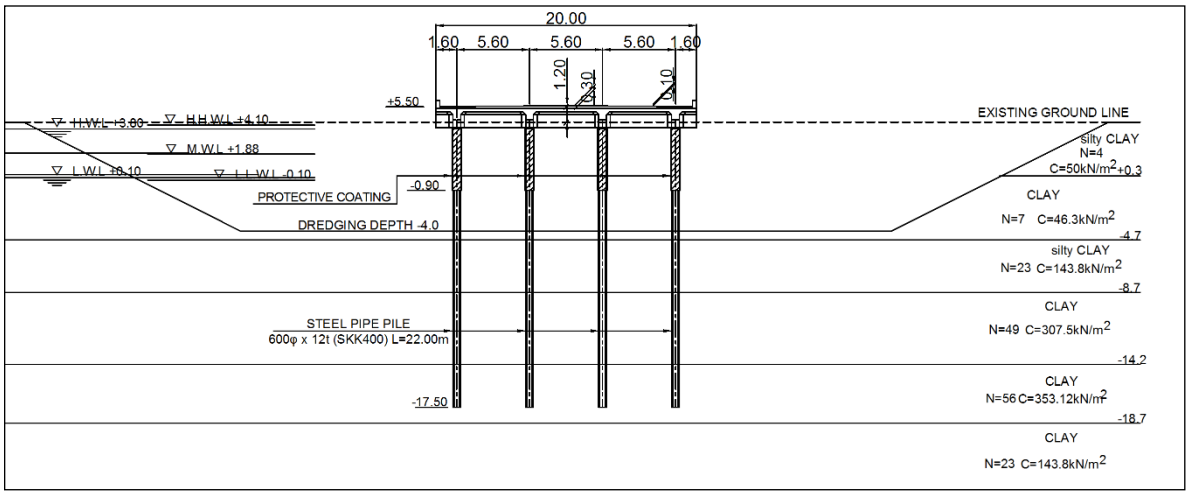


Figure 1.2.4 Cross-section design of the access bridge

1.2.2 Turning Basin

A turning basin of 500 m diameter and -13 m depth will be developed in front the new berth through dredging. The turning basin will connect to the existing Port Reitz access channel. The total dredging volume will be approx. 2.5 million m^3. Figure 1.2.5 shows the location of the turning basin.

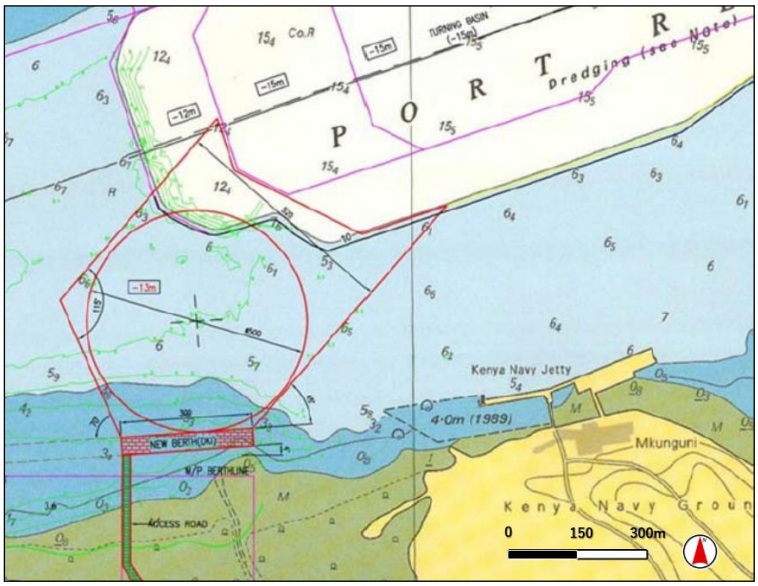


Figure 1.2.5: Layout of the turning basin (indicated in red line)

Cargo will be handled inside the port by use of the following equipment:

- 2 mobile cranes (2): unloading/loading of containers at the berth
- 6 reach stackers: handling of containers at the berth and yard
- 12 tractors: transportation of cargo between the berth and yard

1.2.3 SEZ main road

The SEZ main road will be a dual carriageway with two lanes in each direction. The length is approx. 4.6 km. The standard width of the road Right of Way (RoW) will be 40 m, which will also include a footpath (W=2.5 m), drainage ditch (W=2.25 m) and space for power distribution line on each side. The carriageway will be asphalt paved and each lane will have a width of 3.5 m. The slope of cut and fill areas will be protected with shotcrete. Box culverts will also be installed where the road intersects natural drainage channels. Figure 1.2.6 shows the layout of the SEZ main road while Figure 1.2.7 shows a typical cross-section of the SEZ main road.

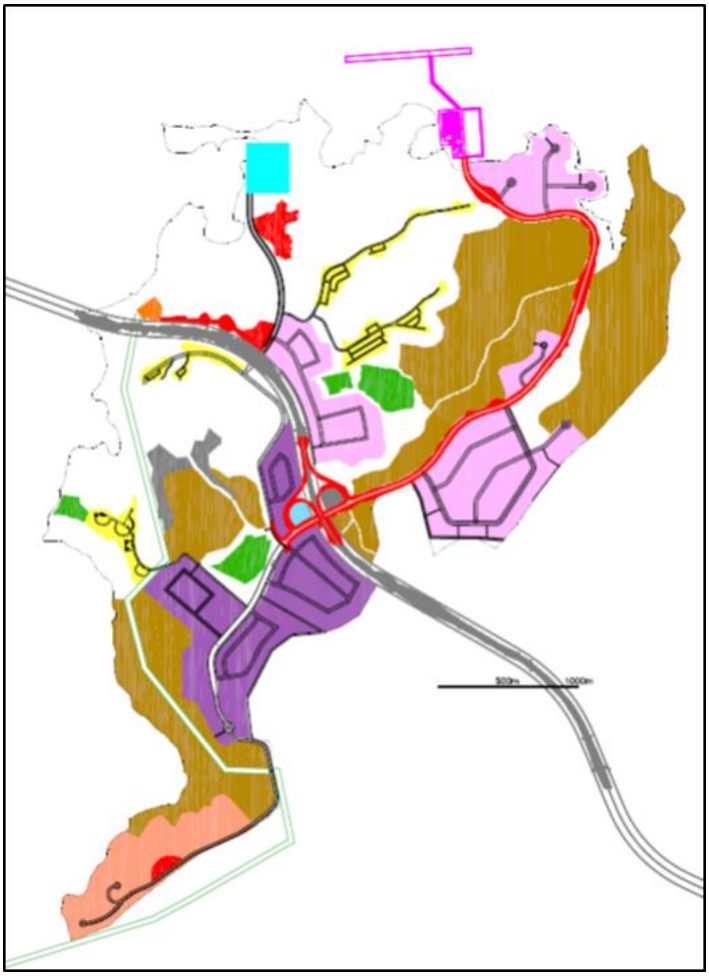


Fig. 1.2.6: Layout of SEZ Main Road

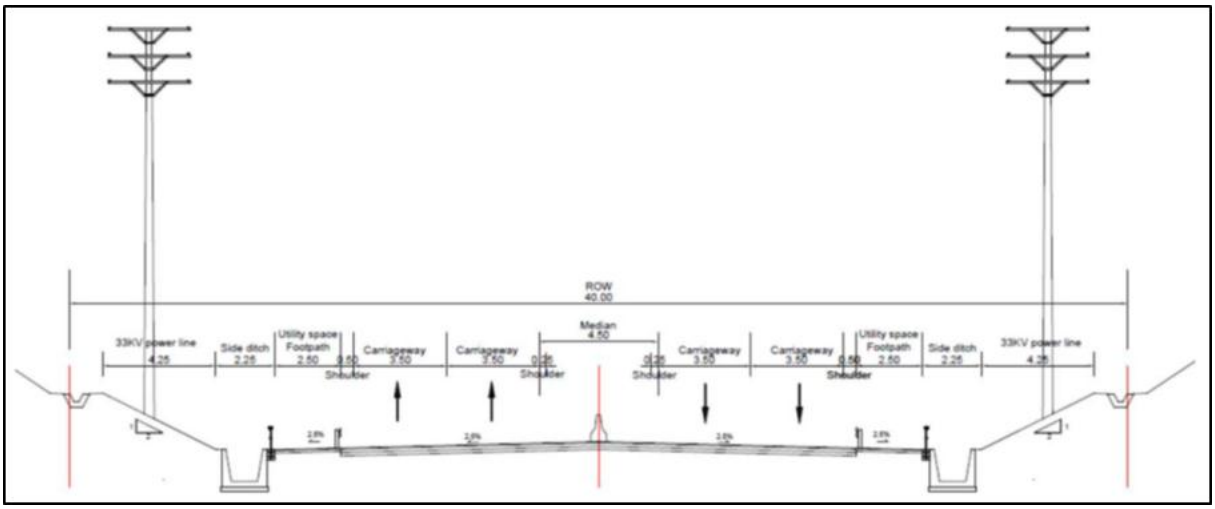


Fig 1.2.7: Typical cross-section of the SEZ main road

The SEZ main road will connect to the Southern Bypass Road by constructing a half cloverleaf interchange as shown in Figure 1.2.8. Since the SEZ main road would intersect the existing community roads and to maintain access, the community roads will be connected to the SEZ main road at the intersection points

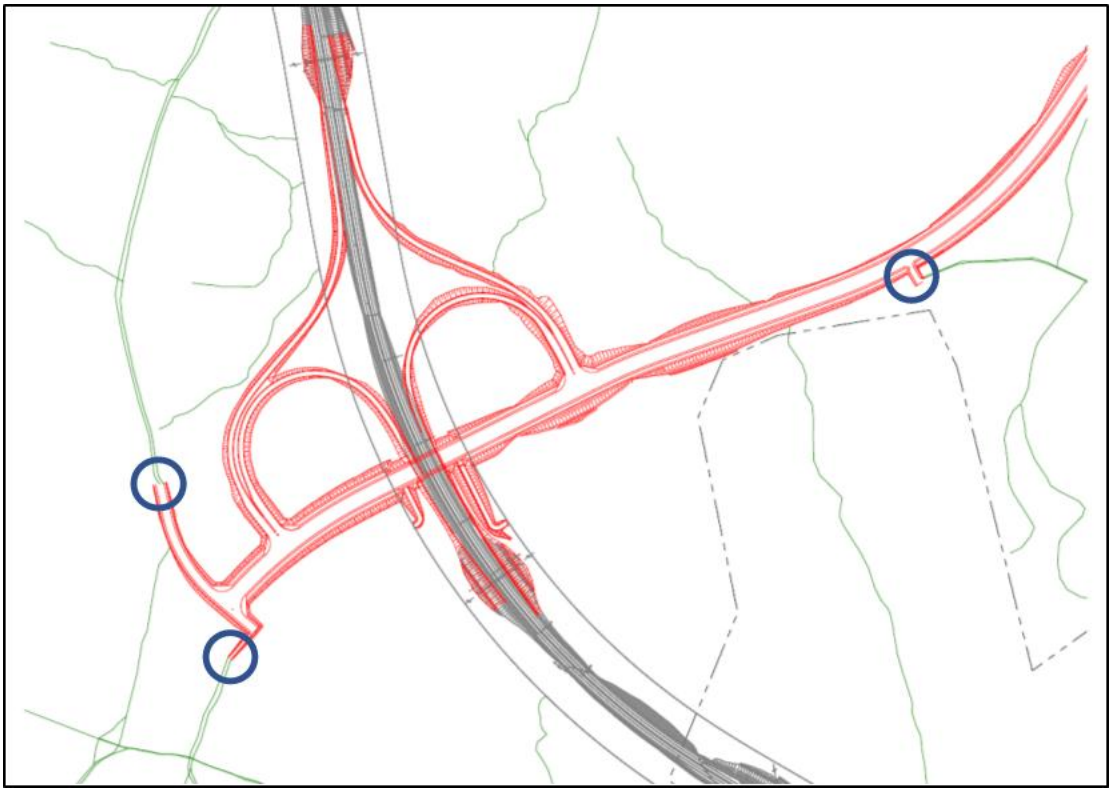


Figure 1.2.8: Layout of the half cloverleaf interchange (blue circle: connections point with existing community roads)

1.3 Methodology for Construction Works (port)

1.3.1 Construction of the Berth

The berth will be constructed through the following steps:

- Dredging around the berth basin
- Installation of steel pipe piles with pile driver
- Placement of armor stone for foot protection
- Construction of berth superstructure
- Concrete pavement of berth apron.

1.3.2 Construction of Access Bridge

The access bridge will be constructed through the following steps:

- Dredging around the bridge basin
- Installation of steel pipe piles with pile driver
- Construction of bridge superstructure
- Asphalt pavement of bridge road

1.3.3 Construction of the Turning basin

The Turning Basin would be constructed through dredging. Two types of dredger are planned to be used namely Grab Dredger and Trailing Suction Hopper Dredger (TSHD).

Grab dredger will be used mainly for dredging of shallow areas (< -8 m) and TSHD for deeper areas (> -8m). Dredged material is currently planned to be disposed in offshore waters previously used for other dredging projects of Mombasa port. It is located approximately 17km offshore from the Mombasa Port at around -200 m depth. Figure 1.3.1 shows the proposed dumping site of dredged material.

Figure 1.3.1: Location of proposed dredged material dumping area

In case of grab dredger, the dredged material will be loaded onto a hopper barge for transportation to the dumping area. As for the TSHD, the dredged material is contained within its own hopper compartment. Once full, the dredger will sail to the dumping area for disposal.

1.3.4 Construction material

Large volume of stone, rubble and sand will be required for constructing the port facilities. The material is planned to be procured from a licensed quarry in Kilifi County (Jaribuni quarry) approximately 80 km from the construction site. These materials will be transported from the quarry to the construction site via land and sea as follows:

- The materials will initially be transported from the quarry using dump trucks to an existing jetty in Kilifi creek located around 24 km from the quarry.
- The materials will then be unloaded onto a barge at the jetty and transported to the construction site by sea.
- The materials will be offloaded onto a temporary jetty/yard that will be constructed at the construction site.

Table 1.3.1 shows the volume of stone, rubble and sand required for construction of the port facilities.

Table 1.3.1 Volume of stone, rubble and sand required for construction of the port facilities

Type	Purpose	Approx. volume (m^3)	Total volume (m^3)
Stone / rubble	Foundation of berth	39,000	Approx. 50,000
	Revetment of yard	7,900	
	Foundation of temporary wharf	4,000	
Sand	Reclamation of cargo yard	125,000	Approx. 137,000
	Concrete for berth structures	7,000	
	Concrete for yard structures	5,000	

Source: JICA Design Team

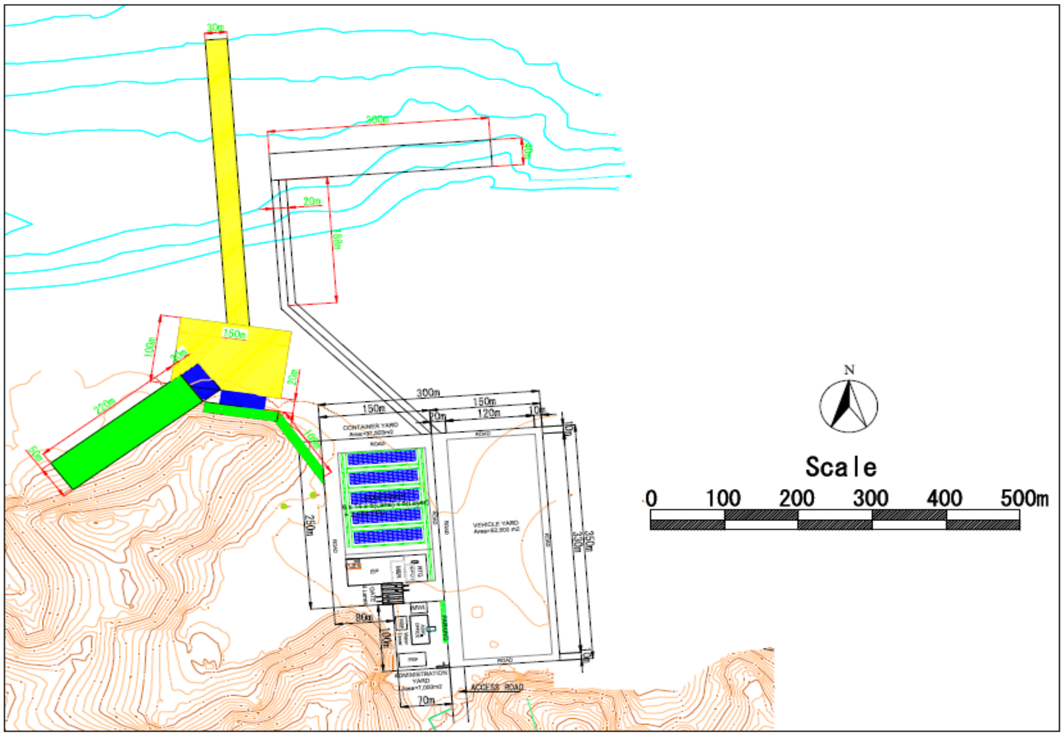
1.3.5 Construction equipment

Following are some of the major construction machines and equipment that are planned to be employed:

- Grab dredger + hopper barge
- Trailing Suction Hopper Dredger (TSHD)
- Hydraulic and/or vibro pile drivers
- Concrete plant vessel
- Dump trucks
- Excavator, bull dozer, wheel roller, road roller, motor grader, asphalt finisher etc for access road;

1.3.5 Temporary construction facilities

A temporary pier type jetty and yard is planned to be constructed for offloading and storage of construction materials/equipment. The temporary jetty/yard is planned to be constructed at the headland adjacent to the access bridge. An access channel (approx. 460 m) and turning basin of approx. -4 m depth will be developed in front of the jetty to allow entrance of construction vessels. A temporary construction road (approx. 100 m) will also be developed between the temporary jetty/yard and reclamation area for transportation of reclamation materials. Figure 1.3.2 shows the planned locations of the temporary construction facilities.



Yellow area: dredging area, Green area: temporary yard/road, Blue area: temporary jetty. Source: JICA Design Team

Figure 1.3.2: Planned layout of the temporary construction facilities

Other temporary construction facilities may include among others: concrete batching plant, asphalt plant and worker's camp. The requirement and location of these facilities will be subject to the Construction contractor.

1.3.5 Construction schedule

Port construction is expected to take around three and half years. Table 1.3.2 shows the approximate construction schedule for the major port components.

Table. 1.3.2 Approximate construction schedule for the major port components

	Month																																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Preparation/mobilization	■	■	■	■																																				
Dredging				■	■	■	■	■	■	■	■	■	■														■	■	■											
Temporary jetty/yard						■	■	■																																
Berth structure								■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
Access bridge										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■														
Cargo yard										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Related buildings																																				■	■	■		
Demobilization																																						■	■	

1.4 Methodology for Construction Works (SEZ main road)

Due to the hilly terrain, significant volume of cut and fill works will be required for construction of the road. In general, the cutting works will precede and the generated soil will be utilized for filling works. Figure 1.4.1 shows the cut and fill areas along the access road.

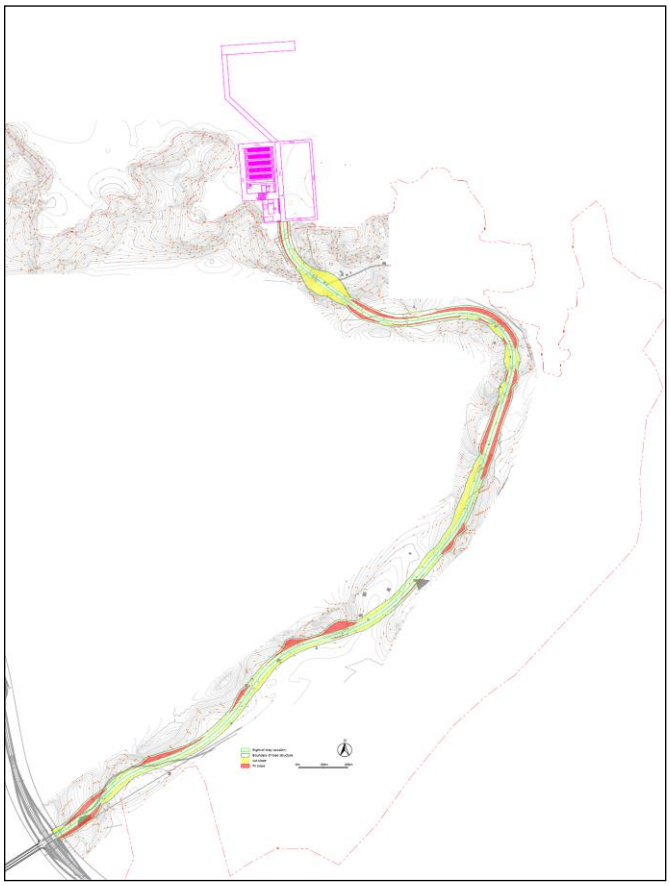


Figure 1.4.1: Cut and fill areas along the SEZ main road (yellow: cutting area, red: filling area)

i) Construction material

Main construction materials required will be reinforcing steel, concrete materials (aggregates, cement, stones etc.) and asphalt materials. All materials are planned to be procured locally from authorized suppliers.

ii) Construction equipment

Main construction equipment required will be excavator, bull dozer, tire roller, road roller, motor grader, asphalt finisher and so on.

iii) Temporary construction facilities

Temporary construction facilities will among others include, office, parking lot, and a yard for equipment and construction materials. Temporary concrete and asphalt plants may be required if not available in the vicinity. The requirement and location of these facilities will be subject to the Construction contractor.

iv) Construction schedule

Construction is expected to be take around 2 years as shown Table 1.4.1.

Table 1.4.1 Approximate schedule major construction works

	Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Preparation	2																					
Culvert works	4																					
Earthworks (cut & fill)	9																					
Slope protection works	9																					
Drainage works	7																					
Pavement works	6																					
Electricity and others	4																					

Source: JICA Design Team

1.5 Analysis of Alternatives

The No Project Option

If the Project is not implemented, there will be no construction-related impacts and no need for involuntary land acquisition but operation of the Mombasa SEZ will be greatly hindered as import/export cargo will be required to be transported to and out from the SEZ via the existing Mombasa port and Southern Bypass Road. This will result in extra travel distance of around 20 km (one-way) for cargo transportation and subsequent loss in time and cost. In addition, it will likely affect the operation of the existing Mombasa port as it is already congested.

The Project Option

The Project Option therefore becomes inevitable and alternative analysis is conducted by considering factors such as environmental/social impacts, cost and technical issues as follows:

- Port location and layout
- Procurement of reclamation material
- Disposal site of dredged material
- Route of access road

1.5.1 Alternative Analysis of Port Location and Layout

A master plan for the Mombasa Port was developed by JICA in 2015. The master plan allocates part of the north coast of Dongo Kundu as a new multipurpose area for handling cargo such as vehicles, wheat and container and for utilization by the Mombasa SEZ. The Mombasa SEZ Master Plan follows this plan as well. Figure 1.5.1 shows the spatial utilization plan developed under the Mombasa Port Master Plan. The multipurpose area consists of 4 multipurpose terminals (D1-D4), in which the D1 area is selected for this Project mainly due to the proximity to the existing access channel.

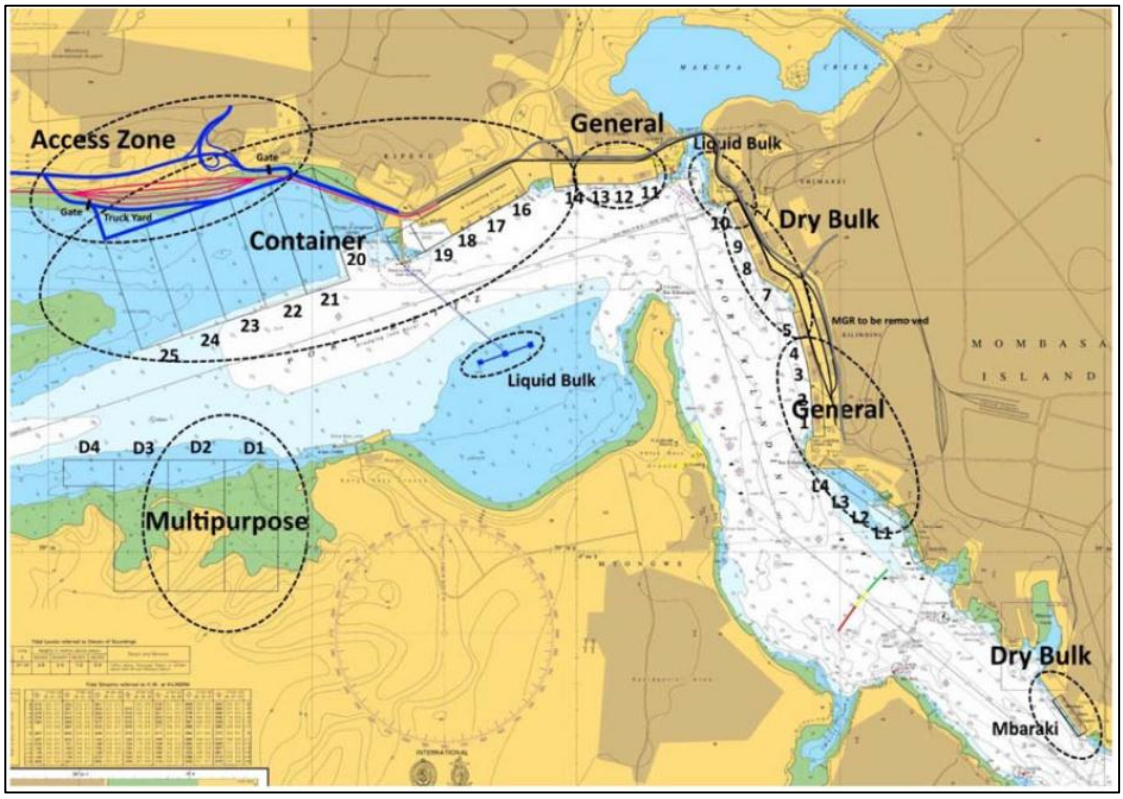
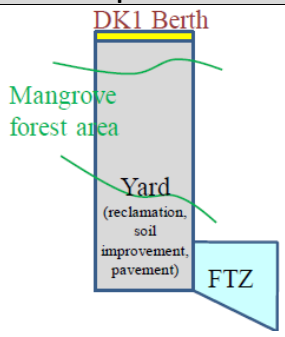
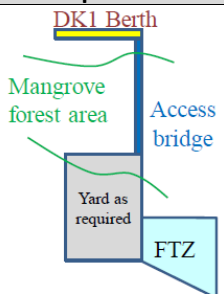
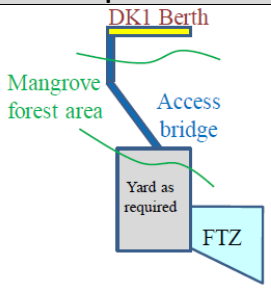


Figure. 1.5.1 Spatial utilization plan developed under the Mombasa Port Master Plan Source: Mombasa Port Master Plan (JICA 2015)

Several port layout options were considered for development of the first berth in Dongo Kundu (DK 1) taking in account factors such as cost, environmental impacts and future expansion. Table 1.5.1 shows the compared options and results of alternative analysis. In conclusion, Option 3 was selected as the most suitable port layout.

Table. 1.5.1 Results of Alternative Analysis for Port Layout

	Option 1	Option 2	Option 3
Layout	 Berth length: 300 m Yard area: Approx. 20 ha	 Berth length: 300 m Yard area: Approx.10 ha Access bridge: Approx. 400 m	 Berth length: 300 m Yard area: Approx. 10 ha Access bridge: Approx. 460 m
Construction cost	Most costly as it will require large-scale reclamation and soil improvement works	Less than Option 1	Less than Option 1
Environmental	Around 13 ha of mangrove	Around 6 ha of mangrove	Around 6 ha of mangrove

impact	area will need to be cleared for yard construction.	area will need to be cleared for yard construction.	area will need to be cleared for yard construction.
Port operation	Due to uncertainties of SEZ cargo demand, there is a risk that some yard space will remain unused.	Due to uncertainties of SEZ cargo demand, the yard area is kept at minimum size. However, connectivity to the D2 berth which is planned for future development is not good.	Due to uncertainties of SEZ cargo demand, the yard area is kept at minimum size. Connectivity to the D2 berth planned for future development is good.
Recommended option	Not recommended as some yard space may remain unused despite the high construction cost. Mangrove clearance is also largest within the three options.	Area of mangrove clearance and operational risks are less than Option 1. However, connectivity to the D2 berth is not good. Therefore, not recommended.	Area of mangrove clearance and operational risks are less than Option 1. Connectivity to the D2 berth is also good. Therefore recommended.

1.5.2 Alternative Analysis for Procurement of Reclamation Material

Reclamation works for the cargo yard will require around 125,000 m^3 of landfill material. Initially two cost effective options were considered for the source of reclamation material: one is to use the dredged material generated from this project and the other option was to use excess material generated during construction works inside SEZ. However, both options were excluded since the soils were found to be unsuitable for reclamation after soil investigation. So as an alternative, the suitability of the following options were considered and compared taking into account environmental and social impacts, and also taking into account cost of delivery of the material:

Option A: Harvesting from offshore seabed in Waa – Tiwi area currently being used for Container Terminal 2;

Option B: Procurement from land-based quarry in Kilifi County

Table 1.5.2 shows the results of comparison of options A and B. In conclusion, while Option A was slightly less in cost, Option B was considered as the more suitable option due to lower potential environmental and social impacts.

Table 1.5.2 Results of Alternative Analysis for Procurement of Reclamation Material

	Option A	Option B
Procurement site	Offshore sea bottom sand harvested from Waa - Tiwi approx. 30 km from Project site - Transport method: sea transport	Existing quarry - Distance: Approx. 80 km from Project site - Transport method: land and sea transport
Environmental impacts	Possible impacts on marine ecosystem due to sand dredging	Possible noise and air pollution associated with land transportation by dump trucks
Social impacts	Possible impacts on coastal fisheries and tourism	None

Cost	Approx. 3,000 KES/m^3	Approx. 3,500 KES/m^3
Other issues	None	None
Recommended option	Not recommended due to possible environmental and social impacts	Despite the higher cost, recommended as environmental and social impacts are less than Option A

1.5.3 Alternative Analysis for Disposal of Dredged Material

Around 2,500,000 m^3 of dredged material will be generated through dredging works. The ideal option will be to utilize this dredged material for the Project's reclamation works but unfortunately it is unsuitable due to its silty/muddy characteristics. Hence, the following two disposal options were instead considered:

- Option A: Disposal at offshore area located approximately 6 km offshore from the Mombasa coastline at around 200 m depth (used by previous projects)
- Option B: Disposal on land by developing a new land-based disposal facility

Table 1.5.3 shows results of the alternative analysis. In conclusion, Option A was considered the better option due to the significant high cost involved in developing a new land-based disposal facility and potential for significant land-based impacts.

Table 1.5.3 Results of Alternative Analysis for Disposal of Dredged Material

	Option A	Option B
Environmental impacts	Although there is potential for adverse impacts on marine ecosystem, no major impacts have been reported from past disposal activities conducted at the same location. According to the EIA sediment quality survey, sediment at the dredging site was found to be free from contamination so risk of contamination at the disposal site is low.	There is potential for adverse impacts through development of a new disposal facility (e.g. groundwater contamination). On-land material transportation may to some extent cause air/noise impacts.
Technical issues	No notable issues	Will need to develop a disposal facility such as a concrete surround that will not cause groundwater contamination.
Approx. cost	Significantly less than Option B	Significantly higher than Option A
Overall conclusion	Option A is considered as the better option due to the following reasons: ・Although Option A will likely have some environmental impacts, it is considered to be controllable through strict environmental monitoring and management. ・No significant impacts have been reported from past disposal activities conducted at the same location. ・Cost is significantly less than Option B.	Option B is considered the less favourable option due to the following reasons: ・Significant investment will be required for developing a new land-based disposal facility. ・May require land acquisition and resettlement. ・There is potential for groundwater contamination.

Source: JICA Design Team

1.5.4 Alternative Analysis of SEZ main road

As part of the planning process, two route options were considered. The first option was the route proposed in the Master Plan of Mombasa SEZ (Option 1) and the other option was direct route from the port to Southern Bypass Road (Option 2).

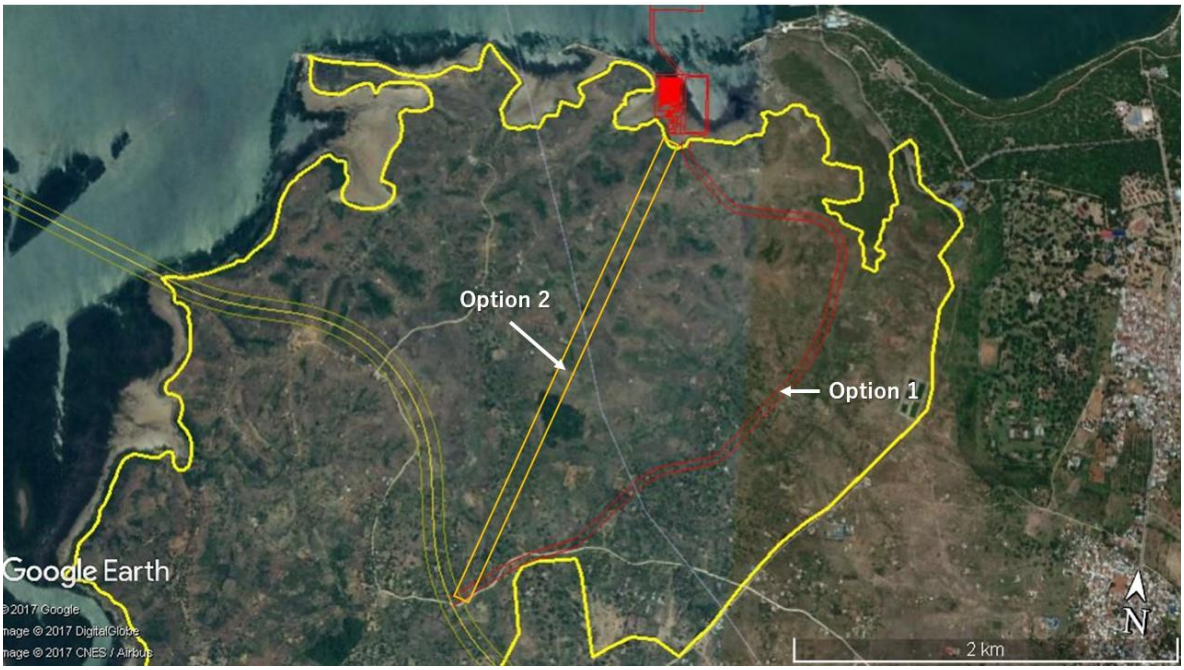


Figure 1.5.2 Layout of the SEZ main road route options

Figure 1.5.2 above shows the layout of the considered route options, and Table 1.5.4 below shows the results of alternative analysis.

Table 1.5.4 Results of alternative analysis

	Option A	Option B
Route	M/P route • Distance: Approx. 4.6 km • Land use: mainly agriculture	Direct route • Distance: Approx. 2.5 km • Land use: mainly agriculture
Environmental impacts	Impact is less than Option 2 as the route only crosses one hill ridge, which consequently will require less cutting works than Option 2.	Impact is greater than Option 1 as the route crosses two hill ridges which will require significant cutting works.
Social impacts	Impact is less than Option 2 as the route avoids major residential areas and does not pass through kaya.	Impact is greater than Option 1 as the route will pass through 2 major residential areas and kaya.
Construction cost	Construction cost is likely to be less than Option 2 due to lower volume of cutting works. Compensation cost is also likely to be less due to smaller	Construction cost is likely to be higher than Option 1 due to significant stabilization works of cut slope. Compensation cost is also likely to be

	social impacts.	higher due to greater social impacts.
Technical issues	None	None

In conclusion, Option 1 was therefore considered as the better route option due to lower environmental and social impacts as well as lower Project cost.

2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Legal Framework

Legislative provisions applicable to the proposed project are:

2.1.1 Constitution of Kenya, 2010

The current constitution was promulgated in 2010 establishing a system of devolved government based on counties. The key constitutional provisions relevant to the proposed project are:

- Article 10 on national values and principles of governance including 10(2a) on democracy and participation of people;
- Fourth Schedule Article 10 on implementation of specific national government policies on natural resources and environmental conservation;
- Fourth Schedule Article 22 under national government on the protection of the environment and natural resources with a view to establishing a durable and sustainable system of development;
- Bill of rights Article 42 which states that every person has the right to a clean and healthy environment;
- Article 196 on public participation.

2.1.2 Environmental Management and Coordination Act, 1999

This is an Act of Parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment. The Act established the National Environment Management Authority (NEMA) as the regulatory authority in charge of environmental matters.

Relevant Provisions include mandates given to NEMA such as:

1. Section 2(a): Co-ordination of environmental management activities and promotion and integration of environmental considerations into development projects.
2. Section 2(d): Examination of land use patterns to determine their impact on the quality and quantity of natural resources;
3. 2(e): Carry out surveys to assist in the proper management and conservation of the environment;
4. 2(l): Monitor and assess activities carried out by proponents in order to ensure that the environment is not degraded by such activities, that environmental management objectives are adhered to, and adequate early warning on impending environmental emergencies is given.

2.1.3 Land Act 2012

This is an Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources. It has repealed the Way leaves Act, Cap 292 and the Land Acquisition Act, Cap 295 and therefore provides for land acquisition for various purposes. Section 5 (1) of this Act provides the following forms of land tenure:

(a) freehold;
(b) leasehold;

(c) such forms of partial interest as may be defined under this Act and other law, including but not limited to easements; and

(d) customary land rights, where consistent with the Constitution.

The Act specifies that there shall be equal recognition and enforcement of land rights arising under all tenure systems and non-discrimination in ownership of, and access to land under all tenure systems.

2.1.4 Fisheries Management and Development Act No 35, 2016

This is an Act of Parliament is to provide for the conservation, management and development of fisheries and other aquatic resources to enhance the livelihood of communities dependent on fishing, and to establish the Kenya Fisheries Services; and for connected purposes.

Relevant provisions include:

- Section 5(1): protect, manage, use and develop aquatic resources in a manner that is consistent with ecologically sustainable development and to uplift the living standards of fishing communities;
- Section 7 which provides for the establishment of Kenya Fisheries Service as the state agency responsible for conservation, management and development of Kenya's fisheries resources.

2.1.5 Forest Conservation and Management Act, 2016

This Act established the Kenya Forest Service (KFS) and supportive institutions for management and conservation of all types of forests. This Act mandates the KFS to conserve and manage all forests and sets out the roles and responsibilities of communities in managing forests. In line with Section 23 of the Act KFS would take keen interest in forest lands where:

- land is an important catchment area, a source of water springs, or is a fragile environment;
- land is rich in biodiversity or contains rare, threatened or endangered species;
- forest is of cultural or scientific significance; or
- the forest supports an important industry and is a major source of livelihood for the local community.

2.1.6 Water Act, 2002

The Water Act (2002) makes provision for the conservation, control and use of water resources in Kenya and for incidental and connected purposes. This Act aims at providing for harmonized and streamlined management of water resources, water supply and sewerage services.

The Water Resource Management Authority was established under this Act to regulate and protect resources from adverse impacts. The Water Act provides for the conservation and controlled use of water resources in Kenya. Under the Ministry of Water the Act prohibits pollution of water resources and controls the discharge of industrial and municipal effluents into the ocean and other water bodies. The proposed project would impact on sea water due to dredging and disposal of dredged material and hence is subject to the provisions of the Water Act.

2.1.7 Physical Planning Act, Cap 286, 1996

The Act provides for preparation of regional and local physical development plans and grants local authorities (now County Governments) powers to control development within the area under their jurisdiction. Relevant sections are:

- Section 36**:** If in connection with a development application a local authority (now County) is of the opinion that proposals for industrial location, dumping sites, sewerage treatment, quarries or any other development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an environmental impact assessment report.

2.1.8 The Merchant Shipping Act No. 4 of 2009

This is an Act of Parliament to make provision for the control, regulation and orderly development of merchant shipping and related services; and to consolidate the law relating to shipping and for connected purposes. It aims to make provision for the registration and licensing of Kenyan ships, to regulate proprietary interests in ships, the training and the terms of engagement of masters and seafarers and matters ancillary thereto; to provide for the prevention of collisions, the safety of navigation, the safety of cargoes, carriage of bulk and dangerous cargoes, the prevention of pollution, maritime security, the liability of shipowners and others, inquiries and investigations into marine casualties.

2.1.9 Energy Act, No. 2006

The Energy Act, No. 12 was enacted in 2006 and has consolidated the law relating to energy whilst simultaneously focusing on improved management and delivery of energy services. The Act brought forth the Energy Regulatory Commission (ERC).

Relevant provisions of this legislation include Section 14 which states that ERC shall, in granting or rejecting an application for a license or permit, take into consideration:-
(a) the impact of the undertaking on the social, cultural or recreational life of the community;
(b) the need to protect the environment and to conserve the natural resources in accordance with the Environmental Management and Coordination Act of 1999.

2.1.10 Wildlife Conservation and Management Act, Cap 376

This Act provides for the protection, conservation and management of wildlife in Kenya and also restricts entry into a protected area without proper permission, prohibits wilful or negligent cause of bush fire, felling of trees, hunting, digging, laying, or constructing any pitfall, net, trap, snare or other device whatsoever, capable of killing, capturing or wounding any animal.

2.1.11 National Museum and Heritage Act No. 6 of 2006

This act of Parliament was passed to ensure protection of Kenya's rich and diverse natural and cultural heritage. It was aimed at establishing a legal framework for heritage management that domesticates some of the international conventions and protocols on heritage which Kenya has ratified. National Museums of Kenya (NMK) established under the Act is a multi-disciplinary institution whose role is to collect, preserve, study, document and present Kenya's past and present cultural and natural heritage. This is for the purposes of enhancing knowledge, appreciation, respect and sustainable utilization of these resources for the benefit of Kenya and the world, for now and prosperity.

2.1.12 Kenya Maritime Authority Act (Cap. 370).

An Act of Parliament to provide for the establishment of the Kenya Maritime Authority as a body with responsibility to monitor, regulate and coordinate activities in the maritime industry and for all other matters connected therewith. Relevant sections include the following functions of the Authority:

- to ensure, in collaboration with such other public agencies and institutions, the prevention of marine source pollution, protection of the marine environment and response to marine environment incidents;
- to regulate activities with regard to shipping in the inland waterways including the safety of navigation; and
- to implement and undertake co-ordination in maritime security.

2.1.13 Tourism Act, 2011

This Act provides for the development and management of stainable tourism and tourism-related activities and services, and for connected purposes. Mombasa County is a popular tourist destination and plans developed have to comply with the Act. Under Section (5) of the Act the Authority responsible for regulation of tourism activities shall, in considering license applications, have regard to:

a) the protection of fragile environmental resources, ecosystems and habitats as provided for by the ministry for the time being responsible for matters relating to the environment;
b) an environmental impact assessment license issued under Part VI of the Environmental Management and Co-ordination Act, 1999 (No. 8 of 1999);
c) any representations received from members of the public.

The Act prohibits discharge of any dangerous materials, substances or oil into a designated tourism development area and pollution of wildlife habitats and ecosystems, or discharge of any pollutant detrimental to the environment contrary to the provisions of this Act or any other law.

2.1.14 Occupational Safety and Health Act, 2007

This is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces. The provisions of the Act relevant to engineering construction works are contained in the Abstract of the Act for Building Operations and Works of Engineering Construction Rules. These rules specify the minimum safety and health measures to be taken during construction works which include that the proponent should:

- Give notice of particular operations or works;
- Such notice should be sent in writing to the Occupational Health and Safety Officer, not later than seven days after commencement of construction;
- Post printed copies or prescribed abstracts of the Occupational Safety and Health Act at the site of operations or works;
- Provide sufficient and suitable sanitary conveniences for persons employed. These must be kept clean and well lit.

The purpose of the Act is to 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 out of activities of persons at work.

2.1.15 Employment Act, 2007

This is an Act of Parliament to declare and define the fundamental rights of employees, to provide basic conditions of employment of employees, to regulate employment of children, and to provide for connected matters. In accordance with the Act it shall be the duty of the Minister, labour officers and the Industrial Court to promote equality of opportunity in employment in order to eliminate discrimination in employment; and to promote and guarantee equality of opportunity for a person who, is a migrant worker or a member of the family of the migrant worker, lawfully within Kenya.

The Act states that no employer shall discriminate directly or indirectly, against an employee or prospective employee or harass an employee or prospective employee on grounds of race, colour, sex, language, religion, political or other opinion, nationality, ethnic or social origin, disability, pregnancy, mental status or HIV status.

2.1.16 HIV and AIDS Prevention and Control Act 2006

The object and purpose of this Act is to (a) Promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS; (b) Extend to every person suspected or known to be infected with HIV and AIDS full protection of his human rights and civil liberties by - (i) Prohibiting compulsory HIV testing save as provided in this Act; (ii) Guaranteeing the right to privacy of the individual; (iii) Outlawing discrimination in all its forms and subtleties against persons with or persons perceived or suspected of having HIV and AIDS; (iv) Ensuring the provision of basic health care and social services for persons infected with HIV and AIDS; (c) Promote utmost safety and universal precautions in practices and procedures that carry the risk of HIV transmission; and (d) Positively address and seek to eradicate conditions that aggravate the spread of HIV infection.

2.2 Policies and Regulations

The table below highlights some of the relevant policies and their overall provisions as related to the proposed development:

Table 2.2.1: Policy Framework and Regulations applicable to the Project

Policy and regulation	Provision Applicable to Proposed Project
Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003	These Regulations were created to give effect to EMCA by providing guidance on the procedure for conducting ESIA studies and detailing the issues to be addressed during the study, as well as the parameters to be evaluated and guidelines for development of environmental management and monitoring plans. In addition the regulations provide guidelines for conducting annual environmental audits.
Environment Impact Assessment Guidelines And Administrative Procedures, 2002	These guidelines were developed to support the Environmental Impact Assessment (EIA) and Environmental Audit (EA) processes and assist in the integration of environmental and social concerns in economic development to foster sustainable development in Kenya.

Kenya Vision 2030	Kenya Vision 2030 is a long-term development blueprint for the country to create a globally competitive and prosperous country with a high quality of life by 2030. It aims at transforming Kenya into "a newly-industrializing, middle income country providing a high quality of life to all its citizens in a clean and secure environment".
National Environment Policy and Guideline 2013	Upon the promulgation of Constitution of Kenya 2010, it was found necessary to review the draft policy of 2008 to accommodate any new developments due to time lapse and to align it to the Constitution.
National Tourism Strategy 2013-2018	The national tourism strategy is a culmination of extensive stakeholders' involvement and participation besides fulfilment of the Tourism Act 2011, Section 3. The main aim of this strategy is to address national issues affecting Kenya's tourism sector and focus the players in the sector on sustainable tourism.
Environmental Management and Coordination (Water Quality) Regulations, 2006	These are described in Legal Notice No. 120 of 2006 and provide for protection of ground and surface water from pollution, quality standards for sources of domestic water and the limits and parameters of pollutants in treated waste water which can be discharged into the aquatic environment.
Environmental Management and Coordination (Noise and Excessive Vibration (Pollution Control)) Regulations, 2008 (Legal Notice No 61)	These regulations apply to operation of equipment or machinery and engagement in commercial or industrial activity that is likely to emit noise or excessive vibrations. The regulations specify the limits or levels within which these shall be undertaken. The Regulations also stipulate in the second schedule that construction activities undertaken during the night should not emit excessive noise beyond the permissible levels.
Environmental Management and Coordination (Waste Management) Regulations, 2006 (Legal Notice No 121)	These regulations outline the responsibility of the waste generator and prescribe proper mechanisms for handling all waste through segregation, recycling and reuse.
Environmental Management and Coordination (Air Quality) Regulations, 2009	These regulations provide for prevention, control and abatement of air pollution from premises, processes, operations or works, and prescribes exposure limits of air pollutants and emission levels of hazardous substances.
Fisheries (Beach Management Unit) Regulations, 2007	These regulations aim to support the Fisheries Act by: (a) strengthening the management of fish-landing stations, fishery resources and the aquatic environment; (b) ensuring achievement of high quality standards with regard so fish and fishery products; (c) building capacity of the members for the effective management of fisheries in collaboration with other stakeholders; and (d) preventing or reducing conflicts in the

	fisheries sector. The regulations recognize the roles played by different sections of the community, including women, in the fisheries sector. The overall aim is to combine elements from all management levels in a common, participatory approach thereby creating a link and partnership between the government level and artisanal fishermen.
Environmental (Prevention of Pollution in Coastal Zone and other Segments of the Environment) Regulations 2003	Regulates wastewater and ballast water discharge from ships.

2.3 Applicable World Bank Safeguards and International Conventions

The following international treaties, Conventions, and WB Policies have provisions applicable to the proposed project that would have to be complied with:

Table 2.3.1: WB Safeguard Policies and International Conventions Applicable to Proposed Works

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 historical sites	Convention Concerning the Protection of the World Cultural and 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. BASELINE INFORMATION

3.1 THE CHEMICAL ENVIRONMENT

3.1.1 Introduction

This part of the EIA report deals with water and sediments quality, noise and air quality and aims at identifying the potential impact construction of the proposed berth on the chemical environment and indicates how these impacts can be mitigated as well as providing Environmental Monitoring Plan (EMP) matrix for monitoring purposes. The study also characterized the existing environmental conditions to provide the data that will act as reference for EMP.

3.1.2 Baseline Chemical Characterization

Environmental characterization was undertaken through literature survey of different studies conducted in the project area and any identified gaps filled through field survey conducted in June 2017.

Water quality survey was carried to determine the quality of marine waters. Water quality survey included four elements:

(a) general features such as temperature, salinity, pH;
(b) water clarity measured by turbidity and suspended solids;
(c) eutrophication-related factors measured by Dissolved Oxygen, COD, biological oxygen demand, total nitrogen and total phosphorus and
(d) contamination related parameters such as TPH and bacterial contamination.

Sediments quality survey encompassed:- a) general feature such as grain size, organic matter, water content; and b) quality related issues i.e. contamination of bottom sediments by toxic or harmful substances such as As, Cd, Cr, Cu, Hg, Pb, Ni, Ag, Zn, PAH TPH, and PCBs. The existing condition was analysed in comparison with permissible levels of pollutants.

Air quality survey consisted of two main elements: (a) soot and dust, measured by particulate matter (PM_{10}), and (b) concentration of sulphur oxides (SO_x) and nitrogen oxides (NO_x). Noise level was also determined.

3.1.3 Samples collection and analysis

Surface and bottom water samples were collected using a Niskin bottle (Plate 1) from 7 stations W1, W2 and W3 (in Likoni channel), W4 and W5 (in Waa and Tiwi areas to the south of the channel), and W6 and W7 (in the marine park to the North of the channel). Water temperature, pH, conductivity and salinity were taken *in situ* with a handheld multi-parameter meter (YSI Professional Plus) while water samples for the analysis of the other parameters were stored appropriately for analysis at the NEMA accredited laboratory (SGS Laboratories). In the laboratory, water samples were analysed for microbial contamination, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Total nitrogen and total phosphate and TPH in water by using various methods presented in Table 3.1.1.

Table. 3.1.1 Results of water quality survey

	Season		Unit	DL	W1	W2	W3	W4	W5	W6	W7	Analysis method
Depth	Wet	-	m	-	16.3	5.6	21.1	18.1	32.2	2.7	2.5	-
	Dry				16.8	5.9	23.8	18.3	28.0	20.1	13.3	
Temp.	Wet	S	℃	-	27.6	27.5	27.2	27.0	27.0	27.5	27.5	*In situ* measurement (YSI Professional Plus)
		B			27.4	27.6	27.5	27.2	27.0	28.2	27.7	
	Dry	S			27.5	27.4	27.3	27.2	27.4	27.4	27.5	
		B			27.4	27.6	27.3	27.3	27.2	28.3	27.4	
pH	Wet	S	-	-	8.13	8.21	8.31	8.38	8.37	8.37	8.31	*In situ* measurement (YSI Professional Plus)
		B			8.28	8.19	8.25	8.36	8.36	8.38	8.31	
	Dry	S			8.06	8.09	8.23	8.31	8.16	8.27	8.25	
		B			8.06	8.09	8.23	8.31	8.16	8.27	8.25	
Salinity	Wet	S	‰	0.01	28.49	25.55	26.98	39.31	39.16	38.49	38.35	APHA 2510B
		B			37.82	33.47	38.95	38.79	39.47	38.49	38.77	
	Dry	S			36.10	36.12	35.75	35.39	35.27	35.42	34.74	APHA 2520B
		B			36.42	36.44	35.94	35.40	35.11	35.28	35.30	
DO	Wet	S	mg/l	-	0.2	0.2	0.2	<0.2	<0.2	<0.2	<0.2	APHA EXT
		B			0.9	0.2	0.2	<0.2	<0.2	<0.2	<0.2	
	Dry	S			5.6	5.0	5.9	5.8	5.8	5.5	5.7	*In situ* measurement (YSI Professional Plus)
		B			4.0	4.1	4.2	4.5	4.05	3.9	4.0	
Turbidity	Wet	S	NTU	0.048	7.10	3.44	3.71	2.41	2.28	5.57	2.68	APHA 2130B
		B			6.78	3.50	2.76	3.10	2.73	2.82	2.99	
	Dry	S			7.18	4.38	2.92	1.04	1.49	1.79	1.20	
		B			11.60	9.80	2.50	1.05	1.00	0.88	1.04	
TSS	Wet	S	mg/l	-	1	2	2	1	2	2	1	APHA 2540C
		B			2	2	2	2	1	4	2	
	Dry	S			<5	<5	<5	<5	<5	<5	<5	APHA 2540D
		B			<5	<5	<5	<5	<5	<5	<5	
T-P	Wet	S	mg/l	0.01	3.90	3.10	0.80	0.99	1.96	0.84	0.74	APHA 3120
		B			0.6	0.2	0.6	1.12	0.77	0.7	1.4	
	Dry	S			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	APHA 3120 B
		B			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
T-N	Wet	S	mg/l	0.02	1.26	2.38	1.68	0.50	0.70	0.07	1.10	APHA 4500-Norg
		B			1.96	1.4	2.17	6.8	0	0.7	0.4	
	Dry	S			1.18	2.13	1.51	0.84	1.12	0.90	1.29	APHA 4500-N B
		B			1.57	1.23	1.96	3.75	0.62	1.01	0.56	
BOD	Wet	S	mg/l	1	27.0	18.6	24.1	51.3	129.6	43.1	29.0	APHA 5210B
		B			21.6	35.1	23.49	40.5	67.5	33.75	32.4	
	Dry	S			43.2	54.0	37.8	64.8	59.4	59.4	70.2	
		B			48.6	32.4	59.4	37.8	43.2	43.2	37.8	
COD	Wet	S	mg/l	7	444.96	477.92	494.4	703.84	717.12	690.96	671.97	APHA 5220B
		B			510.88	560.32	527.36	730.4	677.28	697.2	710.48	
	Dry	S			542.92	650.72	376.32	854.56	2587.20	854.56	533.12	
		B			125.44	2108.96	1160.32	2203.04	638.96	35.28	1160.32	
TPH	Wet	S	mg/l	0.0	1.66	1.58	1.51	1.21	1.58	2.47	1.18	SGS TW56

	Season		Unit	DL	W1	W2	W3	W4	W5	W6	W7	Analysis method
		B		5	2.18	1.67	1.55	1.31	1.14	1.02	1.21	
	Dry	S			0.41	0.49	0.74	0.63	0.66	0.83	0.57	EPA 8015C
		B			0.73	1.72	0.59	0.82	0.54	0.55	0.65	
Coliforms	Wet	S	MPN/100 ml	0	>1,800	>1,800	>1,800	>1,800	1,600	240	130	ISO 9308-2
		B			>1,800	>1,800	>1,800	1,600	920	>1,800	33	
	Dry	S			920	1600	140	27	540	110	110	
		B			>1,800	>1,800	33	8	11	>1,800	920	

For the analysis of sediment quality, sediment samples were collected along the access channel (S1 and S4) and in the turning basin (S2 and S3) using and corers. From each site, 3 samples were collected, mixed and homogenised together and three composite samples for sediment characterization, heavy metals and organics analysis obtained. Sediment samples were analysed for grain size, sediment organic matter, water content, heavy metals (As, Cd, Cr, Cu, Hg, Pb, Ni, Ag and Zn) and organics (PAH, TPH, and PCBs). Sediment grain distribution was carried out using dry sieving and referenced to Wentworth (1922) grain size classification while the other parameters were analysed following methods listed in Table 3.1.2.

Table 3.1.2: Analysis Methods for Sediment Quality Parameters

Parameter	Unit	Analysis Method
Moisture	%	ICARDA
TOC	%	ICARDA 5.5
Sand	%	Gravimetric Dry sieving method (Wentworth, 1922)
Silt	%	Gravimetric Dry sieving method (Wentworth, 1922)

Air quality sampling was carried out at stations (A1, A2, A3 and A4) while and noise measurement were taken at stations N1, N2, N3 and N4 (Figure 4.2). Additional air quality sampling and noise survey was carried out at a reference station (A5 and N5).

Noise level was determined at the 5 sites for a 24-hour following ISO 1996/0,2,3 standards. Microphone was positioned at a height of 1.2m above the ground at the stations. Noise measurement was carried out using calibrated sound level meters (Larson Davis Noise meter LxT1).

Air quality assessment in the study area was carried at for a 24-hour. Minivol air samplers were used to monitor particulate matter (PM_{10}). Passive sampling tubes were used to sample the gaseous pollutants (nitrogen dioxide and sulphur dioxide). The tubes were mounted 1.5m above the ground. The detection limit for SOx was 0.001μg/m^3

The locations of water quality sampling points are indicated in Figure 3.1.1 below:

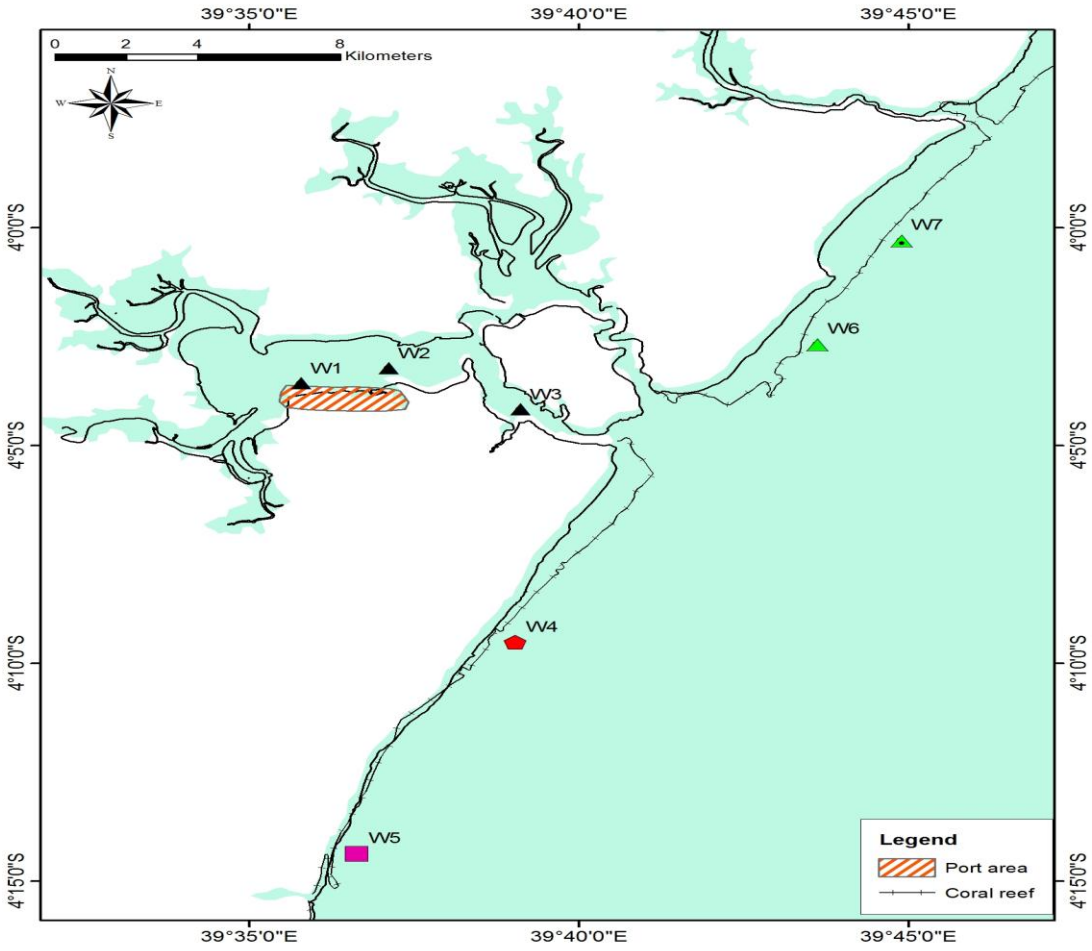


Figure 3.1.1 Map showing water quality sampling points

The coordinates of the above sampling points are as follows:

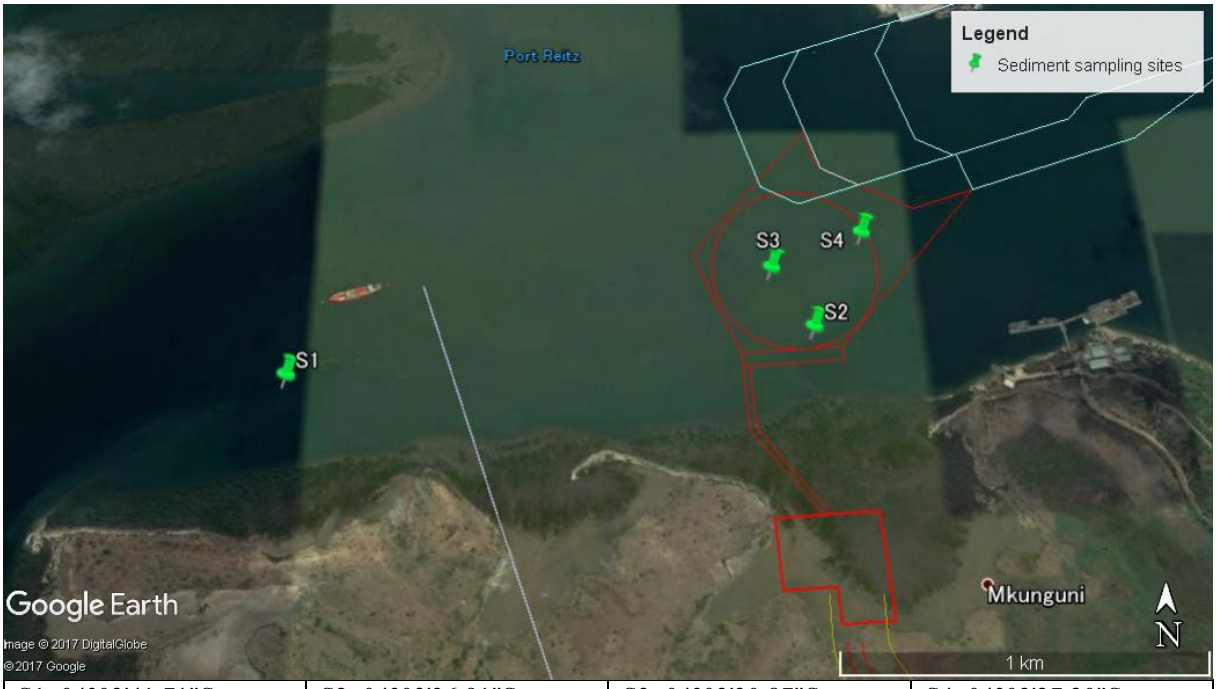
W1: 04°03'34.60"S, 39°35'46.82"E	W2: 04°03'13.81"S, 39°37'49.20"E	W3: 04°04'10.45"S, 39°39'06.43"E	W4: 04°09'37.58"S, 39°39'09.36"E	W5: 04°14'22.74"S, 39°36'35.03"E
W6: 04°02'28.97"S, 39°43'12.61"E	W6D: 04°02'41.06"S, 39°43'36.37"E	W7: 03°59'55.03"S, 39°44'30.55"E	W7D: 04° 00'17.82"S 39°44'53.20"E	

Plate 3.1a: Samples collection using Niskin bottle

Plate 3.1b: Particulates (PM10) monitoring at sampling point A04.

Plate 3.1c: Ambient noise measurement at sampling point N04

The locations of sediment sampling points are indicated in Fig 3.1.2 below:



S1: 04°03'41.71"S, 39°35'55.20"E	S2: 04°03'36.91"S, 39°36'45.51"E	S3: 04°03'30.87"S, 39°36'41.65"E	S4: 04°03'27.20"S, 39°36'50.67"E

Fig 3.1.2: Sediment quality sampling points

The locations of air quality sampling points and noise monitoring points are indicated in Fig 3.1.3 below:

Figure 3.1.3. Map showing air quality and noise monitoring points

The coordinates of the above points are as follows:

	Coordinates	
A1	4° 5'20.73"S,	39°36'31.58"E
A2	4° 4'59.86"S,	39°36'59.05"E
A3	4° 4'12.98"S,	39°36'51.15"E
A4	4° 3'52.78"S,	39°36'37.58"E
A5	4° 4'14.53"S,	39°36'15.92"E

3.1.4 Analysis Results

3.1.4.1 Baseline water quality results

Turbidity, T-P, TPH and Coliforms values tended to be higher in the wet season than dry season. This is most likely due to increased river outflow in wet season.

- Turbidity, T-N, T-P and Coliforms values tended to be higher inside Port Reitz than the coastal area. This is most likely due to the semi-enclosed topography of Port Reitz.
- TPH was measured as an indicator of port-source oil pollution. Since there was no significant difference in the TPH values between Port Reitz and the coastal area for both seasons, it seems that the port activities are not generating any notable oil pollution.
- High levels of bacterial contamination was reported in most sampling stations with coliforms levels exceeding >1800 MPN/100 ml. This is an indication of faecal contamination resulting from sewage discharge.

3.1.4.2 Sediment quality baseline

Regarding the granulometry, the sediments of the channel area were classified as Sandy Mud in all the stations (Table 3.1.3) with sand proportion ranging between 83.40-90.76%.

All the metals analysed range between BDL-2.99, BDL-0.06, 11.53-24.43, 6.57-15.3, 7.44-9.66, 8.87-16.22, 0.06-0.47, and 23.36-51.15 for As, Cd, Cu, Hg, Pb, Ni, Ag and Zn respectively (Table 3.1.3).

Table 3.1.3: Results of sediment quality survey

	Unit	DL	S1	S2	S3	S4	Australia *1	Canada*2	Analysis method
Depth	m		4.1	5	7.8	7.5			
Moisture	%	-	51.2	67.96	44.92	45.1	-	-	ICARDA
TOC	%	-	1.3	0.52	1.78	1.17	-	-	ICARDA 5.5
Sand	%	-	86.24	90.76	89.36	83.40	-	-	Gravimetric Dry sieving method (Wentworth, 1922)
Silt	%	-	13.75	9.24	10.64	16.60	-	-	
Sediment Classification		-	Loamy sand	Loamy sand	Loamy sand		-	-	
As	mg/kg	0.01	2.99	<0.01	2.13	0.05	$ISQG_L$: 20 $ISQG_H$: 70	ISQG: 7.24 PEL: 41.6	EPA 3050B

Cd	mg/kg	0.02	0.06	<0.02	0.11	<0.02	$ISQG_L$: 1.5 $ISQG_H$: 10	ISQG: 0.7 PEL: 4.2	EPA 3050B
Cr	mg/kg	0.08	20.36	17.21	11.53	24.43	$ISQG_L$: 80 $ISQG_H$: 370	ISQG: 52.3 PEL: 160.0	EPA 3050B
Cu	mg/kg	0.04	15.3	6.57	9.82	15.21	$ISQG_L$: 65 $ISQG_H$: 270	ISQG: 18.7 PEL: 10.8	EPA 3050B
Hg	mg/kg	0.01	<0.01	<0.01	<0.01	<0.01	$ISQG_L$: 0.15 $ISQG_H$: 1	-	D/SGS TW-12
Pb	mg/kg	0.06	7.44	11.46	2.75	9.66	$ISQG_L$: 50 $ISQG_H$: 220	ISQG: 30.2 PEL: 112	EPA 3050B
Ni	mg/kg	0.04	14.59	8.87	8.47	16.22	$ISQG_L$: 21 $ISQG_H$: 52	-	EPA 3050B
Ag	mg/kg	0.03	0.23	2.85	0.06	0.47	$ISQG_L$: 1 $ISQG_H$: 3.7	-	EPA 3050B
Zn	mg/kg	0.09	37.44	51.15	23.36	38.45	$ISQG_L$: 200 $ISQG_H$: 410	ISQG: 124 PEL: 271	EPA 3050B
PAHs	mg/kg	0.05	<0.05	1.05	<0.05	<0.05	$ISQG_L$: 4 $ISQG_H$: 45	ISQG: 124 PEL: 271	SGS TW 65
PCB	mg/kg	0.01	<0.01	Not detected	<0.01	<0.01	$ISQG_L$: 0.023 $ISQG_H$: NA	ISQG: 0.0215 PEL: 0.189	SGS TW 64
TPH (C6-C30)	mg/kg	0.05	1.51	4.46	1.51	1.55	-	-	SGS TW 65

Source: JICA Design Team

Considering that Kenya currently do not have legally adopted sediment guidelines for marine sediment quality, the results of this study were compared with the Australian and Canadian Standards. Two contamination levels were considered:

1. Level 1: threshold below which there is less likelihood of adverse effects to marine biota (e.g. ISQGL and ISQG);
2. Level 2: threshold above which there is more likelihood of adverse effects to marine biota (e.g . ISQGH and PEL)

All the parameters except silver (Ag) were under both the lower threshold of Australian and Canadian sediment quality standards. Silver was above the lower threshold of Australian standard at station S2 but did not exceed the upper threshold. Since the other sites had low values of silver, it can be considered that silver pollution is not significant in the area. Overall, the dredging area can be considered as not contaminated.

3.1.4.3 Baseline Air quality

The priority air pollutants levels (PM10, NO_X and SO_X) in all the monitoring stations were below the EMCA and WHO standards apart from station A01 which had PM_{10} (75 μg/m^3) below EMCA guidelines (75 μg/m^3) but above WHO standards (50 μg/m^3). (Table 3.1.4).

Table 3.1.4: Concentration of Priority Air Pollutants in the project area compared to NEMA Ambient Air Quality Tolerance Limits and WHO standards.

Pollutant	RESULTS-(µg/m3)					EMCA standards (legal notice 34 1st Schedule)- 24 hours (µg/m³)	WHO Ambient air quality guidelines (µg/m³ 24-hr mean)
	A01	A02	A03	A04	A05		
Sulphur oxides, (SO_x)	BDL	BDL	BDL	BDL	BDL	125	200
Oxides of Nitrogen, (NO_x)	0.0020	0.0004	0.0005	0.0005	0.0003	150	20
Particulate Matter (PM_{10})	74	7	10	29	10	75	50

3.1.4.4 Baseline noise levels assessment

The Noise levels ranged between 42.8-50.4, 38.9-52.4 and 34.2-45.8 dB(A) in the morning, afternoon and night session (Table 3.1.5).

Table 3.1.5: Noise levels in the project area compared to permissible levels of Kenya Noise regulations

Monitoring duration	Noise measurements, dB(A)					Noise guidelines
	N01	N02	N03	N04	N05	
Morning session (06:00- 12:00 noon)	45.6	50.4	44.8	44.2	42.8	50.0
Afternoon session (12:01-20:00hrs)	49.9	52.8	44.3	40.3	38.9	
Night (20.01: 06:00hrs)	34.2	34.8	34.5	45.8	34.1	35.0

During the day, the average values of noise were at acceptable levels apart from monitoring station NO_2 which slightly surpassed the guidelines limits by between 0.04 -2.8 dB(A). During the night, noise levels at monitoring point NO_4 was above the allowed limits by 10.8 dB(A) whereas the other stations recorded noise levels below the guidelines limits.

3.2 THE MARINE ENVIRONMENT

3.2.1 Port Reitz basin

Three perennial rivers – Mwache, Mambone, and Chasimba (Pembe) – feed into Port Reitz basin. The significance of these rivers is the supply of freshwater (important for supporting estuarine ecological dynamics). However, during the rainy season, heavy flooding periods ensue and sediments are transported from the highland areas and deposited within Port Reitz basin contributing to siltation challenges for maritime operations and the need for frequent dredging.

3.2.2 Ocean climate and oceanographic indicators

The environment around the Project area is characterized by a hot tropical region where the weather is influenced by the great monsoon winds of the Indian Ocean, which also influences the climate and weather systems that are dominated by the large scale pressure system of the western Indian Ocean and the two distinct monsoon periods. Comparatively dry weather conditions are experienced in the Project area from November/December to March, when the North-East Monsoon predominates. On the contrary, cooler and rougher conditions obtain in the Project area in the South East Monsoon (SEM) from May to October. The key oceanographic indicators include:

i. Tides

Tides around the Project area (Mombasa Port Area) are semidiurnal with a mean amplitude of 3 m, spring tide amplitude of > 4 m and neap tide amplitude of approx. 2 m. As a result, currents in reef channels and creeks are very fast and complete a full cycle in approximately 12.5 hours. The Kenya Marine and Fisheries Research Institute (KMFRI) maintains a tide gauge in Mombasa Harbour as part of the global sea level monitoring network. Annual tide tables are published by the Kenya Ports Authority and KMFRI. Sea level rise for the Western Indian Ocean, as a component of global climate changes are projected to be in the global range of 20-50 cm per 100 years.

ii. Currents

Currents in the project area are dominated by separate offshore and inshore processes. Offshore currents are dominated by the East African Coastal Current (EACC) formed by the northward deflection of the South Equatorial Current when it hits the African mainland in southern Tanzania and northern Mozambique. The EACC flows northwards throughout the year, accelerated during the SEM when reinforced by the prevailing winds to speeds of 0.5-0.75 m/s, and slower during the NEM when the monsoon winds blow counter to the current, at speeds of < 0.25 m/s. At times, southwards-flowing currents may be reported, though the Somali Coastal Current does not penetrate as far south as the Project area (Mombasa Port Area). Flow of inshore and fore reef waters are strongly influenced by tidal flushing patterns, and tend to flow with prevailing winds rather than the offshore EACC. At the channel entrance, maximum current speeds of approx. 1 ms-1 can occur, with ebb currents tending to be slightly stronger than flood currents.

iii. Waves

Wave action around the Project area (Mombasa Port Area) is dependent on the direct wind stress of local winds. Wave action may also arise from swells, significant wave height, bottom

friction and depth of water over the fringing reefs. Although waves in the near-shore waters of the entrance to Mombasa port are small, they are common a feature. The largest waves (2 m) occur during the South East Monsoon when the winds are strongest. Within the channel, waves can propagate directly in as far as Fort Jesus, but to the north and south where fringing reefs occur waves first shoal and break on the reef edge and then propagate with new frequencies and amplitude, on the reef platform, beaches and on the coral-cliff banks near Fort Jesus.

3.2.3 Marine habitats and Biodiversity

Marine habitats include primarily mangrove areas found within Port Reitz area. There are no seagrass beds and coral reef near the proposed development site of SEZ. However, certain operations such as dumping of dredge spoils may impact on distant seagrass beds and coral reef found near and within the Mombasa Marine National Reserve. These seagrass beds and coral reef areas are listed as breeding and feeding areas and have different protection status (KWS and KeFS institutional arrangements – controls and regulations)..

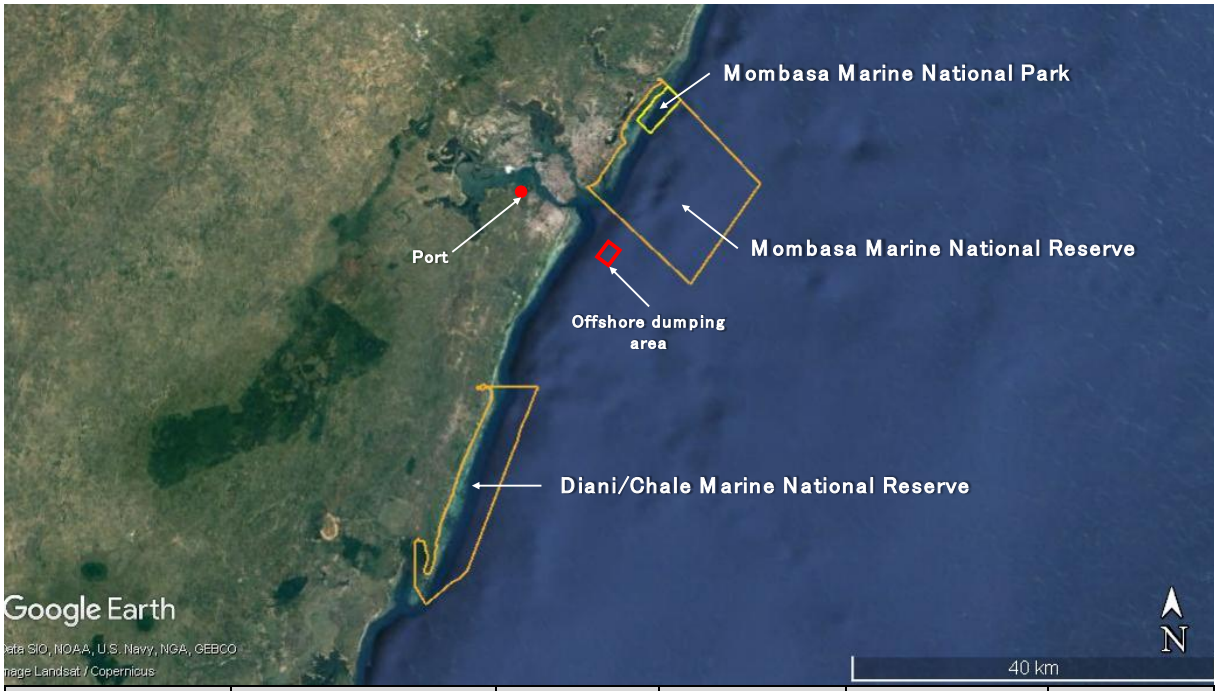
Marine habitats very close to the Project area are in moderate to bad condition, largely due to maritime and port operations that has seriously degraded them, particularly the long term resource extraction for food and scheduled dredging and pollution from multiple sources have degraded the marine habitats and communities. Further off, legal and management protection within the Mombasa Marine National Reserve and local hydrodynamic processes protect MPAs from adverse effects of dredging and pollution activities, but they are still, nonetheless, subject to natural pressures (climate change, coral bleaching, ocean acidification) as well as anthropogenic pressures related to land-based sources of pollution, shipping pollution, heavy resource extraction by fishermen and a host of cumulative impacts associated with activities occurring elsewhere.

Near-shore and Offshore deep water marine habitats associated with the proposed dredge spoil dumping sites (30 – 50m deep) have various habitat types and biodiversity functions. At nearshore sites, the fringing coral reef line occurs at depths from about 30 to 10 m. This is the continuous white line associated with the fringing reef crest of the north Coast (Nyali-Bamburi-Shanzu) and South Coast (Shelly beach – Tiwi – Waa – Diani) up to Diani-Challe marine reserve. On the outer reef, the main habitat is sandy / rocky lagoons where coral growth occurs at depths of 8-15 m (for corals) or of 0 to 5 m (for rocky patch reefs). The lagoon is dominated by seagrass beds from 6 m deep to the surface, interspersed with extensive sand. Even though most of the habitats close to the MPA areas are less pristine, they support highly dependent socio-economic sectors, including fisheries, tourism, and urban and community recreation sites.

3.2.4 Marine Protected Areas

While there are no conservation areas around the Project area, there are three marine protected areas (MPAs) along the Mombasa coastline managed by Kenya Wildlife Service (KWS) which are: Mombasa Marine National Park, Mombasa Marine National Reserve and Diani/Chale Marine National Reserve. The MPAs were established under the Wildlife Conservation and Management Act to protect the corals and marine life, and are managed in accordance to IUCN protected area management category. National Reserve falls under Category IV, which allows certain extractive activities (e.g. hook and line fishing).

National Park falls under Category II and are completely protected from all extractive activities. Environmentally friendly activities are permitted for both MPAs and currently various marine recreational activities (e.g. diving, wind surfing, cruise trips) are been enjoyed inside the calm lagoon areas. The MPAs support important ecosystems such as coral reefs and seagrass beds. Figure 3.2.1 shows the location and outline of the MPAs.



MPA	Designated reason (year)	Surface area (km^2)	IUCN management category	Approx. distance to dumping site (km)	Approx. distance to port site (km)
Mombasa Marine National Park	Protection of coral reef and marine life (1986)	26	II	13	16
Mombasa Marine National Reserve	Protection of coral reef and marine life (1986)	200	VI	3	3
Diani/Chale Marine National Reserve	Protection of coral reef and marine life (1995)	165	VI	17	20

Figure 3.2.1 Location and outline of MPAs in Mombasa

3.2.5 Sea turtles

Five species of sea turtles have been documented as occurring within Kenyan waters (Frazier 1975): the green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*), loggerhead turtle (C*aretta caretta*), olive ridley turtle (*Lepidochelys olivacea*) and the leatherback turtle (*Dermochelys coriacea*). Of these, green, hawksbill and olive ridley turtles are known to nest in Kenya.

An aerial survey conducted in 1994 found that sea turtles are widely distributed along the coastline within the 20m isobath in areas mainly associated with seagrasses and coral reefs, implicating the presence of a

significant foraging turtle population (Wamukoya et al. 1996). Notable concentrations were observed at certain areas particularly Mpunguti/Wasini, Takaungu, Watamu, Ungwana Bay, and Lamu and the adjacent offshore islands.

The Kenya government has put in place legislation to protect sea turtles i.e., the Wildlife Act (Cap 376) and the Fisheries Industry Act (Cap 378). The laws prohibit hunting, removing, holding, moving and trafficking sea turtles and their products whether dead or alive. However, there is no legislation protecting key nesting and foraging habitats utilized by sea turtles except for those falling within Marine Protected Areas (MPAs). As a result, turtle fishing, turtle by-catch in fishing operations, and poaching of sea turtles and turtle eggs continues unabated compounded by poor enforcement due to a lack of personnel and facilities.

To address the plight of marine turtles, KESCOM was established in 1993 under the patronage of various government institutions: Kenya Wildlife Services (KWS), Kenya Fisheries Service (KFS), Kenya Marine and Fisheries Research Institute (KMFRI), Coast Development Authority (CDA) and National Museums of Kenya (NMK) and Wildlife Clubs of Kenya. Various non-governmental organizations, WWF-Kiunga, Baobab Trust, Watamu Turtle Watch (WTW) and Colobus Trust, have given extensive on-ground support towards the KESCOM cause. KESCOM therefore represents a national integrated approach to sea turtle conservation promoting community participation in various conservation activities that include research and monitoring, public awareness and advocacy.

3.2.6 Baseline Ecological Study of Project area

As part of the EIA baseline study, the flora/fauna in the proposed port and dredging areas were studied during baseline survey. Following is a summary of the survey:

Port area survey

The proposed port area is located over a mangrove/mudflat habitat. This area was studied by establishing a total of six (6) belt transects, each 40 to 100 m in length and 10 m width, running roughly perpendicular to the shore line. Along each belt transect line, quadrats of 10 x 10 m^2 were set out at around 50 m intervals, recording the (i) number of trees, (ii) species identity, (iii) diameter at breast height (DBH) and (iv) tree height. Benthic species were also recorded.

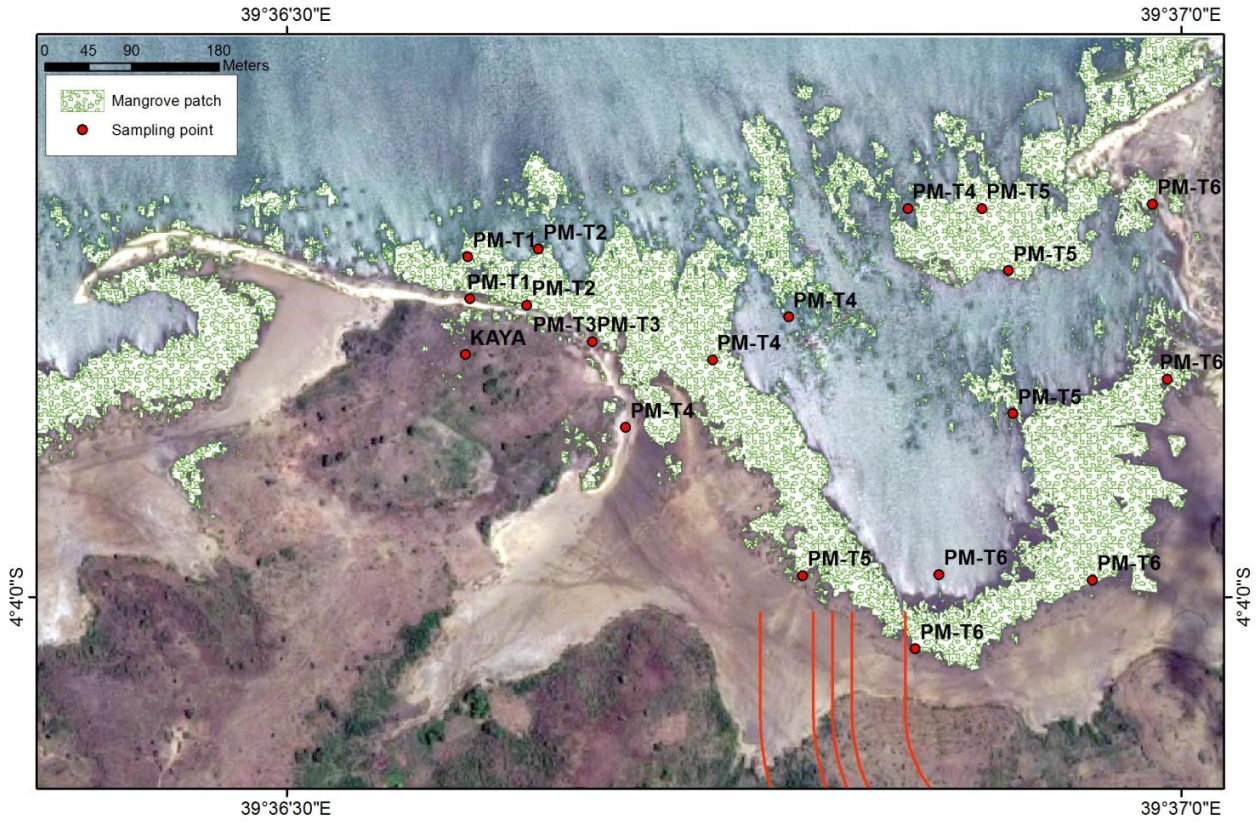


Figure 3.2.2: Map showing the pre-selected sampling sites for mangrove habitats

Five species of mangrove were identified namely: *Rhizophora mucronata*, *Sonneratia alba*, *Avicennia marina*, *Ceriops tagal* and *Lumnitzera racemose*. *Rhizophora mucronata* was most common followed by *Sonneratia alba* and *Avicennia marina*. In general, tree height was relatively low (around 2-4 m) with sparse distribution (9 trees/100 m^2). While none of these species are classified as threatened under IUCN Red List, mangroves are stipulated as public forest under the Forest Conservation and Management Act 2016, and will require permission from Kenya Forest Service (KFS) in case of cutting and removal. The only notable benthic species were fiddler crabs, which were abundant throughout the study area.

Dredging area survey

The proposed dredging area is located over a sandy/muddy area of depth around 5-6 m. This area was studied by analyzing the benthic macrofauna composition, which were collected using sediment core samples from 6 locations (see Table 3.2.1).

Table 3.2.1: Site location, ID and justification for selection and total samples collected for benthic assessments

Location No	GPS points	Site ID and Description (Fig 4.1)	Justification for site selection	Total samples collected
1	040550.4; 0396112.2	ID: Mangrove bay (DSW) Sites near the proposed berthing areas sampled	Proposed berths and quays will affect the physical habitat structure. These benthic species are likely to be disrupted by the project works	2

2	040334.5; 0393645.3	ID: KN Jetty (DMF-1) Sites near Kenya Navy Quay	Habitat of potential species deposition. These benthic species are likely the source of recruitments of individuals into the populations. These groups are likely to be disrupted by the project works	2
3	040550.4; 0396112.2	ID: Mangrove island (DNW) 2 sites near the mangrove formation area	Currently a low circulation area / potential species deposition. These benthic species are likely recruitments sources. These groups are likely to be disrupted by the project works	2
4	040327.1; 0393652.1;	ID: Dredge W (DMF-2) Sites around the recent dredged areas	Area of low circulation, species deposition. These benthic species are likely to give indication of recruitment success after disturbance of resident populations. These groups are likely to be further disrupted by the project works	2
5	DMF-3: 040322.2; 0393641.7; DN: 040550.4; 0396112.2	ID: Dredge area (DMF-3; DN) Sites around the proposed areas for channel dredging	Proposed channel dredging will affect the physical habitat structure. These benthic species are likely to be disrupted by the project works	4
6	040537.6; 0396170.0	ID: Container terminal side (DE) Sites around the deep channel areas	Area of low circulation, low light and probably low species diversity. These benthic species are likely to give indication of benthic species indicator groups adapted to depositional regimes after disturbance of resident populations. These groups are likely to be further disrupted by the project works	

The collected samples were brought to the laboratory and sieved through a 0.5 mm mesh tray. The retained macrofauna were carefully washed into a clear glass dish to allow further sorting and taxonomic analysis. Table 3.2.2 shows the results of the analysis. A total of 104 individuals were identified, consisting mainly of annelids, crustaceans and nematodes accounting for about 72 % total population. About 50 % of these individuals were retrieved from two locations DMF-1 and DMF-2. Figure 3.2.3 shows the distribution of individuals in all sampling locations.

Table 3.2.2: Benthic macrofauna composition in the dredging area

Class		No present	% represent
1	Annelida	35	33.65385
2	Crustacea	25	24.03846
3	Nematoda	15	14.42308
4	Arthropoda	6	5.769231
5	Sipuncula	5	4.807692
6	Bryozoa	4	3.846154

7	Echinodermata	4	3.846154
8	Porifera	4	3.846154
9	Turbellaria	4	3.846154
10	Cnidaria	1	0.961538
11	Mollusca	1	0.961538
		104	100

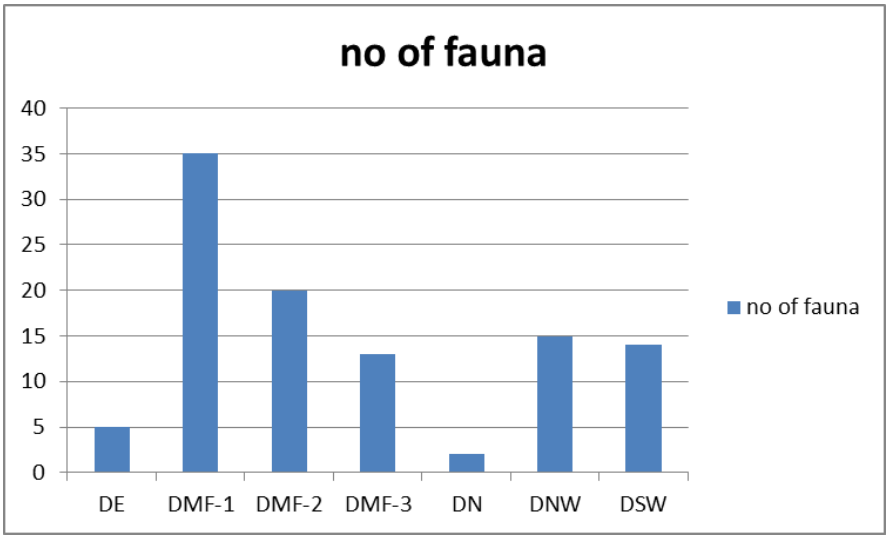


Figure 3.2.3: Distribution of individuals in sampling locations

3.3. TERRESTRIAL ENVIRONMENT

3.3.1 Purpose

The terrestrial baseline study was purposed to assess, document and analyse presence and characteristics of terrestrial flora and fauna on the access road. This is an important initial step in establishing baseline data and information of existing species, whether native or introduced, and applying appropriate mitigation hierarchy for communicating and managing access road's terrestrial flora and fauna as appropriate. The access road will run from the proposed New Port's Cargo yard (to sit on approximately 18.4 ha of land) up to the intersection with the Southern Bypass Road. The access road is approximated at 4,600 m x 40 m, but the baseline study was carried out on a bigger corridor of 100m width to cut and fill areas. (Figure 3.3.1).

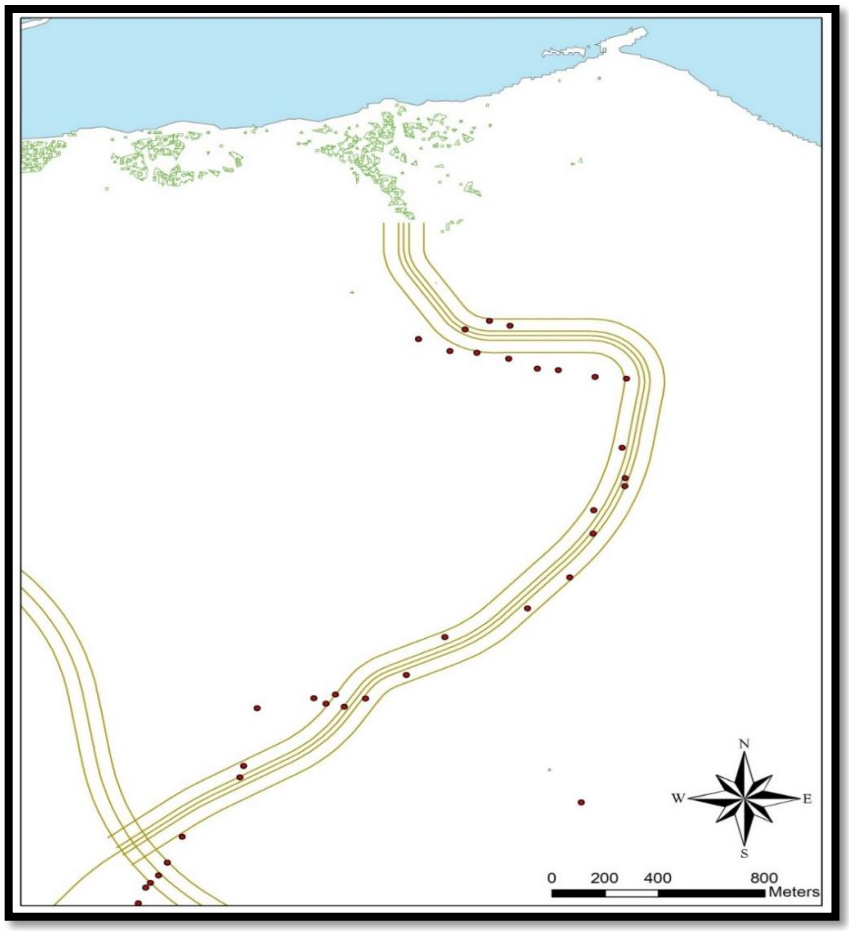


Figure 3.3.1: GPS locations of quadrat sampling points along the access road from the proposed New Port's Cargo yard to the intersection with the Mombasa Southern Bypass Road

3.3.2 Objectives

The main objectives of the terrestrial vegetation baseline surveys were:

a) To establish an inventory of representative flora and fauna in the sampled sites,

b) To establish the status of flora and fauna by cross-referencing listed species to East African conservation database and IUCN classification database, and identify flora and fauna of conservation concern e.g. threatened and endemics.
c) To apply risk assessment and mitigation hierarchy to the flora and fauna for subsequent monitoring and management,

3.3.3 Area characteristics

Within the road areas, large swathes of land areas consist of highly disturbed vegetation, small-holder settlement areas, and community service points. Most settlement areas are also actively converting adjacent lands into agricultural use. However, isolated few sites are still intact and bear the relics of the Coastal forests ecosystem either as (i) large "close-canopy" patches (80 – 100 % cover) and thus harboring a high number of endemic plants, (ii) intermediate "open-canopy" patches (sparse cover) of trees and shrubs or (iii) gradient from isolated stands of single to dozen trees / shrubs to bare non-vegetated sites (Figure 3.3.2; Plate 3.3.1).

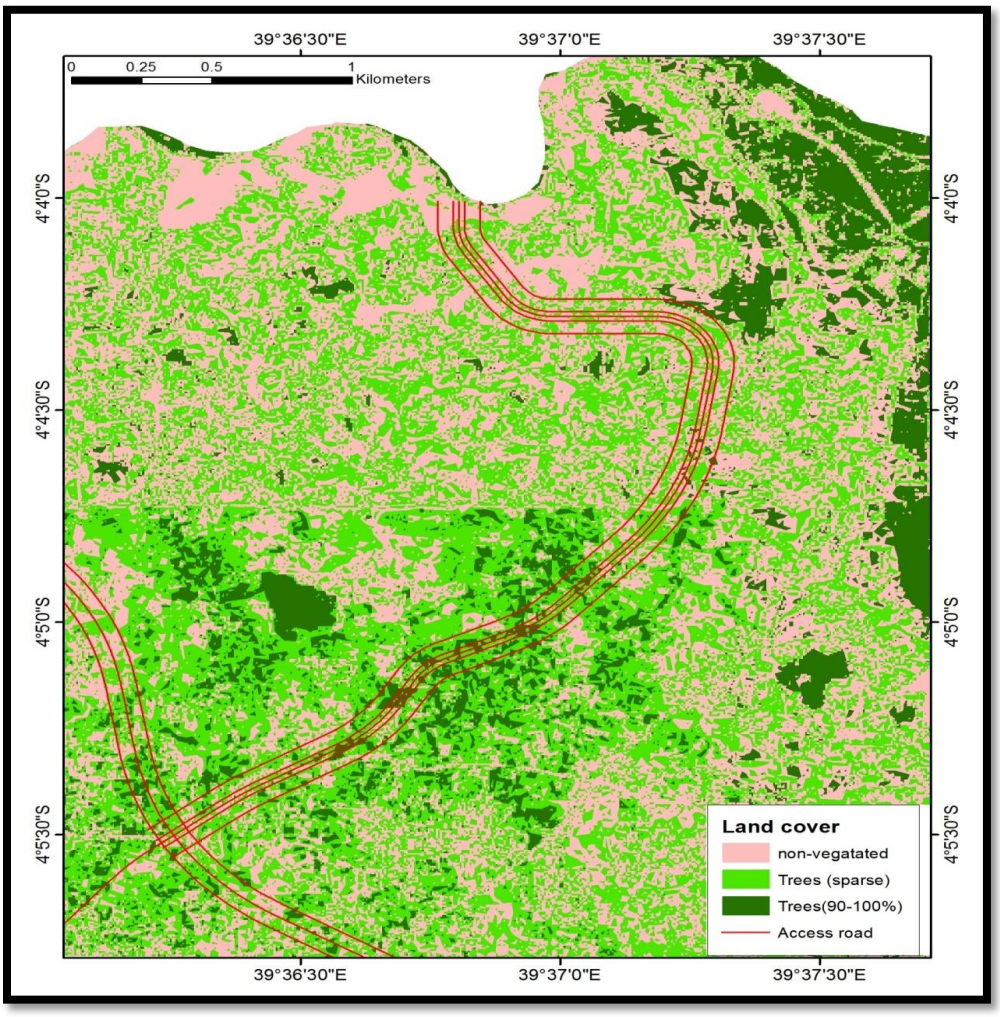


Figure 3.3.2: Areal characteristics of vegetation cover along the access road from the proposed New Port's Cargo yard to the intersection with the Southern Bypass Road showing 3 main vegetation classes associated with the section: close-canopy, sparse vegetation, and less vegetated sites.

3.3.4 Methodology

3.3.4.1 Vegetation sampling protocol

Sampling was undertaken at the New Port at Dongo-Kundu SEZ and along the access road between April 13 - 16, 2018, which fairly corresponds to "wet season sampling" as the 2018 heavy rains in coastal areas started from March 2018 and ended in June 2018. The entire corridor was surveyed, and at strategic sites (which represent large "close-canopy" patches, intermediate "open-canopy" patches and isolated stands of single to dozen trees or shrub) detailed quadrat sampling was undertaken (Plate 3.3.1). In total, for the entire distance of the access road, 50 sampling points were identified, assessed and marked (Figure 3.3.1) with aid of a hand held GPS device.

Field observer pointing at sections with relics of "close-canopy" patches (Left), and a sections with isolated stands of single to dozen trees or shrubs within sampling quadrat (Right)

Section showing highly disturbed vegetation area due to settlement (Left) and sections with small-holder settlement areas encroaching into adjacent forested lands for subsistence agriculture (Right).

Plate 3.3.1: Vegetation characteristics along the transect corridor representing the 3 main gradients of close-canopy patches (cover 80 – 100%), isolated stands of trees or shrubs (sparse vegetation) and bare sites due to agricultural conversion.

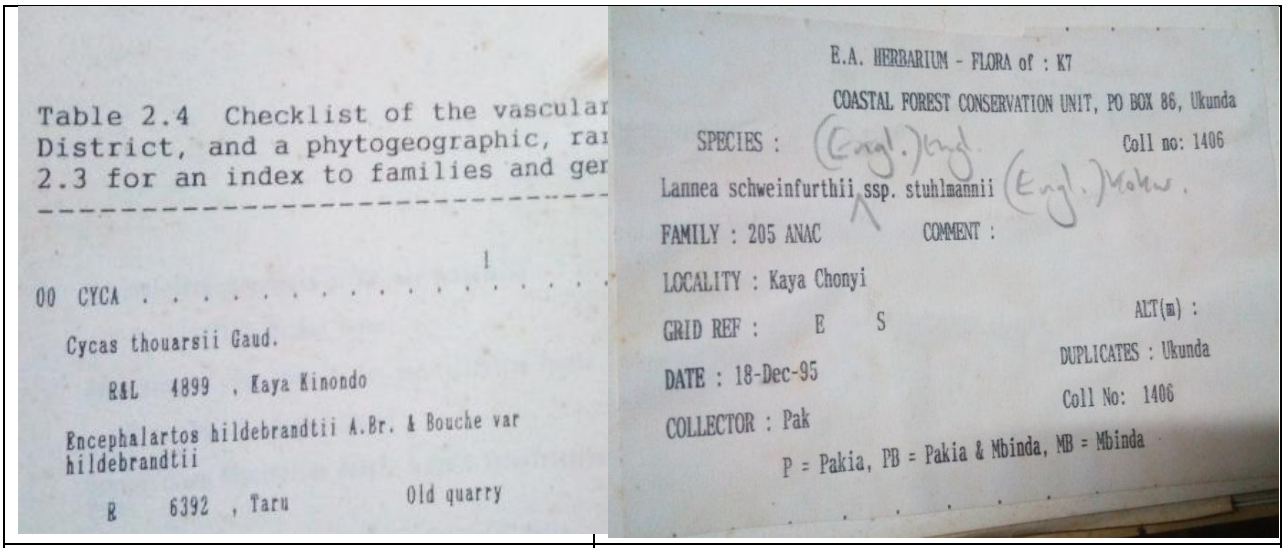
At each sampling point, each vegetation type was observed, identified to species level, photographed and recorded to provide an overview of plant diversity and composition. For the rare, threatened

and endemics (i.e., IUCN-listed species of conservation concern), DBH, height, and tree life form data (i.e. herb, shrub and tree) were taken in addition to the basic vegetation characterization. The main reference guide for taxonomic identification was the List of East African Plants databases (plate-2) while the botanical uniqueness (endemic and threatened plants) status were cross-referenced to, and confirmed from, the updated IUCN Red-List of plants (2012).

For the plant types that could not be identified in the field, specimen samples (leaves, flowers, fruits, etc, as applicable) were collected and processed into herbarium specimen and deposited with Coastal Forests Conservation Unit (CFCU) managed by CFCU, WWF and Kenya Forest Service at Ukunda, Kwale County for further identification. Local experts drawn from NMK – WWF coastal forest thematic group were able to identify most taxonomic groups down to families, genus and species level (plate-3.3.2). Plant nomenclature of Beentje (1994) and Flora of Tropical East Africa (FTEA's) also served as guides. After their identification, these were further cross-referenced to and confirmed from the updated IUCN Redlist of plants (2012).

A: NMK Lead taxonomist (Saeed Chidzunga) pilling through plants reference databases for taxonomic identification

B: Each plant type is referenced to a unique identifier kept as a unique code and filed in harbaria files. The code is further linked to a checklist (C and D below)



B: A checklist page from the database	*D: An identification page from the database*

Plate 3.3.2: The NMK East African Plants databases office for taxonomic reference / identification.

3.3.4.2 Faunal sampling

For the faunal components, rapid visual observations and photographic techniques were used. This simplified technique was informed by the fact that biodiversity hotspots for fauna are outside these areas. The key faunal biodiversity associated with Coastal forest ecosystems nearby are in large forests such as Mwache forest, Shimba Hills Nature reserve, Kaya forests such as Kaya Mrima, Kaya Kinondo and Kaya Jibana.

A simplified survey protocol was developed [adapted from the twin methodology of Howell's (1993). and Bowkett et al, (2007)] to record presences of various wild faunal components, if encountered during the transect walk, and when encountered, how to proceed with identification to general taxonomic grouping. Since most areas earmarked for the New Port at Dongo-Kundu SEZ and the corridor for the access road have been disturbed and converted into agricultural land, majority of wild fauna have been driven out. However, in the few sites are still intact, a targeted search was conducted for any chance find of faunal types for capture, photography, documentation and reporting.

3.3.5 Results and Discussions

3.3.5.1 Vegetation

A total of about 150 different plant species are reported as associated with areas earmarked for the New Port at Dongo-Kundu SEZ and the corridor for the access road (Appendix 8). Of these species, two (2) plant species are confirmed invasive species (Table 3.3.1) and another three (3) are endangered or near threatened under IUCN classification criteria (Table 3.3.2).

Under the Wildlife Conservation and Management Act 2013, there exist regulations governing wildlife conservation and management listed under Protection of Endangered and Threatened Ecosystems, Habitats and Species. The applicable Ecosystems and Habitats are defined and will be improved from time to time, while the "listed species" are found in the Sixth Schedule of the Act.

The introduction of invasive species is listed as one of the prohibited activities within listed ecosystem. The species listed in Sixth Schedule of the Act that are critically endangered, endangered and / or vulnerable species and require to be protected according to both the Convention on Biological Diversity and Convention on International Trade in Endangered Species of Wild Flora and Fauna and any other law regulating listed species. The bulk of these and other protection instruments are elaborated under the policy and legislative frameworks.

Table 3.3.1 List of invasive species encountered along the access road from the proposed New Port's Cargo yard to the intersection with the Southern Bypass Road

Kenya Listed Invasive Species					Ref Source	GPS locations	
		Scientific name		Local name			
1	Scrophulariaceae	*Striga*	*asiatica*	chitsali	Ministry of Agriculture database	4.07583	39.62082
						4.07094	39.61633
2	Vebenaceae	*Lantana*	*camara*	mtsambala	KWS / KFS database	4.09301	39.60513

Key: KWS / KFS = Kenya wildlife service / Kenya forest service databases

For the entire lot of terrestrial vegetation, the most frequently encountered families (dominant families) were few and were dominated by Anacardiaceae, Papilionaceae, Meliaceae, Rubiaceae, Euphorbiaceae, Mimoceae, Palmae at the top (Figure 3.3.3). On the contrary, the less frequently encountered families (moderately rare to rare families) had a higher familial diversity than the dominant families, and accounted for more than 70 % of the entire plant population (Figure 3.3.3). The majority of these plant species are reported as typical of the species compositions known from Coastal Forest Ecosystem. In a study conducted by Critical Ecosystem Partnership Fund (CEPF) (2005), 105 globally threatened species were traceable within the Kenya coastal forest zone hotspot and were listed in the IUCN Red List (2012).

In this study there was one IUCN threatened shrub species *Vitellariopsis kirkii* (Plate 3.3.3) which is classified as vulnerable (VU). This species was found at two locations one each at each location (site 1: GPS 4.07225; 39.616998, site 2 GPS 4.08907; 39.60789).

Table 3.3.2: Listing of threatened and endangered species encountered along the SEZ Main Road

IUCN Threatened & Endangered Species								
S. No		Plant ID	IUCN Category	GPS location		Plant Characteristics		
				S	**N**	**Plant no**	**DBH**	**Ht**
1	Family:	Anacardiaceae	NT	4.09413	39.60444	1	< 5 cm	2.5

	Genus:	*Lannaea*				2	< 5 cm	1.5
	Species:	*schweinfurthii*		4.09331	39.60486	1	< 5 cm	3
	Local name:	mnyumbu		4.0935	39.6047	2	< 5 cm	2.5
				4.0925	39.60543	1	27	6
				4.0863	39.60847	1	14	5
						2	16	5
						3	18	5
				4.08346	39.61482	1	< 5 cm	2
				4.07137	39.62091	1	10.5	5.5
				4.07705	39.62092	1	40	12
						2	44.5	12
				4.07583	39.62082	1	< 5 cm	0.5
						2	< 5 cm	2
				4.07305	39.62097	1	< 5 cm	1.5
				4.07298	39.6199	1	< 5 cm	2
				4.07265	39.61795	1	< 5 cm	1.5
				4.07271	39.61866	1	< 5 cm	2
				4.07201	39.61591	1	51	8
				4.06564	39.6109	1	< 5 cm	2
2	Family:	Moraceae	NT	4.08591	3.61213	1	< 5 cm	3
	Genus:	*Milicia*						
	Species:	*excelsa*		4.07137	39.62091	1	< 5 cm	2
	Local name:	mvure		4.07705	39.62092	1	< 5 cm	1.5
3	Family:	Sapotaceae	VU	4.07225	39.616998	1	< 5 cm	1
	Genus:	*Vitellariopsis*		4.08907	39.60789	1	< 5 cm	1
	Species:	*kirkii*						
	Local name:							

Key: NT = Near Threatened; VU = Vulnerable (both as used in IUCN)

Plate 3.3.3 Threatened shrub *Vitellariopsis kirkii* encountered within project area

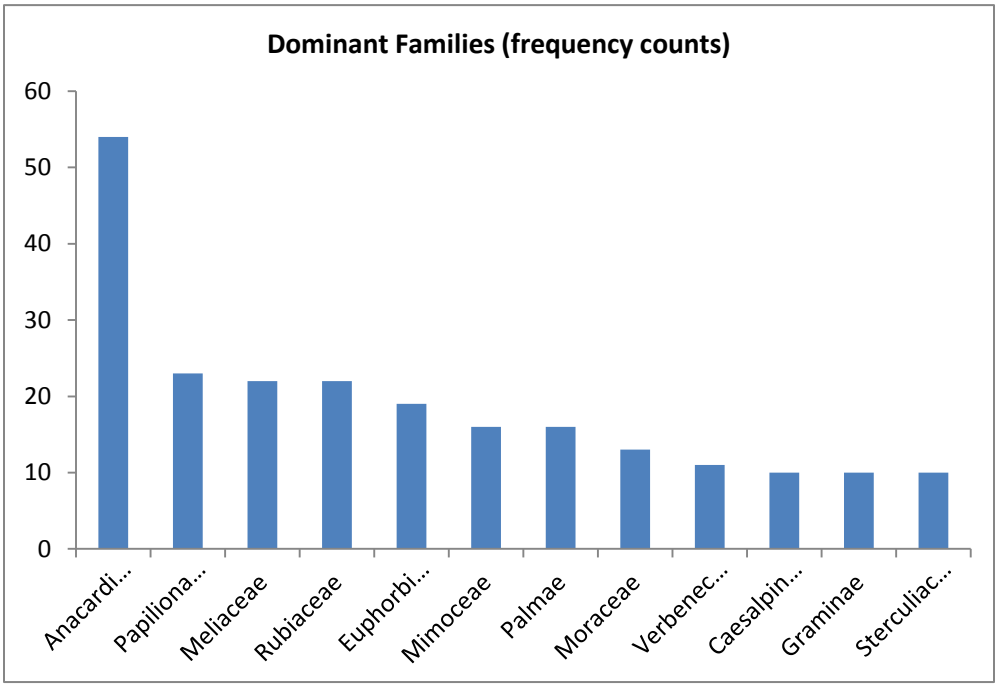


Figure 3.3.3: Dominant families recorded from sampling points along the SEZ Main Road

4.3.5.2 Fauna

Representative fauna associated with areas earmarked for the New Port at Dongo-Kundu SEZ and the corridor for the access road (Plate 3.3.4 and 3.3.5).

Plate 3.3.4: some of the faunal components observed during the transect surveys (From top left clockwise: bird nest, bird in the air, chameleon, beetle)

Plate 3.3.5: some of the faunal components observed during the transect surveys (From top left clockwise: cricket, grasshoppers, cricket, millipede)

3.4. OTHER PHYSICAL FEATURES

3.3.1 Geology

Geologically, the environment around the Project area is similar to the regional geological setting, with crystalline rocks of Archean age within the hinterland to unconsolidated recent sediments at the coast. The coastal plain has essentially been "sculptured" by Quaternary (1million years to present) sea level changes. Of particular importance to the coastal plain and continental shelf was the Last Glacial Maximum low sea level stand (approximately 130 m below present), approximately 18,000 years before present. Late Pleistocene sea level changes have resulted in a number of "Beachrock" and Aeolianite (lithified dune sequences) calcarenite sequences being deposited along the coastline. Limited deposits are found onshore, with the vast majority being located offshore. These deposits are normally formed as narrow bands of outcrop that follow paleo-coastlines, the result of sea level still stands. They also provide the base for coral reef formation.

3.3.2 Groundwater

The environment around the Project area has some potential in terms of groundwater resources. This is because of the background geological structure (Kilindini sands) that promotes rapid infiltration and percolation of surface run-off to recharge groundwater aquifers. Areas covered with the Kilindini sands have a high groundwater potential so are the areas with Triassic sandstone geology, which have shown high groundwater yields.

3.3.2 Soil

The soil types in areas near the Project area are broadly associated with the geological formations along the physiographic zones in Mombasa County as detailed by the Ministry of Agriculture, Government of Kenya (1988). There are significant deposits in the quaternary sands (also referred to as Kilindini sands), as well as well-drained very deep, dark red to strong brown, firm, sandy clay loam to sandy clay, underlying 30 to 60 cm medium sand to loamy sand soils. Moreover, most of these soils are developed on coral limestone bedrock. The coral soils are generally well drained and of sandy clay loam to sandy clay texture. They range from very deep and non-rocky to very shallow and extremely rocky.

3.5 FISHERIES

This section describes the fisheries characteristics within the proposed project area, with emphasis on fishing effort (vessels, fishing gears), target species, fishing areas and economic value of the fishery. The activities include both creek capture fisheries and fishing/collection in the intertidal zone and open sea for adjacent areas accessible to the fishers. It also describes important habitats like mangroves that fishing communities are protecting to enhance fisheries. Information is also provided on available management structures in the area and aspects of marketing and distribution system for fish caught in the project area.

Fishers share fishing grounds scattered within the Port Reitz and Makupa creeks consisting of a unique ecosystem, with migratory marine fauna and extensive mangrove habitats along the creeks. However, these fishing grounds have reduced due to the expansion of the port area and other infrastructure development projects in the same area over the last ten years. The study has established that Mkunguni landing site within the project area is likely to be lost during project implementation.

Port Reitz creek is important for small scale fisheries and also has high potential for aquaculture and mariculture development. The creek is a connected ecosystem to the open sea, with fish species migrating in search for food, shelter and nursery habitats. Fishing activity is predominantly artisanal with use of small non mechanized boats. Fishery is an important source of livelihood and the wellbeing of the local communities living near the sea.

3.5.1 Methodology for Fisheries Survey

Desktop analysis was conducted using the fisheries statistics and Beach Management Units (BMUs) registers from the County government of Mombasa and Kwale for landing and recent Catch assessment surveys (Kenya Fisheries Service) from some landing site in the creek. Field surveys were also conducted to map out the resources at selected landing sites. The assessment further reviewed previous baseline and assessment reports and the impacts highlighted thereof. The Beach Management Units targeted for this assessment include Mtongwe (Shaza, Mweza Mtongwe, Migingo, Tibwani, Hawaii and Mkunguni landing stations); Mwangala BMU (Dongo Kundu, Mwangala, Mwakuzimu and Teja); Kitanga Juu BMU, Ngare BMU (Ngare, Mtundwini, Mshahame and Shazani) Mkupe BMU (Mkupe, Mchajama, Mwanagamavi and Maweni) and Mwandumbo BMU (Kwasewa, Mwadumbo, Kiboponi and Tsunza ya muyu) and Guya BMU(Mazazani, Jimbo, Mfudo, Mwagoa and Store) located in Tsunza) that have potential to be impacted by the project.

3.5.2 Overview of the fishery resources in the project area

Fisheries within the project area is characterized as resident species/families or those fish species that migrate seasonally to spawn or during tidal migrations in such of food. Fishing is generally based on simple non-mechanized technologies with a few mechanized boats that operate in and out of the creek. Fishers in the creek are resident and only a few migrate to the open sea during the North East monsoons season. Fishing activity itself is divided into

vessel based marine capture activities and more subsistence oriented collection activities in the intertidal zone, normally on foot without a vessel.

3.5.3 General locations of fishing activities

Port Reitz creek lies south-west of Mombasa Island and is a major fishing ground shared by fishers from both Mombasa and Kwale Counties. The spatial location of the main landing sites and productive reefs whose fishing grounds are is shared by fishers from all the BMUs are shown in the map below (Figure 3.5.1).

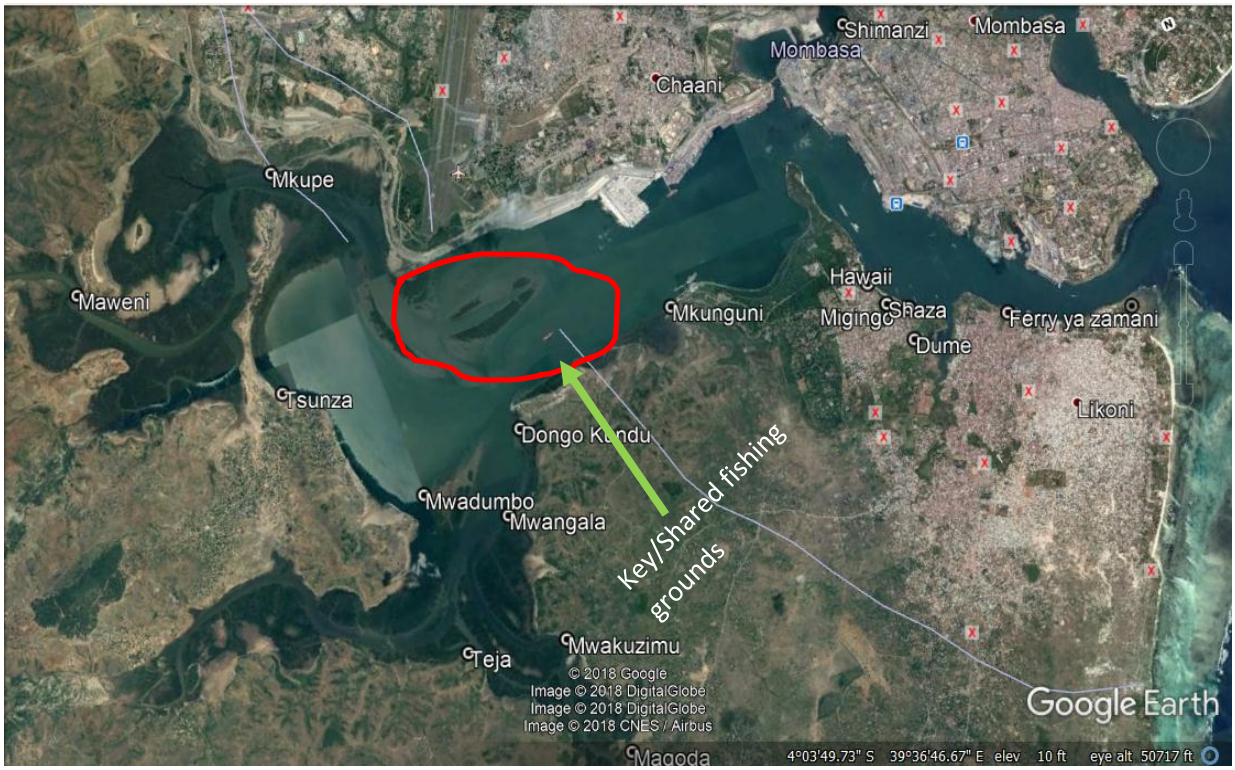


Figure 3.5.1: Main landing stations and shared fishing ground within the two creeks

3.5.4 Type of fishing

Fishing methods employed in the project area are traditional artisanal (small scale) methods, predominantly hand lines, traps and use of nets. The fishing boats are not mechanized, and are used by one or two fishers per boat. Most fishers utilise the shallow sea creek area while a few fish in the deep sea especially from Mtongwe and Kitanga Juu areas.

Seasonal migrations by creek fishers to the open sea is practiced mostly among the Mtongwe BMU fishers during calm weather. Movement of vessels is likely to be disrupted during the construction phase due to movement of the dredger to and fro between the project site and the dredge dumping site.

Subsistence fishing exists at the creek area targeting mangrove crabs (Maduda) and gastropods (Tondo) that are used as food. This fishery has not be quantified and largely associated with intertidal and mangrove habitats

3.5.5 Fishing gear used

Fishing equipment used by households engaged in fishing vary according to the nature of fishing or where the activity is being carried out. As indicated on Table 3.5.1, the most widely used fishing gears are seining and cast nets based on frame survey results 2016.

Table 3.5.1: Fishing gears

Gear Type	Description/Nos	Number
Cast net	Net	56
Fence Traps	Traps	23
Gill net	Net	162
Hand Gathering	Gathering	5
Handline	Line	348
Hooked Stick	Stick	13
Long lines	No. Hooks	2554
Mono Filament	Net	13
Prawn Seine	Net	23
Reef Seine	Net	11
Scoop net	Net	16
Small Basket Traps	Traps	271

3.5.6 Organization of Fisheries

3.5.6.1 Beach Management Units (BMUs)

Fisheries co-management involves collaboration between the government, fishers and other fisheries stakeholders for the purpose of ensuring sustainable fisheries resources management. This is a flexible management structure which enhances power sharing, decision making, conflict management and dialogue among resource users, stakeholders and the government. The Beach Management Units (BMUs) support and participate in implementation of the fisheries Act through implementation of co-management plans. Beach Management Units (BMUs) is the co-management institutions that provide for fisheries management at the grassroots (resource) level. BMUs are composed of stakeholders in fishing communities with mandates of conservation, protection, monitoring and control of fishery resources and the environment, and fisheries planning and development in collaboration with government. BMUs are guided by BMU Regulations of 2007 (GoK, 2007). The participation of fisher-folks is in line with the general principles of Code of Conduct for Responsible Fisheries (FAO, 1995).

3.5.6.2 Co-management Areas

According to the BMU regulations 2007 every individual BMU is expected to define either an individual or joint co-management area. The BMUs in creek share the key fishing grounds although they have defined their management area. The BMUs collect revenue from

different sources as outlined in the BMU regulations and may include fees from the individual fishers and traders. These revenues are to enhance management of the resources.

3.5.7 Conservation of Fish Habitats

All the BMUs within the creek are involved in management of the mangrove habitats primary to enhance fish production but non-extractive use benefits (Plate 3.5.1). There are conservation groups that engage in mangrove rehabilitation and they plant seedlings for restoration of the forest. Mangrove forest are important ecosystem in terms of nursery, feeding and support the mud crab and the molluscs fishery in the creek.

Plate 3.5.1: Mangrove conservation project by Mbuta Mazingira and Dongo Kundu group

3.5.8 Market and value chain

3.5.8.1 Upstream and Downstream Structures

The structure of the upstream and downstream value chain supporting fishing in creek is typical of artisanal value chains in the marine sector. There are others involved in construction of canoes, those that own the fishing boats, most of whom also trade fish. Fish is traded to small markets mainly by women fish traders, locally known as *mama karangas* as well as urban markets in Mombasa for the high value products like prawns and lobsters.

3.5.8.2 Volumes of fish catch

The quantity of fish caught based on the data available at County Government of Mombasa fisheries office in 2017 is as shown in Table 3.5.2. This has been used to estimate the average catch per fisher in the different catch category and the income per fisher per day. The average number fishing days is estimated as 28 days every month. The price per kilo for prawns is estimated to range between 350-500 Kshs ex-vessel price with changes based on area seasonality of the product. The price per kilo for fish and crabs is estimated at 200-250 Kshs. The cost of lobster range widely from 300 to 1000 Kshs depending on area and season.

Table 3.5.2. Fish catch landed in 2017

Area/Location	Catch by fishery (mt)			Total Annual Catch (mt)
	Prawns	Crabs/Others	Finfish	
Likoni	6.27	0.85	104.12	111.22
Mkupe/Maweni	50.73	4.80	20.13	75.66
Ngare/Kitangajuu	4.84	3.15	30.76	38.75
Mtongwe	11.95	1.85	133.30	147.10
Mwangala	48.71	7.28	44.75	100.74
Tudor	1.36	1.70	6.63	9.70
Tsunza	-	-	43.43	43.43

3.5.8.3 Fish trade volume

The average quantity of fish traded daily indicated in Table 3.5.3. The data is based on reports on fish trading available at the County Fisheries Office. The profit earned by the fish traders was based on quantities of fish traded and price. The daily sales range from 50 – 100 Kshs.

Table 3.5.3 Average Fish traded per each area/location

Area	Fish catch traded (Kg)	Average profit /Kg
Mkupe/Maweni	168.6	100
Kitanga juu	155	100- 750
Ngare	53	100
Mtongwe	62	100
Mwangala	116	50-100
Tudor	9.70	50
Tsunza	290.75	50-100

3.6 SOCIO ECONOMIC ENVIRONMENT

3.6.1 Introduction

Mombasa County is endowed with diverse natural, human, financial and technological resources that support different economic activities, and provide livelihoods, employment and income to its inhabitants. The natural resources are found in both the terrestrial environment and the marine environment. Mombasa County also has a rich history that has made it attract a lot of attention both nationally and globally. The project site has complex socioeconomic characteristics particularly with regard to the ownership of land which has a very unique history. Details about the socio-economic characteristics are elaborated below.

3.6.2 Methodology for Socioeconomic Assessment

The methodology used in the study included literature review and semi-structured interviews. Literature review was conducted to obtain secondary data from relevant reports, government publications and peer-reviewed scientific publications. During the literature review, the main reports that were reviewed included:

- The Master Plan for the Port of Mombasa, 2009;
- Strategic Environmental Assessment for Special Economic Zone;
- ESIA for the ongoing Mombasa Port Development Project;
- EIA Report for Dredging of the Access Channel at the Port of Mombasa; and
- Environment Sensitivity Atlas for the Coastal Area of Kenya.

The government publications that were reviewed include:

- 2009 Kenya Population and Housing Census;
- The State of the Coast Report for Kenya;
- Statistical abstracts; and
- Mombasa County Integrated Development Plan.

Semi-structured interviews were carried out using open-ended questions to generate primary data. The semi-structured interviews targeted the 116 households that are located within the project area. Fishermen that operate at Mkunguni fish landing site as well as households adjacent to the area where one berth will be constructed. Because the population was small, a census was conducted covering almost all the households. The data was analyzed using descriptive statistics to bring out key features of the target population. Primary data was also gathered using key informant interviews and focus group discussions. Key informant interviews were conducted with opinion leaders such as village heads and beach management unit (BMU) officials. Focus group discussions were conducted mainly with marine resource users.

3.6.3 Coastal population

The human population along the coast of Kenya has risen from 944,082 people in the year 1969 to 3,325,307 people in the year 2009 (Republic of Kenya, 2010; Republic of Kenya, 2000). Population trends from the last five national census reports show a steady growth since 1969 (Figure 3.6.1). Population size and density on the coast of Kenya varies from

place to place with the urban centres having the highest density, resulting from rural-urban migration. There are seven urban centres in the coast of Kenya with Mombasa being the largest. Other important urban centres in the coast that host about 22% of the population include Malindi, Kilifi, Kwale, Lamu, Voi, Wundanyi and Ukunda. It is estimated that about 50% of the coastal population live in rural areas. As population grows, the use of natural resources has intensified in the coastal areas.

Apart from the influence of rural-urban migration, distribution of the population in the coast region is influenced by rainfall, altitude, agro-ecological area, and administrative policy through which a number of settlement schemes have been created (Hoorweg *et al.*, 2000). Due to location of most of the country's coastal urban centres in the vicinity of estuaries, mangrove swamps and coral lagoons, the rapid growth in population places significant pressure on fisheries and other marine resources.

The inhabitants of the coast of Kenya are culturally diverse with the largest indigenous ethnic groups being the Mijikenda. The Mijikenda consists of nine sub-tribes namely: Giriama, Digo, Rabai, Duruma, Kauma, Chonyi, Kambe, Ribe, and Jibana. Other coastal ethnic groups are: Taita, Pokomo, Bajuni, Orma, Sagala, Swahili, Boni, Watha, Munyoyayaand. Each of these ethnic groups has a distinct culture. The south coast is however dominated by the Digo and Duruma.

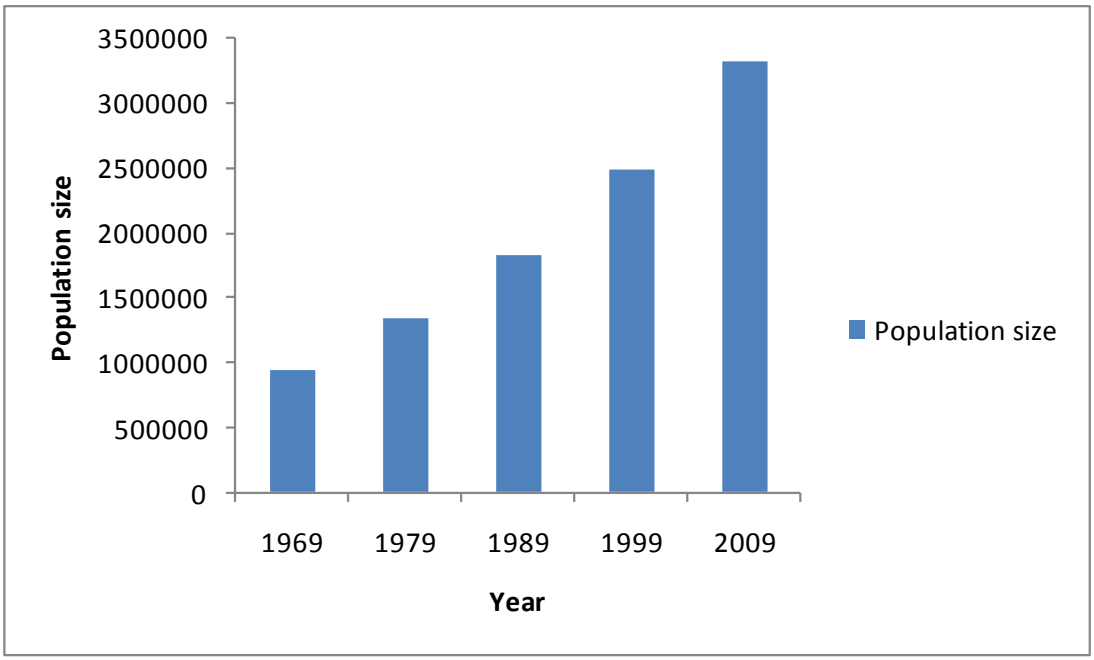


Figure 3.6.1: Trends in coastal population since 1969 (Source: Republic of Kenya, 2010)

3.6.4. Population Characteristics in Project Area

3.6.4.1 Ethnic Composition

About 67 percent of the respondents were from the Digo ethnic group, who are part of the larger Mijikenda community of the coast of Kenya. The Digo is one of the dominant ethnic groups in the south coast of Kenya. Similarly, about 17 percent of the respondents were from the Duruma ethnic group. The Duruma is also one of the larger Mijikenda community

of the coast of Kenya and is another major ethnic group that reside in the south coast of Kenya. The other ethnic groups that reside in the area that will be affected by the access road are Giriama (4 percent), Kauma (4 percent), Luo (4 percent) and Kikuyu (4 percent). It is evident from these results that 84 percent of the residents of the area that will be affected by the access road are from the Digo and Duruma communities who traditionally reside in the south coast of Kenya.

Plate 3.6.1: A socio-economist interviews a female resident in the project area

3.6.4.2 Marital Status and Household Size

About 81 percent of the respondents were married while approximately 14 percent were widowed (Table 3.6.1). This shows that 14 percent of the households in the area that will be affected by the access road are headed by widows who are economically and socially vulnerable. The widow-headed households are also exposed to high levels of poverty which is manifested in lower incomes, savings and investment. In addition, the average household size is about 4.

Table 3.6.1: Marital Status of PAPs

Marital status	No.	Percentage
Divorced	2	2
Married	88	80.7
Separated	4	3.6
Widow	15	13.7
Total Respondents	109	100

Table 3.6.2: Number of Spouses for Married PAPs

No. of spouses	No.	Percentage
1 wife	79	91.8
2 wives	6	7
3 wives	1	1.2
Total Respondents	86	100

3.6.4.3 Gender Characteristics

66 percent of the respondents were male while 38 percent were female (Table 3.6.3). Considering the gender inequality with respect to access to economic resources, the 38 percent of the households are exposed to extremely high levels of poverty. The main causes of poverty in the project area are unemployment, low incomes, lack of technical and entrepreneurial skills, lack of formal land ownership rights hence the land cannot be used as collateral, high and increasing cost of living and difficulties in accessing credit facilities.

Table 3.6.3: Gender Characteristics of PAPs

Gender	No.	Percentage
Female	38	34.5
Male	72	65.5
Total Respondents	110	100

3.6.5 Economic Context

Generally the project area is characterized by high poverty levels with a majority of the population living below the poverty line (below Ksh 2,610/- per month). Poverty in the project area is multifaceted and could be linked with the low literacy level, lack of land title deeds hence inaccessibility to bank credit facilities; poor infrastructure and poor service provision in the area. Economic activities include:

3.6.5.1 Formal Employment

Among the households that are located on the access road, one household head is a public health officer employed by the Government while four household heads are employed as casual workers. Most households are either engaged in artisanal fishing or peasant farming. The farmers remain unemployed during periods of drought while the artisanal fishers have lost part of their fishing grounds to port development. This indicates a high unemployment rate which may be aggravated by the planned development.

Plate 3.6.2: High poverty level is reflected in the lifestyle of the residents

3.6.5.2 *Small-scale agriculture*

Nine households that are located on the access road are engaged in peasant farming. The small scale farming activities include food crops such as maize which is the staple food, green grams, cowpeas, pigeon peas and cassava, and tree crops such as mango, coconut, banana and cashew nut. A number of community members have been trained by the Department of Agriculture on agri-business. The livestock that are kept in the area include cattle, goats, sheep and poultry.

3.6.5.3 *Artisanal fisheries*

The Port Reitz creek and adjoining ecosystem of the open sea are very productive and provide vital spawning and breeding grounds hence playing an important role in recruitment to the fishery. About 283 artisanal fishers and over 50 fish traders/fishmongers operate in the area. The main fish landing sites in the survey area are Dongo Kundu and Mwangala. Artisanal fishersmainly target prawn fishery. The artisanal prawn fishery is a highly valuable resource (Japan Port Consultants *et al.* 2010) due to the high price of prawns in the market. The fishers mainly use traditional fishing crafts and simple fishing gears. Artisanal fishing has a lot of backward and forward linkages. The backward linkages include linkages to the suppliers of fishing inputs such as boats, gears and bait while the forward linkages include linkages with the marketing activities through fish mongers and dealers.

3.6.6 Social Services and distribution of social facilities

A few community services are available in close proximity to the project area such as health amenities, primary schools, religious places (mosques and churches) and pipe water, electricity.

3.6.6.1 Health Amenities

The Dongo Kundu area is served by Mbuta Dispensary which falls within the Mtongwe sub-location. A number of traditional healers also address the health needs of a section of the population in the survey area. There are no health facilities within the access road boundaries.

3.6.6.2 Education

At Dongo Kundu, there is Mwangala Primary School close to the survey area. This school was established by the community in 1994 but has since been taken by the Government. It has about 700 pupils who attend classes 1 to 8. In addition, a number of private nursery and primary schools exist in the neighborhood. There are no school facilities in the actual project site. During the socioeconomic study, about 44 percent of the respondents had attained different levels of primary education, 39 percent had no education while 11 percent had university. Generally, the results show that the area that will be affected by the access road is characterized by low levels of education.

3.6.6.3 Religion and Religious places

Both mosques and churches are available in the survey area. There is one mosque at Dongo Kundu and another at Mwangala. In addition, there are four churches at Dongo Kundu and others at Mwangala. The study has shown that 72 percent of the households on the access road are Muslims and 28 percent are Christians. Since Islam is the dominant religion any interventions that will affect the livelihoods and other ways of life of the local communities must take cognizance of the values that are enshrined in the Islamic faith. There are no religious facilities in the actual project site.

3.6.6.4 Electricity and other sources of energy

The project area does not have electricity but there are power lines running close by. All surveyed households have no electricity and use kerosene lamps.

3.6.6.5 Potable water

Generally, there is no piped water in the area. The community relies on Mdongoni and Tembo springs for their potable water (freshwater) and some households have to walk long distances to fetch this water to fetch water in 20 litre plastic containers locally known as jerricans. (Plate 3.6.3)

Plate 3.6.3 Domestic water is fetched from streams using small water containers (above)

3.6.6.6 Telecommunication

Both Port Reitz and Kwa Skembo area is well covered by mobile phone networks particularly Airtel, Safaricom and Orange. The same situation obtains in Dongo Kundu but the mobile network suffers from poor reception due to absence of reliable booster stations.

3.6.6.7 Public transport

Dongo Kundu area does not have public transport but is served by motorcycles that manoeuvre the access paths and the murram road that links Dongo Kundu with Mtongwe and Likoni. This murram road crosses the proposed access road. The main Mombasa-LungaLunga road passes close to the area and links the south coast with Mombasa City. In addition, there is a tarmac road linking Likoni with Mtongwe. The planned Dongo Kundu bypass which shall link the south coast with the west mainland is also scheduled to pass through this area. A section of residents mainly walk because they do not have access to reliable public transport. This is common in the area stretching from Mbuta junction towards Dongo Kundu and the peri-urban settlements at Tsunza.

3.6.7 Housing

There were a total of 66 housing structures in the project area. Out of this total, 52 housing structures were semi-permanent buildings made of mud walls and iron sheet roofs, while 14 housing structures were temporary structures made of mud walls and "*makuti*" thatch roofs.

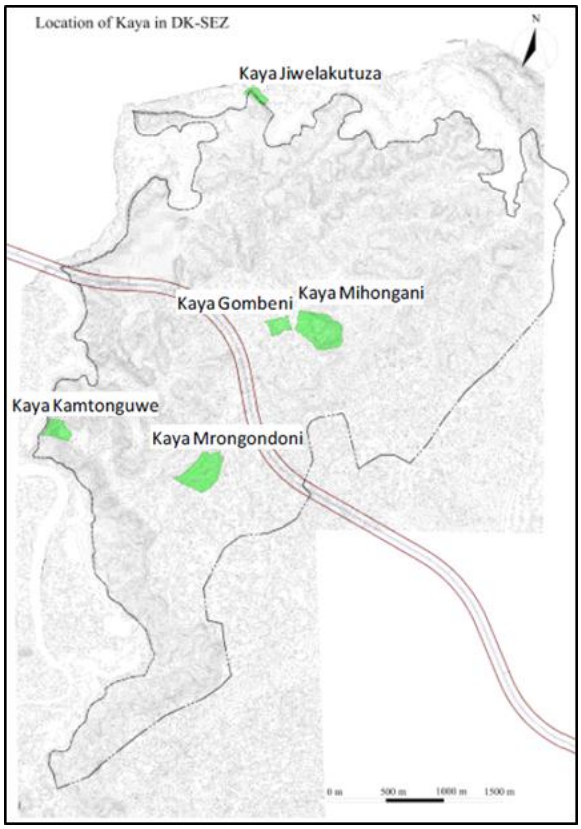
Plate 4.6.4: Most of the houses in project area are semi-permanent structures

3.6.8 Leadership arrangement in the project area

The entire project area falls in Likoni Sub-County of Mombasa County. Counties are headed by Governors who undertake administrative responsibilities over the Counties while the County Commissioners are also present to coordinate National Government activities within the Counties. Each County has a number of Sub-Counties (Constituencies) that are administratively headed by Deputy County Commissioners (DCC). The Deputy County Commissioner is assisted by the Assistant County Commissioner who in turn is assisted by location chiefs and their assist\ants. The Chief and his assistants represent the Government authority at the location and sub-location levels respectively. They are assisted by village headmen/women whom they have appointed from amongst respected people in the villages to administer these smaller units and handle petty matters on their behalf. The chiefs report to the Assistant County Commissioner who further report to the Sub-County Commissioner.

3.6.9 Culture and Heritage

There is one cultural site namely Kaya Mikadini close to the port area. Two other sacred sites Kaya Jiwe la Kutuza and Kaya Mtongwe also exist near the project area. The *Kaya* refers to unique indigenous forests found along the coast. The *Kaya* forests are highly biodiverse and have high cultural significance to the Mijikenda communities, who consider them as sacred and have used them for traditional religious and spiritual ceremonies for centuries (Blackett, 1994; Government of Kenya, 2009). The *Kaya* have recently spurred the growth of forest tourism in the coastal region (Government of Kenya, 2009). Other socially important sites include Mrogondoni and Tembo springs that provide fresh drinking water to the local community.



Source: Mombasa SEZ Master Plan (2015)

Fig 4.6.2: Location of Cultural / Heritage Sites

3.6.10 Vulnerable and marginalized peoples

According to the Constitution of Kenya 2010, the VMGs include the economically disadvantaged, low-income earners, children, the elderly, the homeless, the widows, female headed households, people with human immunodeficiency virus (HIV), and those with other chronic health conditions, including severe mental illness. The VMGs also include households that often encounter barriers to accessing healthcare services. The vulnerability of these individuals is determined by age, sex, and factors such as low income, lack of insurance coverage, and absence of care givers.

The vulnerable and marginalized group in the survey area includes a number of female headed households, those without legal entitlement to the land they occupy, the poor and widows. These female headed households are living below the national poverty line of Ksh. 2,610 per month. The categorization of the female headed households under the vulnerable and marginalized populations (VMGs) is based on the definition by the Constitution of Kenya 2010. Following from the Constitutional categorization, all the PAPs encountered within the proposed road area can be classified as vulnerable.

The household size for the VMGs in the project area ranges from 5 to 10 people with an average household size of 8 persons.

3.6.11 Issues Identified from Socioeconomic Assessment

- Construction of the proposed road would require that local residents are relocated from their current settlements. Resettlement Action Plan (RAP) is being prepared to ensure that the Project Affected Persons (PAPs) are compensated and assisted in line with relevant regulations.
- The key development priorities as perceived by the Dongo Kundu community include provision of potable water, infrastructure such as roads; grid electricity and security.
- Provision of public facilities like schools; health centers and markets were also ranked highly in their development list.
- There are a number of households that are headed by women. This category forms part of the vulnerable groups. A number of households are also supporting other children who are not theirs.

Population characteristics of affected households is as follows:

Table 4.6.4: Population Characteristics of Affected Households

	Category	**Number**
1	***Asset holders***	
1.1	Individual Asset holder	116
1.2	Other Institutes / Organizations	0
	Total asset holders	116
2	***Affected persons***	
2.1	Number of adults	74
2.2	Number of children	117
	Number of affected residents	191
3	***Relocated households / number of people***	
3.1	Number of households	50
3.2	Number of persons	191

4. ASSESSMENT OF POTENTIAL IMPACTS

Introduction

The potential impacts of the proposed project were assessed for port and road covering pre-construction, construction and operation stages. The assessment covers pollution, natural and socioeconomic aspects as per requirement of Kenyan regulation and JICA guidelines. Mitigation measures are proposed in the Environmental and Social Management Plan (ESMP) for items that were predicted to have certain level of adverse impacts.

4.1 Air pollution

4.1.1 Port

41.1.1 Air Pollution Impacts of Port Construction

The main source of air pollution will be exhaust gas from construction vehicles/machines and fugitive dust emission from heavy construction works (e.g. reclamation works). However, since construction activities will be temporary and intermittent, and the fact that there are no sensitive receptors in the vicinity (nearest sensitive receptor is 300 m away), impacts are likely to remain within moderate levels. Other sources of air pollution will be fugitive dust from temporary concrete plant and stack emission of asphalt plant. In general, impacts from these facilities will be limited as they will only operate temporary and are relatively small-scale facilities, but may become an issue if they are to be located near sensitive areas.

41.1.2 Air Pollution Impacts of Port Operation

The main source of air pollution will be exhaust gas of ships and cargo handling machines. However, impacts will be insignificant as emissions from ships and cargo handling machines will be limited to activities of one berth, and also the fact that there are no sensitive receptors in the vicinity.

4.1.2 Road

4.1.2.1 Air Pollution Impacts of Road Construction

The main source of air pollution will be exhaust gas from construction vehicles/machines and fugitive dust emission from heavy construction works (e.g. cut and fill works). In general, impacts of construction activities are likely to remain within moderate levels due to its temporary and intermittent nature. However, there could be certain localized impacts where residential houses are located in the vicinity of the construction sites. Strict air pollution control will therefore be required especially when conducting activities near residential houses.

Other sources of air pollution will be fugitive dust from temporary concrete plant and stack emission of asphalt plant. In general, impacts from these facilities will be limited as they will only operate temporary and are relatively small-scale facilities, but may become an issue if they are to be located near sensitive areas.

4.1.2.2 Air Pollution Impacts of Road Operation

During operation, exhaust emissions from cargo and commuting vehicles may deteriorate the air quality along the SEZ main road. Road side air quality (PM10 and NO_2) was therefore

predicted using the technical manual (Technical Method of Road Environmental Impact Assessment) published by Research Institute for Road and Street of Japan. The prediction was conducted under the following conditions:

- Traffic volume: Estimated traffic at SEZ phase 3 stage (cargo vehicle: 238 vehicles/hour, commuting vehicles: 155 vehicles/hour)
- Wind direction: Easterly wind which is the dominant wind during dry season
- Wind speed: 5 m/s[1]
- PM_{10} emission factor[2]: Cargo vehicle (4.05 g/km), Commuting vehicles (0.05 g/km)
- NOx emission factor[3]: Cargo vehicle (2.08 g/km), Commuting vehicles (0.118 g/km)
- Prediction site: 0 m from roadside

Table 4.1.1 shows the results of prediction.

Table 4.1.1: Prediction results of road-side air quality

	Concentration contributed from vehicles	Baseline concentration*1	Predicted roadside air quality	National standard (annual mean)*2	WHO guideline value (annual mean)
PM10 (μg/m³)	1.9	30.3	32.2	50	20
NO_2 (μg/m³)	0.85	0.00097	0.85097	95*3 (0.05 ppm)	40

*1: Average of air quality baseline survey conducted at proposed road location

*2: Environmental Management & Co-ordination Act (Air Quality) Regulations, 2014 (residential, rural and other areas)

*3: The standard value of 0.05 ppm was converted to μg/m³

(Source: JICA Design Team)

According to the prediction, vehicles will have minor contribution to ambient PM10 and NO_2 concentration, and hence roadside air quality was predicted to satisfy the national air quality standard. Impact of vehicles on air quality will therefore be negligible.

4.2 Water pollution

4.2.1 Port

4.2.1.1 Water Pollution Impacts of Port Construction

Approximately 3 million m³ of initial dredging will be required, of which approximately 0.5 million m³ will be done by grab dredger and the remaining 2.5 million m³ by Trailing Suction Hopper Dredger (TSHD). All the dredged material is planned to be disposed at the offshore disposal site used by other Mombasa port projects. Dredging and offshore dumping of dredged material will deteriorate the surrounding water quality as such activities will result in suspension and dispersion of sediments.

To assess the potential impacts of dredging/dumping activities, the water quality (i.e. turbidity) monitoring report of Container Port Modernization Project was analyzed, which is a similar port development project implemented in Port Reitz during 2012-2015 involving channel dredging and dumping of around 6 million cm³ of dredged material at the same

[1] Based on meteorological data of Mombasa Port Master Plan (2015)
[2] Hirata et al (2000), An Analysis of Roadside Air Pollution in Metro Manila
[3] Research Institute for Road and Street (2007), Technical Method of Road Environmental Impact Assessment

location as this Project. Water quality monitoring was conducted inside Port Reitz around the dredging area and at the coral reefs along the Mombasa coastline nearest to the offshore dumping area. According to the water quality monitoring results, turbidity levels inside Port Reitz expectedly increased significantly but at the coral reef sites turbidity in general remained at low levels (around 0-2 NTU). There was also no notable decrease in coral coverage as per the coral monitoring conducted at that time. Based on the above information, it is likely that offshore dumping activities will not have any significant impacts on water quality.

There are however uncertainties in how turbidity will actually disperse as it will be influenced by weather and oceanographic conditions at the time of dumping. The Project will therefore proactively and continuously monitor water quality and corals, and dumping methods will be revised in case any signs of impacts are identified in the process. Also if the timing of dredging and dumping overlaps with other dredging projects in Mombasa port, it will require coordination between both projects and further strengthen the ESMP and ESMoP as necessary.

Other sources of pollution will be wastewater from construction facilities such as concrete plant and construction camps. Such wastewater may cause localized pollution if not treated appropriately.

4.2.1.2 Water Pollution Impacts of Port Operation

Around 470,000 m^3 of maintenance dredging is expected to be required every 5 years, which is planned to be dumped offshore at the same location as the initial dredging. However, impacts will be less as dumping volume is only around 15% of the initial dredging.

Other potential pollution sources will be rainwater runoff from port facilities and ship wastewater. Rainwater runoff may become contaminated with oil by collecting the oil that were spilled and leaked from cargo handling machines/vehicles and subsequently pollute Port Reitz. However, significant impacts are not expected as volume of rainwater runoff will be limited due to the relatively small scale of the port and the fact that oil will be rapidly decomposed naturally in seawater.

Ship wastewater mainly consists of bilge water and sewage water. Discharge of these wastewater in territorial waters are prohibited in Kenya under the Environmental (Prevention of Pollution in Coastal Zone and other Segments of the Environment) Regulations 2003. The Marine Operation Department, Pollution Control Section of KPA is charged with the responsibility of implementing and ensuring compliance of ships with MARPOL 73/78 and national regulations. The Pollution Control Section has 33 staff conducting 24/7 sea patrols with Anti-pollution vessel and inspect all incoming vessels onboard for checking compliance with MARPOL 73/78. The port also provides competent licensed contractors for collecting wasterwater from ships such as bilge and grey-water. With a dedicated pollution management and inspection system in place, the risk of pollution from ship wastewater is considered low.

4.2.2 Water Pollution impacts of Road Construction

Water pollution may occur when large volume of soil from exposed construction areas (e.g. cut and fill sites) are eroded and discharged to downstream surface water body via rainwater runoff. According to the catchment map of Mombasa SEZ area, there are no perennial streams in the downstream area. Rainwater runoff will flow through valleys and natural channels and eventually drain towards a shrubby area and eventually to an extensive mud flat area in Port Reitz as shown in Figure 4.2.1.

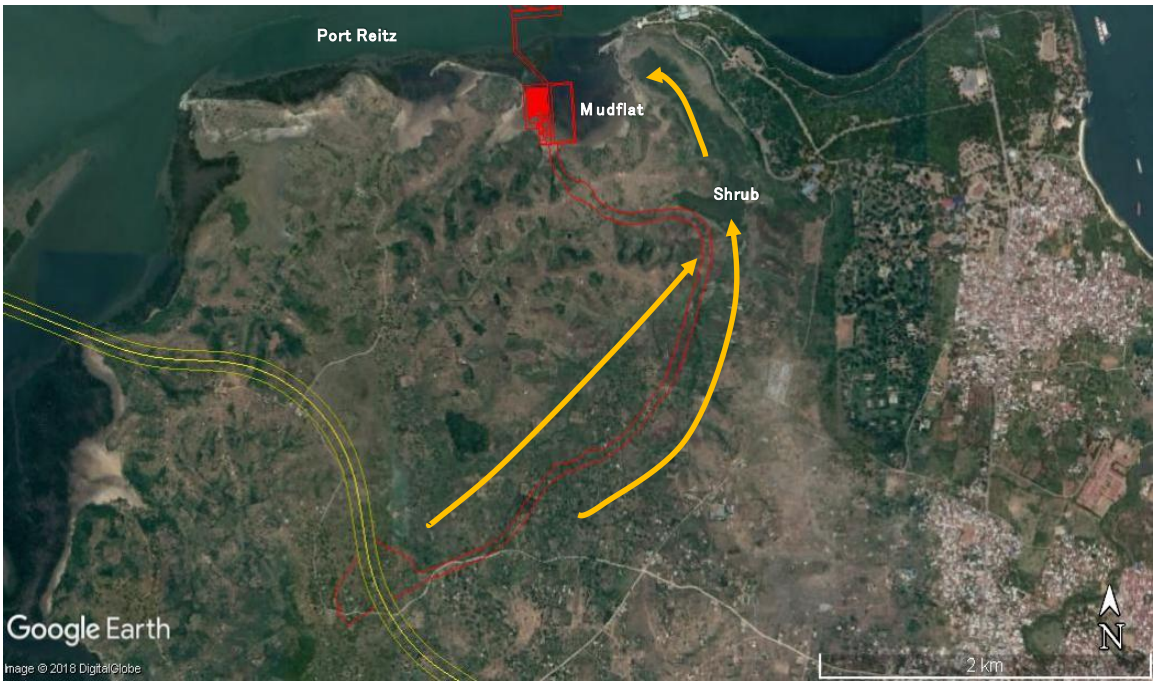


Figure 4.2.1 Drainage route of rainwater runoff around SEZ main road

Significant impacts are not expected as most of the sediment contained in rainwater runoff will likely settle in the shrub/mud flat area as runoff velocity reduces.

Other sources of pollution will be wastewater from construction facilities such as concrete plant and construction camps. Such wastewater may cause localized pollution if not treated appropriately.

4.3 Soil Pollution Impacts of Road Construction

Oil spill/leaks from construction vehicles/machines and fuel tanks may cause soil pollution. Risk of pollution will be high in case of using old and poorly-maintained vehicles/machines, using maintenance facilities with inadequate pollution control and on-site fueling activities. However, considering that the source of potential oil pollution is limited to construction vehicles/machines and fuel tanks, the extent of soil pollution will be limited to a relatively small area in case of oil spill/leaks events. Therefore, significant impacts are not expected.

4.4 Waste Impacts

4.4.1 Impacts of Port Development

【Pre-construction】

The main waste during pre-construction will be vegetation remains from mangrove clearance. However, disposal will not be required as they will be reused locally such as for fuel.

【Construction】

During construction, around 3 million m^3 of dredged material will be generated. Since the dredging area sediment was identified to be uncontaminated, these will be disposed at an offshore disposal site previously used by other Mombasa port projects.

Other construction wastes will typically consist of packaging material, metal scrap, waste oil and so on. Non-hazardous wastes that cannot be reused/recycled will be disposed at the county's waste disposal sites. This will be either at Mwakirunge or Shonda landfill but should be decided at the time after consulting the county government waste authority. Either way it should not be a major issue as waste volume will be limited. Hazardous wastes such as waste oil will be recycled through local NEMA authorized recycling firms. The construction contractor will be required to prepare Construction Waste Management Plan (CWMP) outlining how wastes will be stored, reused/recycled, treated and disposed.

【Operation】

Main wastes during port operation will be ship garbage, waste oil from cargo handling machines and general office waste. Non-hazardous wastes that cannot be reused/recycled will be disposed at the county's waste disposal sites which will either be at Mwakirunge or Shonda landfill. Either way it should not be a major issue as waste volume will be limited.

Hazardous wastes such as waste oil will be recycled through local NEMA authorized recycling firms. Around 470,000 m^3 of dredged material is expected to be generated every 5 years from maintenance dredging, which are planned to be disposed at the same offshore site as the initial dredging.

4.4.2 Impacts of Road Development

【Pre-construction】

The main waste during pre-construction will be vegetation remains from tree clearance. However, disposal will not be required as they will be reused locally such as for fuel wood and building material.

【Construction】

During construction, around 340,000 m^3 of excessive excavated soil will be generated. Around 150,000 m^3 will be top soil which can be reused for other usages such for agriculture. The remaining soil of around 190,000 m^3 will be stored temporary in the empty ramp space of the interchange for later use by other SEZ projects. Hence disposal of excavated soil will not be required.

Other construction wastes may consist of domestic waste, packaging material, metal scrap, medical waste, waste oil and so on. Non-hazardous wastes that cannot be reused/recycled will be disposed at the county's waste disposal sites. In case of Mombasa, this will be either at Mwakirunge or Shonda landfill but should be decided at the time after consulting the county government waste authority. Either way it should not be a major issue as waste volume will be limited. Hazardous wastes such as waste oil will be recycled through local NEMA authorized recycling firms. The construction contractor will be required to prepare Construction Waste Management Plan outlining how wastes will be stored, reused/recycled, treated and disposed.

【Operation】

During operation, wastes from road maintenance is expected such as cleared vegetation, asphalt debris and sediment/sludge from drainage system. Most of these wastes can be reused/recycled (e.g. composting, road resurface). Non-hazardous wastes that cannot be reused/recycled is expected to be disposed at the Mwakirunge or Shonda landfill. Due to the limited waste volume, this is not expected to be an issue.

4.5 Noise/vibration

4.5.1 Impacts of Port Development

【Construction】

The main noise sources will be from construction vehicles/machines and pile-driving works. Since pile driving will be the most dominant noise source, impacts of pile driving works was predicted by assuming the use of hydraulic pile-driver. Noise attenuation from the pile driver was calculated using the following standard noise attenuation formula:

LAeq = LAw-8-20 x log10r

LAeq：Equivalent continuous A-weighted sound pressure Level
LAw：Source power level (set as 108 dB as per Sarsby R.W, 2000)
r: Distance from source

Table 4.5.1 shows the prediction results. According to the prediction, noise from pile driving works will attenuate to around the same level as the Kenyan noise standard of 50 dB (residential daytime) at a distance of around 300 m. Since there are no sensitive receptors within the 300 m radius impacts are not expected (see Figure 4.5.1)

Table 4.5.1: Predicted noise attenuation from hydraulic pile-driver

	Distance from noise source (m)								
	10	20	50	100	150	200	250	300	350
Noise level (dB)	80	74	66	60	57	54	52	51	49

Source: JICA Design Team

Source: JICA Design Team

Figure 4.5.1: Predicted noise attenuation from pile-driving works

The main source of vibration will be from pile driving works. According to the manual of "Japanese Technical Association for Steel Pipe Piles and Sheet Piles", vibration levels of hydraulic pile-driver will in general attenuate to below 75 dB (construction site-boundary vibration standard of Japan) after 25 m. No impacts are expected as there are no structures within such distance.

【Operation】

During operation, there will noise generated from cargo handling activities. However, impacts are not expected as noise influence will be spatially limited and the fact that there are no sensitive receptors in the vicinity.

4.5.2 Impacts of Road Development

【Construction】

The main noise sources will be from construction vehicles/machines. Significant impacts are not expected as there will be no excessive noisy works such as pile driving. However, some of the residential houses near the road may be affected temporary hence strict noise control measures are required when working near these areas.

【Operation】

a. Noise

During operation, noise from travelling cargo and commuting vehicles may raise noise level along the SEZ road. Roadside noise level was therefore predicted using the noise

predication model "ASJ RTN-Model 2008". The prediction was conducted for two scenarios described in Table 4.5.2

Table 4.5.2: Scenarios of road-side noise prediction

	Prediction period	Assessment target	Predicted daily traffic volume*	Vehicle speed
Scenario 1	During operation of Phase 1 (2028)	Roadside residential area	Cargo vehicle: 2,274 Commuting vehicles: 1,258	60 km/h
Scenario 2	During operation of Phase 1, 2, 3 (2040)	SEZ facilities (all roadside residents are assumed to have relocated by 2040)	Cargo vehicles: 5,706 Commuting vehicles: 3,724	60 km/h

*: All vehicles assumed to travel during day-time (Source: JICA Design Team)

Tables 4.5.3 and 4.5.4 show the prediction results of Scenario 1 and 2 respectively.

Table 4.5.3: Predicted noise attenuation from SEZ main road (Scenario 1)

Distance from roadside (m)	0	10	20	30	40	50	60	70	80	90	100
LAeq (dB)	66.2	63.8	62.3	61.2	60.3	59.6	59.0	58.4	57.9	57.5	57.1
Distance from roadside (m)	110	120	130	140	150	160	170	180	190	200	-
LAeq (dB)	56.7	56.4	56.1	55.8	55.5	55.2	55.0	54.8	54.6	54.3	-

Source: JICA Design Team

Table 4.5.4 Predicted noise attenuation from SEZ main road (Scenario 2)

Distance from roadside (m)	0	10	20	30	40	50	60	70	80	90	100
LAeq (dB)	70.2	67.9	66.4	65.3	64.4	63.7	63.0	62.5	62.0	61.6	61.2
Distance from roadside (m)	110	120	130	140	150	160	170	180	190	200	-
LAeq (dB)	60.8	60.5	60.1	59.9	59.6	59.3	59.1	58.9	58.6	58.4	-

Source: JICA Design Team

According to the prediction of Scenario 1, noise level will exceed the Kenyan noise standard (residential) of 50 dB even at a distance of 200 m from the roadside. However, if compared with the WHO standard (55 dB), noise level will attenuate to satisfactory level at 170 m from the roadside. In conclusion, it can be said that residents living within the 200 m area will be affected by vehicle noise, which is counted as around 10-20 households. It is therefore necessary to reduce the roadside noise levels through employing certain mitigation measures. However, since most of these residents will be relocated by Phase 2 (year 2029), it is unrealistic to install expensive noise barriers. It is therefore proposed to establish green belt along the areas facing the residential houses, which has a noise attenuation effect of around 2-3 dB[4].

In regards to Scenario 2, roadside noise level will inevitably be further elevated due to greater traffic volume. However, since all residents will be relocated by then, it is more reasonable to compare the predicted noise level with industrial area noise standards of Kenya and WHO, which is 60 dB and 70 dB respectively. In such case, roadside noise level will satisfy Kenyan standard after 130

[4] Annual report of Tokyo Metropolitan Government Civil Engineering Technical Center (2008)

m and WHO standard after 10 m. Since SEZ facilities are not particularly sensitive to noise, the predicted noise levels are considered to be within acceptable range.

b. Vibration

During operation, vibration from travelling cargo and commuting vehicles may affect nearby structures along the SEZ main road. Roadside vibration level was therefore predicted using the technical manual (Technical Method of Road Environmental Impact Assessment) published by Research Institute for Road and Street of Japan. The prediction was conducted under the following conditions:

- Traffic volume: Predicted traffic volume during operation of Phase 1, 2, 3 (Cargo vehicles: 238 vehicles/hour, Commuting vehicles: 155 vehicles/hour)
- Travelling speed: 60 km/h

Table 4.5.5 shows the prediction results.

Table 4.5.5: Predicted vibration attenuation from SEZ road

Distance from roadside (m)	0	10	20	30	40	50	60	70	80	90	100
Vibration level (dB)	55.6	54.6	53.9	52.9	52.1	51.5	51.	50.6	50.2	49.9	49.6

Source: JICA Design Team

According to the prediction, vibration levels will be under 60 dB at the roadside, which is below the roadside vibration standard of Japan (daytime: 65 dB, nighttime: 60 dB). Therefore, no vibration impacts are expected.

4.6 Odour Impacts of Port and Road Development

【Construction】

Asphalt plant will generate some "asphalt" smell during its production process. Sewage from construction camps may also become source of odor. Odor from these facilities may become a nuisance in case they are established near sensitive areas such as residential areas.

4.7 Sediment Impacts

4.7.1 Impacts of Port Development

【Construction】

Dredging activities may cause sediment pollution of surrounding areas by dispersing contaminated sediments. However, since no sediment contamination was identified in the dredging area through the sediment quality survey, sediment pollution is not expected.

【Operation】

Ships using harmful anti-fouling paints may cause sediment pollution around the port area as harmful substances contained in anti-fouling paints can potentially accumulate in the underlying sediment. However, such risks can be considered low as Kenya is a signatory of

the "International Convention on the Control of Harmful Anti-fouling Systems on Ships", which prohibits ships entering Kenyan port of using anti-fouling paints.

4.8 Impacts on Marine Protected Areas

4.8.1 Impacts of Port Development

【Construction】

Sediment dispersion from offshore dumping of dredged material may affect the MPAs along the coastal area namely Mombasa Marine National Park, Mombasa Marine National Reserve and Diani/Chale Marine National Reserve. Impacts on Mombasa Marine National Park and Diani/Chale Marine National Reserve are unlikely as they are located around 13 km and 16 km from the dumping site respectively. On the other hand, Mombasa Marine National Reserve will be more likely to be affected as it is relatively close to the dumping site (around 3 km separation).

To assess the potential impacts of offshore dumping activities on Mombasa Marine National Reserve, the water quality (i.e. turbidity) monitoring report of Container Port Modernization Project was analyzed, which is a similar port development project implemented in Port Reitz during 2012-2015 involving channel dredging and dumping of dredged material at the same location as this Project. Water quality monitoring was conducted inside Port Reitz around the dredging area and at the coral reefs along the Mombasa coastline nearest to the offshore dumping area. According to the water quality monitoring results, turbidity levels in general remained at low levels (around 0-2 NTU) near Mombasa Marine National Reserve. There was also no notable decrease in coral coverage as per the coral monitoring conducted at that time. In conclusion, dumping activities are unlikely to have any significant impacts on Mombasa Marine National Reserve.

【Operation】

Approximately 470,000 m^3 of maintenance dredging is expected to be required every 5 years, which is planned to be dumped offshore at the same location as initial dredging. Significant impacts on MPAs are not expected as dredging volume will only be around 15% of the initial dredging and period will be short-term.

4.9 Impacts on Ecosystem

4.9.1 Impacts of Port Development

【Pre-construction】

According to the National Mangrove Ecosystem Management Plan (2017-2027), mangroves in Mombasa County are mainly distributed in Port Reitz and Tudor Creek having a total area of 3,771 ha. Main mangrove species are *Rhizophora*, *Ceriops*, *Avicennia* and *Sonneratia* species. The average mangrove stem density is 1,636 stems/ha. Figure 4.9.1 shows the mangrove distribution in Mombasa County. Nearly 1,850 ha of mangroves in Mombasa

County are degraded due to illegal harvesting, development, pollution and are in urgent need of rehabilitation.

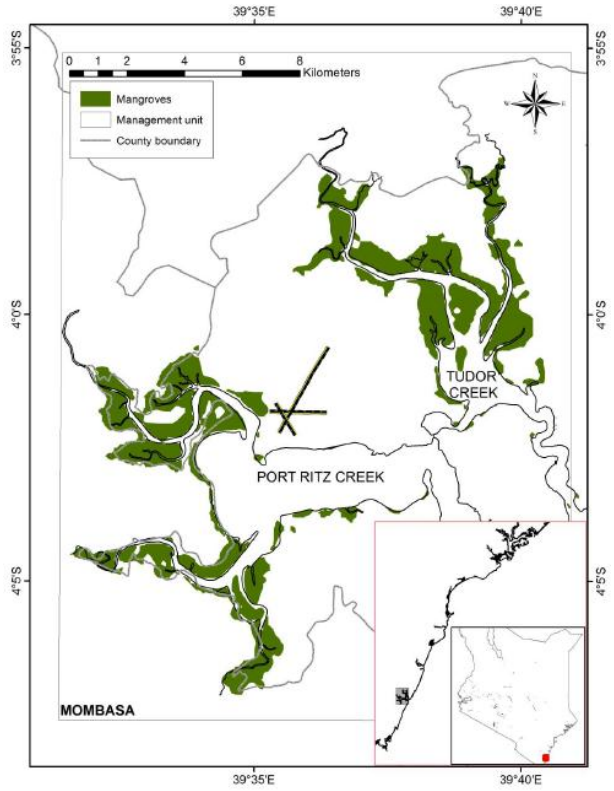


Figure 4.9.1: Mangrove distribution in Mombasa County

Source: National Mangrove Ecosystem Management Plan (2017-2027)

Around 15 ha of mangrove forest will need to be cleared for construction of port and temporary construction facilities as shown Figure 4.9.2. However that mangrove distribution within the 15 ha area is not uniform and around half of the area is mudflat, so the actual mangrove area will be around 7.5 ha and the number of mangrove trees that require felling is estimated to be around 6,750 trees.

Figure 4.9.2: Area of mangrove forest to be affected by port development (Source: JICA Design Team)

Mangrove clearance is not expected to have any significant impacts on ecosystem for the following reasons:

- The affected area is not designated as a protected area.
- The affected area (7.5 ha) is only around 0.5% of the total mangrove area in Port Reitz which is approximately 1,500 ha, hence reduction of mangrove resource will be minimal. Mangroves are extensively distributed in Port Reitz, hence it is considered that there are still sufficient alternative habitats for mangrove dependent species.

Nevertheless, to mitigate the impacts of mangrove clearance, mangrove plantation is planned to be conducted under the following policy:

- Mangrove seedlings to be planted in degraded mangrove forest area as per the National Mangrove Ecosystem Management Plan (2017-2027) and Mombasa Participatory Forest Management Plan (2015-2019).
- Target species: 5 species found in the affected area
- Planting quantity: 1.5 times the number of cleared mangroves
- Location: Areas with no plans for future development and degraded mangrove forest area
- Implementation structure: KPA (planning, financing), KFS (technical assistance), local community (plantation, monitoring)

Detailed mangrove plantation plan is planned to be developed through consultation with KFS and local community, and finalized in the D/D stage when the port design and construction plans are further refined.

【Construction】

Marine construction works in Port Reitz such as dredging and reclamation works will directly or indirectly affect marine species such as fish and benthos. These activities however are not expected to have significant ecosystem impacts for the following reasons:

- Although around 10 ha of mangrove and mud flat area will be directly lost through reclamation works, there are still sufficient area of mangrove/mudflat habitats for dependent species in Port Reitz (approx. 2,000 ha) and even within the vicinity (approx. 30 ha within 2 km radius).
- Although benthic species in and around the dredging area will be affected by dredging works, most of the species in the area are opportunistic species (i.e. macrobenthos of annelids, crustaceans, nematodes) which in general have relatively high recovery potential. Hence it is likely that these species will gradually recover to its former level after dredging.
- Most fish species are mobile enough to avoid areas affected by dredging.

On the other hand, corals and seagrass in the coastal area are sensitive to stresses such as turbidity and therefore may be affected by offshore dumping works. To assess the potential impacts of offshore dumping activities on corals and seagrass, the ecology monitoring report of Container Port Modernization Project was analyzed, which is a similar port development project implemented in Port Reitz during 2012-2015 involving channel dredging and dumping of dredged material at the same location as this Project. Monitoring was conducted every 3 months at five locations along the coral reefs of Mombasa coastline nearest to the offshore dumping area. According to the monitoring results, there was no notable decrease in coral and seagrass coverage. Turbidity also remained at low levels (around 0-2 NTU). In conclusion, dumping activities are unlikely to have any significant impacts on ecosystem such as coral reefs.

There are however uncertainties in how turbidity will actually disperse as it will be influenced by weather and oceanographic conditions at the time of dumping. The Project will therefore proactively and continuously monitor water quality and corals, and dumping methods will be revised in case any signs of impacts are identified in the process. Also if the timing of dredging and dumping overlaps with other dredging projects in Mombasa port, it will require coordination between both projects and further strengthen the ESMP and ESMoP as necessary.

【Operation】

Around 470,000 m^3 of maintenance dredging is expected to be required every 5 years, which will likely be dumped offshore at the same location as in construction. Significant impacts on MPAs are not expected as dredging volume will only be around 15% of the initial dredging and period will be short-term.

4.9.2 Impacts of Road Development

【Pre-construction】

Prior to construction works, vegetation in the road RoW (approx. 40 ha) will need to be cut and removed. According to the flora survey, the road area has low vegetation cover and mostly cultivated for farming. This implies that the road area has low ecological value. However, an IUCN threatened species *Vitellariopsis kirkii* was identified at two sites during flora survey (after revisiting the site, one of the *Vitellariopsis kirkii* no longer existed due to burning and farming). This species is endemic to Kenya and Tanzania but is not protected under Kenyan law. Regionally it is probably relatively wide-spread as its presence has been confirmed in kayas through the study of SEA of Mombasa SEZ and EIA of SBR. Therefore, removal of one *Vitellariopsis kirkii* is considered to be not of any significant consequence.

At the moment, it is planned to transplant *Vitellariopsis kirkii* to a nearby kaya but detailed method and location will be decided through consultation with KFS and NMK.

【Construction】

The road area is mostly cultivated for farming and there are no important ecosystem or habitats in the area. Hence, construction works are unlikely to have any ecological impacts.

4.10 Involuntary Resettlement

4.10.1 Impacts of Road Construction

【Pre-construction】

As per the Resettlement Action Plan (RAP) study, around 39 ha of land acquisition will be required for acquiring the road RoW. This will result in resettlement of 50 households (191 PAPs). No resettlement will be required for the port area.

4.11 Impacts on Vulnerable Groups

4.11.1 Impacts of Road Construction

【Pre-construction】

As per the RAP study, all affected 50 households are classified as vulnerable due to low income level. These PAPs will be vulnerable to resettlement related impacts especially as they often have limited financial resources to cope during the transition period.

4.12 Indigenous/minority people

There are no people living in the project area that are considered as indigenous/minority, hence impact on indigenous/minority people are not expected.

4.13 Impacts on livelihood and regional economy

4.13.1 Impacts of Port Development

【Construction】

Artisanal fishermen fish in the Port Reitz area mainly by use of dugout canoe. These fishermen may experience reduced catch and subsequent income reduction associated with

the disturbance caused through marine construction works such as dredging. Fish traders may also be affected as they rely on fish caught by the fishermen. There are 8 BMUs operating in Port Reitz and as per their registration data, there are around 1,600 fishermen and 800 fish traders. Impacts will be significant if all these fishermen and fish traders experience income reduction and no measures are implemented to assist them.

In past Mombasa port projects, fishermen were financially compensated, and the same is planned for this project as well. Compensation amount is calculated as shown in Table 4.13.1.

Table 4.13.1: Calculation method of fishermen compensation

	Fishermen	Fish traders
Compensation period	Dredging period + 2 years post-dredging (assumption is that fish resources will fully recover in 2 years after construction)	
Compensation for dredging period	Daily catch volume x fish price x dredging period	Daily trade volume x sale per kg x dredging period
Compensation for post-dredging period (1st year)	Daily catch volume x fish price x dredging period x 50%	Daily trade volume x sale per kg x dredging period x 50%
Compensation for post-dredging period (2nd year)	Daily catch volume x fish price x dredging period x 25%	Daily trade volume x sale per kg x dredging period x 25%

Source: JICA Design Team

As per discussion with BMU, the following additional assistance measures are also planned:

- Provision of one motor boat per BMU
- Provision of cooler box for each BMU
- Capacity building training for fishermen (e.g. management of compensation money, offshore fishing methods)
- Establishment of new landing station (see 11.3.6(15) for details)

The planned compensation and assistance measures will require further refinement through discussions with BMU and other relevant organizations. In the process it is necessary to consider the construction plan and schedule of the Project based on the D/D study as well as consider future plans of other port projects as they may overlap with this Project.

Offshore dumping activities may also affect fisheries operating in the coastal/offshore areas. In regards to the coastal area, some artisanal fishermen fish along the coral reef area but these fishermen are unlikely to be affected as the dumping area is 6 km offshore, where impacts from dumping (e.g. turbidity dispersion) is unlikely to reach in accordance to past monitoring results of Container Port Modernization Project. In regards to the offshore area, industrial fisheries operate with longline to catch mainly tuna. Since the fishing ground of industrial fisheries extend over a wide area including EEZ, offshore dumping is unlikely to have any impacts on industrial fisheries.

4.13.2 Impacts of Road Development

【Pre-construction】

Most of the residents along the SEZ main road rely on land for their livelihood such as farming. The livelihood of these people if not adequately compensated will be greatly affected. However, since farming is conducted on a subsistence/small-scale level, impacts on regional economy will be limited.

【Construction】

Residents in and around the road area will experience income reduction in case temporary construction facilities are built in farmland.

4.14 Land use and local resources

4.14.1 Impacts of Port Development

【Construction】

Large volume of reclamation material will be required for cargo yard construction. Since these materials will be procured from local quarry with sufficient capacity, impacts on local resources are not expected.

4.14.2 Impacts of Road Development

【Pre-construction】

The current land use in the road area will no longer be possible after land acquisition. Due to the limited area, impact is considered not significant.

【Construction】

There may be some restrictions in current land use, in case temporary construction facilities are built for example over farmland. Due to the limited area, impact is considered not significant.

4.15 Impact on Fisheries

4.15.1 Impacts of Port Development

【Construction】

There is one fish landing site near the port namely Mkunguni landing site which is under Mtongwe BMU jurisdiction (see Figure 4.15.1). Access to this site will likely become difficult due to presence of marine construction works. Fishermen and associated traders using this site will therefore likely be required to use alternative landing sites site.

Figure 4.15.1: Location of Mkunguni landing site

The nearest landing site is Dongo Kundu located around 2.5 km west. However, since Dongo Kundu is under the jurisdiction of Mwangala BMU, it will be necessary to reach an agreement with Mwangala BMU for using their landing site. Another potential landing site will be Hawaii landing site located around 5 km east (see Figure 4.15.2).

Figure 4.15.2: Location of Dongo Kundu and Hawaii landing sites

【Operation】

Fishing in the proposed port area will no longer be possible once port operation starts. However, impacts are limited as the area is not a major fishing ground and the fact that there are other fishing grounds.

4.16 Impacts on Social infrastructure and Services

4.16.1 Impacts of SEZ Main Road Development

【Construction】

The SEZ main road intersects with two community roads as shown in Figure 4.16.1.

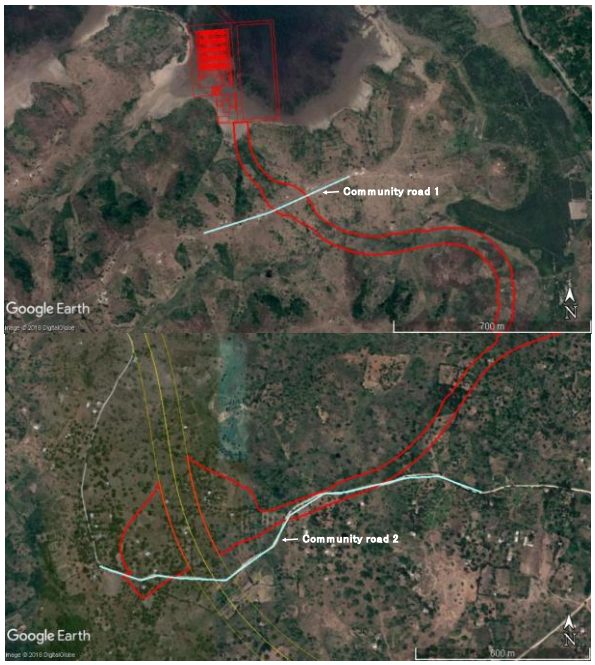


Figure 4.16.1: Community roads intersecting with SEZ main road (light blue)

The road shown on the left figure is used by some residents living in the east side of the SEZ main road (around 10 household). However, these people are expected to relocate during FTZ development, hence the road will no longer be required then onwards.

The road shown on the right figure is used by the community to access Likoni area. While this road is planned to be connected to SEZ main road, the road will be segmented temporary during construction. This will hinder access within the SEZ area.

4.17 Cultural heritage

4.17.1 Impacts of Port Development

【Construction】

A small kaya of around 0.1 ha in size (Kaya Mikadi) is located approximately 80 m west of the port as shown in Figure 4.17.1. Construction workers may affect the kaya through intrusion.

Figure 4.17.1: Location of Kaya Mikadi

4.18 Gender

4.18.1 Impacts of Road Development

【Pre-construction】

Due to the patriarchal nature of the society, women will likely be more vulnerable to resettlement related impacts.

4.19 Children's right

4.19.1 Impacts of Port/ Road Development

【Construction】

Since child labour is relatively common in Kenya, there is a possibility that underage children can be exploited for construction works. Also the majority of the households in the project area have low income levels hence there will be tendency for underage children to look for jobs to help their families.

Kenya is a signatory of ILO Minimum Age Convention 1973 and regulates child labour under the Employment Act as follows:

- Definition of child is a person who has not attained the age of eighteen years (Article 2)
- No person shall employ children under 13 years of age (Article 56).
- Light work is permitted for children between 13 to 16 years of age under certain conditions (Article 56)
- Children between 13 to 16 years of age are restricted to attend machinery (Article 58)
- No person shall employ a child in any opencast workings or sub-surface workings (Article 58)

The Act is consistent with the Minimum Age Convention for light work but does not set any age limits for potentially hazardous works (except machinery and mining), which is set as

above 18 years under the Minimum Age Convention. Therefore, there is a certain possibility that children under 18 years can be employed for hazardous construction works. Furthermore, underage children may also be unintentionally employed as children may not have official documents to prove their age. It is therefore important to confirm the candidate's age through local government offices or other means.

4.20 Infectious diseases

4.20.1 Impacts of Port/SEZ Main Road Development

【Construction】

According to Mombasa County AIDS Strategic Plan 2016-2020, the HIV prevalence rate in Mombasa County is 7.4% (year 2014), which is higher than the national average of 5.6%. HIV prevalence rate is higher with women (10.5%) than men (4.5%). HIV patients are relatively high with sex workers, drug users and so on. Considering such situation, there are certain risks that incoming construction workers can become infected by HIV as well as spreading HIV.

4.21 Occupational Safety

4.21.1 Impacts of Port Development

【Construction】

There is a moderate risk of occupational accidents associated with marine construction works such as falling into sea, diving incidents, boat sinking and so on. There is a moderate risk of maritime accidents such as by movement of marine construction vessels.

【Operation】

There is a moderate risk of occupational accidents associated with cargo handling.

4.21.2 Impacts of SEZ Main Road

【Construction】

There is a moderate risk of occupational accidents associated with use of heavy construction vehicles and machines.

There is a moderate risk of road accidents such as by movement of construction vehicles along public access roads. Risks will be high along commuting roads used by children and intersection with busy roads.

4.22 Impacts on Climate change

4.22.1 Impacts of Port Development

Port construction will result in loss of around 7.5 ha of mangrove cover. Impacts on climate change is considered negligible for the following reasons:

- Carbon stock in Kenya forest is estimated at 137 ton per hectare (FAO 2010). Therefore, loss of 7.5 ha of mangrove can be roughly estimated to result in reduction

of 1,027 tonnes of carbon stock. This is equivalent to only around 0.00021% of the total forest carbon stock of Kenya, which is 476 million tonnes (FAO 2010).

- Kenya's Nationally Determined Contribution (NDC) under the Paris Agreement aims to abate its GHG emissions by 30% by 2030 relative to the BAU scenario. One of the proposed measures to achieve this target is to increase tree cover to at least 10% of the total land area. According to FAO (2010), the total forest area in Kenya is approximately 3.5 million hectares. Since the total land area of Kenya is approximately 57 million hectare, to achieve the 10% target (i.e. 5.7 million hectare) it is necessary to increase the forest area an additional 2.2 million hectare. While the loss of 7.5 ha of mangrove from this Project will somewhat hinder in achieving this target, overall it is not a major setback to Kenya's NDC.
- The mangrove plantation that are planned in this Project, is expected to significantly minimize the Project's impacts on climate change.

5. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Tables 5.1.1 and 5.1.2 show the environmental and social management plan (ESMP) for the port and SEZ main road respectively. The ESMP lists the proposed mitigation measures for the predicted adverse impacts and their implementation and supervision responsibilities. The approximate costs of the mitigation measures are also estimated where possible.

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Table 5.1.1: Environmental and Social Management Plan (Port)

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
Pre-construction					
Ecosystem	Cutting of mangrove trees (approx. 7.5 ha)	• Mangroves to be planted in degraded mangrove forest area as per the National Mangrove Ecosystem Management Plan (2017-2027) and Mombasa Participatory Forest Management Plan (2015-2019). • Detailed mangrove plantation plan will be prepared through consultation with KFS and local community.	KPA Construction contractor	KFS	6,200,000 (to be included construction cost)
Construction					
Air pollution	Fugitive dust and exhaust emissions from construction vehicles	• Implement regular maintenance and vehicles emitting visible pollutants (e.g. black soot) to be removed from operation until repaired as per Environmental Management and Co-ordination (Air Quality) Regulations 2014. • Construction vehicles without inspection certificate will not be allowed to operate. • Avoid to the extent possible passing through sensitive areas (e.g. residential area, schools). • Slow driving on dusty roads within the community area. • Cover truck loading bed when transporting loose materials (e.g. soil).	Construction contractor	Supervising consultant KPA	Included in construction base cost
	Fugitive dust emission from heavy civil works	• Regular water spraying of exposed surfaces. • Covering of stockpiles.	Construction contractor	Supervising consultant KPA	Included in construction base cost
	Dust and exhaust emissions from concrete/asphalt plant	• Asphalt plant to acquire emission license from NEMA and comply with emission standard set under Environmental Management and Co-ordination (Air Quality) Regulations 2014. • Concrete/asphalt plant to be located as far as possible from sensitive areas (e.g. residential area). • Covering of stockpiles.	Construction contractor	Supervising consultant KPA	Included in construction base cost
Water pollution	Sediment dispersion through dredging and offshore dumping of dredged material	**[Grab dredger]** • Installation of silt curtain where dredging works are conducted. • Ensure there are no leakage from equipment such as barge hopper seal. • Prohibition of overflow from barge during transportation of dredged material from the dredging site and dumping site. • Tracking of barge movement during offshore dumping to ensure dumping is conducted at the designated site.	Construction contractor	Supervising consultant KPA	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		[TSHD] • Prohibition of overflow during transportation of dredged material from the dredging site and dumping site. • Ensure there are no leakage from equipment such as hopper seal. • Use TSHD with keel-level overflow. • Maximize under-keel clearance to minimize propeller wash effect on seabed. • Tracking of dredger movement during offshore dumping to ensure dumping is conducted at the designated site. **[Common]** • Implement water quality and coral monitoring and reconsider dredging and dumping methods in case turbidity levels exceeds set threshold level or coral health degradation is observed (see monitoring plan for more details). • In case dredging works overlap with other Mombasa port dredging projects, coordinate with those projects and revise and strengthen the ESMP and ESMoP as necessary.			
	Uncontrolled discharge of concrete wash water	• Discharge of untreated concrete wash water to the environment to be strictly prohibited. • Concrete wash water to be treated at designated facilities (e.g. facilities with wash water treatment system). • Treated wash water to be reused as far as possible. • Acquire effluent discharge license from NEMA in case discharge to environment is planned. Effluent quality (e.g. pH) to comply with discharge standard set under Environmental Management and Coordination, (Water Quality) Regulations 2006.	Construction contractor	Supervising consultant KPA	Included in construction base cost
	Wastewater discharge from temporary construction facilities.	• Wastewater (e.g. grey/blackwater) from temporary construction facilities to be treated with sewage treatment facility (e.g. septic tank) as per Kenyan regulations or norms.	Construction contractor	Supervising consultant KPA	Included in construction base cost
Soil pollution	Oil leak/spill from construction vehicles/machines and fueling area	• Regular inspection of vehicles and machines for oil and fuel leaks. Leaking vehicles and machines to be immediately moved to a designated workshop and not used until repaired. • Maintenance/repair activities to be conducted only at designated workshop with appropriate pollution control facility (e.g. oil/water separator).	Construction contractor	Supervising consultant KPA	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		• Spill response kit (e.g. absorbents) to be readily available at the construction site. Spills to be removed with absorbents and contained and disposed as hazardous waste. • Fuel tank to be installed on an impermeable base with bunds. Install oil/water separator at fueling area.			
Waste	Generation of construction solid waste (e.g. domestic waste, packaging material, metal scrap, medical waste)	• Minimize waste generation through reuse and recycling. • Wastes to be stored in designated areas and with containers specialized for each waste type. • Wastes to be collected and disposed only by NEMA-authorized firms. • Medical waste to be segregated from other wastes and disposed at NEMA-authorized facilities. • Construction contractor to prepare a Construction Waste Management Plan (CWMP) through consultation with the county government, which identifies the different wastes that will be generated and their proposed storage and disposal procedures. • Tracking and keeping records of waste movement and disposal.	Construction contractor	Supervising consultant KPA NEMA County government	Included in construction base cost
	Generation of hazardous waste (e.g. waste oil)	• Hazardous wastes to be stored in designated areas and with containers specialized for each waste type. • Storage area to be have an impermeable base with bunds. • Hazardous wastes to be collected and disposed only by NEMA-authorized firms.			
Noise/vibration	Noise from construction vehicles/machine and pile driving works	• Equip vehicles and machines with exhaust mufflers and carry out regular maintenance/inspection. • Prohibit using vehicles that exceed 84 dBA when accelerating as per Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. • Avoid to the extent possible using roads that pass through sensitive areas. If unavoidable, implement speed control measures (e.g. installation of speed bumps) near sensitive areas and avoid raving of engines and unnecessary idling. • Use to the extent possible low-noise pile driver. Conduct pile-driving works in a manner so that noise levels do not exceed the construction site noise standard set under Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. • Obtain permit from NEMA in case there are works involving	Construction contractor	Supervising consultant KPA	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		excessive noise/vibration as per Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. • Install warning signs and use PPE (e.g. earmuff) where excessive noisy works are conducted.			
Odor	Odor from asphalt plant and construction camps	• Asphalt plant to be located as far as possible from sensitive areas. • Operate asphalt plant at minimum temperature. • Cover truck loading bed when transporting asphalt. • Food waste from construction camp to be segregated from other wastes and stored in manner to prevent odor. • Toilets to be cleaned daily and sludge to be removed regularly.	Construction contractor	Supervising consultant KPA	Included in construction base cost
Conservation area	Sediment dispersion through offshore dumping of dredged material	• Prohibition of overflow during transportation of dredged material from the dredging site and dumping site. • Tracking of dredger/barge movement during offshore dumping to ensure dumping is conducted at the designated site. • Implement water quality and coral monitoring and reconsider dredging and dumping methods in case turbidity levels exceeds set threshold level or coral health degradation is observed (see monitoring plan for more details). • In case dredging works overlap with other Mombasa port dredging projects, coordinate with those projects and revise and strengthen the ESMP and ESMoP as necessary.	Construction contractor	Supervising consultant KPA	Included in construction base cost
Ecosystem	Sediment dispersion through dredging and offshore dumping of dredged material	• Implement measures stated under "Water Pollution".	Construction contractor	Supervising consultant KPA	Included in construction base cost
Livelihood	Impact of marine construction works on fishing activities	• Provision of compensation and assistance to affected fishermen/traders. • If requested, preferentially employ affected fishermen for casual labor.	KPA Construction contractor	BMU KeFS	To be estimated in D/D stage
Water use	Restriction in use of fish landing site	• Establish alternative landing site.	KPA	BMU KeFS	1,000,000
Cultural heritage	Impact on Kaya Mikadi	• Prohibit entrance of construction workers inside kaya. • Demarcation of kaya boundary and erection of sign post, to ensure that workers do not enter the kaya.	Construction contractor	Supervising consultant KPA	—
Children's right	Employment of underaged	• As per Employment Act 2007, children under 13 years of age will not	Construction	Supervising	—

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
	children	be employed. • As per Employment Act 2007, children between 13 and 16 years of age will not be employed for works that are potentially harmful and prejudice the child's attendance at school. • Prohibit employment of children under 18 years of age for potentially harmful works.	contractor	consultant KPA	
	Exploitation of underaged children	• Contractor to prepare Code of Conduct for construction workers.	Construction contractor	Supervising consultant KPA	—
Infectious diseases	Proliferation of infectious diseases due to influx of construction workers	• Contractor to prepare and implement HIV/AIDS Prevention/Awareness Plan in accordance to HIV and AIDS Prevention and Control Act 2006. The plan shall among others include the following: - Awareness programs for construction workers - Code of Conduct to be complied by the construction workers - Other measures (e.g. counselling and testing) • Contractor to subcontract implementation of the HIV/AIDS Prevention/Awareness Plan to qualified organizations in this field.	Construction contractor	Supervising consultant KPA NACC	Included in construction base cost
Occupational safety	Risk of occupational accidents	• Contractor to prepare Occupational Health and Safety Plan in accordance to Occupational Safety and Health Act 2007. The plan shall among others include the following: - Risk assessment and planned safety measures - Training plan for construction workers - Organizational structure - Emergency response plan	Construction contractor	Supervising consultant KPA DOSHS	Included in construction base cost
Accidents	Risk of maritime accidents	• Inform in advance marine users the construction plan. • Installation of buoys along construction boundary.	Construction contractor	Supervising consultant KPA	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
Operation					
Water pollution	Sediment dispersion through dredging and offshore dumping of dredged material	**[Grab dredger]** • Installation of silt curtain where dredging works are conducted. • Ensure there are no leakage from equipment such as barge hopper seal. • Prohibition of overflow from barge during transportation of dredged material from the dredging site and dumping site. • Tracking of barge movement during offshore dumping to ensure dumping is conducted at the designated site. **[TSHD]** • Prohibition of overflow during transportation of dredged material from the dredging site and dumping site. • Ensure there are no leakage from equipment such as hopper seal. • Use TSHD with keel-level overflow. • Maximize under-keel clearance to minimize propeller wash effect on seabed. • Tracking of dredger movement during offshore dumping to ensure dumping is conducted at the designated site. **[Common]** • Implement water quality and coral monitoring and reconsider dredging and dumping methods in case turbidity levels exceeds set threshold level or coral health degradation is observed (see monitoring plan for more details). • In case dredging works overlap with other Mombasa port dredging projects, coordinate with those projects and revise and strengthen the ESMP and ESMoP as necessary.	Dredging contractor	KPA	Included in operation base cost
	Rainwater runoff from port facilities	• Minimize oil leak/spill through regular maintenance of cargo handling machines • Installation of oil/water separator (during construction) along the drainage and regularly collect residual oil.	Port operator Construction contractor	KPA	Oil/water separator: Included in construction base cost
	Wastewater discharge from ships	• Regulate ship wastewater as per Environmental (Prevention of Pollution in Coastal Zone and other Segments of the Environment) Regulations 2003 and Marpol regulations.	Port operator KPA	KMA	Included in operation base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
Waste	Generation of operation waste	• Wastes to be handled and disposed only by NEMA-authorized firms. • Waste disposal containers to be provided onsite for each waste category. • Preparation of Waste Management Plan (WMP) that identifies the different wastes that will be generated and their proposed disposal procedure	Port operator	KPA NEMA County government	Included in operation base cost
Conservation area	Sediment dispersion through offshore dumping of dredged material	• Prohibition of overflow during transportation of dredged material from the dredging site and dumping site. • Tracking of dredger/barge movement during offshore dumping to ensure dumping is conducted at the designated site. • Implement water quality and coral monitoring and reconsider dredging and dumping methods in case turbidity levels exceeds set threshold level or coral health degradation is observed (see monitoring plan for more details).	Dredging contractor	KPA	Included in operation base cost
Ecosystem	Sediment dispersion through offshore dumping of dredged material	• Implement measures stated under "Water pollution".	Dredging contractor	KPA	Included in operation base cost
Occupational safety	Risk of occupational accidents	• Preparation of Occupational Health and Safety Plan in accordance to Occupational Safety and Health Act 2007. The plan shall among others include the following: - Risk assessment and planned safety measures - Training plan for operation workers - Organizational structure - Emergency response plan	Port operator	KPA	Included in operation base cost

Table 5.1.2: Environmental and Social Management Plan (SEZ main road)

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
Pre-construction					
Ecosystem	Cutting of threatened tree species (one *Vitellariopsis kirkii*)	• Transplantation of *Vitellariopsis kirkii*. Detailed transplantation plan to be prepared through consultation with KFS.	KeNHA	KFS NMK	300,000
Resettlement	Resettlement due to land acquisition	• Carry out fair and adequate compensation as per RAP and provide livelihood restoration assistance until their livelihoods are restored to pre-project levels or better. • Implement internal and external monitoring to ensure the RAP is implemented appropriately. • A grievance redress mechanism (e.g. establishment of PAP Committee) will be put in place to address all emerging complaints and grievances from the PAPs and project area community.	KeNHA NLC	RAP implementation committee	Included in RAP budget
Vulnerable persons	Resettlement of vulnerable persons due to land acquisition	• Vulnerable households to be provided with extra assistance as per RAP.	KeNHA NLC	RAP implementation committee	Included in RAP budget
Livelihood	Loss of income due to land acquisition	• Provision of compensation and assistance as per RAP until income are restored to pre-project levels or better.	KeNHA NLC	RAP implementation committee	Included in RAP budget
Land use	Alteration of land use due to land acquisition	• Provision of compensation and assistance as per RAP until income are restored to pre-project levels or better.	KeNHA NLC	RAP implementation committee	Included in RAP budget
Gender	Resettlement of women HHs due to land acquisition	• Women HHs to be provided with extra assistance as per RAP. • Hold women focused group meetings as necessary. • Allocate women representative in the PAP committee.	KeNHA NLC	RAP implementation committee	Included in RAP budget
Construction					
Air pollution	Fugitive dust and exhaust emissions from construction vehicles	• Implement regular maintenance and vehicles emitting visible pollutants (e.g. black soot) to be removed from operation until repaired as per Environmental Management and Co-ordination (Air Quality) Regulations 2014. • Construction vehicles without inspection certificate will not be allowed to operate. • Avoid to the extent possible passing through sensitive areas (e.g. residential area, schools). • Slow driving on dusty roads within the community area. • Cover truck loading bed when transporting loose materials (e.g. soil).	Construction contractor	Supervising consultant KeNHA	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
	Fugitive dust emission from heavy civil works	• Regular water spraying of exposed surfaces. • Covering of stockpiles.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
	Dust and exhaust emissions from concrete/asphalt plant	• Asphalt plant to acquire emission license from NEMA and comply with emission standard set under Environmental Management and Co-ordination (Air Quality) Regulations 2014. • Concrete/asphalt plant to be located as far as possible from sensitive areas. • Covering of stockpiles.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
Water pollution	Sediment-laden rainwater runoff from construction site	• Exposed cut and fill slopes to be protected (e.g. by shotcrete) as soon as cut and fill works are completed. • Install temporary erosion control measures (e.g. sheet cover, sedimentation pond) as necessary. • Stockpiles (e.g. topsoil) to be covered by sheet. • Temporary construction yard to be located as far as possible from surface water bodies.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
	Uncontrolled discharge of concrete wash water	• Discharge of untreated concrete wash water to the environment to be strictly prohibited. • Concrete wash water to be treated at designated facilities (e.g. facilities with wash water treatment system). • Treated wash water to be reused as far as possible. • Acquire effluent discharge license from NEMA in case discharge to environment is expected. Effluent quality (e.g. pH) to comply with discharge standard set under Environmental Management and Coordination, (Water Quality) Regulations 2006.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
	Wastewater discharge from temporary construction facilities.	• Wastewater (e.g. grey/blackwater) from temporary construction facilities to be treated with sewage treatment facility (e.g. septic tank) as per Kenyan regulations or norms.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
Soil pollution	Oil leak/spill from construction vehicles/machines and fueling area	• Regular inspection of vehicles and machines for oil and fuel leaks. Leaking vehicles and machines to be immediately moved to a designated workshop and not used until repaired. • Maintenance/repair activities to be conducted only at designated workshop with appropriate pollution control facility (e.g. oil/water separator). • Spill response kit (e.g. absorbents) to be readily available at the construction site. Spills to be removed with absorbents and contained and disposed as hazardous waste. • Fuel tank to be installed on an impermeable base with bunds. Install	Construction contractor	Supervising consultant KeNHA	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		oil/water separator at fueling area.			
Waste	Generation of construction solid waste (e.g. domestic waste, packaging material, metal scrap, medical waste)	• Minimize waste generation through reuse and recycling. • Wastes to be stored in designated areas and with containers specialized for each waste type. • Wastes to be collected and disposed only by NEMA-authorized firms. • Medical waste to be segregated from other wastes and disposed at NEMA-authorized facilities. • Construction contractor to prepare a Construction Waste Management Plan (CWMP) through consultation with the county government, which identifies the different wastes that will be generated and their proposed storage and disposal procedures. • Tracking and keeping records of waste movement and disposal.	Construction contractor	Supervising consultant KeNHA NEMA County government	Included in construction base cost
	Generation of hazardous waste (e.g. waste oil)	• Hazardous wastes to be stored in designated areas and with containers specialized for each waste type. • Storage area to be have an impermeable base with bunds. • Hazardous wastes to be collected and disposed only by NEMA-authorized firms.			
Noise/vibration	Noise from construction vehicles/machine and sites	• Equip vehicles and machines with exhaust mufflers and carry out regular maintenance/inspection. • Prohibit using vehicles that exceed 84 dBA when accelerating as per Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. • Avoid to the extent possible using roads that pass through sensitive areas. If unavoidable, implement speed control measures (e.g. installation of speed bumps) near sensitive areas and avoid raving of engines and unnecessary idling. • Obtain permit from NEMA in case there are works involving excessive noise/vibration as per Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. • Install warning signs and use PPE (e.g. earmuff) where excessive noisy works are conducted.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
Odor	Odor from asphalt plant and construction camps	• Asphalt plant to be located as far as possible from sensitive areas. • Operate asphalt plant at minimum temperature. • Cover truck loading bed when transporting asphalt. • Food waste from construction camp to be segregated from other wastes and stored in manner to prevent odor. • Toilets to be cleaned daily and sludge to be removed regularly.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
Livelihood	Temporary loss of income	• In case temporary construction facilities will affect livelihood of the	Construction	Supervising	Included in

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
	due to construction-related disturbances	locals such as farming, the affected persons to be compensated depending on the degree of impact. • Inform well in advance the affected persons about the construction plan so that they can harvest their crops and their request can be incorporated into the plan. • Casual labor to be resourced from the local community.	contractor	consultant KeNHA	construction base cost
Land use and local resource	Procurement of construction raw materials (e.g. aggregates)	• Construction raw materials to be procured only from NEMA authorized quarries. • Contractor to obtain EIA license in case the Contractor will develop new quarries. The quarry to be rehabilitated once it is decommissioned. • Quarry to be operated in accordance to Integrated National Land use Guidelines 2011.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
Social infrastructure	Division of community road	• Construct detour road in case construction works will hinder the use of existing community road.	Construction contractor	Supervising consultant KeNHA KeRRA	Included in construction base cost
Children's right	Employment of underaged children	• As per Employment Act 2007, children under 13 years of age will not be employed. • As per Employment Act 2007, children between 13 and 16 years of age will not be employed for works that are potentially harmful and prejudice the child's attendance at school. • Prohibit employment of children under 18 years of age for potentially harmful works.	Construction contractor	Supervising consultant KeNHA	—
	Exploitation of underaged children	• Contractor to prepare Code of Conduct for construction workers.	Construction contractor	Supervising consultant KeNHA	—
Infectious diseases	Proliferation of infectious diseases due to influx of construction workers	• Contractor to prepare and implement HIV/AIDS Prevention/Awareness Plan in accordance to HIV and AIDS Prevention and Control Act 2006. The plan shall among others include the following: - Awareness programs for construction workers - Code of Conduct to be complied by the construction workers - Other measures (e.g. counselling and testing) • Contractor to subcontract implementation of the HIV/AIDS Prevention/Awareness Plan to qualified organizations in this field.	Construction contractor	Supervising consultant KeNHA NACC	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
Occupational safety	Risk of occupational accidents	• Contractor to prepare Occupational Health and Safety Plan in accordance to Occupational Safety and Health Act 2007. The plan shall among others include the following: - Risk assessment and planned safety measures - Training plan for construction workers - Organizational structure - Emergency response plan	Construction contractor	Supervising consultant KeNHA DOSHS	Included in construction base cost
Accidents	Risk of traffic accidents	• Strict compliance to speed limits. • Avoid to the extent possible using roads with high risk of accidents. If unavoidable, implement measures to minimize risks such as installing speed bumps, warning signs and placing traffic control officers at high risk areas. • Vehicle motion alarm to be installed on all construction vehicles.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
Operation					
Waste	Generation of maintenance waste	• Wastes to be handled and disposed only by NEMA-authorized firms. • Waste disposal containers to be provided onsite for each waste category. • Preparation of Waste Management Plan (WMP) that identifies the different wastes that will be generated and their proposed disposal procedure	Maintenance contractor	KeNHA NEMA County government	Included in operation base cost
Noise/vibration	Noise from vehicles	• Establishment of green belt along sensitive areas. • Regular maintenance of green belt and road.	Construction contractor Maintenance contractor	KeNHA	Construction cost: 5,000,000 Maintenance cost: Included in operation base cost

6. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

Tables 6.1.1 and 6.1.2 show the environmental and social monitoring plan (ESMoP) for the port and SEZ main road respectively.

Table 6.1.1: Environmental and Social Monitoring Plan (Port)

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
Pre-construction					
Ecosystem	To check the progress and effectiveness of mangrove plantation plan	➢ Check growth status (e.g. height, survival, health) of planted mangrove seedling.	2/year until 5 years after plantation	KPA	1,900,000
Construction					
Air pollution	To check whether excessive dust and exhaust gas are not emitted from the construction sites	➢ Visual inspection of: - Fugitive dust emissions from construction sites - Exhaust gas emissions (e.g. black soot) from construction vehicles and machines	Daily	Construction contractor	Part of construction base cost
	To check stack emission concentration from asphalt plant	➢ Measurement of stack emission concentration ➢ Parameters: PM10, SOx, NOx, HC ➢ Assessment criteria: Emission standard set under Environmental Management and Co-ordination (Air Quality) Regulations 2014	4/year	Construction contractor	500,000
Water pollution	To check turbidity dispersion from dredging and dumping activities	**[Turbidity monitoring]** ➢ Method: *In situ* measurement of surface and bottom turbidity (NTU) around dredging area (4 sites), MPA/coral reef area (6 sites) and between MPA/coral reef area and dumping site (6 sites) ➢ Assessment criteria (coral reef area): Baseline + 2 NTU. Dredging/dumping method to be reconsidered in case turbidity exceeds the set criteria for 2 weeks continuously. ➢ Assessment criteria (dredging area): Baseline + 15 NTU. Dredging method to be reconsidered in case turbidity exceeds the set criteria for 2 weeks continuously.	Pre-construction: 7 days (baseline study) Construction: Daily during dredging, Weekly for between MPA/coral reef area and dumping site	Construction contractor	13,000,000
		[Other water quality monitoring] ➢ Method: Measurement of DO, SS, T-N, T-P, Coliforms at dredging area (4 sites) and MPA/coral reef area (6 sites) ➢ Analysis to be done at NEMA certified lab. ➢ Assessment criteria: comparison with baseline values	Pre-construction: 7 days (baseline study) Construction: Weekly		
		[Aerial monitoring] ➢ Method: Taking of aerial photographs along the MPA/coral reef area and dredger/barge transport route such as by drone. ➢ Assessment criteria: Check presence of turbid plumes at MPA/coral reef area and if any are generated from travelling dredger/barge.	Construction: Weekly		
	To check the water quality	➢ Method: Measurement of water quality of treated concrete	Prior to discharge	Construction	500,000

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
	of treated concrete washwater	washwater ➢ Parameters: pH ➢ Assessment criteria: Effluent standard (6.5-8.5) set under Environmental Management and Coordination (Water Quality) Regulations 2006		contractor	
Soil pollution	To check of any oil leaks from construction vehicles/machines and fuel tank	➢ Visual inspection of oil leaks from construction vehicle/machines and fuel tanks.	Daily	Construction contractor	Part of construction base cost
Waste	To check whether wastes are stored and handled in accordance to the contractor's Waste Management Plan	➢ Method: Site inspection and checking of waste treatment/disposal records. ➢ Assessment criteria: Waste storage method, site littering, waste treatment/disposal records.	Daily 4/year	Construction contractor Supervising consultant	Part of construction / supervision base cost
Noise / vibration	To check whether excessive noise is not emitted from the construction sites	➢ Method: Field measurement of noise level (LAeq) ➢ Location: Construction site boundary (2 sites), sensitive receptors (3 sites) ➢ Assessment criteria (construction site boundary): Noise standard set under Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. Daytime: 60 dB, Nighttime: 35 dB ➢ Assessment criteria (sensitive receptors): Noise standard set under Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. Daytime: 50 dB, Nighttime: 35 dB	Pre-construction: Once Construction: 1/week	Construction contractor	500,000
Odor	To check whether excessive odor is not emitted from the asphalt plant	➢ Check odor at sensitive receptors near the asphalt plant.	1/week	Construction contractor	Part of construction base cost
Conservation area	To check impacts on MPA due to offshore dumping of dredged materials	➢ Check impacts on MPA by interviewing managers of MPA.	1/month during dredging	Supervising consultant KPA	Part of supervision base cost
Ecosystem	To check impacts on coastal ecosystem due to offshore dumping of dredged materials	➢ Method: Transect survey along the coral/seagrass habitats in the coastal/MPA areas ➢ Item: Coral and seagrass ➢ No. of transect: 8 transects each for coral and seagrass ➢ Assessment criteria: Coral/seagrass cover, health status (e.g. sedimentation, bleaching, mucus secretion). Dredging/dumping method to be reconsidered in case degradation of	2/month during dredging	Construction contractor	2,600,000

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
		coral/seagrass health is observed. ➢ Survey to be conducted by marine ecology expert			
Livelihood	To check the progress and effectiveness of fishermen Livelihood Restoration Plan	➢ Interview BMU members and confirm status of fish landing, motor boat usage, training effectiveness and so on.	1/month during construction and until 2 years post-construction	KPA	4,800,000
Water use	To check status of how alternative landing site is used	➢ Interview BMU members and confirm if there are any isssues with fish landing usage	1/month during construction and until 2 years post-construction	KPA	Included in above cost
Cultural heritage	To check impacts on Kaya Mikadi	➢ Check of any presence of workers inside or around kaya through patrol.	Daily	Construction contractor	Part of construction base cost
Children's right	To check whether there are any child labour	➢ Check employment registration of the Contractor (confirm its accuracy with local administration office).	4/year	Supervising consultant	Part of supervision base cost
Infectious diseases	To check the progress and effectiveness of HIV/AIDS Prevention Plan	➢ Method: Checking through meetings and reports. ➢ Assessment criteria: Records of awareness programs, counselling, number of participants	4/year	Supervising consultant	Part of supervision base cost
Occupational safety	To check whether safety procedures are implemented in accordance to Occupational Health and Safety Plan	➢ Visual inspection of work safety procedures and equipment.	Daily	Construction contractor Supervising consultant	Part of construction / supervision base cost
Accident	To check status of maritime accidents	➢ Method: Checking through meetings and reports. ➢ Assessment criteria: Number and types of accidents, risk minimization measures	1/week	Supervising consultant	Part of supervision base cost
Operation					
Water pollution	To check impacts from rainwater runoff	➢ Check of any presence of oil film at rainwater runoff discharge site	During rain	KPA	Part of operation base cost
	To check turbidity dispersion from dredging and dumping activities	**[Turbidity monitoring]** ➢ Method: *In situ* measurement of surface and bottom turbidity (NTU) around dredging area (4 sites), MPA/coral reef area (6 sites) and between MPA/coral reef area and dumping site (6 sites) ➢ Assessment criteria (coral reef area): Baseline + 2 NTU. Dredging/dumping method to be reconsidered in case turbidity exceeds the set criteria for 2 weeks continuously. ➢ Assessment criteria (dredging area): Baseline + 15 NTU. Dredging method to be reconsidered in case turbidity exceeds	Pre-construction: 7 days (baseline study) Construction: Daily during dredging, Weekly for between MPA/coral reef area and dumping site	Construction contractor	2,200,000

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
		the set criteria for 2 weeks continuously.			
		[Other water quality monitoring] ➢ Method: Measurement of DO, SS, T-N, T-P, Coliforms at dredging area (4 sites) and MPA/coral reef area (6 sites) ➢ Analysis to be done at NEMA certified lab. ➢ Assessment criteria: comparison with baseline values	Pre-construction: 7 days (baseline study) Construction: Weekly		
		[Aerial monitoring] ➢ Method: Taking of aerial photographs along the MPA/coral reef area and dredger/barge transport route such as by drone. ➢ Assessment criteria: Check presence of turbid plumes at MPA/coral reef area and if any are generated from travelling dredger/barge.	Construction: Weekly		
Waste	To check whether wastes are stored and handled in accordance to the Waste Management Plan	➢ Visual inspection of waste storage sites. ➢ Check records of waste treatment/disposal.	4/year	KPA	Part of operation base cost
Conservation area	To check impacts on MPA due to offshore dumping of dredged materials	➢ Interview of managers of MPA	1/month during dredging	KPA	Part of operation base cost
Ecosystem	To check impacts on corals due to offshore dumping of dredged materials	➢ Coral survey along 6 transects set along the coastal area ➢ Assessment criteria: Coral cover and coral health (e.g. sedimentation, bleaching, mucus secretion). Dredging/dumping method to be reconsidered in case degradation of coral health is observed. ➢ Survey to be conducted by coral expert	2/month during dredging	Dredging contractor	430,000
Occupational safety	To check whether safety procedures are implemented in accordance to Occupational Health and Safety Plan	➢ Visual inspection of work safety procedures and equipment.	1/week	KPA	Part of operation base cost

Table 6.1.2: Environmental Monitoring Plan (SEZ Main Road)

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
Pre-construction					
Ecosystem	To check the progress and effectiveness of plantation of threatened species	➢ Check growth status (e.g. height, survival, health) of planted trees.	2/year until 5 years after plantation	KeNHA	1,900,000
Resettlement	To check the progress and effectiveness of RAP	**Internal monitoring** ➢ Check status of compensation disbursement, land purchase, structures, livelihood, standards of living etc.	• 1/month during RAP implementation • Quarterly after RAP implementation for 1 year	KeNHA	Included in RAP monitoring budget
		External monitoring ➢ Check status of compensation disbursement, land purchase, structures, livelihood, standards of living, grievance issues etc.	• 2/year during RAP implementation • 2/year after RAP implementation for 1 year	KeNHA contract third party	Included in RAP monitoring budget
Vulnerable social groups	To check the effectiveness of assistance measures for vulnerable PAPs	➢ As part of RAP monitoring, check status of livelihood and standards of living of vulnerable PAPs.	• 1/month during RAP implementation • Quarterly after RAP implementation for 1 year	KeNHA	Included in RAP monitoring budget
Livelihood	To check the effectiveness of livelihood recovery measures	➢ As part of RAP monitoring, check status of livelihood and standards of living of PAPs.	• 1/month during RAP implementation • Quarterly after RAP implementation for 1 year	KeNHA	Included in RAP monitoring budget
Land use	To check the effectiveness of livelihood recovery measures	➢ As part of RAP monitoring, check status of livelihood and standards of living of PAPs that were dependent on land for livelihood.	• 1/month during RAP implementation • Quarterly after RAP implementation for 1 year	KeNHA	Included in RAP monitoring budget
Gender	To check the effectiveness of assistance measures for women HH	➢ As part of RAP monitoring, check status of livelihood and standards of living of women HH.	• 1/month during RAP implementation • Quarterly after RAP implementation for 1 year	KeNHA	Included in RAP monitoring budget
Construction					
Air pollution	To check whether excessive dust and exhaust gas are not emitted from the construction sites	➢ Visual observation of: - Fugitive dust emissions from construction sites - Exhaust gas emissions (e.g. black soot) from construction vehicles and machines	Daily	Construction contractor	Part of construction base cost
		➢ Method: Measurement of PM10 ➢ Location: Sensitive receptors (3 sites) ➢ Assessment criteria: PM10 standard (100 μg/m^3) set under Environmental Management and Co-ordination (Air Quality)	Pre-construction: Once Construction: 1/week	Construction contractor	3,000,000

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
		Regulations 2014			
	To check stack emission concentration from asphalt plant	➢ Method: Measurement of stack emission concentration ➢ Parameters: PM10, SOx, NOx, HC ➢ Assessment criteria: Emission standard set under Environmental Management and Co-ordination (Air Quality) Regulations 2014	4/year	Construction contractor	500,000
Water pollution	To check whether rainwater runoff from construction site is not causing water pollution	➢ Visual observation of rainwater runoff flow pattern (e.g. check whether there is any inflow of sediment-laden runoff from construction site). ➢ In case there is significant inflow of sediment-laden rainwater runoff, measure water quality (turbidity and TPH) of the receiving water body before and after mitigation.	Before and after mitigation	Construction contractor	500,000
	To check the water quality of treated concrete washwater	➢ Method: Measurement of water quality of treated concrete washwater ➢ Parameters: pH ➢ Assessment criteria: Effluent standard (6.5-8.5) set under Environmental Management and Coordination (Water Quality) Regulations 2006	Prior to discharge	Construction contractor	500,000
Soil pollution	To check of any oil leaks from construction vehicles/machines and fuel tank	➢ Visual observation of oil leaks from construction vehicle/machines and fuel tanks.	Daily	Construction contractor	Part of construction base cost
	To check the soil quality of top soil at the excavation site	➢ Method: Sampling and analysis of top soil ➢ Parameters: PAHs, heavy metals (As, Cd, Cr^{+6}, Hg, Pb, Ni, Zn) ➢ Location: 5 sites ➢ Assessment criteria: Soil quality standard set under Dutch Soil Remediation Circular 2013	Once before construction	Construction contractor	700,000
Waste	To check whether wastes are stored and handled in accordance to the contractor's Waste Management Plan	➢ Method: Site inspection and checking of waste treatment/disposal records. ➢ Assessment criteria: Waste storage method, site littering, waste treatment/disposal records.	1/month	Supervising consultant	Part of supervision base cost
Noise / vibration	To check whether excessive noise is not emitted from the construction sites	➢ Method: Field measurement of noise level (LAeq) ➢ Location: Construction site boundary (2 sites), sensitive receptors (3 sites) ➢ Assessment criteria (construction site boundary): Noise standard set under Environmental Management and	Pre-construction: Once Construction: 1/week	Construction contractor	500,000

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
		Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. Daytime: 60 dB, Nighttime: 35 dB ➢ Assessment criteria (sensitive receptors): Noise standard set under Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. Daytime: 50 dB, Nighttime: 35 dB			
Odor	To check whether excessive odor is not emitted from the asphalt plant	➢ Check odor at sensitive receptors near the asphalt plant.	1/week	Construction contractor	Part of construction base cost
Livelihood	To check impacts on livelihood due to acquisition of land for construction works	➢ As part of RAP monitoring, check status of livelihood and standards of living of PAPs affected by acquisition of land for construction works.	1/month	KeNHA	Included in RAP monitoring budget
Land use	To check impacts on land use due to acquisition of land for construction works	➢ Method: Check contractors construction plan ➢ Assessment criteria: type/location of construction facilities, distance to sensitive receptors	Once before construction	Supervising consultant	Part of supervision base cost
Social infrastructure and services	To check the status of detour road	➢ Visual observation of road conditions.	1/month	Supervising consultant	Part of supervision base cost
Children's right	To check whether there are any child labour	➢ Check employment registration of the Contractor (confirm its accuracy with local administration office).	4/year	Supervising consultant	Part of supervision base cost
Infectious diseases	To check the progress and effectiveness of HIV/AIDS Prevention Plan	➢ Method: Checking through meetings and reports. ➢ Assessment criteria: Records of awareness programs, counselling, number of participants	4/year	Supervising consultant	Part of supervision base cost
Occupational safety	To check whether safety procedures are implemented in accordance to Occupational Health and Safety Plan	➢ Visual inspection of work safety procedures and equipment.	Daily	Construction contractor Supervising consultant	Part of construction / supervision base cost
Accidents	To check status of traffic accidents	➢ Method: Checking through meetings and reports. ➢ Assessment criteria: Number and types of accidents, risk minimization measures	1/week	Supervising consultant	Part of supervision base cost
Operation					
Waste	To check whether wastes are stored and handled in accordance to the Waste	➢ Visual inspection of waste storage sites. ➢ Check records of waste treatment/disposal.	During maintenance	KeNHA	Part of operation base cost

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
	Management Plan				
Noise / vibration	To check noise impacts from vehicles	➢ Method: Field measurement of noise level (LAeq) ➢ Location: Sensitive receptors (3 sites) ➢ Assessment criteria: Noise standard set under Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009. Daytime: 50 dB, Nighttime: 35 dB	4/year	KeNHA	Part of operation base cost

7. STAKEHOLDER CONSULTATION AND PUBLIC PARTICIPATION

7.1 Introduction

The Constitution of Kenya 2010 recognizes the sovereignty of the people and that people possess the power to guide development within their areas either directly or indirectly through their leaders. The public should therefore be involved in the evaluation process because the constitution demands it to be so. The main objectives of the stakeholder engagement process are to:

- Inform the stakeholders about the proposed project and provide opportunities for influencing/amending the plans;
- Collect stakeholders' views on the proposed project including potential positive/negative impacts the stakeholders may associate with the project;
- Get an idea of Stakeholders' preferred approaches to implementation of the project;
- Get local knowledge on any sensitive areas within the project area of influence (physical, environmental, cultural or proposed facilities); and

7.2 Stakeholder Identification

Stakeholder identification was undertaken through consultative meetings with the proponent, to flag out persons or institutions that may have interest in the project. The following groups of stakeholders were identified and consulted:

- Stakeholders with environmental interests – Kenya Marine and Fisheries Research Institute (KMFRI), Kenya Wildlife Service (KWS), Kenya Forest Service (KFS), NEMA, Kenya Maritime Authority (KMA);
- Lead Agencies – County Government of Mombasa, Kengen, Kenya Pipeline Company, Kenya Power, Kenya National Highways Authority (KeNHA), Kenya Fisheries Service;
- The local communities along the SEA main road and the fishers who use the fishing grounds within Port Reitz creek and landing sites close to the project area.

7.3 Stakeholder Meetings

Several Stakeholder meetings were held during the study, including with lead agencies, public and BMU.

The 1st SHM was held on 26th April 2018 at Pride Inn Hotel, Mombasa. This was a key informant SHM held at the scoping stage to brief the stakeholders on the project details and have their concerns on board to be addressed during the study. The meeting was attended by key state agencies comprising of KPA, KeNHA, Kenya Power, Kenya Maritime Authority (KMA), Coast Water Services Board, Kenya Fisheries Service, Kenya Navy, Kenya Power, Coast Development Authority (CDA) and Maritime Police Unit (MPU). During the meeting KPA gave an illustration of the nature and scope of the project, explaining that JICA Design Team has commenced Preparatory Survey for Mombasa Special Zone whose aim is to plan and design necessary infrastructure for the SEZ and port development is one of the main components.

The 2nd SHM was a Public Meeting held at Dongo Kundu on Thursday 13th September 2018. To ensure good attendance the meeting was advertised through several forums as follows:

- Advertisement placed in the Nation newspaper on Thursday 6th September 2018;
- Radio announcements made by state owned Kenya Broadcasting Corporation. 9 announcements were made in total (5 in English and 4 in Kiswahili) on 10th, 11th and 12th September 2018.
- Letters from KPA to key stakeholders sent via emails and also hand-delivered to their offices;
- Posters pinned at key locations in the project area such as Local administration offices, schools and health centres among others;
- Announcements made at *Public Barazas* in Dongo Kundu by Likoni Deputy County Commissioner and Mtongwe Senior Chief.

The meeting was attended by 307 people, including the general public, NGOs, local administration, county government officials, the area Member of Parliament and state agencies. Slightly over 50% were women, the rest men. Presentations were done by way of posters and banners over the public address system. During presentation both **Kiswahili** and **English** were used to ensure meaningful engagement across the board.

The 3rd SHM was a Public Meeting held at DCC Compound (AP Camp) in Dongo Kundu on Thursday 31st January 2019. The purpose of the meeting was to present the findings of the ESIA study to stakeholders and get their concerns to be included in the final report.

The meeting was advertised through Newspaper (Daily Nation, January 24, 2019), Eight Radio Advertisements on State Radio KBC, Invitation Letters to Key Stakeholders, Posters pinned at key public places such as DCC office, Meeting Venue, Hospitals and Markets.

Stakeholders in attendance included KeNHA (Proponent for Road Infrastructure), KPA (Proponent for Port Infrastructure), Local Administration (Led by Likoni Deputy County Commissioner, ACC Dongo Kundu and Senior Chief), County Government of Mombasa, State Agencies, Political leaders including area MP and 2 Members of County Assembly, PAP Committee Members, PAPs and Members of the Public. A total 408 people attended the meeting.

In addition to these, Focus Group Discussions have been held with BMU leaders and other strategy meetings held with representatives of Project Affected Persons.
The key issues raised during these stakeholder meetings are outlined in the appendix of this report.

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APPENDICES

1. Minutes of Key SHM I Meeting
2. Minutes of Public SHM I
3. Minutes of Consultative Meeting with Port Reitz BMU Leaders
4. Minutes of Focus Group Meeting I with PAP Committee
5. Minutes of Consultative Meeting with County BMU Leaders
6. Minutes of Consultative Meeting with Mtongwe area BMU Leaders
7. Minutes of Focus Group Meeting II with PAP Committee
8. Minutes of Public SHM II
9. Characterisation of Port Reitz Creek Fishery
10. Overall Species List

Appendix 1: Minutes of Key SHM I

MINUTES OF KEY STAKEHOLDERS MEETING HELD ON 26TH APRIL 2018 AT PRIDEINN HOTEL, MOMBASA

Present

As in the attached attendance list (Attachment 1).

MIN 1/26/04/18: Introduction

The meeting was called to order at 10:15 am and started with introductions after a word of prayer from one of the participants

MIN 2/26/04/18: Official Opening

Mr. Martin Mutuku, Head of Corporate Development KPA officially opened the meeting by giving the highlights of the Special Economic Zone (SEZ) project. He informed the audience that the project is a vision 2030 project under the Ministry of Industrialization and KPA is involved as the landlord of the 3006 hectares of land in Dongo Kundu and as the government agency responsible for ports. He further elaborated that the government plans to develop several facilities such as modern conference facilities, free trade zone, and residential areas among others.

The government is in the process of getting development partners to support the project and has settled on JICA to support the feasibility study for the port infrastructure. It is expected that construction of the first berth and access road will attract investors into the SEZ.

MIN 3/26/04/18: Project Presentation

Eng. K. Nyaga from KPA gave the presentation by illustrating the nature and scope of the project. He explained that JICA Design Team has commenced Preparatory Survey for Mombasa Special Zone whose aim is to plan and design necessary infrastructure for the SEZ, and port development is one of the main components.

Eng Nyagah pointed out that other necessary infrastructure for early implementation of the Mombasa SEZ are the Power Supply Facility, Water Supply Facility and Drainage but the works under the current preparatory survey comprise of:

1) Development of one berth (approx. 300 m width) and associated cargo handling yard (approx. 10 ha) connected by an access bridge;
2) Development of turning basin (-13 m depth) through dredging (approx. 2.5 million cm3);
3) Construction of access road from the proposed port to Southern Bypass Road (approx. 4.3 km long x 40 m Right of Way (RoW))

He also highlighted that implementation of the project would need support of state agencies such as KenHA, Kenya Power, Coast Water Service Board among others, as well as other stakeholders and the civil society.

MIN 04/26/04/18: Environmental Impact Assessment Presentation

EIA presentation was done by Eng. H.Adala, the Team Leader for the ESIA team. Eng Adala explained that the purpose of the ESIA study is to ensure that all environmental and social concerns arising out of implementation of the proposed project are identified and addressed. The ESIA Study will ensure compliance with Kenya's EMCA 1999 and JICA's Guidelines for Environment and Social Consideration (2010).

Eng Adala explained that stages of assessment include:

Preliminary Tasks such as screening, scoping development of terms of reference and preparation of study workplan;

Detailed Study: Project Description, Analysis of Alternatives, Baseline Studies, Public / Stakeholder Consultation, Policy, Institutional and Regulatory Considerations, Identification of Potential Impacts, Proposal of Mitigation Measures and preparation of Environmental Management and Monitoring Plan (EMMP).

The study is expected to be completed in August 2018 after which the EIA report would be presented to NEMA for review and approval. Three (3No) Stakeholder meetings would be held during the study, the final one for the purpose of presenting and discussing the findings of the EIA study.

MIN 05/26/04/18 : Questions And Answers

After presentation, stakeholders were given opportunity to ask questions, request for clarifications and make suggestions.

Question 1: **KeNHA**

Patricia Agula of KeNHA requested to know specific areas where the input of KeNHA would be required. She said the Mombasa Southern Bypass Road is categorised into 3 packages, packages 1,2 and 3 and they would like to know the point of intersection of the proposed access road with the Southern Bypass.

Response 1: JICA Design Team: The study in still going on. Where to connect to the Mombasa Southern by-pass road will be confirmed after consultation with KeNHA Engineers. Consultations with KeNHA will continue throughout the design of the access road.

Comment 1: Mr. Mutuku of KPA emphasised the need for immediate discussions with KeNHA with regard to the intersection point so that KeNHA incorporates this into their design.

Comment 2: KeNHA confirmed that they are looking for a consultant for preparation of packages 2 and 3, and there is still time to incorporate the intersection point since it appears not to be in package 1 whose design is already completed.

Question 2: Kenya Navy

Maj. Jacob Kariuki, Kenya Navy was concerned that previous dredging projects caused siltation streams settling around the Navy jetty. He proposed that dredging also be done at the Navy jetty to remove previous deposits.

Response, JICA Design Team: There is need for Kenya Navy to prove that the siltation was due to previous dredging, then this proposal be considered if necessary it is included in the study scope and budgeted for in the EMP.

Question 3: Coast Water Service Board

Haji Massa, CWSB: It is important to clearly define the zone of influence of project activities so that impact zones can be well understood.

Response JICA / Heztech: Project boundaries are now being concluded and impact zones will be included in the project description as well as potential impacts.

Question 4: Kenya Fisheries Service

Mr Wanyoike, Kenya Fisheries Service: The project is likely to affect fishermen who may have to be relocated hence compensation for fishers would be necessary.

Response JICA / Heztech: Impacts on fisheries would be reviewed and recommendations made on restoration of their livelihoods. However multiple compensation of fishers should be avoided by identifying all projects in the area and preparing a comprehensive compensation plan covering these projects

Response, Kenya Fisheries Service: Comprehensive compensation is welcome so long as it is fundamental and covers the needs of fishers for the short and long term. It is clear that the project area is for port development and the future of fisheries lies elsewhere, probably in offshore fisheries. During the study it would be necessary to ensure that the profile for fisheries is well done and proposal made to consider humanitarian assistance for fishing activities.

Comment, Coast Development Authority, CDA:

Mr Japhet Moroa, CDA: Socio economic profiles and user rights of previous projects are known. There is need to develop a comprehensive way of handling these issues so that they do not recur every time port projects are being undertaken. Kenya Fisheries Service should gazette new landing sites outside the port area and advise fishers to move there.

Comment, Maritime Police Unit

Mr. Daniel Ndombi, Maritime Police Unit: Fishermen do not normally fish within port areas. However their landing sites are located close to port areas and this creates security risk. It would be important to just relocate their landing sites

Kenya Power Company

Mr Eric Libese, Kenya Power proposed merging compensation packages for all projects being undertaken in same area.

Response by Kenya Fisheries Service

Kenya Fisheries Service supported comprehensive compensation coupled with relocation of fishers but suggested that clear instructions would need to be given to fishermen during

compensation, so that they understand that upon receiving compensation they have to move out of port areas.

Min 7/26/04/18: Closing Remarks

Mr Mutuku, KPA thanked the participants for creating time to attend the meeting and emphasized that the SEZ project is one of the pillars of the Presidents 'Big Four Agenda' and requires support from all the state agencies.

The meeting adjourned at 1:00 pm.

Attachment 1: SHM I Attendance Register

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR PORT INFRASTRUCTURE OF MOMBASA SEZ DEVELOPMENT

KEY SHM I ATTENDANCE REGISTER

Date: 26th April 2018 **VENUE: PrideInn Hotel**

Name	Organisation	E-Mail Address	Signature
1. Ahmed Afwy	K.P.A	aafwy@kpa.co.ke	
2. JESCAH INDANGASI	K.P.A	sindangasi@kpa.co.ke	
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5. Joseph Kithinga	KPA	JKithinga@kpa.co.ke	
6. DANIEL GITHINJI	KPA	gmaina@kpa.co.ke	
7. Capt. Dave Muli	KMA	dmuli@kma.go.ke	
8. Edwin M. Lenga	CWSB	edwinlenga@gmail.com	
9. Haji S. Massa	CWSB	hajimassa@yahoo.com	
10. Takeshi Sato	JICA Design Team	sato-t@ides-inc.co.jp	
11. Martin Mutuku	KPA	mmutuku@kpa.co.ke	
12. Weldon Mogin	KPA	Wlowino@kpa.co.ke	
13. Capt MUNGA PSMA	KMA	mungatsma@kma.go.ke	
14. JOHN WANYOIKE	KENYA FISH. SERV.	kkarungoj@yahoo.com	
15. Hezekiah Adala	Heztech	info@heztech.com	
16. Jacob Kairuki	Kenya Navy	Kairuki.Jacob@yahoo.com	
17. Eric Libese	Kenya Power	Elibese@kplc.co.ke	
18. Patricia Agula	KENHA	P.agula@kenha.co.ke	
19. Japhet Mooa	CDA	Japhetmooa@gmail	
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22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			
31.			

Attachment 2: SHM I Meeting Programme

Environmental Impact Assessment for Port Infrastructure of Mombasa Special Economic Zone (SEZ) Development

Date: April 26, 2018 **Venue:** PRIDEINN HOTEL

Time: 9.00am-1.00pm

KEY STAKEHOLDER MEETING I PROGRAMME

Time	Activity	Action by
9.00 - 9.15	Arrival and Registration of Participants	All
9.15 - 9.30	Introduction	KPA
9.30 - 9.40	Official Opening	KPA
9.40 – 10:15	Project Presentation	KPA
10.15 - 10.30	TEA BREAK	ALL
10.30 - 11.00	Environmental Impact Assessment (EIA) Presentation	EIA Consultant
11.00 - 12.00	Questions and Answers / Clarifications	KPA / EIA Consultant
12.00– 12.15	Closing Remarks and Vote of Thanks	KPA
12.15 - 1.00	Lunch	ALL

Attachment 3: Images of SHM I

PORT INFRASTRUCTURE OF MOMBASA SPECIAL ECONOMIC ZONE DEVELOPMENT PROJECT
KEY STAKEHOLDERS MEETING AT PRIDEINN HOTEL MOMBASA, 26th APRIL 2018

PORT INFRASTRUCTURE OF MOMBASA SPECIAL ECONOMIC ZONE DEVELOPMENT PROJECT
KEY STAKEHOLDERS MEETING AT PRIDEINN HOTEL MOMBASA, 26th APRIL 2018

PORT INFRASTRUCTURE OF MOMBASA SPECIAL ECONOMIC ZONE DEVELOPMENT PROJECT
KEY STAKEHOLDERS MEETING AT PRIDEINN HOTEL MOMBASA, 26th APRIL 2018

PORT INFRASTRUCTURE OF MOMBASA SPECIAL ECONOMIC ZONE DEVELOPMENT PROJECT
KEY STAKEHOLDERS MEETING AT PRIDEINN HOTEL MOMBASA, 26th APRIL 2018

Appendix 2: Minutes of Public Meeting I

MINUTES OF THE PUBLIC STAKEHOLDERS MEETING I ON ESIA FOR PORT INFRASTRUCTURE OF MOMBASA SPECIAL ECONOMIC ZONE (SEZ)

DATE: THURSDAY, SEPTEMBER 13TH, 2018 **VENUE: DONGO KUNDU**

TIME: 0900AM-1300PM

1.1 Purpose of Meeting

The purpose of the meeting was to provide for stakeholder consultation to ensure concerns of various stakeholders are adequately addressed in all the phases of the project.as stipulated in EMCA 1999 and in the Constitution of Kenya 2010.

1.2 Agenda

i. To share details of the proposed project with the stakeholders;
ii. To provide a comprehensive feedback on key findings based on issues investigated in the ESIA baseline studies;
iii. Obtain inputs from stakeholders for consideration during preparation of the draft report of the ESIA study;
iv. AOB.

1.3 Welcome note, Introduction of Participants and climate setting (Felix Maiya - Assistant County Commissioner Longo, Mohammed Golicha - KPA)

The meeting began at 10:35 am with a word of prayer from one of the participants followed by welcome note from the Assistant County Commissioner Longo Mr Felix Maiya. The introductions encompassed all the groups represented in the meeting.

The objective and scope of issues to be discussed and participants were asked to take note of the environmental and social impacts identified by the consultant to enable them raise their concerns appropriately.

1.4 Official Opening Remarks – Deputy County Commissioner Likoni Mr Eric Mulevu

The DCC highlighted the education and awareness opportunity created by the consultation forum acknowledging the transformation envisioned for the area as a SEZ. He commended the community for being cooperative and urged them to extend the same commitment by working together with the developers in ensuring the proposed project is successful. He concluded by pointing out that challenges should be anticipated but the community should be prepared to discuss the emerging issues constructively with the aim of forging a way forward.

1.5 Presentation of key findings of ESIA study- Eng. H.Adala, Dr. P.Gwada.

The consultant's team leader (Eng Adala) began by appreciating the participants for turning up for the meeting to exercise their right. To complement presentations banners with component-specific findings and a map of the infrastructure (roads) was provided on-site to allow those interested to spend more time in interrogating the findings before the meeting. A Swahili language translator was also engaged to ensure effective and meaningful communication during the presentations.

The approach used for the ESIA study was explained as follows:

- Detailed description of the project (Surveys-Ecological, Chemical, Fisheries ; Socioeconomic assessment; while ensuring public participation in the process)
- Analysis of regulations that apply to the project-Environmental management and regulations act, Land Act.
- Assessment of potential impacts and mitigation measures of the proposed project.
- Analysis of alternatives to the project

The Ecological Expert Dr. Patrick Gwada who took participants through the findings of the ecology survey (both marine and terrestrial) and chemical analysis components. Detailed component-specific presentations are provided in the annex.

The floor was then opened to participants to comment on the ESIA findings and raise their concerns.

1.6 Issues raised on the Presentations/Concerns of Stakeholders

1. The community appreciates the project because of the impact it will have on development. However, why can't the residents of Dongo Kundu, majority of whom are senior citizens well advanced in years while the others have spent over the 12 years stipulated in the legislation on the disputed land, be recognized as rightful owners of the land? Why is the planned compensation to be done for some trees and not all? At the very least, the community needs to be resettled elsewhere. - ***Dume Jira, Community leader***

2. Most residents were born in Dongo Kundu and are not illegal settlers as claimed. From the time inventory of property since RAP was done to date there are significant changes including construction of houses and burial of the dead. How will these changes be taken into account during compensation? If one has an adult child who needs to put up structures like a house to live in, is the child allowed to do so considering the delay in implementation of the project and possible implications for resettlement/compensation? ***-Saidi Ali Ching'onda***

3. Considering the proposed development projects and the related opportunities, how will the locals benefit if there are plans to resettle them elsewhere? If the mangroves are cleared, how will fishermen with other livelihood activities (such as bee keeping) that are linked to the mangroves benefit? Which specific areas or locations have been encroached by the local community considering they were born in the Dongo Kundu area? - ***Dadi Kesi Kalume***

4. Besides the dust that will be an impact of the proposed constructions, residents are currently affected by dust already from the existing road around "Corner Mbaya". The project should consider addressing this first. Given the statistics of high unemployment in the area, the project should educate the community members in advance and build the required capacity to make them eligible for jobs that will be created from the proposed developments. - ***Rajab Bilembe***

5. Although wildlife will be affected, people are the key victims of the proposed development. Since the community is not represented in the higher planning and decision making processes, planners should have the local community at the forefront in terms of how and where they will be relocated. ***Bakari Hassan Mwamtoa***

6. People have long term projects intended to cover several generations, does the plan consider these long term plans in compensation? The community will need to live the lifestyles that they are accustomed to. They will require livelihoods and employment wherever they will be resettled, but in some instances they will lack the capacity needed to get meaningful employment and jobs in these new areas. How will this be addressed? ***Abdrahaman Swaleh***

7. The community needs resettlement first before the project starts. It should not work the other way round. The community also needs support from their representatives such as Member of Parliament to enable them acquire title deeds. The statistics on unemployment are not a true reflection of the situation in Dongo Kundu and need to be reviewed. ***- Female participant***

8. Does the 2016, Squatter Amendment bill apply in Dongo Kundu? How is the Member of parliament representing the community with regards to the land issues? **Irene Mwinyi**

The level of compensation being considered should be comprehensive/susbtantial and should cover relocation, livelihood restoration and security. Project needs proper planning and to be rolled out transparently, systematically, and in an integrated way that ensures efficient use of resources without unnecessary destructions ***- Male Youth Representative***

Land is a key issue in determining peace in an area and ownership issues should be addressed promptly. 55% of youths are unemployed and one of the project's objective should be to reduce this. What is the assurance to the community that the children and youth will be employed and by how much (%)? What is the timeframe for project inception and completion? Why are other organisations like Civil societies and NGOs not represented in the public participation forum considering they can play a key role in educating and sensitizing the local community on the proposed projects? Compensation should be finalised before the project starts to avoid negative opinions by locals - ***Nicholas, Human Rights Activist***

1.7 Responses to issues raised

Compensation

Compensation will precede implementation of the project - ***Heztech (Adala*)**

The Resettlement Action Plan was developed 2 years ago. Due to the delays experienced, the plan will require review and updating to incorporate the changes over the past two years before it can be implemented. - ***Hussein Mamo (KPA)***

Parliament has passed Land Value Index Law Amendment bill 2017 which looks at issues of compulsory acquisition of land by the government and addresses all the concerns that were raised by the community members. Among the provisions is the requirement for full compensation before project inception, occupants of good faith-applying to default ownership of land in cases where people have lived in an area uninterrupted for 12 years. The mechanism for compensation will vary and can include cash, resettlement in alternative areas, being shareholders in the project and grants. The bill is currently at the Senate and will be addressed after the recess before being submitted to the President for ascent. - ***Mishi Mboko, MP Likoni***

Employment	A project of this magnitude considers the locals first and local capacity as this is also an advantage to the developer in terms of cost. External capacity is considered if the capacity required is not available locally. - ***Heztech (Adala*)**
Time frames	The project is currently at the design stage. When it will start depends on when the design will be completed, when the resettlement / compensation action plan would be completed and when all affected communities will have been compensated. ***- Heztech (Adala*)**

Dust on the road	Road construction is a mandate of other government agencies such as KeNHA, KURA and KeRRA, some of whom are represented at this meeting. The consultant will communicate the concerns raised on the status of the roads to these agencies at the key stakeholders meeting. - ***Heztech (Adala*)**
Businesses and relocation	The Resettlement Action Plan will take into account loss of businesses and they will be compensated based on agreed terms. - ***Heztech (Adala*)**
Social amenities	Proposed Resettlement Action Plan will take an inventory of all amenities that will be affected and this will be incorporated in the compensation plan. - ***Heztech (Adala*)**

Other Remarks

- The County Government is working to ensure concerns and rights of the citizens are considered during implementation of the project. **Ward Administrator Timbwani (Steven Ochieng)**
- Dongo Kundu has a beautiful surrounding and hope the project will preserve this. - **Likoni Subcounty ward (Ahmed Khamisi)**
- Stakeholders should cooperate to ensure all challenges are adressed for the benefit of the community and success of the project. - **Ward Administrator Mtongwe (Helen Mueni)**
- Citizens have the right to public participation in issues that affect them. The senator's office will report on what has been spoken and what is implemented on the ground and take necessary action where the two differ. For any project, the community should be among the key beneficiaries. – **Mombasa Senator's Representative**
- BMUs should ensure justice is done to all affected members without excluding others - The state department and Kenya Ferry Service should be kept informed of all issues arising and progress and be kept involved to help in ensuring all goes well. **- State Department for Fisheries and Blue Economy**
- The Land 2016 Act applies and works on all land related injustices. The Mombasa office is waiting for cases to be brought so as to be forwarded to Nairobi. Resident should make use of the Mombasa office.Complaints can come from government bodies (National and County), communities or individuals. NLC would like to receive a copy of the reviewed Resettlement Action Plan for the proposed project as the first one did not get to them. - **National Land Commission, Mombasa (Edward Bosire)**
- Project should prioritize the interest of the community.Commended the reluctance of Japanese government in engaging in any projects before issues are resolved conclusively, hence the need to ensure all the concerns raised are addressed for the project to continue. Fishermen need capacity to access deep sea if their fishing grounds will be affected. Need to ensure all affected areas are incorporated in the project. **- Representative ministry of transport (Mr. Chirema)**

Closing remarks by Likoni DCC Eric Mulevu

Community should wait for the relevant authorities to get the right information on every aspect of the project instead of acting based on unsubstantiated information. Moving forward a team will be established to engage with the project team and ensure the community is informed of any activities, meetings held and progress. Any grievances raised will be addressed by the government according to the law.

Thanked the participants for their patience and for turning up in a good numbers when they were called upon.

Closing remarks KPA (Paul Mwaka)

Thanked the community for their involvement in the public participation process. KPA takes cognizance of the needs of its neighbours including local communities. The Authority will ensure the project has a good mechanism in place to compensate those affected. Recounted past collaborations with the BMUs including mangrove replanting. KPA is a law abiding state agency and will ensure the project is aligned to all legal requirements.

PUBLIC MEETING I INVITATION LETTER

Kenya Ports Authority

P. O. Box 95009 - 80104 Mombasa, Kenya.
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Website: www.kpa.co.ke

Dear All

RE: INVITATION TO STAKEHOLDER MEETING FOR EIA STUDY FOR PORT INFRASTRUCTURE OF MOMBASA SEZ

Kenya Ports Authority with support from the Japan International Co-operation Agency (JICA) is in the process of undertaking Environmental Impact Assessment (EIA) for the Port Infrastructure comprising of One Berth and Access Road of the proposed Mombasa Special Economic Zone (SEZ). The proposed project is located in Dongo Kundu, Mtongwe Location, Likoni Subcounty.

Your organisation has been identified as a key stakeholder who may have an interest in the proposed project. You have therefore been invited to the upcoming **Stakeholder Meeting** to be held at the **Likoni DC Compound (AP Camp)** in Dongo Kundu on Thursday **13th September 2018** starting at **9:00 am**. The purpose of the meeting would be to present the findings of the baseline to the general public and stakeholders and get their concerns so as to be incorporated into the EIA process.

Yours faithfully

Martin Mutuku
Head of Corporate Development
for: MANAGING DIRECTOR

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(1)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR PORT INFRASTRUCTURE OF MOMBASA SEZ DEVELOPMENT

PUBLIC SHM I ATTENDANCE REGISTER

Date: 13th September 2018 **VENUE: DC OFFICES DONGO KUNDU**

	Name	Organisation/Residence	E-Mail Address	Signature
1.	DANIEL G. MAINA	KPA	gmaina@kpa.co.ke	
2.	Mohamed I. Lutcha	K.P.A		
3.	ERIC MULEMU	[illegible]	emulemu@yahoo.com	
4.	Hon. Mishi Mboko	MP N/A	mishikhamis@gmail.com	
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13	Hurrein Hesran	COF LIKONI	nugiaes@gmail.cv	
14	AZI SASABU	MCA'S OFFICE MTONGWE WARD	sasabu14@gmail.a	
15	WALTER - KURTS	Peace / Cohesion	kurts310@gmail.com	
16	Stephen Achieng	Ward Admin MCA's	stephenachieng2014@yahoo.com	
17	Hamzan Dhuambo	JDT	hamzanadhuambo@yahoo.com	
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22	Abdallah Juma	MP. LIKONI OFFICE	abdallah.aj@gmail.com	
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27	Lenice Ofueny	HEZTECH	lenice@ofueny@gmail.com	
28	Fatuma Mwamzandi	SACCO - LIKONI S.C	Kunyotera@gmail.com	
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30	DEBORAH NEHEMIAH	KERRA	dwilkister@yahoo.com	
31	Ramadhan Mwatumwa	KPA	rmwatumwa@kpa.co.ke	
32	Hezekiah Achieng	HEZTECH/JICA	heztech@gmail.com	

(2)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR PORT INFRASTRUCTURE OF MOMBASA SEZ DEVELOPMENT

PUBLIC SHM I ATTENDANCE REGISTER

Date: 13th September 2018 VENUE: DC OFFICES DONGO KUNDU

	Name	Organisation/Residence	E-Mail Address	Signature
33	BEJA LEWA	DONGO KUNDU	0746422720	
34	Kemba Nyamawi	DONGOKUNDU	0715177709	
35	PETER MACHAMIA	D - KUNDU	0705206797	
36	ALII CHARO	D DONGO KUNDU	0722493655	
37	MWAFIGLA NYAMAWI	DONGOKUNDU	0720 410 264	
38	HAMISI S. MADINDIMA	MWANGALA	0715 921 002	
39	NYAMAWI ROMBA	DONGOKUNDU	0727290979	
40	DANIEL MACHAMA	DONGONGO	0701570785	
41	ABDALLAH CHOFA	DONGO KUNDU	-	
42	JAMES - M - MWATIVILA	DONGOK	0729573522	
43	Philomena Mbila	Dongo Kundu	0729856081	
44	M'baraka Bumba	Dongo Kundu	0705755452	
45	Ramadhan Mwalim	Dongo Kundu	0701552845	
46	ALI. H. KITAMBI	Dongo Kundu	3468711	
47	MUSA · M · MWADZOYA	Dongo Kundu	20696820	
48	GENCE ABALLA	MBUTA	0729144177	
49	IRINE WAVINYA	MWANGALA	0721201003	
50	SARIA HUSSEIN	MBUTA	0729584493	
51	Hassan Juma	Mwangala	-	
52	Mariam Tsuma	Mbuguni	0719200118	
53	Kadzo Kaa Jefa	Mbuguni	0710924625	
54	MEALI ALII	MBUGUNI	0716284240	
55	MWANIAKOMBO Bora	DONGOkundu		
56	Fatuma Rama	Mbuguni	0704449263	
57	Mwanamisi	Mwangala	0706835975	
58	athuman.			
59	Kashi Muhamed	mwangala	-	
60	Mariam Yusufu	mrongondoni	0713478390	
61	Chidodo Nyamawi	Mwangala	-	
62	Mnyazi Luambi	Mwangala	-	
63	Mwaka Mwangale	Mbuta	0708947489	

(3)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR PORT INFRASTRUCTURE OF MOMBASA SEZ DEVELOPMENT

PUBLIC SHM I ATTENDANCE REGISTER

Date: 13th September 2018 VENUE: DC OFFICES DONGO KUNDU

	Name	Organisation/Residence	E-Mail Address	Signature
64	REHEMA MZEE MWALIMU	MTONGWE	0714102973	
65	MABIBI ABDALLAH MWATUMALIRO	MTONGWE	0703638648	
66	MWANAHAMISI H. MOHAMED	MTONGWE	0702186053	
67	MARIAMU ABDALLA	VYEMANI		
68	MWANALIMA HAMISI	VYEMANI	0723412851	
69	SULEIMAN MWINYI KIMUSHA	CHAIRMAN MTONGWE BMU	0713089138	
70	MWINYI MOHAMMED MWAMADA KUTRA	SHIKAADABU	0715020982	
71	WESO SALIM MBEREO	MTONGWE	0722421651	
72	ZAIDI SWALEH	MTONGWE	0754350722	
73	SAIDI OMAR	MKOMGONDONI	0708433307	
74	KIBWANA JUMA	MKOMGONDONI	0700937912	
75	BENSON SAVAI	MWANGALA	0723637613	
76	LILIAN NABWIRE	MWANGALA	0726049323	
77	SAMSON SAVAI	MWANGALA	0728927824	
78	Abdallah Juma	Kaya mtongwe	0708329193	
79	HAMISI SWALEA	DONGO KUNDU	0717726638	
80	ABDALLA SAID	Mtongwe	0712580173	
81	HAMISI RASHID	MTONGWE	0701775128	
82	SULEIMAN MBARUKU	MTONGWE	0718997321	
83	MSHAZU BAYA	MTONGWE	0713994997	
84	ABDUL ABDALLA SAIDI	MTONGWE	0717935401	
85	Hamisi said	mrongondoni	0707187925	
86	mwalimu o.	mrongondoni		
87	ISSA ZAHORO JUMA	Mwangala	0703240688	
88	Ramos Peter Kai	mtongwe	0705505089	
89	Rashid OMAR	MTONGWE	0725058497	
90	Fatma F. Fimbo	mtongwe	0715322913	
91	BAKARI MWAYI	mtongwe	— —	
92	MOHAMED MWINYI	MWANGALA	0742985225	
93	HAMISI JUMA SHEHE	MTONGWE	0718809826	
94	FREDRICK KUOCO	MTONGWE B.M.U	0722595418	

Public SHM I Advertisement

DAILY NATION

September 6, 2018

Daily Nation • Thursday

NO WANYAMA, NO WORRIES FOR COACH MIGNE

Harambee Stars coach, Frenchman Sebastien Migne, puts on brave face despite the absence of captain Victor Wanyama from Saturday's crucial match against Ghana. PAGE 54, 55

Scan this QR code with your smart phone for pictures, videos and more stories.

Study loans > 64,000 students to benefit as board sets out to disburse money early

Helb to release cash for freshers in two weeks

tudents urged to ubmit forms with VET deadline set or end of October

Y OUMA WANZALA

First Year university students will start receiving their education loans in mid this nonth, with about 4,451 expected to miss out.

This will be a major shift from ne past when the students got the ans as late as November.

The Higher Education Loans oard (Helb) said it had budgeted or 64,700 first-year students ho started reporting to their spective institutions this week. otal of 69,151 students qualified o join universities, both public nd private.

Helb chief executive Charles ingera said the lowest beneficiary f the loan will get Sh42,000, hile vulnerable orphans will get up to Sh60,000 and a bursary of Sh8,000.

"At the closure of the application period last month, we had 89,900 online application forms with 63,000 having been printed. The physical forms received so far are 53,000 and we continue to receive huge numbers daily. For those whose forms have already been received, verified and passed — funding starts on September 15," said Mr Ringera.

"This is, therefore, to call on the ones who have not submitted forms to Helb to do so to earnest in our various Huduma centres spread across the country."

Mr Ringera explained that Afya Elimu Fund (for nurses) payments for continuing students would also begin on September 15, while for the first-time applicants, it was ongoing. Technical and Vocational Education Training (TVET) applications are also going on and will close on October 31.

"We are living within the budget as instructed by the National Treasury. Fresh students' budget will be Sh2.8 billion, the continuing students (264,000), will take up Sh6.9 billion," said the CEO.

The 4,000 postgraduate students, he said, would be given Sh400 million.

"Of the 264,000 continuing students, who have opened for the first semester, we have already paid 90,000 some Sh1.9 billion. We are paying as they open," he said.

Helb, Mr Ringera noted, would use a total of Sh10.1 billion to fund the students during this financial year.

This year, all the students will be required to have a smart card in order to access the Helb funds.

"The use of the cards will ensure effective and efficient management of funds that have been invested in the education sector by the government," said the Helb boss.

Sh40,000

Lowest amount beneficiaries can be allocated.

"I also wish to remind universities that the smart card solution must be in place in September this year," said Education CS Amina Mohamed.

Mr Ringera said the smart cards would enable the timely disbursement of loans to the students and eliminate the errors that had been experienced in the past, such as having the wrong bank details.

Education CS Amina Mohammed and Helb boss Charles Ringera on August 15, when she announced increased financing to TVETs. Freshmen will get their loans in mid-September.

FILE | NATION

All schools to get land title deeds

BY OUMA WANZALA

The government has set up a standing committee to hasten the processing of title deeds for public schools after it emerged that only 2,170 out of 27,000 institutions have acquired the documents.

Education Cabinet Secretary Amina Mohamed said the government was "making every effort to secure public interest that lies in the learning institutions.

"It is for this reason that the Ministry of Education, together with the Ministry of Lands, are transforming the working group on school titling into a standing committee so as to fast-track the process that began in 2016," said Ms Mohamed.

She was speaking during the launch of this year's national examinations at Pangani Girls, Nairobi, on Tuesday. The CS said the government would not relent in its bid to secure school land.

"We will ensure that the schools that were established by our forefathers and foremothers as well as many well-wishers do not fade into the sunset under our watch but remain the haloed grounds that they are through the sanctity of the title."

In Nairobi, a report shows, many schools have no title deeds.

Member of the Audit Bureau of Circulation

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Public SHM I Meeting Program

Environmental Impact Assessment for Port Infrastructure of Mombasa

Special Economic Zone (SEZ)

Date: September 13, 2018 **Venue:** DONGO KUNDU

Time: 9.00am-1.00pm

PUBLIC STAKEHOLDER MEETING I PROGRAMME

Time	Activity	Action by
9.00am - 9.15am	Arrival and Registration of Participants	All
9.15am - 9.30am	Introduction	KPA
9.30am - 9.45am	Official Opening	DCC Likoni
9.45am – 10:15am	Project Presentation	KPA
10.15am - 11.00am	Environmental Impact Assessment (EIA) Presentation	EIA Consultants
11.00am - 12.00pm	Questions and Answers / Clarifications	KPA / EIA Consultants
12.00pm - 12.15pm	Closing Remarks and Vote of Thanks	KPA


Socioeconomic
and
Fisheries Assessment

Summary of Minutes of Focus Group Meeting I

Venue of Meeting: ACK Guest House, Likoni. **Date of Meeting:** 24/01/2019

Purpose of Meeting: To discuss the methodology and time frame for RAP with PAP Committee and get their concerns to be addressed during the study and discuss preparations for Public Meeting on 31st January 2019

Meeting was attended by: KeHNA, KPA, Local administration (Likoni Deputy County Commissioner, Senior Chief), National Land Commission, County Government of Mombasa and members of PAP Committee.

Key Highlights;

Institution	Statement
KPA & KeNHA	• Explained that purpose of the meeting was to provide project update and discuss preparations for Public Meeting on 31st January 2019 • Provided background of project and progress so far, explaining that two consultants (Heztech and Repcon) are on the ground to conduct RAP studies for the access road and also review RAP for entire SEZ. • Requested for patience and cooperation from the community as RAP matters are being resolved • Raised concern about the high number of fishermen recorded during LRP study
Deputy County Commissioner, Likoni	• Likoni residents are the lucky that such development and infrastructure improvement are taking place here Community need to provide enabling environment for consultants to undertake the studies. • PAP Committee are the representatives of the community hence are better placed to assist convey correct information to the locals. • Special Economic Zone is aligned to the big four Agenda (Industrialization, Infrastructure, Affordable housing) and PAP Committee should inform the people of the anticipated opportunities. There will be training and capacity development for the committee to enable them do their work.
Heztech / Repcon	• Thanked committee members for coming to the meeting and confirmed that consultants will work together with PAP Committee. • Explained that both consultants have been working in project area for a long time hence are familiar with area and people • Ultimate purpose of RAP is to ensure justice for PAPs

QUESTIONS AND ANSWERS	
Question	**Answer**
When will Shika Adabu residents get compensation for Southern Bypass	Compensation matters are handled by NLC. KeNHA will push to try quicken the process
There has been no compensation to fishermen in Tsunza yet their lives will be affected	Southern Bypass Road has 3 phases, and are compensated separately. Kwale BMUs will be handled later
Number of fishermen has been increasing due to speculation of getting compensation. The numbers appear inflated This needs to be addressed	The government through fisheries agency keeps clear records of fishermen and these will be referred to during compensation. DCC- Fishermen issues are sensitive –the best way is to

	harmonize the list with fisheries
Why is the government compensating for two project at the same time- they should harmonize the report	Government cannot pay double compensation. When two projects are done at once, lists are reconciled and compensation is only done once. There will be no overlap.
Structures enumerated but not trees. Only structure owners have been listed in compensation reports	RAP experts will enumerate all loses and present in the entitlement matrix
What happens to the other areas of only road is being surveyed/	Consultants will be on the ground at the same time and will survey all the area. KPA would wish to secure the entire land and have all PAPs compensated at the same time.

Closing Remarks – DCC Likoni

Inflating the number of fishermen can not be accepted The list of compensation will reduce the actual facilitation of each fisherman if numbers are more. Consultants to meet with fishermen and committee members to resolve the issue. BMU chairs to collaborate with the committees to clean the list of fishermen.

Public Meeting has been called for 31/01/2019 and PAP Committee members should pass the correct information to ensure peaceful meeting. Project cannot continue if people do not accept it.

There was no any other business the meeting closed at 4.45pm.

Summary of Minutes of Public Stakeholders Meeting II

Date of Meeting: 31st January 2019

Purpose of Meeting: To present the approach and work plan of RAP to stakeholders and get their concerns to be addressed during the study. This was also to act as a sensitization meeting and the official commencement of RAP study.

Meeting Advertisement: Newspaper (Daily Nation, January 24, 2019), Eight Radio Advertisements on State Radio KBC, Invitation Letters to Key Stakeholders, Posters pinned at key public places such as DCC office, Meeting Venue, Hospitals and Markets

Stakeholders in Attendance: KeNHA (Proponent for Road Infrastructure), KPA (Proponent for Port Infrastructure), Local Administration (Led by Likoni Deputy County Commissioner ACC and Senior Chief), County Government of Mombasa, State Agencies, Political leaders including area MP and 2 Members of County Assembly, PAP Committee Members, PAPs and Members of the Public.

Total Attendance: 439

Key Issues Raised

Name	Question	Answer
Pastor Eleazar Mati (*Religious Leader)*	He noted that everyone in the community would be affected environmentally; Ho does the community stand to benefit?	The key benefit to the community is development, job creation, improved infrastructure and better services for the community, such as water and electricity. *-Adala, Heztech*
Mohammed Nyaumbe *(Mbuta Resident)*	Some people have partially been compensated in the road project, what will happen if they are impacted in the SEZ project as it was said there will be no double compensation?	Compensation will be done under the project is affecting the target asset. In cases where assets are affected by all the three projects (Southern by-pass road, Access Road and SEZ development compensation will only be done only once. – *Wairagu, Repcon*
John Nyamwai- *(Conservationist)*	Trees that are not on the shore line but on private property and will be cut down, is there a way to ensure they are replanted elsewhere?	First the affected land owners would be compensated for the trees cut, then an assessment would be done for compensatory forestry, where areas neighboring severe deforestation will be reforested. – *Wairagu, Repcon*
Abdalla Mwalimu	How will valuation of land and compensation be done without title deeds and will title deeds be issued in this process? What of areas that developments have been made since the last report, how will	This exercise is a study for relocation and development not to issue title deeds. The purpose of reviewing the report done by the University of Nairobi is to update on the changes that have taken place since it was done to ensure fair compensation. – *Wairagu, Repcon*

	such get treated?	
Rashid Mwashimila *(Kaya Elder)*	What happens to the kayas within the SEZ once the land is acquired? Such places are community inheritance, and their identity adjoins past, present and future communities	Kayas would not be impacted, but would be surrounded. Considerations will be made of how the kaya elders and other interested parties can access the kayas. - *Wairagu, Repcon*
Ramah Kibwana *(Health Officer)*	There will be a lot of dust and noise pollution during the construction stage, how will such be mitigated to protect the community? What about noise when implementation is happening near schools.	The contractor would ensure compliance with air quality and noise regulations. Construction works near schools to be done at night to ensure that learning process in schools is not interfered with. *- Adala, Heztech*
Elinah Mwarina *(Farmer)*	She urged that only space adequate for project should be acquired and the community left to continue using the rest of the land for livelihood continuity. Is there compensation for non-permanent crops?	All the 3000 acres are required for the development and thus all of it would be acquired. Compensation will be done for all crops affected both permanent crops and seasonal. *- Wairagu, Repcon*
John Charo	Compensation for the southern bypass has been done for some residents but others are yet to receive theirs. What is happening?	Every affected person would be compensated before the project begins. PAP should exercise patience as NLC works on this. *– Eng Ikevu, KeNHA*
BMU Leader	It is clear that KPA will not allow fishermen to access the area near the port once built. KPA should consider sponsoring education of local youths to help them get employment within the port	The SEZ project is an initiative of the Ministry of Industrialization, and KPA is only a facilitator. KPA has been involved in youth development in the past, e.g. in the Lamu Port development where KPA is training 400 youths. KPA will engage the Ministry of Industrialisation with the proposal of absorbing trained youths *- Mr Golicha, KPA*

Remarks by Local Leaders

Hamisi Musa- MCA Mtongwe

- Expressed gratitude that the process was following the requirements of the constitution and including public participation.
- Noted that such big projects take time and urged the locals to be patient.

- Noted that updating of the register was necessary to ensure that all the affected persons are included in it and also ensure a proper and fair compensation.
- Urged the PAP Committee to ensure that the process was open and fair.
- Emphasized that employment opportunities be made available for the youths during implementation stage of the project.

Mwalimu Hamadi Mwigusho- Mca Shika Adabu

- Urged local leaders to follow up and ensure that each person had receives their fair share in the process
- Expressed hope that politics will not derail such an important project;
- Local youth should get first priority when it comes to employment opportunities in this project.

Suleiman Shakombo Former Heritage Minister, Former area MP

- Noted that the idea was brought to the public almost 15 years ago, and the public agreed to it and a study was done for it, wondered what the delay was for and why the process was being repeated.
- The most important thing was to let the public know when the construction would begin, when compensation would be done and where the PAPs will be relocated to.

Mishi Mboko, Likoni Member of Parliament

- Expressed satisfaction that all the parties to the project were being involved through public participation as provided for in the constitution.
- Noted that the reason for repeating the study process is because things had changed, improvements had been made on the land and a second assessment would ensure that everything was included in the register.
- Urged all the project affected persons to ensure they attend such meetings to ensure they did not miss out on critical information.
- Noted that together with the fishermen, the women who sell fish would be affected. She also noted that there had been a complaint regarding the list being fronted on the number of fishermen that would be affected in the process, and that numbers had risen drastically which was not reasonable. She urged the representatives of the BMUs to ensure that only the legitimate fishermen are include in the list, as including those that were not fishermen would not only delay the compensation process but also deny the legitimate fishermen their rightful shares.
- Warned BMUs that the correct records of fishermen were available in the fisheries office and authorities would know if there were discrepancies, urging all parties involved in this process to be diligent.
- Noted that it was very easy for people to misuse the compensation money and urged the PAPs to ensure they have ideas on how to invest the compensation cash.
- Concluded by asking that opportunities for both skilled and non-skilled workers to be given to the locals.

Closing Remark – Mr Eric Mulevu- Deputy County Commissioner

- Thanked everyone who attended for sparing their time and contributing ideas at the meeting.
- Urged all leaders to ensure compliance with the constitution during project implementation.
- Requested the PAP committee to arrange a meeting with the chiefs and the BMU leaders to ensure that the list of fishermen were forwarded for compensation is legitimate.
- Asked the PAPs in the southern bypass project who are yet to be compensated to be patient as KeNHA and the NLC we working to ensure that it was done.
- Urged all the youths to take advantage of the bursary opportunities available to enable them gain appropriate skills.

Meeting Closure

There being no other business the meeting ended at 13:55 pm with a word of prayer from one of the participants.

Likoni MP Mishi Mboko addresses the meeting

Likoni DCC Mr Eric Mulevu Introducing the PAP Committee

Government officials and political leaders at meeting

Senior Chief among the local administration at meeting

PUBLIC MEETING II ATTENDANCE REGISTER

EIA AND RAP FOR PORT AND ROAD INFRASTRUCTURE OF MOMBASA SEZ

PUBLIC STAKEHOLDER MEETING

Date: **January 31, 2019** Venue **Dongo Kundu AP Camp**

NO	NAME	ID NO	SIGNATURE
1.	Charles Musa	9629444	C. M. T.
2.	Amina Omari Ngala	22982713	
3.	Mohamed Hassan	22056[illegible]	
4.	Ali Bakari Mgowa	0724474574	
5.	Kwekwe Simazi	5424884	
6.	Mosaid Juma Mwamdigonie	28786027	
7.	Mohamed Chumeila	2205653	
8.	Rukia Abdalla	30845413	
9.	Dickson Ngumbao	29998127	
10	Chizi Tsuma	4610272	
11	NURU TOOTH DWEPT FORUM	33864300	
12	Shashamee self help group	27696194	
13	Mwanamisi Fakii FIMBO	8470774	
14	Mwanamisi Shilingi	9881836	
15	HAMISI FAKI	11367820	
16	Hamisi Juma	24358044[illegible]	
17	Mwajo Bejito Kabuka	20877177 M	
18	Abdallah Mwakachi	2196966	
19	Hamisi S Dabi	1013944	
20	Abdalla Ali Mabi	4614614	
21	Salim Mohamed	23876042	
22	Saimu Abdallah	4614617	
23	Bint Omari Matano	12844299	
24	Amani Abdalla	20286997	
25	Rashid Mohammed	27763467	
26	Chilango Chimera	26877475	
27	Juma Ali Malumbo	8535821	
28	Mbodze Chuti	31077385	
29	RASHIDI MWINYI MWAKUKA	0701382204	
30	Salim Kombo	24003185	
31	CHINYAYU MTIATIA JOTO	30670807	
32	MBWANA HASSAN DZIKAPHU	20828887	
33	MZURI HAMISI MWANYUNGU	10956653	
34	MWANAFURAHA A. MWANGO	23396569	
35	MOHAMED SALIM GONDA	29644786	
36	Mary Mlongo Nyamawi	29007189	
37	Mlongo Kamanza Beja	36472819	
38	HAMISI RAMA	0712672225	
39	BENJAMIN CARLOS MNGumi	32020204	
40	COSMAS KHAEMBA MASIKA	5315822	
	Mariam Juma	27140000	
	Mariam Kalimbo	27486728	
	Nzadhala Mutuku	12902594	
	MWALIMU M. MAGADI	0724205254	
	GEORGE MWANYIRO MBINU	2176468	

EIA AND RAP FOR PORT AND ROAD INFRASTRUCTURE OF MOMBASA SEZ

PUBLIC STAKEHOLDER MEETING

Date: **January 31, 2019** Venue **Dongo Kundu AP Camp**

NO	NAME	ID NO	SIGNATURE
1.	ABDIMA ARI SILI PPA	07132 1036	
2.	MWAMWIKOMBO MWISAMU	23578400	
3.	MINAJI SALIM MWENDO	30091170	
4.	MZIRA CHILAGA	8394485	Nil
5.	KIDODO MYAMANI	6724171	Kidodo
6.	MWAISHA JUMA	21888799	
7.	JUMA KIRWA OGA	13282048	
8.	JOSEPH KNUTOSYO	12488735	
9.	Catherine M. Mudyadi	20082971	
10	MWINYI HAMISI	5329905	
11	MEJAN JUMA	8328264	
12	MESICA GWEDE LUGWE	30693304	
13	SWAKE MUSUKI	1169920	
14	MWANGUMA GUNDA KANJI	9632477	
15	IMU SAIDI OMAR	11460461	
16	MWANAJUMA AZII	5328688	
17	LEAH NCHANIKU	2267326	
18	MWANATUMU ARI	464 464 8	
19	MWANAMRISI HAMISI	9633175	
20	MIMOEZI ABRAHA	2184019	
21	STANLEY HINGA	5613	
22	FLORENCE W. MBONDO	4592040	
23	TABITHA ICOKI	0231283	
24	ELIZABETH MAKOME	31584666	
25	AIDA ALI SULEIMAN	27129442	
26	OMAR SULEIMAN	—	
27	MBETU BETA	31809849	
28	GRACE SADA MNGUMI	20710136	Grace.
29	MARIAMU HAMISI CHIGUU	24828506	
30	ALI MAIANO MWAKUMWA	10505796	
31	Steven MKULA	6117849	
32	HASSAN ATHUMAN	21664958	
33	HAMISI MOHAMED	10,107	
34	FATUMA SULEIMAN	2691125	
35	LENA KOLI MUTUTA	880556	
36	MOSE CHAKA MUDUNE	2227691	UGA APPRAISAL
37	EGA CHAKA MUDUNE	2227691	
38	KHAMISI JUMA SHEE	0808586	
39	MUDZOMBA NYAWA MDIGO	9632421	
40	ASHA WESADA GAMBO	32919765	ASHA
41	FATUMA MEDZA TSUMA	2117071	
42	JUMANNE MOHAMMED	13630617	
43	SHANGA MEZIRA	31623541	
44	KAMWENGA MAZERA MATSUNGU	8394259	

PUBLIC MEETING II NEWSPAPER ADVERTISEMENT

Politics > Leaders say the President has the right to re-organise his government, but not for political reasons

Ruto role in new structure biggest puzzle in Jubilee

As President dines with his deputy, questions linger over elevation of Interior CS Matiang'i

BY NATION TEAM
newsdesk@ke.nationmedia.com

Deputy President William Ruto met with President Uhuru Kenyatta in Mombasa yesterday, a day after Mr Kenyatta appeared to transfer most of the DP's powers and responsibilities to Interior Cabinet Secretary Fred Matiang'i.

The meeting came against the backdrop of hue and cry from Dr Ruto's allies, who, speaking in various forums around the country, demanded to know his role in the new Cabinet reporting structure announced by the President on Tuesday.

Details of the DP's meeting with the President were scanty last evening as neither State House nor Dr Ruto's communication team was willing to discuss the matter.

President Kenyatta hosted Dr Ruto for lunch after the meeting. The duo were joined by National Assembly Speaker Justin Muturi, his Senate counterpart Kenneth Lusaka, House Majority leaders Aden Duale (National Assembly) and Kipchumba Murkomen (Senate), Senate deputy Speaker Kithure Kindiki (Tharaka-Nithi), and Senate deputy majority whip Irungu Kang'ata (Murang'a).

Also in the 1.30pm lunch at Barka Restaurant in Mombasa's Old Town district — where the President ordered a plate of *biryani*, chicken *tikka*, *chapati*, *mchicha*, (amaranthus) and tamarind juice — were Jubilee Secretary-General Raphael Tuju, party chairman Nelson Dzuya, and Director of Public Prosecutions Noordin Haji.

Mr Duale and Prof Kindiki said the morning meeting at State House Mombasa discussed the party's legislative agenda for the next one year, but the presence of Mr Tuju betrayed another agenda: that of the health of Jubilee Party.

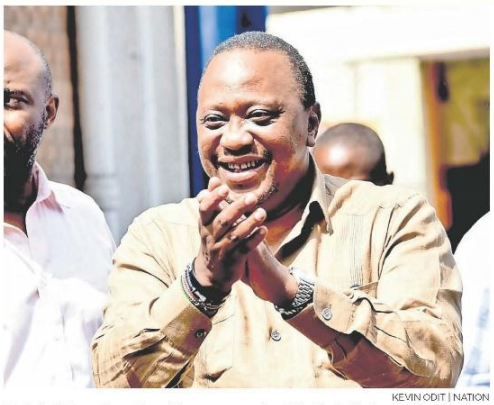
"We discussed our legislative agenda ahead of the resumption of the two Houses," said Prof Kindiki on phone with the *Nation*, before adding: "We also discussed other issues touching on the party."

Both Mr Duale and Prof Kindiki, however, refused to be drawn into discussions on what came of the deliberations about the Jubilee Party and the simmering disunity within, with Mr Duale saying it is Mr Tuju who should comment on party matters.

Asked by the *Nation* about his sudden silence over issues affecting the country and politics, Mr Duale, who is the Garissa Town MP, referred us to *The 48 Laws of Power*, the book by American author Robert Greene regarded as the definitive manual for anyone interested in gaining ultimate control of others.

"When you are silent, you receive more honour and respect," Mr Duale said, adding: "I am a senior leader in this country."

During the meeting, Mr Kang'ata, National Assembly deputy speaker Moses Cheboi (Kuresoi North), and nominated MP Cecily Mbarire were chosen to accompany the President for Thursday's swearing-in ceremony of Democratic Republic of Congo president-elect Felix Tshisekedi.



KEVIN ODIT | NATION

President Uhuru Kenyatta addresses a crowd outside Barka Restaurant in Mombasa yesterday, shortly after having lunch with his deputy William Ruto.

After lunch, President Kenyatta briefly addressed a crowd outside the restaurant and asked them to live in unity, while Dr Ruto jumped straight into his car and drove off.

"*Nimekuja kutembelea mtaani wenu kidogo na nashukuru kwa kunikaribisha.* (I have come to see how you are all doing, and I am happy with this reception) We want Kenyans to live together," the President said before boarding his car and leaving.

Away from Mombasa, the DP's allies were curious about what the changes announced by the President on Tuesday meant within the context of power sharing in Jubilee.

Although many were guarded in questioning the elevation of Dr Matiang'i to the position of overseeing the implementation of government projects — a role that Dr Ruto had taken as his own in his numerous tours across the country — they argued that there should be clarity on what the DP will be doing henceforth.

Dr Matiang'i, now regarded as President Kenyatta's Mr Fix-It, was named as chairman of the National Development Implementation and Communication Cabinet Committee comprising all Cabinet Secretaries, Attorney-General Paul Kihara, and Head of Public Service Joseph Kinyua. Deputised by his Treasury counterpart Henry Rotich, Dr Matiang'i will, in the new role, report directly to the President.

He will be in charge of supervising the delivery cycle of all national government projects and providing guidance on measures to address challenges impeding effective implementation of projects. He will also monitor and evaluate State projects to ensure proper utilisation of resources.

By placing the "inspection" of government projects under the Dr Matiang'i-led team, the President appeared to disparage the many countrywide "development" tours that Dr Ruto has in recent months been conducting, and now many analysts see this as a whittling-down of the role of the DP.

"In the letter of the law, what the President did is right, but the spirit of the government re-organisation is, understandably, making many Kenyans uncomfortable," vocal Nandi Senator Samson Cherargei told the *Nation*.

While insisting that those were his own views, Mr Cherargei, one of Dr Ruto's staunchest defenders, called the current environment within Jubilee the "symptomatic effects of the handshake" — referring to the March 2018 truce between President Kenyatta and opposition leader Raila Odinga. Many of Dr Ruto's allies regard that truce as the single biggest threat to the DP's presidential bid.

"I have always suspected that the handshake is a poisoned chalice, and you cannot rule out succession politics in all this right now. But no one should even imagine that the Deputy President can be undermined. Both he and the President serve at the pleasure of the people who elected them in 2017," said Mr Cherargei.

Keiyo South MP Daniel Rono said the President has the right to re-organise his government, but said it should not be politically motivated.

"It sounds irregular for a minister to be a prefect of other ministers. This defeats the Building Bridges spirit. The right person for the job would have been Dr Ruto," said Mr Rono before posing: "The big question is, what is the role of the DP in this arrangement? Is he in or is he out?"

But, as the Deputy President's camp fussed and fumed over Dr Matiang'i's appointment, Amani National Congress (ANC) Deputy Party leader Ayub Savula was rooting for the President, saying he had reached out to at least 30 MPs to entrench the super-minister role in the Constitution.

"This is a noble idea," said Mr Savula. "It effectively elevates Dr Matiang'i to a *de facto* Prime Minister. Once the House resumes from recess, I will table a motion in Parliament and mobilise MPs to formalise the position."

The ODM director of elections Junet Mohamed also supported the move, saying it is the prerogative of the President "to organise his government".

Appendix 3: MINUTES OF CONSULTATIVE MEETING WITH PORT REITZ CREEK BMU CHAIRMEN

ATTENDANCE LIST

	NAME	ORGANIZATION	POSITON
1.	Elizabeth Mweni	KeFS	ADF
2.	Simon Losepicho	County Govt of MSA	Ag. CFO
3.	Erastus S. Mwatine	County Govt of MSA	AFO
4.	Hamisi S. Mwamowe	BMU - Likoni	Chairman
5.	Kelly Konde	BMU – Mwangala	Chairman
6.	Ali Nzije Masudi	BMU – Guya	Chairman
7.	Swedi H. Hassan	BMU – Mwadumbo	Chairman
8.	Abdalla Ali Kitondo	BMU – Ngare	Chairman
9.	Suleiman M. Kimuswa	BMU – Mtongwe	Chairman
10.	Chindoro Mwingo	BMU – Mkupe	Chairman
11.	Mwaiwe Kombo Mavune	BMU – Tudor/Shimanzi	Asst. Chairman
12.	Hezekiah Adala	Heztech	Team Leader

AGENDA

1. Mapping out fisheries resource potential in the Portreitz creek.
2. Any potential impacts

Opening Remarks

The chairperson welcomed the BMU chairmen to the meeting and thanked them for responding very well in that short notice. She stressed that it was important to know their fisheries potential within the creek and get an understanding on the status of the resource.

Min.1/1/10/18 Fisheries Resources in the Creek

The BMUs that have activities within the creek are 9. These are;- Likoni, Mtongwe, Mwangala, Mwadumbo, Guya, Ngare, Kitanga-juu, Mkupe and Tudor/Shimanzi.

(a) Mwangala BMU

The meeting was informed that apart from the mangrove forest that occupies a large area, Landing sites and there are also different types of fish species namely; crabs, lobsters, prawns, oysters, demersal species such as grunters, eels from the brackish water, snappers etc, Pelagics such as milk fish and also shark/rays, and sardines species.

The meeting was also informed that the area was rich in crustacean production especially prawns.

Gears used - Cast net and monofilament for prawns and sardines, hook and sticks for crabs and oysters, Long line for fish and crabs and fence traps including visoso.

(b) Mtongwe BMU

Resources;- Landing sites, Mangrove forest, different types of fishes both Demersals and Pelagics, Crustacean, Sharks/Rays, sardines, Octopus and Squids.
Gears Used;- Gill net, Monofilament, Prawn seine, Fence traps, Basket traps, Long lines, Pointed sticks, Strong pointed wires, Lobster net, Spear guns, Cast net and diving equipments

(c) Guya BMU

Resources;- Landing sites, Mangrove forest, different types of fish species namely; crabs, lobsters, prawns, oysters, demersal species such as grunters, eels from the brackish water, snappers etc, Pelagics such as milk fish and also shark/rays, and sardines species.

Gears Used

Cast net and monofilament for prawns and sardines, hook and sticks for crabs and oysters Long line for fish and crabs, fence traps including visoso, mosquito net for Duvi and Handline.

(d) Ngare BMU

Resources;- Landing sites, Mangrove forest, different types of fish species namely; crabs, lobsters, prawns, oysters, demersal species such as grunters, eels from the brackish water, snappers etc, Pelagics such as milk fish and also shark/rays, and sardines species.

Gears Used: Cast net and monofilament for prawns and sardines, hook and sticks for crabs and oysters Long line for fish and crabs, fence traps including visoso, mosquito net for Duvi, Handline and gill net of mesh size 8" for rays and other wider fishes.

(e) Likoni BMU

Resources;-

Landing sites, Mangrove forest, different types of fishes both Demersals and Pelagics, Crustacean, Sharks/Rays, sardines, Octopus and Squids.

Gears Used;- Gill net, Monofilament, Prawn seine, Fence traps, Basket traps, Long lines, Pointed sticks, Strong pointed wires, Lobster net, Spear guns, diving equipments and Cast net.

(f) Mkupe BMU

Resources

Landing sites, Mangrove forest, different types of fish species namely; crabs, lobsters, prawns, oysters, demersal species such as grunters, eels from the brackish water, snappers etc, Pelagics such as milk fish and also shark/rays, and sardines species.

Gears Used: Cast net and monofilament for prawns and sardines, hook and sticks for crabs and oysters Long line for fish and crabs, fence traps including visoso, mosquito net for Duvi, Handline and gill net of mesh size 8" for rays and other wider fishes.

(g) Tudor/Shimanzi

Resources: Landing sites, Mangrove forest, different types of fish species namely; crabs, lobsters, prawns, oysters, demersal species such as grunters, eels from the brackish water, snappers etc, Pelagics such as milk fish and also shark/rays, and sardines species.

Gears Used;- Cast net and monofilament for prawns and sardines, hook and sticks for crabs and oysters Long line for fish and crabs, fence traps including visoso, mosquito net for Duvi, Handline and gill net of mesh size 6" for rays and other wider fishes.

(h) Mwadumbo BMU

Resources
Landing sites, Mangrove forest, different types of fish species namely; crabs, lobsters, prawns, oysters, demersal species such as grunters, eels from the brackish water, snappers etc, Pelagics such as milk fish and also shark/rays, and sardines species.
Gears Used;- Cast net and monofilament for prawns and sardines, hook and sticks for crabs and oysters Long line for fish and crabs, fence traps including visoso, mosquito net for Duvi, Handline and gill net of mesh size 8" for rays and other wider fishes.

(i) Kitanga-Juu BMU

The BMU was not represented during the meeting.

Min.1/2/10/18 Landing sites, vessels used by fishermen and BMU Membership.

During the meeting the BMU chairmen gave the following information as tabulated below;-

BMU NAME	LANDING SITE	NO. OF VESSELS USED	MAIN CATEGORIES OF BMU MEMBERSHIP
Likoni	Ferry ya Zamani	Wooden boats – 17 Dug-out - 10	Total members – 580 Fishermen – 220 Mama karanga – 200 Fish traders and others - 160
	Mwasefu		
	Newport		
	mvumoni		
	Kokoni		
	Kibuyuni		
Mwangala	Dongo-kundu	Dug-out – 36	Total members – 319 Fishermen – 183 Mama karanga - 136
	Mwangala		
	Mwakuzimu		
	Magoda		
	Teja		
Guya	Matsazani	Dug-out - 41	Total members – 280 Fishermen – 165 Traders – 115
	Jimbo		
	Mfundo		
	Mwangoa		
	Store		
Mwadumbo	Kwa sowa	Dug-out - 54	Total members – 331 Fishermen – 165 Mama karanga - 166
	Mwadumbo		
	Kiboponi		
	Tsunza ya munyu		
Ngare	Ngare	Dug-out – 32 Dhow - 1	Total members – 196 Fishermen – 97 Traders - 99
	Mtudwini		
	Mshahame		
	Shazani		

Mtongwe	Migingo	Boats – 10 Dug-out - 25	Total members – 315 Fishermen – 175 Traders – 4 Mama karanga - 136
	Mweza		
	Shaza		
	Mtibwani		
	Hawaii		
	Mkunguni (Shared)		
Mkupe	Mshame	Dug-out - 80	Total members – 333 Fishermen – 227 Fish traders – 106
	Mkupe		
	Mchanjama		
	Mwanga-mavi		
	Maweni		
Tudor/Shimanzi	Tudor	Dug-out - 24	Total members – 142 Fish traders – 46 Fishermen - 96
	shimanzi		

Other activities that add to their resources is bee keeping, crab fattening and fish ponds.

Concluding Remarks

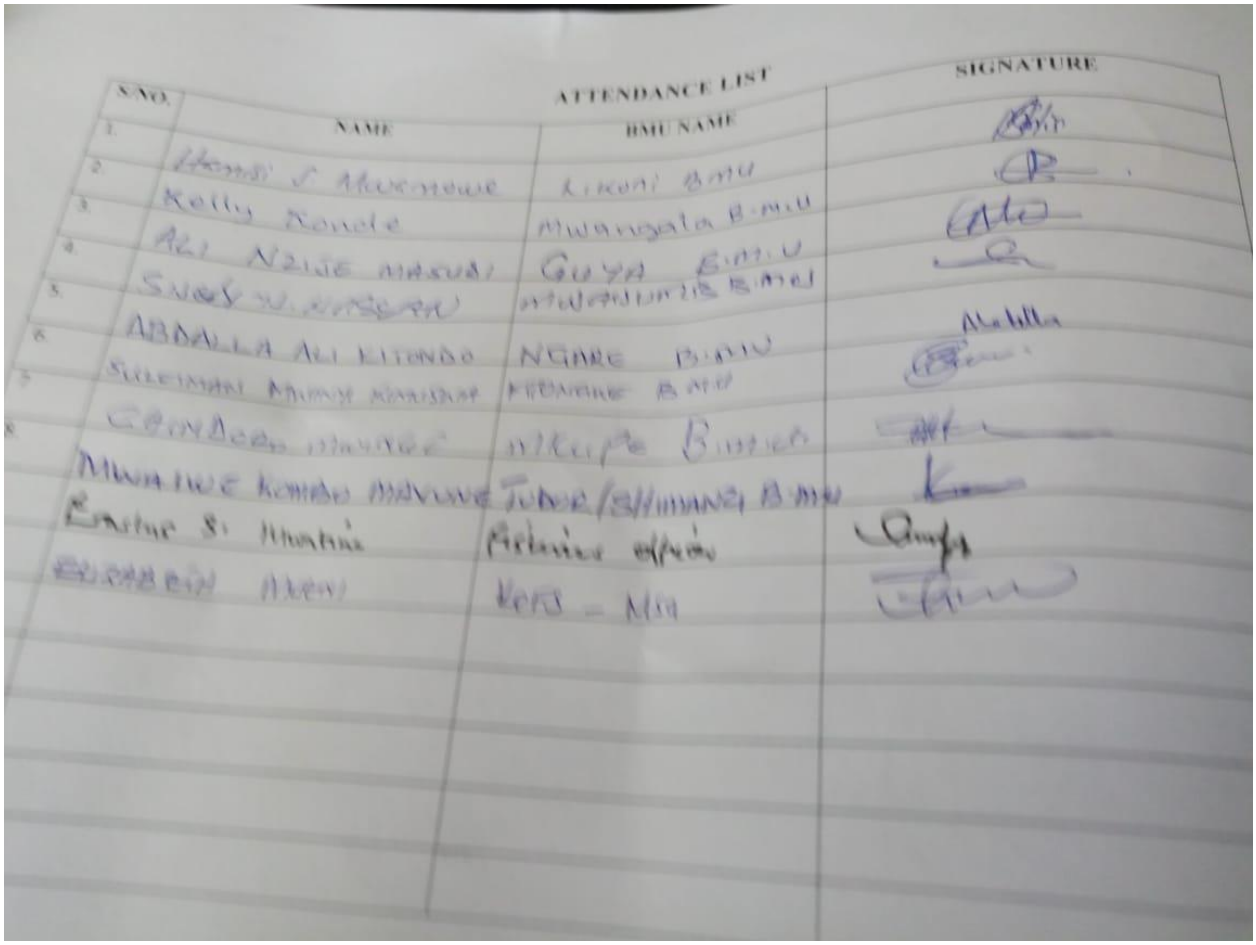
The County Director of Fisheries cautioned the BMU chairmen on adding more members in their registers who are not genuine BMU members since such people bring in problems within the BMU.

The BMUs were advised them to report every activity that was going on in their respective jurisdiction. She said such information is vital for future management plans.

It was agreed that other BMUs will be involved during the stakeholder meeting and the results of the study will be shared including those within the open sea.

Attachment

List of participants



ATTENDANCE LIST

S.NO.	NAME	BMU NAME	SIGNATURE
1.			
2.			
3.			
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Photos

Appendix 4: MINUTES OF FIRST CONSULTATIVE MEETING WITH PAP COMMITTEE

DATE: **11TH DECEMBER 2018** VENUE: **ROYAL COURT HOTEL, MOMBASA**

Present

As in the attached attendance register.

PURPOSE OF MEETING

To introduce the PAP Committee to key stakeholders in the Dongo Kundu Mombasa Special Economic Zone (SEZ) and brief the PAP Committee on the current status and next steps.

AGENDA

- Introduction of Paticipanys
- Opening Remarks
- Project Background and Update of Current Status
- Plenary Discussion
- Closing Renarks and Vote of Thanks

MIN. 1/12/2018: PRELIMINARY

The meeting was called to order at 10:00 am followed by word of prayer from Mr Hamisi Mwadzengo.

MIN. 2/12/2018: WELCOME NOTE AND INTRODUCTION – HUSSEIN MAMO, KPA

Mr Hussein Mamo, Surveyor KPA welcomed the participants to the meeting and took them through a round of self-introductions.

Mr Mamo then made the following welcome notes:

- Appreciated the role the Committee would play as the intermediaries between the local community and government agencies undertaking projects in Dongo Kundu;
- Noted that many of the Project Affected Persons (PAPs) are anxiously waiting for compensation following several meetings already conducted in the area;
- Observed that KeNHA has initiated compensation through the National Land Commission but KPA still has a long way to go. KPA prepared a Resettlement Action Plan (RAP) report about 3 years ago but this report has to be updated to reflect the current situation;
- Informed the meeting that JICA has advertised for a consultant to review the UNES RAP report and urged the PAP Committee to participate actively during the RAP review;
- Pleaded for patience from the Project Affected Persons, explaining that most of these processes require approvals which take a lot of time.

MIN. 3/12/2018: OPENING REMARKS – MR ERIC MULEVU, DCC LIKONI

The Deputy County Commissioner thanked the participants for taking their time to attend the meeting. Invited the Likoni Subcounty Administrator (SCA) Mr Mwalimu Mohammed to talk on behalf of the County Government of Mombasa. The SCA informed the meeting that this project

has full support of the County Government of Mombasa and urged the stakeholders to work together towards realization of the project;

- The DCC noted that representatives of people living with disabilities and those of minority groups have not been elected but that would be done soon;
- Noted that the community feels frustrated with the government due to delays in payment of compensation;
- Commended KPA for active engagement with local communities and urged KeNHA to follow KPA example;
- Proposed that compensation should be done at the same time for all PAPs and should commence prior to project implementation;
- Gave commitment of the national government through local administration in ensuring smooth implementation of the project
- Emphasized the need for effective communication to avoid rumours that could derail the project;
- Noted the high level of unemployment in Likoni and informed the committee to urge locals to undertake vocational training in preparation for job opportunities likely to arise during project implementation;
- Noted that the Digo community that dominates the project area are classified as marginalized, hence should use the opportunities likely to arise from project implementation to uplift and empower themselves.

MIN. 4/12/2018: REMARKS BY MS. MISHI MBOKO, LIKONI MP

- Praised KPA for effective public consultation and urged KeNHA to do the same, noting that public participation is enshrined in the constitution and must involve all concerned;
- Noted that the Mombasa Southern Bypass Road traverses Shika Adabu area, hence there is need to bring them on board including representation in the committee;
- Emphasized the need to employ locals to undertake manual works during implementation of the project, noting that local communities have been taking their children to schools and would soon be able to do technical works;
- Promised to secure an appointment for the committee to meet with the Governor, Mombasa County as part of getting project support of the County Government;
- Urged the committee to remain united and avoid misinformation. Undertook to ensure that any member causing division within the committee is removed.
- Noted that this is an industrialization project hence it is in line with the President's Big 4 Agenda and must therefore be supported by all;
- Requested KPA to employ at least 2 residents of Dongo Kundu as a show of goodwill, noting that KPA has been building and equipping a school in Likoni as part of Corporate Social Responsibility (CSR).

MIN. 5/12/2018: PROJECT BACKGROUND AND UPDATE – DANIEL GITHINJI, KPA

- Thanked the area MP Mishi Mboko and Likoni DCC Mr Eric Mulevu for actively participating in this project, noting that this committee was formed as a resolution of the Stakeholder Meeting held in Dongo Kundu on 13th September 2018 in which the two leaders were present;

- Explained that KPA and the project consultants were not involved in election of the committee so as to remain neutral. Equally the committee must remain neutral and not be influenced to look at the interest of the government;
- Informed that KPA has also done a lot of consultation before this meeting, including consulting with NLC, KeNHA and JICA to ensure all agencies undertaking projects in Dongo Kundu speak with one voice;
- The RAP report done by UNES has been difficult to implement, especially after JICA noted that it does not fully comply with JICA guidelines. The report therefore has to be reviewed to meet JICA guidelines and also to take account of changes that have taken place since completion of the report. The changes may be both positive and negative;
- The revised RAP would be the Master RAP for the entire SEZ area, and other state agencies undertaking projects in the area may undertake Component RAPs for each subproject. However there is need for coordination through the committee to identify all people affected by the various projects to avoid double compensation. KPA would take particular interest in people living within SEZ area whose plots are not affected by any of the subprojects.
- KPA is interested in the SEZ project for two reasons: KPA holds the Title Deed for the land and they are also doing a new port within the proposed SEZ area.
- Mr Githinji urged the community to separate EIA issues from RAP issues so that the consultants can do their work without interference, noting that there would soon be a final stakeholder meeting for EIA to enable the project acquire license from NEMA. Without NEMA license there would be no project development hence need for compensation would not arise;
- Informed that KPA intends to undertake exhaustive public consultation to ensure that all contentious issues are resolved in an amicable manner, and urged the committee to act as good ambassadors between the community, KPA and other government agencies.

MIN. 6/12/2018: REMARKS BY KENHA – ENG E. MUTEA

- The area traversed by the Mombasa Southern Bypass Road (MSBR) comprises of land claimed by KPA as well as private land. KeNHA treated KPA as PAP for purpose of the MSBR project;
- KeNHA completed the RAP for the MSBR and submitted report to NLC. KeNHA has also obtained the compensation cash from The Treasury and handed over the same to NLC to initiate compensation;
- In line with the RAP prepared by KeNHA a Greivance Redress Committee was supposed to be established to help in resolution of complaints or disputes arising from the project. KeNHA proposes that the PAP committee now established also acts as the Greivance Redress Committee;
- KeNHA would then train the committee to equip them with skills for handling disputes. Other state agencies undertaking subprojects in the area should also educate the committee on matters specific to their components;
- KeNHA also purposes to train PAPs on entrepreneurship to enable them use compensation resources responsibly;
- Eng Mutea clarified that the MSBR was split into 3 packages to ease its administration. The first package has been completed and was recently commissioned. Contract for the second phase of the project has been concluded and awarded but not yet signed;

- Clarified that the contractor for the 2nd package has not yet commenced the works, contrary to information circulating that the project is already ongoing. The contractor has only relocated his equipment to an area close to the proposed site in preparation for commencement of the work when the contract is signed and all outstanding issues resolved;
- KeNHA will insist that the contractor employs locals in areas where their skills match the job requirements.

MIN. 7/12/2018: REMARKS MR SIMON LOSEPICHO, ACTING CHIEF FISHERIES OFFICER, COUNTY GOVERNMENT OF MOMBASA

- The fisheries sector will be fully involved in project implementation;
- Committed that the County fisheries office would cooperate with project team by availing all the information required;
- Emphasized that the design and EIA team need to clearly define duration and location of project components to enable classification of impacts into temporary or permanent;
- Fishermen would then be compensated based on whether they would suffer total loss or they would only be affected during construction period;

In response to Mr Losepicho the area MP Hon Mishi Mboko lamented that in previous compensation initiatives the fisheries officers and Beach Management Units (BMUs) acted irresponsibly resulting into situations where compensation resources ended up in wrong hands. This situation may have arisen because of lack of a representative committee of PAPs;

Hon Mboko proposed that the BMU leadership needs to be interrogated before release of compensation resources to weed out corrupt leaders.

MIN. 8/12/2018: PLENARY SESSION

Mr Hamisi Rama, Member PAP Committee

- Applauded the formation of the PAP Committee and the initiative by KPA to call the meeting noting that in previous assessments people's representatives were not involved;
- Emphasized on the need to employ the locals including women when the project commences.

Said Bidu – Youth Representative PAP Committee

What happens to those who would be affected upon being paid – where do they move to or would they be allocated land within the area?

KPA Response: The Master RAP soon to be prepared would address resettlement issues after consultation with PAPs.

James Jira – Member, PAP Committee

- Appreciated the participation of the local MP in working with PAPs to resolve issues affecting them;
- Urged KPA and other state agencies involved in the project to engage the community so as to get their ideas and also secure their goodwill.

Fatuma Khamisi – Senior Chief, Mtongwe

- Previously there has been a lot of animosity between KPA and the local community over the proposed project. This meeting hopefully opens way for meaningful communication between the two parties;
- There is need to educate the PAPs that the entire SEZ area would have to be vacated so that they in a state of preparedness.

Shaban Omar – Member, PAP Committee

Wanted to know why only 17 PAPs have been compensated for the MSBR whereas 77 are affected.

KeNHA Response: The compensation process has just commenced. KeNHA will ensure that all PAPs are compensated and educated on responsible use of compensation cash.

MIN. 9/12/2018: CLOSING REMARKS

Likoni DCC:

- The Committee needs to sit down and elect officials inclusive of Chairman, Secretary and Treasurer from among themselves.
- Representatives for the marginalized and people living with disabilities would be elected to join the committee, as well as a representative from Shika Adabu area since the area is also traversed by the Mombasa Southern Bypass Road.
- Urged the community through their representatives to cooperate with the government and use such participatory forums to resolve disputes instead of taking the law into their own hands.

KPA:

- Will support the project all the way by providing opportunities for consultation with affected persons;
- A final stakeholders meeting for the EIA for port infrastructure and access Road will take place in Dongo Kundu before end of January 2019. PAP representatives would be expected to spread awareness so that the community is informed of the difference between EIA and RAP;
- The Consultant reviewing the UNES Report would be on the ground soon and the residents should also cooperate with him.

Closing Prayers

There being no further business the meeting ended at 1:05pm after a words of prayer from Mr. Hamisi Mwadzengo and Mr Shaban Omar.

EIA AND RAP FOR PORT INFRASTRUCTURE OF MOMBASA SEZ

CONSULTATIVE MEETING WITH DONGO KUNDU PAP COMMITTEE

Date: **December 11, 2018** Venue: **Royal Court Hotel**

NO	NAME	MOBILE NO	SIGNATURE	ORGANISATION
1.	DANIEL M. GITHINJI	0721897725		KPA
2.	HAMISI RAMA MWADZENGO	0734515688		DK Comm
3.	SAMUEL SANGA KALAMA	0722264706		DK Comm
4.	KELLY KONDE	0725256138		DK Comm
5.	Hazel Kadu Adule	0722782696		Hezteck
6.	MOHAMED SELEMANI MWANJOJE	0702915914		DK Comm
7.	Shubun Omar Fungiza	0701590513		DK Comm
8.	SALIM RIDU	0700842100		DK Comm
9.	ERIC MULEMI	0722588788		NG-AO-DCC
10	BINTALI SUBIRA ABDALLA	0717562857	Subira	FEMALE YOUTH
11	RIZIKI. H. MWAKUSIRIKWA	0725716082		CSO
12	PATRICIA AGULA	0723729389		KeHHA.
13	ROBERT IKEGA	0722877588		MPARD
14	EUSTACE MUTEA	0724546012		MPARD
15	JONATHAN WAIRAGO	0722160685		KEHHA/MPARD.
16	NICHOLAS K MUNGAI	0721665748		MPARD/KENHA
17	HON. MISHI CHUMA MBOKO	0722783752		MP
18	FATUMA J. KHAMIS	0726462794		SNR. CHIEF
19	FATUMA SHEHE MWAFUA	0754196974		WOMEN REP.
20	HUSSEIN H. XXXXO	0722570060		KPA.
21	MKHALIMU MOHAMED	0720345122		S.C. ALKN
22	Christine Natole	0714638882		Kamati
23	Simon Losepich	0724888400		CBM
24	JAMES DUME JIRA	0723912554		KANMA
25				
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DK Comm – Member of Dongo Kundu Committee

PROGRAMME FOR foMEETING

EIA AND RAP FOR PORT INFRASTRUCTURE OF MOMBASA SEZ

CONSULTATIVE MEETING WITH DONGO KUNDU PAP COMMITTEE

Date: DECEMBER 11, 2018 **Venue:** ROYAL COURT HOTEL

Time: 9.00am-1.00pm

MEETING PROGRAMME

Time	Activity	Action by
9.00 - 9.30am	Arrival and Registration of Participants	All
9.30 - 9.45am	Introduction	KPA
9.45 – 10:00am	Opening Remarks	DCC Likoni
10:00 – 10:30am	Project Background and Present Situation	KPA
10:30 – 11:00am	TEA BREAK	ALL
11.00 - 12.00pm	Plenary Discussion	ALL
12.00– 12.15pm	Closing Remarks and Vote of Thanks	KPA/DCC Likoni
12.15 - 1.00pm	Lunch	ALL

Appendix 5: Focus Group Meeting with BMU Leaders

MINUTES OF CONSULTATIVE MEETING WITH BMU LEADERS

DATE: FRIDAY, DECEMBER 14TH, 2018 VENUE: COUNTY FISHERIES BOARDROOM

TIME: 0900

1.1 Purpose of Meeting

The purpose of the meeting was to further consultations with BMU representatives from the creek fishing community on the likely impacts and proposed mitigations towards likely loss of livelihood due to project implementation. The meeting was also made to gather the fishers/traders views on impacts due to multiple /concurrent projects with same or adjacent area.

1.2 Agenda

v. To share details of the likely impacts of the resource;
vi. Obtain inputs from stakeholders for consideration towards compensation against loss of livelihood due project implementation

1.3 Brief Remarks and Introductions

The meeting began at 9:45 am with a word of prayer from one of the participants followed by opening remarks from meeting chair- Elizabeth Mueni. The meeting was attended by representatives from Tudor BMU (Shimanzi area), Mkupe BMUand Ngare BMU. Kitanga Juu BMU was not represented and it noted that the County Director will confirm the status of Kitanga Juu BMU. The SEZ ESIA was conducted and a stakeholder meeting will be held to present the findings. The stakeholder meeting will also include representation of those BMUs operating in the open sea and who fish in areas near dumping areas.

The participants were asked to highlight the key areas of concern regarding the impacts and the proposal for compensation.

1.4 Key impact areas

The creek has both nursery and breeding areas. Mkunguni area and another area within Makupa creek namely Maji Moto were identified as critical areas as breeding sites. Maji moto is important for Jumbo prawns. Tudor fishes are depended on the fishery of the PortReizt and any impact to the fishery directly impact on their fish catches. Dongo Kundu is a main fishing ground. It is the deepest area within the creek as most of the other areas are shallow and intertidal within mangrove habitats.

When asked who is likely to be impacted?

The response was that all of them will be impacted with a boat owner likely to be impacted more as the investor into the fisher and also based on arrangements that fishers use to have a proportion of the catch allocated to the boat owner even if he is not involved in the active fishing. The fish traders /Mama Karangas indicated their sole reliance on the catch from the creek fishermen hence all the community depended on fishing to be considered.

1.2. Compensation for affected Persons

The question here was who should be compensated? The participants agreed that all should be compensated as they will be affected directly or indirectly.

Are there records to indicate the daily or monthly income from the various categories? Most of the BMUs indicated they had their members' records in terms of catch while some did not keep records but were aware of the daily income due to fishing. Some BMUs kept pooled records of the income.

Can the compensation be uniform? The unanimous response was that the individual daily income is known hence that should be applied during the compensation.

Are impacts cumulative or each project has its unique impact? According to the participants there has been decline in catches from the different projects hence the impacts are cumulative. However, each project has taken place at different periods. Capital dredging has more impact than maintenance dredging and the recovery of the habitats may take longer for dredging projects. The Participants were in agreement that compensation for dredging for SEZ one berth construction should considered based on the fishery recovery period. Mkunguni is a breeding site and the likely loss of recruits according to the participants.

The participants raised concern that already KPA had plans for maintenance dredging where it was agreed that the fishers would be compensated for a period of 3 years. In the event the implementation of two projects coincide, the participants agreed that compensation to be extended by 2-3 years due to the impact from dredging the muddy bottoms at the proposed area.

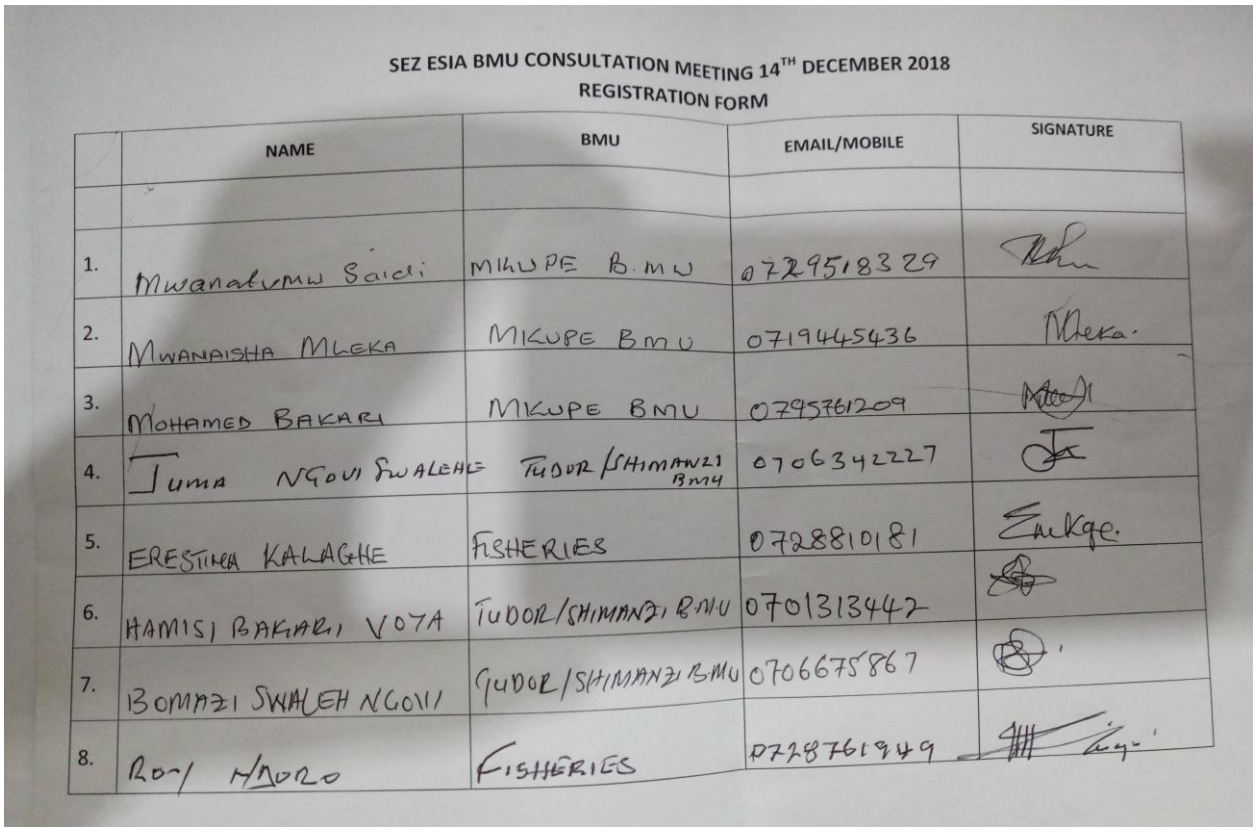
1.2. Wayforward

1. It was agreed that the BMUs will provide the details on individual income to the County Fisheries officer for compilation and submission.
2. The county Director of fisheries to confirm the status of the Kitanga Juu BMU
3. The BMU leaders to provide names of those fishers who are not members at the moment to through the County Director of Fisheries
4. The final compensation plan to be discussed and agreed with all the BMUs

1.4. Closing remarks

In closing remarks the community were encouraged to start keeping the right information. They were reminded of the requirements legally for every fisher/crew to submit their fishing records. Elizabeth Mueni thanked the community for their involvement in the meeting. She urged all to give the correct information to assist identifying the actual persons that will be affected through the project. The meeting was closed with a word of prayer at 12.00.

List of participants



SEZ ESIA BMU CONSULTATION MEETING 14TH DECEMBER 2018
REGISTRATION FORM

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5.	ERESTINA KALAGHE	FISHERIES	0728810181	Erukge.
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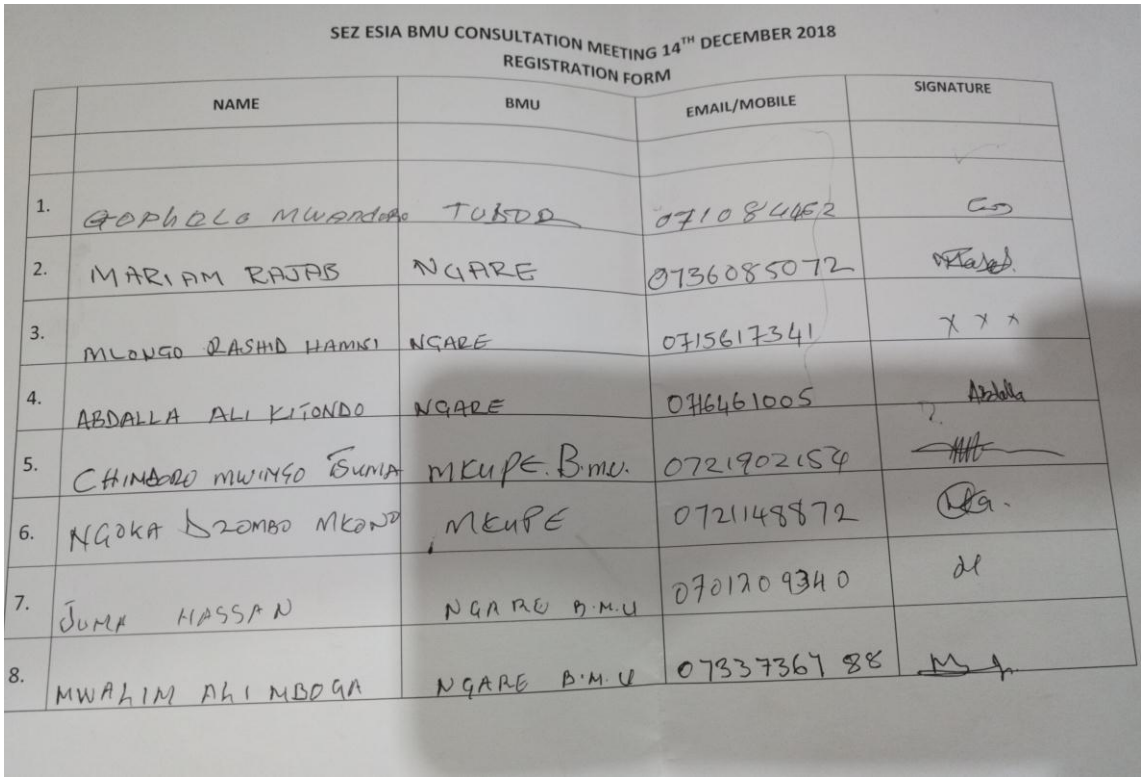
7.	BOMANZI SWALEH NGOVI	TUDOR/SHIMANZI BMU	0706675867	
8.	Roy MORO	FISHERIES	0728761949	



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5.	CHIMADU MWINGO GUMA	MKUPE B.M.U.	0721902154	
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2.				
3.				
4.				
5.				
6.				
7.				
8.				

Photos

Appendix 6: Consultative Meeting with Mtongwe Area BMUs

REPORT OF A CONSULTATIVE MEETING WITH MTONGWE AREA BMUS AT MTONGWE (LONGWE CDI PREMISES) ON 10TH DECEMBER 2018

INTRODUCTION

The consultative meeting involved the participation of 3-5 representatives from five Beach Management Units that conduct their fishing activities at Dongo Kundu, Mkunguni and Mweza creek in the project area. The five Beach Management Units that were represented are Mtongwe, Mwangala, Guya, Mwadumbo and Likoni. Duly signed lists of representatives from each Beach Management Unit are annexed in this report.

RESULTS

Position on the project

The participants expressed their support for the project but expressed reservations regarding how the previous projects handled compensation to the fishermen. They suggested that a committee be established bringing together the Kenya Ports Authority, Fisheries Department, Beach Management Unit representatives to oversee compensation in this project. Mechanisms should be put in place to make this committee accountable to the project affected persons.

Number of Beach Management Unit members:

The Beach Management Units had varying numbers of members as follows:

- Mtongwe Beach Management Unit had a total of 315 members that consist of 175 fishermen, 5 medium scale fish dealers and 135 fishmongers.
- Mwadumbo Beach Management Unit had a total of 331 members consisting of 165 fishermen and 166 fishmongers.
- Guya Beach Management Unit had 280 members consisting of 156 fishermen and 124 fishmongers.
- Likoni Beach Management Unit had 580 members consisting of 220 fishermen, 200 fishmongers and 160 traders.

The fishermen consist of those who target prawns, lobsters, mud crabs and finfish. In addition, the fishermen use different fishing gears.

The fishermen's earnings varied with type of fishery. Prawn fishers earned relatively higher incomes followed by finfish fishers.

Fishing grounds

The following fishing grounds were identified during the consultative meeting:

1. Mweza creek which is used by different fishers
2. Makame
3. Mkunguni-Mwangala-Dongokundu

Identified Impacts of the project

The following impacts were identified during the consultative meeting:

1. There was concern that the project will lead to loss of two landing sites namely Mkunguni and Kibuyuni which are currently actively used by the fishermen and fishmongers.
2. Pollution associated with increased sedimentation and noise will make fishing in the traditional fishing grounds impossible during the project implementation.
3. Dumping of dredge material will affect Shika Adabu, Old port and Timbwani Beach Management Units hence the need to consider these Beach Management Units in the compensation package.

   It was agreed that those who will be most affected are those whose landing sites will be lost. It was suggested that a few landing sites should be modernized to accommodate more fishers and improve quality.

   There was a question regarding the start date of the project so that the affected people could start organizing themselves. It was agreed that the information would be conveyed once all processes are completed.

PARTICIPANTS LIST

S. NO.	NAME	Identity Number	BEACH MANAGEMENT UNIT
1	Fredrick Kioko Munotu	8417103	Mtongwe
2	Suleiman Mwinyi Kimiswa	21779729	Mtongwe
3	Jane Luvuno Chitsango	5012020	Mtongwe
4	Mwacheti Suleiman Sumoni	8410901	Mtongwe
5	Ali Masudi Nzije	9874843	Guya
6	Bodwe Peku Tsetse	2215219	Guya
7	Bakari Voya Chimera	8434905	Guya
8	Nyamvuza Mavune Kombo	10504214	Guya
9	Hajar Ali Charo	30078075	Guya
10	Suedi Hamisi Hassan	9875651	Mwadumbo
11	Khamisi Ngonda Nyae	31436887	Mwadumbo
12	Salim Bakari Kodi	9875648	Mwadumbo
13	Said Hamisi Makoba	21477822	Likoni
14	Hamisi S. Mwanowe	13357943	Likoni
15	Mbwana Babu	11648692	Likoni
16	Mohamed Mwinyi Dephengo	3961662	Mwangala
17	Dadi Kesi Kalume	24563662	Mwangala
18	Salim A. Mwanyakaka	8413091	Mwangala
19	Oridah K. Kinywa	27392327	Fisheries Department MCG
20	Dr. Jacob Ochiewo		HEZTECH

Appendix 7: Characterization of Port Reitz Creek Fishery

Creek fishery utilization & community attributes

Survey Items	Contents
Biological attributed	Spawning seasons, areas; migration route if any
Status of resources	Species; Catch; fishing grounds; fishing seasons;
Fishing methods	Cost-benefit analysis of each type of resource exploitation method used
Community characteristics	Geographical characteristics; population; number of households; number of fishing boats
Surrounding Condition	Infrastructures; markets; Source of inputs, Supply chain, Value addition chains

Creek fishery Resource Management

Survey Items	Contents
Management Structure	Community participation including BMUs
Resource Management Systems	Co-management; traditional resource management; coastal resource management; target species; fishing gear restriction; Cases closing season and site; catch size restriction
Issues	Technical issues; economic issues; community issues

Appendix 8: Overall Species List

S. No	Family	Plant ID		
		Generic	species	Local name
1	Acanthaceae	Asystasia	gangentica	futsule
2	Anacardiaceae	Anacardium	ocidentale	mbibo
3	Anacardiaceae	Lannaea	schweinfurthii	mnyumbu
4	Anacardiaceae	Mangifera	indica	muhembe
5	Anacardiaceae	Ozoroa	insignis	msalasanga
6	Anacardiaceae	Rhus	natalensis	
7	Anacardiaceae	Sclerocarya	birrea	mng'ongo
8	Anonnaceae	Ananna	sp.	mfwitsanundu
9	Anonnaceae	Anonna	senegalensis	mbokwe
10	Apocynaceae	Rauvolfia	mombasiana	
11	Apocynaceae	Saba	comoriensis	muhungo
12	Apocynaceae	Thevetia	peruviana	mkode
13	Araliaceae	Cursonia	zirmammanii	mnyala
14	Asclepidaceae	Tylophora	stenoloba	
15	Bignoniaceae	Makhamia	zanzibarica	mpwalawandu
16	Bombacaceae	Adansonia	digitata	mbuyu
17	Boraginaceae	Eheretia	amuena	
18	Burseraceae	Commiphora	africana	chibambara
19	Burseraceae	Commiphora	hildebrandtii	
20	Cacinaceae	Pyrenacantha	vogelii	bundi
21	Caesalpiniaceae	Aphzelia	quenzensis	mbambakofi
22	Caesalpiniaceae	Bauhinia	thuringii	mtseketse
23	Caesalpiniaceae	Cassia	aphrophistula	mrabai
24	Caesalpiniaceae	Tarmarindus	indica	mkwadzu
25	Caesalpiniaceae	Termarindus	indica	mkwaju
26	Capparidaceae	Cliome	branchycarpa	
27	Casuarinaceae	Cassuarina	angustifolia	muinde
28	Celastraceae	Mytenus	udata	mdungatundu
29	Celastraceae	Mytenus	mossambicensis	
30	Combretaceaae	Terminalia	cartappa	mkungu
31	Combretaceaae	Terminalia	cartappa	mkungu
32	Combretaceae	Terminalia	methali	mwanga
33	Combretaceae	Terminalia	spinosa	mwanga
34	Commilinaceae	Commilina	comphiusa	kongwe
35	Compositae	Aslia	kotzii	
36	Compositae	Launea	cornuta	mtsunga wa utsungu
37	Compositae	Vernonia	hildebrandtii	chiphatsa

38	Compositae	Vernonia	zanzibarica	
39	Connaraceae	Rawrrea	orientalis	
40	Convolvulaceeae	Ipomoea	sp.	nganjarasimba
41	Cyperuceae	Bulbusylis	hispidula	
42	Cyperuceae	Cyperus	amabilis	
43	Dilleniaceae	Tetracera	boivinii	mpalika
44	Ebenaceae	Diospyros	squarrosa	mpweke
45	Euphorbiaceae	Acalypha	fruticosa	
46	Euphorbiaceae	Antidesma	venossum	mdzenga tsongo
47	Euphorbiaceae	Bridelia	carthatica	mduda
48	Euphorbiaceae	Fluggea	verosa	mkwamba kwamba
49	Euphorbiaceae	Jatropha	sp.	mbono bono
50	Euphorbiaceae	Manihot	cassava	manga
51	Euphorbiaceae	Phylanthus	reticulata	mkwamba
52	Euphorbiaceae	Ricinus	comunis	mnyono
53	Euphorbiaceae	Surigada	zanzibarica	mdimu tsaka
54	Graminae	Dactyloctenium	geminutam	nyasi
55	Graminae	Digitaria	milanjiana	
56	Graminae	Digitaria	mienjiana	mondo
57	Graminae	Hyperthelia	dissoluta	mtsuchi
58	Graminae	Saccharum	officinurum	muwa
59	Labiatae	Hoslundia	oppositifolia	mtserere
60	Lauraceae	Cassytha	filiformis	
61	Loganiaceae	Strychnos	madagascarensis	muhonga
62	Loganiaceae	Strychnos	spiriosa	mkwakwa
63	Loganiaceae	Strychnos	madagascarensis	mpwakwa
64	Loganiaceae	Strychnos	birrea	muonga
65	Malvaceae	Abelmoschus	fisulneus	mabenda
66	Malvaceae	Abtulon	fruticosum	
67	Malvaceae	Abtulon	rotundifolia	
68	Malvaceae	Thespesia	danis	muhowe
69	Meliaceae	Azadracta	indica	mwarubaini
70	Meliaceae	Trichilia	emetica	mnywa madzi
71	Menispermaceae	Ormocarpam	parera	
72	Miliaceae	Turea	nilotica	
73	Mimoceae	Acacia	afrofistula	
74	Mimoceae	Acacia	nilotica	mgunga
75	Mimoceae	Acacia	stuhlmanii	mlozi
76	Mimoceae	Albizia	adianthifolia	mtsani tsiye
77	Mimoceae	Lucina	africana	mjohoro
78	Mimoceae	Pithecellobium	dulse	mchongoma
79	Mimosaceae	Albizia	anthilmetica	mpojo
80	Mimosaceae	Albizia	versicolor	mtsanidzovu
81	Mimosaceae	Dicrostachys	cinirea	chikwata

82	Moraceae	Ficus	zanzibarica	mgandi
83	Moraceae	Ficus	cycomorius	mkuyu
84	Moraceae	Ficus	sycomorius	mkuyu
85	Moraceae	Ficus	stuhlmannii	mgandi
86	Moraceae	Maclura	africana	mdhahabu
87	Moraceae	Milicia	excelsa	mvure
88	Moringaceae	Moringa	olivera	mjungamoto
89	Myritaceae	Syzygium	cuminii	mzambarau
90	Nyctaginaceae	Boerhavia	coccinea	mtsimbi
91	Ochnaceae	Brakenrdgia	zanzibarica	
92	Ochnaceae	Ocra	kirkii	muuwa-pweza
93	Orchidaceae	Narvilia	sp.	
94	Palmae	Hyphaene	combresa	mkoma
95	Palmae	Phoenix	reclinata	uchindu
96	Papilionaceae	Abras	precatorius	mwangala nyuchi
97	Papilionaceae	Alysicarpus	vaginalis	
98	Papilionaceae	Crotalaria	retusa	chibalazi
99	Papilionaceae	Dalbergia	melanoxylon	muingo
100	Papilionaceae	Dalbergia	melanoxylon	mvingo
101	Papilionaceae	Desmodia	velutinum	banda kogo
102	Papilionaceae	Erythrina	sacleuxii	mbambangoma
103	Papilionaceae	Ormocarpam	kurkii	chitadzi
104	Papilionaceae	Rynchosia	gangetica	mturituri
105	Papilionaceae	Staylosanthes	fruticosa	
106	Papilionaceae	Tephrosia	villosa	
107	Rhamnaceae	Ziziphus	mauritania	mkunazi
108	Rhamnaceae	Ziziphus	mucronata	mgugune
109	Rubiaceae	Aganthesanthemum	bojeri	chivundzakesi
110	Rubiaceae	Borreria	pedicellata	
111	Rubiaceae	Cartunaregam	nilotica	mdzongo dzongo
112	Rubiaceae	Feretia	apodanthera	mchigoda
113	Rubiaceae	Keetia	zanguebarica	mnyunzu
114	Rubiaceae	Keetia	zanzibarica	mnyunzu
115	Rubiaceae	Lamprothemnas	zanzibarica	
116	Rubiaceae	Polysiphaerica	parvifolia	mfiofio
117	Rubiaceae	Vangueria	infusta	mviru
118	Rutaceae	Zanthokylon	chalybium	mndungu
119	Sapindaceae	Lecaniodiscus	fraxinifolia	mlemero
120	Sapindacee	Deinbolia	bobornica	mpwakapwaka
121	Sapotaceae	Vitelariopsis	kirkii	
122	Scrophulariaceae	Striga	asiatica	chitsali
123	Simaroubaceae	Harrisonia	abyssinica	chidori
124	Solanaceae	Solanum	nigrum	mtungudza koma
125	Sterculiaceae	Sterculia	rynchocarpa	mgoza
126	Sterculiaceae	Waltheria	stuhlmanii	mbangulamavi

127	Taccaceae	Tacca	leontopetaloides	ulanga wa nyoka
128	Tiliaceae	Greewia	plagyophyla	mkowe
129	Tiliaceae	Triumfetta	sp.	mnyunyurica
130	Vebenaceae	Lantana	camara	mtsambala
131	Verbenaceae	Clerodendron	glabra	mkula usiku mlume
132	Verbenaceae	Clerodendron	hildebrandtii	mkula usiku
133	Verbenaceae	Premna	chrysoclada	mvuma
134	Verbenaceae	Vitex	mombassae	mfudu madzi
135	Verbenaceae	Vitex	trifolia	chifudu
136	Verbeneceae	Vitex	payos	mfudu
137		Bulbulstylis	sp.	
138		Cajanas	janus	mbalazi
139		Carica	papaya	mpapali
140		Ceriopsis	tagal	
141		Citras	sp.	mlimau
142		Gymilina	arborea	mwahoberea
143		Melia	olivera	mkaa bure
144		Musa	sp.	mgomba
145		Parndunus	rabaiensis	mkadi
146		Psidium	guajava	mapera
147		Tectonia	grandis	majani mapana