



Supplementary Environment Assessment Study for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).

FINAL REPORT

13th March 2023

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LIST OF ACRONYMS

BMU	Beach Management Unit
BOD	Biological Oxygen Demand
CCCC	China Communications Construction Company
CDA	Coast Development Authority
CITES	Convention on International Trade in Endangered Species
COD	Chemical Oxygen Demand
CT2	Container Terminal 2
CWMP	Construction Waste Management Plan
CWWDA	Coast Water Works Development Authority
D/D	Detailed Design
DO	Dissolved Oxygen
EIA	Environmental Impact Assessment
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
HIA	Heritage Impact Assessment
IACS	International Association of Classification Societies
IUCN	International Union for Conservation of Nature (IUCN)
KeFS	Kenya Fisheries Service
KFS	Kenya Forest Service
KOT	Kipevu Oil Terminal
KPA	Kenya Ports Authority
KPLC	Kenya Power and Lighting Company
KWS	Kenya Wildlife Service
MARPOL	International Convention for the Prevention of Pollution from Ships
MPA	Marine Protected Area
NDVI	Normalized Difference Vegetation Index
NEMA	National Environment Management Authority
NLC	National Land Commission
NT	Near Threatened
PAPs	Project Affected Persons
PPE	Personnel Protective Equipment
RAP	Resettlement Action Plan
SBR	Southern Bypass Road
SEZ	Mombasa Special Economic Zone
SUEA	Supplementary Environmental Assessment
T-N	Total Nitrogen
T-P	Total Phosphorus
TPH	Total Petroleum Hydrocarbons
TSHD	Trailer Suction Hopper Dredger
USGS	United States Geological Survey
VU	Vulnerable

1 Introduction

The Environmental Impact Assessment (EIA) Study Report for the Port and Road Development of the Mombasa Special Economic Zone (SEZ) was conducted in 2019 and a License issued by NEMA on 13th January 2020 (License no. NEMA/EIA/PSL/8810), valid for 24 months. The license has since expired and hence Kenya Ports Authority (KPA) applied for a variation in May 2022 in order to i) extend the validity period, ii) increase dredging hours from 10 to 24hrs and iii) include a change in project design and scope. In response to the application, NEMA issued a letter on 6th June 2022 requiring KPA to carry out a Supplementary Environmental Assessment (SUEA) to address the three issues covering the following scope;

1. Project implementation status
2. The proposed variation
3. Current baseline information and development trends
4. Infrastructure in place to support the development
5. The area land use changes
6. Potential environmental changes and proposed mitigation measures
7. Evidence of current public consultation and stakeholder engagement

In January 2023, KPA through Nippon Koei Co. Limited contracted Envasses Environmental Consultants Limited to prepare the Supplementary Environmental Assessment (SUEA) and submit it to NEMA for decision making. The spatial scope of the SUEA covered the project site as detailed in the EIA study report.

2 Approach and methodology

The SUEA was carried out by a team of experts in environment and natural resources management. It involved a systematic review and assessment of the proposed changes to the detailed design of the Port and Road Project Development, current environmental baseline study on mangroves, terrestrial vegetation cover, avifauna and water quality, stakeholder engagement, updating the Environmental Management Plan (EMP) and the Environmental Monitoring Plan (EMoP).

2.1 Updating baseline information and development trends

During the preparation of the EIA study report for the project in 2019, baseline information on water and sediments quality, noise levels, air quality, mangroves, benthic macrofauna, fisheries and terrestrial flora and fauna was collected. In preparation of the SUEA, the consultant updated data and information on the mangroves, terrestrial biodiversity and water quality to determine the levels of deviation from the values obtained during the baseline monitoring (Figure 1). In addition, the baseline survey sought to establish a current status that will inform future monitoring of the marine and terrestrial environment during the construction, operation and possible decommissioning phases of the port and road project.

2.1.1 Mangroves

2.1.1.1 Assessing mangrove health

Mangrove health was determined through satellite imagery (2018 and 2022) using Normalized Difference Vegetation Index (NDVI) which is a ratio derived from red and Near infrared (NIR) bands and is based on the Leaf Area Index (Equation 1).

$$NDVI = \frac{NIR - RED}{NIR + RED} \quad \text{Equation 1}$$

Where RED is visible red reflectance, and NIR is near infrared reflectance.

The results from the equation were then used to derive index values ranging from -1 to 1. The index value was employed as a parameter to indicate whether the mangroves were healthy (pristine) or unhealthy (degraded).

2.1.1.2 Determining mangrove distribution and species composition

Mangroves distribution and species composition was conducted using 30m line transects and 5m × 5m quadrat sampling based on ordinal degradation values obtained from the Normalized Difference Vegetation Index (NDVI) analysis and oriented from sea to land. At least four transects were laid for each degradation formation in Port Reitz, Mteza and Bombo Creeks based on the size and configuration of the forest. At each quadrant data was collected on mangrove species present, number of mangrove trees, stumps, mean canopy and mean Diameter at Breast Height as shown in Figure 2.

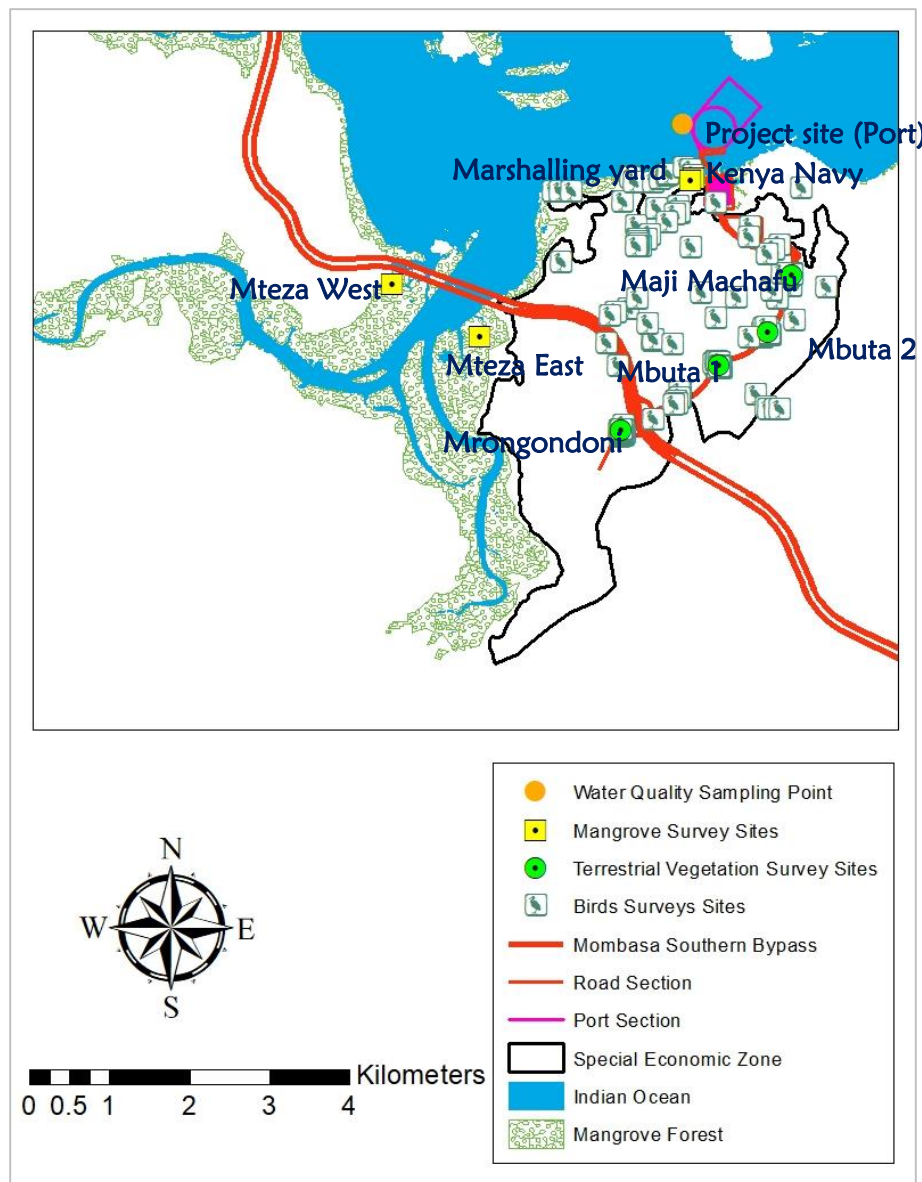


Figure 1: SUEA baseline data collection sites for mangroves, terrestrial biodiversity and water quality (Source: Envassess Environmental Consultants Limited, 2023).



Figure 2: Transect setting (left) and Diameter at Breast Height (DBH) (right) measurement during the mangroves baseline survey at the project site (Source: Field survey, February 2023).

2.1.2 Bird surveys

Bird diversity assessment involved intense searches throughout the proposed port and road development sections, by walking in terrestrial bushes along the road transect as well as wading in mangrove mudflats (Figure 3). Terrestrial birds were surveyed very early in the morning while creek birds were surveyed during low tide. Binoculars, telescope, notebook, tally counters, camera, mobile phone (Birdlasser and SW Maps apps installed) and pencil were the main data collection tools. All heard and seen terrestrial bird species were logged into the Birdlasser app while all water birds were logged and their population written down in a notebook.

2.1.3 Terrestrial vegetation assessment

Terrestrial vegetation assessment targeted six predetermined stations along the proposed road transect including two sites where a threatened shrub species *Vitellariopsis kirkii* (IUCN: VU) was reported during the EIA study in 2019. Vegetation species composition was documented within a radius of 30m from every pre-selected central point of the sampling station. At each sampling point, vegetation types were observed (Figure 3), identified to species level, photographed and recorded to provide an overview of plant diversity and composition. For the rare, threatened and endemic species (i.e., IUCN-listed species of conservation concern), tree life form data (i.e., herb, shrub and tree) were taken in addition to the basic vegetation characterization. Species of conservation concern which included Near Threatened plants were determined using information obtained from the IUCN Red List and Convention on International Trade in Endangered Species (CITES) databases. Plant specimens of interest were collected for further verification (taxonomy) post field work.

2.1.4 Water quality

Two samples were obtained along the water column (-0.5m and -10m) at Kilindini Channel in collaboration with Polucon Services (K) Limited which is a NEMA designated laboratory. The parameters analyzed were Total Petroleum Hydrocarbons (TPH), Total Nitrogen (T-N), Total Phosphorus (T-P) and Coliforms (Table 1).



Figure 3: Land bird's survey using a telescope (Left) and terrestrial vegetation assessment (Right) at one of the monitoring stations along the proposed road transect (Source: Field survey, February 2023).

Table 1: Baseline water Quality Parameters, Monitoring Methods and Equipment (Source: Polucon Services (K) Limited).

Parameters	Test Methods	Equipment
Total Petroleum Hydrocarbons	EPA 8015	GC FID
Total Nitrogen	APHA 4500; Calculation	Gerhardt digester
Total Phosphorus	APHA 3120	ICP
Coliforms	ISO 9308	Incubator and plate count

2.2 The area land use changes

The area land use changes were carried out using the 30 m spatial resolution Landsat imagery products acquired from the US Geological Survey (USGS) website. Two images for the years 2018 and 2022 were downloaded for land use classification and change detection between the two years as per the process flow chart on Figure 4. Five classes including water body, mangrove forest, terrestrial vegetation, built-up area, mudflat and bare-land were selected. ArcGIS software was applied in processing and analysis of the satellite data. The initial procedure involved compositing of the bands which combines them to create a single raster dataset from the multiple bands. Further, training samples were developed for the selected classes. Further, maximum likelihood algorithm with a supervised signature extraction was used to classify the images. The classified maps were then subjected to validation process through ground truthing. The area covered by each land-use in all the produced maps was extracted in ArcGIS and analyzed in excel to detect the extent of change over the years.

2.3 Updating the EMP and the EMoP

The EMP and the EMoP were updated on the basis of the proposed changes to the project scope and design in addition to the environmental and social studies that were required under the EIA license and other studies undertaken as part of the detailed design study which consists of the following documents;

- Environmental audit of offshore disposal site (requirement under Article 2.6 of the EIA license)
- Heritage Impact Assessment (HIA) (requirement under Article 2.5 of the EIA license)
- Waste management study

- Mangrove transplantation study
- Fisheries impact assessment study
- Resettlement Action Plan study

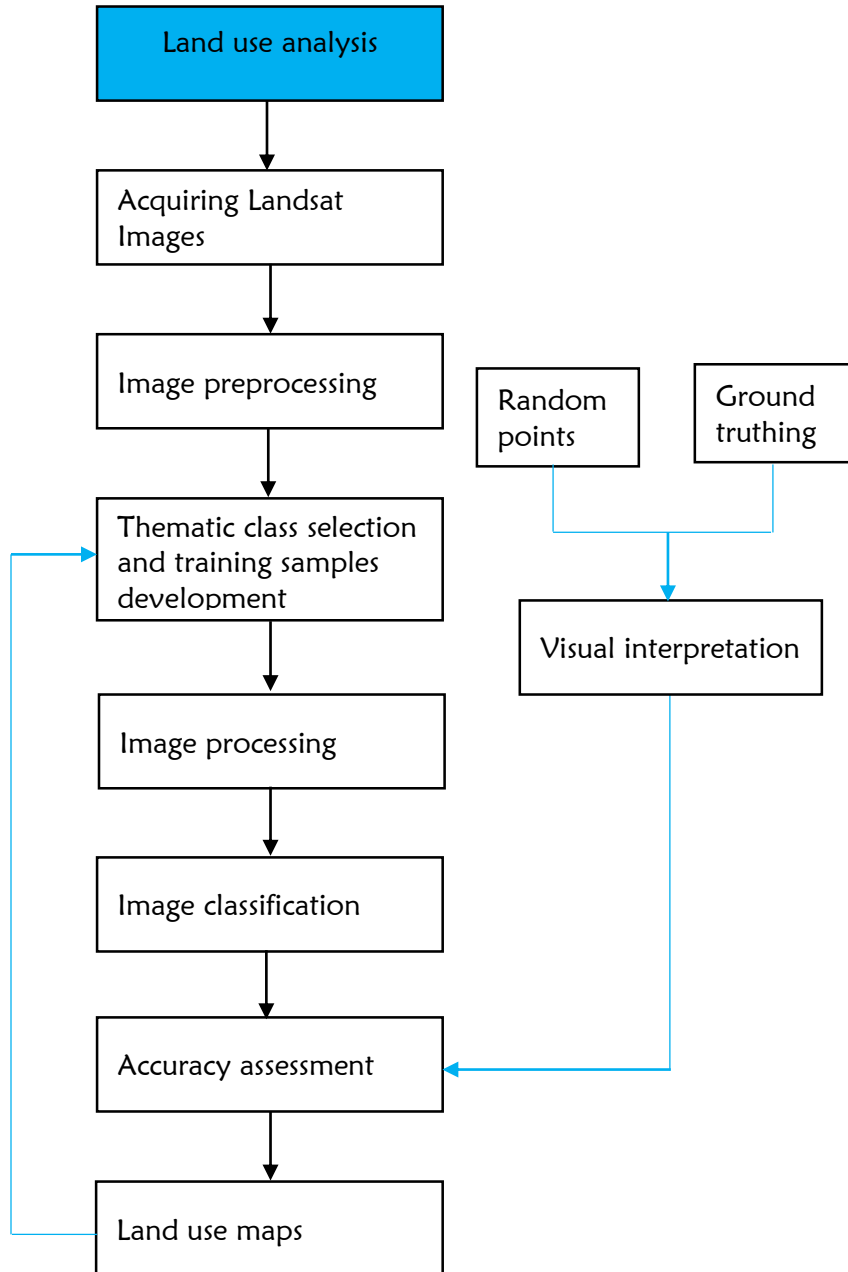


Figure 4: Land use change analysis approach using Landsat satellite data (Source: Envasses Environmental Consultants Limited, 2023).

3 Project implementation status

The project is yet to commence but the tendering process is ongoing (as of the time of submission of the SUEA report) and is expected to be completed by April 2023. The construction phase of the project is expected to kick-off from October 2023 and will be completed in three years.

4 The proposed variation

According to the Terms of Reference for the consultancy, there will be three aspects to the EIA licence variation i.e., i) variation of Condition No. 1.2. of the EIA License to extend the validity for a further 24 months, ii) variation of Condition 2.18 to allow port and road construction works to be conducted for 24hrs and iii) inclusion of the changes in the detailed design of the Port and Road Project. In regards to the validity of the EIA License, it expired on 13th January 2022 by which date the project was yet to commence. According to the project documents provided by Nippon Koei Co., Limited, there will be variations in the plan and design of the SEZ project components which include the turning basin, quay depth, pier structure, reclamation area, source of raw materials, construction of temporary yard, ramp, auxiliary facilities and excessive soil storage site (Table 2).

Table 2: Proposed variations in Mombasa SEZ Port and Road plan and design (Source: JICA Design Team, 2022).

SEZ infrastructure	Component	Plan/design proposed in the EIA Study	Proposed variations in plan and design
Port	Turning basin	Depth of turning basin: -13 m	Depth of turning basin increased to -15 m to accommodate larger vessels.
	Berth	Quay depth: -13 m	Quay depth increased to -15 m to accommodate larger vessels.
	Access bridge	Pier structure (L=450 m, B=20 m)	Part of the access bridge changed to a stone-revetment causeway structure of approx. 150 m length. Overall length of the access bridge shortened to around 360 m due to alteration in the cargo yard layout.
	Cargo yard	Reclamation area: 10 ha	The cargo yard area was expanded to accommodate additional port facilities (e.g., dangerous goods area). Subsequently, reclamation area has increased to approx. 14 ha.
	Construction material	Procurement from Jaribuni quarry in Kilifi County located approx. 80 km from the Project site.	Kokotoni quarry added as another possible procurement source, which is located closer to the Project site.
	Temporary construction yard	Construction of temporary jetty/yard along the headland west of the Project site.	The temporary jetty/yard is planned to be constructed at the temporary yard established by KOT project.
Road	Ramp	One-side half-cloverleaf structure	Changed to diagonal half-cloverleaf structure to enhance traffic flow.
	Ancillary facilities	Not planned	Waiting plaza, control gate and access road added.
	Storage site of excessive soil	Empty space inside the ramp	Shifted to the land formation site planned under the Mombasa SEZ PID project.

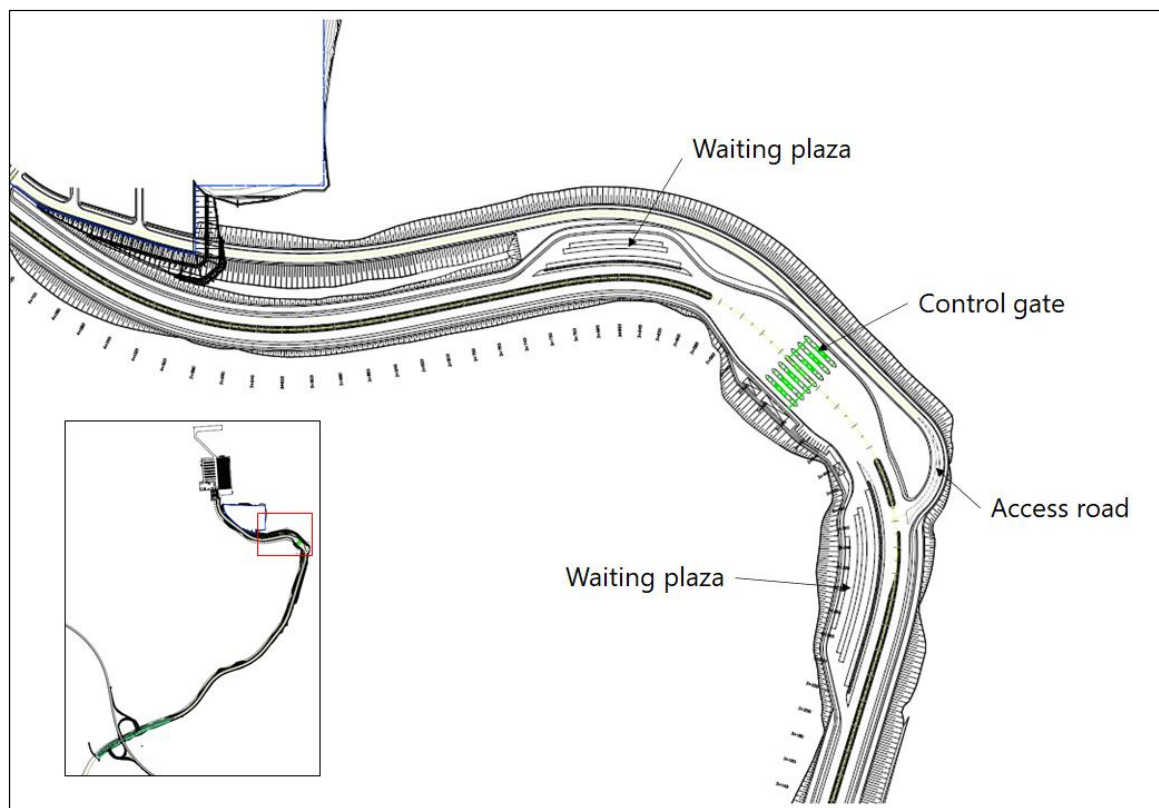


Figure 7: Layout of the road ancillary facilities (Source: JICA Design Team, 2022).

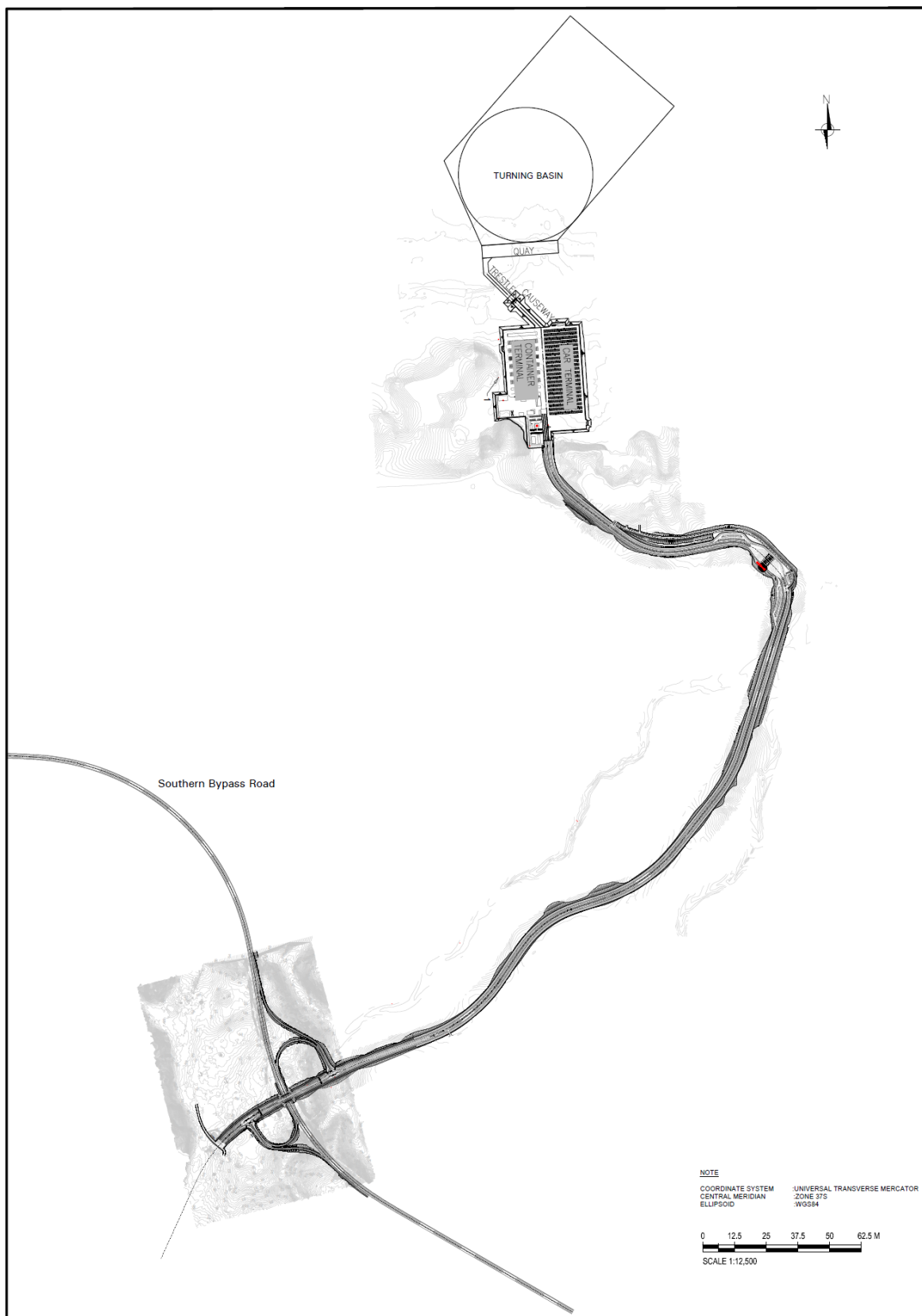


Figure 8: Overall layout of the Port and Road project (Source: JICA Design Team, 2022).

5 Current baseline information and development trends

During the preparation of the SUEA, the consultant updated baseline data and information on critical habitats i.e., mangroves and terrestrial vegetation as well as birds and water quality and the findings are discussed below.

5.1 Mangroves

Mangrove forests are critical habitats for a variety of fish species and invertebrates, which depend on them for feeding and nursery grounds. The habitat also hosts a wide variety of bird life, acts as a carbon and pollution sink and provides a line of defense against shoreline erosion. The artisanal fishers within the project area rely on the mangrove ecosystem for a substantial part of their catch. Five species of mangroves are found within the project area namely: *Rhizophora mucronata*, *Sonneratia alba*, *Avicennia marina*, *Ceriops tagal* and *Lumnitzera racemose*. According to the National Mangrove Ecosystem Management Plan (2017-2027), the mangroves in the project area are already under pressure from over-exploitation, coastal developments and climate change. The construction of the Port will require reclamation of 14ha of mangrove forest area leading to the loss of the ecosystem goods and services that they provide. It was therefore important to measure the magnitude of this loss to inform mitigation measures and update the EMP and EMoP of the proposed port and road development.

5.1.1 Mangrove health

The NDVI ordinal levels of mangrove forest degradation for the two years ranged from low (degraded), medium and pristine stands. Accordingly, the results depict that in 2018 pristine mangrove covered an area of 511ha as compared to 402 ha in 2022. Moreover, highly degraded mangroves covered 124ha in 2018 as compared to 189ha in 2022 (Figure 9).

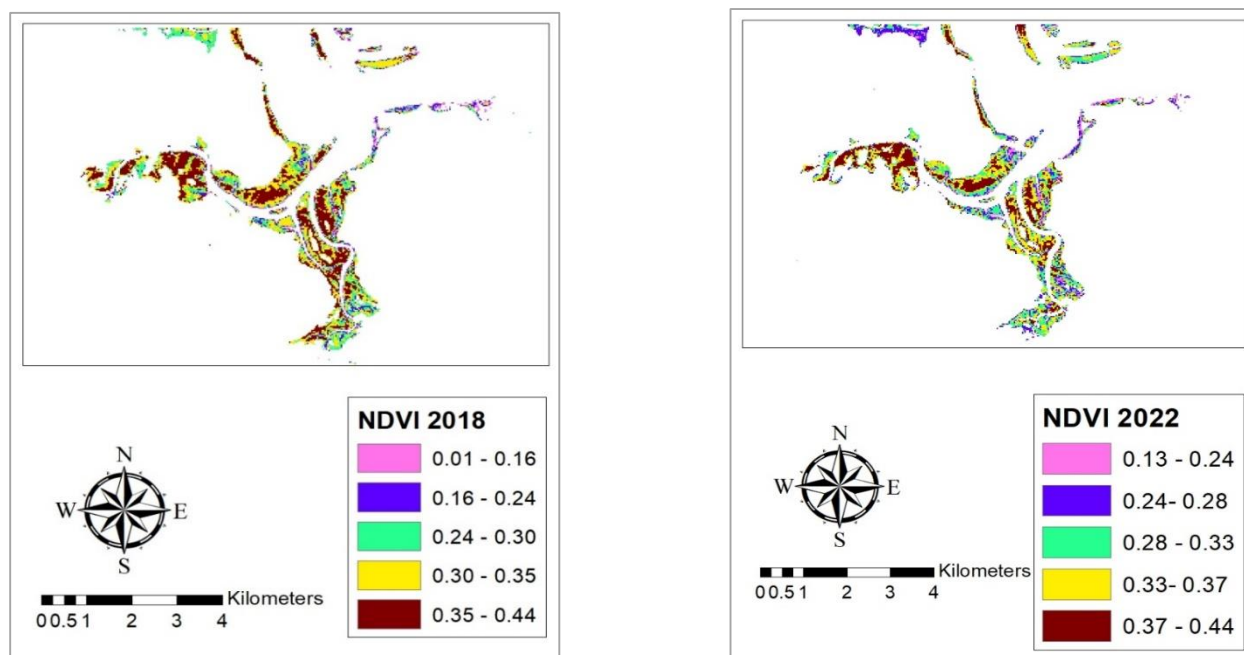


Figure 9: Spatial distribution of mangrove Forest and NDVI values in 2018 (Left) and 2022 (Right) (Source: USGS website, 2023).

The degradation is attributed to exploitation of the mangroves for wood fuel and construction poles by the local community.

5.1.2 Mangrove distribution and species composition

A total of four (4) mangrove species were recorded from the monitoring stations with Kenya Navy recording four (4) species, Project site, Mteza East and decommissioned China Communications Construction Company Limited (CCCC) pipeline marshalling yard recording three (3) species, and Mteza West recording two (2) species. The species recorded were *Avicennia marina*, *Ceriops tagal*, *Rhizophora mucronata* and *Sonneratia alba* (Figure 10). The EIA study (2019) recorded five (5) species including *Lumnitzera racemose* which was not found during the SUEA.

Rhizophora mucronata was the dominant mangrove species at the project site (83%), decommissioned CCCC pipeline marshalling yard (72%) and Kenya Navy (59%) respectively. However, the *Rhizophora mucronata* at the project site comprises mainly of juveniles owing to previous clear felling during the laying of pipeline for the new Kipevu Oil Terminal. The second dominant mangrove species at the project site was *Sonneratia alba* (14%), while Kenya Navy and the decommissioned CCCC Marshalling yard was *Ceriops tagal* at 23% and 20% respectively. Further, Mteza East and West was dominated by *Ceriops tagal* at 49% and 84% respectively, followed by *Rhizophora mucronata* and *Avicennia marina* at 48% and 16% respectively. The mean canopy height was 3m while the Diameter at Breast Height (DBH) ranged from 2-10cm (Table 3). Stumps were counted at the project site (30 No.; 20%), Kenya Navy (62 No. 41%;) and the CCCC pipeline marshalling yard (61 No.; 39%) attributed to illegal logging and port developments (Figure 11). The findings correspond to those of the EIA study i.e., *Rhizophora mucronata* was the most abundant species and height range was 2-4m.

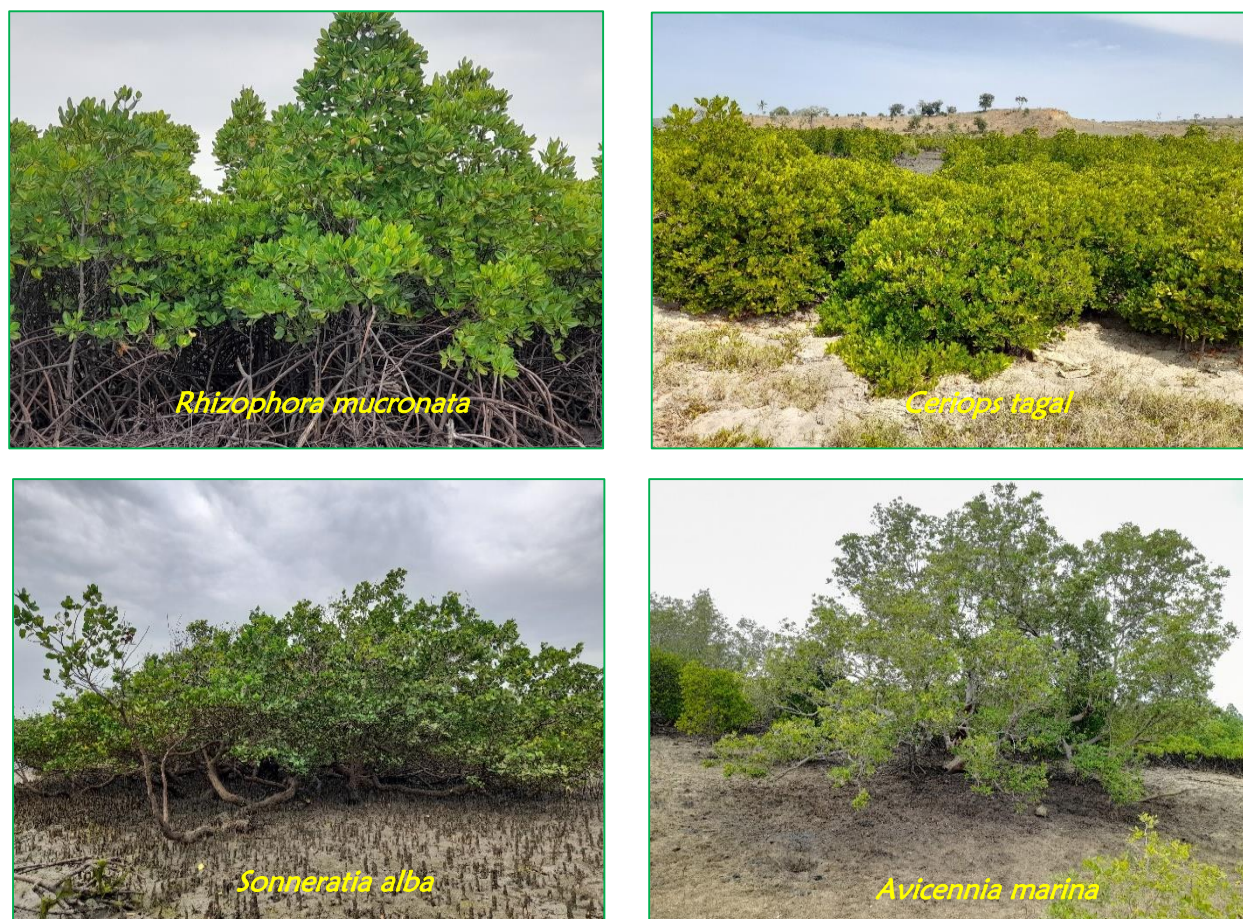


Figure 10: Mangrove species found within the monitoring stations (Source: Field survey, February 2023).

Table 3: Mean canopy height and stem diameter for the mangrove species within the project site and neighboring formations (Kenya Navy, decommissioned CCCC pipeline marshall yard, Mteza East and West) (Source: Field survey, February 2023).

Sampling area (No. of transects)	Fringe edge (m)	No. Mangroves	Species	Mean Canopy height (m)	Mean DBH (cm)	No. of stumps
Project site (1)	1	1	<i>Avicennia marina</i>	3	7	30
		4	<i>Sonneratia alba</i>	3	4	
		24	<i>Rhizophora mucronata</i>	2	2	
Kenya Navy (4)	7	60	<i>Rhizophora mucronata</i>	4	6	15
		13	<i>Avicennia marina</i>	3	4	
		6	<i>Ceriops tagal</i>	1	3	
		27	<i>Sonneratia alba</i>	3	10	
	6	40	<i>Rhizophora mucronata</i>	4	5	2
		30	<i>Ceriops tagal</i>	1	3	
		1	<i>Avicennia marina</i>	5	2	
		16	<i>Sonneratia alba</i>	2	10	
	2	25	<i>Ceriops tagal</i>	3	2	15
		60	<i>Rhizophora mucronata</i>	5	4	
		17	<i>Sonneratia alba</i>	4	10	
		50	<i>Ceriops tagal</i>	1	1	
	4	130	<i>Rhizophora mucronata</i>	4	5	30
		15	<i>Sonneratia alba</i>	4	4	
Decommissioned CCCC pipeline marshall yard (4)	35	30	<i>Ceriops tagal</i>	2	5	10
		120	<i>Rhizophora mucronata</i>	3	5	
		20	<i>Sonneratia alba</i>	3	8	
	40	80	<i>Ceriops tagal</i>	1	2	8
		130	<i>Rhizophora mucronata</i>	4	3	
		25	<i>Sonneratia alba</i>	3	10	
	35	30	<i>Ceriops tagal</i>	1	4	32
		200	<i>Rhizophora mucronata</i>	2	5	
		10	<i>Sonneratia alba</i>	3	9	
	6	35	<i>Ceriops tagal</i>	2	5	11
		180	<i>Rhizophora mucronata</i>	3	5	
		12	<i>Sonneratia alba</i>	3	10	
Mteza East	30	14	<i>Ceriops tagal</i>	2	2	0

Sampling area (No. of transects)	Fringe edge (m)	No. Mangroves	Species	Mean Canopy height (m)	Mean DBH (cm)	No. of stumps
(4)		30	<i>Rhizophora mucronata</i>	9	5	
	20	20	<i>Ceriops tagal</i>	3	2	0
		45	<i>Rhizophora mucronata</i>	8	4	
	35	43	<i>Ceriops tagal</i>	2	4	0
		7	<i>Avicennia marina</i>	7	3	
	30	15	<i>Ceriops tagal</i>	3	7	0
		15	<i>Rhizophora mucronata</i>	8	7	
Mteza West (4)	42	38	<i>Ceriops tagal</i>	2	5	0
		12	<i>Avicennia marina</i>	7	5	
	30	12	<i>Ceriops tagal</i>	1	3	0
	22	5	<i>Ceriops tagal</i>	2	3	0
	25	10	<i>Ceriops tagal</i>	2	3	0



Figure 11: Mangrove stumps observed within Kenya Navy monitoring station (Source: Field survey, February 2023).

5.2 Bird surveys

5.2.1 Waterbird's diversity

A total of 23 wader species were identified along the port and mangrove habitats (Figure 12). Only 246 individuals were counted with Little stint recording approximately one-third (30%) of the entire population. Cattle egret were the second highest with 32 individuals followed by Common ringed plover with 29 individuals (Annexure 1). Out of the total counted, four (4) species of conservation concern were identified (Table 4). During the EIA study the waterbirds diversity was not particularly assessed but the findings are important for monitoring habitat quality (birds are proxy indicators of ecosystem health) before, during and after the project is completed.

The SUEA survey observed that most of the waders are migrants from Europe and Asia and spend their non-breeding period wintering along the Kenyan Coast including Mombasa. They arrive late July/early August and by late April, most of them have gone back to in readiness for breeding. All waders had a population of 246 individuals indicating that the site is not a major roosting or feeding site for waders. This could be due to existing human and port activities. Only one Black heron/egret was seen feeding around with a pair of Sacred Ibis. The numbers of Curlew Sandpiper and Eurasian Curlew were too few compared to other areas along the Kenyan coast such Mida Creek where substantial numbers have been recorded.



Figure 12: A Grey heron on a mangrove mudflat within the SEZ (Source: Field survey, February 2023).

Table 4: Aquatic bird species of conservation concern (Source: Field work and IUCN Red List of Threatened Species, February 2023).

No.	Species name	Conservation status
1.	Curlew Sandpiper	Near Threatened
2.	Eurasian Curlew	Near Threatened
3.	Woolly-necked Stork	Near Threatened
4.	Black Heron/Egret	Regionally Near Threatened

5.2.2 Land bird's diversity

A total of 80 terrestrial species were recorded during the survey in bushes, farmlands well as mangrove forest. There were no species of conservation concern observed but two species were identified as invasive i.e., i) Indian House Crow which poses a serious threat to the local indigenous small fauna species and livelihoods such as agriculture and tourism and ii) House sparrow with no known threat as yet.

The land birds have two overlapping migrant's scenarios experiencing both Palearctic (Europe and Asian migrants) and Intra-African (within Africa) migrants. The study reasonably estimates that the count of bird species would increase tremendously if it is done across the two seasons. All the land bird species counted during the survey were recorded (Annexure 2 & 3).

5.3 Terrestrial vegetation assessment

A total of 112 plant species were documented along the proposed road transect belonging to 48 families (Compared to 150 species found during the EIA Study, 2019). Euophorbiaceae and Verbaseae had a joint highest diversity with 8 species each, followed by Rubiaceae with seven species. Twenty-three families including anacardaceae had one specie each. Further, two major invasive species i.e., *Lantana camara* and *Azadirachta indica* which pose a serious threat to forests and farmlands were recorded.

In addition, the search for *Vitellariopsis kirkii* (IUCN: VU), was intensively done at two monitoring stations where they were recorded during the EIA Study in 2019. The first monitoring station is now in the middle of well used murram road with very clear indications of farming activities for the last two or so years (Figure 13). On the second monitoring station, there was intense bulldozing work going on within 20m to the North of the central point. At this station, there was one shrub thought to be *Vitellariopsis kirkii*. However, the specimen collected for post field work taxonomy confirmed it to be a different species *Lamprothamnus zanguebaricus* (Figure 14).

Lannea scheinfurthii var. *acutifoliolate* was the only plant of conservation status (IUCN: NT and CITES: NT) observed during the current survey at Latitude 4°05'30.88"South and Longitude 39°36'11.03"East (Figure 15). Several stands of the species were noted within and outside the SEZ. The construction of the road component is likely to impact on the species through clear felling and hence propagation in other areas within and without the SEZ by either cuttings and/or seeds is recommended. All the tree species counted during the survey were documented (Annexure 4 & 5).



Figure 13: Evidence of farming activities (trenches) at one of the monitoring stations where *Vitellariopsis kirkii* was recorded in 2019 (Source: Field survey, February 2023).



Figure 14: *Vitellariopsis kirkii* (Left- Photo taken during the EIA study in 2019) and *Lamprothamnus zanguebaricus* (Right) (Photo taken during the field survey in February 2023).



Figure 15: *Lannea scheinfurthii* var. *acutifoliata* (IUCN: NT and CITES: NT) found within the SEZ area (Source: Field survey, February 2023).

5.4 Water quality

The implementation of the project has a potential to degrade water quality within the Bombo, Mteza, Port Reitz and Mwache creeks. Poor water quality affects marine habitats and fauna including benthic communities due to reduced light and dissolved oxygen. During the preparation of the EIA study report, baseline water quality sampling was undertaken from the Likoni channel, Waa and Tiwi areas

and within the Mombasa National Marine Park and Reserve. The parameters sampled and analyzed include; Depth, temperature, pH, salinity, turbidity, Dissolved Oxygen (DO), coliforms, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids, Total Petroleum Hydrocarbons, Total Petroleum Hydrocarbons (TPH), Total Nitrogen (T-N), Total Phosphorus (T-P) and coliforms.

For the SUEA, the water quality analysis results indicated that the Total Petroleum Hydrocarbons, Total Nitrogen and Total Phosphorous are in low quantities while coliforms were not detected an indication of a relatively fair baseline water quality (Table 5 and Annexure 6). These values were similarly low during the EIA study except for coliforms which ranged from 1,600 - >1,800cfu/100ml attributed to discharge from point and non-point sources into the Kilindini Creek during the wet season when the sampling was carried out (Table 5). Thus, the proponent should ensure implementation of the updated EMP and EMoP during the entire project cycle to mitigate water degradation since high concentrations of Nitrogenous and Phosphorous compounds, and coliforms may lead to eutrophication of the marine environment.

Table 5: Water quality results based on the samples obtained across the water column at -0.5m and 10m (Source: Polucon Services (K) Limited, February 2023).

Parameters	Depth		KS EAS 12:2018: Standard
	-0.5m (Water column-surface value in EIA Study)	-10m (Water Column - Bottom value in EIA Study)	
Total Petroleum Hydrocarbons, mg/l	1.78 (0.49)	1.04 (1.72)	-
Total Nitrogen, mg/l	0.15 (2.13)	0.28 (1.23)	-
Total Phosphorus, mg/l	<0.01 (<0.01)	<0.01 (<0.01)	-
Coliforms, cfu/100mls	Not detected (1,600)	Not detected (>1,800)	Absent

6 Infrastructure in place to support the development

During the field surveys, it was noted that two major infrastructure were in place to support the development. This includes;

1. Mombasa Southern Bypass Road and access roads that may be used during transportation of construction materials and
2. The CCCC decommissioned marshalling yard that will serve as a temporary yard during the construction of the port and road project

Furthermore, the main sources of water in the SEZ area are three natural springs within Kayas Mrongondoni, Tembo and Siji supplemented by individual, community boreholes which are saline and a seasonal water pan. Seasonal lakes outside the SEZ include Ziwa Tseha and Bombo which are potential sources of water especially for livestock. Additionally, the area has power from the national grid. Thus, during project implementation, development of water supply facilities and upgrading the existing power from the national grid will be required to serve the development.

7 The area land use changes

The analysis of the two satellite images shows change in the six selected classes between 2018 and 2022 (Figure 16 and Table 6). Water body decreased from 1569 Ha in 2018 to 1540 Ha in 2022 with mudflat increasing from 244 Ha in 2018 to 282 Ha in 2022. The changes on water body and mud flats were mainly as a result of the differences in the tide level when both images were acquired. Mangrove forest and terrestrial vegetation decreased from 823 Ha and 5212 Ha in 2018 to 795 Ha and 4921 Ha in 2022 respectively. On the other hand, built-up area increased from 942 Ha to 1080

Ha in 2022 and bare land increased from 500 Ha in 2018 to 668 Ha in 2022. The changes in mangrove forest, terrestrial vegetation cover and built-up areas were attributed to the construction of the Mombasa Southern bypass and the CCCC pipeline marshaling yard, logging and increase in human settlements. Moreover, variations in bare land were attributed to the seasonality of farming activities and weather patterns.

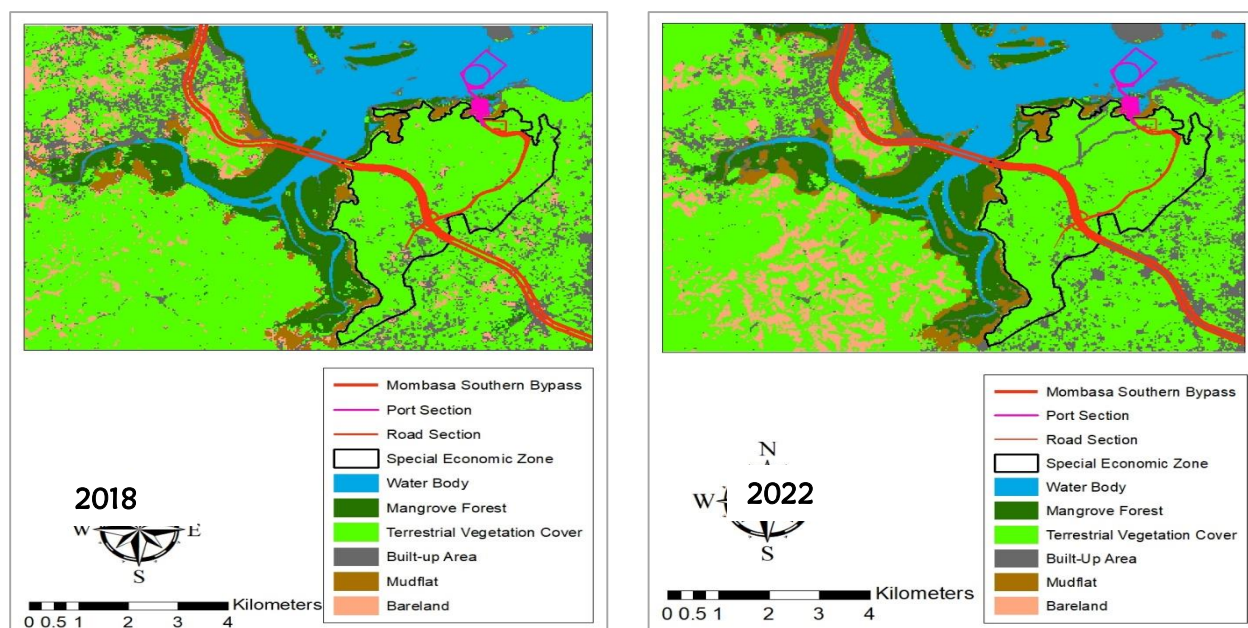


Figure 16: Land-use changes between 2018 (Left) and 2022 (Right) (Source: USGS website, 2023).

Table 6: Land use changes between 2018 and 2022 based on satellite data (Source: Envasses Environmental Consultants Limited, 2023).

Land-Use	Area in hectares		Change	% change	Potential causes for the change
	2018	2022			
Water Body	1569	1540	-29	-1.84	The change is dynamic and not real; explained by tidal variations when the images are acquired. The satellite image in 2018 was acquired during high tide while that of 2022 was low tide.
Mangrove Forest	823	795	-28	-3.40	Mangrove clearance during construction of the Mombasa Southern Bypass Road and CCCC marshaling yard as well as harvesting by the local community
Terrestrial Vegetation Cover	5212	4921	-291	-5.58	Clearance during the construction of the Mombasa Southern Bypass Road and enhancement of settlement areas
Built-Up Area	942	1080	138	14.65	Construction of Mombasa Southern Bypass Road, CCCC pipeline marshaling yard and enhancement of settlements
Mudflat	244	282	38	15.57	Differences in the tide level when both images were acquired (2018-high tide; 2022-low tide), clearance of mangroves.
Bare-land	500	668	168	33.6	Seasonality of farming activities and weather patterns, human activities including clearance of vegetation

8 Potential environmental changes and proposed mitigation measures

8.1 Introduction

As per the scoping and screening exercise, the potential impacts of the Project plan/design modifications were assessed for the revised port and road designs and components.

8.2 Port component

8.2.1 Impacts of additional reclamation on mangrove

Since the proposed port is located within a mangrove forest area, the additional reclamation required for the cargo yard construction (i.e., approx. 4 ha) will likely result in more mangrove clearance. However, the cumulative impacts from such additional mangrove clearance are likely to be insignificant as majority of the additional reclamation area is within the mangrove clearance area that was set under the EIA (Figure 17). Hence the total mangrove clearance area will likely remain within the estimation (i.e., 15 ha) made under the EIA. Nevertheless, to compensate the loss of mangrove, the Project plans to conduct mangrove transplantation as proposed in the EIA. While the EIA proposed to transplant 1.5 seedlings per cleared tree, the transplantation quantity has been raised to 2 seedlings per cleared tree based on the mangrove transplantation study conducted under the detailed design (D/D) study. During the 3 & 4th stakeholder meeting held in Mombasa, Kenya Forest Service noted that the recommended number of mangrove seedlings is 10,000 trees/ha and this stocking rate should be considered during the implementation of the project.



Figure 17: The mangrove area to be cleared during the construction of the port development project (Source: EIA Study, 2019).

8.2.2 Impacts of transporting construction material from Kokotoni quarry

Kokotoni quarry is located approximately 20 km north of the Project site in Kilifi County near the Mombasa road (A109). The quarry is operated by two private companies and both have an EIA license. Three candidate routes have been identified for transporting the construction material from the quarry to the Project site as shown in Figure 18. The potential environmental impacts of each route have been evaluated and summarized (Table 7).

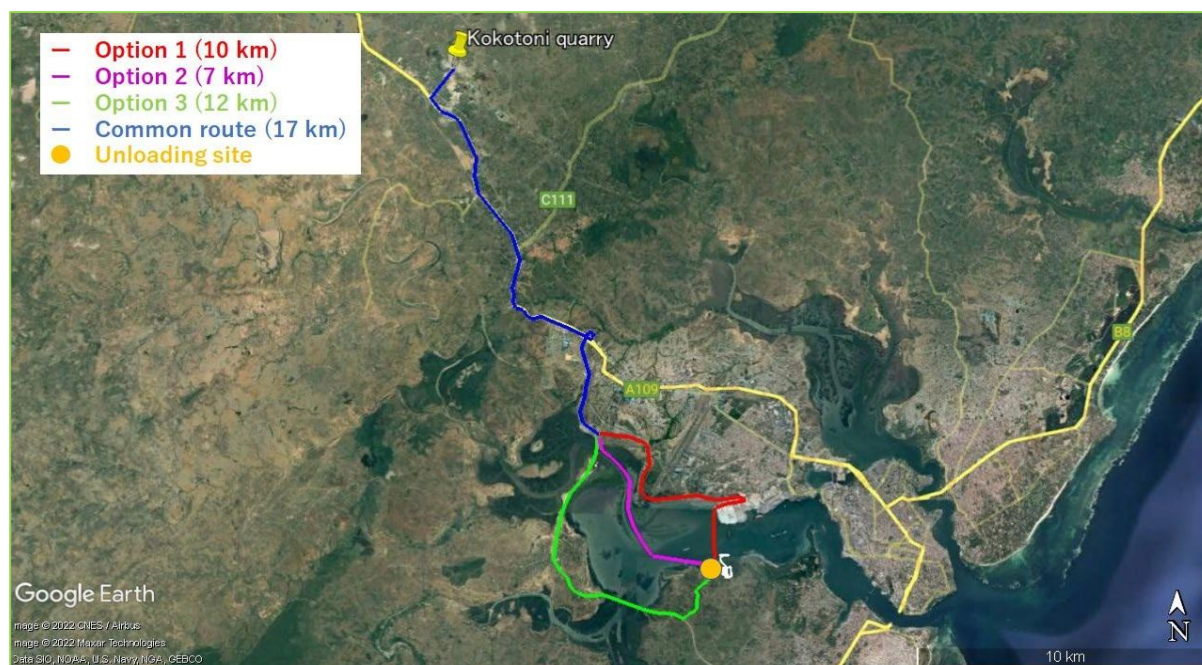


Figure 18: Candidate transportation routes from Kokotoni quarry to Project site (Source: JICA Design Team, 2022).

Table 7: Potential impacts of the candidate transportation routes (Source: JICA Design Team, 2022).

Option	Outline of transportation route	Potential impacts
1	- Materials will be transported to a reserve plot next to the Mombasa port Container Terminal 2(CT2) in Port Reitz via Mombasa Road (A109), and then will be unloaded to a barge and transported to the Project site by crossing Port Reitz creek. - Overall distance: approx.: 27 km - Construction of a temporary unloading jetty will be required at the reserve plot next to CT2.	There are no notable sensitive receptors along the route. Environmental impacts are likely to be insignificant providing that adequate haulage vehicles and barges are used.
2	- Materials will be transported to an open space next to the SBR bridge abutment via Mombasa Road (A109), and then will be unloaded to a barge and transported to the Project site by crossing Port Reitz creek. - Overall distance: approx.: 24 km - Construction of a temporary unloading jetty will be required near the SBR bridge abutment area. - May require dredging along the shallow water channels.	- May require mangrove clearance for constructing the temporary unloading jetty. - May affect fishing activities as the site of the temporary unloading jetty is near a fish landing area and fishing ground. - Dredging of the water channel may affect local fish resources and mangroves.
3	- Materials will be transported to the Project site via Mombasa Road (A109), Southern Bypass Road (SBR) and community road inside SEZ. It will not require any sea transport but will only be usable after opening of the SBR. - Overall distance: approx. 29 km	The residents along the community road may be affected by the excessive noise and dust emitted from passing haulage vehicles. Furthermore, the areas along the community road are planned as a resettlement site of the SEZ residents.

From an environmental perspective, Option 1 is most favorable as environmental impacts are considered limited. Option 2 is most unfavorable, as it may affect mangroves and local fishing activities. Option 3 is probably favorable from an operational perspective but will likely require mitigation and monitoring especially along the community road area.

The transportation route will eventually be determined once the Construction Contractor is onboard. An alternative analysis of all the options, including the option of using Jaribuni quarry, will be undertaken in the process and reported to NEMA as part of the EIA study required for temporary construction facilities.

8.3 Road component

Impacts due to the modification of the ramp alignment were assessed mainly through field reconnaissance of the new ramp site. Following are some of the main features identified:

- The site is located over a hilly terrain adjacent to the ongoing SBR construction site.
- Vegetation cover is generally low mainly consisting of fruit trees (e.g., mango) and shrubs.
- Only one human settlement was identified within the site.
- Small-scale farming was practiced in some limited areas.
- No kayas were found within the site.

In conclusion, the area can be considered to have relatively low ecological and social values, hence the modification of the ramp alignment is unlikely to generate any additional impacts to the environment.

9 Updated Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP)

9.1.1 Updated Environmental Management Plan (EMP)

Following identification, prediction and analysis of impacts based on the latest project design, the consultant in consultation with the proponent updated the existing EMP prepared during EIA study report to guide the proponent in implementing the mitigation measures recommended under each of the impacts. The EIA study report covered the pre-construction, construction and operational phases. The main updates were based on the impacts identified during the SUEA vis a vis the adequacy of the mitigation measures provided in the EMP prepared during the EIA study.

9.1.1.1 Port component

Table 8 shows the updated EMP for the port component (the updated parts are highlighted in yellow). The main updates made are as follows:

- Mangrove transplantation has been strengthened based on the mangrove transplantation study (e.g., increase of seedling transplantation quantity).
- Measures against sediment dispersion from dredging and disposal works has been strengthened as per the environmental audit study of offshore disposal site (e.g., inclusion of real-time tracking of dredged material leakages).
- Waste management has been strengthened based on the waste management study (e.g., greater emphasis on reuse and recycling).
- Measures against cultural heritage has been strengthened based on the HIA study (e.g., protection of sacred shrine).
- Establishment of an alternative fish landing site was proposed in the EMP. However, this will no longer be required as no fish landing sites will be affected by the Project as identified in the fisheries impact assessment study.

9.1.1.2 Road component

Table 9 shows the updated EMP for the road component (the updated parts are highlighted in yellow). The main updates made are as follows:

- Waste management has been strengthened based on the waste management study (e.g., greater emphasis on reuse and recycling).
- Measures on cultural heritage has been added based on the HIA study (e.g., protection of sacred shrines).
- Measures and implementing organizations related to resettlement has been updated as per the latest resettlement policy of the Mombasa SEZ.

Table 8: Updated EMP for Port Component (The updated sections are highlighted in yellow)

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
Pre-construction					
Ecosystem	Cutting of mangrove trees	• Mangrove seedlings to be transplanted in collaboration with KFS and MOKICFA. • At least 2 mangrove seedlings to be planted per cleared mangrove tree at a suitable location identified through field survey (KFS proposed 10,000 seedlings/ha to be transplanted at Dongo-Kundu where 1,000ha area degraded subject to confirmation with KPA) • Construction contractor to prepare Mangrove Transplantation Plan as per the National Mangrove Ecosystem Management Plan (2017-2027) and Mombasa Participatory Forest Management Plan (2015-2019) and through consultation with local stakeholders. • Proponent to obtain a Special User Licence from KFS or seek an exemption	Construction contractor	KFS, KPA Supervising consultant	To be determined based on KFS and KPA agreement (subcontract cost of CBO)
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	Include 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

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
	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 basecost
Water pollution	Sediment dispersion through dredging and offshore dumping of dredged material	[Common] - Trailer Suction Hopper Dredger (TSHD) and grab dredging not to be conducted during the same period. - Use of dredger/vessels with a valid ship inspection certificate issued by member societies of International Association of Classification Societies (IACS). - Discharge or overflow of dredged material during transport to the designated disposal site to be strictly prohibited. - Conduct regular vessel inspection and maintenance to prevent leakages of dredged material from the dredger/vessels. - Real-time tracking of dredged material leakages from the vessels during transport to the disposal site (e.g. monitoring of dredged material volume in the hopper compartment). - Real-time tracking of vessel movement during transport of dredged material to the designated disposal site. - Dredging/disposal methods and EMP to be proactively adjusted and strengthened in case set water quality threshold levels (i.e. turbidity) are exceeded or any early signs of ecosystem stress (i.e. corals and seagrass) are detected from the environmental monitoring. - In case dredging works overlap with other Mombasa port dredging projects, coordinate with those projects and revise and strengthen the EMP and EMoP as necessary. [TSHD] - Use of TSHD with keel-level overflow and green valve in case dredging is planned with overflow. [Grab dredger]	Construction contractor	Supervising consultant KPA	10,000,000 (cost of real-time tracking system)

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		Installation of silt curtain where dredging works are conducted.			
	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/black water) 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). - 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.	Construction contractor	Supervising consultant KPA	Included in construction base cost
Waste	Generation of construction solid waste (e.g. domestic waste, packaging material, metal scrap, medical waste)	- Minimize waste generation through reuse and recycling. In principle, locally recyclable wastes shall be recycled. - Wastes to be stored in designated areas with sufficient capacity 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	Construction contractor	Supervising consultant KPA NEMA County government	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		- 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 with sufficient capacity 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. - Hazardous wastes that cannot be safely treated in Kenya shall be treated overseas in accordance to the Basel Convention.			
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 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 KPA	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
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	Implement measures stated under “Water Pollution”.	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	300 million (compensation cost)
Cultural heritage	Impact on local heritage resources (e.g. Vikadini shrine)	- Hold a cleansing ceremony at Vikadini shrine as per the request of the local community. - Prohibit entrance of construction workers inside Vikadini shrine. - Demarcation of Vikadini shrine boundary and erection of sign post, to ensure that workers do not enter the shrine. - No temporary construction facilities to be established inside the shrine. - Construction contractor to prepare a Heritage Management Plan through consultation with local heritage experts.	Construction contractor	Supervising consultant KPA, NMK	350,000 (cost of ceremony)
Children's right	Employment of under aged 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	Construction contractor	Supervising consultant KPA	—

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		potentially harmful works.			
	Exploitation of under aged 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
Operation					
Water pollution	Sediment dispersion through dredging and offshore dumping of dredged material	Same as construction EMP.	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

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
	Wastewater discharge from ships	Regulate ship wastewater as per MARPOL regulations.	Port operator KPA	KMA	Included in operation base cost
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	Same as construction EMP.	Dredging contractor	KPA	Included in operation base cost
Ecosystem	Sediment dispersion through offshore dumping of dredged material	Same as construction EMP.	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
Water pollution	Sediment dispersion through dredging and offshore dumping of dredged material	Same as construction EMP.	Dredging contractor	KPA	Included in operation base cost

Table 9: Updated EMP for Road Component.

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
Pre-construction					
Resettlement	Resettlement due to land acquisition	• Provide land for resettlement inside Mombasa SEZ. • Provide public amenities at resettlement site. • Provide compensation for developments (structures, crops). • Provide livelihood assistance (e.g., job opportunity, relocation assistance, transitional assistance, vocational training). • 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.	KPA NLC Min. of Lands	RAP implementation unit	Included in SEZ RAP budget
Vulnerable persons	Resettlement of vulnerable persons due to land acquisition	• Provide one-time cash assistance.	KPA NLC Min. of Lands	RAP implementation unit	Included in SEZ RAP budget
Livelihood	Loss of income due to land acquisition	• Provide livelihood assistance (e.g., job opportunity, relocation assistance, transitional assistance, training).	KPA NLC Min. of Lands	RAP implementation unit	Included in SEZ RAP budget
Land use	Alteration of land use due to land acquisition	• Provide livelihood assistance (e.g., job opportunity, transitional assistance, vocational training).	KPA NLC Min. of Lands	RAP implementation unit	Included in SEZ RAP budget
Gender	Resettlement of women HHs due to land acquisition	• Prioritize livelihood assistance (e.g., job opportunity)	KPA NLC Min. of Lands	RAP implementation committee	Included in SEZ RAP budget
Threatened tree species, <i>Lannea scheinfurthii</i> var. <i>acutifoliate</i>	Localized extinction	• Propagation in other areas within and without the SEZ by either cuttings and/or seeds is recommended.	KPA, KFS	KFS	200,000 (Labour and logistical costs)

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
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
	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	Construction contractor	Supervising consultant KeNHA	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		and Coordination, (Water Quality) Regulations 2006.			
	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 oil/water separator at fueling area.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
Waste	Generation of construction solid waste (e.g., domestic waste, packaging material, metal scrap, medical waste)	- Minimize waste generation through reuse and recycling. In principle, locally recyclable wastes shall be recycled. - Wastes to be stored in designated areas with sufficient capacity 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 with sufficient capacity 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-			

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		authorized firms. Hazardous wastes that cannot be safely treated in Kenya shall be treated overseas in accordance to the Basel Convention.			
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 due to construction-related disturbances	- In case temporary construction facilities will affect livelihood of the localssuch 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.	Construction contractor	Supervising consultant KeNHA	Included in 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	Construction contractor	Supervising consultant KeNHA	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		decommissioned. • Quarry to be operated in accordance to Integrated National Land Use Guidelines 2011.			
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
Cultural heritage	Impact on local heritage resources (e.g., Mbuyuni shrine)	• Prohibit entrance of construction workers inside shrines • Demarcation of shrine boundary and erection of sign post, to ensure that workers do not enter the shrines. • No temporary construction facilities to be established inside shrines. • Construction contractor to prepare a Heritage Management Plan through consultation with local heritage experts.	Construction contractor	Supervising consultant KeNHA, NMK	Included in construction base cost
Children's right	Employment of under aged 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	Included in construction base cost
	Exploitation of under aged children	• Contractor to prepare Code of Conduct for construction workers.	Construction contractor	Supervising consultant KeNHA	Included in construction base cost
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
Occupational safety	Risk of occupational accidents	• Contractor to prepare Occupational Health and Safety Plan in accordance to Occupational Safety and Health Act 2007. The	Construction contractor	Supervising consultant	Included in construction base cost

Item	Potential impact	Mitigation measure	Implementation responsibility	Supervision responsibility	Approx. cost (KES)
		plan shall among others include the following: -Risk assessment and planned safety measures -Training plan for construction workers -Organizational structure -Emergency response plan		KeNHA DOSHS	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

9.1.2 Updated Environmental Monitoring Plan (EMoP)

After updating the EMP, the consultant updated the existing EMoP for the implementation of the updated EMP. In particular, monitoring plan focused on the updated baseline information. Each of the monitoring levels shows the location, sampling frequency and the parameters, the parties responsible for monitoring, timeframe and costs for the monitoring activities.

9.1.2.1 Updated EMoP for Port component

Table 10 shows the updated EMoP for the port component (the updated parts are highlighted in yellow). The main updates made are as follows:

- Monitoring frequency of transplanted mangrove seedling has been increased based on the mangrove transplantation study.
- Environmental monitoring during dredging and disposal works has been strengthened as per the EA study (e.g., increase of monitoring sites/frequency, addition of benthos monitoring).
- The monitoring of alternative fish landing site has been removed as no alternative fish landing site will be required

9.1.2.2 Updated EMoP for Road Component

Table 11 shows the updated EMoP for the road component (the updated parts are highlighted in yellow). The updates were made on the implementing organization of RAP monitoring activities.

Table 10: Updated EMoP for Port component.

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
Pre-construction					
Ecosystem	To check the progress and effectiveness of mangrove transplantation plan	Check growth status (e.g. height, survival, health) of transplanted mangrove seedlings.	4/year for the first 2 years after plantation 2/year until settlement of seedlings are confirmed Local community scouts to be employed from nursery establishment to out-planting and tendering/growth monitoring	Construction contractor KPA (post-construction)	Included in transplantation cost
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: <i>In situ</i> measurement of surface and bottom turbidity (NTU) ➤ Location: - Port Reitz/Kilindini: 5 sites (TSHD/Grab) - Tudor Creek: 3 sites (TSHD/Grab) - Inner reef: 4 sites (TSHD/Grab) - Outer reef: 8 sites (TSHD), 5 sites (Grab)	Pre-construction: 14 days each before TSHD and grab dredging (baseline study) During dredging: 3 times/week	Construction contractor	13,000,000

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
		➤ Dredging/disposal method to be reconsidered in case turbidity exceeds the following levels for 2 weeks continuously at pre- determined sites: - Reef area: Baseline + 2 NTU - Port Reitz: Baseline + 15 NTU			
		[Other water quality monitoring] ➤ Method: Measurement of DO, SS, T-N, T-P, Coliforms through <i>insitu</i> measurement or lab analysis ➤ Location: • Port Reitz/Kilindini: 5 sites (TSHD/Grab) • Tudor Creek: 3 sites (TSHD/Grab) • Inner reef: 4 sites (TSHD/Grab) • Outer reef: 8 sites (TSHD), 5 sites (Grab) ➤ Analysis to be done at NEMA certified lab. ➤ Assessment criteria: comparison with baseline values	Pre-construction: 14 days each before TSHD and grab dredging (baseline study) During dredging: weekly		
		[Aerial monitoring] ➤ Method: Taking of aerial photographs such as by drone. Authority to be sought from KWS, Kenya Civil Aviation Authority and Department of Defence. ➤ Location: Two sites (dredging area and between dredging area and disposal site) ➤ Assessment criteria: Check presence of turbid plumes at MPA/coral reef area and if any are generated from travelling dredger/barge. Kenya Wildlife Service should be involved.	Construction: Weekly		
	To check the water quality of treated concrete wash water	➤ Method: Measurement of water quality of treated concrete wash water ➤ 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	• Visual inspection of oil leaks from construction vehicle/machines and fuel tanks.	Daily	Construction contractor	Part of construction base

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
	vehicles/machines and fuel tank				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	3,000,000
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	[Coral] ➤ Method: Transect or quadrat survey at fixed locations along coral habitats in the coastal/MPA areas ➤ Location: -Four sites during grab dredging -Eight sites during TSHD dredging ➤ Parameters: coral coverage, bleaching, algae coverage, predators, discoloration, mucus secretion, disease, sedimentation	Pre-construction: once (baseline study) During dredging: Bi-weekly	Construction contractor	3,200,000

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
		➤ Assessment criteria: Dredging/disposal method and EMP to be reconsidered in case signs of coral stress/degradation are observed. ➤ Survey to be conducted by marine ecology expert. [Seagrass] ➤ Method: Transect or quadrat survey at fixed locations along coral habitats in the coastal/MPA areas ➤ Location: -Four sites during grab dredging -Eight sites during TSHD dredging ➤ Parameters: seagrass coverage, algae coverage, sedimentation ➤ Assessment criteria: Dredging/disposal method and EMP to be reconsidered in case signs of seagrass stress/degradation are observed. • Survey to be conducted by marine ecology expert.			
	To check impacts on benthos due to dredging	➤ Method: Grab or core sampling of surface sediment ➤ Location: Three sites during TSHD dredging • Parameters: Species and abundance of macrobenthos	Pre-construction: Once (baseline study) During TSHD dredging: Once Post-TSHD dredging: Once	Construction contractor	300,000
Livelihood	To check the progress and effectiveness of fishermen Livelihood Restoration Plan	• Interview BMU members and confirm status Livelihood Restoration Plan.	1/month during construction and until 2 years post-construction	KPA	480,000
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

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost (KES)
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	➤ Same as construction EMoP	Same as construction EMoP	Dredging contractor	Will depend on dredging volume
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	➤ Same as construction EMoP	Same as construction EMoP	KPA	Will depend on dredging volume
Ecosystem	To check impacts on coastal ecosystem due to offshore dumping of dredged materials	➤ Same as construction EMoP	Same as construction EMoP	Dredging contractor	Will depend on dredging volume
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 11: Updated EMoP for Road component.

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost(KES)
Pre-construction					
Resettlement	To check the progress and effectiveness of RAP	Internal monitoring ➤ Check status of compensation disbursement, land allocation within SEZ, structures, livelihood, standards of living etc.	• 1/month during RAP implementation • Quarterly after RAP implementation for 1 year	KPA	Included in SEZ RAP monitoring budget
		External monitoring ➤ Check status of compensation disbursement, land allocation within SEZ, structures, livelihood, standards of living, grievance issues etc.	• 2/year during RAP implementation • 2/year after RAP implementation for 1 year	KPA contract third party	Included in SEZ 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	KPA	Included in SEZ 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	KPA	Included in SEZ 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	KPA	Included in SEZ 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	KPA	Included in SEZ RAP monitoring budget
Threatened tree species, <i>Lannea schaefferi</i> var. <i>acutifolia</i>	To check the progress and effectiveness of propagation of threatened species	➤ Check growth status (e.g. height, survival, health) of planted trees.	• 2/year until 5 years after plantation	KPA KFS	200,000 (Labour and logistical costs)
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 construction cost

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost(KES)
		➤ Method: Measurement of PM10 ➤ Location: Sensitive receptors (3 sites) ➤ Assessment criteria: PM10 standard (100 µg/m³) set under Environmental Management and Co-ordination (Air Quality) Regulations 2014	Pre-construction: Once • Construction: 1/week	Construction contractor	4,500,000
	To check concentration plant stack from emission asphalt	➤ 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 wash water	➤ Method: Measurement of water quality of treated concrete wash water ➤ 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 vehicle/machines and fuel tanks.	Daily	Construction contractor	Part of construction base cost
	To check the soil quality of topsoil 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	➤ Method: Site inspection and checking of wastetreatment/disposal records.	1/month	Supervising consultant	Part of supervision base cost

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost(KES)
	accordance to the contractor's Waste Management Plan	➤ Assessment criteria: Waste storage method, site littering, waste treatment/disposal records.			
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: 35dB ➤ 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	3,000,000
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
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 is any child labor	➤ 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

Item	Aim	Method	Frequency	Implementation responsibility	Approx. cost(KES)
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 Management Plan	➤ Visual inspection of waste storage sites. ➤ Check records of waste treatment/disposal.	During maintenance	KeNHA	Part of operation base cost
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

10 Evidence of current public consultation and stakeholder engagement

10.1 Introduction

The consultant organized and held four stakeholder engagement meetings (SHM) i.e., kick-off, community level, review of the draft SUEA and validation meetings. Engagement of stakeholders is crucial because it will help the project achieve transparency and sustainability throughout the construction and operational phase by enhancing social safeguards and mechanisms to address grievances. Participation in the meetings was based on a prior stakeholder analysis conducted by the consultant in consultation with KPA and Nippon Koei Co., Limited and reference to previous engagement proceedings during the preparation of the EIA Study report for the project in 2019. The stakeholder mapping and analysis was based on a gradient of influence and interest in the project (Figure 19).

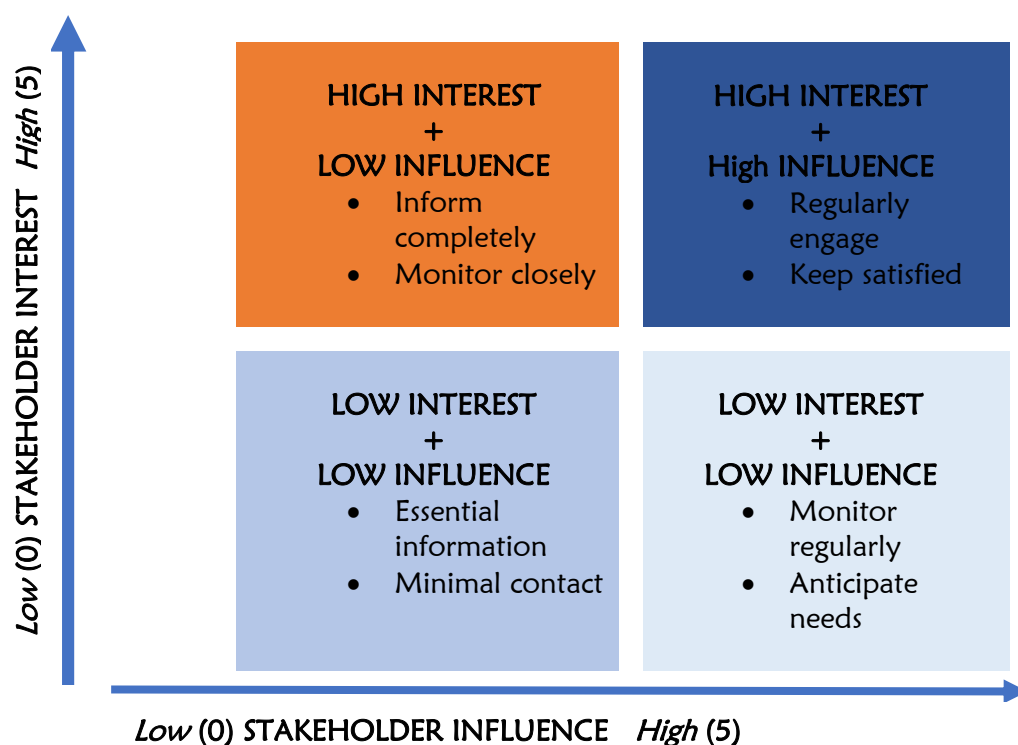


Figure 19: Stakeholder analysis and engagement considerations based on interest and influence in the project.

10.2 Kick off meeting

The meeting was held on 13th February 2023 at Royal Court Hotel, Mombasa and was attended by 13 members drawn from the Ministry of Interior and National Administration, National Environment Management Authority, State Department of the Blue Economy and Fisheries, Kenya National Highways Authority, Kenya Navy, Kenya Power and Lighting Company, Mombasa Beach Management Network and Mombasa Kilindini Community Forest Association. During the kick-off meeting, the consultant made a presentation on the scope of the SUEA, the approach and methodology, the timeframe and the stakeholders' roles in the SUEA (Figure 20 and Annexure 7). A number of key issues raised were discussed during the plenary session based on the presentation by the consultant and other matters arising from the project (Table 12).



Figure 20: Participants during the kick off meeting at Royal Court Hotel in Mombasa (Source: Stakeholder consultative meeting, February 2023).

Table 12: The main issues of discussion during the kick-off meeting and the responses given (Source: Kick-off meeting, February 2023).

No.	Issue	Response
1.	Extent of Port components within Kilindini Channel	The consultant presented a map showing the layout of the Port components within the Kilindini Channel relative to Kenya Navy.
2.	Inclusion of the 12 km SEZ access road in the SUEA	The access road is not included in the SUEA process and further consultations will be done
3.	Disposal of dredged materials	Extensively covered during the EIA study and the SUEA will only update the change in scope which potentially includes increased dredged material quantity due to the change in turning basin and quay depth.
4.	Formula used in determining the number of mangroves to be planted	MOKICFA are part of the target participants during the community level meeting where they will have an opportunity to provide recommendations on the number of mangroves and areas to be replanted to compensate for the loss occasioned by the Port development. Currently project envisions to plant 2 seedlings for each one lost to the development
5.	Impact of the project on fisheries and marine biodiversity	KPA in collaboration with JICA Design Team carried out a Fisheries Survey targeting the project area from March 2021 to March 2022. The survey was carried to update the Livelihood Restoration Plan prepared in 2019 and meant to address the socio-economic impact of the project on local fishermen.
6.	Compensation of the Project Affected Persons (PAPs)	The objective of the SUEA is to update the EIA study carried out in 2019 where issues of compensation were discussed with the local community and a RAP is in process. This is besides the findings of the livelihood restoration plan where a number of BMUs will be compensated.

10.3 Community level meeting

The meeting was held on 27th February 2023 at Shika Adabu Chief's Hall, Mombasa and was attended by 45 members drawn from the Ministry of Interior and National Administration, County Government of Mombasa, Mombasa and Kwale Counties Beach Management Units, Mombasa Kilindini Community Forest Association (Figure 21 and Annexure 8).



Figure 21: Mr. Teddy Bonaya, the Assistant County Commissioner – Likoni, addressing the community members during the Community Level Meeting (Source: Community Level Meeting, February 2023).

The key areas of deliberations during the meeting are summarized below (Table 13).

Table 13: The main issues raised during the community level meeting and the responses given (Source: Community level meeting, February 2023).

No.	Issue	Response
1.	Storage site of excessive soil	The storage site of excessive soil has been shifted from the empty space inside the ramp to the land formation site planned under the Mombasa SEZ PID project.
2.	Impact of the project on fisheries and marine biodiversity	KPA in collaboration with JICA carried out a Fisheries Survey targeting the project area from March 2021 to March 2022. The survey was carried out to update the Livelihood Restoration Plan prepared in 2019 and meant to address the socio-economic impact of the project on local fishermen
3.	Mangrove transplanting location	The exact location will be identified through consultation with the local stakeholders as per the updated EMP.
4.	Number of mangroves that will be cleared and transplanted	14ha of mangrove will be cleared and at least 2 mangrove seedlings to be planted per cleared mangrove tree.
5.	Monitoring of mangroves	Monitoring will be undertaken to check on growth status of the mangrove transplanted seedlings. The frequency will be 4 times/year for the first 2 years after plantation and 2 times/year until adequate growth and natural generation potential of seedlings is confirmed.

No.	Issue	Response
6.	Conservation of cultural sites in the SEZ	KPA in collaboration with JICA carried out a Heritage Impact Assessment (HIA) targeting the project area in 2021 and updated on the cultural sites within the area

10.4 Stakeholder meeting to review and validate the Draft SUEA report

The stakeholder meeting to review and validate the Draft SUEA report was held on 7th March 2023 at Royal Court Hotel, Mombasa and was attended by key stakeholders including Kenya Ports Authority (KPA), Ministry of Interior and National Administration, Kenya National Highways Authority (KeNHA), Kenya Navy, Coast Water Works Development Authority (CWWDA), Coast Development Authority (CDA), Kenya Forest Service (KFS), Kenya Wildlife Service (KWS), Kenya Power and Lighting Company (KPLC), Mombasa and Kilindini Community Forest Association (MOKICFA), the Beach Management Units (BMU) Network and Envasses Environmental Consultants Limited. During the meeting, the consultant made a presentation on the scope of the SUEA, the approach and methodology, and findings of the SUEA for each of the scope (Figure 22 and Annexure 9). The review issues raised were discussed during the plenary session based on the presentation by the consultant and other matters arising from the project (Table 14).

Following the end of the plenary session, the consultant team reviewed the SUEA report incorporating stakeholder comments to produce an updated SUEA report which was then validated.



Figure 22: Mr. Daniel Githinji addressing the stakeholders during the meeting to review and validate the Draft SUEA report (Source: Stakeholder meeting to review and validate the Draft SUEA report, March 2023).

Table 14: The main issues raised during the stakeholder meeting to review and validate the Draft SUEA report and the responses given (Source: Stakeholder meeting to review and validate the Draft SUEA report, March 2023).

No.	Issue	Response
1.	Why Total Suspended Solids (TSS) were not among the parameters monitored during the SUEA	The TORs were specific on the parameters to be monitored during the SUEA and TSS was not one of them. In addition, during the EIA Study carried out in 2019, comprehensive water quality assessment was conducted which included TSS and the Updated EMP and EMoP has provided comprehensive mitigation measures to monitor water quality status.
2.	Mangrove transplantation site	The site will be identified in collaboration with KFS and MOKICFA
3.	Inclusion of Resettlement Action Plan, Fisheries and Heritage Impact Assessment Studies in the SUEA	The studies were undertaken as separate consultancies and detailed on resettlement, fisheries and heritage concerns within the SEZ area. In addition, all the relevant stakeholders were engaged in the preparation of the reports and their validation.
4.	Out-planting of 10,000 seedlings per hectare at the degraded areas in Dongo Kundu (1,000 ha)	The National Mangrove Ecosystem Management Plan (2017-2027) documents the stocking rate for Mombasa County as approximately 1,600 trees per ha and hence there will be need to validate on the actual number of mangroves to be replanted.
5.	Commencement of restoration activities prior to the construction of the port and road development project	Restoration activities are undertaken by the project contractor as outlined in the updated EMP, and hence will not be possible to commence prior. Further, KFS should provide data and information on availability of mangroves seedlings from the local CFA for replanting activities.
6.	Data on gazetted forests within the SEZ area	The project occurs within the Mombasa SEZ which is owned by KPA and there are no gazetted forests.
7.	Land use changes	Land use changes on water body and mud flats were mainly as a result of the differences in the tide level when both images were acquired. The changes in mangrove forest, terrestrial vegetation cover and built-up areas were attributed to the construction of the Mombasa Southern bypass and the CCCC pipeline marshaling yard, logging and increase in human settlements. Variations in bare land were attributed to the seasonality of farming activities and weather patterns.
8.	Inclusion of a management and monitoring plan for the <i>Lanea scheinfurthii</i> var. <i>acutifoliate</i> (IUCN: NT)	This will be incorporated in the final SUEA report.
9.	Authorization from KWS for use of drones in monitoring of sediment plumes and monitoring of biological communities within the Marine Protected Areas (MPAs).	KPA will engage KWS in monitoring activities and will also seek authorization for use of drones in monitoring from Kenya Civil Aviation Authority and Kenya Defense Forces.

11 Conclusion

The proposed project is due to commence from October 2023 and will be completed in 3 years according to the project schedule discussed with the proponent. In response to the application for variation obtained from NEMA, the SUEA report updated data and information on mangroves, birds, terrestrial vegetation and water quality, infrastructure, land use changes, potential environmental impacts due to the proposed variations, the EMP and EMoP as well as a current stakeholder engagement process.

The current baseline survey reported four (4) mangrove species i.e., *Avicennia marina*, *Ceriops tagal*, *Rhizophora mucronata* and *Sonneratia alba*. However, *Lumnitzera racemose* which was recorded during the EIA Study, 2019 was not found. An assessment of the mangrove health based on NDVI showed that mangroves in project area are experiencing a negative trend regarding their health over the years. Further, a total of 103 wader and land birds were identified within the project area. Out of the total counted, four (4) wader species of conservation concern were identified including *Curlew Sandpiper*, *Eurasian Curlew*, *Woolly-necked Stork* and *Black Heron/Egret*.

Terrestrial vegetation assessment identified 112 plant species belonging to 48 families. The search for *Vitellariopsis kirkii* (IUCN: VU), was intensively done at two monitoring stations where they were recorded in the EIA Study, 2019. However, the plant species were not identified during the survey which is attributed to land use changes at the first monitoring station and possible erroneous identification at the second monitoring station.

Water quality analysis results indicated that the Total Petroleum Hydrocarbons, Total Nitrogen and Total Phosphorous are in low quantities while coliforms were not detected an indication of a fair water quality status. In terms of change in land use between 2018 and 2022, there were nominal changes where mangrove forest, terrestrial vegetation and built-up area were cleared to pave way for the construction of the Mombasa Southern Bypass Road and the KOT Pipeline Marshalling Yard. Lastly, the SUEA study report has updated the EMP and EMoP to guide the proponent in implementing the mitigation measures recommended under each of the impacts.

On the basis of a commitment by the proponent to implement the updated EMP and EMoP, we recommend variation of the EIA License as proposed and in accordance with the Environmental Management and Coordination Act Cap 387 of the Laws of Kenya and Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003.

12 References

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13 Annexures

1. Summary of waders recorded along the port and mangrove habitats during the survey
2. Summary of land birds' species recorded during the survey
3. Photos of waders and land birds recorded during the survey
4. Summary of tree species recorded during the survey
5. Photos of tree species recorded during the survey
6. Copies of water quality analysis results
7. Proceedings of the Kick off Meeting held on 13th February 2023 at Royal Court Hotel, Mombasa
8. Proceedings of the Community Level Meeting held on 27th February 2023 at Shika Adabu Chief's Hall, Mombasa
9. Proceedings of the Stakeholder Meeting to review and validate the draft SUEA Study Report held on 7th March 2023 at Royal Court Hotel, Mombasa
10. Copy of the NEMA practicing license for the Firm, Envasses Environmental Consultants Limited
11. Copy of the NEMA practicing license for Lead Expert, Mr. Simon Nzuki

Annexure 1: Summary of waders recorded along the port and mangrove habitats during the survey.

Species name	Count
Cattle Egret	32
Lesser Crested Tern	25
Little Stint	72
Whimbrel	12
Senegal Plover	8
Gull-billed Tern	6
White-winged Black Tern	5
Common Sandpiper	8
Eurasian Curlew	3
Pink-backed Pelican	3
Three-banded Plover	3
Common Ringed Plover	29
Curlew Sandpiper	2
Grey Heron (Figure)	1
Grey Plover	6
Hadada	2
Pied Kingfisher	2
Dimorphic Egret	8
Yellow-billed Egret	1
Sacred Ibis	8
Common Greenshank	2
Greater Sand Plover	2
Lesser Sand Plover	6
Total	246

Annexure 2: Summary of land bird's species recorded during the survey.

English Name	Scientific Name	Conservation Status
African Black-shouldered Kite	<i>Elanus caeruleus</i>	Least Concern
African Palm Swift	<i>Cypsiurus parvus</i>	Least Concern
African Pied Wagtail	<i>Motacilla aguimp</i>	Least Concern
Amethyst Sunbird	<i>Chalcomitra amethystina</i>	Least Concern
Barn Swallow	<i>Hirundo rustica</i>	Least Concern
Black Heron	<i>Egretta ardesiaca</i>	Regionally Near Threatened
Black Kite (resident)	<i>Milvus migrans aegyptius/parasitus</i>	Least Concern
Black-and-white Mannikin	<i>Spermestes bicolor nigriceps</i>	Least Concern
Black-backed Puffback	<i>Dryoscopus cubla</i>	Least Concern
Black-bellied Starling	<i>Notopholia corusca</i>	Least Concern
Black-crowned Tchagra	<i>Tchagra senegalus</i>	Least Concern
Black-headed Oriole	<i>Oriolus larvatus</i>	Least Concern
Blue-cheeked Bee-eater	<i>Merops persicus</i>	Least Concern
Booted Eagle	<i>Hieraaetus pennatus</i>	Least Concern
Bronze Mannikin	<i>Spermestes cucullata</i>	Least Concern
Brown-breasted Barbet	<i>Pogonornis melanopterus</i>	Least Concern
Brown-hooded Kingfisher	<i>Halcyon albiventris</i>	Least Concern
Cattle Egret	<i>Bubulcus ibis</i>	Least Concern
Collared Sunbird	<i>Hedydipna collaris</i>	Least Concern
Common Drongo	<i>Dicrurus adsimilis</i>	Least Concern
Common Greenshank	<i>Tringa nebularia</i>	Least Concern
Common Ringed Plover	<i>Charadrius hiaticula</i>	Least Concern
Common Sandpiper	<i>Actitis hypoleucos</i>	Least Concern
Crested Francolin	<i>Dendroperdix sephaena</i>	Least Concern
Curlew Sandpiper	<i>Calidris ferruginea</i>	Near Threatened
Cut-throat Finch	<i>Amadina fasciata</i>	Least Concern
Diederik Cuckoo	<i>Chrysococcyx caprius</i>	Least Concern
Dimorphic Egret	<i>Egretta dimorpha</i>	Least Concern
Dodson's Bulbul	<i>Pycnonotus barbatus dodsoni</i>	Least Concern
East Coast Boubou	<i>Laniarius sublacteus</i>	Least Concern
Emerald-spotted Wood Dove	<i>Turtur chalcospilos</i>	Least Concern
Eurasian Curlew	<i>Numenius arquata</i>	Near Threatened
Eurasian Golden Oriole	<i>Oriolus oriolus</i>	Least Concern
European Roller	<i>Coracias garrulus</i>	Least Concern
Feral Pigeon	<i>Columba livia</i>	Least Concern
Golden Palm Weaver	<i>Ploceus bojeri</i>	Least Concern
Grassland Pipit	<i>Anthus cinnamomeus</i>	Least Concern
Great Sparrowhawk	<i>Accipiter melanoleucus</i>	Least Concern
Greater Sand Plover	<i>Charadrius leschenaultii</i>	Least Concern
Grey Heron	<i>Ardea cinerea</i>	Least Concern

English Name	Scientific Name	Conservation Status
Grey Plover	<i>Pluvialis squatarola</i>	Least Concern
Grey-backed Camaroptera	<i>Camaroptera brachyura</i>	Least Concern
Grey-headed Bushshrike	<i>Malaconotus blanchoti</i>	Least Concern
Grosbeak Weaver	<i>Amblyospiza albifrons</i>	Least Concern
Gull-billed Tern	<i>Gelochelidon nilotica</i>	Least Concern
Hadedda	<i>Bostrychia hagedash</i>	Least Concern
House Crow	<i>Corvus splendens</i>	Least Concern
House Sparrow	<i>Passer domesticus</i>	Least Concern
Jameson's Firefinch	<i>Lagonosticta rhodopareia</i>	Least Concern
Klaas's Cuckoo	<i>Chrysococcyx klaas</i>	Least Concern
Lesser Crested Tern	<i>Thalasseus bengalensis</i>	Least Concern
Lesser Sand Plover	<i>Charadrius mongolus</i>	Least Concern
Lesser Striped Swallow	<i>Cecropis abyssinica</i>	Least Concern
Lilac-breasted Roller	<i>Coracias caudatus</i>	Least Concern
Little Bee-eater	<i>Merops pusillus</i>	Least Concern
Little Stint	<i>Calidris minuta</i>	Least Concern
Little Swift	<i>Apus affinis</i>	Least Concern
Lizard Buzzard	<i>Kaupifalco monogrammicus</i>	Least Concern
Long-crested Eagle	<i>Lophaetus occipitalis</i>	Least Concern
Long-tailed Fiscal	<i>Lanius cabanisi</i>	Least Concern
Madagascar Bee-eater	<i>Merops superciliosus</i>	Least Concern
Marsh Warbler	<i>Acrocephalus palustris</i>	Least Concern
Mombasa Woodpecker	<i>Campethera mombassica</i>	Least Concern
Namaqua Dove	<i>Oena capensis</i>	Least Concern
Northern Brownbul	<i>Phyllastrephus strepitans</i>	Least Concern
Northern Carmine Bee-eater	<i>Merops nubicus</i>	Least Concern
Northern Crombec	<i>Sylvietta brachyura</i>	Least Concern
Pale Batis	<i>Batis soror</i>	Least Concern
Pale Flycatcher	<i>Bradornis pallidus</i>	Least Concern
Palm-nut Vulture	<i>Gypohiera1 angolensis</i>	Least Concern
Parrot-billed Sparrow	<i>Passer griseus gongonensis</i>	Least Concern
Pied Crow	<i>Corvus albus</i>	Least Concern
Pied Kingfisher	<i>Ceryle rudis</i>	Least Concern
Pink-backed Pelican	<i>Pelecanus rufescens</i>	Least Concern
Purple-banded Sunbird	<i>Cinnyris bifasciatus</i>	Least Concern
Red-billed Quelea	<i>Quelea quelea</i>	Least Concern
Red-cheeked Cordon-bleu	<i>Uraeginthus bengalus</i>	Least Concern
Red-eyed Dove	<i>Streptopelia semitorquata</i>	Least Concern
Red-fronted Tinkerbird	<i>Pogoniulus pusillus</i>	Least Concern
Ring-necked Dove	<i>Streptopelia capicola</i>	Least Concern

English Name	Scientific Name	Conservation Status
Rufous Scrub Robin	<i>Cercotrichas galactotes</i>	Least Concern
Sacred Ibis	<i>Threskiornis aethiopicus</i>	Least Concern
Senegal Plover	<i>Vanellus lugubris</i>	Least Concern
Speckled Mousebird	<i>Colius striatus</i>	Least Concern
Spectacled Weaver	<i>Ploceus ocularis</i>	Least Concern
Spotted Flycatcher	<i>Muscicapa striata</i>	Least Concern
Striped Kingfisher	<i>Halcyon chelicuti</i>	Least Concern
Tawny-flanked Prinia	<i>Prinia subflava</i>	Least Concern
Three-banded Plover	<i>Charadrius tricollaris</i>	Least Concern
Trumpeter Hornbill	<i>Bycanistes bucinator</i>	Least Concern
Village Indigobird	<i>Vidua chalybeata</i>	Least Concern
Village Weaver	<i>Ploceus cucullatus</i>	Least Concern
Whimbrel	<i>Numenius phaeopus</i>	Least Concern
White-browed Coucal	<i>Centropus superciliosus</i>	Least Concern
White-browed Robin Chat	<i>Cossypha heuglini</i>	Least Concern
White-throated Bee-eater	<i>Merops albicollis</i>	Least Concern
White-winged Black Tern	<i>Chlidonias leucopterus</i>	Least Concern
Winding Cisticola (Coastal)	<i>Cisticola galactotes haematocephalus</i>	Least Concern
Woolly-necked Stork	<i>Ciconia episcopus</i>	Near Threatened
Yellow-billed egret	<i>Ardea intermedia</i>	Least Concern
Yellow-fronted Canary	<i>Crithagra mozambica</i>	Least Concern
Yellow-throated Longclaw	<i>Macronyx croceus</i>	Least Concern
Zanzibar Greenbul	<i>Andropadus importunus</i>	Least Concern

Annexure 3: Photos of warders and land birds recorded during the survey.



Figure 23: Some of terrestrial bird species observed during the survey (Source: site visit, February 2023).

Annexure 4: Summary of tree species recorded during the survey.

Family	Scientific Name	Local Name
Acanthaceae	<i>Asystasia gangentica</i>	Futsule
Acanthaceae	<i>Anacardium occidentale</i>	Mbibo/mkorosho
Anacardiaceae	<i>Lannea schweinfurthii</i> var. <i>acutifoliata</i>	Mnyumbu
Anacardiaceae	<i>Lannea schweinfurthii</i> var. <i>stuhlmannii</i>	
Anacardiaceae	<i>Mangifera indica</i>	Muembe
Anacardiaceae	<i>Ozoroa obovata</i>	Mkayukayu
Anacardiaceae	<i>Ozoroa insignis</i>	
Anacardiaceae	<i>Sclerocarya birrea</i>	Mng'ongo
Annonaceae	<i>Annona cherimola</i>	Mtomoko
Annonaceae	<i>Annona senegalensis</i>	Mbokwe/mtomoko
Annonaceae	<i>Polyalthia longifolia</i>	
Annonaceae	<i>Uvaria auminate</i>	Mrori
Annonaceae	<i>Uvaria lucida</i>	Madzala
Apocynaceae	<i>Rauvolfia mombasiana</i>	Mumazia
Apocynaceae	<i>Saba comorensis</i>	
Apocynaceae	<i>Thevetia peruviana</i>	Mkode
Araliaceae	<i>Cussonia zimmermannii</i>	
Bignoniaceae	<i>Makhamia zanzibarica</i>	Mhalanda
Bombacaceae	<i>Adansonia digitata</i>	Mbuyu/Muyu
Boraginaceae	<i>Ehretia amoena</i>	Mbuduki-mwitu
Burseraceae	<i>Commiphora africana</i>	
Burseraceae	<i>commiphora hildebrandtii</i>	
Bromeliaceae	<i>Ananas sp.</i>	Mnanasi
Caesalpiniaceae	<i>Azelia quanzensis</i>	Mbambakofi
Caesalpiniaceae	<i>Cassia afrofistula</i>	
Caesalpiniaceae	<i>Tamarindus indica</i>	Mkwaju
Caricaceae	<i>Carica papaya</i>	
Casuarinaceae	<i>Casuarina equisetifolia</i>	Mvinje
Combretaceae	<i>Combretum illairii</i>	Msinda alume
Combretaceae	<i>Terminalia catappa</i>	Mkungu
Combretaceae	<i>Terminalia prunioides</i>	Mwanga
Combretaceae	<i>Terminalia spinosa</i>	Mwanga
Compositae	<i>Launea cornuta</i>	Mtsunga
Compositae	<i>Vernonia hildebrandtii</i>	
Compositae	<i>Vernonia zanzibarensis</i>	Mlazakoma/Waatsa
Convolvulaceae	<i>Ipomoea sp.</i>	
Cyperaceae	<i>Cyperus amabilis</i>	
Ebenaceae	<i>Diospyros squarrosa</i>	Mpweke
Euophorbiaceae	<i>Antidesma venosum</i>	

Family	Scientific Name	Local Name
Euophorbiaceae	<i>Bridelia cathartica</i>	Mkalakal
Euophorbiaceae	<i>Fluggea virosa</i>	Mkwamba
Euophorbiaceae	<i>Jatropha sp.</i>	Mbono koma
Euophorbiaceae	<i>Manohot cassava</i>	Manga/mazija
Euophorbiaceae	<i>Phyllanthus reticulatus</i>	Mkasiri/mkwamba
Euophorbiaceae	<i>Ricinus communis</i>	Mbono
Euophorbiaceae	<i>Suregada zanzibariensis</i>	Mdimu-mwitu
Fabaceae	<i>Cajanas janas</i>	Mbalazi
Fabaceae	<i>Delonix regeia</i>	Mkayamba
Flacourtiaceae	<i>Flacourtia indica</i>	
Labiatae	<i>Hoslundia opposita</i>	Mutserere
Lamiaceae	<i>Gmelina arborea</i>	Mwaborea
Loganiaceae	<i>Strychnos madagascariensis</i>	Mkwakwa
Loganiaceae	<i>Strychnos spinosa</i>	Mjaji
Malvaceae	<i>Abelmoschus fisulneus</i>	Mabenda
Malvaceae	<i>Abutilon mauritiana</i>	Chibangula mavi
Malvaceae	<i>Thespesia danis</i>	Mhowe
Meliaceae	<i>Azadirachta indica</i>	Mwarubaini/Mkilifi
Meliaceae	<i>Melia volkensii</i>	
Meliaceae	<i>Trichilia emetica</i>	Mnywa madzi
Miliaceae	<i>Turreaea nilotica</i>	Moza nyama/Mrondaronda
Mimoceaea	<i>Acacia nilotica</i>	
Mimoceaea	<i>Acacia senegal</i>	Kikwata
Mimoceaea	<i>Albizia adianthifolia</i>	
Mimoceaea	<i>Dicrostachys Dicrostachys</i>	Mkingiri
Moraceae	<i>Ficus sansibarica</i>	Mgandi
Moraceae	<i>Ficus cycomorus</i>	Mkuyu
Moraceae	<i>Ficus stuhlmannii</i>	Mgandi
Moringaceae	<i>Moringa oliefera</i>	Mzungi
Musaceae	<i>Musa sp.</i>	Mgomba
Myrtaceae	<i>Sidium guajava</i>	Mpera
Myrtaceae	<i>Syzygium cuminii</i>	Mzambarau
Olocaceae	<i>Ximenia americana</i>	Mtundukula
Palmae	<i>Cocous nucifera</i>	Mnazi
Palmae	<i>Hyphaene combresa</i>	Mkoma
Palmae	<i>Phoenix reclinata</i>	Uchindu
Papilionaceae	<i>Alysicarpus viginalis</i>	
Papilionaceae	<i>Dalbergia melanoxylon</i>	Mpingo
Papilionaceae	<i>Desmodia velutinum</i>	Banda kogo
Papilionaceae	<i>Lonchocarpus bussei</i>	Msumari bara

Family	Scientific Name	Local Name
Poaceae	<i>Bamboo sp.</i>	
Poaceae	<i>Zea mays</i>	Mahindi
Rhamnaceae	<i>Ziziphus mauritiana</i>	Mkunazi
Rhamnaceae	<i>Ziziphus mucronata</i>	Mgugune
Rhizophoraceae	<i>Ceriops tagal</i>	
Rhizophoraceae	<i>Rhizophora mucronata</i>	Mkoko
Rubiaceae	<i>Bourreria petiolaris</i>	Mbunduki
Rubiaceae	<i>Cartunaregam nilotica</i>	Mdzongodzongo
Rubiaceae	<i>Feretia apodanthera</i>	Mchigoda
Rubiaceae	<i>Lamprothamnus zanguebaricus</i>	Mnyukufu
Rubiaceae	<i>Polyshaeria parvifolia</i>	Mmangimangi
Rubiaceae	<i>Zanthoxylum chalybeum</i>	Mdungu
Rubiaceae	<i>Zanthoxylum holtzianum</i>	Mjafari/Mdungu
Rutaceae	<i>Citrus sp.</i>	Mdimu
Rutaceae	<i>Citrus sp.</i>	Mchungwa utsungu
Rutaceae	<i>Citrus sp.</i>	Mlimau
Salvadoraceae	<i>Saladora persica</i>	Mswaki
Sapindaceae	<i>Allophylus rubifolius</i>	Mnyanga kitswa
Sapindaceae	<i>Lecaniodiscus fraxinifolius</i>	Mbelenga
Sapindaceae	<i>Deinbolia borbonica</i>	Mdalamwaka
Sapotaceae	<i>Sideroxylon inerme</i>	Mkoko bara
Simaroubaceae	<i>Harrisonia abyssica</i>	Kidori
Sonneratiaceae	<i>Sonneratia alba</i>	Mlilana
Sterculiaceae	<i>Sterculia africana</i>	Morya
Tiliaceae	<i>Grewia plagiophylla</i>	Mkone
Verbenaceae	<i>Avicenia marina</i>	Mchu
Verbenaceae	<i>Lantana camara</i>	Mshomoro
Verbenaceae	<i>Clerodendron glabrum</i>	Mkula usiku mlume
Verbenaceae	<i>Clerodendron hildebrandtii</i>	Mkula usiku
Verbenaceae	<i>Premna chrysoclada</i>	Mvuma
Verbenaceae	<i>Vitex mombassae</i>	Mfudu madzi
Verbenaceae	<i>Vitex ferruginea</i>	Mfudu
Verbenaceae	<i>Ceriops tagal</i>	

Annexure 5: Photos of tree species recorded during the survey.

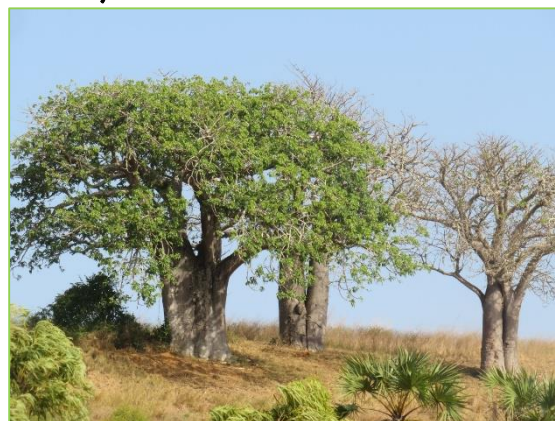


Figure 24: *Lamprothamnus zanguebaricus* (Left) and *Adansonia digitata* (Right) observed in the monitoring stations (Source: site visit, February 2023).

Annexure 6: Copies of water quality analysis results.



NIPPON KOEI CO., LIMITED
5 – 4 KOJIMACHI CHIYODA - KU
TOKYO 102 – 8539
JAPAN

TEST REPORT NO: 202316010509B				
SAMPLE	WATER			
DATE & PLACE SUBMITTED	22 nd February 2023 Polucon Laboratory, Nyali.			
DATE ANALYSIS STARTED	22 nd February 2023			
SAMPLING METHOD	N/A			
MARKINGS	Ocean Water Depth- 0.5 Meters			

TESTS	TEST METHOD	RESULTS	UNITS	KS EAS 12: 2018: NATURAL POTABLE WATER SPECIFICATION
Total coliform count	ISO 9308-1	Not detected	cfu/100ml	Absent
*Total Nitrogen as N	APHA 4500 N (B)	0.15	mg/l	--
Phosphorus as P	APHA 4500 P (E)	<0.01	mg/l	--
*Total petroleum hydrocarbons (TPH)	PQA/LIM/06	1.78	mg/l	--

*****End of test results*****

Mombasa Lab
01st March, 2023

Chemist

Microbiologist


E. Wambughia - Analyst


B. Katini - Analyst



*Indicates test(s) covered under the KENAS accreditation schedule.

A statement(s) of conformity is made without taking account of measurement uncertainty "conformity simply" - Results are within limits while "does not conform simply" - Results are outside limits. This test report and/or certificate is issued subject to Polucon Services (K) Limited Standard Terms and Conditions, a copy of which is available on request, and, cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful, and offenders may be prosecuted to the fullest extent of the law.

*Unless otherwise stated the results shown in this test report refer only to sample(s) tested and each sample(s) are retained for 90 days only (if non-perishable)."

NB: This report relates to submitted sample(s) only. The source and/or markings are as provided by the customer.

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TL 06721

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Member of POLUCON Group





NIPPON KOEI CO., LIMITED
5-4 KOJIMACHI CHIYODA - KU
TOKYO 102-8539
JAPAN

TEST REPORT NO: 202316010509A

SAMPLE	WATER
DATE & PLACE SUBMITTED	22 nd February 2023 Polucon Laboratory, Nyali.
DATE ANALYSIS STARTED	22 nd February 2023
SAMPLING METHOD	N/A
MARKINGS	Ocean Water
	Depth- 10 Meters

TESTS	TEST METHOD	RESULTS	UNITS	KS EAS 12: 2018: NATURAL POTABLE WATER SPECIFICATION
Total coliform count	ISO 9308-1	Not detected	cfu/100ml	Absent
*Total Nitrogen as N	APHA 4500 N (B)	0.28	mg/l	--
Phosphorus as P	APHA 4500 P (E)	<0.01	mg/l	--
*Total petroleum hydrocarbons (TPH)	PQA/LIM/06	1.04	mg/l	--

*****End of test results*****

Mombasa Lab
01st March, 2023

Chemist

Microbiologist

E. Wambunga - Analyst

B. Katini - Analyst



**Indicates test(s) not covered under the KENAS accreditation schedule.

A statement(s) of conformity is made without taking account of measurement uncertainty. 'conforms/comply' - Results are within limits while 'does not conform/comply' - Results exceed limits. This test report and/or certificate is issued subject to Polucon Services (P) Limited Standard Terms and Conditions, a copy of which is available on request, and, cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful, and offenders may be prosecuted to the fullest extent of the law.

*Unless otherwise stated the results shown in this test report refer only to sample(s) tested and such sample(s) are retained for 90 days only (if non-perishable).

NR: This report relates to submitted sample(s) only. The source and/or markings are as provided by the customer.

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Polucon Services (Kenya) Limited

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TL 08720

Member of POLUCON Group



Annexure 7: Proceedings of the Kick off Meeting held on 13th February 2023 at Royal Court Hotel, Mombasa.



Supplementary Environment Assessment Study for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).

PROCEEDINGS OF THE KICK OFF MEETING HELD ON 13TH FEBRUARY 2023 AT ROYAL COURT HOTEL, MOMBASA.

Client	Contractor
Nippon Koei Co., Limited, 5-4 kojimachi Chiyoda-ku, Tokyo 102-8539, Japan.	Envasses Environmental Consultants Limited, P.O. Box 2013-80100, Mombasa, Kenya.

1. Meeting Agenda

The kick off meeting is one of the four scheduled stakeholder engagement forums to provide input to the Supplementary Environment Assessment Study for the Port and Road Development of Mombasa Special Economic Zone. The agenda of the meeting was as follows;

1. Prayer and introductions
2. Opening remarks- Kenya Ports Authority
3. Presentation on the Supplementary Environment Assessment Study for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).
4. Plenary discussions on SUEA
5. Role of stakeholders in the SUEA process
6. Way forward and AOB

2. Prayer and introductions

The meeting started with a word of prayer by Mr. Mohammed Ahmed and thereafter introductions. It was attended by key stakeholders including Kenya Ports Authority (KPA), Nippon Koei Co., Limited, Ministry of Interior and Coordination of National Government, National Environment Management Authority (NEMA), Kenya National Highways Authority (KeNHA), Kenya Fisheries Service (KeFS), Mombasa and Kilindini Community Forest Association (MOKICFA), the Mombasa Beach Management Unit (BMU) Network and Envasses Environmental Consultants Limited (Annexure 1).

3. Opening remarks

Mr. Mohammed of Kenya Ports Authority thanked the participants for attending the meeting. He noted that an Environmental Impact Assessment (EIA) Study had been conducted in 2019 for the project and a License issued by NEMA in 2020. Further, he noted that the licence has since expired and KPA through Nippon Koei Co., Limited has engaged Envasses Environmental Consultants Limited to carry out the SUEA to update the EIA study and facilitate variation of the EIA licence. He stated that the consultant will provide details on the scope of work to be carried out during SUEA. He appealed to the participants to support the consultant in the SUEA process to make it a success.

4. Presentation on the Supplementary Environment Assessment Study for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).

Ms. Rhoda Mutua from Envasses Environmental Consultants Limited gave a detailed presentation on how the Supplementary Environment Assessment Study for the Port and Road Development of the Mombasa Special Economic Zone (SEZ) assignment will be carried out. She informed the meeting that the scope of the SUEA will be based on a NEMA response letter issued in June 2022 responding to an application by KPA to extend the validity of the EIA licence for the 2019 study. In this regard, the scope includes;

- Project implementation status
- The proposed variation
- Current baseline information and development trends
- Infrastructure in place to support the development
- The area land use changes
- Potential environmental changes and proposed mitigation measures
- Evidence of current public consultation and stakeholder engagement

Ms. Rhoda discussed each of the scope required by NEMA, KPA and Nippon Koei Co., Limited consistent with the Terms of Reference for the SUEA. The discussion focused on the methodology for carrying out the SUEA, the key personnel for the consultancy and the work plan.

Based on the above scope, Ms. Rhoda informed the meeting that the SUEA process will provide a report that will be submitted to NEMA to inform variation of the EIA licence in three aspects i.e., i) vary condition 1.2 to extend validity of the licence, ii) vary condition 2.18 to extend working hours from 10 to 24 and iii) inclusion of the changes in the detailed design of the project and updating the EMP and EMoP accordingly.

5. Plenary discussions on SUEA

Mr. Teddy Bonaya from the Ministry of Interior and Coordination of National Government noted that the President gave a directive on tree planting across the country and thus requested the Consultant to recommend to both the KPA and Nippon Koei Co., Limited to initiate tree planting in Likoni area. Mr. Bonaya added that Likoni area has been sidelined in mangrove replanting activities. He highlighted that they looking forward to collaborating with the consultant during the implementation of SUEA especially with regards to community level meeting and sensitization.

In response to the issue of tree planting directive by the President, Mr. Mohammed Hassan from KPA stated that they participated during the Mombasa County Launch by providing 1000 seedlings and planting is still ongoing. Mr. Hassan highlighted that between 2019 and 2022 they have planted over 40,000 seedlings in Jomvu and they are working with Community Based Organizations (CBOs) to grow them. He added that the stakeholders should seize the opportunity provided by the SUEA process to recommend areas in Likoni where mangrove planting can be carried out during the Port and Road construction.

Major Ernest Ndirangu from the Kenya Navy wanted to know the extent of the Port components within the Kilindini Channel. In response, Mr. Simon Nzuki from Envassess Environmental Consultants Limited presented a map showing the layout of the Port components within the Kilindini Channel relative to Kenya Navy.

Mr. Fredrick Hiribae from the Kenya National Highways Authority (KENHA) sought clarification on the variation for sources of construction materials from Jaribuni to include Kokotoni quarry instead of liberalizing the market. Mr. Hiribae was also keen to know whether the 12Km access road within the Special Economic Zone (SEZ) had been factored in the SUEA. He added that 5Km had already been constructed and requested KPA to consult with the Nippon Koei Co. Limited on the same and provide feedback at institutional level.

In response to the issue of sourcing construction materials, Mr. Nzuki noted that the information on variation of the project scope and design has been provided by Nippon Koei Co., Limited and is probably based on other information that may not be apparent in the shared documents. On the issue of the 12 Km access road, Mr. Hassan from KPA stated that it's not included in the SUEA process and further consultations will be done.

Mr. John Orina from the Mombasa Kilindini Community Forest Association (MOKICFA) was keen to know where the dredged materials from the Port development will be dumped. He was also concerned about the formula used in determining the number of mangroves that will be planted to compensate for the 14 ha loss and whether Kenya Forest Service will be involved in the process.

On the issue of dredged materials during construction phase, Mr. Nzuki informed the meeting that it was extensively covered during the EIA study and the SUEA will only update the change in scope which potentially includes increased dredged material quantity due to the change in turning basin and quay depth. In response to number of mangroves to be planted, Mr. Nzuki stated that MOKICFA are part of the target participants during the community level meeting where they will have an opportunity to provide recommendations on the number of mangroves and areas to be replanted to compensate for the loss occasioned by the Port development. He further noted that KFS is a key stakeholder in the SUEA process and will be involved in all mangrove restoration initiatives by the project.

Mr. Eric Thurania from Kenya Fisheries Service (KeFS) stated that some of the impacts of the project are long-term and will affect the fisheries and marine biodiversity and thus the consultant should come up with long-term recommendations to address the impacts. In response, Mr. Nzuki informed the meeting that KPA in collaboration with JICA carried out a Fisheries Survey targeting the project area from March 2021 to March 2022. He noted that the survey was carried out to update the Livelihood Restoration Plan prepared in 2019 and meant to address the socio-economic impact of the project on local fishermen.

Ms. Mercy Mghanga from the Mombasa Beach Management Network informed the meeting that the community is still raising grievances on issues of compensation with respect to the Mombasa SEZ. She informed the meeting that there was need to comprehensively sensitize the local community on how compensation was being calculated and implemented to avoid conflicts. In response, Mr. Nzuki noted that compensation was being carried out at various levels including the Resettlement of Project Affected Persons (PAPs) in Dongo Kundu and the Beach Management Units affected by dredging and dumping. He further noted that the objective of the SUEA is to update the EIA study carried out in 2019 where issues of compensation were discussed with the local community. Mr. Hassan from KPA stated that there are previous studies carried out within the project area which considered all the PAPs and BMUs.

6. Role of stakeholders in the SUEA process

Mr. Nzuki invited the stakeholders to provide recommendations on their anticipated roles during the SUEA process based on the presentation and plenary discussions (Table 1).

Table 15: Role of stakeholders in the SUEA process (Source: Kick off meeting, February 2023).

Name of stakeholder	Role in SUEA
Ms. Mercy Mghanga <i>Mombasa BMU Network</i>	• Mobilization of BMUs for the community level meeting • Information on BMUs and impact of project on natural resources • Procedures on restoration and compensation (Awareness on compensation, benefits and advocacy on Port Projects, role of KPA and communities and the community support for government projects)
Ms. Mainga Brigid <i>Kenya National Highways Authority</i>	• Information and awareness on traffic • The recommended axle limits • Road safety awareness and accident/incidents prevention
Mr. John Orina <i>Mombasa and Kilindini CFA</i>	• Information on mangroves and terrestrial biodiversity • Awareness and community mobilization for SUEA meetings • Identification of degraded sites for restoration and any other tasks

Name of stakeholder	Role in SUEA
Mr. Erick Thurania <i>Kenya Fisheries Service</i>	Data and information on Fisheries at the area, catch, BMU numbers
Major Ernest Ndirangu <i>Kenya Navy</i>	Collaborating with KPA on navigation and maritime safety
Mr. Teddy Bonaya <i>Ministry of Interior and Coordination of National Government</i>	- Security and coordination role during community level meetings - Advocacy through public barazas to ensure local communities are sensitized on the project
Mr. Jackson Kiplagat <i>National Environment Management Authority</i>	- Review of the SUEA as per EMCA mandate - Decision making on the SUEA and EIA Licence variation
Mr. Mohamed Hassan <i>Kenya Ports Authority</i>	- Ensure SUEA TORs are adhered to by the consultant in collaboration with Nippon Koei, Co. Limited - Ensure extensive stakeholder engagement - Ensure all comments from stakeholders are incorporated in SUEA
Mr. Simon Nzuki <i>Envasses Environmental Consultants Limited</i>	Implementing SUEA in collaboration with the stakeholders and in accordance with the TORs by Nippon Koei, Co. Limited

7. Way forward and AOB

Mr. Nzuki informed the meeting that the next steps will involve preparation of the proceedings and submission to KPA and Nippon Koei, Co. Limited, data collection and analysis and further stakeholder engagement meetings. He further informed the meeting that the dates for the three remaining stakeholder engagement meetings will be as shown in Table 2 below.

Table 16: Schedule of the three remaining stakeholder engagement meetings for SUEA (Shaded in blue).

SHM No.	Purpose of meeting	Proposed date
1	Kick off	Monday, 13 th February 2023
2	Community sensitization and feedback on SUEA	Monday, 27 th February 2023
3	Review of draft SUEA	Tuesday, 7 th March 2023
4	Validation of SUEA	Wednesday, 15 th March 2023

The meeting ended at 1:00pm with a word of prayer from Eng. Fredrick Hiribae.

Signed: _____ Date: _____

Ms. Cynthia Nduta
Envasses Environmental Consultants Limited
Meeting Secretary



Annexure 1: List of kick off meeting participants



SUPPLEMENTARY ENVIRONMENTAL ASSESSMENT (SUEA) STUDY FOR THE PORT AND ROAD DEVELOPMENT OF MOMBASA
SPECIAL ECONOMIC ZONE (SEZ).

STAKEHOLDER KICK OFF MEETING

Date: 13th February 2023

Venue: Royal Court Hotel, Mombasa

List of participants, contact details and signatures

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGNATURE
1.	JOHN KENIA NYAMWAYA	MORI CFA MOMBASA KILINDINI CFA	nyamwaya07@gmail.com 0727103599	
2.	FREDRICK KIRIBAE	KENYA - Coast Region 0728064442	Fredrick.9913@gmail.com 0700931528	
3.	ERIC TATVANIPA	KENYA FUTURE SERVICES	tsutanipanaeric@gmail.com 0926162499	
4.	JONEST NDIRANGU	KENYA NAVY	kenyanavy@gmail.com 0722369747	
5.	Mohamed A Hassan	Kenya Ports Authority	0720323185	
6.	MERCY W. MATHANGA	Bnu Network CHAIR	MercyW.Mathanga@bnu.ac.ke 0718651100	
7.	MAINGA BRIGID	KENYA COAST REGION	maingabrigid@gmail.com	
8.	James Nzeki	Envassess Ltd	info@envassess.org	

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGNATURE
9.	Jeddy B. Bonaya	Antarior	0720751933	
10.	Douglas Nandwa	Mwakiindini CFA	0728166393	
11.	Jackson Kipliga	Mwaka-mwaka	0726294539	
12.	Anthony Nduta	Envaseses Ltd	0759868840	
13.	Rhoda Nuhus	Envaseses Ltd	0726721393	
14.				
15.				
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26.				

Annexure 8: Proceedings of the Community Level Meeting held on 27th February 2023 at Shika Adabu Chief's Hall, Mombasa.



Supplementary Environmental Assessment Study (SUEA) for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).

Proceedings of the Community Level meeting held on 27th February 2023 at Shika Adabu Chief's Hall, Mombasa.

Prepared by:	Client
Envasses Environmental Consultants Limited, P.O. Box 2013-80100, Mombasa, Kenya.	Nippon Koei Co., Limited, 5-4 kojimachi Chiyoda-ku, Tokyo 102-8539, Japan.

1. Meeting Agenda

The community level meeting is the second stakeholder engagement forum to provide input to the Supplementary Environment Assessment Study (SUEA) for the Port and Road Development of Mombasa Special Economic Zone. The agenda of the meeting was as follows;

1. Prayer and introductions
2. Opening remarks – Kenya Ports Authority, Ministry of Interior and National Administration and County Government of Mombasa
3. Community Sensitization on SUEA for the Port and Road development of the Mombasa Special Economic Zone (SEZ)
4. Presentation on SUEA for Port and Road development of the Mombasa SEZ
5. Plenary discussions on SUEA
6. Way forward and AOB

2. Prayer and introductions

The meeting started with a word of prayer by Mr. Ramadhan Ali Mwadzengo and thereafter introductions. It was attended by key stakeholders and community representatives including Kenya Ports Authority (KPA), Ministry of Interior and National Administration, County Government of Mombasa, Special Economic Zone Committee, Village Elders, Youth leaders, Mombasa and Kilindini Community Forest Association (MOKICFA), Beach Management Units (BMUs) and Envasses Environmental Consultants Limited (Annexure 1).

3. Opening remarks

3.1 Kenya Ports Authority

Mr. Ramadhani Mwatumwa from Kenya Ports Authority (KPA) thanked the participants for attending the meeting. He stated that community participation in the SUEA process is important as it ensures the views and concerns of potentially effected persons and interested parties are taken into account and therefore local project support is assured. He urged everyone to be attentive and to seek clarification where necessary.

3.2 Ministry of Interior and National Administration

Mr. Teddy Bonaya, the Assistant County Commissioner – Likoni, thanked all participants for attending the meeting (Figure 1). He stated that the community views are critical towards the implementation of the proposed project which will improve the Country' Economy. He urged the community to air their views, concerns and comments on the SUEA. Having said that, Mr. Teddy declared the meeting officially opened.

He then invited Ms. Fatuma Khamisi, the Senior Chief - Mtongwe, to give her remarks. Ms. Fatuma stated that KPA should fast track the implementation of the compensation plan for the affected BMUs. Further, she stated that KPA should consider other livelihood restoration measures apart from cash compensation such as acquisition of appropriate fishing vessels and gears and training them to venture into the deeper waters. She then invited Mr. Mwishali Suleiman, the Assistant Chief – Mbuta, to give his remarks.

Mr. Mwishali thanked all participants for attending the meeting and urged them to be attentive and seek clarification where necessary.



Figure 1: Mr. Teddy Bonaya, the Assistant County Commissioner – Likoni, addressing the community members during the Community Level Meeting on 27th February 2023.

3.3 County Government of Mombasa

Mr. Bonaya, invited Ms. Patience Tabu, the Ward Administrator – Mtongwe, to give her remarks. Ms. Patience noted that the County Government of Mombasa supports the national and regional governments in development of the port to fully harness the benefits of the blue economy potential of the marine environment sustainably. Her comments were echoed by Mr. Juma Kali, the Ward Administrator – Shika Adabu.

4. Community Sensitization on Supplementary Environment Assessment (SUEA) Study for the Port and Road Development of the Mombasa Special Economic Zone (SEZ)

Mr. Omar informed the meeting that the substantive Environmental Impact Assessment for the proposed project was conducted in 2019 and a licence issued by NEMA on January 2020 valid for a period of 24 months. However, the license expired on 13th January 2022 and KPA applied for variation to extend the validity period as well as incorporate the changes in project design and scope. In response to the application, NEMA issued a letter dated 6th June 2022 requiring KPA to carry out a SUEA to address issues covering the following scope:

1. Project implementation status
2. The proposed variation
3. Current baseline information and development trends
4. Infrastructure in place to support the development
5. The area land use changes
6. Potential environmental changes and proposed mitigation measures
7. Evidence of current public consultation and stakeholder engagement

5. Presentation on the Supplementary Environment Assessment Study (SUEA) for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).

Mr. Omar discussed each of the scope required by NEMA, KPA and Nippon Koei Co., Limited

consistent with the Terms of Reference for the SUEA. The discussion focused on the methodology for carrying out the SUEA, preliminary results on mangrove and associated fauna, birds and terrestrial vegetation, and the updated Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP).

6. Plenary discussions on SUEA

Mr. Said Ali from Mkwajuni Village requested the consultant to clarify the proposed variation for the storage site of excessive soil. In response, Mr. Omar stated that in the proposed variation, the storage site of excessive soil has been shifted from the empty space inside the ramp to the land formation site planned under the Mombasa SEZ PID project.

Mr. Masudi Mohammed, the Mkupe BMU Chairman, stated that the proposed variation will impact negatively on fisheries and marine biodiversity and thus appropriate mitigation measures should be put in place to address the impacts. He further requested KPA to provide job opportunities to the affected BMUs during project implementation. His comments were supported by all the BMUs. In response, Mr. Omar informed the meeting that KPA in collaboration with JICA carried out a Fisheries Survey targeting the project area from March 2021 to March 2022. He noted that the survey was carried out to update the Livelihood Restoration Plan prepared in 2019 and meant to address the socio-economic impact of the project on local fishermen.

Mr. Feisal Abdalla, the PWD representative, pointed out that the consultant should provide copies of the SUEA report to the local community. Additionally, he wanted to know the exact location where the mangrove transplanting will take place and which Community Based Organizations (CBOs) will be involved in the exercise as per the updated EMP. His comments were echoed by Mr. Patrick Mwingo from MOKIFA.

In response to the issue of providing SUEA report to the local community, Mr. Omar informed the meeting that the report will be submitted to NEMA after which copies of the report can be obtained from their offices and website. On the issue of mangrove transplanting, Mr. Omar stated that the exact location will be identified through consultation with the local stakeholders and MOKICFA as per the updated EMP.

Mr Patrick Mwingo from MOKICFA wanted to know the exact number of mangroves that will be cleared and transplanted during project implementation. He further emphasised on the need to comply with the updated EMP and EMoP by KPA. His comments were echoed by Mr. John Nyamwaya from MOKICFA. In response, Mr. Omar stated that 14ha of mangrove will be cleared and at least 2 mangrove seedlings to be planted per cleared mangrove tree.

Ms. Mercy Mghanga, the Mombasa County BMU Network Chairman, was keen to know whether there will be monitoring of the transplanted mangroves or not. In response, Mr. Omar stated that there will be monitoring to check on growth status of the mangrove seedlings. He further elaborated that the frequency will be 4/year for the first 2 years after plantation and 2/year until settlement of seedlings is confirmed.

Mr. Issa Juma, the Mrongondoni Village Elder, inquired whether other cultural sites in the SEZ area had been taken into consideration apart from Vikadini and Mbuyuni shrine as outlined in the updated EMP for the Road Component. He further emphasized on the need to implement the recommended mitigation measures to mitigate on air pollution. In response, Mr. Omar informed

the meeting that KPA in collaboration with JICA carried out a Heritage Impact Assessment targeting the project area in 2021 and updated on the cultural sites within the area.

Mr. Hamisi Ramadhan, the SEZ Committee Chairman, requested KPA to fast track implementation of the Resettlement Action Plan (RAP) and provide employment opportunities to the locals.



Figure 2: Mr. Hamisi Ramadhan, the SEZ Committee Chairman, raising his views and concerns during the Community Level Meeting on 27th February 2023.

7. Way forward and AOB

Mr. Omar informed the meeting that the next steps will involve preparation of the proceedings incorporating the views and issues raised by the community representatives and submission to KPA and Nippon Koei, Co. Limited.

8. Closure of the meeting

There being no other business, the meeting was adjourned by the Assistant County Commissioner at 12.15pm and by a word of prayer from Mr. Bakari Salim.

Prepared by:

Signature: _____ Date:

Ms. Fridah Khamalishi

Envasses Environmental Consultants Limited

Meeting Secretary



Annexure 1: List of community level meeting participants



Supplementary Environment Assessment Study (SUEA) for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).

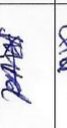
Task: Community Level Meeting

Date: 27th February 2023

Venue: Shika Adabu Chief's Hall

List of participants, contact details and signatures

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGNATURE
1.	UAD BIDU	SEZ - Committee	0700892000	
2.	RAMADHAN MUHAMMADO	SEZ Committee	0734515688	
3.	SULEIMAN SIDU TRAUFIL	V. EL-DOD-kgu Mtorque	0705494222	
4.	ALI MUKHARRABA	Religious leader	0792151408	
5.	JEFERAH WAHABWALE	V. EL DOD-kgu Mtorque	0705545024	
6.	ISSA ZAHORU Juma	V. Elner - Mtorque	0703240888	

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGNATURE
7.	SULEKATU MUAINYI KINUSKAT	KIDONGWE BMY	0713089138	
8.	Mecoy Wason Mthansa	COUNTY Bmywetoport camp	0720723185	
9.	Douglas Naudwa	Msa Kikindini CFA	0728166393	
10.	John Oline Nyamwata	MOMBASA KIKINDINI COMMUNITY FOREST ASSOCIATION	nyamwata07@gmail.com 0727103598	
11.	Patrice C. Mubinyi	"	patricemubinyi@gmail.com 0733931941	
12.	Ali NZISE MASUBI	GUYA B.M.U	0723763139	
13.	Alex RUF NDADAWA	KIKINDINI B.M.U	0792073924 ALEXNDADAWA@gmail.com	
14.	JOE MUAID, CHAKA	NBARE B.M.U	0114509381	
15.	SAID CHIRONGA JOMAA	BONJE B.M.U	0726825227	
16.	SUEDO.H. HASSAN	MUADUNIBO B.M.U	0716478774	
17.	LENY DHINYI GUCHI	BALOI-1	0786420133	
18.	KASHIKA Peter MUSA	N/ELDER-ESTATES KIBAKI	0723895884	
19.	ASTLEY LIA SONY KAMBURA	V/ELDER - DONGO - KUNDU	0713424420	
20.	HAMADI SUMA	V/ELDER - KUNDU	0718559188	
21.	BALMU MALANDI	V/ELDER - BUBU	0710643178	
22.	SHERBAN OMARI	V/ELDER - LA	0701596513	

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGNATURE
23.	Feisal O. Abdallah	Priv Reg.	0717958195	
24.	SAADAH-ADAH		0710643478	
25.	Juma KAL	WARD ADMIN SHIKO-ADAM	0754052063	
26.	Munstan Sufman	ACT. CHIEF - MUKITA	070609188	
27.	PATIENCE TABU	WARD ADMIN. MONGWE	0729513438	
28.	Teddy D. Boraya	Xc Long	0720751953	
29.	Ramadhan J. N. N. N.	KPA	0700750299	
30.	Faidah Kuanglichu	ENVASCOES Environmental Consultants Limited	0704063064	
31.	Mulus Vincent	Envascoes Environmental Consultants Limited	070506473	
32.	SAKAR Bakem	Ward Admin	0724940816	
33.	Juma OMA R.	MZL WARD ADMIN	0726503704	
34.	Ramadhan Mohamed Gamiko	Mzee Ma ngaa petuko	0715278164	
35.	KELIA TUSUF Isak.	YOUTH REP	0721263450	
36.	Michael Isuma	BMO MEMBERS	0723991600	
37.	MABELIN JUMJE Mungat	YIMBUNOI BMO VICE SECRETARY	0713291638	
38.	Juma SAKUR LAGANI	VICE CHAIRMAN	0729989118	

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGNATURE
39.	FATUMA Z. KHANUSI	INTERIOR SNR. CHIEF.	0721646279	
40.	Mwini Mkolibo	Village elder - Shika Akaba	0101949778	
41.	Hussain Mohamed Hussein	Youth leader	0748005569	
42.	Saudi Ali. CHINGODA	V. ELDER - Mkwani	0728502462	
43.	BINTALI SURISA ABDALLA	SEC COMMITTEE SEC	0790141706	
44.	Umar Said	FINANCIAL COMMITTEE CONSULTANTS LIMITED	0706784101	
45.	Mohad Mohamed	Chairman Mkupe Bmu	0724468388	
46.				
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Annexure 9: Proceedings of the Stakeholder Meeting to review and validate the draft SUEA Study Report held on 7th March 2023 at Royal Court Hotel, Mombasa.



Supplementary Environment Assessment Study for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).

PROCEEDINGS OF THE REVIEW AND VALIDATION WORKSHOP HELD ON 7TH MARCH 2023
AT ROYAL COURT HOTEL, MOMBASA.

Client	Contractor
Nippon Koei Co., Limited, 5-4 kojimachi Chiyoda-ku, Tokyo 102-8539, Japan.	Envasses Environmental Consultants Limited, P.O. Box 2013-80100, Mombasa, Kenya.

1. Meeting Agenda

The review and validation meetings are two of the four scheduled stakeholder engagement forums to provide input to the Supplementary Environment Assessment Study for the Port and Road Development of Mombasa Special Economic Zone. The agenda of the meeting was as follows;

1. Prayer and introductions
2. Opening remarks- Kenya Ports Authority
3. Presentation on the draft Supplementary Environment Assessment Study for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).
4. Plenary discussions on the draft SUEA
5. Incorporation of the key stakeholder comments in the draft SUEA Study Report
6. Validation of the Final SUEA Study Report by the stakeholders
7. Way forward and AOB

2. Prayer and introductions

The meeting started with a word of prayer by Mr. John Orina and thereafter introductions. The meeting was attended by key stakeholders including Kenya Ports Authority (KPA), Ministry of Interior and National Administration, Kenya National Highways Authority (KeNHA), Kenya Navy, Coast Water Works Development Authority (CWWDA), Coast Development Authority (CDA), Kenya Forest Service (KFS), Kenya Wildlife Service (KWS), Kenya Power and Lighting Company (KPLC), Mombasa and Kilindini Community Forest Association (MOKICFA), the Beach Management Units (BMU) Network and Envasses Environmental Consultants Limited (Annexure 1).

3. Opening remarks

Mr. Githinji of Kenya Ports Authority thanked the stakeholders for attending the meeting and, in particular, for their participation in port developments throughout the years. He stated that stakeholder engagement is fundamental in ensuring project transparency and sustainability. He further mentioned that over the years, KPA had held at least 60 meetings with stakeholders on various port development projects including the Port and Road development project of the Mombasa Special Economic Zone (SEZ). He said KPA will continue implementing globally acceptable good practice and standards to ensure sustainable development. He urged the participants to be actively involved in the review and validation of the SUEA so as to enrich the final report by the consultant.

4. Presentation on the Supplementary Environment Assessment Study for the Port and Road Development of the Mombasa Special Economic Zone (SEZ).

Ms. Rhoda Mutua and Mr. Omar Said from Envasses Environmental Consultants Limited gave a detailed presentation on the Supplementary Environment Assessment Study Report for the Port and Road Development of the Mombasa Special Economic Zone (SEZ). Ms. Mutua informed the meeting that the scope of the SUEA was based on a NEMA response letter issued in June 2022 responding to an application by KPA to extend the validity of the EIA Licence for the 2019 study. In this regard, the scope included;

- Project implementation status
- The proposed variation
- Current baseline information and development trends
- Infrastructure in place to support the development
- The area land use changes
- Potential environmental changes and proposed mitigation measures

- Evidence of current public consultation and stakeholder engagement

Ms. Mutua discussed in detail the approach and methodology for each of the above scope. Afterwards, Mr. Omar presented the findings of the SUEA for each of the seven components. The findings included; mangrove health status, mangrove distribution and species composition, bird's diversity, terrestrial vegetation, water quality, infrastructure in place to support the development, the land use changes and environmental changes and mitigation measures. In addition, Mr. Omar presented the updated Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) based on the proposed changes to the project scope and design. Further Mr. Omar discussed on public participation and stakeholder engagement meetings i.e. kick-off, community level, review of the draft report and validation.

5. Plenary discussions on the draft SUEA

Mr. Haji Massa from CWWDA stated that significant land use changes were noted between 2018 and 2022 and the final SUEA report should indicate whether the changes were positive or negative. In addition, he wanted to know why Total Suspended Solids (TSS) were not among the parameters monitored during the SUEA. He also wanted to know whether the area for mangrove transplantation had been identified or not.

In response to the issue of water quality monitoring parameters, Mr. Nzuki stated that the TORs were specific on the parameters to be monitored during the SUEA and TSS was not one of them. In addition, during the EIA Study carried out in 2019, comprehensive water quality assessment was conducted which included TSS and the Updated EMP and EMoP has provided comprehensive mitigation measures to monitor water quality status.

In response to the issue of mangrove transplantation site, Mr. Githinji stated that the site will be identified in collaboration with KFS. He reiterated that KPA has previously undertaken mangrove restoration activities to mitigate the impacts of the port development projects and support national policies on afforestation.

Mr. Teddy Bonaya, the Assistant County Commissioner – Likoni, requested the consultant to expound more on the Resettlement Action Plan, Fisheries and Heritage Impact Assessment Studies. In response, Mr. Githinji stated that the studies were undertaken as separate consultancies and detailed on resettlement, fisheries and heritage concerns within the SEZ area. In addition, he stated that all the relevant stakeholders were engaged in the preparation of the reports and their validation.

Mr. Elphas Wesonga from KFS, acknowledged that the project will lead to clearance of approximately 15ha of mangroves and the mangrove transplantation study proposes out-planting of 2 seedlings per cleared mangrove tree. However, he stated that as per the restoration policies, the transplantation ratio was low and proposed out-planting of 10,000 seedlings per hectare at the degraded areas in Dongo Kundu (1,000 ha). He further requested KPA to commence restoration activities prior to the construction of the port and road development project and deploy community scouts to monitor the out-planted mangroves.

Further, Mr. Nzuki noted that on the issue of mangrove restoration policies, the National Mangrove Ecosystem Management Plan (2017-2027) documents the stocking rate for Mombasa County as approximately 1,600 trees per ha and hence there will be need to validate on the actual number of mangroves to be replanted.

In response to commencement of restoration activities prior to construction works, Mr. Githinji stated that the restoration activities are undertaken by the project contractor as outlined in the updated EMP, and hence will not be possible to commence prior. Further, KFS should provide data and information on availability of mangroves seedlings from the local CFA for replanting activities.

Mr. Japheth Moroa from CDA, stated that consultant updated data on mangroves, birds, terrestrial vegetation, land use changes and significant changes were noted between 2018 and 2022 based on the satellite data. However, he inquired whether the consultant considered updating baseline data on gazetted forests within the SEZ area or not. In response, Mr. Githinji stated that the project occurs within the Mombasa SEZ which is owned by KPA and there are no gazetted forests.

Mr. Githinji raised a concern on the land use change map and findings especially on changes on the water body and mud flats classes between 2018 and 2022. Ms. Rhoda informed the meeting that the land use changes on water body and mud flats were mainly as a result of the differences in the tide level when both images were acquired. The changes in mangrove forest, terrestrial vegetation cover and built-up areas were attributed to the construction of the Mombasa Southern bypass and the CCCC pipeline marshaling yard, logging and increase in human settlements. Variations in bare land were attributed to the seasonality of farming activities and weather patterns. In response to the explanation, Mr. Githinji recommended that a column be added to the table on land use changes with the comments and a brief explanation provided in the SUEA report.

Mr. Kenneth Mosop from KPA stated that there will be no land purchase in RAP as indicated in the Updated EMP and EMoP and instead the PAPs will be provided with land inside the Mombasa SEZ and this change should be reflected in the report. Mr. John Orina from MOKICFA stated that the consultant should include a management and monitoring plan for the *Lannea schaefferi* var. *acutifolia* (IUCN: NT). In response, Mr. Nzuki stated that this will be incorporated in the final SUEA report.

Mr. Salim Makomba from KWS stated that KPA will need authorization from KWS for use of drones in monitoring of sediment plumes and monitoring of biological communities within the Marine Protected Areas (MPAs). Mr. Kenneth Mosop in response noted that KPA will engage KWS in monitoring activities and will also seek authorization for use of drones in monitoring from Kenya Civil Aviation Authority and Kenya Defense Forces.

6. Incorporation of the key stakeholder comments in the draft SUEA Study Report

Following the end of the plenary session, the consultant team reviewed the SUEA report incorporating stakeholder comments to produce an updated SUEA report.

7. Validation of the Final SUEA Study Report by the stakeholders

Mr. Nzuki presented the final SUEA report to the stakeholders which was in turn validated.

8. Way forward and AOB

Mr. Nzuki informed the meeting that the next steps will involve submission of the validated report to KPA and Nippon Koei, Co. Limited for verification. He further noted that thereafter the final report would be submitted to NEMA for decision making on the variation of the EIA Licence.

Mr. Kenneth Mossop of KPA, thanked the participants for attending the meeting.

Mr. Japheth Moroa of Coast Water Works Development Authority sought to understand whether the consultant had covered all the issues required by NEMA via their letter dated 6th June 2022.

SUEA. Mr. Nzuki stated that the SUEA report has incorporated all the issues as covered in the TORs.

Mr. Wesonga of KFS asked whether the consultant had incorporated the deployment of at least five scouts within the monitoring plan. Mr. Nzuki responded by stating that the monitoring plan provides for capacity building of various stakeholders who will be involved through the monitoring process.

The meeting ended at 4:40pm with a word of prayer from Ms. Brigid Mainga.

Signed: _____ Date: _____

Ms. Cynthia Nduta
Envasses Environmental Consultants Limited
Meeting Secretary



Annexure 1: List of stakeholder meeting to review and validate the Draft SUEA report participants



ENVASSES
ENVIRONMENTAL
CONSULTANTS
LIMITED

SUPPLEMENTARY ENVIRONMENTAL ASSESSMENT (SUEA) STUDY FOR THE PORT AND ROAD DEVELOPMENT OF MOMBASA
SPECIAL ECONOMIC ZONE (SEZ).

STAKEHOLDER MEETING TO REVIEW AND VALIDATE THE DRAFT SUEA

Date: 7th March 2023

Venue: Royal Court Hotel, Mombasa

List of participants, contact details and signatures

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGNATURE
1.	MWATWEZ KOMBOMAYWE	Tudor/Shimani, B.M.U	0705810163	
2.	JOHN GUYA AGINGA	Tudor/Shimani, B.M.U	0797991228	
3.	JOSEPH MUNDLE	Maring B.M.U	0757838626	
4.	EUPHAF WECONGA	KFS	0712935205	
5.	OLIVER NGIRIE MURARO	KENYA NAVY	0712183077	
6.	JOHN O. NYAMWAYA	MDK/ICFA	0727103599	
7.	Haji MAISA	CWDA	0722379703	
8.	HOPE MAKARO	CWDA	0720714708	

NO.	NAME	AFFILIATION	TELEPHONE NO/EMAIL	SIGNATURE
9.	Mwangi Mbayo	Kenya Power	0710667129 0775642242	
10.	SACINI MUKOMBA	IKWS	0720272864	
11.	Douglas Nardwa	MSA - Kilindini CFA	0728 166 393	
12.	Japhet Mwangi	Coast Development Authority (CDA)	0708 553 749	
13.	Jackly B. Bwaga	Interior	0720751933	
14.	Simon Nzuki	Envases Ltd	0722347155	
15.	MATILDA NGEENE	KENHA - Coast Region	0720526534	
16.	Ramadhani Mwirimwa	KPA	0700750299	
17.	MAINGA BRIGD	KENHA - Region	0718651400	
18.	Kenneth Ndosop	KPA - Projects	072187965	
19.	DANIELA M. GITHIAS	KPA - Envt.	0721897725	
20.	Rhoda Njiru	Envases Limited	0726721943	
21.	Omar Said	Envases Limited	0706784101	
22.	Cynthia Nduta	Envases Limited	0759868840	
23.	Prof. Bernard Fubanda	Envases Limited	0707705250	
24.				
25.				
26.				

Annexure 10: Copy of the NEMA practicing license for the Firm, Envasses Environmental Consultants Limited.



FORM 7

(r.15(2))

**NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY(NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING
LICENSE**

License No : NEMA/EIA/ERPL/18513

Application Reference No: NEMA/EIA/EL/24308

M/S Envasses Environmental Consultants Ltd
(individual or firm) of address
P.O. Box 2013 - 80100 Mombasa

is licensed to practice in the
capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts**
registration number **6175**

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

Issued Date: 1/12/2023

Expiry Date: 12/31/2023

Signature.....

(Seal)

Director General

The National Environment Management Authority

P.T.O.



Annexure 11: Copy of the NEMA practicing license for Lead Expert, Mr. Simon Nzuki.



nema
mazingira yetu | uhai wetu | wajibu wetu

FORM 7

(r.15(2))

**NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY(NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING
LICENSE**

License No : NEMA/EIA/ERPL/18514

Application Reference No: NEMA/EIA/EL/24309

M/S **Simon Kioko Nzuki**
(individual or firm) of address
P.O. Box 2013 - 80100 Mombasa

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

registration number **1350**

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

Issued Date: 1/12/2023

Expiry Date: 12/31/2023

Signature.....

(Seal)

Director General
The National Environment Management Authority

P.T.O.



ISO 9001:2015 Certified